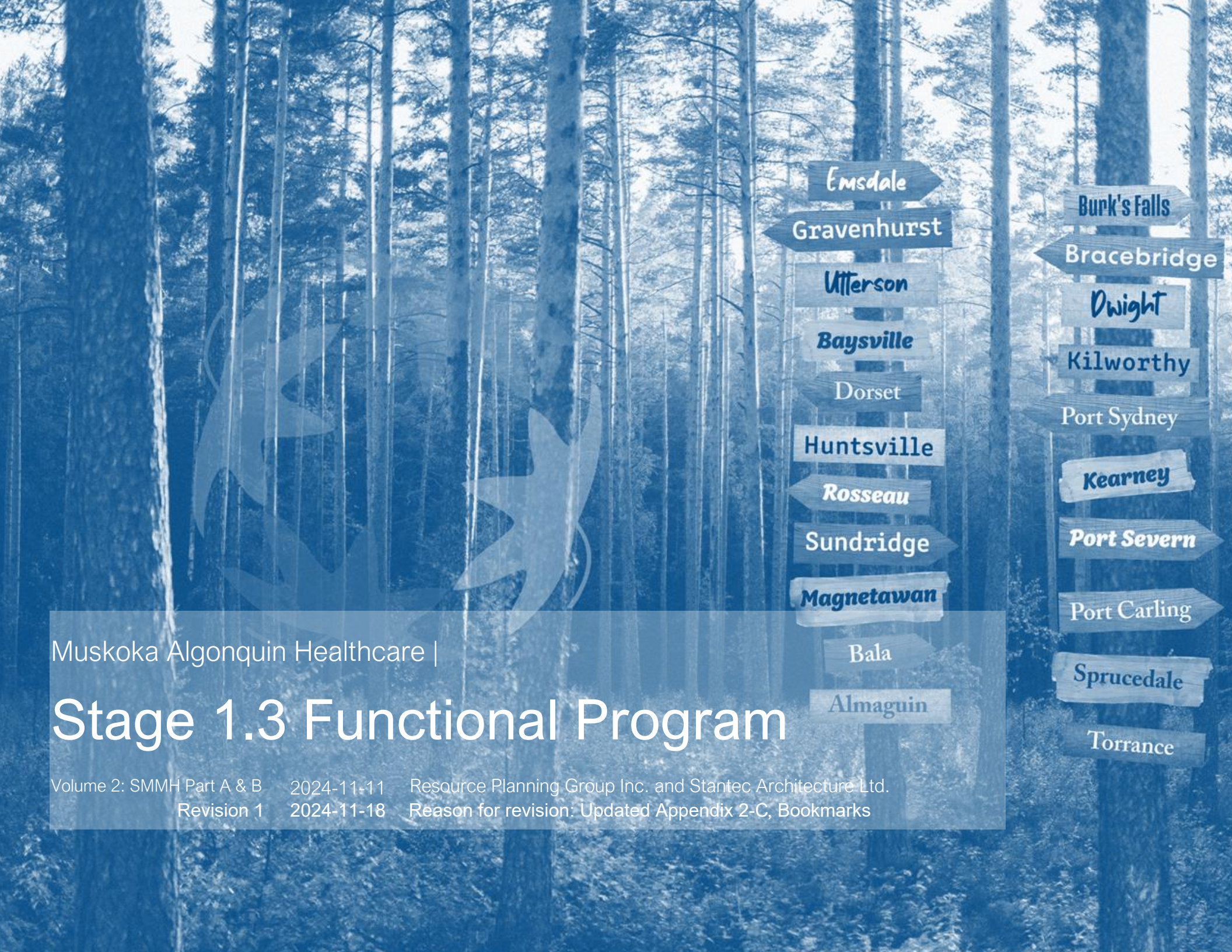

Muskoka Algonquin Healthcare |

Stage 1.3 Functional Program

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Part A Elements

1.3.2 FUNCTIONAL PROGRAM

1.3.2.1 SUMMARY

Overview

This document contains the Part A and Part B for the SMMH site of the MAHC redevelopment. Further details on the overall project can be found in Volume 1: Corporate Overview.

Summary Tables (Workload & Space)

The following summary tables include projections for the year 2031/32 at SMMH. The year 2019/20 was used as a basis for workload projections, whereas staffing projections utilize 2022/32 as the current state.

The range of services at SMMH is outlined in the following inpatient bed table as well as a workload table of key clinical support services.

Table 1. Workload Summary (Base and Projected)

Program/Service	Base Year 2019/20	Projected 2031/32
Inpatient Beds	**65**	**46**
Medical/Surgical	46	41
Critical Care	3	4
Maternal/Newborn	1	1
Reactivation & Complex Medical Management	15	-
Integrated Stroke Unit	-	-
Emergency Department	**21,644**	**24,299**
Surgical Services	**3,402**	**9,515**
Inpatient	397	225
Day Surgery	657	1,154
Cataracts	-	1,052
Endoscopies	2,348	5,316
Urology Procedures		1,768
Ambulatory Care	**21,517**	**33,876**
Chemotherapy	2,783	3,667
Chronic Disease Management Clinic	4,135	6,011
Cardiac (Pacemaker)	632	936
Fracture Clinic	1,313	1,707
Medical Day Care (Infusion Clinic)	4,187	6,996
Mental Health Clinic	-	400
Nutritional Counselling	414	828
OTN (Ontario Telemedicine Clinic)	4,326	8,800
Plastic Surgery	208	263
Specialist Visits	700	700
Surgical	2,819	3,568
Laboratory Services	**1,111,838**	**1,441,579**
Core Lab: Clinical Chemistry	232,457	271,142
Core Lab: Clinical Haematology	91,125	106,019
Core Lab: Clinical Microbiology	4,258	5,035
Core Lab: Clinical Cytopathology	-	23,987
Core Lab: Pre & Post Analysis	313,417	366,273
Core Lab: Transfusion Medicine	12,256	12,210
Core Lab: Pathology/Histology	458,325	656,913
Diagnostics	**37,742**	**103,058**
Radiography	17,550	38,411
Mammography	3,296	10,527
Ultrasound	7,947	22,987
Nuclear Medicine	-	2,557
CT scan	6,597	19,212
BMD	-	1,936

Program/Service	Base Year 2019/20	Projected 2031/32
MRI	-	-
Cardiac & Respiratory Diagnostics	2,352	7,428

Early calculations of the staffing complement at SMMH result in the following change in the full-time equivalents.

Table 2. MAHC Staffing Projections

	2022/23 FTE	2031/32 FTE
SMMH	269.21	519.35

Space projections have been developed using a combination of guidelines and standards including RPG space standards, CSA Z8000-11/18, and Ministry of Health Capital Bulletin Space Benchmarks (2011-2018).

The following table summarizes the component gross square feet for the SMMH site.

Table 3. Planned Space Summary

	SMMH 2024 Functional Program (cgsf)
Total	123,510
Acute Inpatient Unit	32,255
Administrative Services	8,090
Ambulatory	8,140
Diagnostics (incl. cardiorespiratory)	14,760
Emergency Department	13,040
Facilities Support Services	7,895
Food & Nutrition Services	3,375
Laboratory Services	4,170
Main Lobby	4,985
Pharmacy	2,040
Physician & Staff Amenities	3,190
Surgical Services & MDRD	21,570

1.3.2.1.1 DEFINITION OF SPECIAL TERMS

A number of terms are used throughout the document that is specific to functional programming. They are defined here, and their acronyms identified to facilitate reading of the document. A full list of all the abbreviations used within this document is located in ***Appendix A***.

Component or Functional Component – A cohesive grouping of activities or spaces related by service or physical arrangement. In the context of a Functional Program, a component may or may not be a department since the term "department" refers to an administrative organization rather than a functional organization of spaces and activities.

Component Gross Square Feet (CGSF) – That portion of a building assigned to a specific component, including net areas, internal circulation, partitions, building structure, and small mechanical shafts. Component gross area is measured to the inside face of exterior walls and to the centre line of partitions adjoining other components or general circulation space.

Component Gross Square Metre (CGSM) – That portion of a building assigned to a specific component/department but including only the net assignable areas. The internal circulation, partitions, building structure and small plumbing shafts are not included in this measurement.

Full-Time Equivalent (FTE) – A term used to express the conversion of a number of annual paid hours into the number of individuals who, if they were working a complete shift on a regularly scheduled basis, would be required to accommodate that number of hours.

Headcount – The translation of FTEs into the actual daily capacity (as noted), and/or translation of FTEs into the headcount.

Internal Circulation – The system of connecting links (corridors, elevators, stairs, etc.) within components, connecting rooms of a component or directly connecting contiguous components.

Net Area or Net Square Feet (NSF)/Net Square Metres (NSM) – The horizontal area of space assigned to a specific function. Net areas are measured to the inside face of wall surfaces. Spaces such as corridors, unprogrammed or unassigned storage, mechanical and electrical service closets, and other areas that are determined as a result of design are not considered assignable net areas.

Net to Gross Ratio – A factor that is applied to the nsf to yield the CGSF. These factors vary depending on the service area and function.

1.3.2.1.2 METHODS USED TO DEFINE THE PROJECTED WORKLOAD

This section describes how the projections of MAHC's future health services were developed. The forecasting exercise linked population health-based and operational efficiency analysis with the consultative process and MAHC's strategic directions. The resulting projections aim to match the amount and mix of MAHC's services to the needs of its populations, incorporating expected care model improvements across the system of care.

The methods were designed to incorporate the following factors:

- Growth and aging of the MAHC catchment populations
- Expectations for further reductions in acute and ALC lengths of stay
- Opportunities for admission avoidance in new care models that emphasize care coordination, ambulatory and community-based care, and population health management
- MAHC's optimal role in the future regional system of care

1.3.2.2 PROGRAM

See individual components for 1.3.2.2.1-1.3.2.2.5

1.3.2.2.1 DESCRIPTION OF CURRENT AND PROJECTED PROGRAMMING BY TYPE

1.3.2.2.2 FUNCTIONS (CURRENT AND PROJECTED BY TYPE)

1.3.2.2.3 PROCEDURES (CURRENT AND PROJECTED BY TYPE)

1.3.2.2.4 PROJECTED WORKLOAD (CURRENT AND PROJECTED BY TYPE)

1.3.2.2.5 PROJECTED STAFFING (CURRENT AND PROJECTED BY TYPE)

Program Components

01. Ambulatory Services

Functional Description (Current and Projected)

Service Overview

The vision for Muskoka Algonquin Healthcare (MAHC) Ambulatory Care is to provide client-centred care, closer to home, utilizing facilities and partnerships in the local communities to improve access to services. The Burk's Falls location is an excellent example of this approach. As members of the Muskoka Area Ontario Health Team (MAOHT), MAHC has an important role to play in providing Ambulatory Services that support primary care providers and complement Public Health's work. This is currently working very effectively with local Family Health Teams (FHT). MAHC continues to plan with the MAOHT to streamline activities and optimize management of care across the region. This approach will only expand as MAHC finds opportunities to deliver Ambulatory Services in the community and through existing and new relationships. Together with MAHC's partners, Ambulatory Services can improve patient outcomes, better population health and ensure an integrated approach to care.

Chronic disease management is an important service to lower morbidity and mortality rates. In partnership with MAOHT, MAHC is home to the Heart Failure Clinic and anticipates its expansion as well as new clinics to support patients with Chronic Obstructive Pulmonary Disease (COPD) and individuals at risk of stroke. In keeping with the philosophy of care closer to home, it is anticipated that chronic disease services will shift into the community, ideally to satellite locations, and with MAHC's participation and support.

The hospital's Ambulatory Care will focus on regional programs and supporting the flow of patients out of the Emergency Department (ED) and inpatient units, enabling more timely transitions back home, and avoiding admission or readmission. Medical Daycare services will expand at South Muskoka Memorial Hospital (SMMH). The hospital will capitalize on the availability of visiting specialists to SMMH to operate clinics with their support. Surgical patients with high complexity will be cared for at the hospital, and internal medicine will also utilize Ambulatory Care to assist with hard-to-treat refractory medical conditions.

Current hospital Ambulatory Services work in a decentralized manner. They are located at the inpatient units and are not easily accessible from the main entrance and parking. The new MAHC Ambulatory Care services at SMMH will be a consolidated, client-centred approach to serving outpatients in a clinic environment with standardized room types, creating flexibility to address a wide range of services and disciplines.

Outpatient Rehabilitation Services also work effectively in the community when resources are available. There are currently no local communities of practice. MAHC Nutritional Counselling will continue to be available in the community, and the provision of Physiotherapy (PT) services in Burk's Falls is a model that MAHC would like to expand. MAHC will continue to address its commitments to provide bundled services locally, of which outpatient rehabilitation is an important component. Following the lead of other hospitals, MAHC will implement group programs for many of these post-surgery patients. Pre-surgery groups, which include the patient's informal caregiver(s) have

also been found to improve outcomes and expedite recovery. These services will be explored for implementation within the community.

Planning Principles and Assumptions

- Allied Health's participation in Ambulatory Care will increase in accordance with the greater emphasis on complex cases, in particular, the Registered Dietitian, Social Worker and Clinical Pharmacists.
- Fracture Clinic will be operated by Ambulatory Care rather than ED.
- Cancer care is evolving, and cancer patients will receive more non-chemotherapy infusions such as iron, magnesium, potassium. Chemotherapy will be delivered at SMMH.
- Outpatient Rehabilitation will be accommodated within the community.
- The clinic environment will have standardized room types, creating flexibility to address a wide range of services and disciplines.
- Ambulatory Care will share a common Reception, Waiting Area and select support spaces.
- Special procedures will be completed within the Exam/Consult Rooms and specialized equipment will be stored to facilitate these activities, e.g., pacemaker follow-up clinic, minor surgical procedures.
- Remote monitoring technologies will be further introduced.
- Virtual care will be maximized for patient convenience.
- MAHC sees value in developing home infusion capabilities through HCC and/or advanced care paramedics and will explore this model.
- MAHC will continue to advocate to address gaps in current service, including Mental Health and Eating Disorders, for programming and follow-up closer to home, and to lessen the burden on regional partners and the MAHC ED.

Patient Profile

The range of patients accessing MAHC Ambulatory Care will be broad, from children to adults and the elderly. Plans are to care for multi-morbid and high-risk patients while the less complex will be cared for in the community.

Scope of Services (Current and Projected)

The main objective of the Ambulatory Clinics is to support consultations, interventions, diagnostic exams and follow-up, as a complement to community services, focusing on complex and high-risk patients. Clinics will evolve to support early discharge of patients, avoid admission, and provide relief to the ED and related follow-up care. Two or more conditions result in challenges such as balancing medications and require a comprehensive, multidisciplinary approach to care.

The following clinics are anticipated at opening:

- Visiting specialists/locums work at MAHC on a regular basis to provide care closer to home and prevent exacerbation of symptoms requiring admission or transfer to a regional centre. Specialties include Plastic Surgery, Ears, Nose and Throat (ENT), Orthopaedics and Gynaecology. The work of these specialists involves both consultations and procedures that could be performed in an Ambulatory Care setting, freeing up procedure rooms for more complex day surgeries. Examples include removal of lesions and lumps, paracentesis, elective cardioversions, ear cleanings, vasectomies.
- Oncology Clinic – patients suspected of requiring cancer care are initially referred by their physician to the North East Regional Cancer Centre in Sudbury or the Simcoe Muskoka Regional Cancer Centre in Barrie at the Royal Victoria Regional Health Centre (RVH). After an initial assessment with an Oncologist at one of these partner centres, systemic chemotherapy and/or ongoing supportive oncology care is provided closer to home at MAHC. Supportive care consists of nursing assessment and follow-up such as peripherally inserted central catheter (PICC) insertion and removal, PICC dressing changes, port flush, laboratory work, pump disconnect.
- Pacemaker Clinic – this busy clinic receives referrals from RVH, Southlake Regional Health Centre and Health Sciences North in Sudbury where pacemakers are implanted. The clinic is staffed by an Internist and a Cardiovascular Technologist who see patients for an initial assessment and then visits every six and 12 months. In addition, up to three patients per week rely on the clinic to evaluate unusual episodes or issues they are experiencing. The Pacemaker Clinic is currently unable to meet demand so the referral centres must retain these patients who have to travel outside of the region. Demand is expected to only increase with aging of the population and increasing medical indications for pacemakers.
- Medical Daycare/Infusion Clinic – this is a busy clinic running every weekday. These medical day activities include blood and blood products, pump disconnections, intravenous iron, biologic anti-inflammatory infusions, bladder instillations, medication infusions, antibiotics, etc. This clinic prevents some patients from having to return to the ED for follow-up treatment.
- Fracture Clinic – these prescheduled visits will include initial casting as well as follow-up visits and cast removal. Workload is anticipated to increase with the recruitment of visiting Orthopaedic Surgeons.

- Ontario Telemedicine Network (OTN) – both inpatient and outpatient visits are facilitated through OTN, improving access to care closer to home. OTN workload is highest with Orthopaedics, Psychiatry (Centre for Addiction and Mental Health [CAMH], Orillia, Penetanguishene), Chemotherapy (RVH and Sudbury), Nephrology, and to support diagnostics. OTN also supports education activities, meetings and case conferences. Currently OTN has two dedicated spaces for all patients. In future, all clinical spaces will be planned to be multipurpose and will accommodate this activity. Future expansion is anticipated to include tele-mental health services, virtual medicine, and increased home dialysis patients requiring support.

Education

Students of Northern Ontario School of Medicine (NOSM) will train in Ambulatory Care. In addition, Nurse Practitioners (NP), Nursing Students and Dietetic Interns will train in the clinics.

Research

Not applicable.

Linkages/ Partnerships

Table 1. Linkages and Partnerships

Linkages/Partnerships	Description
Family Health Teams	Primary caregivers to clinic patients, complementary services
Nurse Practitioner (NP) Clinics	Primary caregivers to clinic patients, complementary services
Hospital Partners e.g. Orillia, Barrie, Sudbury	Specialty services, referrals, virtual services, clinics
Home and Community Care	Support for clinic patients to remain at home
Community Paramedics	Help maintain and stabilize chronic disease patients in the community
Muskoka Seniors	Social supports
Alzheimer's Society	Family and patient support
CMHA	Complementary services and supports. Future mental health programs
Family Connections	Paediatric supports
Corrections Canada	Prisoners served in Ambulatory Care
MAOHT	Assistance in coordinating care, maximizing effectiveness
Geriatric Care Team	Multidisciplinary approach to serving geriatric patients
Palliative Care Team	Multidisciplinary approach to serving palliative patients
Cancer Care Ontario (CCO)	Leadership and support for chemotherapy services

Workload (Current and Projected)

Table 2. Historical and Projected Workload – Ambulatory Care Clinics

	Historical	Projected
Clinic Annual Visits	**2019/20**	**2031/32**
Total	21,517	33,876
Chemotherapy	2,783	3,667
Systemic	*1,551*	*2,077*
Pre & Post Visits	*1,232*	*1,589*
Chronic Disease Management Clinic (COPD, Diabetes, Heart Failure, Psycho-Geriatric)	4,135	6,011
Cardiac Clinic – Pacemaker Clinic	632	936
Fracture Clinic	1,313	1,707
Medical Daycare (Infusion Clinics)	4,187	6,997
Mental Health Clinic	0	400
Nutritional Counselling	414	828
OTN (Ontario Telemedicine Network)	4,326	8,800
Plastic Surgery	208	263
Specialist Visits	700	700
Surgical Clinics	2,819	3,568

Organization and Management

Ambulatory Care Services will be overseen by a Coordinator with the assistance of a Scheduling Clerk. They will report to the Director, Outpatient Services. OTN is overseen by a Manager, reporting to this Director. Management positions overlap with multiple outpatient responsibilities. Chemotherapy has a separate Manager, reporting to the same Director, Clinical Services. Management positions overlap with multiple outpatient responsibilities.

Hours of Operation

Current and future hours of operation are noted in the table below.

Table 3. Hours of Operation

	Current			Projected		
Modality	**Weekdays**	**Saturday**	**Sunday**	**Weekday**	**Saturday**	**Sunday**
Fracture Clinic	8:00am-12:00pm Tues.	Closed	Closed	Based on Orthopaedic Surgeons' availability	Closed	Closed
Medical Daycare/ Infusions	8:00am-4:00pm M-F	Closed	Closed	8:00am-4:00pm M-F	Closed	Closed
OTN	7:30am-3:30pm M-F	ED & Inpatient only	ED & Inpatient only	7:30am-3:30pm M-F	ED & Inpatient only	ED & Inpatient only
Surgical Clinics, Specialist Clinics, Other	8:00am-4:00pm every second Monday, every Thursday	Closed	Closed	Increased hours Dependent on physician schedules	Closed	Closed
Oncology Clinic	8:00am-4:00pm M-F	Closed	Closed	8:00am-4:00pm M-F	Closed	Closed
Cardiac Clinic - Pacemaker	7:30am-3:30pm Thursdays	Closed	Closed	7:30-3:30pm Tues. & Thursdays	Closed	Closed

Workflow

Referrals & Scheduling Appointments

Hospital and community physicians complete e-referrals for Ambulatory Care through the Central Waitlist Management System. This is expanding to a regional system. MAHC Central Registration contacts the patient to book an appointment. The hospital will consider offering the opportunity for self-scheduling in the future.

OTN bookings are completed by the OTN Coordinator on-site.

Chemotherapy visits are booked by the Clerk in that program. The specialist receives all of the patients' information and tests ahead of time. A consultation takes place within one of the hospital sites, using the videoconference system. Family members can support the patient by attending the consultation. A Registered Nurse (RN) also attends the consultation, for support and clarification.

Arrival, Registration and Check-in

Patients can pre-register online the night before their visit. Alternatively, they may visit Central Registration upon their arrival at the hospital. Kiosks will be available in the future at convenient locations in the hospital.

Note: Speech Language Pathology (SLP) Swallowing Studies are carried out in Diagnostic Imaging (DI) where registration takes place.

Patient Assessment & Care

The clinician escorts patients from the waiting room to the treatment or exam space. Patient assessment varies by visit type:

- Infusion patients are assessed at the treatment chair by the nurse.
- Specialty consult visits are carried out directly by the physician, potentially with NOSM students in attendance.
- OTN supports clinical service delivery with assessments, e.g., Cardiology.
- Oncology Clinic patients are assessed by the Oncology Nurse for 15-30 minutes at the start of each visit to ensure they are well enough to receive treatment on that day. This is carried out in accordance with the Regional Cancer Centre's protocols.

Ambulatory patients may be required to visit DI, Cardiorespiratory Services and/or the Laboratory for testing. Clinicians will utilize the electronic medical records (EMR) order entry module and patients can access the tests on a drop-in basis. Upon return to Ambulatory Care, patients will be seen by the clinical staff for further assessment and treatment. Their test results will be available through the EMR's results reporting module.

End of Appointment/ Follow-up

Upon completion of the appointment, the clinician will provide instructions for scheduling a follow-up appointment as appropriate. Options for rebooking include in-person with the clinician, at the Reception desk, or self-scheduling from home. Software and an online app provides instructions and follow-up for patients. It can be sent to their phones or printed and provided at the end of the visit.

Patient Changing & Preparation

The occasional patient will need to change for treatments. They can utilize a patient washroom for this purpose and lockers will be provided outside the washroom(s) for storing their belongings.

Reporting

Documentation will be completed on tablets or laptops by nursing and rehab staff. Workstations (wall-mounted) will be available at the Care Team Station and in the Exam/Consult Rooms. Workstations on wheels (WOW) are another option for clinicians.

Discharge notes will be forwarded to the referring physician.

General Support Activities

Diagnostic & Therapeutic Services

Most patients requiring DI will be ambulatory and will walk to and from the DI department unaided. If the patient is not ambulatory, DI Porter Aides will transport patients to and from DI.

Blood will be drawn by Lab staff. It will be transported to the Laboratory by staff.

Pharmaceutical Services

The Pharmacy will provide service to the rest of the hospital, as well as supply chemotherapy to the clinic. All medication and central intravenous (IV) accessories will be stored and distributed from the Medication Preparation Room within the Ambulatory Clinic. Most medication including first doses and narcotics will be maintained in automated dispensing units (ADU). Those not located within the ADU will be stored in locked cupboards or refrigerators.

The Medication Preparation Room will be acoustically private and will contain ward stock, a refrigerator dedicated to medications only, hand hygiene sink, a countertop working area with computer access, and adequate space for storage. The room will meet specifications for the safe storage and preparation of medication. To support patient safety, the work area will accommodate up to two clinical staff members with carts at one time. Medication carts must be locked in a secure space when not in use.

The Pharmacist Team will support the Care Team, reviewing patient medications and treatment plans as required. They will be available to assist with changes/substitutions and support student and patient education.

Supplies & Linen

Clean Supply Rooms will include storage systems standardized to MAHC requirements. The Clean Supply Room will be distributed within Ambulatory Care to equalize travel time to each treatment space, to as great an extent as possible. Personal protective equipment (PPE) supplies will be stored in accessible locations as needed (with additional shelving for other supplies as necessary).

Materials Management staff will monitor and replenish supplies for all Clinical Services, using a top-up system and high-density shelving. The delivery cycle will be determined by minimum and par-level stock of all products. For planning purposes, the number of monitored carts will be established with the Materials Management Team. From time to time, the Unit will exceed the daily quota of certain supplies, and they will call for the delivery of extra supplies as needed.

Linen carts will be delivered on a regular basis to Ambulatory Care and stored in the Clean Supply Room. The Clean Supply Room will also accommodate a Blanket Warmer.

Sterile instrument packs for procedures will be delivered by MDRD and stored in the Clean Supply Room.

Equipment

Stored in the patient care areas:

- Emergency carts for resuscitation. These are monitored by the nursing staff with support from Respiratory Therapy (RT) and Pharmacy to ensure supplies/medications are replenished and updated.
- A designated number of pumps, monitors, and other power equipment will be stored in a central location within the treatment area.
- Large devices on wheels e.g., ambulatory support devices, patient lifts, Blanket Warmer, treatment carts (casting, ENT, others) will be stored in designated alcoves.

Medical equipment, IV poles, commodes will be stored in an enclosed room. Carts, mobile shelves, peg boards and open floorspace will be allocated to maximize the efficiency of the area.

Access to a power bar or multiple outlets at waist height will be used to maintain or recharge any electronic equipment.

Environmental Services

Cleaning will be carried out by Environmental Services (EVS). They will utilize the Housekeeping Room provided within Ambulatory Care. Clinic staff will carry out the turnover of patient spaces and cleaning of equipment.

EVS staff on the “transport shift” will collect waste, recycling and soiled linen from the Soiled Utility Room.

Nourishment and Meals

A Nutrition Alcove will be available for staff to access ice, water and snacks to assist with patient well-being. Patients can store their own snacks in this space. Stocking and upkeep will be managed by Food Services.

Patient Transport

Nursing staff and attendants are responsible for patient transfer within the hospital. MAHC will consider the addition of porters for the future.

Administration & Staff Spaces

Each care delivery area will have a small Team Station with touchdown workstations (e.g., Oncology, Medical Day and Exam/Consults). A centralized Care Planning Room will be available to all team members and will contain a table with seating and shared workstations. These shared workstations will be available for Allied Health professionals, nursing and medical staff, students and other external partners.

Offices for the Managers will be provided.

Allocation of staff spaces will follow the corporate model.

Security Services

A closed-circuit television (CCTV) camera will be located in the Medication Preparation Room. Mobile duress buttons will be provided for staff and physicians.

Enabling Technologies

Information Systems

Clinical documentation, including orders for medications, labs and diagnostic tests will occur in MAHC's Health Information System (HIS). This system will be fully integrated to optimize patient safety, facilitate easier patient access to their health information, standardize assessment and workflows for clinicians and remove any technological barriers that prevent timely care.

Key components of the system include:

- Standardized electronic documentation to facilitate interprofessional collaboration and connections with community resources
- Computerized Provider Order Entry (CPOE) with clinical decision support
- Patient portal with access to their health information, questionnaires and e-scheduling
- Voice dictation at source
- Mobile computing
- Real-time tracking
- Electronic referrals platform
- Virtual care
- Data privacy and security.

Finally, an after-visit summary will be provided to the patient (via app or print-out); summary to include education, next appointment, follow-up directions, as well as any other prescriptions or requisitions. Patients will have the ability to access their own portal to access private health information and be part of the care plan.

Virtual Care

Treatment stations will have the capability to host remote rounds for off-site specialists to participate and view/interact with the patient and Care Team. Mobile equipment is preferred. Meeting rooms will be equipped with digital displays, video- and teleconferencing capabilities and presentation inputs to provide flexible and adaptable collaboration spaces.

Communication Systems

Planning assumes the availability of wireless technologies which will have a significant impact on communications, data recording, data retrieval, and documentation within the ED. In each treatment station there will be Wi-Fi for patient use in accessing the internet. Electronic dashboards will be utilized which can display clinical information from the HIS. Bedside terminals will provide the following capabilities and services:

- Educational content
- Electronic health record
- Hospital information
- Phone calls (softphone)
- Nurse call button
- Environmental controls, including lights and room temperature.

Staffing (Current and Projected)

Table 4. Current and Projected Staffing

	Current	Projected			
Category	**2022/23 Total FTE**	**2031/32 Total FTE**	**2031/32 Headcount/Day**	**2031/32 Headcount/Evening**	**2031/32 Headcount/Night**
Total	24.67	25.98	17		
Subtotal - Ambulatory Care	*10.99*	*22.38*	*15*	*0*	*0*
Director, Outpatient Services	1.00	1.00	1	0	0
Manager, Outpatient Services	0.60	1.00	1	0	0
Ambulatory Care Ward Clerk	0.00	4.80	2	0	0
Chemo Ward Clerk	1.30	0.00	0	0	0
Chemo Clinical Lead	1.32	1.32	1	0	0
Chemo RN	2.37	5.00	3	0	0
Infusion Clinic RN/RPN	1.00	2.40	1	0	0
Ambulatory Care Registered Dietician	0.20	1.20	1	0	0
Pacemaker Clinic	0.20	0.40	1	0	0
OTN, RN/RPN	3.00	3.36	2	0	0

	Current	Projected			
Category	**2022/23 Total FTE**	**2031/32 Total FTE**	**2031/32 Headcount/Day**	**2031/32 Headcount/Evening**	**2031/32 Headcount/Night**
Fracture Clinic Technician/Physician	0.00	0.00	0	0	0
Clinics, RN	0.00	1.90	1	0	0
Subtotal – Satellite Pharmacy	*2.00*	*3.60*	*2*	*0*	*0*
Pharmacy Technician – Infusion Clinic	1.00	2.40	1	0	0
Pharmacy Technician – Chemotherapy	1.00	1.20	1	0	0
Subtotal – Moving to Community	*11.68*	*0.00*	*0*	*0*	*0*
Diabetes Clerk	1.60	0.00	0	0	0
Diabetes Nurse Educator	2.24	0.00	0	0	0
Diabetes Dietitian	2.24	0.00	0	0	0
SASOT Secretary	1.12	0.00	0	0	0
SASOT RN	1.12	0.00	0	0	0
SASOT Social Worker	2.24	0.00	0	0	0
SASOT Occupational Therapist	1.12	0.00	0	0	0

Note:

1. Ward Clerk provides support to all Ambulatory areas, 5 days/week

Design Objectives

Locations and Adjacencies

This component should have the following adjacencies in priority order:

1. Proximate access to the ED to accommodate overflow of emergency patients if necessary.
2. Proximate access to the main entrance and patient drop-off and pick-up area.
3. Proximate access to DI.

Internal Organization

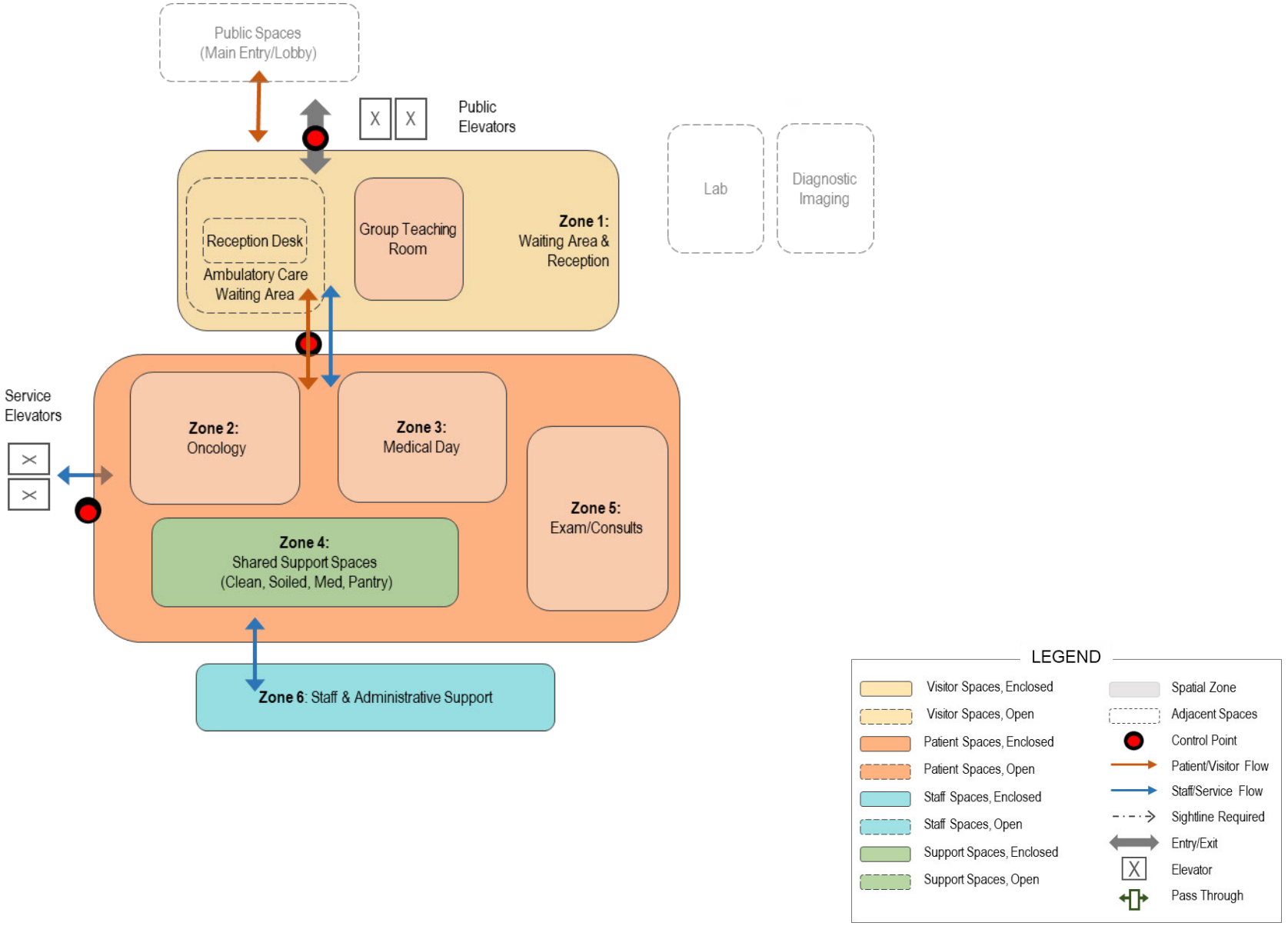
Ambulatory Care will be organized into the following zones:

1. Waiting Area & Reception
2. Oncology

3. Medical Day
4. Shared Support Spaces
5. Exam/Consultations
6. Staff & Administrative Spaces

The spatial organization should be generally as shown in the diagram on the following page. The diagram illustrates conceptual relationships only and should not be treated as an architectural design. It should only be used to emphasize and identify important adjacencies and patient/visitor flows and staff/service flows. The diagram is not to scale.

Figure 1. Functional Relationship Diagram



Special Considerations

Infection Prevention and Control

Infection Control in Ambulatory Care will be supported with:

- Treatment stations enclosed on three sides, ideally with operable glass on the sides
- Distribution of PPE in wall-mounted storage at all public entries and throughout the treatment rooms
- Subdivided waiting room to allow for separation of susceptible patients, if required.

All patient treatment spaces will have hand hygiene sinks immediately available to entering clinicians, within view of the patient. For open treatment stations a minimum of one hand hygiene sink per three patients will be provided.

Staff hand hygiene sinks will also be provided at:

- Care Team Station
- Medication Preparation Room
- Soiled Utility Room
- Clean Supply Room
- Housekeeping Room.

Important considerations include:

- Separation of clean and soiled materials
- Transportation routes for soiled materials separate from public corridors, when possible
- Containment of soiled material for transport to the disposal point
- Appropriate ventilation and pressure control to maintain containment within rooms.

Wayfinding

Access from the main entrance and drop-off/pick-up area to Ambulatory Care should be direct, easy and supplemented by effectively placed signage.

Wayfinding should be intuitive between the waiting room and the treatment areas, for entering and exiting. Treatment stations and rooms should have easily identified numbering for patient wayfinding.

All entry/exit, alarm, fire detection, fire exit plans, sprinkler systems should be labelled; signage to be well lit. Wayfinding should be designed to address the visual challenges some patients may be experiencing.

Accessibility & Corridor Design

Access to all public spaces, including washrooms and treatment spaces, must be accessible. Power door operators are required at the entrance/exit to the department and in any patient care areas. Internal corridors must be wide enough for two wheelchairs to comfortably pass each other. Wherever it is anticipated that a stretcher will be moved, the corridor must be sufficiently wide to allow for getting a stretcher in and out of the room. Corridors will not be used as places for storage. Exam/Consult Room doors must be wide enough to accommodate passage of a stretcher.

Complete access for those with physical disabilities must be planned for in Ambulatory Care areas. All spaces and circulation areas should be configured with the functional abilities/disabilities of patients in mind, including the use of all categories/types of wheelchairs. Other considerations may include:

- Motion sensor operated doors
- Lever style door hardware
- Sinks and other fixtures/equipment designed with wheelchair users in mind.

Consider the challenges of the visually impaired in addition to mobility impairments. The Canadian National Institute for the Blind (CNIB) document, *Clearing Our Path Design Needs*, is an excellent resource.

Acoustic

All walls and partitions for Exam/Consult Rooms, treatment areas, washrooms, etc. will be provided with acoustic insulation to ensure that conversations and other sounds do not leak through them.

Insulation to be provided above the ceiling tiles in the Exam/Consult Rooms for noise reduction purposes, as per OTN guidelines. Ceiling height should be no greater than 10 feet. Nine feet is the ideal height.

Air/Environmental	In consideration of the philosophy and practice of patient-centred care, the environment should be as non-institutional in appearance as possible, with a warm and welcoming décor that is pleasant and conducive to health and wellness. The environment should incorporate natural elements from the outdoors. Medical Daycare patients spend several hours receiving treatments. Access to windows is very important to their well-being. The ability to socialize and support each other has been very valuable in the current open layout and design. The partitions between treatment stations should have glass that can open between stations to allow for these types of interactions. Exam/Consult Room colours should be solid gray-blue in matte or flat finish, as per OTN guidelines.
Medical Gases	Medical gases (oxygen, air, and suction) will be provided at each patient treatment station and in the Exam/Consult Rooms. The number of outlets will be determined during the next stage of planning. The mechanical consultant will ensure that the number of outlets meets the applicable Code requirements.
Patient Privacy	Though patient privacy is achieved through staff behaviour, the physical environment can be a positive contributor. For example, placement of doors and swings of doors can impact patient privacy. The architect shall maintain vigilance during the design stage in this regard.
Lighting	Individual lighting controls are important at treatment stations and Exam/Consult Rooms, and offices. Lighting should be 4100 Kelvin CRI > 91. A moveable light source is also required, potentially hanging from the ceiling. Surgical procedure lights are required in the larger Exam/Consult Rooms.
Ergonomic Considerations	Design of all millwork and placement of electrical outlets, switches, etc. shall consider ergonomics. Occupational Health & Safety (OH&S) staff shall be consulted during detailed design in order to ensure compliance with ergonomic expectations.
Security	The design of the space should help to ensure the safety and security of all patients/family, staff, and visitors to be enhanced through the design. Visualization of the patient treatment stations from the Care Team Station(s) should be achieved to as great an extent as possible. Each patient space will be equipped with a Code Blue call button.

Codes & Standards

In addition to the above criteria, the facility must conform to recognized national, provincial, and local building codes and standards as they may relate to safety and accessibility for patients, staff, and visitors. Architects are also instructed to refer to CSA Z8000-18 Canadian Health Care Facilities.

Projected Space Requirements

Table 5. *Space Table*

			Component Gross Area (CGSF / CGSM): TOTAL: Ambulatory Care				**8,140**				**756.2**	
			Net to Gross Ratio				1.40				1.40	
			Total Net Area (NSF / NSM): Ambulatory Care				5,813				540.0	

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
			Zone 1: Waiting Area and Reception			**subtotal net area**		**998**		**subtotal net area**		**92.7**		
01	.001		Reception/Registration			138	1	138		12.8	1	12.8		
		.01	*- workstation, clerk*	*1*	*50*				*4.6*					
		.02	*- office equipment*	*1*	*50*				*4.6*					
		.03	*- circulation*	*1*	*38*				*3.5*					
01	.002		Waiting			470	1	470		43.7	1	43.7		Subdividable
		.01	*- seat, standard*	*16*	*20*				*1.9*					
		.02	*- seat, accessible/bariatric*	*5*	*30*				*2.8*					
01	.003		Washroom, Public, Accessible			60	1	60		5.6	1	5.6		
01	.004		Group Teaching Room			330	1	330		30.7	1	30.7		Provide telemedicine capability
		.01	*- seats, standard*	*10*	*25*				*2.3*					
		.02	*- storage*	*1*	*80*				*7.4*					
01	.005		left intentionally blank											
			Zone 2: Oncology			**subtotal net area**		**1,245**		**subtotal net area**		**115.7**		
01	.006		Team Station			110	1	110		10.2	1	10.2		
		.01	*- workstation, touchdown*	*3*	*30*				*2.8*					
		.02	*- printer/work area*	*1*	*20*				*1.9*					
01	.007		Patient Weigh Scale			20	1	20		1.9	1	1.9		
01	.008		Mobility Device Parking			30	1	30		2.8	1	2.8	For scooters and wheelchairs	

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
01	.009		Oncology			845	1	845		78.5	1	78.5		
		.01	*- stretcher/recliner bay, regular*	*6*	*90*				*8.4*					
		.02	*- stretcher/recliner bay, bariatric*	*1*	*110*				*10.2*					Provide ceiling track with portable lift
		.03	*- circulation @ 30%*	*1*	*195*				*18.1*					
01	.010		Hand Hygiene Station			10	3	30		0.9	3	2.8		
01	.011		Washroom, Patient, Accessible			60	1	60		5.6	1	5.6		
01	.012		Exam/Consult Room			120	1	120		11.1	1	11.1		
01	.013		Alcove, Linen Cart & Blanket Warmer			30	1	30		2.8	1	2.8		
			Zone 3: Medical Day			**subtotal net area**		**1,090**		**subtotal net area**		**101.3**		
01	.014		Team Station			110	1	110		10.2	1	10.2		
		.01	*- workstation, touchdown*	*3*	*30*				*2.8*					
		.02	*- printer/work area*	*1*	*20*				*1.9*					
01	.015		Scooter & Wheelchair Parking			30	1	30		2.8	1	2.8		
01	.016		Medical Day Clinic			830	1	830		77.1	1	77.1		
		.01	*- stretcher/recliner bay, regular*	*8*	*90*				*8.4*					
		.02	*- stretcher/recliner bay, bariatric*	*1*	*110*				*10.2*					
01	.017		Hand Hygiene Station			10	3	30		0.9	3	2.8		
01	.018		Washroom, Patient, Accessible			60	1	60		5.6	1	5.6		
01	.019		Alcove, Linen Cart & Blanket Warmer			30	1	30		2.8	1	2.8		
			Zone 4: Shared Support Spaces			**subtotal net area**		**920**		**subtotal net area**		**85.5**	**Shared with Medical Day, Oncology, Exam/Consults**	
01	.020		Medications Preparation Room			130	1	130		12.1	1	12.1		
		.01	*- ADU*	*1*	*35*				*3.3*					
		.02	*- storage tower (ADU)*	*2*	*20*				*1.9*					
		.03	*- refrigerator, single door*	*1*	*15*				*1.4*					
		.04	*- medication cart*	*2*	*10*				*0.9*					
		.05	*- counter*	*1*	*10*				*0.9*					

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
		.06	*- hand hygiene sink*	*1*	*10*				*0.9*					
01	.021		Care Planning Room			205	1	205		19.0	1	19.0	CENTRALIZED FOR ALL TO ACCESS	
		.01	*- workstation, telephone privacy*	*1*	*40*				*3.7*					
		.02	*- touchdown workstations, staff*	*3*	*30*				*2.8*					
		.03	*- small meeting table*	*1*	*75*				*7.0*					
01	.022		Nutrition Alcove			35	1	35		3.3	1	3.3		
01	.023		Clean Supply Room			120	1	120		11.1	1	11.1		
01	.024		Soiled Utility Room			130	1	130		12.1	1	12.1		
01	.025		Storage, Equipment			180	1	180		16.7	1	16.7		
		.01	*- equipment*	*1*	*140*				*13.0*					
		.02	*- alcove, stretcher*	*1*	*25*				*2.3*					
		.03	*- alcove, emergency equipment*	*1*	*15*				*1.4*					
01	.026		Housekeeping Room			120	1	120		11.1	1	11.1		
01	.027		left intentionally blank											
01	.028		left intentionally blank											
			Zone 5: Exam/Consults		**subtotal net area**			**1,200**		**subtotal net area**		**111.5**		
01	.029		Care Team Station			80	1	80		7.4	1	7.4		
		.01	*- workstation, touchdown*	*2*	*30*				*2.8*					
		.02	*- printer/work area*	*1*	*20*				*1.9*					
01	.030		Washroom, Patient, Accessible			60	1	60		5.6	1	5.6		
01	.031		Patient Weigh Scale			20	1	20		1.9	1	1.9		
01	.032		Exam/Consult Room			120	6	720		11.1	6	66.9		
01	.033		Exam/Consult Room - Specialized Equipment			140	1	140		13.0	1	13.0		Set-up for Telemedicine purposes. Partial wall behind which equipment will be stored

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
01	.034		Exam/Consult Room - Procedures			180	1	180		16.7	1	16.7	Fracture Clinic as required	Set-up for Telemedicine purposes. Contains utility sink with plaster trap
01	.035		left intentionally blank											
01	.036		left intentionally blank											
			Zone 6: Staff & Administrative Support			**subtotal net area**		**360**		**subtotal net area**		**33.4**		
01	.037		Office, Clinical Leadership/Shared			100	2	200		9.3	2	18.6		
01	.038		Washrooms, Staff			60	2	120		5.6	2	11.1		
01	.039		Lockers, Staff			2	20	40		0.2	20	3.7		Provide cube lockers

02. Acute Inpatient Unit

Functional Description (Current and Projected)

Summary

At SMMH, all inpatient services will be delivered within a total of 46 beds, including four Level 2 Intensive Care Unit (ICU), 41 Medical/Surgical beds, and one Labour, Birthing, Recovery Postpartum (LBRP). This Acute Inpatient Unit will provide assessment, treatment, follow-up, and education to support patients and families requiring an inpatient admission that is intended to have a shorter length of stay. However, there will be capacity for longer lengths of stay as necessary. Patients who need specialized services offered at Huntsville District Memorial Hospital (HDMH) (e.g., Stroke care, Level 3 ICU, Reactivation and Complex Medical Management) will be transferred when appropriate (see related HDMH components).

Service Overview

Services are delivered by an Interprofessional Team of providers delivering a broad range of Medical and Surgical inpatient services for patients requiring admission to hospital for diagnosis, observation, and treatment. Care delivery is patient- and family-centred, with the goal of delivering safe and excellent healthcare to assist in the recovery and smooth transition back home or to the community.

The Acute Inpatient Unit will allow for flexibility to respond to changes in patient census, including Medical Care, Surgical Care, Critical Care, Maternity and Newborn Care, and Paediatrics. Patients will be provided single room accommodation with attached washrooms including roll-in showers for chairs/attendant support.

Planning Principles and Assumptions

Acute Inpatient Services will be developed to support the highest standard of service delivery, service quality and patient safety. The following assumptions reflect the model of care:

- The incorporation of best practice in patient care and service delivery as a core principle
- Addition of two code compliant Airborne Isolation Rooms (AIIR) within the Unit. There will be one AIIR planned within the Critical Care grouping and another as part of the Medical/Surgical beds
- The ICU beds will be adjacent to Medical Surgical inpatient beds to allow for surge capacity and future flexibility, while maintaining easy access to the Emergency Department (ED)
- Respiratory Therapy (RT) Workroom will be adjacent to the ICU. RTs are responsible for the care of patients in different departments throughout the hospital, as well as replenishing emergency airway supplies throughout the building. RTs will continue to provide maintenance to all ventilator equipment throughout the hospital, and equipment used in the ICU and ED. The RT Workroom will allow for the storage, maintenance, and testing of equipment, and will therefore require medical gas hookups. A counter space will allow for arterial blood gas

(ABG) testing in future. The RT Workroom will contain a workstation for documentation and transfer of care, as well as storage to ensure any required supplies are readily accessible

- Ten ICU beds at HDMH will allow access to Critical Care Services Ontario (CCSO) funding for a Critical Care Resource Team. This team will support care of critically ill patients at both sites as required
- Accommodating the isolation of a group of beds in the event of an infectious outbreak in the community or in the facility is beneficial
- High quality care in an environment that supports patient comfort, safety/ security, and confidentiality through single patient rooms zoned to accommodate discrete areas for patients, staff, and family
- Family-centred care directed at the comfort and care needs of all patients especially aging adults
- Integrating technology (including virtual care) to support and enhance patient safety, information collection and retrieval, patient monitoring, and to streamline service support
- Alignment with lean workflows to minimize unnecessary travel for patients and staff
- Enable delivery of clinical training across all health-related disciplines
- The SMMH site will continue to care for prisoners from Beaver Creek Institution when required. It has been confirmed that no additional inpatient room design specifications are necessary to care for this population

Patient Profile

General Medical/Surgical cases will be cared for at SMMH. Emergency will be the primary source of admissions to the Medical inpatient beds, including referrals from physician offices who direct a patient to SMMH Emergency anticipating immediate admission. Medical repatriation from tertiary referral centres will be implemented to allow patients to recover closer to home when medically stable. Patients will arrive by ambulance/ transfer vehicles and be brought directly to the appropriate Care Unit. The Medical/Surgical inpatient beds will support Muskoka Algonquin Healthcare's (MAHC) Surgery Program, with a short inpatient length of stay. If patients need more intensive care, they will be admitted into one of the four Level 2 ICU beds.

The vast majority of patients admitted to the ICU will be adults though some patients may be as young as adolescents. The admitting diagnosis will be primarily medical in nature. The Emergency, Surgery and Medical/Surgical Inpatient Units will be the primary source of admissions to the Critical Care beds.

Patients deemed appropriate for admission to the ICU cannot be clearly identified by any single criterion. Patients most likely to benefit from care in the ICU are those with reversible or potentially reversible life threatening disorders. Patients cared for in the ICU have a variety of diagnoses and meet MAHC ICU admission criteria. Most commonly, the population in the ICU will include:

- Acute Medical or Surgical inpatients with multi-organ failure whose medical condition is uncertain and where continuous monitoring or physiologic support is required
- Acute Medical emergency patients who present with myocardial infarction
- Post cardiac/respiratory arrest patients from the ED or the Inpatient Unit
- Patients suffering from limited trauma who require continuous monitoring.

Although the Maternal/Newborn Program will primarily be based within the HDMH site, accommodation for births at SMMH with an LBRP are planned.

Scope of Services (Current and Projected)

The Acute Inpatient Unit will offer a full range of services to support successful recovery from their reason for admission. The team will oversee the delivery and monitoring of inpatient care, as well as evaluate and address change in the medical disposition of admitted patients. Admission assessments, initiation of treatment orders, monitoring and ongoing consultation with the Care Team and the patient's family fall within the rubric of care. Specific activities of this service include, but are not limited to:

- Assessment and regular monitoring/recording of vital signs
- Monitoring and initiating interventions to alleviate discomfort
- Administering medication
- Assisting with personal care
- Ongoing patient assessment in consultation with specialists, admitting physicians and other members of the Clinical Team
- Diagnostic testing
- Consultation/Referral to specialists to manage issues
- Implementing treatment plan
- Engaging appropriate clinical support including members of the Allied Health Team to assess, educate and counsel patients on the treatment plan and follow-up care
- Teaching patients and families self-management techniques and empowering them to achieve improved well-being
- Family support and education during recovery, including coordinating post discharge follow-up care plan

- Full care monitoring and support to mother/family during birth
- Managing transfer to the operating room (OR) for all caesarean sections (C-section)
- Assessment and examination of the newborn
- Interface with the Acute Care Transport Service (ACTS) Team to support optimal care for higher risk infants.

The following functions will occur in the ICU:

- Intubation and airway protection
- Respiratory support including invasive and non-invasive mechanical ventilation and high flow oxygen therapy
- Invasive and non-invasive haemodynamic monitoring and vasopressor/inotrope administration
- Close and constant observation in a high nurse-to-patient ratio environment
- Post-operative care for patients requiring specialized post-operative management

Care is delivered by a multidisciplinary team of providers that include physicians (hospitalists, family physicians, internists and general surgeons), a mixed model Nursing Team (Registered Nurses [RN] and Registered Practical Nurses [RPN]), personal support workers [PSW], Clinical Nurse Educators [CNE], pharmacists, dietitians, physiotherapists [PT], occupational therapists [OT], discharge planners, social workers [SW], speech language pathologists [SLP], respiratory therapists [RT], administrative support, spiritual care, Indigenous patient support, volunteers, and learners. In future physician assistants and hospital attendants may be introduced.

Education

The Unit will accommodate up to eight nursing students, four medical students/residents and one to two Allied Health students at any one time. It is anticipated that the Acute Inpatient Unit will continue to actively participate in telemedicine/teleconferencing events.

Research

In future, the Unit may participate in clinical research. No additional space would be required beyond shared workstations currently planned.

Linkages/ Partnerships

The most significant program linkage of the Acute Inpatient Unit will continue to be with the Critical Care Unit (ICU) and the Maternal/Newborn Unit at HDMH for the sharing of staff resources. The operational linkage with RT Services and Surgical Services is important, as are DI and the Laboratory. Given the amount and complexity of medications administered in the Acute Inpatient Unit, there will continue to be a very close program linkage with the Pharmacy.

RT is integrated into the ICU and provides support to Surgical Services as needed. RT move related equipment from their workspace to ICU inpatient rooms and to the ED.

Externally the prime linkages will be as follows:

Table 1. Linkages and Partnerships

Linkages/Partnerships	Description
Centre for Addiction and Mental Health (CAMH), Addictions Outreach	Mental Health support
MAOHT (Muskoka and Area Ontario Health Team [OHT])	System support
Family Health Team (FHT) – Breastfeeding clinics	Lactation support post discharge
Orillia Soldier's Memorial Hospital (OSMH)	Closest Level 3 ICU, Level 2 Maternal/Newborn support and care
Royal Victoria Regional Health Centre	Regional ICU Lead organization

Workload (Current and Projected)

Table 2. Historical and Projected Workload

	Historical			Projected
Department - SMMH	**2019/20**	**2020/21**	**2021/22**	**2031/32**
Total Beds	43			46
Maternal/Newborn Beds	3			1
Total SMMH births	95	86	117	
Vaginal Births	52	56	82	
C-Section	43	30	35	
Medical Surgical Beds	36			41
Critical Care Beds (level 2)	4			4
Inpatient Days	1,060	1,025	1,111	
Bed Occupancy	71.77%	66.83%	68.79%	
Ventilator Occupancy Rate	14.34%	19.04%	6.99%	
SMMH ICU Admissions	314	361	374	

Notes:

1. Sources: Discharge Abstract Database (DAD) 2012/13 - 2021/22, Statistics Canada Ministry of Finance (MoF) Population Projection Spring 2021 Release.
2. Sources: IntelliHealth DAD 2017/18 - 2020/21; MoF Population Projections Spring 2021 Release; PSG Calculations.

Operational Description

Organization and Management

There will be one Manager responsible for the overall functioning of the Acute Inpatient Unit. The ICU Manager will support ICU beds at both sites, and the Maternal Newborn Manager from HDMH will support the LBRP at SMMH.

Education will continue to be supported through a central shared CNE.

Medical oversight will be provided through a shared model (internists, general surgery, family medicine and hospitalists).

Hours of Operation

The Acute Inpatient Unit will operate continuously 24/7. Medical doctor (MD) will be on-call at all times. RT on-site 24/7.

Length of Stay

Most Medical/Surgical patients will have a LOS of up to six to seven days, with some patients staying longer as necessary. Should a patient require specialized services delivered at HDMH (e.g., Level 3 ICU, Stroke Services, Reactivation/Complex Medical Management), they will be transferred when appropriate.

Maternal/Newborn patients will have a stay of 24-48 hours.

The LOS in the ICU varies according to the type of patient. For example:

- Mechanically ventilated patients will stay in the ICU between two to seven days
- Myocardial Infarctions (MI) patients stay from 48 to 72 hours. However, 85% of MI patients are scheduled for angiography which much take place in a regional centre and may require a wait before transfer (usually within 48 hrs)
- Medically complex patients could stay from two to five days
- It is expected in the future that most stroke patients will have a minimal stay in the ICU before transfer to the Integrated Stroke Unit (24 hours)
- Surgical patients usually stabilize between 24 and 48 hours and are transferred to a Medical/Surgery Inpatient bed

- Over the last two fiscal years (2021/22, 2022/23), the average LOS in the ICU has been approximately 3.5 days.

Workflow

Admission

Emergency is the primary point of admission for most Medical and some Surgical patients. The Ward Clerk in Emergency will admit and complete documentation for all patients admitted from Emergency. Some patients will have an arranged direct admission and will be registered upon arrival to the Unit. Some Surgical patients will have a scheduled admission and will register in the Surgical Services area upon scheduled arrival. In future, technology solutions may allow for the patient or family member to self-register through their phone or a portable tablet. There will be two Ward Clerks to support the Acute Inpatient Unit.

Pregnant patients are pre-registered (generally after 20 weeks) and notify the Unit on departure for the hospital at the onset of labour (as able).

Preferred parking for Obstetrics patients will be provided as close as possible to the building's main entrance. Patients will enter at the main door and be greeted by a reception desk staff (Switchboard). If an Obstetric patient presents as clinically unstable, they will be directed to the ED. Otherwise, the patient will be directed to the Acute Inpatient Unit. Currently patients are registered at this desk, but in future, registration practices will ideally transition to the patient (self-registration or check-in) or to the bedside. As MAHC's plan for technology integration develops, this pathway will be further refined.

When an Obstetric patient presents to the ED, the triage staff will determine the most appropriate care location by conferring with the RN staff on the Acute Inpatient Unit. This will either be the Emergency or the Acute Inpatient Unit and will be dependent upon various clinical factors, such as gestational age.

In future, ICU patients will be admitted because of an unstable medical crisis at the sole discretion of the Medical Director (or designate) against a set of formalized criteria. The MRP (Most Responsible Physician) will confer as needed with other facilities in determining whether a patient is to be admitted to the ICU. Once in the ICU, the MRP may request any number of referral consultations to diagnose and treat the presenting medical condition.

Patients will usually come into the ICU by stretcher or bed from the primary sources of the ED, the Acute Inpatient Unit, or the Surgical Suite. Frequently, a patient may come to the Unit as a transfer (repatriation from a tertiary centre or a transfer from another less acute hospital).

General waiting for public/extended family will be located outside the Unit entry in the Family Lounge.

Patient Assessment

With the support of accompanying staff/family, the assigned staff nurse completes the admission assessment and documentation, and orients patient/family on patient Unit facilities and protocols.

A patient record is opened, and orders initiated as part of the initial consultation with the admitting physician or by application of a clinical pathway as available.

Patient assessment will include recording of vital signs, medication reconciliation, skin and fall assessments, and an evaluation of potential communicable infections, Peripheral Intravenous (PIV)/Central lines, drains, wounds, Confusion Assessment Method (CAM), BRADEN scores (pressure ulcers), intake and output/ fluid balance.

Patient Care

Single Bedrooms with attached washrooms/showers will be provided for all patients. Rooms will be zoned to accommodate patient care, care related activities of the Clinical Team and area for the family.

Two Airborne Infectious Isolation Rooms (AIIR) will be available for patients who require airborne isolation. They will be sized larger to also support patients with body mass index (BMI) exceeding 45. The room will be larger to accommodate the patient and care activities comfortably and will include equipment to afford the Clinical Team support to move the patient as required. There will be a Bariatric AIIR room planned within the Medical/Surgical beds and one within the four ICU beds.

A clinical care plan is developed with the entire Clinical Team as quickly as possible following admission. This plan is reviewed daily to monitor patient progress and plan discharge.

In addition to identifying and documenting vital signs, changes in physical state and monitoring pain, the Nursing Team provide psychosocial/emotional support, education and assists with dressing, bathing, and other activities of daily living (ADL), where appropriate.

Changes in state of health are monitored with the admitting physician and Clinical Team.

The Clinical Team will examine and consult with the patient daily. Ideally patient rounds will include the full Clinical Team including Allied Health professionals. Learners will generally accompany their preceptors on rounds.

Regular rounds will be held to review each patient's goals and plan for discharge. Typically rounds include 12-15 people.

Specialty consultants may be asked to assess specific issues, either remotely or on-site.

The Rehabilitation Team will actively work with patients during their admission to maintain or improve their mobility. The Rehabilitation Team has many types of supportive equipment that are used by patients and with patients in their rooms. A storage room will be planned on the Unit to ensure that equipment is not stored in corridors.

Preparation for Discharge

The Nursing Team and MRP will update the patient treatment plan following clinical rounds.

Staff nurse will provide information to the patient/family on the care plan including the planned discharge date.

The family will consult with members of the Allied Health Team including the Flow Navigator (discharge planning) to gather information to support care following discharge. Home and Community Care will be contacted early in the patient's stay if there are potential issues identified with patient safety and independence at home.

Labour and Birth

The pregnant person and partner will be admitted to the LBRP room following assessment. They will remain primarily in the room for their labour and birthing but may choose to walk the corridors during labour. The washroom will contain a tub for the mother to labour in, if desired. Additional labour support items (e.g., birthing ball) may be used and will be stored in the LBRP room.

Should a second labouring person present, when the LBRP room is occupied, that patient can labour in a single Medical/Surgical inpatient room in the Acute Inpatient Unit.

Diagnostic reports are returned and reviewed by Clinical Team.

The Delivery Team will transfer the mother from the LBRP to the OR for a C-section when indicated.

The birthing room will have an area for resuscitation and a complete post-delivery exam of the infant.

C-Sections/Recovery

Where possible, elective C-sections will be scheduled at HDMH.

When an emergency C-section is indicated, Surgical Services will be notified. A Category I (CodeOB) or Category 2 will be called and the next available OR will be cleared. This protocol will also clear the designated room included in Post Anaesthesia Unit (PACU). The mother is prepared as needed and transferred to the OR with the Maternal Newborn RN and team. The partner will change into scrubs in the inpatient room and wait for the Surgical Team to collect them when ready.

There should be space in the OR area to store an infant warmer, neonatal crash cart, neonatal vital signs monitor, and fetal monitor to be used for C-sections. This will avoid having to transfer these pieces of equipment during emergencies.

Additional support to manage newborn distress may be ordered by the physician at any point during delivery (e.g., Registered Respiratory Therapist [RRT]).

The newborn is generally examined immediately following delivery by the Newborn Team: MRP (Obstetrics [OB] MD or Registered Midwife [RM]) and RRT. Mother/family are transferred to the designated space in PACU for recovery and maintaining mother/newborn dyad together is a priority of the model of care. An infant warmer will be available if skin-to-skin contact is limited. The Maternal Newborn RN will continue to care for the newborn and the OR RN will support the mother's recovery until transfer back to the Acute Inpatient Unit.

General Support Activities

Allied Health Team

The Acute Inpatient Unit require support from a variety of central Allied Health resources, including dietitian, SLP, palliative care, SW, PT, and OT.

Diagnostic & Therapeutic Services

In addition to the patient monitors, portable x-rays, electrocardiograms (ECG) and ultrasound (U/S) will be the main DI activities on the Inpatient Unit. It is anticipated that some may also be performed in DI, including computed tomography (CT) and magnetic resonance imaging (MRI) (potentially in future).

Although all computers can access Picture Archiving Communication System (PACS) images, a dedicated PACS viewing terminal, will be required on the Unit to view radiological images in more detail when required.

Patient specimens will be transported from the Unit to the on-site Laboratory. Lab staff will pack samples that must go off-site for analysis, in preparation for daily pick-up. Test results will be available electronically.

Pharmaceutical Services

All medication and central intravenous (IV) accessories will be stored and distributed from the Medication Rooms. Most medication including first doses and narcotics will be maintained in automated dispensing units (ADU). Those not located within the ADU will be stored in locked cupboards or refrigerators.

The Medication Rooms will be acoustically private and will contain ward stock, a refrigerator dedicated to medications only, hand hygiene sink, a countertop working area with computer access, and adequate space for storage. The rooms will meet specifications for the safe storage and preparation of medication. Medication Rooms will be distributed through the Inpatient Units to balance the number of rooms with the staff assigned to each room. To support patient safety, the work area will accommodate up to two clinical staff members at one time.

The Medication Rooms will also contain locked cupboard for storage of patient-own medications (including narcotics).

Pharmacy Technicians are incorporated into the Clinical Team and conduct medication reconciliations on all new patient admissions.

Clinical Pharmacists participate in inpatient rounds when possible and consult with patients and families as required.

Clean Supply

Clean Supply Rooms will include storage systems standardized to MAHC requirements. Clean Supply Rooms will be distributed within the inpatient floor to equalize travel time to each patient room. To carefully minimize waste, there will be limited supplies stored in the patient rooms. However, personal protective equipment (PPE) supplies will be stored in an open cabinet outside each patient room (with additional shelving for other supplies as necessary).

Materials Management staff will monitor and replenish supplies for all Clinical Services, using a top-up system with high-density shelving. Staff will scan barcode labels in the Clean Supply Rooms and information will be accessed by Receiving staff. All stock requirements will be system generated based on point of use consumption. Supply orders will be automatically generated with established on-hand safety stock levels.

Linen Carts will be delivered on a regular basis to the Units. The carts will be stored in the Clean Supply Room on the Unit. The Clean Supply Rooms will also accommodate a Blanket Warmer.

Soiled Collection & Disposal

Soiled material will be collected and contained as close to 'point of care' as possible and aggregated for removal to the Soiled Utility Room. In addition, planning will contain soiled material for transport especially on elevators and provide for managing and handling hazardous or contaminated items.

Soiled Utility Rooms will be distributed to serve approximately 18 patient rooms. The Soiled Utility Room will accommodate:

- A designated area for used instruments for collection and return to Medical Device Reprocessing (MDR) (who are responsible for the cleaning, decontamination, sterilization and packaging of all procedural equipment and instruments)
- Bins/transfer carts for linen, recyclables, medical waste, and general waste will be available to collect and transfer to the loading dock for exchange by an external laundry service
- A disposal unit for liquid waste.

An alcove outside the Soiled Utility Room will be provided for a closed cart designed to collect patient meal trays.

Internal staff will continue to collect waste, recycling and dirty linen from the Unit.

Equipment Storage

Emergency carts for resuscitation and difficult airways will be available on the Unit. Carts will be monitored by nursing staff in consultation with RT.

Patient care equipment must be available, operational, and quickly retrievable when it is required. An asset management system will be in place, with equipment tagged and trackable.

Portable equipment (e.g., IV pumps/poles, wheelchairs, commodes, shower chairs/trollies) will be stored in an enclosed room for convenient access from corridor serving contiguous sub-units. Power bars at waist height will be required. Ideally the configuration of this room will accommodate a cross circulation path between two entries to facilitate access and retrieval of equipment.

A charging countertop will be accommodated within the Care Team Station and Care Planning Room for hand-held devices. Additional alcoves may be identified for equipment that require power support within each zone.

Corridor alcoves are helpful for storing select equipment to facilitate frequency/emergent access or maneuverability related to size.

Protocols for cleaning and storage of patient support equipment will be established with the Clinical Team in the Care Unit and coordinated with Environmental Aides.

Maintenance and repairs will be performed by the regional Biomed Team. Requisitions for Biomedical service will be entered electronically and triaged by the Biomed Team. Items for repair will be cleaned and moved by clinical staff or Environmental Aides to a secure staging area. Units will be notified electronically when a repair is completed, and the item can be retrieved for return to the Unit.

Environmental Services

Environmental Aides will support the department continuously in the turnover of patient rooms, management and changing of damaged or inoperable furnishing/equipment and removal of soiled material. Daily maintenance protocols will be instituted in addition to response for emergency needs.

Environmental requirements including new policies and procedures may evolve to incorporate new protocols for movement of clean and soiled material, equipment cleaning in response to the recent pandemic.

Nourishment & Meals

Inpatient meal trays will be delivered to the patient bedside by Dietary staff and collected following the meal. Menu selections will be available online for patients. Delivery carts from the kitchen will hold up to 20 patient trays. These carts should be stored in an alcove outside of the Soiled Utility Room.

Nourishments will be made available outside of meal trays following Ward Stock Policy and contained in a Nourishment Centre. This will be stocked by the Food Services Department and accessed by staff only. It is anticipated that in future, some on-unit meal preparation will be required, and the Nourishment Centre will accommodate this activity. There will be a Nourishment Alcove available for items such as ice and water and accessible to both staff and visitors.

Patient Transport

MAHC has porters for transportation to and from DI. Otherwise, nursing staff and attendants are responsible for patient transfer elsewhere within the hospital.

Administration & Staff Spaces

The Ward Clerk and Clinical Lead will maintain responsibility for daily activity on the Unit from a centralized Care Team Station located near the Unit entrance. Adjacent to the Care Team Station will be a Care Planning Room with table seating and shared workstations. These shared workstations will be available for Home Care and other external partners, Allied Health professionals, nursing and medical staff, and students.

The Unit will have a Consultation Room to meet with patients and families, but can also be used for private telephone calls, consultations, dictation, or virtual care sessions.

A shared larger multipurpose Meeting Room will be available for family team meeting and larger Interprofessional Team rounds. This will accommodate up to 15 people.

Many roles involved in the support of Clinical Service provision require quiet/private office space at times (e.g., Managers, Clinical Leads, Clinical Educators, Nurse Practitioners (NP), Patient Flow Navigators, Medical Chiefs). Recognizing that several of these roles support the care of patients across both sites, it is anticipated that many staff will require space both at HDMH and SMMH. There is a private office planned for the Manager of the Unit. The adjacent ED has shared offices planned that could accommodate staff from HDMH as required. Additionally, the Unit has an Allied Health Workroom with two workstations that can be shared with the leadership team as required. The intention is that these offices would be flexible use and bookable and could be assigned in future should a staff member become dedicated to a specific program and site.

All staff and learners will have access to staff facilities, locker rooms, changing rooms and washrooms with showers in a centralized location. All staff will have access to a shared Lounge with comfortable seating and table seating, a kitchenette, and cube lockers closer to the Unit.

On-call rooms will be centralized. (see Physician and Staff Amenities component).

Security Services

Security is of particular importance on the Unit. Appropriate controls will be in place to ensure that the mother/baby dyad is maintained. Security services will be provided at MAHC on-site and summoned when required.

Access Control Systems will be utilized to ensure a safe and secure environment for patients, staff and visitors.

Internet protocol (IP)-based video surveillance camera is required in the Medication Room.

An active Real-Time Locating System (RTLS) will be provided throughout the facility to support patient wandering. infant security and staff duress. Mobile duress buttons will be provided to staff. Fixed duress buttons will be available in select locations.

The visitor entrance to the Unit will be accessed through an access control system (either via cameras or intercom). Staff in the Unit will have control over release of the door from the nursing station or from opening the door from the inside. The access control system utilized will need to be integrated with the central hospital monitoring system to ensure that both systems functioning is monitored, as well as any activated alarms. The Unit will need to be lockable in emergency situations.

The space should be designed to help ensure the safety and security of all patients/family, staff, and visitors to be enhanced through:

- The configuration of the Unit to ensure that nursing time with the patient is maximized and that travel time to support spaces is minimized
- Optimizing the visualization of the corridors and patient rooms, while also maintaining line of sight for the main entrance from the Care Team Station is required
- A second secure entrance/exit that will allow staff an alternate route out of the Unit
- Each patient space being equipped with a Code Blue call button.

Enabling Technologies

Information Systems

A Ward Clerk will have an assigned workstation within each Care Team Station and will support all Acute Inpatient Unit beds.

The Care Team Station will also hold a bank of patient monitors so that cardiorespiratory monitoring can be viewed both at the station and in the patient room if required. The monitor bank should be in a discrete location for confidentiality. A PACS viewing monitor will also be located at the Care Team Station.

Documentation stations or workstations will otherwise be touchdown and available to any member of the Clinical Team and learners. Stations/data entry keyboards will be available within the patient room, in the Care Team Station, in the Care Planning Room and with each medication cart. A workspace will also be provided in the Staff Lounge.

Some documentation stations may be planned for standing use and to accommodate easier viewing between team members and for demonstration/teaching.

Each Unit will also have a Consult Room that can be used for private telephone conversations, consultations, dictation or virtual care sessions.

Wireless Technology

Planning assumes the availability of wireless technologies which will have a significant impact on communications, data recording, data retrieval, and documentation within the Inpatient Unit. In each patient room, there will be Wi-Fi for patient use in accessing the internet. Patient rooms will be equipped with Integrated Bedside Terminals (IBTs) and electronic dashboards which can display clinical information from the Health Information System (HIS). Bedside terminals will provide the following capabilities and services:

- TV/entertainment
- Educational content
- Electronic medical record (EMR)
- Hospital information
- Phone calls (softphone)
- Nurse call button
- Environmental controls, including lights and room temperature.

Virtual Care

Inpatient rooms will have the capability to host remote rounds for off-site specialists to participate and view/interact with the patient and Care Team. Mobile equipment is preferred. Meeting Rooms will be equipped with digital displays, video- and teleconferencing capabilities and presentation inputs to provide flexible and adaptable collaboration spaces.

Communication Systems

The Acute Inpatient Unit will be equipped with a state-of-the-art communications system to facilitate its activities. Specifications will be developed in consultation with the electrical consultant, architect, and users during the design stage and are expected to include such items as the following:

- Telephone(s) for staff use – the number to be determined during the design stage
- Telephone and television cabling, as determined during design
- Nurse call system from each patient bed
- Staff-to-staff wearable communication technology (e.g., Vocera)
- Video camera and audio link to the secure entrance, with remote control of the entrance door to control and allow visitor access
- Emergency call bells from patient washrooms
- Code Blue call buttons in each patient bedroom.

Staffing (Current and Projected)

Table 3. Current and Projected Staffing

	Current	Projected 2031/32			
Category	**2022/23 Total FTE**	**Total FTE**	**Headcount per Day**	**Headcount per Evening**	**Headcount per Night**
Total	89.81	104.44	29	20	18
Subtotal – Critical Care (4 beds)	*18.17*	*15.62*	*4*	*3*	*3*
Manager, Intensive Care Unit (ICU)	0.50	0.50	1	0	0
Ward Clerk	1.57	5.04	1	1	1
Clinical Lead	0.50	0	0	0	0
Registered Nurse (RN)	10.90	10.08	2	2	2
Registered Practical Nurse (RPN)	4.70	0.00	0	0	0
Subtotal – Medical/Surgical & LBRP (42 beds)	*65.93*	*75.56*	*17*	*15*	*14*
Manager	1.00	1.00	1	0	0
Manager, Maternal Newborn	0.50	0.50	1	0	0
Ward Clerk	4.76	5.04	1	1	1
Clinical Lead	1.19	3.50	1	1	0
RN	15.43	20.16	4	4	4
RN (Mat/Newb)	9.99	10.08	2	2	2
RPN	21.43	*20.16*	4	4	4
Personal Support Worker (PSW)	11.63	15.12	3	3	3
Subtotal – Allied Health	*0.00*	*4.20*	*5*	*0*	*0*
Physiotherapist (PT)	0.00	1.00	1	0	0
Occupational Therapist (OT)	0.00	1.00	1	0	0
Speech Language Pathologist (SLP)	0.00	0.20	1	0	0
Social Work (SW)	0.00	1.00	1	0	0
Dietitian	0.00	1.00	1	0	0

	Current	*Projected 2031/32*			
Category	**2022/23 Total FTE**	**Total FTE**	**Headcount per Day**	**Headcount per Evening**	**Headcount per Night**
Subtotal – Respiratory Therapy	5.70	*9.06*	*3*	*2*	*1*
Charge Registered Respiratory Therapist (RRT)	0.50	0.50	1	0	0
Bedside RRT	4.70	5.04	1	1	1
Cardiopulmonary Technician	0.50	3.52	1	1	0

Notes:

1. ICU and Maternal/Newborn Managers provide support to both sites. Medical/Surgical Manager provides oversight to the entire Acute Inpatient Unit.
2. Clinical Lead will work 5 days/week and 8 hrs/day.
3. Two Ward Clerks will provide 24/7 coverage to the entire Acute Inpatient Unit.
4. Care model includes a mix of RNs, RPNs and PSWs.
5. Allied Health staff will support the entire SMMH site as required.
6. RRTs support the entire SMMH site. The Cardiopulmonary Technicians support testing in the Diagnostic area.

Design Objectives

Locations and Adjacencies

The ICU beds should be as close to the ED as possible and close to the Care Team Station. The LBRP bed should have a private and direct route to/from the Surgical Suite. The RT Workroom should be easily accessible to the ED and Surgical Services.

Internal Organization

The Acute Inpatient Unit will be zoned into the following areas:

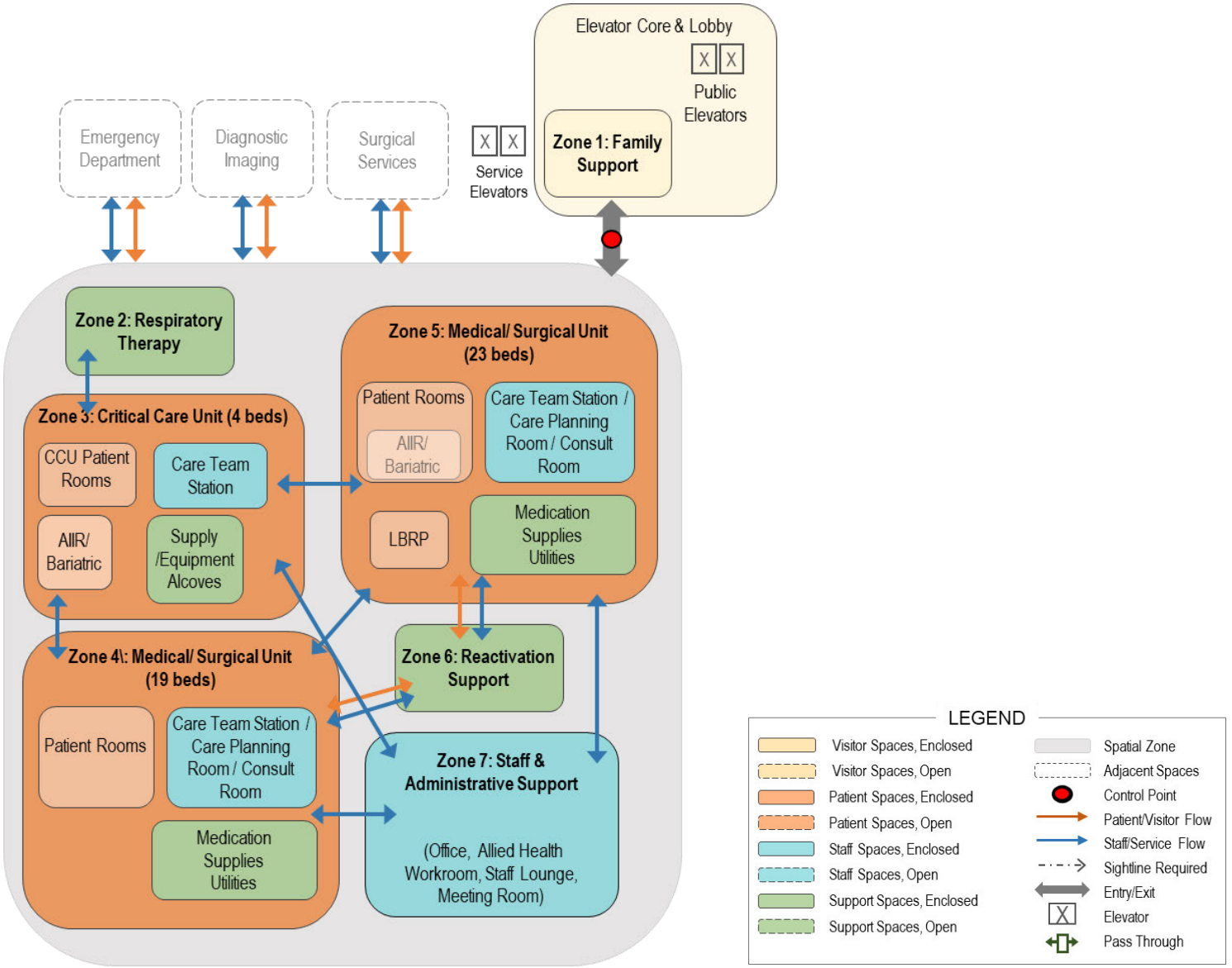
- Zone 1: Family Support – shared by all inpatient areas
- Zone 2: Respiratory Therapy
- Zone 3: Critical Care Unit – four beds with support spaces
- Zone 4: Medical/Surgical Unit – 19 beds with support spaces
- Zone 5: Medical/Surgical Unit – 12 beds and one LBRP with support spaces
- Zone 6: Reactivation Support – Rehabilitation Treatment Gym to support all patients
- Zone 7: Staff & Administrative Support – offices, Allied Health Workroom, Staff Lounge, Meeting Room

Note the following specifics regarding configuration of the spaces comprising the Medical/Surgical Inpatient Units:

- The Care Team Stations will be located to ensure visualization of the entrances to all patient rooms as well as the visitor entrance to the Unit
- AIIRs should be located near the Care Team Station
- The Code cart will be located in a readily accessible area to all patient rooms
- Spaces should be configured to be equitably accessible from all patient rooms

The spatial organization should be generally as shown in the diagram on the following page. The diagram illustrates conceptual relationships only and should not be treated as an architectural design. It should only be used to emphasize and identify important adjacencies and patient/visitor flows and staff/service flows. The diagram is not to scale.

Figure 1. Functional Relationship Diagram



Special Considerations

Infection Prevention and Control

Two Medical/Surgical patient rooms will be planned for AIIR. The AIIRs will have negative air pressure, with an anteroom and adjoining washroom. The anteroom will be utilized for staff to don and doff PPE according to organization's practices. There will be hand hygiene sinks in the anteroom, patient room and washroom.

The other patient rooms will be single rooms and will offer contact protection as a result.

Alcoves will be planned for PPE and a select list of frequently used disposable supplies at the entrance to each patient room. Cabinetry would be preferred to prevent possible contamination of these items. Any storage solution must not interfere with circulation to the patient room or Unit corridor.

All patient rooms will have hand hygiene sinks/alcohol dispensers immediately available to entering clinicians, within view of the patient.

Staff hand hygiene sinks/alcohol dispensers will also be provided in the:

- Care Team Station
- Medication Room
- Clean Supply Room and Soiled Utility Room
- Housekeeping Closet and Room
- Staff Lounge.

Additional considerations for soiled material include:

- Separation of clean and soiled materials
- Provisions for managing and handling hazardous or contaminated items
- Containment of soiled material for transport to the disposal point
- Appropriate ventilation and pressure control to maintain containment of patient infections.

Patient/Family

The introduction of single patient rooms has many advantages:

- Superior privacy and confidentiality for patients
- Designated area within the room for family for overnight visits and comfortable furniture
- Additional infection control.

With these advantages, the patient room will also offer additional area for storage of supplies, mobility aides and furniture suitable for overnight accommodation.

The Unit will support needs of family who can play an important role in health restoration. Fixed sleeping accommodation is preferred in patient rooms to reduce the risk of interference with staff movement in a darkened room.

Wayfinding

All entry/exit, alarm, fire detection, fire exit plans, sprinkler systems should be labelled; signage to be well lit. Wayfinding should be designed to address the visual challenges some patients may be experiencing.

Accessibility & Corridor Design

Access to all public spaces, including washrooms and treatment spaces, must be accessible. Internal corridors must be wide enough for two wheelchairs to comfortably pass each other. Wherever it is anticipated that a stretcher will be moved, the corridor must be sufficiently wide to allow for getting a stretcher in and out of the room. Corridors will not be used as places for storage.

Provision will be made for bariatric patients in two of the Medical/Surgical patient rooms.

A ceiling-mounted patient lift will be provided in each patient room.

Acoustic

Every effort must be made to maintain a quiet environment despite the sounds of equipment and staff working in the Unit. Acoustic privacy between patient rooms is mandatory. Appropriate sound dampening techniques including insulation, and, in some situations, mechanical support may be considered, i.e., white noise.

Environmental

In consideration of the philosophy and practice of patient-centred care, the environment should be as non-institutional in appearance as possible, with a warm and welcoming décor that is pleasant and conducive to health and wellness. The environment should incorporate natural elements from the outdoors. Opportunities to bring natural light and views to circulation within the Unit will be important to staff working in this component.

Medical Gases

Medical gases (oxygen, air, and suction) will be provided at each patient bed. The number of outlets will be determined during the next stage of planning. The mechanical consultant will ensure that the number of outlets meets the applicable Code requirements.

Patient Privacy

Though patient privacy is achieved through staff behaviour, the physical environment can be a positive contributor. For example, placement of doors and swings of doors can impact patient privacy. The architect shall maintain vigilance during the design stage in this regard.

Lighting

Lighting shall be designed to meet the clinical activities performed in an Inpatient Unit. Patient comfort must also be addressed, including patient-controlled lighting. Nighttime lighting must accommodate patient sleeping yet ensure maintenance of nurse-patient observation.

Given the abundance of literature supporting the curative value of natural light and open views to the outside for recovery of the patient, the Medical/Surgical Inpatient Units will be designed such that each patient room has a window. Provision of natural daylight in each patient room is non-negotiable. Skylights will not be acceptable as the sole source of daylight.

Ergonomic Considerations

Staff work environments (desks, counter-heights, etc.) shall be designed to ensure that ergonomic requirements are met.

Security

The design of the space should help to ensure the safety and security of all patients/family, staff, and visitors to be enhanced through the design.

The configuration of the Units will ensure that Care Team time with the patient is maximized and that travel time to support spaces is minimized.

Visualization of the patient rooms from the Care Team Station is required.

A second secure entrance/exit will be required for delivery/removal of material and also allow staff an alternate route out of the Unit.

Each patient space will be equipped with a Code Blue call button.

Codes & Standards

In addition to the above criteria, the facility must conform to recognized national, provincial, and local building codes and standards as they may relate to safety and accessibility for patients, staff, and visitors. Architects are also instructed to refer to CSA Z8000-18 Canadian Health Care Facilities.

Projected Space Requirements

Table 4. *Space Table*

			Component Gross Area (CGSF): TOTAL				**32,255**				**2,996.6**		
			Component Gross Area (CGSF / CGSM) - Critical Care (incl. Respiratory Therapy)				**3,985**				**370.2**		
			Net to Gross Ratio				1.55				1.55		
			Total Net Area (NSF / NSM)				2,570				238.8		
			Component Gross Area (CGSF / CGSM) - Medical/Surgical				**28,270**				**2,626.0**		
			Net to Gross Ratio				1.55				1.55		
			Total Net Area (NSF / NSM)				18,236				1694.2		
CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
			Zone 1: Family Support			**subtotal net area**		**260**		**subtotal net area**		**24.2**		**FOR ALL BEDS**
02	.001		Family Lounge			200	1	200		18.6	1	18.6		
02	.002		Washroom, Public, Accessible			60	1	60		5.6	1	5.6		
			Zone 2: Respiratory Therapy			**subtotal net area**		**200**		**subtotal net area**		**18.6**		**ADJACENT TO CCU**
02	.003		Respiratory Therapy Workroom			200	1	200		18.6	1	18.6	For work and storage	
		.01	*- workstation, touchdown*	*1*	*30*				*2.8*					
		.02	*- equipment storage, with workbench*	*1*	*150*				*13.9*					Provide medical gases
		.03	*- blood gas analyzer and counter space*	*1*	*20*				*1.9*					
			Zone 3: Critical Care Unit (4 beds)			**subtotal net area**		**2,110**		**subtotal net area**		**196.0**		**ADJACENT TO MEDICAL/SURGICAL BEDS**
02	.004		Care Team Station			145	1	145		13.5	1	13.5		
		.01	*- workstation, touchdown*	*3*	*45*				*4.2*					
		.02	*- hand hygiene sink*	*1*	*10*				*0.9*					
02	.005		CCU Patient Room, AIIR (Bariatric)			475	1	475		44.1	1	44.1		Provide clear zones for patient, staff and family use within the room
		.01	*- anteroom*	*1*	*80*				*7.4*					Provide supply storage, data entry station
		.02	*- bed area*	*1*	*300*				*27.9*					Provide patient lift and IV ceiling track above the bed
		.03	*- washroom, 3-piece*	*1*	*80*				*7.4*					
		.04	*- alcove, PPE/supply storage*	*1*	*15*				*1.4*					Locate cupboards outside of room

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
02	.006		CCU Patient Room			335	3	1,005		31.1	3	93.4		Provide clear zones for patient, staff and family use within the room
		.01	*- bed area*	*1*	*245*				*22.8*					Provide patient lift and IV ceiling track above the bed
		.02	*- charting area*	*1*	*15*				*1.4*					Could be planned outside of room with window into room
		.03	*- washroom, 3-piece*	*1*	*60*				*5.6*					
		.04	*- alcove, PPE/supply storage*	*1*	*15*				*1.4*					
02	.007		Medication Room			140	1	140		13.0	1	13.0		
02	.008		Clean Supply Room			120	1	120		11.1	1	11.1		
02	.009		Soiled Utility Room			130	1	130		12.1	1	12.1		
02	.010		Nourishment Alcove			35	1	35		3.3	1	3.3	For public/staff use	Include ice/water machine
02	.011		Alcove, Equipment			50	1	50		4.6	1	4.6	For Pumps, IV poles	
02	.012		Alcove, Emergency Equipment			10	1	10		0.9	1	0.9		
			Zone 4: Medical/Surgical Unit (19 beds)			**subtotal net area**		**7,492**		**subtotal net area**		**696.0**		
02	.013		Care Team Station			260	1	260		24.2	1	24.2		
		.01	*- workstation, clerk*	*1*	*50*				*4.6*					
		.02	*- printer/work area*	*1*	*20*				*1.9*					
		.03	*- workstation, physician/viewing*	*1*	*40*				*3.7*					PACS viewing monitor
		.04	*- alcove, physiological monitors*	*1*	*30*				*2.8*				For Telemetry monitoring	
		.05	*- workstation, touchdown*	*3*	*30*				*2.8*					
		.06	*- alcove, medical equipment/devices*	*1*	*20*				*1.9*					
		.07	*- hand hygiene sink*	*1*	*10*				*0.9*					
02	.014		Care Planning Room			250	1	250		23.2	1	23.2		Glass wall to allow visibility into adjacent Care Team Station
		.01	*- table with chairs*	*6*	*30*				*2.8*					
		.02	*- workstation, touchdown*	*1*	*30*				*2.8*					
		.03	*- workstation, telephone privacy*	*1*	*40*				*3.7*					Enclosed for dictation

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
02	.015		Consult Room/Quiet Room			140	1	140		13.0	1	13.0	Multipurpose - For MD calls, consult, virtual, family consult, family quiet	
02	.016		Single Bedroom			290	19	5,510		26.9	19	511.9		
		.01	*- bed area*	*1*	*160*				*14.9*					
		.02	*- washroom, 3-piece*	*1*	*60*				*5.6*					
		.03	*- entry vestibule/hand hygiene sink*	*1*	*55*				*5.1*					
		.04	*- alcove, PPE/supply storage*	*1*	*15*				*1.4*					
02	.017		Charting Alcove			15	10	105		1.4	10	9.8		Disperse 1 alcove per 2 bedrooms
02	.018		Medication Room			160	1	160		14.9	1	14.9		
02	.019		Equipment Storage			280	1	280		26.0	1	26.0		Provide power at 42" AFF (above finished floor), cross circulation path between 2 entries
		.01	*- equipment*	*1*	*200*				*11.1*					
		.02	*- alcove, wheeled equipment*	*2*	*15*				*1.4*					
		.03	*- alcove, stretcher*	*2*	*25*				*2.3*					
02	.020		Clean Supply Room			120	1	120		11.1	1	11.1		
02	.021		Soiled Utility Room			130	1	130		12.1	1	12.1		
02	.022		Nourishment Centre			105	1	105		9.8	1	9.8		
02	.023		Alcove, Food Tray Cart Holding			12	1	12		1.1	1	1.1		
02	.024		Nourishment Alcove			35	1	35		3.3	1	3.3	For public/staff use	Provide ice/water machine
02	.025		Washroom, Staff			50	2	100		4.6	2	9.3		
02	.026		Washroom, Public, Accessible			60	2	120		5.6	2	11.1		
02	.027		Housekeeping Room			120	1	120		11.1	1	11.1		

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
			Zone 5: Medical/Surgical and LBRP Unit (23 beds)			**subtotal net area**		**9,262**		**subtotal net area**		**860.5**		
02	.028		Care Team Station			260	1	260		24.2	1	24.2		
		.01	*- workstation, clerk*	*1*	*50*				*4.6*					
		.02	*- printer/work area*	*1*	*20*				*1.9*					
		.03	*- workstation, physician/viewing*	*1*	*40*				*3.7*					PACS viewing monitor
		.04	*- alcove, physiology monitors*	*1*	*30*				*2.8*				For Telemetry monitoring	
		.05	*- workstation, touchdown*	*3*	*30*				*2.8*					
		.06	*- alcove, medical equipment/devices*	*1*	*20*				*1.9*					
		.07	*- hand hygiene sink*	*1*	*10*				*0.9*					
02	.029		Care Planning Room			250	1	250		23.2	1	23.2		Glass wall to allow visibility into adjacent Care Team Station
		.01	*- table with chairs*	*6*	*30*				*2.8*					
		.02	*- workstation, touchdown*	*1*	*30*				*2.8*					
		.03	*- workstation, telephone privacy*	*1*	*40*				*3.7*					Enclosed for dictation
02	.030		Consult Room/Quiet Room			140	1	140		13.0	1	13.0	Multipurpose - For MD calls, consult, virtual, family consult, family quiet	
02	.031		Single Bedroom			290	21	4,930		26.9	21	458.0		
		.01	*- bed area*	*1*	*160*				*14.9*					
		.02	*- washroom, 3-piece*	*1*	*60*				*5.6*					
		.03	*- entry vestibule/hand hygiene sink*	*1*	*55*				*5.1*					
		.04	*- alcove, PPE/supply storage*	*1*	*15*				*1.4*					
02	.032		Single Bedroom, AIIR (Bariatric)			405	1	405		37.6	1	37.6		
		.01	*- anteroom*	*1*	*80*				*7.4*					Provide supply storage, data entry station
		.02	*- bed area*	*1*	*230*				*21.4*					Provide patient lift and IV ceiling track above the bed
		.03	*- washroom, 3-piece*	*1*	*80*				*7.4*					
		.04	*- alcove, PPE/supply storage*	*1*	*15*				*1.4*					Locate cupboards outside of room
02	.033		Single Bedroom, LBRP			460	1	460		42.7	1	42.7		Provide clear zones for patient, staff and family use within the room
		.01	*- bed area*	*1*	*350*				*32.5*					Provide patient lift and IV ceiling track above the bed
		.02	*- washroom, 3-piece*	*1*	*80*				*7.4*					
		.03	*- entry vestibule/hand hygiene sink*	*1*	*15*				*1.4*					
		.04	*- alcove, PPE/supply storage*	*1*	*15*				*1.4*					Locate cupboards outside of room

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
02	.034		Charting Alcoves			15	12	120		1.4	12	11.1		Disperse 1 alcove per 2 bedrooms
02	.035		Equipment Storage			280	1	280		26.0	1	26.0		Provide power at 42" AFF, cross circulation path between 2 entries
		.01	*- equipment*	*1*	*200*				*18.6*				For LDRP supplies, infant warmer	
		.02	*- alcove, wheeled equipment*	*2*	*15*				*1.4*					
		.03	*- alcove, stretcher*	*2*	*25*				*2.3*					
02	.036		Alcove, Emergency Equipment			10	1	10		0.9	1	0.9		
02	.037		Medication Room			160	1	160		14.9	1	14.9		
02	.038		Clean Supply Room			120	2	240		11.1	2	22.3		
02	.039		Soiled Utility Room			130	2	260		12.1	2	24.2		
02	.040		Nourishment Alcove			35	2	70		3.3	2	6.5	For public/staff use	Include ice/water machine
02	.041		Nourishment Centre			105	1	105		9.8	1	9.8		
02	.042		Alcove, Food Tray Cart Holding			12	1	12		1.1	1	1.1		
02	.043		Washroom, Staff			50	2	100		4.6	2	9.3		
02	.044		Washroom, Public, Accessible			60	2	120		5.6	2	11.1		
02	.045		Housekeeping Room			120	1	120		11.1	1	11.1		
			Zone 6: Reactivation Support			**subtotal net area**		**360**		**subtotal net area**		**33.4**		**ACCESSIBLE TO ALL PATIENTS, COULD BE OFF UNIT**
02	.046		Rehabilitation Treatment Gym			360	1	360		33.4	1	33.4		
		.01	*- supervised therapy stations*	*2*	*135*				*12.5*					Include circulation around equipment
		.02	*- workstation, touchdown*	*1*	*30*				*2.8*					Anticipate Workstation on Wheels
		.03	*- hand hygiene sink*	*1*	*10*				*0.9*					
		.04	*- equipment storage*	*1*	*50*				*4.6*				*Exercise balls, hand weights, and other training equipment*	Provide wire carts

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
			Zone 7: Staff & Administrative Support											
02	.047		Office, Clinical Leadership			100	2	100		9.3	2	18.6		
02	.048		Workroom, Allied Health (2 workstations)			140	1	140		13.0	1	13.0		
02	.049		Lounge, Staff			522	1	522		48.5	1	48.5		
		.01	*- hand hygiene sink*	*1*	*10*				*0.9*					
		.02	*- kitchenette*	*1*	*80*				*7.4*					
		.03	*- tables and chairs*	*8*	*25*				*2.3*					
		.04	*- soft seating*	*4*	*20*				*1.9*					
		.05	*- workstation*	*2*	*30*				*2.8*					
		.06	*- charging station*	*3*	*4*				*0.4*					
		.07	*- lockers, staff*	*40*	*2*				*0.2*					Provide cube lockers
02	.050		Meeting Room			160	1	160		14.9	1	14.9		
02	.051		Washroom, Staff			50	2	100		4.6	2	9.3		

03. Administrative Services

Functional Description (Current and Projected)

Service Overview

Administrative Services is/will be comprised of a range of services that will continue to provide the overall leadership and direction for Muskoka Algonquin Healthcare (MAHC). The following subcomponents which encompass the MAHC Leadership Team and related Administrative support, will be described under this component within the Functional Program:

- General Administration (i.e., senior management and related Administrative supports)
- Finance
- Health Records
- Human Resources
- Occupational Health & Safety (OH&S)
- Infection Prevention & Control (IPAC)
- Information Services
- Meeting/Education Spaces
- Northern Ontario School of Medicine (NOSM)
- Public Relations & Communications
- Quality & Risk (QR).

Note that other aspects of senior leadership and overall MAHC operations have been included in other components. Please see the *Main Lobby* components for detail related to the Auxiliary, Foundation, Patient Advocate, and Patient Registration, Scheduling & Switchboard.

Planning Principles and Assumptions

Planning principles will include:

In-person/remote workplace solutions are still evolving at MAHC, for the purposes of planning it is anticipated that a hybrid work model will be in place for some non-patient facing roles; but adaptability and flexibility of the Administrative Services area will be paramount to accommodate change in the way staff work over time.

Senior management staff with dual-site responsibilities will require access to workspace at both sites; this will include a range of flexible, unassigned/hoteling workspaces for staff while they are on the site. This will ensure related supports (e.g., Meeting Rooms) are available to maintain effective workflow and collaboration across the two sites.

The Administrative Services area must be welcoming and support the culture of open, transparent, and visible leadership; it must include a high degree of privacy as it must support difficult conversations with patients, families and staff.

The amount of overhead paging will be reduced significantly in the future, with the use of portable paging technology. This will make a significant improvement in the auditory environment (and consequent patient/family experience) in the hospital. Note: for staff that support both sites, technology will need to be provided/integrated to ensure they receive codes/paging while they at the respective site. It is also assumed that cellular reception and Wi-Fi will be improved in future to allow for use wireless devices for staff-to-staff communications.

Patient Profile

Not applicable to this component.

Scope of Services (Current and Projected)

General Administration

General Administration will continue to be responsible for strategic planning, resource allocation, professional staff credentialing and recruitment, Medical Advisory Committee, Board of Directors support, public relations and communications, contract negotiations, legal and external relations.

Executive Offices will include:

- President and Chief Executive Officer
- Chief of Staff
- Vice President (VP) Integrated Care, Patient Services & Quality, Chief Nurse Executive (CNE)
- VP Corporate Services and Chief Financial Officer (CFO)
- VP Operations and Chief, Human Resources
- Executive Assistants.

Finance

The Finance Department will continue to maintain the accounting records of the organization in accordance with Canadian generally accepted accounting principles (GAAP). The department will collect financial and statistical data according to the Management Information System (MIS) Guidelines set by the Ministry of Health and Long-Term Care (MoH).

Principle functions will include:

- Establishment of internal controls for the safeguarding of Finance assets
- External reporting to MoH and other funding agencies
- Internal reporting to Managers and Board members
- Payroll services to approx. 750 employees and related government reporting
- Payment of invoices to vendors and suppliers
- Billing and collection of invoices to insurance companies, patients, and Ontario Health Insurance Plan (OHIP)
- Preparation and management of budgets.

Note: the main Finance presence will be at HDMH, with touchdown space for staff available when they are on-site at SMMH.

Health Records

The Health Records Department will process, collect, and secure health information documented for every episode of care, including day treatment and overnight stays. Patient care will continue to be meticulously charted in the individual health record as legislated by the Public Hospitals Act and in keeping with the Personal Health Information Protection Act (PHIPA).

Principal functions will include:

- Maintenance of a complete and accessible electronic record for each episode of care
- Provision/coordination of a medical transcription service (facilitated remotely)
- Collection and submission of data required by the Ontario MoH and the Canadian Institute of Health Information (CIHI), a national database
- Release of information after care in compliance with legislation
- Resource in development of documentation best practices and forms design
- Medical Staff Committees' resource and support
- Monitoring compliance with MAHC privacy practices
- Collection and distribution of monthly, quarterly, annual and ad-hoc statistics.

Note that at present coding is completed both on-site and off-site. Coding will be fully off-site in future, with the ability for coding staff to come on-site for training and meeting purposes, as required.

Human Resources

Human Resources (HR) is responsible for the management of the organization's human resources, including the following services:

- Screening and recruitment of new employees and physicians
- HR planning
- Management and staff counselling
- Labour relations
- Contract and union negotiations
- Policy/procedure development and implementation
- Salary and benefits administration
- Statistics reporting
- Employee files management
- Corporate education/staff learning
- Employee orientation and onboarding
- Staff scheduling
- Employee retention, recognition, and appreciation
- Diversity, equity, and inclusion initives and implementation
- Attendance management.

Meeting Rooms and touchdown space will be booked on-site as required to perform the above noted tasks, as well as for organizational development and onboarding of new staff.

It is assumed that technology will be utilized as much as possible, to aid in recruiting, screening, staff credentials/ access, and other HR activities.

Occupational Health & Safety

OH&S will continue to promote a safe and health working environment for MAHC staff. This will include:

- Counselling services
- Employee wellness
- Disability management

- Workplace safety and violence prevention
- Medical examinations
- Work injury assessments.

OH&S at MAHC will be a collaborative, proactive approach to staff health and safety, in keeping with the organizations' mission, vision, and values. This will include a prioroity and focus on staff wellness, through initiative such as:

- Physical wellness(e.g., fitness programming)
- Psychological wellness (e.g., mindfulness, meditation, psychological factors for health and safety, peer support employee and family assistance program etc.)
- Financial wellness (e.g., financial literacy coaching, budgeting, retirement planning etc.).

Infection Prevention & Control

IPAC will include the following:

- Focused surveillance
- Creation of MAHC-wide policies and procedures
- Education/training
- Outbreak management
- Antibiotic stewardship
- Research.

IPAC will continue to serve as a primary resource for staff, Supervisors, Managers, and volunteers on IPAC issues, providing expert information and recommendations/guidance as an integral team member across all health care settings.

Information Services

IT will provide technology resources for health care and business services to support the hospital's physicians, staff, and volunteers. These services will include computer and network support, audio/visual, telephone, administrative systems, and portal access.

IT services will include the following:

- Implementation, maintenance, and support of all MAHC information, booking and scheduling systems

- Coordinating and supporting the electronic patient record
- Supporting point of care documentation, telecommunications, and wireless technology used at MAHC
- Maintenance and linkages to external databases and providers, including other health care providers, regional and provincial databases etc.
- Implementation of intranet, including hospital-wide access to internet, email, and office systems
- User training
- Technical support, as required.

Undoubtedly, IT needs will continue to grow into the future. Current and future workflows are becoming very dependant on IT hardware and software and the demand for support will continue to evolve with the changing technology. This will include the use of artificial intelligence (AI), advanced analytics, and predictive technology. A move to mobile technology will continue and the number of end users and devices that will require support will increase over time.

Note: IT leadership will be located at HDMH, with touchdown space available when they are on-site at SMMH. IT staff dedicated to the SMMH site will be responsble for Clinical Informatics and technical support. A data centre will be located at both sites.

Meeting/Education Spaces

Education spaces will be required for a variety of educational opportunities and requirements to facilitate and support ongoing competence, current knowledge of evidence-based practices, and continuous learning by staff – all of which are directly related to the quality of patient care provided by MAHC. Similarly, the need to connect with team members will continue to be a requirement of daily operations, to enable collaboration and cohesion, communication and knowledge dissemination, facilitate ongoing improvements, and generally ensure excellence in care and operations.

It is anticipated that meetings and education sessions will continue to be a hybrid of in-person and remote participation. As such, meeting and education spaces will require advanced technology to enable seamless communication and engagement regardless of location.

Meeting Rooms for smaller groups will be embedded throughout the site as a shared, bookable resource. A large Multipurpose Room will serve several functions at each site, including (but not limited to):

- Board functions
- Grand rounds
- Team and committee meetings

- Employee orientation
- Staff and Auxiliary appreciation events
- Education and skills training sessions (e.g., mock codes)
- Inpatient family care conferences
- Others.

A Simulation Lab (shared with NOSM) will be located at the HDMH site as a shared resource for experiential and interactive clinician and learner education and training.

The Simulation Lab will permit learners and clinicians to work with patient simulators (mannequins and/or actors) and simulated spaces (e.g., patient bedroom, clinic room, OR, and related support areas) to hone their skills in different treatment scenarios. A range of technologies will be available for clinical providers to diagnose and treat patients in the simulated environment. Clinical Simulation education and training may be conducted on a variety of simulated experiences including patient simulators, actor or volunteer patient, procedural trainer, or virtual patient device.

Technology will be used to support the delivery of clinical skills education by enhancing access to materials that learners can use to prepare, review, and debrief.

Northern Ontario School of Medicine

It is anticipated that in the future, MAHC and NOSM will share education and support spaces as required and availability permits. However, it should be noted that a separate lounge space for Medical students is required.

Public Relations & Communications

The Public Relations & Communications Team will continue to be responsible for media relations on behalf of MAHC and the management of all internal and external communications. This may include:

- Media and external communications
- All internal communications for staff, patients, and visitors
- Maintenance of the MAHC website
- Monitoring and responding to social media on MAHC accounts
- Production of the annual report, community reports, and other corporate publications
- Support for opening ceremonies and official visits
- Video Production
- Social Media.

Quality & Risk

QR services will continue to coordinate the identification, assessment, correction, and evaluation of all potential and actual risks to person and property within the organization. As such, QR will remain an integral part of MAHC operations, to ensure efficient and safe delivery of quality patient care. QR will maintain a proactive management approach, utilizing technology to synchronize risk mitigation efforts across the organization and sites, and remove risk associated with siloed departments and/or business units.

Additionally, data analytics will continue to be embedded to support decision-making, organizational cohesiveness, risk prioritization, and resource management and allocation.

Table 1. Meeting/Education Space Summary (site-wide, bookable)

Room	Number of Places	Component
Group Teaching Room	10	Ambulatory Care
Meeting Room, Small	6	Acute Inpatient Unit
Meeting Room, Small	6	Administrative Services
Meeting Room, Medium	8	Administrative Services
Multipurpose Meeting Room	30	Administrative Services
NOSM Classroom, Medium	8	Administrative Services
Meeting Room, Medium	8	Emergency Services

Education

Growth of the NOSM Program will equate to more learners on-site at MAHC in future. As a consequence, workspace and meeting space will be required for learners.

Research

Not applicable to this component.

Linkages/ Partnerships

Due to the nature and role of Administrative Services, they will be inextricably linked to all MAHC programs and services. Staff, management, physicians and occasionally patients and families will access the area(s) for various reasons on a consistent basis.

Workload (Current and Projected)

Table 2. Historical and Projected Workload

	Current	Projected
Department	**2022/23**	**2031/32**
Total Staff (approx. headcount)	750	1,250
Number of FTEs	650.73	1,087.22
Number of Physicians	225	+250 (TBD)

Operational Description

Organization and Management

Day-to-day operations will be under the leadership of the Chief Executive Officer (CEO) and VPs. Members of the Executive Team will be present at both sites (weekdays) to provide leadership and support.

Corporate programs will provide managerial leadership and oversight, some of which will include on-site dedicated staff, while others will be a MAHC-wide shared resource. The site will have a dedicated VP with overall responsibilities for the site, as well as VPs with responsibilities for individual programs/services.

Physicians will have direct reporting relationships to the Chief of Staff.

Hours of Operation

Current and future hours of operation are noted in the table below.

Table 3. Hours of Operation

	Current			Projected		
Modality	**Weekdays**	**Saturday**	**Sunday**	**Weekday**	**Saturday**	**Sunday**
Administrative Services	8:00am-5:00pm	-	-	8:00am-5:00pm	-	-

Notes:

1. The general hours of operation will be weekdays from 8:00am to 5:00pm. Staff may be present in the area outside of the hours of operation, for meetings or individual work.
2. IPAC staff will be on-call outside of working hours.

Duration of Visit

Not applicable to this component.

Referrals & Scheduling Appointments

Not applicable to this component.

Workflow

Administrative Suite

Administrative Services for the most part will exhibit workflow similar to other Administrative spaces. Typical activities will be both scheduled and unscheduled with a combination of private and collaborative work.

As a multi-site organization, senior leadership will have an on-site presence at both sites over the course of the week. Leadership staff will spend part of each week at either site, maintaining a relatively balanced amount of leadership at each location.

For MAHC-wide staff (i.e., those that move between both sites), touchdown workspace will be booked in advance through an online system (i.e., as part of the online meeting booking system). A screen or board will be located in the Administrative Services area to indicate open spaces for those on-site on an unscheduled basis. Touchdown spaces will include private offices, workstations, phone rooms, and meeting spaces. A provision of half lockers will also be provided for staff to store personal belongings while on-site.

Reception (Administrative staff) will serve as a control point for the suite of spaces. Administrative support will be shared across senior leadership roles.

Administrative support to the CEO will be responsible for the management of hoteling space, facilitated via on online booking system.

Health Records

Clinical documentation, including orders for medications, labs and diagnostic tests will occur in MAHC's Health Information System (HIS). This system will be fully integrated to optimize patient safety, facilitate easier patient access to their health information, standardize assessment and workflows for clinicians and remove any technological barriers that prevent timely care.

Key components of the system include:

- Standardized electronic documentation to facilitate interprofessional collaboration and connections with community resources
- Computerized Provider Order Entry (CPOE) with clinical decision support
- Patient portal with access to their health information, questionnaires and e-scheduling
- Voice dictation at source

- Mobile computing
- Real-time tracking
- Electronic referrals platform
- Virtual care
- Data privacy and security.

A small scanning area will be located in the Switchboard/Scheduling area for downtime and/or infrequent (minimal) scanning requirements.

Human Resources

Recruitment functions will commence via HR, in collaboration with the respective program/service area. Interviews will be conducted within the Administrative meeting space, or in bookable space outside of the clinical areas, as applicable. Interviews may or may not be attended by HR staff.

Education & Meeting Spaces

Assessments, training, and exams will be booked in advance and carried out in various spaces throughout MAHC. Some training will require specialized equipment (e.g., ceiling lifts) and therefore will only take place in certain rooms. Other training may be accommodated off-site, as may be required.

Occupational Health & Safety

Employee immunizations and testing will take place within OH&S. Work injury assessments will occur at the point of injury or within OH&S (based on the nature and severity of the injury), to support staff and provide first aid treatment for both occupational and non-occupational injuries and illnesses.

Fit testing will occur in a conference/Meeting Room or team room, depending on the volume of staff participating.

There may be programs dealing with sensitive information, requiring on-site meetings in a private space with a closed door to maintain participant confidentiality.

Counselling sessions will similarly require a private space to maintain confidentiality.

Infection Prevention and Control

Referrals/requests for IPAC consults will come via the electronic health record. IPAC staff will provide consultations and support to all areas of the hospital in-person and/or remotely (virtually or phone), as required. Consultations may include patients and their families.

General Support Activities	Facility and general supports will be provided within the overall corporate strategy.
Staff Resources	Staff will have access to nearby lunch/lounge spaces, likely shared with an adjacent area.
Security Services	Panic buttons will be located in key areas of the Administrative Suite, for emergency response. Two manners of egress should be provided in this area for security purposes.
Enabling Technologies	Information Technology will be provided within the overall corporate strategy. It is assumed that those using touchdown workspace and meeting space will be bringing their own devices. A small provision of computers may be available in certain spaces for those requiring access. It is assumed that Meeting Rooms will include (as standard equipment) screens for projecting presentations/material and the ability to teleconference and videoconference. Depending on the size and dimensions of larger meeting/conference rooms, multiple screens may be required. A performance dashboard will be utilized within the Administrative Suite to show real-time tracking for performance targets and outcomes. It is feasible in the future that wearable technology will be utilized for monitoring of hand hygiene and/or other IPAC measures.
Information Systems	See above.
Communication Systems	Overhead pages (codes and emergency use) must be audible from within the Administrative Suite.

Staffing (Current and Projected)

Table 4. Current and Projected Staffing (for both sites of MAHC)

	Current	Projected 2031/32			
Category	**2022/23 FTE**	**Total FTE**	**Headcount per Day**	**Headcount per Evening**	**Headcount per Night**
Total	73.45	97.92	75	3	3
Subtotal, General Administration	*7.00*	*8.00*	*9*	*0*	*0*
President & CEO	1.00	1.00	1	0	0
Director, Nursing CNE (Clinical Nurse Educator)	1.00	1.00	1	0	0
Chief Executive Diag. & Planning	0.00	1.00	1	0	0
VP, Patient Quality & Risk (QR)	1.00	1.00	1	0	0
Chief of Staff	(1.00)	(1.00)	1	0	0
Executive Assistant (to CEO and Board)	1.00	1.00	1	0	0
Executive Assistant (to CNE)	1.00	1.00	1	0	0
Executive Assistant (to Chief of Staff)	1.00	1.00	1	0	0
Burks' Falls and District Health Centre (BFDHC) Nurse Practitioner (NP)	1.00	1.00	1	0	0
Subtotal, Finance	*16.00*	*16.00*	*14*	*0*	*0*
VP Corporate Services & Chief Financial Officer (CFO)	1.00	1.00	1	0	0
Payroll Administrator	2.00	2.00	2	0	0
Executive Assistant (to CFO)	1.00	1.00	1	0	0
Accounting Clerk	5.00	5.00	5	0	0
Manager, Finance	1.00	1.00	1	0	0
Director, Finance & Data Analytics	1.00	1.00	1	0	0
Financial Analyst	3.00	3.00	1	0	0
Data Analyst	1.00	1.00	1	0	0
Accounting & Statistics Technician/Junior Analyst	1.00	1.00	1	0	0
Subtotal, Health Records	*6.00*	*6.00*	*6*	*0*	*0*
Health Records Clerk	2.00	2.00	2	0	0
Transcriptionist	2.00	1.00	1	0	0

	Current	*Projected 2031/32*			
Category	**2022/23 FTE**	**Total FTE**	**Headcount per Day**	**Headcount per Evening**	**Headcount per Night**
Health Records Tech	2.00	3.00	3	0	0
Subtotal, Human Resources	*9.50*	*10.00*	*10*	*0*	*0*
VP, Operations and Chief, HR	1.00	1.00	1	0	0
Manager, HR	1.00	1.00	1	0	0
Business Partner	3.00	3.00	1	0	0
Recruitment Specialist	1.00	1.00	1	0	0
Labour Relations	1.00	1.00	1	0	0
HR Coordinator	1.00	1.00	1	0	0
Education Coordinator	1.00	1.00	1	0	0
Executive Assistant (VP HR)	0.50	1.00	1	0	0
Subtotal, Occupational Health & Safety & Infection Prevention & Control	*7.40*	*7.40*	*8*	*0*	*0*
Manager, OH&S and Wellness	1.00	1.00	1	0	0
Manager, IPAC	1.00	1.00	1	0	0
Occupational Health Coordinator	2.00	2.00	2	0	0
Program Assistant	1.00	1.00	1	0	0
IPAC Practitioner	2.40	2.40	3	0	0
Subtotal, Project Management Office	*2.00*	*4.00*	*4*	*0*	*0*
Project Manager	(1.00)	2.00	2	0	0
Project Coordinator	2.00	2.00	2	0	0
Subtotal, Information Services	*15.30*	*22.00*	*14*	*0*	*0*
Business Analyst/Project Manager	1.00	5.00	3	0	0
Information Systems Analyst	5.00	5.00	3	0	0
Technical Coordinator	1.30	1.00	1	0	0
Technical Support	5.00	5.00	4	0	0
Manager, IT	1.00	1.00	1	0	0
Director, IT & Emergency Preparedness	1.00	1.00	1	0	0
Clinical Informatics Coordinator	1.00	4.00	1	0	0

	Current	Projected 2031/32			
Category	**2022/23 FTE**	**Total FTE**	**Headcount per Day**	**Headcount per Evening**	**Headcount per Night**
Subtotal, Public Relations & Communications	*2.00*	*2.00*	*2*	*0*	*0*
Communications Officer	1.00	1.00	1	0	0
Manager, Communications & Public Relations	1.00	1.00	1	0	0
Subtotal, Quality & Risk	*4.00*	*4.00*	*4*	*0*	*0*
Director, QR	1.00	1.00	1	0	0
Skin & Wound Care Specialist	1.00	1.00	1	0	0
CNE	2.00	2.00	2	0	0
Subtotal, Utilization Management	*8.25*	*18.52*	*4*	*3*	*3*
Hospital Supervisor	3.72	10.08	0	2	2
Bed Allocation	1.15	5.04	1	1	1
Patient Experience Flow Navigator	2.38	2.40	2	0	0
Manager, Utilization and MAOHT Clincs	1.00	1.00	1	0	0

Note:

1. Staffing represents organization-wide Administrative staffing, as these roles serve both sites. They have been included in this component and reflected in the SMMH Administrative Services component.

Design Objectives

Locations and Adjacencies

Due to the number of sub-areas within Administrative Services, adjacencies have been subdivided and shown in priority order within their respective sub-area.

Administrative Suite

- Since it services patients and families, as well as staff and physicians, the Administrative Services area should be easily located by the public, with clear wayfinding from main areas of the hospital.
- Administrative Services will require reasonable proximity to the Foundation.
- If possible, the Multipurpose Meeting Room should have access to outdoor, enclosed space (e.g. a courtyard).
- The Multipurpose Room needs to be in an area that can be accessed after-hours.

Occupational Health & Safety

- Easily located by staff, but not on a main thoroughfare, to maintain privacy.

Information Technology

- Could be centralized with rest of Administration or decentralized but accessible to the clinical areas for support.
- Would benefit from proximity to multipurpose meeting space for IT support and onboarding.

Internal Organization

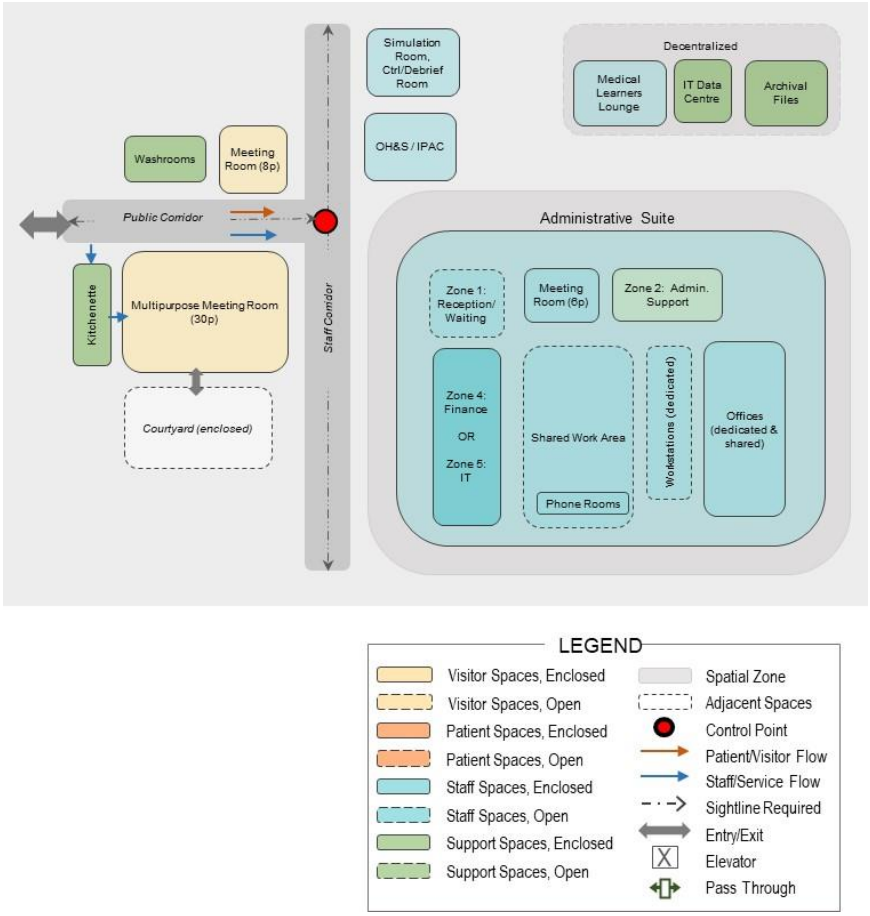
Depending on design, Meeting Rooms within Administrative Services may require an entrance from an outside corridor, rather than from within the Administrative Suite, to maintain privacy/confidentiality (e.g., if they are in use by HR).

Generally speaking, offices should be clustered in the same general area (to the greatest extent possible/practical) to allow for long-term adaptability and flexibility as staffing positions fluctuate by department over time.

HR should be located in a private end of the Administrative Suite, allowing for greater privacy and a secondary exit route.

The spatial organization should be generally as shown in the diagram on the following page. The diagram illustrates conceptual relationships only and should not be treated as an architectural design. It should only be used to emphasize and identify important adjacencies and patient/visitor flows and staff/service flows. The diagram is not to scale.

Figure 1. Functional Relationship Diagram



Special Considerations

Infection Prevention and Control

MAHC policies and procedures related to IPAC in workspaces will be maintained in Administrative Services spaces.

Clarity of Spatial Organization

Shared (touchdown) workspaces located within the Administrative Services space will require a computer workstation (laptop docking or fixed devices), and a phone; secured storage for belongings (e.g., lockers) will be provided close to the work area for staff storage; a display within the area will indicate which spaces are booked/available.

Offices and workspaces (dedicated and touchdown alike) will be designed to accommodate changing needs over time. Therefore, spaces must also be clustered to permit multiple functions, avoiding as much as possible the creation of defined suites within the area. In addition, modular furniture should be used where possible to allow or room layout changes over time.

The workspace for dedicated staff and workspace for touchdown staff shall be proximate but allow for some separation for concentration and workflow. This could be accomplished by co-locating the areas with separate entrances or through locating the shared support area between the dedicated and touchdown work areas to serve as a buffer.

Wayfinding

Clear wayfinding to the Multipurpose Room should be provided since it may be utilized by patients/family and the community, as well as staff.

Disabled Access & Corridor Design

Administrative Services will comply with all standards as required to ensure the space is accessible.

In addition to the above criteria, the facility must conform to recognized national, provincial, and local building codes and standards as they may relate to safety and accessibility for clients, staff, and visitors.

Acoustic

Administrative areas will provide a professional environment that is welcoming to visitors and ensures confidentiality and privacy of activities occurring within the area.

Within the Administrative Services area, particular attention to staff privacy (for personal and professional reasons) and related acoustics will be required. This may require additional sound masking, sound dampening materials (e.g. carpet vs hard flooring) and groupings of spaces to allow for a productive, private workspace for all staff.

This could also be accomplished by interspersing the dedicated staff spaces with more casually/less intensely used spaces, such as touchdown workspace or wellness spaces.

Additionally, bookable private workspaces (private offices and phone rooms) will be provided for high concentration tasks, or those which would distract others such as tele/videoconferences.

In addition to design and space planning efforts to manage privacy and sound, operational policies may be required to further ensure that all staff are respecting the need for privacy and confidentiality within a shared area.

Lighting	Natural light is desirable for all Offices, Workstations, and Meeting Rooms. Workstations should be prioritized for natural light over enclosed spaces. Consideration for occupancy sensors that automatically turn off when the room is empty should be given for all staff workspaces and Meeting Rooms.
Ergonomic Considerations	Staff workspace will include consideration for sit/stand desks.
Security	The entrance to the Administration suite should have controlled electronic access. As previously mentioned, this area should have at minimum, two means of egress for staff safety purposes.
Codes & Standards	In addition to the above criteria, the facility must conform to recognized national, provincial, and local building codes and standards as they may relate to safety and accessibility for patients, staff, and visitors. Architects are also instructed to refer to CSA Z8000-18 Canadian Health Care Facilities.

Projected Space Requirements

Table 5. *Space Table*

			Component Gross Area (CGSF / CGSM) : TOTAL				**8,090**			**782.2**		
			Component Gross Area (CGSF / CGSM) : Admin Suite				**3,035**			**282.0**		(Zones 1, 2, 3)
			Net to Gross Ratio				1.25			1.25		
			Total Net Area (NSF / NSM)				2,429			367		
			Component Gross Area (CGSF / CGSM) : Information Technology				**1,790**			**166.3**		
			Net to Gross Ratio				1.25			1.25		
			Total Net Area (NSF / NSM)				1,430			133		
			Component Gross Area (CGSF / CGSM) : Switchboard/Scheduling				**330**			**30.7**		
			Net to Gross Ratio				1.25			1.25		
			Total Net Area (NSF / NSM)				265			25		
			Component Gross Area (CGSF / CGSM) : Occupational Health & Safety & IPAC				**440**			**40.9**		
			Net to Gross Ratio				1.25			1.25		
			Total Net Area (NSF / NSM)				350			33		
			Component Gross Area (CGSF / CGSM) : Meeting Spaces				**1,465**			**136.1**		
			Net to Gross Ratio				1.25			1.25		
			Total Net Area (NSF / NSM)				1,170			109		
			Component Gross Area (CGSF / CGSM) : NOSM				**1,030**			**95.7**		
			Net to Gross Ratio				1.25			1.25		
			Total Net Area (NSF / NSM)				822			76.4		

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
			Zone 1: Reception/Waiting			**subtotal net area**		**120**		**subtotal net area**		**11.1**		
03	.001		Reception			50	1	50		4.6	1	4.6		Include panic button
03	.002		Waiting			70	1	70		6.5	1	6.5		
		.01	*- seat, standard*	*1*	*20*				*1.9*					
		.02	*- seat, accessible/bariatric*	*1*	*30*				*2.8*					
		.03	*- coat closet*	*1*	*20*				*1.9*					

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
			Zone 2: Administrative Support			**subtotal net area**		**370**		**subtotal net area**		**34.4**		**shared by all**
03	.003		Resource/Mail Room			110	1	110		10.2	1	10.2	For holding of office equipment and supplies	Provide multi-function copier, layout counter with above/below storage for paper supplies etc.
03	.004		Storage, General			80	1	80		7.4	1	7.4	For storage of podium, microphone, and step and repeat banner for announcements	Could be decentralized
03	.005		Storage, Files			80	1	80		7.4	1	7.4		
03	.006		Storage, Files (archival)			---	1	---		---	1	---		Provide caged storage in a lower level
03	.007		Washroom, Staff			50	2	100		4.6	2	9.3		Non-gendered, individual; barrier-free
			Zone 3: Staff Work Area			**subtotal net area**		**1,939**		**subtotal net area**		**180.1**		
03	.008		Office, President & CEO			120	1	120		11.1	1	11.1		Incl. panic button
03	.009		Workstation, Executive Administration			50	2	100		4.6	2	9.3	For executive assistants (4 total, assume 2 at each)	
03	.010		Office, Shared (VP, CoS)			120	2	240		11.1	2	22.3	Shared among VPs (3) and Chief of Staff (1)	
03	.011		Office, Shared (Directors, Managers)			100	6	600		9.3	6	55.7	Bookable, unassigned workspace for multi-site staff. Shared among 5 Directors (Nursing, Finance, Quality/Risk, and Interprofessional Practice/Ambulatory/Support Services, Diagnostics) and 5 Managers (HR, Health Records, OH&S, IPAC, PR), Labour Relations (1), Privacy Officer (1) - 11 total	
03	.012		Office, Business Partner			100	1	100		9.3	1	9.3	Two offices total; assume 1 at each site	
03	.013		Workstation, Clinical Nurse Educator			50	1	50		4.6	1	4.6	Two offices total; assume 1 at each site	Can be located with unassigned workstations

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
03	.014		Workstation, Project Management Staff			50	1	50		4.6	1	4.6	Dedicated to site	
03	.015		Work Area, Shared			429	1	429		39.9	1	39.9		
		.01	*- workstation, touchdown*	*3*	*50*				*4.6*				Bookable, unassigned workspace for multi-site staff. Shared among: HR Coordinator (1), Education Coordinator (1), Communications Officer (1), Skin & Wound Care Specialist (1), PR & Quality Coordinator (1) - 6 total	
		.02	*- workbench*	*1*	*180*				*16.7*				Additional flexibility for multi-site work	Provide 4-6 seats @ 30sf each; harvest table, touchdown collaborative seating
		.03	*- circulation @ 30%*	*1*	*99*				*9.2*					
03	.016		Phone Room			40	2	80		3.7	2	7.4	Bookable; for privacy in shared work area; enclosed room to support quiet work and phone calls	Includes desk, telephone, computer workstation with access to power; virtual health capable
03	.017		Meeting Room, Small			170	1	170		15.8	1	15.8	Bookable	
		.01	*- seat, standard*	*6*	*25*				*2.3*					
		.02	*- AV equipment*	*1*	*20*				*1.9*					Includes desk, telephone, computer workstation with access to power, communications.
03	.018		left intentionally blank											
			Zone 4: Information Technology			**subtotal net area**		**1,430**		**subtotal net area**		**132.9**		
03	.019		Workstation, Staff			50	3	150		4.6	3	13.9	For Technical Support (2), Clinical Informatics (3)	
03	.020		Office, Shared			100	1	100		9.3	1	9.3	For onboarding of staff. Can be used by IT Director or Manager when on-site	Include computer and small meeting table
03	.021		Work Counter			80	1	80		7.4	1	7.4	For repair and testing of devices	Include workspace and supplies
03	.022		Storage, IT			200	1	200		18.6	1	18.6		
03	.023		Data Centre			900	1	900		83.6	1	83.6		
		.01	*- server equipment*	*1*	*750*				*69.7*					
		.02	*- staging area*	*1*	*150*				*13.9*					

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
03	.024		left intentionally blank											
			Zone 5: Switchboard/Scheduling			**subtotal net area**		**265**		**subtotal net area**		**24.6**		
03	.025		Switchboard and Scheduling			215	1	215		20.0	1	20.0		
		.01	*- workstation*	*4*	*50*				*4.6*					Provide acoustic privacy from one another
		.02	*- monitors and associated technology*	*1*	*15*				*1.4*					Include overhead paging equipment, code management equipment, annunciator panels etc.
03	.026		Washroom, Staff			50	1	50		4.6	1	4.6		
			Zone 6: Occupational Health & Safety & IPAC			**subtotal net area**		**350**		**subtotal net area**		**32.5**		
03	.027		Workstation, Occupational Health Coordinator			50	1	50		4.6	1	4.6	Two workstations total; assume 1 at each site	
03	.028		Workstation, Shared			50	2	100		4.6	2	9.3	For Program Assistant (1), IPAC Practitioner (3); does not need to be collocated with OH&S	Could be decentralized to inpatient area
03	.029		Exam Room, Occupational Health & Safety (OH&S)			100	1	100		9.3	1	9.3	For first aid, immunizations etc.	
03	.030		Storage, OH&S			100	1	100		9.3	1	9.3		
			Zone 7: Meeting Spaces			**subtotal net area**		**1,170**		**subtotal net area**		**108.7**		
03	.031		Meeting Room, Medium			220	1	220		20.4	1	20.4		Locate adjacent to Multipurpose Meeting Room
		.01	*- seat, standard*	*8*	*25*				*2.3*				Bookable; Small Meeting Room and/or breakout room for Multipurpose Meeting Room	
		.02	*- AV equipment*	*1*	*20*				*1.9*					

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
03	.032		Multipurpose Meeting Room			830	1	830		77.1	1	77.1	Bookable; multipurpose large meeting space for a variety of purposes	Consideration to subdivide space
		.01	*- seat, standard*	*30*	*25*				*2.3*					
		.02	*- AV equipment*	*1*	*20*				*1.9*					
		.03	*- kitchenette*	*1*	*60*				*5.6*					Include door into Meeting Room and door into corridor for discrete access during meeting
03	.033		Washroom, Public, Accessible			60	2	120		5.6	2	11.1		Non-gendered, individual; barrier-free with infant change table; locate proximate to Multipurpose Meeting Room
			Zone 8: Northern Ontario School of Medicine			**subtotal net area**		**822**		**subtotal net area**		**76.4**		
03	.034		Office, Coordinator			100	1	100		9.3	1	9.3		
03	.035		Medical Learners Lounge			238	1	238		22.1	1	22.1		
		.01	*- kitchenette*	*1*	*60*				*5.6*					
		.02	*- table and chairs*	*2*	*25*				*2.3*					
		.03	*- soft seating*	*3*	*20*				*1.9*					
		.04	*- workstation*	*2*	*30*				*2.8*					
		.05	*- charging station*	*2*	*4*				*0.4*					
03	.036		Medical Learners Workroom			180	1	180		16.7	1	16.7		Could be decentralized
		.01	*- table and chairs/workstations (TBC)*	*6*	*30*				*2.8*					
03	.037		Locker Room			84	1	84		7.8	1	7.8		
		.01	*- lockers*	*12*	*7*				*0.7*					
03	.038		Classroom, Large			220	1	220		20.4	1	20.4		
		.01	*- seat, standard*	*8*	*25*				*2.3*				Bookable; Small Meeting Room and/or breakout room for Multipurpose Meeting Room	
		.02	*- AV equipment*	*1*	*20*				*1.9*					
03	.039		left intentionally blank											

04. Diagnostics

Functional Description (Current and Projected)

Service Overview

Diagnostic Imaging (DI) and Cardiorespiratory Services (CRS) provide a full range of imaging and therapeutic services to hospital patients, community residents and people vacationing within the region.

The DI and CRS department at SMMH will meet forecasted volumes with space designed and scaled to achieve maximum clinical and operational efficiency.

The table below articulates the current and future services to support core programs at SMMH.

Table 1. Current and Future Modalities

	South Muskoka (SMMH)	
Service	**Current**	**Future**
General Radiology (including fluoroscopy)	✓	✓
Mammography - Diagnostic	✓	✓
Mammography - Screening and Routine	✓	✓
Computed Tomography (CT)	✓	✓
Ultrasound (U/S)	✓	✓
Nuclear Medicine	-	✓
Bone Mineral Densitometry (BMD)	-	✓
Cardiorespiratory Services (CRS)	✓	✓

CRS Services provided include:

- Cardiac Holter monitoring
- 24-hour Blood Pressure Monitoring
- Echocardiograms (Echo)
- Pulmonary Function Testing (PFT) including Body Box
- Home Oxygen Assessments including walk tests and arterial blood gas (ABG) collection and analysis
- Cardiac Stress Testing and Pharmacological Stress Testing

- Nuclear Heart Scans following Cardiac Stress Testing
- Asthma and Chronic Obstructive Pulmonary Disease (COPD) education

In addition to the services noted above, Diagnostics staff will continue to support imaging functions outside of the department including portable x-ray, U/S, and Echo in key inpatient areas and the Emergency Department (ED). Point of Care (POC) U/S in ED, Ambulatory Care, and Surgical Suite, as well as the C-arm within the Surgical Suite will continue to be performed by Clinical Teams in the future.

Planning Principles and Assumptions

The following planning assumptions are to be noted for Diagnostics:

- All imaging equipment will be digital
- Patient registration will be completed online by a significant number of DI patients, with availability for on-site registration via a kiosk and/or in-person at the DI/CRS Reception desk
- DI will be colocated with CRS, providing a single reception point for patients, as well as the opportunity to develop a central area for support services
- The adjacencies between Diagnostics, the ED, Surgical Suite, Ambulatory Care, Inpatient Units and Critical Care are core considerations in realigning and/or expanding existing program spaces
- Approximately 50% of General Radiography workload is generated by the ED, therefore this modality in particular should have direct adjacency and easy access from the ED
- Diagnostic Bronchoscopies will be done in an endoscopic procedure room within the Surgical Suite
- MAHC will not provide sleep studies
- DI should be located on an outside wall for future expansion, and supporting services strategically located around key departments ensures the ability for future expansion with minimal disruption to the delivery of clinical care.

Patient Profile

Patients of all ages will be served through DI and CRS at the SMMH. This includes inpatients, ED patients, outpatients, and community referrals.

Scope of Services (Current and Projected)

The table that follows describes the current units and the planned number of each modality for the 2031/2032 planning horizon.

Table 2. Current and Projected Modalities

	Current		2031/32
DI Modality	**Current Qty**	**Comments**	**Projected Qty**
Radiography (General X-Ray)	2	Plus portable	2
Fluoroscopy	1	Fixed, OR has 1 fixed	1
Ultrasound (U/S)	3		5
Computed Tomography (CT) Scan	1		1
Magnetic Resonance Imaging (MRI)	-		Potential future
Mammography	1	Stereotactic	3
Nuclear Medicine	0		2
Bone Density	0		1
CRS	**Current Qty**	**Comments**	**Projected Qty**
Echocardiography (Echo)	1	Shared	2
Holter Monitoring, Stress Testing	1	Shared	1 shared
Ambulatory Blood Pressure Clinic	1	Shared	
Pulmonary Function Testing/Home Oxygen Monitoring			1 dedicated

Education

MAHC is affiliated with the Northern Ontario School of Medicine (NOSM), providing placements for medical students within both DI and CRS. Other learners include student technologists from Cambrian, St. Clair and Mohawk Colleges as well as secondary school co-op students.

Research

While there is potential for DI and CRS to support research initiatives in the future, there is no anticipated impact to the space requirements as outlined in this document.

Linkages/ Partnerships

Table 3. Linkages and Partnerships

Linkages/Partnerships	Description
Cambrian College	Learners (General Radiography)
St. Clair College	Learners (U/S)
NOSM University	Medical Students (DI/CRS)
Mohawk College	Learners (U/S)
Orillia Picture Archiving and Communication Systems (PACS) Servers	PACS System Server location
Royal Victoria Regional Health Centre (RVRHC)	Cardiology support for Echo Program
Ontario Breast Screening Program (OBSP)	Clerical support
Local secondary schools	Co-op student placements

Workload (Current and Projected)

Table 4. Historical and Projected Workload

		Historical			*Projected*
Modality	**Measure**	**2017/18**	**2018/19**	**2019/20**	**2031/32**
Total		35,162	37,533	37,742	103,057
Subtotal, Radiography		16,430	17,590	17,550	38,411
	Inpatient	1,433	1,706	1,652	1,116
	Outpatient	6,540	6,780	7,009	27,220
	Day Surgery	203	210	223	346
	Emergency	8,254	8,894	8,666	9,729
Subtotal, Mammography		2,806	3,142	3,296	10,527
	Routing and Diagnostic	852	1,109	1,330	4,127
	OBSP	1,954	2,033	1,966	6,400
Subtotal, Ultrasound (U/S)		8,433	8,730	7,947	22,987
	Inpatient	496	577	550	326
	Outpatient	6,403	6,527	5,863	20,923
	Day Surgery	5	3	10	27
	Emergency	1,529	1,623	1,524	1,711

		Historical			*Projected*
Modality	**Measure**	**2017/18**	**2018/19**	**2019/20**	**2031/32**
Subtotal, Nuclear Medicine Total		0	0	0	2,557
	Inpatient	0	0	0	69
	Outpatient	0	0	0	2,486
	Emergency	0	0	0	2
Subtotal, Computed Tomography (CT)		5,725	5,812	6,597	19,212
	Inpatient	801	800	848	531
	Outpatient	2,617	2,716	3,092	11,574
	Day Surgery	38	28	18	22
	Emergency	2,269	2,268	2,639	7,085
Subtotal, Bone Marrow Densitometry (BMD)		0	0	0	1,935
	Inpatient	0	0	0	3
	Outpatient	0	0	0	1,932
Subtotal, Cardiac Diagnostics: Echocardiography (Echo)	Exams	533	904	919	2,831
Subtotal, Cardiac Diagnostics: Stress Tests	Exams	11	49	89	797
Subtotal, Cardiac Diagnostics: Holter Monitoring	Exams	460	484	474	1,449
Subtotal, Cardiac Diagnostics: Home Oxygen/Ambulatory Blood Pressure (APB)/ Arterial Blood Gas (ABG) Clinic	Exams	112	86	104	187
Subtotal, Respiratory Diagnostics: Pulmonary Function Test (PFT)/Spirometry	Exams	652	736	766	2,164

Notes:

1. Projected workload is based on base volumes of 2019/20 except as noted below.
2. Mammography based on 2022/23 volumes, due to recent increase in activity.
3. Echo based on Aug 2022 – May 2023 when a 2nd full-time equivalent (FTE) started.

Operational Description

Organization and Management

DI and CRS will operate under a dyad leadership model consisting of a Manager of DI and CRS, a Director of Community Collaboration and Diagnostics, and a Medical Chief and Director of DI.

Within DI, Senior Technologists (one per modality) will report to a site Charge Imaging Technologist, who will report to the Manager of DI and CRS.

Within CRS, there will be dual reporting structure. RTs and Cardiopulmonary Technologists will report to a Charge RT, who will also report to the Manager of DI and CRS. Clinically, RTs will report as well to the internists.

Radiologist coverage is provided on-site by one radiologist four days/week, with potential to increase to five days/week in the future. Outside of regular business hours, coverage is provided by remote service.

Echocardiographs (Echos) are read by an internist, with coverage from staff at RVRHC when the internist is absent.

Hours of Operation

Current and future hours of operation are noted in the table below.

Table 5. Hours of Operation

	Current			***Projected***		
Modality	**Weekday**	**Saturday**	**Sunday**	**Weekday**	**Saturday**	**Sunday**
Radiography (General X-Ray)	7:30am - 11:30pm On-call 11:30pm - 7:30am	7:30am - 11:30pm On-call 11:30pm - 7:30am	7:30am - 11:30pm On-call 11:30pm - 7:30am	24/7	24/7	24/7
Radiography (General X-Ray) Outpatient Bookings	8:15am - 4:30pm, 8:00pm	-	-	8:00am - 7:00pm	9:00am - 5:00pm	9:00am - 5:00pm
Fluoroscopy (and U/S biopsies)	8:30am -3:00pm 2 days/wand every 4th Friday)	-	-	8:30am -3:00pm. Up to 5 days/week split between 2 sites – alternating 3-day/2-day weeks based on coverage	-	-
Ultrasound (U/S)	7:30am - 11:30pm	8:00am - 4:00pm	8:00am - 4:00pm	7:30am - 11:30pm	8:00am - 4:00pm	8:00am - 4:00pm
U/S Outpatient Bookings	8:00am - 9:45pm	8:00am - 4:00pm	8:00am - 4:00pm	8:00am - 9:45pm	8:00am - 4:00pm	8:00am - 4:00pm
Computed Tomography (CT) Scan	7:30am - 11:30pm On-call 11:30pm - 7:30am	7:30am - 11:30pm On-call 11:30pm - 7:30am	7:30am - 11:30pm On-call 11:30pm - 7:30am	7:30am - 11:30pm On-call 11:30pm - 7:30am	7:30am - 11:30pm On-call 11:30pm - 7:30am	7:30am - 11:30pm On-call 11:30pm - 7:30am

	Current			*Projected*		
Modality	**Weekday**	**Saturday**	**Sunday**	**Weekday**	**Saturday**	**Sunday**
CT Scan Outpatient Bookings	8:00am - 8:15pm	5 appoints between 9:30am - 8:15pm	5 appoints between 9:30am - 8:15pm	8:00am - 8:15pm	9:30am - 8:15pm	9:30am - 8:15pm
Mammography	7:30am - 3:30pm	7:30am - 3:30pm 1 weekend/month	7:30am - 3:30pm 1 weekend/month	7:30am - 8:00pm	8:00am - 4:00pm 2 weekends/month	8:00am - 4:00pm 2 weekends/month
Nuclear Medicine	-	-	-	7:30am - 5:00pm	-	-
Bone Density	-	-	-	7:30am - 5:00pm	-	-
Cardiorespiratory Diagnostics	7:30am - 3:30pm	-	-	7:30am - 3:30pm	8:00am - 4:00pm	8:00 - 4:00pm
Echocardiogram (Echo)	7:30am - 3:30pm	-	-	7:30am - 3:30pm	8:00am - 4:00pm	8:00 - 4:00pm

Duration of Visit

The duration of the visit for patients undergoing diagnostic testing will vary from 15 to 90 minutes. Assumed exam times by modality are listed below.

Table 6. Duration of Visit

Modality	**Average Length of Appointment including room turnover (mins)**
Radiography (General X-Ray)	15
Fluoroscopy	45
Ultrasound (U/S)	30
U/S Biopsy	60
Computed Tomography (CT) Scan	20
Mammography (screening)	20
Diagnostic Mammography (non-stereo)	30
Stereo Mammography (low volume)	90
Nuclear Medicine	60
Bone Density	30
Cardiac Diagnostics: Echocardiography (Echo)	60
Cardiac Diagnostics: Stress Tests	30 - 60 (+20 for Nuc Med)
Cardiac Diagnostics: Holter Application	30
Cardiac Diagnostics: Holter Analysis	45

Modality	Average Length of Appointment including room turnover (mins)
Cardiac Diagnostics: Home Oxygen	60
Cardiac Diagnostics: Arterial Blood Gas (ABG) Clinic	30
Respiratory Diagnostics: Pulmonary Function Test (PFT)/Spirometry	45

Referrals & Scheduling Appointments

Inpatient/ED Patients: Requests are submitted electronically via EMR.

Outpatient/Referrals: Currently referrals are via electronic fax or e-referral (OCEAN) and manually transcribed into the EMR by DI clerical staff. DI Technologist reviews referrals and assigns a priority code in urgent patients are scheduled by DI Registration Clerk and non-urgent cases are sent to central patient scheduling. In the future there is anticipation for a central electronic referral stream.

OBSP is a self-referred service, and requests go to the DI Mammography Clerk for scheduling. Mammography Clerks are responsible for the scheduling of all mammography, including OBSP, routine and diagnostic.

Scheduling for interventional procedures is completed by the technicians within each modality, and the physician contacts the patient to advise of appoint date/time.

Workflow

Arrival

All ED patients (ambulatory and on stretcher), and inpatients will be escorted to DI/CRS by appropriate staff. Direct adjacency to ED is required to facilitate timely access. Outpatients will navigate to the DI/CRS with efficient wayfinding from main hospital circulation routes.

Registration and Consent

One Reception for DI and CRS will facilitate patient check-in and provide registration support, as required.

It is anticipated that outpatients will have access to online registration in advance of arriving to the hospital. Upon arrival, if they have not already registered online, a kiosk will be available, and, if required, in-person registration at the Reception. Inpatients and ED patients will already be registered in the system via CPOE and will be transported directed to their modality for testing.

Functions performed at the DI/CRS Reception will include:

- Checking patient identification and determine scheduled procedures

- Screening patients with known or suspected communicable illnesses
- Determine if proper testing preparations have been performed. If not, follow defined protocols for rescheduling with proper instructions
- Notifying staff in the appropriate modality that the patient is in the department and direct the patient to the sub-waiting area. Intra-departmental staff will escort patients to the proper locations. Note: a tracker system may also be implemented to assist with advanced patient notification and to avoid congregate waiting, where possible.

A central Waiting room will support patients upon arrival as well as supporting family/visitors. Patients will make their way to the change facilities and sub-waiting area for their modality. Supporting family/visitors will be expected to remain the main DI Waiting area, unless required to accompany the patient.

Patient Changing & Preparation

Modalities will be clustered in order to share sub-waiting/change areas. Most patients will change into a gown either in the Diagnostic room or in a change cubicle. Sufficient chairs/wheelchair areas will be provided for gowned waiting, close to the modality. Patients will keep valuables with them, except where lockers are provided for certain modalities. When the Diagnostic room is ready, the technologist will escort the patient into the room.

Outpatients will prepare for their testing at home when possible, or in designated preparation space within DI for contrast administration etc.

Inpatients will complete some preparation in advance on the inpatient unit, such as IV access lines and preparations administered orally, while IV contrast injections will be completed within DI prior to testing.

Recovery

Some interventional radiology procedures require sedation to ensure the comfort of the patient. These cases require post-procedure monitoring. Preparation bays within DI will also serve as recovery spaces, maintaining patient flow and care within the DI footprint and under the management of the DI Team.

Procedure Completion and Quality Assurance

All modalities will be fully digital, and images will be captured electronically. Technologists will be able to quickly review images for adequacy at a monitor that is integral to the imaging equipment or a nearby review terminal. As necessary, radiologists will review images before the patient is released. In most cases this will be done from the radiologist's PACS reading workstation. Once released, the patient will change into street clothes and exit the department.

Reporting

All images will be captured digitally and will be available on PACS reading stations. A centralized Reading Room will support efficient access to reading stations.

Echos are reported and read on a separate system than the remainder of DI and require a separate reading set-up. An Echo Reading Room will be provided adjacent to the Echo Diagnostic Room to support this.

Transcription/Voice Recognition

Reports will be dictated using a voice recognition system, which allows the radiologist to make immediate corrections and release the report.

Image and Records Management

The PACS system will serve as the central repository for DI exams.

In the future, the CardioPACS system will upload cardiac diagnostic results, reported from the internists, into the patient EMR.

General Support Activities

Supplies, Cleaning & Disposal

Clean Supply Rooms will include storage systems standardized to MAHC requirements. Materials Management staff will monitor and replenish supplies, using a top-up system with high-density shelving. Staff will scan barcode labels in the Clean Supply Rooms and information will be accessed by receiving staff. All stock requirements will be system generated based on point of use consumption. Supply orders will be automatically generated with established on-hand safety stock levels.

Linen Carts will be delivered on a regular basis to DI and CRS and decentralized to Linen Alcoves throughout. The Clean Supply Rooms will also accommodate a blanket warmer.

Soiled Utility Rooms will be distributed throughout the zones. The Soiled Utility Rooms will accommodate:

- A designated area/cart for U/S and Echo transducers for collection and return to MDRD for processing
- Bins/transfer carts for linen, recyclables, medical waste, and general waste.

Housekeeping staff will continue to provide general cleaning services on a regular basis. This includes cleaning stretchers on a scheduled basis. DI staff will continue to be responsible for incidental cleaning and for putting clean linen on the stretchers.

A central Housekeeping Closet will service DI and CRS, with an additional dedicated closet for exclusive use within the Nuclear Medicine Hot Lab.

Pharmaceutical Services

A stock of basic medications will be accommodated in an ADU located in the Medication Room. Medication stock will be replenished by Pharmacy staff on a regular basis.

Staff Resources

A Staff Lounge with kitchenette will be included within the space planned for DI and CRS.

Access to staff facilities such as locker rooms, change rooms and washrooms with showers will be available in a centralized location. If adjacencies permit, consideration should be given to sharing staff facilities with the ED.

Volunteer Services

Volunteers support DI and CRS with patient wayfinding, escorting and miscellaneous tasks which are outside the scope of staff. Volunteers should be provided space to touchdown within the main Reception area.

Enabling Technologies

Information and Communication Systems

DI and CRS require reliable and effective IT/Communications Services for efficient operation. The IT design should address:

- Booking, appointment and queuing systems, potential patient reminder systems
- Patient clinical information systems and electronic records
- Wireless and hospital network requirements, high capacity and speed for digital equipment
- Voice recognition transcription technology for radiologists, internists
- PACS technology and appropriate high-resolution monitors.

As enabling technology expands to support the clinical enterprise, accommodation will be required to ensure safeguards for continuous power supply and business continuity are established and maintained.

Staffing (Current and Projected)

Table 7. Current and Projected Staffing

	Current	Projected 2031/32			
Category	**2022/23 FTE**	**Total FTE**	**Headcount per Day**	**Headcount per Evening**	**Headcount per Night**
Total	33.12	48.34	28	10	1
Echocardiogram (Echo) Sonographer	1.00	2.00	2	0	0
Ultrasound (U/S) Technologist (Tech)	5.14	8.76	4	2	0
Charge Tech	1.00	1.00	1	0	0
Sr Computed Tomography (CT) Tech	0.50	1.00	1	0	0
Sr Diagnostic Imaging (DI) Tech – Mammography	1.00	1.00	1	0	0
Sr Interventional Tech	0.00	0.50	1	0	0
Nuclear Medicine Tech	0.00	1.00	1	0	0
Sr Imaging Tech	0.78	0.50	1	0	0
Sr U/S Tech	0.50	0.50	1	0	0
Clinical Instructor	0.00	1.00	1	0	0
CT Tech	3.50	7.60	2	2	1
Imaging Aide	1.60	3.60	2	1	0
Mammography Tech	2.00	6.20	3	2	0
Imaging Tech	13.58	9.68	4	2	0
Imaging Reception	2.52	4.00	3	1	0

Design Objectives

Locations and Adjacencies

The following adjacencies are to be prioritized for DI and CRS:

- DI must be located adjacent to the ED to facilitate quick transfer for urgent patients requiring Diagnostics
- A central location with easy navigation from the main entrance/patient parking is important for the large number of outpatients
- Cardiac Diagnostic rooms should be adjacent to DI Nuclear Medicine for patients requiring stress tests
- Locate DI in proximity to Critical Care Unit (CCU), the Surgical Suites, and Inpatient units to minimize transfer distance and avoid public corridors/elevators.

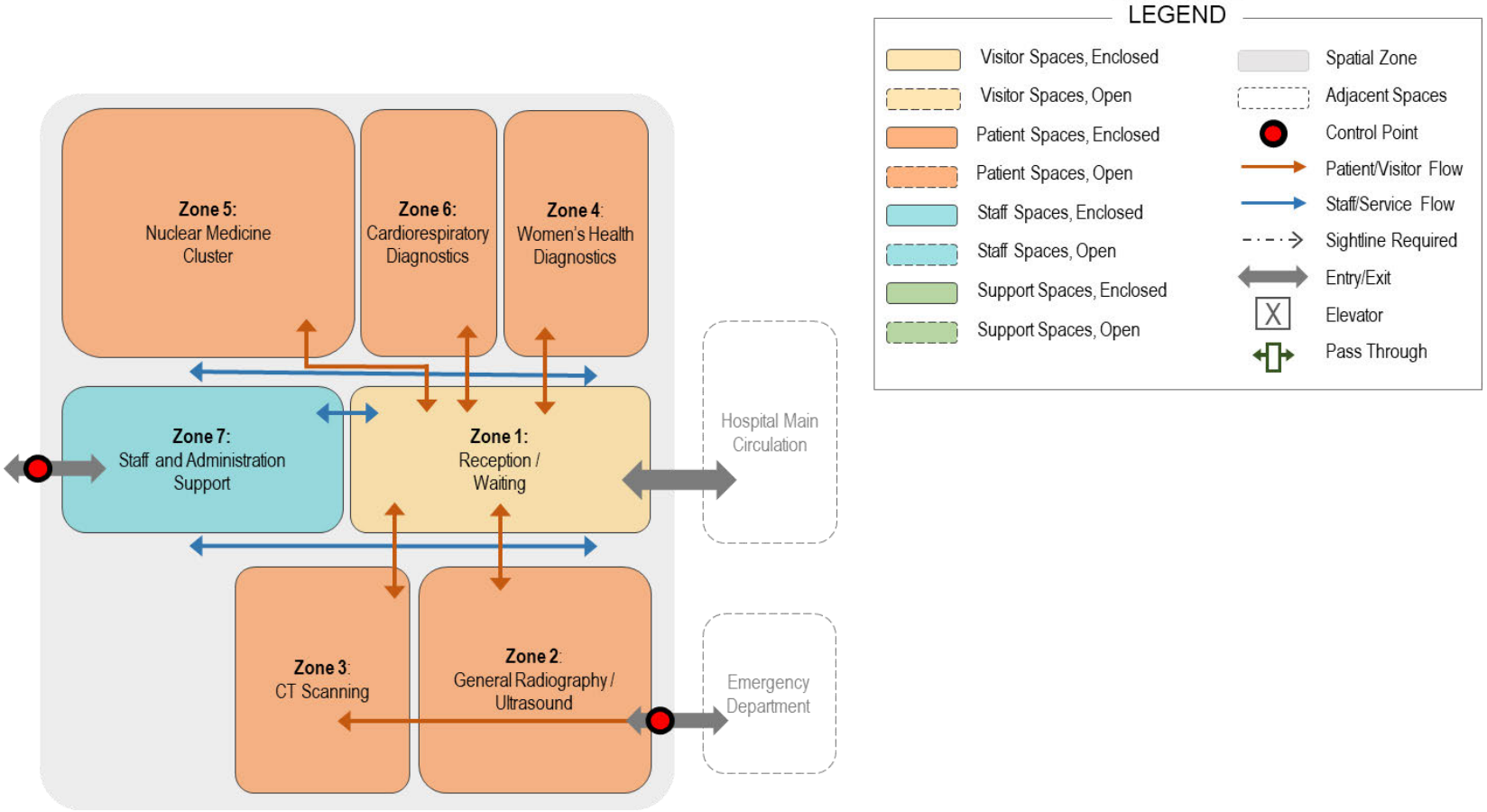
Internal Organization

The following concepts are important for planning the internal elements within DI and CRS:

- Sightlines for staff observation of patients who are awaiting tests as well as those recovering from procedures
- Separation of access and flows for ED patients, inpatients, and outpatients
- Efficiency in patient and staff flows for:
  - Adjacencies of BMD, Mammo and Ultrasound
  - Adjacencies of MRI, CT, and recovery spaces
  - Adjacencies of CT and Radiography to the ED.

The spatial organization should be generally as shown in the diagram on the following page. The diagram illustrates conceptual relationships only and should not be treated as an architectural design. It should only be used to emphasize and identify important adjacencies and patient/visitor flows and staff/service flows. The diagram is not to scale.

Figure 1. Adjacency Diagram



Special Considerations

Infection Prevention and Control

Infection control procedures will be applied in all patient care/handling areas. Protocols such as separation of clean and dirty flows will be followed, and hand hygiene sinks will be provided according to codes and standards.

Infection Prevention and Control (IPAC) will be considered in design, including:

- Patient Preparation and Recovery bays will be enclosed on three sides
- Distribution of PPE in appropriate carts or purpose-built cabinets within each zone
- For the Nuclear Medicine Hot Lab, specific materials to be specified, as required to meet radioactivity safety standards
- All equipment, furnishings and finishes must be easily cleanable with approved hospital grade disinfectants.

Clarity of Spatial Organization

The layout of the Department must be such that travel distances for staff and patients are kept to minimum and circulation routes are simple.

Wayfinding

Access from the main entrance, ED, and Ambulatory Care to DI and CRS should be easily navigated and supplemented by effectively placed signage. Wayfinding should be intuitive between the main Waiting room and sub-Waiting areas.

Accessibility & Corridor Design

Access to all patient spaces, including washrooms and imaging rooms, must be accessible. Sufficent access to assessible change facilities and Waiting spaces must be provided as well. Power door operators are required at the entrance/exit to the department to facilitate stretcher access. Internal corridors must be wide enough for two wheelchairs to comfortably pass each other and wide enough to allow for getting a stretcher in and out of the room. Corridors will not be used as places for storage.

Acoustic

The computer room for CT will include high volume fans and UPS systems that will require noise abatement.

Air/Environmental

Imaging equipment generates significant heat and requires control of temperature and humidity. The computer room in CT will require a dedicated air conditioning system. Heating, Ventilation and Air Conditioning (HVAC) systems are to be sized appropriately to meet the needs of diagnostic equipment.

Architectural/Structural/ Electrical/Mechanical

Imaging room design requirements include:

- Minimum floor to ceiling heights, floor to deck clearance, and structural systems for mounting equipment per vendor specifications
- Proper shielding for radiation protection and to minimize scattered radiation
- Adequate shelving for positioning devices, storage area for accessories and linen
- Isolation protocol storage for PPE
- Flooring must be monolithic with cove base
- Lead apron racks
- Countertop work area
- Ceiling-mounted patient lifts to be considered
- Ceiling-mounted IV tracks.

Design room access (door swings, hallways) with a minimum of turns to allow easy stretcher and bed access. Rooms may have leaded doors split into 1/3 and 2/3 hinged parts. A hospital bed shall be able to fit through door opening. In all instances, a 1.2m wide door is required in all DI exam rooms.

A dedicated power line and UPS will be required for each imaging room.

For the Hot Lab in Nuclear Medicine, the material for the backsplashes and baseboards need to be finished such that there are no fissures or crevices and is impermeable to moisture. All rooms with ionizing radiation require shielding.

Medical Gases

Medical air, oxygen, and vacuum should be included in all therapeutic and diagnostic areas (two outlets each). These outlets should be in close proximity to the testing equipment.

Patient Privacy

Patient privacy to be considered thoughtfully through the placement of doors and orientation of door swings as well as sightlines from change rooms, gowned sub-waiting areas and imaging rooms.

Lighting

Provide glare-free full-spectrum, dimmable, artificial lighting and special task lighting for technical work areas and imaging rooms. Natural light should be provided where possible based on the modality type.

Ergonomic Considerations	Provide appropriate heights for control room equipment, shelving, computer terminals and keyboards to minimize physical stress or accidents and to maximize the comfort of Diagnostics staff. Adjustability of all workstation heights should be considered.
Security	Access to DI and CRS (with the exception of via the main Reception) will be controlled by employee radio-frequency identification (RFID) badge (swipe access), or other similar technology. In particular, the Nuclear Medicine Hot Lab is a restricted area with access controlled by employee RFID badge (swipe access).
Codes & Standards	In addition to the above criteria, the facility must conform to recognized national, provincial, and local building codes and standards as they may relate to safety and accessibility for patients, staff, and visitors. Architects are also instructed to refer to CSA Z8000-18 Canadian Health Care Facilities.

Projected Space Requirements

Table 8. *Space Table*

			Component Gross Area (CGSF / CGSM): TOTAL				**14,760**				**1371.2**		
			Component Gross Area (CGSF): Diagnostic Imaging (without Cardio Resp)				**13,290**				**1234.7**		
			Net to Gross Ratio				1.50				1.50		
			Total Net Area (NSF)				8,859				823.0		
			Component Gross Area (CGSF): Cardio Resp				**1,470**				**136.6**		
			Net to Gross Ratio				1.50				1.50		
			Total Net Area (NSF)				980				91.0		
CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
			Zone 1: Central Reception/Waiting			**subtotal net area**		**500**		**subtotal net area**		**46.5**		
04	.001		Reception/Registration, Diagnostic Services			160	1	160		14.9	1	14.9		
		.01	*- workstation, registration*	*2*	*50*					4.6				Provide small touchdown space for volunteer as well
		.02	*- printer/work area*	*1*	*60*					5.6				
04	.002		Waiting, Diagnostic Services, Outpatients			280	1	280		26.0	1	26.0		Based on 14 patients per hour plus 70% escorted; then 50% dispersed to zones
		.01	*- seat, standard*	*10*	*20*					1.9				
		.02	*- seat, accessible/bariatric*	*2*	*30*					2.8				
		.03	*- alcove, wheelchair*	*1*	*20*					1.9				
04	.003		Washroom, Public, Accessible			60	1	60		5.6	1	5.6		
			Zone 2: General Radiography and U/S			**subtotal net area**		**2,840**		**subtotal net area**		**263.8**		
04	.004		Digital Radiography (General X-ray)			700	1	700		65.0	1	65.0		
		.01	*- scanning room*	*2*	*310*					28.8				
		.02	*- control room*	*1*	*80*					7.4				Two workstations, plus 1 student space
04	.005		Digital Radiography (Fluoroscopy)			440	1	440		40.9	1	40.9		
		.01	*- scanning room*	*1*	*310*					28.8				
		.02	*- control room*	*1*	*80*					7.4				One station

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
		.03	*- washroom, patient, accessible*	*1*	*50*				4.6					
04	.006		Ultrasound (U/S)			620	1	620		57.6	1	57.6		
		.01	*- U/S room, standard*	*2*	*140*				13.0					
		.02	*- U/S room, interventional*	*1*	*160*				14.9					
		.03	*- U/S room, stretcher accessible/bariatric*	*1*	*180*				16.7					
04	.007		Washroom, Patient, Accessible			60	1	60		5.6	1	5.6		Locate at U/S rooms
04	.008		U/S Tech Review Area			220	1	220		20.4	1	20.4		Open area
		.01	*- workstation*	*5*	*40*				3.7					
		.02	*- quality dashboard w/ circulation*	*1*	*20*				1.9					Wall-mounted screen
04	.009		Change and Waiting			370	1	370		34.4	1	34.4		
		.01	*- cubicle, change, standard*	*6*	*25*				2.3					
		.02	*- cubicle, change, accessible*	*1*	*40*				3.7					
		.03	*- sub-waiting, standard*	*6*	*15*				1.4					
		.04	*- sub-waiting, accessible/bariatric*	*1*	*30*				2.8					
		.05	*- washroom, patient, accessible*	*1*	*60*				5.6					
04	.010		Alcove, Mobile equipment			40	1	40		3.7	1	3.7		
04	.011		Clean Supply Room			120	1	120		11.1	1	11.1	Shared between modalities	Provide space for ultrasound transducer storage cabinets, as well as Echo transducers. Interventional carts
04	.012		Soiled Utility Room			130	1	130		12.1	1	12.1	Shared between modalities	
04	.013		Alcove, Linen			15	1	15		1.4	1	1.4		
04	.014		Housekeeping Closet			75	1	75		7.0	1	7.0		
04	.015		Washroom, Staff			50	1	50		4.6	1	4.6		
04	.016		left intentionally blank											

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
			Zone 3: CT Scanning			**subtotal net area**		**1,235**		**subtotal net area**		**114.7**		
04	.017		CT Scanning			585	1	585		54.3	1	54.3		
		.01	*- scanning room (incl. hand hygiene sink)*	*1*	*430*				39.9					Ceiling-mounted injector
		.02	*- control room*	*1*	*120*				11.1					Injector control; 2 workstations incl. post-processing
		.03	*- equipment cabinets*	*1*	*35*				3.3					
04	.018		Patient Preparation/Recovery			250	1	250		23.2	1	23.2	Used for both pre-/post-procedure for DI/IR/Mammo	
		.01	*- stretcher bay*	*2*	*100*				9.3					Three-wall enclosed with gases
		.02	*- counter and supplies*	*1*	*40*				3.7					
		.03	*- hand hygiene sink*	*1*	*10*				0.9					
04	.019		Change and Waiting Area			100	1	100		9.3	1	9.3		
		.01	*- cubicle, change, standard*	*1*	*25*				2.3					
		.02	*- sub-waiting, standard*	*1*	*15*				1.4					
		.03	*- washroom, patient, accessible*	*1*	*60*				5.6					
04	.020		Medication Room			120	1	120		11.1	1	11.1	Shared with all modalities. For contrast preparation etc.	Centralize for ease of access by all modalities (except BMD/Nuc Med)
04	.021		Reading Room			180	1	180		16.7	1	16.7	2 workstations	Centralize for access to modalities. Two workstations
04	.022		left intentionally blank											
			Zone 4: Women's Health Diagnostics			**subtotal net area**		**1,090**		**subtotal net area**		**101.3**		
04	.023		Mammography Diagnostic / Screening Room			180	3	540		16.7	3	50.2		Stereotactic unit
04	.024		Bone Mineral Density Room			120	1	120		11.1	1	11.1		
04	.025		Change and Waiting Area			275	1	275		25.5	1	25.5		
		.01	*- cubicle, change, accessible*	*2*	*40*				3.7					
		.02	*- sub-waiting, standard*	*3*	*15*				1.4					
		.03	*- sub-waiting, accessible/bariatric*	*1*	*30*				2.8					
		.04	*- washroom, patient, accessible*	*2*	*60*				5.6					

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
04	.026		Alcove, Linen Cart			15	1	15		1.4	1	1.4		
04	.027		U/S Room, Standard			140	1	140		13.0	1	13.0		
			Zone 5: Nuclear Medicine Cluster			**subtotal net area**		**2,232**		**subtotal net area**		**207.4**		
04	.028		Nuclear Medicine Room			1,100	1	1,100		102.2	1	102.2		
		.01	*- SPECT-CT scanner*	*2*	*430*				39.9					
		.02	*- control room*	*1*	*240*				22.3					Shared between scanners, 2 workstations for techs and 1 for radiologist reading
04	.029		Cold / Regular Change and Waiting Area			232	1	232		21.6	1	21.6		
		.01	*- cubicle, standard*	*1*	*25*				2.3					
		.02	*- cubicle, accessible/bariatric*	*1*	*40*				3.7					
		.03	*- lockers, patient*	*6*	*7*				0.7					Provide Z lockers
		.04	*- sub-waiting, standard*	*3*	*15*				1.4					
		.05	*- sub-waiting, accessible/bariatric*	*1*	*30*				2.8					
		.06	*- washroom, patient, accessible*	*1*	*50*				4.6					
04	.030		Injection Room, Bays			120	2	240		11.1	2	22.3		Three-wall stretcher bays
04	.031		Hot Waiting			90	1	90		8.4	1	8.4		
		.01	*- sub-waiting, standard*	*3*	*20*				1.9					
		.02	*- sub-waiting, accessible/bariatric*	*1*	*30*				2.8					
04	.032		Hot Washroom, Patient, Accessible			60	1	60		5.6	1	5.6		
04	.033		Hot Stretcher Holding			80	1	80		7.4	1	7.4		
04	.034		Hot Lab/Decay Storage			230	1	230		21.4	1	21.4		
		.01	*- hand hygiene sink*	*1*	*10*				0.9					
		.02	*- gowning vestibule*	*1*	*30*				2.8					
		.03	*- fume hood, 4'*	*1*	*50*				4.6					
		.04	*- storage, decay*	*1*	*60*				5.6					
		.05	*- counter and utility sink*	*1*	*15*				1.4					
		.06	*- emergency eyewash*	*1*	*10*				0.9					
		.07	*- emergency shower*	*1*	*15*				1.4					
		.08	*- housekeeping closet*	*1*	*40*				3.7					

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
04	.035		Clean Supply Room			100	1	100		9.3	1	9.3		
04	.036		Soiled Utility Room			100	1	100		9.3	1	9.3		
04	.037		left intentionally blank											
			Zone 6: Cardiorespiratory Diagnostics		**subtotal net area**			**980**		**subtotal net area**		**91.0**		
04	.038		Echo Room			170	2	340		15.8	2	31.6		Include tech workspace
04	.039		Echo Reading Room			80	1	80		7.4	1	7.4		Private room with 2 workstations/1 chair
04	.040		Pulmonary Function/Home Oxygen Monitoring			150	1	150		13.9	1	13.9		
04	.041		Exercise Testing Room/Holter Monitor Room/ABP Clinic			240	1	240		22.3	1	22.3		Include tech workspace, treadmill, stretcher, blood pressure monitor - Shared
04	.042		Washroom, Patient, Accessible			60	1	60		5.6	1	5.6		
04	.043		Stretcher Holding			80	1	80		7.4	1	7.4	For ED patients/inpatients	
04	.044		Alcove, Emergency Equipment			15	1	15		1.4	1	1.4		Locate close to Exercise Testing Room
04	.045		Alcove, Linen Cart			15	1	15		1.4	1	1.4		
04	.046		left intentionally blank											
			Zone 7: Staff & Administrative Support		**subtotal net area**			**962**		**subtotal net area**		**89.4**		
04	.047		Office, Booking			160	1	160		14.9	1	14.9		
		.01	*- workstation*	*2*	*50*				4.6					
		.02	*- storage, printer/files*	*1*	*60*				5.6					
04	.048		Office, Radiologist/Reading Room			140	1	140		13.0	1	13.0		Include reading station
04	.049		Office, Charge Tech			100	1	100		9.3	1	9.3		Private office

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
04	.050		Office, Shared (swing space)			120	1	120		11.1	1	11.1		
		.01	*- workstation*	*3*	*30*				2.8				For senior technologists (7 shared across both sites) and learners	
		.02	*- files*	*1*	*30*				2.8					
04	.051		Washroom, Staff			50	1	50		4.6	1	4.6		
04	.052		Staff Lounge			392	1	392		36.4	1	36.4		
		.01	*- hand hygiene sink*	*1*	*10*				0.9					
		.02	*- kitchenette*	*1*	*60*				5.6					
		.03	*- table and chairs*	*10*	*25*				2.3					
		.04	*- lockers, staff*	*36*	*2*				0.2					Provide cube lockers. If adjacency permits, could be integrated into shared locker space with ED component
04	.053		left intentionally blank											

05. Emergency Department

Functional Description (Current and Projected)

Service Overview

The South Muskoka Memorial Hospital (SMMH) ED accommodates a full range of unscheduled emergency services to meet the needs of adults and children presenting to the hospital. Each patient presenting to the ED is triaged according to the five eCTAS classifications and, is treated in response to his or her specific clinical needs. Care is provided by nurses, physicians, consulting physicians, and Allied Health professionals working as an integrated team supported by patient registration staff along with clinical and non-clinical support services. The scope of services provided within the ED will remain unchanged.

The SMMH ED must, notably, provide support to patients of the following specialty services located at this site:

- Obstetrics
- Chemotherapy.

The current ED does not have a separate Ambulance Entrance which is best practice. This shortfall affects Triage, waiting and generally negatively impacts the patient experience. There is a need to right-size the department and address poor adjacencies. Visibility is poor and this affects patient safety, particularly at Trauma/Resuscitation.

Planning Principles and Assumptions

The following considerations are critical to the planning and development of the ED:

- The department will be planned to address the significant seasonal increases in ED volumes arising from visitors/tourists to the area.
- Scheduled visits to ED will shift to the Ambulatory Care Clinics.
- Fracture Clinic will be based out of Ambulatory Care.
- Obstetrics patients under 20 weeks will be cared for in ED; patients over 20 weeks with obstetrical issues will be assessed and managed in the LBRP on the Acute Inpatient Unit (Labour, Birthing, Recovery and Postpartum) room in the Acute Inpatient Unit.
- Walk-in and ambulance entrances to the ED will be separate, with the associated support spaces.
- An emphasis on up front assessment and care, including ECG's directly adjacent to Triage to expedite decision-making.
- Continued use of medical directives to facilitate team-based care.

- Lean approach to patient care, with a focus on value-add steps only and streamlined interactions.
- Waiting patients will be reassessed on a regular basis to determine if any change in status has occurred and re-evaluate the level of risk.
- Fast Track/Rapid Assessment Zone (RAZ) appropriately sized to assist with peaks in volume, as well as education and teaching. Medical care in this zone would potentially be led by a Nurse Practitioner (NP).
- Spaces and equipment will be standardized to as great an extent as possible.
- Sufficient spaces will be available to hold patients awaiting transfer and continue to provide care in a safe and supportive environment, particularly for mental health patients.
- A GEM Nurse will be in place at SMMH to assist with system navigation and discharge planning for geriatric ED patients.
- OT, PT, and SW resources will be available to support assessment and discharge planning.
- It is anticipated that expanded EMR capabilities and further supports will decrease the non-clinical responsibilities of staff and physicians.
- Security Department's presence will increase in the ED and associated workspace will be provided.
- Community mental health will be expanded to provide crisis support beyond the current daytime hours and offer options for mental health care beyond the current limitations, alleviating the number of ED visits by this patient population.
- Primary care will be available within the community.

Patient Profile

Based on 2019/20 base year data, the following inferences can be made to describe the SMMH ED patients:

- 3,292 ED visits (15%) are by patients under the age of 18.
- 10,243 ED visits (47%) are by patients between the ages of 18-59.
- 8,109 or 37% of the total ED visits are 60 years of age and older; and of these 2,527 or 31% are 80 years of age and older.

Mental Health visits continue to increase, year over year. The 2019/20 data showed 699 visits for patients with a Most Responsive Diagnosis of Mental Health. In 2021/22 there were 1,043 visits.

Table 1. Presenting Diagnosis

		2017/18	2018/19	2019/20
Total		**6,461**	**6,660**	**6,904**
1	Contusion/Abrasion	1,032	1,242	1,532
2	Pain: Abdominal	908	861	795
3	Fracture Sprain Strain & Dislocation	718	722	742
4	Chest Pain	732	705	676
5	Open Wounds: Extremities	747	711	635
6	Urinary Tract Infections	687	667	636
7	Skin Disorders: Minor	534	554	650
8	Upper Respiratory Infection	521	565	605
9	Screening & Observation for Suspected Conditions	47	42	141
10	Back Problems	535	591	492

Scope of Services (Current and Projected)

The ED triages, assesses, and treats unscheduled emergency patients 24/7 with complete physician coverage. Services will continue to include, but are not limited to, the following:

- Trauma management and resuscitation
- Stabilization and transfer of critically ill patients requiring resources not available at the Huntsville Hospital
- Assessment and initial treatment of life threatening and/or major injuries or acute illnesses
- Assessment and treatment of non-critical emergency conditions (minor injuries, lacerations, fevers, etc.)
- Examinations, diagnostic testing, treatments, and referrals
- Collaborating with clinical support services needed to assist in diagnosis to ensure timely testing and results required to support clinical decision-making
- Assessment and stabilization of mental health patients, and appropriate disposition
- Observation of patients for up to 18-24 hours as required for clinical decision-making, followed by transfer to the appropriate hospital, admission, or, in some cases, discharge
- Patient education and counselling for self-care management and follow-up

- Discharge planning including linkages to available community resources such as Home and Community Care and Community Mental Health Services
- Participation in medication reconciliation
- Providing rapid access services to non-urgent patients
- Setting, splinting, and casting of fractured bones and dislocation of joints

The table that follows describes the current and planned number of patient treatment spaces for the 2029/2030 planning horizon.

Table 2. Treatment Spaces

Category	*Current* 2019/20	*Projected* 2031/32
Total Patient Spaces	11	22
Acute Care Zone	9	2
General Care & Observation Zone	2	13
Rapid Access Zone	0	7

Notes:

1. Current Rapid Access Zone (4 beds) is outside of the ED.
2. Future General Care and Observation Zone includes 4 Mental Health rooms. Overflow can be accommodated in other rooms in this zone.

Education

The ED will continue to provide opportunities for the education of numerous individuals, including, but not limited to:

- Medical students and residents with the Northern Ontario School of Medicine
- Physician assistants
- Nursing and nursing students
- Allied Health professionals (including OT, PT, RT, and Social Work)
- Pharmacy residents/students
- Co-op students
- Paramedics.

Research

Not applicable to this component.

Linkages/ Partnerships

Key internal linkages include:

- Diagnostic Imaging (DI)
- Acute Inpatient Units (including Obstetrics)
- Surgical Services
- Integrated Stroke Unit
- ICU
- Allied Health Services including Occupational Therapy, Physiotherapy and Social Work
- Laboratory Services
- Pharmacy Services.

Key external linkages to local health service partners are included in the following table.

Table 3. Linkages and Partnerships

Linkages/Partnerships	Description
Ontario Provincial Police (OPP)	Support with safety threats
Muskoka Paramedic Services	Arrival with patients; transfers to other providers
Home & Community Care	Assessments for patients requiring home care services, facilitating discharge
CCSO/Ornge Transfers	Guidelines/standards/resources/ambulance service and medical transfers
Victims' Services	Support for patients
Children's Aid Services (CAS)	Assistance with suspected abuse cases
CMHA Crisis Workers	Assistance with mental health patients
Federal Nursing Station	Referrals for Indigenous patients
Corrections Canada	Prisoners' escorts

Workload (Current and Projected)

Table 4. Historical and Projected Workload

		Historical			Projected
Emergency Department	**Acuity (eCTAS)**	**2017/18**	**2018/19**	**2019/20**	**2031/32**
Total Annual Visits		21,873	22,036	21,644	24,299
	Level 1	101	95	176	214
	Level 2	3,187	2,771	3,454	4,111
	Level 3	9,541	9,878	9,832	11,783
	Level 4	8,416	8,760	5,751	5,751
	Level 5	602	510	2,383	2,383
	Other	26	22	48	57

Note: mental health volumes have increased by 40% since 2019/20 and volume of CTAS 2 patients has increased by almost 200 visits per year (2022/23).

Operational Description

Organization and Management

The Emergency Department is managed by a Clinical Lead who reports to the Corporate Manager of ED. The Chief of Emergency Department oversees the physicians who provide ED coverage.

Hours of Operation

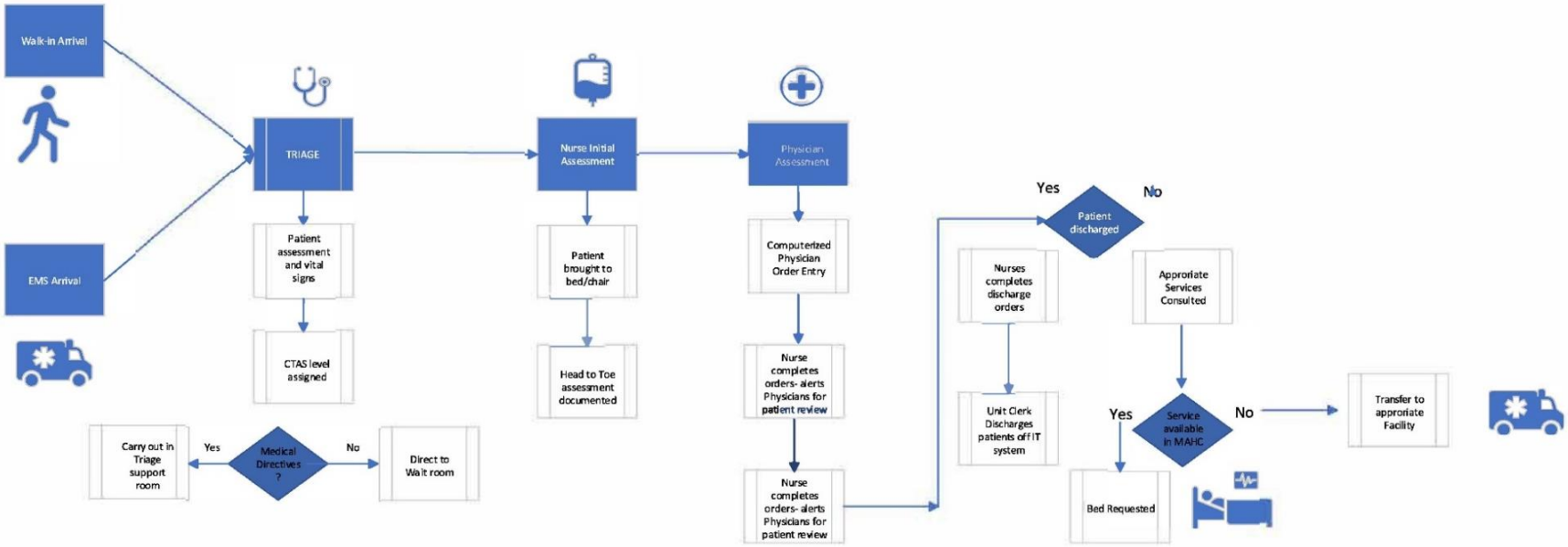
Current and future hours of operation are noted in the table below.

Table 5. Hours of Operation

	Current			Projected		
	Weekdays	**Saturday**	**Sunday**	**Weekday**	**Saturday**	**Sunday**
ED	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours

Workflow

The following workflow diagram summarizes the desired future workflow for both walk-in patient arrival and patients arriving by ambulance.



Patient Registration

In the future, registration will occur in one of four locations: online/mobile app, at the self-registration kiosk, or at the chair/bedside. All other registration activities such as payment transactions, funeral release, etc. will be carried out at the main registration desk.

Paediatric Patients

Generally, paediatric patients will follow the same workflows as adult patients: however, certain Exam/Treatment Rooms will be designed to be paediatric friendly.

Patients Arriving with Known or Suspected Infectious Disease

Self-screening of infectious diseases will occur when patients arrive at the Walk-in Entrance. The Walk-in Entrance will have an Infection Control Kiosk with hand sanitizer and masks for those patients presenting with a cough or other defined symptoms. The Triage RN will also perform screening at the patient's initial assessment.

If a patient requires isolation, the patient will be escorted directly to an appropriate treatment space, depending on their CTAS level and urgency.

Patients can be separated within the Waiting Room if designed appropriately.

Patients Arriving Requiring Decontamination

Patients requiring decontamination will be assisted by ambulance personnel and/or nurses as required. Patients may be required to use decontamination showers in the ambulance bay. Patients will then enter the Decontamination Room from the bay and be washed down before being brought to an appropriate treatment space. If a patient is off gassing, they must stay in the Decontamination Room or be moved into an airborne isolation room (AIIR).

If walk-in patients requiring decontamination present themselves at the Walk-in Entrance, they will be directed back outside to the decontamination entrance in the ambulance bay.

Patients Arriving - Victims of Sexual Assault

Patients who are victims of sexual assault will follow the same workflows as other patients. After initial assessment and once medically cleared, the patient will be referred to Orillia, MAHC's regional partner.

Patients Arriving with a Primary Mental Health or Substance Use Diagnosis

Generally, adult patients with a primary mental health diagnosis, will follow the same workflows as other patients. They will be triaged by an RN to determine their status. They will be directed to the most appropriate safe space.

Following the initial physician assessment and initial diagnostics, patients who can be medically cleared after initial physician assessment, but who still require additional mental health resources, will be referred to a community resource or held for transfer to an inpatient psychiatry service. Patients who cannot be medically cleared after initial assessment, will remain in the most appropriate Treatment Room e.g., Mental Health room, ICU.

Paediatric patients (16 years and under) with a primary mental health diagnosis, will follow the same workflows as the adult patients.

Aggressive Patients and/or Patients Arriving with Police

If a patient arrives with OPP (with or without restraints) they will quickly be assessed by an RN in the mental health safe room, near the Ambulance Entrance, and then would be expedited to the most appropriate Treatment Room where Triage and registration will take place. Additionally, if a patient arrives on their own and is aggressive or becomes aggressive, they will also be expedited to the mental health safe room, prior to Triage and diagnostics. MAHC Security will be called to assist with the movement of aggressive/restrained patients within the ED.

Patient Care & Discharge

Patient care will be coordinated primarily through the nurse and and/or Emergency Physician.

Telehealth and virtual health technologies will be available in all patient treatment zones to enable all care provider consults as required, including RAZ.

Cardiac/Central monitoring will be available for the General Care & Observation Zone and the Acute Treatment Zone.

Medical directives are initiated upon patient arrival and followed until patient discharge for some patient populations presenting to the ED.

CTAS Levels 4 and 5 will be cared for in the RAZ following Triage.

CTAS Level 3 will be cared for in the General Care and Observation Zone, and a small proportion in RAZ.

CTAS Levels 1 and 2 will be cared for in the Acute Treatment Zone and potentially in the Trauma/Resuscitation Room.

The decision to discharge is at the discretion of the ED Physician. Discharge from the ED may be to the following destinations:

- Discharged to leave the ED with discharge instructions emailed to the patient and the discharge report sent to the patient's family physician, from the EMR
- Transfer to another facility
- Admission to an inpatient bed
- Emergency surgery
- Morgue (Body Holding Area).

Deceased patients (with the exception of Coroner's cases and for specific religious practices) will be prepared for transport to the body holding area by clinical staff. The patient's personal effects will be given to the patient's family (or the patient's family is called to claim items) or will be transported with the patient to the body holding area. In instances where a Coroner is required, a deceased patient will remain in their treatment space until the Coroner comes to transport the patient. For religious reasons, some patients will be transported directly from the ED by vehicle to another location (such as a mosque).

General Support Activities

Diagnostic & Therapeutic Services

Most patients requiring DI testing will be ambulatory and will walk to and from the DI department unaided. If the patient is not ambulatory, DI Porter Aides will transport patients to and from DI or they will be escorted by clinical staff if unstable.

Blood will be drawn by laboratory staff and transported to the Laboratory by a staff member. Point of Care Testing (POCT) will be carried out in the ED, potentially by Lab staff.

Pharmaceutical Services

All medication and central IV accessories will be stored and distributed from the Medication Room. Most medication including first doses and narcotics will be maintained in automated dispensing units (ADU). Those not located within the ADU will be stored in locked cupboards or refrigerators.

The Medication Room will be acoustically private and will contain ward stock, a refrigerator dedicated to medications only, hand hygiene sink, a countertop working area with computer access, and adequate space for storage. The room will meet specifications for the safe storage and preparation of medication. To support patient safety, the work area will accommodate up to two clinical staff members with carts at one time. Medication carts must be locked in a secure space when not in use.

The clinical pharmacist will support the Care Team, completing medication reconciliation immediately following Triage, either in-person or electronically. Throughout the ED, the clinical pharmacist will be available to assist with care planning, changes/substitutions and support student and patient education.

Supplies & Linen

Clean Supply Rooms will include storage systems standardized to MAHC requirements. The Clean Supply Room will be located within the ED to equalize travel time to each treatment space, to as great an extent as possible. PPE supplies will be stored in an open cabinet outside each patient room (with additional shelving for other supplies as necessary).

Materials Management staff will monitor and replenish supplies for all Clinical Services, using a top-up system with high-density shelving. The delivery cycle will be determined by minimum and par-level stock of all products. For planning purposes, the number of monitored carts will be established with the Materials Management Team. From time to time, the Unit will exceed the daily quota of certain supplies, and they will call for the delivery of extra supplies as needed.

Linen carts will be delivered on a regular basis to ED. The carts will be stored in the Clean Supply Room on the Unit. The Clean Supply Room will also accommodate a blanket warmer.

Sterile instrument packs for procedures will be delivered by MDRD and stored in the Clean Supply Room.

Soiled Collection & Disposal

Soiled material will be collected and contained as close to 'POC' as possible and aggregated for removal to the Soiled Utility Room. In addition, planning will contain soiled material for transport especially on elevators and provide for managing and handling hazardous or contaminated items.

Soiled Utility Rooms will be distributed throughout the zones. The Soiled Utility Rooms will accommodate:

- A designated area for used instruments for collection and return to MDR (who are responsible for the cleaning, decontamination, sterilization and packaging of all procedural equipment and instruments)

- Bins/transfer carts for linen, recyclables, medical waste, and general waste
- A disposal unit for liquid waste.

EVS Transport Staff will continue to collect waste, recycling and dirty linen from the Unit.

All equipment cleaning (e.g., commode chairs or wheelchairs) will be centralized and not cleaned on the Unit. All equipment will be transported to the centralized cleaning space. If visibility soiled, will be covered for transport.

Equipment

Stored in the patient care areas:

- Emergency/crash carts for resuscitation, difficult airways (3 adult and 1 paediatric). These are monitored by the nursing staff with support from Respiratory Therapy and Pharmacy to ensure supplies/medications are replenished and updated.
- A designated number of pumps, monitors, respirators and other powered equipment will be stored in a central location within the treatment area.
- Large devices on wheels e.g., ambulatory support devices, patient lifts, blanket warmer, treatment carts (casting, ENT, others) will be stored in designated alcoves.
- Ice machine for treatment, potentially within the Nourishment Station.
- POC Ultrasound (2).
- ECG machines (4+).

Medical equipment, IV poles, commodes will be stored in an enclosed room. Carts, mobile shelves, peg boards and open floorspace will be allocated to maximize the efficiency of the area.

The configuration of the Equipment Room will accommodate cross circulation from opposing entries to facilitate access and retrieval of equipment. Access to a power bar or multiple outlets at waist height will be used to maintain or recharge any electronic equipment.

Environmental Services

Cleaning will be carried out by EVS. They will utilize the Housekeeping Room provided within ED. EVS will assist with the turnover of patient spaces and cleaning of equipment.

Nourishment and Meals

A Nourishment Centre will be available in ED for staff to access ice, water and snacks to assist with patient well-being. Stocking and upkeep will be managed by Nutrition and Food Services.

Patient Transport

Nursing staff and attendants are responsible for patient transfer within the hospital. MAHC will consider the addition of porters for the future.

Administration & Staff Spaces

The Unit Clerk and Unit Coordinator (Charge Nurse) will maintain responsibility for daily activity in ED from a centralized Care Team Station. Adjacent to the Care Team Station will be a Care Planning Room with a table and seating and shared workstations. These shared workstations will be available for Allied Health professionals, nursing and medical staff, students and other external partners.

The Unit will have a Consultation Room to meet with patients and families, but can also be used for private telephone calls, consultations, dictation, or virtual care sessions.

Offices will be provided for the Chief of Emergency Medicine, Clinical Lead, Clinical Nurse Educator and the ED Manager. Allocation of staff spaces will follow the corporate model.

Staff will share a common, gender-neutral locker room within the building. The external linen provider provides scrubs for the ED. These will be stored in a scrub dispenser machine within the locker room. A shared staff Lounge will be available.

Security Services

Security will have a workstation in the ED. CCTV cameras will be located at the entrances, Waiting Room, Medication Rooms and Mental Health rooms. Mobile duress buttons will be provided for staff, physicians and volunteers. Fixed Code White buttons/pull stations will be located in high-risk areas.

Enabling Technologies

Information Systems

Clinical documentation, including orders for medications, labs and diagnostic tests will occur in MAHC's Health Information System (HIS). This system will be fully integrated to optimize patient safety, facilitate easier patient access to their health information, standardize assessment and workflows for clinicians and remove any technological barriers that prevent timely care.

Key components of the system include:

- Standardized electronic documentation to facilitate interprofessional collaboration and connections with community resources
- Computerized Provider Order Entry (CPOE) with clinical decision support
- Patient portal with access to their health information, questionnaires and e-scheduling

- Voice dictation at source
- Mobile computing
- Real-time tracking
- Electronic referrals platform
- Virtual care
- Data privacy and security.

Wireless Technology

Planning assumes the availability of wireless technologies which will have a significant impact on communications, data recording, data retrieval, and documentation within the ED. In each treatment station there will be Wi-Fi for patient use in accessing the internet. Electronic dashboards will be utilized which can display clinical information from Cerner HIS. Bedside terminals will provide the following capabilities and services:

- Educational content
- Electronic health record
- Hospital information
- Phone calls (softphone)
- Nurse call button
- Environmental controls, including lights and room temperature.

Virtual Care

ED treatment stations will have the capability to host remote rounds for off-site specialists to participate and view/interact with the patient and Care Team. Mobile equipment is preferred. Meeting Rooms will be equipped with digital displays, video- and teleconferencing capabilities and presentation inputs to provide flexible and adaptable collaboration spaces. OTN facilitates assessments and consultations.

Communication Systems

The ED will be equipped with a state-of-the-art communications system in order to facilitate activities. Specifications will be developed in consultation with the electrical consultant, architect, and users during the design stage and are expected to include such items as the following:

- Telephone(s) for staff use – the number to be determined during the design stage
- Telephone and television cabling, as determined during design

- Nurse call system from each patient bed
- Staff-to-staff wearable communication technology (e.g., Vocera)
- Video camera and audio link to the secure entrance, with remote control of the entrance door to control and allow visitor access
- Emergency call bells from patient washrooms
- Code Blue call buttons in each patient bedroom.

Staffing (Current and Projected)

Table 6. Current and Projected Staffing

	Current	***Projected 2031/32***			
Category	**2022/23 FTE**	**Total FTE**	**Headcount per Day**	**Headcount per Evening**	**Headcount per Night**
Total	30.38	62.34	18	11	11
Ward Clerk	2.25	5.04	1	1	1
Clinical Lead	0.50	1.00	1	0	0
Manager	0.50	0.50	1	0	0
RN	22.19	30.24	6	6	6
NP	1.00	1.40	1	0	0
RPN	2.44	15.12	3	3	3
PSWs	0.00	5.04	1	1	1
Clinical Educator/Clinical Scholar	0.50	1.00	1	0	0
Mental Health Navigator	0.50	1.00	1	0	0
Indigenous Patient Navigator	0.50	1.00	1	0	0
GEM Nurse	0.00	1.00	1	0	0

Notes:

1. Manager supports both sites.
2. HCC and SASOT staff will often work in the ED.

3. OT and PT staff will consult within the ED. See Inpatient components for staffing.
4. Spiritual Care staff will provide support within the ED. See Main Lobby component for staffing.
5. RT staff will support the ED. See Critical Care component for staffing.

Design Objectives

Locations and Adjacencies

This component should have the following adjacencies in priority order:

1. The component should be located adjacent to DI and should have access via service circulation for the quick and safe movement of patients (who may be gowned) and for collaboration of staff.
2. The component should have proximate access to and from the inpatient units (Medical/Surgical, Critical Care) for the movement of patients and collaboration of staff.
3. The component should have proximate access to the Body Holding area via service circulation.

Internal Organization

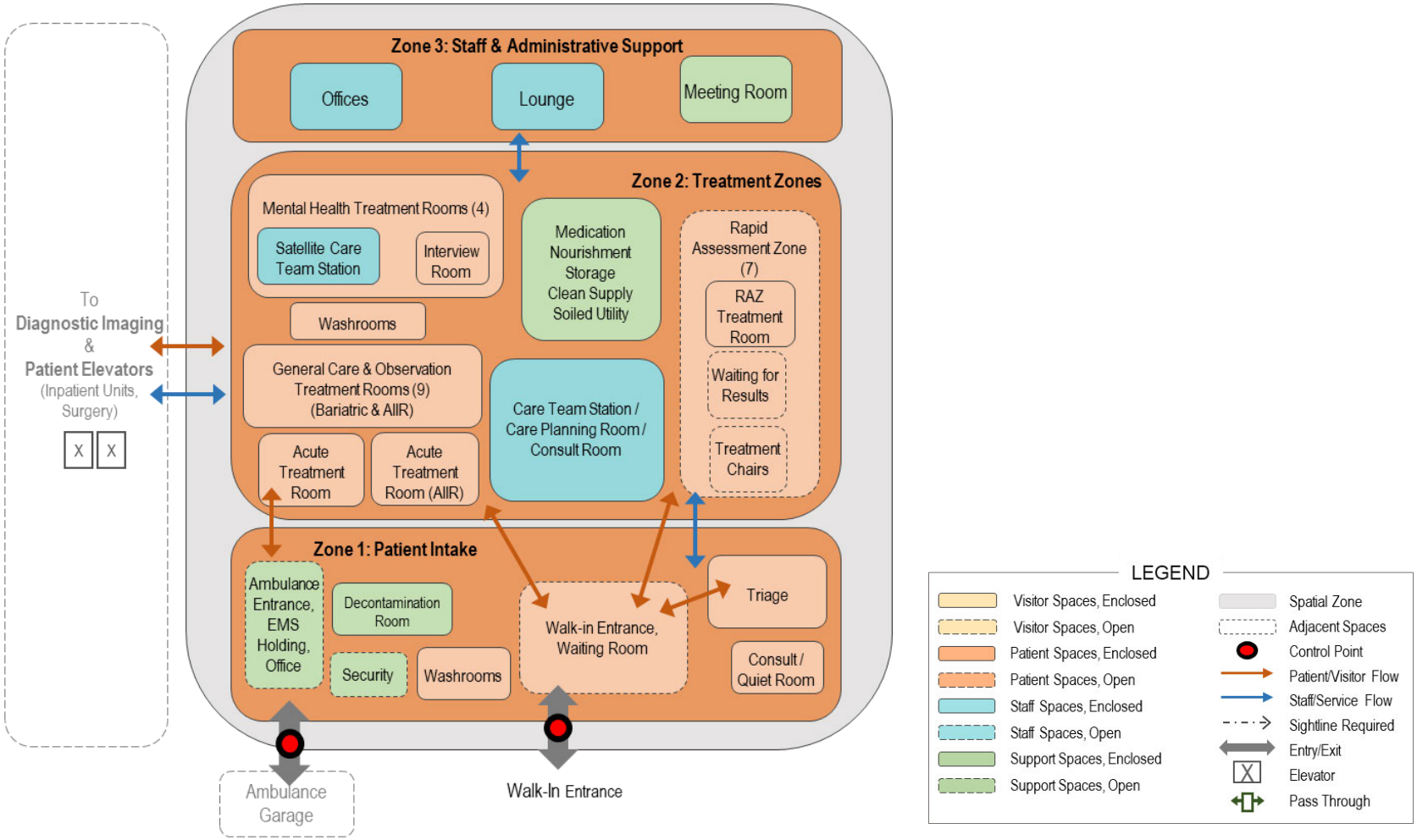
The ED shall be organized into three zones: Patient Intake Zone, Treatment Zone and Staff/Administrative Zone which will share a central Care Team Station and Support Spaces.

The Treatment Zone will be further divided into:

1. RAZ.
2. General Care & Observation, including Mental Health. There should be the ability to close off the corridor to the Mental Health rooms for safety and acoustics, but also the ability to open up the corridor to allow for use of these rooms for other types of patients, as required. A direct and expeditious route to the Mental Health rooms from the Ambulance Entrance is important.
3. Acute Care which should be directly adjacent to the Ambulance Entrance.

The spatial organization should be generally as shown in the diagram on the following page. The diagram illustrates conceptual relationships only and should not be treated as an architectural design. It should only be used to emphasize and identify important adjacencies and patient/visitor flows and staff/service flows. The diagram is not to scale.

Figure 1. Functional Relationship Diagram



Special Considerations

Infection Prevention and Control

Infection Control in the ED will be supported with:

- Zoning of the space to minimize cross circulation of patients
- Private enclosed treatment spaces for all acute patients
- Availability and effective location of AIIRs as follows: one in the Acute Treatment Zone and one in the General Care & Observation Zone
- Separating locations of acute care patient care areas from non-acute patient care areas
- Distribution of PPE in appropriate sizes on carts or purpose-built cabinets at all public entries and throughout the Treatment Rooms.

All patient treatment spaces will have hand hygiene sinks immediately available to entering clinicians, within view of the patient. For open treatment areas a minimum of one hand hygiene sink per three patients will be provided.

Staff hand hygiene sinks will also be provided at:

- Care Team Station
- Medication Room
- Soiled Utility and Clean Supply Rooms
- Housekeeping Room.

Important considerations include:

- Separation of clean and soiled materials
- Transportation routes for soiled materials separate from public corridors, when possible
- Containment of soiled material for transport to the disposal point
- Appropriate ventilation and pressure control to maintain containment within rooms.

Wayfinding

The ED's Walk-in Entrance is frequently designated as the facility's 24-hour entrance. Access from this point to the public elevators for patients, particularly expecting mothers or family responding to emergent developments should be direct, easy and supplemented by effectively placed signage.

Wayfinding should be intuitive between Triage, the patient care zones and DI.

All entry/exit, alarm, fire detection, fire exit plans, sprinkler systems should be labelled; signage to be well lit. Wayfinding should be designed to address the visual challenges some patients may be experiencing.

Accessibility & Corridor Design

Access to all public spaces, including washrooms and treatment spaces, must be accessible. Internal corridors must be wide enough for two wheelchairs to comfortably pass each other. Wherever it is anticipated that a stretcher will be moved, the corridor must be sufficiently wide to allow for getting a stretcher in and out of the room. Corridors will not be used as places for storage.

A ceiling-mounted patient lift will be provided in each patient room.

Acoustic

Every effort must be made to maintain a quiet environment in spite of the sounds of equipment and staff working in the ED. Acoustic privacy between patient treatment spaces is mandatory. Appropriate sound dampening techniques including insulation, and, in some situations, mechanical support may be considered, i.e., white noise.

Environmental

In consideration of the philosophy and practice of patient-centred care, the environment should be as non-institutional in appearance as possible, with a warm and welcoming décor that is pleasant and conducive to health and wellness. The environment should incorporate natural elements from the outdoors. Opportunities to bring natural light and views to circulation within the ED will be important to staff working in this component.

Medical Gases

Medical gases (oxygen, air, and suction) will be provided at each patient treatment station. The number of outlets will be determined during the next stage of planning. The mechanical consultant will ensure that the number of outlets meets the applicable Code requirements.

Patient Privacy

Though patient privacy is achieved through staff behaviour, the physical environment can be a positive contributor. For example, placement of doors and swings of doors can impact patient privacy. The architect shall maintain vigilance during the design stage in this regard.

Lighting

Lighting shall be designed to meet the clinical activities performed in an ED. Patient comfort must also be addressed, including patient-controlled lighting.

Lighting at staff work areas must be carefully considered to limit eye strain.

Ergonomic Considerations	Staff work environments (desks, counter-heights, etc.) shall be designed to ensure that ergonomic requirements are met.
Security	The design of the space should help to ensure the safety and security of all patients/family, staff, and visitors to be enhanced through the design. The configuration of the ED will ensure that Care Team time with the patient is maximized and that travel time to support spaces is minimized. Visualization of the patient treatment stations from the Care Team Station(s) should be achieved to as great an extent as possible. A second secure entrance/exit will be required for delivery/removal of material and also allow staff an alternate route out of the ED. Each patient space will be equipped with a Code Blue call button.
Codes & Standards	In addition to the above criteria, the facility must conform to recognized national, provincial, and local building codes and standards as they may relate to safety and accessibility for patients, staff, and visitors. Architects are also instructed to refer to CSA Z8000-18 Canadian Health Care Facilities.

Projected Space Requirements

Table 7. *Space Table*

			Component Gross Area (CGSF): TOTAL				**13,040**				**1211.5**		**Not including Ambulance Garage**
			Component Gross Area (CGSF / CGSM) - Ambulance Garage				2,520				(234.1)		
			Net to Gross Ratio				1.50				1.50		
			Total Net Area (NSF / NSM)				1,680				156.1		
			Component Gross Area (CGSF / CGSM) - Emergency Department				**13,040**				**1211.5**		
			Net to Gross Ratio				1.50				1.50		
			Total Net Area (NSF / NSM)				8,692				809.4		
CO	**RN**	**SN**	**Element**	**QTY**	**NSF**	**Unit Area (sf)**	**Units**	**Total Net Area (sf)**	**NSM**	**Unit Area (sm)**	**Units**	**Total Net Area (sm)**	**Room Intent**	**Specific Design Criteria / Comments**
			Ambulance Garage (Exterior)			**subtotal net area**		**-**		**subtotal net area**		**0.0**		
05	.001		Ambulance Garage			1,680		-		156.1		0.0		External. Plus parking for 2 other vehicles.
		.01	*- bay, ambulance, law enforcement*	*4*	*420*				*39.0*					Four - 12' X 35' bays; enclosed low-level heating in winter
			Zone 1: Patient Intake Zone			**subtotal net area**		**2,115**		**subtotal net area**		**196.5**		
05	.002		Ambulance Entrance			210	1	210		19.5	1	19.5		
		.01	*- vestibule*	*1*	*120*				*11.1*					
		.02	*- wheelchair/stretcher alcove*	*1*	*90*				*8.4*					Assumes space for 2 stretchers, 4 stackable wheelchairs
05	.003		Decontamination Room			135	1	135		12.5	1	12.5		
		.01	*- decontamination room*	*1*	*80*				*7.4*					Directly accessible from ambulance bay
		.02	*- anteroom*	*1*	*55*				*5.1*					
05	.004		EMS Holding			190	1	190		17.7	1	17.7		
		.01	*- stretcher, patient holding*	*2*	*80*				*7.4*					Incl. drop down work surface
		.02	*- hand hygiene sink*	*1*	*10*				*0.9*					
		.03	*- alcove, linen/supplies*	*1*	*20*				*1.9*					
05	.005		Office, EMS/Police/Staff			100	1	100		9.3	1	9.3		
05	.006		Washroom, EMS/Police/Staff			50	1	50		4.6	1	4.6		
05	.007		Washroom, Patient, Accessible			60	1	60		5.6	1	5.6		

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
05	.008		Walk-in Entrance			190	1	190		17.7	1	17.7		
		.01	*- vestibule*	*1*	*100*				*9.3*					
		.02	*- self-registration kiosk*	*1*	*10*				*0.9*					
		.03	*- wheelchair/stretcher alcove*	*1*	*80*				*7.4*					Accessible for Triage Nurse
05	.009		Workstation, Security			50	1	50		4.6	1	4.6		Worksurface with computer terminal & viewing screens (2)
05	.010		Waiting Room			475	1	475		44.1	1	44.1	Based on 41 patients during peak hours	
		.01	*- information display*	*1*	*5*				*0.5*					Wall-mounted
		.02	*- seat, standard*	*12*	*20*				*1.9*					Integrate outlets for charging devices
		.03	*- wheelchair/scooter/bariatric*	*6*	*30*				*2.8*					
		.04	*- vending machine*	*2*	*20*				*1.9*					
		.05	*- telephone(s)*	*1*	*10*				*0.9*					
05	.011		Washroom, Public, Accessible			60	2	120		5.6	2	11.1		
05	.012		Triage			395	1	395		36.7	1	36.7		
		.01	*- interview, assessment area*	*2*	*140*				*13.0*					
		.02	*- secure alcove, equipment storage*	*1*	*30*				*2.8*				For portable oxygen tank(s), stretcher, wheelchairs, ECG	
		.03	*- alcove, linen/supplies*	*1*	*20*				*1.9*					
		.04	*- ECG*	*1*	*65*				*6.0*					
05	.013		Consult Room/Quiet Room			140	1	140		13.0	1	13.0		Access from public and treatment areas
05	.014		left intentionally blank											
05	.015		left intentionally blank											
			Zone 2: Treatment Zones			**subtotal net area**		**5,555**		**subtotal net area**		**516.1**		
05	.016		Care Team Station			330	1	330		30.7	1	30.7		
		.01	*- workstation, charge nurse*	*1*	*50*				*4.6*					
		.02	*- workstation, unit clerk*	*1*	*50*				*4.6*					
		.03	*- workstation, touchdown*	*2*	*30*				*2.8*					
		.04	*- workstation, stand-up - teaching space*	*2*	*30*				*2.8*					
		.05	*- central monitors and office equipment*	*1*	*40*				*3.7*					
		.06	*- hand hygiene sink*	*1*	*10*				*0.9*					
		.07	*- congregation*	*1*	*60*				*5.6*					

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
05	.017		Care Planning Room			235	1	235		21.8	1	21.8		
		.01	*- workstation*	*4*	*30*				*2.8*					
		.02	*- table and chairs*	*1*	*75*				*7.0*					
		.03	*- workstation, telephone privacy*	*1*	*40*				*3.7*					Enclosed
05	.018		Rapid Assessment Zone (RAZ)			810	1	810		75.3	1	75.3		
		.01	*- seat, standard*	*7*	*20*				*1.9*					
		.02	*- seat, accessible/bariatric*	*1*	*30*				*2.8*					
		.03	*- treatment chair bays*	*5*	*90*				*8.4*					
		.04	*- treatment stretcher bay*	*1*	*110*				*10.2*					
		.05	*- workstation, touchdown*	*2*	*30*				*2.8*					
		.06	*- hand hygiene sink*	*2*	*10*				*0.9*					
05	.019		RAZ Treatment Room			140	1	140		13.0	1	13.0	For Rapid Assessment. e.g. gyne patients	Fully Enclosed
05	.020		Acute Treatment Room			250	1	250		23.2	1	23.2		Locate directly adjacent to Ambulance Entrance.
		.01	*- patient stretcher area*	*1*	*200*				*18.6*					Provide clear floor area
		.02	*- alcove, workstation*	*1*	*30*				*2.8*					
		.03	*- alcove, hand hygiene sink*	*1*	*10*				*0.9*					
		.04	*- storage, supply cart*	*1*	*10*				*0.9*					
05	.021		Acute Treatment Room, AIIR			280	1	280		26.0	1	26.0		Directly adjacent to Ambulance Entrance.
		.01	*- patient stretcher area*	*1*	*140*				*13.0*					
		.02	*- washroom, 2 piece*	*1*	*60*				*5.6*					Door opens into the room
		.03	*- anteroom*	*1*	*80*				*7.4*					
05	.022		Treatment Room, General Care & Observation			130	9	1,170		12.1	9	108.9		Enclosed with breakaway doors, documentation at bedside
		.01	*- patient stretcher area*	*1*	*120*				*11.1*					
		.02	*- hand hygiene sink*	*1*	*10*				*0.9*					
05	.023		Treatment Room, General Care & Observation, Bariatric			150	1	150		13.9	1	13.9		Enclosed with breakaway doors, documentation at bedside
		.01	*- patient stretcher area*	*1*	*140*				*13.0*					
		.02	*- hand hygiene sink*	*1*	*10*				*0.9*					

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
05	.024		Treatment Room, General Care & Observation, AIIR			280	1	280		26.0	1	26.0		Locate directly adjacent to Acute Treatment
		.01	*- patient stretcher area*	*1*	*140*				*13.0*					
		.02	*- washroom, 2 piece*	*1*	*60*				*5.6*					Door opens into the room
		.03	*- anteroom*	*1*	*80*				*7.4*					
05	.025		Washroom, Patient			60	2	120		5.6	2	11.1		
05	.026		Treatment Room, Mental Health			140	2	280		13.0	2	26.0		Secure design. Provide medical gases within securable, tamper resistant cabinet. Two means of egress. In-room toilet and sink with adjustable plumbing connections. Consider doors to potentially separate this area from other General Care & Observation Rooms
05	.027		Satellite Care Team Station			70	1	70		6.5	1	6.5		
		.01	*- workstation*	*1*	*50*				*4.6*					
		.02	*- storage cabinets*	*1*	*10*				*0.9*				For blankets, restraints etc.	Above and below counter
		.03	*- hand hygiene sink*	*1*	*10*				*0.9*					
05	.028		Interview Room			120	1	120		11.1	1	11.1	For crisis support, navigation	
05	.029		Washroom, Patient, with shower			65	1	65		6.0	1	6.0		Locate adjacent to Mental Health rooms
05	.030		Medication Room			130	1	130		12.1	1	12.1		Locate contiguous with Care Team Station
		.01	*- automated dispensing unit (ADU)*	*1*	*50*				*4.6*					
		.02	*- refrigerator*	*2*	*10*				*0.9*					
		.03	*- medication carts*	*2*	*10*				*0.9*					
		.04	*- hand hygiene sink*	*1*	*10*				*0.9*					
		.05	*- countertop workspace*	*1*	*30*				*2.8*					
05	.031		Nourishment Centre			105	1	105		9.8	1	9.8		
05	.032		Alcove, Point of Care Testing			30	1	30		2.8	1	2.8		
05	.033		Alcove, Emergency Equipment			20	4	80		1.9	4	7.4	For three adult carts, one paediatric cart	
05	.034		Alcove, Carts			15	2	30		1.4	2	2.8	For ultrasound, ECG	

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
05	.035		Equipment Storage			30	3	90		2.8	3	8.4	For treatment carts, mobile X-Ray, stretchers	
05	.036		Equipment Room			120	1	120		11.1	1	11.1	For pumps, IV poles, commodes	
05	.037		Clean Supply Room			120	2	240		11.1	2	22.3		
05	.038		Soiled Utility Room			130	2	260		12.1	2	24.2		
05	.039		Washroom, Staff			50	1	50		4.6	1	4.6		
05	.040		Housekeeping Room			120	1	120		11.1	1	11.1		
05	.041		left intentionally blank											
			Zone 3: Staff & Administrative Support			**subtotal net area**		**1,022**		**subtotal net area**		**94.9**		
05	.042		Office, Shared			100	1	100		9.3	1	9.3	Consultants Office/Multipurpose/Learners	
05	.043		Office, ED Chief			100	1	100		9	1.0	9.3		
05	.044		Office, Shared			140	1	140		13	1.0	13.0	Clinical Leadership	
05	.045		Workroom, Allied Health (2 workstations)			140	1	140		13	1.0	13.0		
05	.046		Lounge			332	1	332		31	1.0	30.8		
		.01	*- hand hygiene sink*	*1*	*10*				*0.9*					
		.02	*- kitchenette*	*1*	*60*				*5.6*					
		.03	*- table and chairs*	*4*	*25*				*2.3*					
		.04	*- soft seating*	*4*	*20*				*1.9*					
		.05	*- workstation*	*1*	*30*				*2.8*					
		.06	*- charging station*	*3*	*4*				*0.4*					
		.07	*- cube lockers, staff*	*20*	*2*				*0.2*					
05	.047		Meeting Room			160	1	160		14.9	1	14.9		
05	.048		Washroom, Staff			50	1	50		4.6	1	4.6		

06. Facilities Support Services

Functional Description (Current and Projected)

Service Overview

Together, Facilities Support Services are responsible for the upkeep, cleanliness and safety of the new hospital and its grounds. It is important that operations are supported by physical facilities with capacity to accommodate projected workloads and provide safe, accessible and clinically effective environments.

Facilities Support Services includes the departments of Plant Operations and Maintenance, Environmental Services (EVS), and Materials Management. Detailed areas of responsibility include building systems, preventive maintenance, groundskeeping, security, parking, housekeeping, waste management, linen/laundry, purchasing, and shipping and receiving.

There are numerous shortcomings with the existing Facilities Support Services' space which limit the effectiveness and safety of staff. Examples include:

- Lack of redundancy of important building equipment e.g., generators
- Repairs and maintenance have to be completed in the physical plant rather than a separate shop area
- Equipment awaiting repair sits in the hallways, blocking traffic and posing a fire hazard
- Clean supply and soiled utility rooms are under-sized
- No separate biomedical waste storage room
- No proper equipment cleaning space
- Insufficient space at the Loading Docks to accommodate skids, breakdown deliveries and set-up equipment
- No separation of clean and soiled Loading Docks
- Lack of a compactor (Huntsville)
- Lack of space for Security personnel in the ED and inappropriate spaces for the safety of staff and mental health patients in ED.

MAHC recognizes the opportunity to achieve efficiencies with Materials Management by establishing one site as the primary receiving site and operating an intercampus transport service to the secondary site. Given its closer proximity to the Greater Toronto Area, the primary site will be SMMH.

Planning Principles and Assumptions

In the future, Facilities Support Services will operate under the following assumptions and operating parameters:

- Proper in-house shops will be provided in order for hospital staff to complete work, due factors such as lack of local tradespeople.
- Fixtures and equipment will be standardized across the two sites to streamline parts and for consistency for Maintenance staff. Building lock systems will be consistent and reflect the latest in security technology.
- The goal will be to design a facility and supportive security infrastructure that creates a feeling of safety for patients, visitors, and staff while remaining a welcoming and inclusive environment. Security strategies will aim to protect personal safety. Systems such as controlled access, cameras and durress buttons will be thoroughly planned to support the corporate approach to prevention and risk mitigation.
- Security will assume responsibility for Lost and Found; Finance will retain responisibility for identification (ID) badges.
- Streamlining of responsibilities for parking given it is currently shared with Finance and Information Technology (IT).
- Biomedical Engineering will continue to be outsourced, however, sufficient space will be available in-house for the work of this company as well as other equipment vendors.
- Linen/laundry will continue to be provided by an outside contractor but EVS staff will continue to deliver and collect laundry. Linen deliveries will increase from five days per week to six or seven days.
- In-house laundry will be available for individual items such as slings, kitchen rags, and some patient clothing.
- MAHC's two sites will continue to function with common/mutual contracts, but suppliers will deliver to SMMH. Stores at SMMH will be sized to accommodate volumes for both sites as well as a Supply Cart Holding area for supplies awaiting transport to Huntsville. Huntsville District Memorial Hospital (HDMH) will a small Stores, sized to accommodate back-up/emergency supplies.
- Doubleheight warehousing within Stores.
- The top-up system will be continued by Materials Management. Clean supply and Storage rooms will be stocked with high-density shelving.
- There will not be a pneumatic tube system at SMMH.
- Portering will be explored as a formal role within the organization.
- A real-time locating system (RTLS) will be used to track equipment.
- Clean rooms, soiled rooms, Storage spaces will be adequately sized and located within easy walking distance for staff.

- Meals on Wheels will have access to the kitchen for picking up meals, separate from the Loading Docks.
- The deceased will be picked up from the Body Holding Area.

Patient Profile

Not applicable to this component.

Scope of Services (Current and Projected)

Plant Operations and Maintenance encompasses:

- Operation and maintenance of building systems
- Infrastructure projects, capital projects/renovations
- Preventive maintenance
- Painting, plumbing, electrical, carpentry. Some welding and low pressure steam-fitting
- Workplace Hazardous Materials Information System (WHMIS) and Fire Safety
- Groundskeeping and snow removal
- Move management
- Equipment repairs
- Security including, but not limited to parking enforcement, Code responses, facility monitoring, building and door access, computer access, swipe card technology, and security cameras. Assistance with Morgue (body holding) and access by funeral homes
- Parking lot maintenance.

EVS encompasses:

- Housekeeping
- Room turnover and set-up
- Equipment cleaning
- Waste Management
- Project work e.g., floor care, window care

- Terminal cleans
- Delivery and pick-up of linen/laundry.

Materials Management involves:

- Purchasing of supplies and materials, and capital equipment. Contract management. The following departments are responsible for their own purchasing: Pharmacy, Food Services, Plant Operations and Maintenance
- Shipping and receiving
- Stores
- Inventory and distribution
- Receipt of mail from Canada Post and couriers. Distributed by Finance
- Furniture & Equipment Storage.

Security Services will provide monitoring, response, and access for site-related safety activities. The main location for security monitoring will be located as part of the Lobby space, with a satellite location in the ED. Specific services will include:

- Facility monitoring (via security camera and in-person patrols)
- Code responses
- Building and door access
- Parking enforcement/support
- Staff identification card provision
- Lost and Found services.

Education

Potential opportunities within Plant Operations and Maintenance.

Research

Not applicable to this component.

Linkages/ Partnerships

By their inherent nature, Facilities Support Services will work closely with every program/service on the hospital site.

Table 1. Linkages and Partnerships

Linkages/Partnerships	Description
Vendors	Maintenance, projects, upgrades, Waste Management, shredding
Vendor	Laundry supplier
Equipment Suppliers, Service Contracts	Maintenance and repairs, EVS mats
Regional Police	Security
Fire and Emergency Services	Alarm response
Local Prison(s)	Coordination of prisoner escorts, security
Biomedical Engineering	Services
Shared Services Organizations	Joint purchasing

Workload (Current and Projected)

Table 2. Historical and Projected Workload

Component	Measure	Historical				Projected
		2019/20	2020	2021	2022	2031/32
Plant Operations & Maintenance						
Preventive Maintenance Work Orders	Number Annually	0	343	312	320	707.2
Corrective Maintenance Work Orders	Number Annually	0	410	525	553	1222
Maintenance Requests	Number Annually	0	161	160	220	485
Total Square Footage	Building Gross Square Feet (BGSF) (10%)	84,194	84,194	84,194	84,194	185,699
Security						
Security Assistance1	MH Patients/Year	0	1646	1924	0	2309
Staff Hours1	Daily Total Staff Hours	16-24	36	36	36	60
Code White1	Annual Incidents	0	99	148	141	178
Violence, Incivility, Verbal Abuse1	Annual Incidents	0	106	39	46	127
Environmental Services						
Area Cleaned		84,194	84,194	84,194	84,194	185,699
Waste Management (kg)		0	0	0	0	0

Component	Measure	Historical				Projected
		2019/20	2020	2021	2022	2031/32
Materials Management2						
Purchase Orders	Number Annually	3,350	0	3,200	0	4187.5
On-Hand Inventory	Dollar Value or SKU's	$ 84,315	$ 0	$ 168,295	$ 0	$ 202,000
Inventory Turnover	Days	10.94	0	7.34	0	12
Stock Items Issued to Departments	Number Weekly	1188	0	1132	0	1485
Deliveries - Laundry & Linen	Number weekly	14	0	14	0	14
Deliveries - Food	Number Weekly	9	0	9	0	9
Deliveries - Supplies	Number Weekly	12	0	12	0	15
Deliveries - Courier	Number Weekly	42	0	42	0	53
Deliveries - Other	Number Weekly	11	0	11	0	14

Note:

1. Calendar years.

Operational Description

Organization and Management

Plant Operations and Maintenance is overseen by a Director of Facilities with the assistance of a Manager of Plant, Facilities and Security. There is a Maintenance Team Lead at each site and a Security Team Lead that oversees both sites.

EVS is overseen by a Director who is assisted by a Manager at each site and a Team Lead at each site.

A Director of Materials Management oversees both sites with a Buyer and Clerks reporting directly to this position.

Security will continue to be under the responsibility of the Manager of Plant, Facilities, and Security.

Hours of Operation

Current and future hours of operation are noted in the table below.

Table 3. Hours of Operation

	Current			Projected		
Modality	**Weekdays**	**Saturday**	**Sunday**	**Weekday**	**Saturday**	**Sunday**
Plant Operations and Maintenance	7:30am-3:30pm On-Call after-hours	On-Call	On-Call	7:30am-3:30pm On-Call after-hours	On-Call	On-Call
Security	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
EVS	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
Linen Deliveries	8:00am-4:00pm	-	-	8:00am-4:00pm	8:00am-4:00pm	
Materials Management	8:00am-4:00pm	-	-	8:00am-4:00pm		

Workflow

Plant Operations and Maintenance

Facilities management staff will monitor the building systems and environmental controls electronically, viewing the status from anywhere in the building and remotely. Large display screens within the central plant operations area will be available with Building Automation System (BAS) functionality distinct from other software and communications.

Ongoing preventive and minor building maintenance will be provided using in-house shops. The digital requisition system will ensure maintenance requests are sent, assigned, tracked, and resolved using an integrated electronic approach. The current system is shared with Orillia Soldier's Memorial Hospital and requires improvements as a project management tool with streamlined navigation. An independent system is anticipated for the future.

Maintenance would welcome tablets or other technology, connected to the EMR which would allow staff real-time information regarding admissions and discharges, and streamlined communications.

Specialized maintenance and repairs will be coordinated in-house but provided in partnership with external contractors. Facilities Management will secure quotes, execute contracts and monitor completion of work.

Fire Safety will be handled through a centralized monitoring system. Computer workstations will allow for mapping and reporting of issues. It will be integrated with the digital building controls. Fire safety status will be monitored by MAHC Patient Registration/Switchboard and Security will be the first responders to alarms in the hospital.

Equipment requiring repair is red-tagged by hospital staff and then cleaned by EVS prior to movement to Maintenance's pre-repair holding area. Following repair, it is held adjacent to Maintenance, where EVS staff pick it up for cleaning before returning it to the Clinical area.

Security

Safety is a priority at MAHC: for staff, patients and visitors. The hospital's responsibility extends beyond physical and emotional safety to encompass the need for privacy and confidentiality as well. The goal will be to design a facility and supportive security infrastructure that creates a feeling of safety for patients, visitors, and staff while remaining a welcoming and inclusive environment. Security strategies will aim to protect personal safety (both physical and with regards to privacy and confidentiality) as well as equipment and building safety (e.g., theft and damage of hospital materials and equipment).

It is anticipated that a combination of CCTV monitoring, panic buttons (fixed and/or wearable), staff and patient locating, asset tracking systems, swipe card, and other techniques and technology will be utilized. A comprehensive plan for security technology and infrastructure will be developed at a later stage in the process once site and facility layout are confirmed.

Security coverage is important for the whole building but will be of particular importance for the ED. Protocols will be established within all areas for management of security concerns and/or crisis situations.

On-site Security staff will be located within the Main Lobby, with satellite space in the ED but will perform routine walk arounds and door checks throughout the building during the day. CCTV monitors will be viewable from the Security Office. Automatic door locking and area lockdowns will be facilitated centrally.

Security requests will go to Security staff via Switchboard and/or their radios. The Security staff member will then travel to the area requesting support and assist in the resolution of the issue. Security personnel will complete any required documentation on computers located in the Security workspace.

Codes will be called centrally from Switchboard. On-site Security will be notified automatically of all codes and will lock down any areas of the facility, as may be required.

Lost and found items will be held by Security, awaiting public pick-up. Note: no soft goods will be kept, solely patient/visitor valuables (e.g., phones, wallets, glasses).

Storage of narcotics which patients and members of the public bring on-site is a responsibility of Security, prior to transferring it to the OPP. Proper locked storage and to maintain evidence control capability is required.

Security staff are part of the team which provides pre and post ORNGE helipad inspections. The lighting control for the helipad will be provided centrally.

Parking

Parking will be enforced by Security staff on a 24/7 basis. Security staff will perform routine patrols of the parking areas after-hours and ticket vehicles as required. Maintenance of parking equipment will be managed by the vendor. Note that the HDMH site currently includes external and adjacent partners with some shared site access and parking infrastructure. These parking systems (and ideally access points) will need to be separated during site planning to allow for a separate parking system and traffic flow.

Security Services will provide parking assistance and issuing of parking passes (staff and long-term visitor passes). Passes can also be obtained electronically.

Parking machines (or quick response [QR] code posting to link to a payment app) will be located within or adjacent to the Main Entry. Quick tap on exit gates will be accommodated as an alternative payment method. Security staff will provide assistance with parking issues – either in-person from their station within the ED, or remotely via an intercom system associated with payment kiosks.

Materials Management

Purchasing

Purchasing will provide centralized ordering and purchase order processing. They will maintain a roster of suppliers for standard and specialty items. End users will create purchase requisitions using an online requisition process as part of the hospital Management Information System (MIS). Materials Management will then process and manage all purchasing requests. Food Services, Pharmacy and Facilities Management will purchase directly from suppliers. Surgical Services will requisition through Purchasing.

Materials Management staff will scan barcodes on the high-density shelving units in the Clinical areas' clean supply rooms and information will be immediately downloaded, for access by Purchasing and Receiving staff. This will be carried out early in the day at HDMH to enable picking at the SMMH site and loading onto carts for delivery to Huntsville.

Purchasing and Finance will have integrated software, providing Managers with access to electronic requisitioning as well as financial, statistical and budgeting information pertaining to acquisitions and contracts. Stores-issued items will be posted directly to budgets as issued. All stock requirements will be system generated based on point of use consumption.

Supply orders will be automatically generated with established on-hand safety stock levels. These levels are higher than average for other health facilities given the hospital's geographic location.

Receiving and Stores

Receiving is centralized at SMMH. Materials Management staff will enter deliveries in the Materials Management software upon receipt and inspection, at a workstation located in this area.

Items will be de-cased and placed on shelving within the SMMH Stores area.

Some direct or drop shipments will be received at HDMH and will be entered into the system from a workstation close to the Loading Docks. Food Services' supplies and Pharmaceutical products will be delivered directly to the departments at HDMH, and distributed to SMMH by the departments as required.

Utilizing online par levels and inventory status, Materials Management staff will load carts to be taken to the Clinical and Support areas at SMMH or to be held awaiting pick-up and transport to HDMH. SMMH will receive back the empty supply carts from HDMH and repeat the process on a five day per week basis. The dispatch/logistics function will be handled by the Shipper/Receiver at the SMMH site in coordination with the HDMH Storekeepers.

The following supplies will be kept in Stores:

- Corporate wide medical/surgical, including PPE
- Housekeeping
- Auxiliary
- Special storage environments will be needed for gas storage and chemical storage. External bulk oxygen storage will be required.

The dispatch/logistics function will be handled by the Shipper/Receiver at the SMMH site in coordination with the HDMH Storekeepers.

EVS

Housekeeping

Staff (EVS Aides) sign-in at the department at the start of their shift and obtain their standard/daily assignment sheets and weekly project assignments. They then proceed to the EVS closet in each Clinical/Support area where their cart and supplies are located. EVS Lead Hands stock the closets from central storage in Materials Management.

Discharge cleaning is currently organized by the EVS Aide with each Unit Clerk at the Team Station(s). Other communications take place via cell phone and texting with Bed Allocation Staff. EVS would welcome tablets or other technology, connected to the EMR which would allow EVS Aides real-time information regarding admissions and discharges, and streamlined communications.

For specialized tasks, housekeeping equipment will be found in equipment rooms located centrally on each floor of the building. There will be a drainage and fill station on each floor. Equipment cleaning will ideally take place in a designated room on each floor, close to the source.

Linen

EVS manages linen inventory and vendor relations. Standard orders are in place for each area. EVS staff deliver the clean linen carts to designated alcoves and collect soiled linens from the soiled utility room on designated carts (3' x 6'). Scrubs are provided by the linen company for Surgical Services, MDRD, ED and Pharmacy. Scrub machines will be implemented for better control of distribution and collection. MDRD uses disposables for the instrument packs and Lab coats are laundered in-house. Laundering of small items such as slings, kitchen towels and security restraints will also be completed in-house.

Waste Management

Garbage is collected from each room by the EVS Aides and stored in bags in the soiled utility rooms. From this point the bags of garbage are collected on a cart by the EVS transport shift for disposal at the soiled Loading Dock(s).

Recycling is collected from the source by EVS Aides and stored in the soiled utility rooms. The EVS transport shift collects the recycling and sorts it into the correct collection bins at the soiled Loading Dock(s).

Hazardous waste is collected by the EVS transport shift and stored in a secured, flammable storage room equipped with sprinklers and a blow-out door, as dictated by the fire code. An external vendor picks up hazardous waste on a regular basis. Chemical pick-up and other expired products (e.g., KCL) is once every six months.

Confidential waste is collected by the EVS transport shift at point of use confidential waste cabinets and stored in larger bins at the soiled Loading Dock(s) for pick-up by the vendor once per month.

Green bin service is available in the community. The hospital currently recycles cooking grease but further participation in the green bin program may take place.

IT waste will be provided near the soiled Loading Dock(s).

Biomedical waste and sharps are placed in designated containers near the point of generation. They are collected by the EVS transport shift. Biomedical waste is stored in a walk-in freezer near the soiled Loading Dock(s) for pick-up by the external vendor. Sharps are stored in a locked cabinet for pick-up by the external vendor.

General Support Activities

Cleaning & Disposal

Plant Operations and Maintenance are responsible for cleaning their own shop and plant areas for safety reasons. EVS will clean all other areas.

Waste removal is completed by EVS. Storage at the Loading Dock is segregated into regular waste, recycling, biomedical, hazardous, and chemical wastes.

Staff Resources

Staff of Facilities Support Services will share a central locker room and central staff lounge/eating area within the building.

Computer station(s) will be provided in the Facilities Support Services' work areas for staff to access communications and training materials.

Enabling Technologies

Information Systems

Software and hardware to facilitate the work of Facilities Support Services is:

- BAS
- Maintenance and EVS online requisition process(es)
- Support for Security infrastructure (e.g. Real-Time Locating Services, parking platform, building monitoring and access systems) will be required
- Cell phones and other mobile devices
- CCTV
- Duress System

Materials Management/Inventory Management System; integrated with Finance and Purchasing. Including online purchase requisitioning. Bar code scanning capabilities.

Equipment

Key equipment for Facilities Support Services:

- Electric walker at the Loading Dock, with charging/docking station
- Linen carts
- Transport carts, including flatbeds
- Industrial washer and dryer
- Patient equipment washer e.g., commodes (see Inpatient Units)
- Cart washer.

Staffing (Current and Projected)

Table 4. Current and Projected Staffing

	Current	Projected			
	2022/23 Total FTE	2031/32 Total FTE	2031/32 Headcount/Day	2031/32 Headcount/Evening	2031/32 Headcount/Night
Total	**42.33**	**77.92**	**41**	**12**	**6**
Subtotal, Environmental Services (EVS)	*24.27*	*43.26*	*22*	*8*	*2*
Manager, Support Services (EVS & Food Services)	1.00	1.00	1	0	0
EVS Lead Hand	1.23	1.30	1	0	0
EVS Aide	20.81	39.66	19	8	2
Laundry Aide	1.23	1.60	1	0	0
Subtotal, Plant Operations & Maintenance	5.41	6.00	6	0	0
Lead Hand	1.11	1.00	1	0	0
Trades	4.30	5.00	5	0	0
Subtotal, Security	*9.50*	*21.16*	*6*	*4*	*4*
Security Officer	8.50	14.17	3	3	2
Security Lead Hand	0.50	0.50	1	0	0
Security Manager	0.50	0.50	1	0	0
Subtotal, Materials Management	*7.48*	*7.50*	*7*	*0*	*0*
Director, Purchasing	0.53	0.60	1	0	0

	Current	Projected			
	2022/23 Total FTE	2031/32 Total FTE	2031/32 Headcount/Day	2031/32 Headcount/Evening	2031/32 Headcount/Night
Buyer	1.00	1.00	1	0	0
Purchasing Clerk	2.80	2.00	2	0	0
Receiver & Forklift Operator	3.15	1.30	1	0	0
Warehouse Staff		2.60	2	0	0

Notes:

1. Materials Management staff currently located at HDMH.
2. Security Lead Hand and Manager provide services to both sites.

Design Objectives

Locations and Adjacencies

Facilities Support Services should be adjacent to the service elevators.

Plant and Facilities Operations requires adjacency of General Maintenance Shop and service corridors/elevator, proximity to Receiving docks, and proximity for administration and workshops to outside access by vendors and contractors.

Security requires a workspace in the front lobby area (See Lobby component) and a workspace in the ED (See ED component).

As much as possible, the site layout should support segregation of materials traffic (e.g., delivery and receiving) from public vehicular and pedestrian traffic.

There should be a simple and direct route from the Receiving area to key users (e.g., Nutrition Services, Pharmacy). This route should have as few turns as possible for efficient delivery.

A clear delineation between clean and soiled areas of the Receiving area and related support spaces must be maintained; this includes both locations of spaces and paths of travel.

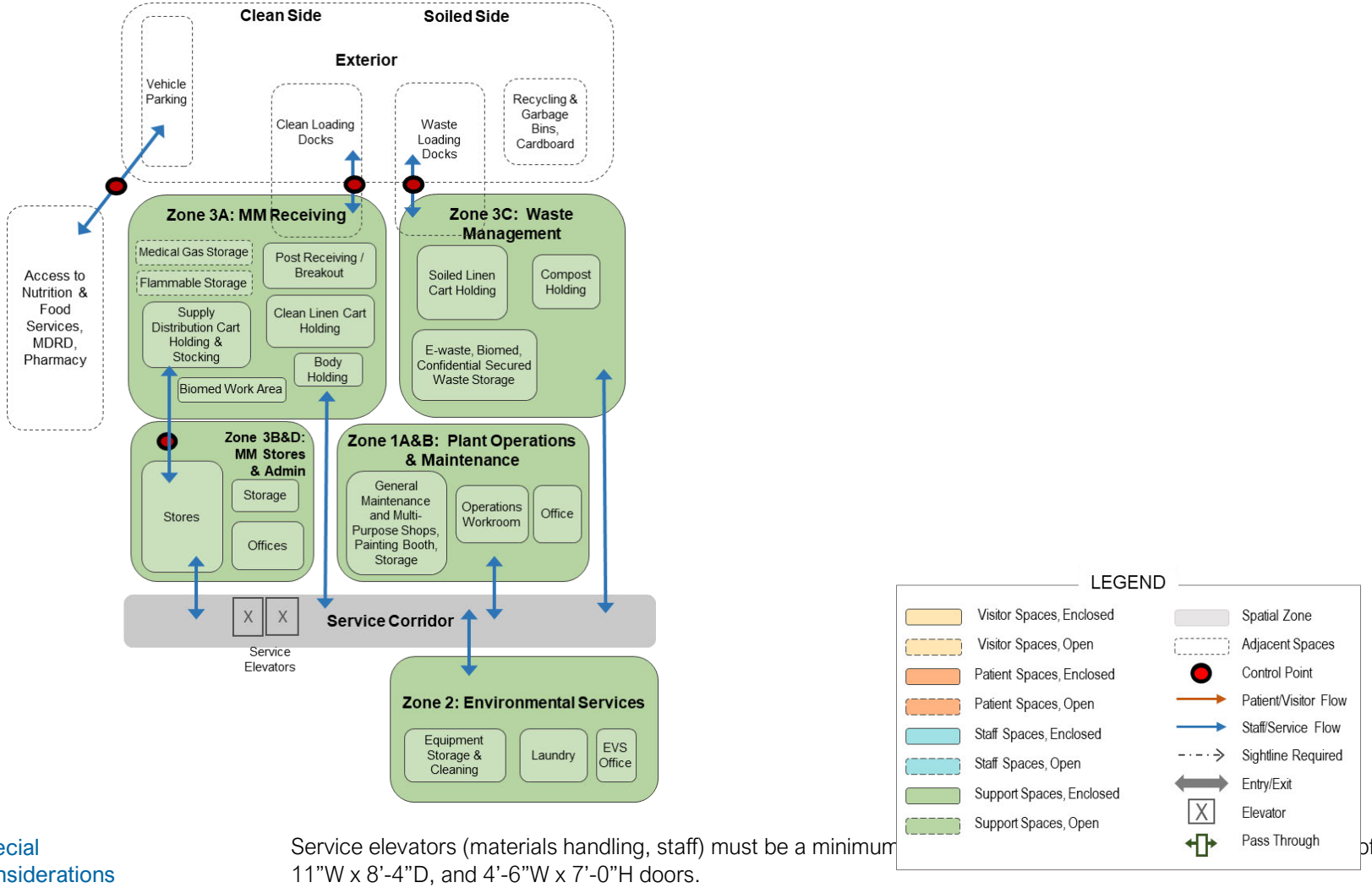
Internal Adjacencies

Facilities Support Services has the following subzones:

- Zone 1A: Plant Operations and Maintenance Workshops
- Zone 1B: Plant Operations and Maintenance Administration
- Zone 2: Environmental Services
- Zone 3A: Materials Management Receiving
- Zone 3B: Materials Management Stores
- Zone 3C: Waste Management
- Zone 3D: Materials Management Administration

The spatial organization should be generally as shown in the diagram on the following page. The diagram illustrates conceptual relationships only and should not be treated as an architectural design. It should only be used to emphasize and identify important adjacencies and patient/visitor flows and staff/service flows. The diagram is not to scale.

Figure 1. Functional Relationship Diagram



Special Considerations

Service elevators (materials handling, staff) must be a minimum [illegible] of 5'-11"W x 8'-4"D, and 4'-6"W x 7'-0"H doors.

Patient transport elevators (patients, staff) must also be minimum 5,000 lbs (2,268 Kg) capacity with slightly different dimensions of 5'-8"W x 9'-0"D, and 4'-0" W x 7'-0"H doors. Consideration should also be given to large platform Patient Transport elevators (6,500 lbs to 8,000 lbs capacity) which can offer wider doors up to 5'-0".

Receiving should accommodate a workstation and have clear sightlines to all truck bays. Additional security measure including video monitoring/cameras must be provided for the Loading Docks, doors and corridors leading to/from the Loading Docks to improve controls during working hours.

Walls, corners and door jambs in and adjacent to the Loading Docks must have robust protection, such as steel diamond plate, to minimize damage from carts/trolleys, skids, and material handling equipment.

Interior Receiving area should include a secure space for manual and electric material handling equipment.

Stores should have a 20' clear ceiling to accommodate double height warehousing.

The service yard leading to the Loading Docks should accommodate 52-ft trailers (63-ft nose-to-tail), with a slope not exceeding 5-degrees.

Features that will contribute to environmental comfort are:

- Noise attenuation strategies, ventilation and safety considerations within the Plant Operations and Maintenance Workshops.
- Ventilation and temperature controls at the Loading Docks and where the Receiving area intersects with the other Materials Management workspaces.
- Covered area for smaller vehicles in addition to Loading Docks.
- Design Plant Operations and Maintenance as open concept, allowing ease of movement for equipment and personnel. All Plant Operations and Maintenance shops will be equipped with air compressors, uninterrupted power supply (UPS) systems and on back-up power as required.
- One workbench should have compressed medical air, gases and a fume hood to accommodate Biomedical Engineering work by outside vendors.

Codes & Standards

In addition to the above criteria, the facility must conform to recognized national, provincial, and local building codes and standards as they may relate to safety and accessibility for patients, staff, and visitors. Architects are also instructed to refer to CSA Z8000-18 Canadian Health Care Facilities.

Projected Space Requirements

Table 5. *Space Table*

Component Gross Area (CGSF): TOTAL	**7,895**	**733.5**
Component Gross Area (CGSF / CGSM): Facilities Management	**1,035**	**96.2**
Net to Gross Ratio	1.15	1.15
Total Net Area (NSF / NSM): Facilities Management	900	83.6
Component Gross Area (CGSF / CGSM): Environmental Services	**825**	**76.6**
Net to Gross Ratio	1.15	1.15
Total Net Area (NSF /. NSM): Environmental Services	719	66.8
Component Gross Area (CGSF / CGSM): Materials Management	**6,035**	**560.7**
Net to Gross Ratio	1.15	1.15
Total Net Area (NSF / NSM): Materials Management	5,250	487.7

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Comments
			Exterior Spaces			**subtotal net area**		**0**		**subtotal net area**		**0.0**		
06			Parking - MAHC Vehicles (1), Contractor Vehicles (5), Meals on Wheels vehicles (15 to 20)				7	-		-	7	-	To be provided on-site	Charging capability for electric vehicles
06			Parking - Landscaping and Snow Removal Vehicles				3	-		-	3	-	To be provided on-site	Charging capability for electric vehicles
06			Storage, Snow Removal				1	-		-	1	-	Capacity within property	
06			Morgue Door & Ramp				1	-		-	1	-		
06			External Recycling & Garbage Bins				5	-		-	5	-		
			Zone 1A: Plant Operations & Maintenance			**subtotal net area**		**610**		**subtotal net area**		**56.7**		
06	.001		General Maintenance Shop			310	1	310		28.8	1	28.8		Overhead doors to move full size pallets in and out of shop. Open concept plan
		.01	*- equipment receiving/holding - pre and post repair*	*1*	*80*					*7.4*				Structure for a lift point
		.02	*- workbenches*	*1*	*50*					*4.6*				
		.03	*- general storage*	*1*	*80*					*7.4*			Small parts, lubricants, tapes	

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Comments
		.04	*- utility sink*	*1*	*20*				*1.9*					
		.05	*- tool storage*	*1*	*80*				*7.4*					
06	.002		Multipurpose Shop			180	1	180		16.7	1	16.7	Including Carpentry, Plumbing, Steam-fitting, Electrical	Table saw. One workbench along the sides as well as cabinetry and tools
06	.003		Storage, Inventory			120	1	120		11.1	1	11.1		
		.01	*- air filters/chemical treatment supplies*	*1*	*-*				*0.0*					Store in mechanical room (20 sf per air handler)
		.02	*- pumps, fans*	*1*	*120*				*11.1*					Shelving
06	.004		Power Plant Storage			-	1	0		0.0	1	0.0		Within power plant area
06	.005		left intentionally blank											
			Zone 1B: Plant Operations and Maintenance Administration			**subtotal net area**		**290**		**subtotal net area**		**26.9**		
06	.006		Office, Shared			100	1	100		*9.3*	*1*	9.3		
06	.007		Operations Workroom			190	1	190		*17.7*	*1*	17.7		
		.01	*- digital building controls computer station*	*1*	*50*				*4.6*					
		.02	*- fire alarm system*	*1*	*40*				*3.7*					
		.03	*- workstation*	*1*	*50*				*4.6*				Lead Hand, Clerk, Staff	
		.04	*- storage*	*1*	*50*				*4.6*				For files, manuals, drawings	
			Zone 2: Environmental Services			**subtotal net area**		**719**		**subtotal net area**		**66.8**		
06	.008		EVS Main Office			80	1	80		7.4	1	7.4		
		.01	*- sign-in and workstation*	*2*	*30*				*2.8*					
		.02	*- printer/work area*	*1*	*20*				*1.9*					
06	.009		Office, Supervisor			100	1	100		9.3	1	9.3		Manager's Office is in Nutrition & Food Services component
06	.010		Storage, Equipment			264	1	264		24.5	1	24.5		Design chemical storage area separately
		.01	*- autoscrubber*	*1*	*30*				*2.8*					
		.02	*- floor polisher*	*1*	*20*				*1.9*					
		.03	*- wet vac*	*1*	*20*				*1.9*					
		.04	*- vacuum/Sodexo*	*1*	*30*				2.8					
		.05	*- floor mats*	*1*	*30*				*2.8*					
		.06	*- garbage cans, pads, attachments*	*1*	*30*				*2.8*					

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Comments
		.07	*- janitors sink incl. handwash station*	*1*	*20*				*1.9*					
		.08	*- chemical storage*	*1*	*30*				*2.8*					
		.09	*- spill kit storage*	*1*	*10*				*0.9*					
		.10	*- circulation*	*1*	*44*				*4.1*					
06	.011		Equipment Cleaning			160	1	160		14.9	1	14.9		
		.01	*- soiled holding*	*2*	*15*				1.4					
		.02	*- spray washer and drainage*	*1*	*100*				*9.3*					Separate room
		.03	*- equipment drying*	*2*	*15*				*1.4*					
06	.012		Laundry			115	1	115		10.7	1	10.7		Plan for a dirty side and a clean side
		.01	*- soiled laundry cart*	*1*	*15*				*1.4*					
		.02	*- industrial washer*	*1*	*15*				*1.4*					E.g., Unimac Model UCT060QN0F
		.03	*- counter*	*1*	*15*				*1.4*					
		.04	*- industrial dryer*	*1*	*20*				*1.9*					E.g., Unimac Model UT075NNN0NX
		.05	*- clean cart*	*1*	*15*				*1.4*					
		.06	*- circulation*	*1*	*35*				*3.3*					
06	.013		left intentionally blank											
06	.014		left intentionally blank											
			Zone 3A: Materials Management Receiving			**subtotal net area**		**1,830**		**subtotal net area**		**170.0**		
06	.015		Loading Dock (Interior Portion)			570	1	570		53.0	1	53.0		
		.01	*- clean loading dock - full size trucks*	*2*	*130*				*12.1*					
		.02	*- waste loading dock - compactor with tipper*	*2*	*130*				*12.1*					
		.03	*- workstation*	*1*	*50*				*4.6*					
06	.016		Post Receiving/Breakout			300	1	300		27.9	1	27.9		
06	.017		Body Holding Room			150	1	150		13.9	1	13.9		Two stretchers
06	.018		Clean Linen Carts, Holding			160	1	160		14.9	1	14.9		Enclosed
		.01	*- carts*	*8*	*20*				*1.9*					6' carts
06	.019		Supply & Distribution Cart Holding & Return			400	1	400		37.2	1	37.2	For distribution to HDMH	Enclosed
		.01	*- carts*	*20*	*20*				*1.9*					

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Comments
06	.020		Flammable Storage			40	1	40		3.7	1	3.7		
06	.021		Medical Gas Storage			60	1	60		5.6	1	5.6	Cylinders for patients, full and empty	Manifolds separate
06	.022		Biomedical Engineering Work Area			100	1	100		9.3	1	9.3	For vendors	Medical gases and built-in bench
06	.023		Washroom, Staff			50	1	50		4.6	1	4.6		
06	.024		left intentionally blank											
			Zone 3B: Materials Management Stores			**subtotal net area**		**2,600**		**subtotal net area**		**241.5**		
06	.025		Stores			2,200	1	2,200		204.4	1	204.4		Double height. Includes pandemic allocation. Includes secure equipment storage for deliveries. Incl. workstation
06	.026		Storage, Auxiliary			200	1	200		18.6	1	18.6		
06	.027		Storage, Equipment, Shared			200	1	200		18.6	1	18.6		
06	.028		left intentionally blank											
			Zone 3C: Waste Management			**subtotal net area**		**435**		**subtotal net area**		**40.4**		
06	.029		Waste Management			215	1	215		20.0	1	20.0		
		.01	*- recycling bins - outside*	*0*	*40*				*3.7*				Outside	8' x 8' each
		.02	*- cardboard baler, pallets and storage - outside*	*0*	*180*				*16.7*				Outside	Baler size of 60" x 30", pallets 48" x 48". Twice per week pick- up
		.03	*- waste & cardboard bins - outside*	*0*	*40*				*3.7*				Outside	Two-day storage capacity
		.04	*- e-waste*	*1*	*75*				*7.0*					
		.05	*- biohazard walk-in freezer*	*1*	*80*				*7.4*					Biweekly pick-up
		.06	*- confidential secured waste storage*	*1*	*50*				4.6					Lockable cage
		.07	*- hand hygiene sink*	*1*	*10*				*0.9*					
06	.030		Compost Holding			60	1	60		5.6	1	5.6		Refrigerated
06	.031		Cart Holding, Soiled Linen			160	1	160		14.9	1	14.9		Enclosed
		.01	*- carts*	*8*	*20*				*1.9*					
06	.032		left intentionally blank											

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Comments
			Zone 3D: Materials Management Administration			**subtotal net area**		**385**		**subtotal net area**		**35.8**		
06	.033		Office, Director			100	1	100		9.3	1	9.3		
06	.034		Office, Buyer			100	1	100		9.3	1	9.3		
06	.035		Materials Management Main Office			185	1	185		17.2	1	17.2		
		.01	*- sign-in and workstation*	*2*	*45*				4.2					
		.02	*- workstation, purchasing clerk*	*1*	*65*				*6.0*					
		.03	*- printer/work area*	*1*	*30*				*2.8*					
06	.036		left intentionally blank											
06	.037		left intentionally blank											

07. Food and Nutrition Services

Functional Description (Current and Projected)

Summary

This Functional Program component provides a description of Food and Nutrition Services within the South Muskoka Memorial Hospital (SMMH). The South Muskoka Main Kitchen will receive bulk prepared, produced and chilled inpatient and community program meals from Huntsville Hospital. The South Muskoka Main Kitchen will assemble and plate meals and nourishments for patients within the Main Kitchen. Once delivered, meal trays are centrally cleaned and sanitized within the Main Kitchen. The Main Kitchen will also have capability to support and assemble community programming (e.g., meals on wheels [MOW]) meals.

Additionally, the department will re-introduce a staff and visitor cafeteria, in collaboration with Hospital Auxiliary.

Service Overview

This Functional Program component provides a description of Food and Nutrition Services within the SMMH.

Food and Nutrition Services scope will include the following:

- Provision of inpatient meals, nourishments and supplies (including Emergency)
- Snacks and beverages for patients who are not admitted
- Community meals for MOW
- Internal catering and vending services
- Prepare meals for the reintroduction of staff and visitor food services cafeteria (in partnership with Hospital Auxiliary)
- Clinical Nutrition supporting inpatient units, refer to inpatient services functional programs.

Planning Principles and Assumptions

The Food and Nutrition Services Department will be empowered to fully direct its food service needs. Key planning assumptions for this component include the following:

- On-site kitchen facilities to support inpatient meals and internal catering (inclusive of storage, preparation, production, assembly, dishwashing and department administration)
- Meal selection facilitated via bedside ordering device or app, supplemented with order facilitation by Nutrition and Food Services staff
- After-hours soiled trays will reside within on-unit soiled tray alcoves for collection

- On-unit nourishment centres will be staff restricted to support Food Services function for nourishments and stock
- Nourishment alcove within inpatient units to support patients and visitors with hydration
- Staff and visitor cafeteria, inclusive of seating and vending.

Patient Profile

Nutrition & Food Services will support multiple patient populations including but not limited to Medicine, Surgery, Critical Care, Obstetrics and Reactivation & Complex Medical Management.

Scope of Services (Current and Projected)

The current Food and Nutrition Services model is predicated on producing menu items on-site, supplemented with procurement of selected chilled and frozen pre-prepared items from private and commercial purveyors. Patients are offered a selective menu in compliance with their diet and Food and Nutrition Services staff facilitate meal orders a day in advance of service. Meals are cooked and assembled centrally in advance of service and delivered to inpatient units in carts. Patients received meal trays at bedside. Soiled trays and carts are returned to the Main Kitchen for warewashing.

Going forward, bulk produced, prepared and chilled meals will be delivered from Huntsville Hospital. The South Muskoka Main Kitchen will reheat, assemble and plate meals for delivery to inpatient floors. After meal service, soiled trays and carts are returned to the Main Kitchen for warewashing. Patients will continue to be able to make meal selections a day in advance. The department will continue the MOW program. Additionally, the department will re-introduce a staff and visitor cafeteria in the future. Food and Nutrition Services is currently trialing a café kiosk at SMMH, offering primarily pre-prepared grab and go items, hot and cold beverages and baked goods.

Education

Food and Nutrition Services will provide the following education and training opportunities:

- Consult with patients who are at high nutrition risk and support therapeutic interventions for optimal disease management and recovery
- Information through media display, menus, nutritional information, etc.
- Supporting dietetic internship program and dietetic interns.

Standards and care protocols established by the College of Dietitians of Ontario will guide development of programs and services and practice of professional dietetic staff.

Research

Not applicable to this component.

Linkages/ Partnerships

Table 1. Linkages and Partnerships

Linkages/Partnerships	Description
Meals on Wheels (MOW)	Monday through Friday

Workload (Current and Projected)

Table 2. Historical and Projected Workload

		Current	Projected
Department	**Position**	**2019/20**	**2031/32**
Beds Total		**65**	**46**
	Medicine/Surgery	46	41
	Critical Care	3	4
	Obstetrics	0.7	1
	Reactivation & Complex Medical Management	15	0
Daily Meals Total		**220**	**228**
	Inpatient meals	195	138
	MOW	25	90

Notes:

1. Inpatient daily meals are determined based on bed number multiplied by a factor of 3 per patient per day.
2. SMMH current provides MOW Monday through Friday to clients in Bracebridge and Gravenhurst. Daily volumes range from 15 to 30 lunch meals. MOW demand is anticipated to grow. Current volumes are limited by hospital kitchen capacity.

Operational Description

Organization and Management

Food and Nutrition Services (including Clinical Dietitians) is directed by a Manager, Patient Support Services reporting to a Director, Interprofessional Practice, Ambulatory Care and Patient Support Services.

Hours of Operation

Current and future hours of operation are noted in the table below.

Table 3. Hours of Operation

	Current			Projected		
Modality	**Weekdays**	**Saturday**	**Sunday**	**Weekday**	**Saturday**	**Sunday**
Kitchen	6:00am-7:00pm	6:00am-7:00pm	6:00am-7:00pm	6:00am-8:00pm	6:00am-8:00pm	6:00am-8:00pm
Clinical Nutrition	8:00am-4:00pm	Note 2	Note 2	8:00am-4:00pm	Note 2	Note 2
Cafeteria	7:00am-7:00pm	As demand warrants	As demand warrants	7:00am-7:00pm	As demand warrants	As demand warrants

Notes:

1. Kitchen inclusive of internal catering operation.
2. Clinical Nutrition on-call and after-hours.

Workflow

Perishable and non-perishable food products will be received and de-cased at the loading dock, verified and portered to the department's internal receiving area by prime vendor. Incoming products and chilled bulk meals from Huntsville will be placed in refrigerated, frozen and dry storage rooms within the Main Kitchen.

Patients will be offered a 14 day restaurant style menu in compliance with their diet. Meal orders will be placed through digital ordering devices or apps. Additionally, dietary aides will visit patients a day in advance and facilitate orders for the following day. Patients who do not order, will be provided a system select meal (batch tray) in accordance with their diet.

Bulk meals will be reheated and trays will be assembled and plated centrally in the Main Kitchen in advance of service. Once assembled, meal trays will be delivered to patient bedside at set mealtimes. Select units such as Reactivation & Complex Medical Management will have option to dine within congregate dining area and/or bedside.

Following every meal service, Food and Nutrition Services staff will collect all soiled trays. All soiled carts, trays and service wares will be returned to the Main Kitchen for warewashing and sanitation. After-hours soiled trays will reside within on-unit soiled tray alcoves for collection, one cart per unit (noting cart capacity can typically accommodate up to 20 trays).

Additionally, Food and Nutrition Services personnel will be responsible for the delivery of daily nourishments, snacks and supplements. Nourishments will be prepared and delivered by department personnel daily. Food and Nutrition Services will be responsible for stocking and replenishment of on-unit nourishment centre.

MOW meals will be delivered bulk from Huntsville to South Muskoka Main Kitchen. The meals will be pre-assembled one day in advance by department staff. Menu items are the same as inpatient meals, therefore MOW entrees are assembled before inpatient meals by department staff. Once prepared, MOW organization volunteers pick-up meals for delivery to community.

Going forward as the hospital grows, a cafeteria will be re-introduced to support staff and visitors in partnership with Hospital Auxiliary. The staff visitor food services will include a small café bistro (pre-packaged sandwiches, salads, etc.) and vending accessible 24/7. Food product will be received, stored and prepared in the Main Kitchen.

Clinical Dietitians

Dietary education and nutritional assessments will be facilitated through clinical nutrition. Registered Dietitians will be responsible for nutritional assessment and care plan development, patient monitoring and outcome measurements for patients who are identified by the physician/team members as requiring nutritional intervention. The dietitians will be the liaison between the patient's family, healthcare personnel and food service staff to ensure appropriate implementation of the care plan. Dietitians set the diet definition and standards which are then used to develop patient menus, regular and modified, oral and tube feeding formularies, nourishments and specialized nutrition products. To learn more, refer to inpatient services functional programs.

General Support Activities

Environmental Services

EVS and Food and Nutrition Services staff share cleaning and waste removal responsibilities within the Main Kitchen and on-unit nourishment centres. EVS will be responsible for cleaning congregate dining rooms.

Facilities Management

All food service equipment will be maintained by the Hospital Plant and Facilities Management personnel and/or external contracts. Plant and Facilities Management will maintain and monitor the Building Management System (BMS), tracking refrigerator and freezer temperatures and alarms including after-hour monitoring of walk-in refrigerator and freezer temperature alarms. Refrigeration equipment will be connected to Building Automation System (BAS) monitoring.

Materials Management

Materials Management will continue to provide selected supplies from central stores as requisitioned by Food and Nutrition Services personnel.

Support Services

Centralized lockers and lounges will be provided to Hospital Support Services staff. Nutrition and Food Services department will have staff lunch storage area and staff washroom.

Enabling Technologies

Information Systems

The Dietary Management Information System (MIS) will be fully integrated with the Hospital's Information System.

Food and Nutrition Services needs will be assessed on admission and diet orders will be sent to department via a computerized system. This system will also be linked to all inpatient program areas. The Dietary Management System will include digital ordering devices to accommodate a bed side spoken menu model.

Communication Systems

Food and Nutrition Services operations will be enhanced with smart phones and tablets to allow for communication among department personnel.

Equipment

Food and Nutrition Services will require wireless technologies for hand-held ordering tablets.

Staffing (Current and Projected)

Table 4. Current and Projected Staffing

	Current	Projected 2031/32			
Category	**2022/23 FTE**	**Total FTE**	**Headcount per Day**	**Headcount per Evening**	**Headcount per Night**
Total	13.74	12.27	8	3	0
Food Services Supervisor	1.65	2.10	1	1	0
Cook	2.60	1.00	1	0	0
Dietary Clerk	0.80	0.70	1	0	0
Dietary Aide	8.09	7.35	4	2	0
Dietitian	0.60	1.12	1	0	0

Notes:

1. The Manager supports both Food and Nutrition Services and EVS (full-time equivalent [FTE] is planned within Facilities component).
2. Dietitians are captured within inpatient services functional programs.

Design Objectives

Locations and Adjacencies

The following principles should be applied when determining the location for this service:

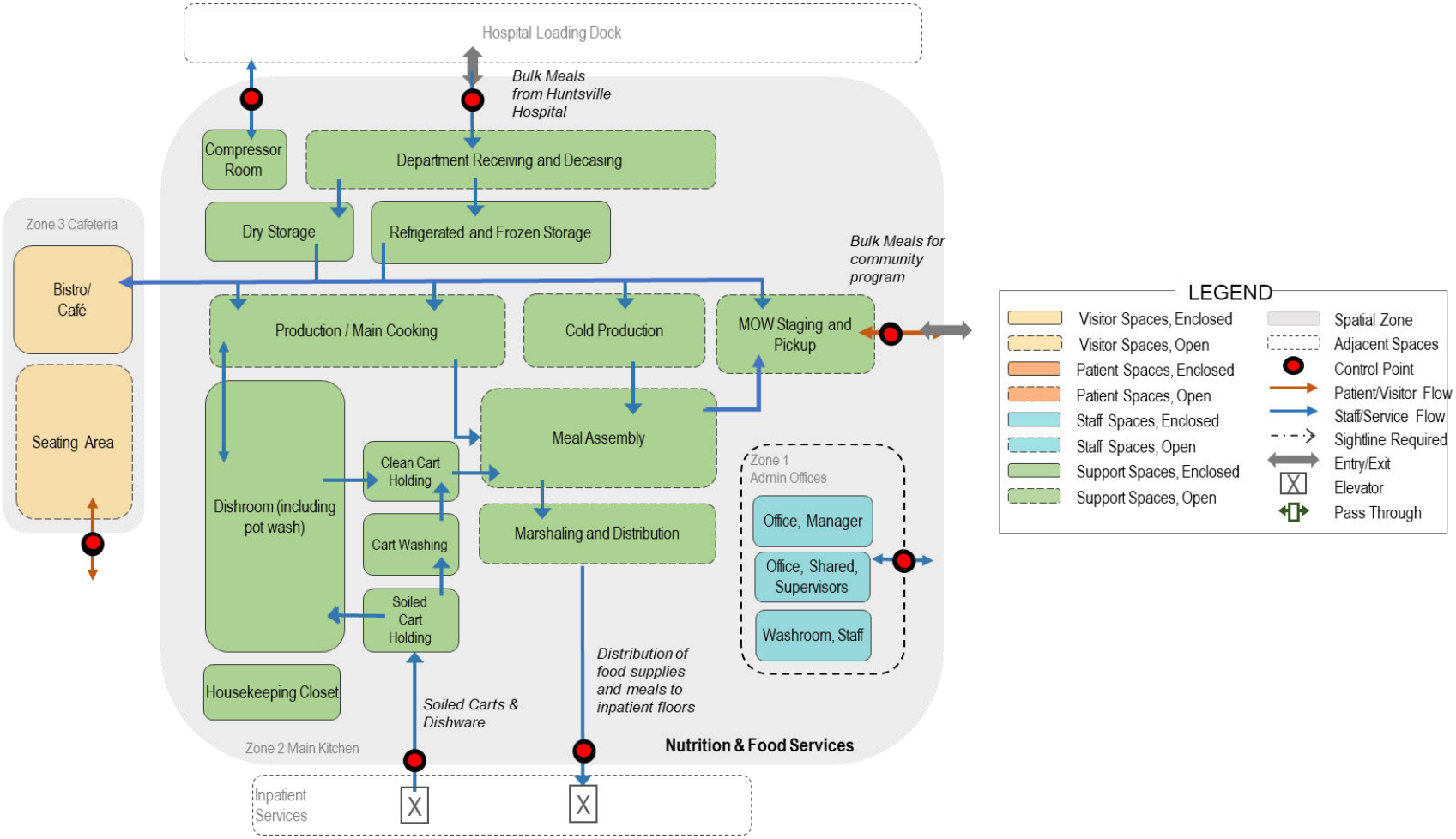
- Food and Nutrition Services Main Kitchen shall have close proximate to service elevators or horizontal traffic routes for timely delivery of meals to inpatient units.
- Food and Nutrition Services Main Kitchen shall have close proximate to non-public circulation to the hospital loading dock for the receipt of food product and removal of waste.
- Food and Nutrition Services Main Kitchen shall have access to or within close proximity to an external entrance for the pick-up of MOW.
- Cafeteria shall be public facing on main thoroughfare, main lobby and/or public spaces.
- Cafeteria shall have access to non-public circulation to the Main Kitchen for the receipt of food product and loading dock for removal of waste.
- Cafeteria to have access to outdoor seating/patio (if possible).

Internal Organization

The Main Kitchen will be designed to support a forward workflow of food products and a separate and non-crossing flow of waste and soiled carts and service wares. The two workflows should not cross to avoid contamination.

The spatial organization should be generally as shown in the diagram on the following page. The diagram illustrates conceptual relationships only and should not be treated as an architectural design. It should only be used to emphasize and identify important adjacencies and patient/visitor flows and staff/service flows. The diagram is not to scale.

Figure 1. Functional Relationship Diagram



Special Considerations

Infection Prevention and Control

All food service areas will support a Hazard Analysis Critical Control Points (HACCP) Program. Hazard analysis is the process of identifying and assessing where hazards may enter the food processing flow and affect food safety. Critical control points are operational procedures or functions where identified hazards must be controlled and continuously monitored.

Central to the HACCP Program will be the control of time temperature relationships through the food processing flow. To support this effort, equipment such as walk-in refrigerators and freezers within the central kitchen will include temperature recorders and alarms.

Handwash stations will be within every point of access and functional areas within the departmental preparation, production and assembly areas. Emergency eyewash facilities located where staff may be exposed to contact with chemicals harmful to eyes or skin. Eyewash stations will be provided within key areas such as department receiving, dishroom, pot washing and on-unit nourishment centres.

Clarity of Spatial Organization

The Main Kitchen shall be designed to be functional, square or a rectangular shape desired. The kitchen shape shall have a length to width ratio no greater than 1.5 to 1. The Main Kitchen should allow for multiple and separate points of access and egress for a) incoming product, b) distribution of meals, c) return of soiled carts, trays and service wares and d) staff and visitor access.

Air/Environmental

Conditioned velocity supply air as well as ventilation will be provided in all kitchen work areas. Slight negative pressure will be provided for odour control.

Work areas will be gradually sloped to central floor drains for general drainage and to enable mechanically assisted spray wash and chemical sanitation.

The food service areas will be air conditioned. The kitchen will require clearance of no less than 10 feet from finished floor to finished ceiling and 14 feet to underside of slab.

Exhaust ventilators will also be required within the kitchen cooking area and for all dishwashing equipment. Additional ventilation with the capability to remove excessive humidity and odour will be required in the warewashing and waste management areas.

Architectural/Structural/ Electrical/Mechanical	To the extent possible, mobile equipment will be used to allow for movement and repositioning in the future, easy replacement and ease of cleaning. A variety of mechanical and electrical sources will be provided. Desire to have ceiling access for services to mitigate hazards. At a minimum the lighting, walk-in and reach-in refrigerators and freezers and 50% of the production equipment will be on uninterrupted power supply (UPS). Emergency power shall also be provided to the Dietary Management Information (IT) Systems which maintains patient diet profiles. Architectural provisions will be required to enable removal and replacement of any large food service equipment following the end of its useful life. Commercial, heavy duty non-slip flooring which is washable, impervious to food acids and oils and suitable for rolling equipment will be utilized and all corners between walls, floors, and ceilings shall be coved within kitchen facilities. All walk-in freezers and refrigerators will require depressed floor slabs (a minimum of 8” deep) to allow for smooth access for carts. Air cooled refrigeration units will be utilized for any new walk-in coolers and freezers. Alternatively, if a continuous/ uninterrupted chilled water loop exists, water cooled units can be used. Dual condenser units required on all units to minimize temperature variation. All wall finishes within the Main Kitchen will be smooth, washable, durable, and comfortable. Protection from cart damage on walls and columns will be provided.
Lighting	To the extent possible, provide access to natural lighting.
Ergonomic Considerations	To the extent possible selected counters will be designed at height less that 34” in instances where preparation equipment is positioned to ensure equipment is at a suitable height. Alternatively selected equipment such as slicers shall be on a 24” high mobile stand to ensure equipment is at a suitable height. Where possible equipment with adjustable heights shall be provided. Meal Assembly configuration and equipment will be designed to minimize staff rotation and reach.
Security	The Main Kitchen and on-unit nourishment centre will be a restricted area accessible only by Food and Nutrition Services personnel. All points of access and egress will be code or card access only. Use of security camera within the food service areas.

Temperature alarms for all refrigerators and freezers will be networked to a computerized control system.

Codes & Standards

Equipment selected will meet applicable standards and comply with the following:

- National Sanitary Foundation (NSF)
- Underwriters Laboratories of Canada (ULC)
- National Electric Manufacturer's Association (NEMA)
- National Electric Code, US (N.E.C.)
- American Society of Mechanical Engineers (ASME)
- National Fire Protection Agency (NFPA) and UL standard ULC-S646-98 for exhaust ventilators
- Infection Prevention and Control (IPAC).

Projected Space Requirements

Table 5. *Space Table*

			Component Gross Area (CGSF / CGSM)				**3,375**				**313.5**			
			Component Gross Area (CGSF / CGSM) - Kitchen				**1,910**				**177.4**			
			Net to Gross Ratio				1.25				1.25			
			Total Net Area (NSF / NSM)				1,529				142.0			
			Component Gross Area (CGSF / CGSM) -Cafeteria				**1,465**				**136.1**			
			Net to Gross Ratio				1.25				1.25			
			Total Net Area (NSF / NSM)				1,170				108.7			
CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
			Exterior Spaces			**subtotal net area**		**-**		**subtotal net area**		**0.0**		
07			Parking - Meals on Wheels (MOW) Vehicles			7		-		0.7		0.0		Parking (5); exterior door from Main Kitchen
			Zone 1: Admin Offices			**subtotal net area**		**254**		**subtotal net area**		**23.6**		
07	.001		Office, Manager			100	1	100		9.3	1	9.3	Shared for EVS and Nutrition and Food Services	Locate accessible from service corridor
07	.002		Office, Shared, Supervisor			104	1	104		9.7	1	9.7		Locate for visibility and access to the Kitchen - Meal Assembly
		.01	*- workstation, dedicated*	*1*	*50*				*4.6*					
		.02	*- printing/filing area*	*1*	*30*				*2.8*					
		.04	*- 30% circulation*	*1*	*24*				*2.2*					
07	.003		Washroom, Staff			50	1	50		4.6	1	4.6		
			Zone 2: Main Kitchen			**subtotal net area**		**1,275**		**subtotal net area**		**118.5**		
07	.004		Department Receiving and Decasing			40	1	40		3.7	1	3.7		
07	.005		Storage, Dry Goods			60	1	60		5.6	1	5.6		
07	.006		Storage, Refrigerated (walk-in)			80	1	80		7.4	1	7.4		

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
07	.007		Storage, Frozen (walk-in)			40	1	40		3.7	1	3.7		
07	.008		Cold Food Production			110	1	110		10.2	1	10.2		Provide reach-in freezer
07	.009		Production/Main Cooking			110	1	110		10.2	1	10.2	Heating of prepared foods	
07	.010		Meal Assembly			280	1	280		26.0	1	26.0		
07	.011		Marshalling and Distribution			60	1	60		5.6	1	5.6		
07	.012		MOW Staging and Pick-up			200	1	200		18.6	1	18.6		Adjacent to meal assembly and exterior door
07	.013		Dishroom (including pot wash)			180	1	180		16.7	1	16.7		Provide 3-compartment pot sink and rack machine; enclosed room
07	.014		Soiled Cart Holding			30	1	30		2.8	1	2.8		
07	.015		Clean Cart Holding			45	1	45		4.2	1	4.2		
07	.016		Housekeeping Closet			40	1	40		3.7	1	3.7		
			Zone 3: Cafeteria			**subtotal net area**		**1,170**		**subtotal net area**		**108.7**		**Must be located in a highly visible and traffic area**
07	.017		Cafeteria			450	1	450		41.8	1	41.8		
		.01	*- bistro/café*	*1*	*300*				*27.9*					Including area for queuing
		.02	*- venue storage (back of house)*	*1*	*150*				*13.9*					
07	.018		Seating Area			720	1	720		66.9	1	66.9		
		.01	*- condiment station*	*1*	*10*				*0.9*					
		.02	*- microwave station*	*1*	*10*				*0.9*					
		.03	*- vending*	*3*	*20*				*1.9*					
		.04	*- waste collection*	*1*	*10*				*0.9*					
		.05	*- seating*	*35*	*18*				*1.7*					

08. Laboratory

Functional Description (Current and Projected)

Service Overview

Laboratory Services are located at each of the Muskoka Algonquin Healthcare (MAHC) sites to provide 24-hour clinical support with testing used in the diagnosis and evaluation of disease. The MAHC Laboratories support hospital-based testing and do not provide community lab services except on rare circumstances with referal.

Laboratory Services include Biochemistry, Haematology, select Microbiology, Transfusion Medicine, Pathology/ Histology, Outpatient Specimen Collection and ECG testing. The Laboratory is also responsible for Point of Care (POC) testing and body holding.

Currently, post workup, most Microbiology is referred out to the Shared Hospital Laboratory (SHL). Rapid antigen testing, polymerase chain reaction (PCR) analysis, respiratory syncytial virus (RSV) and flu screening will continue to be provided at both MAHC Laboratories on-site. Cytology is currently referred out and will continue to be in the future.

ECG services are provided by Laboratory staff, on demand, and this is anticipated to be unchanged in the future. The ED and CCU will continue to perform their own ECGs.

Future siting of Laboratory Service will be aligned to meet forecasted volumes with space designed and scaled to achieve maximum operational efficiency and optimum clinical support.

Planning Principles and Assumptions

The following planning assumptions are to be noted for Laboratory Services:

- The current test menu will be continued for the 2031/32 planning horizon, within the capacities of the equipment on-site.
- Transfusion Medicine may have additional equipment (auto-analyzer) at both sites.
- Microbiology: A small space will continue to be required for Microbiology workups (gram stain), prior to being referred out for testing (hood, bench, sink, microscope). Rapid antigen testing, PCR analysis, RSV and flu screening will continue to be provided at both MAHC Laboratories.
- SMMH will continue to be the central location for Pathology Medicine, however both sites will have capacity to prepare frozen sections within the Labs, supported by Pathology.
- The relationships between the Laboratory, the ED, Surgical Suite, Ambulatory Care, Inpatients and CCU are core considerations for adjacencies in program spaces.

Patient Profile

MAHC patients of all ages will be supported by the Laboratories at SMMH. This includes inpatients, ED patients and outpatients.

Scope of Services (Current and Projected)

SMMH Laboratory on-site services will include:

- Pre/Post Analytical: Pre-analytical functions, specimen receiving, specimen send-out, data entry and distribution of specimens across all disciplines
- Biochemistry: Routine chemistry evaluation of electrolytes, enzymes, immunoproteins and hormone levels used in diagnosing the diseases of organs and interactive organ systems; urinalysis as a check on kidney function and disease states; therapeutic drug level testing to evaluate the efficacy of treatment in attaining steady-state therapeutic levels; and drug testing to identify overdose scenarios and affect suitable course of treatment
- Haematology: Cell counts and morphological assessment in peripheral blood and body fluids to aid in identification, diagnosis, treatment and follow-up of haematological disorders, leukemia, and other cancers; coagulation testing to aid in the diagnosis of coagulation deficiencies and thrombotic conditions, as well as to monitor anticoagulated patients
- Microbiology: Workup for referred out testing: identification of pathogenic organisms, antimicrobial susceptibility testing, microscopy, and serology; on-site rapid antigen testing, PCR analysis, RSV and flu screening
- Transfusion Medicine: Pre-transfusion testing to provide serologically compatible blood products to patients and serological testing for diagnosis of immune disorders; blood grouping, antibody screening, cross-matching and plasma/blood products storage
- Specimen Collection: Specimen collection occurs within different services and the responsibility for collection will differ by patient location and specimen type (see workflow details below)
- Pathology/Histology: Surgical Pathology including routine surgical tissue processing, embedding, microtomy, slide staining. Specimens collected at HDMH will be contained, batch packed and referred out to SMMH for Histology and Pathology. Both sites will have capacity to prepare frozen sections within the labs, supported by Pathology. Grossing will be centrally done at SMMH
- Body Holding: Space allocation for body holding for SMMH is addressed within the Facilities Support Services component
- Point of Care Testing (POCT): Control and monitoring of POCT including glucose testing, urinalysis, amnio, fecal occult and pregnancy testing

- ECGs: Lab technicians provide ECG testing for inpatients and outpatients on an as needed basis, outpatient testing is done within the same footprint as Outpatient Specimen Collection. The ED and CCU will perform their own ECGs.

The table below articulates the current and future services to support core programs across the MAHC system.

Table 1. Current and Future Laboratory Services per Hospital Site

	Huntsville (HDMH)		***South Muskoka (SMMH)***	
Service	**Current**	**Future**	**Current**	**Future**
Accessioning	✓	✓	✓	✓
Biochemistry	✓	✓	✓	✓
Haematology	✓	✓	✓	✓
Microbiology (limited, workup for referring out)	✓	✓	✓	✓
Cytology	-	-	-	-
Pathology/Histology	-	Frozen sections	✓	✓
Transfusion Medicine	✓	✓	✓	✓
Point of Care Testing (POCT)	✓	✓	✓	✓
Specimen Collection/Phlebotomy	✓	✓	✓	✓
Electrocardiogram (ECG)	✓	✓	✓	✓

Education

Laboratory Services will provide educational placements for one to two Medical Lab Technologists (MLT) and one to two Medical Lab Technicians/Assistants (MLA). At any given time, there may be up to two trainees working in the department at each site.

Senior MLTs require workspaces for ongoing professional development and education.

Research

Laboratory Services may participate in research initiatives/studies in the future, and appropriate equipment validation space may be used to support these initiatives.

Linkages/ Partnerships

Laboratory Services will continue to initiate and participate in collaborative, partnerships supporting an integrated system of care. External linkages and partnerships are listed below:

Table 2. Linkages and Partnerships

Linkages/Partnerships	Description
Cambrian College; Georgian College	Medical Lab Technician (MLT) and MLA learners/placements
Dynacare Huntsville and Bracebridge	Esoteric testing for MAHC
Shared Hospital Lab (SHL)	Microbiology testing
Orillia Soldier's Memorial Hospital, Royal Victoria Regional Health Centre (Barrie)	Reference Lab as needed
SickKids Hospital (Toronto)	Stat testing for speciality test
Hospital Laboratories (Mount Sinai, University Health Network [UHN], St. Michaels, Sudbury)	Histology services
Public Health Laboratory	Referred testing
Canadian Blood Services	Blood product
Other Area Hospitals	Back-up agreement for testing, reciprocated
Burks Falls/Parry Sound Hospitals	Collection centres refer some testing to HDMH

Workload (Current and Projected)

Table 3. Historical and Projected Workload

		Historical			Projected
Component	**Measure**	**2017/18**	**2018/19**	**2019/20**	**2031/32**
Total		1,111,838	1,111,838	1,111,838	1,417,592
Core Lab: Pathology/Histology	Procedures	458,325	458,325	458,325	656,913
Core Lab: Clinical Chemistry	Contracted Out Procedures	2,750	2,750	2,750	3,625
	Procedures	232,457	232,457	232,457	271,142
Core Lab: Clinical Haematology	Procedures	91,125	91,125	91,125	106,019
Core Lab: Clinical Microbiology	Contracted Out Procedures	942	942	942	1,232
	Procedures	4,258	4,258	4,258	5,035
Core Lab: Pre & Post Analysis	Procedures	313,417	313,417	313,417	366,273
Core Lab: Transfusion Medicine	Procedures	12,256	12,256	12,256	12,210

Note:

1. Historical workload as provided by MAHC; volumes unavailable for unique years.

Operational Description

Organization and Management

MAHC Laboratory Services will operate under a dyad leadership model consisting of a Director of Community Collaboration and Diagnostics, a Manager of Laboratory Services and a Medical Lead, currently a Pathologist. Within each Laboratory Service area, Senior MLTs will report to the site-specific Charge Technologists.

Hours of Operation

Current and future hours of operation are noted in the table below.

Table 4. Laboratory Services Hours of Operation

	Current			Projected		
SMMH	**Weekday**	**Saturday**	**Sunday**	**Weekday**	**Saturday**	**Sunday**
Specimen Collection	On demand	On demand	On demand	On demand	On demand	On demand
ECG Testing (located with Specimen Collection)	On demand	On demand	On demand	On demand	On demand	On demand
Laboratory (all labs except histology)	24 hours	24 hours	24 hours	24 hours	24 hours	24 hours
Histology	6:00am - 4:00pm	On demand	On demand	6:00am - 4:00pm	On demand	On demand

Duration of Visit

Outpatient Specimen Collection or ECG: The anticipated length of visit for specimen collection or ECG testing is approximately 10-15 minutes.

Workflow

Requisitioning of Tests

The requisitioning of tests will be initiated by physician order entry electronically. Container labels will be printed at the time of order and affixed to the containers at the time of collection.

ECGs will also be requisitioned via physician order entry. Appointments are walk-in based, and not booked in advance.

Specimen Collection

An automated process such as a hand-held device will be used at the point of collection to scan the patient's bar-coded identification and print the collection label. This assures positive patient identification and will automatically capture the time of collection and identification of the individual performing the collection. The responsibility for specimen collection will differ by patient location and specimen type:

Outpatient blood collection (for MAHC patients) will continue to be offered five days a week during regular business hours at the Outpatient Specimen Collection area of the Laboratory, and after-hours collection will be accommodated, when required. This includes regular blood work for oncology patients.

Laboratory staff will be responsible for collecting inpatient blood specimens during routine morning rounds, and stat collections. They will also be responsible for collecting specimens from patients within the Day Surgery department (before and/or after surgery), as well as outpatient baby follow-ups within the Maternal Newborn Unit.

Lab will also continue to be responsible for collection in the ED and CCU and providing support for difficult draws when nursing staff is collecting.

Stat specimens collected by nursing staff are delivered by the most appropriate staff.

Venous blood gases (VBG) will be collected by MLA/Ts; arterial blood gases (ABG) will be collected by physicians and/or RT staff, as needed.

Specimen Transportation

All specimens will be hand delivered to the Laboratory by the most appropriate staff.

Specimen Receiving and Processing

There will be a Central Receiving and Accessioning zone at the entrance to the Laboratory that will receive and sort most specimens for distribution to the appropriate processing areas. This area will be operated by MLAs and will include the following:

- Drop-off of hand delivered/couriered specimens, and Canadian Blood Services products
- Pick-up for couriers/taxis (referred out testing)
- Pick-up for blood products for outpatients
- Specimen accessioning and centrifuging area.

All collected specimens will arrive labelled and bar-coded. The samples will be entered into the Laboratory Information System (LIS) and sorted according to testing site, urgency and the need for pre-processing.

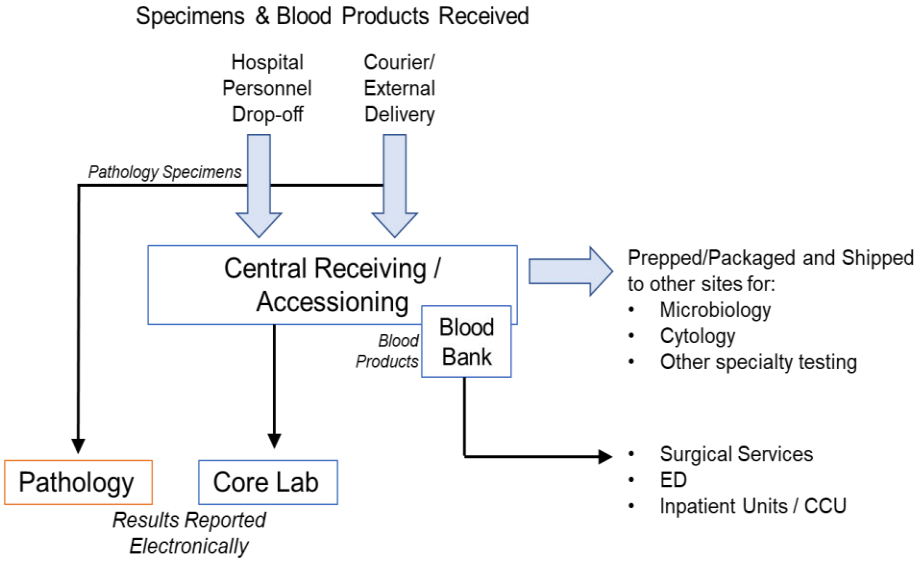
Blood specimens for chemistry, Haematology, and coagulation will be entered by Laboratory staff into the LIS. Specimens will be centrifuged, de-capped, aliquoted, and relabelled as necessary. Whole blood specimens and other samples that do not require preparatory centrifugation will be passed directly to the appropriate testing station, such as routine Haematology.

Pathology specimens will proceed directly to Pathology for accessioning.

Specimens for dispatch to other laboratories will be packed by the Laboratory staff and held; refrigerated, frozen or room temperature, for courier pick-up. Space will be needed for phlebotomy tray storage, transfer carts, containers, and storage of packaging materials.

There will be appropriate storage space for Pathology and Microbiology specimens received after-hours.

Figure 1. Laboratory Workflow – Central Receiving/Accessioning



In-Laboratory Specimen Flow

Chemistry: Specimens will be placed in the loader of the chemistry analyzer for automated processing. All samples remaining after processing will be retained in refrigeration for re-testing for up to three to seven days.

Routine Haematology: Specimens will be loaded into the analyzers. Abnormal samples will be flagged for further study by microscope examination. Blood smears will be made on glass slides and stained. Routine smears are retained for seven days. Abnormal slides are retained for 10-28 years except from children less than 18 years, which are stored up to 30 years. Routine Haematology samples will be retained for 48 hours at room temperature.

Consideration for new technology such as CellaVision™ may be used to digitize the peripheral blood smears, perform blood cell differentials, and then make the images available for remote review via tele haematology.

Transfusion Medicine: Samples for blood grouping, antibody screening and crossmatch are forwarded after centrifugation to Transfusion Medicine for processing; red cells (fridge) seven days, plasma (frozen) three weeks. Nursing staff requiring access to unmatched blood product during a trauma will present at the Lab to pick-up the blood products which are issued by the Lab staff.

Microbiology: Blood culture specimens will have short-term incubation and be referred out from both sites. All rapid micro specimens will be collected from the specimen fridge in central processing and processed as appropriate. Stat specimens such as body fluids and cerebrospinal fluid (CSF) must be delivered to the Microbiology Laboratory immediately upon collection. C-difficile samples and cultures and slides (gram staining) will be retained for one year. Urine culture collection containers are retained for up to three days in fridge.

Pathology: Surgical specimens are grossed and dictated by the Pathologist. The surgical specimens are loaded onto the tissue processor for overnight processing. Once processed, the specimens are embedded into blocks. The blocks are cut, and the tissue sections are placed on slides. Slides are dried, stained and cover slipped. The slides are delivered to the Pathologist for diagnosis. Following this, a request from the Pathologist for additional special stains may be required to complete the diagnosis. Blocks are retained on-site for two years.

Cytology: Specimens are shipped to Dynacare for processing, screening, and interpretation.

Reporting

Most analyzers will have bi-directional communication capability allowing direct download of results into the LIS, Cerner PowerChartTM. A few test results may need to be entered into the system manually.

Results are reported and released by the Lab Technologist for electronic reporting. Stats are automatically broadcast to the appropriate location upon release. All results will continue to be reported electronically using appropriate security protocols.

ECGs will be read reported electronically by a third-party provider, and results uploaded into the patient EMR.

Other Laboratory Service Flows

Point of Care Testing

POCT will continue to be performed by clinical staff in key clinical areas such as the ED and Obstetrics. POC glucometers are already deployed to many services. Results will be interfaced where possible with the LIS, auto-received and auto-released in real-time through middleware platform. Maintenance and validation is the responsibility of the Laboratory staff within the Laboratory.

Body Holding

Bodies will be transported to body holding by clinical staff. Lockable storage will be used to keep personal effects safe until pick-up from families. Bodies will be held until released to the coroner, family, or funeral home in accordance with authorities and provincial policies. Depending on the known or suspected infectious status of the body, additional precautions may also be required until the body is enclosed in a body bag of approved construction for transport.

General Support Activities

Supplies, Cleaning & Disposal

On a weekly basis, technologists will check inventory and order laboratory supplies for their particular service, and stock order products that are maintained by purchasing will be inventoried and ordered by purchasing. Materials Management will deliver supplies to the Laboratory once received at the dock. A central storage area within the Lab will be provided for holding bulk laboratory supplies, including reagents. This area will include secure dry and cold storage, the latter in commercial/laboratory refrigerators/freezer. Storage will be located at each testing station in under and over counter cupboards and shelving, stocked by Lab staff and replenished as necessary. Acid corrosive safety cabinets and flammable cabinets are required for storage at both sites.

All streams of waste will be stored in bins of various sizes at each work area. Laboratory staff will seal the biomedical waste containers/bags when filled and place the contents in exchange biohazard containers for pick-up by Environmental Services (EVS). EVS staff will remove the filled exchange containers for final, off-site disposal. The central Soiled Utility Room will also house exchange containers for recycling and garbage waste streams.

EVS staff will provide daily service within the Laboratory, in particular cleaning of the Histology space will be performed after 4:00pm daily.

Occupational Health

Staff will wear a Laboratory coat when working in the Laboratory. An alcove located adjacent to the entrance/exit will accommodate clean working coats. Similarly, a drop-off area will be provided for soiled coats prior to exiting the Laboratory. Coats will be laundered in-house by EVS while gowns for Histology and Microbiology will be sent off-site for laundering.

Appropriate eyewash stations and emergency deluge showers with drain will be located at accessible points around the Laboratory in accordance will guidelines and standards.

Staff Resources

A small Staff Lounge with kitchenette will be provided, while staff support spaces such as lockers, change facilities and showers will be centralized.

Enabling Technologies

Information and Communication Systems

Laboratory Services require reliable and effective IT/Communications Services for efficient operation. The IT design should address:

- Patient clinical information systems and electronic records
- Wireless and hospital network requirements, high capacity and speed for digital equipment
- Wearable communication technology (e.g., Vocera) for agile staff communications.

Equipment and Biomedical Engineering

ECG machines, centrifuges, and small repairs are undertaken by third-party biomedical engineering services, and other equipment by the vendor. All equipment should be planned with accessibility for servicing.

Staffing (Current and Projected)

Table 5. Current and Projected Staffing

	Current	*Projected 2031/32*			
Laboratory	**2022/23 Total FTE**	**Total FTE**	**Headcount per Day**	**Headcount per Evening**	**Headcount per Night**
Total	14.47	24.96	15	4	2
Charge Core Lab Technologist	1.00	1.00	1	0	0
Sr Lab Technologist	2.75	3.45	3	0	0
Lab Technician	6.11	7.82	3	2	1
Lab Technologist	4.61	6.90	2	2	1
Charge Histology Technologist	0.00	1.15	1	0	0
Histology Lab Technologist	0.00	2.99	3	0	0
Histology Lab Technician	0.00	1.15	1	0	0
Manager (shared resource)	0.00	0.50	1	0	0

Design Objectives

Locations and Adjacencies

The following adjacencies are to be prioritized for Laboratory Services:

- Easy access by couriers for receipt and shipping of specimens and blood products
- Adjacency to the ED to facilitate quick transfer of urgent specimens and support of specimen collection
- A central location with easy navigation from the main entrance/patient parking is important for the large number of outpatients to Specimen Collection and ECG testing
- Easy access to CCU, Surgical Suite, Labour & Delivery and ED is important for timely delivery of blood and blood products and to minimize transfer distance and avoid public corridors/elevators with specimens and product.

Internal Organization

The Laboratory should be organized into principal zones: Accessioning & Collection, Core Laboratory, Pathology and Administrative and Support:

Accessioning should be directly adjacent to a main circulation route.

Core Laboratory will accommodate all testing stations in an open, flexible work environment (including maximizing column-free space) that can be adjusted easily to accommodate new instruments and workflows. Technical support spaces should be convenient to all Laboratory areas and accessible to main hospital circulation to permit delivery of goods and removal of waste. Biochemistry, Haematology and Transfusion Medicine will function as a Core Lab with reduced staff covering this area on evenings and nights seven days per week, and as such, should be organized in a manner that supports efficient flow and minimizes walking distances to key equipment.

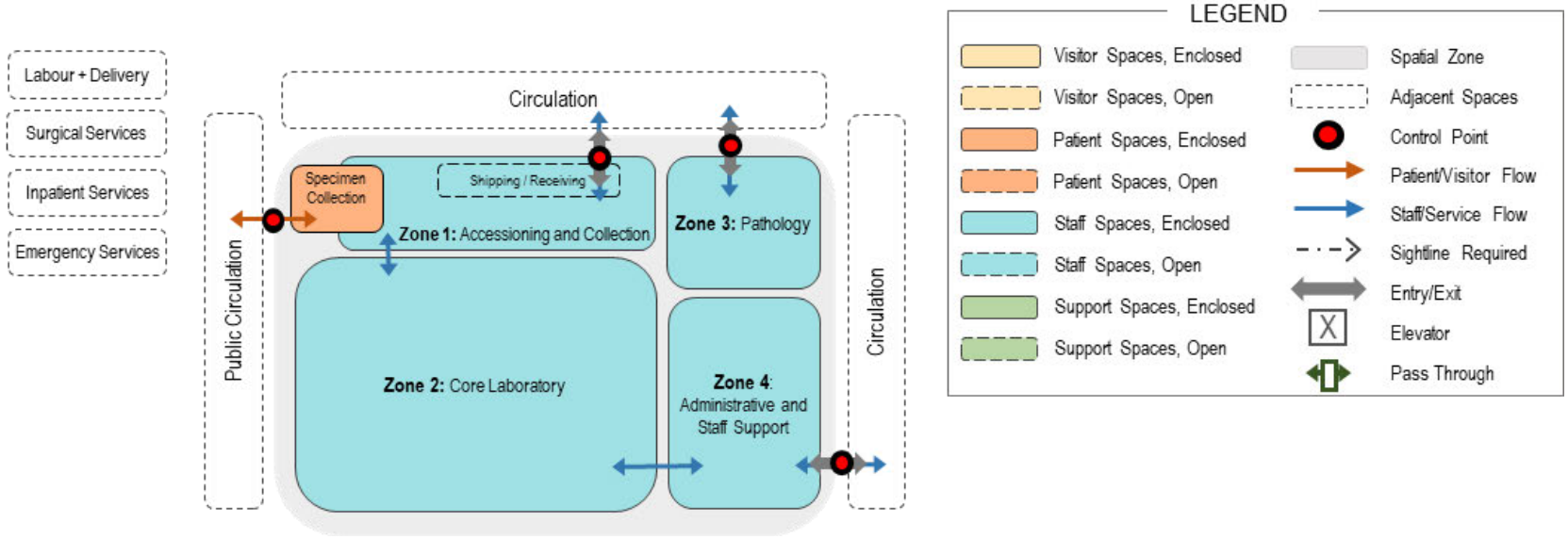
Pathology should have direct, controlled, access from a main circulation route to facilitate the flow of Pathology specimens to Pathology for accessioning.

Administration/Support should be located close to the Laboratory entrance and reached without passing through the testing areas.

Outpatient Specimen Collection and ECG Testing should be conveniently located for outpatients and adjacent to main Laboratory for support from limited Laboratory staff working after regular daytime hours. A method for notifying Lab staff of after-hours patients should be implemented.

The spatial organization of the Laboratory should be generally as shown in the diagram below. The diagram illustrates conceptual relationships and should not be treated as an architectural design. It should only be used to emphasize and identify important adjacencies and patient/visitor flows and staff/service flows. The diagram is not to scale.

Figure 2. Adjacency Diagram



Special Considerations

Infection Prevention and Control

All patient specimens will be considered bio-hazardous, and thus universal safety precautions will be followed to ensure employee and patient safety. All equipment, furnishings and finishes must be easily cleanable with approved hospital grade disinfectants. Sufficient access is required to PPE, hand hygiene sinks and stations and washrooms throughout.

Wayfinding

Appropriate and intuitive wayfiding should be provided for both couriers, and patients accessing Laboratory Services.

Acoustic

While an open laboratory will promote flexibility and interaction it may be a source of higher noise levels. Consideration should be given to partial enclosures around particularly loud instruments, together with sound absorbing surfaces to minimize reverberant sound. The latter would include sound absorbing ceiling surfaces and vertical baffles between stations.

Air/Environmental	Laboratory ventilation must provide comfortable conditions for staff, support correct, continuous, operation of laboratory equipment; and, remove odours and fumes from working areas. Analyzers generate a substantial quantity of heat, which must be removed to ensure its continuous function. Work involving chemically hazardous material will be conducted in appropriate safety cabinets and local exhaust ventilation should be considered at bench level for localized fumes/smells.
Architectural/Structural/ Electrical/Mechanical	Dispersed, individual purified water outlets will be required for work areas around the Laboratory. A reverse osmosis (RO) system is required for the main automated chemistry analyzers. Utility power outlets (110v & 220v) should be provided at regular intervals (four to five feet on centre) along all laboratory benches. Sufficient power should be allowed for primary instruments and a wide range of LIS terminals and peripherals. Higher power/voltage, special characteristics, emergency power and UPS needs should be determined at the design stage when more detailed equipment information is available. Selected pieces of equipment, such as blood bank refrigerators and freezers, will require an alarm connection that is monitored by switchboard staff. There shall be doors into each Laboratory large enough to move equipment in and out of the space.
Lighting	Provide glare-free full-spectrum, artificial or natural, lighting and special task types for technical work areas. Natural light should be provided in areas where staff work all day.
Ergonomic Considerations	Provide appropriate heights for laboratory benches, shelving, computer terminals and keyboards to minimize physical stress or accidents and to maximize the comfort of the Laboratory users. Adjustability of bench heights should be considered.
Security	The Laboratory will be secured, and access controlled by employee RFID badge (swipe access). A camera system will be used for monitoring entrances from central security. No patient access to the work areas of the Laboratory will be possible.
Codes & Standards	In addition to the above criteria, the facility must conform to recognized national, provincial, and local building codes and standards as they may relate to safety and accessibility for patients, staff, and visitors. Architects are also instructed to refer to CSA Z8000-18 Canadian Health Care Facilities.

Projected Space Requirements

Table 6. *Space Table*

			Component Gross Area (CGSF) : TOTAL				**4,170**				**387.4**			
			Component Gross Area (CGSF) : Core Lab				**2,865**				**266.2**			
			Net to Gross Ratio				1.30				1.30			
			Total Net Area (NSF)				2,204				204.8			
			Component Gross Area (CGSF) : Pathology				**1,305**				**121.2**			
			Net to Gross Ratio				1.30				1.30			
			Total Net Area (NSF)				1,005				93.4			
CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
			Zone 1: Accessioning & Collection			**subtotal net area**		**690**		**subtotal net area**		**64.1**		**Lab to be located close to ED**
08	.001		Entry/Exit			25	1	25		2.3	1	2.3		
		.01	*- lab coat rack/PPE area*	*2*	*5*				0.5					
		.02	*- laundry hamper*	*1*	*5*				0.5					
		.03	*- hand hygiene sink*	*1*	*10*				0.9					
08	.002		Shipping/Receiving			95	1	95		8.8	1	8.8		
		.01	*- receiving counter*	*1*	*25*				2.3				For daytime and after-hours drop-off	Provide storage for containers
		.02	*- hand hygiene sink*	*1*	*10*				0.9					
		.03	*- workstation, log-in/sorting*	*2*	*15*				1.4					Include terminal and printers
		.04	*- packing station*	*1*	*30*				2.8					Include supply storage
08	.003		Specimen Processing/Product Issuing			115	1	115		10.7	1	10.7		To accommodate approx. 3 staff
		.01	*- drop-off window*	*1*	*15*				1.4					
		.02	*- work counter*	*1*	*50*				4.6					To include blood culture incubators (stackable)
		.03	*- terminal/bar code scanner, label printer*	*1*	*20*				1.9					
		.04	*- storage, room temperature products*	*1*	*20*				1.9					
		.05	*- centrifuge*	*1*	*10*				0.9					
08	.004		Freezer/Refrigerator			20	1	20		1.9	1	1.9	For sample storage	
08	.005		Storage, Supplies			80	1	80		7.4	1	7.4		

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
08	.006		Specimen Collection and ECG			180	1	180		16.7	1	16.7		
		.01	*- hand hygiene sink*	*1*	*10*				0.9					
		.02	*- stretcher, ECG and blood collection*	*1*	*120*				11.1					Three sided enclosed
		.03	*- specimen sorting and supplies*	*1*	*30*				2.8					
		.04	*- carts for collection*	*2*	*5*				0.5					
		.05	*- ECG storage*	*1*	*10*				0.9					
08	.007		General Support Area			175	1	175		16.3	1	16.3		
		.01	*- hand hygiene sink*	*1*	*10*				0.9					
		.02	*- eyewash*	*1*	*10*				0.9					
		.03	*- waste and biohazard bins*	*1*	*50*				4.6					
		.04	*- utility sink and counter*	*1*	*30*				2.8					
		.05	*- housekeeping closet*	*1*	*75*				7.0					
08	.008		left intentionally blank											
			Zone 2: Core Laboratory			**subtotal net area**		**870**		**subtotal net area**		**80.8**		
08	.009		Chemistry Analyzer			110	1	110		10.2	1	10.2		
		.01	*- set-up and terminal w/ printer*	*1*	*25*				2.3					
		.02	*- sink station*	*1*	*10*				0.9					
		.03	*- analyzer*	*1*	*40*				3.7					Based on Vitros 7600
		.04	*- refrigerator*	*1*	*20*				1.9					3-door fridge
		.05	*- freezer (-20c)*	*1*	*15*				1.4					
08	.010		Blood Gas			25	1	25		2.3	1	2.3		
		.01	*- set-up and terminal w/ printer*	*1*	*10*				0.9					
		.02	*- analyzer*	*1*	*10*	.			0.9					Based on GEM 5000
		.03	*- blood mixer*	*1*	*5*				0.5					
08	.011		Urinalysis Station			70	1	70		6.5	1	6.5		Urine Drug Analyzer in future (bench top)
		.01	*- set-up and terminal*	*1*	*10*				0.9					
		.02	*- analyzer (clinitek)*	*1*	*10*				0.9					Based on Clinitek Advantus
		.03	*- microscope and set-up*	*1*	*20*				1.9					Consider in future could be automated system
		.04	*- centrifuge*	*1*	*10*				0.9					
		.05	*- vented pour-off sink*	*1*	*20*				1.9					

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
08	.012		Rapid Microbiology Testing			115	1	115		10.7	1	10.7		
		.01	*- hand hygiene sink*	*1*	*10*				0.9					
		.02	*- BSC (biosafety cabinet)*	*1*	*25*				2.3				For rapid tests/gram stains, etc.	
		.03	*- molecular testing equipment*	*1*	*20*				1.9					Based on Abbot ID Now (x 2) , BD Bactec, GeneXpert Dx
		.04	*- microscope bench*	*1*	*25*				2.3					
		.05	*- workstation*	*1*	*25*				2.3					
		.06	*- PCR equipment*	*1*	*10*				0.9					
08	.013		Haematology			130	1	130		12.1	1	12.1		
		.01	*- hand hygiene sink*	*1*	*10*				0.9					
		.02	*- set-up and receiving w/ terminal*	*1*	*10*				0.9					
		.03	*- analyzer*	*1*	*20*				1.9					Based on DxH 600/520
		.04	*- CellaVision®*	*1*	*15*				1.4					Blood and body fluid differentials
		.05	*- blood mixer*	*1*	*10*				0.9					
		.06	*- automated stainer*	*1*	*10*				0.9					Based on HemaTek 3000 Stainer
		.07	*- centrifuge*	*1*	*10*				0.9					Based on Cytospin
		.08	*- refrigerator*	*1*	*20*				1.9					
		.09	*- freezer (-40c)*	*1*	*15*				1.4					
		.10	*- workstation*	*1*	*10*				0.9					
08	.014		Coagulation Station			35	1	35		3.3	1	3.3		
		.01	*- analyzer*	*1*	*25*				2.3					Based on ACL TOP 350
		.02	*- centrifuge*	*1*	*10*				0.9					Based on Hettich EBA 205
08	.015		Transfusion Medicine			85	1	85		7.9	1	7.9		
		.01	*- cell wash centrifuge*	*1*	*10*				0.9					Based on Serofuge 2002 and Ultrawasher
		.02	*- plasma thawer/water bath*	*1*	*15*				1.4					Based on Helmer Plasma Thawer
		.03	*- counter w/ utility sink*	*1*	*20*				1.9					
		.04	*- microscope (inverted)*	*1*	*10*				0.9					
		.05	*- workstation, Tech including terminal*	*1*	*20*				1.9					
		.06	*- cross-matching equipment*	*1*	*10*				0.9					Consider in future could be automated system
08	.016		Storage, Blood Products			50	1	50		4.6	1	4.6		
		.01	*- refrigerator*	*1*	*20*				1.9					
		.02	*- freezer (-30c)*	*1*	*20*				1.9					
		.03	*- incubator/shaker*	*1*	*10*				0.9					Based on Helmer platelet incubator

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
08	.017		Support Area			140	1	140		13.0	1	13.0		
		.01	*- emergency shower*	*1*	*35*				3.3					
		.02	*- storage, reagent storage*	*1*	*80*				7.4					
		.03	*- RO water system*	*1*	*15*				1.4					
		.04	*- dry ice maker*	*1*	*10*				0.9					
08	.018		Glasswashing Area			60	1	60		5.6	1	5.6		
		.01	*- utility sink w/ pipette washer attached*	*1*	*20*				1.9					
		.02	*- counter with under counter dishwasher*	*1*	*25*				2.3					Under counter dishwasher
		.03	*- set-up station*	*1*	*15*				1.4					
08	.019		Workstation, Senior MLT			50	1	50		4.6	1	4.6		
08	.020		left intentionally blank											
08	.021		left intentionally blank											
			Zone 3: Pathology			subtotal net area		1,005		subtotal net area		93.4		LOCATE ADJACENT TO SURGICAL SERVICES
08	.022		*Receiving, Log-in Area*			*60*	*1*	60		5.6	1	5.6		
		.01	*- receiving & set-up work counter*	*1*	*60*				5.6					
08	.023		Grossing Room, Frozen Section and Support			300	*1*	300		27.9	1	27.9		
		.01	*- hand hygiene sink*	*1*	*10*				0.9					
		.02	*- grossing workstation built-in venting & sink*	*1*	*60*				5.6					
		.03	*- gross supply area*	*1*	*5*				0.5					
		.04	*- cryostat*	*1*	*15*				1.4					
		.05	*- sharps removal containers*	*1*	*5*				0.5					
		.06	*- bench w/ dictaphone/video image system*	*1*	*20*				1.9					
		.07	*- specimen cart*	*2*	*10*				0.9					Space for 2 carts
		.08	*- fume hood*	*1*	*25*				2.3					
		.09	*- supply storage*	*1*	*40*				3.7					
		.10	*- vented waste storage*	*1*	*20*				1.9					
		.11	*- vented specimen storage cabinet*	*2*	*25*				2.3					
		.12	*- aprons, gowns, specimen waste buckets*	*1*	*30*				2.8					

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
08	.024		*Specimen/Tissue Processing*			*185*	*1*	185		17.2	1	17.2		
		.01	*- set-up & fume hood*	*1*	*25*				2.3					
		.02	*- processor*	*1*	*15*				1.4					
		.03	*- lab sink*	*1*	*15*				1.4					
		.04	*- paraffin wax bench (dispensers)*	*1*	*20*				1.9					
		.05	*- formalin storage and dispensing system*	*1*	*50*				4.6					
		.06	*- formalin prep vented bench w/ sink*	*1*	*30*				2.8					
		.07	*- reagent cart*	*1*	*10*				0.9					
		.08	*- flammable cabinet*	*1*	*20*				1.9					
08	.025		Embedding Centre			*70*	*1*	70		6.5	1	6.5		
		.01	*- set-up work area incl. terminal and scanner*	*1*	*20*				1.9					Provide storage above counter
		.02	*- embedding stations with IT*	*2*	*25*				2.3					Based on Arcadia Embedder
08	.026		Microtomy			130	*1*	130		12.1	1	12.1		
		.01	*- workstation for set-up with scanner and monitor*	*1*	*20*				1.9					
		.02	*- microtome w/ flotation bath, cold plate*	*3*	*15*				1.4					Based on Leica Microtome
		.03	*- oven*	*1*	*15*				1.4					Based on Thermo Scientific
		.04	*- slide cutting and storage bench*	*1*	*30*				2.8					
		.05	*- labelled slide storage area*	*1*	*20*				1.9					
08	.027		Routine Staining			260	*1*	260		24.2	1	24.2		
		.01	*- set-up and staining preparation w/ sink*	*1*	*30*				2.8					
		.02	*- refrigerator*	*1*	*15*				1.4				Reagent storage	
		.03	*- stainers*	*1*	*20*				1.9					Based on Prisma Plus H&E Stainer
		.04	*- fume hood*	*1*	*25*				2.3					
		.05	*- bench for double headed microscope*	*1*	*30*				2.8					
		.06	*- reagent prep*	*1*	*40*				3.7					
		.07	*- scanner and monitor*	*1*	*20*				1.9					
		.08	*- flammable cabinet*	*1*	-				-					Undercounter
		.09	*- speciality staining*	*2*	*40*				3.7				IHC and Special Stain	
08	.028		left intentionally blank											

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
			Zone 4: Administrative and Staff Support			**subtotal net area**		**644**		**subtotal net area**		**59.8**		
08	.029		Office, Charge Tech			100	1	100		9.3	1	9.3		
08	.030		Office, Pathologist			100	1	100		9.3	1	9.3		
08	.031		Office, Shared			140	1	140		13.0	1	13.0	For Pathology support	Provide 2 workstations
08	.032		Workstation, Touchdown			30	2	60		2.8	2	5.6		
08	.033		Washroom, Staff			50	1	50		4.6	1	4.6		
08	.034		Staff Lounge			194	1	194		18.0	1	18.0		
		.01	*- hand hygiene sink*	*1*	*10*				0.9					
		.02	*- kitchenette*	*1*	*60*				5.6					
		.03	*- table and chairs*	*4*	*25*				2.3					
		.04	*- cube lockers, staff*	*12*	*2*				0.2					
08	.035		left intentionally blank											

09. Main Lobby

Functional Description (Current and Projected)

Planning Principles and Assumptions

The SMMH Main Lobby and related spaces are comprised of the following services, that when combined will provide social, retail, and service-related activities that are of particular interest to patients, staff, and visitors coming to the site.

- Main Lobby Spaces (e.g., gathering spaces, Information Desk, Washrooms, vending, Nursing Mother's Room)
- South Muskoka Memorial Auxiliary (incl. retail operations)
- South Muskoka Hospital Foundation (incl. Foundation Office and Donor Recognition/Wall Display)
- Patient Registration
- Patient Navigator/Indigenous Relations (PN/IR) Office
- Security Office
- Spiritual Care.

In keeping with best practices in patient- and family-centred care, the Main Lobby will provide an excellent patient and family experience, with a friendly, welcoming, accessible, and easily navigable environment.

Other planning principles will include:

- The Main Lobby will be a space that patients (and their visitors) can use as a "destination" when they leave their rooms and move about the site; it will serve as an attraction away from other areas for patients, families, and staff, i.e., to provide a positive diversion for family members who are awaiting a patient receiving treatment or to give respite to visitors who are spending lengthy amounts of time at the bedside, etc.
- The Main Lobby will require flexibility to accommodate additional screening measures for outbreak management. Changes to overall planning and design principles related to pandemic planning are ongoing and will be incorporated as they are available and as planning proceeds.
- The Main Lobby will be designed such that it could be utilized as a gathering place for fundraising events, awards, press conferences, and other group events.
- It is assumed that the Main Lobby will be planned and designed to be culturally sensitive, accessible, and age-friendly across the human lifespan, engaging and supporting patients, staff and visitors of all ages and abilities.

- Informational electronic displays will have content updated and changed regularly. Ownership of content will likely rest with Administration (e.g., Public Relations and Communications), with input from programs/services as applicable.
- As an increasingly technology-dependent population, frequent spaces for device charging will be dispersed throughout the seating areas, for public use.
- Spiritual Care will include a Multi-Faith Healing Room with supports for traditional medicine; decentralized outdoor therapeutic space may be provided on the site for patient, staff, and visitor use. This may include a labyrinth, outdoor seating area, Indigenous healing garden, and/or memorial gardens.
- The Multi-Faith Healing Room is intended to be used for emotional, mental, and/or spiritual wellness on a first come/first serve basis and must be available to patients and families in their moment of need. While periodic standing events may be held (e.g., holiday-related Mass), it is not intended to be used as a bookable space for purposes related to spirituality or otherwise (e.g., for use as meeting, exercise space).
- Donor recognition will be included within the Main Lobby and/or other public spaces on the site and may include (but is not limited to Donor Recognition/Wall[s]), memorial wall/plaques (for long tenure staff, volunteers, medical staff), capital project recognition etc. The scope, design and location of donor recognition will continue to develop over the course of the project, and not as a direct outcome of functional programming.

Patient Profile

The Main Lobby will support all patients, staff, visitors, and volunteers at the site.

Scope of Services (Current and Projected)

Main Lobby

Amenities included within the Main Lobby component will be the focal point of the hospital. As such, it will function as the centre from which all activity will be directed. The Main Lobby will accommodate:

- Arrival/drop-off at the building entry including a covered drop-off shielded from the weather and entry vestibule
- Wheelchair storage
- Hand sanitizing stations
- Informal socializing lounge/waiting space
- Pay parking machine (if machines are not pay and display), change machine, automated teller machine (ATM)
- Public Washrooms

- Nursing Mother's Room
- Public/taxi telephones.

The Main Lobby will also include other elements, some of which will be discussed in more detail in the sub-sections below:

- Information Desk – to provide information and wayfinding and monitor people entering the facility (e.g., for hand hygiene); will include a payment box for cashier services (it is assumed most payment will be online)
- Patient Registration (see below)
- Auxiliary-run Gift Shop (see below)
- PN/IR Office (see below)
- Foundation Office and Donor Recognition/Wall Display (see below)
- Communications space and public information displays – changeable space to communicate MAHC information, wellness resources/learning
- Multi-Faith Healing Room to be used for quiet prayer, memorial services, music and meditation
- Kiosks for access to electronic information (e.g. information/wayfinding, fundraising, e-cashier).

Auxiliary

As a result of the merging of two separate hospitals MAHC has maintained two distinct Auxiliaries. These include the SMMH Auxiliary and the Huntsville Hospital Auxiliary. It is assumed that the two organizations will remain as separate entities as long as two acute care hospital sites exist.

Formed in 1949, the South Muskoka Memorial Hospital Auxiliary facilitates volunteer placement in clinical and non-clinical programs/services throughout SMMH.

In addition, the Auxiliary will:

- Operate the Gift Shop
- Operate the Information Desk
- Operate the coffee bar (Muskoka Mocha)
- Provide portering services
- Hold annual fundraising and special events.

The Gift Shop will sell a variety of items to the visitors, patients and staff including, but not limited to:

- Seasonal items
- Giftware (e.g., cards, commemorative items)
- Toiletries and convenience items
- Confectionary items
- Clothing
- MAHC branded merchandise
- Books, magazines
- Toys.

Additionally, the Gift Shop will include an adjacent coffee bar, selling hot beverages and snacks.

South Muskoka Hospital Foundation

As a result of the merging of two separate hospitals, MAHC has maintained two distinct Foundations. These include the South Muskoka Hospital Foundation and the Huntsville Hospital Foundation. It is assumed that the two organizations will remain as separate entities as long as two acute care hospital sites exist.

The South Muskoka Hospital Foundation was established in 1980 to support the improvement of health care in South Muskoka for permanent and seasonal residents. The Foundation provides charitable support to SMMH for urgently needed equipment, technology, facility renovations and staff education, all with the goal of enhancing patient care.

The South Muskoka Hospital Foundation will continue to be responsible for stewardship, donor relations, annual giving programs, legacy giving, capital campaign, and management of the donor database among others to improve health care services for the residents of MAHC's catchment area.

The primary activities that will occur within the Foundation's office suite will include, but are not limited to:

- Preparing, coordinating, and managing special events for fundraising purposes, as well as donor relations/ stewardship
- Preparing, coordinating, and managing major gift proposals, including grants and capital campaigns, to individuals, corporations, foundations, and service clubs
- Developing and managing planned gifts, including, but not limited to bequests, life insurance, and endowment opportunities

- Targeting annual appeals to community organizations, staff, donors, prospects, and their families through activities such as mailing programs, annual reports, direct mailings, radio/public service announcements, special newspaper publications, etc.
- Selling lottery and event tickets to staff, donors, and community at large for Foundation-specific events
- Donation processing, which involves maintaining a database of donors and contacts and the distribution of receipts and appreciation letters
- Operational support and participation in third-party events
- Administration of the South Muskoka Hospital Foundation (general operations, including Human Resource, Public Relations, Finance requirements, etc.).

Patient Registration, Scheduling & Switchboard

Patient Registration will continue to be centralized at each site, providing registration (in-person and via Kiosk) for inpatients, outpatients, and patient transfers. Registration is the act of entering one's health card number and confirming demographics and contact information. For out-of-province or out-of-country patients, insurance coverage may be checked, and some form of pre-authorized payment method may be sought. Every visit to the hospital will require registration.

Patient Scheduling and Switchboard will be located adjacent to the Registration desk in the Main Lobby and will be staffed 24/7. It will be responsible for operation of the main communications centre, including:

- Scheduling of patient visits (with some exceptions, e.g., Surgical Program, some diagnostic tests)
- Receiving and directing incoming calls
- Assisting with outgoing calls
- Registration assistance during peak times and/or break coverage
- Paging and emergency codes
- Greeting visitors and wayfinding when the Information Desk is not operational or is especially busy.

Staff for this area will be cross trained for Registration, Scheduling and Switchboard roles and will work across both sites, as required.

It should be noted that advancements in scheduling and predictive technology (including use of OCEAN platform) will allow for more patient empowered pre-registration and scheduling. It is anticipated that over time, the need for in-person registration will lessen, and parallel improvements in scheduling (through predictive technology and real-time notifications) will result in less need for waiting space in outpatient spaces. Additionally, process for Registration may

shift over time such that routine visits (e.g., chemotherapy) do not require registration centrally, but instead verification of existing information and confirmation of attendance electronically before proceeding to the relevant Clinical area.

Patient Navigator/Indigenous Relations Office

A shared office for the PN/IR will be located at each site to offer patients, their families, and the public a mechanism by which they may voice compliments and concerns about their experience or the care they received in a confidential manner, as well as provide feedback that can help MAHC track the quality of patient experiences and identify opportunities for quality improvement.

Indigenous Relations will provide support and advocacy for Indigenous patients and families by:

- Providing one-on-one support with clients via telephone or in-person
- Accessing culturally relevant care options
- Connecting patients to community resources
- Coordination of traditional ceremonies and connections with Elders
- Advocacy for patients and families
- Support/liaison between care teams and patients
- Planning for short-term and long-term healthcare needs.

Spiritual Care

The Muskoka Chaplaincy Association (MCA), in partnership with MAHC, provides the services of a Spiritual Care Coordinator with scheduled times at both sites. This is supported by Spiritual Care volunteers at each site. Pastoral care by faith-specific representatives will also be available upon request to patients with a particular religious affiliation.

Spiritual Care services will continue to support excellence in total care of patients, staff, families, and volunteers at SMMH by:

- Offering support, companionship, and counsel for issues including (but not limited to):
  - bereavement
  - loneliness, feelings of loss, and grief
  - meaning and purpose in life
  - coping with lifestyle changes such as loss of independence, isolation or hospitalization, moving to a long-term care home

    - end-of-life challenges and issues.
- Developing ongoing programs to meet the spiritual and religious needs of the MAHC
- Serving on various hospital committees, as required
- Building spiritual health care capacity with community clergy
- Work in partnership with the Indigenous Relations to provide providing ongoing training to staff regarding traditional, spiritual, and cultural needs of Indigenous People
- Providing ongoing training and support to staff regarding religious and cultural diversity and sensitivity
- Offering memorial services (including for staff), as appropriate.

In future, Spiritual Care will include a Multi-Faith Healing Room for worship, ceremonies, reflection, and respite. *Note:* this space will require the ability to smudge.

Education

Not applicable to this component.

Research

Not applicable to this component.

Linkages/ Partnerships

Table 1. Linkages and Partnerships

Linkages/Partnerships	Description
Registration	
All MAHC Clinical Departments	Support to staff in Clinical areas by completing registration process
Switchboard	
Security	For support in emergency Codes and other assistance
Patient Registration	For staff cross coverage and other assistance
Foundation	
Administrative Services	For collaboration with Senior Leadership, Finance, Communications, and other departments

Workload (Current and Projected)

Table 2. Historical and Projected Workload

		Historical			Projected
	Measure	**2017/18**	**2018/19**	**2019/20**	**2031/32**
Auxiliary					
SMMH Site	Total Volunteers (approx.)	N/A	N/A	109	109+
Patient Registration					
SMMH Site	Outpatient Registrations	N/A	N/A	19,901	In department
	Inpatient Registrations	2,399	2,465	2,509	In department
	Emergency Registrations	23,668	22,758	22,005	In department

Note:

1. Future model includes bedside and Kiosk registration to leverage technology to the highest degree possible.

Operational Description

Organization and Management

The Auxiliary, Foundation, and Spiritual Care will have responsibility for their respective areas; overall responsibility for the Main Lobby area will rest with Administration and Facility Support Services.

Patient Registration, Scheduling and Switchboard will be under the responsibility of the Manager of HIS, Privacy, and Central Registration and Scheduling.

Hours of Operation

Current and future hours of operation are noted in the table below.

Table 3. Hours of Operation

	Current			***Projected***		
Modality	**Weekdays**	**Saturday**	**Sunday**	**Weekday**	**Saturday**	**Sunday**
Main Lobby	-	-	-	-	-	-
Information Desk	2 shifts per day (6-7 hours total), 5 days per week	As available	As available	7 days per week	-	-
South Muskoka Hospital Foundation	08:00am – 4:00pm	-	-	08:00am – 4:00pm	-	-
Gift Shop	2 shifts per day (6-7 hours total), 5 days per week	As available	As available	7 days per week		
Patient Registration	24/7			24/7		
Patient Navigator/ Indigenous Relations (PN/IR) Office	n/a	n/a	n/a	08:00am – 4:00pm	On-call	On-call
Spiritual Care	09:00am – 5:00pm Tuesdays	On-call	On-call	09:00am – 5:00pm Tuesdays	On-call	On-call
Multi-Faith Healing Room	n/a	n/a	n/a	24/7		

Notes:

1. The South Muskoka Hospital Foundation will also periodically host evening and weekend special events. Meetings may also take place after-hours, as may be required.
2. At present, outside of the scheduled hours for Spiritual Care, a 24/7 chaplain service is provided upon request from within the community.

Duration of Visit

Not applicable to this component.

Referrals & Scheduling Appointments

Spiritual Care

Requests for Spiritual Care Services may be communicated through Registration activities or through self-identification once registered (e.g., upon admission, nurse will ask if the patient would like to connect with Spiritual Care). Spiritual Care will also assist in contacting community spiritual and religious care providers in the community upon patient request.

Support to families will usually be performed indirectly through interactions with the patient.

Staff referrals for Spiritual Care Services may come through the individual themselves, managers, or as a multidisciplinary team recommendation after a traumatic event.

Indigenous Relations

With respect to referrals, patients who self-identify as Indigenous during Registration activities will be connected with Indigenous Relations to determine if/which supports are desired. With the patient's permission, Indigenous Relations staff will follow the patient through triage, admission, inpatient stays and outpatient visits.

Workflow

Information Desk

The Information Desk will represent the hospital as the first point of contact for many patients and visitors. As such, volunteers must have detailed knowledge of the general operation of the site/MAHC to ensure all inquiries and wayfinding are dealt with appropriately. Patient deliveries (flowers, personal items, gifts) will be to the Information Desk; all hospital deliveries will be through the receiving dock.

Patient deliveries will be brought to the units by staff or volunteer, depending on time and item to be delivered.

Patient Registration

Patients will queue to register with Registration staff or to use a Kiosk. It is anticipated that technology solutions for self-registration will continue to progress and the potential for patients to pre-register, or use personal mobile devices for Registration activities which would alleviate registration volume within the Main Lobby.

Spiritual Care

The Multi-Faith Room will be accessible to patients, staff, and visitors on a 24/7 basis. *Note:* faith leaders will proceed directly to the relevant Clinical area to meet with patients and families. Office space for faith leaders will not be included.

Registration and Consent

As previously mentioned, registration activities will be accomplished through a combination of face-to-face (i.e., staff led) and electronic registration activities (e.g. Kiosk, pre-registration through patient-accessed platforms). The method of registration will be dictated by the needs/abilities of the patient, and the requirements of the registration (e.g., some may require in-person registration due to complexity).

General Support Activities

Facility and general supports will be provided within the overall corporate strategy.

Because the Main Lobby public spaces and related amenities will be a high traffic area, they will require more frequent cleaning (e.g., mopping, vacuuming, garbage collecting, sanitizing, etc.) than other public spaces in the hospital.

Infection Control

Screening measures will be put in place at the entrance, as well as sanitizing stations in key areas. A higher air turnover rate may be required in the Main Lobby due to the higher volume of people. This will be determined as the project proceeds and be in accordance with recommendations from IPAC as well as regional and/or provincial governing authorities, as may be applicable.

Regular screening will be completed through the appropriate clinical area. Should a sustained, larger scale communicable disease outbreak occur, in which screening on a larger scale is required, the incident management system will be initiated and manage the screening process. No permanent screening desk will be planned in the Main Lobby.

Security Services

Security should have a discreet presence in the Main Lobby. Security infrastructure (e.g., cameras) will be in place to monitor activity (e.g., reduce theft in Gift Shop, monitor entrances) but also will pass-through this area on their regular rounds and be in regular communication with Switchboard.

The Information Desk and Patient Registration area will require staff/volunteer panic buttons.

Enabling Technologies

IT will be provided within the overall corporate strategy.

In addition, note that the Main Lobby will include wayfinding technology and device charging stations. Device charging stations will be available within the seating area. Digital screen(s) strategically placed will be utilized for MAHC/SMMH information, event communication, etc.

Support to digital screens (e.g., for hospital information/event communication) will therefore be required.

Communication Systems

A security camera and intercom will be installed at the front entrance for use when it is locked after-hours, buzzing into Switchboard. Scheduling for timed door access (e.g., closing main doors in evening) will be automated.

Staffing (Current and Projected)

Table 4. Current and Projected Staffing

	Current	Projected 2031/32			
Category	**2022/23 FTE**	**Total FTE**	**Headcount per Day**	**Headcount per Evening**	**Headcount per Night**
Total	19.68	5.60	8-9	0	0
Subtotal, Auxiliary	*(2.00)*	*0.00*	*0*	*0*	*0*
Information Desk Staff	(1.00)	*0.00*	0	0	0
Gift Shop Staff	(1.00)	*0.00*	0	0	0
Subtotal, Foundation	*(4.00)*	*(4.00)*	*4*	*0*	*0*
Executive Director	(1.00)	*(1.00)*	1	0	0
Development Officer	(1.00)	*(1.00)*	1	0	0
Office Administrator	(1.00)	*(1.00)*	1	0	0
Fundraising Coordinator	(1.00)	*(1.00)*	1	0	0
Subtotal, Patient Registration, Scheduling & Switchboard	*19.68*	*5.60*	*4*	*0*	*0*
Registration/Scheduling Clerk	19.68	*5.60*	4	0	0

	Current	Projected 2031/32			
Category	**2022/23 FTE**	**Total FTE**	**Headcount per Day**	**Headcount per Evening**	**Headcount per Night**
Subtotal, Spiritual Care	*(3.00)*	*(4.00)*	*5*	*0*	*0*
Spiritual Care Coordinator	Incl. at HDMH	Incl. at HDMH	1	0	0
Spiritual Care Volunteers	(3.00)	(4.00)	4	0	0
Subtotal, Security	*n/a*	n/a	*n/a*	*n/a*	*n/a*
Security Officer	Incl. in Facilities	Incl. in Facilities			
Security Team Lead	Incl. in Facilities	Incl. in Facilities			

Notes:

1. Foundation staff (both sites) are a separate entity from MAHC and not part of the hospital budget. As a consequence, they have been shown in brackets.
2. SMMH Patient Registration, Scheduling & Switchboard staff were combined to a central Registration pool and have been counted under staffing for HDMH for 2022/23 onwards.
3. The Spiritual Care Coordinator role is not part of the MAHC budget; a portion of their salary is contributed to Chaplaincy. The role provides services to both sites but has been shown under HDMH.
4. Historic and projected FTEs for Security have been included under the Facilities Support Services component. Security staff are shared between the two sites and have been counted under staffing for HDMH for current. Projected staffing has been shown by site for clarity though it will remain a shared resource. Security staffing has increased over time, originally with one guard overnight 5 years ago moving to 12-16 hour weekday and 24 hour weekend coverage (depending on time of year), in more recent years. At present, 36 hours of coverage are provided at each site, 365 days per year.

Design Objectives

Locations and Adjacencies

Due to the number of sub-areas within the Main Lobby, adjacencies have been subdivided and shown in priority order within their respective sub-area.

Main Lobby Spaces

The Main Lobby should have direct access to the café associated with Food Services.

Auxiliary

The Gift Shop should have clear visibility from the main entrance and be prominent within the Main Lobby as a whole.

The Gift Shop should have convenient access to the main elevator bank, for restocking of items from lower level storage.

The Auxiliary Lounge should have convenient access to the main horizontal and vertical circulation of the hospital.

Central Registration

Central Registration should have clear visibility from the main entrance.

Foundation

The South Muskoka Hospital Foundation should have clear visibility from the main entrance and be prominent within the Main Lobby as a whole.

Patient Navigator/Indigenous Relations Office

The PN/IR Office should be easily found through wayfinding and have convenient access to the main horizontal and vertical circulation of the hospital.

Security

The Security Office shall be located in the Main Lobby, discretely located, but easily found by patients (e.g., will require good wayfinding).

As the Security Office will have a satellite location in the ED, convenient access should be provided for support.

The Security Office should have convenient access to the main horizontal and vertical circulation of the hospital for emergency/crisis response.

Spiritual Care

Multi-Faith Healing Room must be visible and accessible to patients and visitors in time of crisis, but not on busy thoroughfare.

The Multi-Faith Healing Room will require convenient access via a main thoroughfare to the ED and ICU.

It is highly desirable for the Multi-Faith Healing Room should (if possible, based on layout) to have access to an exterior (secured) outdoor space, for wellness, connection to the land and nature in times of reflection, and for use in ceremonial services.

Internal Organization

Foundation

The Foundation will require visibility, accessibility, confidentiality, and sightlines to see donors as they approach the Foundation Office.

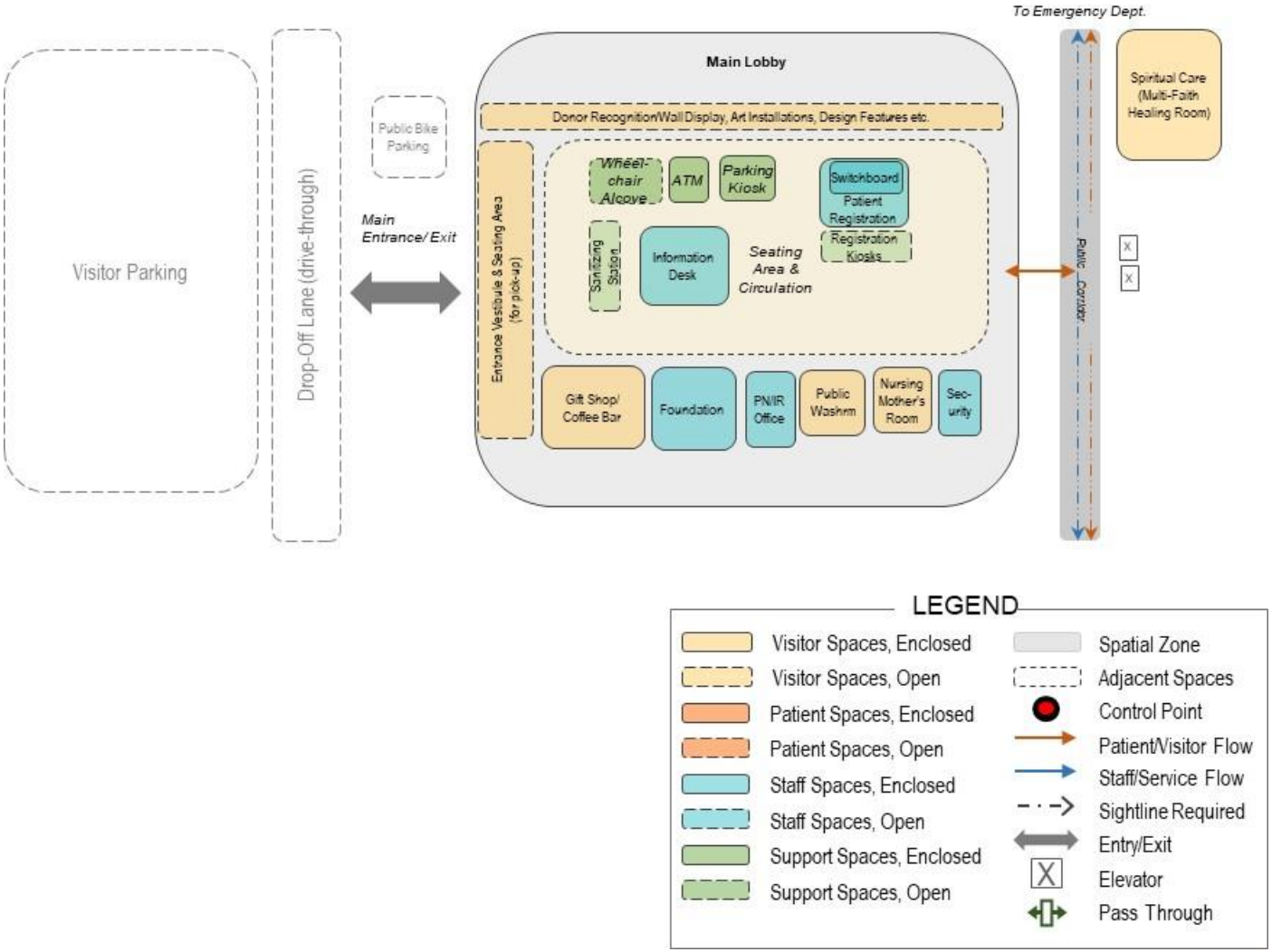
Patient Registration

Patient Registration shall be located in the Main Lobby, directly adjacent to Switchboard/Scheduling.

Registration Kiosks must be in close proximity to the Registration and Information Desk in order for patients to receive assistance if required.

The spatial organization of the Laboratory should be generally as shown in the diagram on the following page. The diagram illustrates conceptual relationships and should not be treated as an architectural design. It should only be used to emphasize and identify important adjacencies and patient/visitor flows and staff/service flows. The diagram is not to scale.

Figure 1. Functional Relationship Diagram



Special Considerations

The following design requirements will be met and enhanced through the design process.

Environment & Atmosphere

MAHC's Main Lobby spaces should uphold and support the principles of patient- and family- centred care. They should also convey the values of the organization and the communities served and will do so aesthetically through the use of Donor Recognition Walls, art, information screens, and other methods of communication.

For many, the Main Lobby will be the first experience with the site, and therefore, great care must be taken with the amenities, design and flow, and overall experience – to best suit the varying needs of patients, staff, and visitors. For some, it will be a place to connect; for others, a place to withdraw and rest. Effectively meeting the varying needs of all users will require a delicate balance of services offered, as well as the aesthetics of the environment itself. It must be stimulating, but relaxing, engaging, but allowing for individual reflection.

The SMMH Main Lobby will serve as a 'destination' for patients, visitors, and staff. Hospital news, events, and displays should be updated and changed on a regular basis to ensure the Main Lobby remains an engaging destination.

The following describes other general environmental features of note:

- Many patients who come for assessments/and or admissions will be sensitive to the proximity of others: provide ample personal space in all areas where incoming patients may be moving.
- Provide non-intimidating settings for individuals and/or families that allow for comfortable refuge and respite.
- Consideration for natural, calming design features that will link the facility back to the community, such as a living wall, or fireplace.
- Provide an environment that is visually muted, with straightforward orientation, clear sightlines to destinations, and careful orchestration of potentially invasive visual and/or auditory activity.
- Visitors, family members and patients will be provided with various choices and opportunities in the area, to allow for self-selection of the level of interaction sought by an individual.

The following describes the desired 'feel' of the Main Lobby as for many it will provide a first impression of the organization and care provided within. Achievement of this environment and feeling through design should be the goal. The following environmental considerations should be included in the planning of the Main Lobby and related spaces:

- Welcoming and inclusive
- Calm, relaxing and comfortable
- Communicates dignity and respect for all

- Open/bright/airy with clarity of organization and wayfinding to reduce anxiousness
- Inspires confidence
- Visibility of volunteers and wayfinding; help when you need it
- Communicates the look and feel of Muskoka as a Region in features and finishes
- Promotes sustainability and green, i.e. experience not at the expense of sustainability.

Indigenous Design & Cultural Sensitivity

The site and facility should be designed to be welcoming and non-institutional in appearance to convey MAHC's desire to provide culturally safe and sensitive care to Indigenous patients and families. Design features which would assist to communicate this philosophy to Indigenous patients, families, staff, and visitors, this may include (but is not limited to):

- Inclusion of the medicine wheel
- Natural materials used in finishings
- Consideration for inclusion of fireplace as a gathering place for seating
- Round architecture, rather than straight lines, to mimic natural environment
- Clear connection to outdoors through views to nature and sky
- Wayfinding in Indigenous languages
- Water feature and use of greenery.

Multi-Faith Healing Room

The Multi-Faith Healing Room shall have ample natural light but have no views in/out of the space at eye level to ensure a private and respectful experience. The Multi-Faith Healing Room must be calming in nature. This may be accomplished through the use of natural materials and soft furnishings, as well as a connection to nature (either in view, location and/or materials and colours used).

SMMH Foundation Office

The SMMH Foundation Office space will be a welcoming, creative, professional environment. It must communicate the culture and values of MAHC and encourage participation and commitment to a shared vision.

Infection Prevention and Control

The Main Lobby will be designed to encourage and facilitate the practice of hand sanitizing upon entry and exit to the facility. Screening stations (e.g., hand sanitizer dispenser, screening information) will be included at key points within the entry space, before proceeding into the Lobby, proper.

The following considerations for IPAC should be included in the planning of the Main Lobby:

- Circulation at the entry (i.e., as one enters from the entrance into the 'lobby' space, proper) should allow for space to incorporate additional screening measures before entering the facility, should it become necessary
- Furniture solutions in the Lobby should be easily maintained and wipeable for ease of cleaning
- A higher air turnover rate may be required in the Main Lobby, due to the higher number of people. This will be determined as the project proceeds and be in accordance with recommendations from IPAC as well as regional and/or provincial governing authorities, as may be applicable
- Seating should allow for a variety of groupings, to allow privacy, social distancing, and self-determination of level of engagement with others.

Clarity of Spatial Organization

This component supports the movement of visitors, outpatients and inpatients, and staff as they flow in and out of the site to clinics, diagnostics, and treatment areas and to the inpatient units. As such, a critical success factor to the Main Lobby and its relationship with the numerous other services within the site will be clarity of spatial organization (e.g., intuitive layout and orientation) and effective wayfinding.

Wayfinding

The Main Lobby will require easy visibility from the outdoors, for exterior wayfinding from parking and for visual cues for drop-off and pick-up of patients and visitors. Once an individual is in the main public area, clear visual cues to the overall layout of the hospital will be paramount. This includes the ability to see the main thoroughfares to key areas of the building (e.g., ED), as well as transportation routes, including elevators and stairwells. Essentially, the Main Lobby needs to serve as a welcoming space, in addition to providing intuitive wayfinding to the site at large.

For clarity and ease of navigation throughout the site, wayfinding must be standardized for all areas of the building and site and must consider those for whom English is not their first language (including use of traditional languages for Indigenous patients and families).

Moreover than comprehensive signage, the foundational element of wayfinding will be based in the overall design of the hospital, with easy visual cues to the main circulation routes – stairs, elevators, external cues etc.

Accessibility & Corridor Design

To ensure accessibility of the Main Lobby and its related spaces, the following considerations related to accessibility should be included in the planning of these areas:

- Ample circulation in public spaces to ensure accessibility
- Avoid ramps where possible (to access the Main Lobby's public spaces, and within them)
- Scale that is easy to navigate with the ability to rest along long corridors (in entry spaces, but throughout circulation of building as a whole), breaking up of long hallways with recessed rest areas (e.g., seating). Furniture must not be too low as this is challenging for Seniors
- If multi-stall washrooms are included, design with no entrance door access (e.g. access by corridor to provide privacy vs a door) is preferable
- The welcome/Information Desk and Patient Registration counter height (or a portion of the counter) must be designed at an accessible level for those using mobility devices
- As mentioned previously, for wayfinding, include simple, universal graphics and symbols to be easily understood by all. Consider the use of languages in addition to English.

In acknowledgment of the demographics of the catchment area, additional senior friendly guidelines must be in place, including (but not limited to):

- Seating in corridors periodic and not low
- Gradual transitions in lighting and floor finishes
- Minimizing glare by ensuring lighting is even, soft, and well diffused, minimize use of glossy floor finishes
- Use of colours easily seen by older adults (e.g., warm colours vs pastels) and utilize different colours on floors and walls, to distinguish between horizontal and vertical spaces
- Ample circulation in public spaces to ensure accessibility
- As referenced above, the Information Desk and Registration desk counter height (or a portion of the counter) must be designed at an accessible level for those using mobility devices; for staff ergonomic considerations, there should be consideration for sit/stand capability in the work space, to provide postural variation to info desk staff
- Breaking up of long hallways with recessed rest areas (e.g., seating)
- For wayfinding, include simple, universal graphics and symbols to be easily understood by all.

Key design considerations for the Patient Registration area will include:

- Accessibility at the Registration desk and Switchboard for individuals in wheelchairs and scooters, as well as those with auditory and visual challenges

- Privacy for patients and family members to enable them to confidentially share personal information. Sufficient separation from circulation space as well as adjacent patients
- Ergonomically designed workstations for staff
- Temperature comfort given the exposure to outside air, being located near the main entrance.

Acoustic

As a large, open space, the areas included under the Main Lobby will require thoughtful sound planning, to minimize echo and maintain privacy in open spaces, to ensure a welcoming, supportive space for patients, visitors, staff, and volunteers. To maintain a feeling of calm and wellness, the Main Lobby should aim for muted, low noise levels, and minimized sound impacts, reflectivity, and reverberation.

Aspects of sound/noise control that should be considered for this area will include (but are not limited to):

- Minimize echo and noise in large open spaces (as referenced above)
- Privacy and noise control for volunteers working at the Information Desk, staff working at Patient Registration and members of the public seeking assistance
- Seating should be grouped in smaller sub-areas, to allow for personal choice in interaction with others; therefore, those seeking quiet can find it through location of more discrete seating
- Specialized acoustic shielding may be required in high activity areas or those requiring additional acoustic privacy (e.g., Multi-Faith Healing Room).

Air/Environmental

The Multi-Faith Healing Room will require the ability to smudge.

Architectural/ Structural/Electrical/ Mechanical

Design elements cannot preclude routine maintenance (e.g., lights that no one can access to change, water/green features that are hard to maintain).

Lighting

To provide a healing atmosphere and stimulate wellness (for patients, staff, and visitors), the Main Lobby should have as much natural light as possible and views to green space. As much as possible, interior spaces (e.g., Gift Shop, retail operations) should have natural or borrowed light. *Note:* for privacy, if the Multi-Faith Healing Room has views to/of the outdoors, it should be to an area not visible by the public (e.g., enclosed courtyard vs sidewalk or parking area).

Where natural light is not possible, a variety of artificial lighting types and lighting conditions will be provided to support individual needs.

The ability to adjust lighting in the area should be included, to serve as additional cues for wayfinding when the space is closed, and to conserve energy when not in use.

Ergonomic Considerations

For staff ergonomic considerations, there should be consideration for sit/stand capability in the workspace, to provide postural variation to Information Desk and Patient Registration desk staff/volunteers.

Security

The following considerations for safety/security should be included in the planning of the Main Lobby:

- External access to this area may will be restricted overnight; this will be determined based on design, as planning proceeds
- As previously noted, panic alarms will be included at the Information Desk and Patient Registration, for volunteer and staff safety
- The area requires the ability to be easily locked down and add screening measures
- As a high traffic, public space, the Main Lobby (and other public areas) will require camera monitoring, for patient/ visitor/staff safety.

Codes & Standards

In addition to the above criteria, the facility must conform to recognized national, provincial, and local building codes and standards as they may relate to safety and accessibility for patients, staff, and visitors. Architects are also instructed to refer to CSA Z8000-18 Canadian Health Care Facilities.

Projected Space Requirements

Table 5. *Space Table*

Component Gross Area (CGSF / CGSM): TOTAL	**4,985**	**463.1**
Component Gross Area (CGSF / CGSM) : Main Lobby	**1,610**	**149.6**
Net to Gross Ratio	1.40	1.40
Total Net Area (NSF / NSM)	1,150	118.0
Component Gross Area (CGSF / CGSM) : Auxiliary (incl. Gift Shop)	**1,205**	**111.9**
Net to Gross Ratio	1.40	1.40
Total Net Area (NSF / NSM)	860	79.9
Component Gross Area (CGSF / CGSM) : Foundation	**1,500**	**139.4**
Net to Gross Ratio	1.40	1.40
Total Net Area (NSF / NSM)	1,070	99.4
Component Gross Area (CGSF / CGSM) : Security	**180**	**16.7**
Net to Gross Ratio	1.40	1.40
Total Net Area (NSF / NSM)	130	12.1
Component Gross Area (CGSF / CGSM) : Spiritual Care	**490**	**45.5**
Net to Gross Ratio	1.40	1.40
Total Net Area (NSF / NSM)	350	32.5

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
			Zone 1: Exterior Amenities			**subtotal net area**		**-**		**subtotal net area**		**0.0**		
09			Drop-Off Lane	(---)	(---)	(---)	1	(---)	(---)	(---)	1	(---)	External space, therefore, no square footage included; 2 lanes assumed (lane width to accommodate fire services)	
09			Taxi/Ride-Share Holding	(---)	(---)	(---)	1	(---)	(---)	(---)	1	(---)	Would use drop-off lane	
09			Bicycle Parking, Public	(---)	(---)	(---)	1	(---)	(---)	(---)	1	(---)		Covered

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
			Zone 2: Main Lobby			**subtotal net area**		**1,150**		**subtotal net area**		**118.0**		
09	.001		Entrance Vestibule	(---)	(---)	(---)	1	(---)	(---)	(---)	1	(---)		Incl. in bgsf
09	.002		Telephone, Public/Taxi			10	2	20		0.9	2	1.9		
09	.003		Alcove, Wheelchair			40	1	40		3.7	4	14.9		Must be clearly visible from the entrance to facilitate quick access to mobility aids upon entry
09	.004		Seating Area - Front Door			170	1	170		15.8	1	15.8	For those waiting for pick-up	Must have view to exterior drop-off/pick-up area
		.01	*- seat, standard*	*4*	*20*				*1.9*					
		.02	*- seat, accessible/bariatric*	*1*	*30*				*2.8*					
		.03	*- mobility device parking*	*2*	*30*				*2.8*				Scooters and Wheelchairs	
09	.005		Hand Hygiene Station			10	1	10		0.9	1	0.9		
09	.006		Kiosks, Entry			50	1	50		4.6	1	4.6		Types of kiosks required will be re-evaluated at a later stage in the process; could be decentralized within Lobby space
		.01	*- automated teller machine (ATM)*	*1*	*10*				*0.9*					
		.02	*- parking payment*	*1*	*10*				*0.9*					
		.03	*- auxiliary/fundraising*	*1*	*20*				*1.9*				For sale of Nevada Tickets, Foundation events etc. Could also be used for other hospital events (e.g., flu shot campaigns, nursing awareness week)	
		.04	*- wayfinding*	*1*	*10*				*0.9*					
09	.007		Information Desk			80	1	80		7.4	1	7.4		Includes wheelchair accessible counter section, cashier box for patient payments
		.01	*- workstation, volunteer*	*2*	*30*				*2.8*					
		.02	*- storage*	*1*	*20*				*1.9*				Temporary holding for deliveries	
09	.008		Seating Area			300	1	300		27.9	1	27.9		Seating to be arranged in various groupings of 2-4; fireplace, living wall or other design feature for gathering around; incl. circulation
		.01	*- décor feature*	*1*	*80*				*7.4*					
		.02	*- seat, standard*	*8*	*20*				*1.4*					
		.03	*- seat, accessible/bariatric*	*2*	*30*				*2.8*					
09	.009		Office, Patient Navigator/Indigenous Relations			100	1	100		9.3	1	9.3	Shared office	

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
09	.010		Donor Recognition/Wall Display	(---)	(---)	(---)	1	(---)	(---)	(---)	1	(---)	Could be art-based and wall-mounted or electronic; incl. donor recognition and/or art display	
09	.011		Communications Board	(---)	(---)	(---)	1	(---)	(---)	(---)	1	(---)	Wall-mounted display for electronic communication of hospital events, fundraising, general information etc.	
09	.012		Washroom, Public, Accessible			60	1	60		5.6	1	5.6		Non-gendered
09	.013		Washroom, Public, Universal/Family			120	1	120		11.1	1	11.1		Non-gendered
09	.014		Nursing Mother's Room			80	1	80		7.4	1	7.4		Incl. 2 seats plus counter and sink with baby changing; microwave, handwash sink and sanitizing station
09	.015		Housekeeping Room			120	1	120		11.1	1	11.1		
09	.016		left intentionally blank											
09	.017		left intentionally blank											
			Zone 3: Gift Shop			**subtotal net area**		**570**		**subtotal net area**		**53.0**		**Must be located in a highly visible. High traffic area of the Main Lobby**
09	.018		Gift Shop/Coffee Bar			570	1	570		53.0	1	53.0		
		.01	*- storefront*	*1*	*420*					*39.0*				Provide fixed and moveable display racks to ensure flexibility of rearranging store layout; slat wall for display flexibility; spinner display (e.g. for greeting cards, small items), racks for books, newspapers, and magazines, windows to view interior of Gift Shop from Lobby (depending on design)
		.02	*- cash register area*	*1*	*50*					*4.6*				Incl. counter space for check out and bagging/wrapping of items
		.03	*- storage*	*1*	*100*					*9.3*				Requires proximity to elevators
09	.019		Bistro/Café			(---)	1	(---)		(---)	1	(---)		Located as part of Cafeteria space; see Food Services

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
			Zone 4: Auxiliary Lounge			**subtotal net area**		**290**		**subtotal net area**		**26.9**		
09	.020		Auxiliary/Volunteer Lounge			110	1	110		10.2	1	10.2		
		.01	*- computer, sign-in*	*1*	*30*				*2.8*					
		.02	*- garment rack*	*1*	*10*				*0.9*				For uniform storage	
		.03	*- lockers*	*10*	*7*				*0.7*					
09	.021		Office, Volunteer Director			100	1	100		9.3	1	9.3		
09	.022		Storage, Volunteers			80	1	80		7.4	1	7.4	Storage of volunteer supplies and incidentals	Could be decentralized
			Zone 5: Foundation			**subtotal net area**		**1,070**		**subtotal net area**		**99.4**		
09	.023		Reception			180	1	180		16.7	1	16.7		
		.01	*- donation drop-off window*	*1*	*20*				*1.9*					
		.02	*- waiting, seat, standard*	*2*	*20*				*1.9*					
		.03	*- coat/boot area*	*1*	*20*				*1.9*					
		.04	*- coffee counter*	*1*	*50*				*4.6*					
		.05	*- workstation, reception*	*1*	*50*				*4.6*				For office administrator	
09	.024		Office, Foundation CEO/Executive Director			120	1	120		11.1	1	11.1		
09	.025		Office, Staff			140	2	280		13.0	2	26.0		Two workstations in each
09	.026		Meeting/Project Room			250	1	250		23.2	1	23.2		For 8-10 people
09	.027		Alcove, Office Equipment			60	1	60		5.6	1	5.6	For printer, paper supplies	
09	.028		Storage			180	1	180		16.7	1	16.7	For donated items, shelving for banners etc.	Incl. safe
09	.029		left intentionally blank											
09	.030		left intentionally blank											

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
			Zone 6: Security Office			**subtotal net area**		**130**		**subtotal net area**		**12.1**		
09	.031		Security Office			130	1	130		12.1	1	12.1		
		.01	*- workstation, security*	*1*	*80*				*7.4*					Line of sight to entry/information desk area desired; CCTV monitors and workspace; bulletin board for notifications (not viewable by visitors)
		.02	*- storage*	*1*	*50*				*4.6*				Charging for communication devices, vests, lost and found etc.	
			Zone 7: Spiritual Care			**subtotal net area**		**350**		**subtotal net area**		**32.5**		
09	.032		Multi-Faith Healing Room			270	1	270		25.1	1	25.1		Circular or rounded room; vented for smudging; ability to completely darken room for certain ceremonies; access to an enclosed courtyard or garden desirable
		.01	*- alcove, coats/boot*	*1*	*30*				*2.8*					
		.02	*- seat, standard*	*8*	*20*				*1.9*					Chairs with arms; moveable seating
		.03	*- storage cupboard*	*1*	*20*				*1.9*				Religious texts, supplies and symbols used for services	
		.04	*- traditional medicine storage*	*1*	*60*				*5.6*				Storage and preparation of traditional medicine	Incl. storage and small prep counter; must be secured
09	.033		Exterior Courtyard			(---)	1	(---)		(---)	1	(---)		Adjacent and accessible from Multi-Faith Healing Room; secured
09	.034		Washroom, Public, Universal / Family			80	1	80		7.4	1	7.4		Non-gendered, barrier-free; incl. foot washing station; could be located outside of Spiritual Care if nearby in corridor

10. Pharmacy

Functional Description (Current and Projected)

Service Overview

MAHC Pharmacy Services include the purchasing, storage, dispensing, and distribution of medications, supported by a clinical pharmaceutical care model to enhance patient care. Clinical Pharmacy Services is patient-centred and semi-decentralized to program areas.

At Huntsville District Memorial Hospital (HDMH) services also include the packaging of unit-dose oral medications for distribution to all MAHC sites.

At South Muskoka Memorial Hospital (SMMH), the Pharmacy will receive unit-dose and stock medications from HDMH, as well as prepare and supply medications for Ambulatory Care.

The table below articulates the current and future dispensing and distribution services, by site, to support core programs across the MAHC system.

Table 1. Current and Future Services per Hospital Site

Service	Huntsville (HDMH)			South Muskoka (SMMH)		
	Current	Future	Preparation Type	Current	Future	Preparation Type
Medication Dispensing	ü	ü	-	ü	ü	-
Chemotherapy IV Admixture	ü	-		-	ü	Hazardous / Sterile
Intravenous (IV) Admixture (including TPN)	ü	ü	Non-Hazardous / Sterile	ü	ü	Non-Hazardous / Sterile
Clozaril Dispensing	ü	ü	-	-	-	
BCG Preparation – Hazardous, non-cytotoxic	-	-	-	ü	ü	Hazardous / Sterile
Clinical Pharmacy Services (on-units)	ü	ü	-	ü	ü	-
Compounding (non-sterile, non-hazardous)	ü	ü	-	-	-	-

Planning Principles and Assumptions

The following planning assumptions are to be noted for Pharmacy Services:

- HDMH will be the site for all unit-dose packaging capability, and transport medication to SMMH.
- All automated drug dispensing units (ADUs) will interface seemlessly with unit-dose packaging (PAC-MED) machines.
- MAHC will continue to use larger ADUs in key locations to support overnight needs, in lieu of a 'night cupboard' system.
- CPOE will be implemented (planned for 2025) for medication orders, with a closed loop barcode system on inpatient units.
- There will be further implementation to unit-based clinical pharmacy services, with pharmacists clinically assessing orders on the unit and the technicians filling orders in the dispensary.
- Patient supplied medications will be kept in appropriated locked space within the medication rooms on in patient units. They will not be integrated into the ADUs.

Patient Profile

Pharmacy Services will extend to inpatients, and certain outpatient services within Ambulatory Care.

Scope of Services (Current and Projected)

SMMH Pharmacy functions will include:

- Storage, control, and supply of limited on-site medications
- Order review of computerized order entries; timely and accurate drug distribution
- Management and replenishing of ADUs for designated treatment areas of the hospital, including the anaesthesia cart ADUs
- Manual crash cart medication replenishment
- Preparation of medications for systemic therapy (chemo) and ambulatory infusion clinics within Ambulatory Care, as well as BCG treatments
- Quality management activities including quality improvement, incident reporting, adverse drug reaction reporting and audits within the context of a safe medication practices

- Clinical services as part of pharmaceutical care model including therapeutic drug monitoring, patient and staff education, drug dosing, drug information, and consultation
- Drug information services includes teaching, research, and staff orientation and development.

Education

Pharmacy Services will be actively involved in providing educational placements for students from University Pharmacy Programs such as PharmD Residents and Community College Pharmacy Technician Programs.

At any given time, there may be up to two learners in the department, a resident, and a technician student.

Research

Pharmacy Services do not currently support any research in the way of clinical trials, should there be trials in the future, there would be no requirement for dedicated space within the Pharmacy to support. The MAHC First Line project does rely on knowledge support from pharmacy, however there are no space requirements/impact.

Linkages/ Partnerships

The table below outlines current partnerships, which are anticipated to continue to be in place in the future.

Table 2. Linkages and Partnerships

Linkages/Partnerships	Description
Soldiers Memorial (Orillia)	Supplying ward stock for nephrology program
Royal Victoria Hospital (oncology)	Supplying oncology medications
Health Sciences North (satellite for Oncology)	Supplying oncology medications

Workload

The table that follows describes the current workload of Pharmacy services, per site.

Table 3. Annual Workload (current)

	Total	HDMH	SMMH
	2022/23		
Orders Verified by site	137,091	N/A	N/A
Doses by Site – Cerner[2]	540,000	220,000	320,000
Doses by Site - Omnicell	950,604	N/A	N/A

Notes:

1. Excludes manual doses for OR, ER patients, crash carts and MAiD doses.
2. Cerner doses are verified orders only, does not include the additional doses pulled by nursing staff thru ADUs.
3. Projected workload is unavailable.

Operational Description

Organization and Management

Pharmacy Services will continue to operate under the leadership of a MAHC Director of Outpatient and Support Services and MAHC Manager of Pharmacy, Oncology and Infusion. Similarly, there will continue to be a Team Lead for technicians and a Professional Practice Lead (pharmacist) responsible for both sites. Currently the Professional Practice Lead is present 2 days/week and in the future the goal is to increase to 4 days/week if possible.

Overnight, pharmacist support is provided by remote pharmacists who do order entry and verification.

Hours of Operation

Current and future hours of operation are noted in the table below.

Table 4. Hours of Operation

	Current Hours of Operation			Future Hours of Operation		
	Weekday	**Saturday**	**Sunday**	**Weekday**	**Saturday**	**Sunday**
Pharmacy	7:00am - 6:00pm Pharmacist Coverage 6:00pm - 7:00am	8:00am - 6:00pm (tech) 8:00am - 4:00pm (pharmacist) Pharmacist Coverage 6:00pm - 8:00am	8:00am - 6:00pm (tech) 8:00am - 4:00pm (pharmacist) Pharmacist Coverage 6:00pm - 8:00am	7:00am - 7:00pm (tech) 7:00am - 7:00pm (pharmacist) Pharmacist Coverage 7:00pm - 7:00am	7:00am - 7:00pm (tech) 7:00am - 7:00pm (pharmacist) Pharmacist Coverage 7:00pm - 7:00am	7:00am - 7:00pm (tech) 7:00am - 7:00pm (pharmacist) Pharmacist Coverage 7:00pm - 7:00am

Workflow

Purchasing

The majority of Pharmacy purchasing and stock will be the responsibility of the Pharmacy at HDMH; however there will be a limited amount of purchasing for direct order to SMMH, and will follow the same process as outlined below.

Purchasing of pharmaceuticals will be coordinated by the pharmacy technician, under the supervision of a pharmacist. Minimum and maximum order levels will be established. Most orders will be generated on the computer system and communicated electronically i.e., uploaded to wholesalers, and when required via fax/phone. Shipments will be received in the Pharmacy by the technician, verified, and stocked in the appropriate storage area. It is anticipated that by 2031/32 the Pharmacy will be under electronic inventory and orders will be received electronically.

All expiry dates will be checked prior to dispensing and expired medications will be returned to the vendor or collected by wastage.

Manufacturing & Packaging

Most items will be purchased in a manufactured form. Where possible, HDMH will use automated unit-dose packaging for oral solids and narcotics / controlled medications and distribute to SMMH.

Manufacturing of certain IV medications, will be prepared in the Pharmacy (if not available commercially) in compliance with the National Association of Pharmacy Regulatory Authorities (NAPRA) Standards, on an as needed basis.

Medication Order Processing & Administration

There are several steps to the order processing and administration functions for Pharmacy Services as outlined below:

- Orders will be entered electronically into the patient electronic health record (CPOE planned for 2025) and processed immediately
- Orders will be received instantly in the Pharmacy and acknowledged
- Real-time allergy and drug-interaction checking will be done at the time of ordering - enhancing medication safety, reducing transcription errors, and lowering risk of error with drugs of similar name
- Patients will have their wristband and medications scanned and verified using a barcode scanner or mobile device before any medication administration
- Medications prepared by nurses will have the labels printed out in medication rooms using pharmacy label printer
- All Medication Administration Records (MARs) will be electronic and updated in real-time
- Decision support tools to monitor utilization of barcode scanning.

ADU Replenishment

All medications will be stocked and dispensed from ADUs (both towers and flex-lock fridge systems), and technicians will replenish the ADUs daily or as required according to min and max par levels. HDMH will ship medications to SMMH at regular intervals to support. The following table outlines the planned locations and quantities for ADUs at SMMH.

Table 5. Proposed Counts of ADUs

	2031/32		
	Projected Beds	**ADU Count**	**Comments**
Inpatient Services	**46**	**8**	
Acute Inpatient Unit	42	4	
Critical Care Unit	4	1	
Emergency Services		**1**	
Surgical Services		**1**	**Plus anaesthesia carts**
Ambulatory Care		**1**	

General Support Activities

Supplies, Cleaning & Disposal

The pharmacy will be cleaned daily by Environmental Service (ES), who will collect pharmacy waste (including biohazard waste) from the listed holding areas on a scheduled basis and transport to the waste dock for outside pick-up. Access to sterile compounding rooms requires ES staff with specific training, therefore designated staff for Pharmacy should be considered.

Supplies (weekly or as needed) arrive from Materials Management on cart and will be broken down in appropriate space (de-boxing etc.).

Linen Services

Pharmacy staff will use PPE where required; these will be supplied by Materials Management and stored in Pharmacy.

Staff Resources

Staff support spaces such as lounges and lockers will be centralized with one per floor.

The Pharmacy Administrative area will require an office to be shared between Professional Practice Lead (PPL) and Pharmacy Manager, and touchdown workspace for technicians/students.

Occupational Health and Safety

Universal safety precautions and guidelines (NAPRA) will be followed to ensure employee safety in the preparation of IV medications.

Enabling Technologies

Information and Communication Systems

Pharmacy Services require reliable and effective IT/Communications Services for efficient operation. The IT design should address:

- Connectivity between the IV Formation Zone and the Dispensing Zone with hardwired 2-way video/audio via closed-circuit (not wireless)
- Patient clinical information systems and electronic records
- Wireless and hospital network requirements, high capacity and speed for digital equipment
- Wearable communication technology (e.g., Vocera) for agile staff communications.

Staffing (Current and Projected)

Pharmacy staff are shared resources, covering both hospitals.

Currently, Monday – Friday there are 5 Pharmacy Technicians at each site, along with 2 Pharmacists. On weekends, there are 3 Pharmacy Technicians and 1 Pharmacist covering both sites, and 1 remote Pharmacist. In the future, staffing is anticipated to increase by an additional 2-3 FTEs for both Pharmacists and Pharmacy Technicians

The PPL Pharmacist works 2 days a week, with expectation to increase up to 1.0FTE in the future.

Table 6. Current and Projected Staffing

	Current	***2031/32***			
Pharmacy	**2022/23 FTE**	**Total Projected FTE**	**Headcount per Day**	**Headcount per Evening**	**Headcount per Night**
Total	*22.58*	*25.98*	*12*	*9*	*1*
Pharmacy Technician	14.48	17.48	7	5	0
Pharmacy Manager	1.00	1.00	1	1	0
Pharmacists /Supervisor	6.50	6.50	4	2	1
Professional Practice Lead - Pharmacist (PPL)	0.60	1.00	1	1	0

Note:

1. Total current and projected staffing is for both MAHC sites.

MAHC also holds a service contract with a third-party to provide remote pharmacist services. Currently overnight and weekend services as noted in Table 5: Hours of Operation. In the Future, MAHC will need to maintain this coverage with either a local (budgeted) resource or continue this service, ideally weekend daytime coverage by local.

Design Objectives

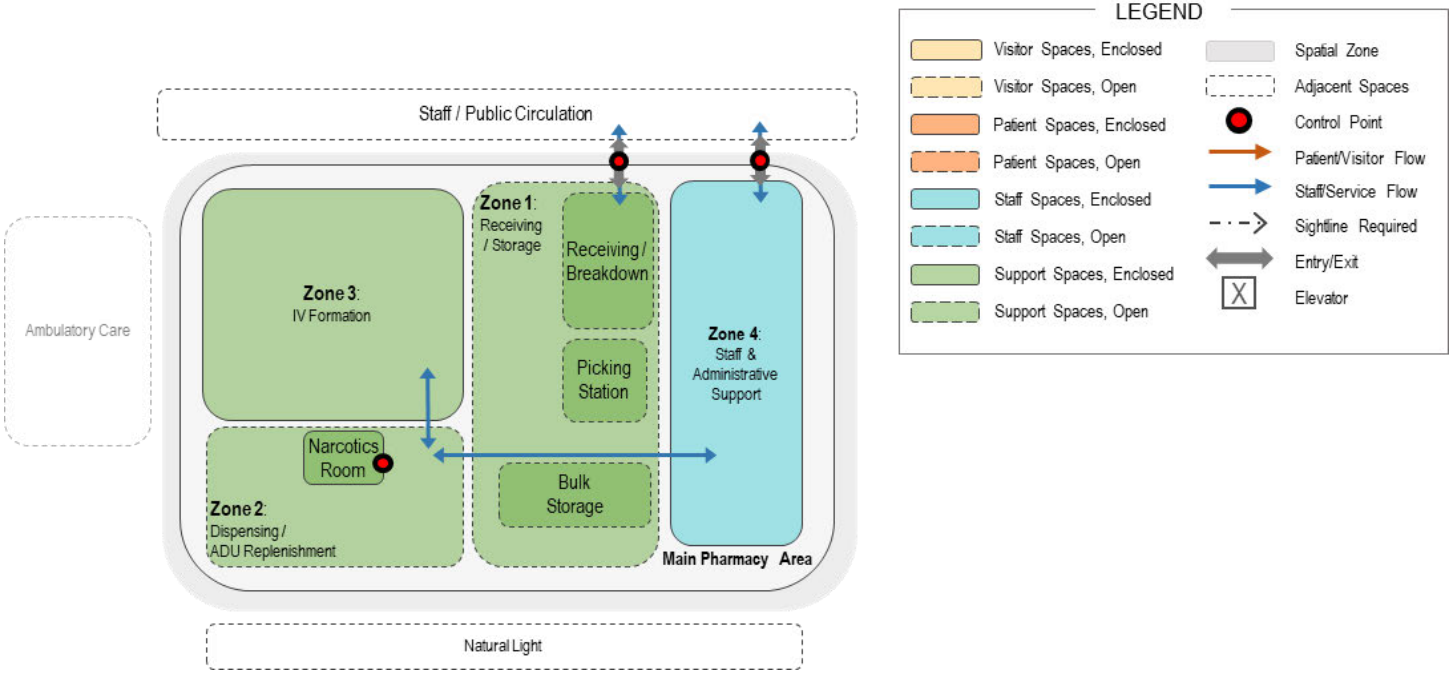
Locations and Adjacencies

The Pharmacy should be located with convenient access to circulation routes for inpatient units, as well as efficienct and convenient access to dialysis and surgical services. The Pharmacy should be located to permit natural light for staff, however, the narcotic vault should not be located on an exterior wall

Internal Organization

The spatial organization should be generally as shown in the diagram below. The diagram illustrates conceptual relationships only and should not be treated as an architectural design. It should only be used to emphasize and identify important adjacencies and patient/visitor flows and staff/service flows. The diagram is not to scale.

Figure 1. Adjacency Diagram



Special Considerations

Infection Prevention and Control

All equipment, furnishings and finishes must be easily cleaned and utilize materials able to withstand repeated contact by approved hospital grade disinfectants and decontamination products. Sterile isopropyl alcohol is a required standard for cleaning of equipment and supplies in the sterile compounding areas. Separate flows (clean vs dirty) must be established for movement of staff, supplies and materials; and sufficient access is required to PPE.

Clarity of Spatial Organization

The Pharmacy should be subdivided into zones: Receiving and Storage, Dispensing / ADU Replenishment, IV Formation, and Staff and Administrative Support. The planning and design of these areas is contingent on the equipment selected. Areas allocated in the space table reflect general areas included within the Pharmacy. Specific planning will be required to address integration of information systems, modular storage, inventory units and narcotic storage in relation to the flow of staff and production within the Pharmacy.

Acoustic

The Staff and Administrative Support zone, used for clinical consultation and drug information, should be acoustically separate from the larger machinery and busy flow of receiving areas.

Architectural/Structural /Electrical/Mechanical

IV, hazardous, and sterile medication preparation rooms must be divided from dispensary though staging and anterooms, following all applicable standards and codes.

There should be an area to store dedicated cleaning equipment for the cleaning staff (particular to IV Formation).

Air handling and air quality requirements must be met to maintain proper sterility and integrity in medication preparation. Room temperature and humidity must be controlled and monitored for drug storage and for employee comfort as per NAPRA requirements.

Manufacturers installation guidelines specify the proximity to walls and other equipment. Sufficient space (minimum 1 foot) shall be provided around equipment for housekeeping to effectively clean around.

Hand hygiene sinks, emergency showers and eyewash stations to be readily accessible to pharmacy areas per applicable codes and standards.

Refrigerators must be alarmed, connected to a central monitoring system, and must monitor and record temperature. Separate refrigerator units are required for storage of hazardous and non-hazardous drugs.

Lighting

Appropriate lighting levels are required to ensure the safe and efficient review of orders and preparation of medications. Access to natural light should be provided in areas of the pharamcy where staff work all day, with consideration for the proper storage conditions for medications that are light sensitive.

Ergonomic Considerations

Layout of the space will promote collaboration and interaction among staff. Consideration to ergonomic height adjustable design throughout all working areas.

Security

The Pharmacy will be secured, and access controlled by employee RFID badge (swipe access). A camera system will be used for monitoring entrances and the Narcotics Room from central security. No patient access to the work areas of the Pharmacy will be possible.

Codes & Standards

In addition to the above criteria, the facility must conform to recognized national, provincial, and local building codes and standards as they may relate to safety and accessibility for patients, staff, and visitors.

Component Gross Area (CGSF / CGSM): TOTAL	**2,040**		**190**	
Net to Gross Ratio	1.30		1.30	
Total Net Area (NSF / NSM)	1,570		146	

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
			Zone 1: Receiving / Storage Area			**subtotal net area**		**300**		**subtotal net area**		**27.9**		
10	.001		Receiving/Breakdown Area			150	1	150		13.9	1	13.9		Provide 42-48' wide door
		.01	*- decasing area*	*1*	*30*				*2.8*				To accommodate 5-7 totes at any given time, plus cart	
		.02	*- receiving station*	*1*	*30*				*2.8*					
		.03	*- HDMH cart holding*	*1*	*80*				*7.4*				HDMH main Pharmacy will deliver to SMMH	
		.04	*- waste holding*	*1*	*10*				*0.9*					
10	.002		Storage, Bulk			80	1	80		7.4	1	7.4		
		.01	*- storage, non-refrigerated*	*1*	*20*				*1.9*				2' shelving units accommodating lin feet of shelving	
		.02	*- storage, refrigerated, 36 cu ft*	*1*	*20*				*1.9*				For vaccines, insulin, etc. (Double door fridge).	
		.03	*- freezer, -20c*	*1*	*20*				*1.9*				Freezer. Infusion bags	
		.04	*- IV storage bulk*	*1*	*20*				*1.9*					
10	.003		Picking Station			70	1	70		6.5	1	6.5		
		.01	*- counter with computer workstation*	*1*	*30*				*2.8*					
		.02	*- storage of unit-dose meds from HDMH*	*1*	*40*				*3.7*					
			Zone 2: Dispensing/ADU Replenishment			**subtotal net area**		**190**		**subtotal net area**		**17.7**		
10	.004		Order Entry Review			60	1	60		5.6	1	5.6		Locate in quiet area
		.01	*- workstation, technician*	*1*	*50*				*4.6*	-				
		.02	*- label printer, fax/scanner/copier*	*1*	*10*				*0.9*	-				
10	.005		Narcotics Room			70	1	70		6.5	1	6.5		Camera, swipe card access
		.01	*- controlled substance storage tower (ADU)*	*1*	*10*				*0.9*					
		.02	*- workstation with computer*	*1*	*50*				*4.6*					
		.03	*- storage, refrigerated*	*1*	*-*				*-*					Undercounter
		.04	*- distribution cart, lockable*	*1*	*10*				*0.9*					
10	.006		Workstation, Pharmacist			50	1	50		4.6	1	4.6		

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
10	.007		Eyewash Station			10	1	10		0.9	1	0.9		Determine best zone
			Zone 3: IV Formation			**subtotal net area**		**770**		**subtotal net area**		**71.5**	**(includes 40 sq.ft. hskp closet)**	
10	.008		IV Staging / Dispensing			200	1	200		18.6	1	18.6		
		.01	*- counter w/ printer and workstation*	*1*	*60*				*5.6*					
		.02	*- hand hygiene sink*	*1*	*10*				*0.9*					
		.03	*- supplies/cart circulation*	*1*	*20*				*1.9*					
		.04	*- circulation/pass-through*	*2*	*10*				*0.9*				One for each clean room from Clean Room (compounding room)	
		.05	*- overstock storage*	*1*	*60*				*5.6*					
		.06	*- narcotic storage tower*	*1*	*10*				*0.9*					
		.07	*- drug information/journals*	*1*	*20*				*1.9*					
10	.009		Housekeeping Closet			40	1	40		3.7	1	3.7		
									-					
10	.010		Shared Anteroom for Sterile Compounding			100	1	100		9.3	1	9.3		Locate between Hazardous and Non-Hazardous
		.01	*- change/gowning area*	*1*	*40*				*3.7*					
		.02	*- hand hygiene sink*	*1*	*10*				*0.9*					
		.03	*- eye wash station*	*1*	*10*				*0.9*					
		.04	*- emergency deluge shower*	*1*	*10*				*0.9*					
		.05	*- stool*	*1*	*5*				*0.5*					
		.06	*- waste receptacle*	*1*	*5*				*0.5*					
		.07	*- fridge for non-hazardous*	*1*	*20*				*1.9*					
10	.011		Non-Hazardous Sterile Clean Room (ISO 7)			100	1	100		9.3	1	9.3		
		.01	*- clean field cabinet 6' (ISO 5)*	*1*	*80*				*7.4*					
		.02	*- transfer cart*	*1*	*10*				*0.9*					
		.03	*- pass-through*	*1*	*10*				*0.9*					
10	.012		Hazardous Sterile Clean Room (ISO 7)			270	1	270		25.1	1	25.1		
		.01	*- clean field cabinet 6' (ISO 5)*	*2*	*80*				*7.4*				For Chemo & BCG preparation	
		.02	*- transfer cart*	*1*	*10*				*0.9*					
		.03	*- pass-through*	*2*	*10*				*0.9*					
		.04	*- fridge (hazardous storage)*	*2*	*20*				*1.9*					
		.05	*- cabinet for hazardous product*	*1*	*40*				*3.7*					
									-					
10	.013		Hazardous Storage Room			60	1	60		5.6	1	5.6	For Storage of Hazardous Drugs	Negative Pressure
									-					

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
			Zone 4: Staff & Administrative Support			**subtotal net area**		**310**		**subtotal net area**		**28.8**		
10	.014		Office			100	1	100		9.3	1	9.3		
10	.015		Clinical Resource Room			160	1	160		14.9	1	14.9		
			- conference table	*1*	*100*				*9.3*					
			- storage, journals	*1*	*30*				*2.8*					
			- workstation, touchdown	*1*	*30*				*2.8*					
10	.016		Washroom, Staff			50	1	50		4.6	1	4.6		

11. Physician and Staff Amenities

Functional Description (Current and Projected)

Summary

This component details the support spaces included within the SMMH for staff, students, and medical staff.

Service Overview

Physician and Staff Amenities are intended to support the well-being and productivity of staff, students, and medical staff.

These amenities will facilitate staff recruitment and retention, as well as ongoing day-to-day work-life of MAHC staff and students. The safety of staff members, particularly during off-hours, will be of primary importance.

These spaces will be detailed below, but generally speaking refer to locker and lounge space, as well as access to spaces for rest and respite (e.g., on-call spaces, quiet rooms).

Planning Principles and Assumptions

General planning principles will include:

- A separate staff and medical staff entrance (covered) will be provided
- In the pursuit of MAHC's commitment to advancing equity and inclusion, and providing a supportive work environment for staff, the Locker Area has been planned as a gender-neutal space with shared locker space and individual change cubicles/rooms
- Uniform dispenser machine(s) will be utilized, located centrally in an alcove within the hallway by the staff and medical staff entrance
- Lockers will be assigned to full-time staff, part-time staff, and physicians. A system will be implemented for locker usage by casual staff and students. Cube lockers decentralized to the work areas will be for day use only and remain unassigned.

Patient Profile

Not applicable to this component.

Scope of Services (Current and Projected)

The following amenities have been included as part of the facility/site as an asset to quality of work-life:

- Exterior spaces, such as staff bike storage and outdoor seating for meals and breaks

- On-Call Rooms (3) for physicians and/or other staff who need overnight accommodation in the course of their clinical support to patients (e.g., ED, ICU, Maternal/Newborn)
- Staff lockers, with associated change space, washrooms, and showers
- Medical Staff Locker Area and Lounge.

Note: dedicated space for medical students (including locker space) has been included in the *Administration Services* component within the NOSM space allocation.

Lounge space has been decentralized to clinical areas with cube lockers for day use storage of personal items. Administration and related departments will have a kitchenette available with their central Multipurpose Meeting Room. It is anticipated that programs/services too small to require a dedicated lounge space will share with an adjacent, larger program/service area.

A Multi-Faith Healing Room has been included as part of the Main Lobby portfolio of space, intended for quiet reflection, prayer, and respite. Additionally, Consult/Quiet Rooms have been included within the Medical/Surgical Unit and Emergency Department for use by families and staff requiring a calm and peaceful space for private discussion or individual respite.

Education

Not applicable to this component.

Research

Not applicable to this component.

Linkages/ Partnerships

Not applicable to this component.

Workload (Current and Projected)

Not applicable to this component.

Operational Description

Organization and Management

Physician and Staff Amenities will be under the management of Human Resources. The assignment of lockers will also be managed by Human Resources.

Hours of Operation

Physician and Staff Amenities will continue to be accessible 24/7 and will be available only through the use of a swipe card or other electronic means at each entry and exit.

Duration of Visit

Not applicable to this component.

Referrals & Scheduling Appointments

Not applicable to this component.

Workflow

Not applicable to this component.

General Support Activities

Supplies, Cleaning & Disposal

EVS will be responsible for cleaning and upkeep of Physician and Staff Amenities. EVS will stock and restock the facilities with towels, toilet tissue, paper towels etc.

Waste, recycling and sharps containers will be available for staff and physicians. EVS will collect and dispose of soiled and waste materials as per the established routines.

Infection Control

As a shared space, Physician and Staff Amenities will comply with all IPAC initiatives and protocols to maintain a healthy and safe work environment.

Security Services

Security provisions will include:

- Electronically controlled access (e.g., by swipecard or similar technology)
- Camera monitoring outside the staff entrance and other areas as determined during design
- Security features (and lighting) for safe travel between the staff entrance and the staff parking lot
- Secured bicycle storage.

Enabling Technologies

Physician and Staff Amenity spaces will be part of the MAHC wireless network. Hardwired phones may also be provided in these facilities.

Charging stations will be provided for telephones and other wireless devices.

Staffing (Current and Projected)

Not applicable to this component.

Design Objectives

Locations and Adjacencies

The location of the staff Locker Area shall be directly adjacent to the staff entrance. There shall be ease of access to the support departments and stairwells and elevators for travel to work areas.

Medical Staff lockers and Lounge shall be centrally accessible to the clinical area (e.g., inpatient units). Locate these two functions adjacent to each other.

On-Call Rooms should also be located central to the inpatient units, for ease of access.

The bike racks shall be directly outside the staff entrance. Note: they must be covered and secured.

Internal Organization

Not applicable to this component

Special Considerations

Physician and Staff Amenities shall be bright and welcoming.

While this component details amenities requiring space, the essential importance of less tangible aspects of staff wellness, such as access to natural light, air quality, thermal comfort, views to the exterior, consistency of design and layout across program/services, soothing colours and design of space, as well as other factors impacting the work environment cannot be overstated. These design and environmental aspects will be significant influencers of employee performance, motivation, happiness, and well-being.

Additionally, while outdoor space will not be exclusive to staff and students, the importance of walking paths and landscaping on the SMMH site should be considered an ‘amenity’ for the well-being of all using the site – whether staff/student or patient/visitor.

A vestibule directly inside the staff entrance door is recommended to assist with temperature control. A corridor with space to carry out staff screening would be valuable prior to entering the Locker Area.

The shower areas will each be planned with a “dressing/undressing” anteroom. This anteroom will be internally lockable to ensure security for all staff during their shower.

Toilet and change facilities shall be lockable rooms not cubicles. Electrical capability shall be provided in the change facilities e.g., for breast pumps.

Infection Prevention and Control

As previously mentioned, attention to cleaning protocols and IPAC initiatives/policies will be required in shared space.

Handwash sinks shall be provided in the Lounges in addition to the kitchen sinks.

Disabled Access & Corridor Design

The Locker Room and Lounge areas shall be accessible to employees who may be in a wheelchair or using crutches.

Codes & Standards

In addition to the above criteria, the facility must conform to recognized national, provincial, and local building codes and standards as they may relate to safety and accessibility for staff, physicians and students. Architects are also instructed to refer to CSA Z8000-18 Canadian Health Care Facilities.

Projected Space Requirements

Table 7. *Space Table*

			Component Gross Area (CGSF / CGSM) : TOTAL				**3,190**				**296.4**		
			Component Gross Area (CGSF / CGSM) : On-Call Rooms				**405**				**37.6**		
			Net to Gross Ratio				1.35				1.35		
			Total Net Area (NSF / NSM)				300				27.9		
			Component Gross Area (CGSF / CGSM) : Staff Locker Area				**1,845**				**171.4**		
			Net to Gross Ratio				1.35				1.35		
			Total Net Area (NSF / NSM)				1,365				126.8		
			Component Gross Area (CGSF / CGSM) : Medical Staff Facilities				**940**				**87.3**		
			Net to Gross Ratio				1.35				1.35		
			Total Net Area (NSF / NSM)				695				64.6		
CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria
			Zone 1: Exterior Spaces			**subtotal net area**		**-**		**subtotal net area**		**0.0**		
11			Bike Storage, Secured	(---)	(---)	(---)	1	(---)	(---)	(---)	1	(---)		Covered and secured
11			Picnic Tables/Outdoor Seating	(---)	(---)	(---)	1	(---)	(---)	(---)	1	(---)	For staff and public seating	Decentralized throughout campus
11			Entryway, Staff Entrance	(---)	(---)	(---)	1	(---)	(---)	(---)	1	(---)		Covered
			Zone 2: On-Call Rooms			**subtotal net area**		**300**		**subtotal net area**		**27.9**		
11	.001		On-Call Room			80	3	240		7.4	3	22.3		Provide bed, desk, computer with telehealth link, dimmable lighting, soundproof, small fridge, small safe, charging station(s) Provide occupancy indicator to show when in use. Including panic alarm
11	.002		Washroom with Shower			60	1	60		5.6	1	5.6		Adjoining the On-Call Rooms, complete with shower

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria
			Zone 3: Staff Lockers			**subtotal net area**		**1,365**		**subtotal net area**		**126.8**		
11	.003		Locker Area, Staff			1,315	1	1,315		122.2	1	122.2		Non-gendered
		.01	*- vestibule, privacy*	*1*	*50*				*4.6*					
		.02	*- lockers*	*120*	*7*				*0.7*					Lockers will be individually lockable; provide lockable personal device charging stations
		.03	*- shower room*	*2*	*60*				*5.6*					Including drying area, seat, hooks for clothing, full length mirror Non-gendered
		.04	*- washroom*	*3*	*60*				*5.6*					
		.05	*- change cubicle, standard*	*3*	*25*				*2.3*					Including hooks for clothing, seat, full length mirror Non-gendered
		.06	*- change cubicle, accessible*	*1*	*50*				*4.6*					Including hooks for clothing, seat, full length mirror Non-gendered
11	.004		Uniform Supply Alcove			50	1	50		4.6	1	4.6		
			Zone 4: Medical Staff Facilities			**subtotal net area**		**695**		**subtotal net area**		**64.6**		
11	.005		Locker Area, Medical Staff			375	1	375		34.8	1	34.8		
		.01	*- vestibule, privacy*	*1*	*50*				*4.6*					
		.02	*- lockers*	*10*	*7*				*0.7*					Lockers will be individually lockable; provide lockable personal device charging stations
		.03	*- shower room*	*1*	*60*				*5.6*					Including drying area, seat, hooks for clothing, full length mirror Non-gendered
		.04	*- washroom*	*2*	*60*				*5.6*					
		.05	*- change cubicle, standard*	*1*	*25*				*2.3*					Including hooks for clothing, seat, full length mirror Non-gendered
		.06	*- change cubicle, accessible*	*1*	*50*				*4.6*					Including hooks for clothing, seat, full length mirror Non-gendered
11	.006		Medical Staff Lounge			320	1	320		29.7	1	29.7		
		.01	*- seating, lounge*	*4*	*20*				*1.9*					Incl. charging stations
		.02	*- table and chairs*	*1*	*100*				*9.3*					Incl. 4 chairs
		.03	*- workstation, touchdown*	*1*	*30*				*2.8*					
		.04	*- phone room*	*1*	*40*				*3.7*				Bookable; enclosed room to support quiet work and phone calls	Incl. desk, telephone, computer workstation with access to power; virtual health capable
		.05	*- kitchenette*	*1*	*60*				*5.6*					
		.06	*- hand hygiene sink*	*1*	*10*				*0.9*					

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria
10	.007		left intentionally blank											

12. Surgical Services & MDRD

Functional Description (Current and Projected)

Service Overview

Muskoka Algonquin Healthcare's (MAHC) Surgical Service will continue to offer inpatient, outpatient, elective and emergency/unscheduled surgical procedures including emergency C-sections at both hospital sites.

MAHC will continue serve the local population as well as residents of remote communities in the surrounding region. The patient and family experience in Surgical Services will be supported by high quality care, delivered in a comfortable physical environment. The patient care environment will be respectful, compassionate, and culturally sensitive to the patient and their family/community.

Surgical Services will be planned to support:

- A patient focused environment delivering care that reflects best practice
- Patient comfort and satisfaction with attention to local demographics
- Physical and operational support of sterile process in the Surgical Suite
- An efficient flow of patients and staff from admission to discharge
- Enhanced local surgical service offerings, through the addition of new surgical specialties and site specialization
- Continued development to advance procedural technique, patient safety, and operational efficiency within this service.

Future Surgical Services will include Operating Rooms (OR) at both sites, but they will differ in their respective surgical offerings and specialization. The **HDMH site** will provide emergent surgeries (e.g., linked to the HDMH OR, ICU or C-section activity) and inpatient surgeries for those with higher post-operative care requirements and/or recovery period. The **SMMH site** will also provide emergent surgeries, and will consolidate MAHC's ambulatory activity, with Procedure Rooms and the Day Surgery Unit to support a robust ambulatory Surgical Centre.

Planning Principles and Assumptions

The HDMH and SMMH Surgical Suites will accommodate scheduled and unscheduled procedures for inpatients and outpatients. ORs and Patient Care Areas will be developed to provide maximum flexibility to serve population needs for MAHC patients.

General assumptions used for planning future Surgical Services and Endoscopy at SMMH include:

- The Surgical Suite will support state-of-the-art service delivery, comply with all building, health and safety codes, and provide optimal flexibility to accommodate ongoing advancement in Surgical Services.
- Surgical volumes for MAHC will increase as surgical cases previously transported to regional hospitals are repatriated to MAHC (for orthopaedics and plastic surgery), as well as in keeping with overall demographic growth and aging.
- ORs will be planned, fitted, and equipped for all procedures. No rooms will be designed/assigned for a specific service or specialty.
- Surgical Services will be planned to support designated circulation within unrestricted, semi-restricted and restricted zones. Protocol for scrubs, and head, face and shoe covers passing between restricted, semi-restricted and unrestricted areas will be established and maintained.
- Pre-operative and recovery space will continue to be colocated and used flexibly to allow for optimal use of staffing and space resources.
- The program will focus on continual improvement in clinical outcomes and procedural efficiency supported by an effective working environment for the Clinical and Service Team.
- The patient and family journey, initiated at arrival, will continue from admission/registration, surgical preparation/ procedure through to a phased post-procedure recovery and return home or to an inpatient care bed. Other admitted patients will be prepared in ICU/Inpatient Care Unit (IPU) or the ED and transferred to the Surgical Suite.
- Medical Device Reprocessing Department (MDRD) will be centralized at each site; with a direct adjacency (horizontal or vertical) to Surgical Services to allow for proper workflow and movement of clean/soiled materials; MDRD will meet the standards of MAHC's Infection Prevention & Control (IPAC), Canadian Standards Association (CSA), Provincial Infection Diseases Advisory Committee (PIDAC), Accreditation Canada, Health Canada, and other relevant associations.
- Increased substitution of non-invasive diagnostics including CT scan and new technologies such as ingestible cameras for diagnostic endoscopies.
- Increased use of regional blocks for anaesthesia.
- Continued growth of outpatient surgery and minimally invasive procedures; Note: these will be performed predominantly at the SMMH site in future.
- With technological advances and appropriate procedure space, more advanced endoscopy procedures could be accomodated at MAHC in the space planned; Note: these will be performed at the SMMH site in future.

Patient Profile

Surgical patients will either be inpatient, outpatient, same day admission, or admissions from the ED.

Most patients will be adults; however, a small number of paediatric procedures will be provided on-site.

Scope of Services (Current and Projected)

Surgical Services

Surgical Services at SMMH will include two ORs and five Procedure Rooms. Surgical activity will include:

- General surgery
- Obstetrics elective and urgent C-sections
- Ophthalmology (incl. emergency eye surgery and cataracts)
- Orthopaedics
- Otolaryngology
- Urology
- Gynaecology
- Endoscopy
- Plastic surgery.

The vast majority of surgeries and procedures at SMMH will be performed on an outpatient basis. A small volume of inpatient surgery will be done in support of inpatient and emergent SMMH patients, as well as C-sections for obstetrics patients.

The MAHC Team of general surgeons, opthalmologists, urologists and anaesthesiologists will continue to engage a team of specialty surgeons from other hospitals in the region for certain scheduled patient procedures.

The table that follows describes the current units and the planned location of each modality for the 2031/32 planning horizon.

Table 1. Current and Projected Modalities

Modality	*Current*	*Projected (10 years)*
General Surgical Procedures	Both sites	Both sites
Minor Surgical Procedure	Both sites	Single sited
Cataracts	Single sited	Single sited
Endoscopy	Both sites	Primarily single sited

Note: services shown above as located at both sites in future will vary in volume and/or patient mix.

Medical Device Reprocessing Department (MDRD)

The MDRD will continue to be responsible for reprocessing of reusable devices, including surgical instruments and hardware, metal containers (basins, trays) and consignment instruments/supplies. It will also be responsible for the cleaning/sterilization of scopes and probes used in procedures throughout the hospital.

MDRD staff will be responsible for the reprocessing, inspection, and care of all surgical instruments. They will also maintain responsibility for the selection and packaging and storing all instruments and equipment between uses. Specific services include:

- Receiving case carts, soiled instruments, vessels and metal ware used at the site
- Cleaning, inspection, sterilization, and storage of equipment/instruments for all procedures
- Receipt and storage of disposables required for sterile packs or maintained in the Sterile Core of the Surgical Suite for use in procedures
- Preparation of standardized instrument sets, carts, and equipment for distribution to other patient care units including Emergency, Critical Care, and Inpatient Units
- Support maintenance and stocking of crash carts ensuring all required material including respiratory supplies/ equipment, medications, instruments/equipment are available and ready for use.

Education

MAHC is affiliated with the Northern Ontario School of Medicine (NOSM), and as such will include learners in clinical areas. Growth in NOSM at MAHC is anticipated in future across all clinical areas.

Six to 10 learners (including medical students, residents, and/or nursing) may be present in the SMMH Surgical Services area at any given time.

Research

As with other MAHC clinical programs, staff in this area will undertake continuous quality improvement (CQI) initiatives that focus on program evaluation and patient satisfaction.

It is not anticipated that Surgical Services will undertake any research studies in future, however they will support research studies of others, as required.

Linkages/ Partnerships

Table 2. Linkages and Partnerships

Linkages/Partnerships	Description
Orillia Soldiers Memorial Hospital	OSMH provides specialists and support
Haliburton Highlands Health Services	MAHC provides consults
West Parry Sound Health Centre	MAHC provides urology consults
Georgian Bay General Hospital	MAHC provides urology consults

Workload (Current and Projected)

Table 3. Historical and Projected Workload

		Historical			*Projected*
	Measure	**2017/18**	**2018/19**	**2019/20**	**2031/32**
Day Surgery		**559**	**615**	**546**	**1,277**
General Surgery	Cases	425	466	410	713
Obstetrics & Gynaecology	Cases	134	127	120	134
Plastic Surgery	Cases	0	21	16	123
Orthopaedics	Cases	0	0	0	115
Otolaryngology	Cases	0	0	0	68
Plastic Surgery	Cases	0	0	0	123
Other	Cases	0	1	0	1
Inpatient Surgery		**284**	**290**	**315**	**225**
General Surgery	Cases	184	211	227	225
Family Practice/General Practice Medicine	Cases	91	62	83	0
Other	Cases	9	17	5	0

		Historical			Projected
	Measure	**2017/18**	**2018/19**	**2019/20**	**2031/32**
Ophthalmology		**0**	**0**	**0**	**1,052**
Cataracts	Cases	0	0	0	1,052
Urology		**1,323**	**1,399**	**1,453**	**1,768**
Inpatient	Cases	89	88	82	0
Outpatient	Cases	1,234	1,311	1,371	1,768
Endoscopy		**2,454**	**2,360**	**2,348**	**5,316**
Inpatient	Cases	95	102	79	118
Outpatient	Cases	2,359	2,258	2,269	5,198
Total, Post Anaesthesia Care Unit (PACU)		**2,132**	**2,365**	**3,373**	**0**
Inpatient	Visits	328	385	405	0
Day Surgery	Visits	1,804	1,980	2,968	0

Notes:

1. MAHC is currently part of a regional program for orthopaedics surgery, with orthopaedics beginning on-site at HDMH in 2021/22, therefore showing no historic volumes. At present, orthopaedics at HDMH runs 4 days/month. Projections assume a repatriation of 25% of the volume of MAHC catchment area patients (current market share is approximately 3%). This activity is projected to be located at SMMH in future.
2. Plastic surgery volumes assume an additional 15% repatriation of patients from the MAHC catchment area (current market share for MAHC is approximately 19%).
3. Future planning assumes OR availability of 1,840 Hours per year (46 weeks/year, 5 days/week, 8 hours/day).

Operational Description

Organization and Management

The Surgical Services Manager and the Charge Nurse will maintain responsibility for daily operations in the Surgical Suite.

Hours of Operation

Current and future hours of operation are noted in the table below.

Table 4. Hours of Operation

	Current			Projected		
Modality	**Weekdays**	**Saturday**	**Sunday**	**Weekday**	**Saturday**	**Sunday**
Day Surgery	7:00am-5:00pm	-	-	8 hours/day	-	-
Operating Rooms (OR)	8:00am start; last case 2:30pm	On-call	On-call	8 hours/day	On-call	On-call
Endoscopy/Procedures Suite	8:30am-4:00pm (last case at 4:00pm), 3-4 days/ week	-	-	8 hours/day	-	-
Post Anaesthesia Care Unit (PACU)	7:00am-5:00pm	-	-	8 hours/day	-	-
Medical Device Reprocessing Department (MDRD)	8:00am-6:00pm	Every other weekend at on-call site 8:00am-6:00pm	On-call	8:00am-9:00pm	On-call	On-call

Notes:

1. PACU is used for preparation and recovery for surgery and endo patients currently.
2. OR hours reflect scheduled procedures. The OR will remain on-call during off-hours for emergency surgeries (e.g., emergency C-sections).
3. Future OR hours assume 46 weeks/year, 5 days/week, 8 hours/day.
4. MAHC Surgical Services will continue to utilize a shared call system for physicians whereby a rotation is used between the two sites for on-call services. Surgeons will be on-call when their site is on-call. The Nursing Team will be on-call 24/7 to support emergency surgeries.

Duration of Visit

Table 5. Duration of Visit

Modality	**Average Room Turnaround Time (Mins)**
Inpatient	30
Outpatient	20
Outpatient Cataract	5
Endoscopy	10

Referrals & Scheduling Appointments

Scheduled surgical appointments will be booked through the Surgical Liaison Office (located at SMMH), who also book any required pre-procedure visits (e.g., bloodwork, diagnostics).

An electronic platform (SeamlessMD at present) will continue to be utilized for virtual guidance, monitoring, and support for surgical patients. The application will be accessed electronically by patients to connect with nursing staff in advance of their procedure, and post-procedure for follow-up and monitoring.

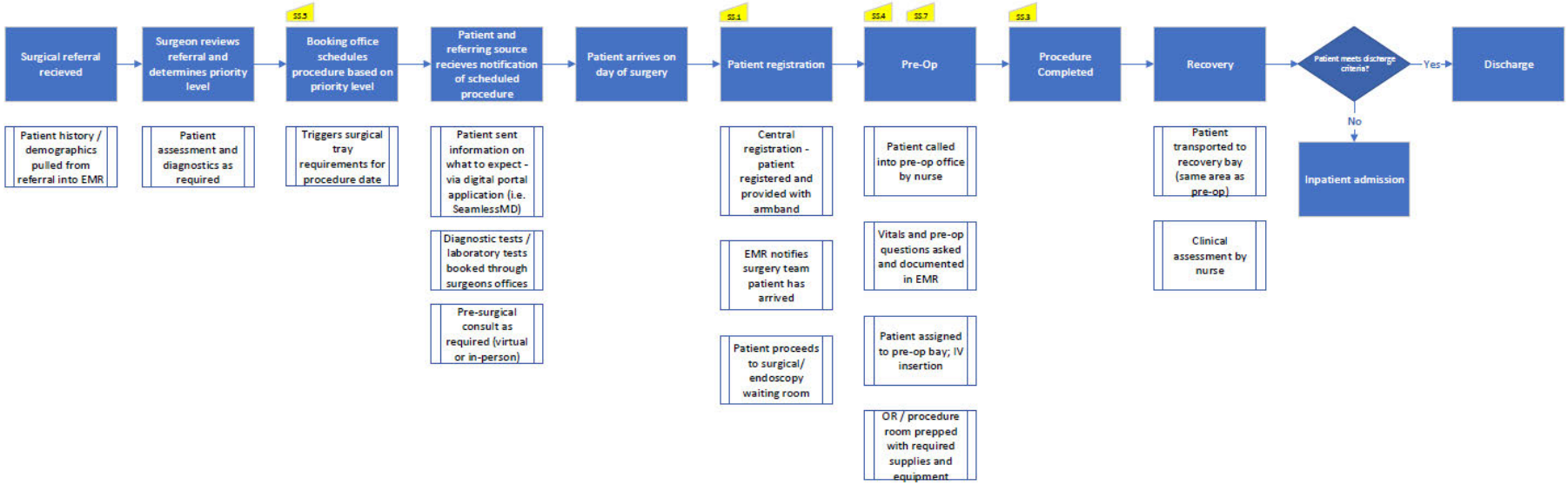
At their initial meeting with the Clinical Team, patients will be provided a link to information about their upcoming procedure and contact information for any questions. In advance of the procedure, nursing staff will access the platform to provide any required education, instructions, reminders, and schedule testing, as required.

Patient profiles and the anticipated procedure will determine the requirement for an inpatient encounter, a 'virtual encounter' or a telephone conversation. As much as possible, patients will have completed pre-registration activities via online, virtual or phone portals.

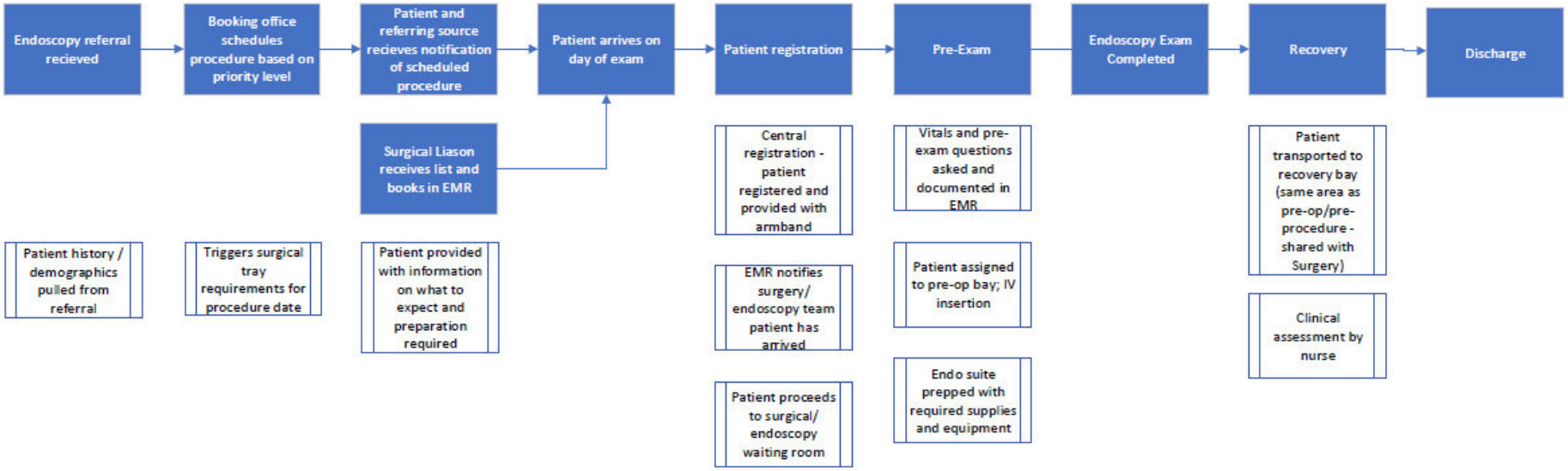
Note: an anaesthesiologist may request a pre-operative consult or speak to the patient in the consultation room or the OR.

Workflow

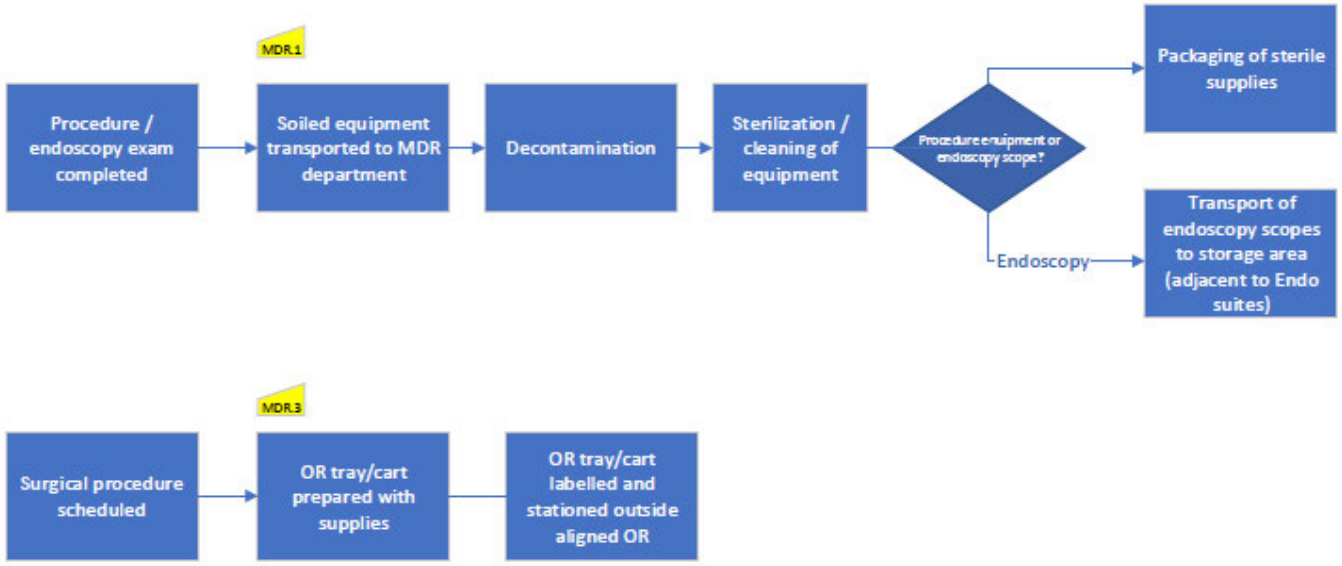
Surgical Services/PACU



Endoscopy


Endoscopy referral recieved
Booking office schedules procedure based on priority level
Patient and referring source recieves notification of scheduled procedure
Patient arrives on day of exam
Patient registration
Pre-Exam
Endoscopy Exam Completed
Recovery
Discharge
Surgical Liason receives list and books in EMR
Patient history / demographics pulled from referral
Triggers surgical tray requirements for procedure date
Patient provided with information on what to expect and preparation required
Central registration - patient registered and provided with armband
EMR notifies surgery/ endoscopy team patient has arrived
Patient proceeds to surgical/ endoscopy waiting room
Vitals and pre-exam questions asked and documented in EMR
Patient assigned to pre-op bay; IV insertion
Endo suite prepped with required supplies and equipment
Patient transported to recovery bay (same area as pre-op/pre-procedure - shared with Surgery)
Clinical assessment by nurse

Medical Device Reprocessing Department



Registration and Consent

For scheduled surgery patients, on the day of their procedure, patients will self-register at a kiosk in the lobby, or if necessary, at the bedside during their pre-operative assessment.

Patient Changing & Preparation

Surgical Suite

Following registration, the patient/family will proceed to the Waiting area within Surgical Services. The Unit Clerk will be responsible for check-in and escorting the patient to a change area (often with a family member). The escorting family member(s) will return to the Waiting area once the patient moves to the OR.

Patients will complete any pre-operative activities and change with or without assistance from family and store any belongings. Family will wait in the Waiting area which will include electronic status boards for information purposes.

Once changed, pre-op preparation may include assessment by nursing, anaesthesia and surgery and initiation of IVs prior to transfer to OR.

Pre-operative patients will be prepared in an enclosed bay. Glass doors or partitions will be electrochromic or include integral blinds to enhance visual and acoustic privacy.

Designated staff will complete a standardized checklist to verify identity, confirm pre-operative protocols, procedural site, and that consent has been appropriately completed.

Paediatric patients will remain with their parent(s)/caregiver(s) until transferred to the OR by a staff member. Following the completion of the procedures a staff member will provide appropriate scrubs/gowns and escort parents to meet the child in recovery area.

Anaesthesia equipment including a spinal cart, epidural equipment (supplies/pumps) will be stored in the Anaesthesia Workroom. An alcove will be designated for the epidural care in Day Surgery when procedures are required.

Endoscopy/Procedure Room

Outpatients will follow a similar procedure as described above for scheduled patients and will be prepared and recovered in Day Surgery.

Procedure Completion and Quality Assurance

Surgical Suite

Scheduled patients prepared and waiting for surgery will be transferred by stretcher to the OR.

Patients entering the Restricted Zone will wear hospital gowns and a head covering. Blankets will cover the patient while in transfer.

Stations stocked with additional head covers, gowns and masks will be available at any entrance to this corridor from staff or service corridors of the hospital. Public corridors are not anticipated beyond the patient/family waiting room.

Should patients walk to the OR, a stretcher will be moved outside the OR to transport patients to the PACU following the procedure.

Ceiling lifts to assist patients onto the operating/procedure table are preferred to manual transfer.

General anaesthesia will be initiated in the OR. Anaesthesia blocks will be administered in Day Surgery, in the private stretcher area.

The Surgical Team will scrub outside the OR/Procedure Room. A scrub sink may serve two adjacent ORs.

Ceiling-mounted booms with flexible arms will be used to maintain the floor area of the OR clear of cords and tripping hazards.

Surgical devices/equipment required for procedures will be assembled in the Sterile Core and moved to the OR prior to the start of surgery.

Room cleaning/turnover between procedures will be established with EVS. The scrub nurse will collect and contain soiled instruments/equipment for transfer to Soiled Collection for return to MDRD. An assigned EVS worker will move linen, trash and waste to bins in Soiled Collection prior to cleaning equipment/surfaces and changing protective covers for the next procedure.

Workspace/dictation stations will be provided immediately outside the OR for physicians to complete documentation and other activities while the room is cleaned for the next procedure. Stations should offer acoustic privacy for telephone calls.

Elective C-sections

Elective C-sections are usually scheduled at the first procedure of the day in the OR. When an emergency C-section is indicated, Surgical Services will be notified. Priority 1 protocol will be initiated, and the next available OR will be cleared. The mother will be prepared as needed (e.g., IV started) and transferred to the OR with the Maternal Newborn RN. The partner will change into scrubs in the inpatient room and wait for the Surgical Team to collect them when ready.

Scheduled mothers will be seen by the general surgeon one week before for assessment and bloodwork (group and screen). Currently on the C-section day, mothers/partners are prepared in Surgical Services. In future, the Acute Inpatient Unit will admit mothers into a Medical/Surgical inpatient room where all pre-op preparation will occur. The mother will be transferred to the OR at the appropriate time. The partner will use the inpatient room to change into scrubs and store all personal belongings. The Surgical Team will collect the partner when ready for their attendance in the OR.

There should be space in the OR area to store an overbed warmer, neonatal crash cart, neonate vital signs monitor, and fetal monitor to be used for C-sections. This will avoid having to transfer these pieces of equipment during emergencies.

Additional support to manage newborn distress may be ordered by the physician at any point during delivery (e.g., respiratory therapist).

After the C-section, the mother, newborn and partner will move to PACU for supervised recovery from anaesthesia and following clearance return to the Acute Inpatient Unit for postpartum care.

The newborn is generally examined immediately following delivery by the Maternal Newborn RN. Mother/family are transferred to the designated space in PACU for recovery and maintaining mother/newborn together is a priority of the model of care. An infant warmer will be available if skin-to-skin contact is limited. The Maternal Newborn RN will continue to care for the newborn and the OR RN will support the mother's recovery until transfer back to the Acute Inpatient Unit.

Endoscopy/Procedure Room

The endoscopy room will be adjacent to the Surgical Suite area, with controlled access from that area. Outpatients will be prepared and recovered in Day Surgery.

Inpatients/ED patients will arrive on a patient elevator with direct access to Day Surgery for preparation.

Post Anaesthesia Care Unit (PACU)

Anaesthesiologists and nursing staff will transport patients directly to the PACU following surgery. The anaesthesiologist/OR nurse will report on surgical procedure and patient condition. Once the patient is wheeled to a designated bay, the assigned PACU nurse will begin the monitoring protocol.

All patients will recover in a private room. The recovery time will vary from 30 minutes for ophthalmology patients to 240 minutes for some orthopaedic cases. The average time is projected from 30-60 minutes.

All preparation and recovery spaces will be enclosed with hard walls and glass 'breakaway' doors to facilitate access in an emergency. Staff will require direct observation to the patient's head either via direct line of sight from corridor observation alcoves outside each room or from the Care Team Station in the PACU.

After discharge, the patient will continue to be followed by the Surgical Team through the electronic platform and dashboard. Level and duration of monitoring will vary by patient need but may include daily wellness checks or other remote monitoring. Patients will be flagged for intervention and escalated back to their physician as determined.

Reporting

Workspace/dictation stations will be provided immediately outside the OR and Procedure Rooms for physicians to complete documentation and other activities while the room is cleaned for the next procedure. Stations should offer acoustic privacy for telephone calls.

Transcription/Voice Recognition

Technology will be leveraged to the highest degree possible, including future consideration for transcription and voice recognition utilization to improve physician efficiency and workflow.

General Support Activities

Coordination of the nursing staff with the site's EVS staff will be studied to ensure all staff is optimized to full scope of practice.

Supplies, Cleaning & Disposal

Supply restocking will be in keeping with MAHC-wide supply stocking processes.

Housekeeping Closets will be distributed throughout Surgical Services. A dedicated closet will be maintained for the exclusive use within the Surgical Suite. Other(s) will be distributed to ensure reasonable access to other areas. Rooms will accommodate carts, equipment, and supplies for interim/terminal cleaning within the restricted areas.

Instrument Sterilization – MDRD

Instrument sterilization will be completed in MDRD. Instruments will be processed and packed with sterile supplies onto closed case carts in the MDRD. Carts will be moved by MDRD techs to designated locations within a sterile corridor that serves each OR. Closed carts will be moved to the appropriate OR once the room has been cleared for the next procedure.

Additional supplies/disposables may be stored in the sterile storage and delivered on request to the OR.

Additional carts packed for emergency procedures will be maintained in a designated area of the MDRD.

MDRD will be responsible for cleaning and sterilization of endoscopes, bronchoscopes, cystoscopes, and U/S probes used in many areas of the hospital. This instrumentation is delicate and requires specific handling. MDRD techs will be assigned to this process.

Endoscopy equipment will be placed in a container in the Procedure Room, carried to Soiled Collection and delivered through the pass-through window/cabinet to Scope Reprocessing Area. Scopes will be soaked, to remove major debris and disinfected before delivery through a pass-through window/cabinet to the adjacent processing room for sterilization.

Infection Control

Access to the working areas will be limited to authorized personnel.

Within Surgical Services and the Procedure Rooms, all patients will be treated with "routine practices". Appropriate PPE and an area to gown are required at the entry to any room. Appropriate signage/notification will be developed to identify a patient under contact or other precautionary measures for antibiotic-resistant organisms.

Within MDRD, entrances to clean/contaminated areas will require an anteroom equipped with a hand hygiene sink. Gowns will be removed before the staff re-enters the vestibule to depart.

Pharmaceutical Services

A Medication Room will be available proximate to the PACU. An ADU with a smaller subset of anaesthesia medication will be available in the OR.

Laboratory Services

Surgeons may collect tissue, bone, fluid samples during a procedure. Laboratory support will be required for specimen analysis intra-operatively where an immediate review and report is required or post-operatively.

Samples will be transported by a MAHC staff member to the Lab.

Diagnostic Services

Portable imaging equipment for use in surgery (e.g., C-Arm, portable x-ray) will be stored in the OR. The units will move to a service area for cleaning following each deployment.

RT will support newborn infants in the OR if required. They will also respond to Code Blue calls within Surgical Services.

Staff Resources

A Surgical Lounge will be included as part of the Surgical Suite for physician use.

Staff Locker and Lounge space will be included within the space planned for Surgical Services.

Security Services

Both Surgical Services and MDRD will have very restricted access. Entry will require a swipe card or other access technology.

All visitors will require an escort and appropriate clothing in the Clean and Soiled areas.

Volunteer Services

The surgical Waiting area may include a volunteer presence.

Enabling Technologies

State-of-the-art patient monitoring will support all aspects of surgical care. Technology platforms, use of predictive technology, and the degree of integration with the patient record that are utilized within Surgical Services in future will be determined as planning proceeds. Components/features for consideration may include:

- Standardized electronic documentation to facilitate interprofessional collaboration and connections with community resources
- Computerized Provider Order Entry (CPOE) with clinical decision support
- Closed loop bedside medication administration and reconciliation processes
- Patient portal and e-scheduling
- Voice dictation at source
- Mobile computing
- Real-time tracking
- Electronic referrals platform

- Virtual care
- Data privacy and security.

It is assumed that hands-free, voice activated communication system will be available to clinical staff.

It is also assumed that the Surgical Suite will include some form of patient tracking to inform the waiting family of the patient's progress though the procedure and staged recovery. Electronic tracking of equipment will be a consideration for the future.

Communication Systems

A direct communication system between the ORs and Procedure Rooms to MDRD will be required for stat deliveries, and to Day Surg/PACU for workflow and patient status.

Equipment

Equipment Storage room(s) will be provided, supplemented by equipment alcoves to keep hallways clear. Carts will be purchased for specialized equipment to allow movement of equipment in and out of rooms.

Implementation of a RFID device program will be considered to reduce time required to locate the equipment.

Emergency (crash) carts for resuscitation and difficult airways will be available in the Surgical Suite.

All patient positions will have a ceiling lift. Lifts in the OR will be integrated with other surgical equipment.

Staffing (Current and Projected)

Table 6. Current and Projected Staffing - SMMH

	Current	2031/32			
Category	**2022/23 FTE**	**Total FTE**	**Headcount per Day**	**Headcount per Evening**	**Headcount per Night**
Total	19.99	33.60	23	0	0
Subtotal, Surgical Services	*15.99*	*28.00*	19	*0*	*0*
Registered Nurse (RN)	9.01	16.00	10	0	0
Operating Room (OR) Tech (Registered Practical Nurse [RPN])	2.98	8.00	5	0	0
RN First Assist	1.00	1.00	1	0	0
Clinical Lead	1.00	1.00	1	0	0
OR Unit Aide	1.00	1.00	1	0	0
Surgical Suite Liaison	1.00	1.00	1	0	0
Subtotal, Medical Device Reprocessing Department (MDRD)	*4.00*	*5.60*	*4*	*0*	*0*
MDRD Technician	4.00	5.60	4	0	On-call

Notes:

1. Manager, Surgical Services & MDRD is a shared role across both sites.
2. The Seamless Nurse role is a shared position with Ambulatory Care.
3. Surgical Suite Liaison staffing is included with central registration in 2023/23.

Design Objectives

Locations and Adjacencies

Most scheduled patients will arrive through the main lobby entrance. While advances in information systems will support electronic pre-registration, in future arriving patients may pre-register at home or a kiosk on arrival. Alternately they will proceed to registration prior to going to Day Surgery. Clear wayfinding between the main lobby and Surgical Services will be required.

Surgery as a service area is dependant on the immediate availability of supplies and equipment to support their work. In addition, the increasing sophistication of technology and tools used in surgery relies on an integrated team of technical and support available at a moment's notice to support clinical activities (e.g., MDR, radiology and laboratory) and address equipment issues (clinical engineering, information technology and operations and a range of engineering specialist). Access from these service groups for routine support and preventive maintenance as well as emergent issues will enhance the overall utilization of the ORs.

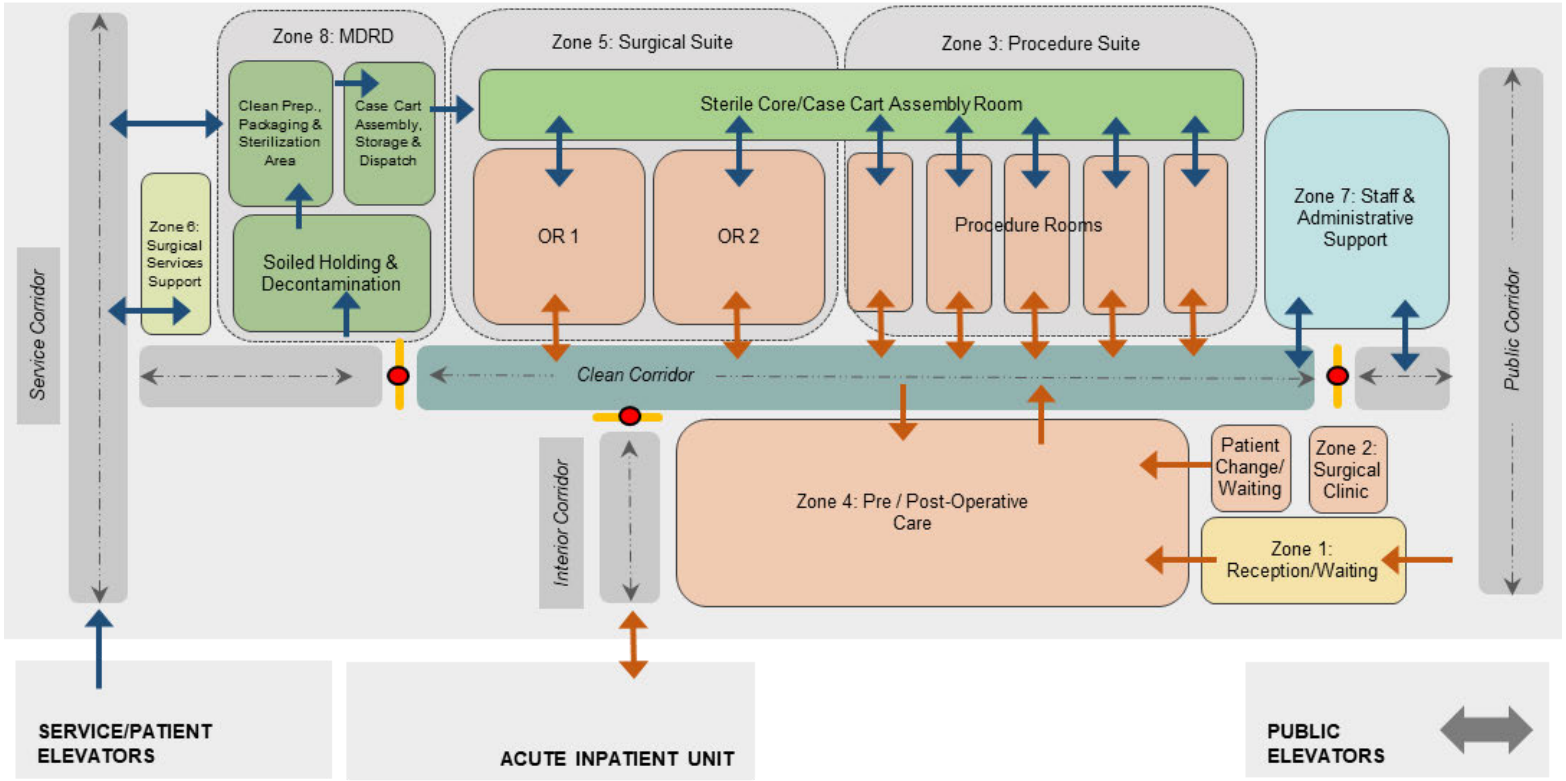
The following additional adjacencies/relationships (in order of priority) will be essential to operations, patient and materials flow, and most imporantly, patient safety:

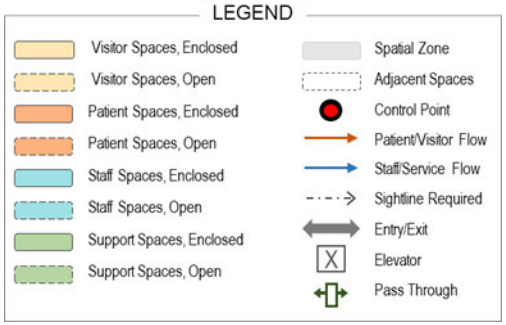
- Direct horizontal or vertical connection to MDRD is required; a horizontal connection is considered highly preferable for patient safety, infection control and optimal workflow.
- Reasonable proximity to the Acute Inpatient Unit, to optimize workflow and safety for transfer of care for critically ill patients and labouring mothers requiring an emergency C-section.
- Reasonable proximity to the physician Lounge.

Internal Adjacencies

The spatial organization should be generally as shown in the diagram on the following page. The diagram illustrates conceptual relationships only and should not be treated as an architectural design. It should only be used to emphasize and identify important adjacencies and patient/visitor flows and staff/service flows. The diagram is not to scale.

Figure 1. Functional Relationship Diagram





Special Considerations

Infection Prevention and Control

To optimize IPAC soiled or infectious material will be contained and transported via a prescribed route that does not intersect with other routes.

The flow of clean and decontaminated supplies and equipment to the area will not compromise universal precautions or aseptic techniques.

The OR will require a Sterile Core with no cross traffic between clean supplies and soiled/decontaminated areas. A direct and dedicated link is required from the Sterile Storage Core to the ORs. A distinct and separate pathway is required from the OR to the MDR decontamination entrance.

IPAC in Surgical Services will be achieved through:

- Zoning of the space as noted above
- The use of hand hygiene sinks, scrub sinks, and other fixtures and equipment in conformance with CSA standards
- Specially designed HVAC systems in compliance with the CSA standard for health facilities, including HEPA (high-efficiency particulate filter) filtered supply air system
- The use of impervious, seamless, durable and easily cleaned surfaces and easily cleaned equipment that tolerates approved disinfectants
- Installation of a seamless floor with a coved base extending no less than 6" above finish floor. No floor drains will be permitted.

Clarity of Spatial Organization

As previously mentioned, clear delineation between patient/family spaces and the Sterile Core must be maintained. This will be accomplished through signage and security infrastructure but should also be intuitive through design.

Wayfinding

All entry/exit, alarm, fire detection, fire exit plans, sprinkler systems should be labelled; signage to be effectively placed for maximum visibility and appropriately lit when necessary.

Disabled Access & Corridor Design

Regional demographics include a rapidly growing population over 60. This warrants attention to planning and design features to accommodate special requirements that accompany aging including sensitivity to lighting, floor patterns and use of specific colours as well as the need for the support of a family member for dressing, clarifying communications etc.

Seating in Waiting areas should be selected to be comfortable but also accommodate the physical challenges common to older adults.

Acoustic

All walls and partitions for exam/consult rooms, meeting rooms, washrooms, etc. will be provided with acoustic insulation to ensure that conversations and other sounds do not leak through them.

Within the OR and Procedure Rooms and surrounding support zones, sound attenuation and acoustics are important for concentration and privacy. Appropriate sound dampening techniques including insulation and, in some situations, mechanical support, (i.e., white noise) may be considered.

Patient Privacy

Confidentiality of patients is additionally important in hospitals serving smaller communities. As previously mentioned, acoustics and sound transfer in all patient and family spaces should be of key concern.

Lighting

For flexibility, lighting should be adaptable for minimally invasive surgery use, with dimmable pot lights and zoned switching of all lighting fixtures.

Opportunities to bring natural light and views to corridors and lounge areas are important for staff working in these areas. Similarly, natural light and views within the Waiting areas would be beneficial for families waiting for loved ones in surgery.

Ergonomic Considerations

The placement and mobility of elements used in surgical delivery (e.g., monitors, equipment booms) shall consider how to maintain the intended objective of a universal space with a range of individuals working in that environment.

Equipment including ceiling lifts and transfer boards will be considered to reduce staff injuries. Anti-fatigue mats may be requested for by specific clinicians.

In procedure areas ceiling-anchored booms for lighting and equipment ensures the floor area is clear reducing potential hazards as the Surgical Team moves around the room.

Security

As previously mentioned, the Surgical Suite will be a controlled access space. Though this will largely be accomplished by security infrastructure and wayfinding, the design of the Unit should also allow for clear demarcation between patient/family spaces and restricted access spaces.

Codes & Standards

In addition to the above criteria, the facility must conform to recognized national, provincial, and local building codes and standards as they may relate to safety and accessibility for patients, staff, and visitors. Architects are also instructed to refer to CSA Z8000-18 Canadian Health Care Facilities.

Projected Space Requirements

Table 7. *Space Table*

			Component Gross Area (CGSF / CGSM) : TOTAL				**21,570**				**2003.9**		
			Component Gross Area (CGSF / CGSM) : Surgical Services				**18,700**				**1737.3**		
			Net to Gross Ratio				1.55				1.55		
			Total Net Area (NSF / NSM)				12,066				1119.1		
			Component Gross Area (CGSF / CGSM) : MDRD				**2,870**				**266.6**		
			Net to Gross Ratio				1.35				1.35		
			Total Net Area (NSF / NSM)				2,125				197.4		
CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
			Zone 1: Reception/Waiting			**subtotal net area**		**370**		**subtotal net area**		**34.4**		
11	.001		Reception, Surgery			80	1	80		7.4	1	7.4		
		.01	*- workstation, volunteer*	*1*	*30*				*2.8*					
		.02	*- workstation, touchdown*	*1*	*50*				*4.6*					Patient check-in
11	.002		Waiting, Surgery			230	1	230		21.4	1	21.4		
		.01	*- seat, standard*	*10*	*20*				*1.9*					
		.02	*- wheelchair/scooter/bariatric*	*1*	*30*				*2.8*					
11	.003		Washroom, Patient, Accessible			60	1	60		5.6	1	5.6		
			Zone 2: Surgical Clinic			**subtotal net area**		**340**		**subtotal net area**		**31.6**		
11	.004		Pre-admission Clinic			240	1	240		22.3	1	22.3		
		.01	*- examination/consult room*	*1*	*140*				*13.0*					In-person pre-operative examination/nurse consult room
		.02	*- consult room*	*1*	*100*				*9.3*					Pre-admission consults, family consults
11	.005		Office, Surgical Suite Liaison			100	1	100		9.3	1	9.3	Surgical Booking Office	
			Zone 3: Procedure Suite			**subtotal net area**		**2,987**		**subtotal net area**		**277.5**		
11	.006		Patient Change/Waiting			402	1	402		37.3	1	37.3		
		.01	*- cubicle, change, standard*	*1*	*25*				*2.3*					
		.02	*- cubicle, change, accessible*	*1*	*50*				*4.6*					Sized for family assistance

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
		.03	*- lockers, patient*	*6*	*7.5*				*0.7*					
		.04	*- seat, standard*	*8*	*20*				*1.9*					
		.05	*- wheelchair/scooter*	*1*	*30*				*2.8*					
		.06	*- alcove, linen cart*	*1*	*15*				*1.4*					
		.07	*- alcove, closed linen hamper*	*1*	*10*				*0.9*					
		.08	*- circulation, 20%*	*1*	*67*				*6.2*					
11	.007		*Washroom, Patient, Accessible*			60	1	60		5.6	1	5.6		
11	.008		Procedure, Endoscopy, Therapeutic			530	1	530		49.2	1	49.2	With imaging	Scope Processing incl in MDRD
		.01	*- procedure room*	*1*	*420*				*39.0*					Include C-Arm, anaesthesia capability
		.02	*- scrub sink*	*1*	*30*				*2.8*					
		.03	*- control room*	*1*	*80*				*7.4*					Incl. sterile scope transport cabinet
11	.009		Procedure, Endoscopy			380	2	760		35.3	2	70.6	Scope Processing incl in MDRD	
		.01	*- procedure room*	*1*	*350*				*32.5*					
		.02	*- scrub sink*	*1*	*30*				*2.8*					
11	.010		Procedure, Urology			*380*	*1*	380		35.3	1	35.3	Urology and other procedures	Sized to accommodate cystoscopy equipment
		.01	*- procedure room*	*1*	*350*				*32.5*					
		.02	*- scrub sink*	*1*	*30*				*2.8*					
11	.011		Procedure, Ophthalmology			*440*	*1*	440		40.9	1	40.9		
		.01	*- procedure room*	*1*	*410*				*38.1*					
		.02	*- scrub sink*	*1*	*30*				*2.8*					
11	.012		Procedure Room Support (shared)			70	1	70		6.5	1	6.5		
		.01	*- alcove, stretcher*	*2*	*25*				*2.3*					
		.02	*- alcove, equipment*	*1*	*20*				*1.9*					Provide cabinet
11	.013		Clean Supply			*165*	*1*	165		15.3	1	15.3		
		.01	*- storage units, supplies*	*1*	*80*				*7.4*					
		.02	*- alcove, equipment*	*2*	*30*				*2.8*					
		.03	*- alcove, stretcher*	*1*	*25*				*2.3*					
11	.014		Soiled Utility Room			130	1	130		12.1	1	12.1		
11	.015		Washroom, Staff			50	1	50		4.6	1	4.6		

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
			Zone 4: Pre / Post-Operative Care			**subtotal net area**		**4,715**		**subtotal net area**		**432.5**		
11	.016		Entry to/from Surgical Suite			20	1	20		1.9	1	1.9	Clean/Semi-restricted	
		.01	*- alcove, ppe*	*1*	*10*				*0.9*				For gowns/masks/bonnets/shoe covers	
		.02	*- hand hygiene sink*	*1*	*10*				*0.9*					
11	.017		Care Team Station			110	1	110		10.2	1	10.2		Unobstructed visibility to all areas
		.01	*- workstation, Charge Nurse*	*1*	*50*				*4.6*					
		.02	*- workstation, touchdown*	*1*	*30*				*2.8*					
		.03	*- printer/work area*	*1*	*20*				*1.9*					
		.04	*- hand hygiene sink*	*1*	*10*				*0.9*					
11	.018		Alcove, Linen Cart			30	1	30		2.8	1	2.8	For Linen Cart and blanket warmer	Provide power for blanket warmer
11	.019		Alcove, Supply Cart			15	1	15		1.4	1	1.4		Medical supply carts (2), PPE cart; decentralized within PACU care area
11	.020		Alcove, Equipment Storage			20	1	20		1.9	1	1.9	For epidural cart, block cart	
11	.021		Patient Care Area			3,445	1	3,445		320.1	1	320.1	May accommodate family	ACCOMMODATES FUTURE GROWTH TO FILL ORs and DI RECOVERY SPACE
		.01	*- stretcher bay*	*24*	*130*				*12.1*					Semi-private bays, include ceiling lift
		.02	*- workstation, nurse*	*13*	*15*				*1.4*					
		.03	*- hand hygiene sink*	*13*	*10*				*0.9*				Shared between 2 rooms	
11	.022		Patient Bay, AIIR			250	1	250		23.2	1	23.2	Room assigned to patient for both prep/recovery	
		.01	*- anteroom*	*1*	*80*				*7.4*					
		.02	*- patient stretcher area*	*1*	*130*				*12.1*					Include sink, ceiling lift
		.03	*- washroom, 2-piece*	*1*	*40*				*3.7*					Door opens into the patient area
11	.023		Patient Bay, Enclosed			150	1	150		13.9	1	13.9	For patient requiring additional privacy (e.g., for seclusion)	
		.01	*- patient stretcher area*	*1*	*140*				*13.0*					Include ceiling lift
		.02	*- hand hygiene sink*	*1*	*10*				*0.9*					
11	.024		Washroom, Patient, Accessible			60	2	120		5.6	1	5.6		
11	.025		Medication Room			135	1	135		12.5	1	12.5		
		.01	*- ADU*	*2*	*30*				*2.8*					
		.02	*- refrigerator, single door*	*1*	*20*				*1.9*					
		.03	*- work counter*	*1*	*45*				*4.2*					

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
		.04	*- hand hygiene sink*	*1*	*10*				*0.9*					
11	.026		Clean Supply Room			120	1	120		11.1	1	11.1		
11	.027		Soiled Utility Room			130	1	130		12.1	1	12.1		
11	.028		Washroom, Staff			50	1	50		4.6	1	4.6		
11	.029		Housekeeping Room			120	1	120		11.1	1	11.1		
11	.030		left intentionally blank											
			Zone 5: Surgical Suite			**subtotal net area**		**2,685**		**subtotal net area**		**253.2**		**(Semi-Restricted Zone)**
11	.031		Entry, Surgical Suite			15	1	15		1.4	1	1.4		
		.01	*- alcove, ppe*	*1*	*5*				*0.5*				For gowns/masks/bonnets/shoe covers	
		.02	*- hand hygiene sink*	*1*	*10*				*0.9*					
11	.032		Care Team Station, Surgical Suite			115	1	115		10.7	1	10.7		Provide visual access to OR entries
		.01	*- workstation, clinical lead*	*1*	*50*				*4.6*					
		.02	*- stand-up workstation*	*1*	*30*				*2.8*					
		.03	*- hand hygiene sink*	*1*	*10*				*0.9*					
		.04	*- circulation, 25%*	*1*	*25*				*2.3*					
11	.033		Alcove, Hemabank			20	1	20		1.9	1	1.9		
11	.034		Alcove, Formalin Storage Cabinet			5	1	5		0.5	1	0.5	Required for decanting formalin for tissue samples	
11	.035		Workroom, Anaesthesia			175	1	175		20.0	1	20.0		
		.01	*- blood gas analyzer*	*1*	*25*				*2.3*					
		.02	*- utility sink*	*1*	*15*				*1.4*					
		.03	*- work area*	*1*	*40*				*3.7*					Incl. blood gas analyzer, workstation for line set-up
		.04	*- equipment*	*1*	*30*				*2.8*				For spinal cart, epidural cart, anaesthesia machine, rapid infuser, cell saver, supply cart (1)	
		.05	*- workstation, touchdown*	*1*	*30*				*2.8*					
		.06	*- circulation, 25%*	*1*	*35*				*3.3*					

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
11	.036		AIR Induction			220	1	220		20.4	1	20.4		Must be contiguous with direct access to 1 OR (Tuberculosis [TB] or other airborne infections)
		.01	*- procedure, induction*	*1*	*140*				*13.0*					
		.02	*- anteroom, staff*	*1*	*80*				*7.4*					Incl. scrub sink, PPE cart
11	.037		Operating Suite			635	2	1,270		59.0	2	118.0	Restricted zone	
		.01	*- operating room*	*1*	*600*				*55.7*					
		.02	*- scrub sink*	*1*	*10*				*0.9*					2-scrub stations/unit
		.03	*- alcove, stretcher*	*1*	*25*				*2.3*				For patient lifts, stretchers outside OR	
11	.038		Sterile Core/Case Cart Assembly Room			465	1	465		43.2	1	43.2		
		.01	*- equipment cart*	*1*	*250*				*23.2*					
		.02	*- equipment cart, for unscheduled/emergency procedures*	*1*	*30*				*2.8*					
		.03	*- case cart*	*2*	*25*				*2.3*					
		.04	*- circulation, 40%*	*1*	*135*				*12.5*					
11	.039		Storage, Equipment			255	1	255		23.7	1	23.7		
		.01	*- specialty equipment room*	*1*	*150*				*13.9*				For specialty tables, monitors etc.	Provide double door access to room
		.02	*- alcove, supply/equipment*	*2*	*30*				*2.8*				For patient lifts, stretchers outside ORs	Provide 1 for each OR
		.03	*- alcove, diagnostic imaging*	*1*	*20*				*1.9*				Shared alcove for C-Arm, x-ray, U/S, lead shields, lead aprons etc.	
		.04	*- alcove, stretcher*	*1*	*25*				*2.3*					
11	.040		Emergency Equipment			40	1	40		3.7	1	3.7		
		.01	*- restricted airways*	*1*	*10*				*0.9*					
		.02	*- crash cart (paediatric)*	*1*	*10*				*0.9*					
		.03	*- crash cart (adult)*	*1*	*10*				*0.9*					
		.04	*- cart, malignant hyperthermia*	*1*	*10*				*0.9*					
11	.041		Washroom, Staff			50	1	50		4.6	1	4.6		
11	.042		Housekeeping Closet			40	1	40		3.7	1	3.7		Provide floor sink w/ eyewash , storage for cleaning supplies
11	.043		Closet, Liquid Waste Disposal			15	1	15		1.4	1	1.4		
11	.044		left intentionally blank											
11	.045		left intentionally blank											

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
			Zone 6: Surgical Services Support			**subtotal net area**		**175**		**subtotal net area**		**16.3**	**(Unrestricted)**	
11	.046		Soiled Collection			175	1	175		16.3	1	16.3		Must be contiguous with MDRD Receiving
		.01	*- case cart staging*	*3*	*20*				*1.9*					
		.02	*- medical waste, recycling, soiled linen staging*	*2*	*25*				*2.3*					
		.03	*- utility sink*	*1*	*20*				*1.9*					
		.04	*- hand hygiene sink*	*1*	*10*				*0.9*					
		.05	*- circulation, 25%*	*1*	*35*				*3.3*					
11	.047		left intentionally blank											
			Zone 7: Staff & Administrative Support			**subtotal net area**		**794**		**subtotal net area**		**73.8**	**(Semi-restricted)**	
11	.048		Scrub Dispenser			80	1	80		7.4	1	7.4		Locate in alcove outside locker rooms
11	.049		Staff Locker Room			334	1	334		31.0	1	31.0	Lockers for MDRD technicians will be included here	
		.01	*- vestibule*	*1*	*30*				*2.8*					
		.02	*- lockers, staff*	*20*	*7*				*0.7*					
		.03	*- day lockers, learners*	*2*	*7*				*0.7*					
		.04	*- change cubicle*	*2*	*25*				*2.3*					Full height doors and partitions between cubicles
		.05	*- washroom, staff*	*1*	*50*				*4.6*					Full height doors
		.06	*- shower/change room, staff*	*1*	*50*				*4.6*					
11	.050		Staff Lounge			280	1	280		26.0	*1*	26.0		
		.01	*- seating, lounge*	*4*	*20*				*1.9*					
		.02	*- table and chairs*	*1*	*100*				*9.3*				Four chairs	
		.03	*- workstation, touchdown*	*1*	*30*				*2.8*					
		.04	*- kitchenette*	*1*	*60*				*5.6*					
		.05	*- hand hygiene sink*	*1*	*10*				*0.9*					
11	.051		Office, Manager			100	1	100		9.3	1	9.3	Surgical Services/MDRD	
11	.052		left intentionally blank											

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
			Zone 8: MDRD (restricted)			**subtotal net area**		**2,125**		**subtotal net area**		**197.4**		
			Soiled Holding and Decontamination											
11	.053		Soiled Cart Holding			115	1	115		10.7	1	10.7		
		.01	*- decontam supply cart*	*1*	*15*				*1.4*					
		.02	*- case cart staging*	*4*	*15*				*1.4*					
		.03	*- hopper sink, mop & pail*	*1*	*40*				*3.7*					
11	.054		Waste Holding			25	*1*	25		2.3	1	2.3		
		.01	*- container holding*	*3*	*5*				*0.5*				For waste/glass/biohazard/recycling	
		.02	*- soiled linen hamper*	*2*	*5*				*0.5*					
11	.055		Soiled Processing			445	1	445		41.3	1	41.3		
		.01	*- washer/disinfector w/ transfer carts, soap storage*	*3*	*50*				*4.6*					Assumes more instrumentation to avoid 4th washer/disinfector
		.02	*- pass-through air-lock window*	*1*	*15*				*1.4*					
		.03	*- workstation incl. double basin sink (w/ eyewash, RO water)*	*3*	*30*				*2.8*					
		.04	*- cart wash with cueing space*	*1*	*140*				*13.0*					
		.05	*- circulation/sorting bench*	*1*	*50*				*4.6*					Could be 4th washer/disinfector in future
11	.056		Scope Reprocessing Area			175	1	175		16.3	1	16.3		
		.01	*- cleaning station with triple sink*	*1*	*50*				*4.6*					
		.02	*- scope reprocessor*	*2*	*40*				*3.7*					
		.03	*- ultrasonic washer*	*1*	*30*				*2.8*					Could be located outside of Scope Reprocesssing Area
		.04	*- pass-through dryer*	*1*	*15*				*1.4*					Could be located outside of Scope Reprocesssing Area
11	.057		Hand Hygiene Station			10	1	10		0.9	1	0.9		
11	.058		Supplies/Chemicals Room			50	1	50		4.6	1	4.6		
11	.059		Housekeeping Room			75	1	75		7.0	1	7.0		
11	.060		left intentionally blank											
			Clean Preparation, Packaging & Sterilization Area											
11	.061		Vestibule, Staff Change Area			60	1	60		5.6	1	5.6		Include sink, PPE
11	.062		Pass-Through Conveyor			15	1	15		1.4	1	1.4		

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
11	.063		Unloading Zone Washer Decontaminator			20	2	40		1.9	2	3.7		
11	.064		Unloading Zone Drying Cabinet			10	1	10		0.9	1	0.9		
11	.065		Cart Staging/Unloading (Cart Wash Exit)			60	1	60		5.6	1	5.6	Staging area before sorting to clean-up sinks, washers	
		.01	*- case cart/table unloading*	*4*	*10*				*0.9*					
		.02	*- utensil cart*	*2*	*10*				*0.9*					
11	.066		Instrument Assembly/Packing Area			380	1	380		35.3	1	35.3	Includes loading area	
		.01	*- set-up/pack table*	*2*	*120*				*11.1*					
		.02	*- Peel Pack and Tool assembly workstation*	*1*	*80*				*7.4*					
		.03	*- instrument storage cabinet*	*3*	*10*				*0.9*					
		.04	*- supply cart*	*3*	*10*				*0.9*					
11	.067		Sterilization Area			235	1	235		21.8	1	21.8		
		.01	*- steam unit, pass-through, hi-vac*	*2*	*65*				*6.0*					
		.02	*- loading area*	*2*	*20*				*1.9*					
		.03	*- unloading and cool down area*	*2*	*20*				*1.9*					
		.04	*- low temperature unit*	*1*	*25*				*2.3*					Tabletop unit
11	.068		Documentation Station			30	1	30		2.8	1	2.8	For quality assurance (QA)/quality control (QC) documentation	
11	.069		left intentionally blank											
			Case Cart Assembly, Storage & Dispatch											
11	.070		Ordering Desk/Dispatch Station			30	1	30		2.8	1	2.8	For QA/QC documentation	
11	.071		Case Cart Holding			60	1	60		5.6	1	5.6		
		.01	*- case cart empty*	*4*	*10*				*0.9*					
		.02	*- transfer/top-up floor cart*	*1*	*10*				*0.9*				For replenishing other clinical areas and delivery of product to OR	
		.03	*- circulation*	*1*	*10*				*0.9*					
11	.072		Supplies Storage			150	1	150		13.9	1	13.9		
11	.073		Storage, Patient Equipment			150	1	150		13.9	1	13.9		

CO	RN	SN	Element	QTY	NSF	Unit Area (sf)	Units	Total Net Area (sf)	NSM	Unit Area (sm)	Units	Total Net Area (sm)	Room Intent	Specific Design Criteria / Comments
11	.074		Hand Hygiene Station			10	1	10		0.9	1	0.9		
11	.075		left intentionally blank											

1.3.2.2.6 HOSPITAL ESTIMATED OPERATING COSTS WITH FUNDING SOURCES AND BASED ON THE PCOP GUIDELINES

See Volume 1.

Part B Elements

1.3.3.4 PROJECTED SPACE REQUIREMENTS

Table 14. Projected Space Requirements

Component		Stage 1.3 2024 Functional Program (cgsf)	G/N Ratio Used
	Totals	**123,510**	
1	Ambulatory		
	- Ambulatory Services	8,140	1.40
2	Acute Inpatient Unit		
	- Medical/Surgical beds (incl. Reactivation and LBRP)	28,270	1.55
	- ICU beds	3,985	1.55
3	Administrative Services		
	- Administrative Suite	3,035	1.25
	- Information Technology	1,790	1.25
	- Occupational Health & Safety & IPAC	440	1.25
	- Meeting Spaces	1,465	1.25
	- Northern Ontario School of Medicine	1,030	1.25
	- Switchboard/Scheduling	330	1.25
4	Diagnostics (incl. cardio respiratory)		
	- Diagnostic Services	13,290	1.50
	- Cardio Respiratory Services	1,470	1.50
5	Emergency Department	13,040	1.50
6	Facilities Support Services		
	- Environmental Services	825	1.15

Component		Stage 1.3 2024 Functional Program (cgsf)	G/N Ratio Used
	- Materials Management	6,035	1.15
	- Plant Operations & Maintenance	1,035	1.15
7	Food & Nutrition Services		
	- Kitchen	1,910	1.25
	- Cafeteria	1,465	1.25
8	Laboratory Services		
	- Core Lab	2,865	1.30
	- Pathology	1,305	1.30
9	Main Lobby		
	- Main Lobby	1,610	1.40
	- Auxiliary (incl. gift shop)	1,205	1.40
	- Foundation	1,500	1.40
	- Security	180	1.40
	- Spiritual Care	490	1.40
10	Pharmacy	2,040	1.30
11	Physician & Staff Amenities	3,190	1.35
12	Surgical Services & MDRD		
	- Surgical Services (incl. endo)	18,700	1.55
	- Medical Device Reprocessing	2,870	1.35

1.3.6 PROJECT SCHEDULE

1.3.6.1 SUMMARY

The overall project schedule can be found on the following page. The overall schedule aligns with the dates provided by Infrastructure Ontario as part of their June 2024 Market Update. It assumes that the project will be delivered under a Design Build Finance (DBF) model. The ultimate model selected will be negotiated with the Ministry of Health following this submission. Delivery under any other model will result in changes to this preliminary schedule and sequence of activities. The remainder of the project, including building the new hospital and site work for parking and landscaping would be completed as one project.

The schedule also assumes that Ministry of Health review and approval will be required after each stage (2.1, 2.2, 2.3, 3.1) and the Ministry of Health review time will be as noted in the schedule. Any changes to these assumptions will result in changes to the overall schedule.

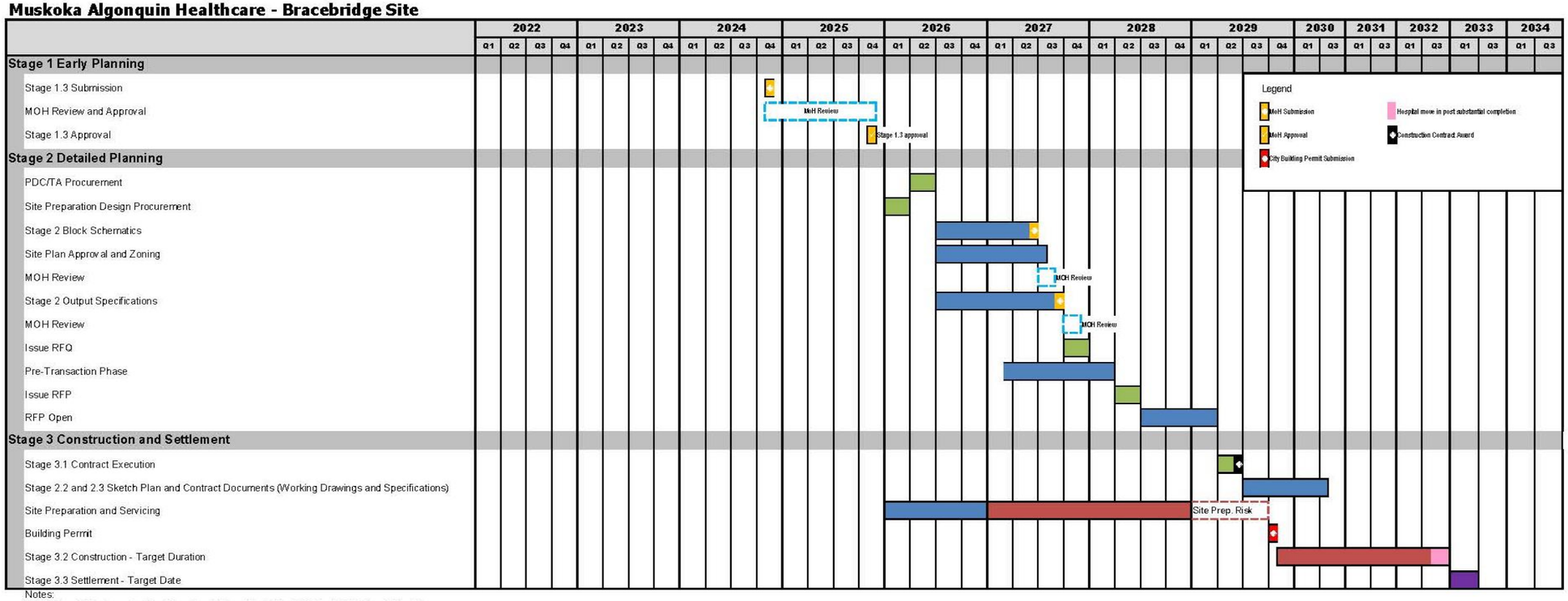
1.3.6.2 UPDATED PROJECT SCHEDULE

Stantec

Version 1
9/20/2024

Schedule
Stage 1.3 Draft Submission

Muskoka Algonquin Healthcare - Bracebridge Site



Notes:
1. Ministry of Health review timelines should be validated by MAHC with Ministry of Health.
2. Construction durations are initial estimates and reflect current market conditions.

1.3.7 LETTERS OF ATTESTATION

Refer to Appendix 1-B.

Appendix 2-C

Stantec

Memo

To:	Hellen Scott Stantec	From:	Guy Taylor Stantec
Project/File:	140022038	Date:	December 1, 2023

Reference: South Muskoka Memorial Hospital Site Selection Due Diligence

1 Introduction

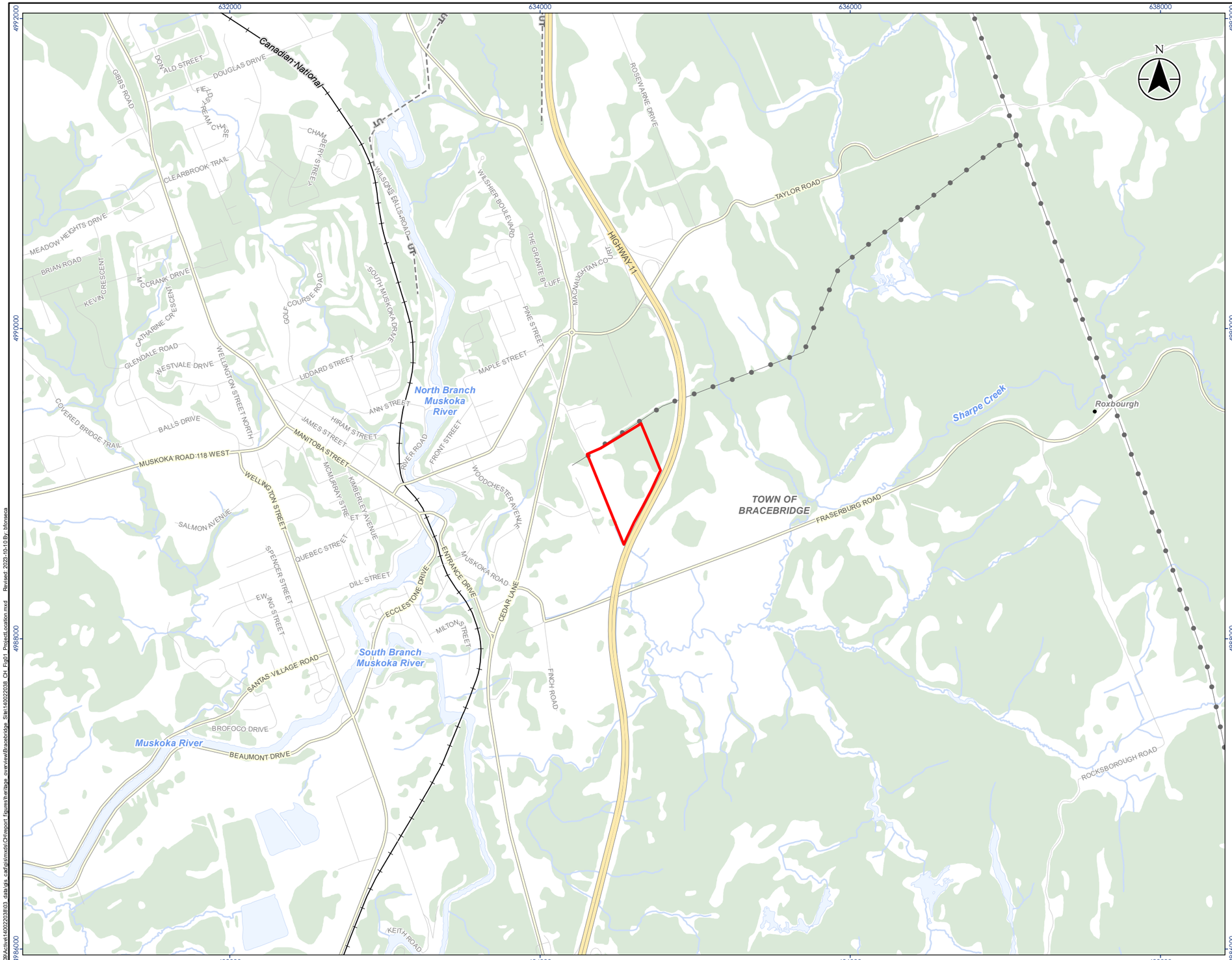
The Muskoka Algonquin Healthcare Group is conducting a site selection exercise for the South Muskoka Memorial Hospital in Bracebridge, Ontario. Two properties are under consideration: 300 Pine Street and 1975 Muskoka Beach Road, both in Bracebridge (the Study Area) (Figure 1 and Figure 2). These properties, forming the "Project Location", are located in the following Lots and Concessions in the former Macaulay Township, now part of the Township of Bracebridge, District of Muskoka:

- Lot 6, Concession 1
- Lot 4, Concession 11
- Lot 5, Concession 11

As part of the due diligence process, Muskoka Algonquin Healthcare retained Stantec Consulting Ltd. (Stantec) to undertake a *Cultural Heritage Screening Report* (CHSR). The CHSR follows the Ministry of Citizenship and Multiculturism's (MCM) *Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes* (2016). The CHSR aims to identify known and potential built heritage resources or cultural heritage landscapes within the Study Area. Where heritage resources are identified, the CHSR includes recommendations for further cultural heritage reporting, such as a *Cultural Heritage Report: Existing Conditions and Preliminary Impact Assessment* (CHR) or site-specific *Cultural Heritage Evaluation Reports* (CHERs) or *Heritage Impact Assessments* (HIAs).

2 Scope and Method

The scope for a CHSR is outlined in the Ministry of Citizenship and Multiculturalism (MCM) Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes: A Checklist for the Non-Specialist (2016; the MCM Checklist). The MCM Checklist provides a tool to identify known or recognized built heritage resources and cultural heritage landscapes in the project area, as well as commemorative plaques, cemeteries, Canadian Heritage River watersheds, properties with buildings 40 or more years old, or potential cultural heritage landscapes. Under the Ontario Heritage Act, cultural heritage is linked to real property. The MCM Checklist is typically used in the context of Environmental Assessments but has been used here as a guiding document to identify potential heritage concerns during the due diligence process.



Stantec

Legend

- Site Boundary
- Highway
- Major Road
- Minor Road
- Railway
- Hydro Line
- UT Unknown Transmission Line
- Watercourse
- Waterbody
- Wooded Area

0 250 500 m

1:25,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
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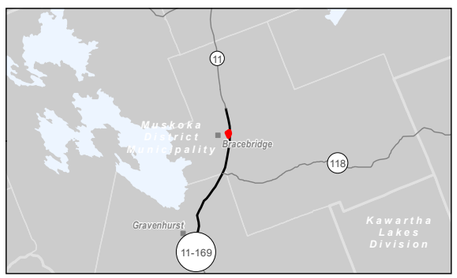

Project Location
Muskoka, ON

140022038 REV1
Prepared by BF on 2023-10-10
Technical Review by DH on 2023-10-10

Client/Project
MUSKOKA ALGONQUIN HEALTHCARE
CULTURAL HERITAGE OVERVIEW
SOUTH MUSKOKA MEMORIAL HOSPITAL DUE DILIGENCE

Figure No.
1

Title
Location of the Study Area

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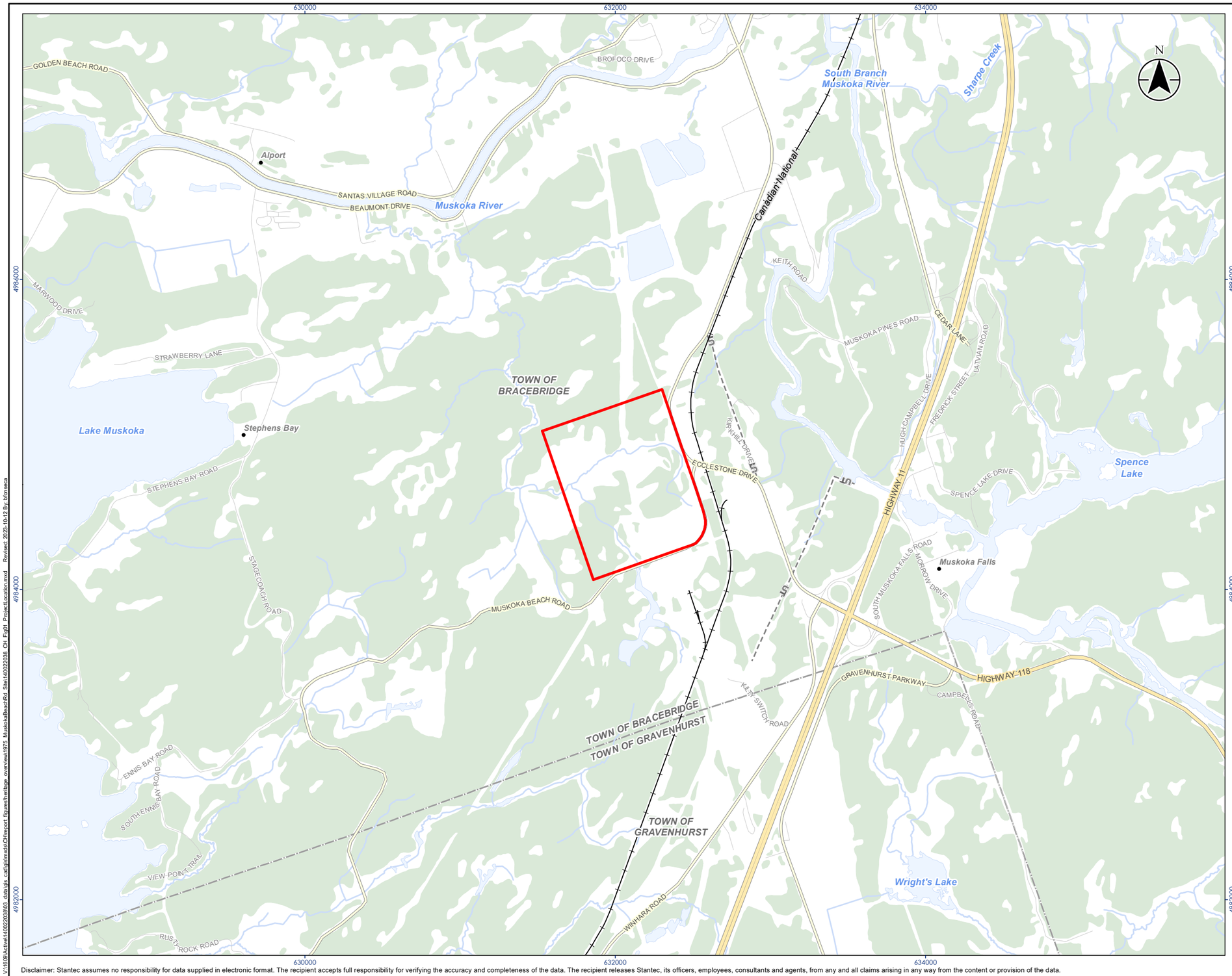
V:\1696\Active\140022038\03 data\gis cad\gis\mxds\CHreport Figures\heritage overviewBracebridge Site\140022038 CH Fig01 ProjectLocation.mxd Revised: 2023-10-10 By: Monesca



Stantec

Legend

- Site Boundary
- Highway
- Major Road
- Minor Road
- Railway
- UT Unknown Transmission Line
- Watercourse
- Municipal Boundary, Lower
- Waterbody
- Wooded Area

0 250 500 m

1:25,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
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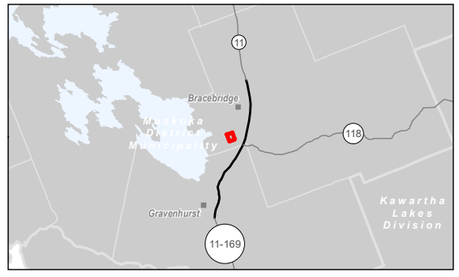

Project Location
Muskoka, ON

140022038 REV1
Prepared by BF on 2023-10-12

Client/Project
MUSKOKA ALGONQUIN HEALTHCARE
CULTURAL HERITAGE OVERVIEW
SOUTH MUSKOKA MEMORIAL HOSPITAL DUE DILIGENCE

Figure No.
1

Title
Location of the Study Area

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V:\1695\Active\140022038\data\gis_cad\gismxd\CHreport_figures\heritage_overview\1975_MuskokaBeachRd_Site\140022038_CH_Fig01_ProjectLocation.mxd Revised: 2023-10-12 By: bfonseca

Stantec

Legend
- Site Boundary
- Study Area (50 m)

0 100 200 m

1:4,000 (At original document size of 11x17)

Notes
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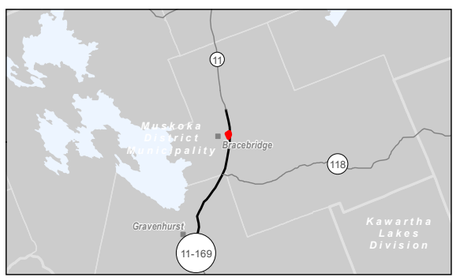

Project Location
Muskoka, ON

140022038 REV1
Prepared by BF on 2023-10-10
Technical Review by DH on 2023-10-10

Client/Project
MUSKOKA ALGONQUIN HEALTHCARE
CULTURAL HERITAGE OVERVIEW
SOUTH MUSKOKA MEMORIAL HOSPITAL DUE DILIGENCE

Figure No.
2

Title
Study Area

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Stantec

Legend
- Site Boundary
- Study Area (50 m)

0 100 200 m

1:8,000 (At original document size of 11x17)

Notes
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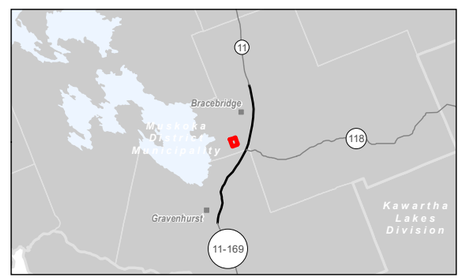

Project Location
Muskoka, ON

140022038 REV1
Prepared by BF on 2023-10-12

Client/Project
MUSKOKA ALGONQUIN HEALTHCARE
CULTURAL HERITAGE OVERVIEW
SOUTH MUSKOKA MEMORIAL HOSPITAL DUE DILIGENCE

Figure No.
2

Title
Study Area

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V:\1609\Active\140022038\03 data\gis cad\gis\mxds\Chrisport Figures\heritage overview\1975 MuskokaBeachRd Site\140022038 CH Fig02 StudyArea.mxd Revised: 2023-10-12 By: bfonseca

This CHSR was composed of a program of agency consultation and documentary research in accordance with the scope outlined in the MCM Checklist (MCM 2016).

To complete the MCM Checklist, the following tasks were undertaken:

- **Task 1:** Review available desktop sources for applicable aerial imagery, historical maps, and municipal, provincial and federal registers, inventories or databases. Sources used include:
  - The Parks Canada Directory of Federal Heritage Designations (http://www.pc.gc.ca/apps/dfhd/search-recherche_eng.aspx)
  - The Canadian Register of Historic Places (https://www.historicplaces.ca/en/home-accueil.aspx)
  - The UNESCO World Heritage List (https://whc.unesco.org/en/statesparties/CA)
  - The Ontario's Historic Plaques website (https://www.ontarioplaques.com/)
  - The Ontario Heritage Trust's Inventory of Provincial Plaques (https://www.heritagetrust.on.ca/user_assets/documents/Inventory-of-provincial-plaques-ENG.pdf)
  - CanadaGenWeb's Cemetery Project Map (https://cemetery.canadagenweb.org/map-project/)
  - Canadian Heritage Rivers System (https://chrs.ca/en)
  - Google Earth Pro and Google Streetview
  - The Ontario Council of University Libraries' Historical Topographic Map Digitization Project (https://ocul.on.ca/topomaps/collection/)
  - Ontario Trails Council (https://www.ontariotrails.on.ca/index.php?url=trails)
- **Task 2:** Consultation with planners or heritage officers from the Town of Bracebridge was undertaken

  to identify known or potential properties of cultural heritage value or interest (CHVI) within the Study Area.
- **Task 3:** Identify known (i.e., designated, listed, inventoried) and potential built heritage resources and cultural heritage landscapes in the Study Area, and recommend further studies, if required.

2.1 Results of Engagement

Agency consultation included both provincial and municipal consultation. Consultation occurred via email and included mapping of the Study Area. At the provincial level, Sammy Bayefsky, Property Coordinator with the Ontario Heritage Trust (OHT), reported that there are no OHT easement sites in the vicinity of the Study Area. Karla Barboza, Team Lead, Heritage, with the MCM, confirmed that there are no provincial heritage properties in the Study Area.

At the municipal level, Cheryl Kelley, Director of Planning and Development with the Town of Bracebridge, was consulted to determine the presence of municipally protected properties. The municipality confirmed that there are no municipal heritage properties in the Study Area.

2.2 Overview of Study Results

Tasks 1 to 3 identified the following within or adjacent to the Study Area:

- No properties of provincial heritage interest
- No protected heritage properties designated under Part IV of the *Ontario Heritage Act*
- No protected heritage properties designated under Part V of the *Ontario Heritage Act*
- No properties listed on the Municipal Heritage Register
- No National Historic Sites or UNESCO sites
- No municipal or provincial heritage plaques
- No known cemeteries or burial sites within or adjacent to the Study Area
- No watersheds associated with the Canadian Heritage River System
- No potential Cultural Heritage Landscapes within the Study Area

There are no existing structures on either site.

3 Recommendations

Based on a review of applicable background data, historical mapping, and consultation with regulatory bodies, there are no known or potential heritage resources within the Study Area. Based on the results of this CHSR, Stantec recommends that no further heritage studies are required.

STANTEC CONSULTING LTD.

Guy Taylor
Cultural Heritage Specialist
Mobile: (437) 882-6248
Guy.Taylor@stantec.com

Reference: South Muskoka Memorial Hospital Site Selection Due Diligence

Attachment A MCM Checklist – 300 Pine Street

Ontario

Ministry of Tourism, Culture and Sport

Programs & Services Branch
401 Bay Street, Suite 1700
Toronto ON M7A 0A7

Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes

A Checklist for the Non-Specialist

The **purpose of the checklist** is to determine:

- if a property(ies) or project area:
  - is a recognized heritage property
  - may be of cultural heritage value
- it includes all areas that may be impacted by project activities, including – but not limited to:
  - the main project area
  - temporary storage
  - staging and working areas
  - temporary roads and detours

Processes covered under this checklist, such as:

- *Planning Act*
- *Environmental Assessment Act*
- *Aggregates Resources Act*
- *Ontario Heritage Act* – Standards and Guidelines for Conservation of Provincial Heritage Properties

Cultural Heritage Evaluation Report (CHER)

If you are not sure how to answer one or more of the questions on the checklist, you may want to hire a qualified person(s) (see page 5 for definitions) to undertake a cultural heritage evaluation report (CHER).

The CHER will help you:

- identify, evaluate and protect cultural heritage resources on your property or project area
- reduce potential delays and risks to a project

Other checklists

Please use a separate checklist for your project, if:

- you are seeking a Renewable Energy Approval under Ontario Regulation 359/09 – separate checklist
- your Parent Class EA document has an approved screening criteria (as referenced in Question 1)

Please refer to the Instructions pages for more detailed information and when completing this form.

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Project or Property Name

300 Pine Street

Project or Property Location (upper and lower or single tier municipality)

Bracebridge, ON

Proponent Name

South Muskoka Memorial Hospital

Proponent Contact Information

Screening Questions

	Yes	No
1. Is there a pre-approved screening checklist, methodology or process in place?	☐	☑

If Yes, please follow the pre-approved screening checklist, methodology or process.

If No, continue to Question 2.

Part A: Screening for known (or recognized) Cultural Heritage Value

	Yes	No
2. Has the property (or project area) been evaluated before and found **not** to be of cultural heritage value?	☐	☑

If Yes, do **not** complete the rest of the checklist.

The proponent, property owner and/or approval authority will:

- summarize the previous evaluation and
- add this checklist to the project file, with the appropriate documents that demonstrate a cultural heritage evaluation was undertaken

The summary and appropriate documentation may be:

- submitted as part of a report requirement
- maintained by the property owner, proponent or approval authority

If No, continue to Question 3.

	Yes	No
3. Is the property (or project area):		
a. identified, designated or otherwise protected under the *Ontario Heritage Act* as being of cultural heritage value?	☐	☑
b. a National Historic Site (or part of)?	☐	☑
c. designated under the *Heritage Railway Stations Protection Act*?	☐	☑
d. designated under the *Heritage Lighthouse Protection Act*?	☐	☑
e. identified as a Federal Heritage Building by the Federal Heritage Buildings Review Office (FHBRO)?	☐	☑
f. located within a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site?	☐	☑

If Yes to any of the above questions, you need to hire a qualified person(s) to undertake:

- a Cultural Heritage Evaluation Report, if a Statement of Cultural Heritage Value has not previously been prepared or the statement needs to be updated

If a Statement of Cultural Heritage Value has been prepared previously and if alterations or development are proposed, you need to hire a qualified person(s) to undertake:

- a Heritage Impact Assessment (HIA) – the report will assess and avoid, eliminate or mitigate impacts

If No, continue to Question 4.

Part B: Screening for Potential Cultural Heritage Value

	Yes	No
4. Does the property (or project area) contain a parcel of land that:		
a. is the subject of a municipal, provincial or federal commemorative or interpretive plaque?	☐	☑
b. has or is adjacent to a known burial site and/or cemetery?	☐	☑
c. is in a Canadian Heritage River watershed?	☐	☑
d. contains buildings or structures that are 40 or more years old?	☐	☑

Part C: Other Considerations

	Yes	No
5. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area):		
a. is considered a landmark in the local community or contains any structures or sites that are important in defining the character of the area?	☐	☑
b. has a special association with a community, person or historical event?	☐	☑
c. contains or is part of a cultural heritage landscape?	☐	☑

If Yes to one or more of the above questions (Part B and C), there is potential for cultural heritage resources on the property or within the project area.

You need to hire a qualified person(s) to undertake:

- a Cultural Heritage Evaluation Report (CHER)

If the property is determined to be of cultural heritage value and alterations or development is proposed, you need to hire a qualified person(s) to undertake:

- a Heritage Impact Assessment (HIA) – the report will assess and avoid, eliminate or mitigate impacts

If No to all of the above questions, there is low potential for built heritage or cultural heritage landscape on the property.

The proponent, property owner and/or approval authority will:

- summarize the conclusion
- add this checklist with the appropriate documentation to the project file

The summary and appropriate documentation may be:

- submitted as part of a report requirement e.g. under the *Environmental Assessment Act, Planning Act* processes
- maintained by the property owner, proponent or approval authority

Instructions

Please have the following available, when requesting information related to the screening questions below:

- a clear map showing the location and boundary of the property or project area
  - large scale and small scale showing nearby township names for context purposes
- the municipal addresses of all properties within the project area
- the lot(s), concession(s), and parcel number(s) of all properties within a project area

For more information, see the Ministry of Tourism, Culture and Sport's Ontario Heritage Toolkit or Standards and Guidelines for Conservation of Provincial Heritage Properties.

In this context, the following definitions apply:

- **qualified person(s)** means individuals – professional engineers, architects, archaeologists, etc. – having relevant, recent experience in the conservation of cultural heritage resources.
- **proponent** means a person, agency, group or organization that carries out or proposes to carry out an undertaking or is the owner or person having charge, management or control of an undertaking.

1. Is there a pre-approved screening checklist, methodology or process in place?

An existing checklist, methodology or process may already be in place for identifying potential cultural heritage resources, including:

- one endorsed by a municipality
- an environmental assessment process e.g. screening checklist for municipal bridges
- one that is approved by the Ministry of Tourism, Culture and Sport (MTCS) under the Ontario government's Standards & Guidelines for Conservation of Provincial Heritage Properties [s.B.2.]

Part A: Screening for known (or recognized) Cultural Heritage Value

2. Has the property (or project area) been evaluated before and found not to be of cultural heritage value?

Respond 'yes' to this question, if all of the following are true:

A property can be considered not to be of cultural heritage value if:

- a Cultural Heritage Evaluation Report (CHER) - or equivalent - has been prepared for the property with the advice of a qualified person and it has been determined not to be of cultural heritage value and/or
- the municipal heritage committee has evaluated the property for its cultural heritage value or interest and determined that the property is not of cultural heritage value or interest

A property may need to be re-evaluated, if:

- there is evidence that its heritage attributes may have changed
- new information is available
- the existing Statement of Cultural Heritage Value does not provide the information necessary to manage the property
- the evaluation took place after 2005 and did not use the criteria in Regulations 9/06 and 10/06

Note: Ontario government ministries and public bodies [prescribed under Regulation 157/10] may continue to use their existing evaluation processes, until the evaluation process required under section B.2 of the Standards & Guidelines for Conservation of Provincial Heritage Properties has been developed and approved by MTCS.

To determine if your property or project area has been evaluated, contact:

- the approval authority
- the proponent
- the Ministry of Tourism, Culture and Sport

3a. Is the property (or project area) identified, designated or otherwise protected under the *Ontario Heritage Act* as being of cultural heritage value e.g.:

i. designated under the *Ontario Heritage Act*

- individual designation (Part IV)
- part of a heritage conservation district (Part V)

Individual Designation – Part IV

A property that is designated:

- by a municipal by-law as being of cultural heritage value or interest [s.29 of the *Ontario Heritage Act*]
- by order of the Minister of Tourism, Culture and Sport as being of cultural heritage value or interest of provincial significance [s.34.5]. **Note**: To date, no properties have been designated by the Minister.

Heritage Conservation District – Part V

A property or project area that is located within an area designated by a municipal by-law as a heritage conservation district [s. 41 of the *Ontario Heritage Act*].

For more information on Parts IV and V, contact:

- municipal clerk
- Ontario Heritage Trust
- local land registry office (for a title search)

---

ii. subject of an agreement, covenant or easement entered into under Parts II or IV of the *Ontario Heritage Act*

An agreement, covenant or easement is usually between the owner of a property and a conservation body or level of government. It is usually registered on title.

The primary purpose of the agreement is to:

- preserve, conserve, and maintain a cultural heritage resource
- prevent its destruction, demolition or loss

For more information, contact:

- Ontario Heritage Trust - for an agreement, covenant or easement [clause 10 (1) (c) of the *Ontario Heritage Act*]
- municipal clerk – for a property that is the subject of an easement or a covenant [s.37 of the *Ontario Heritage Act*]
- local land registry office (for a title search)

---

iii. listed on a register of heritage properties maintained by the municipality

Municipal registers are the official lists - or record - of cultural heritage properties identified as being important to the community.

Registers include:

- all properties that are designated under the *Ontario Heritage Act* (Part IV or V)
- properties that have not been formally designated, but have been identified as having cultural heritage value or interest to the community

For more information, contact:

- municipal clerk
- municipal heritage planning staff
- municipal heritage committee

---

iv. subject to a notice of:

- intention to designate (under Part IV of the *Ontario Heritage Act*)
- a Heritage Conservation District study area bylaw (under Part V of the *Ontario Heritage Act*)

A property that is subject to a **notice of intention to designate** as a property of cultural heritage value or interest and the notice is in accordance with:

- section 29 of the *Ontario Heritage Act*
- section 34.6 of the *Ontario Heritage Act.* **Note**: To date, the only applicable property is Meldrum Bay Inn, Manitoulin Island. [s.34.6]

An area designated by a municipal by-law made under section 40.1 of the *Ontario Heritage Act* as a **heritage conservation district study area**.

For more information, contact:

- municipal clerk – for a property that is the subject of notice of intention [s. 29 and s. 40.1]
- Ontario Heritage Trust

---

v. included in the Ministry of Tourism, Culture and Sport's list of provincial heritage properties

Provincial heritage properties are properties the Government of Ontario owns or controls that have cultural heritage value or interest.

The Ministry of Tourism, Culture and Sport (MTCS) maintains a list of all provincial heritage properties based on information provided by ministries and prescribed public bodies. As they are identified, MTCS adds properties to the list of provincial heritage properties.

For more information, contact the MTCS Registrar at registrar@ontario.ca.

3b. Is the property (or project area) a National Historic Site (or part of)?

National Historic Sites are properties or districts of national historic significance that are designated by the Federal Minister of the Environment, under the *Canada National Parks Act*, based on the advice of the Historic Sites and Monuments Board of Canada.

For more information, see the National Historic Sites website.

3c. Is the property (or project area) designated under the *Heritage Railway Stations Protection Act*?

The *Heritage Railway Stations Protection Act* protects heritage railway stations that are owned by a railway company under federal jurisdiction. Designated railway stations that pass from federal ownership may continue to have cultural heritage value.

For more information, see the Directory of Designated Heritage Railway Stations.

3d. Is the property (or project area) designated under the *Heritage Lighthouse Protection Act*?

The *Heritage Lighthouse Protection Act* helps preserve historically significant Canadian lighthouses. The Act sets up a public nomination process and includes heritage building conservation standards for lighthouses which are officially designated.

For more information, see the Heritage Lighthouses of Canada website.

3e. Is the property (or project area) identified as a Federal Heritage Building by the Federal Heritage Buildings Review Office?

The role of the Federal Heritage Buildings Review Office (FHBRO) is to help the federal government protect the heritage buildings it owns. The policy applies to all federal government departments that administer real property, but not to federal Crown Corporations.

For more information, contact the Federal Heritage Buildings Review Office.

See a directory of all federal heritage designations.

3f. Is the property (or project area) located within a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site?

A UNESCO World Heritage Site is a place listed by UNESCO as having outstanding universal value to humanity under the Convention Concerning the Protection of the World Cultural and Natural Heritage. In order to retain the status of a World Heritage Site, each site must maintain its character defining features.

Currently, the Rideau Canal is the only World Heritage Site in Ontario.

For more information, see Parks Canada – World Heritage Site website.

Part B: Screening for potential Cultural Heritage Value

4a. Does the property (or project area) contain a parcel of land that has a municipal, provincial or federal commemorative or interpretive plaque?

Heritage resources are often recognized with formal plaques or markers.

Plaques are prepared by:

- municipalities
- provincial ministries or agencies
- federal ministries or agencies
- local non-government or non-profit organizations

For more information, contact:

- municipal heritage committees or local heritage organizations – for information on the location of plaques in their community
- Ontario Historical Society's Heritage directory – for a list of historical societies and heritage organizations
- Ontario Heritage Trust – for a list of plaques commemorating Ontario's history
- Historic Sites and Monuments Board of Canada – for a list of plaques commemorating Canada's history

4b. Does the property (or project area) contain a parcel of land that has or is adjacent to a known burial site and/or cemetery?

For more information on known cemeteries and/or burial sites, see:

- Cemeteries Regulations, Ontario Ministry of Consumer Services – for a database of registered cemeteries
- Ontario Genealogical Society (OGS) – to locate records of Ontario cemeteries, both currently and no longer in existence; cairns, family plots and burial registers
- Canadian County Atlas Digital Project – to locate early cemeteries

In this context, adjacent means contiguous or as otherwise defined in a municipal official plan.

4c. Does the property (or project area) contain a parcel of land that is in a Canadian Heritage River watershed?

The Canadian Heritage River System is a national river conservation program that promotes, protects and enhances the best examples of Canada's river heritage.

Canadian Heritage Rivers must have, and maintain, outstanding natural, cultural and/or recreational values, and a high level of public support.

For more information, contact the Canadian Heritage River System.

If you have questions regarding the boundaries of a watershed, please contact:

- your conservation authority
- municipal staff

4d. Does the property (or project area) contain a parcel of land that contains buildings or structures that are 40 or more years old?

A 40 year 'rule of thumb' is typically used to indicate the potential of a site to be of cultural heritage value. The approximate age of buildings and/or structures may be estimated based on:

- history of the development of the area
- fire insurance maps
- architectural style
- building methods

Property owners may have information on the age of any buildings or structures on their property. The municipality, local land registry office or library may also have background information on the property.

Note: 40+ year old buildings or structure do not necessarily hold cultural heritage value or interest; their age simply indicates a higher potential.

A building or structure can include:

- residential structure
- farm building or outbuilding
- industrial, commercial, or institutional building
- remnant or ruin
- engineering work such as a bridge, canal, dams, etc.

For more information on researching the age of buildings or properties, see the Ontario Heritage Tool Kit Guide Heritage Property Evaluation.

Part C: Other Considerations

5a. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area) is considered a landmark in the local community or contains any structures or sites that are important to defining the character of the area?

Local or Aboriginal knowledge may reveal that the project location is situated on a parcel of land that has potential landmarks or defining structures and sites, for instance:

- buildings or landscape features accessible to the public or readily noticeable and widely known
- complexes of buildings
- monuments
- ruins

5b. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area) has a special association with a community, person or historical event?

Local or Aboriginal knowledge may reveal that the project location is situated on a parcel of land that has a special association with a community, person or event of historic interest, for instance:

- Aboriginal sacred site
- traditional-use area
- battlefield
- birthplace of an individual of importance to the community

5c. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area) contains or is part of a cultural heritage landscape?

Landscapes (which may include a combination of archaeological resources, built heritage resources and landscape elements) may be of cultural heritage value or interest to a community.

For example, an Aboriginal trail, historic road or rail corridor may have been established as a key transportation or trade route and may have been important to the early settlement of an area. Parks, designed gardens or unique landforms such as waterfalls, rock faces, caverns, or mounds are areas that may have connections to a particular event, group or belief.

For more information on Questions 5.a., 5.b. and 5.c., contact:

- Elders in Aboriginal Communities or community researchers who may have information on potential cultural heritage resources. Please note that Aboriginal traditional knowledge may be considered sensitive.
- municipal heritage committees or local heritage organizations
- Ontario Historical Society's "Heritage Directory" - for a list of historical societies and heritage organizations in the province

An internet search may find helpful resources, including:

- historical maps
- historical walking tours
- municipal heritage management plans
- cultural heritage landscape studies
- municipal cultural plans

Information specific to trails may be obtained through Ontario Trails.

Reference: **South Muskoka Memorial Hospital Site Selection Due Diligence**

Attachment B MCM Checklist – 1975 Muskoka Beach Road

Ontario

Ministry of Tourism, Culture and Sport

Programs & Services Branch
401 Bay Street, Suite 1700
Toronto ON M7A 0A7

Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes

A Checklist for the Non-Specialist

The **purpose of the checklist** is to determine:

- if a property(ies) or project area:
  - is a recognized heritage property
  - may be of cultural heritage value
- it includes all areas that may be impacted by project activities, including – but not limited to:
  - the main project area
  - temporary storage
  - staging and working areas
  - temporary roads and detours

Processes covered under this checklist, such as:

- *Planning Act*
- *Environmental Assessment Act*
- *Aggregates Resources Act*
- *Ontario Heritage Act* – Standards and Guidelines for Conservation of Provincial Heritage Properties

Cultural Heritage Evaluation Report (CHER)

If you are not sure how to answer one or more of the questions on the checklist, you may want to hire a qualified person(s) (see page 5 for definitions) to undertake a cultural heritage evaluation report (CHER).

The CHER will help you:

- identify, evaluate and protect cultural heritage resources on your property or project area
- reduce potential delays and risks to a project

Other checklists

Please use a separate checklist for your project, if:

- you are seeking a Renewable Energy Approval under Ontario Regulation 359/09 – separate checklist
- your Parent Class EA document has an approved screening criteria (as referenced in Question 1)

Please refer to the Instructions pages for more detailed information and when completing this form.

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Project or Property Name

1975 Muskoka Beach Road

Project or Property Location (upper and lower or single tier municipality)

Bracebridge, ON

Proponent Name

South Muskoka Memorial Hospital

Proponent Contact Information

Screening Questions

	Yes	No
1. Is there a pre-approved screening checklist, methodology or process in place?	☐	☑

If Yes, please follow the pre-approved screening checklist, methodology or process.

If No, continue to Question 2.

Part A: Screening for known (or recognized) Cultural Heritage Value

	Yes	No
2. Has the property (or project area) been evaluated before and found **not** to be of cultural heritage value?	☐	☑

If Yes, do **not** complete the rest of the checklist.

The proponent, property owner and/or approval authority will:

- summarize the previous evaluation and
- add this checklist to the project file, with the appropriate documents that demonstrate a cultural heritage evaluation was undertaken

The summary and appropriate documentation may be:

- submitted as part of a report requirement
- maintained by the property owner, proponent or approval authority

If No, continue to Question 3.

	Yes	No
3. Is the property (or project area):		
a. identified, designated or otherwise protected under the *Ontario Heritage Act* as being of cultural heritage value?	☐	☑
b. a National Historic Site (or part of)?	☐	☑
c. designated under the *Heritage Railway Stations Protection Act*?	☐	☑
d. designated under the *Heritage Lighthouse Protection Act*?	☐	☑
e. identified as a Federal Heritage Building by the Federal Heritage Buildings Review Office (FHBRO)?	☐	☑
f. located within a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site?	☐	☑

If Yes to any of the above questions, you need to hire a qualified person(s) to undertake:

- a Cultural Heritage Evaluation Report, if a Statement of Cultural Heritage Value has not previously been prepared or the statement needs to be updated

If a Statement of Cultural Heritage Value has been prepared previously and if alterations or development are proposed, you need to hire a qualified person(s) to undertake:

- a Heritage Impact Assessment (HIA) – the report will assess and avoid, eliminate or mitigate impacts

If No, continue to Question 4.

Part B: Screening for Potential Cultural Heritage Value

	Yes	No
4. Does the property (or project area) contain a parcel of land that:		
a. is the subject of a municipal, provincial or federal commemorative or interpretive plaque?	☐	☑
b. has or is adjacent to a known burial site and/or cemetery?	☐	☑
c. is in a Canadian Heritage River watershed?	☐	☑
d. contains buildings or structures that are 40 or more years old?	☐	☑

Part C: Other Considerations

	Yes	No
5. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area):		
a. is considered a landmark in the local community or contains any structures or sites that are important in defining the character of the area?	☐	☑
b. has a special association with a community, person or historical event?	☐	☑
c. contains or is part of a cultural heritage landscape?	☐	☑

If Yes to one or more of the above questions (Part B and C), there is potential for cultural heritage resources on the property or within the project area.

You need to hire a qualified person(s) to undertake:

- a Cultural Heritage Evaluation Report (CHER)

If the property is determined to be of cultural heritage value and alterations or development is proposed, you need to hire a qualified person(s) to undertake:

- a Heritage Impact Assessment (HIA) – the report will assess and avoid, eliminate or mitigate impacts

If No to all of the above questions, there is low potential for built heritage or cultural heritage landscape on the property.

The proponent, property owner and/or approval authority will:

- summarize the conclusion
- add this checklist with the appropriate documentation to the project file

The summary and appropriate documentation may be:

- submitted as part of a report requirement e.g. under the *Environmental Assessment Act, Planning Act* processes
- maintained by the property owner, proponent or approval authority

Instructions

Please have the following available, when requesting information related to the screening questions below:

- a clear map showing the location and boundary of the property or project area
  - large scale and small scale showing nearby township names for context purposes
- the municipal addresses of all properties within the project area
- the lot(s), concession(s), and parcel number(s) of all properties within a project area

For more information, see the Ministry of Tourism, Culture and Sport's Ontario Heritage Toolkit or Standards and Guidelines for Conservation of Provincial Heritage Properties.

In this context, the following definitions apply:

- **qualified person(s)** means individuals – professional engineers, architects, archaeologists, etc. – having relevant, recent experience in the conservation of cultural heritage resources.
- **proponent** means a person, agency, group or organization that carries out or proposes to carry out an undertaking or is the owner or person having charge, management or control of an undertaking.

1. Is there a pre-approved screening checklist, methodology or process in place?

An existing checklist, methodology or process may already be in place for identifying potential cultural heritage resources, including:

- one endorsed by a municipality
- an environmental assessment process e.g. screening checklist for municipal bridges
- one that is approved by the Ministry of Tourism, Culture and Sport (MTCS) under the Ontario government's Standards & Guidelines for Conservation of Provincial Heritage Properties [s.B.2.]

Part A: Screening for known (or recognized) Cultural Heritage Value

2. Has the property (or project area) been evaluated before and found not to be of cultural heritage value?

Respond 'yes' to this question, if all of the following are true:

A property can be considered not to be of cultural heritage value if:

- a Cultural Heritage Evaluation Report (CHER) - or equivalent - has been prepared for the property with the advice of a qualified person and it has been determined not to be of cultural heritage value and/or
- the municipal heritage committee has evaluated the property for its cultural heritage value or interest and determined that the property is not of cultural heritage value or interest

A property may need to be re-evaluated, if:

- there is evidence that its heritage attributes may have changed
- new information is available
- the existing Statement of Cultural Heritage Value does not provide the information necessary to manage the property
- the evaluation took place after 2005 and did not use the criteria in Regulations 9/06 and 10/06

Note: Ontario government ministries and public bodies [prescribed under Regulation 157/10] may continue to use their existing evaluation processes, until the evaluation process required under section B.2 of the Standards & Guidelines for Conservation of Provincial Heritage Properties has been developed and approved by MTCS.

To determine if your property or project area has been evaluated, contact:

- the approval authority
- the proponent
- the Ministry of Tourism, Culture and Sport

3a. Is the property (or project area) identified, designated or otherwise protected under the *Ontario Heritage Act* as being of cultural heritage value e.g.:

i. designated under the *Ontario Heritage Act*

- individual designation (Part IV)
- part of a heritage conservation district (Part V)

Individual Designation – Part IV

A property that is designated:

- by a municipal by-law as being of cultural heritage value or interest [s.29 of the *Ontario Heritage Act*]
- by order of the Minister of Tourism, Culture and Sport as being of cultural heritage value or interest of provincial significance [s.34.5]. **Note**: To date, no properties have been designated by the Minister.

Heritage Conservation District – Part V

A property or project area that is located within an area designated by a municipal by-law as a heritage conservation district [s. 41 of the *Ontario Heritage Act*].

For more information on Parts IV and V, contact:

- municipal clerk
- Ontario Heritage Trust
- local land registry office (for a title search)

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ii. subject of an agreement, covenant or easement entered into under Parts II or IV of the *Ontario Heritage Act*

An agreement, covenant or easement is usually between the owner of a property and a conservation body or level of government. It is usually registered on title.

The primary purpose of the agreement is to:

- preserve, conserve, and maintain a cultural heritage resource
- prevent its destruction, demolition or loss

For more information, contact:

- Ontario Heritage Trust - for an agreement, covenant or easement [clause 10 (1) (c) of the *Ontario Heritage Act*]
- municipal clerk – for a property that is the subject of an easement or a covenant [s.37 of the *Ontario Heritage Act*]
- local land registry office (for a title search)

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iii. listed on a register of heritage properties maintained by the municipality

Municipal registers are the official lists - or record - of cultural heritage properties identified as being important to the community.

Registers include:

- all properties that are designated under the *Ontario Heritage Act* (Part IV or V)
- properties that have not been formally designated, but have been identified as having cultural heritage value or interest to the community

For more information, contact:

- municipal clerk
- municipal heritage planning staff
- municipal heritage committee

---

iv. subject to a notice of:

- intention to designate (under Part IV of the *Ontario Heritage Act*)
- a Heritage Conservation District study area bylaw (under Part V of the *Ontario Heritage Act*)

A property that is subject to a **notice of intention to designate** as a property of cultural heritage value or interest and the notice is in accordance with:

- section 29 of the *Ontario Heritage Act*
- section 34.6 of the *Ontario Heritage Act.* **Note**: To date, the only applicable property is Meldrum Bay Inn, Manitoulin Island. [s.34.6]

An area designated by a municipal by-law made under section 40.1 of the *Ontario Heritage Act* as a **heritage conservation district study area**.

For more information, contact:

- municipal clerk – for a property that is the subject of notice of intention [s. 29 and s. 40.1]
- Ontario Heritage Trust

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v. included in the Ministry of Tourism, Culture and Sport's list of provincial heritage properties

Provincial heritage properties are properties the Government of Ontario owns or controls that have cultural heritage value or interest.

The Ministry of Tourism, Culture and Sport (MTCS) maintains a list of all provincial heritage properties based on information provided by ministries and prescribed public bodies. As they are identified, MTCS adds properties to the list of provincial heritage properties.

For more information, contact the MTCS Registrar at registrar@ontario.ca.

3b. Is the property (or project area) a National Historic Site (or part of)?

National Historic Sites are properties or districts of national historic significance that are designated by the Federal Minister of the Environment, under the *Canada National Parks Act*, based on the advice of the Historic Sites and Monuments Board of Canada.

For more information, see the National Historic Sites website.

3c. Is the property (or project area) designated under the *Heritage Railway Stations Protection Act*?

The *Heritage Railway Stations Protection Act* protects heritage railway stations that are owned by a railway company under federal jurisdiction. Designated railway stations that pass from federal ownership may continue to have cultural heritage value.

For more information, see the Directory of Designated Heritage Railway Stations.

3d. Is the property (or project area) designated under the *Heritage Lighthouse Protection Act*?

The *Heritage Lighthouse Protection Act* helps preserve historically significant Canadian lighthouses. The Act sets up a public nomination process and includes heritage building conservation standards for lighthouses which are officially designated.

For more information, see the Heritage Lighthouses of Canada website.

3e. Is the property (or project area) identified as a Federal Heritage Building by the Federal Heritage Buildings Review Office?

The role of the Federal Heritage Buildings Review Office (FHBRO) is to help the federal government protect the heritage buildings it owns. The policy applies to all federal government departments that administer real property, but not to federal Crown Corporations.

For more information, contact the Federal Heritage Buildings Review Office.

See a directory of all federal heritage designations.

3f. Is the property (or project area) located within a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site?

A UNESCO World Heritage Site is a place listed by UNESCO as having outstanding universal value to humanity under the Convention Concerning the Protection of the World Cultural and Natural Heritage. In order to retain the status of a World Heritage Site, each site must maintain its character defining features.

Currently, the Rideau Canal is the only World Heritage Site in Ontario.

For more information, see Parks Canada – World Heritage Site website.

Part B: Screening for potential Cultural Heritage Value

4a. Does the property (or project area) contain a parcel of land that has a municipal, provincial or federal commemorative or interpretive plaque?

Heritage resources are often recognized with formal plaques or markers.

Plaques are prepared by:

- municipalities
- provincial ministries or agencies
- federal ministries or agencies
- local non-government or non-profit organizations

For more information, contact:

- municipal heritage committees or local heritage organizations – for information on the location of plaques in their community
- Ontario Historical Society's Heritage directory – for a list of historical societies and heritage organizations
- Ontario Heritage Trust – for a list of plaques commemorating Ontario's history
- Historic Sites and Monuments Board of Canada – for a list of plaques commemorating Canada's history

4b. Does the property (or project area) contain a parcel of land that has or is adjacent to a known burial site and/or cemetery?

For more information on known cemeteries and/or burial sites, see:

- Cemeteries Regulations, Ontario Ministry of Consumer Services – for a database of registered cemeteries
- Ontario Genealogical Society (OGS) – to locate records of Ontario cemeteries, both currently and no longer in existence; cairns, family plots and burial registers
- Canadian County Atlas Digital Project – to locate early cemeteries

In this context, adjacent means contiguous or as otherwise defined in a municipal official plan.

4c. Does the property (or project area) contain a parcel of land that is in a Canadian Heritage River watershed?

The Canadian Heritage River System is a national river conservation program that promotes, protects and enhances the best examples of Canada's river heritage.

Canadian Heritage Rivers must have, and maintain, outstanding natural, cultural and/or recreational values, and a high level of public support.

For more information, contact the Canadian Heritage River System.

If you have questions regarding the boundaries of a watershed, please contact:

- your conservation authority
- municipal staff

4d. Does the property (or project area) contain a parcel of land that contains buildings or structures that are 40 or more years old?

A 40 year 'rule of thumb' is typically used to indicate the potential of a site to be of cultural heritage value. The approximate age of buildings and/or structures may be estimated based on:

- history of the development of the area
- fire insurance maps
- architectural style
- building methods

Property owners may have information on the age of any buildings or structures on their property. The municipality, local land registry office or library may also have background information on the property.

Note: 40+ year old buildings or structure do not necessarily hold cultural heritage value or interest; their age simply indicates a higher potential.

A building or structure can include:

- residential structure
- farm building or outbuilding
- industrial, commercial, or institutional building
- remnant or ruin
- engineering work such as a bridge, canal, dams, etc.

For more information on researching the age of buildings or properties, see the Ontario Heritage Tool Kit Guide Heritage Property Evaluation.

Part C: Other Considerations

5a. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area) is considered a landmark in the local community or contains any structures or sites that are important to defining the character of the area?

Local or Aboriginal knowledge may reveal that the project location is situated on a parcel of land that has potential landmarks or defining structures and sites, for instance:

- buildings or landscape features accessible to the public or readily noticeable and widely known
- complexes of buildings
- monuments
- ruins

5b. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area) has a special association with a community, person or historical event?

Local or Aboriginal knowledge may reveal that the project location is situated on a parcel of land that has a special association with a community, person or event of historic interest, for instance:

- Aboriginal sacred site
- traditional-use area
- battlefield
- birthplace of an individual of importance to the community

5c. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area) contains or is part of a cultural heritage landscape?

Landscapes (which may include a combination of archaeological resources, built heritage resources and landscape elements) may be of cultural heritage value or interest to a community.

For example, an Aboriginal trail, historic road or rail corridor may have been established as a key transportation or trade route and may have been important to the early settlement of an area. Parks, designed gardens or unique landforms such as waterfalls, rock faces, caverns, or mounds are areas that may have connections to a particular event, group or belief.

For more information on Questions 5.a., 5.b. and 5.c., contact:

- Elders in Aboriginal Communities or community researchers who may have information on potential cultural heritage resources. Please note that Aboriginal traditional knowledge may be considered sensitive.
- municipal heritage committees or local heritage organizations
- Ontario Historical Society's "Heritage Directory" - for a list of historical societies and heritage organizations in the province

An internet search may find helpful resources, including:

- historical maps
- historical walking tours
- municipal heritage management plans
- cultural heritage landscape studies
- municipal cultural plans

Information specific to trails may be obtained through Ontario Trails.

Stage 1 Archaeological Assessment: Bracebridge Hospital – 300 Pine Street

Part of Lot 6, Concession 1, Geographic Township of MacAulay, former Muskoka County, now the Town of Bracebridge, District Municipality of Muskoka, Ontario

December 1, 2023

Prepared for:
Muskoka Algonquin Healthcare
100 Frank Miller Drive
Huntsville, Ontario P1H 1H7

Prepared by:
Stantec Consulting Ltd.
300W-675 Cochrane Drive
Markham, Ontario L3R 0B8

Project Number:
140022038
Licensee: Ragavan Nithiyanantham
License Number: P390
Project Information Form Number:
P390-0404-2023

ORIGINAL REPORT

Limitations and Sign-off

The conclusions in the Report titled Stage 1 Archaeological Assessment: Bracebridge Hospital – 300 Pine Street are Stantec's professional opinion, as of the time of the Report, and concerning the scope described in the Report. The opinions in the document are based on conditions and information existing at the time the scope of work was conducted and do not take into account any subsequent changes. The Report relates solely to the specific project for which Stantec was retained and the stated purpose for which the Report was prepared. The Report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient's own risk.

Stantec has assumed all information received from Muskoka Algonquin Healthcare (the "Client") and third parties in the preparation of the Report to be correct. While Stantec has exercised a customary level of judgment or due diligence in the use of such information, Stantec assumes no responsibility for the consequences of any error or omission contained therein.

This Report is intended solely for use by the Client in accordance with Stantec's contract with the Client. While the Report may be provided to applicable authorities having jurisdiction and others for whom the Client is responsible, Stantec does not warrant the services to any third party. The report may not be relied upon by any other party without the express written consent of Stantec, which may be withheld at Stantec's discretion.

Prepared by: Digitally signed by O'Shaughnessy, Andrew Date: 2024.11.12 18:08:35 -05'00'

Signature

Andrew O'Shaughnessy, Hons. BA
Project Archaeologist

Printed Name and Title

Reviewed by: Date: 2024.11.12 16:41:32 -05'00'

Signature

Ragavan Nithiyanantham, MA CAHP,
Senior Archaeologist/Cultural Heritage Specialist

Printed Name and Title

Approved by: Digitally signed by Dickson, Parker Date: 2024.11.12 16:51:20 -05'00'

Signature

Parker Dickson, MA,
Senior Associate, Senior Archaeologist

Printed Name and Title

Executive Summary

Muskoka Algonquin Healthcare (MAHC) retained Stantec Consulting Ltd. (Stantec) to provide architectural and engineering services in support of their Ministry of Health Capital Redevelopment Stage 1.3 Functional Program (the Project). The Project involves the redevelopment of the South Muskoka Memorial Hospital, which will be developed on a new property. As part of the site selection process for the Project, two short-listed sites are being considered, 300 Pine Street and 1975 Muskoka Beach Road in the Town of Bracebridge, District Municipality of Muskoka.

To facilitate the Project, Stantec is conducting Stage 1 archaeological assessment for the 300 Pine Street site (the study area). The study area is in part of Lot 6, Concession 1, Geographic Township of Macaulay, former Muskoka County, now in the Town of Bracebridge, District Municipality of Muskoka, Ontario. The study area spans roughly 18.21 hectares, predominantly covered by dense mixed forest, indicative of its natural vegetation, with an aggregate pit in its northwest section. The Project is subject to the Provincial Policy Statement (PPS), issued under Section 3 of the *Planning Act* (Government of Ontario 1990a).

The Stage 1 archaeological assessment was completed under Project Information Form (PIF) number P390-0404-2023 issued to Ragavan Nithiyanantham, of Stantec, by the Ministry of Citizenship and Multiculturalism (MCM). An optional Stage 1 property inspection was not conducted for this assessment.

The background research identified that the study area is in the Muskoka River watershed. The closest navigable water source is more than 150 metres away. An examination of the MCM's *Ontario Archaeological Sites Database* did not identify any registered archaeological site in or within 150 metres of the study area (Government of Ontario 2023b). Additionally, a review of the Ontario Heritage Trust *Plaque Database* and Government of Ontario *Ontario Heritage Act Register* (Ontario Heritage Trust 2023a, 2023b; Government of Ontario 2023a) did not identify any commemorative plaques or cultural heritage resources within 150 metres of the study area. The Town of Bracebridge does not have an online registry of cultural heritage resources (Town of Bracebridge 2023). An examination of historical mapping demonstrates that a 19th century transportation route is adjacent to the study area's western limit.

However, a negative indicator of archaeological potential is extensive and deep land alterations that have severely damaged the integrity of any archaeological resources. This may include quarrying, major landscaping involving grading below topsoil, building footprints, and sewage and infrastructure development. The review of topographic maps and aerial imagery shows notable disturbances in the terrain in the northwest part of the study area linked to quarrying activities. However, defining the extent of these disruptions is challenging based on topographic maps and aerial images alone and would require an on-site property inspection for accurate determination. Furthermore, parts of the study area located more than 50 metres from a modern water source and 150 metres from features of archaeological potential other than a modern water source, per Section 2.1.5, are considered to have no to low archaeological potential.

When the above-listed criteria are applied, parts of the study area are evaluated to have archaeological potential.

Based on the findings presented in this report, Stantec recommends:

1. Lands evaluated as having no or low archaeological potential should be visually inspected to confirm existing ground conditions.
2. Stage 2 archaeological assessment of lands evaluated to have archaeological potential. The Stage 2 archaeological assessment will involve a test pit survey per Section 2.1.5 of the MCM's *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011):

- Where the identified feature of archaeological potential is a modern water source, test pitting (Stage 2 archaeological assessment) is required between 0 and 50 metres from the feature. Space test pits at maximum intervals of five metres. Survey is not required beyond 50 metres.
- For features of archaeological potential other than modern water sources (e.g., historical water sources such as glacial shorelines), test pitting (Stage 2 archaeological assessment) is required as follows:
    - Space test pits at maximum intervals of five metres between 0 and 50 metres from the feature of archaeological potential.
    - Space test pits at maximum intervals of 10 metres between 50 and 150 metres from the feature of archaeological potential.

The MCM is asked to enter this report into the *Ontario Public Register of Archaeological Reports*.

The Executive Summary highlights key points from the report only; for complete information and findings, the reader should examine the complete report.

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Acronyms / Abbreviations

BCE	Before Common Era
ca.	Circa
CE	Common Era
GIS	Geographic Information Services
M.Sc.	Master of Sciences
MA	Master of Arts
MAHC	Muskoka Algonquin Healthcare
MCM	Ministry of Citizenship and Multiculturalism
n.d.	No date
P.Eng.	Professional Engineer
PIF	Project Information Form
PPS	Provincial Policy Statement
RPA	Registered Professional Archaeologist
Stantec	Stantec Consulting Ltd.

Project Personnel

Project Manager	Natalie Petricca, M.Arch., OAA, EDAC
Task Manager	Ragavan Nithiyanantham (P390), MA, CAHP
Report Production	Andrew O'Shaughnessy (R497), Hons. BA
Mapping	Brandon Fonseca
Administration	Tammy Maurer
Quality Review	Ragavan Nithiyanantham (P390), MA, CAHP
Independent Review	Parker Dickson (P256), MA

Acknowledgement

Muskoka Algonquin Healthcare	Tim Miller, Director of Facilities and Operations Project Management

1 Project Context

1.1 Development Context

Muskoka Algonquin Healthcare (MAHC) retained Stantec Consulting Ltd. (Stantec)to provide architectural and engineering services in support of their Ministry of Health Capital Redevelopment Stage 1.3 Functional Program (the Project). The Project involves the redevelopment of the South Muskoka Memorial Hospital, which will be developed on a new property. As part of the site selection process for the Project, two short-listed sites are being considered, 300 Pine Street and 1975 Muskoka Beach Road in the Town of Bracebridge, District Municipality of Muskoka.

To facilitate this Project, Stantec is conducting Stage 1 archaeological assessment for the 300 Pine Street site (the study area). The study area is in part of Lot 6, Concession 1, Geographic Township of Macaulay, Muskoka County, now in the Town of Bracebridge, District Municipality of Muskoka, Ontario (Figure 1). The study area spans roughly 18.21 hectares, predominantly covered by dense mixed forest, indicative of its natural vegetation, with an aggregate pit in its northwest section (Figure 2).

The Project is subject to the Provincial Policy Statement (PPS), issued under Section 3 of the *Planning Act* (Government of Ontario 1990a). The PPS states that decisions affecting planning matters may be affected by other legislation; for archaeological work, that would include the *Ontario Heritage Act* (Government of Ontario 1990b). Section 2.6.2 of the PPS states, “development and site alteration shall not be permitted on lands containing archaeological resources or areas of archaeological potential unless significant archaeological resources have been conserved” (Government of Ontario 1990a).

1.1.1 Objectives

In compliance with the provincial standards and guidelines set out in the Ministry of Citizenship and Multiculturalism’s (MCM) *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), the objectives of Stage 1 archaeological assessment are to:

- Provide information about the study area’s geography, history, previous archaeological fieldwork and current land conditions
- Evaluate the study area’s archaeological potential, which will support recommendations for Stage 2 survey for all or parts of the property
- Recommend appropriate strategies for the Stage 2 survey

To meet these objectives, Stantec archaeologists:

- Reviewed relevant archaeological, historical, and environmental literature pertaining to the study area
- Reviewed land use history, including pertinent historical maps
- Examined the *Ontario Archaeological Sites Database* to determine the presence of registered archaeological sites in and around the study area

- Queried the *Ontario Public Register of Archaeological Reports* to determine if previous archaeological assessments have occurred within the study area or 50 metres of the study area.

1.2 Historical Context

The term “contact” is commonly employed as a temporal reference point in discussions concerning Indigenous archaeology in Canada, specifically referring to encounters between Indigenous and European cultures. It signifies a continuous and evolving process rather than a distinct moment. Contact in what is now the province of Ontario is broadly assigned to the 16th century (Loewen and Chapdelaine 2016).

1.2.1 Pre-Contact Indigenous Period

Generally, southwestern Ontario has been occupied by Indigenous peoples since the retreat of the Wisconsin glacier approximately 12,000 years ago. Much of what is understood about the lifeways of Indigenous peoples is derived from archaeological evidence and ethnographic analogy. In Ontario, Indigenous culture prior to contact with European peoples has been distinguished into cultural periods based on observed changes in material culture. These cultural periods are largely based on observed changes in formal lithic tools and are separated into the Early Paleo, Late Paleo, Early Archaic, Middle Archaic, and Late Archaic periods. Following the advent of ceramic technology in the Indigenous archaeological record, cultural periods are separated into the Early Woodland, Middle Woodland, and Late Woodland periods, based primarily on observed changes in formal ceramic decoration. It should be noted that these cultural periods do not necessarily represent specific cultural identities but are a useful paradigm for understanding changes in Indigenous culture through time. The following summary of the pre-contact occupation of southern Ontario is based on syntheses in Ellis and Ferris (1990) and Sutton (1990). The provided periods are based on the “Common Era” calendar notation system, i.e., Before Common Era (BCE) and Common Era (CE).

Table 1.1: Generalized Overview of Pre-contact Indigenous Cultural Chronology

Archaeological Period	Time Period	
Early Paleo	10000 – 8400 BCE	Fluted projectile points; caribou and extinct Pleistocene mammal hunters, small camps
Late Paleo	8400 – 8000 BCE	Hi-Lo projectile points; smaller but more numerous sites
Early Archaic	8000 – 6000 BCE	Nettling and bifurcate projectile points; slow population growth, development of specialized tools
Middle Archaic	6000 – 2500 BCE	Brewerton-like projectile points; environment similar to present, hunting and nut processing, decreased residential mobility

Table 1.1: Generalized Overview of Pre-contact Indigenous Cultural Chronology

Archaeological Period	Time Period	Characteristics
Late Archaic	2500 – 1800 BCE	Lamoka (narrow projectile points), increasing site size
	1800 – 1500 BCE	Broad projectile points, large chipped lithic tools
	1500 – 1100 BCE	Small projectile points, introduction of bow hunting
Terminal Archaic	1100 – 950 BCE	Hind projectile points, emergence of true cemeteries, seasonal mobility patterns
Early Woodland	950 – 400 BCE	Meadowood complex; introduction of pottery, polished stone tools, diverse subsistence
Middle Woodland	400 BCE – 500 CE	Dentate/pseudo-scallop pottery, increased sedentism, seasonal mobility patterns, more elaborate mortuary ceremonialism
Transitional Woodland	550 – 900 CE	Princess Point complex, cord-wrapped stick pottery decoration, introduction of corn
Late Woodland	900 – 1300 CE	Early Late Woodland, emergence of agricultural villages
	1300 – 1400 CE	Middle Late Woodland, large longhouses (100+ metres)
	1400 – 1650 CE	Late Late Woodland, group warfare and displacement

Identifiable human occupation of Ontario begins just after the end of the Wisconsin Glacial period. The first human settlement can be traced back approximately 12,000 years when this area was settled by Indigenous groups living south of the emerging Great Lakes. This initial occupation is referred to as the “Paleo” archaeological culture.

Early Paleo (circa [ca.] 10000 to 8400 BCE) settlement patterns suggest that small groups, or “bands,” followed a pattern of seasonal mobility extending over large territories. Many (although by no means all) of the Early Paleo sites were located on former beach ridges associated with glacial lakes such as Lake Algonquin and Lake Iroquois. Vegetative cover of these areas would have consisted of open spruce parkland, given the cool climatic conditions. Sites tend to be located on well-drained, loamy soils and elevations in the landscape, such as knolls. Large game, such as caribou, mastodon, and mammoth, appears to be of central importance to the sustenance of these early inhabitants.

The Late Paleo period (ca. 8400 to 8000 BCE) is relatively poorly understood, resulting from less research focus. As the climate warmed, the spruce parkland was gradually replaced from south to north with closed coniferous forests. As a result, many of the large game species that had been hunted in the Early Paleo period either moved north or became locally extinct. Late Paleo peoples covered large territories as they moved around to exploit different resources.

The transition from the Paleo period to the Archaic archaeological culture of the Great Lakes region is marked by the development of new tool technologies correlated with increasing resource diversification.

During the Early Archaic period (ca. 8000 to 6000 BCE), the jack and red pine forests that characterized the Late Paleo environment were replaced by forests dominated by white pine with some associated deciduous elements. Early Archaic projectile points differ from Paleo forms, most notably by the presence of side and corner notching on their bases. A ground stone tool industry, including celts and axes, also emerged, indicating that woodworking was an important component of the technological development of Archaic peoples. Although there may have been some reduction in the degree of seasonal mobility, it is still likely that population density during the Early Archaic was low, and band territories were large.

More diversified tool technology development continued into the Middle Archaic period (ca. 6000 to 2500 BCE). The presence of grooved stone net-sinkers suggests an increase in the importance of fishing in subsistence activities. Bannerstones also appeared during this period and are considered weights for “atlatls” or spear-throwers. The increased reliance on local, often poor-quality chert resources for chipped stone tools suggests that in the Middle Archaic, groups inhabited smaller territories lacking high-quality raw materials. This territory size reduction appears to have resulted from gradual region-wide population growth, which forced a reorganization of subsistence patterns. A major development of the later part of the Middle Archaic period was the initiation of long-distance trade. Tools manufactured from natural copper sources near Lake Superior were widely traded in eastern Ontario (‘Old Copper complex’). A distinctive occupation or tradition, known as the Laurentian Archaic, appears in eastern Ontario, western Quebec, northern New York, and Vermont within the transitional zone between the deciduous forests to the south and coniferous forests to the north and is identifiable through the association of certain diagnostic tool types, including ground slate semi-lunar knives (or “ulus”), plummets for use in fishing, ground slate points and knives, and ground stone gouges, adzes and grooved axes. The tool assemblage has been used to suggest that there was less reliance on plant foods and a greater reliance on hunting and fishing in this region than for Archaic peoples in southern Ontario, where people made use of various nut-bearing trees. Stone tools designed specifically for preparing wild plant foods suggest that subsistence catchment was being widened and new resources being more intensively exploited.

The trend towards decreased territory size, increased population density, and a broadening subsistence base continued during the Late Archaic (ca. 2500 to 1100 BCE). Increased territoriality and more limited movement are also consistent with the development of distinct local styles of projectile points. The trade networks that began in the Middle Archaic expanded, including marine shell artifacts from as far away as the Mid-Atlantic coast, polished stone pipes, and slate gorgets. A more unusual Late Archaic artifact is the “birdstone,” small, bird-like effigies usually manufactured from green banded slate. In southern Ontario, the Late Archaic is subdivided into three traditions based on projectile point styles: Narrow, broad, and small points. The small point tradition, i.e., Crawford Knoll and Innes, is thought to represent the spread of bow and arrow technology. The appearance of the first true cemeteries marks the Terminal Archaic period (ca. 1100 to 950 BCE). Before this period, individuals were interred close to where they died. However, burial patterns changed, wherein individuals who died far from the cemetery would be returned for final burial at the group cemetery, often resulting in disarticulated skeletons and occasionally missing minor bone elements (i.e., finger bones). The emergence of local group cemeteries has been interpreted as a response to increased population densities and competition between local groups for access to resources; cemeteries would have provided symbolic claims over a local territory and its resources.

The Early Woodland period (ca. 950 to 400 BCE) is distinguished from the Late Archaic period primarily by the addition of ceramic technology. While the introduction of pottery provides a useful demarcation point for archaeologists, it may have made less difference in the lives of the Early Woodland peoples. Lifeways show a great deal of continuity with the preceding Late Archaic period. For instance, birdstones continue to be manufactured, although the Early Woodland varieties have “pop-eyes” that protrude from their heads' sides. Likewise, well-made projectile points produced during the Archaic period’s terminal part continue in use. The Meadowood complex, marked by thin, well-made, side-notched points, appears primarily in southern Ontario, although there are some sites with Meadowood artifacts in eastern Ontario. The trade networks established in the Middle and late Archaic periods continued to function. However, there does not appear to have been as much traffic in marine shells during the Early Woodland period. These trade items were included in increasingly sophisticated burial ceremonies, some of which involved the construction of burial mounds, particularly in the north shore region of Lake Ontario.

In terms of settlement and subsistence patterns, the Middle Woodland (ca. 400 BCE – 500 CE) provides a major point of departure from previous periods with a great degree of sedentism. Fish were becoming an even more important part of the diet, and rich, densely occupied sites appeared along the margins of major rivers and lakes. Unlike earlier seasonally utilized locations, these sites appear to have functioned as base camps, occupied intermittently throughout the year. There are also numerous small upland sites, many of which can be interpreted as special-purpose camps from which localized resource patches were exploited. Middle Woodland vessels are often decorated with tool-impressed designs covering the entire exterior surface and upper portion of the vessel interior. In eastern Ontario, the Point Peninsula ceramic style features a stamped zigzag pattern applied at various angles to the exterior of the vessel, known as “pseudo scallop shell.” Another common decorative style is the dentate stamp, a comb-like tool that creates square impressions.

The relatively brief period of the Transitional Woodland period (ca. 550 – 900 CE) is marked by the acquisition of cultivar plant species, such as maize and squash, from communities living south of the Great Lakes. With the transition to food production, sites were occupied for longer periods and by larger populations. The Princess Point complex and cord-marked pottery in southern Ontario represent the Transitional Woodland period. There are few Transitional Woodland sites in eastern Ontario. However, these changes are not as evident in the parts of the province where horticulture is not viable, such as the study area. The advent of horticulture is represented mostly through the acquisition of these resources through trade with horticulturalists to the south.

In the Late and Terminal Woodland (immediately prior to the early contact period), there are several instances of Late Woodland pottery types typically associated with Iroquoian groups on what would otherwise be considered Algonquian archaeological sites in the territory east of Georgian Bay across the area of Algonquin Park and the Halliburton Highlands over to, and including, the Ottawa River valley (cf. Ballantine 1996, 1997; Mitchell 1975, 1990, 1996; Saint-Germain 1999; von Gernet 1992, 1993). There has been some debate about what the presence of these purportedly Iroquoian ceramic artifacts in an Algonquin context might indicate. Interpretations include the incursion of Iroquoian peoples into Algonquin territory; ceramics as trade items between Iroquoian and Algonquins; the presence of Iroquoian women in Algonquin societies, either as wives or captives, who continued to manufacture ceramics according to their ethnic traditions; or Algonquin manufacture of ceramics that simulate Iroquoian ceramic types (Pendergast 1999). Each possible interpretation suggests a close interaction sphere between Algonquin and Iroquoian peoples, further

supported by evidence of Iroquoian and Algonquin trade relationships in the early contact period. It has also been suggested that Algonquin and Iroquoian peoples may have “shared in a common Late Woodland cultural stratum,” including common elements such as ceramics (von Gernet 1992). Fox and Garrad (2004) suggest that Huron and Algonquin shared not only a territory in the southern Georgian Bay area (traditional “Huronia”) but also shared a material culture and may have cohabited in settlements to a greater degree than as simply visitors. Ballantine (1997) has suggested that Algonquian sites, or sites shared by Iroquoians and Algonquians, exhibit a wider variety of lithic raw materials and a greater reliance on quartz, based on his work in the Haliburton area.

1.2.2 Post-Contact Indigenous Period

The study area is in the Muskoka District, which forms part of an area sometimes referred to modernly as “The Land Between” for its geographic location between the arable lands in southern Ontario and the Canadian Shield to the north. However, that moniker is also an apt description for an interaction sphere between Indigenous nations. The start of the Contact period was one of a complex interaction between the Huron-Wendat Iroquoian-speaking horticulturalists living in semi-permanent villages located around the southern end of Georgian Bay to the south and more mobile Anishinaabe peoples living along the rivers and lakes to the north (Heidenreich 1971, Map 24). As interactions with Europeans (primarily the French) intensified through the fur trade and later the exploration of the Great Lakes region, travel along the eastern shore of Georgian Bay and through the Severn and French rivers included a greater mix of people and an increase in the trade of goods between Indigenous nations and between Indigenous and European peoples.

The Michi Saagiig Nishnaabeg (Mississauga Anishinaabeg) traditional homeland stretched along the north shore of Lake Ontario and its tributary rivers from present-day Gananoque in the east to Long Point on Lake Erie in the west. In the winter, the communities dispersed into smaller groups. They travelled inland to the north, around present-day Bancroft, the Haliburton Highlands and into the Muskoka area. Mississauga’s oral history relates that their ancestors have occupied this part of southern Ontario since the last deglaciation (Migizi and Kapyrka 2015).

The Mississauga traditional territory was located between two powerful confederacies, the Three Fires Confederacy (consisting of the Odawa, Ojibwa, and Pottawatomi) located to the north and west, and the Haudenosaunee (Five Nations Iroquois) Confederacy on the south shore of Lake Ontario in present-day New York State. In this geopolitical context, the Mississauga positioned themselves as peacekeepers among the various Indigenous nations, acting as negotiators and emissaries (Migizi and Kapyrka 2015). In the 1640s, the Five Nations Iroquois began a territorial expansion campaign between Lake Ontario’s north shore and what is now central Ontario. In 1649, raids by the Seneca and Mohawk north of Lake Ontario, coinciding with the widespread occurrence of infectious disease and famine among the Huron-Wendat, Tionontate (Petun), and Atawandaron (Neutral) nations, resulted in the latter groups’ dispersal from the region, and the Seneca establishing regional dominance (Heidenreich 1978).

In 1667, surviving Huron-Wendat warriors allied with the Ojibwa and Mississaugas to counterattack the Iroquois who had settled along the north shore of Lake Ontario. By 1690, the Mississauga had begun moving back into the lower Great Lakes basin (Konrad 1981; Rogers 1978). Mississauga oral traditions, as told by Chief Robert Paudash and recorded in 1905, indicate that after the Mississauga defeat of the Mohawk, the Mohawk retreated to their homeland south of Lake Ontario, and a peace treaty was negotiated between

those groups around 1695 (Paudash 1905). Upon the Mississaugas' return, they re-established their role as peacekeepers in the region, extending that to include the incoming Euro-Canadian settlers (Curve Lake First Nation no date [n.d.]; Kapyrka 2018). The Huron-Wendat permanently left the region, moving to the east in Quebec and the southwest in the present-day United States.

French maps of the late 17th century indicate the presence of the Mississauga in the Muskoka area. When the British explored the same region in the middle and late 18th century, they noted the presence of "Chippewas," although they used the terms Chippewa and Mississauga interchangeably (Murray 1963: liii). The chief of the Chippewas was Yellowhead (Mesquakie), from which the name Muskoka is derived (Murray 1963, liii).

Despite the differentiation among these groups in Euro-Canadian sources, Indigenous groups had a considerably different view concerning their self-identification during the first few centuries of European contact. These peoples relied upon kinship ties that cut across European notions of nation identity (Bohaker 2006, 277-283). Many of the British-imposed names, such as Chippewa, Ottawa, Potawatomi, or Mississauga, artificially separated how self-identified Indigenous peoples classified themselves; these groups were culturally and socially more alike than contemporary European documentation might indicate (Bohaker 2006, 1-8).

The expansion of the fur trade led to increased interaction between European and Indigenous people and, ultimately, intermarriage between European men and Indigenous women. During the 18th century, the progeny of these marriages began to identify as Métis and no longer identified directly with their paternal or maternal cultures. The ethnogenesis of the Métis progressed with establishing distinct Métis communities along the major waterways in the Great Lakes of Ontario. Métis communities were primarily focused around the upper Great Lakes and along Georgian Bay; however, Métis people have historically lived throughout Ontario (Métis Nation of Ontario 2023; Stone and Chaput 1978, 607-608).

Since contact with European explorers and immigrants, and later, with the establishment of provincial and federal governments (the Crown), the lands within Ontario have been included in various treaties, land claims, and land cessions. Following the American Revolutionary War, the Crown focused on settling European immigrants into what became the province of Upper Canada in 1791. The Crown government entered into a series of treaties with Indigenous peoples to enable widespread settlement. The first treaty signed between the Crown and the Indigenous peoples of the area was the Robinson-Huron Treaty (Treaty number 61), signed on September 9, 1850. Morris (1943) describes the Robinson-Huron Treaty as part of:

> two agreements signed in September of 1850…and secured virtually the whole of the Upper Canadian northwest for government use" (Surtees 1986: 19). This agreement includes "the eastern and northern shores of Lake Huron from Penetanguishene to Sault Ste. Marie, and thence to Batchewana Bay on the northern shore of Lake Superior, together with the Islands in said lakes, opposite to the shores thereof and inland to the height of land which separates the territory covered by the Charter of the Honorable Hudsons Bay Company from Canada, as well as all unconceded lands within the limits of Canada West, to which they have any just claim of the other part
>
> (Morris 1943, 24-25)

The parcel surrendered "contained 35,700 square miles of territory" (Surtees 1986, 19). Twenty-one reserves were included in the treaty, the locations of which could be chosen by the chiefs. The treaty was likely inspired by the promotion of mining activity in the area (Surtees 1986, 20).

In addition to the Robinson-Huron Treaty, the study area also falls within the Williams Treaty lands. Figure 3 provides a map of southwestern Ontario illustrating early treaties and purchases (Government of Canada n.d.; Morris 1943) and shows the location of the study area within the Williams Treaty lands (labelled "AF").

The Williams Treaty, between the Crown and the Chippewas and Mississaugas, is part of "[t]hree separate and large parcels of land in southern and central Ontario…acquired by the Government of Canada in 1923" (Surtees 1986, 1). The particular parcel associated with the study area includes a "very large tract lying between Lake Huron and the Ottawa River bounded on the north by the Mattawa River-Lake Nipissing and French Line and on the south by earlier treaties concluded in 1818 and 1819" (Surtees 1986, 1) and contained approximately 17,600 square miles (Morris 1943, 61). It is also worth noting that this area also "included substantial portions of land that had been the object of previous land cession treaties" (Surtees 1986, 1).

Within the Muskoka District, the Wasauksing First Nation reserve was established on Parry Island, near Parry Sound, in 1850 as part of the Robinson-Huron Treaty. Initially occupied through the early 1800s, the community of Wasauksing originally constituted two villages, known as Niisaakiing (Upper Village) and Nishnaabe-oodenaang (Lower Village), of Ojibwa, Odawa, and Pottawatomi. A third village, Gamiing (Middle Village), was settled in 1880 by additional Ojibwe and Pottawatomi (Wasauksing First Nation Lands and Natural Resources n.d.).

The Wahta Mohawk Territory, west of Bala, was founded in 1881 when the Sulpician Order purchased a block of land in hopes of removing the Mohawk community at Kanesatake in Quebec because of a dispute over land ownership. Ultimately, only about one-fifth of the community consented to move (Smith n.d.).

In the 1830s, many Pottawatomi left the expanding United States to settle in parts of southern Ontario, notably at Walpole Island near Sarnia, Manitoulin Island, and Beausoleil and Christian islands in southern Georgian Bay (First Nations of Simcoe County n.d.). Around 1880, 19 Odawa and Pottawatomi families left Christian Island to settle at Moose Deer Point. The Moose Deer Point Reserve was established in 1917.

The nature of Indigenous settlement size, population distribution, and material culture shifted as European settlers encroached upon Indigenous territory. However, despite this shift, "written accounts of material life and livelihood, the correlation of historically recorded villages to their archaeological manifestations, and the similarities of those sites to more ancient sites have revealed an antiquity to documented cultural expressions that confirms a deep historical continuity to…systems of ideology and thought" (Ferris 2009, 114). As a result, Indigenous peoples have left behind archaeological resources throughout the region which show continuity with past peoples, even if they have not been explicitly recorded in Euro-Canadian documentation.

1.2.3 Euro-Canadian Period

The earliest documented European interaction in the Muskoka District occurred in the early 1600s, first by Etienne Brule, whom Samuel de Champlain sent to live with the Algonquin and Huron over the winter of 1610-1611. In 1615, the Recollet priest Joseph Le Caron and 12 other Frenchmen set out to Huronia along the Ottawa and French rivers route that took them through the north end of Muskoka and along the eastern shore of Georgian Bay. Champlain followed them in the same year when he overwintered with the Huron (Murray 1963). Over the next 65 years, French traders and missionaries followed, taking the Ottawa-French river route and the route that accessed Georgian Bay via the Severn River from Lake Ontario.

Almost a century after the last French missionaries, the British began to show interest in the area. Although knowledge of the Severn River route was widely known in the 1760s, it was not until 1780 that General Frederick Haldimand, Governor of Canada, issued orders for a survey party to follow and survey the route from Lake Ontario along the Toronto portage, Lake Simcoe, and the Severn River (Murray 1963: xlii). Although the survey was fraught with inaccuracies, it did provide the first detailed description of the Severn River. Further exploration occurred in 1788 when Gother Mann made a report on the islands of Georgina Bay, Matchedash Bay, and the Severn River (Murray 1963: xlii). In the spring of 1793, Lieutenant-Governor John Graves Simcoe and a party followed the Toronto route to Georgian Bay, encountering a fur trader named Cowan, who had lived there for 15 years (Murray 1963: xliii).

1.2.3.1 District Municipality of Muskoka

In 1851, Simcoe County annexed the District of Muskoka, and the *Parliamentary Representation Act* of 1853 divided Simcoe County into two ridings (Mika and Mika 1981). Land was made available for settlement under the *Public Lands Act* of 1860, but the settlement was slow until the clearing of Muskoka Road. During the 1850s and 1860s, the government, in attempting to open access to the districts of the north, began the construction of “Colonization Roads” (Ontario Heritage Trust 2018). Muskoka Road was one such colonization road, and construction began in 1858, starting in Washago and going to the interior of Muskoka. The road was completed to Bracebridge by 1861, and by 1863, the road had been completed to the area where Huntsville eventually grew (Murray 1963: lxx). In 1868, the townships in the Muskoka District included Cardwell, Macaulay, Watt, Brunel, Draper, McLean, Muskoka, and Stephenson (Mika and Mika 1981).

1.2.3.2 Town of Bracebridge

Bracebridge, branded as “The Heart of Muskoka,” is located geographically in the centre of Muskoka and is the headquarters for the district government. The community was incorporated as a village in 1875 and a town in 1889. The Bracebridge Public Library service began in 1908 when the original Carnegie building was constructed. The 2,800 square foot Muskoka stone structure was expanded to 8,400 square feet in 1984 with an addition that maintained the heritage character of the building while allowing for improved service and collection space. The Bracebridge Public Library marked 100 years of service to the community during its centennial in 2008.

With the advent of regional government in January 1971, the Town of Bracebridge and the surrounding townships were brought together as one municipality. It encompasses 62,119 hectares and has five wards: Bracebridge, Monck/Muskoka, Macaulay, Draper, and Oakley (Town of Bracebridge 2023b). The naming of Bracebridge has been traced to a postmaster who took the name from the book, “Bracebridge Hall” written by American author Washington Irving.

According to the 2011 Census, the Town’s population is 16,000 (Town of Bracebridge 2023b).

1.2.3.3 Historical Maps

An examination of historical maps was undertaken to understand the historical land use of the study area. When examining 19th century historical mapping, it is important to note that numerous county atlases from that era were primarily created to identify the subscribers’ factories, offices, residences, and landholdings who financially supported their production through subscription fees. Consequently, landowners who chose not to subscribe were often omitted from the maps, leading to their absence in the depicted information (Caston 1997, 100). As a result, the depiction and accuracy of structures on these maps are not always reliable (Gentilcore and Head 1984). Further, a review of historical mapping has inherent inaccuracy due to potential errors in georeferencing. Georeferencing is conducted by assigning spatial coordinates to fixed locations and using these points to spatially reference the remainder of the map. Due to changes in “fixed” locations over time (e.g., road intersections, road alignments, shorelines, etc.), errors/difficulties of scale and the relative idealism of the historical cartography, historical maps may not translate accurately into real space points. This may provide obvious inconsistencies during historical map review.

An examination of the Study Area Overlaid on 1879 *Guide Book & Atlas of Muskoka and Parry Sound Districts* (Page 1879) shows Muskoka Township used the “1,000-acre sectional” system (Figure 4). The Canada Company first introduced the township system in 1835, utilizing a 1,000-acre section system. The company acquired one million acres of unsurveyed land, known as the Huron Tract, from the government, originally purchased from the Six Nations. Each lot in this system was 20 by 50 chains, totalling 100 acres, with additional space for a one-chain wide road at every alternate concession line and every fifth lot line (Weaver 1962). This layout created sections of 1,000 acres each, divided into ten 100-acre lots. The survey lines were in the middle of the allowances for roads. By 1850, this system was adopted for Crown surveys, with the government adding a one-chain road allowance along rivers and lakes. This practice was followed in all subsequent townships, with few exceptions. The 1,000-acre sectional system was widely accepted and used to lay out townships from Georgian Bay to the Ottawa River.

Based on the 1879 map (Page 1879), Lot 6, owned by J. Dixon, includes one historical homestead located greater than 150 metres from the study area. However, a historical transportation route is depicted adjacent to the western limit of the study area.

1.3 Archaeological Context

1.3.1 Natural Environment

The study area is contained within the Number 11 strip physiographic region, as identified by Chapman and Putnam (1984). The Number 11 strip physiographic region, located southeast of Severn Township and north of Ramara Township, is a flat strip of land filled with sediment during the glacial Lake Algonquin phase. As defined by Chapman and Putnam (1984), it is between two bedrock-dominated upland areas, part of the Georgian Bay fringe physiographic region. Three sediment deposits are found here: outwash deposits, glaciolacustrine plain deposits, and subaqueous fan deposits (Chapman and Putnam 1984). These deposits provide sand and gravel resources, although their distribution and quality vary. They mainly consist of stratified sand with varying grain sizes and gravel material in the lower central core of subaqueous fan deposits. Silt and clay are also present in varying amounts.

The Muskoka District forms the southwestern edge of the Canadian Shield, and large-scale soil mapping is unavailable for the Muskoka District. Nevertheless, the general distribution of soils can be interpreted from small-scale soil maps and large-scale quaternary geology maps. Generalized mapping of soil associations in southern Ontario (Hoffman et al. 1964) reveals three dominant soil groups in the Muskoka area: Wendigo, Monteagle, and Magnetawan, with the study area situated in a band of Wendigo loamy sand over rock (Hoffman et al. 1964). In addition to these soils, extensive deposits of organic soils have been mapped in the Muskoka District.

Elevated topography (e.g., eskers, drumlins, large knolls, and plateaux) is considered a feature that indicates archaeological potential. Per the 1981 *Southern Ontario Engineering Geology Terrain Study* (Mollard 1981), the study area and its vicinity do not contain any archaeological features related to elevated topography (Figure 5). The elevation in the study area varies from approximately 255 to 282 metres above sea level. Generally, the topography within the study area and surrounding area descends southwest.

Potable water is an essential resource for any extended human occupation or settlement. Since water sources in southwestern Ontario have remained relatively stable, proximity to potable water is a useful index for evaluating archaeological potential. Distance to water is one of the most used variables for the predictive modelling of archaeological site locations in Ontario. The study area is in the Muskoka River watershed and is crossed by a tributary of the Muskoka River; however, the closest potable and navigable water source is more than 150 metres from the study area.

1.3.2 Registered Archaeological Sites and Previous Archaeological Assessments

In Canada, archaeological sites are registered within the Borden system, a national grid system designed by Charles Borden in 1952 (Borden 1952). The grid covers the entire surface area of Canada and is divided into major units containing an area that is two degrees in latitude by four degrees in longitude. Major units are designated by upper case letters. Each major unit is subdivided into 288 basic unit areas, each containing an area of 10 minutes in latitude by 10 minutes in longitude. The width of basic units reduces as one moves north due to the curvature of the earth. In southern Ontario, each basic unit measures approximately 13.5 kilometres east-west by 18.5 kilometres north-south. In northern Ontario, adjacent to Hudson Bay, each basic unit measures approximately 10.2 kilometres east-west by 18.5 kilometres north-south. Basic units are

designated by lowercase letters. Individual sites are assigned a unique, sequential number as they are registered. These sequential numbers are issued by the MCM, which maintains the *Ontario Archaeological Sites Database*. The study area under review is within Borden Block BhGt.

Information concerning specific site locations is protected by provincial policy and is not fully subject to the *Freedom of Information and Protection of Privacy Act* (Government of Ontario 1990c). The release of such information in the past has led to looting or various forms of illegally conducted site destruction. Confidentiality extends to media capable of conveying location, including maps, drawings, or textual descriptions of a site location. The MCM will provide information concerning site location to the party or an agent of the party holding title to a property or a licensed archaeologist with relevant cultural resource management interests.

An examination of the *Ontario Archaeological Sites Database* has shown that no archaeological sites are registered within a one-kilometre radius of the study area (Government of Ontario 2023b.

A query of the *Ontario Public Register of Archaeological Reports* did not identify any previous archaeological surveys within 50 metres of the study area (Government of Ontario 2023c).

1.3.1 Commemorative Plaques and Cultural Heritage Resources

A query of the Ontario Heritage Trust *Plaque Database* and Government of Ontario *Ontario Heritage Act Register* (Ontario Heritage Trust 2023a, 2023b; Government of Ontario 2023) did not identify any commemorative plaques or cultural heritage resources within 150 metres of the study area. The Town of Bracebridge does not have an online registry of cultural heritage resources (Town of Bracebridge 2023a).

1.3.2 Archaeological Management Plan

The Muskoka *Official Plan*, consolidated in March 2023 (The District Municipality of Muskoka 2023), includes Schedule G – Archaeological Potential, outlining areas with archaeological potential. Based on the Muskoka *Official Plan* (The District Municipality of Muskoka 2023), the study area is identified as having moderate to high archaeological potential. However, it should be noted that the mapping is restricted to identifying such areas based solely on the presence of water source features.

1.4 Existing Conditions

The study area, located at 300 Pine Street, falls within Lot 6, Concession 1 of the Geographic Township of Macaulay, former Muskoka County, now the Town of Bracebridge, District Municipality of Muskoka, Ontario. Situated on the eastern edge of Bracebridge, it lies roughly 14.9 kilometres northeast of Gravenhurst. Spanning approximately 18.21 hectares, the area is mainly covered by dense mixed forest, indicative of its natural vegetation. Notably, an aggregate pit occupies the northwest section of the study area.

2 Field Methods

A desktop Stage 1 archaeological assessment was undertaken to evaluate the archaeological potential of the study area. The Stage 1 archaeological assessment was completed under Project Information Form (PIF) number P390-0404-2023 issued to Ragavan Nithiyanantham, of Stantec, by the MCM. An optional property inspection was not conducted.

3 Analysis and Conclusions

Archaeological potential is established by determining the likelihood that archaeological resources may be present on a subject property. Stantec applied archaeological potential criteria commonly used by the MCM (Government of Ontario 2011) to determine areas of archaeological potential within the region under study. Features and characteristics that indicate the potential for archaeological resources are defined within Section 1.3.1 of the MCM's *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011, 17-18) and include:

- Previously identified archaeological sites.
- Water sources:
    - Primary water sources (lakes, rivers, streams, creeks).
    - Secondary water sources (intermittent streams and creeks; springs; marshes; swamps).
    - Features indicating past water sources (e.g., glacial lake shorelines indicated by the presence of raised gravel, sand, or beach ridges; relic river or stream channels indicated by clear dip or swale in the topography; shorelines of drained lakes or marshes; and cobble beaches).
    - Accessible or inaccessible shoreline (e.g., high bluffs, swamps, or marsh fields by the edge of a lake; sandbars stretching into marsh).
- Elevated topography (eskers, drumlins, large knolls, plateau).
- Pockets of well-drained sandy soil, especially near areas of heavy soil or rocky ground; Distinctive land formations that might have been special or spiritual places, such as waterfalls, rock outcrops, caverns, mounds, and promontories and their bases (there may be physical indicators of their use, such as burials, structures, offerings, rock paintings or carvings).
- Resource areas including:
    - Food or medicinal plants.
    - Scarce raw minerals (e.g., quartz, copper, ochre, or outcrops of chert).
    - Early Euro-Canadian industry (fur trade, mining, logging).
- Areas of Euro-Canadian settlement. These include places of early military or pioneer settlements (e.g., pioneer homesteads, isolated cabins, farmstead complexes), early wharf or dock complexes, pioneer churches and early cemeteries. There may be commemorative markers of their history, such as local, provincial, or federal monuments or heritage parks.
- Early historical transportation routes (e.g., trails, passes, roads, railways, portage routes).
- Property listed on a municipal register or designated under the *Ontario Heritage Act* (Government of Ontario 1990b) or that is a federal, provincial, or municipal historic landmark or site.
- Property that local histories or informants have identified with possible archaeological sites, historical events, activities, or occupations.

Many of the above features of archaeological potential have a buffer assigned to them, extending the zone of archaeological potential beyond the physical feature. Section 1.4 of the MCM's *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011, 20-21) employs the following buffers:

- 300-metre buffer for previously identified archaeological sites, water sources; areas of early Euro-Canadian settlement, or locations identified through local knowledge or informants
- 100-metre buffer for early historical transportation route

If no buffer is present, the potential is restricted to the physical limits or the feature: elevated topography, pockets of well-drained sandy soil, distinctive land formations, and resource areas.

Furthermore, Section 2.1.5 of the MCM's *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011) provides modified buffers that may be used for northern Ontario and Canadian Shield terrain, which apply to the current study area:

- Where the identified feature of archaeological potential is a modern water source, test pitting (Stage 2 archaeological assessment) is required between 0 and 50 metres from the feature. Space test pits at maximum intervals of five metres. Survey is not required beyond 50 metres.
- For features of archaeological potential other than modern water sources (e.g., historical water sources such as glacial shorelines), test pitting (Stage 2 archaeological assessment) is required as follows:
    - Space test pits at maximum intervals of five metres between 0 and 50 metres from the feature of archaeological potential.
    - Space test pits at maximum intervals of 10 metres between 50 and 150 metres from the feature of archaeological potential.
    - Survey is not required beyond 150 metres.

The study area is in the Muskoka River watershed and is crossed by tributaries of the Muskoka River; however, the closest navigable water source is more than 150 metres away.

An examination of the MCM's *Ontario Archaeological Sites Database* did not identify any registered archaeological site in or within 150 metres of the study area (Government of Ontario 2023b). Additionally, a review of the Ontario Heritage Trust *Plaque Database* and Government of Ontario *Ontario Heritage Act Register* (Ontario Heritage Trust 2023a, 2023b; Government of Ontario 2023a) did not identify any commemorative plaques or cultural heritage resources within 150 metres of the study area. The Town of Bracebridge does not have an online registry of cultural heritage resources (Town of Bracebridge 2023).

An examination of historical mapping demonstrates that a 19th century transportation route is adjacent to the study area's western limit.

However, a negative indicator of archaeological potential is extensive and deep land alterations that have severely damaged the integrity of any archaeological resources. This may include quarrying, major landscaping involving grading below topsoil, building footprints, and sewage and infrastructure development. The review of topographic maps and aerial imagery shows notable disturbances in the terrain in the northwest part of the study area linked to quarrying activities (Figure 6). Defining the extent of these

disruptions is challenging based on topographic maps and aerial images alone and would require an on-site property inspection for accurate determination. Furthermore, parts of the study area, located more than 50 metres from a modern water source and 150 metres from features of archaeological potential other than a modern water source, per Section 2.1.5, are considered to have no to low archaeological potential (Figure 7).

When the above-listed criteria are applied, parts of the study area are evaluated to have archaeological potential (Figure 7).

4 Recommendations

Based on the findings presented in this report, Stantec recommends:

1. Lands evaluated as having no or low archaeological potential should be visually inspected to confirm existing ground conditions (Figure 8).
2. Stage 2 archaeological assessment of lands evaluated to have archaeological potential. The Stage 2 archaeological assessment will involve a test pit survey per Section 2.1.5 of the MCM's *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011) (Figure 8):
    - Where the identified feature of archaeological potential is a modern water source, test pitting (Stage 2 archaeological assessment) is required between 0 and 50 metres from the feature. Space test pits at maximum intervals of five metres. Survey is not required beyond 50 metres.
    - For features of archaeological potential other than modern water sources (e.g., historical water sources such as glacial shorelines), test pitting (Stage 2 archaeological assessment) is required as follows:
        - Space test pits at maximum intervals of five metres between 0 and 50 metres from the feature of archaeological potential.
        - Space test pits at maximum intervals of 10 metres between 50 and 150 metres from the feature of archaeological potential.

The MCM is asked to review the results presented and accept this report into the *Ontario Public Register of Archaeological Reports*.

5 Advice on Compliance with Legislation

In accordance with Section 7.5.9 of the MCM's Standards and Guidelines for Consultant Archaeologists (Government of Ontario 2011), the following standard statements are a required component of archaeological reporting and are provided from the MCM's Standards and Guidelines for Consultant Archaeologists (Government of Ontario 2011).

This report is submitted to the Minister of Citizenship and Multiculturalism as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, R.S.O. 1990, c O.18 (Government of Ontario 1990b). The report is reviewed to ensure that it complies with the standards and guidelines that are issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the Ministry of Citizenship and Multiculturalism, a letter will be issued by the ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.

It is an offence under Sections 48 and 69 of the *Ontario Heritage Act* (Government of Ontario 1990b) for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed fieldwork on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Register of Archaeological Reports referred to in Section 65.1 of the *Ontario Heritage Act* (Government of Ontario 1990b).

Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48(1) of the *Ontario Heritage Act* (Government of Ontario 1990b). The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48(1) of the *Ontario Heritage Act* (Government of Ontario 1990b).

The *Funeral, Burial and Cremation Services Act,* 2002, S.O. 2002, c.33 (Government of Ontario 2002), requires that any person discovering or having knowledge of a burial site shall immediately notify the police or coroner. It is recommended that the Registrar of Cemeteries at the Ministry of Public and Business Service Delivery is also immediately notified.

Archaeological sites recommended for further archaeological fieldwork or protection remain subject to Section 48(1) of the *Ontario Heritage Act* (Government of Ontario 1990b) and may not be altered, or have artifacts removed from them, except by a person holding an archaeological licence.

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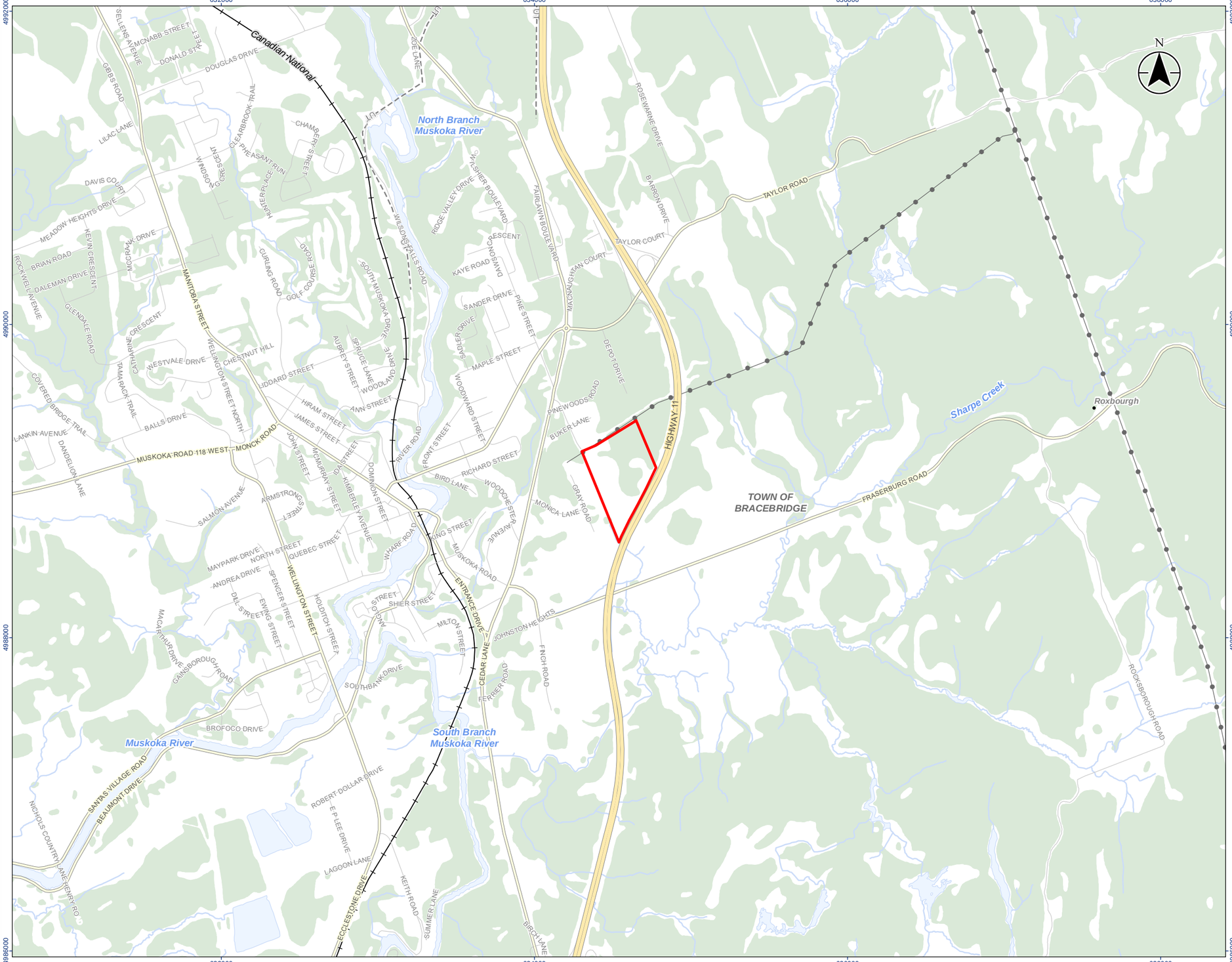
7 Maps

Maps of the Stage 1 archaeological assessment of the study area are provided on the following pages.



Stantec

Legend

- Study Area
- Highway
- Major Road
- Minor Road
- Railway
- Hydro Line
- UT Unknown Transmission Line
- Watercourse
- Municipal Boundary, Lower
- Waterbody
- Wooded Area

0 500 1,000 m

1:25,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2023.

Project Location
Muskoka, ON

140022038 REV1
Prepared by BF on 2023-12-01
Technical Review by DH on 2023-11-08

Client/Project
MUSKOKA ALGONQUIN HEALTHCARE
STAGE 1 ARCHAEOLOGICAL ASSESSMENT: BRACEBRIDGE HOSPITAL - 300 PINE STEET

Figure No.
1

Title
Location of the Project

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Stantec

Legend

Study Area

0 50 100 m

1:4,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
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3. Orthoimagery © First Base Solutions, 2023. Imagery Date, unknown.

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Technical Review by DH on 2023-10-25

Client/Project
MUSKOKA ALGONQUIN HEALTHCARE
STAGE 1 ARCHAEOLOGICAL ASSESSMENT: BRACEBRIDGE HOSPITAL - 300 PINE STREET

Figure No.
2

Title
Location of the Study Area

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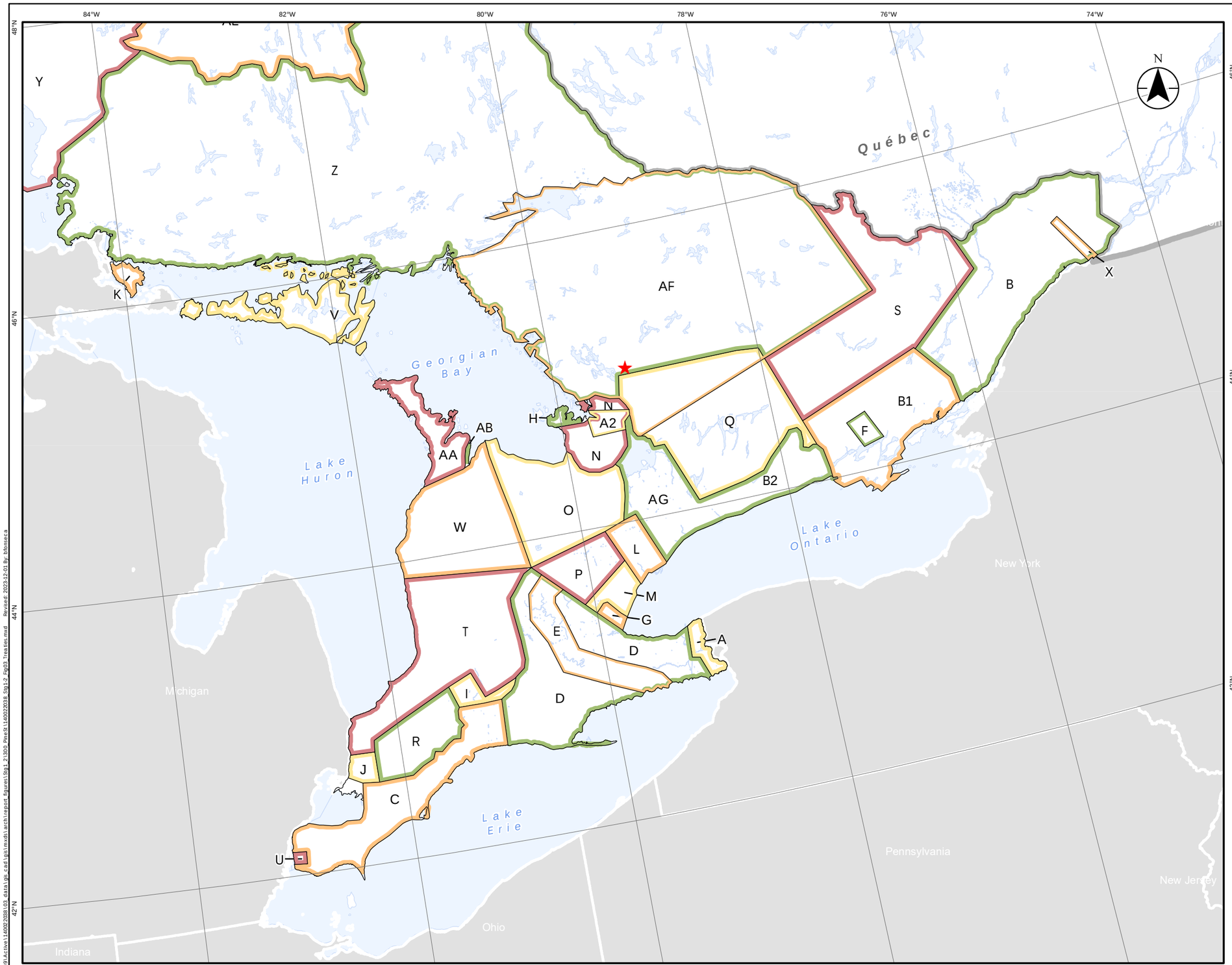

Stantec

Legend

- Study Area
- Waterbody

A	Treaty No. 381, May 9th, 1781 (Mississauga and Chippewa)
AA	Treaty No. 72, October 30th, 1854 (Chippewa)
AB	Treaty No. 82, February 9th, 1857 (Chippewa)
AE	Treaty No. 9, James Bay 1905, 1906 (Ojibway and Cree)
AF	Williams Treaty, October 31st and November 15th, 1923 (Chippewa and Mississauga)
AG	Williams Treaty, October 31st, 1923 (Chippewa)
A2	John Collins' Purchase, 1785 (Chippewa)
B	Crawford's Purchase, October 9th, 1783 (Algonquin and Iroquois)
B1	Crawford's Purchase, October 9th, 1783 (Mississauga)
B2	Crawford's Purchase, 1783, 1787, 1788 (Mississauga)
C	Treaty No. 2, May 19th, 1790 (Odawa, Chippewa, Pottawatomi, and Huron)
D	Treaty No. 3, December 2nd, 1792 (Mississauga)
E	Haldimand Tract: from the Crown to the Mohawk, 1793
F	Tyendinaga: from the Crown to the Mohawk, 1793
G	Treaty No. 3 3/4: from the Crown to Joseph Brant, October 24th, 1795
H	Treaty No. 5, May 22nd, 1798 (Chippewa)
I	Treaty No. 6, September 7th, 1796 (Chippewa)
J	Treaty No. 7, September 7th, 1796 (Chippewa)
K	Treaty No. 11, June 30th, 1798 (Chippewa)
L	Treaty No. 13, August 1st, 1805 (Mississauga)
M	Treaty No. 13A, August 2nd, 1805 (Mississauga)
N	Treaty No. 16, November 18th, 1815 (Chippewa)
O	Treaty No. 18, October 17th, 1818 (Chippewa)
P	Treaty No. 19, October 28th 1818 (Chippewa)
Q	Treaty No. 20, November 5th, 1818 (Chippewa)
R	Treaty No. 21, March 9th, 1819 (Chippewa)
S	Treaty No. 27, May 31st, 1819 (Mississauga)
T	Treaty No. 27½, April 25th, 1825 (Ojibwa and Chippewa)
U	Treaty No. 35, August 13th, 1833 (Wyandot or Huron)
V	Treaty No. 45, August 9th, 1836 (Chippewa and Odawa, "For All Indians To Reside Thereon")
W	Treaty No. 45½, August 9th, 1836 (Saugeen)
X	Treaty No. 57, June 1st, 1847 (Iroquois of St. Regis)
Y	Treaty No. 60, Robinson, Superior, September 7th, 1850 (Ojibwa)
Z	Treaty No. 61, Robinson, Huron, September 9th, 1850 (Ojibwa)

0 50 100 km

1:3,000,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 Statistics Canada Lambert
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2018.
3. Treaty boundaries adapted from Morris 1943 (1964 reprint). For cartographic representation only.

Project Location
Muskoka, ON

140022038 REV1
Prepared by BF on 2023-12-01
Technical Review by DH on 2023-11-08

Client/Project
MUSKOKA ALGONQUIN HEALTHCARE
STAGE 1 ARCHAEOLOGICAL ASSESSMENT: BRACEBRIDGE HOSPITAL - 300 PINE STREET

Figure No.
3

Title
Treaties and Purchases (Adapted from Morris 1943)

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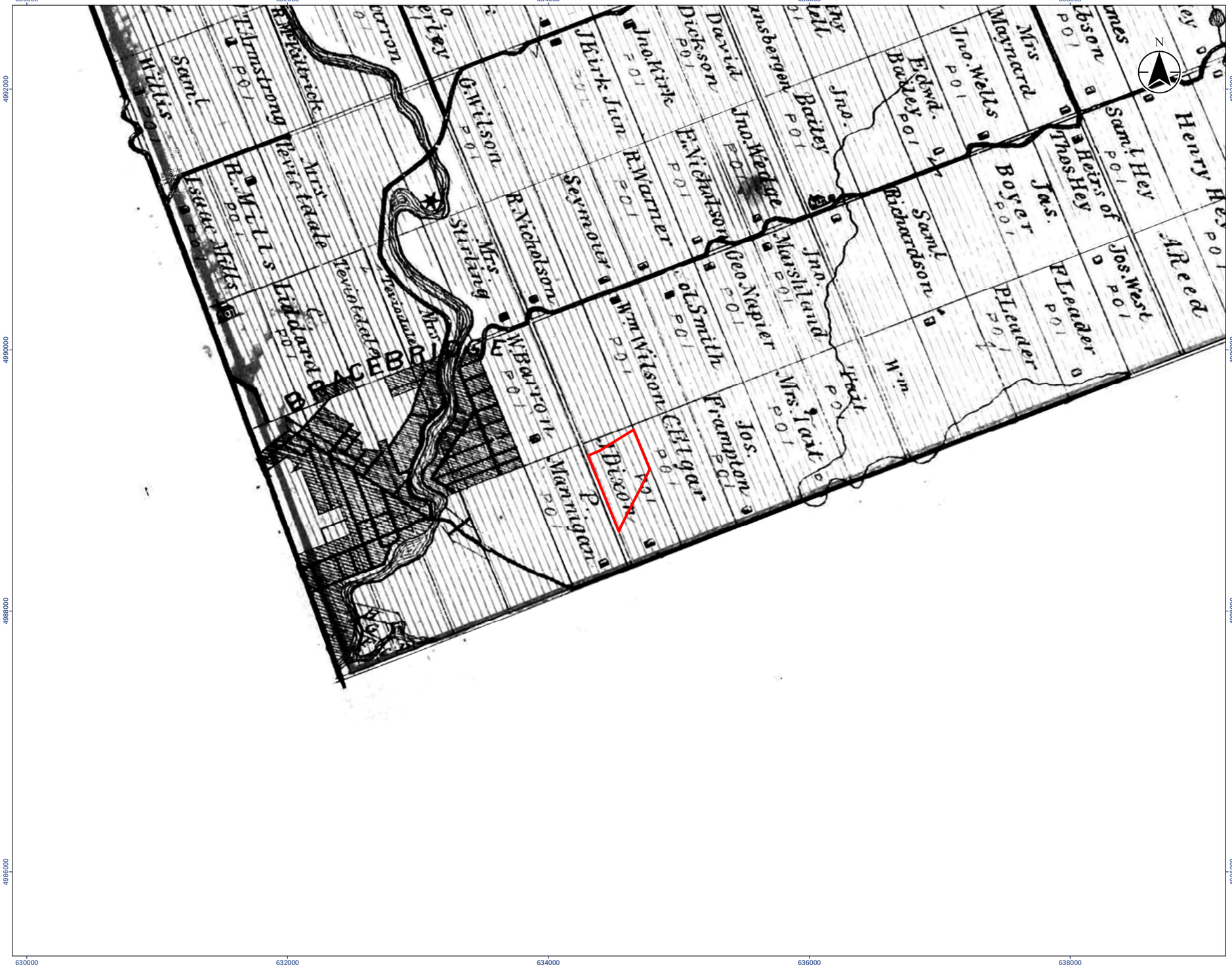
V:\1609\Active\140022038\03_data\gis_cad\gis\mxds\arch\report_figures\Stg1 2\1800 PineSt 140022038 Stg1-2_Fig03_Treaties.mxd Revised: 2023-12-01 By: bfonseca



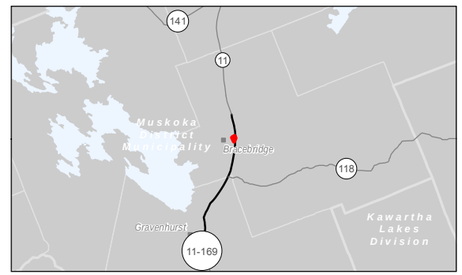
Stantec

Legend

Study Area (Approximate)

Notes

1. Historic image not to scale.
2. Reference: Page, H.R. 1879. Guide Book & Atlas of Muskoka and Parry Sound Districts. Toronto.



Project Location
Muskoka, ON

140022038 REV1
Prepared by BF on 2023-12-01
Technical Review by DH on 2023-10-25

Client/Project
MUSKOKA ALGONQUIN HEALTHCARE
STAGE 1 ARCHAEOLOGICAL ASSESSMENT: BRACEBRIDGE HOSPITAL - 300 PINE STREET

Figure No.
4

Title
Study Area Overlaid on 1879 Guide Book & Atlas of Muskoka and Parry Sound Districts

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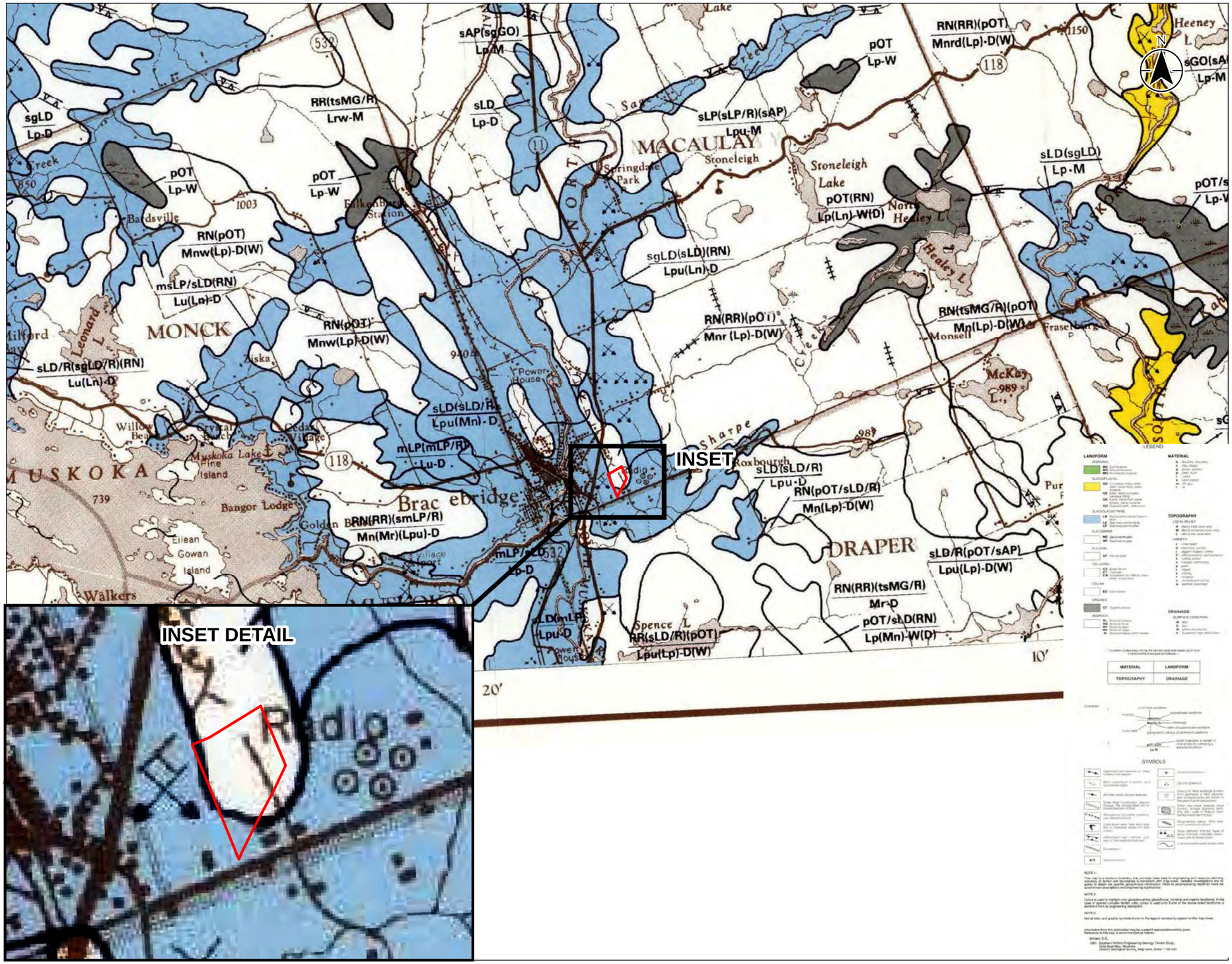

Stantec

Legend

Study Area (Approximate)

Notes

1. Historic image not to scale.
2. Reference: Mollard, D.G. 1981: Southern Ontario Engineering Geology Terrain Study, Data Base Map, Muskoka. Ontario Geological Survey, Map 5504, Scale 1:100 000

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Muskoka, ON

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Prepared by BF on 2023-12-01
Technical Review by DH on 2023-11-24

Client/Project
MUSKOKA ALGONQUIN HEALTHCARE
STAGE 1 ARCHAEOLOGICAL ASSESSMENT: BRACEBRIDGE HOSPITAL - 300 PINE STREET

Figure No.
5

Title
Study Area Overlaid on Muskoka NTS 31E/SW Southern Ontario Engineering Geology Terrain Study

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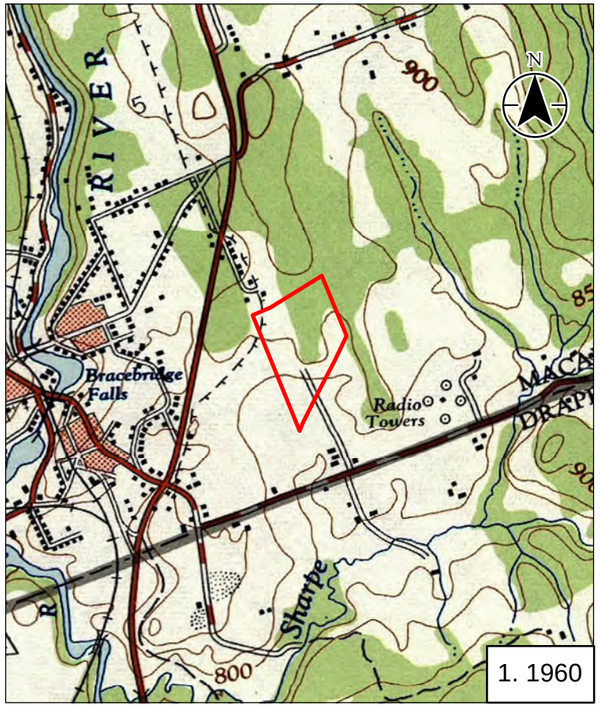
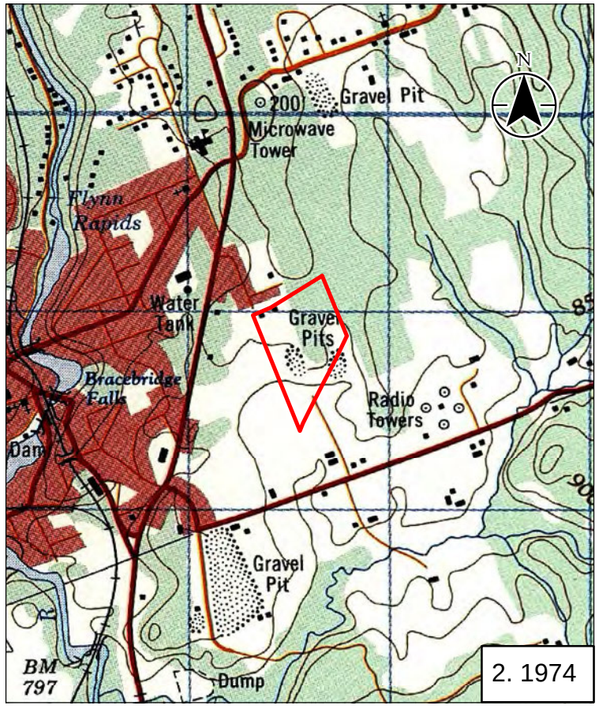
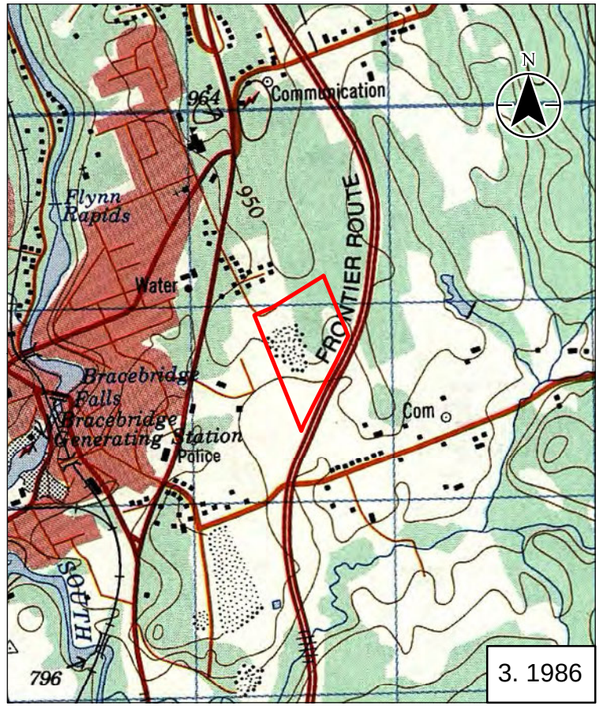
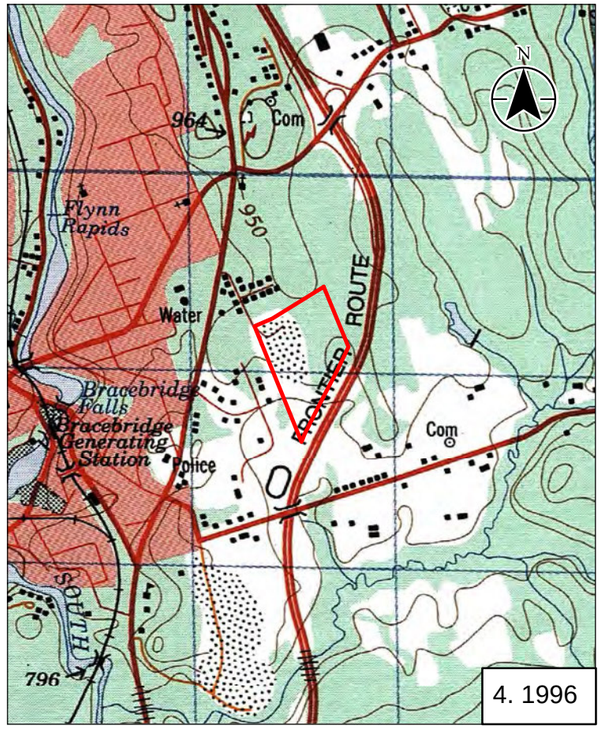
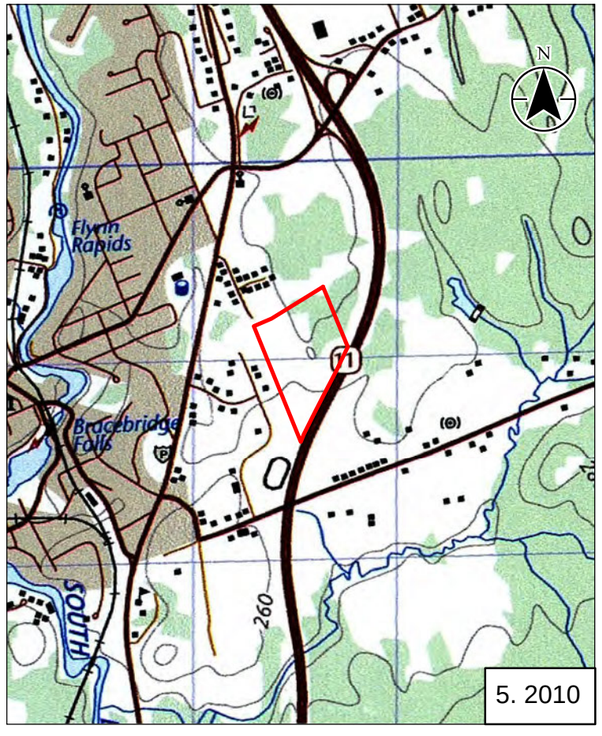










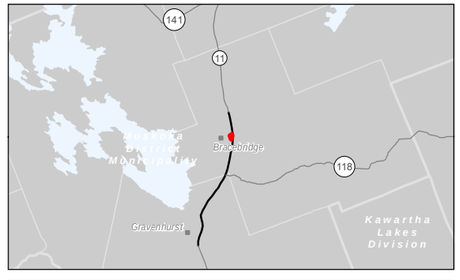
Stantec

Legend

Study Area (Approximate)

Notes

1. Topographic maps not to scale.
2. 1960. Natural Resources Canada (NRCan) / Ministère des Ressources naturelles Canada (RNCan). Bracebridge (East), Ontario. 1:50,000. Map Sheet 031E03, ed. 1, 1960.
3. 1974. Natural Resources Canada (NRCan) / Ministère des Ressources naturelles Canada (RNCan). Bracebridge, Ontario. 1:50,000. Map Sheet 031E03, ed. 2, 1974.
4. 1986. Natural Resources Canada (NRCan) / Ministère des Ressources naturelles Canada (RNCan). Bracebridge, Ontario. 1:50,000. Map Sheet 031E03, ed. 3, 1986.
5. 1996. Natural Resources Canada (NRCan) / Ministère des Ressources naturelles Canada (RNCan). Bracebridge, Ontario. 1:50,000. Map Sheet 031E03, ed. 4, 1996.
6. 2010. Natural Resources Canada (NRCan) / Ministère des Ressources naturelles Canada (RNCan). Bracebridge, Ontario. 1:50,000. Map Sheet 031E03, ed. 5, 2010.



Project Location
Muskoka, ON

140022038 REV1
Prepared by BF on 2023-12-01
Technical Review by DH on 2023-11-09

Client/Project
MUSKOKA ALGONQUIN HEALTHCARE
STAGE 1 ARCHAEOLOGICAL ASSESSMENT: BRACEBRIDGE HOSPITAL - 300 PINE STREET

Figure No.
6

Title
Study Area Overlaid on 20th Century Topographic Maps

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Stantec

Legend

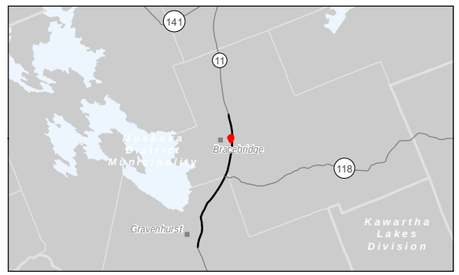
- Study Area
- Historical Farmstead
- Historical Transportation Route
- Archaeological Potential, Stage 2 Archaeological Assessment Recommended
- No or Low Archaeological Potential, Beyond 50 m from Modern Water Sources and 150 m from Features of Archaeological Potential
- No to Low Archaeological Potential, Disturbed

0 50 100 m

1:4,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2023.
3. Orthoimagery © First Base Solutions, 2023. Imagery Date, unknown.



Project Location
Muskoka, ON

140022038 REV1
Prepared by BF on 2023-12-01
Technical Review by DH on 2023-11-14

Client/Project
MUSKOKA ALGONQUIN HEALTHCARE
STAGE 1 ARCHAEOLOGICAL ASSESSMENT: BRACEBRIDGE HOSPITAL - 300 PINE STREET

Figure No.
7

Title
Stage 1 Archaeological Assessment Results

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634000 634400 634800

4989200

4988800

PINE STREET

BUKER LANE

CEDAR LANE

GRAY ROAD

MONICA LANE

HIGHWAY 11

N

Stantec

Legend

Study Area

Assessment Method

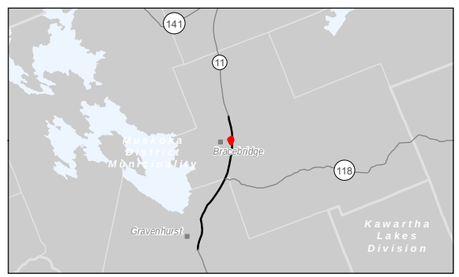
- No to Low Archaeological Potential, Beyond 50 m from Modern Water Sources and 150 m from Features of Archaeological Potential, Visual Inspection Recommended
- Test Pit Survey (5 m), 0 to 50 m from Features of Archaeological Potential
- Test Pit Survey (10 m), 50 to 150 m from Features of Archaeological Potential
- Low to No Archaeological Potential, Disturbed, Visual Inspection Recommended

0 50 100 m

1:4,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2023.
3. Orthoimagery © First Base Solutions, 2023. Imagery Date, unknown.



Project Location
Muskoka, ON

140022038 REV1
Prepared by BF on 2023-12-01
Technical Review by DH on 2023-11-14

Client/Project
MUSKOKA ALGONQUIN HEALTHCARE
STAGE 1 ARCHAEOLOGICAL ASSESSMENT: BRACEBRIDGE HOSPITAL - 300 PINE STREET

Figure No.
8

Title
Stage 1 Archaeological Assessment Results and Recommendations

V:\1069\Active\140022038\03_data\gis_cad\gis\mxds\arch\report_figures\Stg1_2_1300_PineSt\140022038_Stg1-2_Fig08_Recommendations.mxd Revised: 2023-12-01 By: bbrisebois

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Phase I Environmental Site Assessment

300 Pine Street
300 Pine Street, Bracebridge, ON

Prepared for:
Muskoka Algonquin Healthcare

Prepared by:
Stantec
100-300 Hagey Boulevard
Waterloo, ON N2L 0A4

Job No.: 140022038

November 20, 2023

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Executive Summary

Executive Summary

Site Description and Current Operations

Stantec Consulting Ltd. (Stantec) conducted a Phase I Environmental Site Assessment (Phase I ESA) of the property located at 300 Pine Street in Bracebridge, Ontario, hereinafter referred to as the "Site". The Phase I ESA was conducted for Muskoka Algonquin Healthcare (MAHC) in support of redevelopment purposes. The purpose of the Phase I ESA was to assess if evidence of potential or actual environmental contamination exists in connection with the Site, as a result of current or past activities on the Site or neighbouring properties.

The Site is located within an industrial and residential neighbourhood and is currently occupied by a vacant sand pit and undeveloped land.

Records Review

Based on aerial photographs, the Site was vacant and undeveloped with treed areas and agricultural areas until at least 1977. Based on the available aerial photograph from 1977, the Site appeared to be undeveloped with disturbed soils in parts of the western and southern portions of the Site. Based on the available aerial photographs between 1987 to 2022, the Site appears to have been undeveloped with disturbed soils (a sand pit) on the northwest portion of the Site. Based on a review of the Environmental Risk Information Services (ERIS) report the following records were identified for the Site:

- An Environmental Compliance Approval from 2001, 2009, and 2010 for the establishment of stormwater management works, including on-site storm sewers.
- A Certificate of Approval for emissions to the air from an emergency standby diesel generator in 2001. The ECA identifies the location of the generator at the "Pine Street Booster Station, Northwest Side of Intersection of Pine and Maple Streets, Bracebridge, Ontario". Despite being mapped by ERIS as on-site, this location is more than 700 m northwest of the Site and is not considered to represent a potential concern to the Site.

Commercial operations north and west, including historical automotive repair operations at 40 Depot Drive (at least 90 m northeast) and a former retail fuel storage tank at 8 Gray Road (approximately 70 m west) are not considered to represent a potential environmental concern to the Site due to the inferred downgradient locations. Undeveloped, forested land and/or residential properties are also present to the north, east (across Highway 11), and south of the Site.

Site Visit/Interviews

The site visit was conducted by Marissa Lusito, M.Env.Sc., B.Sc.H., of Stantec, on October 18, 2023. The Site and readily visible and publicly accessible portions of adjoining and neighbouring properties were observed for the presence of potential sources of environmental contamination. A Site Representative was not available to complete an interview to obtain or confirm information on the historic operations and activities on the Site.

At the time of the site visit, the Site was vacant and undeveloped, with evidence of a historical sand pit on the northwest portion of the Site.

Conclusions

The Phase I ESA has revealed no evidence of environmental contamination associated with current or historical activities at the Site. No recommendations for further environmental site assessment work are made at this time.

The statements made in this Executive Summary are subject to the same limitations included in the Closure (Section 7.0) and are to be read in conjunction with the remainder of this report.

Phase I Environmental Site Assessment

1.0 General Information

Client Information:
Muskoka Algonquin Healthcare
Andrew Gall
100 Frank Miller Drive
Huntsville, ON P1H 1H7

Project Information:
Bracebridge Hospital
140022038

Site Information:
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300 Pine Street
Bracebridge, ON P1L 1Z5

Consultant Information:
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Phone: (519) 579-4410 **Fax:** (519) 579-6733
E-mail Address:
Site Visit Date:
Report Date: November 12, 2024
Site Assessor: Marissa Lusito, M.Env.Sc., B.Sc.H.
Report Preparer: Marissa Lusito, M.Env.Sc., B.Sc.H.
Senior Reviewer: Randy Sinukoff, M.A.Sc., P.Eng., EP

Site Assessor:

Marissa Lusito, M.Env.Sc., B.Sc.H.
Environmental Assessor

Report Preparer:

Marissa Lusito, M.Env.Sc., B.Sc.H.
Environmental Assessor

Senior Reviewer:

Randy Sinukoff, M.A.Sc., P.Eng., EP
Senior Reviewer

The environmental site assessment and preparation of this report were completed in general accordance with the objectives, requirements or standards of the Canadian Standards Association (CSA) Z768-01 *Phase I Environmental Site Assessment* Standard (R2022).

2.0 Introduction

2.1 Objectives

Stantec Consulting Ltd. (Stantec) conducted a Phase I Environmental Site Assessment (Phase I ESA) of the property located at 300 Pine Street in Bracebridge, Ontario, hereinafter referred to as the "Site". The Phase I ESA was conducted for Muskoka Algonquin Healthcare (MAHC) in support of redevelopment purposes. The purpose of the Phase I ESA was to assess if evidence of potential or actual environmental contamination exists in connection with the Site, as a result of current or past activities on the Site or neighbouring properties.

A site plan is included in **Appendix A** and selected photographs of the Site are included in **Appendix B**.

2.2 Scope of Work

The Phase I ESA carried out by Stantec on this Site was conducted in general accordance with Stantec's Proposal #140022038, dated September 30, 2022, and the Canadian Standards Association's (CSA) *Phase I Environmental Site Assessment* Standard Z768-01 (R2022). The Phase I ESA consisted of the following:

- Records review including, but not limited to, publicly available city directories, aerial photographs, fire insurance plans, geological and topographic maps, provincial government regulatory search;
- Purchase of a database report from Environment Risk Information Services (ERIS) that consisted of a search of available databases within a 250 m radius of the centre of the Site;
- A request to the Ontario Ministry of the Environment, Conservation and Parks (MECP) for documents related to various environmental concerns associated with the Site;
- A request to Technical Standards and Safety Authority for documents related to potential fuel storage equipment associated with the Site;
- A request for city directories for the Site and surrounding properties;
- Review of available environmental databases and records;
- Review of previous environmental reports and existing title searches;
- Interviews with persons having knowledge of the Site;
- A site visit;
- Evaluation of information and preparation of the report provided herein.

A Phase I ESA does not include sampling or testing of air, soil, groundwater, surface water or building materials. For this Phase I ESA, no enhancements to the CSA standard were made.

This assessment did not include a review or audit of operational environmental compliance issues, or of any environmental management systems, which may exist for the Site.

The assessment of the Site for the potential presence of hazardous building materials was based on the age of the building and components, and a non-intrusive visual review of the Site. No sampling of materials was conducted. A Phase I ESA does not constitute a Hazardous Materials Survey or Designated Substances Survey.

The assessment of the Site for microbial contamination and moisture damage was made during the walk through of the building. This assessment was visual only and not every area was assessed. No sampling or intrusive investigation was conducted.

The site visit was conducted by Marissa Lusito, M.Env.Sc., B.Sc.H., of Stantec, on October 18, 2023. The Site and readily visible and publicly accessible portions of adjoining and neighbouring properties were observed for the presence of potential sources of environmental contamination. A Site Representative was not available to complete an interview to obtain or confirm information on the historic operations and activities on the Site.

The professional qualifications of the project team are provided in **Appendix C**.

2.3 Regulatory Framework

CSA Standard Z768-01 (R2022) establishes principles and practices that are applicable to a Phase I ESA. The purpose of a Phase I ESA is to identify actual and potential site contamination. Such identification involves the evaluation and reporting of existing information collected through records review, site visits, and interviews. Phase I ESAs may assist in reducing uncertainty about potential environmental liabilities and may be a basis for further investigation of a property. Phase I ESAs may be used to make informed decisions about property

2.0 Introduction (continued)

2.3 Regulatory Framework (continued)

transactions, to identify certain baseline environmental conditions, to assist in meeting regulatory requirements, and as an initial step in site remediation. This Phase I ESA, however, was not completed for the purposes of meeting the Records of Site Condition requirements described in Ontario Regulation 153/04, as amended.

Because a Phase I ESA does not include such tasks as sample gathering, laboratory testing, or intrusive investigations, a Phase I ESA report can, in most cases, only describe the potential of contamination being present or absent at a property. If there are previous soil or groundwater sample results available, the data can be compared to applicable Federal and/or Provincial numerical standards for soil and groundwater quality for specific land and groundwater uses. A Phase I ESA performed in accordance with the requirements of CSA Standard Z768-01 (R2022) is intended to reduce, but not necessarily eliminate, uncertainty regarding the potential for contamination of a property.

In addition, a Phase I ESA in accordance with the requirements of CSA Standard Z768-01 (R2022) involves a review of any site buildings for the potential presence of hazardous materials related to building components and materials. Specific Federal and/or Provincial regulations, guidelines or codes of practice exist for the individual hazardous materials. Where required, this documentation was used to determine appropriate conclusions and formulate appropriate recommendations.

3.0 Records Review

3.1 Information Sources

The applicable search distance for the records review included the Site, properties immediately adjoining the Site and other neighbouring properties where activities considered to be potential sources of environmental contamination were apparent. Information sources obtained and reviewed as part of the records review are listed below.

SOURCE	INFORMATION/CONTACT
Aerial Photographs	ERIS: 1951, 1993, 2022 The District of Muskoka's Air Photo Catalog: 1969, 1977, 1987, 2008, 2013, and 2018
Fire Insurance Plans	A request was submitted to Opta for fire insurance plans and underwriters' reports for the Site and properties within 250 m of the centre of the Site. No records were available for the Site.
City Directories	A request was made for city directories pertaining to the Site and 10 neighbouring properties, from the following directories: Digital Business Directory - 2012 to 2021
Previous Environmental Reports	"Phase One Environmental Site Assessment - 300 Pine Street, Bracebridge, Ontario" by Golder Associates Ltd., dated November 2015, for Fowler Construction Company Ltd.
Company Records	No company records were made available to Stantec.
Geological and Geotechnical Reports	No previous geological or geotechnical reports were provided to Stantec.
Regulatory Infractions	A request submitted to the MECP's Freedom of Information and Protection of Privacy Office included a search for occurrence reports and general information from the District Office, investigation documents from the Investigations and Enforcement Branch, and orders from the Sector Compliance Branch pertaining to the municipal address of the Site and current/former tenants and owners of the Site.
Reportable Spill Occurrences	ERIS - Ontario Spills
Contaminated Sites	"Inventory of Coal Gasification Plant Waste Sites in Ontario" (April 1987) "Inventory of Industrial Sites Producing or Using Coal Tar and Related Tars in Ontario" (November 1988) ERIS - MECP Brownfield Environmental Site Registry
Hazardous Waste Generator Registration	ERIS - Ontario Regulation 347 Waste Generators Summary
PCB Storage Sites	ERIS - National PCB Inventory database, Ontario Inventory of PCB Storage Sites

3.0 Records Review (continued)

3.1 Information Sources (continued)

SOURCE	INFORMATION/CONTACT
Landfill Records	"Waste Disposal Site Inventory" (June 1991) ERIS - Waste Disposal Sites - MOE CA Inventory, Ontario Regulation 347 Waste Receivers Summary
Underground & Aboveground Storage Tanks	ERIS and Technical Standards and Safety Authority (TSSA) Fuel Storage Tank Databases
Water Well Records	ERIS - Water Well Information System (WWIS)
Other Available Information	"Surficial Geology of Southern Ontario"; Ontario Geological Survey, GIS-based geological map, Data 128-REV, Scale 1:50,000, 2010. "Bedrock Geology of Ontario"; Ontario Geological Survey, GIS-based geological map, Data 126-REV 1, Scale 1:250,000, 2011. ERIS - full database list (erisinfo.com) Topographic mapping available from the Ontario Ministry of Natural Resources and Forestry (MNRF) online mapping accessed October 16, 2023. Geowarehouse, online land registry information, accessed September 27, 2023.
Technical Standards and Safety Authority (TSSA)	A request was made for the Release of Public Information - Fuels Safety Records, on October 18, 2023.

3.2 Previous Reports

Stantec was provided with a previous environmental report entitled, "Phase One Environmental Site Assessment - 300 Pine Street, Bracebridge, Ontario". This report was prepared for Fowler Construction Company Ltd., dated November 2015 by Golder Associates Ltd.

The Phase One ESA was completed in accordance with Ontario Regulation 153/04. It was reported that the southern portion of the Site was historically used for agricultural purposes from at least prior to 1927. The western portion of the Site was redeveloped for commercial aggregate extraction purposes starting in approximately 1980.

At the time of the site visit, on October 27, 2015, the site was undeveloped with evidence of former aggregate extraction activities. No buildings or structures were noted at the Site.

The surrounding properties were reported to have the following land uses:

- North: A Hydro One corridor followed by residential, undeveloped and commercial land. It was reported that Walmart (located at 40 Depot Drive, 90 m northeast) formerly had automotive repair operations at the property.
- East: Highway 11 followed by undeveloped and agricultural properties.
- South: Highway 11 followed by residential and agricultural properties.

3.0 Records Review (continued)

3.2 Previous Reports (continued)

- West: Light industrial and commercial properties, including Hydro One Bracebridge Transmission Station (1 Gray Road, 100 m west), Manion Marine (12 Gray Road, 70 m west), Master Tech Automotive (15 Gray Road, 150 m west), First Canada ULC (23 Gray Road, 150 m west).

Eight potentially contaminating activities (PCAs) were identified within the Phase One Study area, with none of the PCAs resulting in an area of potential environmental concern (APEC) at the Site.

It was reported that a Phase Two ESA was not required based on the conclusion of the report.

3.3 Regulatory Information

Available environmental databases and records were searched to determine if the Site, adjacent or neighbouring properties were listed. The databases and search results are presented below.

MECP Freedom of Information and Privacy Protection Office
A response to a request to the MECP related to various environmental concerns indicated that no records were available for the Site. A copy of the response is included in **Appendix D**.

Technical Standards and Safety Authority (TSSA)
A request was made to TSSA for the release of public records pertaining to fuels safety at the Site. A response to the request was received on November 15, 2023, indicating that no records were available for the Site. A copy of this response is included in **Appendix D**.

Inventory of Coal Gasification Plant Waste Sites in Ontario (dated April 1987)
No properties within 1 km of the Site were listed as former coal gasification sites.

Inventory of Industrial Sites Producing or Using Coal Tars in Ontario (dated November 1988)
No properties within 1 km of the Site were listed as a former coal tar industrial site.

MECP Waste Disposal Site Inventory (dated June 1991)
Based on the coordinates provided in the inventory, no waste disposal sites were identified within 1 km of the Site. The Rosewarne Landfill is located 1.5 km north of the Site.

HWIN Registered Generator List
The ERIS report indicated that neighbouring and/or adjacent properties within 250 m of the Site were listed as hazardous waste generators, these records are discussed in **Section 5.8**. No hazardous waste generator records were listed for the Site.

Ontario Inventory of PCB Storage Sites and National PCB Inventory
The ERIS report indicated that no PCB storage sites were identified for the municipal address of the Site and/or adjacent/neighbouring properties within 250 m of the Site.

MECP Brownfields Environmental Site Registry
The ERIS report indicated that no Records of Site Condition under O.Reg. 153/04 (Part of XV.1 of the Environmental Protection Act) were identified for the municipal address of the Site and/or adjacent/neighbouring properties within 250 m of the Site.

ERIS
An ERIS report was purchased and consisted of a search of available databases within a 250 m radius of the perimeter of the Site. A complete copy of the report is included in **Appendix D**. Relevant listings for the Site are below:

- An Environmental Compliance Approval from 2001, 2009, and 2010 for the establishment of stormwater management works, including on-site storm sewers.
- A Certificate of Approval for emissions to the air from an emergency standby diesel generator in 2001. The ECA identifies the location of the generator at the "Pine Street Booster Station, Northwest Side of Intersection of Pine and Maple Streets, Bracebridge, Ontario". Despite being mapped by ERIS as on-site,

3.0 Records Review (continued)

3.3 Regulatory Information (continued)

this location is more than 700 m northwest of the Site and is not considered to represent a potential concern to the Site.

Relevant listings for adjacent/neighbouring properties within 250 m of the Site presented in the ERIS report are discussed in **Section 5.8**.

Water Well Information System (WWIS) database, searched by ERIS
The ERIS report identified records of 18 wells within a 250 m radius of the centre of the Site, including five located at the Site. The wells at the Site were reportedly installed between 1988 and 1999 and were utilized for domestic water supply. The subsurface conditions generally consisted of sand underlain by clay to a maximum depth of 97.5 m below ground surface (BGS). Bedrock (grey granite) was reportedly encountered in one well at 10.7 m BGS and another well at 81.4 m BGS.

3.4 Physical Setting

3.4.1 Surficial Geology

Based on an available surficial geology map, the native surficial soils at the Site consist of gravel and sand, includes proglacial river and deltaic deposits.

Based on the well records detailed in the ERIS report, the subsurface conditions in the vicinity of the Site generally consisted sand, consistent with the surficial geology mapping, underlain by clay to a maximum investigation depth of 97.5 m BGS.

3.4.2 Surface Water Drainage

The exterior surfaces of the Site mainly consist of an open sand pit on the northwest portion of the Site and vegetated and treed areas on the remainder of the Site. Stormwater on the Site is anticipated to drain by infiltration and/or overland flow.

3.4.3 Topography and Regional Drainage

The Site was observed to have an uneven ground surface at the time of the site visit with an open pit on the northwest portion of the Site.

Based on an available topographic map and the observed site topography, regional surface drainage (and anticipated shallow groundwater flow direction) appears to be to the west and southwest towards the north branch of the Muskoka River located approximately 900 m west of the Site. A tributary of Sharpe Creek is also located approximately 600 m west of the Site.

It should be noted that the direction of the shallow groundwater flow in limited areas can also be influenced by the presence of underground utility corridors and is not necessarily a reflection of regional or local groundwater flow or a replica of the Site or area topography.

3.4.4 Bedrock Geology

Based on an available bedrock geology map, bedrock in the area of the Site consists of migmatitic rocks and gneisses of undetermined protolith, commonly layered biotite gneisses and migmatites, locally includes quartofeldspathic gneisses, orthogneisses, and paragneisses. According to water well records for the Site, depth to bedrock (grey granite) was identified in one well at 10.7 m BGS and in another well at 81.4 m BGS.

4.0 Site Description

4.1 Property Information

The Site is located southeast of Pine Street and northwest of Highway 11, in Bracebridge, Ontario. The Site is located within an industrial and residential neighbourhood as depicted on **Figure No. 2**.

Current Site Owner:	The Corporation of the Town of Bracebridge
Legal Description:	Part Lot 6, Concession 1, Macaulay, Part 1, 35R-3456, except Part 1 to 5, 35R-8356, and Part 1 to 4, 35R-7976; Bracebridge; The District Municipality of Muskoka.
Property Area:	17.8 hectares
Utility Providers:	
Water:	The Site is vacant and is inferred to be not serviced
Storm and Sanitary Sewers:	The Site is vacant and is inferred to be not serviced
Electricity:	The Site is vacant and is inferred to be not serviced
Natural Gas:	The Site is vacant and is inferred to be not serviced

4.2 On-Site Buildings and Structures

No buildings were identified at the site during the site visit.

4.3 Historical Land Use

Historical land use for the Site was determined through historical records listed in Section 3.0. A summary of the historical information is presented below.

Period/Date:	Land Use:
Prior to 1977	Based on aerial photographs, the Site was vacant and undeveloped with treed areas and agricultural areas until the early 1970s, when small disturbed areas are noted on a 1971 aerial photograph included in the Golder Phase One ESA report.
1977 to 1987	Based on the available aerial photograph from 1977, the Site appeared to be undeveloped with disturbed soils in some areas of the western and southern portions of the Site.
1987 to the present	Based on the available aerial photographs between 1987 to 2022, the Site appears to have been undeveloped with disturbed soils (a sand pit) on the northwest portion of the Site.

5.0 Site Visit Findings

5.1 Current Site Operations

The Site is currently undeveloped and vacant. A historical sand pit, which is now vacant, is present on the northwest portion of the Site. A concrete pad was noted on the northwest portion of the Site; this is inferred to be part of the foundation for historical weigh scales used at the former pit.

5.2 Waste Generation and Storage

5.2.1 Solid and Liquid Wastes

No wastewater discharges were identified to be produced on the Site at the time of the site visit. No waste generation (including hazardous) or storage was identified to be conducted on the Site.

5.2.2 Drains, Sumps, Septic Systems and Oil Water Separators

No floor drains, sumps, septic systems, interceptors, or separators were identified on the Site.

5.2.3 Air Discharges and Odours

No sources of air emissions that are suspected to result in residual contamination to the property were identified on the Site. Further, no strong, pungent, or unusual odours were identified during the site visit.

5.3 Fuel and Chemical Storage

5.3.1 Underground Storage Tanks (USTs)

No chemical or fuel storage USTs were identified on the Site. Further, no vent or fill pipes indicating the potential presence of an abandoned or decommissioned UST were observed.

5.3.2 Aboveground Storage Tanks (ASTs)

No chemical or fuel storage ASTs were identified on the Site.

5.3.3 Other Storage Containers

No chemical storage was observed on Site.

5.4 Building Systems/Equipment

5.4.1 Heating and Cooling Systems

No heating or cooling systems are on the Site, as the Site is undeveloped.

5.4.2 Hydraulic Equipment

No hydraulic equipment is on the Site, as the Site is undeveloped.

5.5 Exterior Site Observations

5.5.1 Surface Features

No stained surficial materials or stressed vegetation was observed on the Site. A historical sand pit was identified on the northwest portion of the Site. No watercourses, lagoons or ditches were identified on the Site and no standing water was observed.

5.0 Site Visit Findings (continued)

5.5 Exterior Site Observations (continued)

5.5.2 Fill Materials

No evidence of imported fill materials was observed. The Site generally appears to be at grade with the adjacent roadways and adjoining properties. Therefore, it is unlikely that significant quantities of fill materials were brought onto the Site.

5.5.3 Wells

No abandoned or existing wells (water, oil, gas or disposal) were identified on the Site at the time of the site visit.

5.6 Hazardous Building Materials

5.6.1 Asbestos-Containing Materials (ACMs)

The common use of friable (crumbles easily by hand pressure) asbestos-containing materials (ACMs) in construction generally ceased voluntarily in the mid to late 1970s. Non-friable asbestos-containing products continued to be manufactured, imported and used in Canada until asbestos products were formally banned in December 2018. Asbestos was used in thousands of building products and the common uses of friable ACMs included boiler and pipe insulation, and spray-on fireproofing. Asbestos was also used in many manufactured products such as floor tiles, ceiling tiles, transite cement products and various other construction materials. Vermiculite used as insulation may be contaminated with asbestos fibres.

As the Site is undeveloped, no suspected ACMs were identified on the Site during the site visit.

5.6.2 Polychlorinated Biphenyls (PCBs)

From the 1930s to the 1970s, PCBs were widely used as coolants and lubricants for electrical equipment, including transformers and capacitors, and in a number of industrial materials, including sealing and caulking compounds, inks and paint additives. The use of PCBs was prohibited in heat transfer and electrical equipment installed after September 1, 1977, and in transformers and capacitors installed after July 1, 1980. Regulations now require that PCB containing equipment be taken out of service prior to regulated deadlines.

As the Site is undeveloped, PCBs are not considered to represent a potential environmental concern to the Site.

5.6.3 Lead-Based Materials

In 1976, the lead content in interior paint was limited to 0.5% by weight under the federal Hazardous Products Act. Lead based water supply pipes were used greater than 50 years ago. Between 1930 and 1986, most buildings used copper pipe with lead-solder joints. Other lead-based products include wall shielding (x-ray rooms).

As the Site is undeveloped, no lead-based materials were identified on the Site.

5.6.4 Urea Formaldehyde Foam Insulation (UFFI)

Urea Formaldehyde Foam Insulation (UFFI) was used as an insulation product for existing houses between the mid-1970s and its ban in Canada in 1980. It was not commonly used for commercial or industrial buildings.

As the Site is undeveloped, no UFFI was identified on the Site.

5.6.5 Ozone-Depleting Substances (ODSs)

Refrigeration and air conditioning equipment in place before 1998 may contain refrigerants containing Ozone-Depleting Substances (ODSs). Non-ODS refrigerants have been developed and are available to replace these materials in newer equipment.

5.0 Site Visit Findings (continued)

5.6 Hazardous Building Materials (continued)

5.6.5 Ozone-Depleting Substances (ODSs) (continued)

As the Site is undeveloped, no equipment containing ODSs was identified on the Site.

5.7 Special Attention Items

5.7.1 Radon Gas

Radon is a radioactive gas associated with uranium rich black shale and/or granite bedrock. Radon emits alpha particles and produces several solid radioactive products called radon daughters. Harmful levels of radon and radon daughters can accumulate in confined air spaces, such as basements and crawl spaces.

There are insufficient existing data available to make an accurate assessment of the potential for radon gas issues at this Site. Such conditions would have to be determined by the completion of a study which is beyond the scope of work of this project.

5.7.2 Microbial Contamination (Mould) and Indoor Air Quality

The growth of mould in indoor environments is typically due to a moisture problem related to building envelope or mechanical systems deficiencies or design, and can produce adverse health effects. There is no practical way to eliminate all mould and mould spores in the indoor environment. The way to control mould is to control moisture.

No visual evidence of suspected indoor mould growth was observed on the Site, at the time of the site visit, as no buildings or structures exist.

5.7.3 Electromagnetic Frequencies (EMFs)

Electrical currents induce electromagnetic fields. No scientific data supports definitive answers to questions about the existence or non-existence of health risks related to electromagnetic fields.

The Site is located adjacent to high voltage transmission lines, which are located immediately north of the Site. An electrical substation is located 120 m west of the Site.

5.7.4 Noise and Vibration

The effects of noise and vibration on human health vary according to the susceptibility of the individual exposed, the nature of the noise/vibration and whether exposure occurs in the working environment or in the home.

No major or persistent sources of noise and vibration were identified on the Site at the time of the site visit, other than noise from adjacent roads and highways.

5.8 Neighbouring Property Information

The current activities on neighbouring properties observed at the time of the site visit and a summary of historical information gathered through the records review are presented in the following sections.

<u>North</u>
At the time of the site visit, the properties north of the Site were developed with residential and commercial properties. A summary of the listings in the ERIS report for properties located north of the Site are presented below.

40 Depot Drive (more than 90 m northeast):

- Walmart was listed as a generator of hazardous wastes from 2007 to 2022 for various wastes.
- Walmart was listed as a limited pesticide vendor.

5.0 Site Visit Findings (continued)

5.8 Neighbouring Property Information (continued)

- It was reported in a previous report (Golder, 2015), that Walmart historically performed automotive repair operations.

Given the distance from the Site and inferred groundwater direction (to the west), the historical automotive repair operations at 40 Depot Drive (more than 90 m northeast of the Site) are not expected to represent a potential environmental concern to the Site.

East:

At the time of the site visit, the properties east of the Site were comprised of undeveloped properties and Highway 11.

Given the undeveloped nature of the land east of the Site, no potential environmental concerns were identified east of the Site.

West

At the time of the site visit, the properties west of the Site consisted of light industrial and commercial properties. A summary of the listings in the ERIS report for properties located west of the Site are presented below.

Given the distance from the Site and the inferred groundwater flow direction (to the west), the remaining commercial and industrial operations west of the Site do not represent potential environmental concerns to the Site.

South

At the time of the site visit, the properties south of the Site were comprised of undeveloped and residential properties and Highway 11.

Given the undeveloped nature of the land south of the Site, no potential environmental concerns were identified south of the Site.

5.8 Neighbouring Property Information (continued)

The remaining listings in the ERIS report were not expected to represent potential environmental concerns to the Site based on the distance from the Site and/or the nature of the records.

5.9 Client-Specific Items

No specific client requests were made with respect to this Phase I ESA.

6.0 Conclusions

The Phase I ESA has revealed no evidence of environmental contamination associated with current or historical activities at the Site. No recommendations for additional environmental site assessment work are made at this time.

7.0 Closure

This report documents work that was performed in accordance with generally accepted professional standards at the time and location in which the services were provided. No other representations, warranties or guarantees are made concerning the accuracy or completeness of the data or conclusions contained within this report, including no assurance that this work has uncovered all potential liabilities associated with the identified property.

This report provides an evaluation of selected environmental conditions associated with the identified portion of the property that was assessed at the time the work was conducted and is based on information obtained by and/or provided to Stantec at that time. There are no assurances regarding the accuracy and completeness of this information. All information received from the client or third parties in the preparation of this report has been assumed by Stantec to be correct. Stantec assumes no responsibility for any deficiency or inaccuracy in information received from others.

The opinions in this report can only be relied upon as they relate to the condition of the portion of the identified property that was assessed at the time the work was conducted. Activities at the property subsequent to Stantec's assessment may have significantly altered the property's condition. Stantec cannot comment on other areas of the property that were not assessed.

Conclusions made within this report consist of Stantec's professional opinion as of the time of the writing of this report and are based solely on the scope of work described in the report, the limited data available and the results of the work. They are not a certification of the property's environmental condition. This report should not be construed as legal advice.

This report has been prepared for the exclusive use of the client identified herein and any use by any third party is prohibited. Stantec assumes no responsibility for losses, damages, liabilities or claims, howsoever arising, from third party use of this report.

This report is limited by the following:

- *A Site Representative was not available to complete an interview regarding operations at the Site at the time of issuing this report.*

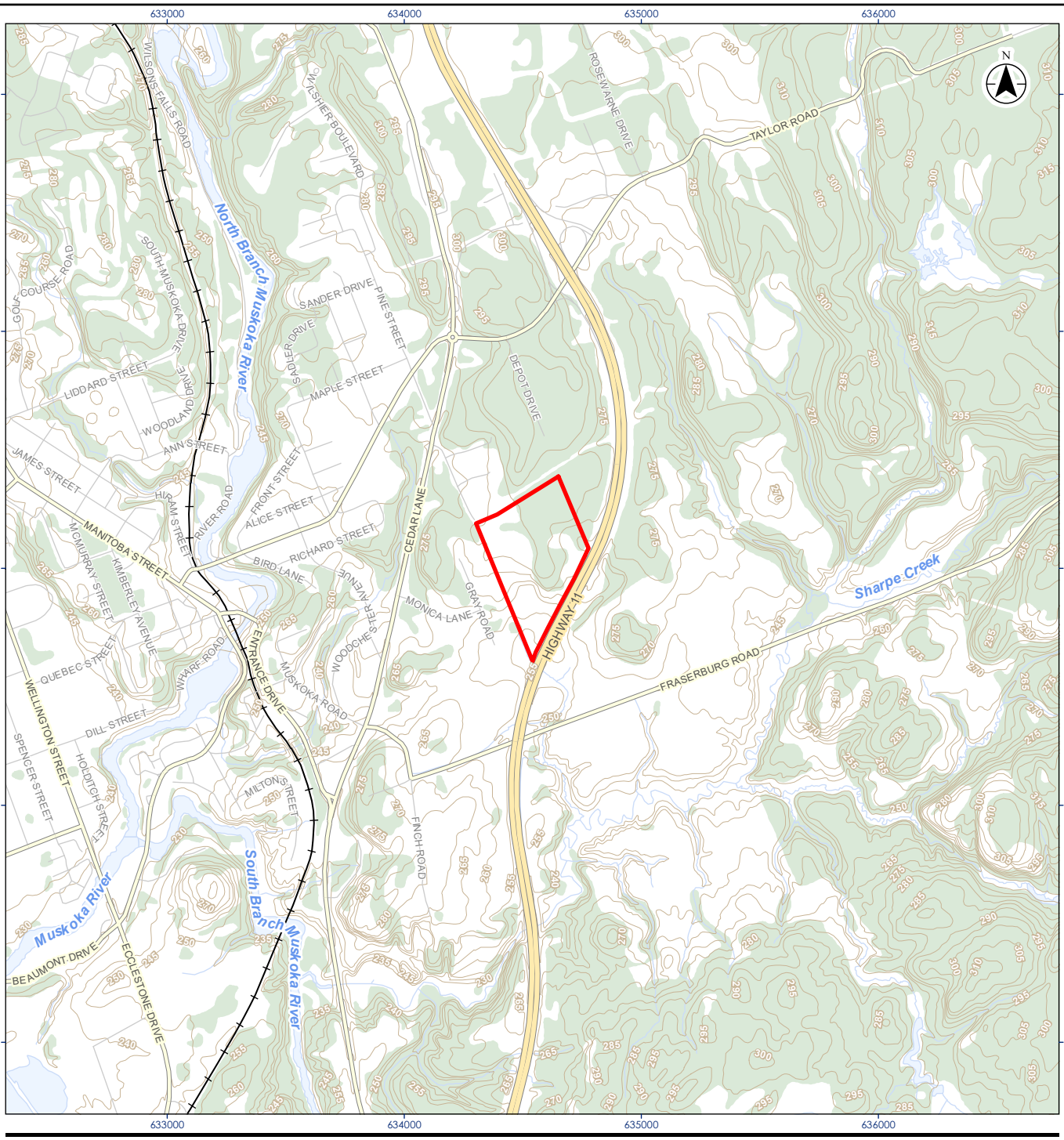
The locations of any utilities, buildings and structures, and property boundaries illustrated in or described within this report, if any, including pole lines, conduits, water mains, sewers and other surface or sub-surface utilities and structures are not guaranteed. Before starting work, the exact location of all such utilities and structures should be confirmed and Stantec assumes no liability for damage to them.

The conclusions are based on the site conditions encountered by Stantec at the time the work was performed at the specific testing and/or sampling locations, and conditions may vary among sampling locations. Factors such as areas of potential concern identified in previous studies, site conditions (e.g., utilities) and cost may have constrained the sampling locations used in this assessment. In addition, analysis has been carried out for only a limited number of chemical parameters, and it should not be inferred that other chemical species are not present. Due to the nature of the investigation and the limited data available, Stantec does not warrant against undiscovered environmental liabilities nor that the sampling results are indicative of the condition of the entire site. As the purpose of this report is to identify site conditions which may pose an environmental risk; the identification of non-environmental risks to structures or people on the site is beyond the scope of this assessment.

Should additional information become available which differs significantly from our understanding of conditions presented in this report, Stantec specifically disclaims any responsibility to update the conclusions in this report.
This report was prepared by Marissa Lusito, M.Env.Sc., B.Sc.H., and reviewed by Randy Sinukoff, M.A.Sc., P.Eng.

Appendix A

Site Plans



Notes
1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Northern Development, Mines, Natural Resources and Forestry © Queen's Printer for Ontario, 2023.
3. This figure is to be viewed in the context of the accompanying report and is subject to the limitations specified in that report.
4. m AMSL - metres above mean sea level.

Legend
- Site Boundary (Approximate)
- Topographic Contour (m AMSL)
- Expressway / Highway
- Major Road
- Minor Road
- Railway - Operational
- Watercourse
- Waterbody
- Wooded Area

0 500 1,000 metres

1:25,000 (at original document size of 8.5x11)

Stantec

Project Location
Bracebridge, Ontario

140022038
Prepared by GB on 2023-09-28

Client/Project
PHASE I ENVIRONMENTAL SITE ASSESSMENT
300 PINE STREET, BRACEBRIDGE, ON

Figure No.
1

Title
Site Location

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Legend

Site Boundary (Approximate)

0 50 100 m

1:4,000 (At original document size of 11x17)

Notes

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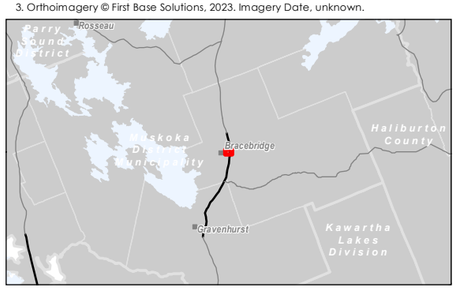

Project Location
Braceridge, ON

140022038 REV1
Prepared by GB on 2023-11-17
Technical Review by DH on 2023-08-09

Client/Project
PHASE I ENVIRONMENTAL SITE ASSESSMENT
300 PINE STREET, BRACEBRIDGE, ONTARIO

Figure No.
2

Title
Surrounding Land Use

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\\Corp.stfs\data\Virtual Workspace\workgroup\169FA.dir\v1\140220238\03 data\gis_cad\gis\mxd\remediation\report figures\esapi\r309\final\140222038 esapi Fig02 landuse.mxd Revised: 2023-11-17 By: gbury

Appendix B

Photographs

View of the entrance to the Site at the northwest boundary, facing south

View of foundations for the historical weigh scales on the northwest portion of the Site, facing northeast

View of the historical sand pit on the northwest portion of the Site, facing east

View of the sand pit on the northwest portion of the Site, facing southeast

View of the western portion of the Site, facing south

View of the west-central portion of the Site, facing north

View of the southern portion of the Site, facing south

View of the southern portion of the Site, facing east

Appendix C

Assessor Qualifications

Randy Sinukoff M.A.Sc., P.Eng., EP, EP(CEA), EP(EMSLA), QP$_{ESA}$

Senior Associate, National Technical Leader Facility Compliance and Auditing

37 years of experience · Markham, Ontario

Randy is a professional chemical engineer specializing in site assessment and remediation, hazard analysis and due diligence reviews, regulatory compliance, management systems, auditing and verifications, and sustainability. He has three Environmental Professional designations, most relevant in Site Assessment and Reclamation. Randy has performed the project management and senior technical evaluation functions for over 5000 projects, large and small, including those in all levels of government, real estate development, due diligence and risk management, chemical manufacturing and distribution, power generation and transmission, pipelines, transportation, construction, insurance, mining, and telecommunications. He has been the Qualified Person obtaining more than 23 Records of Site Condition for a wide cross-section of property uses in Ontario. Randy was heavily involved in the development of the Phase I ESA (Z768) and Phase II ESA (Z769) standards for the Canadian Standards Association (CSA) and is part of the Canadian Mirror Committee advising the International Organization for Standardization (ISO) and CSA on technical matters for environmental site assessment, environmental management and auditing.

EDUCATION

Master of Applied Science, Chemical Engineering, University of Toronto, Toronto, Ontario, Canada, 1984

Bachelor of Applied Science, Chemical Engineering, University of Toronto, Toronto, Ontario, Canada, 1982

REGISTRATIONS

Environmental Professional (Site Assessment and Reclamation); Environmental Management Systems Lead Auditor; Compliance Environmental Auditor #21379, Canadian Environmental Certification Approvals Board

Professional Engineer #42688705, Professional Engineers Ontario

PROJECT EXPERIENCE

Phase I and II ESAs, Risk Assessments and Records of Site Condition, North Maple Regional Park | City of Vaughan | Vaughan, Ontario, Canada | 2016-present | Project Leader/Qualified Person

Completion of ESAs, risk assessments and obtaining three Records of Site Condition under Ontario Regulation 153/04 for this 62 ha area former City of Toronto leaf composting facility for use of the property as public parkland. The initial RSC was obtained in 2018, and ESAs and risk assessments are ongoing to obtain two additional RSCs adjacent to a landfill site to expand the existing park. Randy is the project manager and Qualified Person overseeing completion of the Phase One and Two ESAs, and the Records of Site Condition, and is working closely with the QPRA on the risk assessments.

Phase I and II ESAs, and Records of Site Condition, Lawrence Heights Revitalization | Toronto Community Housing and City of Toronto | Toronto, Ontario, Canada | 2016-2019 | Project Leader/Qualified Person

Project Lead and Qualified Person for Stantec team to complete seven Phase I ESAs and RSCs, plus one Phase Two ESA to facilitate the redevelopment of lands associated with the redevelopment of Lawrence Heights. Randy worked with Toronto Community Housing and City of Toronto to organize RSCs which allowed realignment of roadways, transfer of lands between owners, and construction of new residential community housing and condominiums.

Environmental, Geotechnical and Engineering Pre-Purchase Due Diligence Assessment | Confidential Client | Hamilton, Ontario, Canada | 2020 | Project Manager, Primary Client Contact, Environmental Lead

Led the Stantec technical team (environmental, geotechnical, utilities, rail, structural, building conditions) to provide baseline due diligence assessment and recommendations for proposed purchase and redevelopment of >300 ha industrial property.

Environmental Compliance Reviews | Toronto Transit Commission | Toronto, Ontario, Canada | 2018-2020 | Lead Assessor/Advisor

Performed monthly compliance and contamination inspections and evaluation of construction contractor compliance to environmental regulations and project environmental management procedures at the McNicoll Bus Garage construction site for the Toronto Transit Commission. Work included advice on excess soils.

Marissa Lusito

Intermediate Environmental Assessor
4 years of experience · Whitby, Ontario

Marissa has four years of consulting experience related to the completion of environmental site assessment projects, including conducting and coordinating Phase I and Phase II Environmental Site Assessments and associated remediation programs. Recently, she has gained experience completing Assessments of Past Uses as per Excess Soil Regulation 406/19 requirements. Marissa has participated in soil, groundwater, and surface water sampling programs and has contributed to contaminated soil and groundwater remediation programs. She holds a Master of Environmental Science (M.Env.Sc.) from the University of Toronto and an Honours Bachelor of Science (B.Sc.H. - Biology) from Queen's University.

EDUCATION

Honours Bachelor of Science, Queen's University, Kingston, Ontario, Canada, 2016

Master of Environmental Science, University of Toronto, Toronto, Ontario, Canada, 2017

CERTIFICATIONS & TRAINING

Certificate, POST 2021 LEVEL 1 - BBS - Orientation and Test, Whitby, Ontario, Canada, 2021

PROJECT EXPERIENCE

ASBESTOS, LEAD BASED PAINT, AND HAZARDOUS MATERIAL (MERCURY, PCB) ASSESSMENTS

Culvert and Bridge Hazardous Materials Assessments* | Ontario Ministry of Transportation | Niagara Falls, Ontario | 2020 | Project Coordinator

Overseeing fieldwork, including organizing subcontractors, field technicians, and the necessary equipment. Compiling and reviewing laboratory results. Writing of the hazardous materials assessment report.

ENVIRONMENTAL SITE REMEDIATION

Phase II ESA and Remediation of Cyanide in Soil* | Oakville, Ontario | 2020-2021 | Project Coordinator, Environmental Scientist

Coordination of field staff and subcontractors to complete fieldwork for the Phase II ESA and soil remediation. Ordered and organized the necessary equipment and supplies. Arranged for the required analysis of samples with the laboratory. Contributed to the writing of the Phase II ESA and remediation reports.

Monthly Groundwater Monitoring* | Oshawa, Ontario | 2017-2020 | Project Coordinator

Perform monthly groundwater monitoring at a site with on-going in-situ remediation efforts. Draft quarterly reports based on the groundwater analytical results.

Groundwater Remediation* | Toronto, Ontario | 2017 | Environmental Scientist

Monitor the collection and removal of groundwater contaminated with volatile organic compounds from a historical dry cleaning facility.

ENVIRONMENTAL SITE ASSESSMENTS PHASE I, II, III

Phase I ESA Portfolio for Metrolinx* | Toronto, Ontario | 2021 | Project Coordinator

Completion of a review of current and historical environmental records. Coordination of site inspections with site assessors and the client. Composition of ten Phase I ESA reports in accordance with Ontario Regulation 153/04.

Assessment of Past Uses for Watermain Realignment* | Oshawa, Ontario | 2021 | Environmental Scientist

Review of environmental records for the site and surrounding properties. Completion of a site inspection and interview with the site owners. Production of an Assessment of Past Uses to the requirements of Ontario Regulation 406/19.

Phase I and II ESA and Transformer Removal* | Oshawa, Ontario, Canada | 2020-2021 | Project Coordinator

Participation in the site assessment for the Phase I ESA. Coordination of the fieldwork and composition of the Phase II ESA report. Supervision of the removal of two pad mounted transformers and verification soil sampling.

Phase I and II ESA and Record of Site Condition* | Oshawa, Ontario | 2018-2020 | Project Coordinator

Execution of the Phase I and II ESAs, including a records review, Site visit, soil and groundwater sampling, delineation of impacted surficial soil, and writing of the reports. Assist with the filing of a Record of Site Condition for the property.

Phase II ESA and Removal of Cyanide-Impacted Soil* | Oakville, Ontario | 2020-2021 | Project Coordinator

Organization of field staff and subcontractors contributing to the fieldwork for the Phase II ESA and impacted soil removal program. Arrange for the necessary equipment and supplies and for the required analysis of samples with

** denotes projects completed with other firms*

the laboratory. Support the writing of the Phase II ESA and remediation reports.

Phase I ESA Portfolio* | Toronto, Ontario | 2018 | Environmental Scientist

Inspect several commercial and light industrial facilities and interview site owners on the property uses. Compile relevant environmental information regarding the sites from various records. Composition of Phase I ESA reports for due diligence purposes.

** denotes projects completed with other firms*

Appendix D

Supporting Documentation

DATABASE REPORT

Project Property:	*MHAC* *300 Pine Street* *Bracebridge ON P1L 1Z5*
Project No:	*140022038*
Report Type:	*RSC Report - Quote*
Order No:	*23100200574*
Requested by:	*Stantec Consulting Ltd.*
Date Completed:	*October 5, 2023*

Environmental Risk Information Services
A division of Glacier Media Inc.
1.866.517.5204 | info@erisinfo.com | erisinfo.com

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Executive Summary

Property Information:

Project Property:	*MHAC* *300 Pine Street Bracebridge ON P1L 1Z5*
Project No:	*140022038*

Order Information:

Order No:	*23100200574*
Date Requested:	*October 2, 2023*
Requested by:	*Stantec Consulting Ltd.*
Report Type:	*RSC Report - Quote*

Historical/Products:

Aerial Photographs	*Aerials - National Collection*
City Directory Search	*CD - Subject Site plus 10 Adjacent Properties*
ERIS Xplorer	*ERIS Xplorer*
Insurance Products	*Fire Insurance Maps/Inspection Reports/Site Plans*
Topographic Map	*RSC Maps*

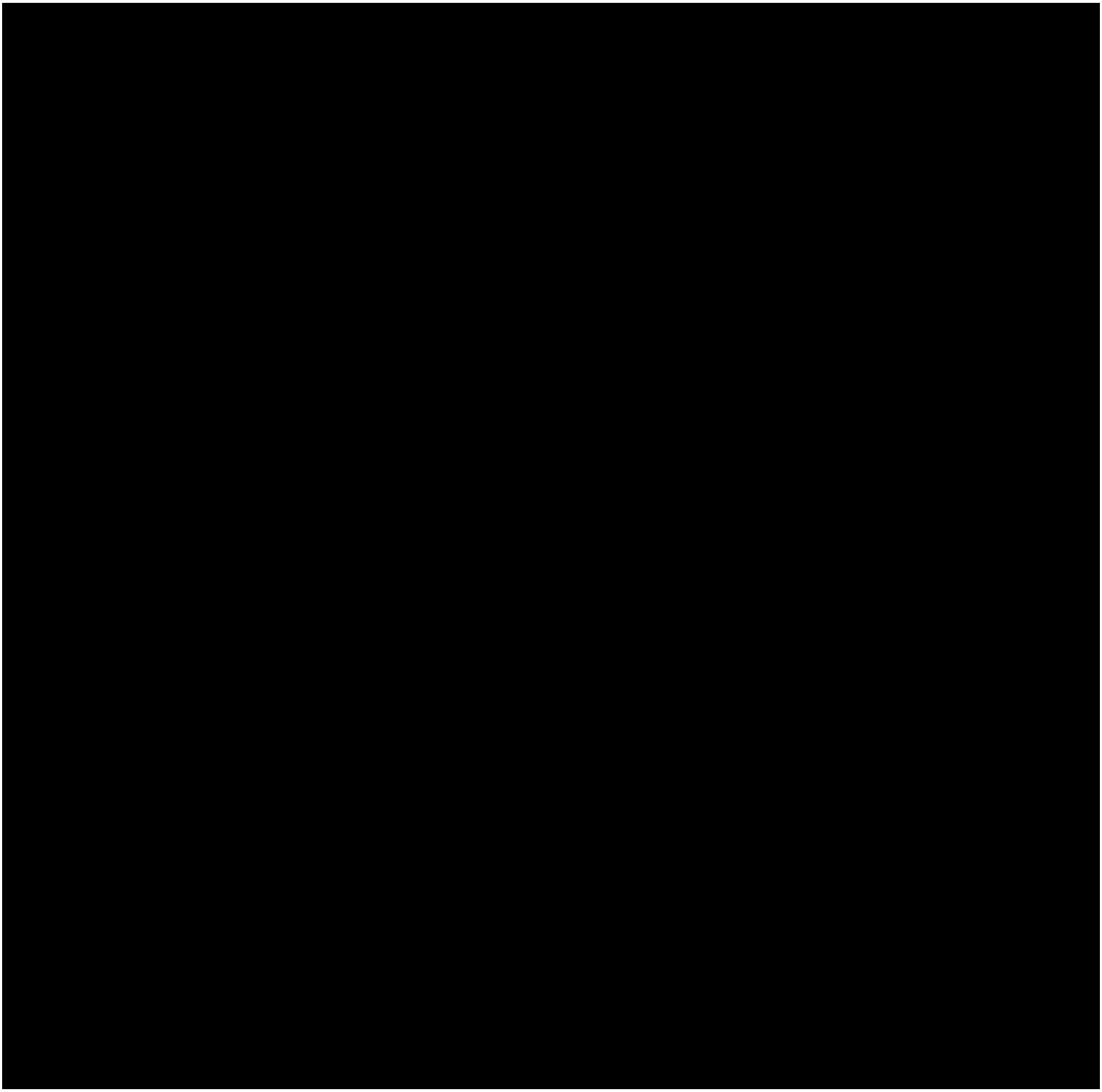
Executive Summary: Report Summary

Database	Name	Searched	Project Property	Boundary to 0.30km	Total
AAGR	Abandoned Aggregate Inventory	Y	0	0	0
AGR	Aggregate Inventory	Y	0	0	0
AMIS	Abandoned Mine Information System	Y	0	0	0
ANDR	Anderson's Waste Disposal Sites	Y	0	0	0
AST	Aboveground Storage Tanks	Y	0	0	0
AUWR	Automobile Wrecking & Supplies	Y	0	0	0
BORE	Borehole	Y	0	0	0
CA	Certificates of Approval	Y	0	2	2
CDRY	Dry Cleaning Facilities	Y	0	0	0
CFOT	Commercial Fuel Oil Tanks	Y	0	0	0
CHEM	Chemical Manufacturers and Distributors	Y	0	0	0
CHM	Chemical Register	Y	0	0	0
CNG	Compressed Natural Gas Stations	Y	0	0	0
COAL	Inventory of Coal Gasification Plants and Coal Tar Sites	Y	0	0	0
CONV	Compliance and Convictions	Y	0	0	0
CPU	Certificates of Property Use	Y	0	0	0
DRL	Drill Hole Database	Y	0	0	0
DTNK	Delisted Fuel Tanks	Y	0	2	2
EASR	Environmental Activity and Sector Registry	Y	0	1	1
EBR	Environmental Registry	Y	0	2	2
ECA	Environmental Compliance Approval	Y	6	4	10
EEM	Environmental Effects Monitoring	Y	0	0	0
EHS	ERIS Historical Searches	Y	1	9	10
EIIS	Environmental Issues Inventory System	Y	0	0	0
EMHE	Emergency Management Historical Event	Y	0	0	0
EPAR	Environmental Penalty Annual Report	Y	0	0	0
EXP	List of Expired Fuels Safety Facilities	Y	0	0	0
FCON	Federal Convictions	Y	0	0	0
FCS	Contaminated Sites on Federal Land	Y	0	0	0
FOFT	Fisheries & Oceans Fuel Tanks	Y	0	0	0
FRST	Federal Identification Registry for Storage Tank Systems (FIRSTS)	Y	0	0	0
FST	Fuel Storage Tank	Y	0	1	1
FSTH	Fuel Storage Tank - Historic	Y	0	0	0
GEN	Ontario Regulation 347 Waste Generators Summary	Y	0	90	90
GHG	Greenhouse Gas Emissions from Large Facilities	Y	0	0	0
HINC	TSSA Historic Incidents	Y	0	1	1

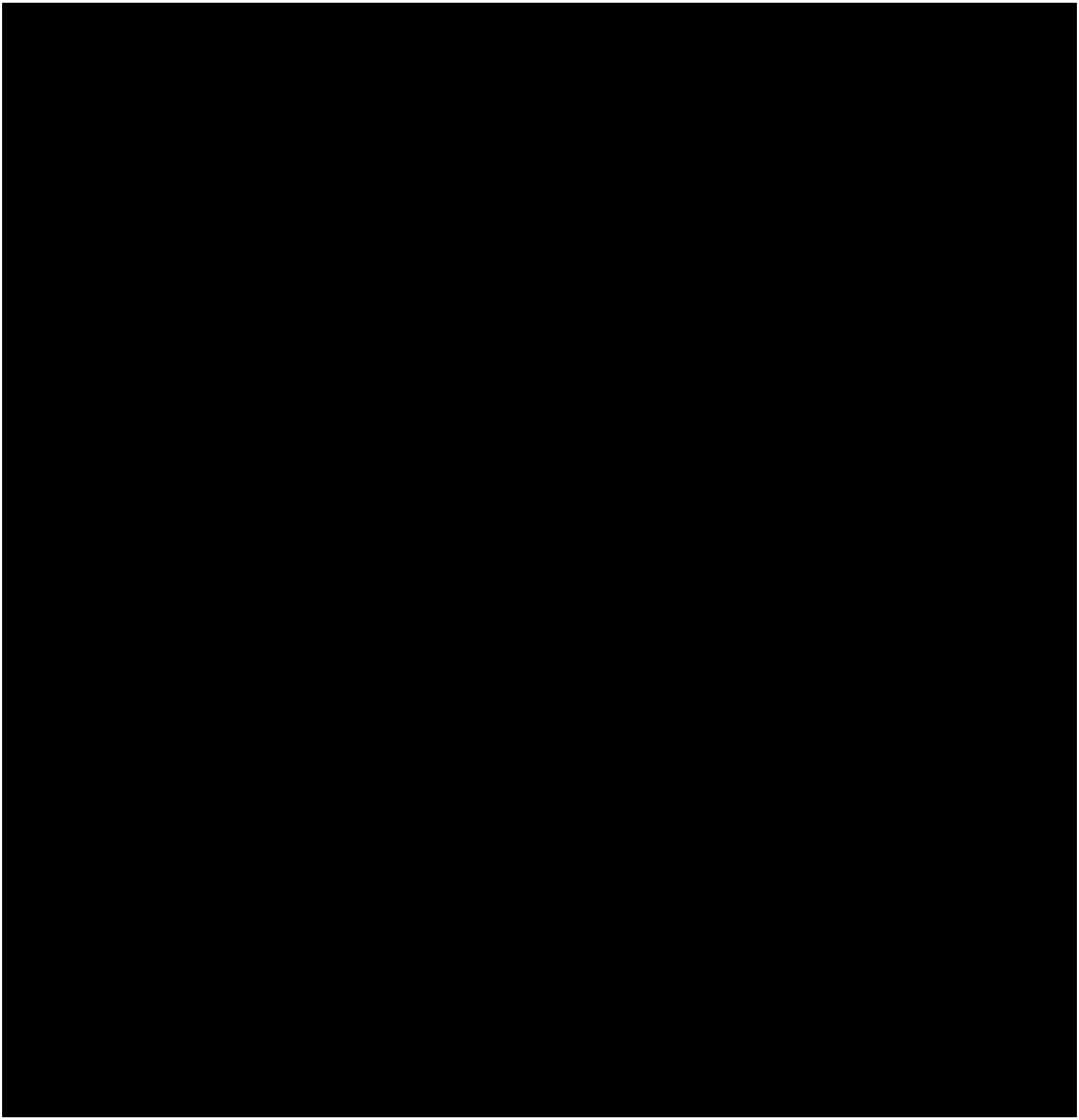
Database	Name	Searched	Project Property	Boundary to 0.30km	Total
IAFT	Indian & Northern Affairs Fuel Tanks	Y	0	0	0
INC	Fuel Oil Spills and Leaks	Y	0	0	0
LIMO	Landfill Inventory Management Ontario	Y	0	0	0
MINE	Canadian Mine Locations	Y	0	0	0
MNR	Mineral Occurrences	Y	0	1	1
NATE	National Analysis of Trends in Emergencies System (NATES)	Y	0	0	0
NCPL	Non-Compliance Reports	Y	0	0	0
NDFT	National Defense & Canadian Forces Fuel Tanks	Y	0	0	0
NDSP	National Defense & Canadian Forces Spills	Y	0	0	0
NDWD	National Defence & Canadian Forces Waste Disposal Sites	Y	0	0	0
NEBI	National Energy Board Pipeline Incidents	Y	0	0	0
NEBP	National Energy Board Wells	Y	0	0	0
NEES	National Environmental Emergencies System (NEES)	Y	0	0	0
NPCB	National PCB Inventory	Y	0	0	0
NPR2	National Pollutant Release Inventory 1993-2020	Y	0	0	0
NPRI	National Pollutant Release Inventory - Historic	Y	0	0	0
OGWE	Oil and Gas Wells	Y	0	0	0
OOGW	Ontario Oil and Gas Wells	Y	0	0	0
OPCB	Inventory of PCB Storage Sites	Y	0	0	0
ORD	Orders	Y	0	0	0
PAP	Canadian Pulp and Paper	Y	0	0	0
PCFT	Parks Canada Fuel Storage Tanks	Y	0	0	0
PES	Pesticide Register	Y	0	3	3
PFCH	NPRI Reporters - PFAS Substances	Y	0	0	0
PFHA	Potential PFAS Handers from NPRI	Y	0	0	0
PINC	Pipeline Incidents	Y	0	0	0
PRT	Private and Retail Fuel Storage Tanks	Y	0	0	0
PTTW	Permit to Take Water	Y	0	0	0
REC	Ontario Regulation 347 Waste Receivers Summary	Y	0	0	0
RSC	Record of Site Condition	Y	0	0	0
RST	Retail Fuel Storage Tanks	Y	0	2	2
SCT	Scott's Manufacturing Directory	Y	0	11	11
SPL	Ontario Spills	Y	0	3	3
SRDS	Wastewater Discharger Registration Database	Y	0	0	0
TANK	Anderson's Storage Tanks	Y	0	0	0
TCFT	Transport Canada Fuel Storage Tanks	Y	0	0	0
VAR	Variances for Abandonment of Underground Storage Tanks	Y	0	0	0
WDS	Waste Disposal Sites - MOE CA Inventory	Y	0	0	0
WDSH	Waste Disposal Sites - MOE 1991 Historical Approval Inventory	Y	0	0	0
WWIS	Water Well Information System	Y	5	13	18

Database	Name	Searched	Project Property	Boundary to 0.30km	Total
Total:			12	145	157

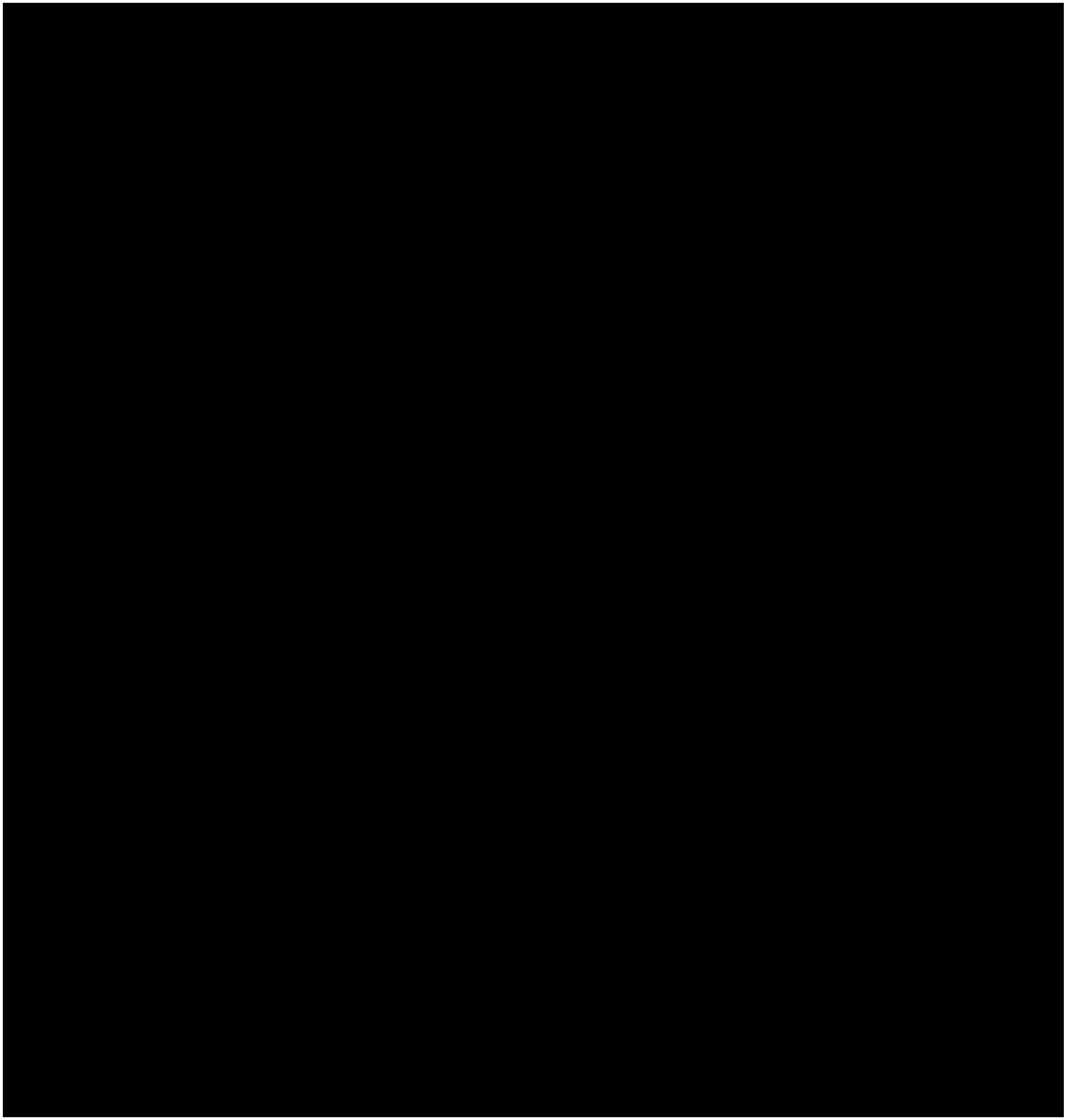
Executive Summary: Site Report Summary - Project Property



Executive Summary: Site Report Summary - Surrounding Properties



Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number



Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number

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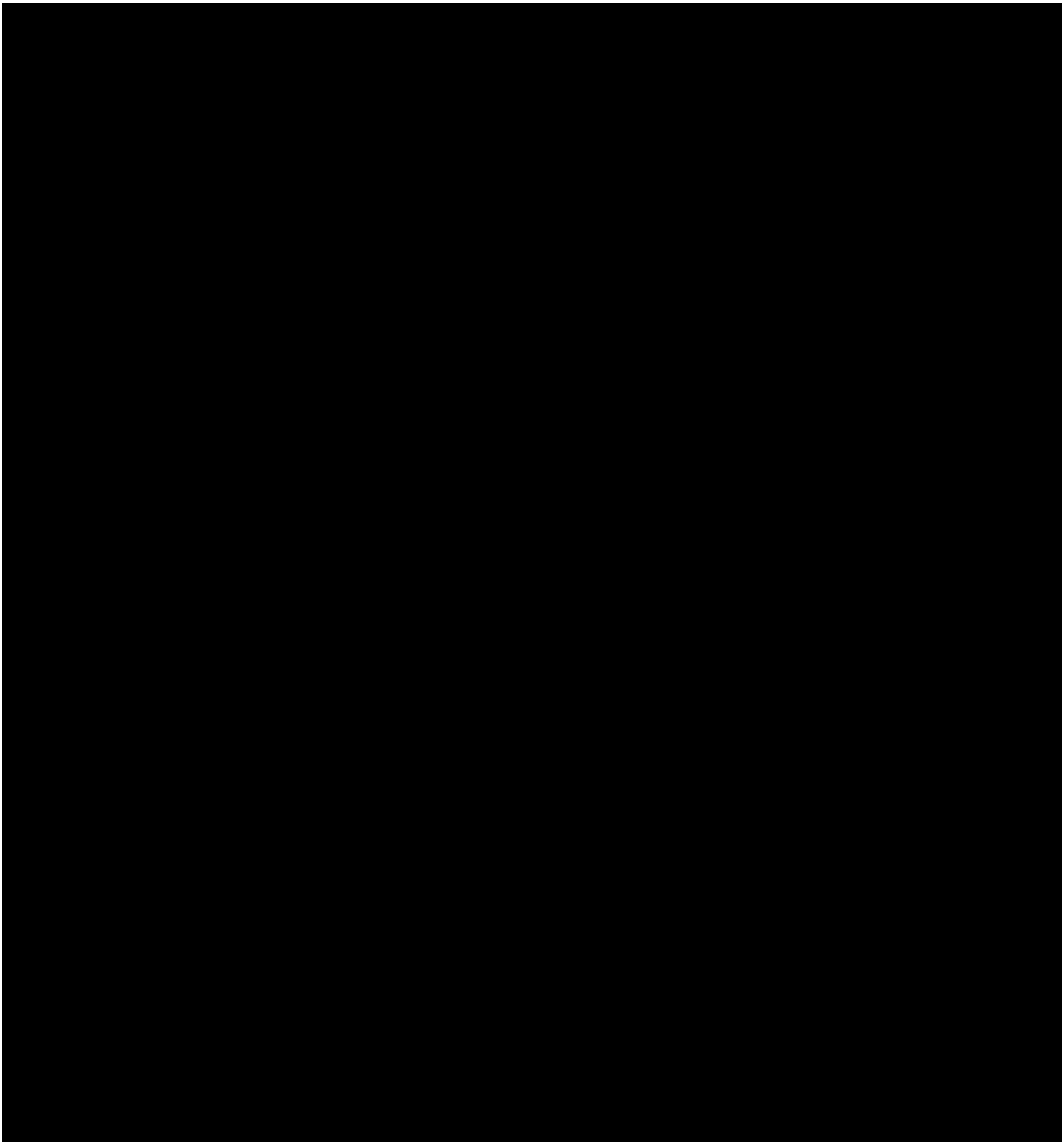
Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number



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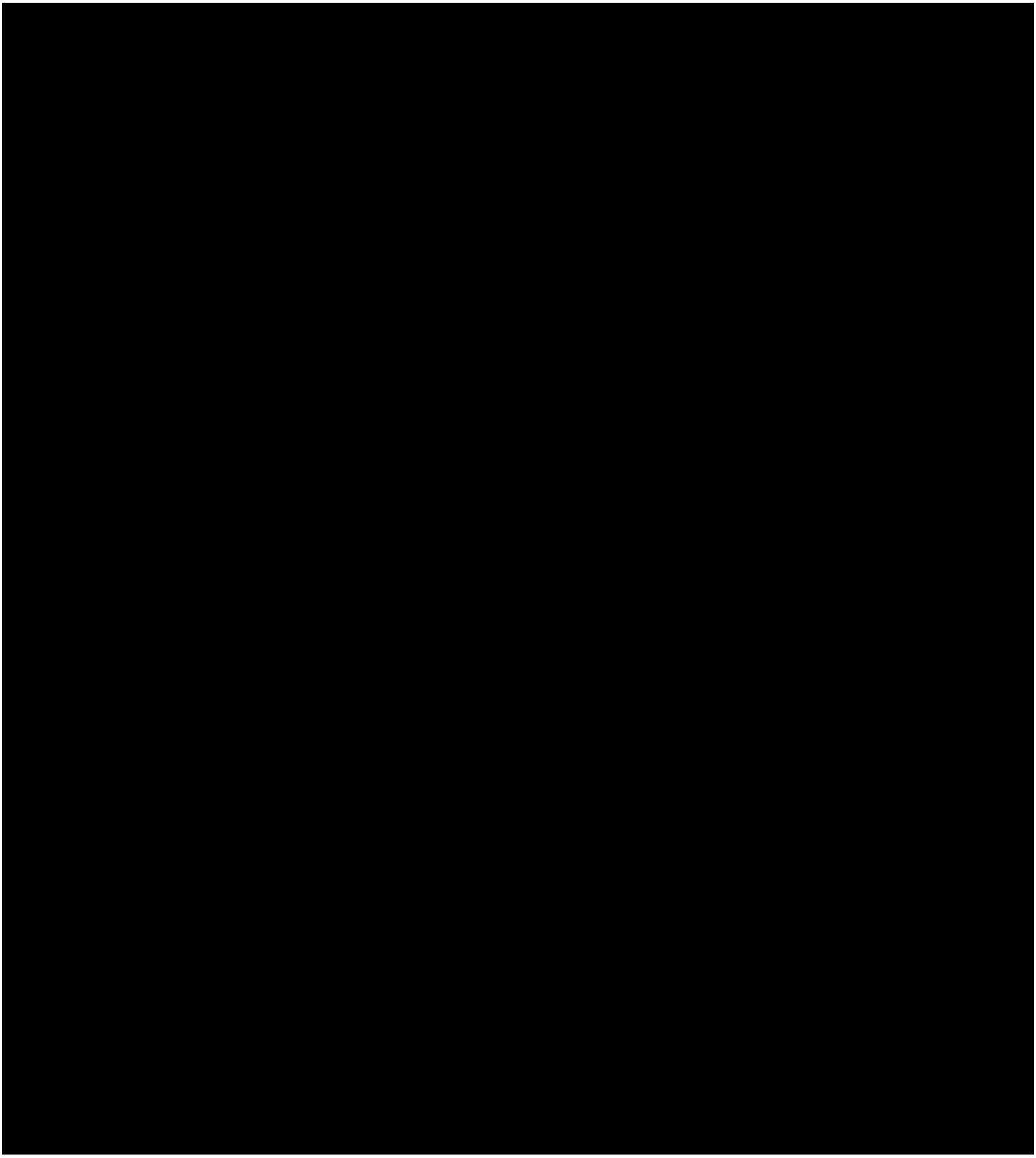
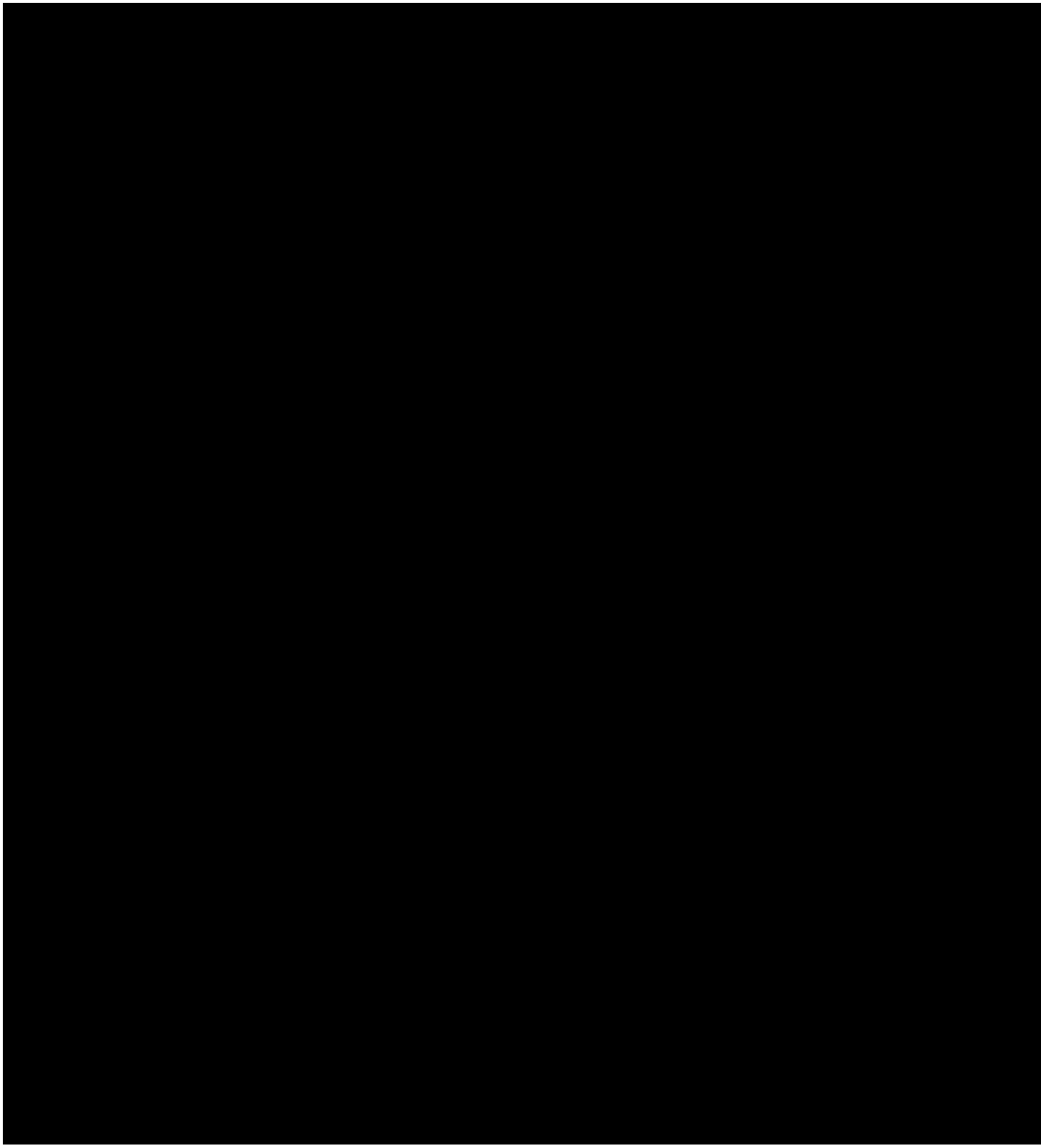
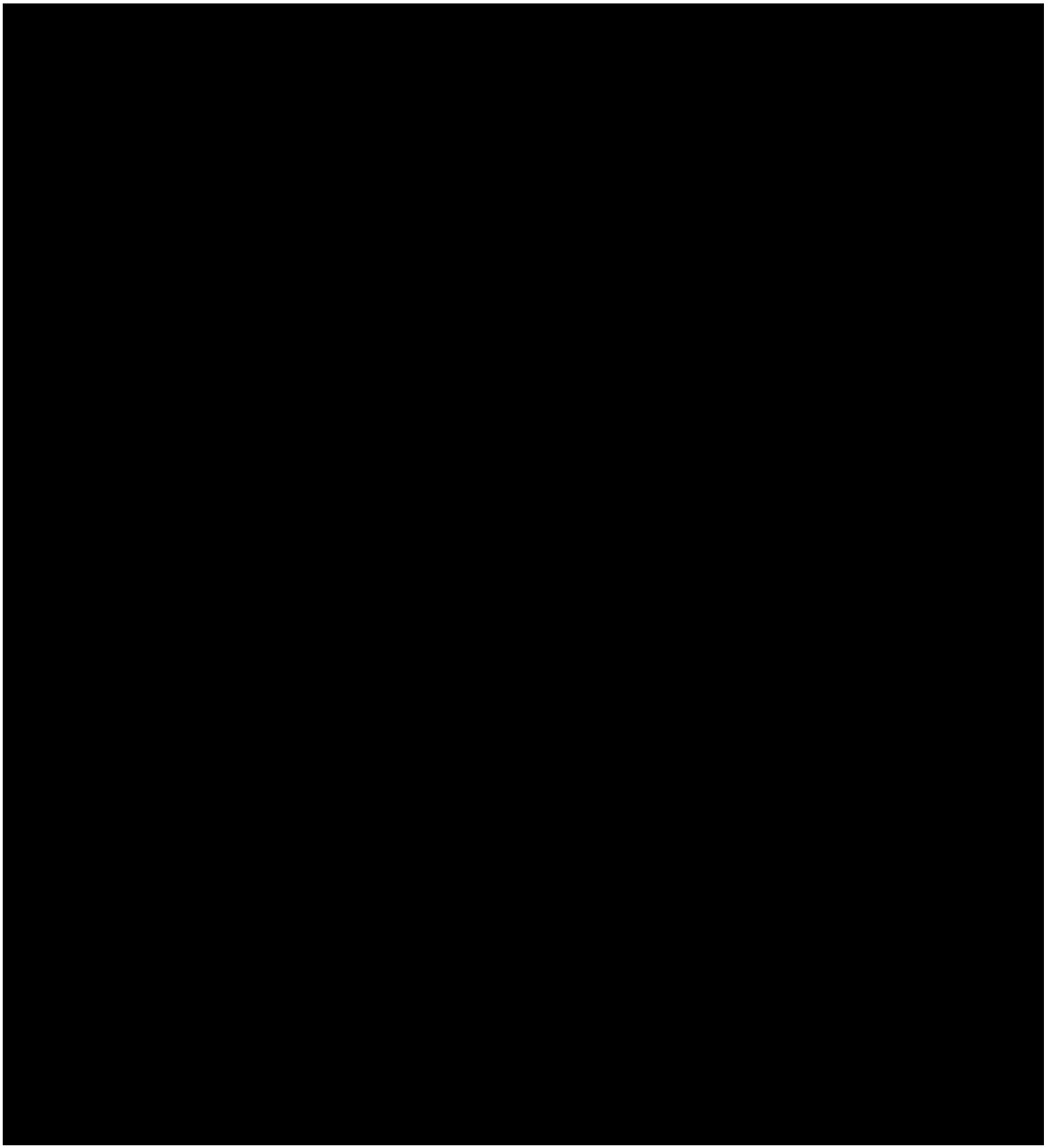


Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number



Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number



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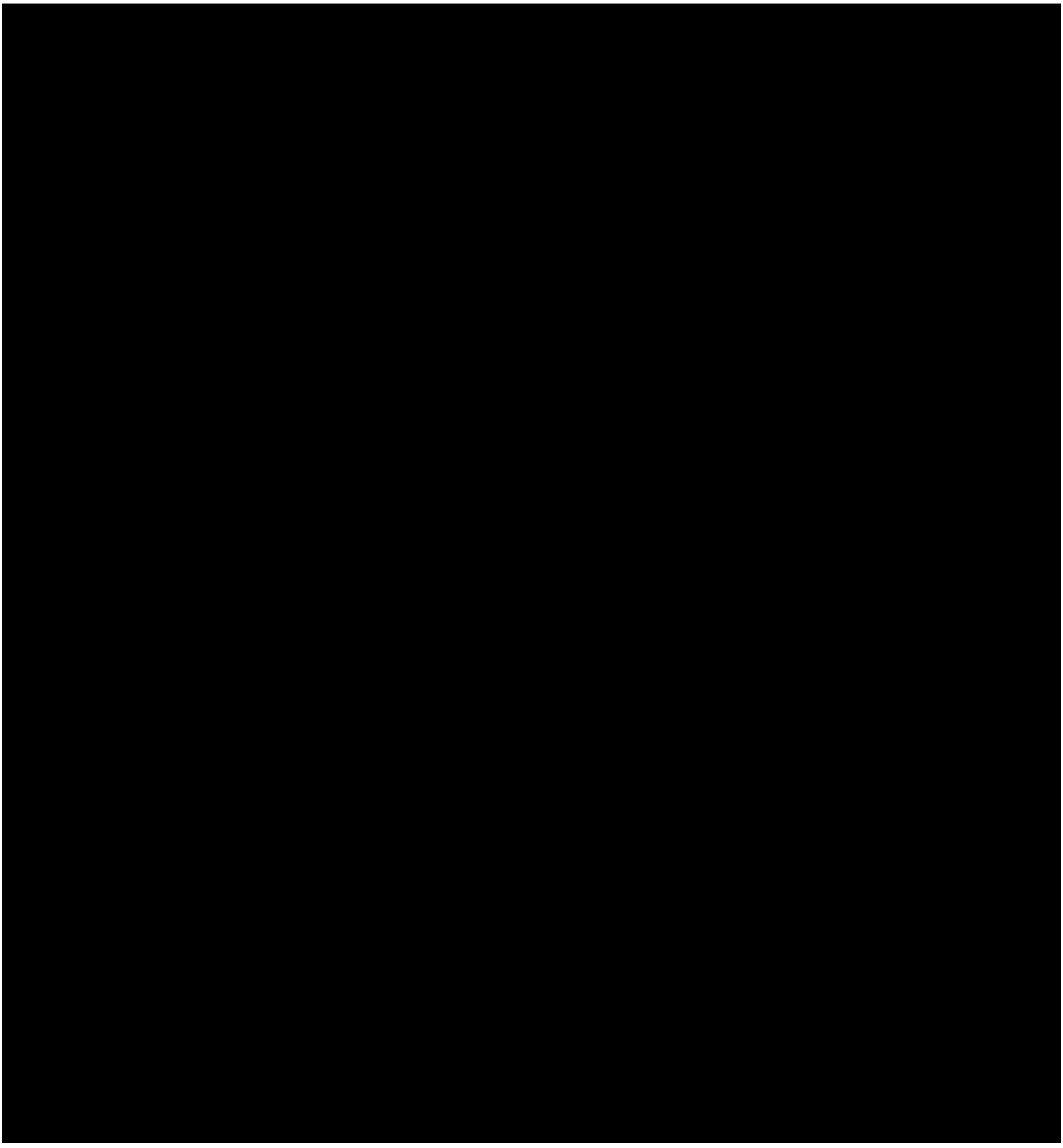
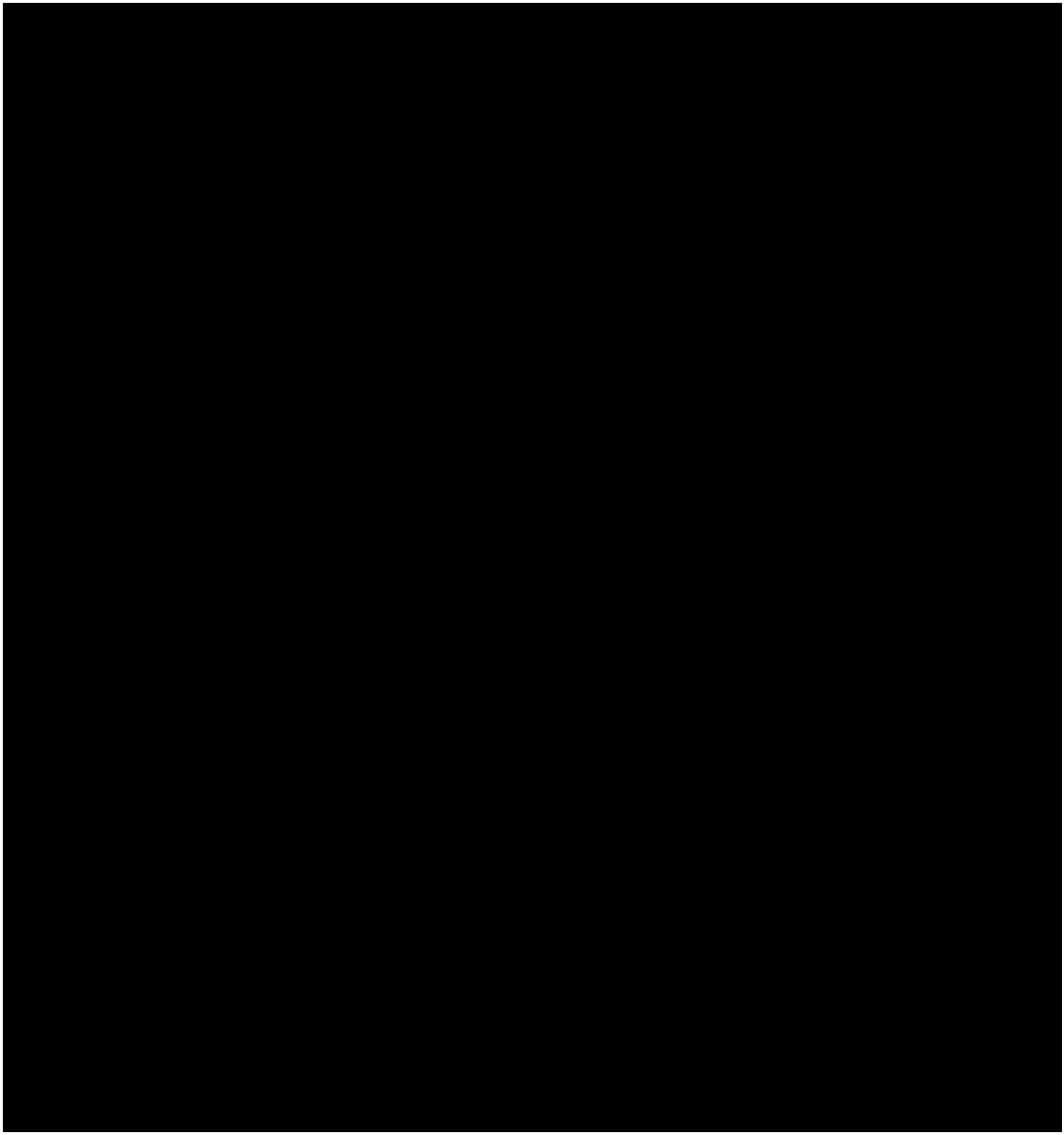
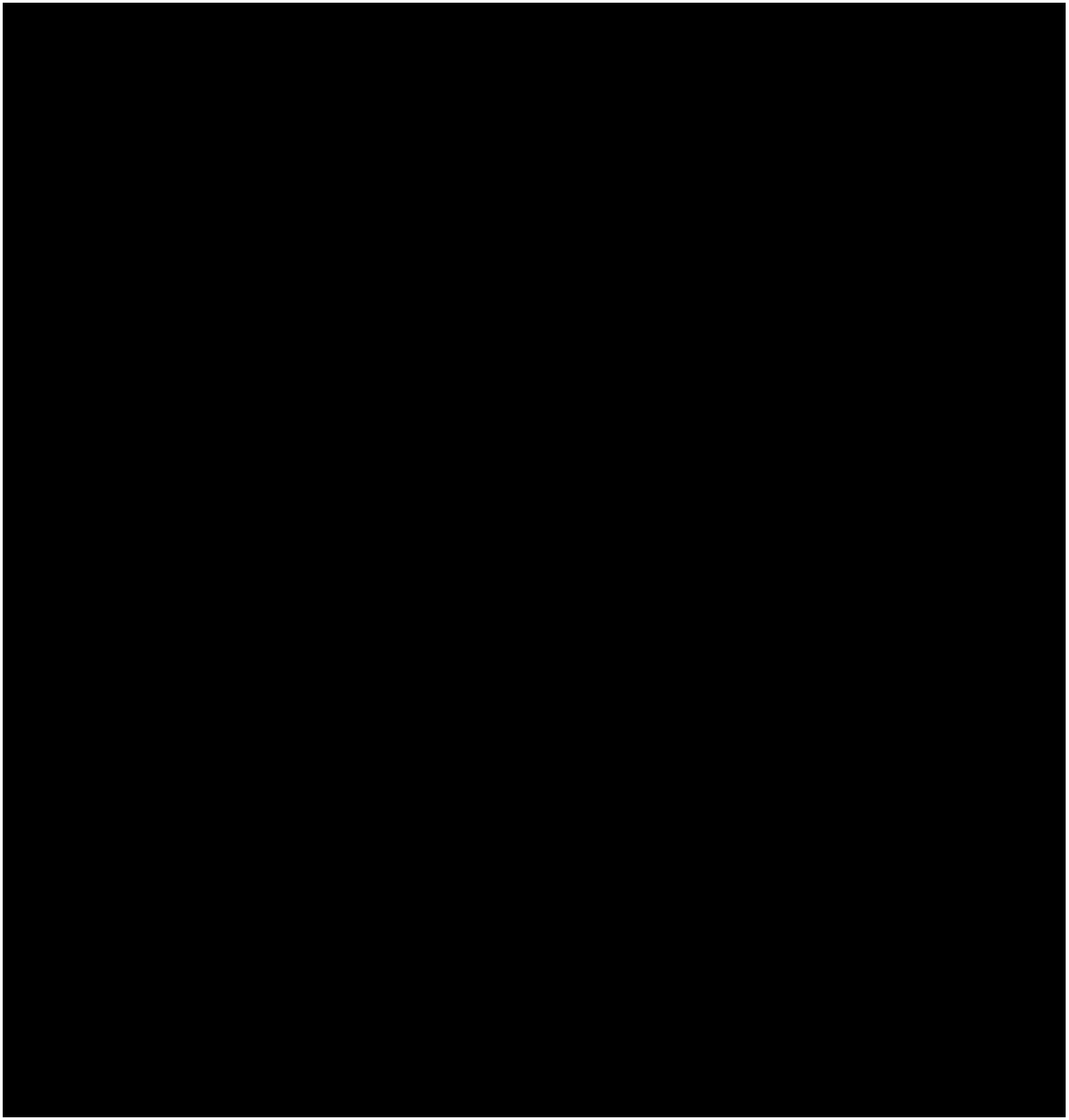


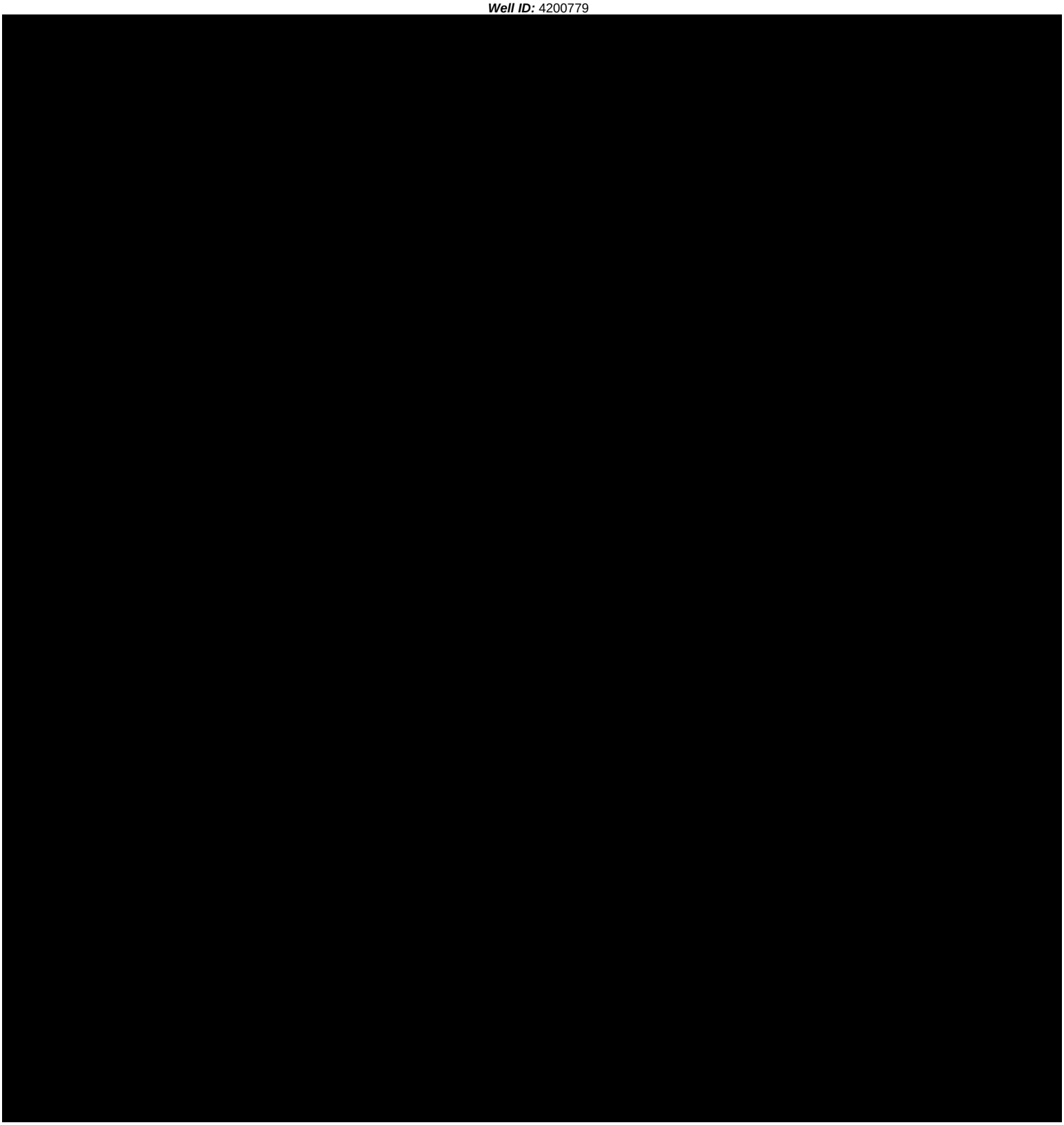
Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number



Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number

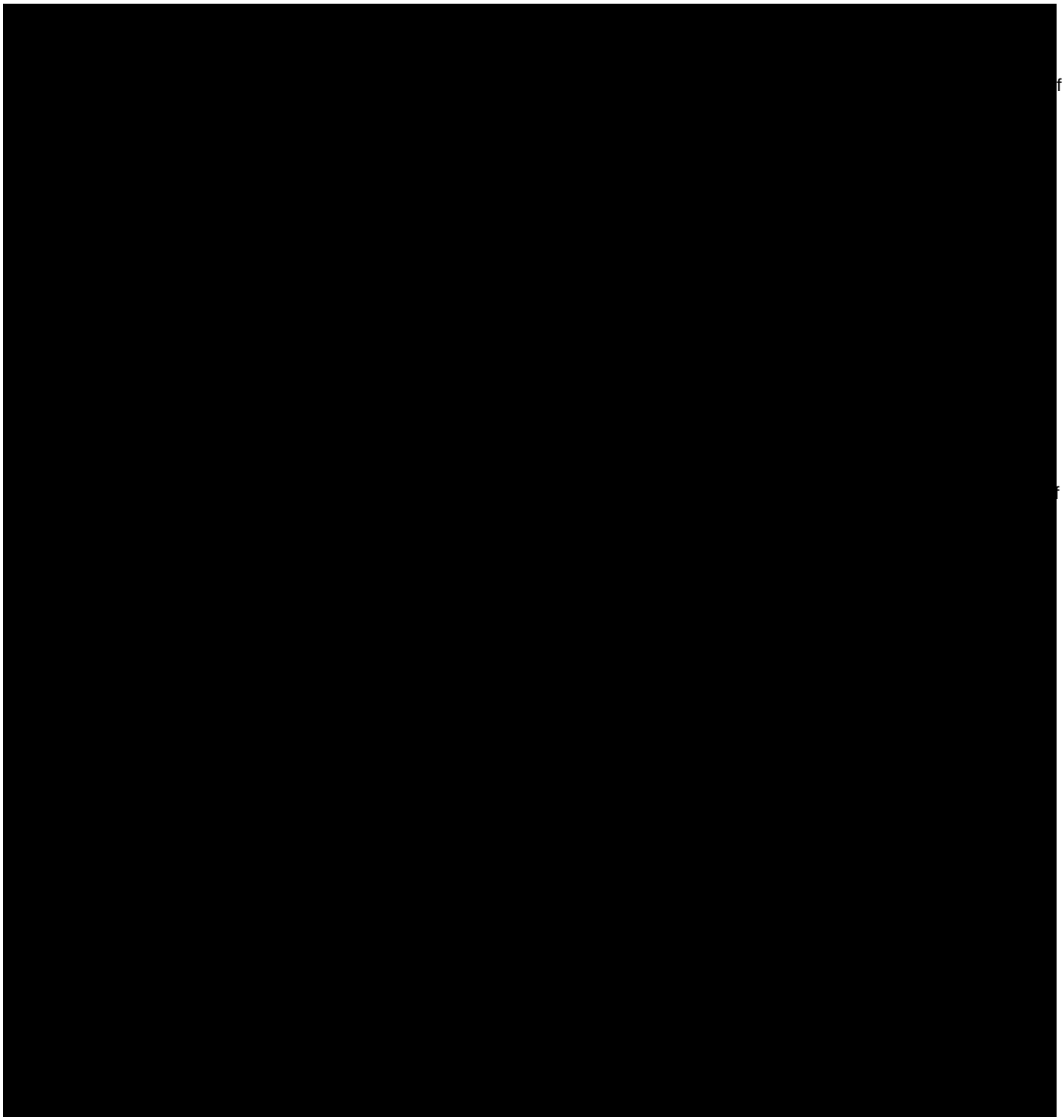


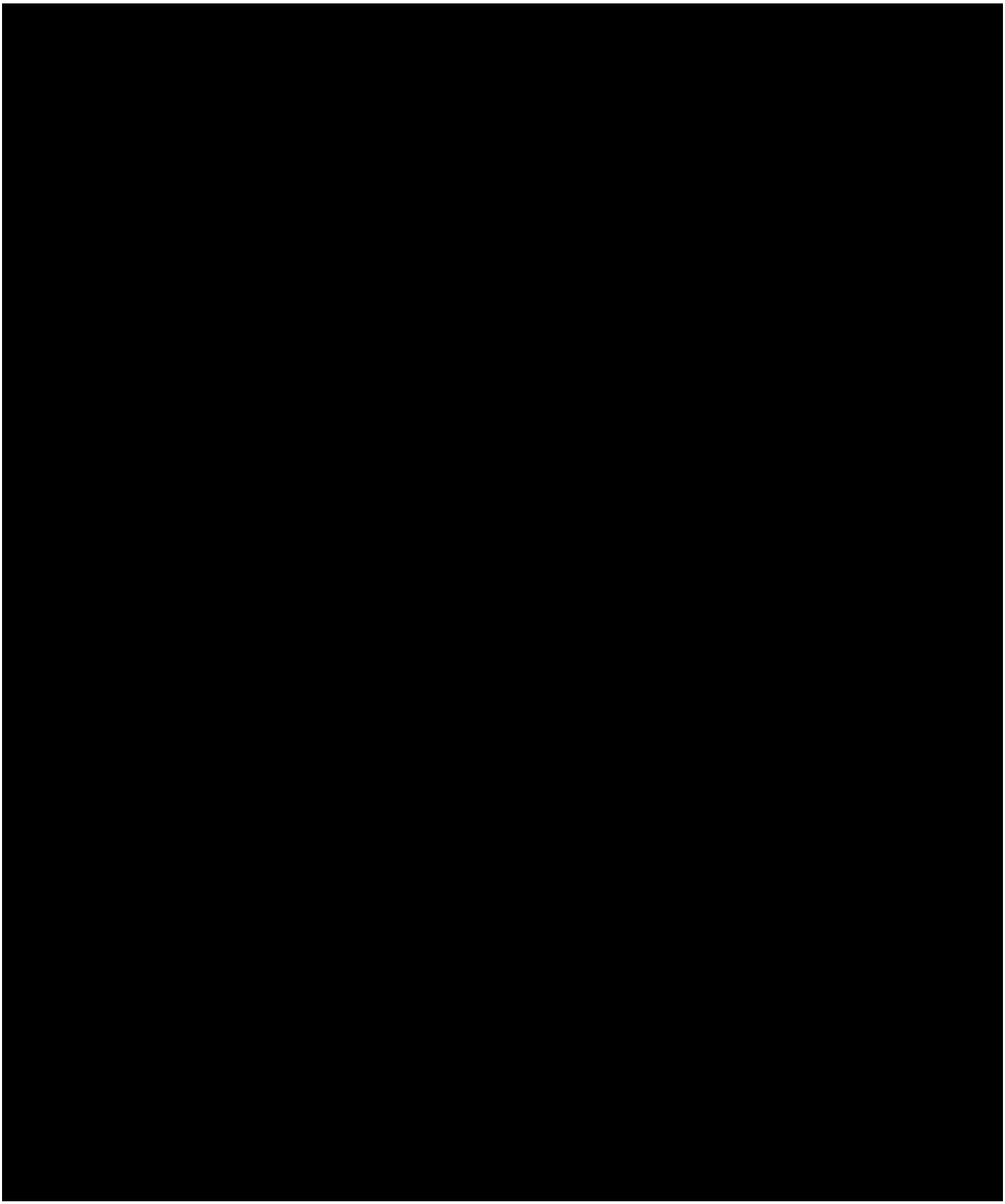
Well ID: 4200779



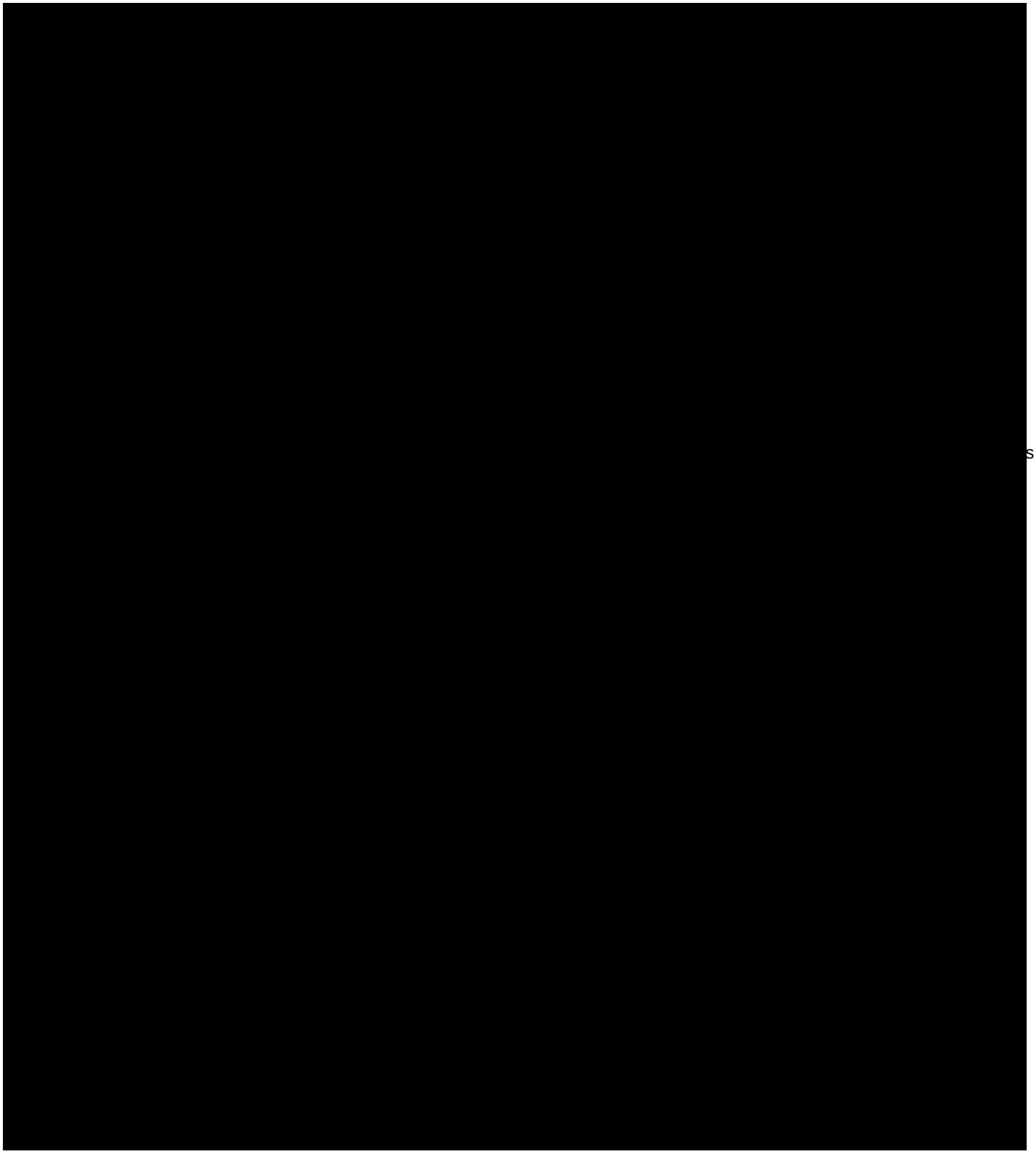
Map Key	DB	Company/Site Name	Address	Dir/Dist (m)	Elev Diff (m)	Page Number

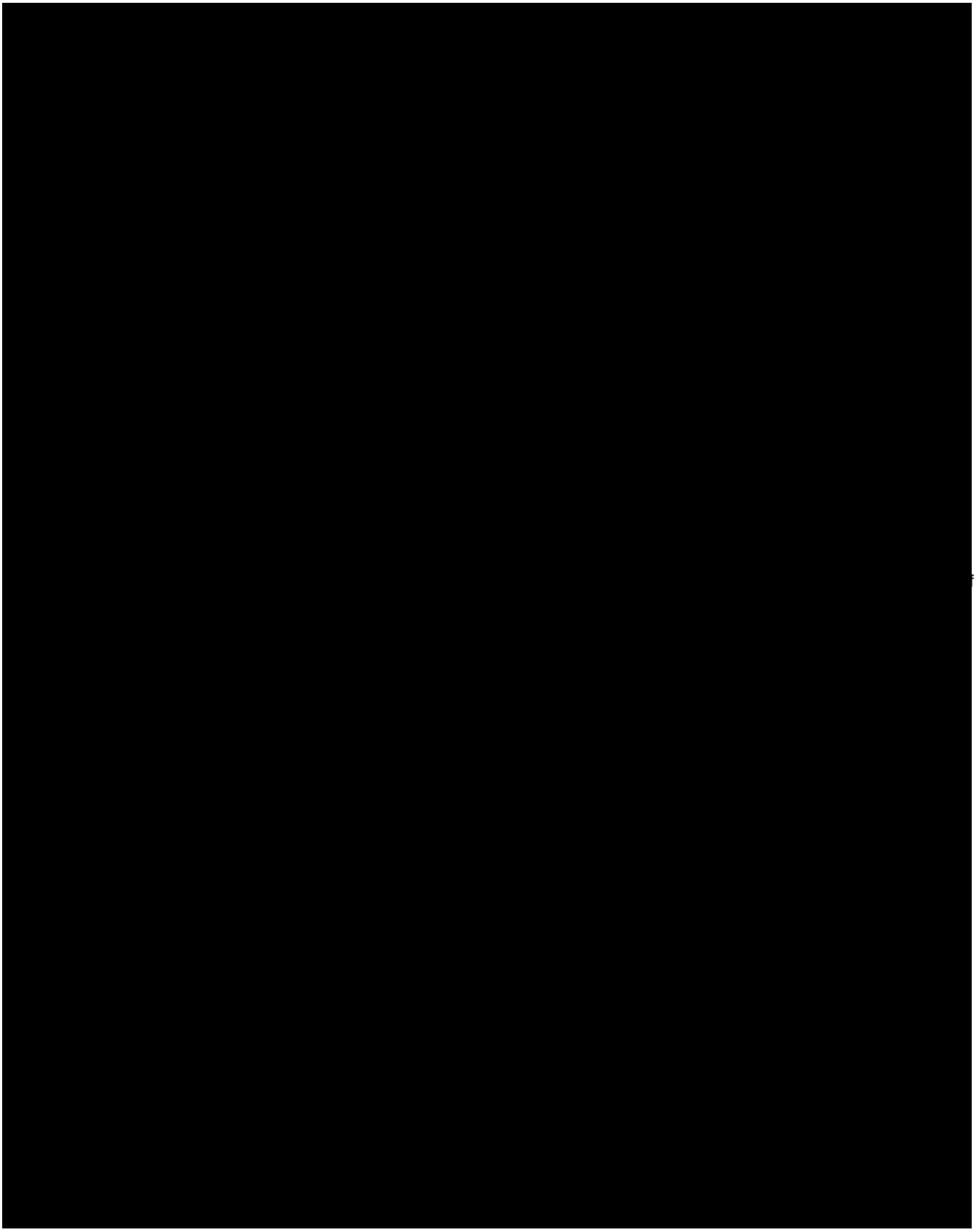
Executive Summary: Summary By Data Source

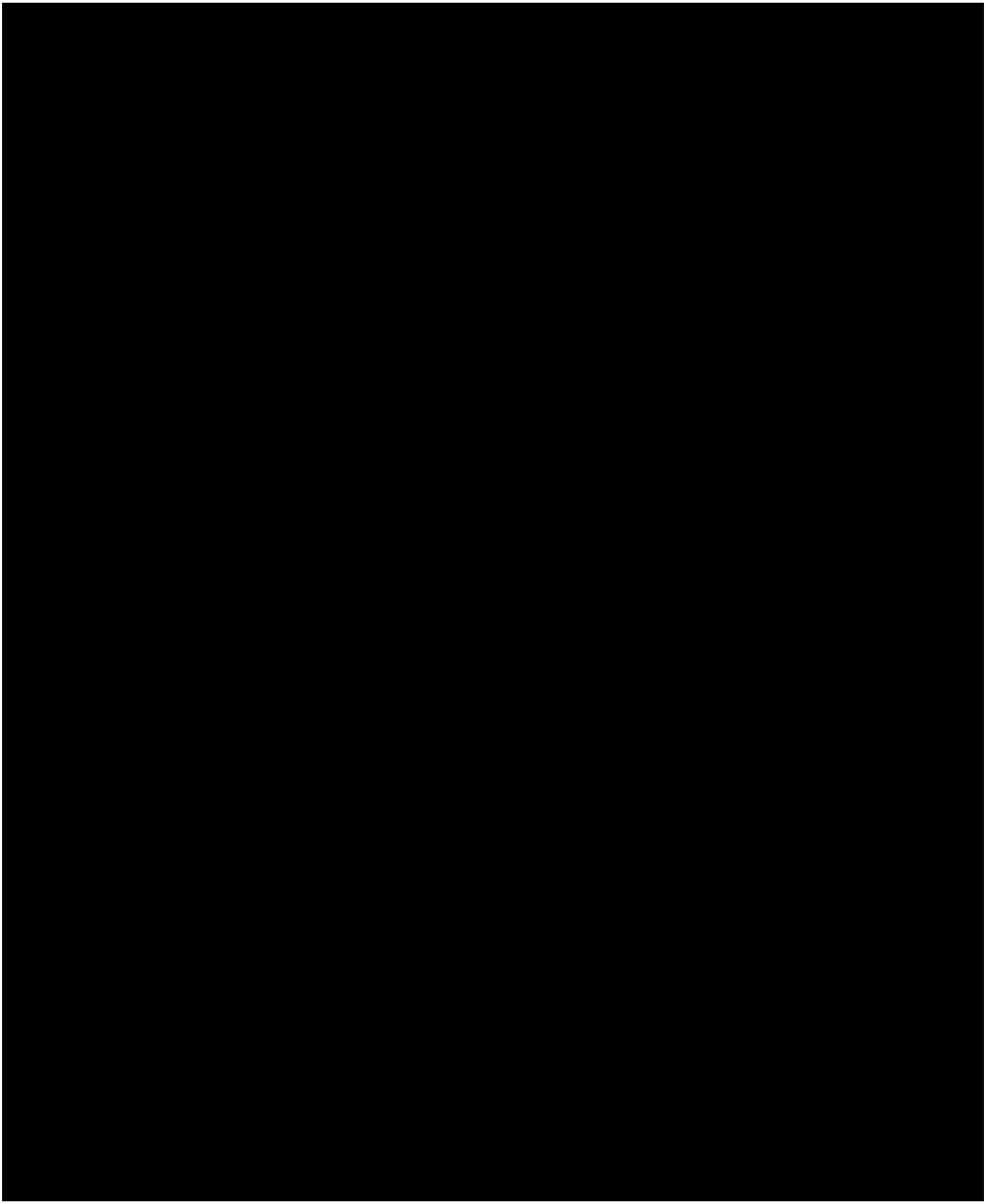




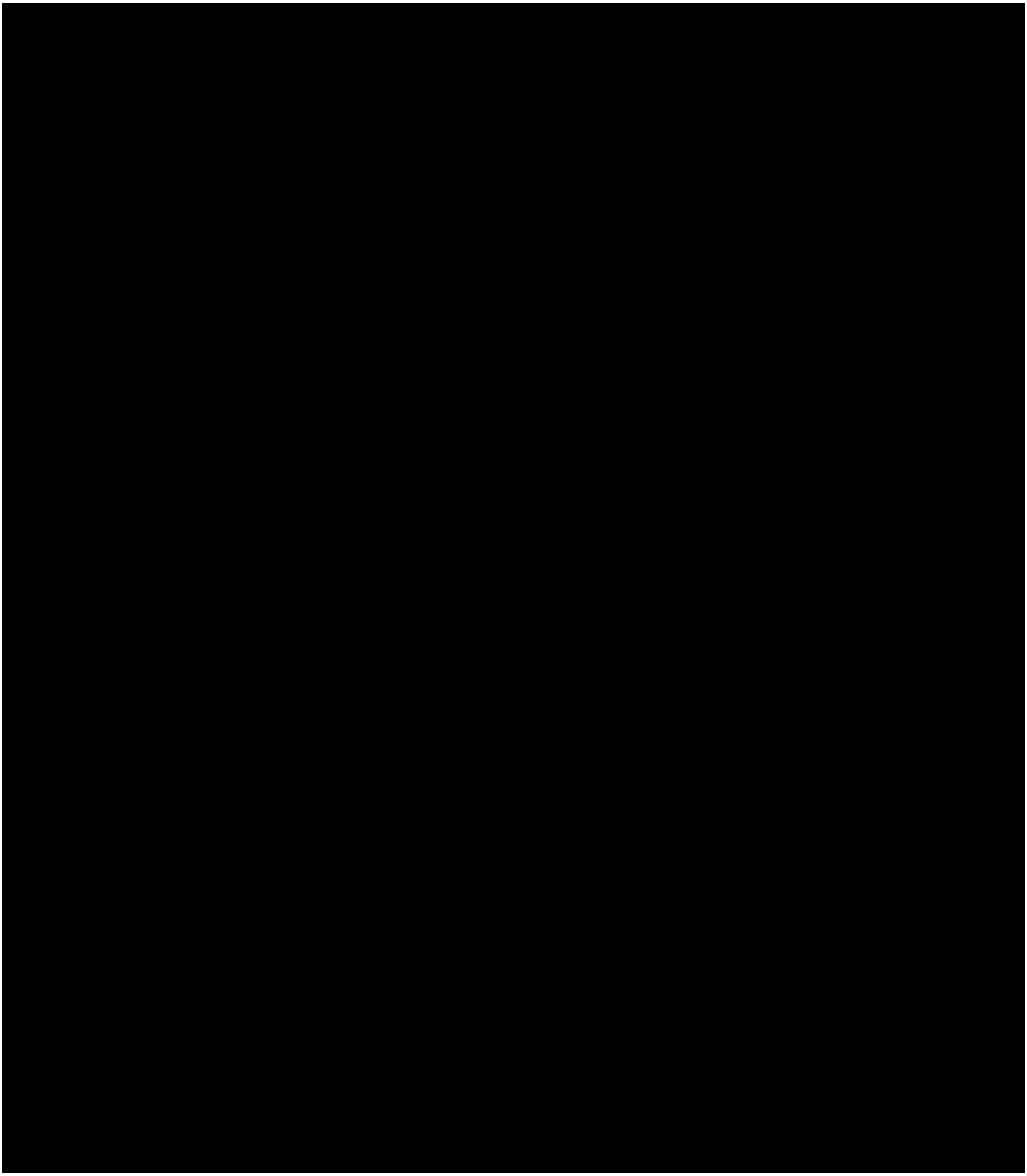
Site	Address	Distance (m)	Map Key



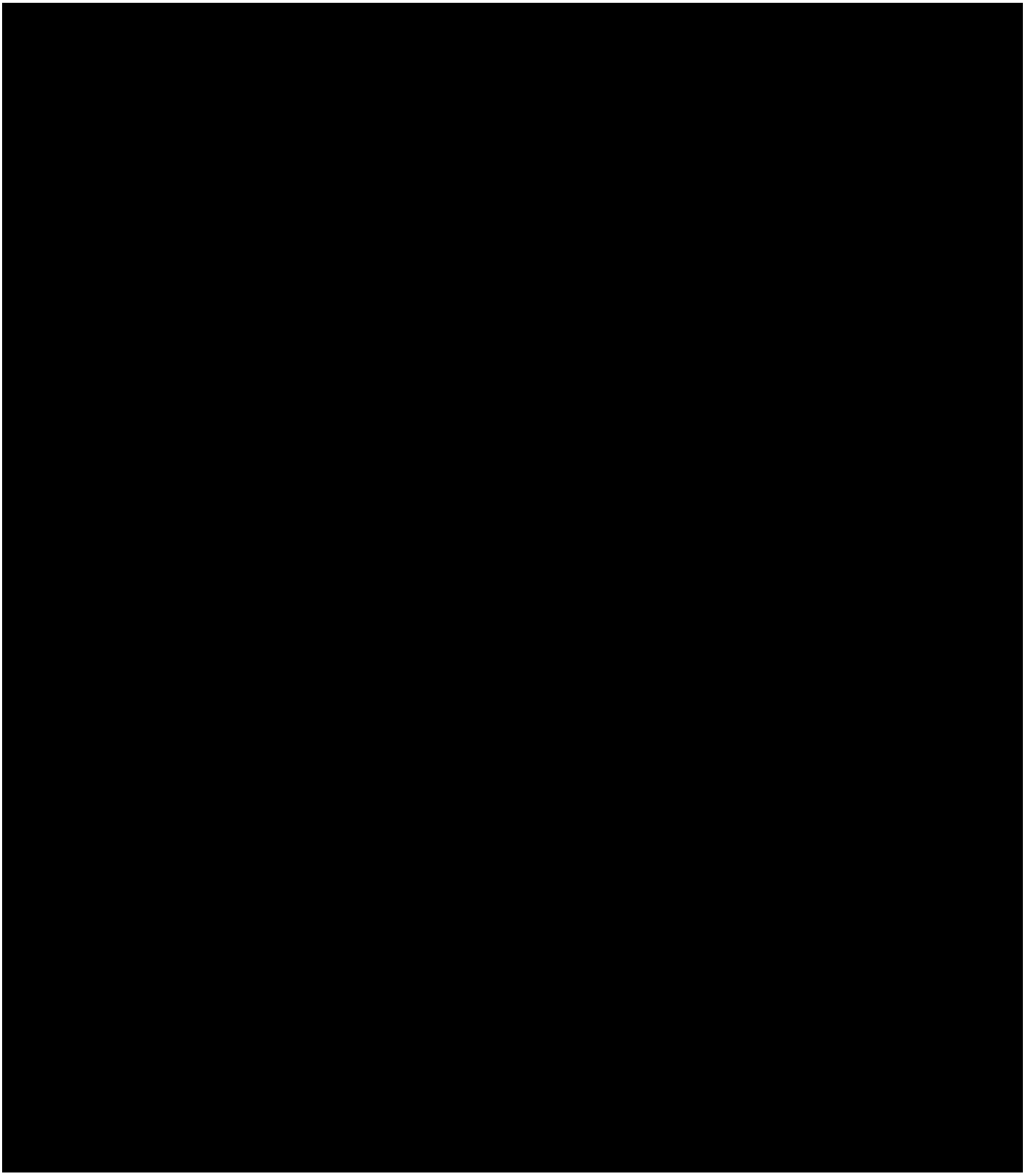




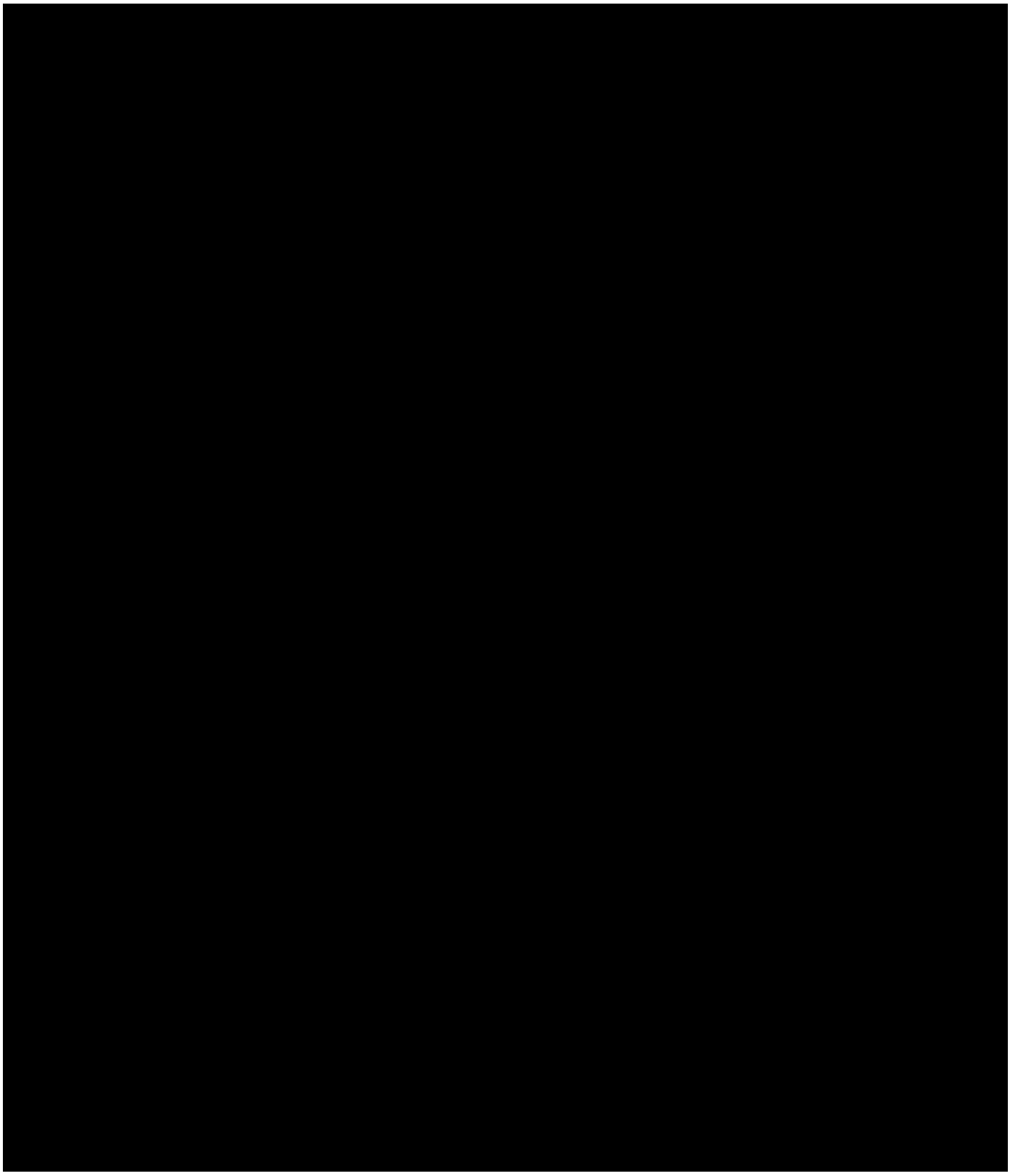
Site	Address	Distance (m)	Map Key



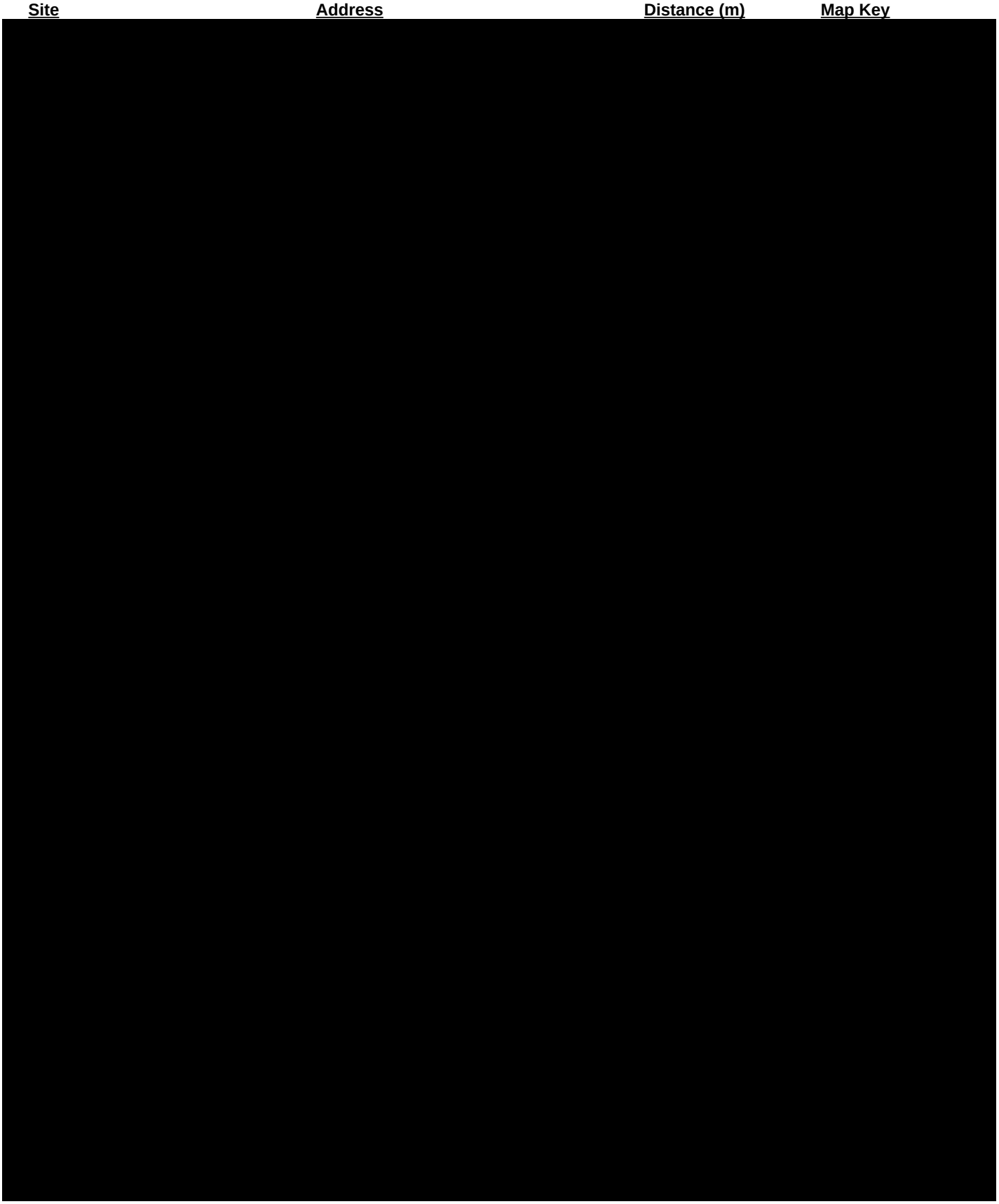
Site	Address	Distance (m)	Map Key



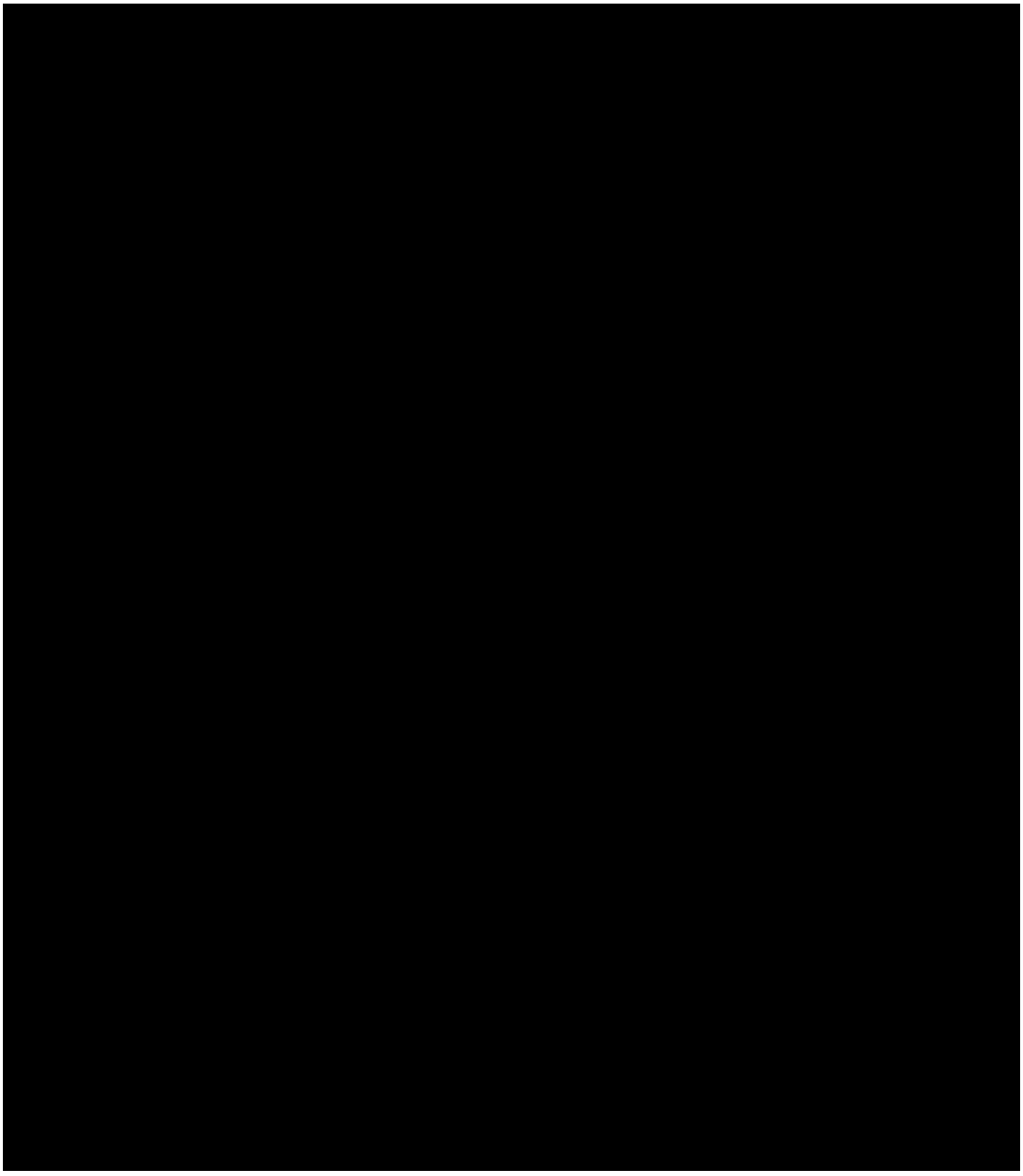
Site	Address	Distance (m)	Map Key



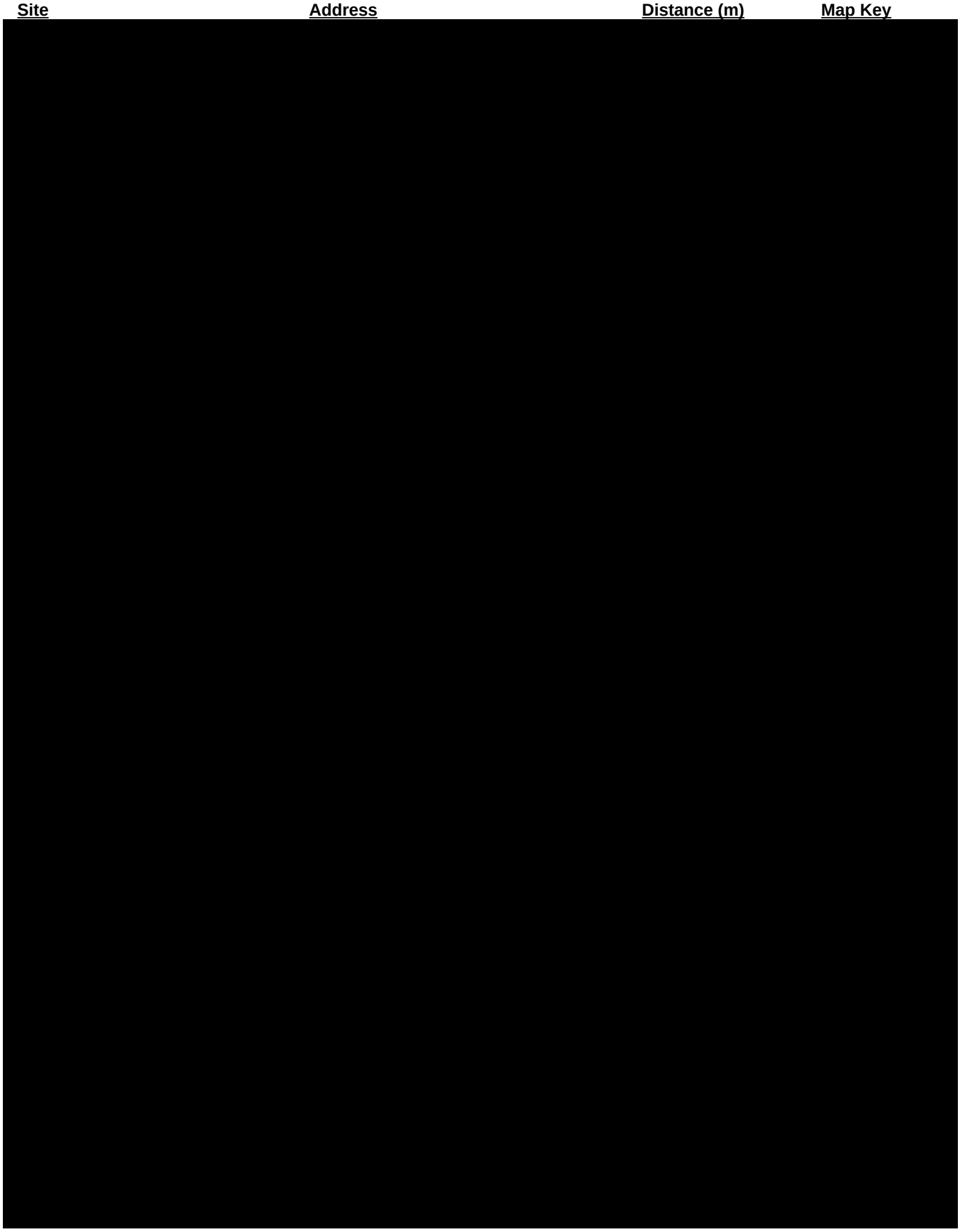
Site	Address	Distance (m)	Map Key



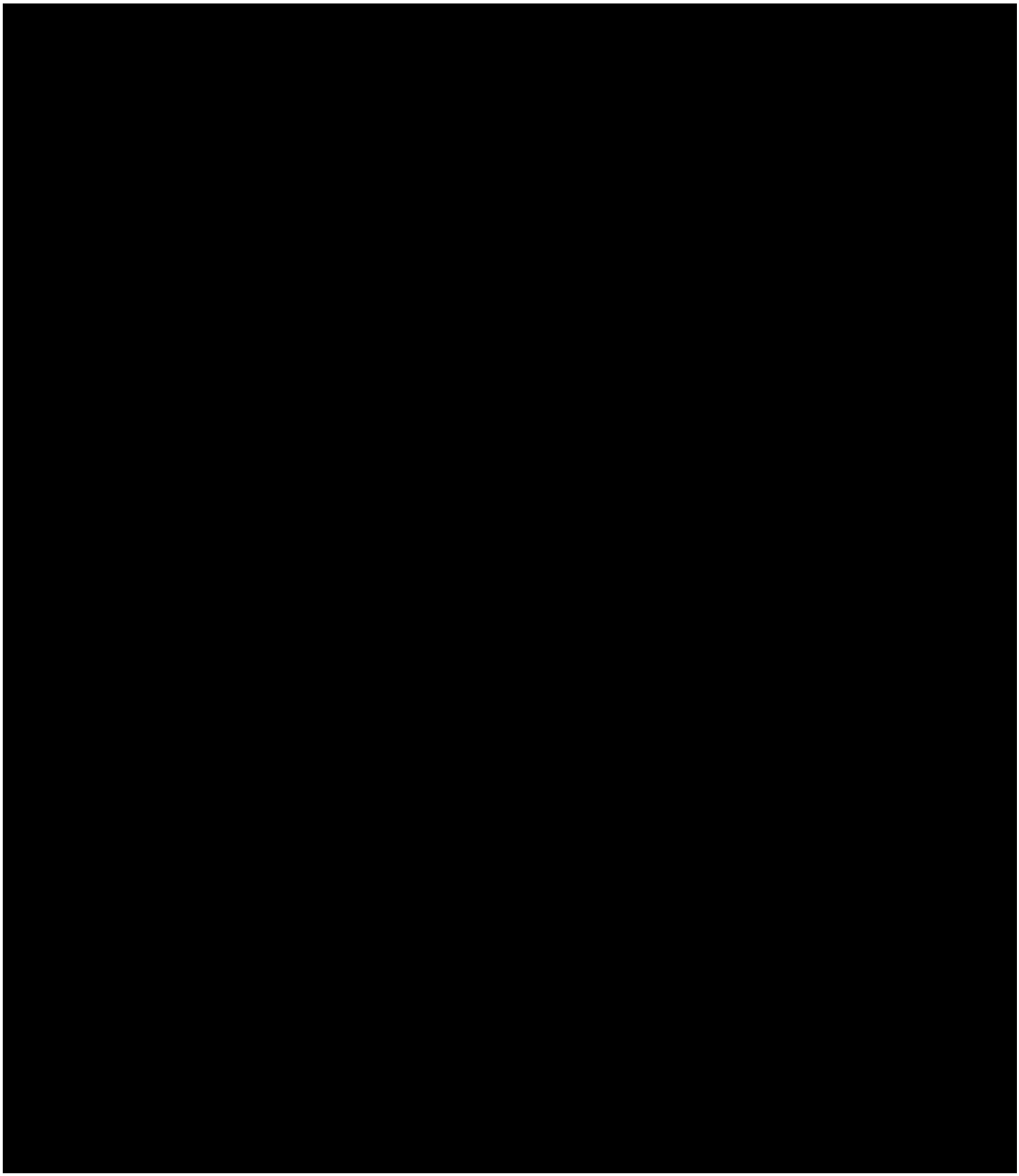
Site	Address	Distance (m)	Map Key



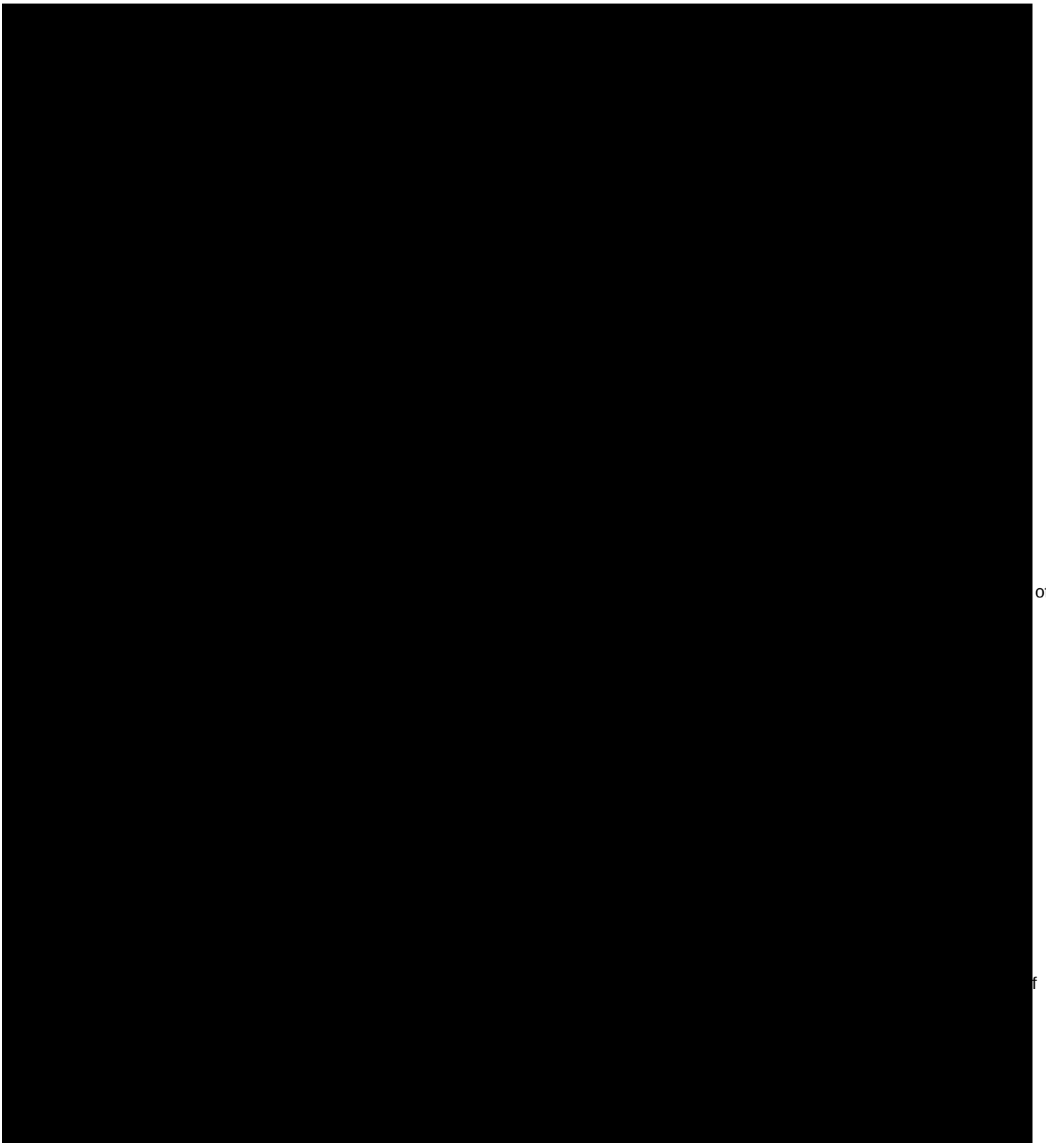
Site	Address	Distance (m)	Map Key



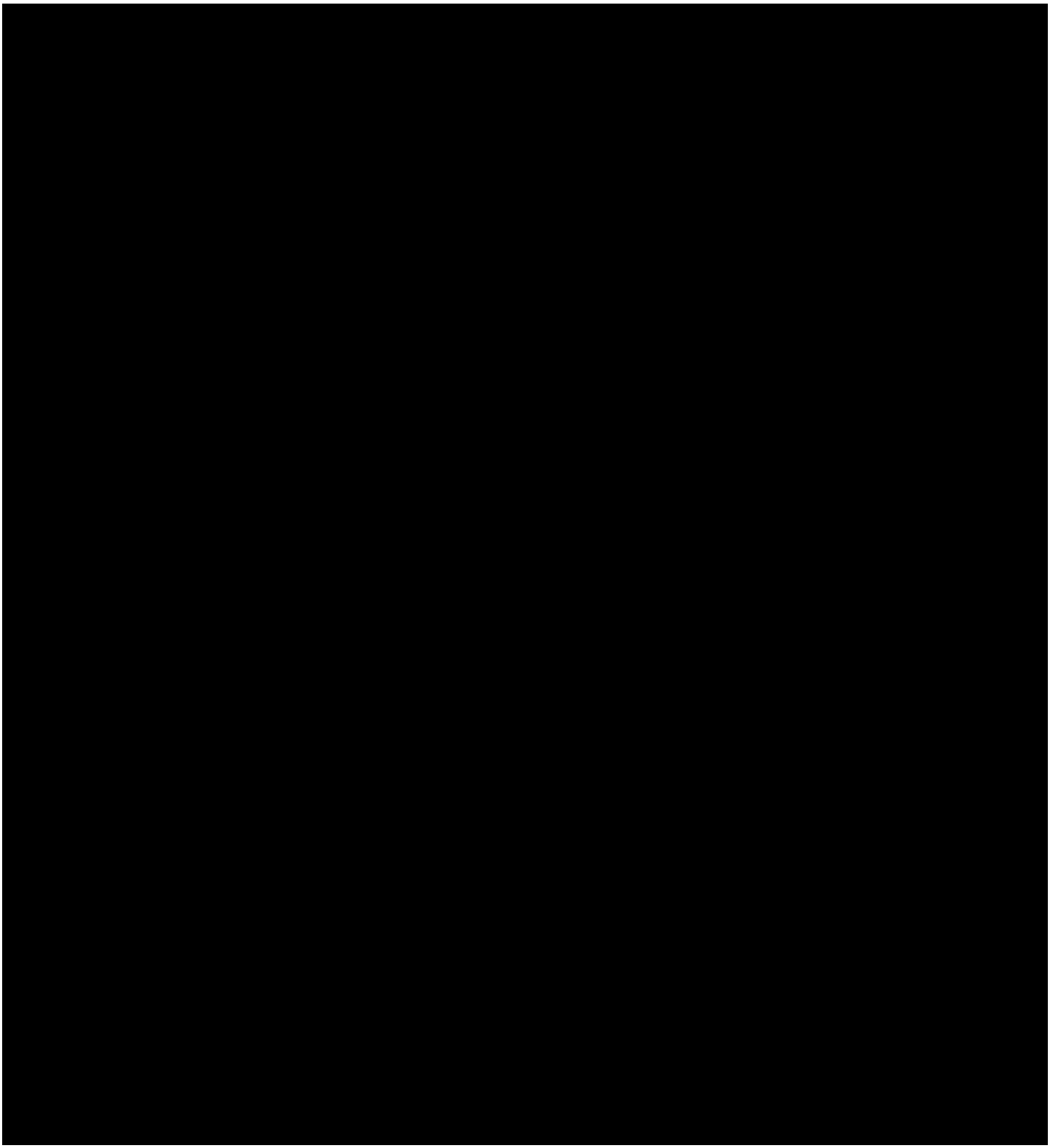
Site	Address	Distance (m)	Map Key



Site	Address	Distance (m)	Map Key



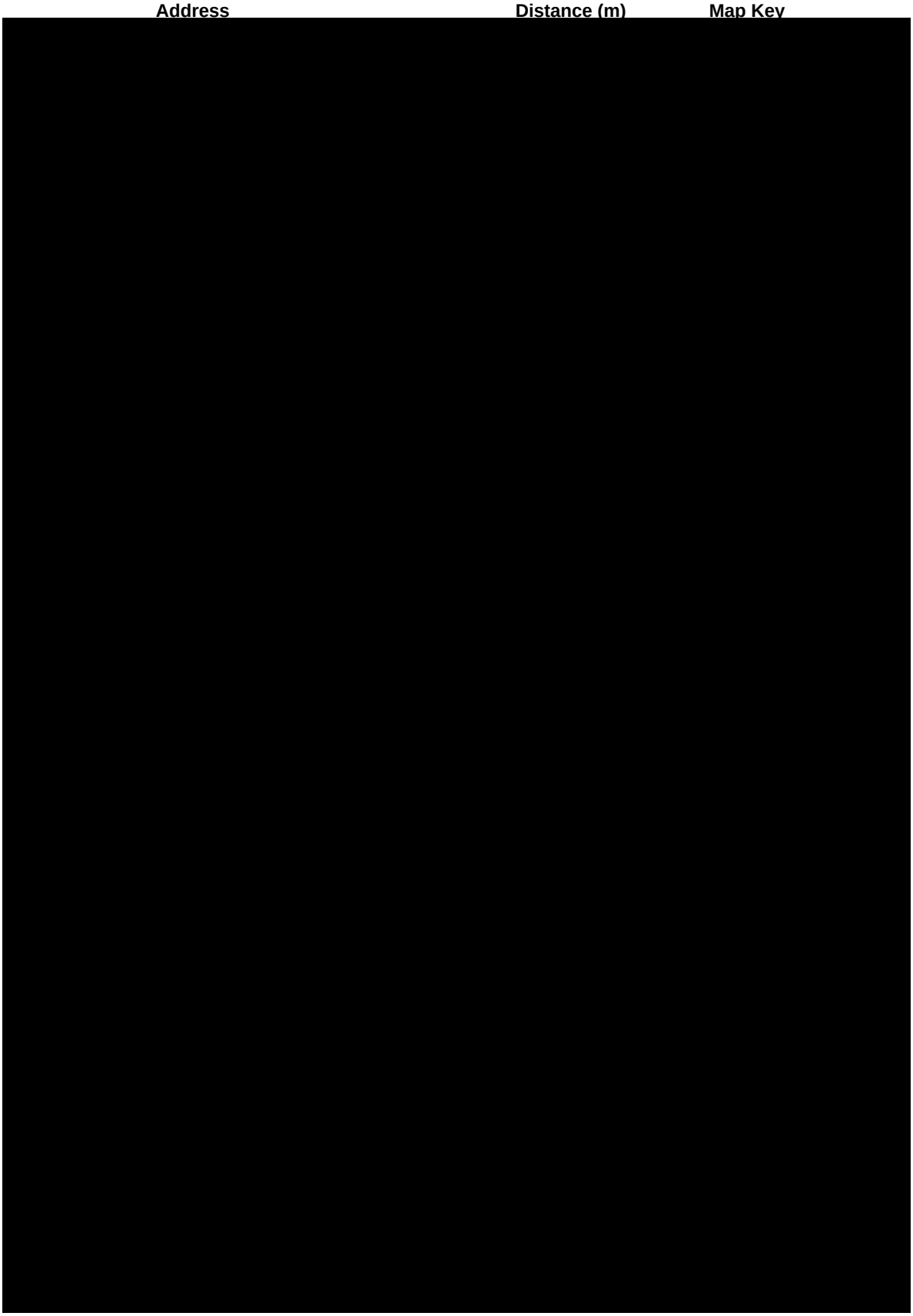
Site	Address	Distance (m)	Map Key



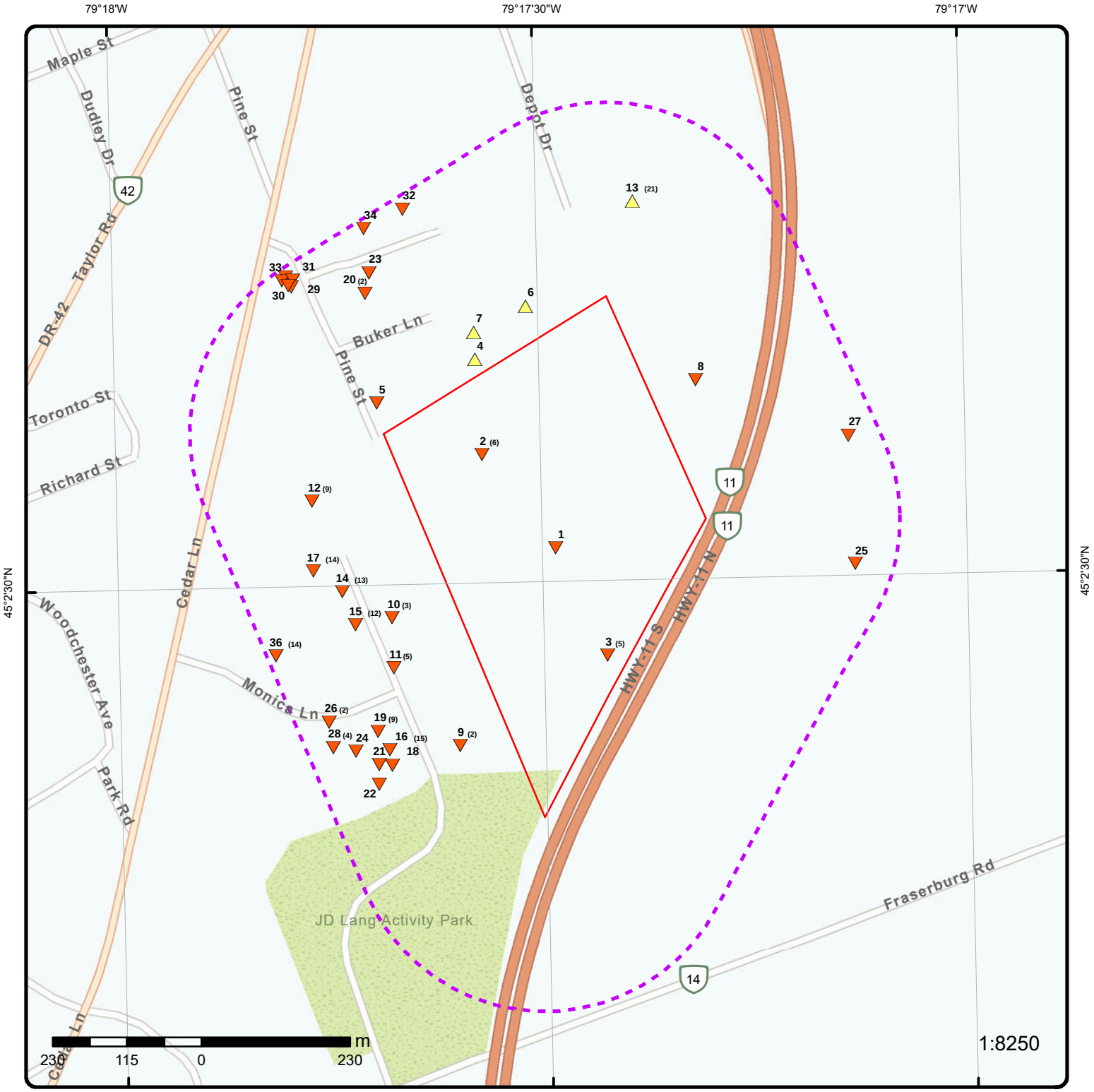
A search of the SPL database, dated 1988-Oct 2021; see description has found that there are 3 SPL site(s) within approximately 0.30 kilometers of the project property.

[redacted]eters of

Site	Address	Distance (m)	Map Key



Site	Address	Distance (m)	Map Key
	Well ID: 4200844		



Map: 0.3 Kilometer Radius

Order Number: 23100200574

Address: 300 Pine Street, Bracebridge, ON

- Project Property
- Buffer Outline
- Eris Sites with Higher Elevation
- Eris Sites with Same Elevation
- Eris Sites with Lower Elevation
- Eris Sites with Unknown Elevation
- Freeways; Highways
- Traffic Circle; Ramp
- Major Arterial; Minor Arterial
- Local Road
- Service Road; Traffic Circle; Ramp
- Rail
- Beach
- Airport
- Industrial Area
- Military Base
- Aircraft Roads
- Native Reservation
- Hospital
- Shopping & Sports Area
- University/College
- Cemetery; Golf Course
- Parkt (National)
- Park (City/County)

Source: © 2021 ESRI StreetMap Premium.

© ERIS Information Limited Partnership

Aerial

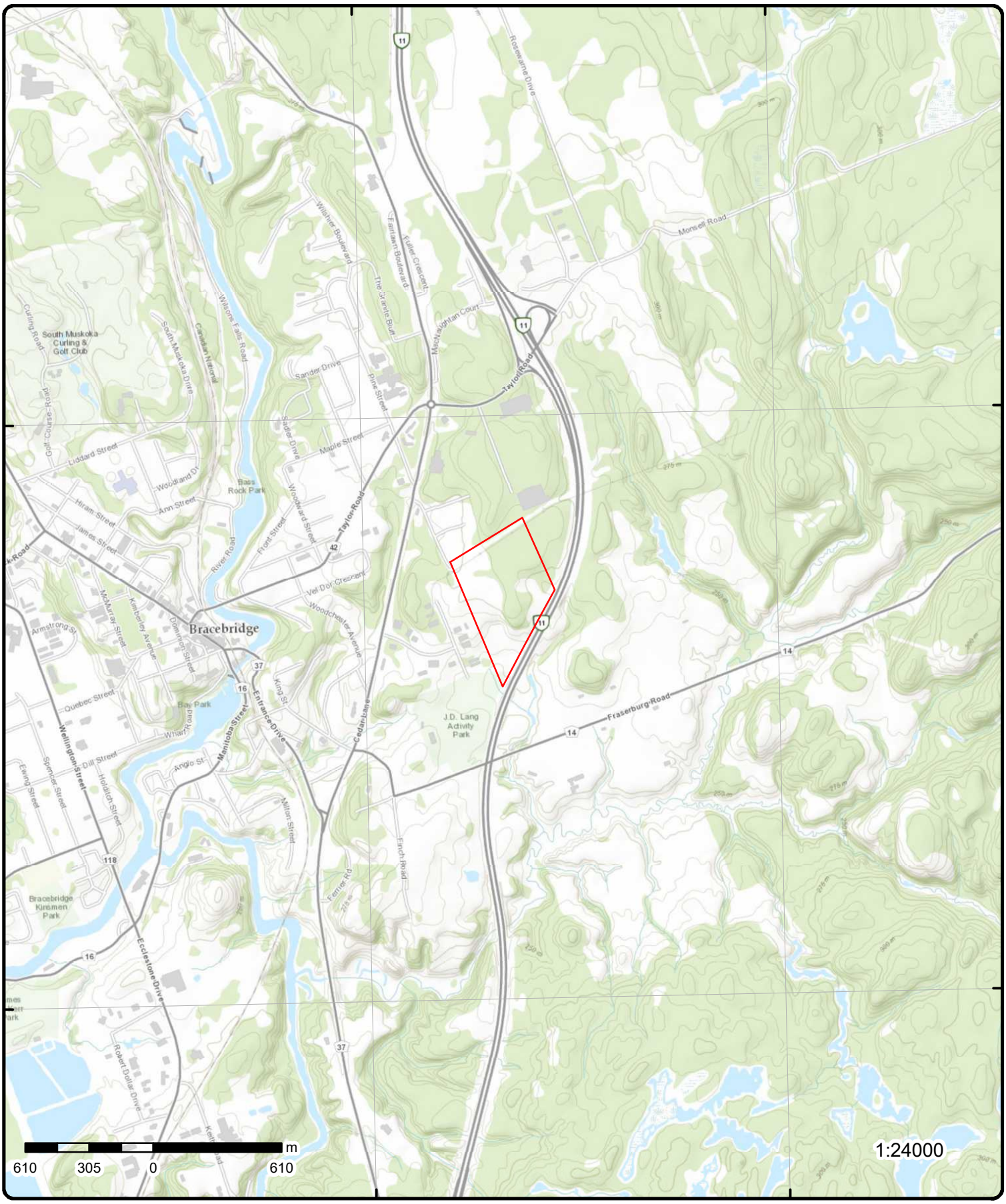
Year: 2022

Order Number: 23100200574

Address: 300 Pine Street, Bracebridge, ON

Source: ESRI World Imagery

© ERIS Information Limited Partnership



Topographic Map

Address: 300 Pine Street, ON

Source: ESRI World Topographic Map

Order Number: 23100200574

ERIS

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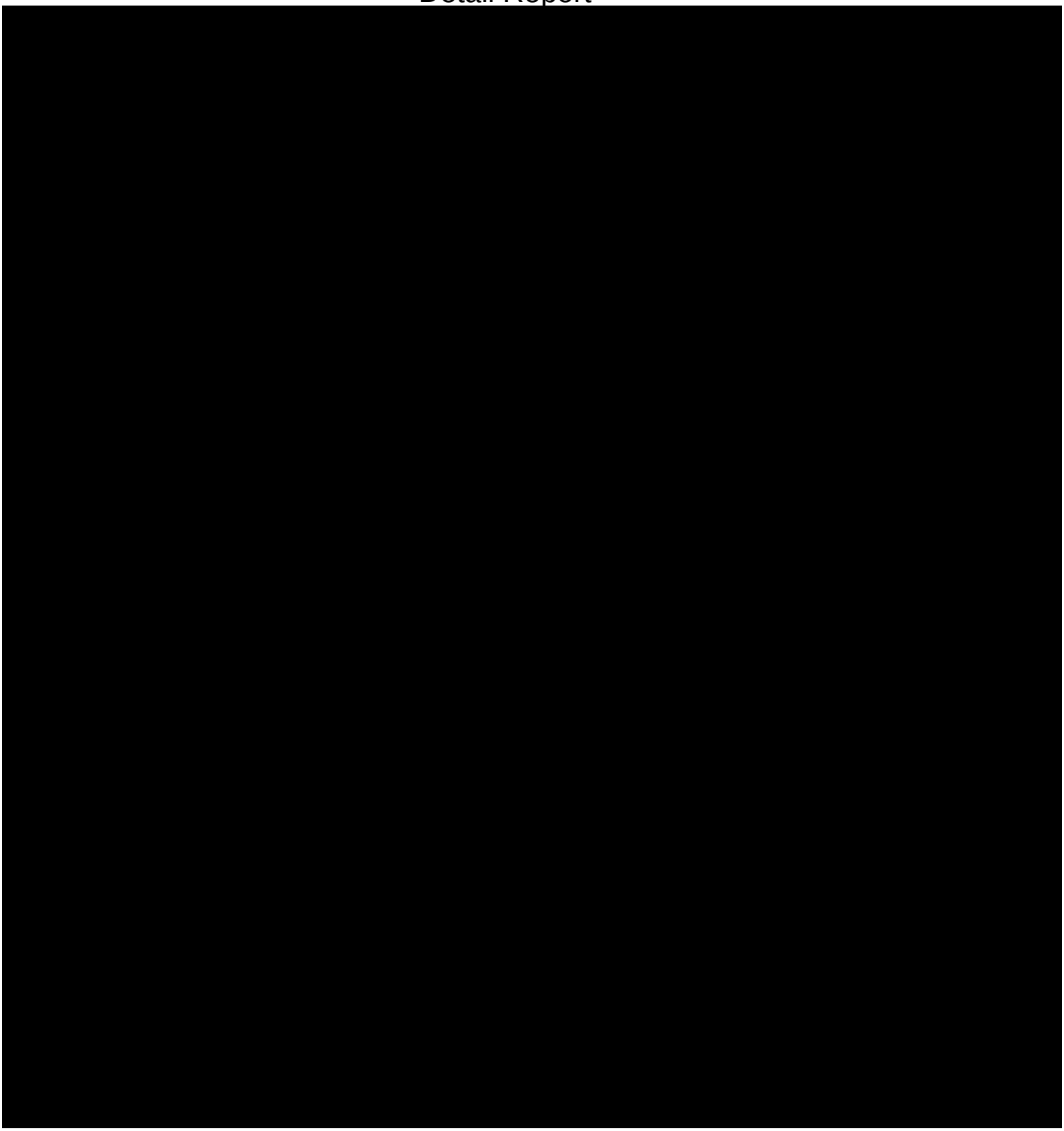
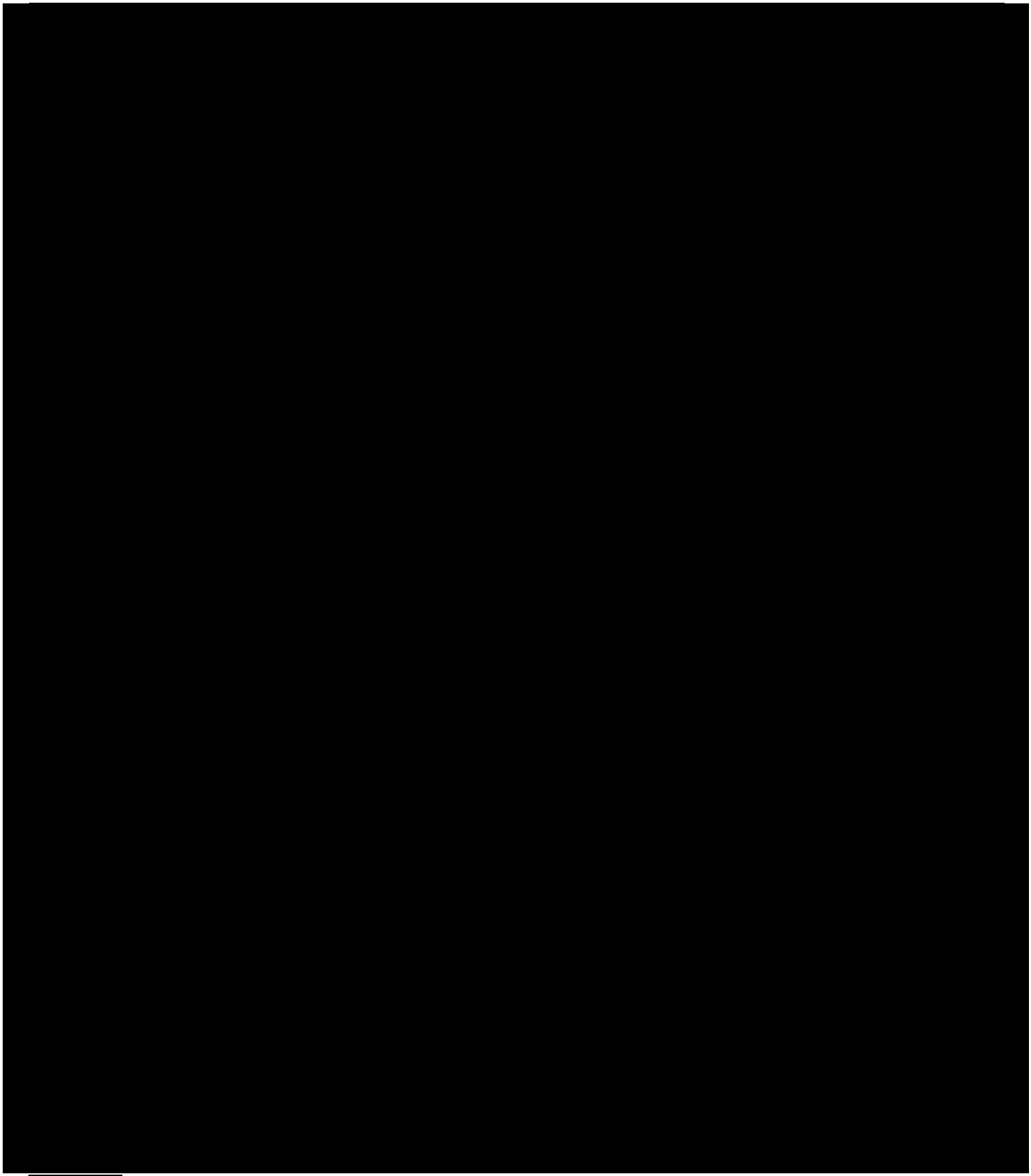
Detail Report



Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB



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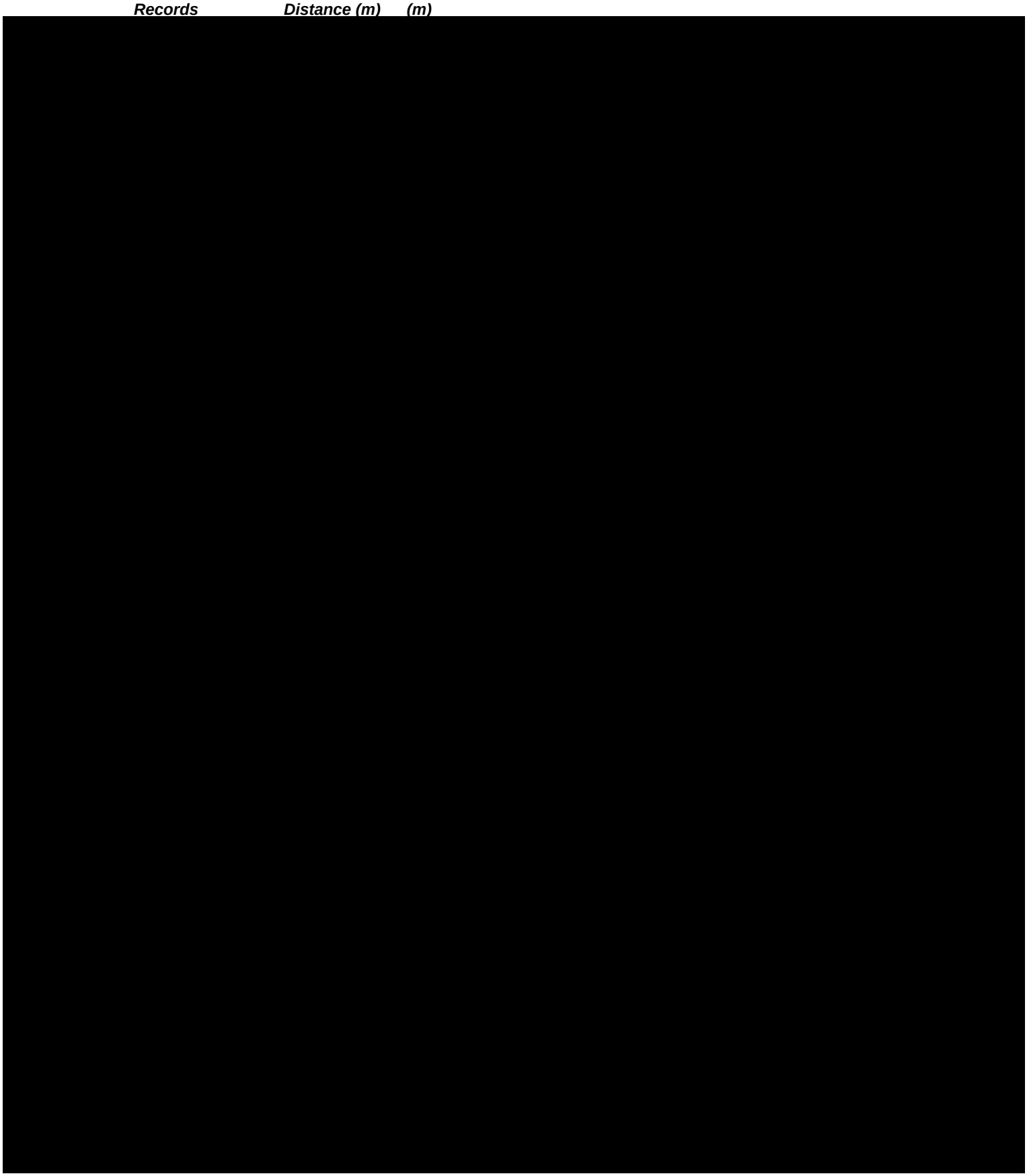
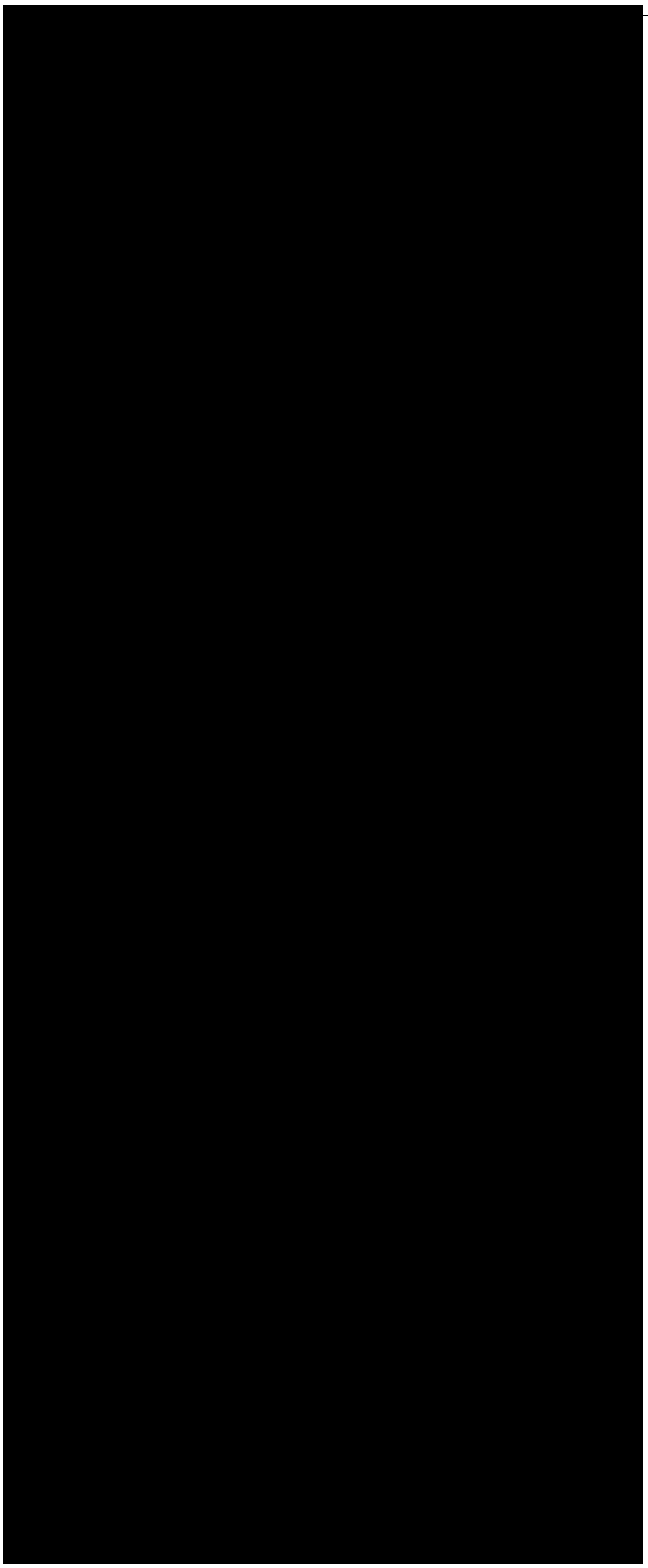
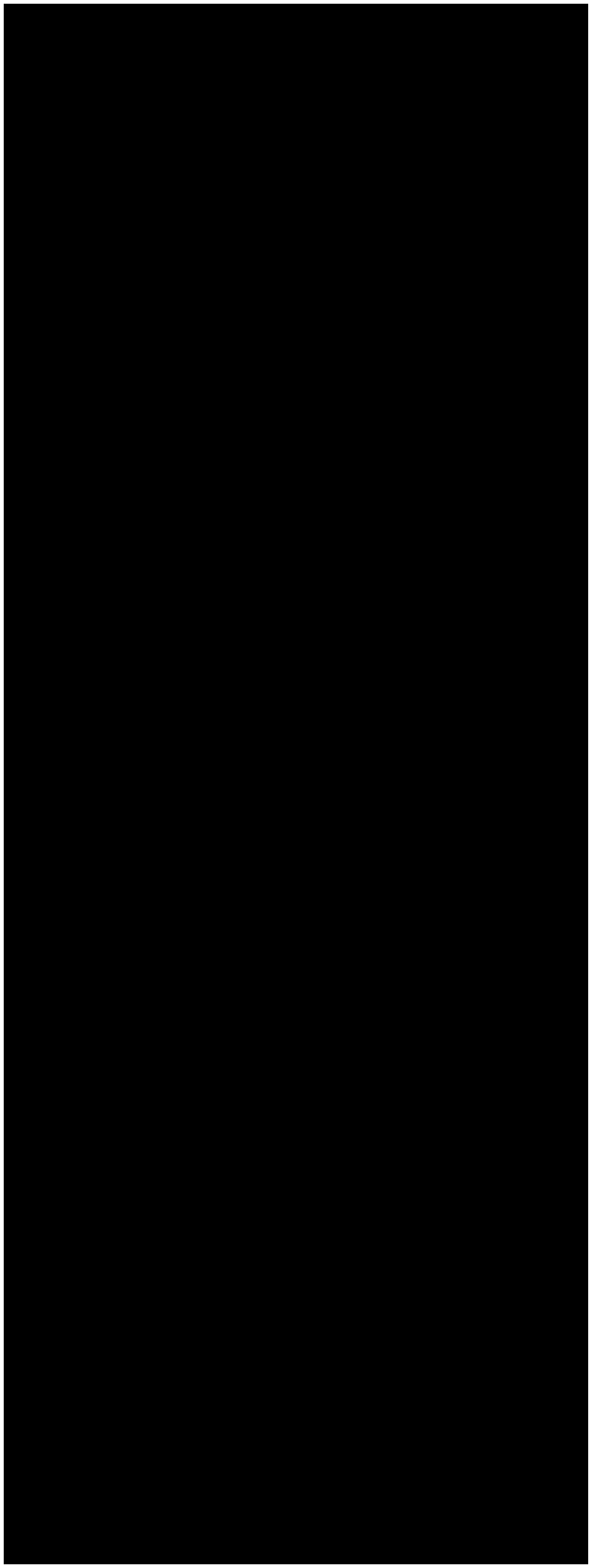
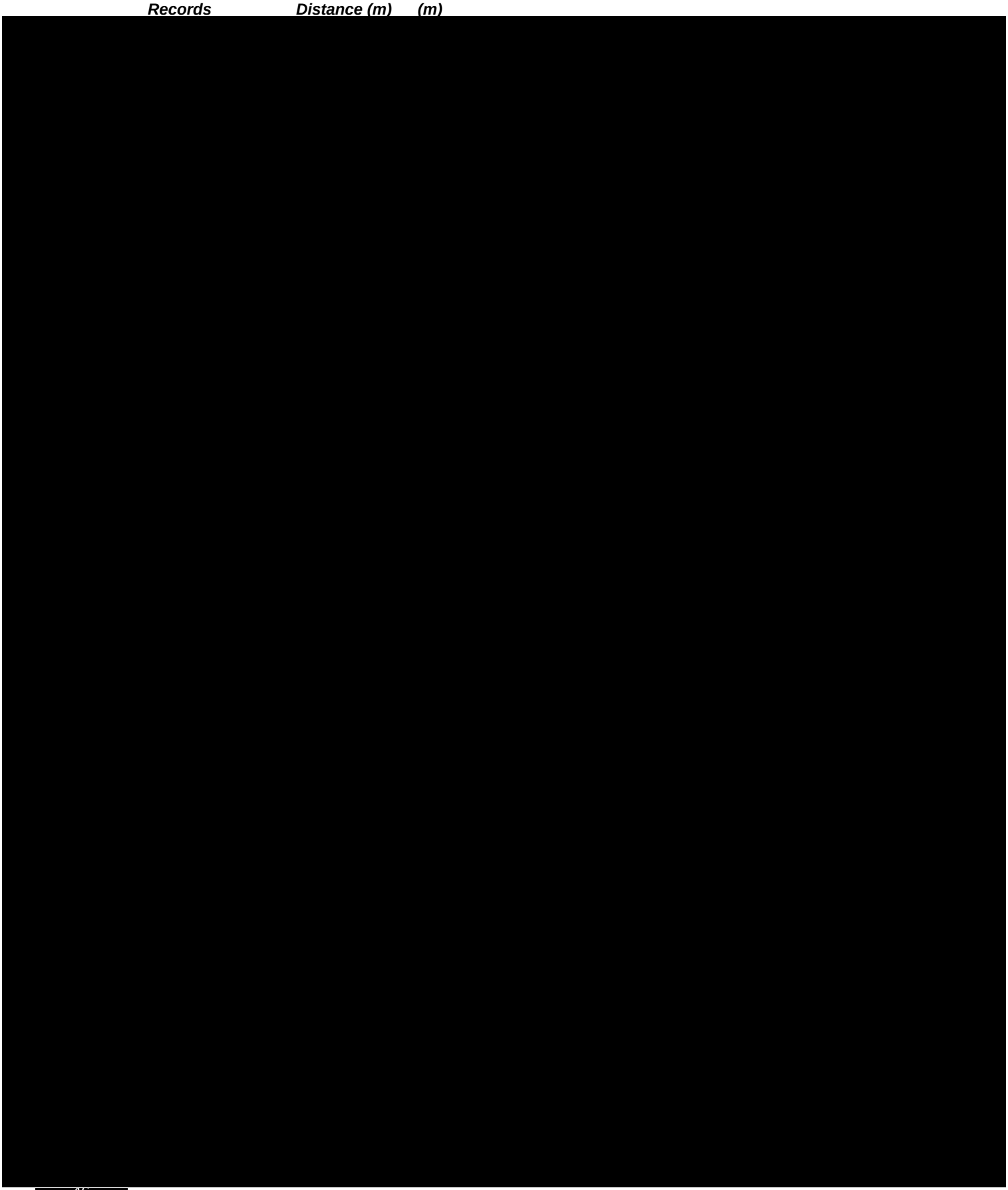
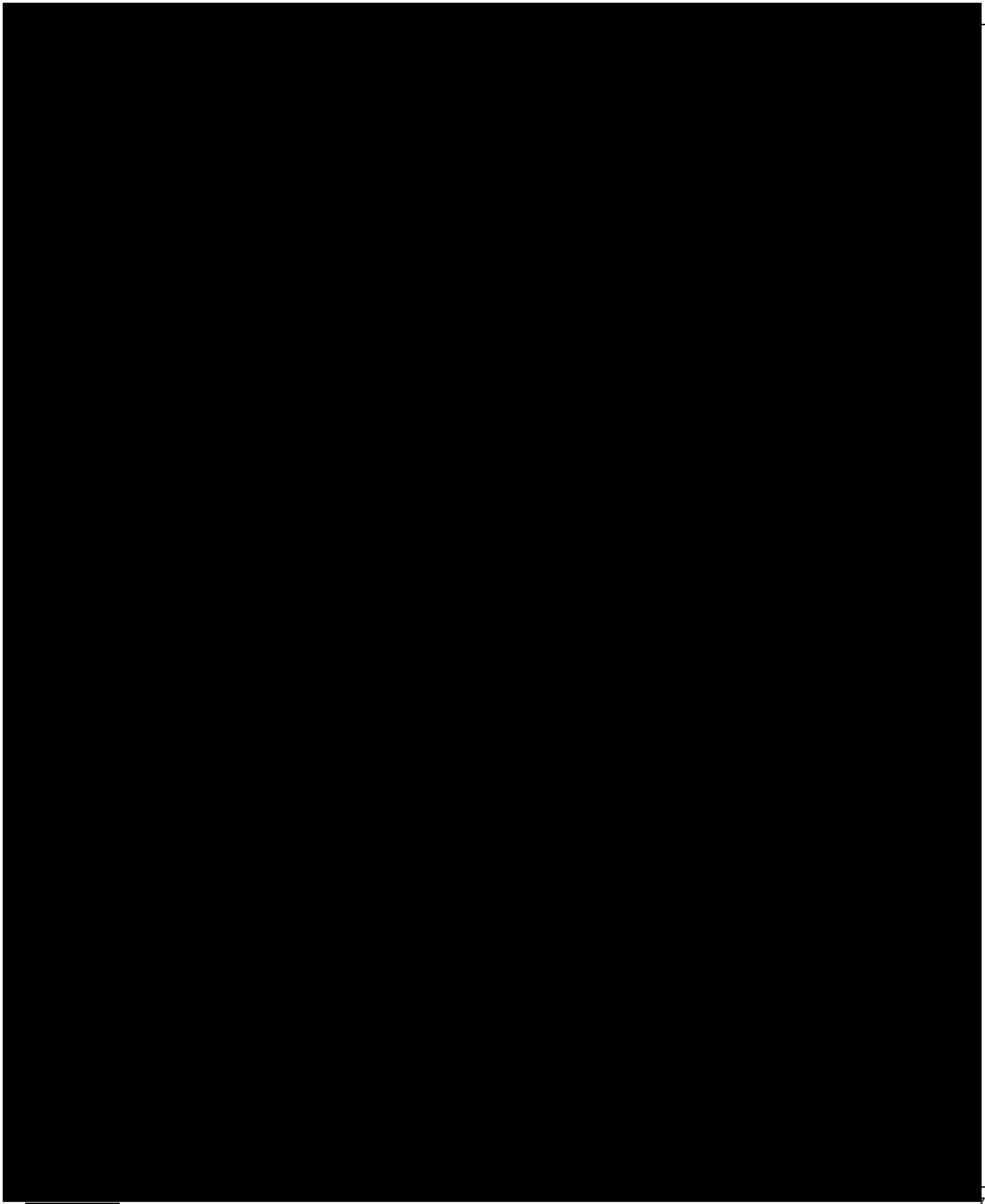


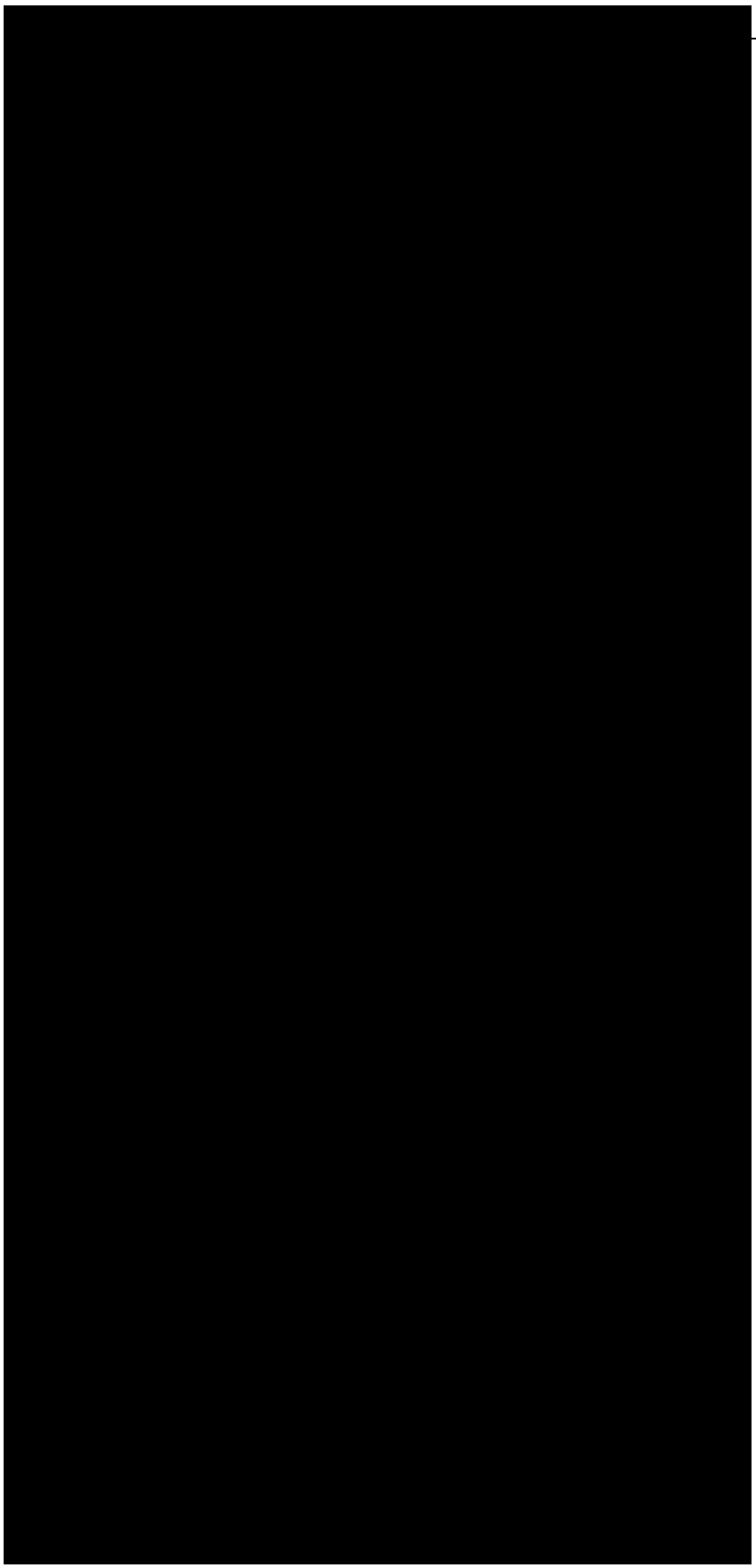




Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB







Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

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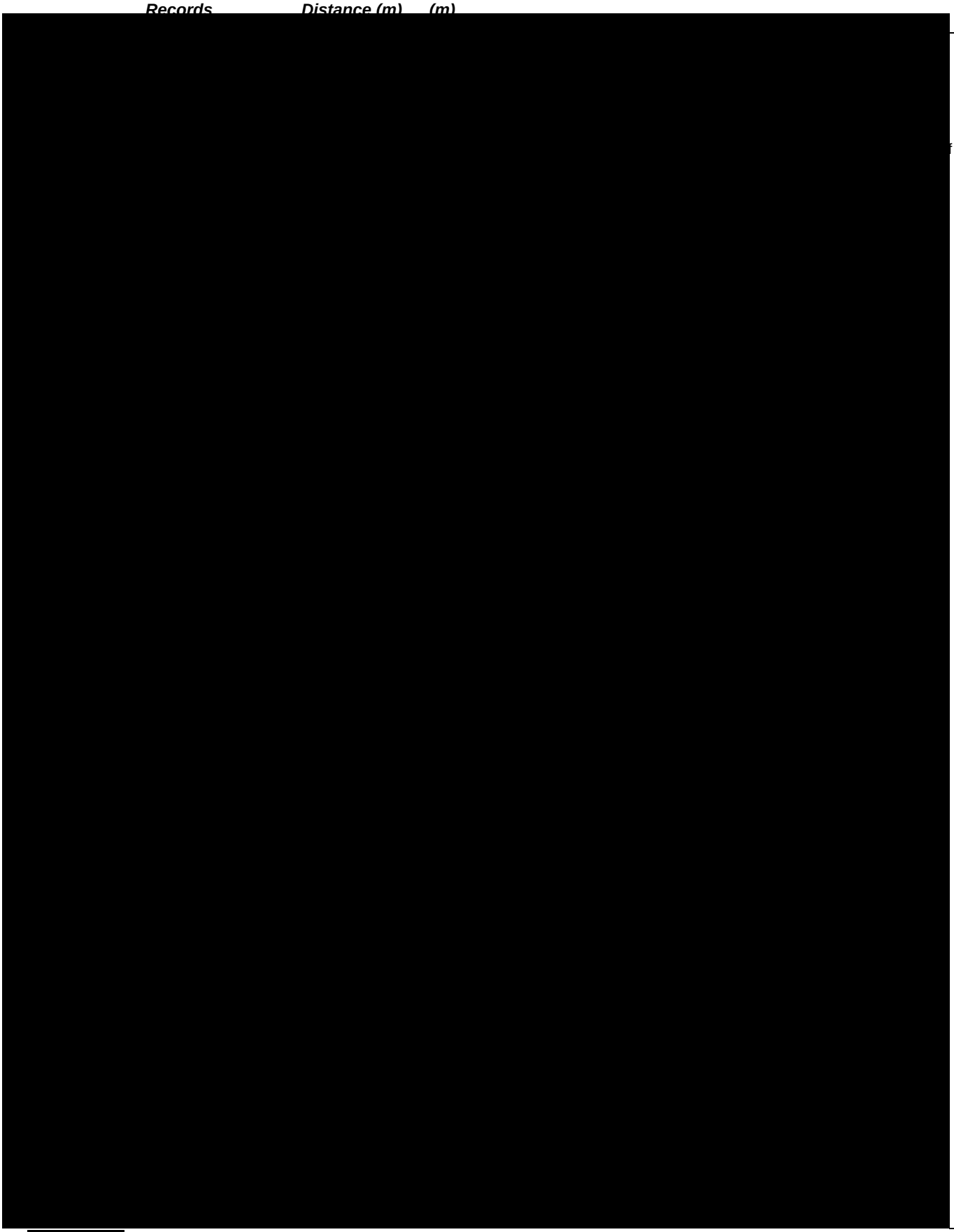
Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB



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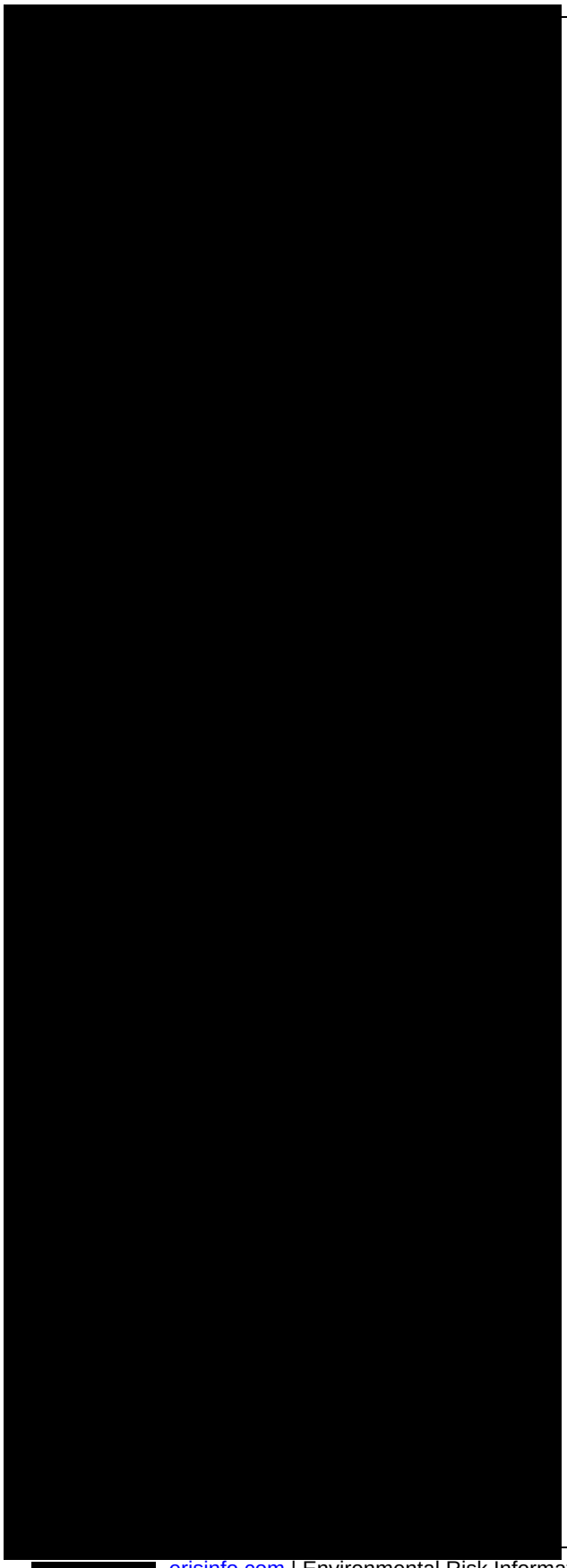
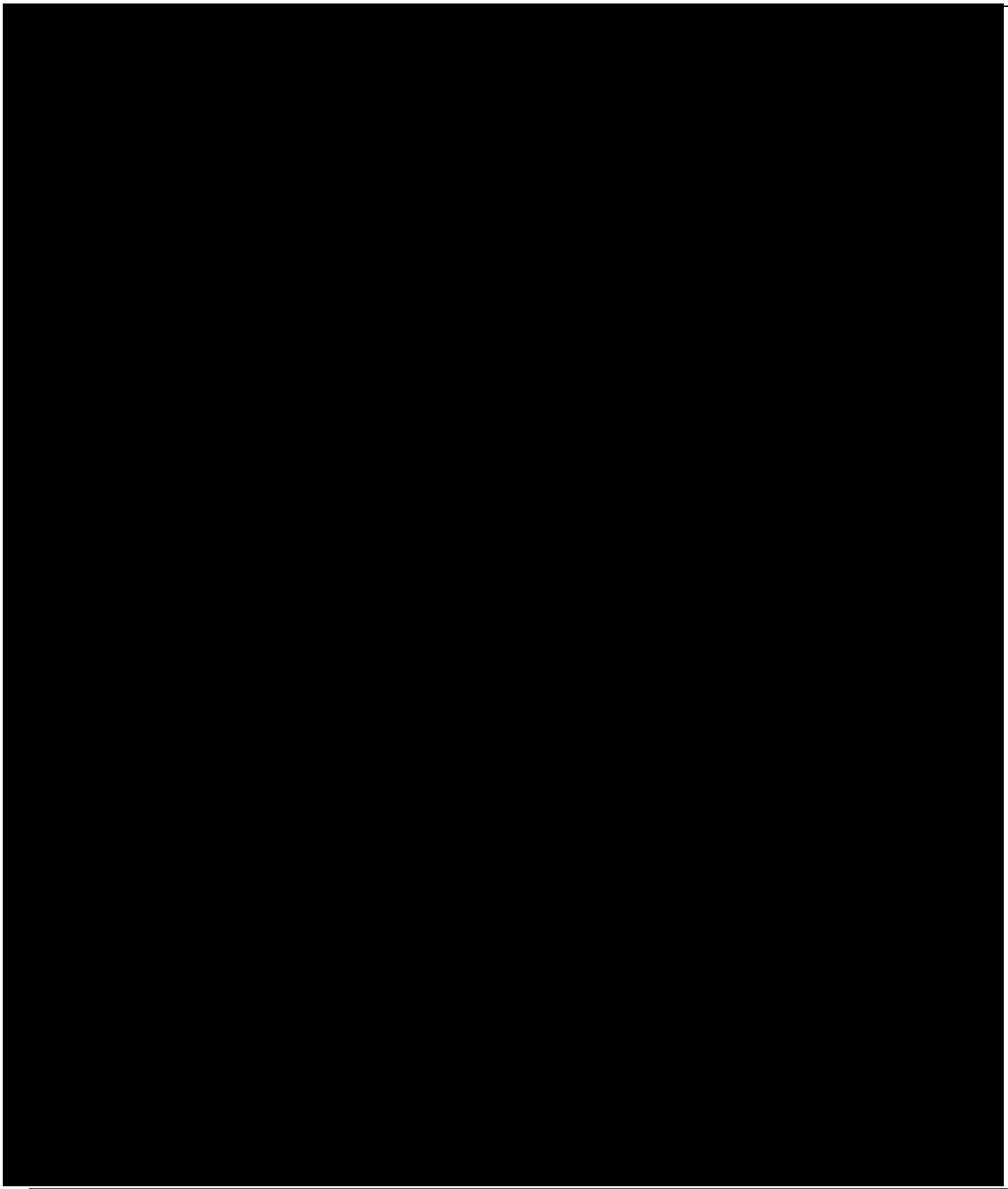


Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB



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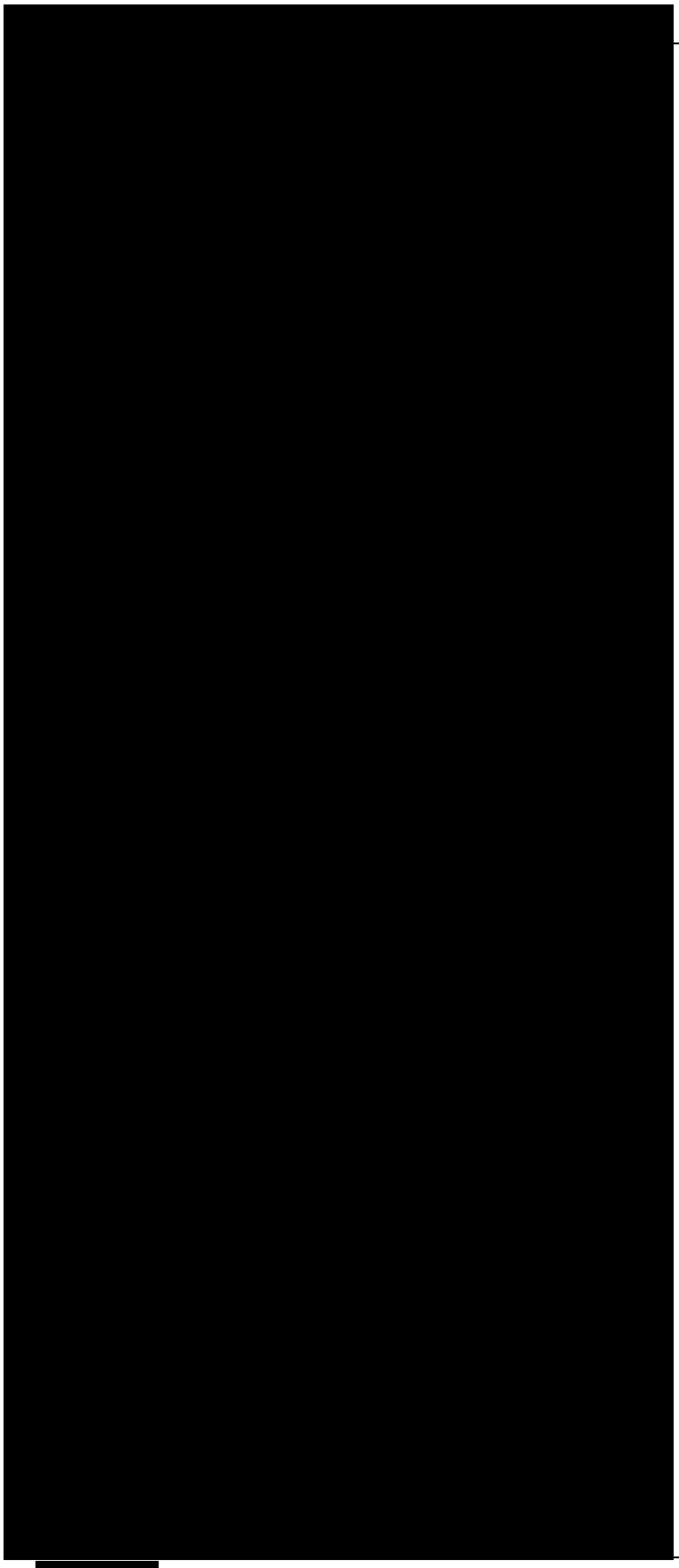

Map Key	Number of	Direction/	Elev/Diff	Site	DB

Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

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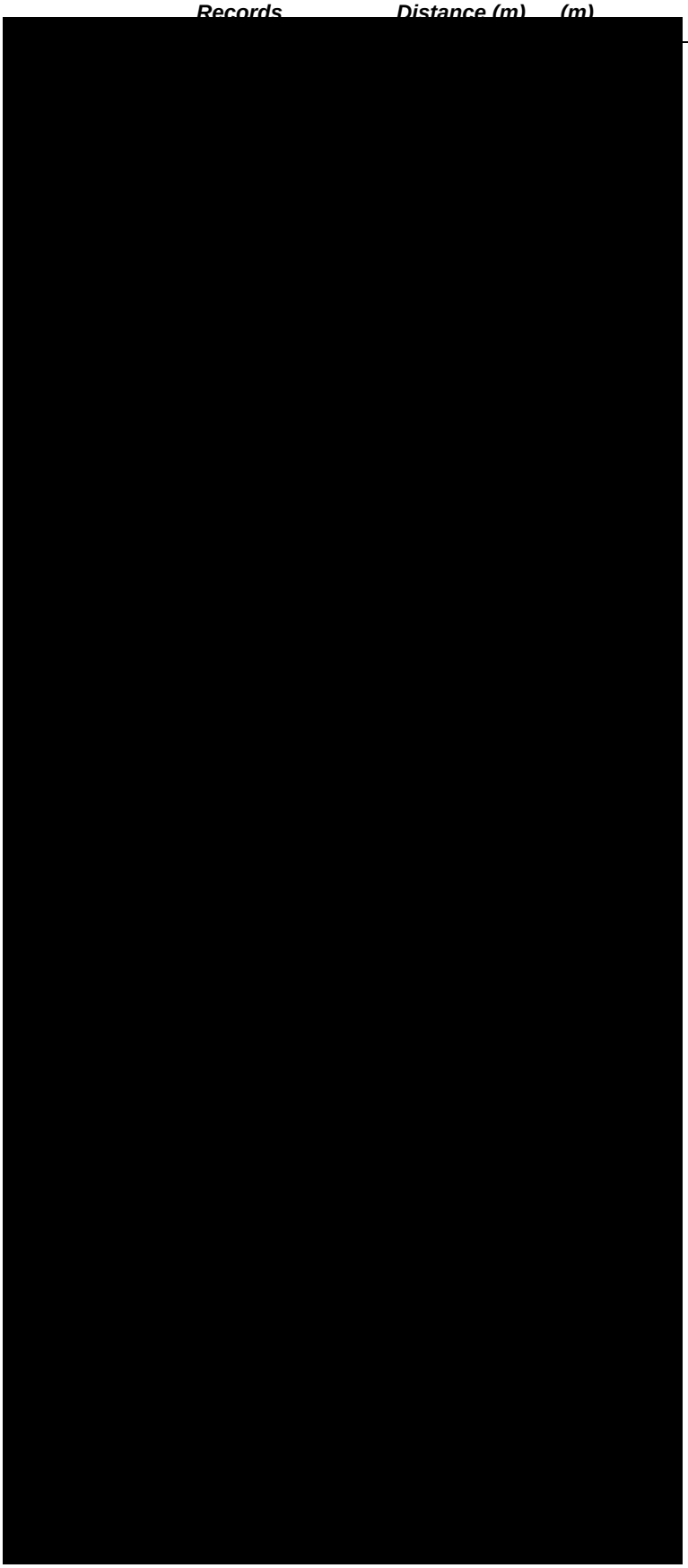
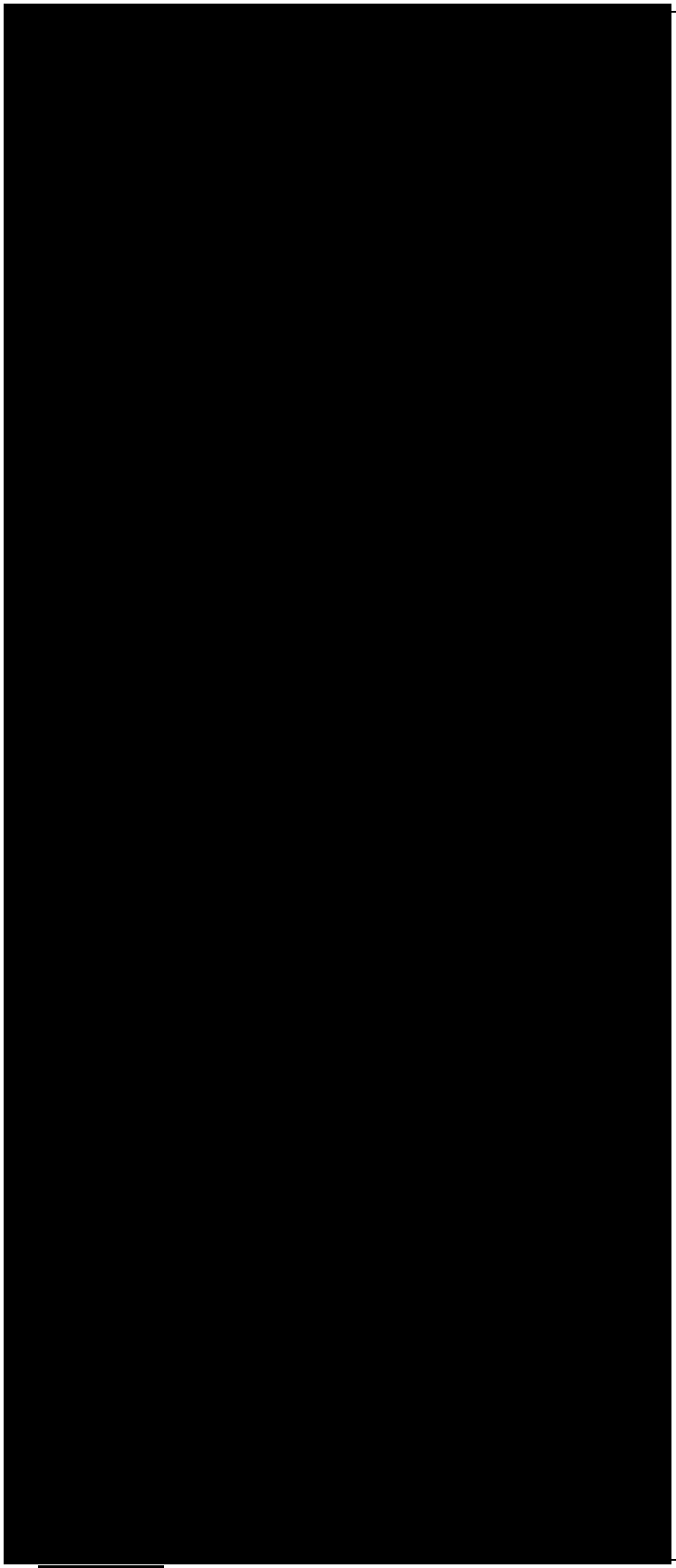
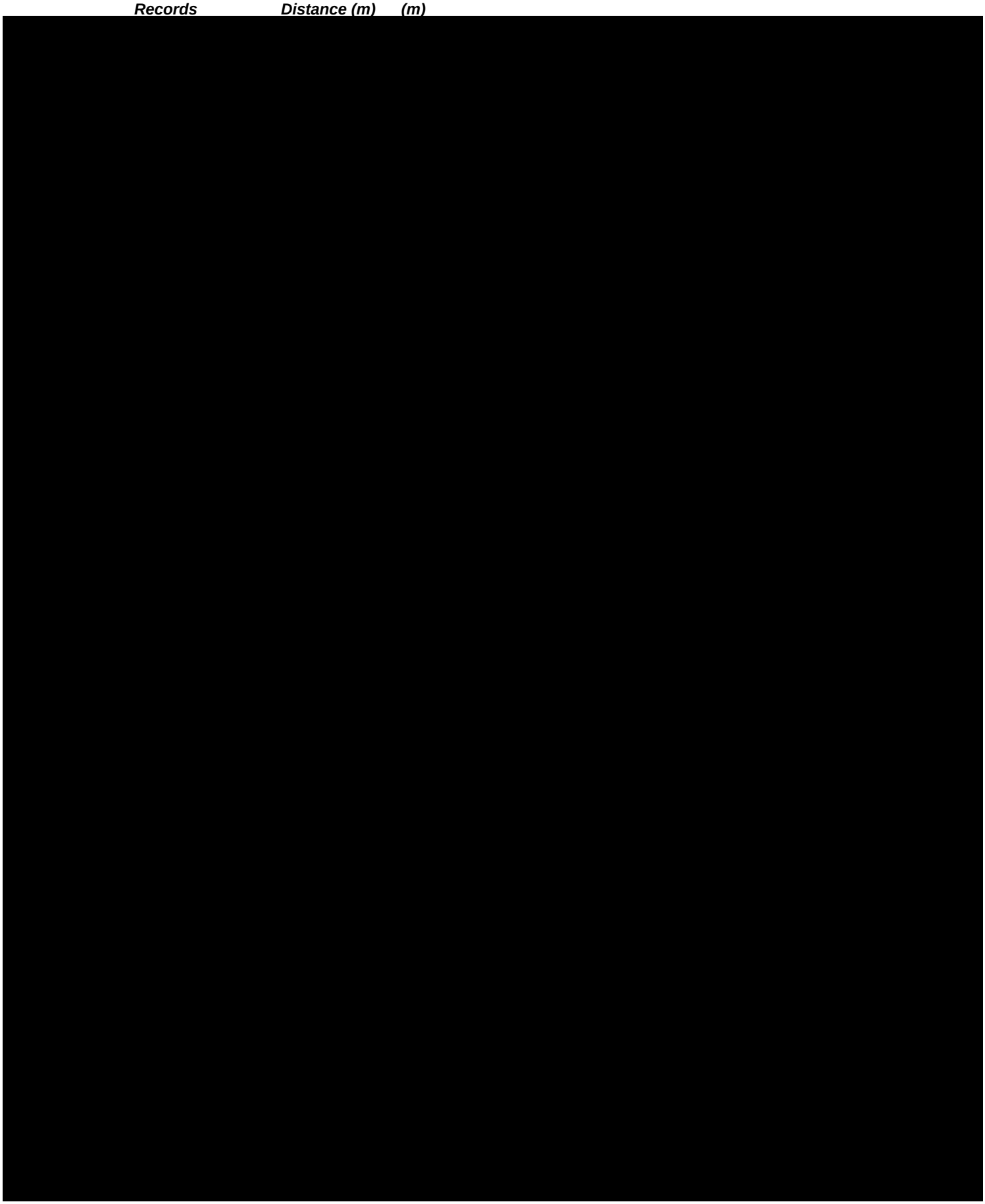
Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB



Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB



Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB



Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB

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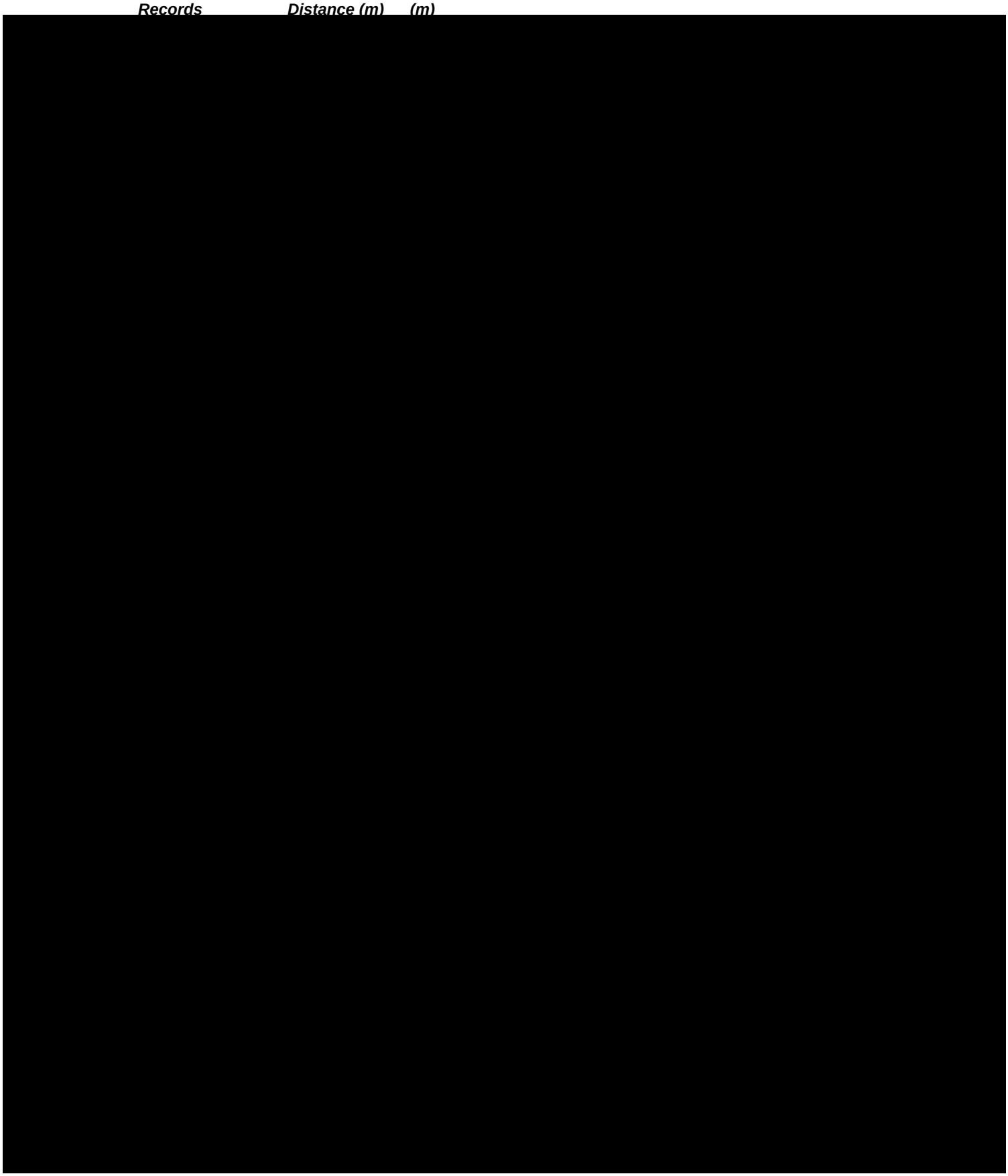
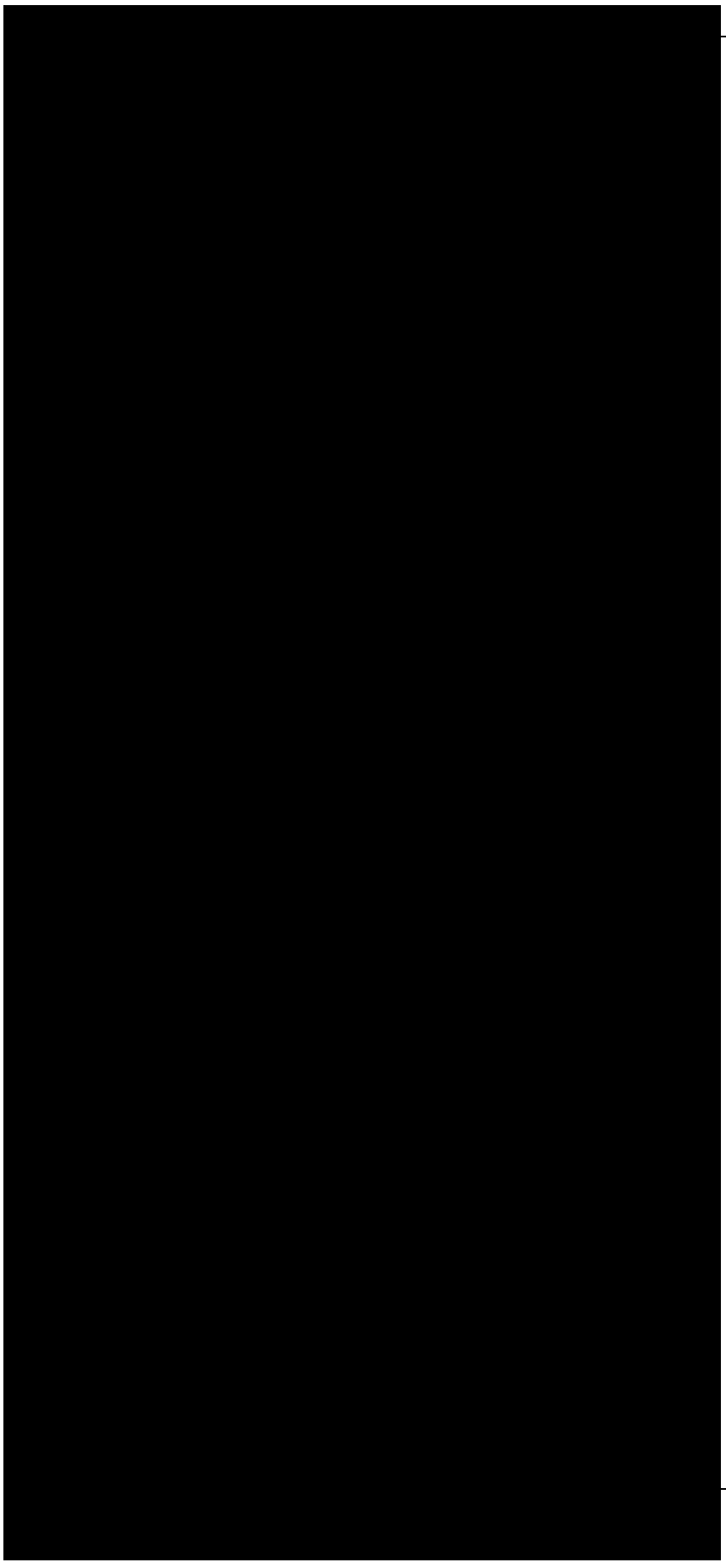
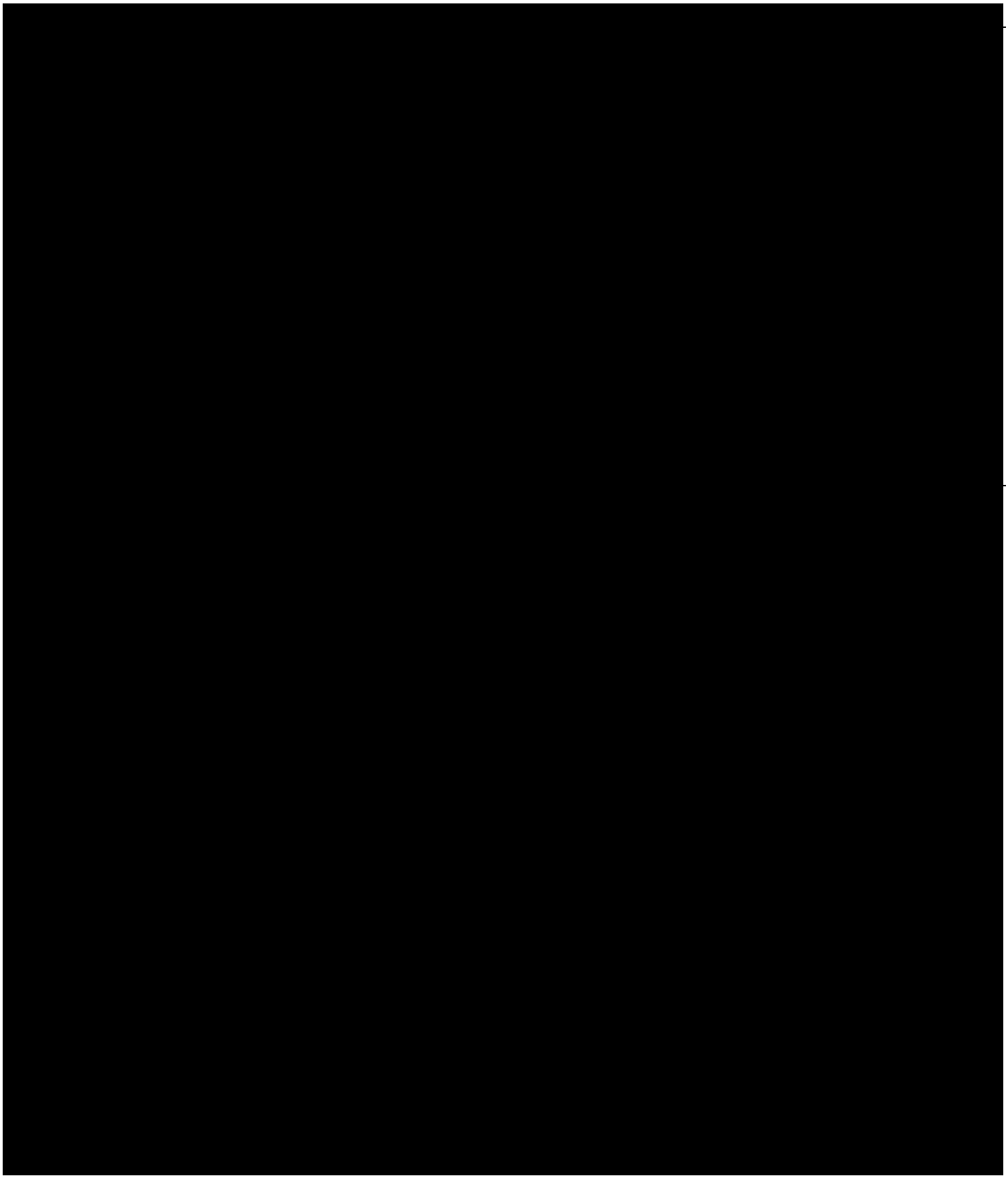
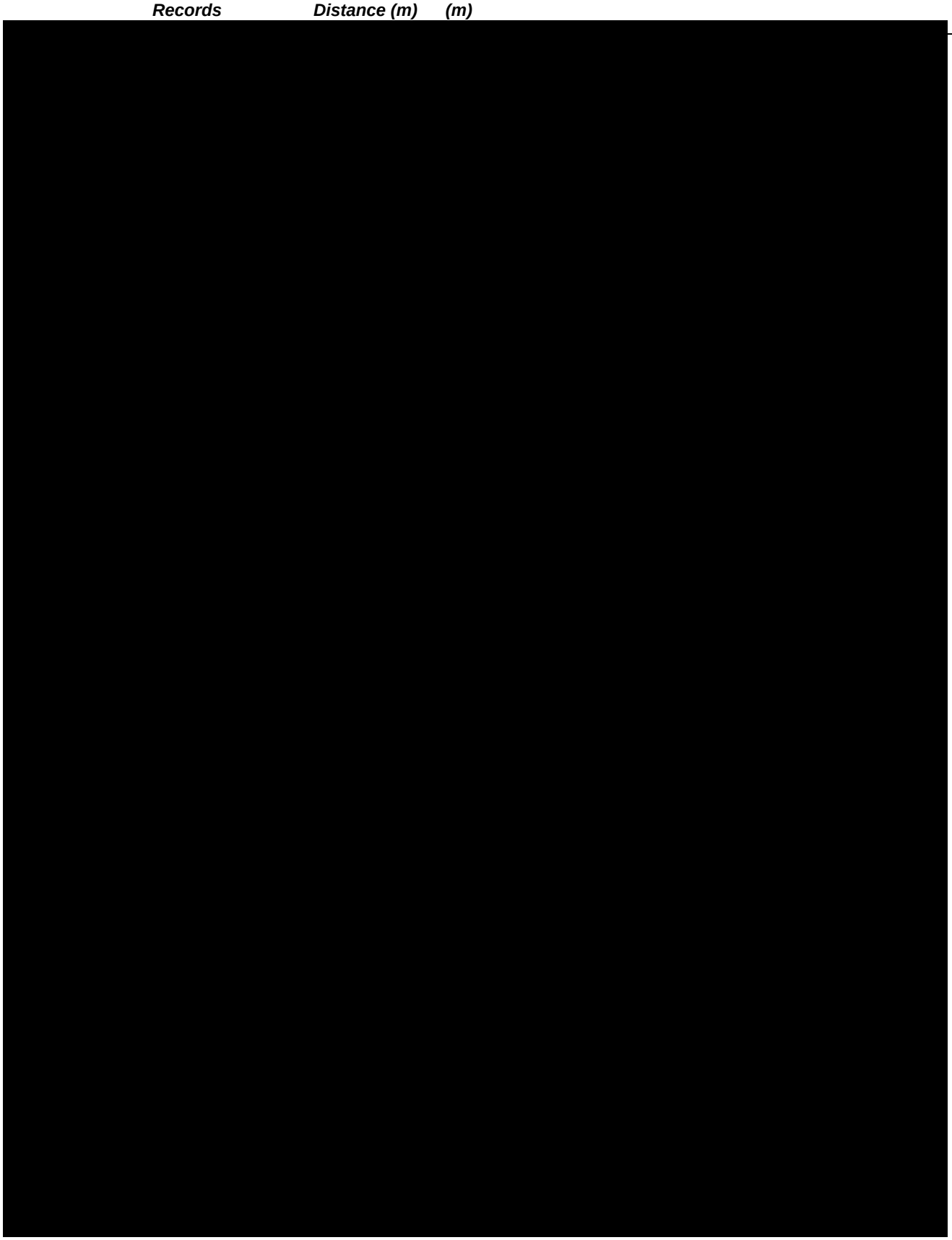
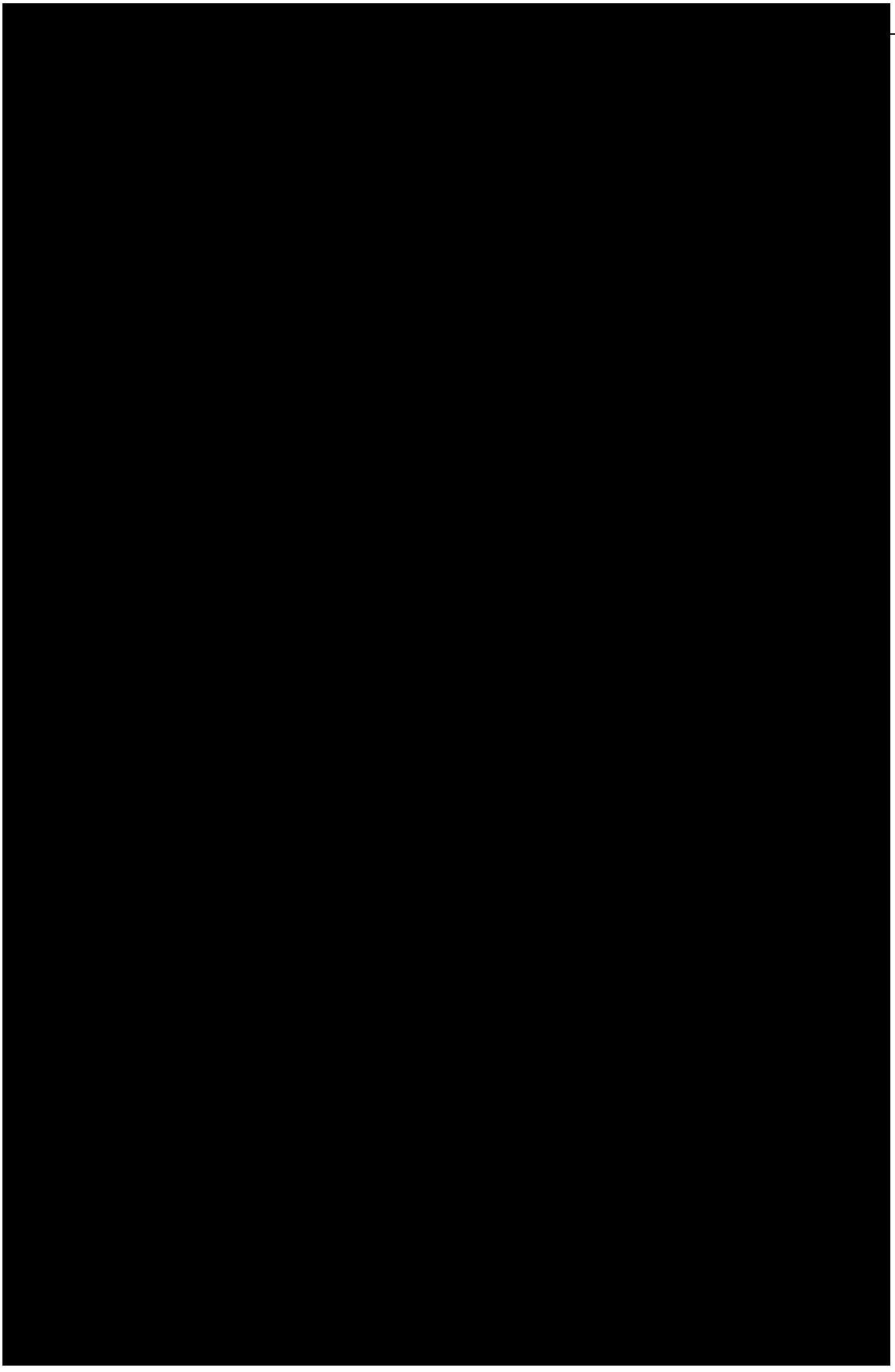
Map Key	Number of Records	Direction/ Distance (m)	Elev/Diff (m)	Site	DB











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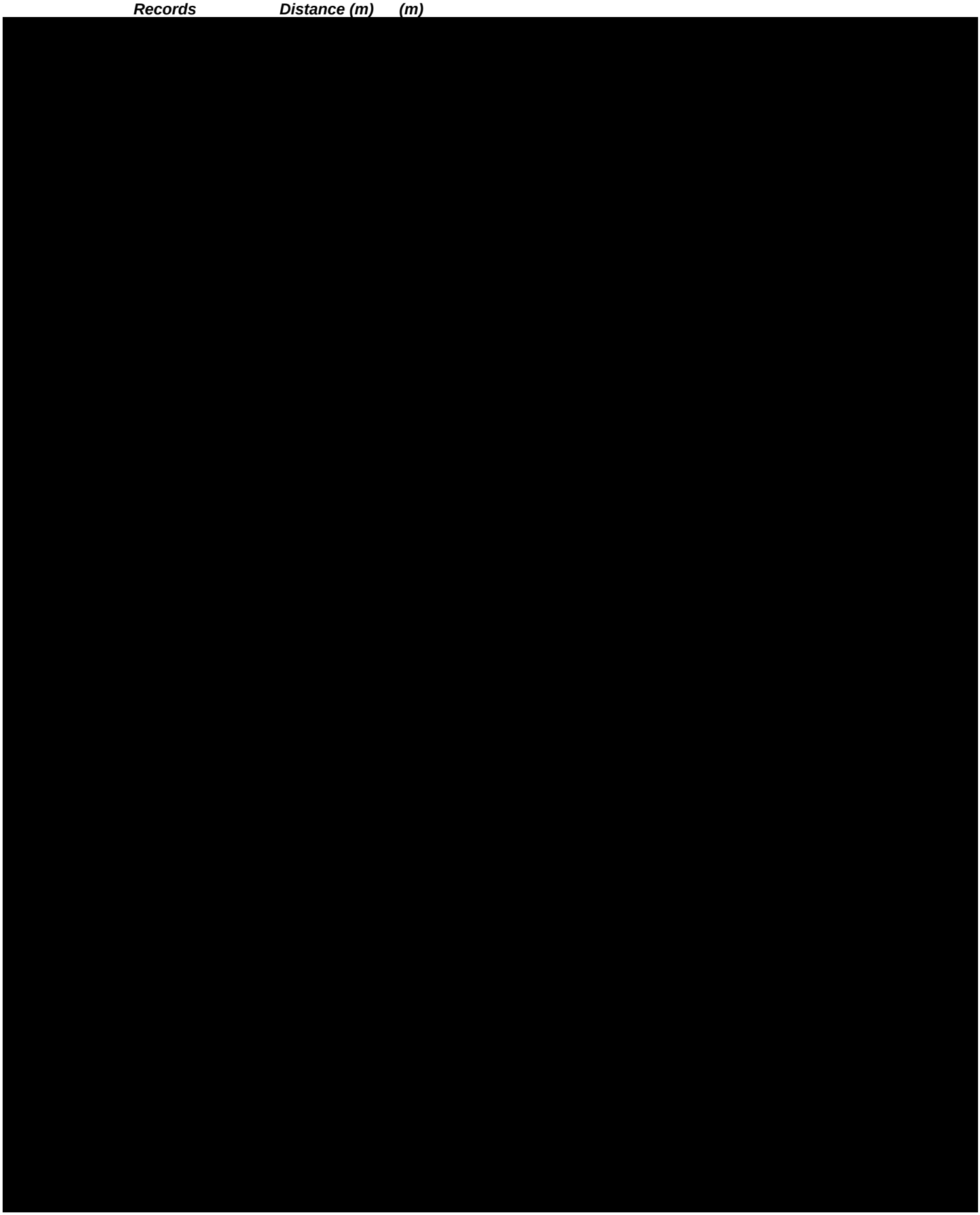

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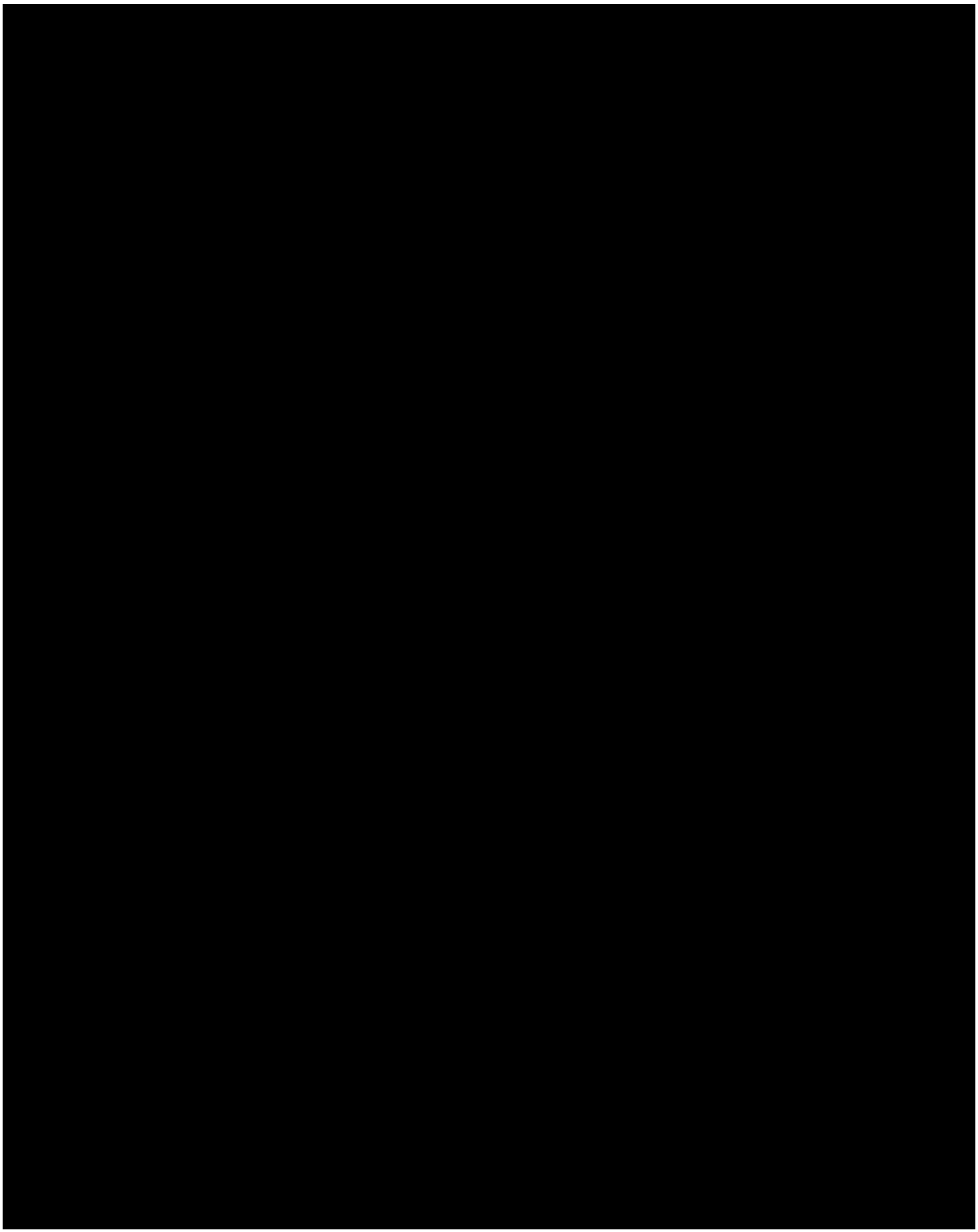

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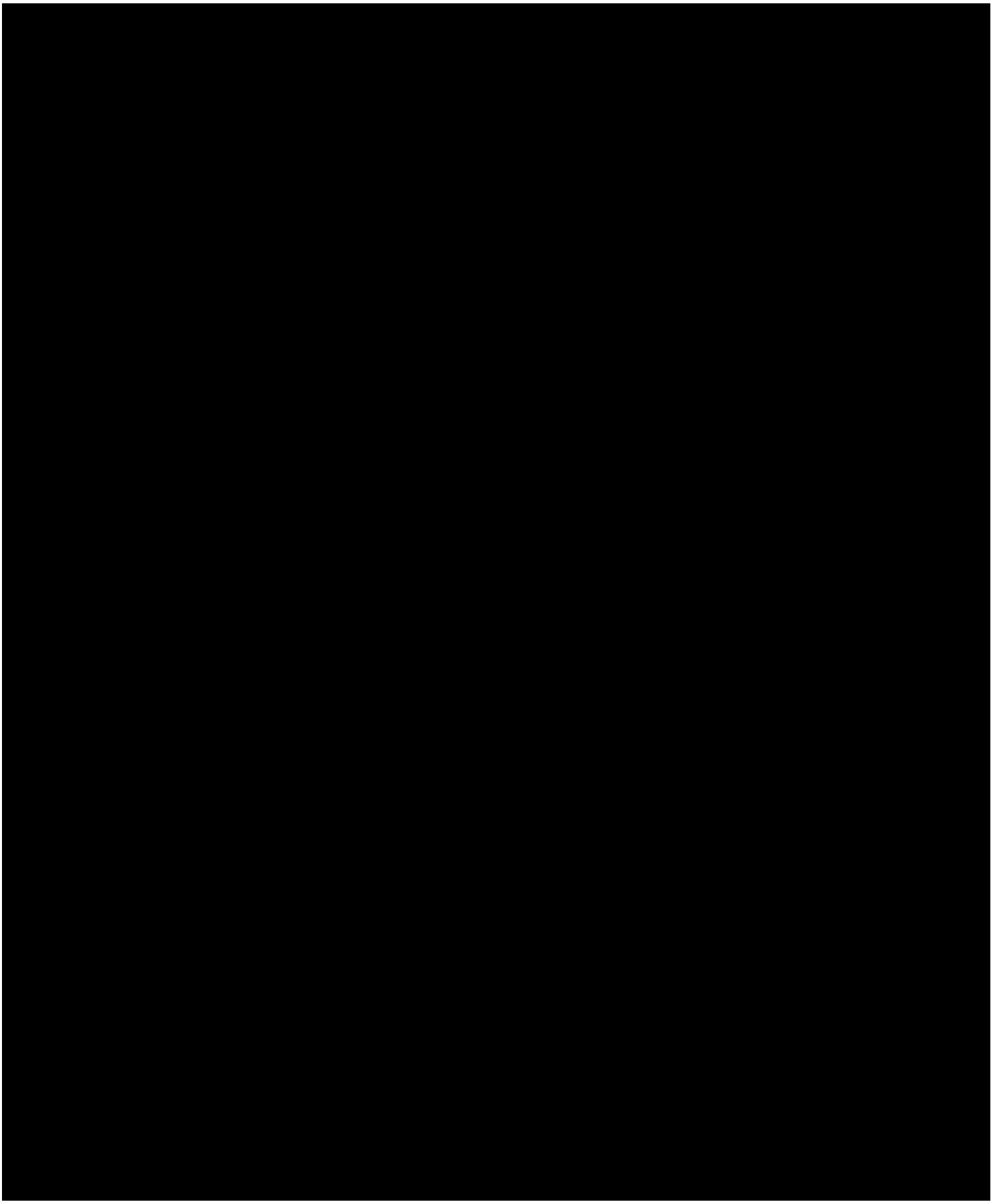

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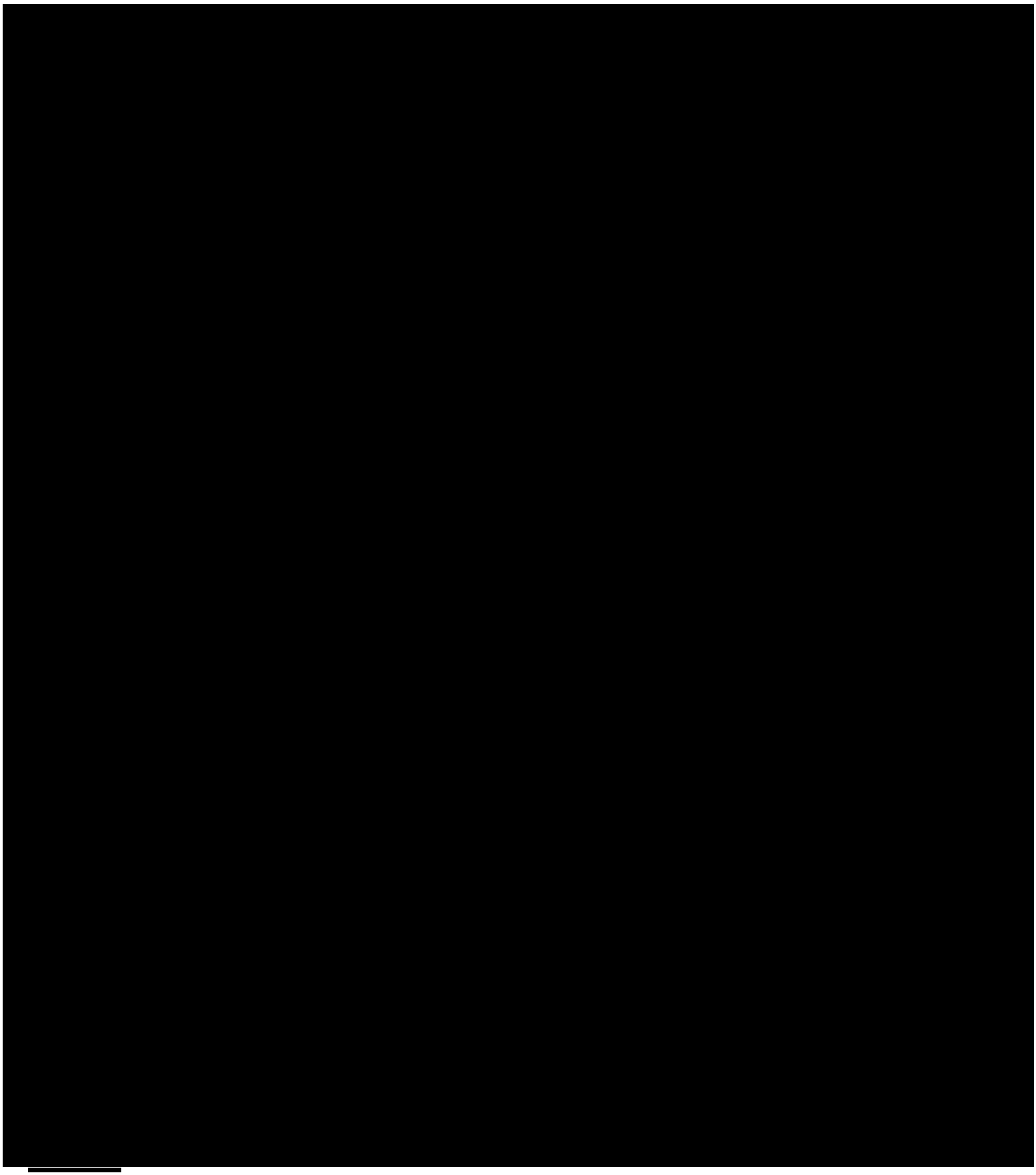

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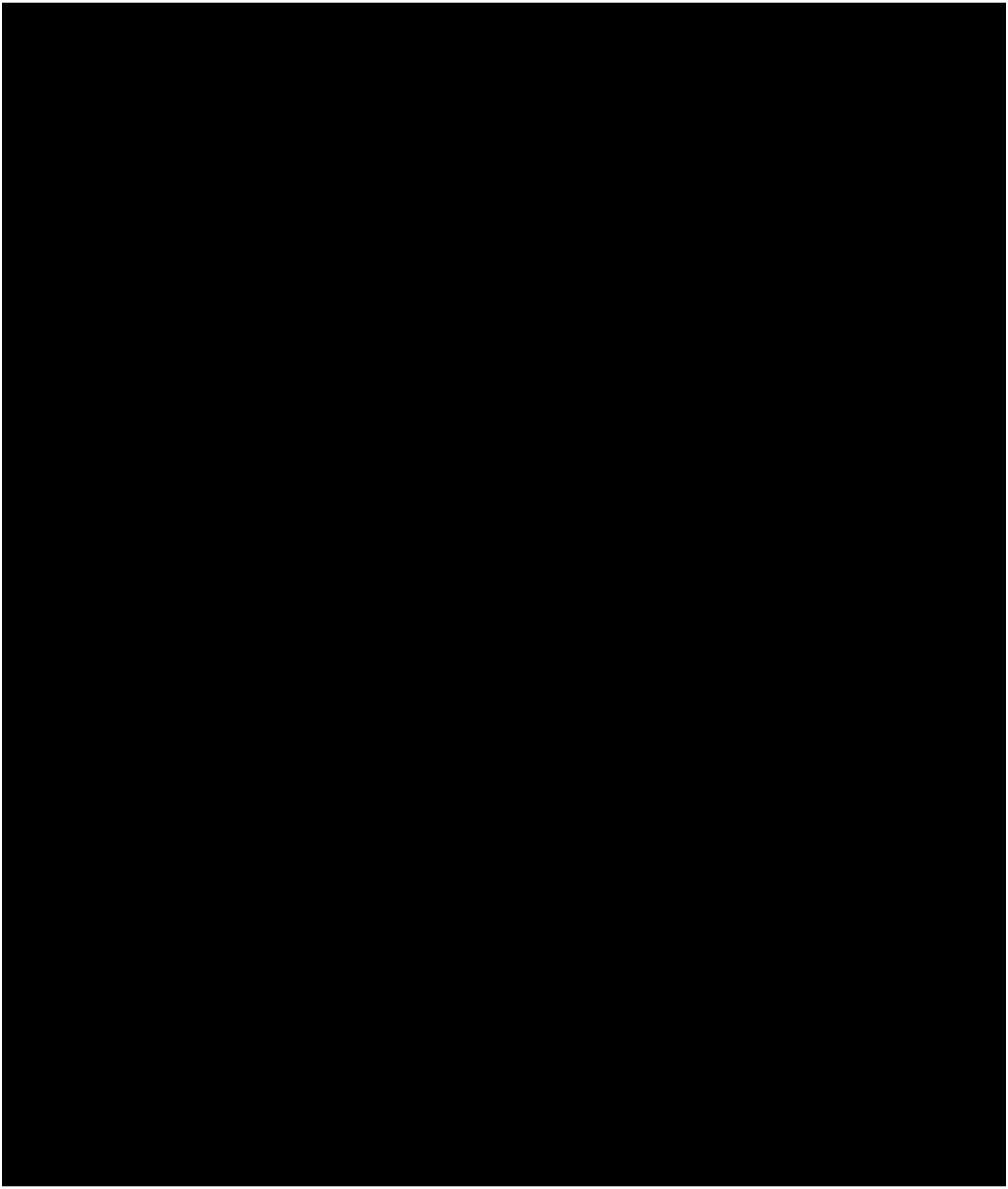

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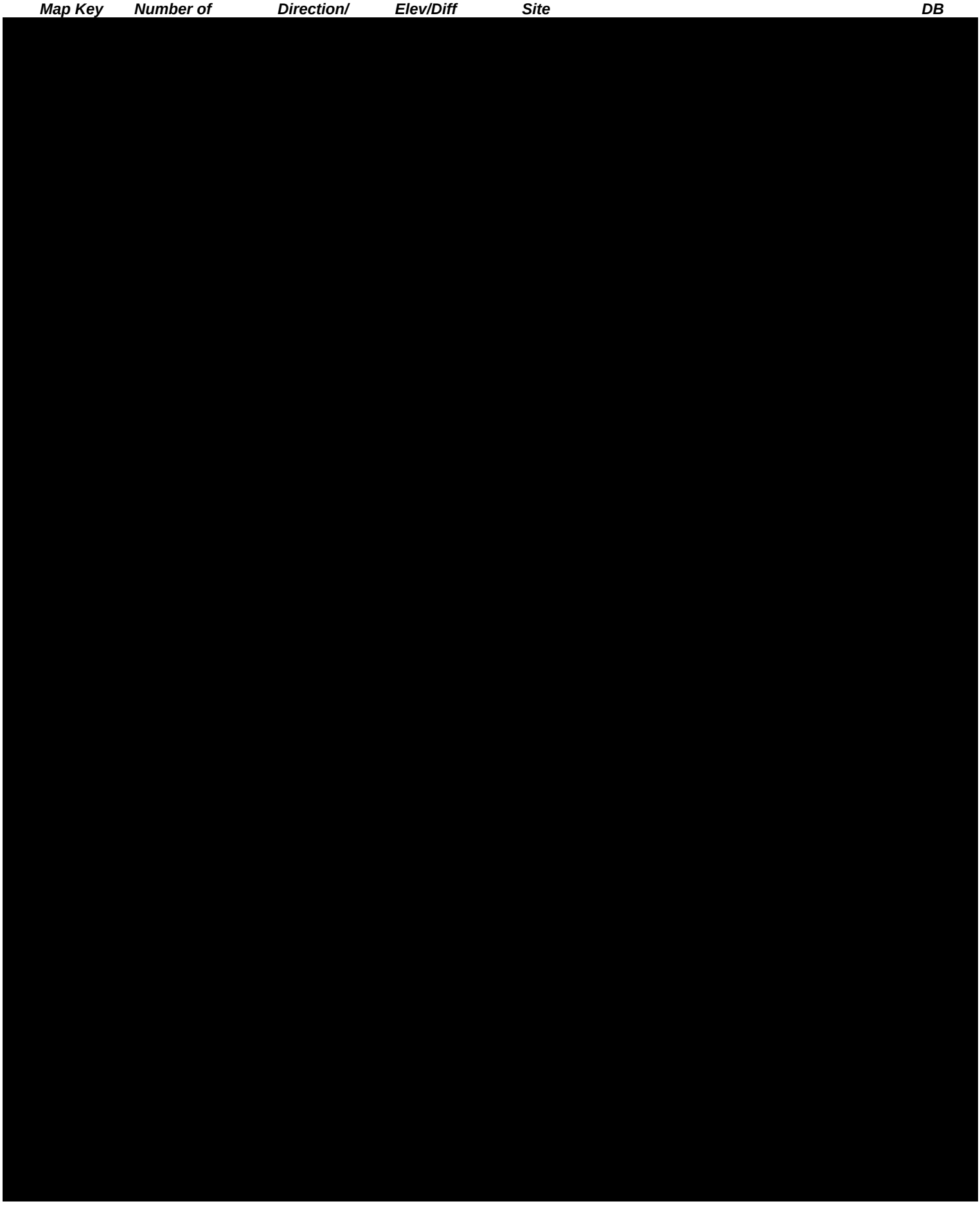

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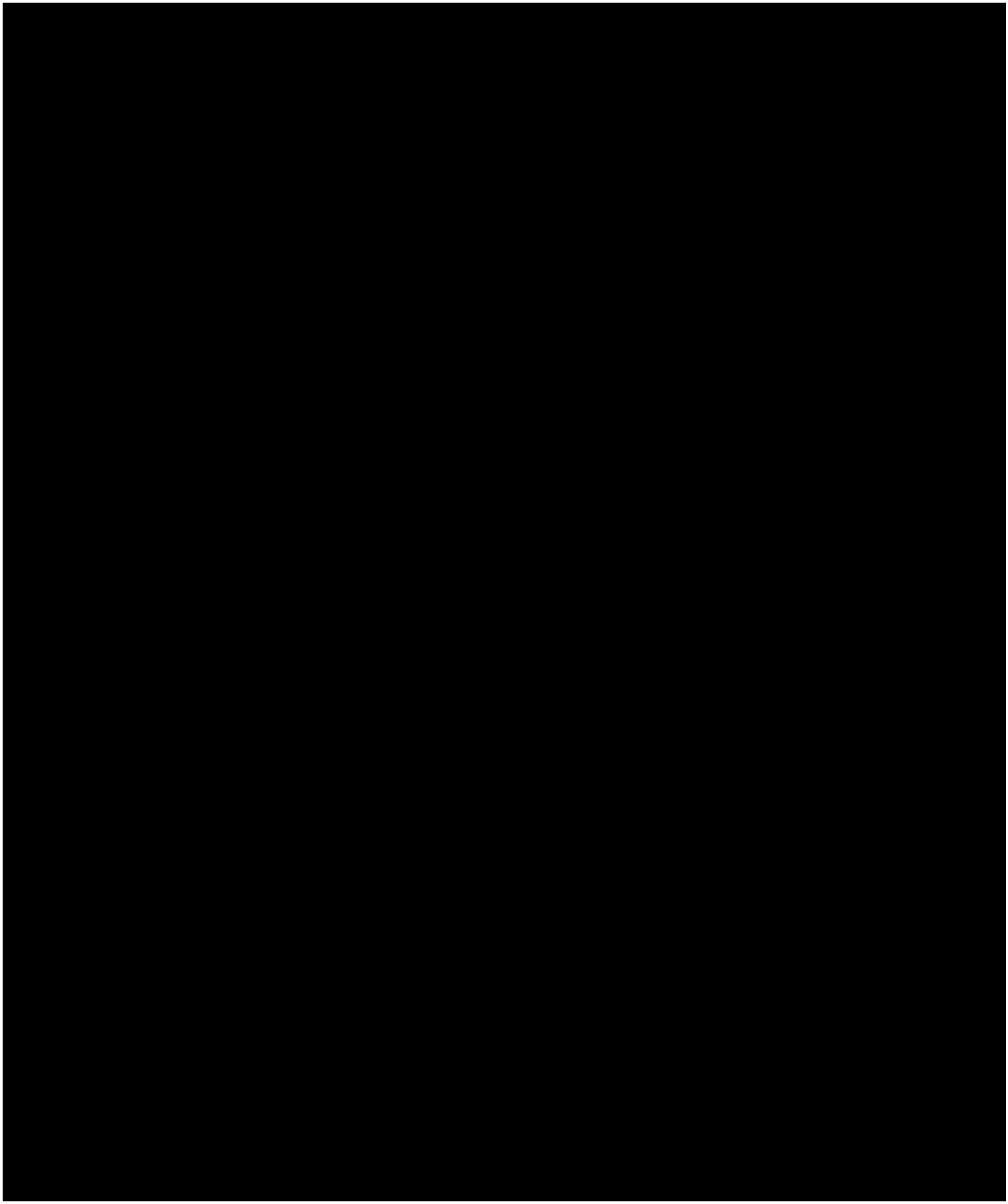

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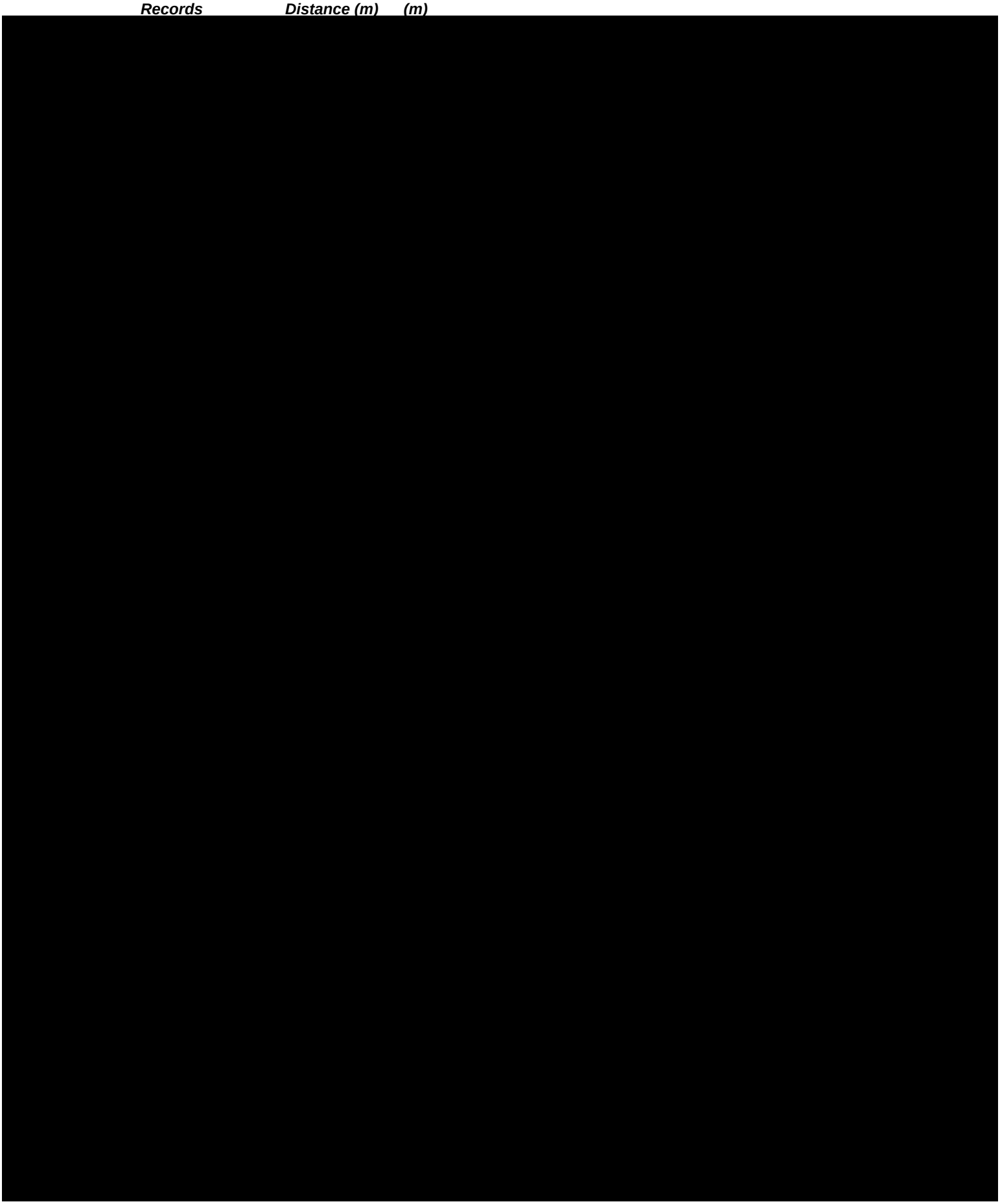

Map Key	Number of	Direction/	Elev/Diff	Site	DB

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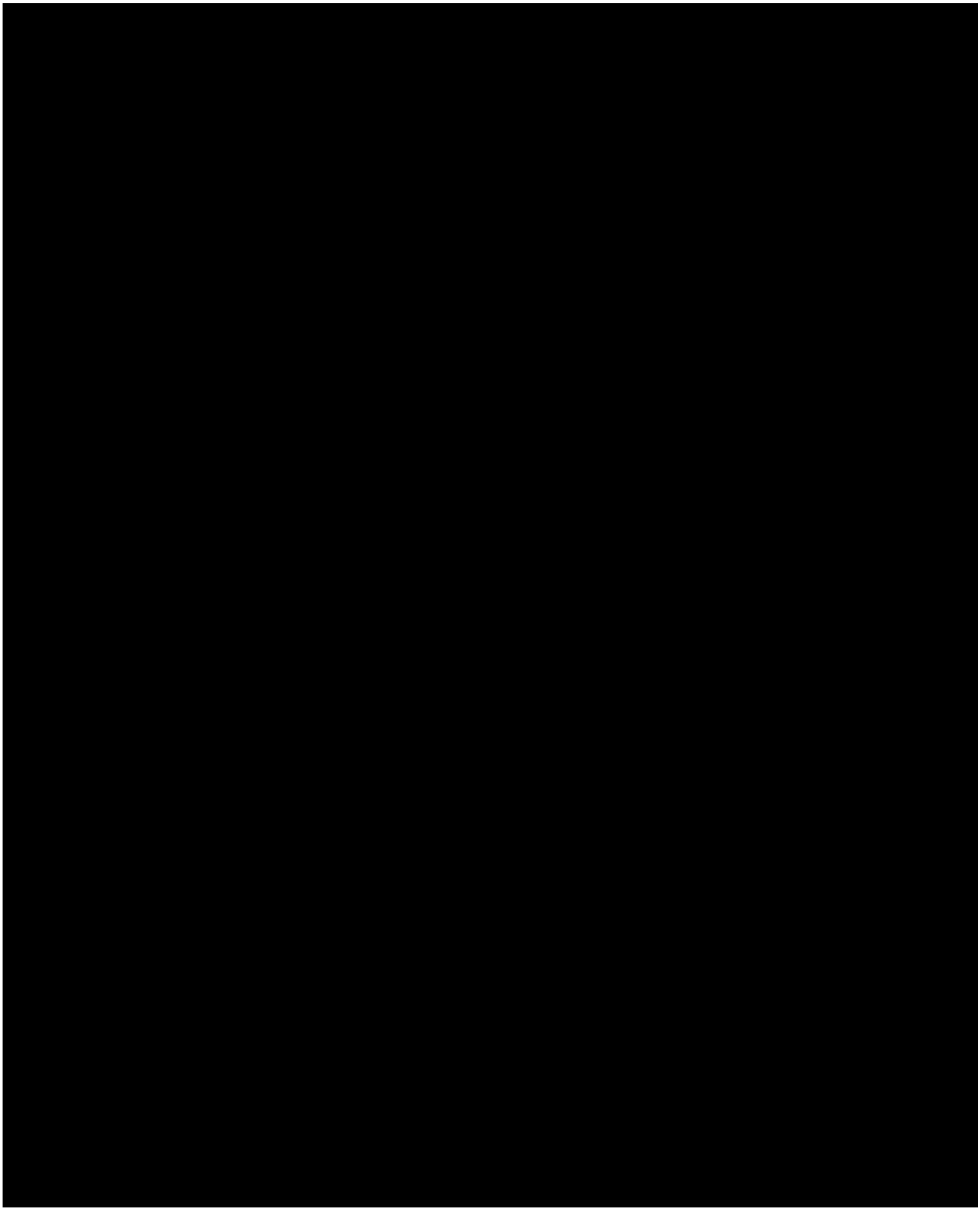
Map Key	Number of	Direction/	Elev/Diff	Site	DB



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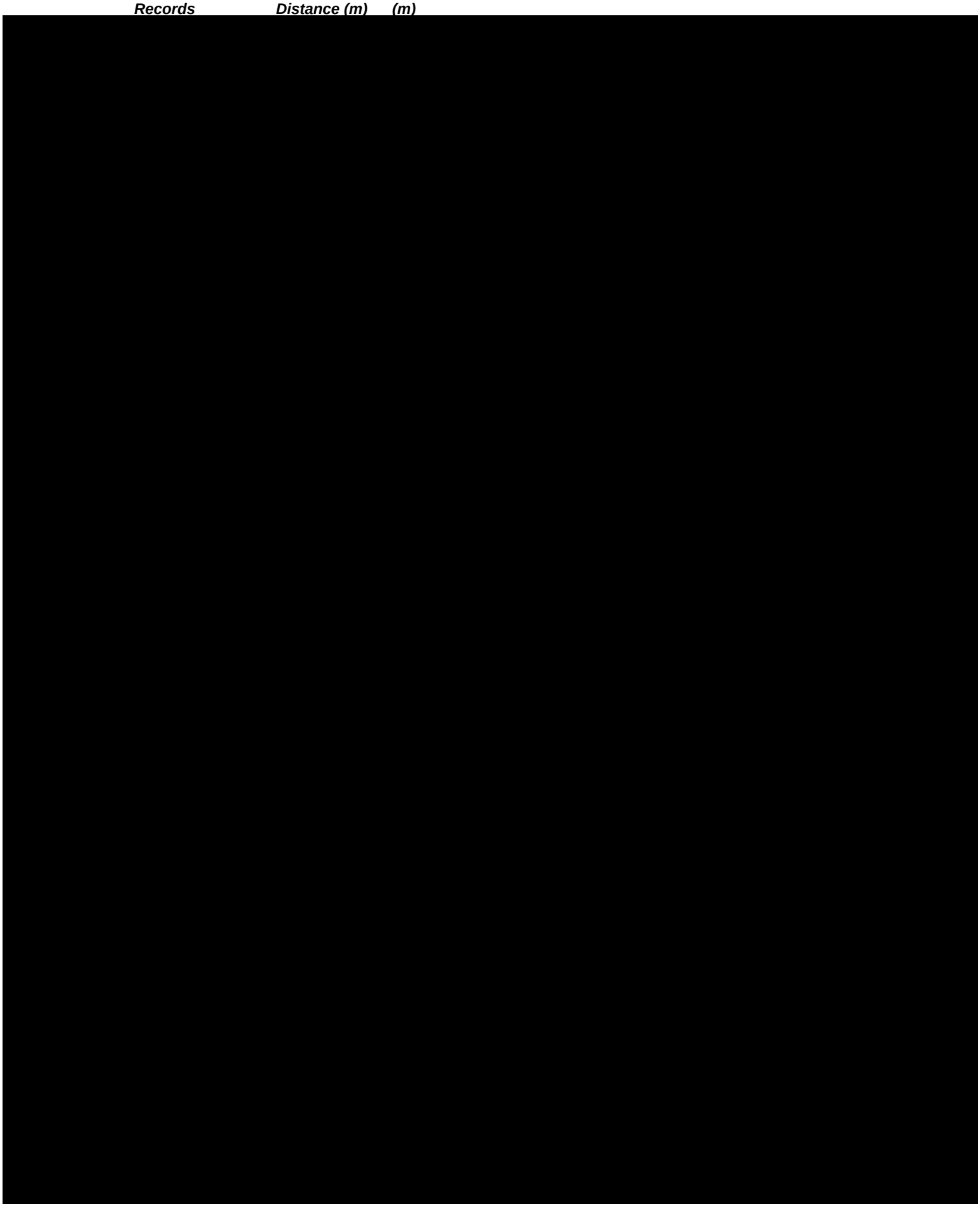

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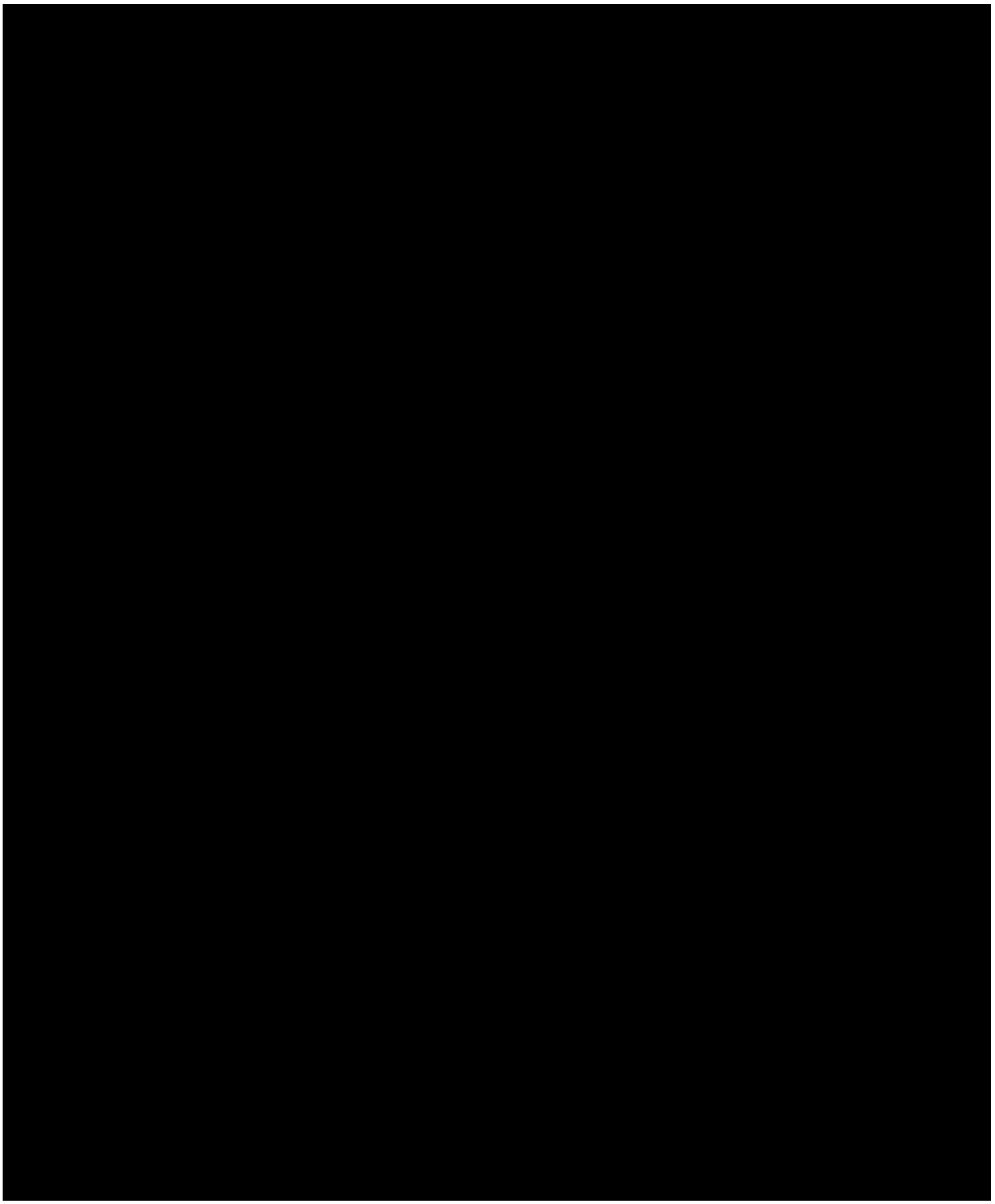
Map Key	Number of	Direction/	Elev/Diff	Site	DB



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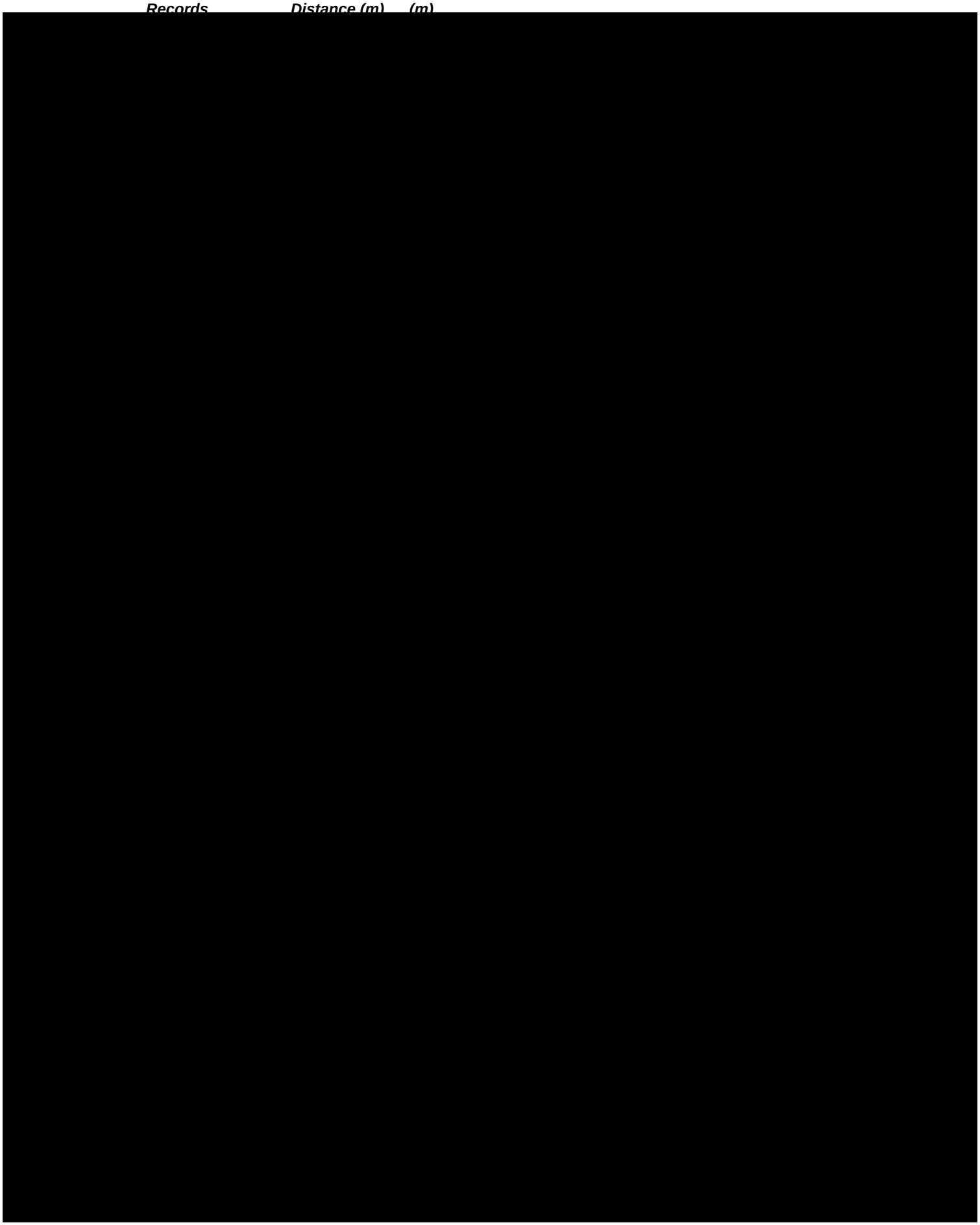

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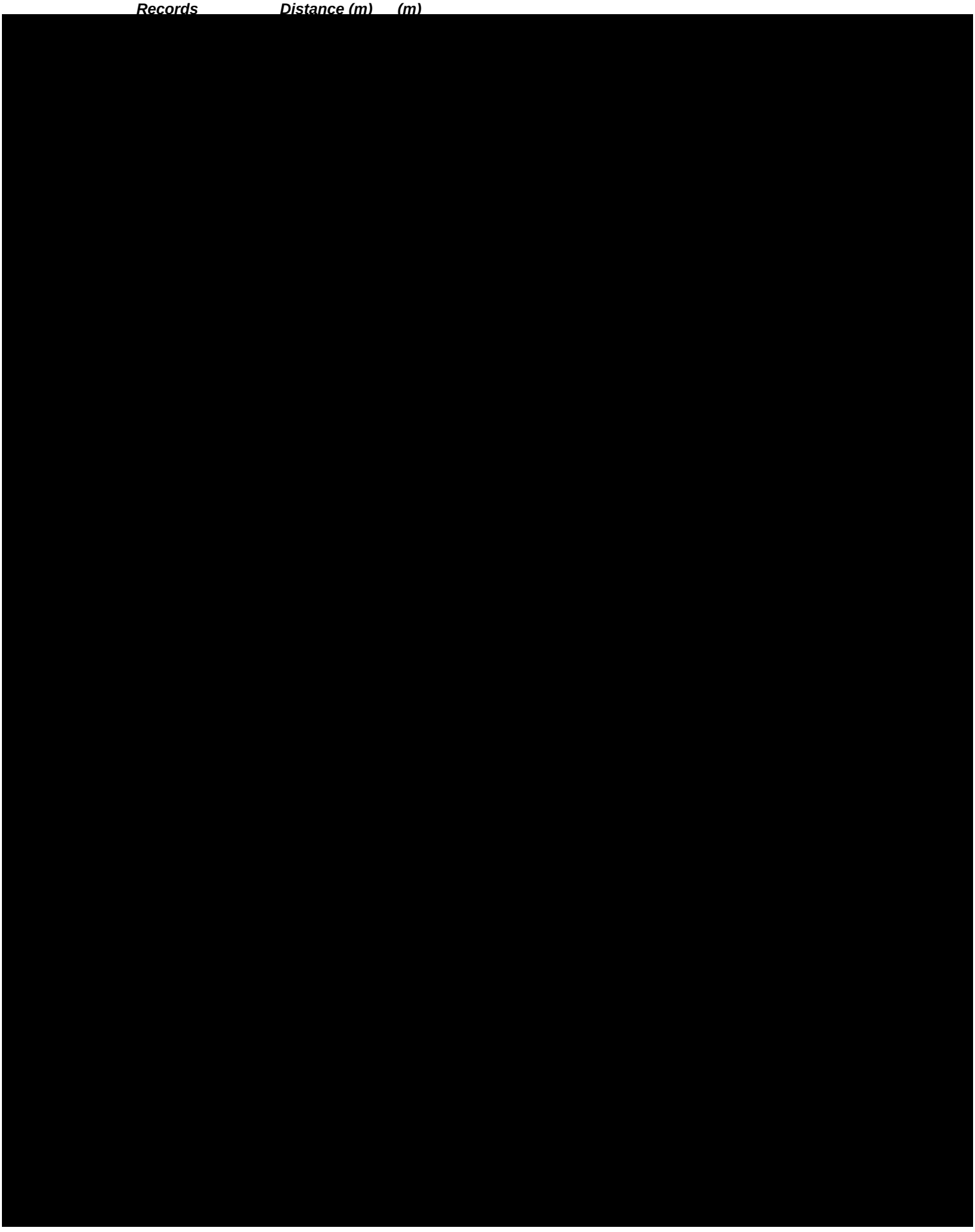

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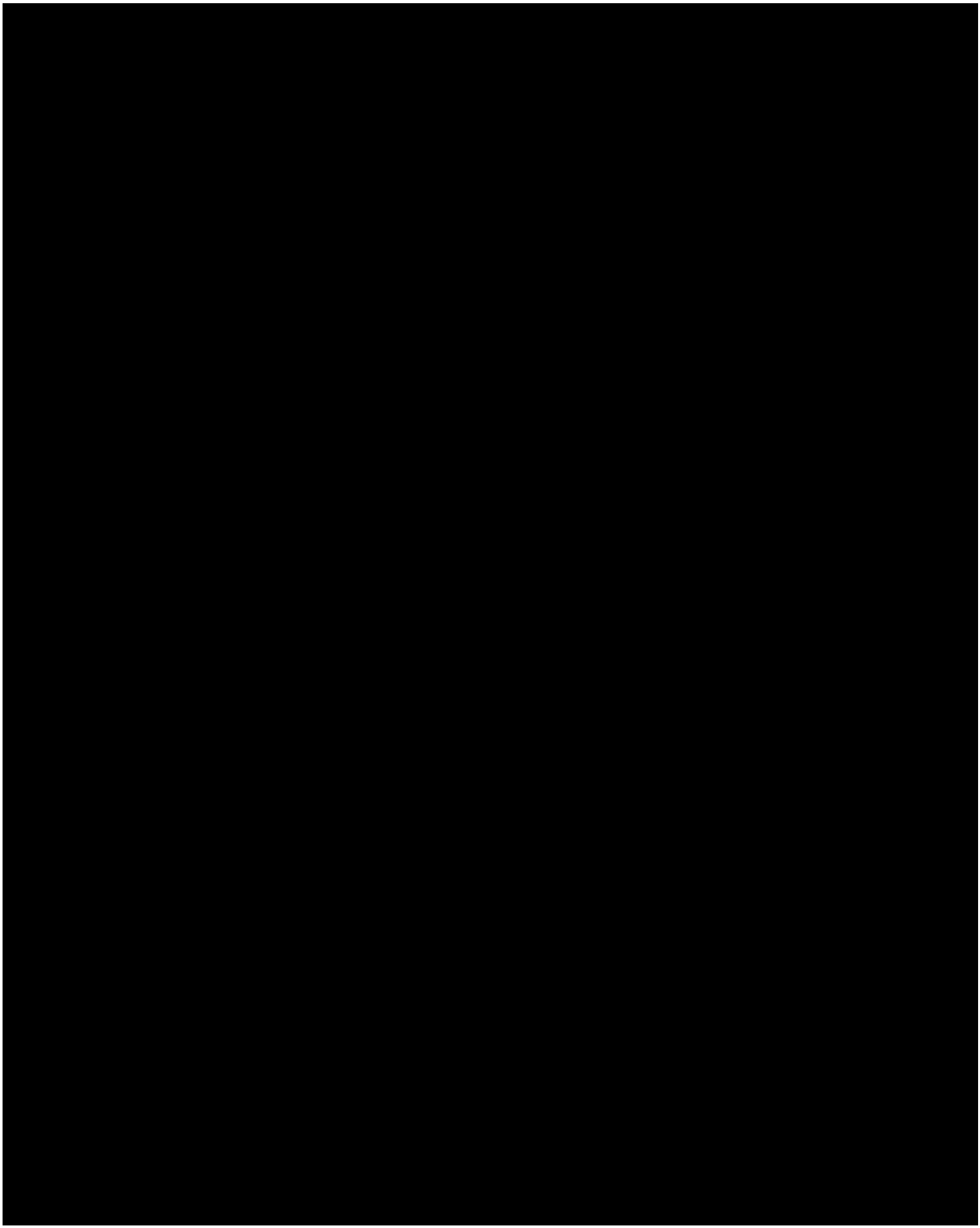

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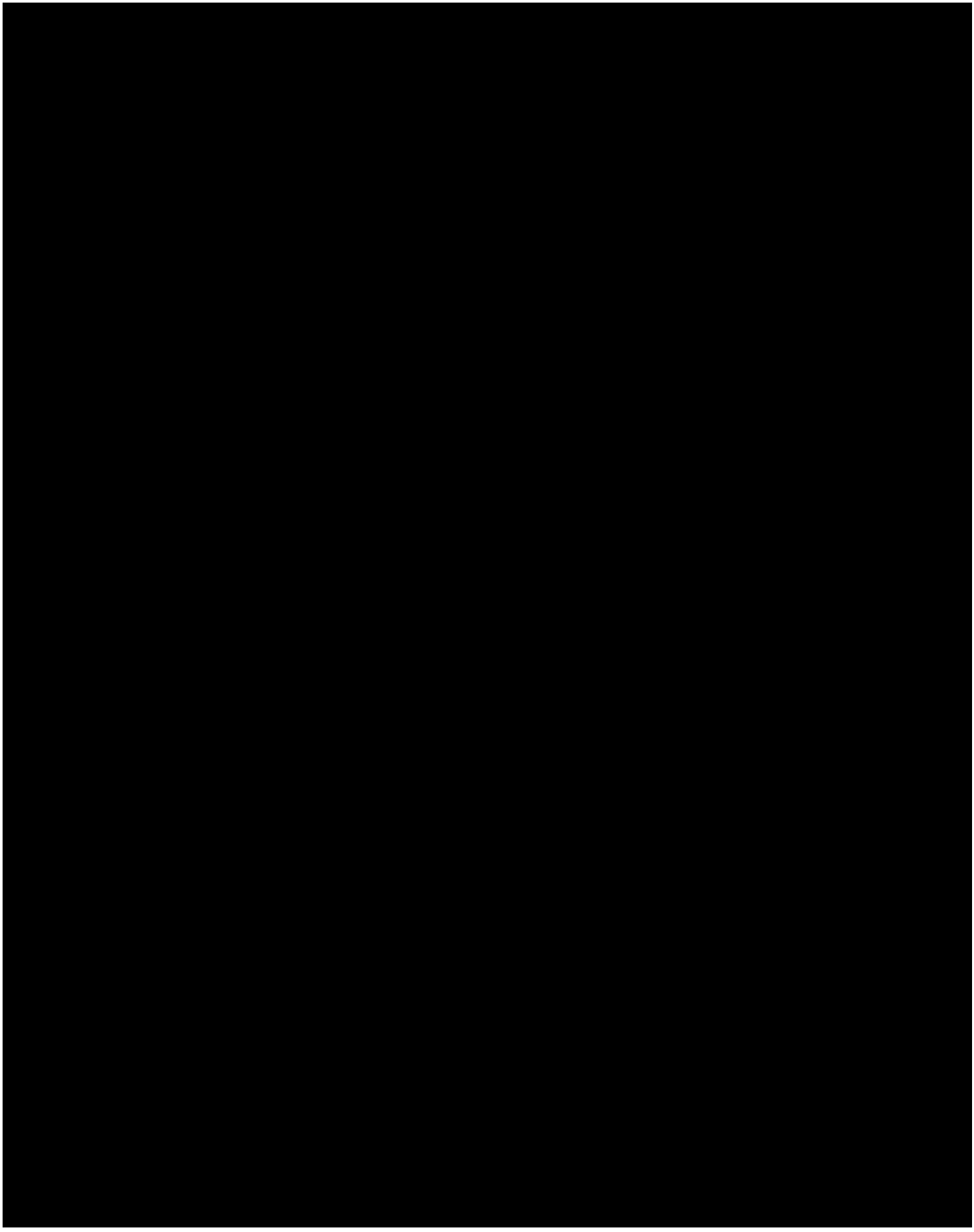

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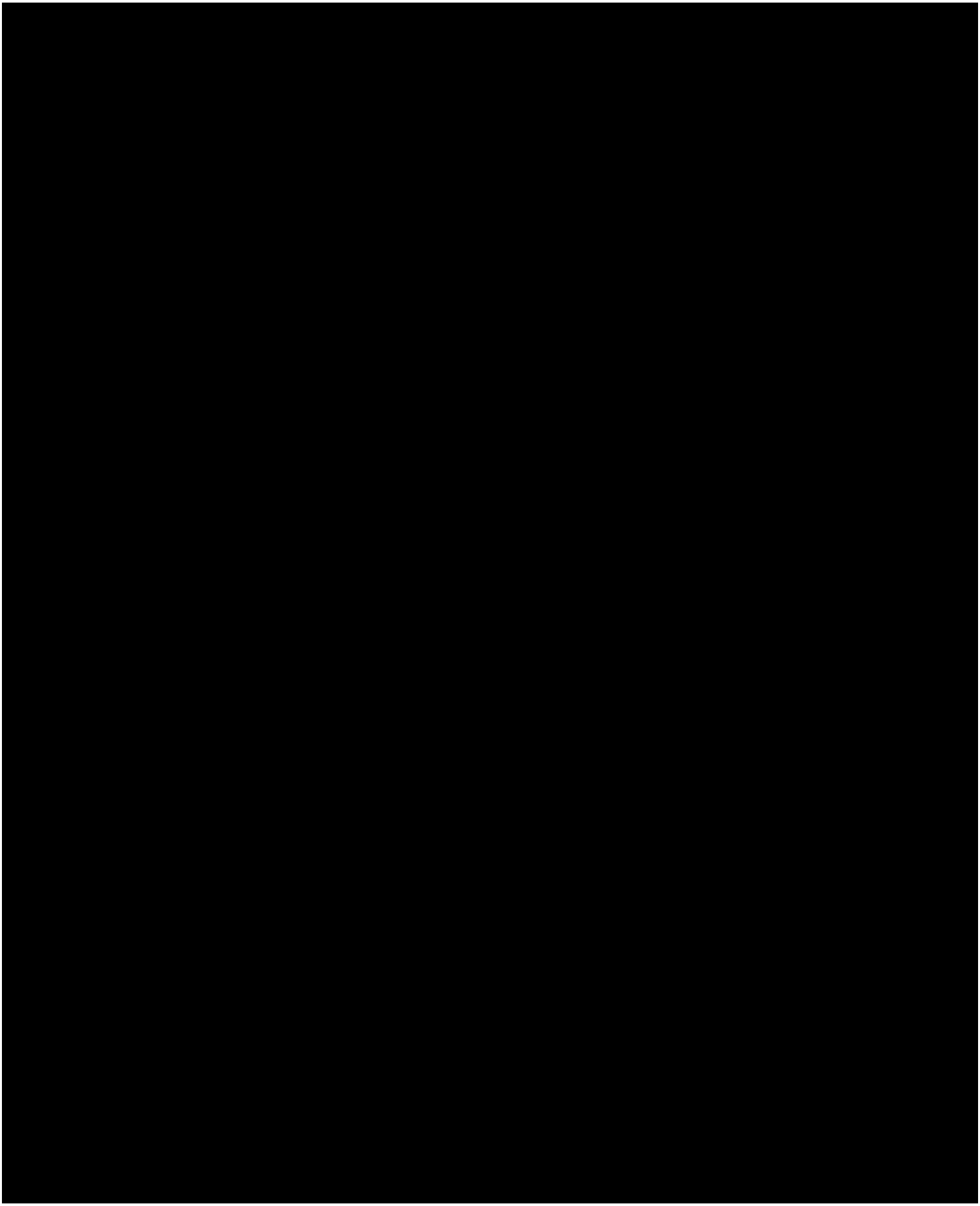

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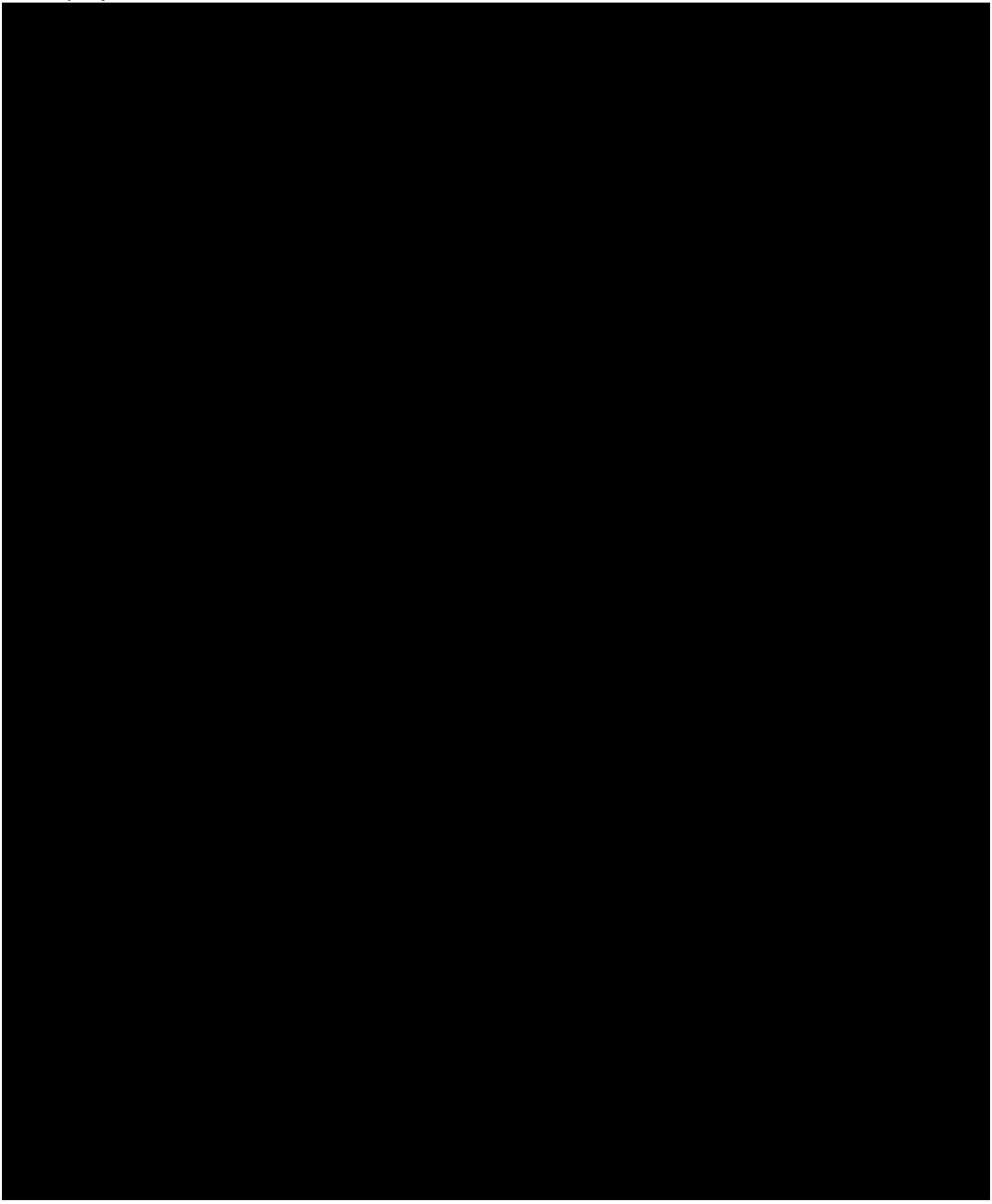

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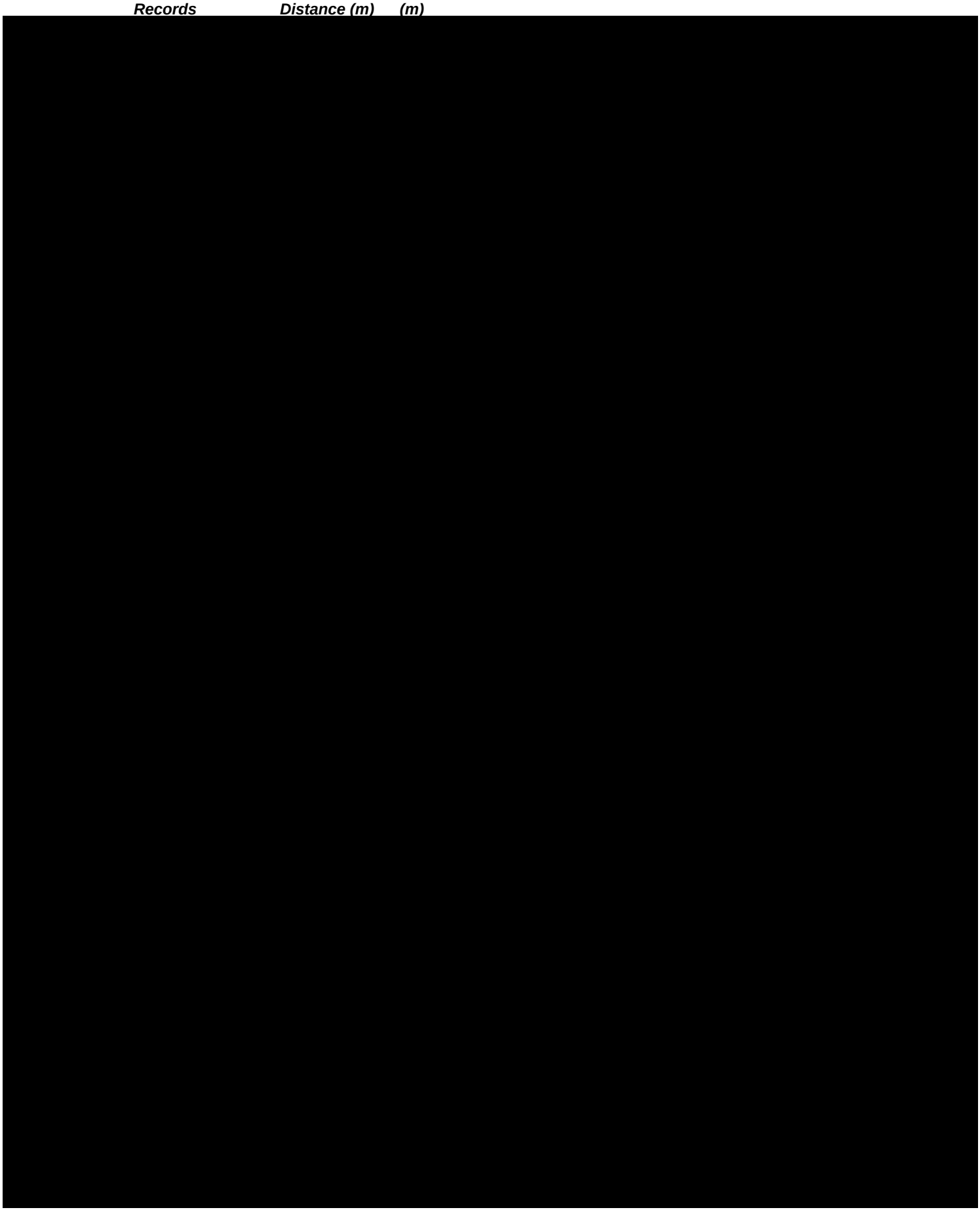

Map Key	Number of	Direction/	Elev/Diff	Site	DB

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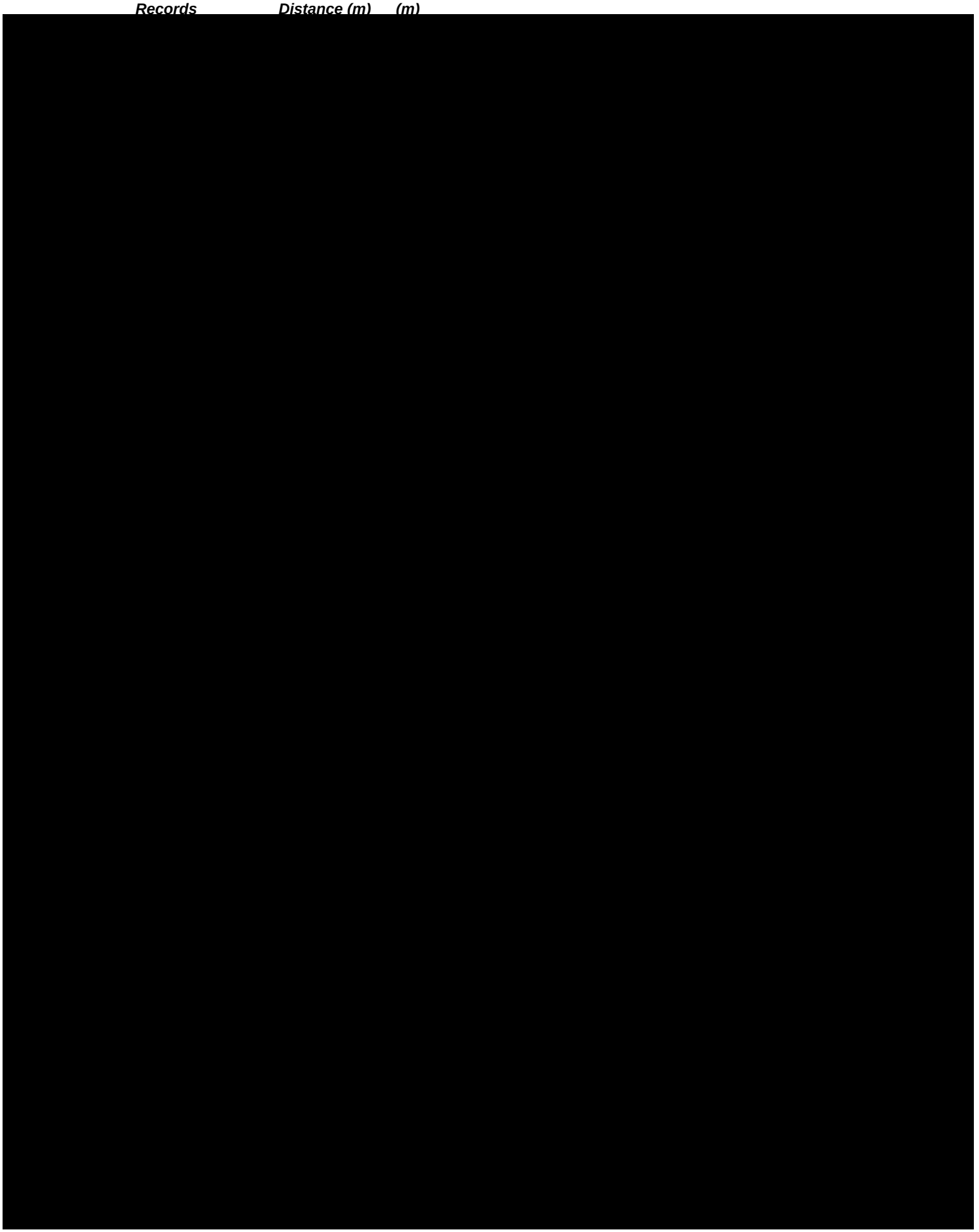

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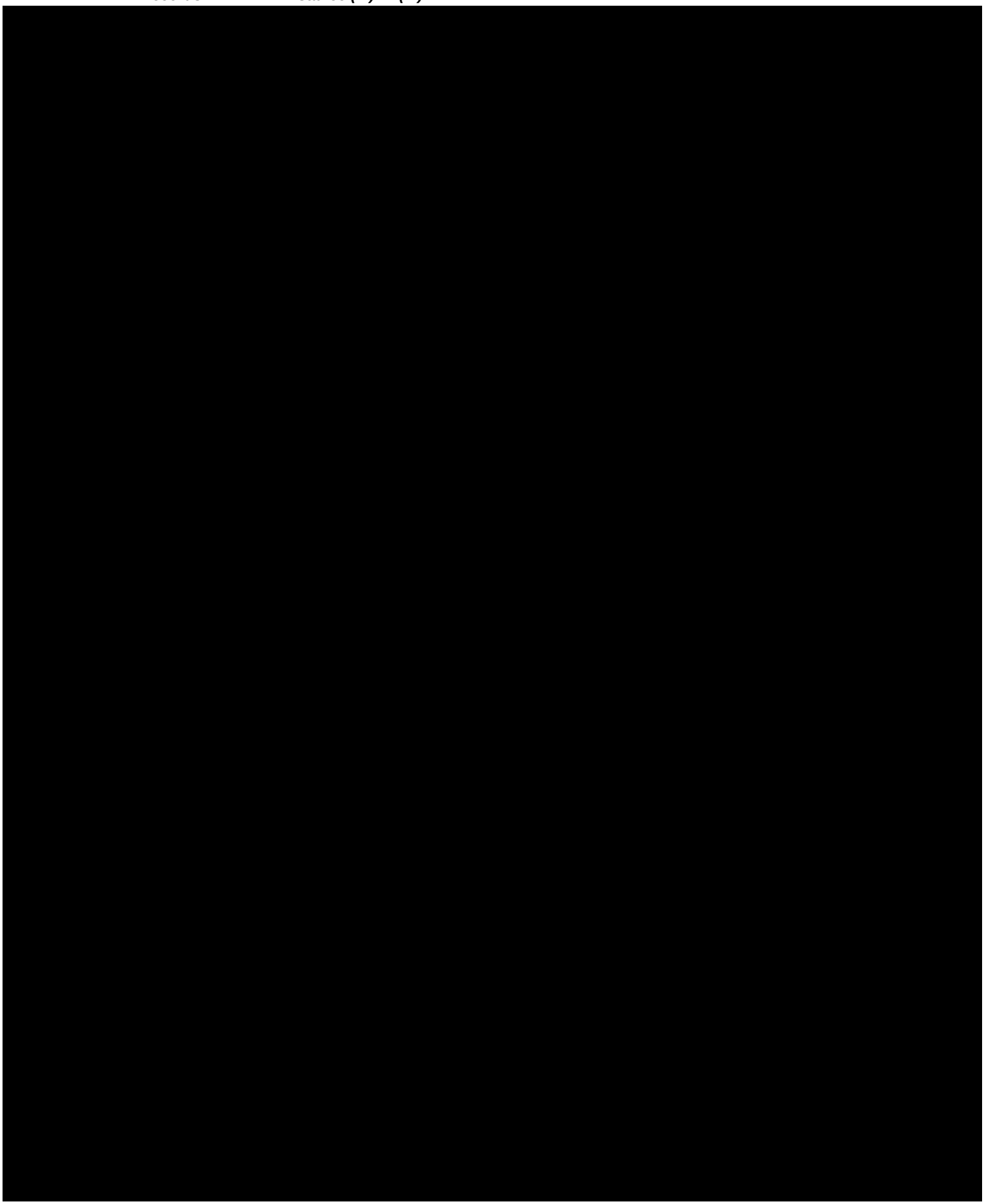

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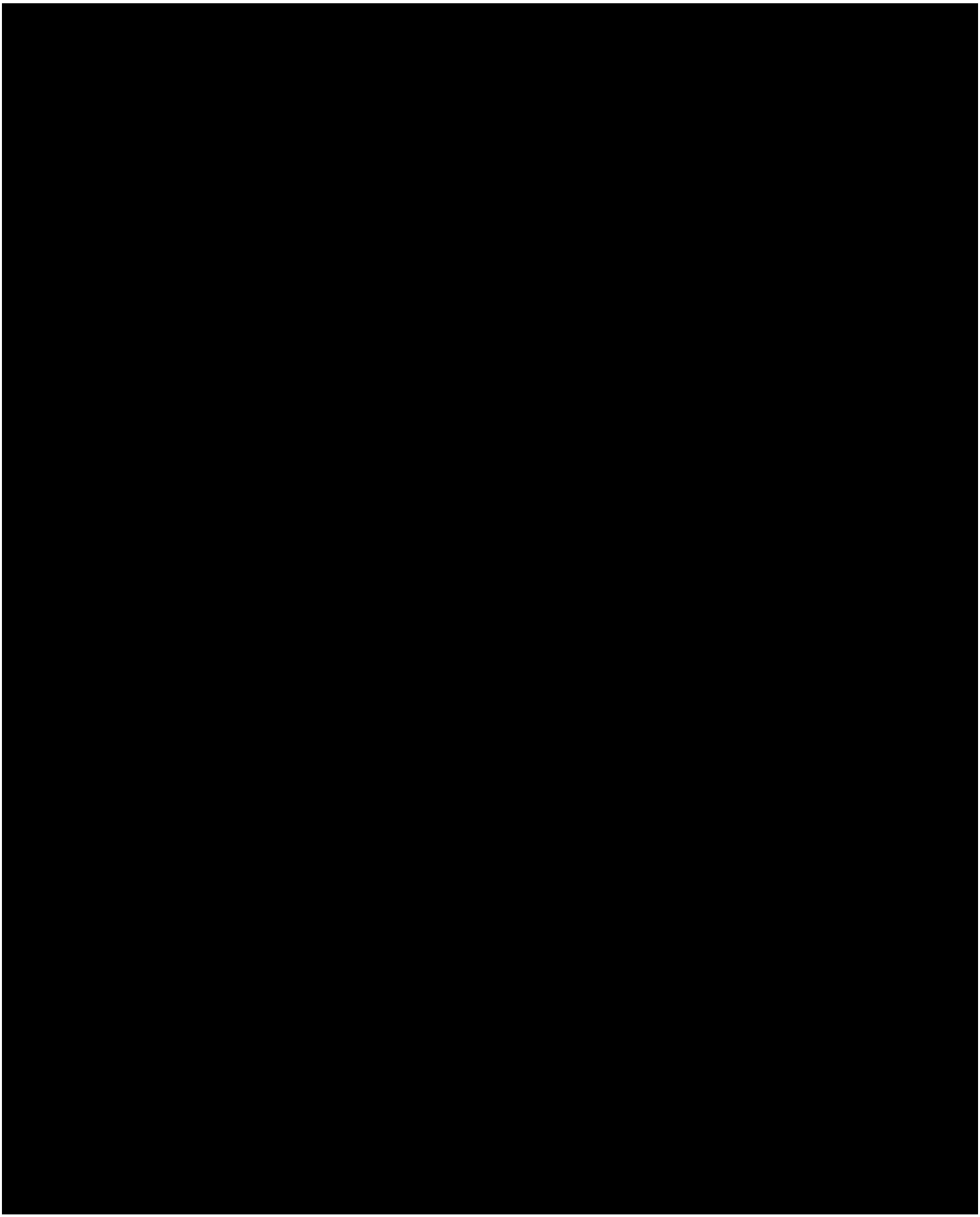

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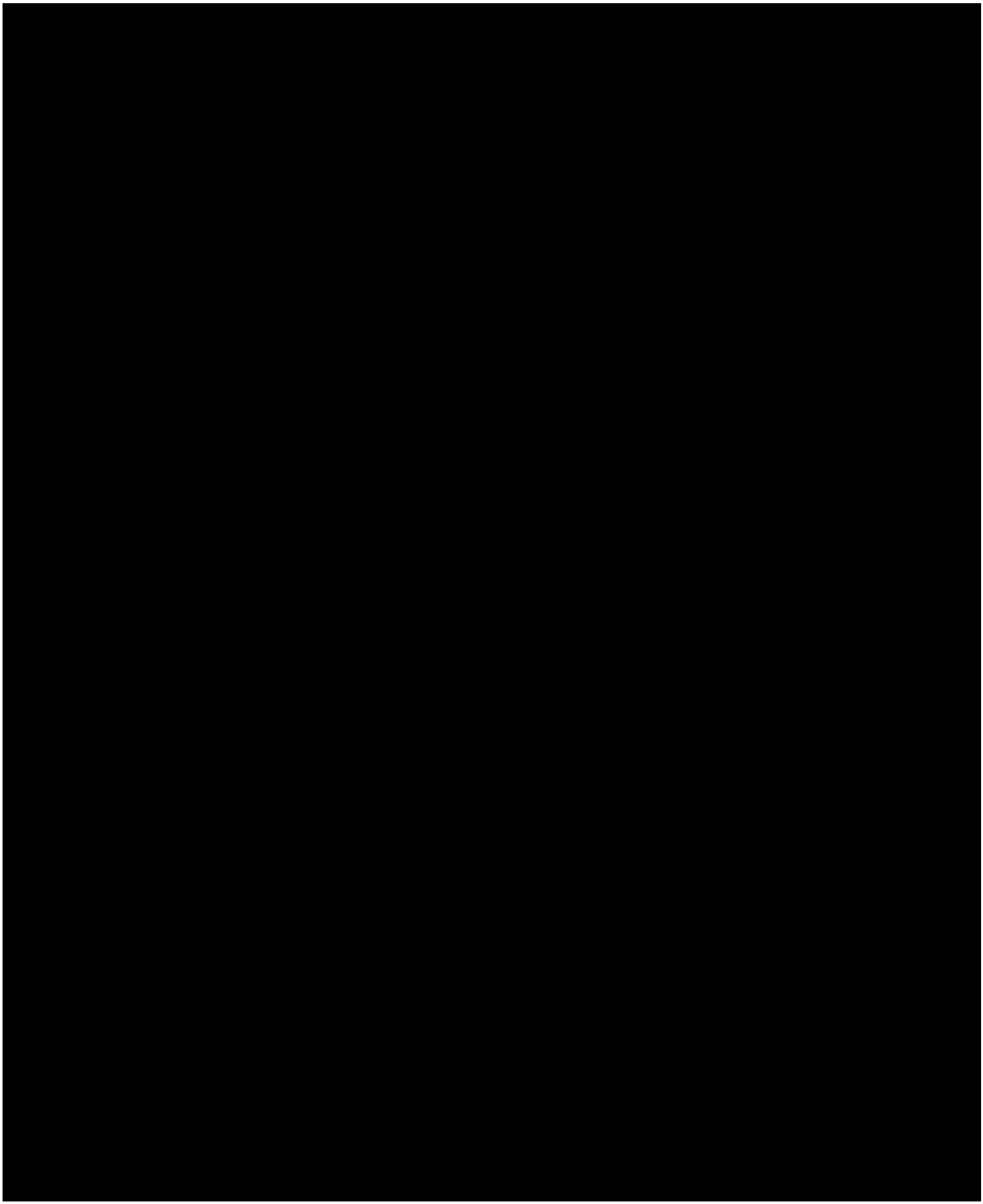

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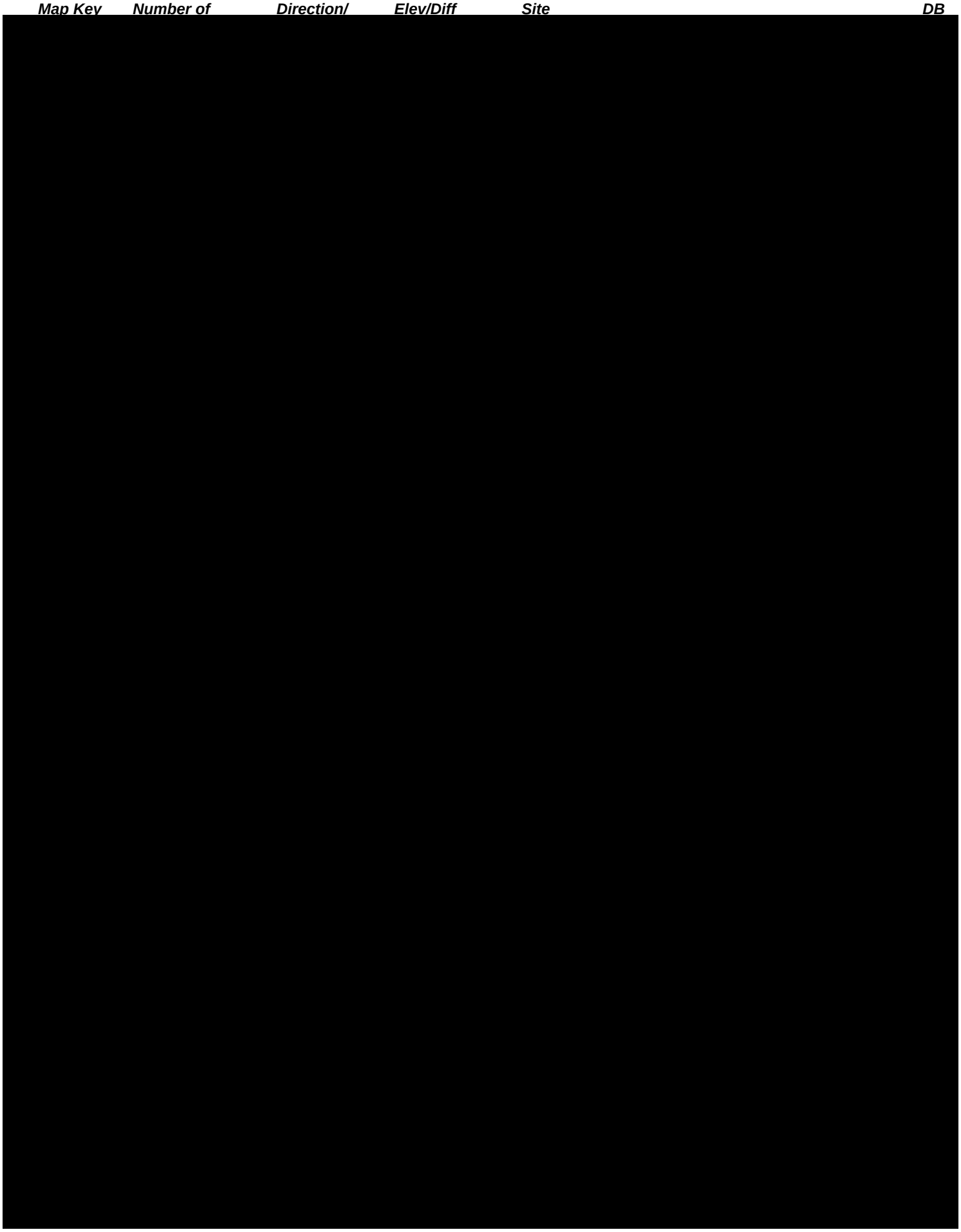

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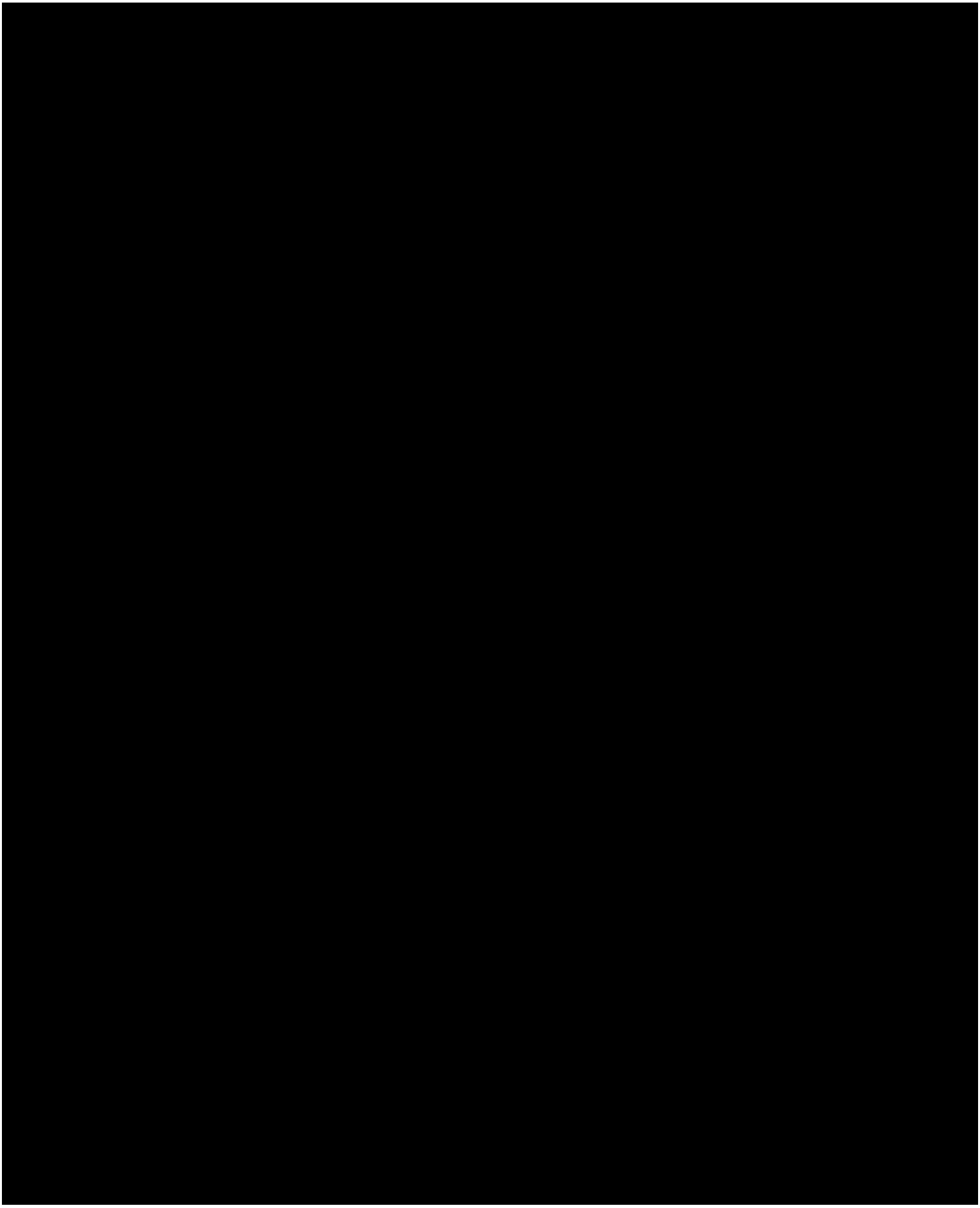
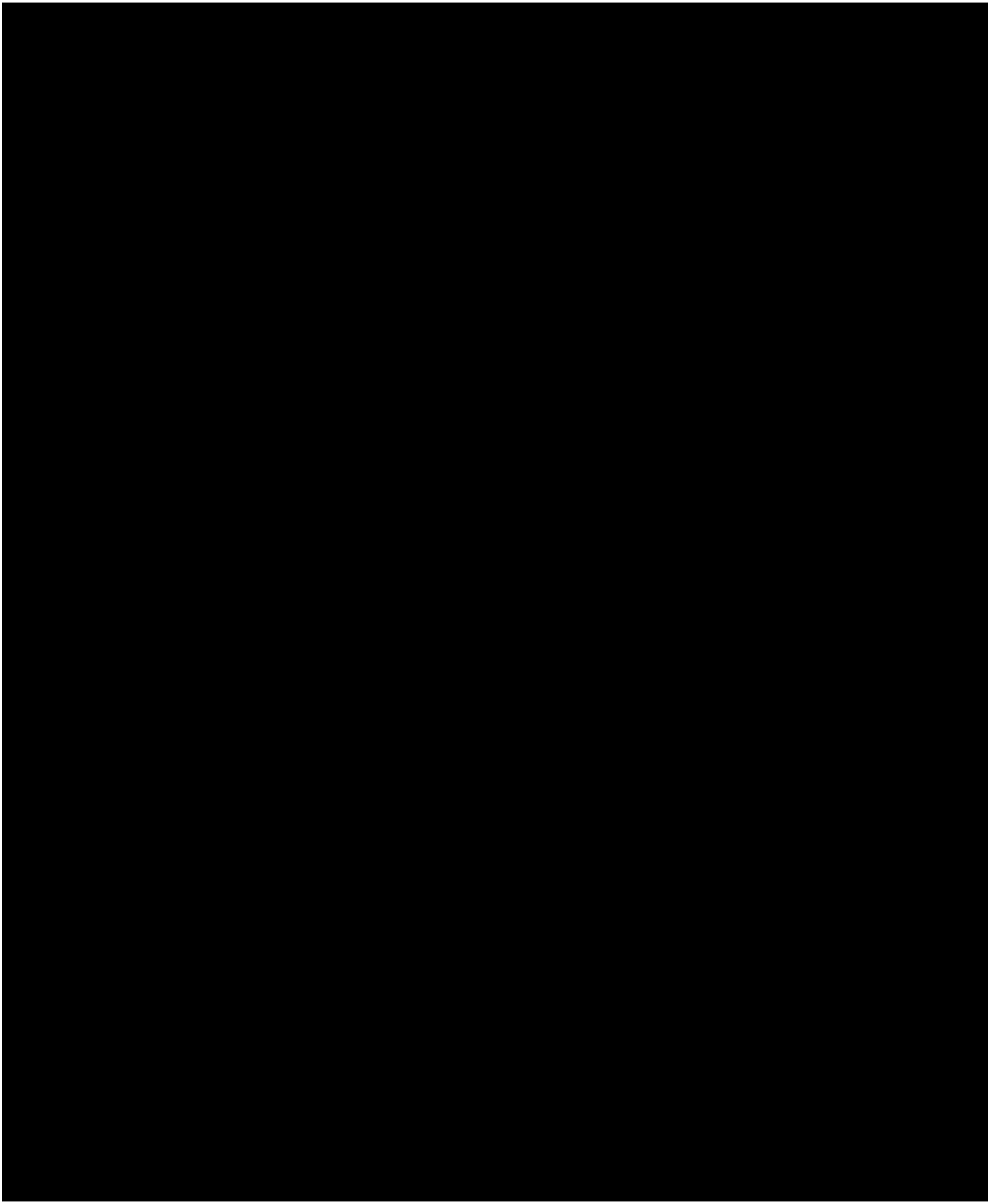


Map Key	Number of	Direction/	Elev/Diff	Site	DB



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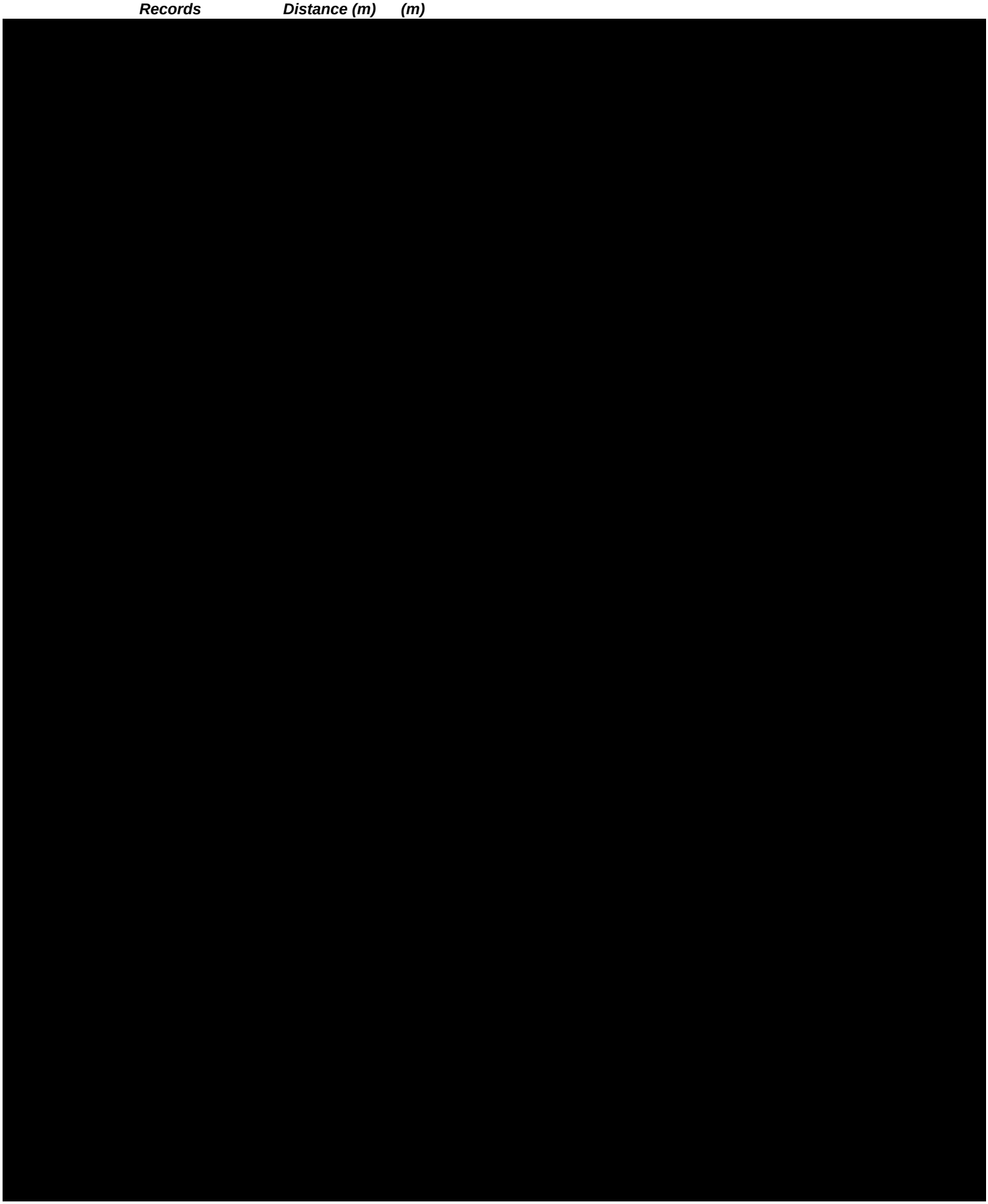

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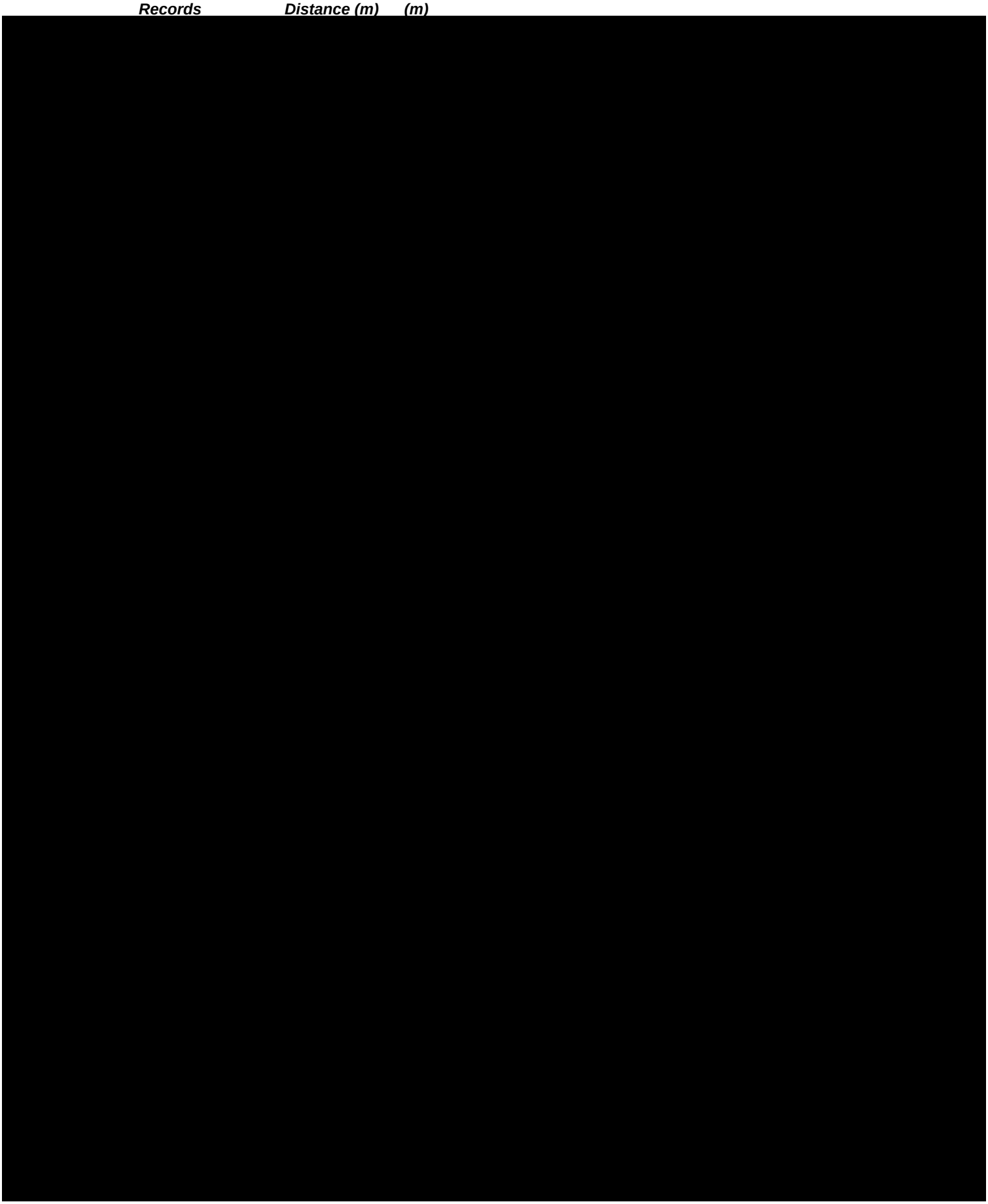

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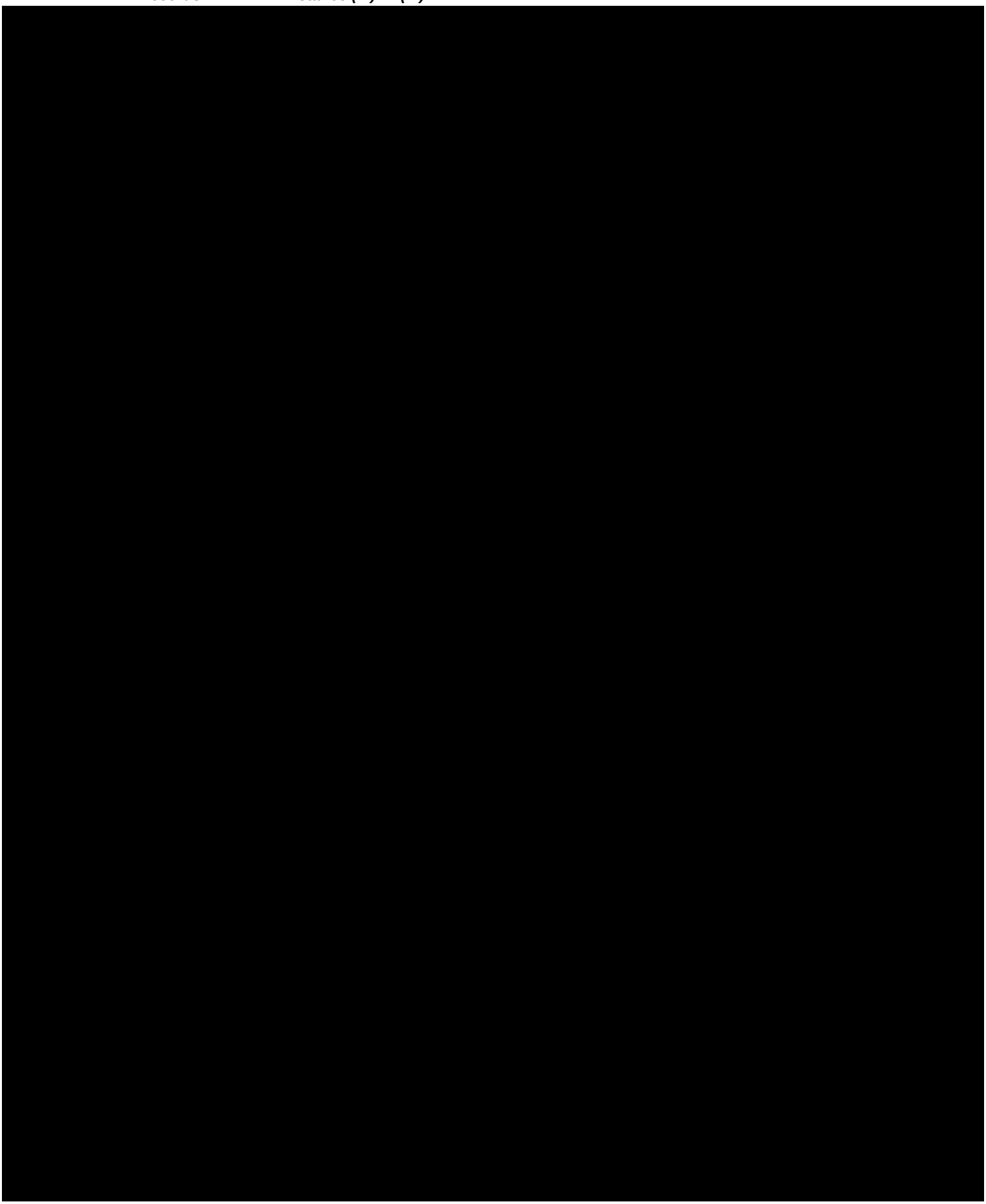

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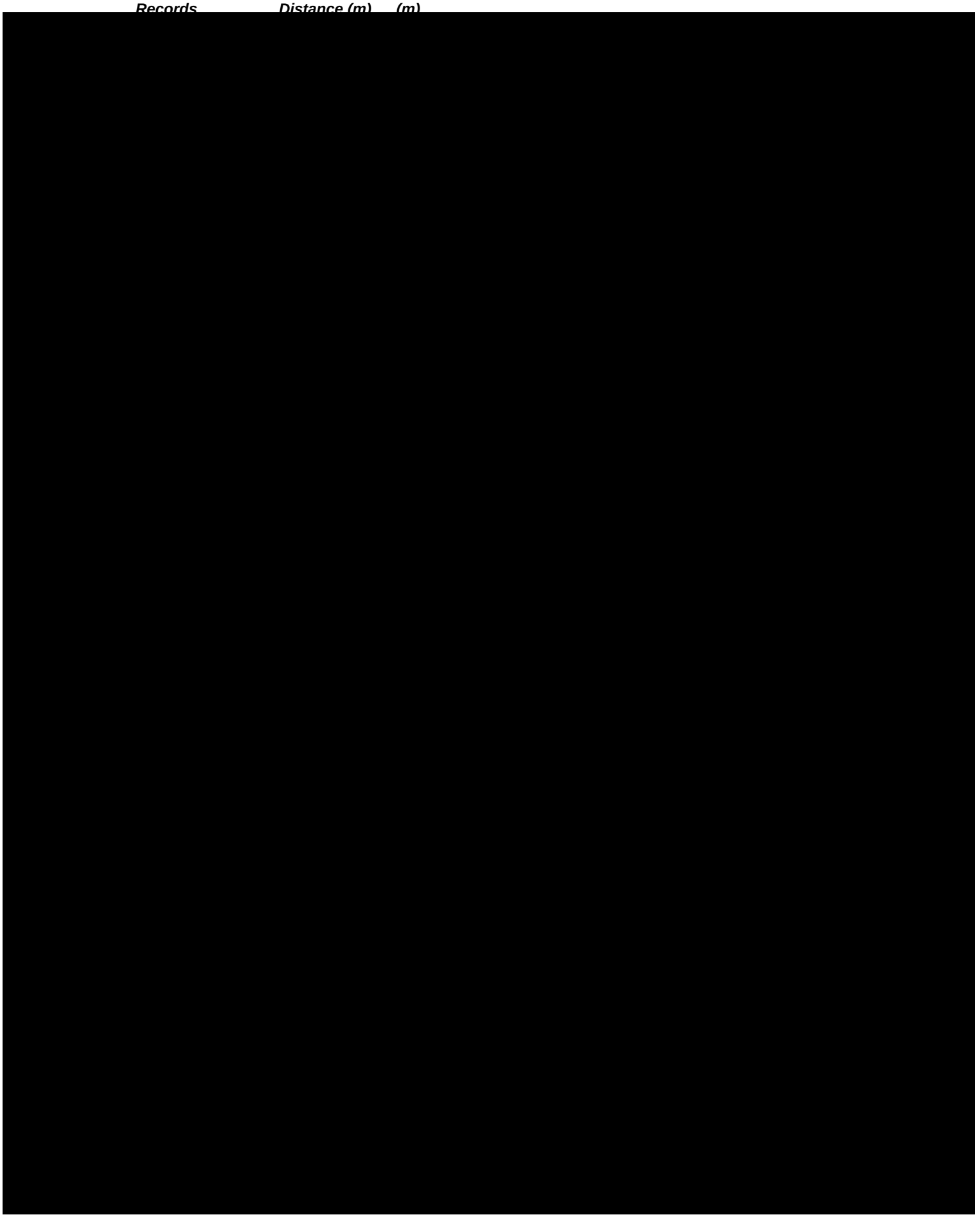

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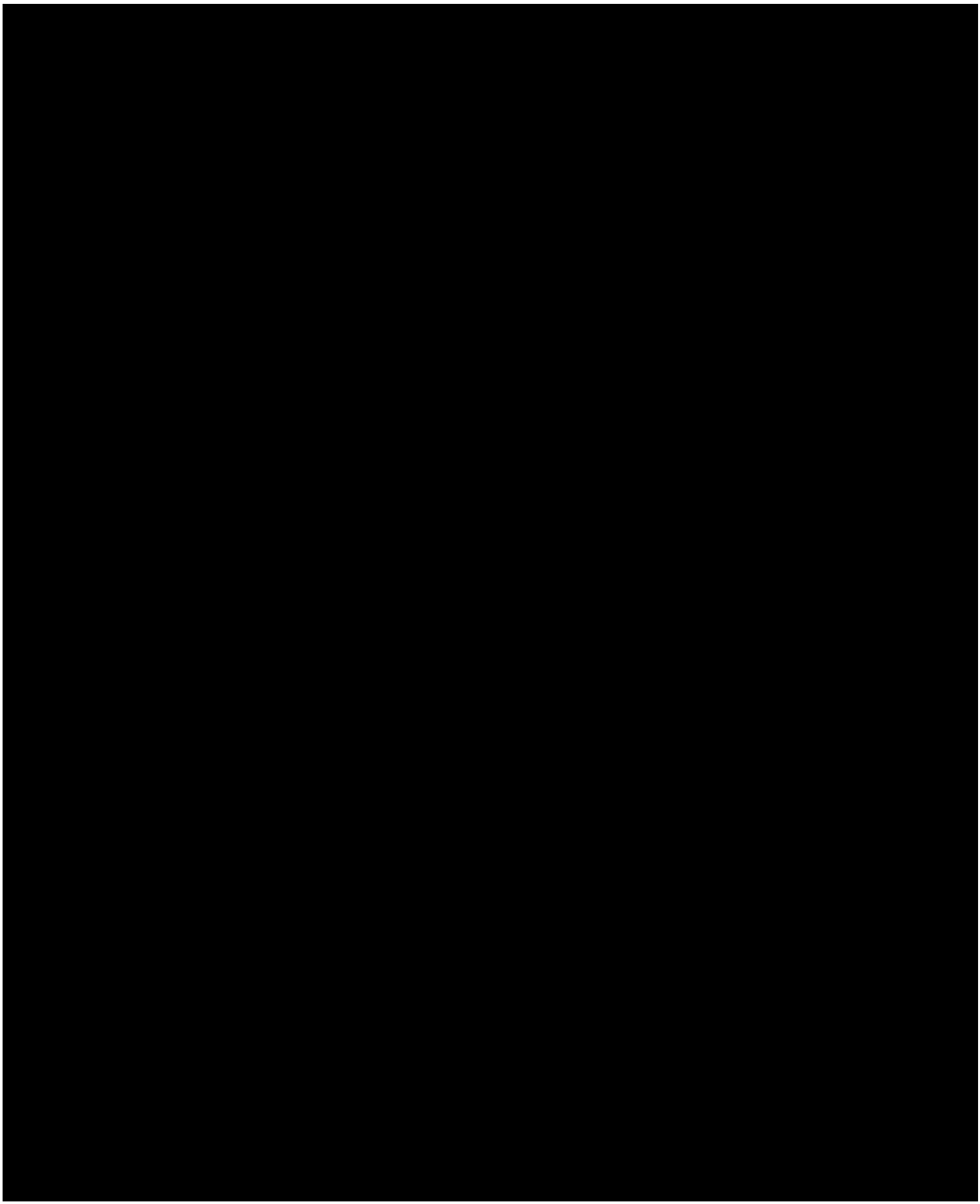

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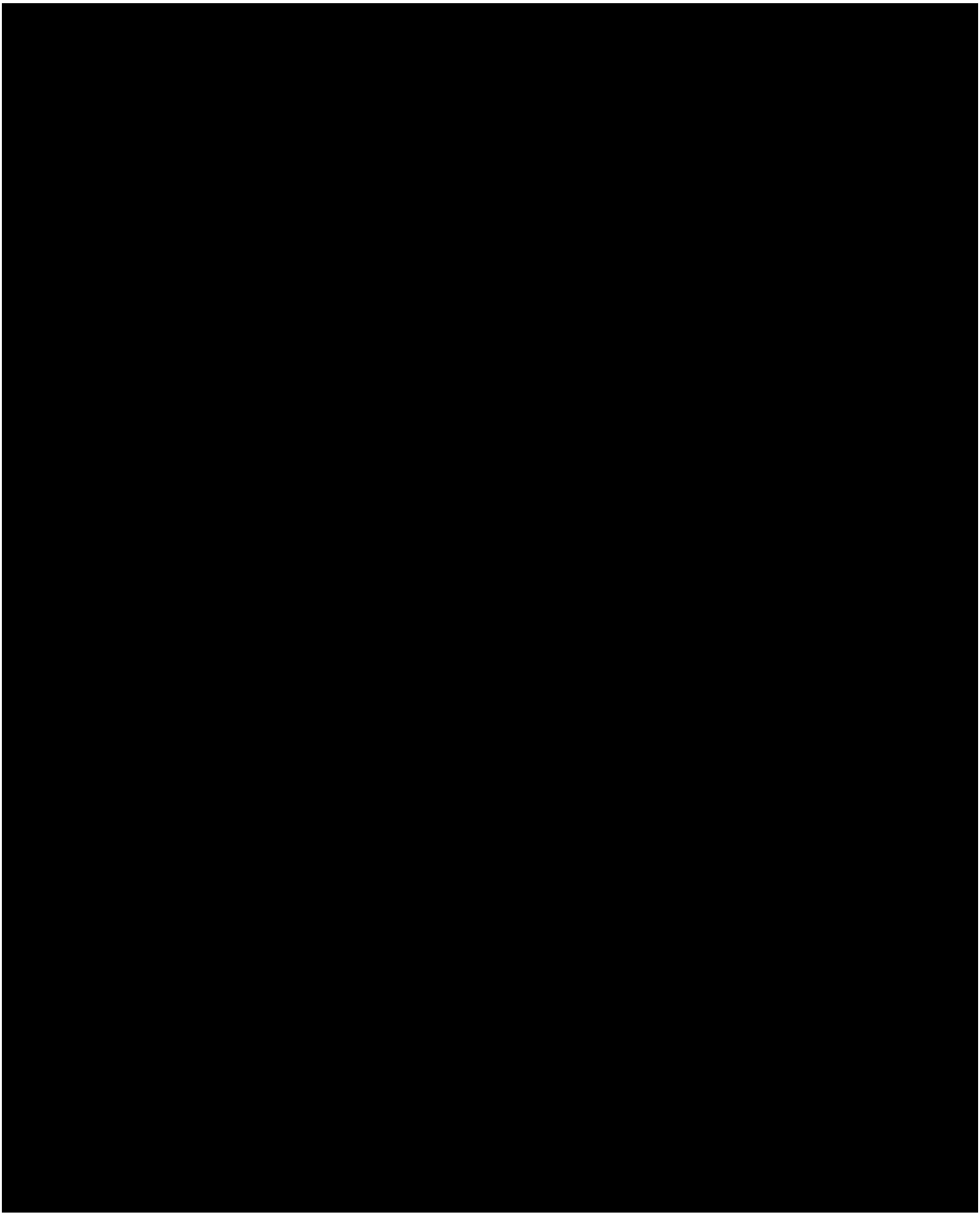

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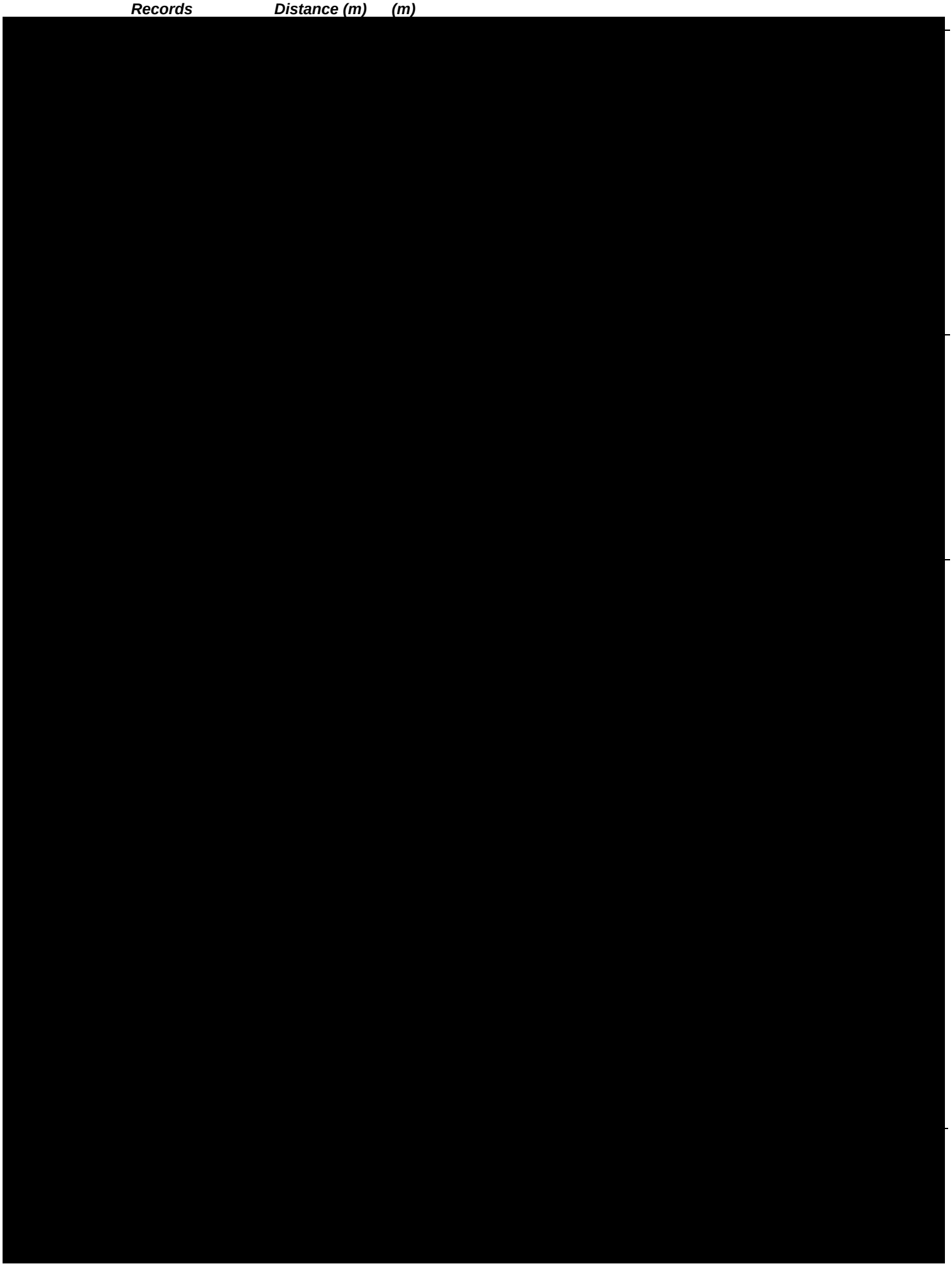

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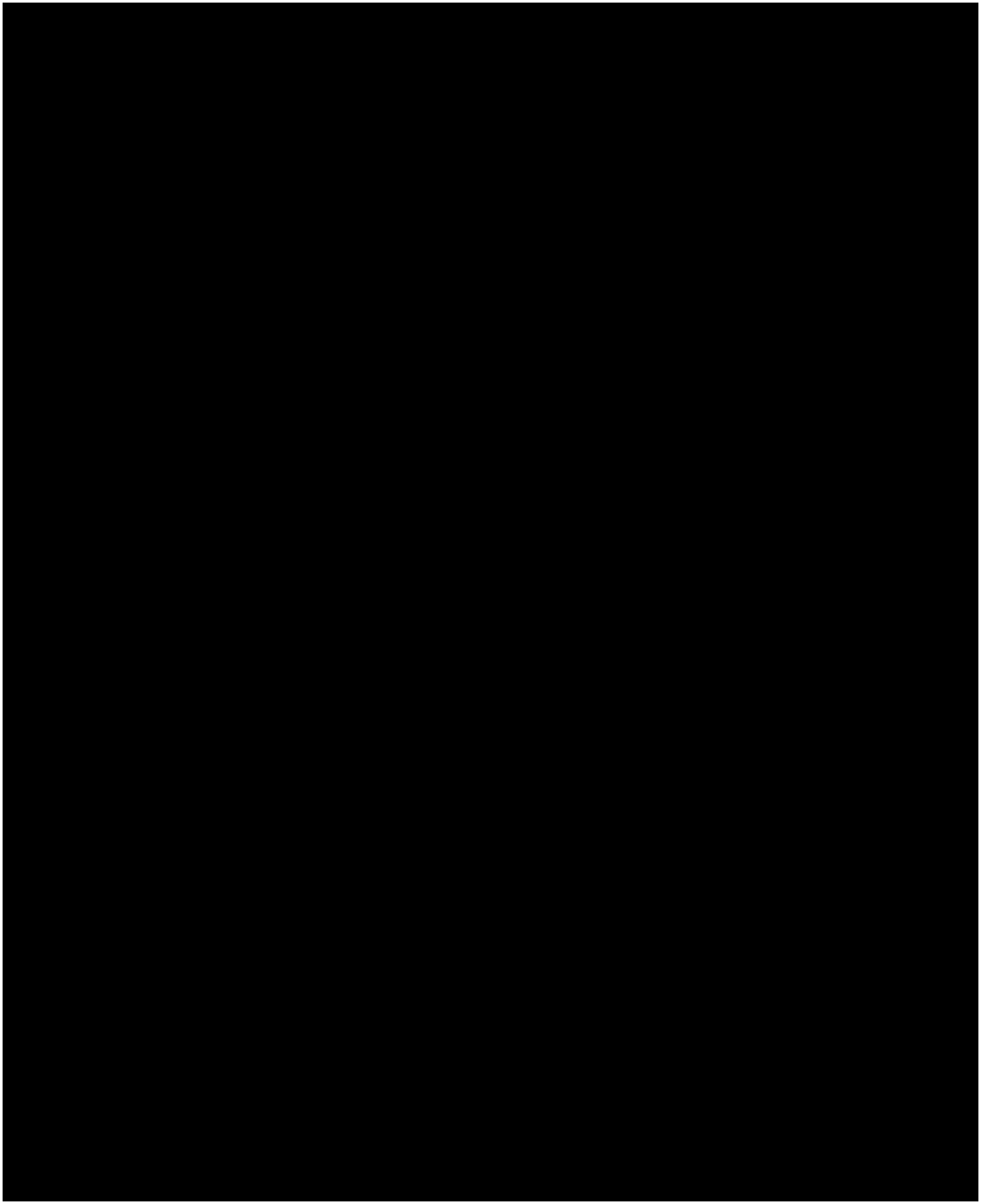

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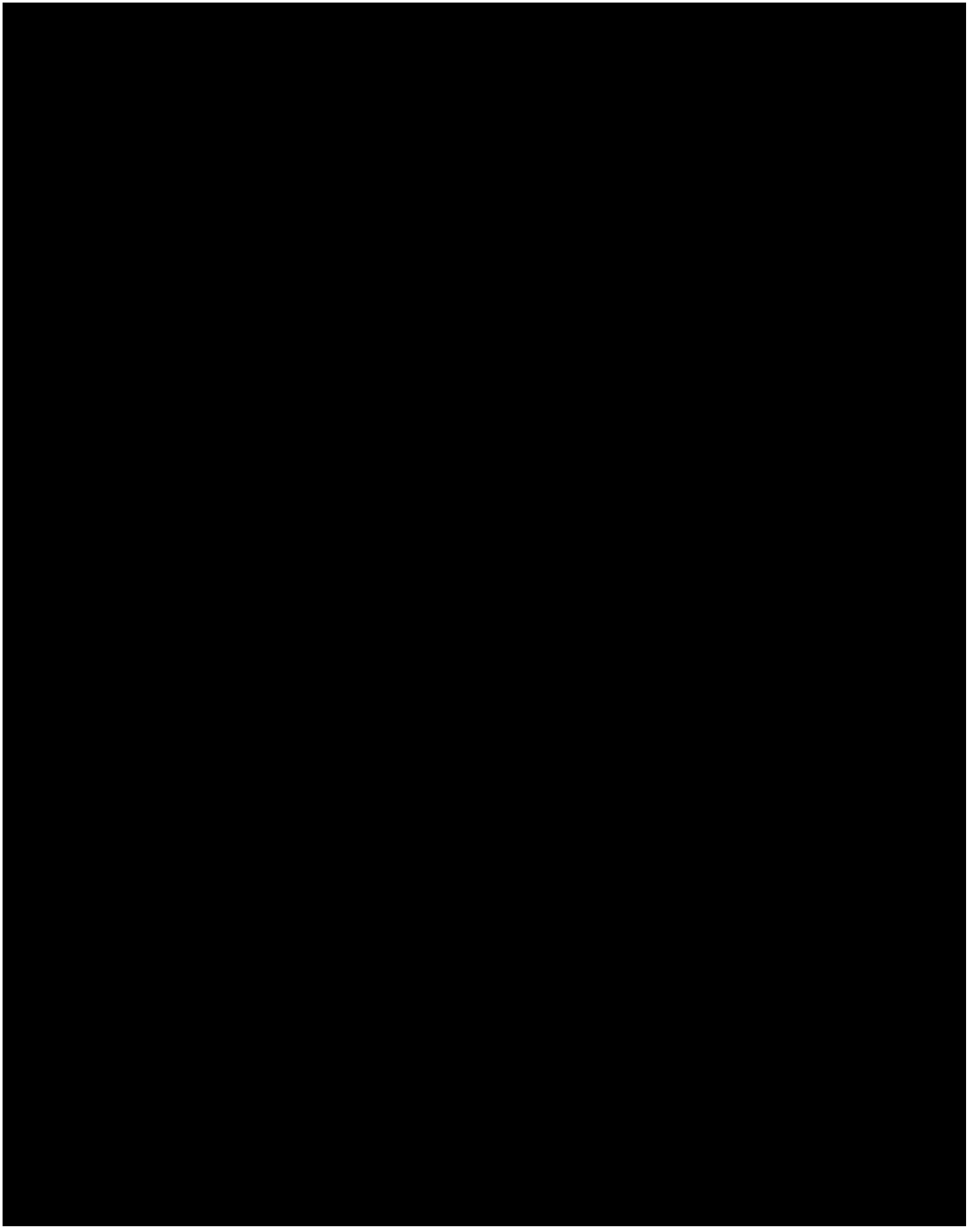

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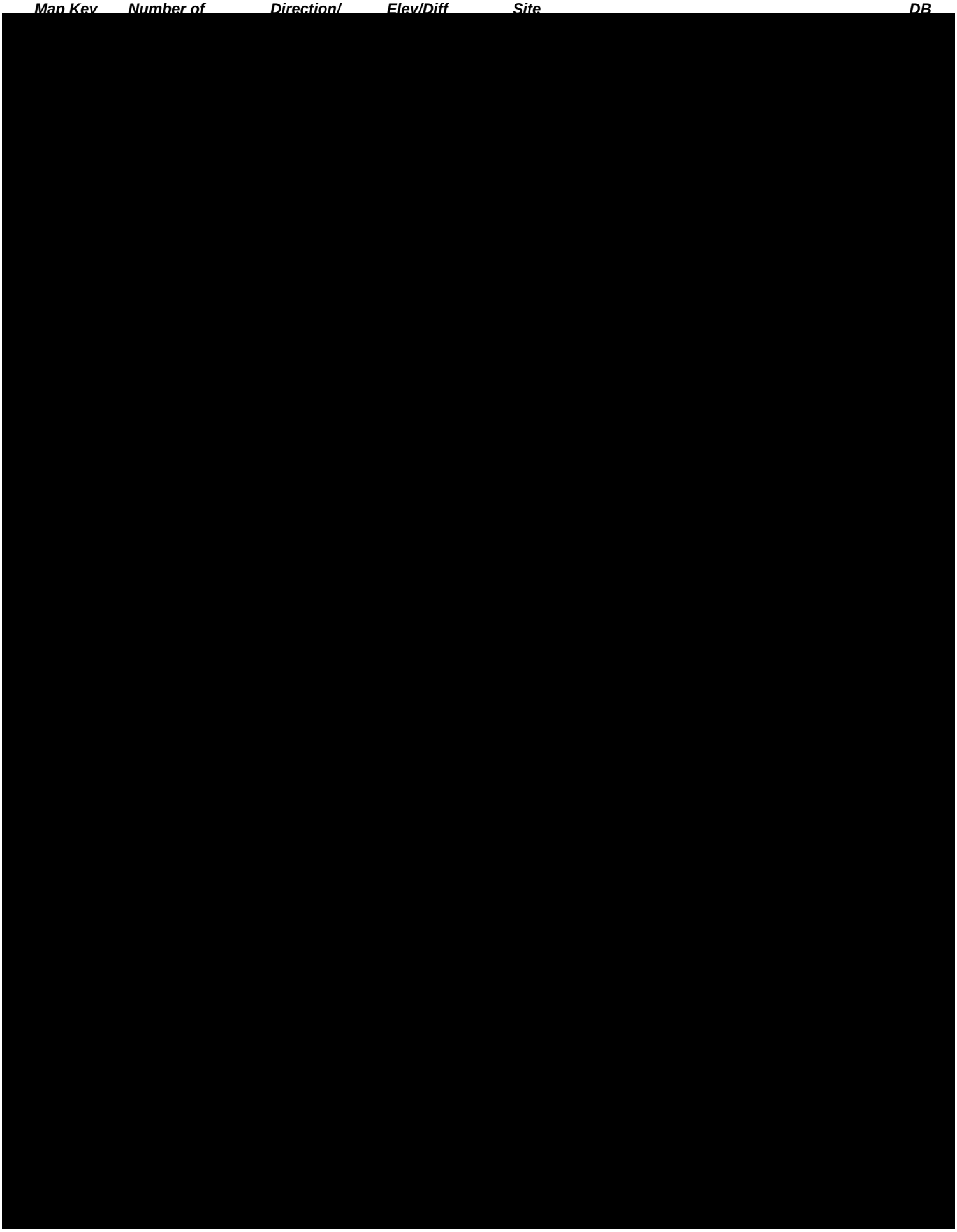

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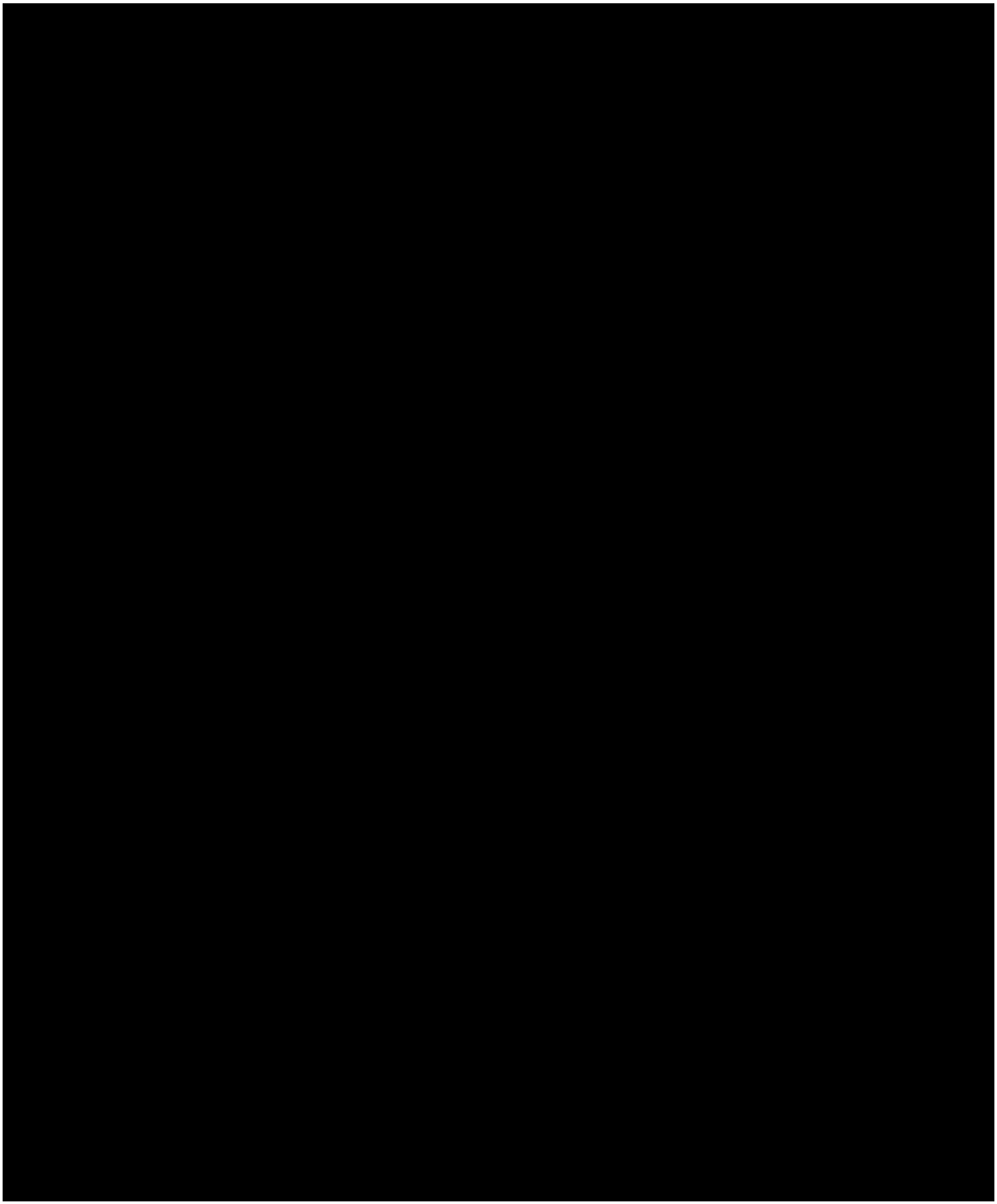

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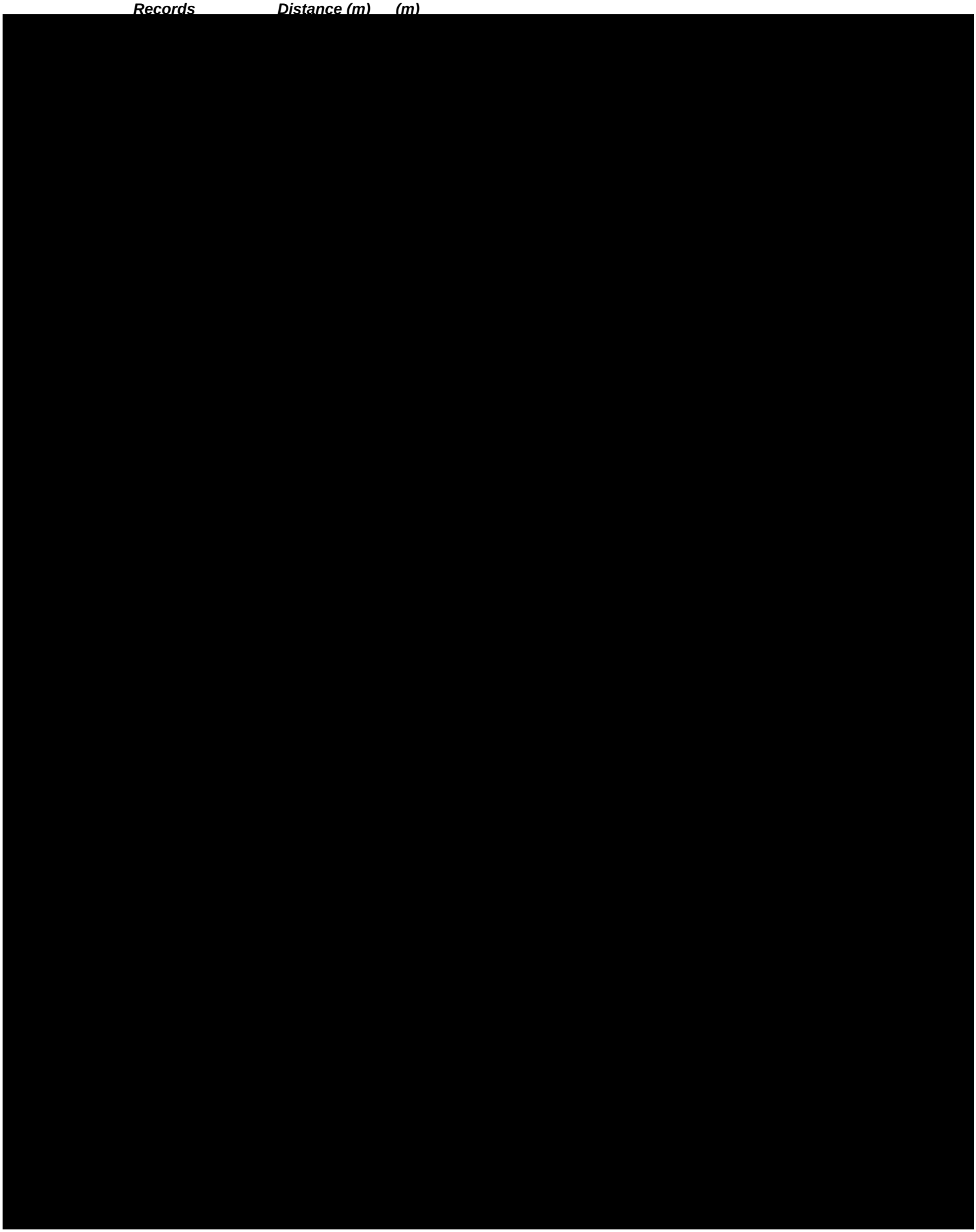

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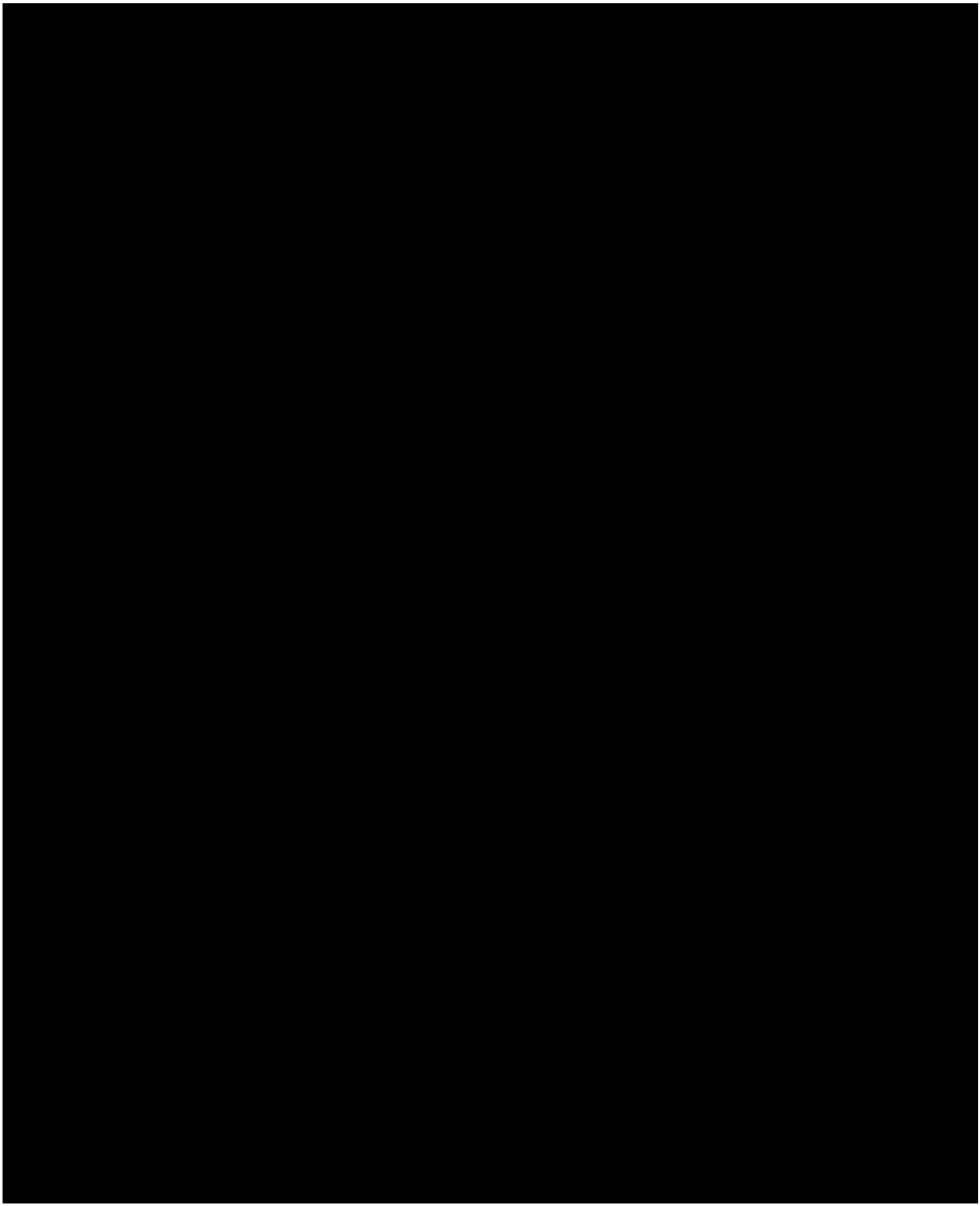

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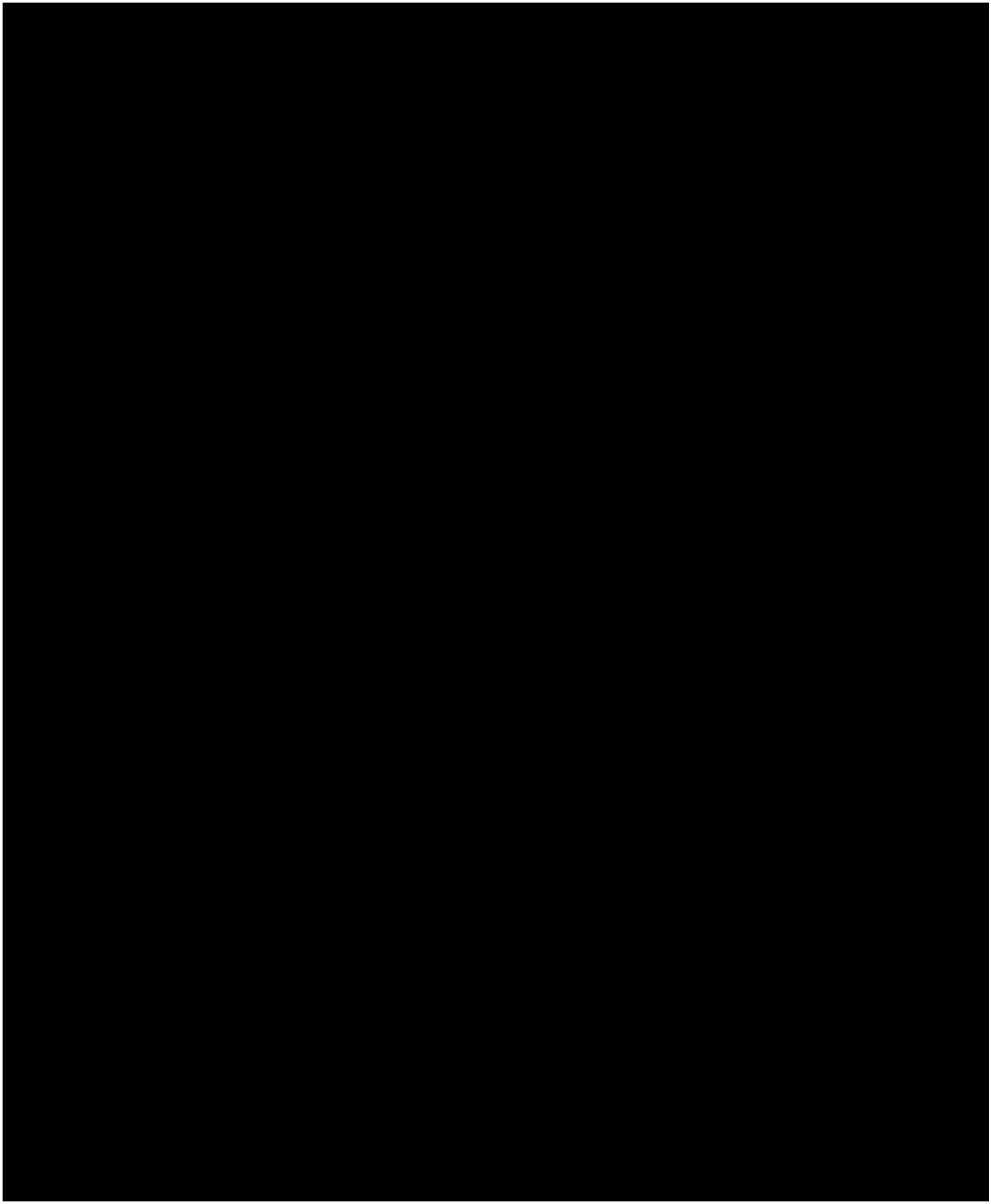

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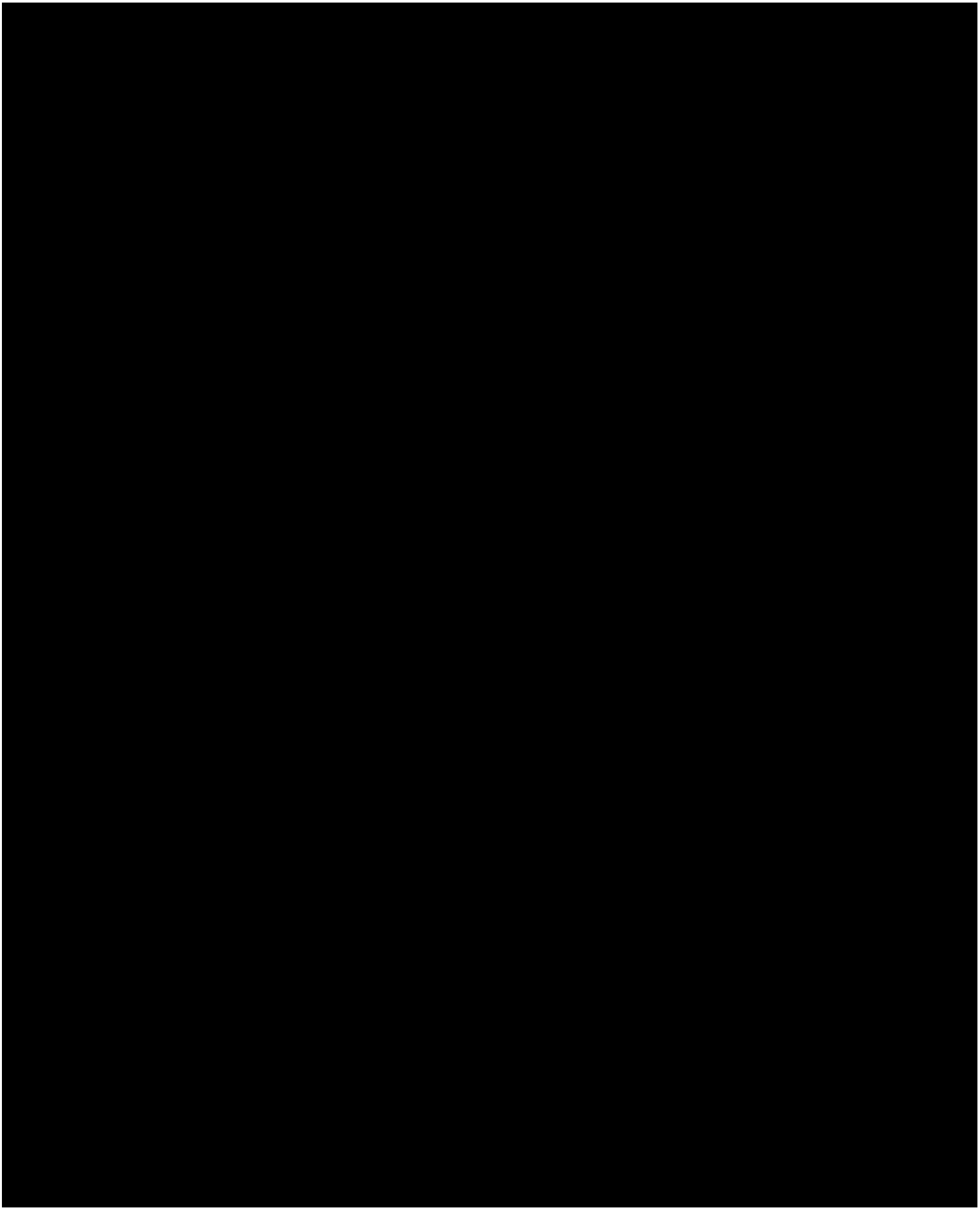

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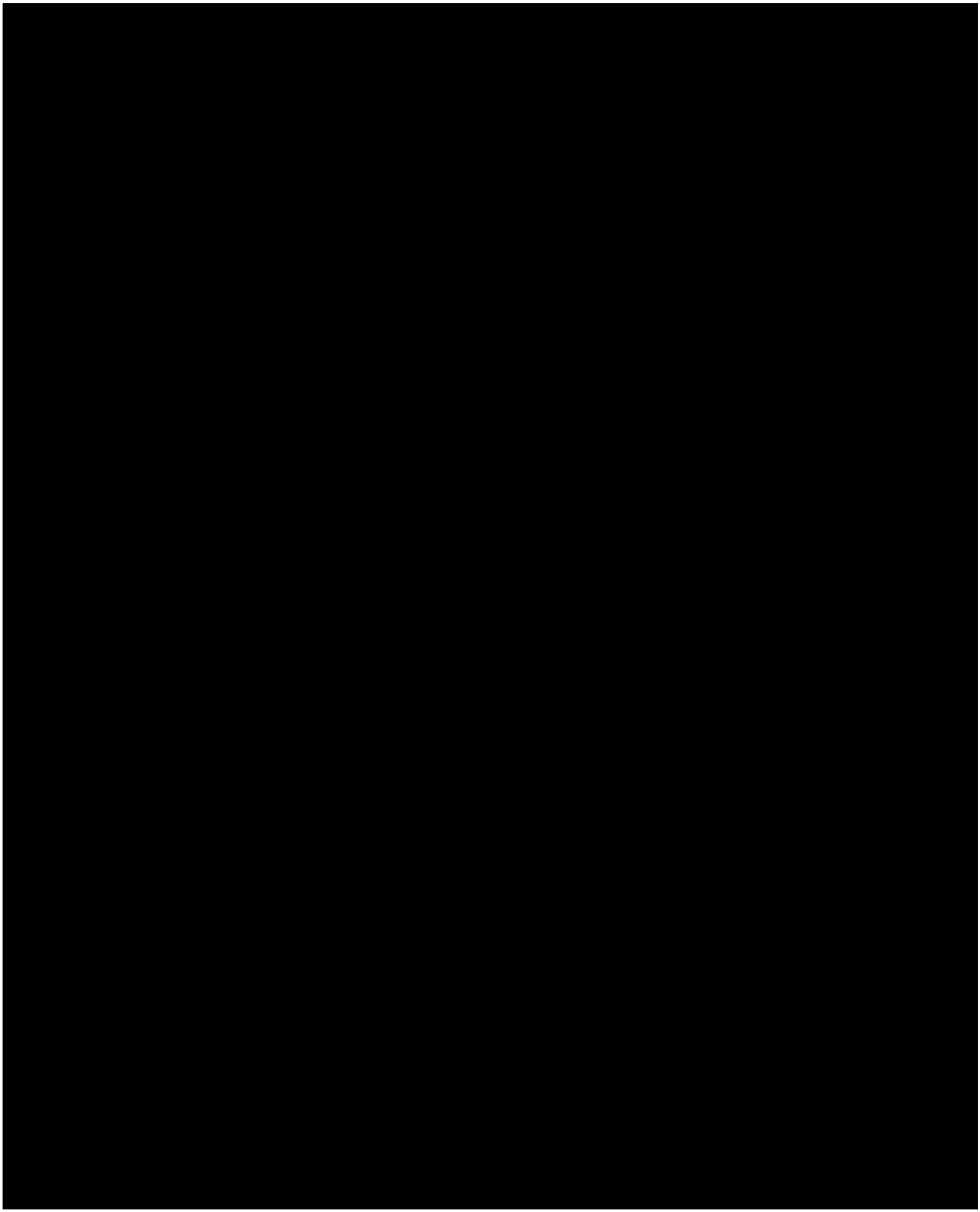

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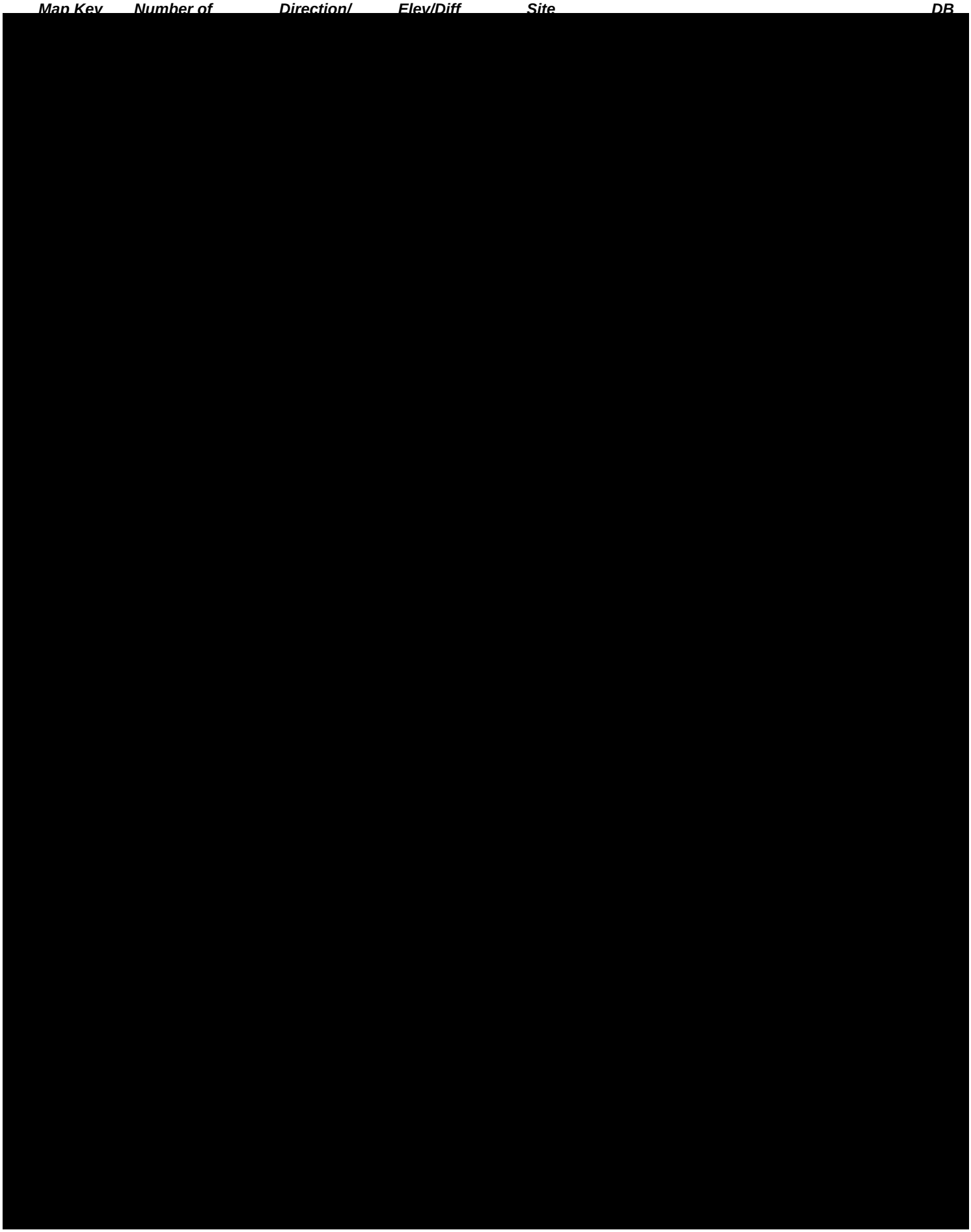

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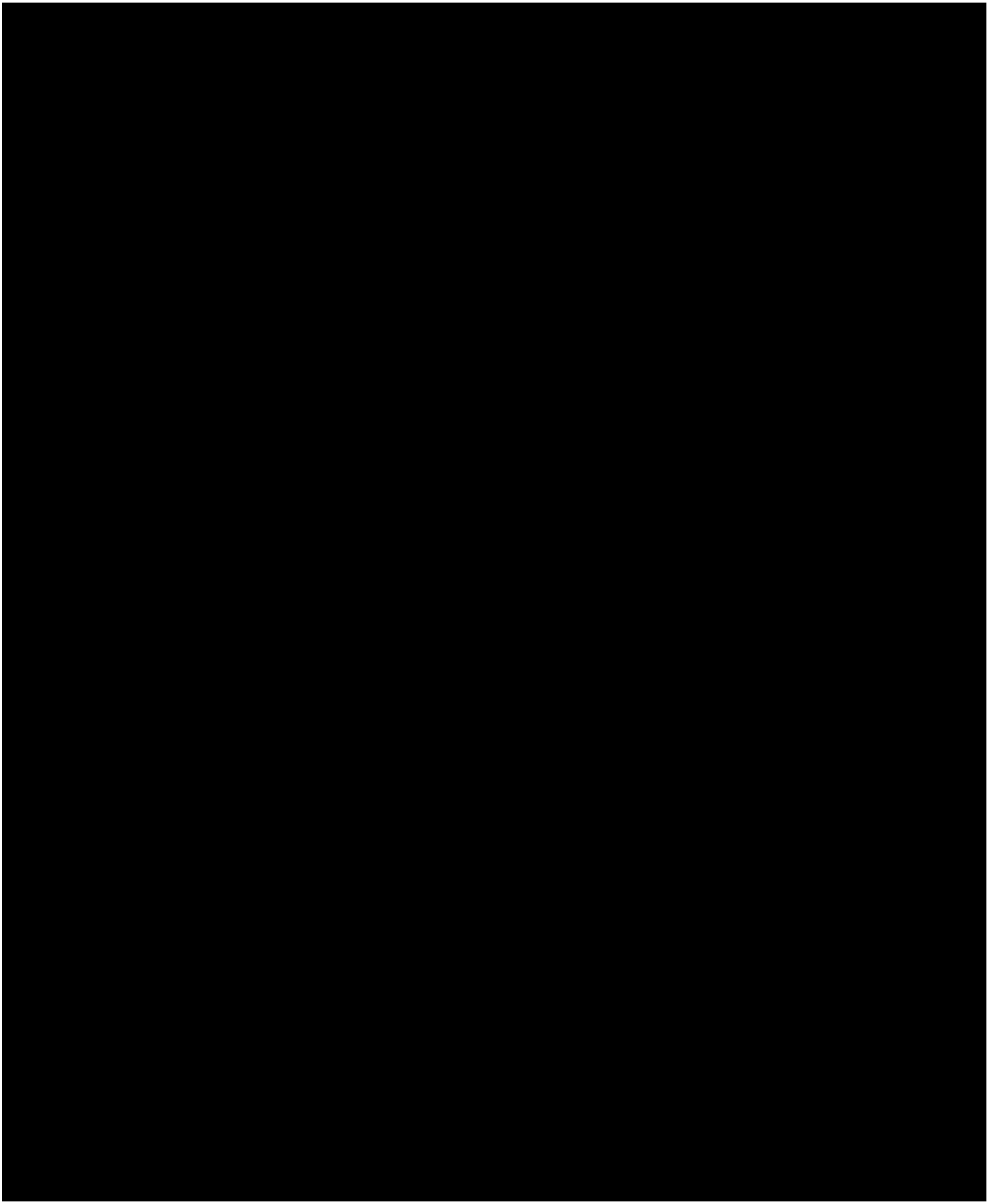

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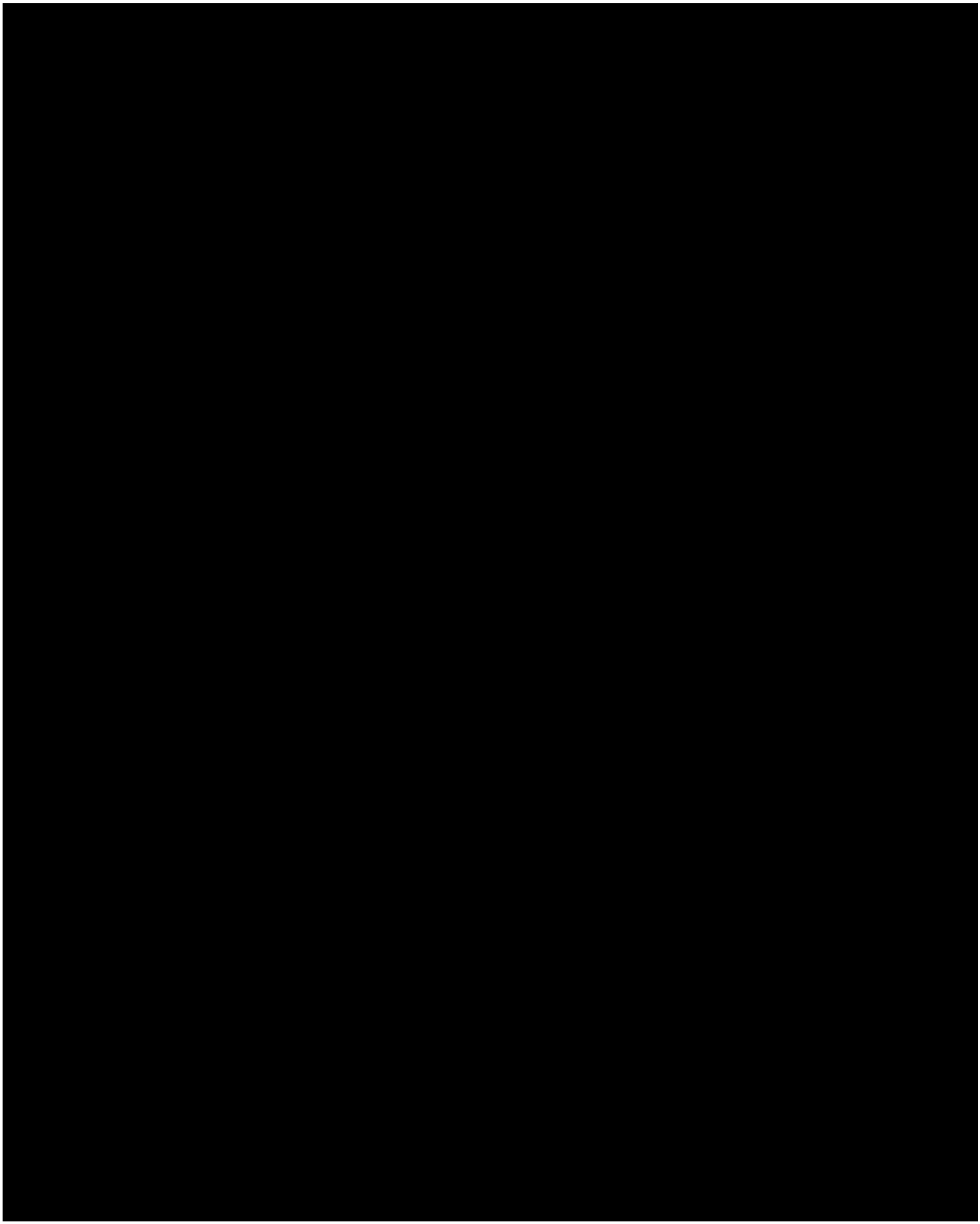

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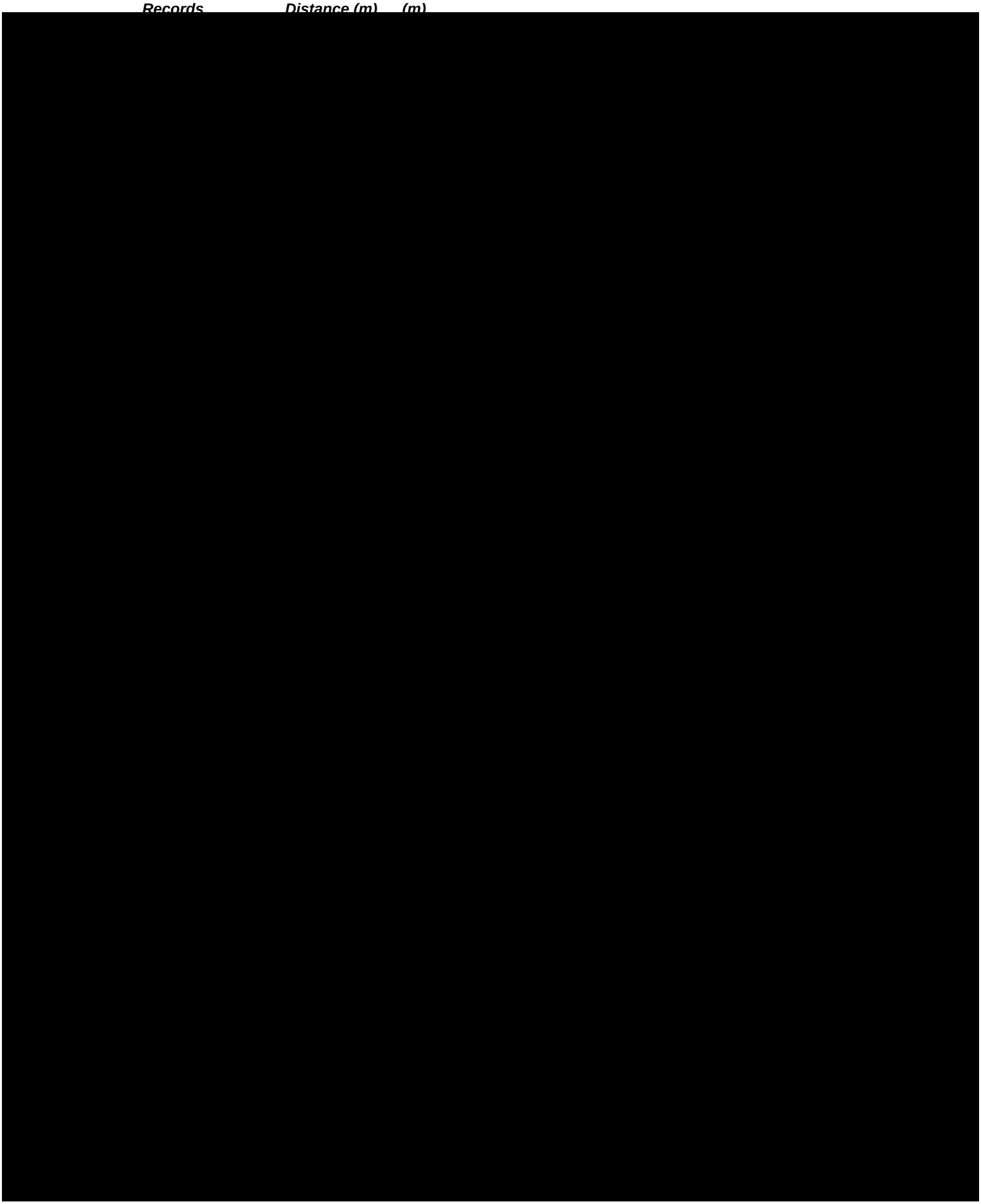

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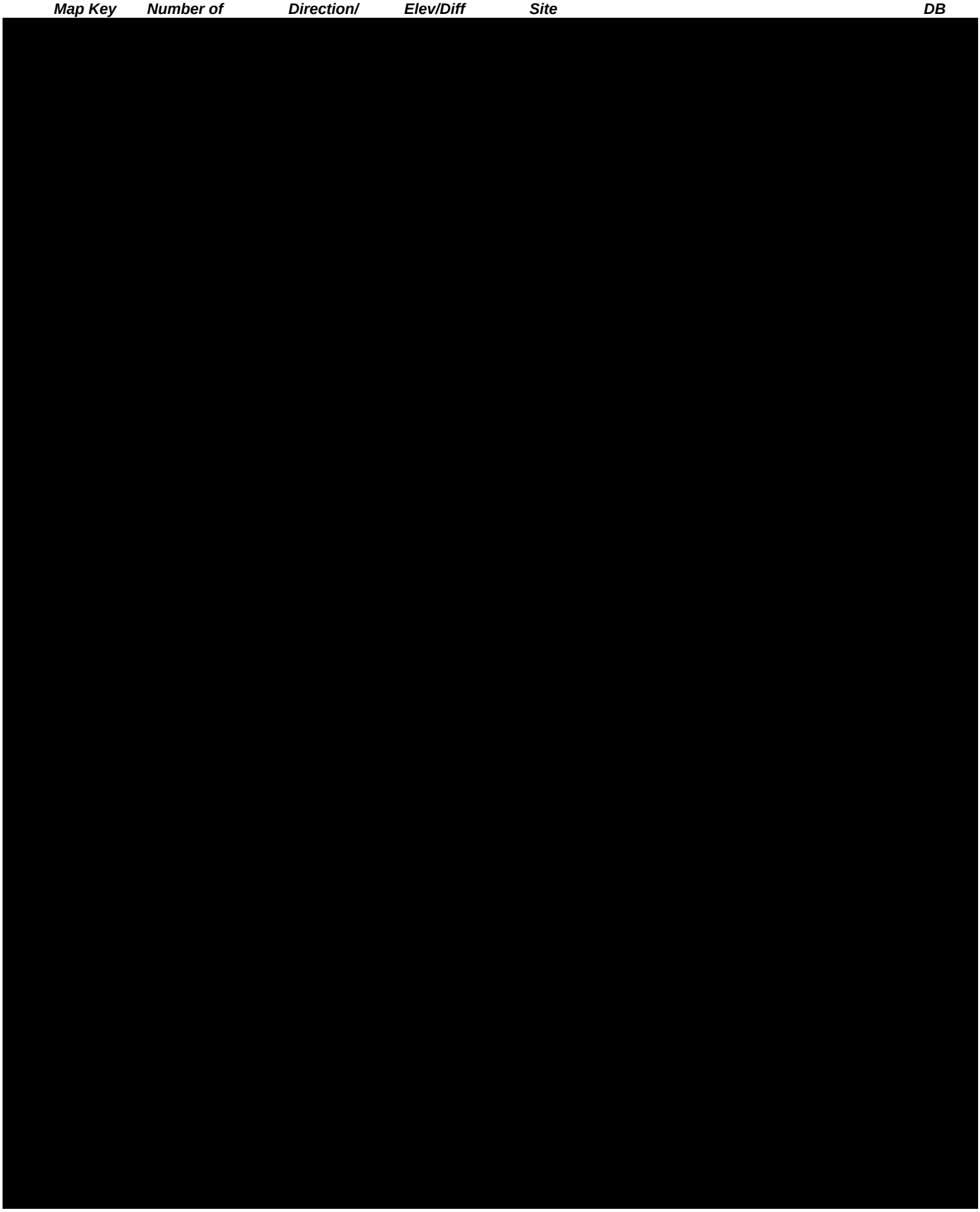

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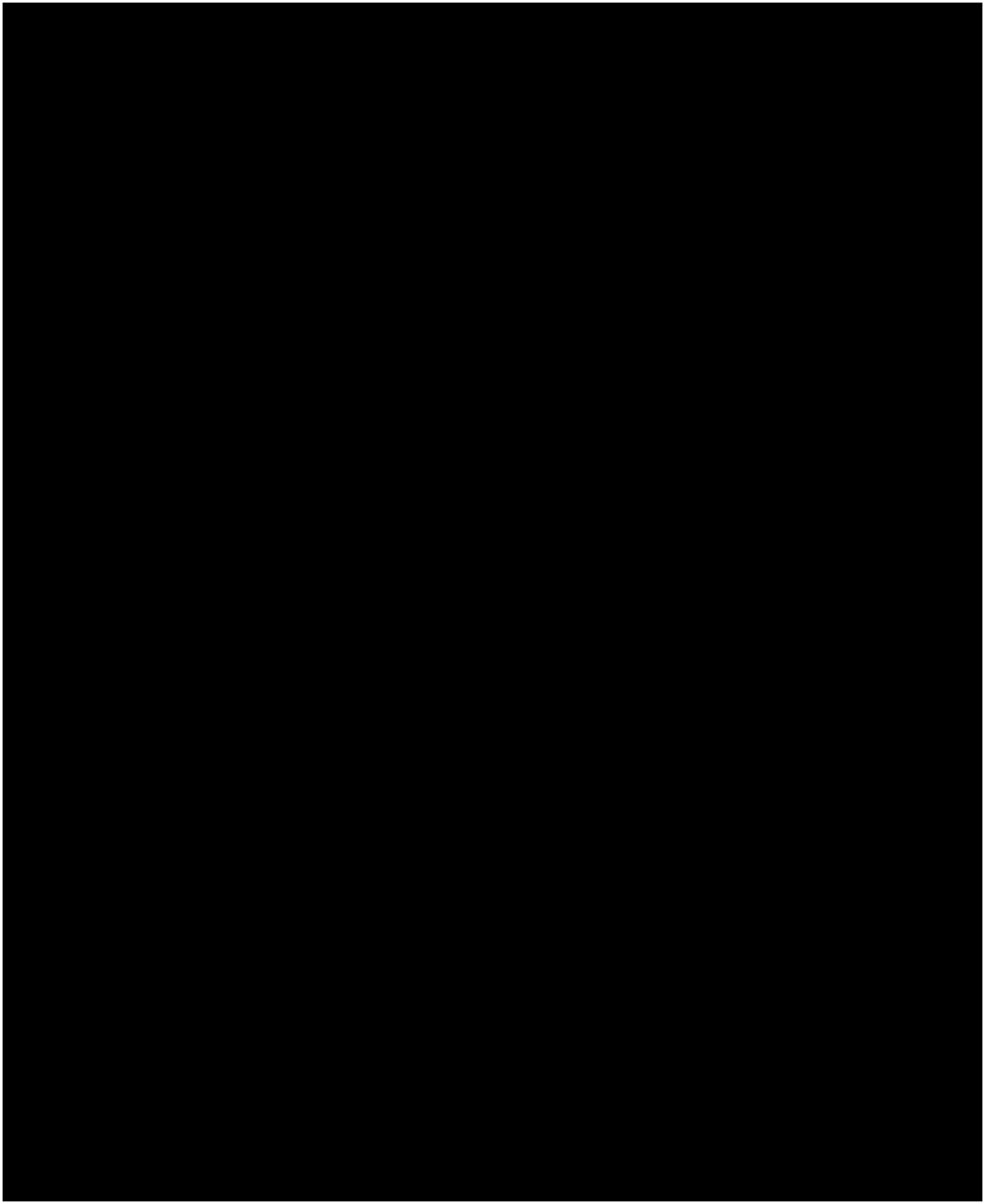

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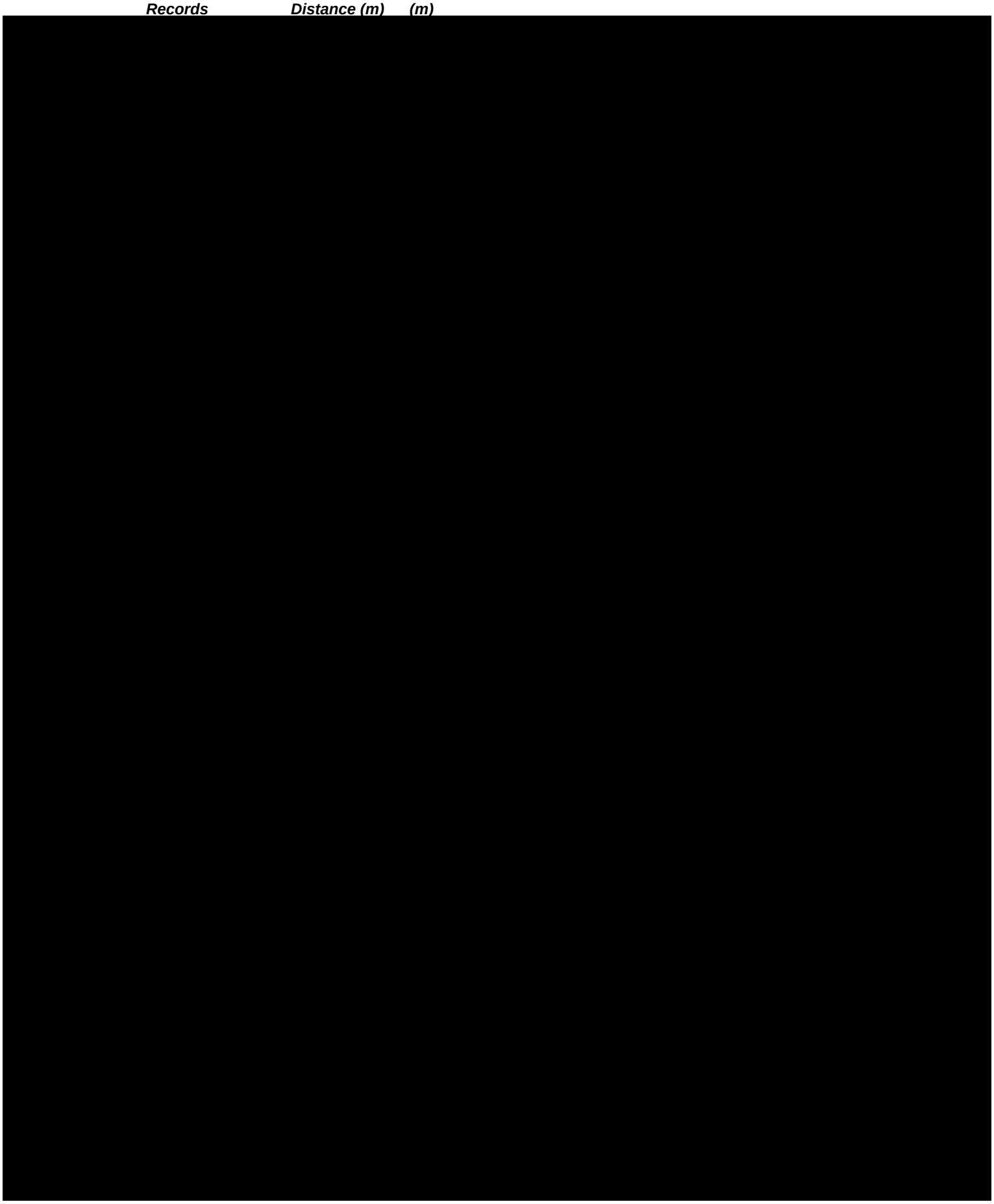

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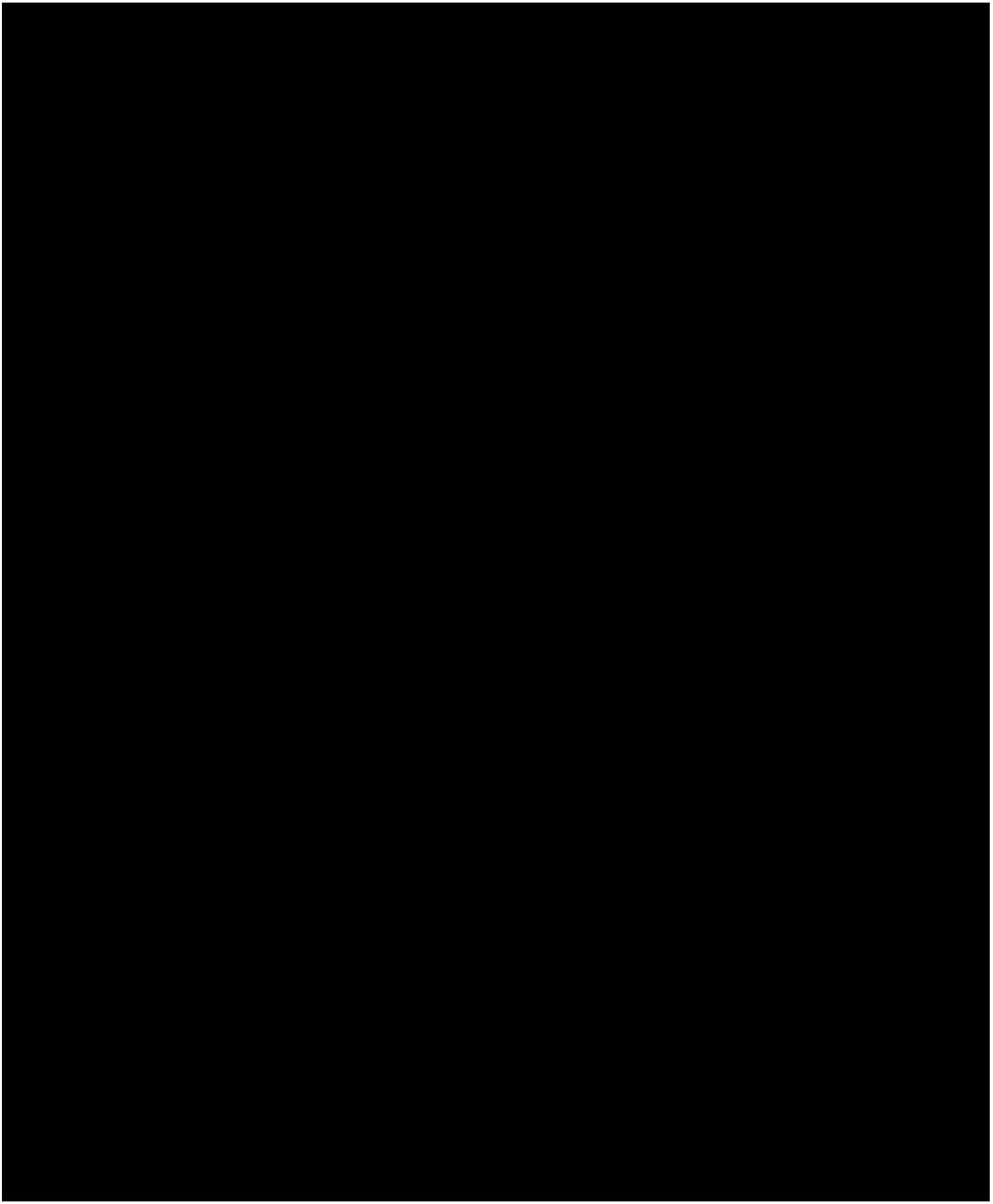

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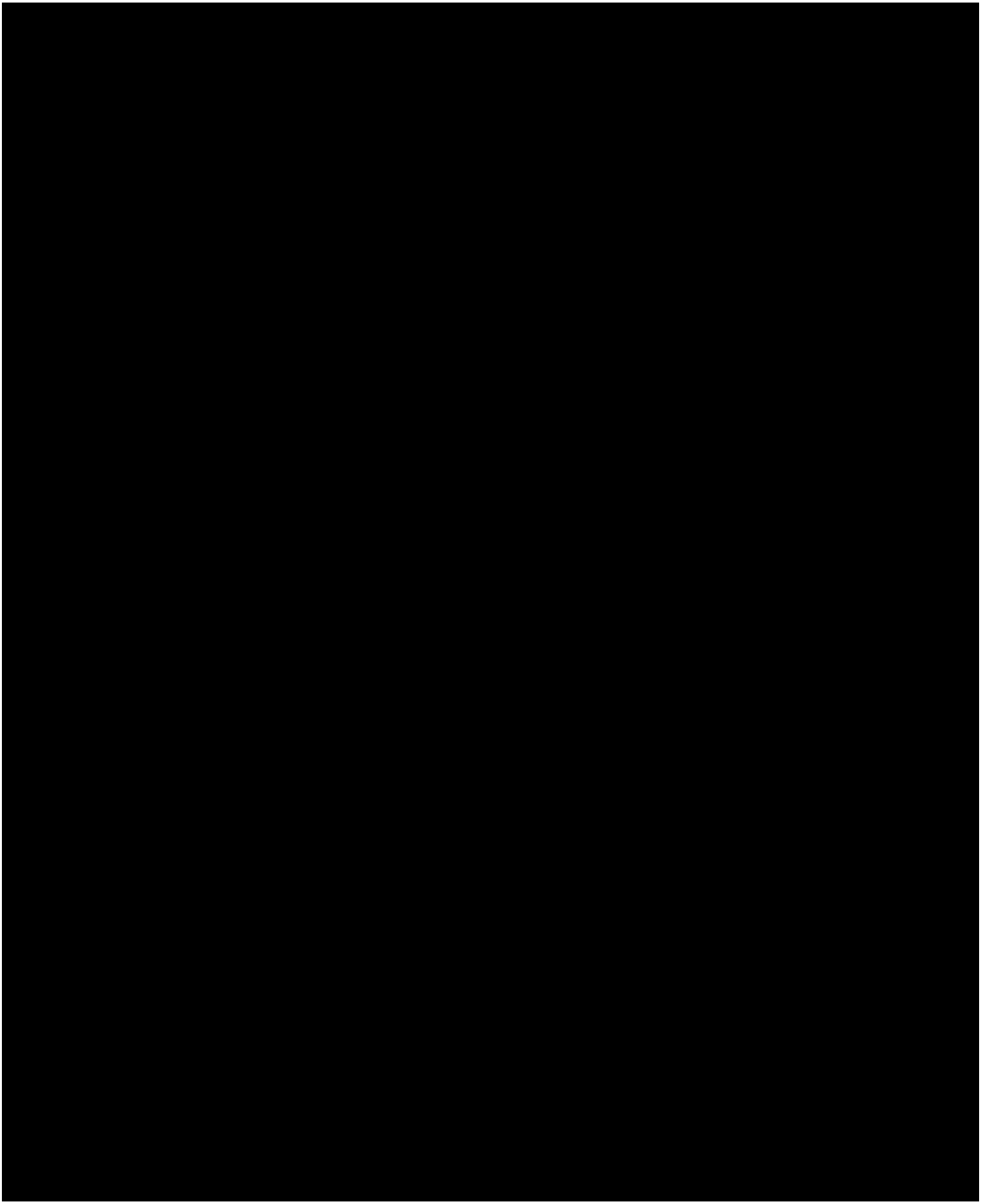

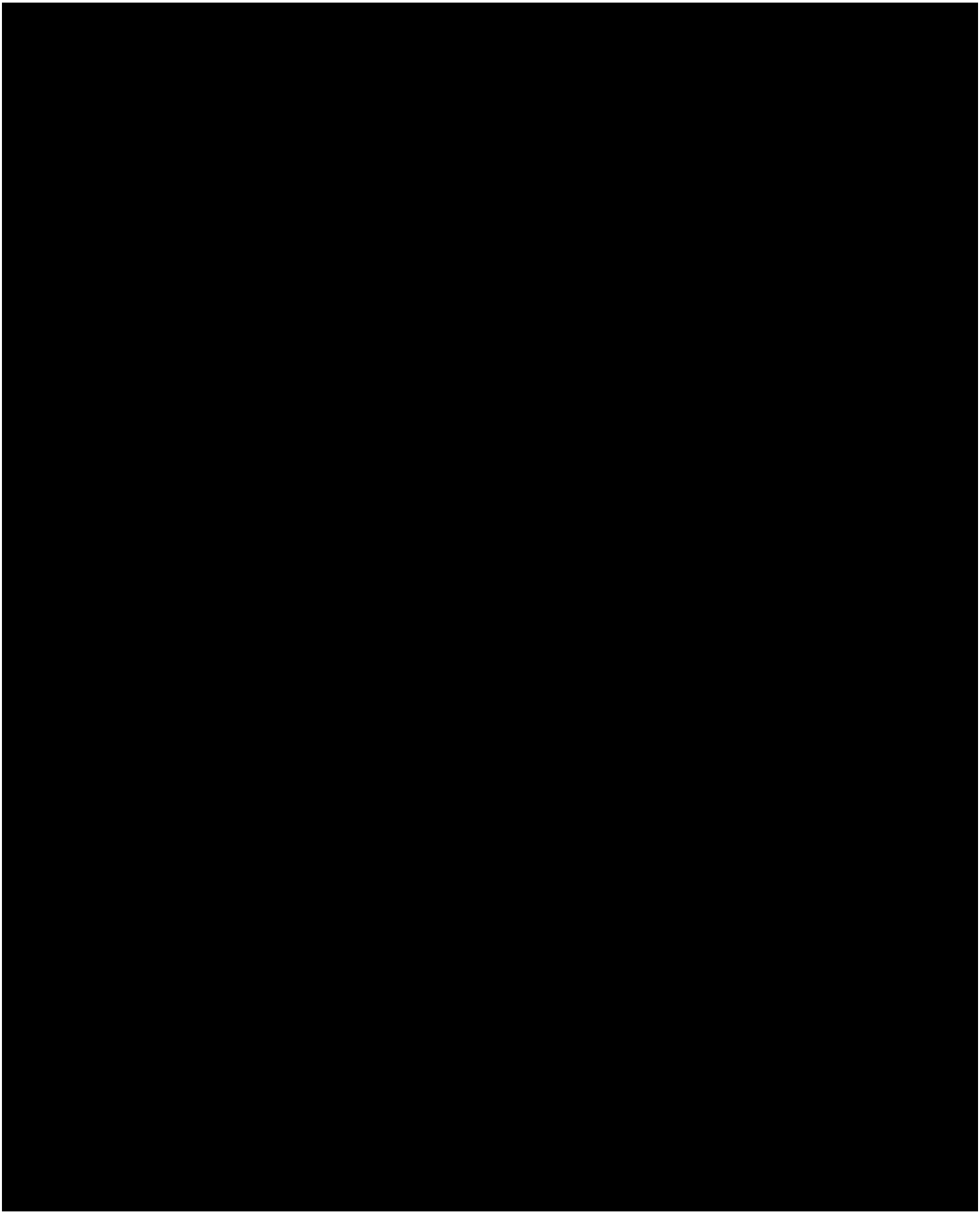

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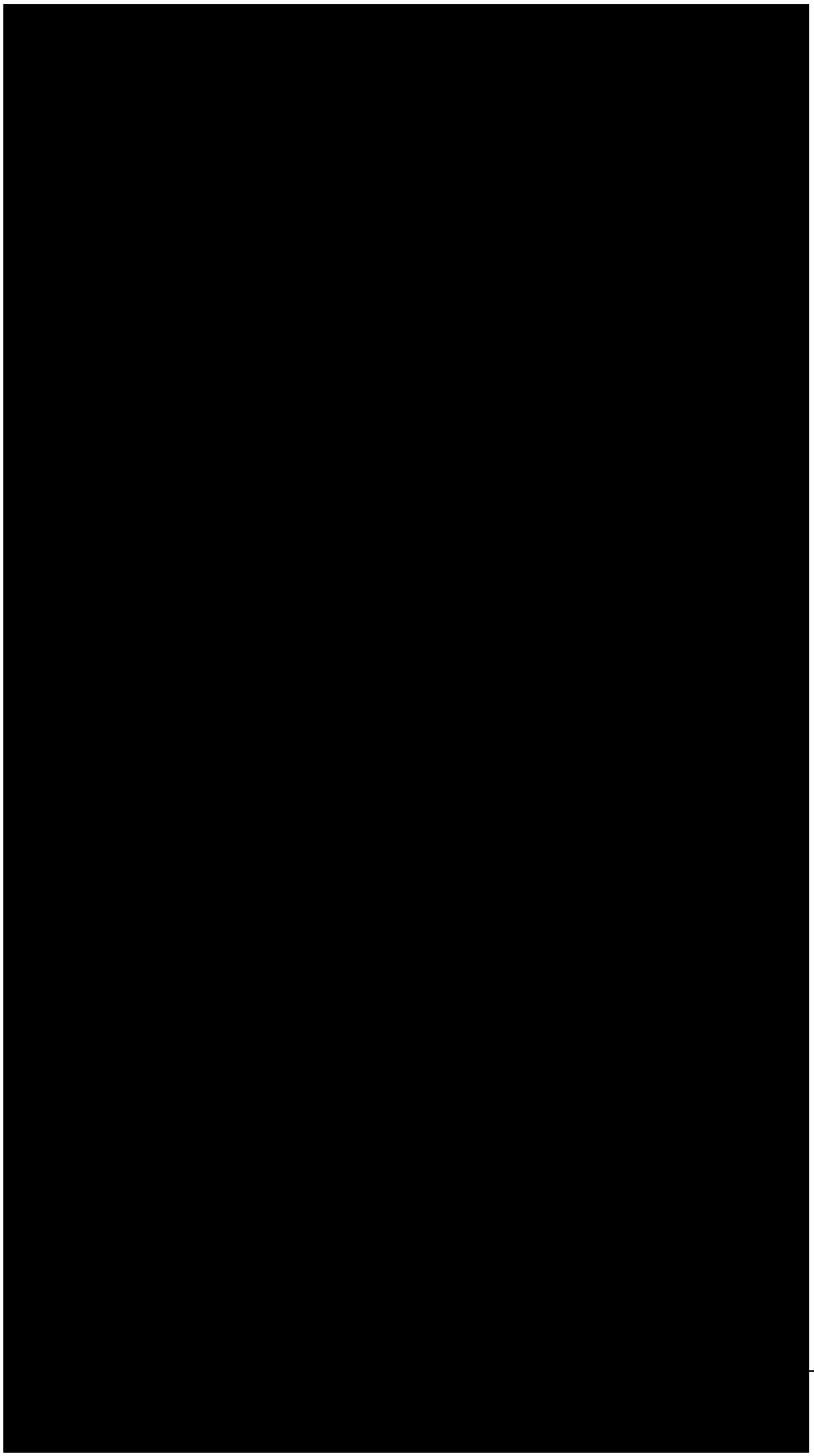

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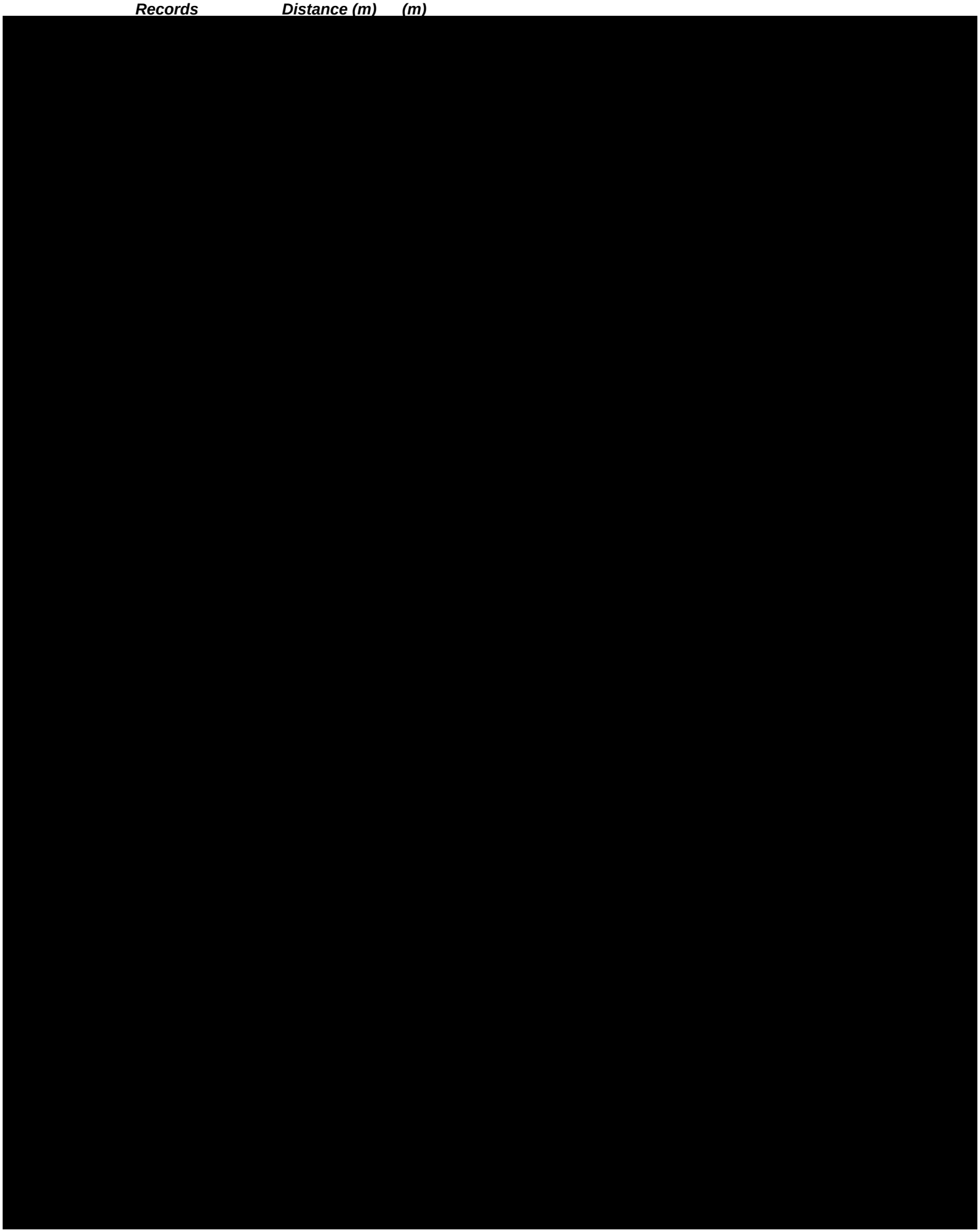

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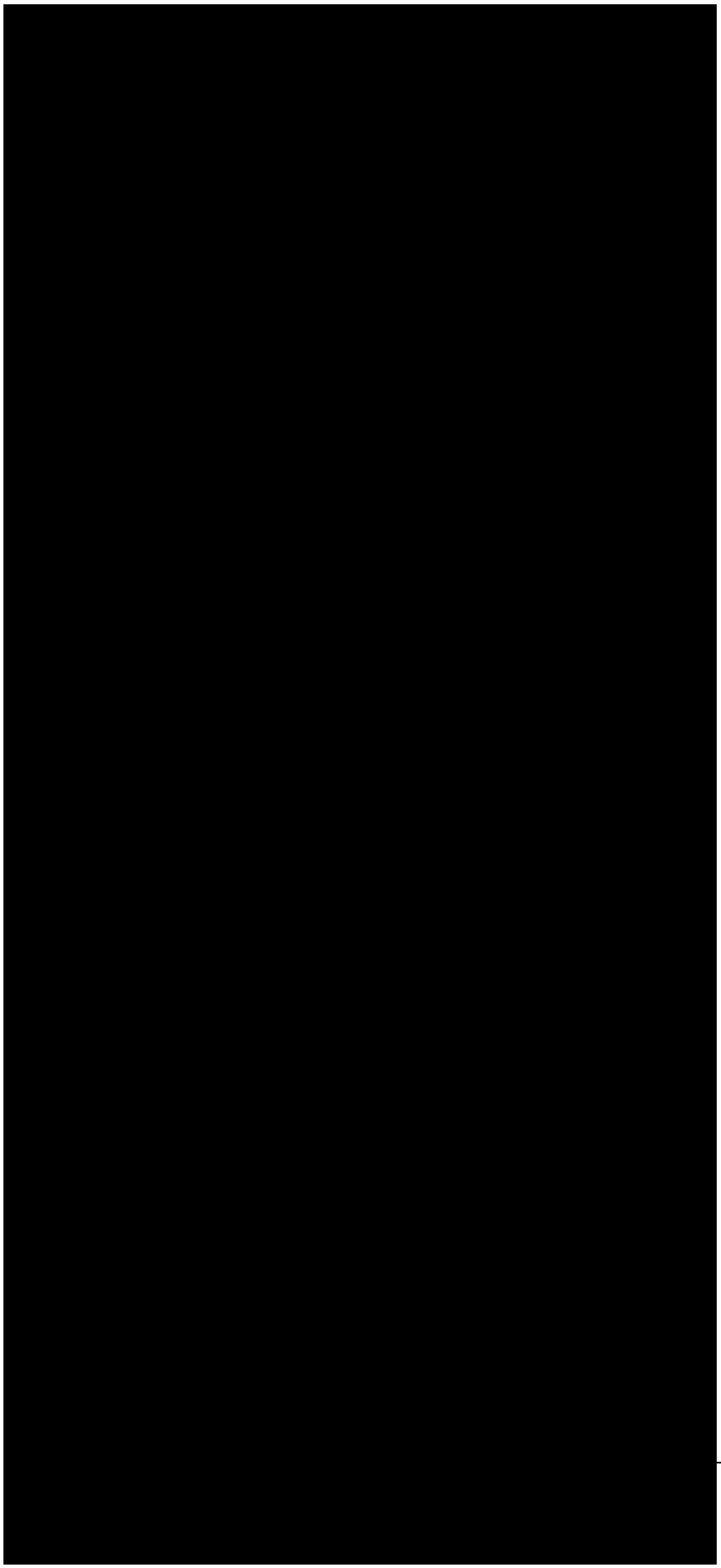

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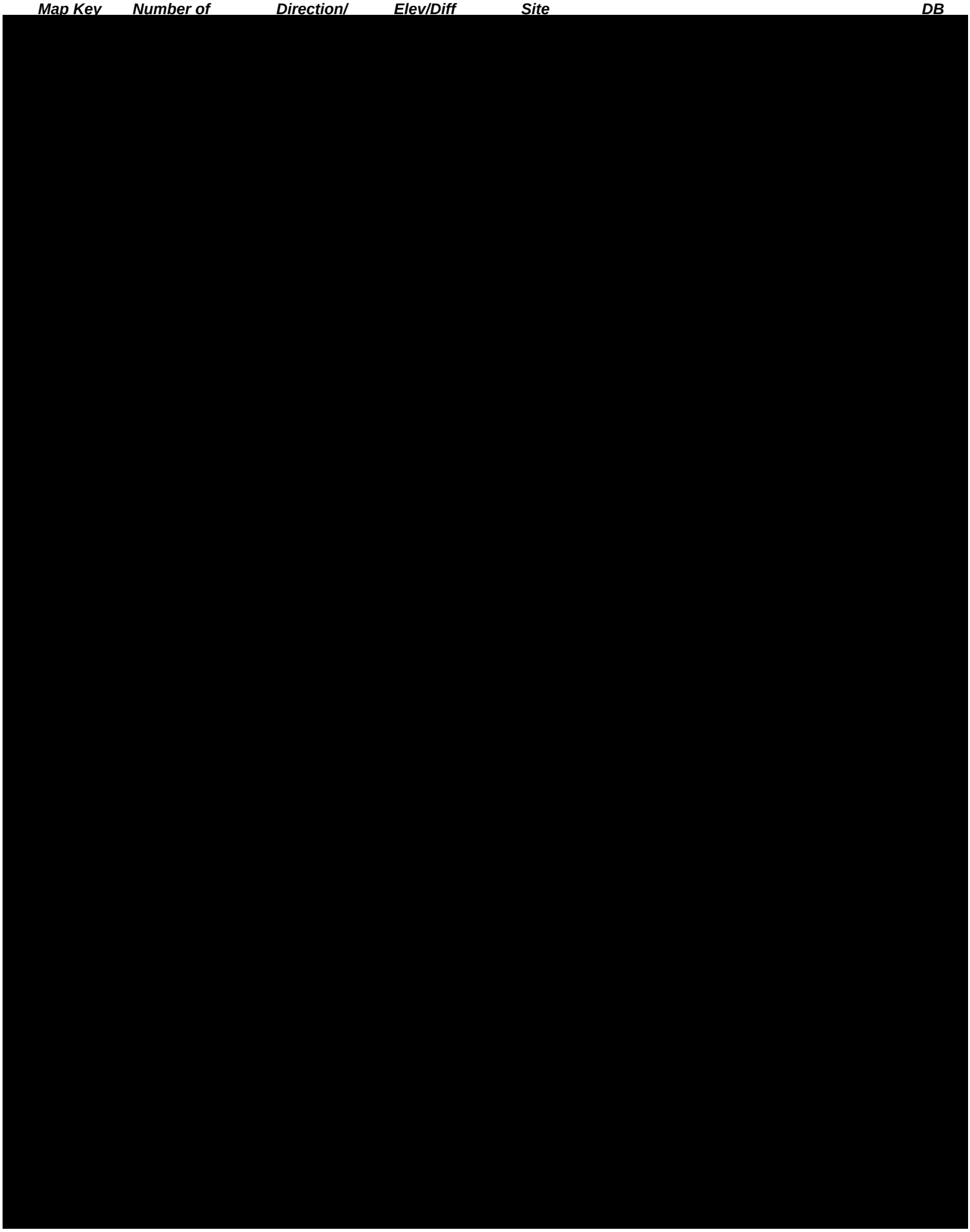

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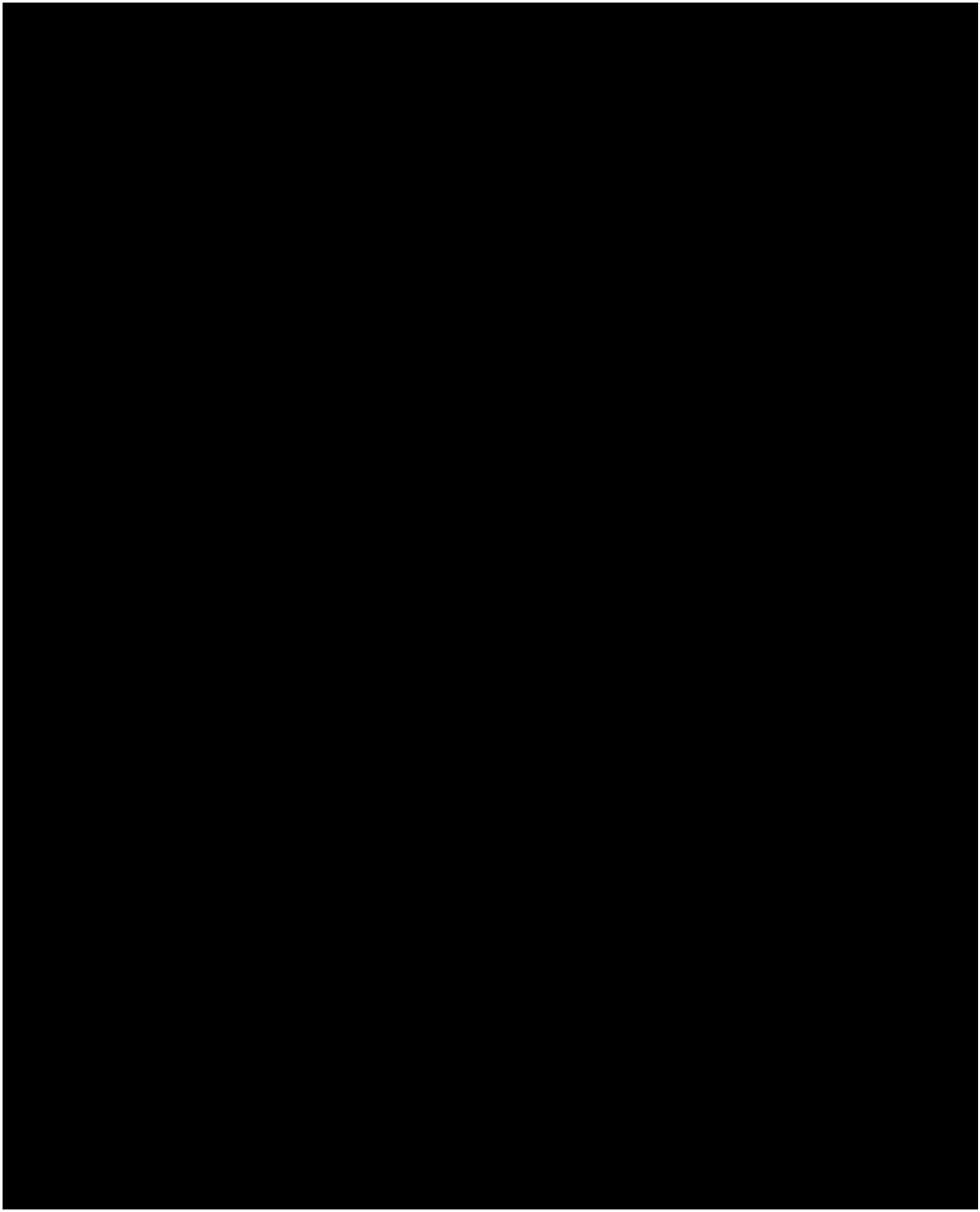

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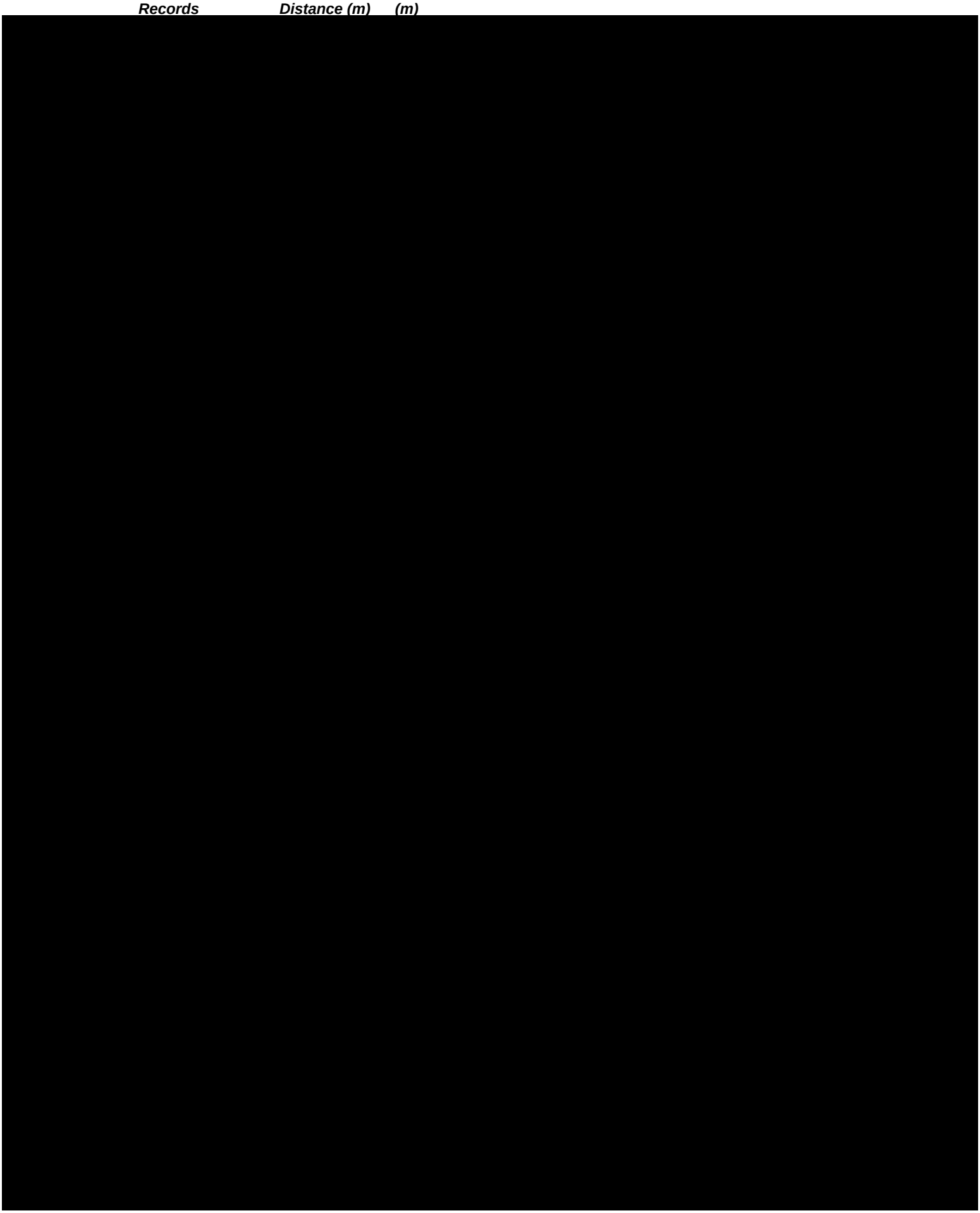

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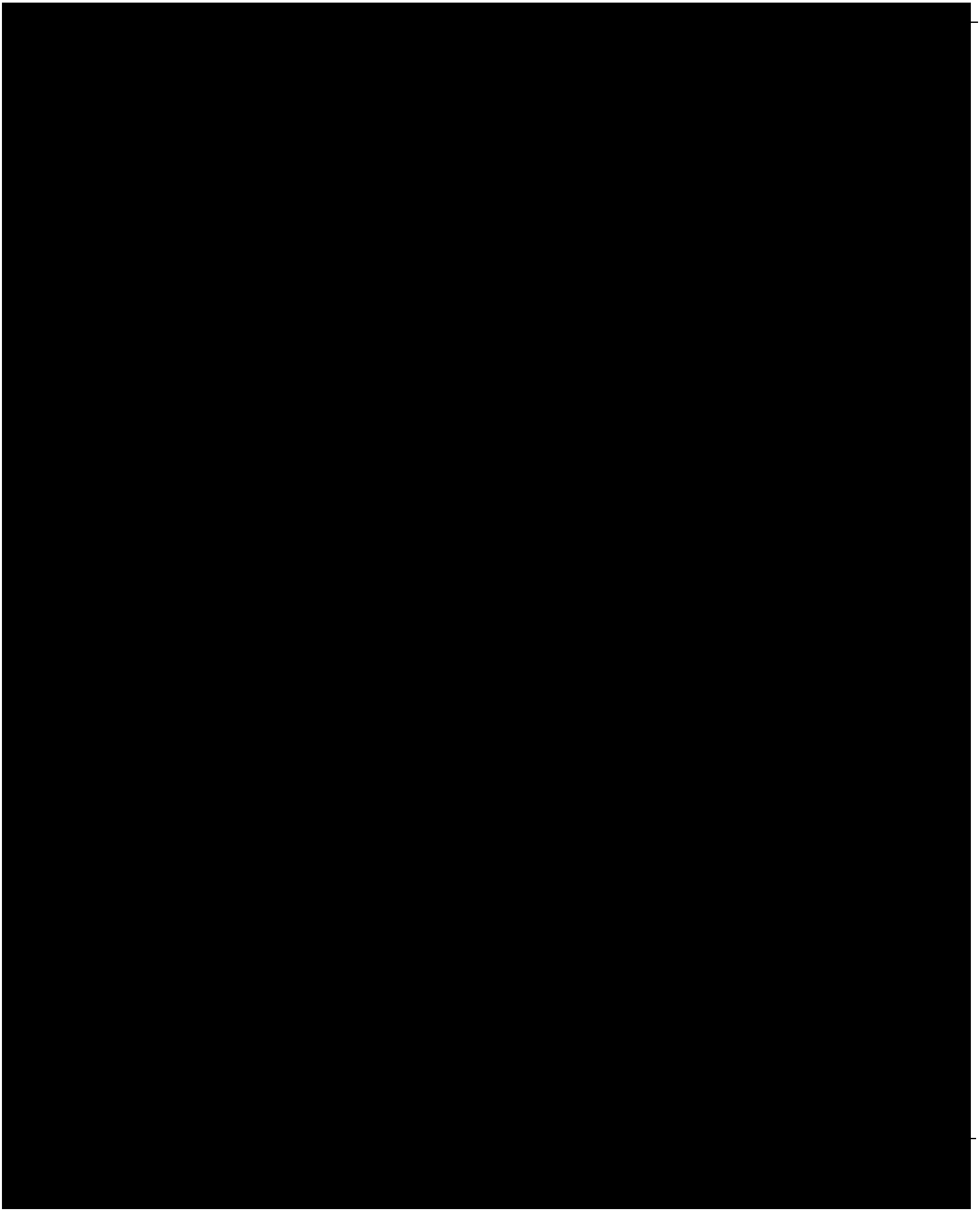

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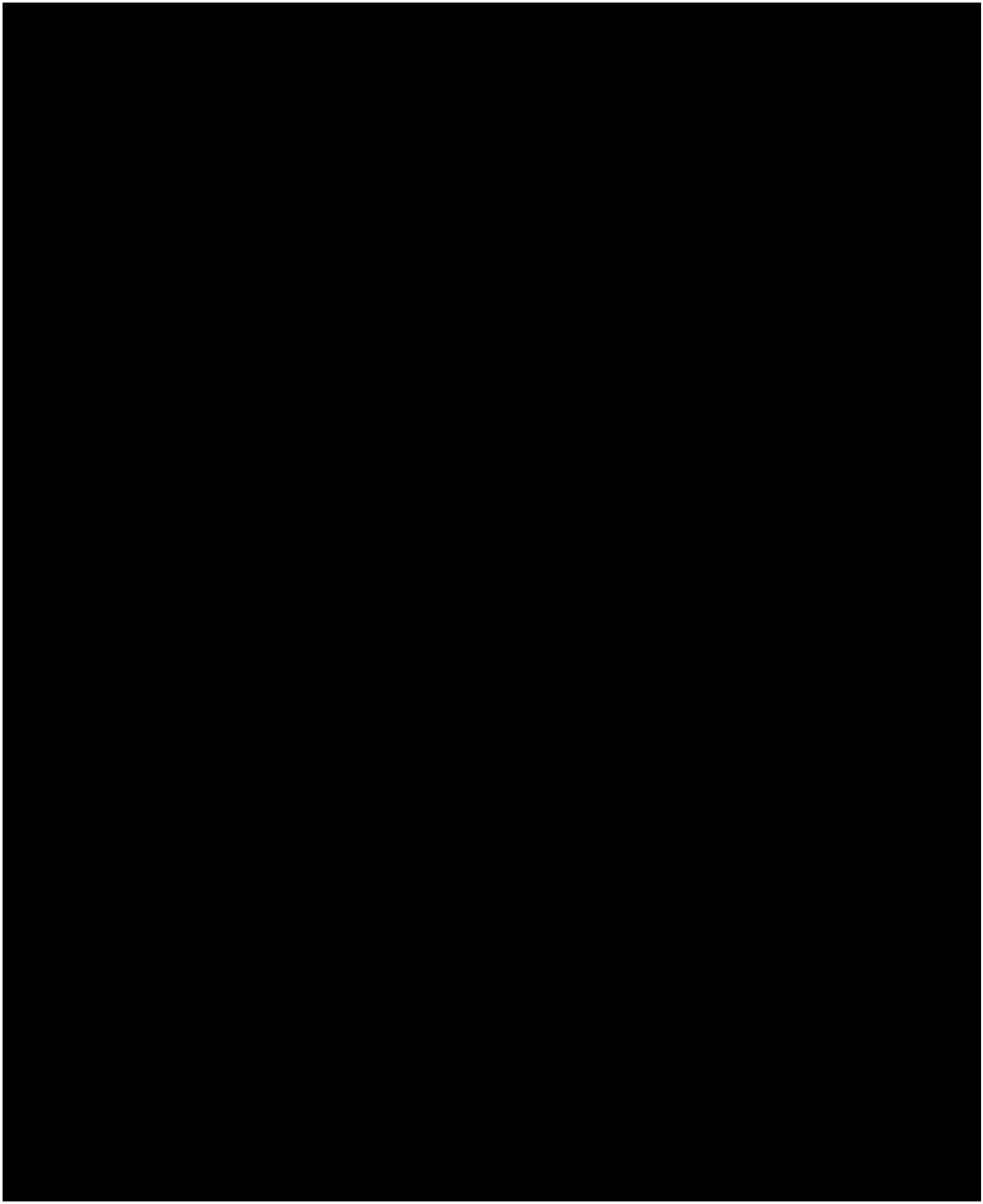

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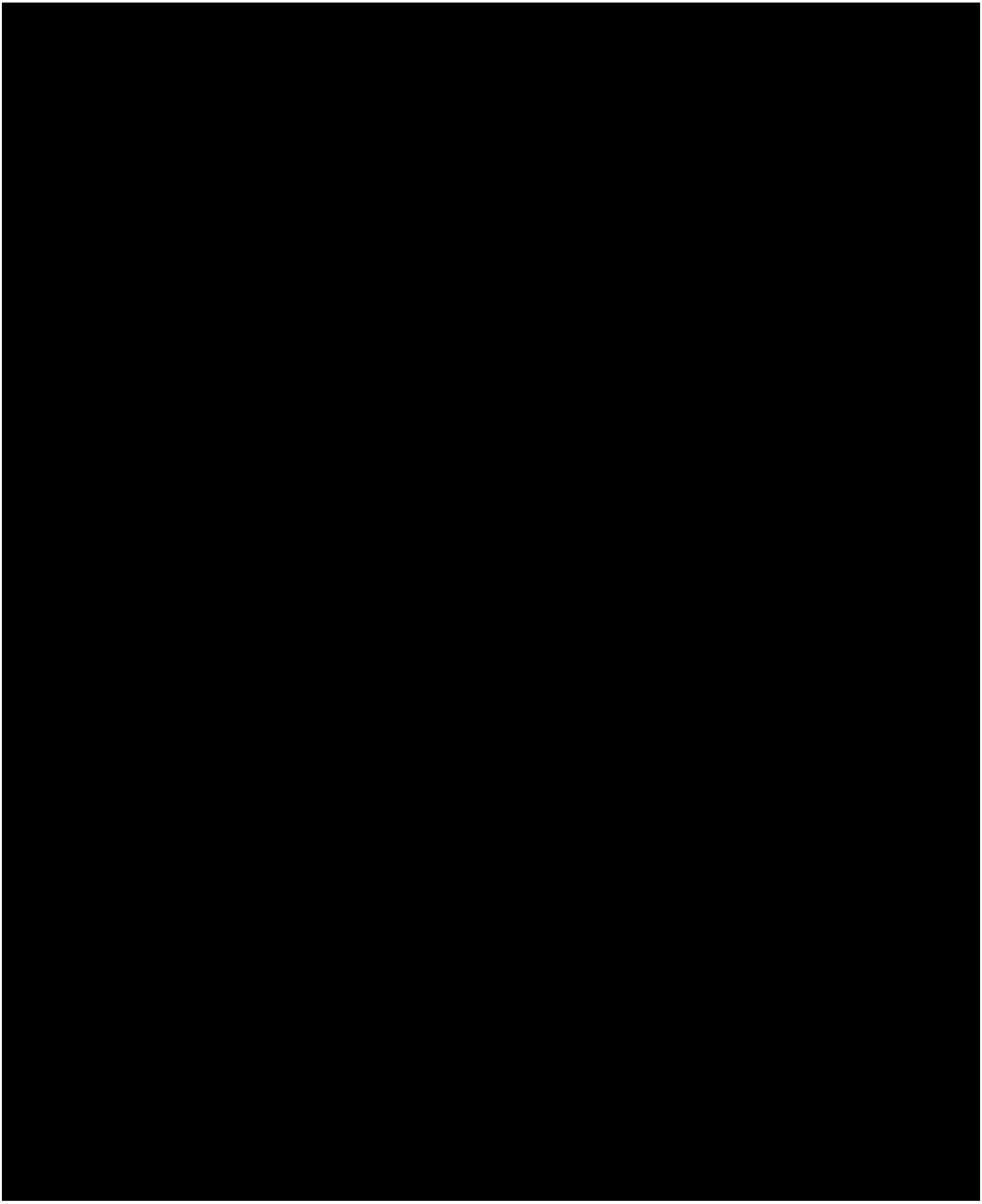

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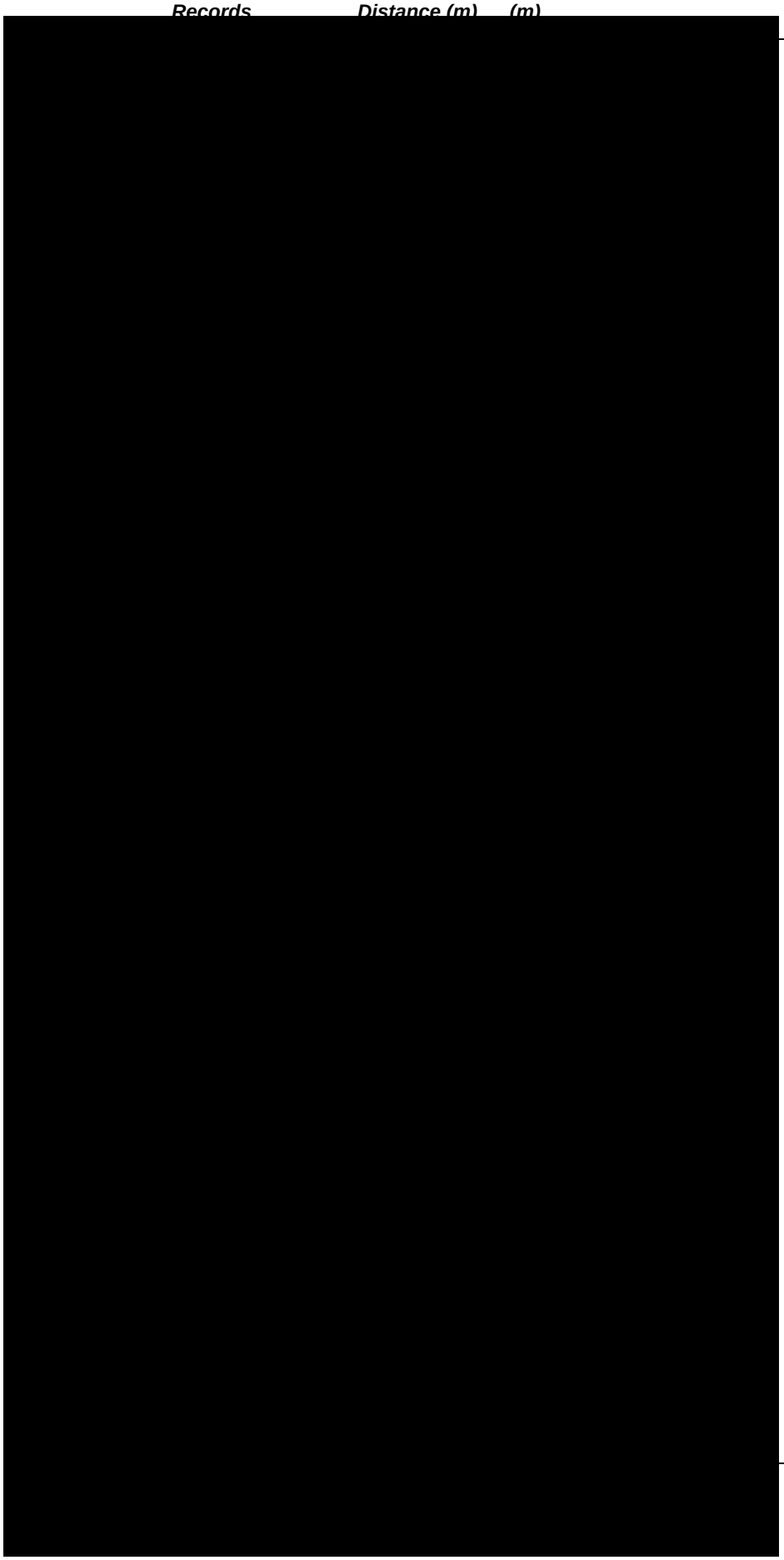

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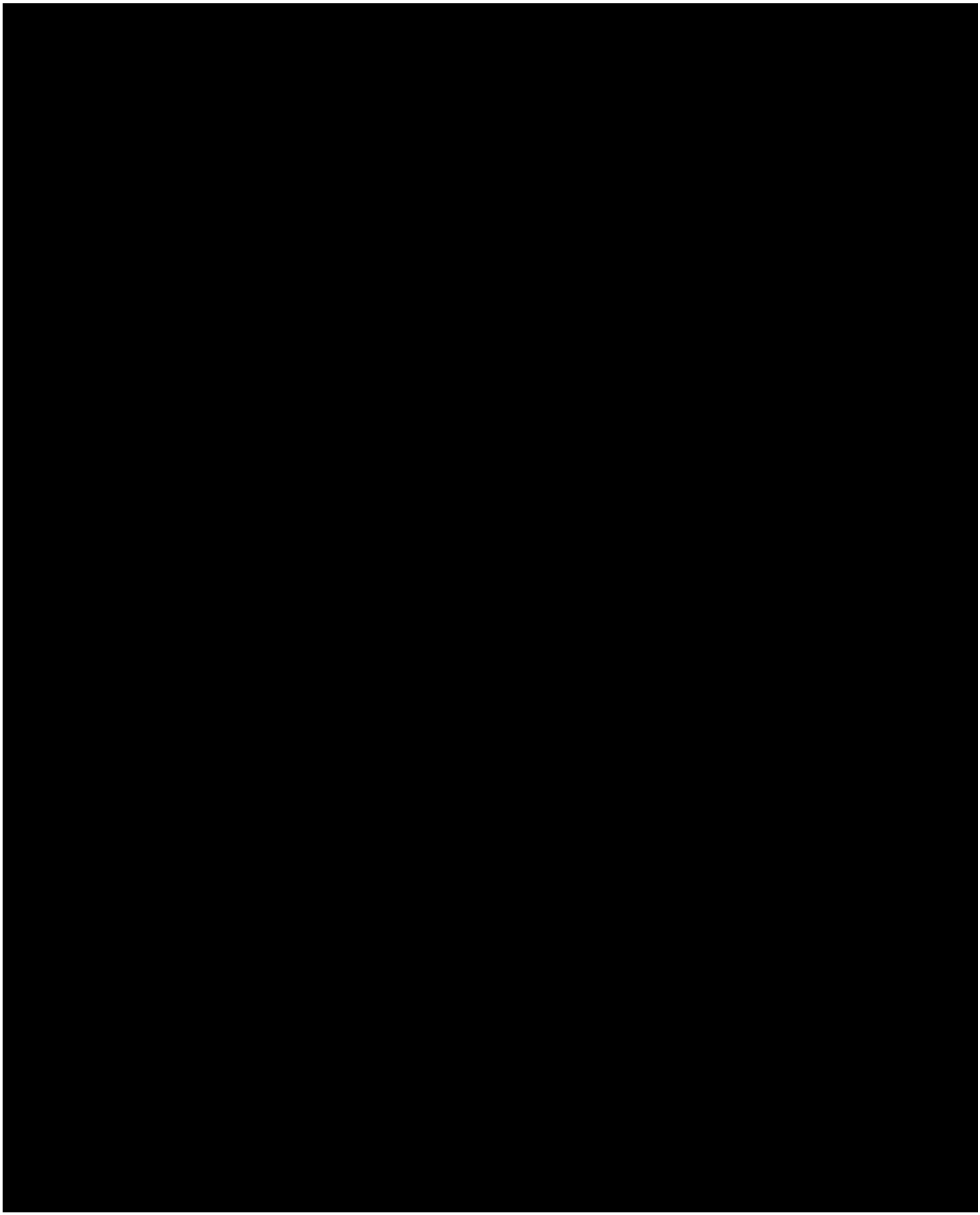

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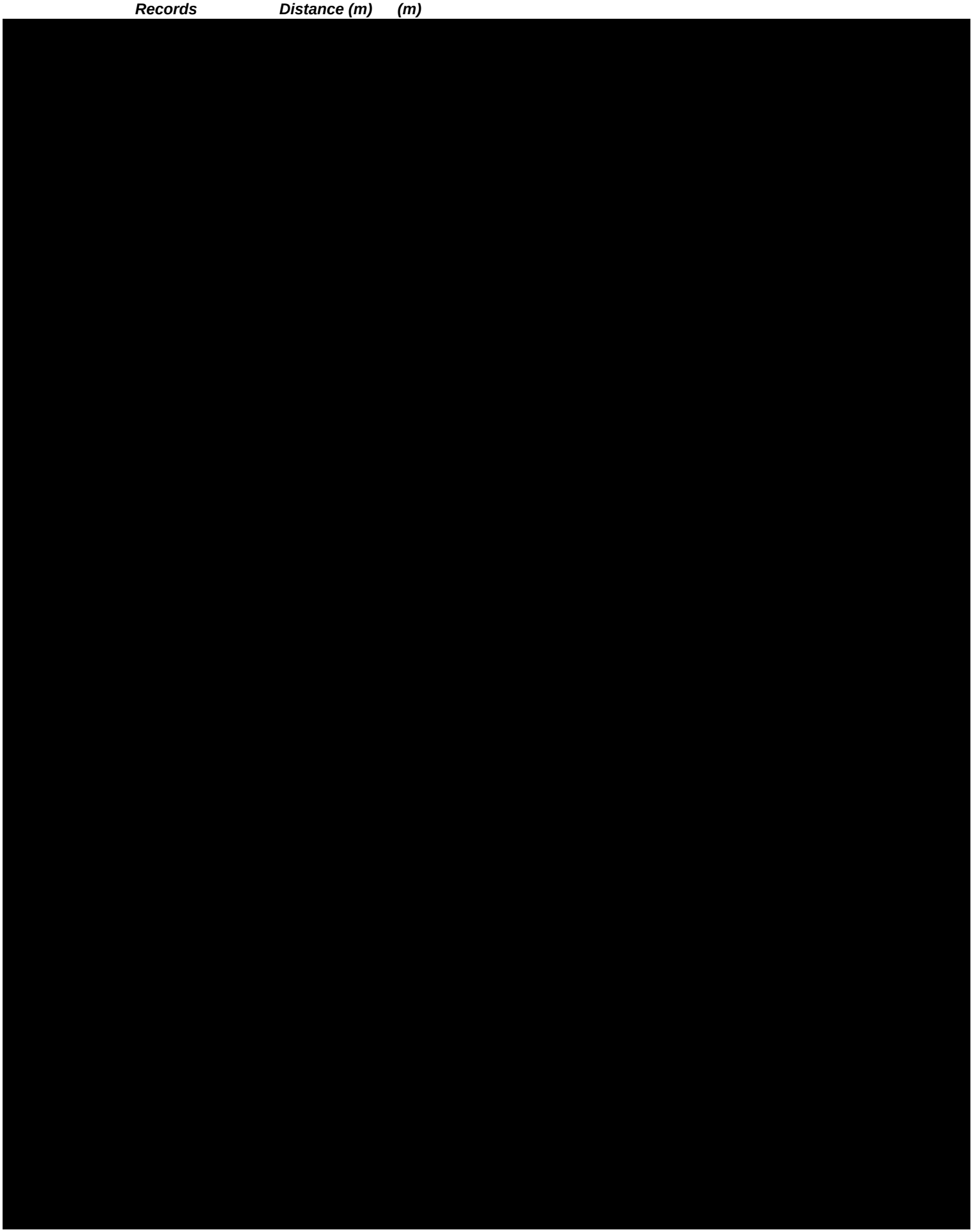

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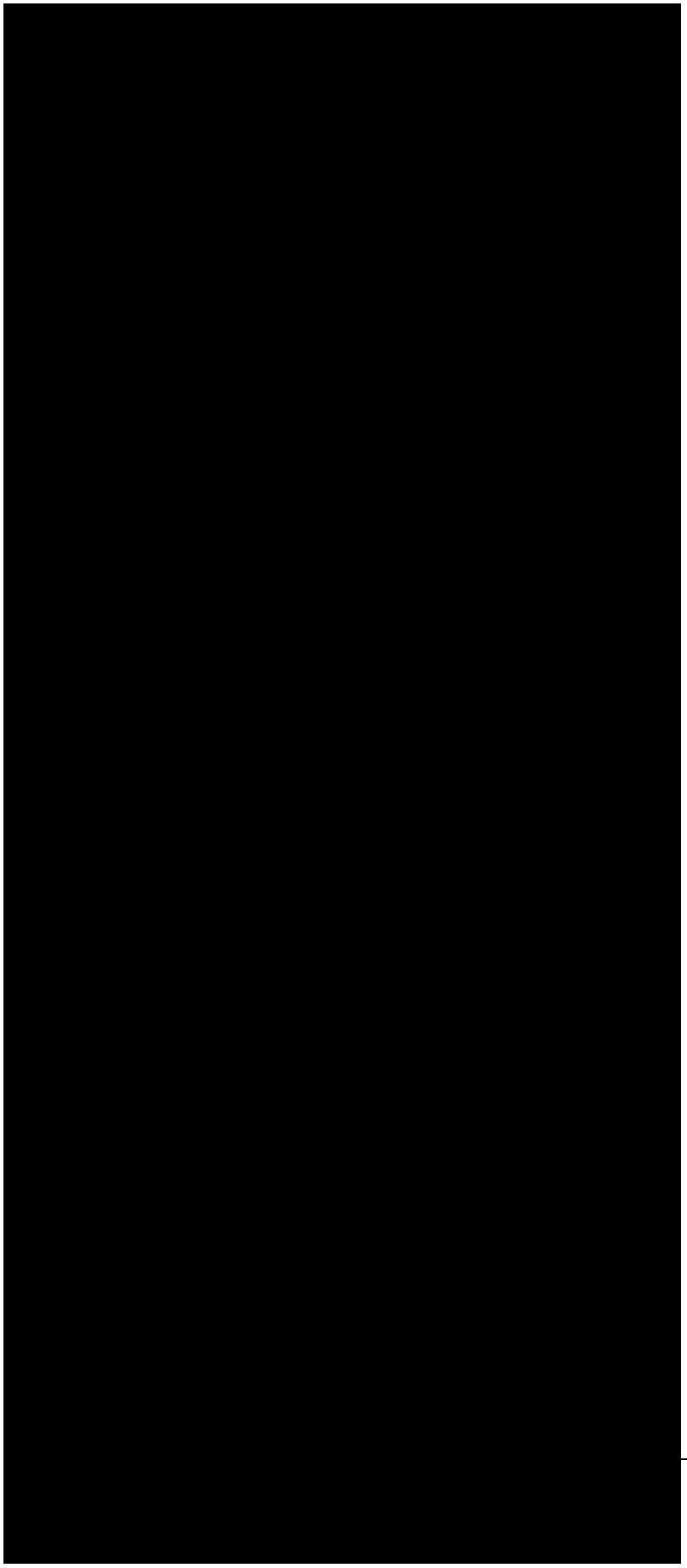

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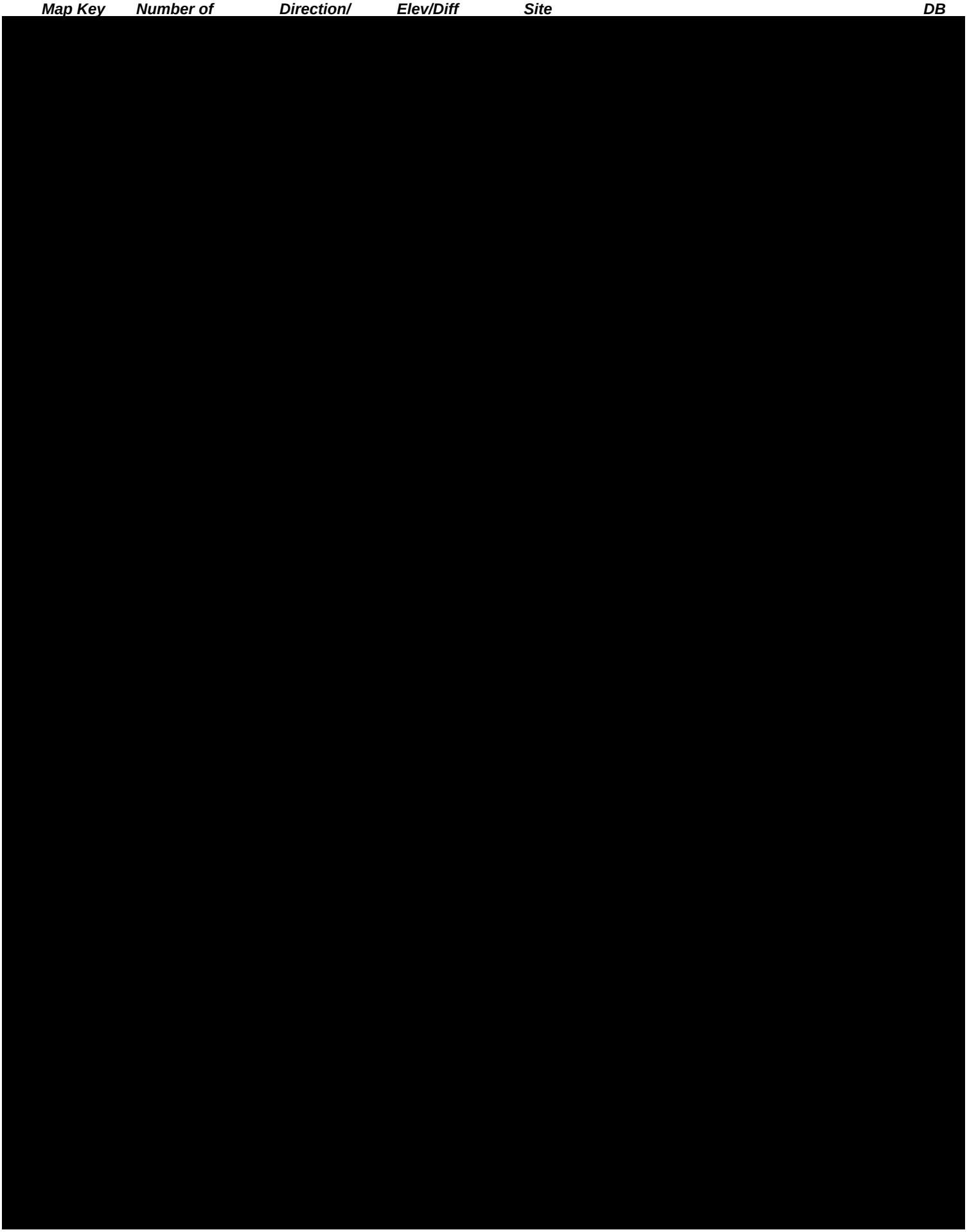

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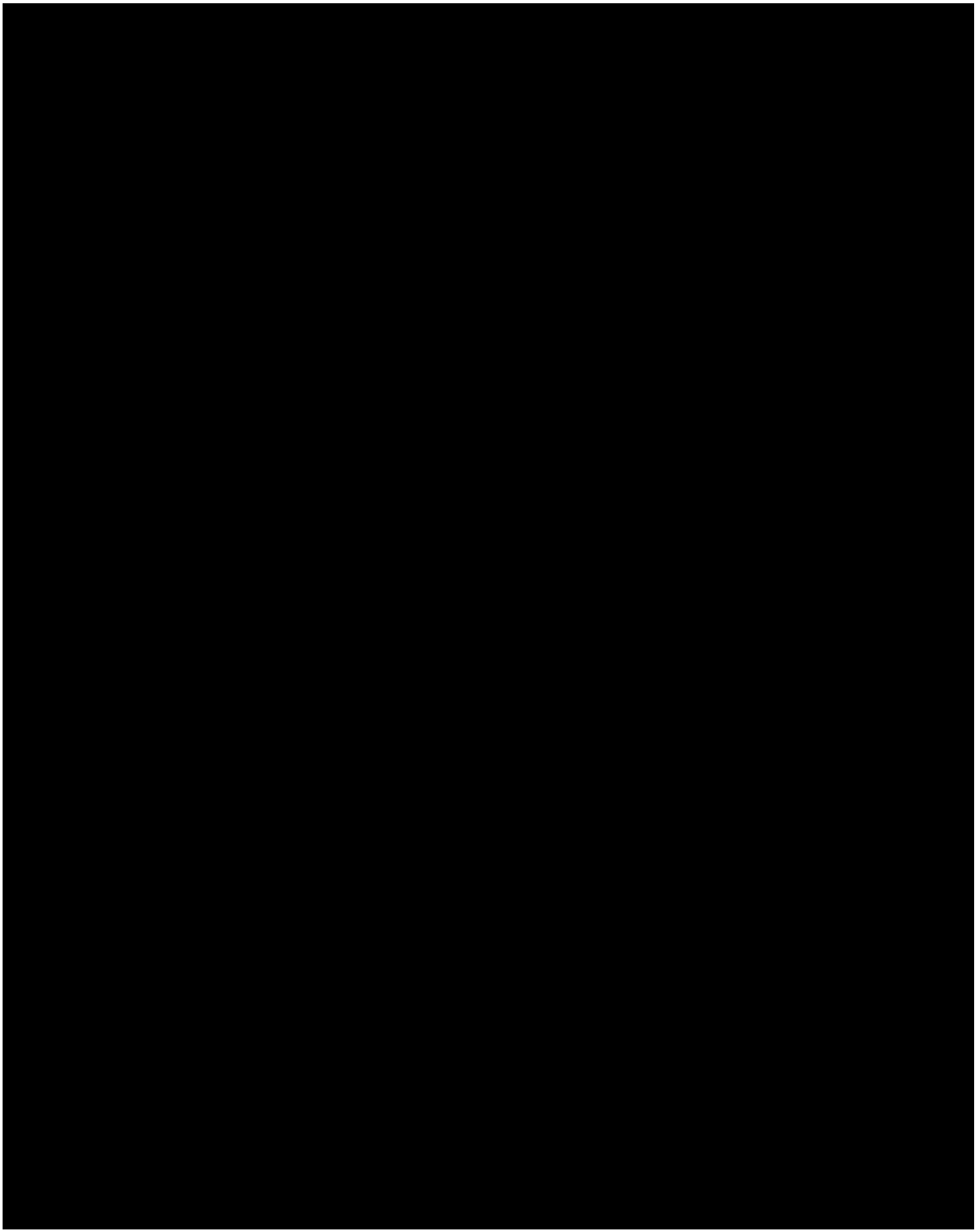

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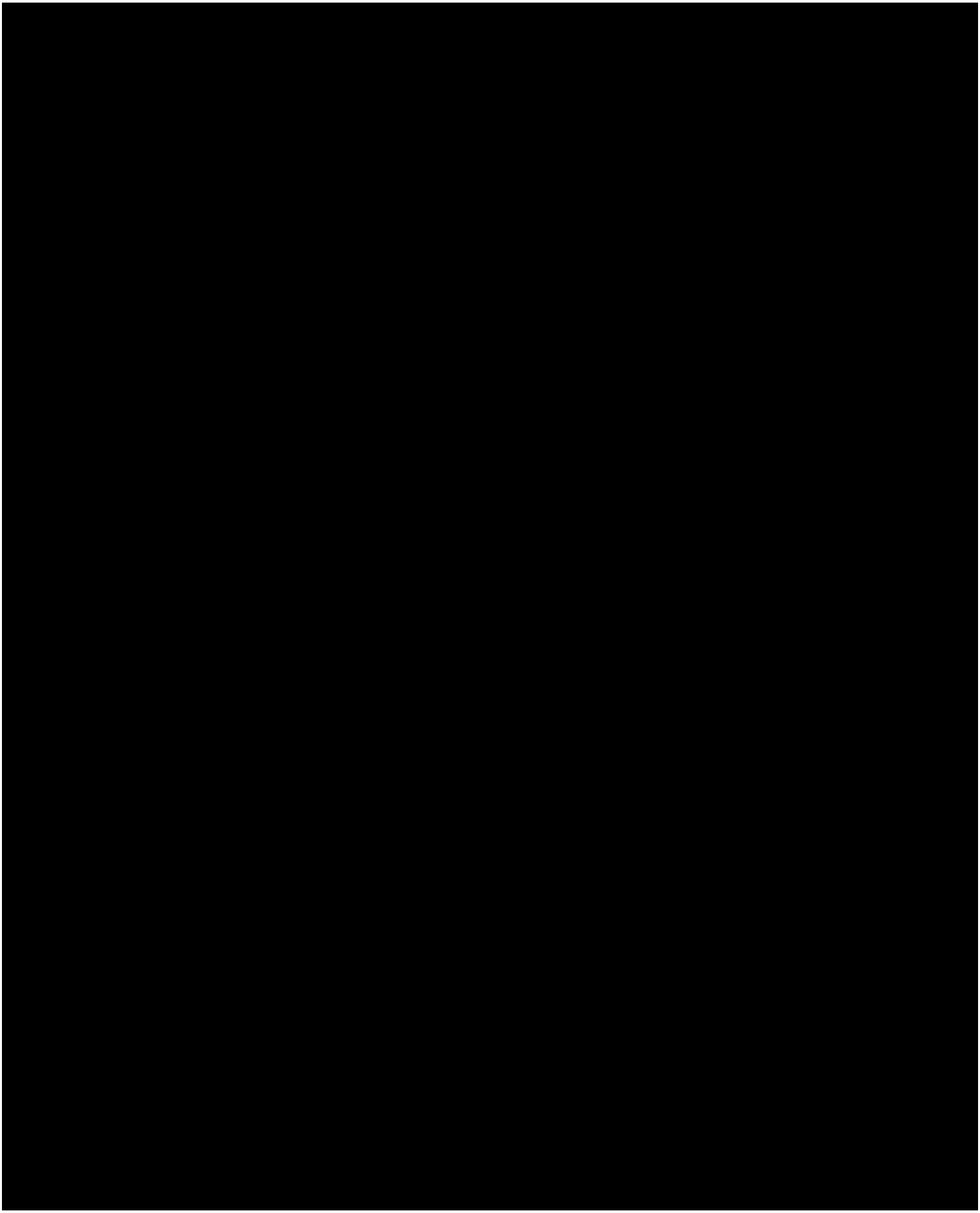

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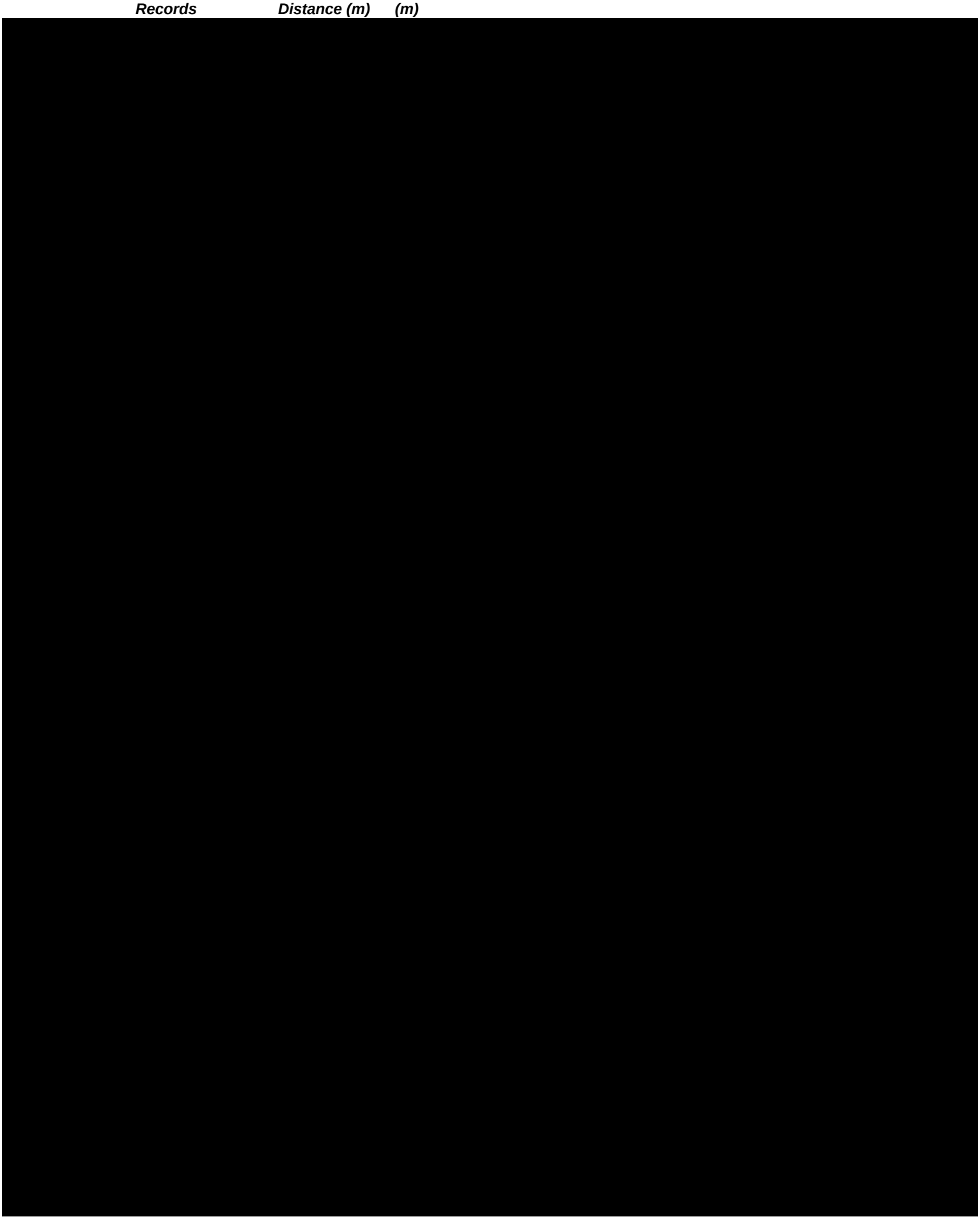

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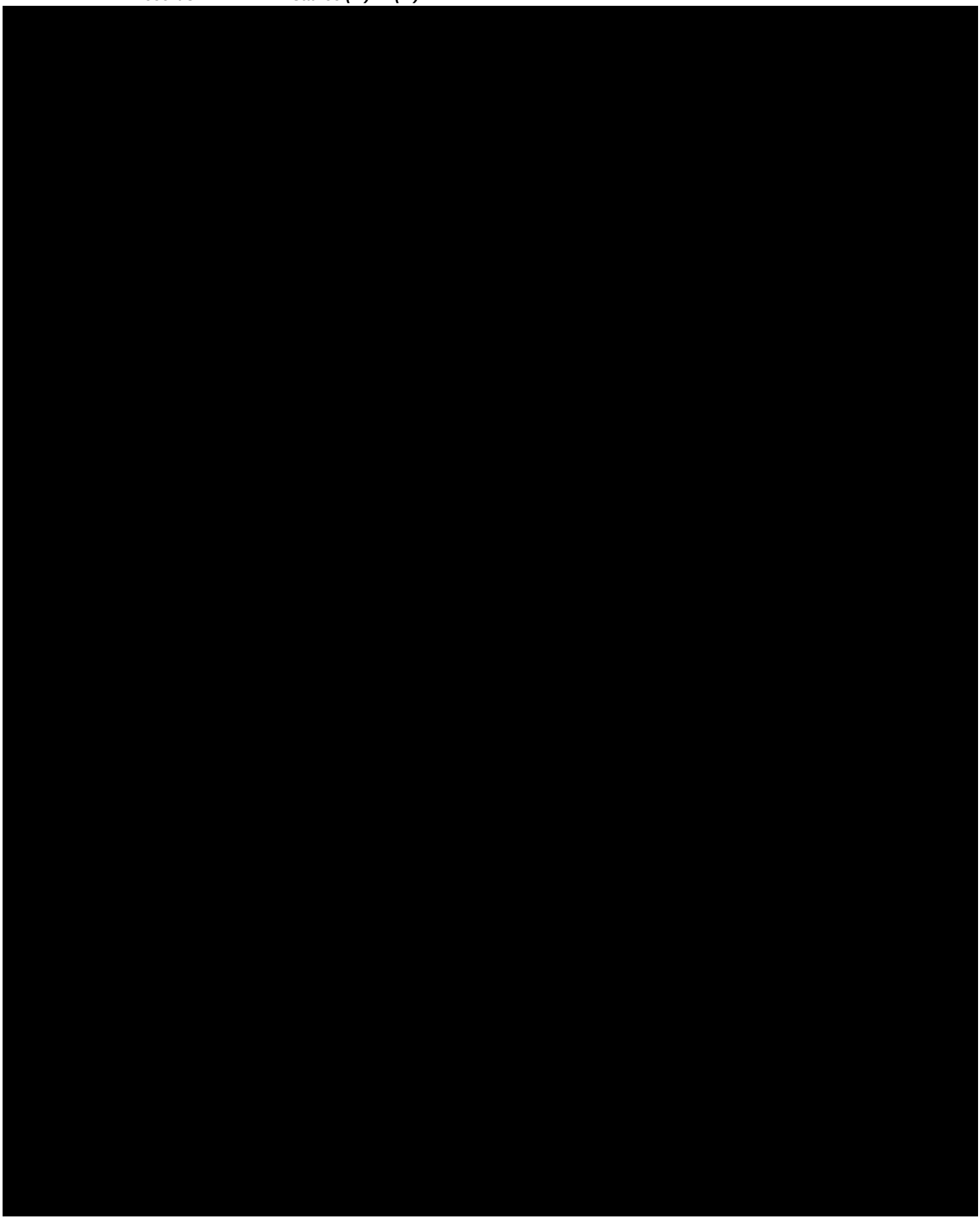

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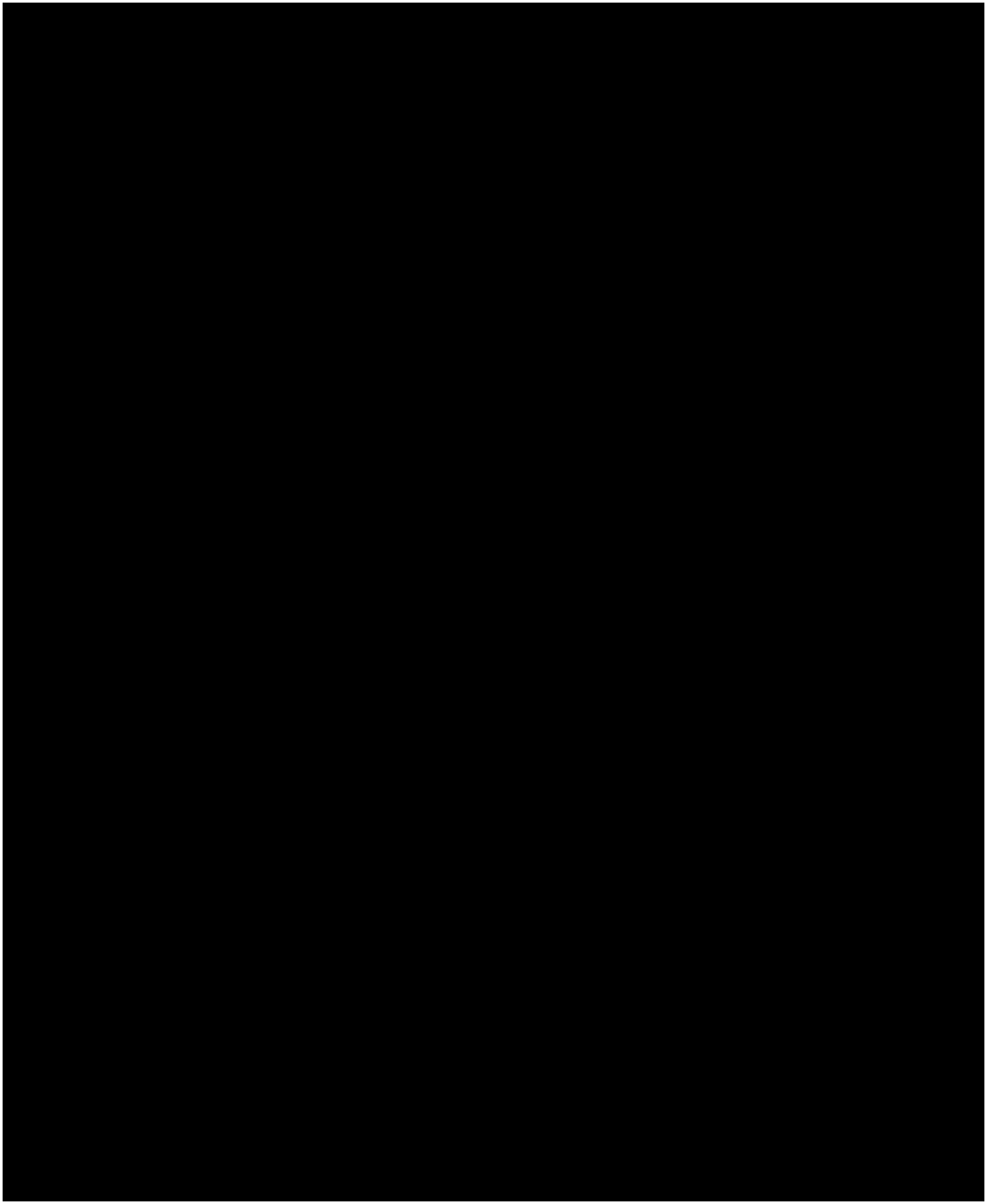

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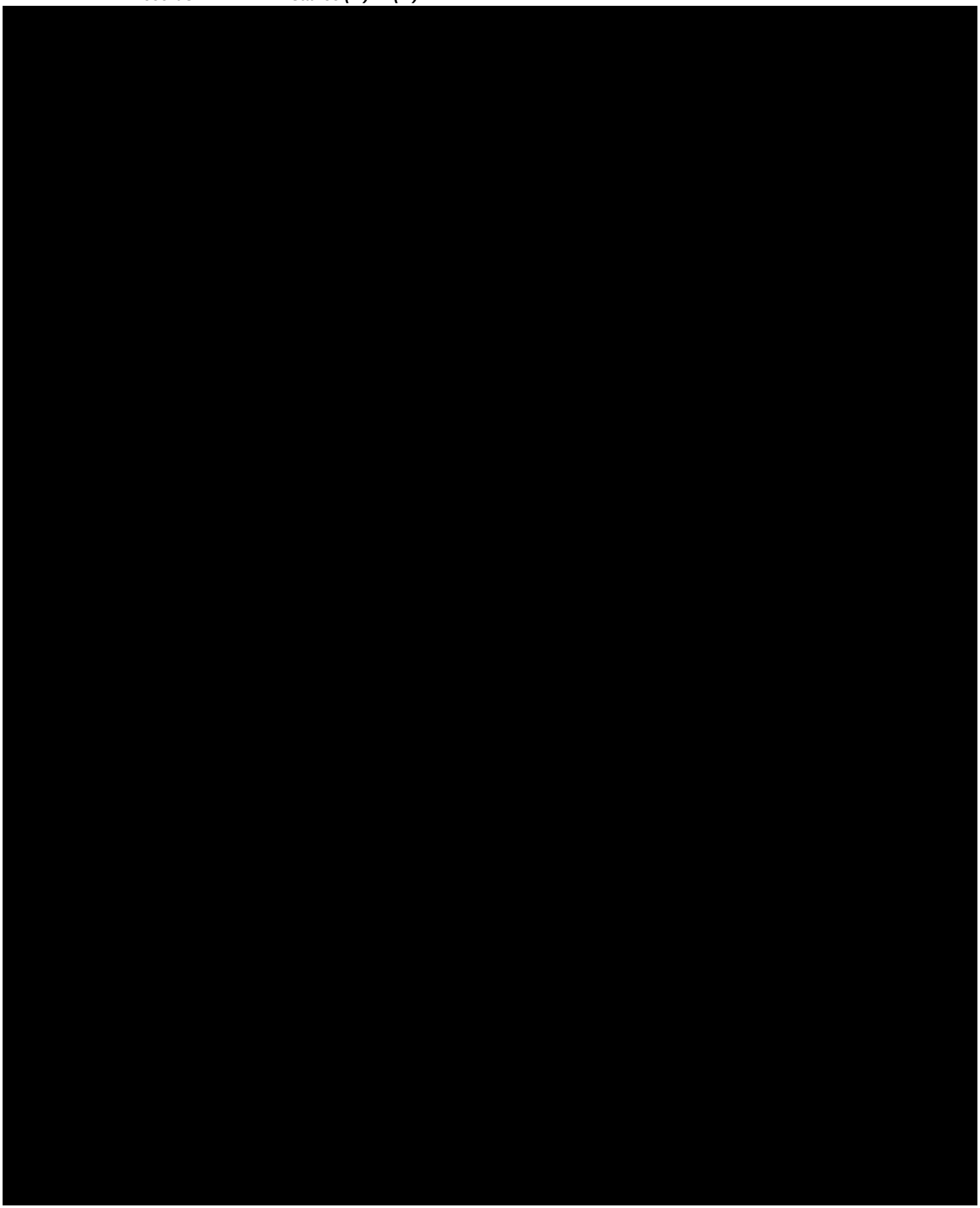

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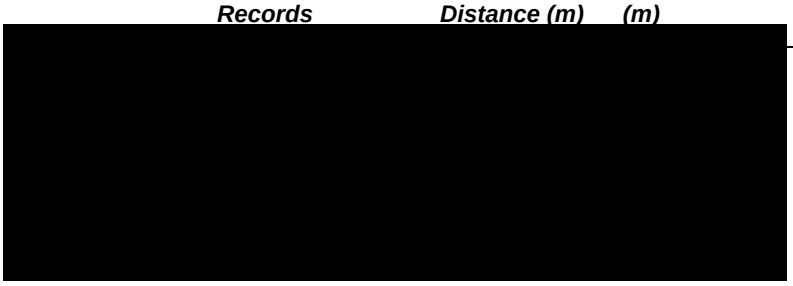
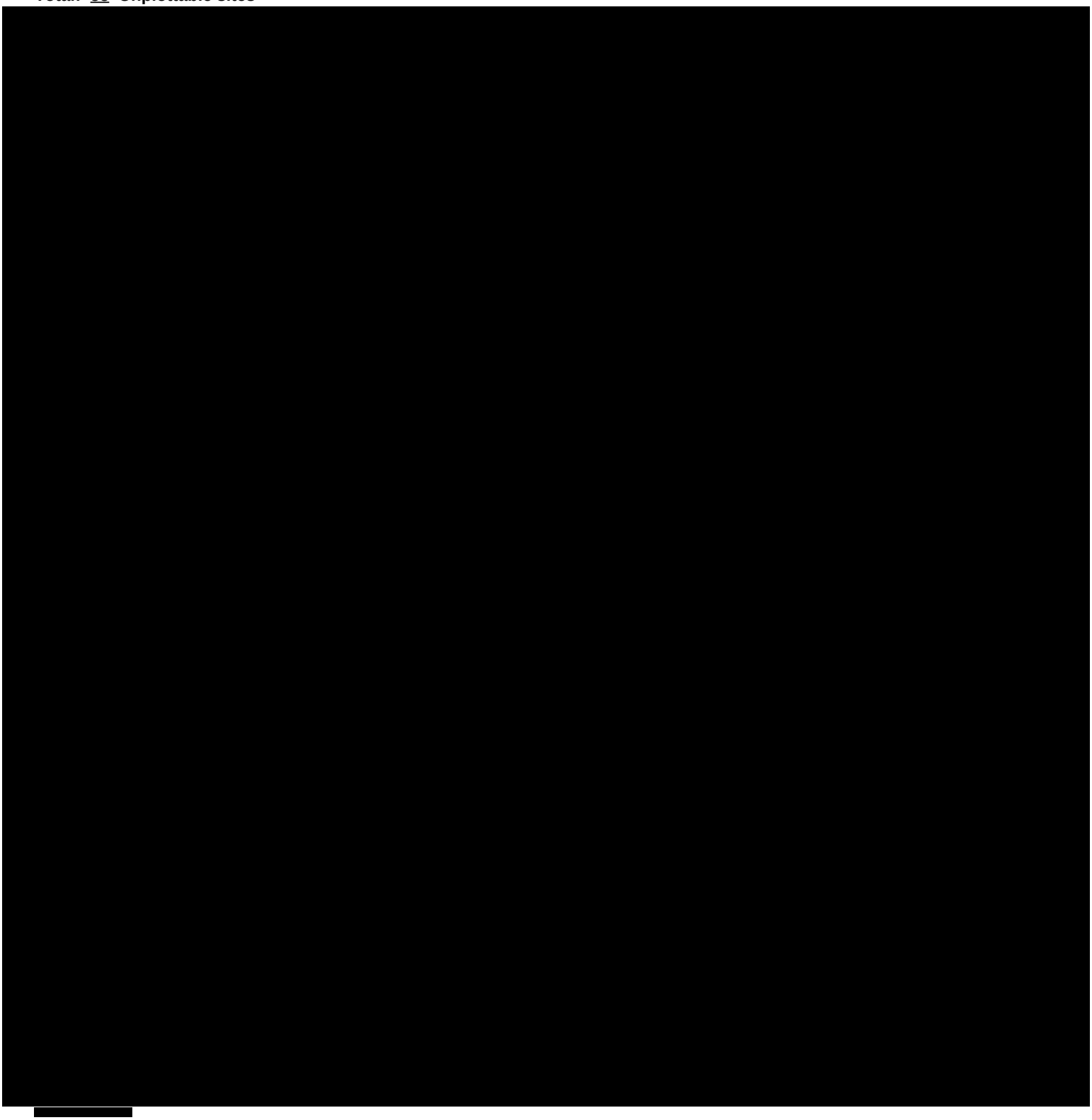
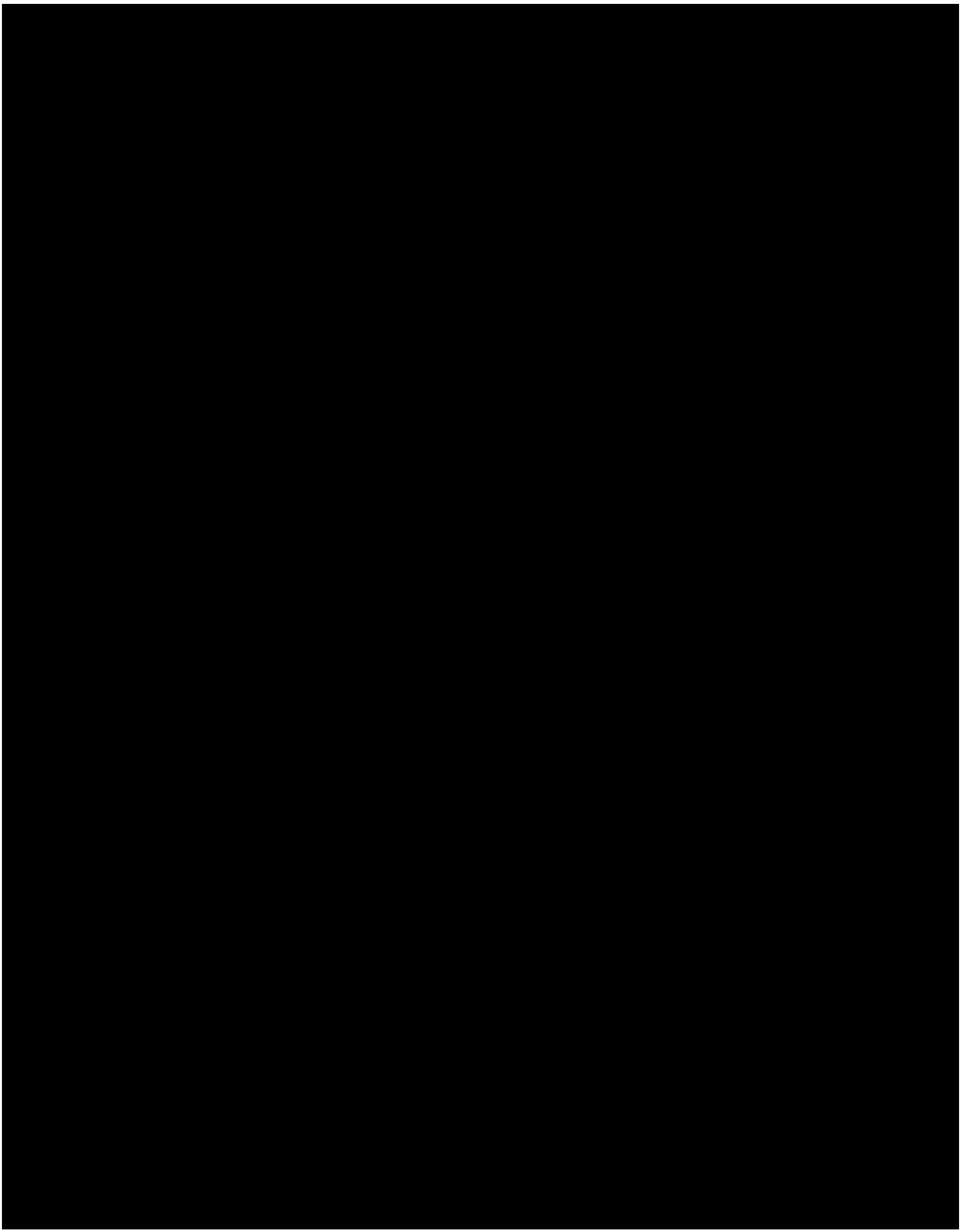


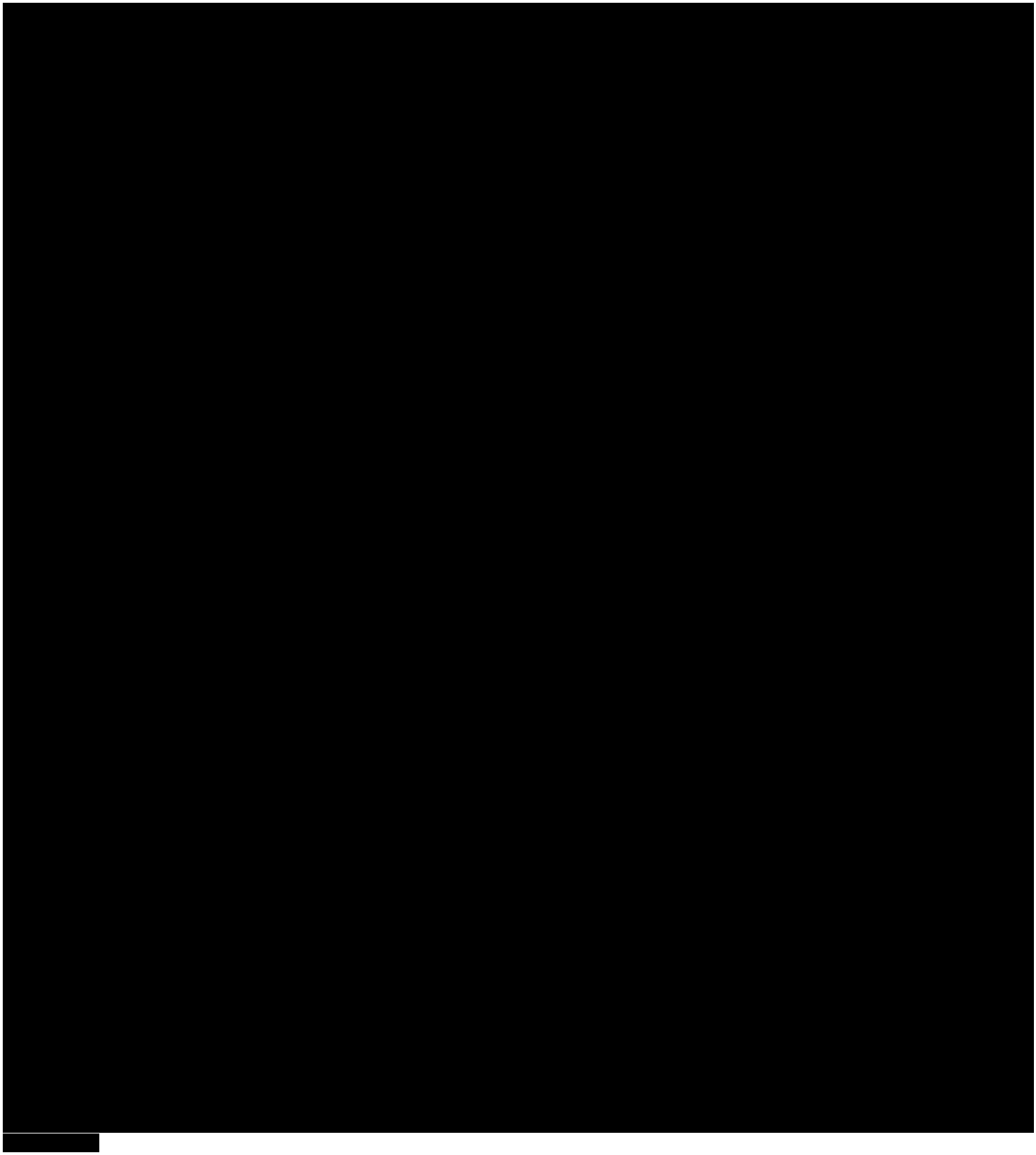
Unplottable Summary

Total: 55 Unplottable sites

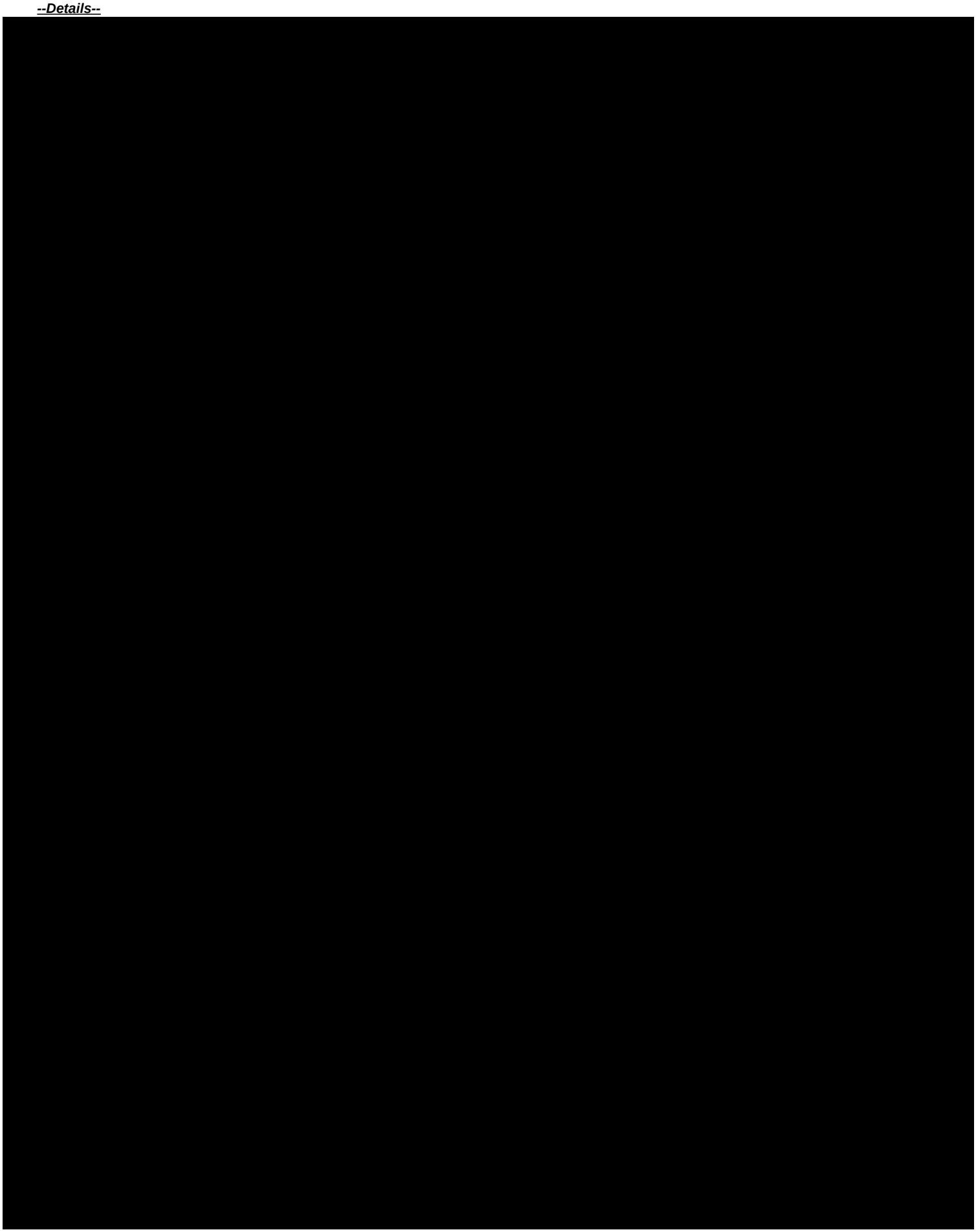


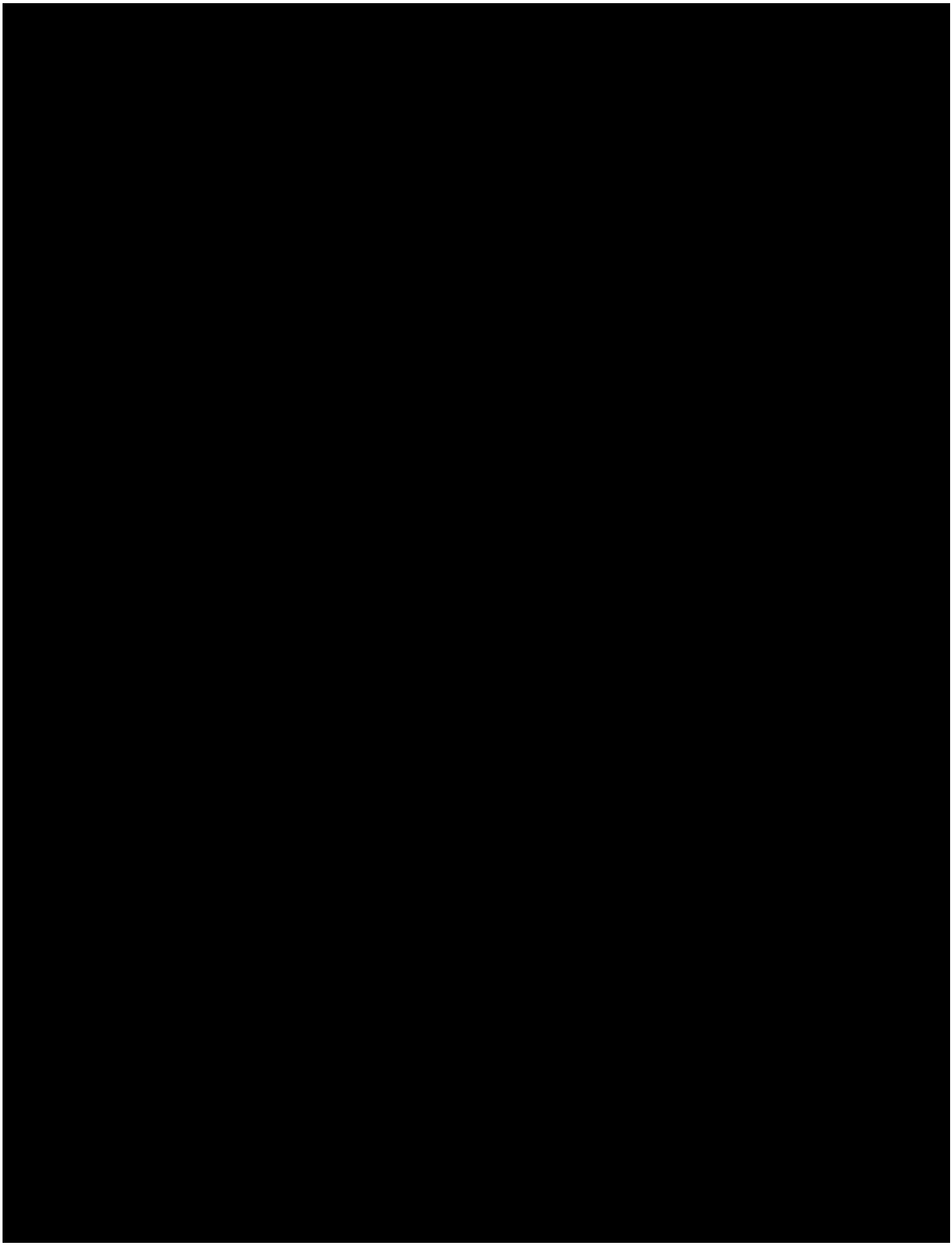


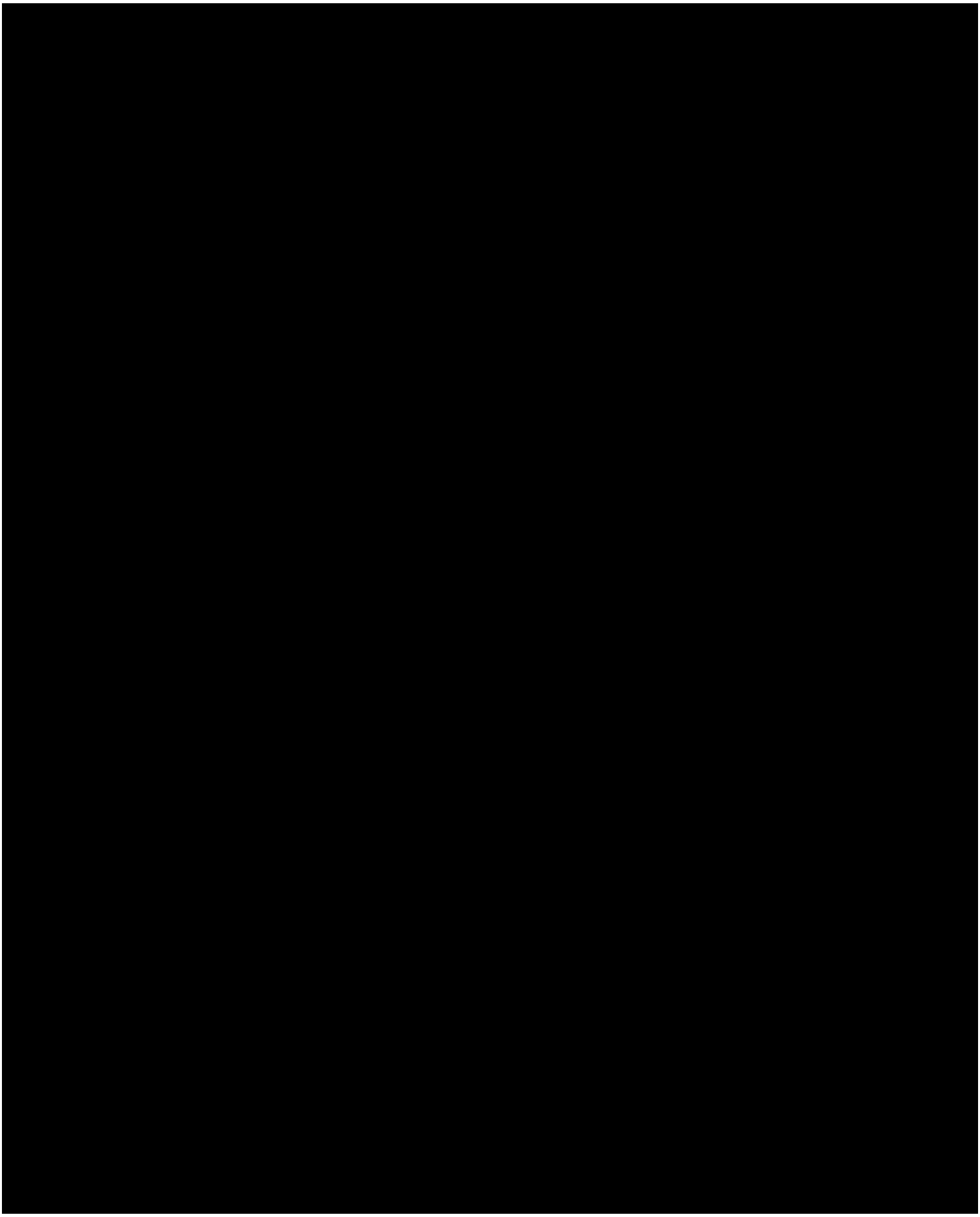
Unplottable Report

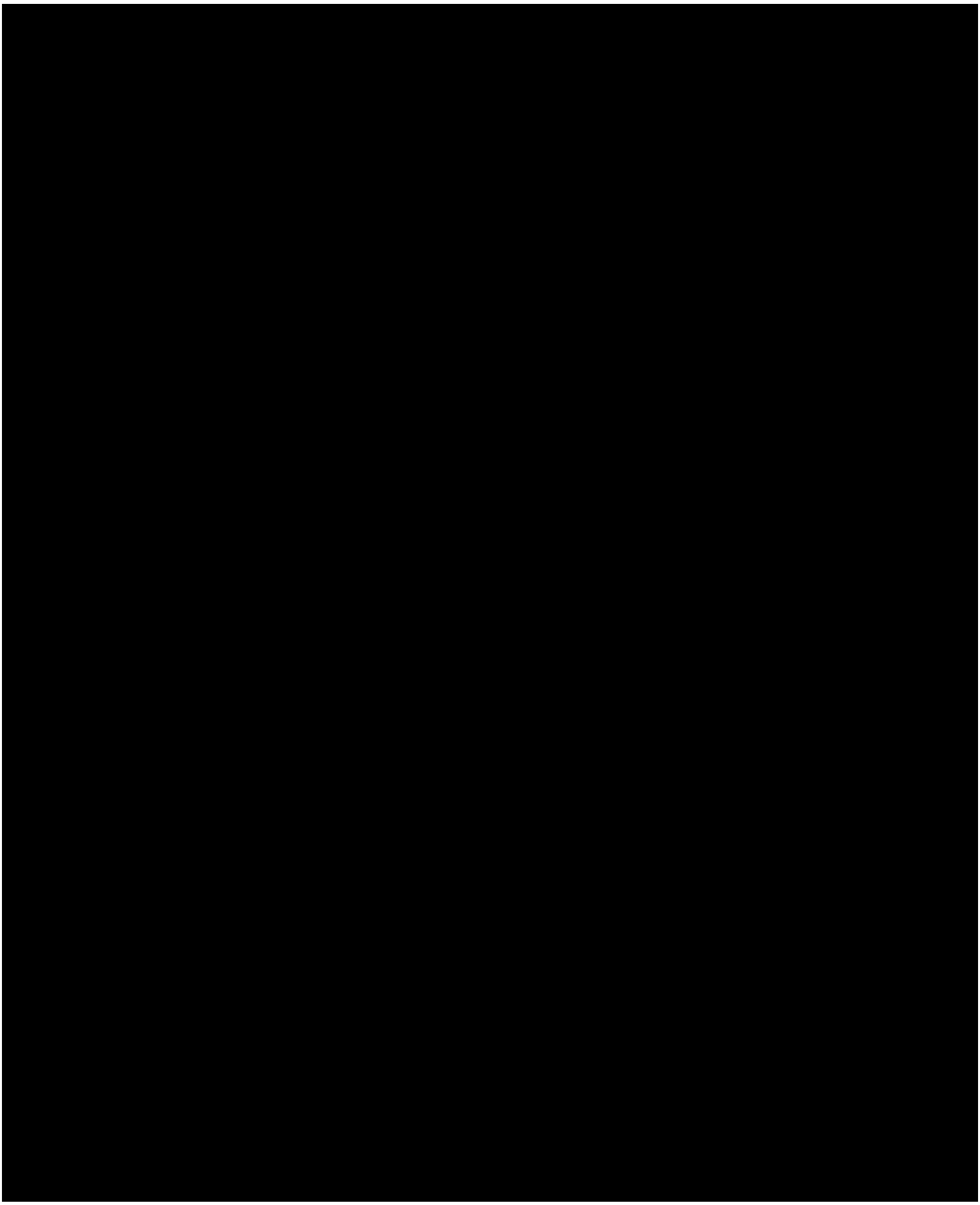


--Details--

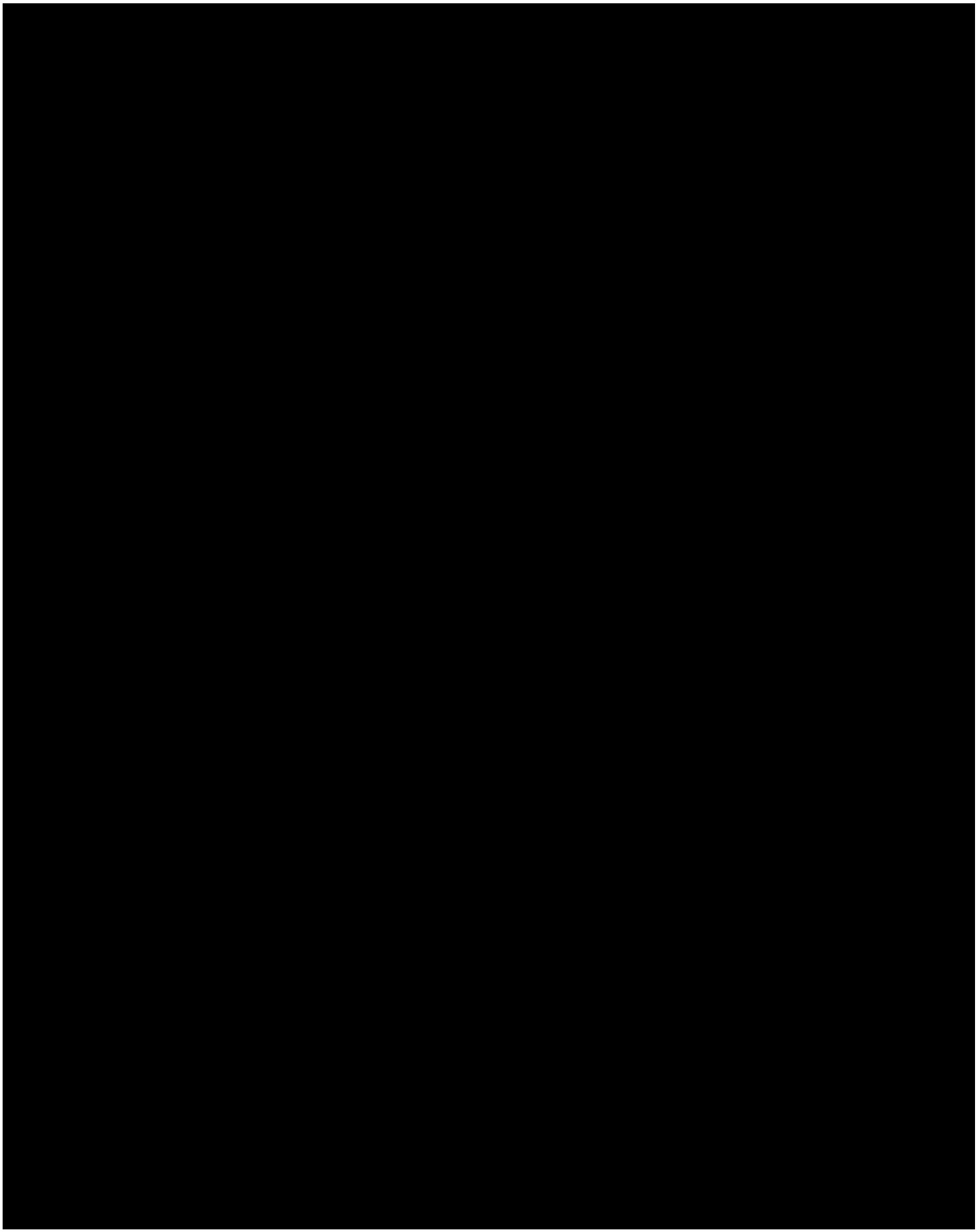






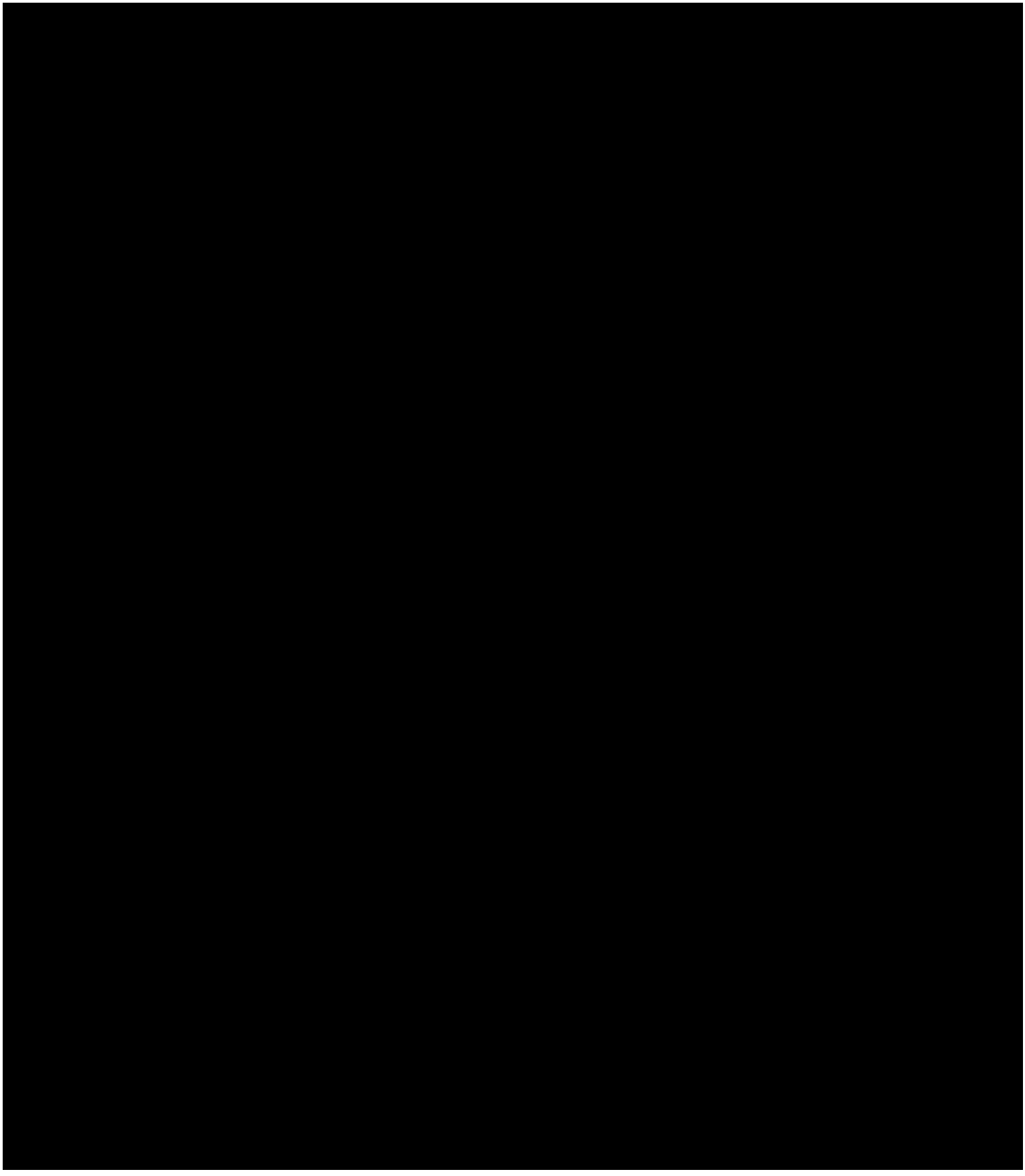


Bore Hole Information

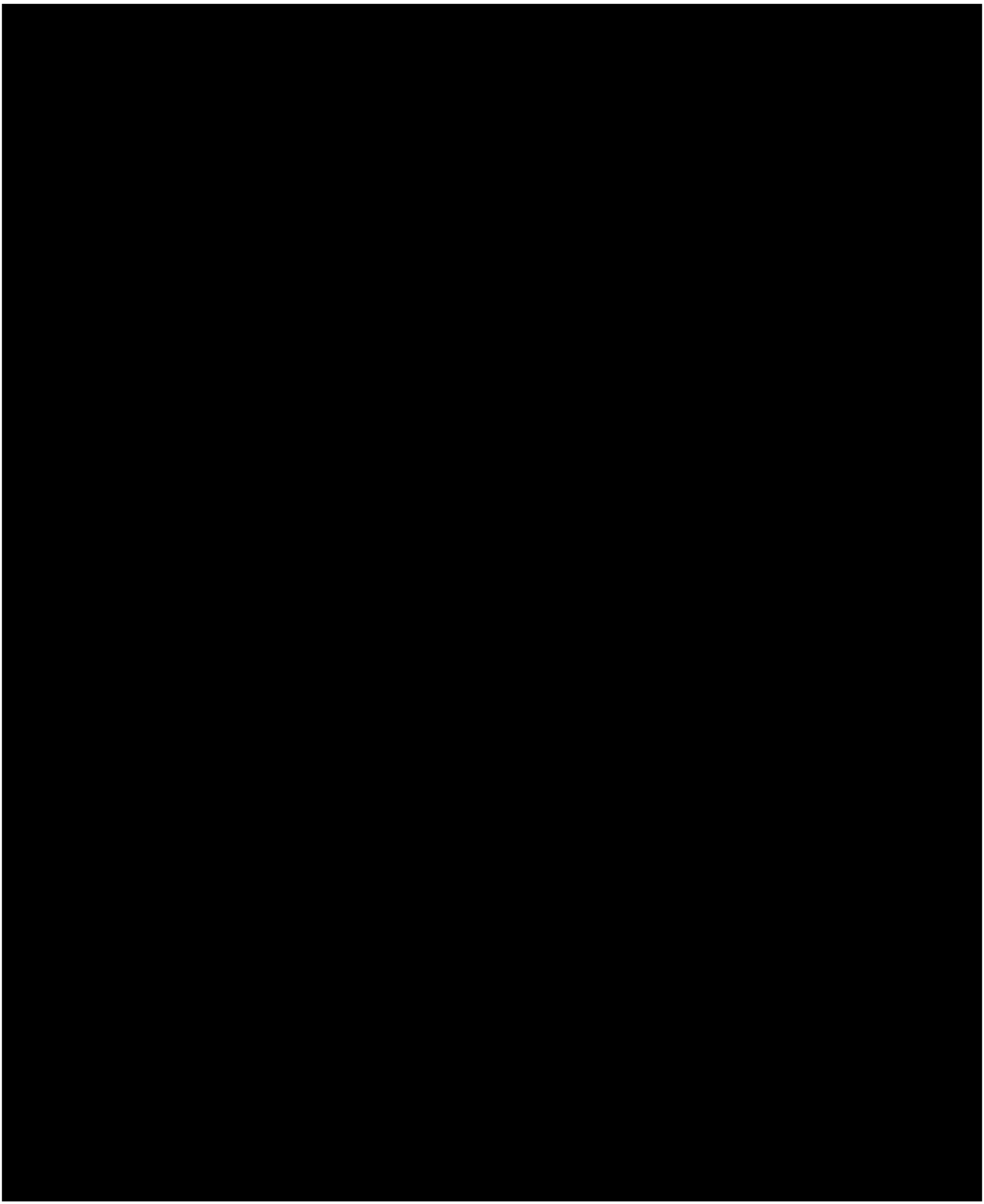


Comment:
Alt Name:

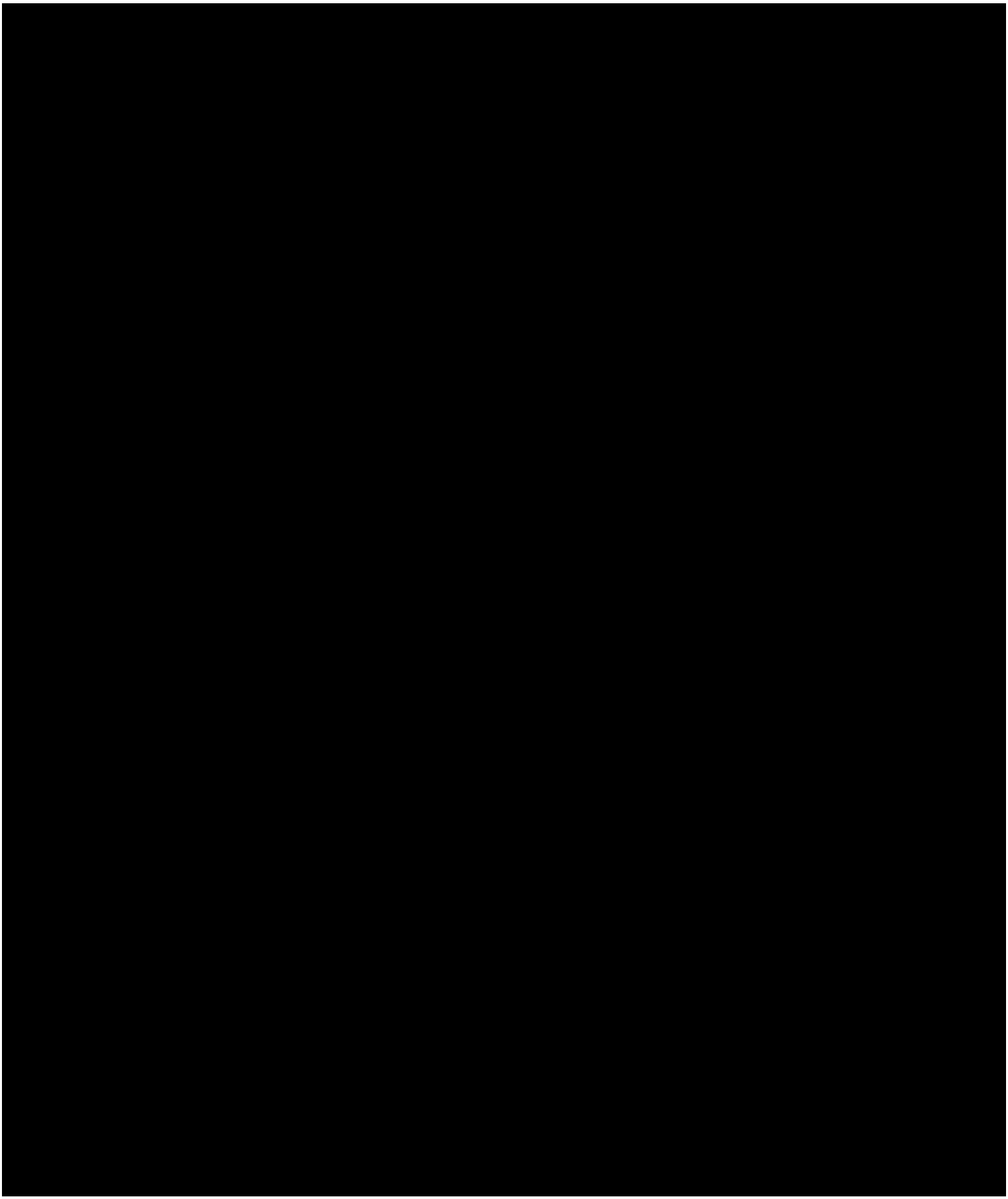
<u>Construction Record - Casing</u>

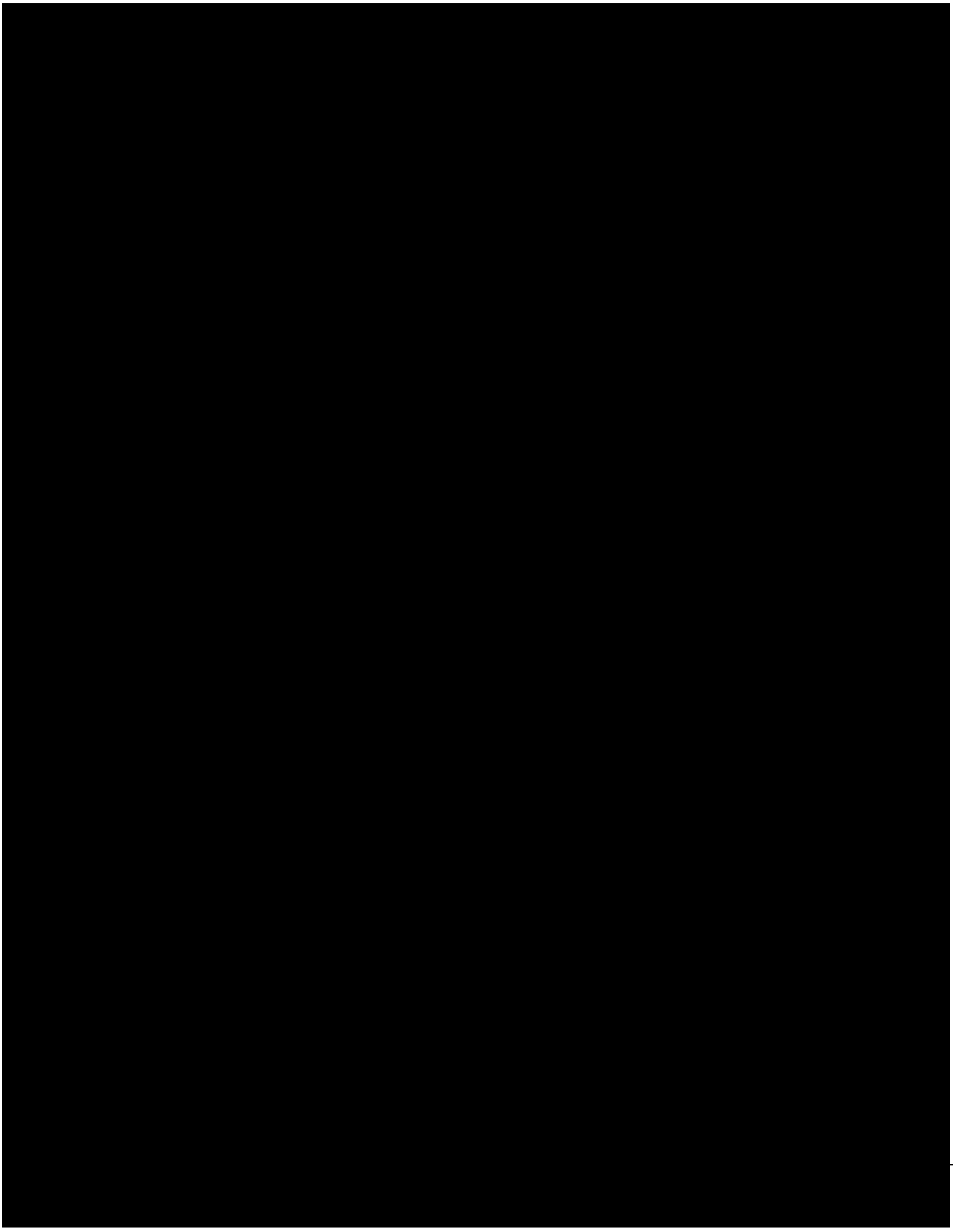


Formation End Depth UOM: ft

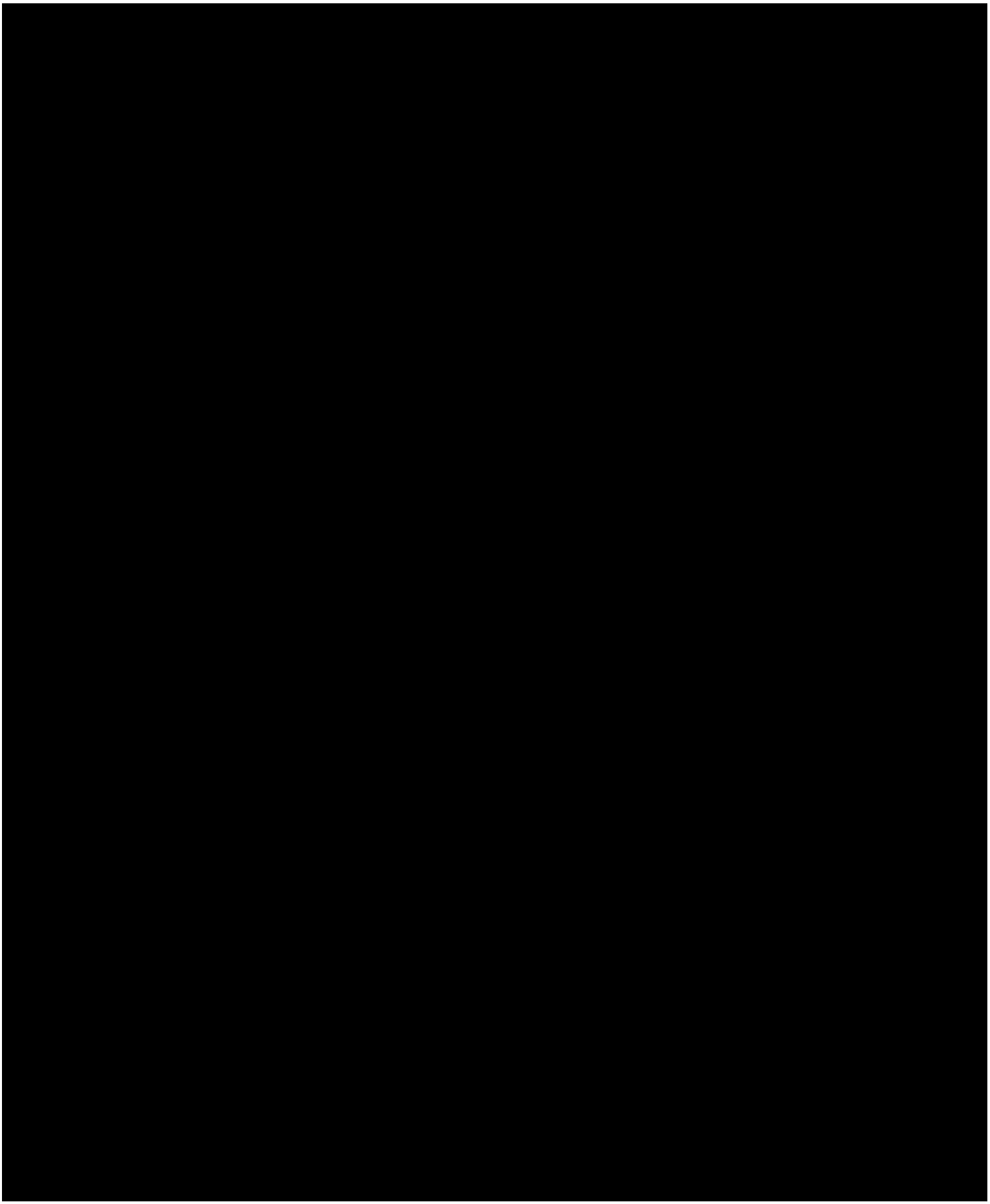


Draw Down & Recovery





Method of Construction & Well Use



Appendix: Database Descriptions

Environmental Risk Information Services (ERIS) can search the following databases. The extent of historical information varies with each database and current information is determined by what is publicly available to ERIS at the time of update. ***Note:*** *Databases denoted with " * " indicates that the database will no longer be updated. See the individual database description for more information.*

Abandoned Aggregate Inventory: Provincial AAGR

The MAAP Program maintains a database of abandoned pits and quarries. Please note that the database is only referenced by lot and concession and city/town location. The database provides information regarding the location, type, size, land use, status and general comments.*

Government Publication Date: Sept 2002*

Aggregate Inventory: Provincial AGR

The Ontario Ministry of Northern Development, Mines, Natural Resources and Forestry (ONDMNRF) maintains this database of pits and quarries. The database provides information regarding the registered owner/operator, location name, operation type, approval type, and maximum annual tonnage.

Government Publication Date: Up to Oct 2022

Abandoned Mine Information System: Provincial AMIS

The Abandoned Mines Information System contains data on known abandoned and inactive mines located on both Crown and privately held lands. The information was provided by the Ministry of Northern Development and Mines (MNDM), with the following disclaimer: "the database provided has been compiled from various sources, and the Ministry of Northern Development and Mines makes no representation and takes no responsibility that such information is accurate, current or complete". Reported information includes official mine name, status, background information, mine start/end date, primary commodity, mine features, hazards and remediation.

Government Publication Date: 1800-Mar 2022

Anderson's Waste Disposal Sites: Private ANDR

The information provided in this database was collected by examining various historical documents which aimed to characterize the likely position of former waste disposal sites from 1860 to present. The research initiative behind the creation of this database was to identify those sites that are missing from the Ontario MOE Waste Disposal Site Inventory, as well as to provide revisions and corrections to the positions and descriptions of sites currently listed in the MOE inventory. In addition to historic waste disposal facilities, the database also identifies certain auto wreckers and scrap yards that have been extrapolated from documentary sources. Please note that the data is not warranted to be complete, exhaustive or authoritative. The information was collected for research purposes only.

Government Publication Date: 1860s-Present

Aboveground Storage Tanks: Provincial AST

Historical listing of aboveground storage tanks made available by the Department of Natural Resources and Forestry. Includes tanks used to hold water or petroleum. This dataset has been retired as of September 25, 2014 and will no longer be updated.

Government Publication Date: May 31, 2014

Automobile Wrecking & Supplies: Private AUWR

This database provides an inventory of known locations that are involved in the scrap metal, automobile wrecking/recycling, and automobile parts & supplies industry. Information is provided on the company name, location and business type.

Government Publication Date: 1999-Feb 28, 2022

Borehole: Provincial BORE

A borehole is the generalized term for any narrow shaft drilled in the ground, either vertically or horizontally. The information here includes geotechnical investigations or environmental site assessments, mineral exploration, or as a pilot hole for installing piers or underground utilities. Information is from many sources such as the Ministry of Transportation (MTO) boreholes from engineering reports and projects from the 1950 to 1990's in Southern Ontario. Boreholes from the Ontario Geological Survey (OGS) including The Urban Geology Analysis Information System (UGAIS) and the York Peel Durham Toronto (YPDT) database of the Conservation Authority Moraine Coalition. This database will include fields such as location, stratigraphy, depth, elevation, year drilled, etc. For all water well data or oil and gas well data for Ontario please refer to WWIS and OOGW.

Government Publication Date: 1875-Jul 2018

Certificates of Approval: Provincial CA

This database contains the following types of approvals: Air & Noise, Industrial Sewage, Municipal & Private Sewage, Waste Management Systems and Renewable Energy Approvals. The MOE in Ontario states that any facility that releases emissions to the atmosphere, discharges contaminants to ground or surface water, provides potable water supplies, or stores, transports or disposes of waste, must have a Certificate of Approval before it can operate lawfully. Fields include approval number, business name, address, approval date, approval type and status. This database will no longer be updated, as CofA's have been replaced by either Environmental Activity and Sector Registry (EASR) or Environmental Compliance Approval (ECA). Please refer to those individual databases for any information after Oct.31, 2011.

Government Publication Date: 1985-Oct 30, 2011*

Dry Cleaning Facilities: Federal CDRY

List of dry cleaning facilities made available by Environment and Climate Change Canada. Environment and Climate Change Canada's Tetrachloroethylene (Use in Dry Cleaning and Reporting Requirements) Regulations (SOR/2003-79) are intended to reduce releases of tetrachloroethylene to the environment from dry cleaning facilities.

Government Publication Date: Jan 2004-Dec 2021

Commercial Fuel Oil Tanks: Provincial CFOT

Locations of commercial underground fuel oil tanks. This is not a comprehensive or complete inventory of commercial fuel tanks in the province; this listing is a copy of records of registered commercial underground fuel oil tanks obtained under Access to Public Information.
Note that the following types of tanks do not require registration: waste oil tanks in apartments, office buildings, residences, etc.; aboveground gas or diesel tanks. Records are not verified for accuracy or completeness.

Government Publication Date: Feb 28, 2022

Chemical Manufacturers and Distributors: Private CHEM

This database includes information from both a one time study conducted in 1992 and private source and is a listing of facilities that manufacture or distribute chemicals. The production of these chemical substances may involve one or more chemical reactions and/or chemical separation processes (i.e. fractionation, solvent extraction, crystallization, etc.).

Government Publication Date: 1999-Jan 31, 2020

Chemical Register: Private CHM

This database includes a listing of locations of facilities within the Province or Territory that either manufacture and/or distributes chemicals.

Government Publication Date: 1999-Feb 28, 2023

Compressed Natural Gas Stations: Private CNG

Canada has a network of public access compressed natural gas (CNG) refuelling stations. These stations dispense natural gas in compressed form at 3,000 pounds per square inch (psi), the pressure which is allowed within the current Canadian codes and standards. The majority of natural gas refuelling is located at existing retail gasoline that have a separate refuelling island for natural gas. This list of stations is made available by the Canadian Natural Gas Vehicle Alliance.

Government Publication Date: Dec 2012 -Aug 2023

Inventory of Coal Gasification Plants and Coal Tar Sites: Provincial COAL

This inventory includes both the "Inventory of Coal Gasification Plant Waste Sites in Ontario-April 1987" and the Inventory of Industrial Sites Producing or Using Coal Tar and Related Tars in Ontario-November 1988) collected by the MOE. It identifies industrial sites that produced and continue to produce or use coal tar and other related tars. Detailed information is available and includes: facility type, size, land use, information on adjoining properties, soil condition, site operators/occupants, site description, potential environmental impacts and historic maps available. This was a one-time inventory.*

Government Publication Date: Apr 1987 and Nov 1988*

Compliance and Convictions: Provincial CONV

This database summarizes the fines and convictions handed down by the Ontario courts beginning in 1989. Companies and individuals named here have been found guilty of environmental offenses in Ontario courts of law.

Government Publication Date: 1989-Jun 2023

Certificates of Property Use: Provincial CPU

This is a subset taken from Ontario's Environmental Registry (EBR) database. It will include CPU's on the registry such as (EPA s. 168.6) - Certificate of Property Use.

Government Publication Date: 1994 - Aug 31, 2023

Drill Hole Database: Provincial DRL

The Ontario Drill Hole Database contains information on more than 113,000 percussion, overburden, sonic and diamond drill holes from assessment files on record with the department of Mines and Minerals. Please note that limited data is available for southern Ontario, as it was the last area to be completed. The database was created when surveys submitted to the Ministry were converted in the Assessment File Research Image Database (AFRI) project. However, the degree of accuracy (coordinates) as to the exact location of drill holes is dependent upon the source document submitted to the MNDM. Levels of accuracy used to locate holes are: centering on the mining claim; a sketch of the mining claim; a 1:50,000 map; a detailed company map; or from submitted a "Report of Work".

Government Publication Date: 1886 - Oct 2022

Delisted Fuel Tanks: Provincial DTNK

List of fuel storage tank sites that were once found in - and have since been removed from - the list of fuel storage tanks made available by the regulatory agency under Access to Public Information.

Government Publication Date: Feb 28, 2022

Environmental Activity and Sector Registry: Provincial EASR

On October 31, 2011, a smarter, faster environmental approvals system came into effect in Ontario. The EASR allows businesses to register certain activities with the ministry, rather than apply for an approval. The registry is available for common systems and processes, to which preset rules of operation can be applied. The EASR is currently available for: heating systems, standby power systems and automotive refinishing. Businesses whose activities aren't subject to the EASR may apply for an ECA (Environmental Compliance Approval), Please see our ECA database.

Government Publication Date: Oct 2011- Aug 31, 2023

Environmental Registry: Provincial EBR

The Environmental Registry lists proposals, decisions and exceptions regarding policies, Acts, instruments, or regulations that could significantly affect the environment. Through the Registry, thirteen provincial ministries notify the public of upcoming proposals and invite their comments. For example, if a local business is requesting a permit, license, or certificate of approval to release substances into the air or water; these are notified on the registry. Data includes: Approval for discharge into the natural environment other than water (i.e. Air) - EPA s. 9, Approval for sewage works - OWRA s. 53(1), and EPA s. 27 - Approval for a waste disposal site. For information regarding Permit to Take Water (PTTW), Certificate of Property Use (CPU) and (ORD) Orders please refer to those individual databases.

Government Publication Date: 1994 - Aug 31, 2023

Environmental Compliance Approval: Provincial ECA

On October 31, 2011, a smarter, faster environmental approvals system came into effect in Ontario. In the past, a business had to apply for multiple approvals (known as certificates of approval) for individual processes and pieces of equipment. Today, a business either registers itself, or applies for a single approval, depending on the types of activities it conducts. Businesses whose activities aren't subject to the EASR may apply for an ECA. A single ECA addresses all of a business's emissions, discharges and wastes. Separate approvals for air, noise and waste are no longer required. This database will also include Renewable Energy Approvals. For certificates of approval prior to Nov 1st, 2011, please refer to the CA database. For all Waste Disposal Sites please refer to the WDS database.

Government Publication Date: Oct 2011- Aug 31, 2023

Environmental Effects Monitoring: Federal EEM

The Environmental Effects Monitoring program assesses the effects of effluent from industrial or other sources on fish, fish habitat and human usage of fisheries resources. Since 1992, pulp and paper mills have been required to conduct EEM studies under the Pulp and Paper Effluent Regulations. This database provides information on the mill name, geographical location and sub-lethal toxicity data.

Government Publication Date: 1992-2007*

ERIS Historical Searches: Private EHS

ERIS has compiled a database of all environmental risk reports completed since March 1999. Available fields for this database include: site location, date of report, type of report, and search radius. As per all other databases, the ERIS database can be referenced on both the map and "Statistical Profile" page.

Government Publication Date: 1999-Jun 30, 2023

Environmental Issues Inventory System: Federal EIIS

The Environmental Issues Inventory System was developed through the implementation of the Environmental Issues and Remediation Plan. This plan was established to determine the location and severity of contaminated sites on inhabited First Nation reserves, and where necessary, to remediate those that posed a risk to health and safety; and to prevent future environmental problems. The EIIS provides information on the reserve under investigation, inventory number, name of site, environmental issue, site action (Remediation, Site Assessment), and date investigation completed.

Government Publication Date: 1992-2001*

Emergency Management Historical Event: Provincial EMHE

List of locations of historical occurrences of emergency events, including those assigned to the Ministry of Natural Resources by Order-In-Council (OIC) under the Emergency Management and Civil Protection Act, as well as events where MNR provided requested emergency response assistance. Many of these events will have involved community evacuations, significant structural loss, and/or involvement of MNR emergency response staff. These events fall into one of ten (10) type categories: Dam Failure; Drought / Low Water; Erosion; Flood; Forest Fire; Soil and Bedrock Instability; Petroleum Resource Center Event, EMO Requested Assistance, Continuity of Operations Event, Other Requested Assistance. EMHE record details are reproduced by ERIS under License with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2017.

Government Publication Date: Apr 30, 2022

Environmental Penalty Annual Report: Provincial EPAR

This database contains data from Ontario's annual environmental penalty report published by the Ministry of the Environment and Climate Change. These reports provide information on environmental penalties for land or water violations issued to companies in one of the nine industrial sectors covered by the Municipal Industrial Strategy for Abatement (MISA) regulations.

Government Publication Date: Jan 1, 2011 - Dec 31, 2022

List of Expired Fuels Safety Facilities: Provincial EXP

List of facilities and tanks for which there was once a fuel registration. This is not a comprehensive or complete inventory of expired tanks/tank facilities in the province; this listing is a copy of previously registered tanks and facilities obtained under Access to Public Information. Includes private fuel outlets, bulk plants, fuel oil tanks, gasoline stations, marinas, propane filling stations, liquid fuel tanks, piping systems, etc; includes tanks which have been removed from the ground.
Notes: registration was not required for private fuel underground/aboveground storage tanks prior to January 1990, nor for furnace oil tanks prior to May 1, 2002; registration is not required for waste oil tanks in apartments, office buildings, residences, etc., or aboveground gas or diesel tanks. Records are not verified for accuracy or completeness.

Government Publication Date: Feb 28, 2022

Federal Convictions: Federal FCON

Environment Canada maintains a database referred to as the "Environmental Registry" that details prosecutions under the Canadian Environmental Protection Act (CEPA) and the Fisheries Act (FA). Information is provided on the company name, location, charge date, offence and penalty.

Government Publication Date: 1988-Jun 2007*

Contaminated Sites on Federal Land: Federal FCS

The Federal Contaminated Sites Inventory includes information on known federal contaminated sites under the custodianship of departments, agencies and consolidated Crown corporations as well as those that are being or have been investigated to determine whether they have contamination arising from past use that could pose a risk to human health or the environment. The inventory also includes non-federal contaminated sites for which the Government of Canada has accepted some or all financial responsibility. It does not include sites where contamination has been caused by, and which are under the control of, enterprise Crown corporations, private individuals, firms or other levels of government. Includes fire training sites and sites at which Per- and Polyfluoroalkyl Substances (PFAS) are a concern.

Government Publication Date: Jun 2000-Jun 2023

Fisheries & Oceans Fuel Tanks: Federal FOFT

Fisheries & Oceans Canada maintains an inventory of aboveground & underground fuel storage tanks located on Fisheries & Oceans property or controlled by DFO. Our inventory provides information on the site name, location, tank owner, tank operator, facility type, storage tank location, tank contents & capacity, and date of tank installation.

Government Publication Date: 1964-Sep 2019

Federal Identification Registry for Storage Tank Systems (FIRSTS): Federal FRST

A list of federally regulated Storage tanks from the Federal Identification Registry for Storage Tank Systems (FIRSTS). FIRSTS is Environment and Climate Change Canada's database of storage tank systems subject to the Storage Tank for Petroleum Products and Allied Petroleum Products Regulations. The main objective of the Regulations is to prevent soil and groundwater contamination from storage tank systems located on federal and aboriginal lands. Storage tank systems that do not have a valid identification number displayed in a readily visible location on or near the storage tank system may be refused product delivery.

Government Publication Date: May 31, 2018

Fuel Storage Tank: Provincial FST

List of registered private and retail fuel storage tanks. This is not a comprehensive or complete inventory of private and retail fuel storage tanks in the province; this listing is a copy of registered private and retail fuel storage tanks, obtained under Access to Public Information.
Notes: registration was not required for private fuel underground/aboveground storage tanks prior to January 1990, nor for furnace oil tanks prior to May 1, 2002; registration is not required for waste oil tanks in apartments, office buildings, residences, etc., or aboveground gas or diesel tanks. Records are not verified for accuracy or completeness.

Government Publication Date: Feb 28, 2022

Fuel Storage Tank - Historic: Provincial FSTH

The Fuels Safety Branch of the Ontario Ministry of Consumer and Commercial Relations maintained a database of all registered private fuel storage tanks. Public records of private fuel storage tanks are only available since the registration became effective in September 1989. This information is now collected by the Technical Standards and Safety Authority.

Government Publication Date: Pre-Jan 2010*

Ontario Regulation 347 Waste Generators Summary: Provincial GEN

Regulation 347 of the Ontario EPA defines a waste generation site as any site, equipment and/or operation involved in the production, collection, handling and/or storage of regulated wastes. A generator of regulated waste is required to register the waste generation site and each waste produced, collected, handled, or stored at the site. This database contains the registration number, company name and address of registered generators including the types of hazardous wastes generated. It includes data on waste generating facilities such as: drycleaners, waste treatment and disposal facilities, machine shops, electric power distribution etc. This information is a summary of all years from 1986 including the most currently available data. Some records may contain, within the company name, the phrase "See & Use..." followed by a series of letters and numbers. This occurs when one company is amalgamated with or taken over by another registered company. The number listed as "See & Use", refers to the new ownership and the other identification number refers to the original ownership. This phrase serves as a link between the 2 companies until operations have been fully transferred.

Government Publication Date: 1986-Oct 31, 2022

Greenhouse Gas Emissions from Large Facilities: Federal GHG

List of greenhouse gas emissions from large facilities made available by Environment Canada. Greenhouse gas emissions in kilotonnes of carbon dioxide equivalents (kt CO2 eq).

Government Publication Date: 2013-Dec 2019

TSSA Historic Incidents: Provincial HINC

List of historic incidences of spills and leaks of diesel, fuel oil, gasoline, natural gas, propane, and hydrogen recorded by the TSSA in their previous incident tracking system. The TSSA's Fuels Safety Program administers the Technical Standards & Safety Act 2000, providing fuel-related safety services associated with the safe transportation, storage, handling and use of fuels such as gasoline, diesel, propane, natural gas and hydrogen. Under this Act, the TSSA regulates fuel suppliers, storage facilities, transport trucks, pipelines, contractors and equipment or appliances that use fuels. Records are not verified for accuracy or completeness. This is not a comprehensive or complete inventory of historical fuel spills and leaks in the province. This listing is a copy of the data captured at one moment in time and is hence limited by the record date provided here.

Government Publication Date: 2006-June 2009*

Indian & Northern Affairs Fuel Tanks: Federal IAFT

The Department of Indian & Northern Affairs Canada (INAC) maintains an inventory of aboveground & underground fuel storage tanks located on both federal and crown land. Our inventory provides information on the reserve name, location, facility type, site/facility name, tank type, material & ID number, tank contents & capacity, and date of tank installation.

Government Publication Date: 1950-Aug 2003*

Fuel Oil Spills and Leaks: Provincial INC

Listing of spills and leaks of diesel, fuel oil, gasoline, natural gas, propane, and hydrogen reported to the Spills Action Centre (SAC). This is not a comprehensive or complete inventory of fuel-related leaks, spills, and incidents in the province; this listing in a copy of incidents reported to the SAC, obtained under Access to Public Information. Includes incidents from fuel-related hazards such as spills, fires, and explosions. Records are not verified for accuracy or completeness.

Government Publication Date: Feb 28, 2022

Landfill Inventory Management Ontario: Provincial LIMO

The Landfill Inventory Management Ontario (LIMO) database is updated every year, as the Ministry of the Environment, Conservation and Parks compiles new and updated information. Includes small and large landfills currently operating as well as those which are closed and historic. Operators of larger landfills provide landfill information for the previous operating year to the ministry for LIMO including: estimated amount of total waste received, landfill capacity, estimated total remaining landfill capacity, fill rates, engineering designs, reporting and monitoring details, size of location, service area, approved waste types, leachate of site treatment, contaminant attenuation zone and more. The small landfills include information such as site owner, site location and certificate of approval # and status.

Government Publication Date: Mar 21, 2022

Canadian Mine Locations: Private MINE

This information is collected from the Canadian & American Mines Handbook. The Mines database is a national database that provides over 290 listings on mines (listed as public companies) dealing primarily with precious metals and hard rocks. Listed are mines that are currently in operation, closed, suspended, or are still being developed (advanced projects). Their locations are provided as geographic coordinates (x, y and/or longitude, latitude). As of 2002, data pertaining to Canadian smelters and refineries has been appended to this database.

Government Publication Date: 1998-2009*

Mineral Occurrences: Provincial MNR

In the early 70's, the Ministry of Northern Development and Mines created an inventory of approximately 19,000 mineral occurrences in Ontario, in regard to metallic and industrial minerals, as well as some information on building stones and aggregate deposits. Please note that the "Horizontal Positional Accuracy" is approximately +/- 200 m. Many reference elements for each record were derived from field sketches using pace or chain/tape measurements against claim posts or topographic features in the area. The primary limiting factor for the level of positional accuracy is the scale of the source material. The testing of horizontal accuracy of the source materials was accomplished by comparing the plan metric (X and Y) coordinates of that point with the coordinates of the same point as defined from a source of higher accuracy.

Government Publication Date: 1846-Feb 2023

National Analysis of Trends in Emergencies System (NATES): Federal NATE

In 1974 Environment Canada established the National Analysis of Trends in Emergencies System (NATES) database, for the voluntary reporting of significant spill incidents. The data was to be used to assist in directing the work of the emergencies program. NATES ran from 1974 to 1994. Extensive information is available within this database including company names, place where the spill occurred, date of spill, cause, reason and source of spill, damage incurred, and amount, concentration, and volume of materials released.

Government Publication Date: 1974-1994*

Non-Compliance Reports: Provincial NCPL

The Ministry of the Environment provides information about non-compliant discharges of contaminants to air and water that exceed legal allowable limits, from regulated industrial and municipal facilities. A reported non-compliance failure may be in regard to a Control Order, Certificate of Approval, Sectoral Regulation or specific regulation/act.

Government Publication Date: Dec 31, 2021

National Defense & Canadian Forces Fuel Tanks: Federal NDFT

The Department of National Defense and the Canadian Forces maintains an inventory of all aboveground & underground fuel storage tanks located on DND lands. Our inventory provides information on the base name, location, tank type & capacity, tank contents, tank class, date of tank installation, date tank last used, and status of tank as of May 2001. This database will no longer be updated due to the new National Security protocols which have prohibited any release of this database.

Government Publication Date: Up to May 2001*

National Defense & Canadian Forces Spills: Federal NDSP

The Department of National Defense and the Canadian Forces maintains an inventory of spills to land and water. All spill sites have been classified under the "Transportation of Dangerous Goods Act - 1992". Our inventory provides information on the facility name, location, spill ID #, spill date, type of spill, as well as the quantity of substance spilled & recovered.

Government Publication Date: Mar 1999-Oct 2022

National Defence & Canadian Forces Waste Disposal Sites: Federal NDWD

The Department of National Defence and the Canadian Forces maintains an inventory of waste disposal sites located on DND lands. Where available, our inventory provides information on the base name, location, type of waste received, area of site, depth of site, year site opened/closed and status.

Government Publication Date: 2001-Apr 2007*

National Energy Board Pipeline Incidents: Federal NEBI

Locations of pipeline incidents from 2008 to present, made available by the Canada Energy Regulator (CER) - previously the National Energy Board (NEB). Includes incidents reported under the Onshore Pipeline Regulations and the Processing Plant Regulations related to pipelines under federal jurisdiction, does not include incident data related to pipelines under provincial or territorial jurisdiction.

Government Publication Date: 2008-Jun 30, 2021

National Energy Board Wells: Federal NEBP

The NEBW database contains information on onshore & offshore oil and gas wells that are outside provincial jurisdiction(s) and are thereby regulated by the National Energy Board. Data is provided regarding the operator, well name, well ID No./UWI, status, classification, well depth, spud and release date.

Government Publication Date: 1920-Feb 2003*

National Environmental Emergencies System (NEES): Federal NEES

In 2000, the Emergencies program implemented NEES, a reporting system for spills of hazardous substances. For the most part, this system only captured data from the Atlantic Provinces, some from Quebec and Ontario and a portion from British Columbia. Data for Alberta, Saskatchewan, Manitoba and the Territories was not captured. However, NEES is also a repository for previous Environment Canada spill datasets. NEES is composed of the historic datasets ' or Trends ' which dates from approximately 1974 to present. NEES Trends is a compilation of historic databases, which were merged and includes data from NATES (National Analysis of Trends in Emergencies System), ARTS (Atlantic Regional Trends System), and NEES. In 2001, the Emergencies Program determined that variations in reporting regimes and requirements between federal and provincial agencies made national spill reporting and trend analysis difficult to achieve. As a consequence, the department has focused efforts on capturing data on spills of substances which fall under its legislative authority only (CEPA and FA). As such, the NEES database will be decommissioned in December 2004.

Government Publication Date: 1974-2003*

National PCB Inventory: Federal NPCB

Environment Canada's National PCB inventory includes information on in-use PCB containing equipment in Canada including federal, provincial and private facilities. Federal out-of-service PCB containing equipment and PCB waste owned by the federal government or by federally regulated industries such as airlines, railway companies, broadcasting companies, telephone and telecommunications companies, pipeline companies, etc. are also listed. Although it is not Environment Canada's mandate to collect data on non-federal PCB waste, the National PCB inventory includes some information on provincial and private PCB waste and storage sites. Some addresses provided may be Head Office addresses and are not necessarily the location of where the waste is being used or stored.

Government Publication Date: 1988-2008*

National Pollutant Release Inventory 1993-2020: Federal NPR2

The National Pollutant Release Inventory (NPRI) is Canada's public inventory of pollutant releases (to air, water and land), disposals, and transfers for recycling. The inventory, managed by Environment and Climate Change Canada, tracks over 300 substances. Under the authority of the Canadian Environmental Protection Act (CEPA), owners or operators of facilities that meet published reporting requirements are required to report to the NPRI.

Government Publication Date: Sep 2020

National Pollutant Release Inventory - Historic: Federal NPRI

Environment Canada has defined the National Pollutant Release Inventory ("NPRI") as a federal government initiative designed to collect comprehensive national data regarding releases to air, water, or land, and waste transfers for recycling for more than 300 listed substances. This data holds historic records; current records are found in NPR2.

Government Publication Date: 1993-May 2017

Oil and Gas Wells: Private OGWE

The Nickle's Energy Group (publisher of the Daily Oil Bulletin) collects information on drilling activity including operator and well statistics. The well information database includes name, location, class, status and depth. The main Nickle's database is updated on a daily basis, however, this database is updated on a monthly basis. More information is available at www.nickles.com.

Government Publication Date: 1988-Aug 31, 2023

Ontario Oil and Gas Wells: Provincial OOGW

In 1998, the MNR handed over to the Ontario Oil, Gas and Salt Resources Corporation, the responsibility of maintaining a database of oil and gas wells drilled in Ontario. The OGSR Library has over 20,000+ wells in their database. Information available for all wells in the ERIS database include well owner/operator, location, permit issue date, and well cap date, license No., status, depth and the primary target (rock unit) of the well being drilled. All geology/stratigraphy table information, plus all water table information is also provide for each well record.

Government Publication Date: 1800-Aug 2023

Inventory of PCB Storage Sites: Provincial OPCB

The Ontario Ministry of Environment, Waste Management Branch, maintains an inventory of PCB storage sites within the province. Ontario Regulation 11/82 (Waste Management - PCB) and Regulation 347 (Generator Waste Management) under the Ontario EPA requires the registration of inactive PCB storage equipment and/or disposal sites of PCB waste with the Ontario Ministry of Environment. This database contains information on: 1) waste quantities; 2) major and minor sites storing liquid or solid waste; and 3) a waste storage inventory.

Government Publication Date: 1987-Oct 2004; 2012-Dec 2013

Orders: Provincial ORD

This is a subset taken from Ontario's Environmental Registry (EBR) database. It will include Orders on the registry such as (EPA s. 17) - Order for remedial work, (EPA s. 18) - Order for preventative measures, (EPA s. 43) - Order for removal of waste and restoration of site, (EPA s. 44) - Order for conformity with Act for waste disposal sites, (EPA s. 136) - Order for performance of environmental measures.

Government Publication Date: 1994 - Aug 31, 2023

Canadian Pulp and Paper: Private PAP

This information is part of the Pulp and Paper Canada Directory. The Directory provides a comprehensive listing of the locations of pulp and paper mills and the products that they produce.

Government Publication Date: 1999, 2002, 2004, 2005, 2009-2014

Parks Canada Fuel Storage Tanks: Federal PCFT

Canadian Heritage maintains an inventory of known fuel storage tanks operated by Parks Canada, in both National Parks and at National Historic Sites. The database details information on site name, location, tank install/removal date, capacity, fuel type, facility type, tank design and owner/operator.

Government Publication Date: 1920-Jan 2005*

Pesticide Register: Provincial PES

The Ontario Ministry of the Environment and Climate Change maintains a database of licensed operators and vendors of registered pesticides.

Government Publication Date: Oct 2011- Aug 31, 2023

NPRI Reporters - PFAS Substances: Federal PFCH

The National Pollutant Release Inventory (NPRI) is Canada's public inventory of releases, disposals, and transfers, tracking over 320 pollutants. Per - and polyfluoroalkyl substances (PFAS) are a group of over 4,700 human-made substances for which adverse environmental and health effects have been observed. This listing of PFAS substance reporters includes those NPRI facilities that reported substances that are found in either: a) the Comprehensive Global Database of PFASs compiled by the Organisation for Economic Co-operation and Development (OECD), b) the US Environmental Protection Agency (US EPA) Master List of PFAS Substances, c) the US EPA list of PFAS chemicals without explicit structures, or d) the US EPA list of PFAS structures (encompassing the largest set of structures having sufficient levels of fluorination to potentially impart PFAS-type properties).

Government Publication Date: Sep 2020

Potential PFAS Handers from NPRI: Federal PFHA

The National Pollutant Release Inventory (NPRI) is Canada's public inventory of releases, disposals, and transfers, tracking over 320 pollutants. Per - and polyfluoroalkyl substances (PFAS) are a group of over 4,700 human-made substances for which adverse environmental and health effects have been observed. This list of potential PFAS handlers includes those NPRI facilities that reported business activity (NAICS code) included in the US Environmental Protection Agency (US EPA) list of Potential PFAS-Handling Industry Sectors, further described as operating in industry sectors where literature reviews indicate that PFAS may be handled and/or released. Inclusion of a facility in this listing does not indicate that PFAS are being manufactured, processed, used, or released by the facility - these are facilities that potentially handle PFAS based on their industrial profile.

Government Publication Date: Sep 2020

Pipeline Incidents: Provincial PINC

List of pipeline incidents (strikes, leaks, spills). This is not a comprehensive or complete inventory of pipeline incidents in the province; this listing in an historical copy of records previously obtained under Access to Public Information. Records are not verified for accuracy or completeness.

Government Publication Date: Feb 28, 2021

Private and Retail Fuel Storage Tanks: Provincial PRT

The Fuels Safety Branch of the Ontario Ministry of Consumer and Commercial Relations maintained a database of all registered private fuel storage tanks and licensed retail fuel outlets. This database includes an inventory of locations that have gasoline, oil, waste oil, natural gas and/or propane storage tanks on their property. The MCCR no longer collects this information. This information is now collected by the Technical Standards and Safety Authority (TSSA).

Government Publication Date: 1989-1996*

Permit to Take Water: Provincial PTTW

This is a subset taken from Ontario's Environmental Registry (EBR) database. It will include PTTW's on the registry such as OWRA s. 34 - Permit to take water.

Government Publication Date: 1994 - Aug 31, 2023

Ontario Regulation 347 Waste Receivers Summary: Provincial REC

Part V of the Ontario Environmental Protection Act ("EPA") regulates the disposal of regulated waste through an operating waste management system or a waste disposal site operated or used pursuant to the terms and conditions of a Certificate of Approval or a Provisional Certificate of Approval. Regulation 347 of the Ontario EPA defines a waste receiving site as any site or facility to which waste is transferred by a waste carrier. A receiver of regulated waste is required to register the waste receiving facility. This database represents registered receivers of regulated wastes, identified by registration number, company name and address, and includes receivers of waste such as: landfills, incinerators, transfer stations, PCB storage sites, sludge farms and water pollution control plants. This information is a summary of all years from 1986 including the most currently available data.

Government Publication Date: 1986-1990, 1992-2021

Record of Site Condition: Provincial RSC

The Record of Site Condition (RSC) is part of the Ministry of the Environment's Brownfields Environmental Site Registry. Protection from environmental cleanup orders for property owners is contingent upon documentation known as a record of site condition (RSC) being filed in the Environmental Site Registry. In order to file an RSC, the property must have been properly assessed and shown to meet the soil, sediment and groundwater standards appropriate for the use (such as residential) proposed to take place on the property. The Record of Site Condition Regulation (O. Reg. 153/04) details requirements related to site assessment and clean up.
RSCs filed after July 1, 2011 will also be included as part of the new (O.Reg. 511/09).

Government Publication Date: 1997-Sept 2001, Oct 2004-Aug 2023

Retail Fuel Storage Tanks: Private RST

This database includes an inventory of retail fuel outlet locations (including marinas) that have on their property gasoline, oil, waste oil, natural gas and / or propane storage tanks.

Government Publication Date: 1999-Feb 28, 2023

Scott's Manufacturing Directory: Private SCT

Scott's Directories is a data bank containing information on over 200,000 manufacturers across Canada. Even though Scott's listings are voluntary, it is the most comprehensive database of Canadian manufacturers available. Information concerning a company's address, plant size, and main products are included in this database.

Government Publication Date: 1992-Mar 2011*

Ontario Spills: Provincial SPL

List of spills and incidents made available by the Ministry of the Environment, Conservation and Parks. This database identifies information such as location (approximate), type and quantity of contaminant, date of spill, environmental impact, cause, nature of impact, etc. Information from 1988-2002 was part of the ORIS (Occurrence Reporting Information System). The SAC (Spills Action Centre) handles all spills reported in Ontario. Regulations for spills in Ontario are part of the MOE's Environmental Protection Act, Part X. The Ministry of the Environment, Conservation and Parks cites the coronavirus pandemic as an explanation for delays in releasing data pursuant to requests. This database includes spill incidents that occurred in March, May, July, and August 2022, and January 2023 in addition to those listed in the Government Publication Date.

Government Publication Date: 1988-Oct 2021; see description

Wastewater Discharger Registration Database: Provincial SRDS

Facilities that report either municipal treated wastewater effluent or industrial wastewater discharges under the Effluent Monitoring and Effluent Limits (EMEL) and Municipal/Industrial Strategy for Abatement Regulations. The Municipal/Industrial Strategy for Abatement (MISA) division of the Ontario Ministry of Environment keeps record of direct dischargers of toxic pollutants within nine sectors including: Electric Power Generation, Mining, Petroleum Refining, Organic Chemicals, Inorganic Chemicals, Pulp & Paper, Metal Casting, Iron & Steel, and Quarries.

Government Publication Date: 1990-Dec 31, 2020

Anderson's Storage Tanks: Private TANK

The information provided in this database was collected by examining various historical documents, which identified the location of former storage tanks, containing substances such as fuel, water, gas, oil, and other various types of miscellaneous products. Information is available in regard to business operating at tank site, tank location, permit year, permit & installation type, no. of tanks installed & configuration and tank capacity. Data contained within this database pertains only to the city of Toronto and is not warranted to be complete, exhaustive or authoritative. The information was collected for research purposes only.

Government Publication Date: 1915-1953*

Transport Canada Fuel Storage Tanks: Federal TCFT

List of fuel storage tanks currently or previously owned or operated by Transport Canada. This inventory also includes tanks on The Pickering Lands, which refers to 7,530 hectares (18,600 acres) of land in Pickering, Markham, and Uxbridge owned by the Government of Canada since 1972; properties on this land has been leased by the government since 1975, and falls under the Site Management Policy of Transport Canada, but is administered by Public Works and Government Services Canada. This inventory provides information on the site name, location, tank age, capacity and fuel type.

Government Publication Date: 1970 - Apr 2023

Variances for Abandonment of Underground Storage Tanks: Provincial VAR

Listing of variances granted for storage tank abandonment. This is not a comprehensive or complete inventory of tank abandonment variances in the province; this listing is a copy of tank abandonment variance records previously obtained under Access to Public Information. In Ontario, registered underground storage tanks must be removed within two years of disuse; if removal of a tank is not feasible, an application may be sought for a variance from this code requirement.
Records are not verified for accuracy or completeness.

Government Publication Date: Feb 28, 2022

Waste Disposal Sites - MOE CA Inventory: Provincial WDS

The Ontario Ministry of Environment, Waste Management Branch, maintains an inventory of known open (active or inactive) and closed disposal sites in the Province of Ontario. Active sites maintain a Certificate of Approval, are approved to receive and are receiving waste. Inactive sites maintain Certificate(s) of Approval but are not receiving waste. Closed sites are not receiving waste. The data contained within this database was compiled from the MOE's Certificate of Approval database. Locations of these sites may be cross-referenced to the Anderson database described under ERIS's Private Source Database section, by the CA number. All new Environmental Compliance Approvals handed out after Oct 31, 2011 for Waste Disposal Sites will still be found in this database.

Government Publication Date: Oct 2011- Aug 31, 2023

Waste Disposal Sites - MOE 1991 Historical Approval Inventory: Provincial WDSH

In June 1991, the Ontario Ministry of Environment, Waste Management Branch, published the "June 1991 Waste Disposal Site Inventory", of all known active and closed waste disposal sites as of October 30st, 1990. For each "active" site as of October 31st 1990, information is provided on site location, site/CA number, waste type, site status and site classification. For each "closed" site as of October 31st 1990, information is provided on site location, site/CA number, closure date and site classification. Locations of these sites may be cross-referenced to the Anderson database described under ERIS's Private Source Database section, by the CA number.

Government Publication Date: Up to Oct 1990*

Water Well Information System: Provincial WWIS

This database describes locations and characteristics of water wells found within Ontario in accordance with Regulation 903. It includes such information as coordinates, construction date, well depth, primary and secondary use, pump rate, static water level, well status, etc. Also included are detailed stratigraphy information, approximate depth to bedrock and the approximate depth to the water table.

Government Publication Date: Mar 31 2023

Definitions

Database Descriptions: This section provides a detailed explanation for each database including: source, information available, time coverage, and acronyms used. They are listed in alphabetic order.

Detail Report: This is the section of the report which provides the most detail for each individual record. Records are summarized by location, starting with the project property followed by records in closest proximity.

Distance: The distance value is the distance between plotted points, not necessarily the distance between the sites' boundaries. All values are an approximation.

Direction: The direction value is the compass direction of the site in respect to the project property and/or center point of the report.

Elevation: The elevation value is taken from the location at which the records for the site address have been plotted. All values are an approximation. Source: Google Elevation API.

Executive Summary: This portion of the report is divided into 3 sections:

'Report Summary'- Displays a chart indicating how many records fall on the project property and, within the report search radii.

'Site Report Summary'-Project Property'- This section lists all the records which fall on the project property. For more details, see the 'Detail Report' section.

'Site Report Summary-Surrounding Properties'- This section summarizes all records on adjacent properties, listing them in order of proximity from the project property. For more details, see the 'Detail Report' section.

Map Key: The map key number is assigned according to closest proximity from the project property. Map Key numbers always start at #1. The project property will always have a map key of '1' if records are available. If there is a number in brackets beside the main number, this will indicate the number of records on that specific property. If there is no number in brackets, there is only one record for that property.

The symbol and colour used indicates 'elevation': the red inverted triangle will dictate 'ERIS Sites with Lower Elevation', the yellow triangle will dictate 'ERIS Sites with Higher Elevation' and the orange square will dictate 'ERIS Sites with Same Elevation.'

Unplottables: These are records that could not be mapped due to various reasons, including limited geographic information. These records may or may not be in your study area, and are included as reference.

HISTORICAL AERIALS

Project Property: 300 Pine Street
300 Pine Street
Bracebridge ON P1L 1Z5

Project No: 140022038

Requested By: Stantec Consulting Ltd.

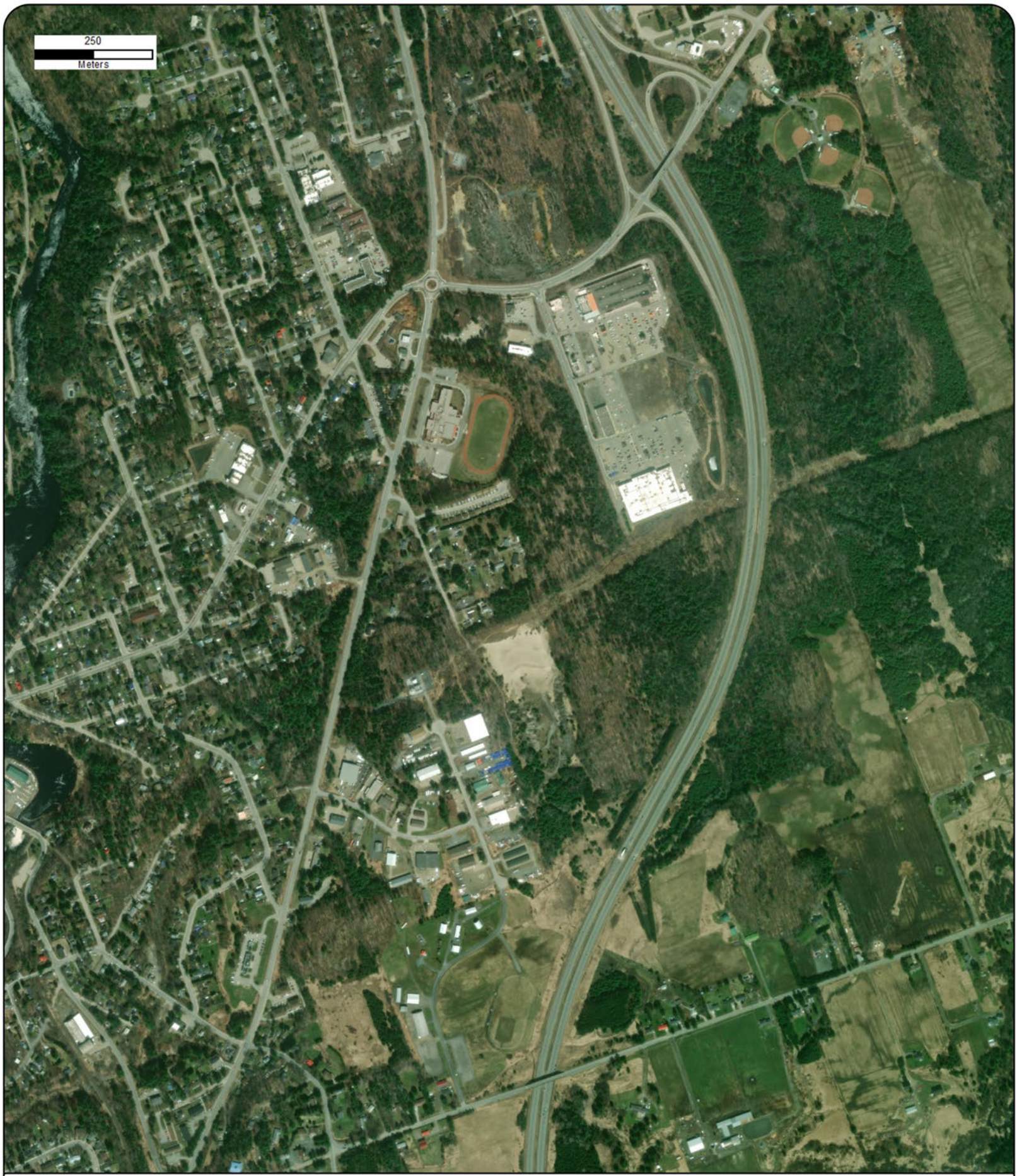
Order No: 23092700374

Date Completed: September 29,2023

Aerial Maps included in this report are produced by the sources listed above and are to be used for research purposes including a phase I report. Maps are not to be resold as commercial property. ERIS provides no warranty of accuracy or liability. The information contained in this report has been produced using aerial photos listed in above sources by ERIS Information Inc. (in the US) and ERIS Information Limited Partnership (in Canada), both doing business as 'ERIS'. The maps contained in this report do not purport to be and do not constitute a guarantee of the accuracy of the information contained herein. Although ERIS has endeavored to present information that is accurate, ERIS disclaims, any and all liability for any errors, omissions, or inaccuracies in such information and data, whether attributable to inadvertence, negligence or otherwise, and for any consequences arising therefrom. Liability on the part of ERIS is limited to the monetary value paid for this report.

Environmental Risk Information Services
A division of Glacier Media Inc.
1.866.517.5204 | info@erisinfo.com | erisinfo.com

Date	Source	Scale	Comments
2022	MAXAR TECHNOLOGIES	10,000	
1993	National Air Photo Library	10,000	
1951	National Air Photo Library	10,000	



Year: 2022
Source: MAXAR
Scale: 10,000
Comment:

Address: 300 Pine Street, Bracebridge, ON
Approx Center: -79.2936835,45.0433905

Order No: 23092700374

ERIS

Year: 1993
Source: NAPL
Scale: 10,000
Comment:

Address: 300 Pine Street, Bracebridge, ON
Approx Center: -79.2936835,45.0433905

Order No: 23092700374

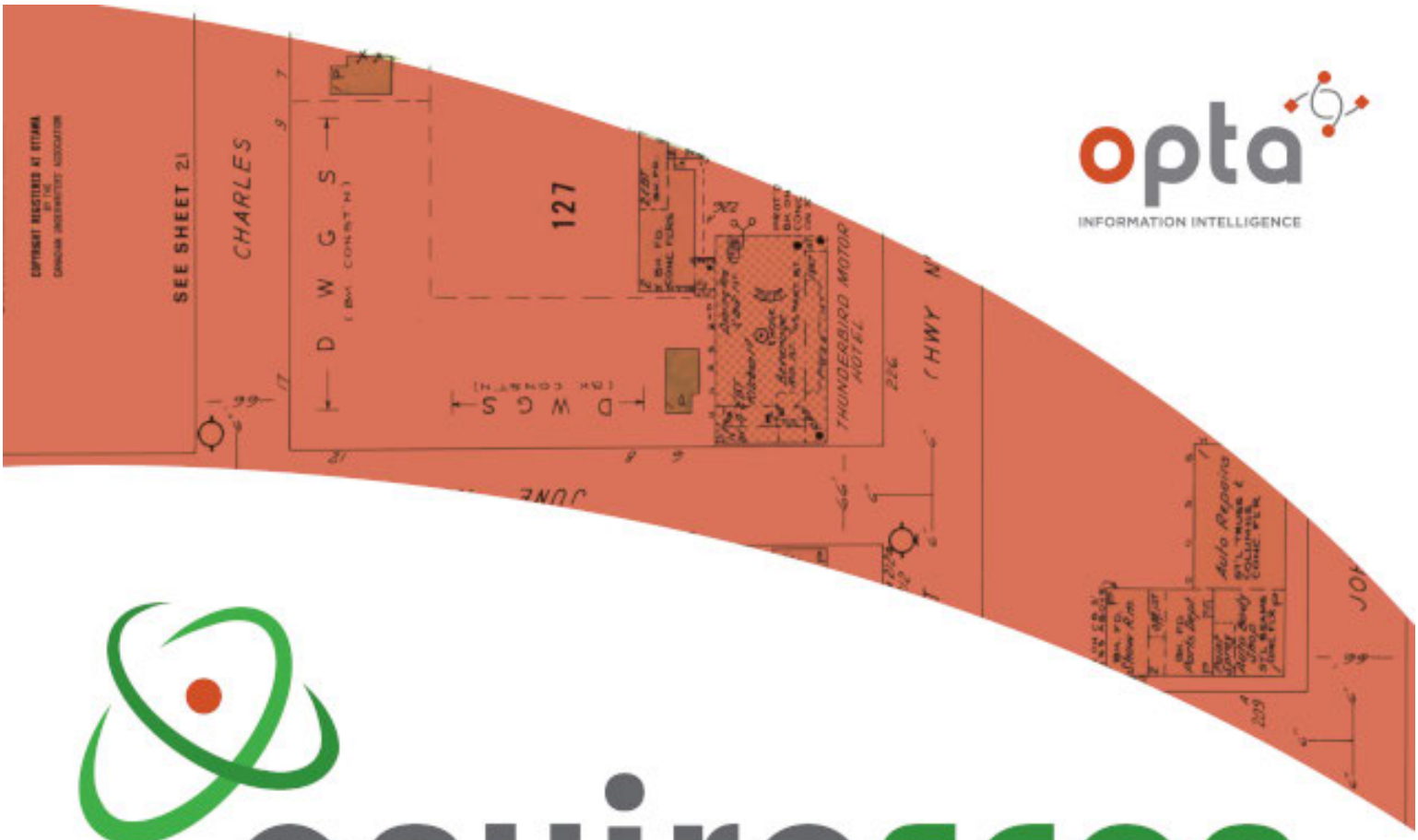
ERIS

Year: 1951
Source: NAPL
Scale: 10,000
Comment:

Address: 300 Pine Street, Bracebridge, ON
Approx Center: -79.2936835,45.0433905

Order No: 23092700374

ERIS



opta
INFORMATION INTELLIGENCE

enviroscan

175 Commerce Valley Drive W
Markham, Ontario L3T 7Z3

T: 1 877 244 9437
W: optaintel.ca

Nate

Site Address:
300 and 500 Pine Street, Bracebridge, Ontario

Project No:
23092700374

Opta Order ID:
135136

Requested by:
Eleanor Goolab
ERIS

Date Completed:
10/3/2023 8:06:38 AM

Project Name: 300 Pine Street

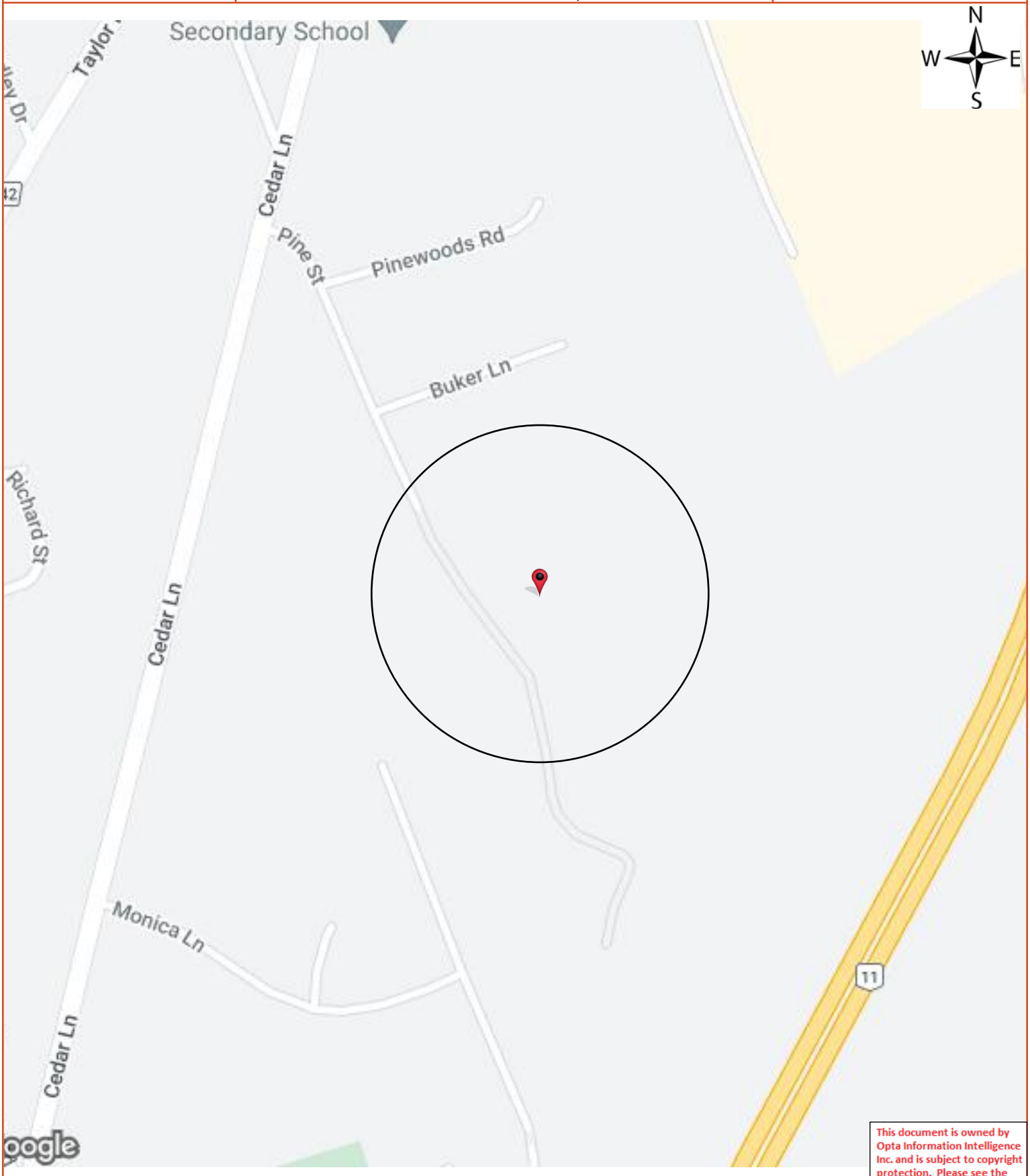
Project #: 23092700374
P.O. #: 140022038

ENVIROSCAN Report

Search Area: 300 and 500 Pine Street, Bracebridge, Ontario

Requested by:
Eleanor Goolab
Date Completed: 10/03/2023 08:06:38

enviroscan
OPTA INFORMATION INTELLIGENCE



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Opta Historical Environmental Services Enviroscan™ Terms and Conditions

Report

The documents (hereinafter referred to as the "Documents") to be released as part of the report (hereinafter referred to as the "Report") to be delivered to the purchaser as set out above are documents in Opta's records relating to the described property (hereinafter referred to as the "Property"). Opta makes no representations or warranties respecting the Documents whatsoever, including, without limitation, with respect to the completeness, accuracy or usefulness of the Documents, and does not represent or warrant that these are the only plans and reports prepared in association with the Property or in Opta's possession at the time of Report delivery to the purchaser. The Documents are current as of the date(s) indicated on them. Interpretation of the Documents, if any, is by inference based upon the information which is apparent and obvious on the face of the Documents only. Opta does not represent, warrant or guarantee that interpretations other than those referred to do not exist from other sources. The Report will be prepared for use by the purchaser of the services as shown above hereof only.

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Entire Agreement

The parties hereto acknowledge and agree to be bound by the terms and conditions hereof. The request form constitutes the entire agreement between the parties pertaining to the subject matter hereof and supersedes all prior and contemporaneous agreements, negotiations and discussions, whether oral or written, and there are no representations or warranties, or other agreements between the parties in connection with the subject matter hereof except as specifically set forth herein. No supplement, modification, waiver, or termination of the request shall be binding, unless confirmed in writing by the parties hereto.

Governing Document

In the event of any conflicts or inconsistencies between the provisions hereof and the Reports, the rights and obligations of the parties shall be deemed to be governed by the request form, which shall be the paramount document.

Law

This agreement shall be governed by and construed in accordance with the laws of the Province of Ontario and the laws of Canada applicable therein.

ENVIROSCAN Report

No Records Found

Requested by:
Eleanor Goolab
Date Completed: 10/03/2023 08:06:38

OPTA INFORMATION INTELLIGENCE

No Records Found

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CITY DIRECTORY

Project Property:	*MHAC* *300 Pine Street* *Bracebridge,ON P1L 1Z5*
Project No:	*140022038*
Requested By:	*Stantec Consulting Ltd.*
Order No:	*23100200574*
Date Completed:	*October 04, 2023*

Environmental Risk Information Services
A division of Glacier Media Inc.
1.866.517.5204 | info@erisinfo.com | erisinfo.com

October 04, 2023
RE: CITY DIRECTORY RESEARCH
300 Pine Street
Bracebridge,ON P1L 1Z5

Thank you for contacting ERIS regarding our City Directory Search services. Our staff has conducted a reverse listing City Directory search to determine prior occupants of the subject site and adjacent properties. When searching a range of addresses, all civic addresses within that range found in the Directory are included.

Note: Reverse Listing Directories generally are focused on highly developed areas, while newly developed areas may be covered in the more recent years, older directories tend to cover only "central" parts of the city. To complete the search, we have either utilized the Toronto Reference Library, Library & Archives Canada and multiple digitized directories. While these do not claim to be a complete collection of all reverse listing city directories produced, ERIS has made every effort to provide accurate and complete information. ERIS shall not be held liable for missing, incomplete, or inaccurate information. If you believe there are additional addresses or streets that require searching, please contact us.

Search Criteria:

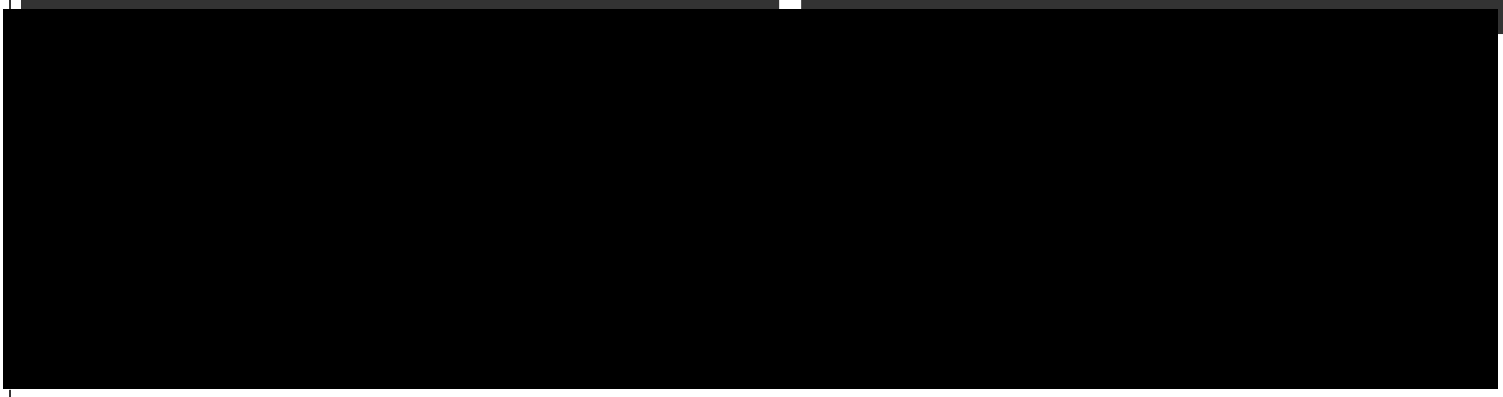
Search Results Summary

Date	Source	Comment
2021	DIGITAL BUSINESS DIRECTORY	
2017	DIGITAL BUSINESS DIRECTORY	
2012	DIGITAL BUSINESS DIRECTORY	

[redacted]

2021 GRAY ROAD

2021 MONICA LN



2021 PINE STREET

SOURCE: DIGITAL BUSINESS DIRECTORY

[redacted]

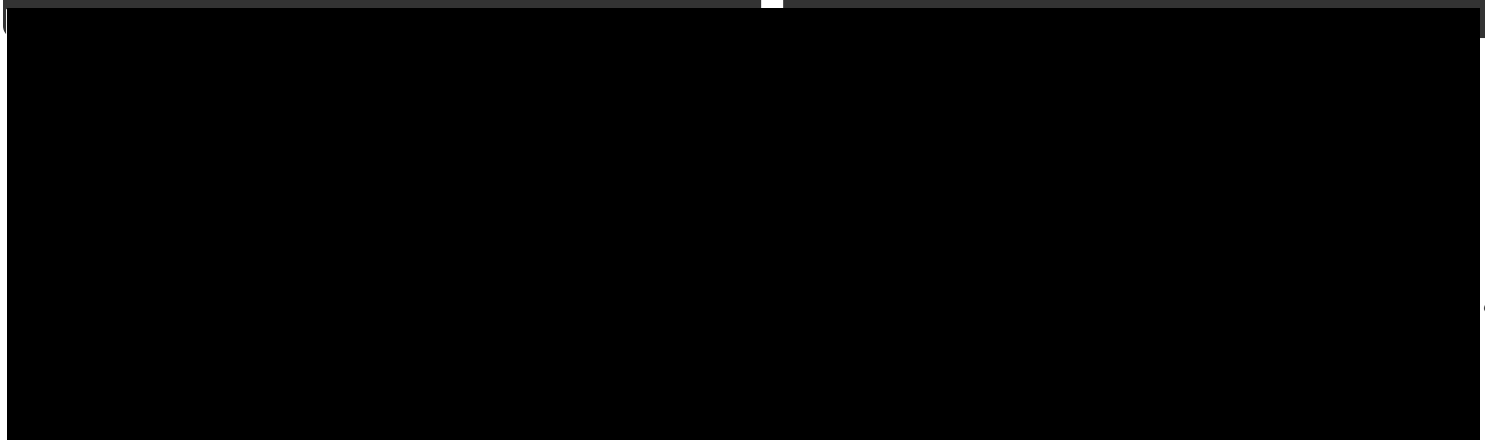
2017 CEDAR LN

SOURCE: DIGITAL BUSINESS DIRECTORY

[redacted]

2017 FRASERBURG RD

2017 GRAY ROAD



2017 MONICA LN

2017 PINE STREET

2012 CEDAR LN

SOURCE: DIGITAL BUSINESS DIRECTORY

NO LISTING FOUND

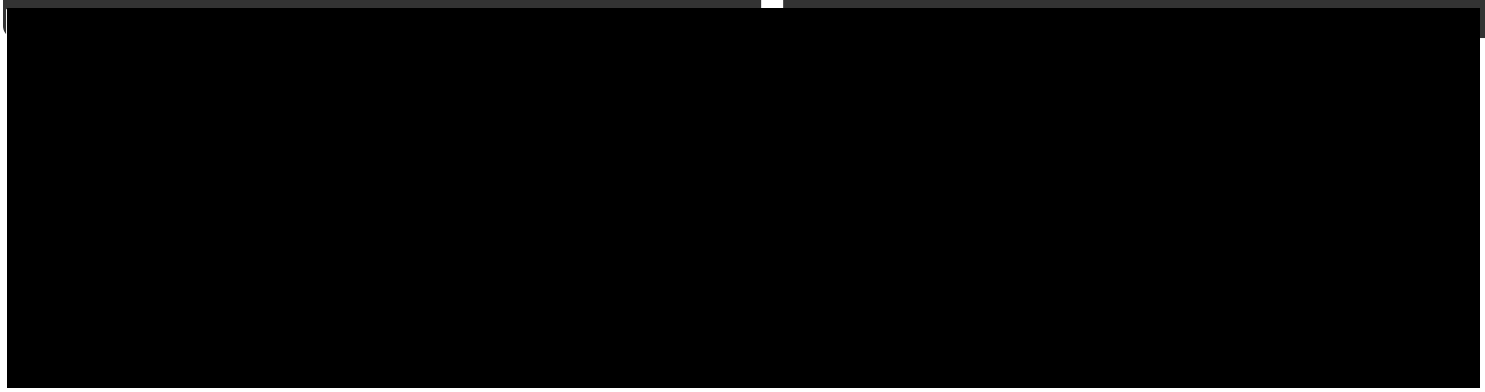
2012 FRASERBURG RD

SOURCE: DIGITAL BUSINESS DIRECTORY

NO LISTING FOUND

2012 GRAY ROAD

2012 MONICA LN



NO LISTING FOUND

Ministry of the Environment, Conservation and Parks

Emergency Management and Access Branch

40 St. Clair Avenue West
Toronto ON M4V 1M2

Ministère de l'Environnement, de la Protection de la nature et des Parcs

Direction de la gestion des situations d'urgence et de l'accès à l'information

40, avenue St. Clair ouest
Toronto ON M4V 1M2

Ontario

October 31, 2023

Marissa Lusito
Stantec Consulting Ltd.
675 Cochrane Avenue, Suite 300W
Markham, Ontario L3R 0B8
marissa.lusito@stantec.com

Dear Marissa Lusito:

RE: **MECP FOI A-2023-06066, Your Reference – Decision Letter**

This letter is in response to your request made pursuant to the Freedom of Information and Protection of Privacy Act (the Act) relating to 300 Pine Street, Bracebridge.

After a thorough search through the ministry files, no records were located responsive to your request. The official responsible for making the access decision on your request is the undersigned.

You may request a review of my decision within 30 days from the date of this letter by contacting the Information and Privacy Commissioner/Ontario at http://www.ipc.on.ca. Please note there may be a fee associated with submitting the appeal.

If you have any questions, please contact Tolani Abraham at Tolani.Abraham2@ontario.ca.

Yours truly,

Tolani Abraham

for
Josephine DeSouza
Manager (A), Access and Privacy Office

345 Carlingview Drive
Toronto, Ontario M9W 6N9
Tel.: 416.734.3300
Fax: 416.231.1626
Toll Free: 1.877.682.8772

www.tssa.org

15 November 2023

Marissa Lusito
Stantec Consulting Ltd.
150 – 1555 Wentworth Street
Whitby, ON L1N 9T6

Subject: **300 Pine Street, Bracebridge, Ontario**
Your File No.: **140022038.800.200**
WO No.: **14150163**

Dear Madam/Sir:

We are in receipt of your correspondence wherein you requested the release of information regarding the above noted address.

A search of TSSA public records **did not** locate any records relating to the following Program(s):

Program	No Record
Fuels Safety	☒
Boiler/Pressure Vessel	☐
Elevating & Amusement Devices	☐

**For BPV, if it has been indicated that records have been located but are not attached, it is likely that TSSA may not be the keeper of the records you are looking for, see note below.

TSSA does not make any representations or warranties with respect to the accuracy or completeness of any records released. The requestor assumes all risk in using or relying on the information provided.

Should you have any questions, please contact Public Information at publicinformationservices@tssa.org.

Yours truly,

C. Hill

Connie Hill
Public Information Services Agent

Limitations and Notices:

General:

TSSA, as a safety regulator, uses inspection resources to address the greatest harm posed to the public. Thus, inspection only follows-up on safety orders it issues based on the degree of risk posed by the non-compliance identified in the order(s). All high-risk orders will result in a follow-up inspection by TSSA until the non-compliance is resolved. TSSA no longer follows-up on low or medium risk orders referred to as safety tasks, therefore, TSSA can no longer provide you with a report indicating the safety tasks (low and medium-risk orders) have been resolved. This information should be obtained from the device/facility owner or their contractor. One can also engage a third-party contractor to confirm device/facility compliance.

The Public Information Department, (PID), can only provide ***existing*** records for a specific location, facility, or device. If an inspection or any other type of record does not exist, PID cannot instruct TSSA to do work, such as an inspection, to create a record. TSSA, as an outcome-based regulator, deploys all of its resources, including, inspections to address the greatest harm posed to the public; and as such, cannot deploy resources to create records to satisfy an inquiry.

Please Note: *While the PID provides existing records for a specific location, facility, or device; it does not interpret or provide further explanations of the content contained in the document.*

TSSA Fuels Safety:

If you have environmental concerns regarding this property, you should consider hiring an environmental consultant to conduct an environmental assessment of the property in question.

- Sites that have not been licensed since 1987 may not be in TSSA records.

- Be advised, TSSA Fuels Safety Division did not register:
  - private fuel underground/ aboveground storage tanks prior to January of 1990; and
  - furnace oil tanks prior to May 1, 2002.

- Fuels Safety Division does not register
  - private waste oil tanks in apartments, office buildings, residences etc.; and
  - aboveground gas or diesel tanks.

- The *Technical Standards and Safety Act* and associated regulations do not require the registration of private fuel outlets, nor does it require that any documentation on these facilities be submitted to or reviewed or approved by TSSA. As a result, TSSA has limited information on these facilities. TSSA cautions that any information provided may be inaccurate, incomplete or out of date.

TSSA Elevating & Amusement Devices Program Notice:

- All orders and/or directions issued by the TSSA Inspector have a compliance date and the owner or designated contractor are required to comply within the specified time limit. Compliance is the responsibility of the owner or operator of the device.

- All written declarations of compliance (where eligible) should be sent to TSSA. Once a declaration of compliance has been received, the outstanding order will be resolved.

- Each report shows the details and date of the inspection conducted by TSSA at the requested location.

- The Ontario Amusement Devices Regulation (O. Reg. 221/01) was adopted in 2001. Since that time, TSSA retains copies of technical dossiers of new amusement devices in Ontario (as per TSSA's retention policy). However, for rides that existed prior to the adoption of the Regulation, which were subject to a "grandfathering-in" clause, technical dossiers were not required to be filed with the TSSA.

However, if the amusement ride remains in operation, as per ASTM requirements, the owner/licensee must possess an operations document for the device in question.

Federal Elevators

- Please be advised that without the express written consent of the owner, the TSSA does not release any information with respect to federal elevators or federal elevating equipment. The TSSA is a provincial regulator for the province of Ontario and federal elevators do not fall within the scope of TSSA's provincial mandate and the *Technical Standards and Safety Act* and associated Regulations. Further, the TSSA's Access and Privacy Code only applies to information collected, used, or disclosed by the TSSA in the course of TSSA's administration of the *Act*. Therefore, information with respect to federal elevators or federal elevator equipment is outside of the administration of the *Act,* and outside of the scope of the TSSA's Access and Privacy Codes.

Indigenous Lands

- Please be advised that the TSSA does not release any information with respect to indigenous lands, which are outside of the TSSA's mandate, without the express written permission from the Band. The *Technical Standards and Safety Act*, associated regulations, and TSSA's Access and Privacy Code does not apply to indigenous lands.

TSSA Boilers and Pressure Vessels (BPVs) Program Notice:

- Be advised, TSSA does not typically periodically inspect BPVs. These inspections are usually performed by insurance companies.

- **Inspection reports may not be submitted to TSSA by insurance companies; therefore, while TSSA may have some evidence of a BPV at a location on file, there may be no inspection records pertaining to BPVs located at the address provided.

- As of July 1, 2018, BPVs in Ontario may not be operated unless the Director has issued a current certificate of inspection (COI) to the owner or operator. A COI will be issued to the owner or operator of the BPV by TSSA after TSSA has received a Record of Inspection (ROI) from the insurer/third-party inspector, the associated fees have been paid and the BPV has passed a periodic inspection.

- Please note that if the BPV in question is insured, the insurance company may have additional inspection records. Please contact the insurer directly should you wish to obtain further information.

Stantec

Memo

To:	Tim Miller, Director of Facilities and Operations Project Management Muskoka Algonquin Healthcare	From:	Eric Veska, PhD., P.Geo., C.Chem., QPESA Stantec Consulting Ltd.
File:	140022038.800.200	Date:	December 18, 2023

Reference: Environmental Sampling, 300 Pine Street, Bracebridge, Ontario

Muskoka Algonquin Healthcare retained Stantec Consulting Ltd. (Stantec) to complete a Phase I Environmental Site Assessment (ESA) and subsequent environmental sampling and analysis to support the proposed development of the property at the above-mentioned address (the "Site"). The Site is proposed to be developed as a hospital.

The purpose of the environmental sampling and analysis program was to assess baseline soil and groundwater conditions at the Site prior to development. Stantec completed a Phase I ESA at the Site in November 2023 to identify areas of potential environmental contamination based on the current and historical activities at the Site and surrounding properties. Based on Stantec's findings from the Phase I ESA, no potential environmental concerns were identified at the Site.

As part of the concurrent geotechnical and hydrogeological investigations at the Site, ten boreholes were advanced to termination depths of 0.2 meters (m) to 9.8 m at locations across the Site with monitoring wells installed in three of the boreholes (BH1, BH3, and BH9).

The sampling locations are provided on **Figure No.1**, attached.

METHODS

Soil samples were collected from nine of ten borehole locations. A soil sample could not be collected from one borehole (BH6), as bedrock was encountered at 0.2 m below ground surface (BGS). One sample from each of the nine boreholes was analyzed for metals and inorganics, petroleum hydrocarbon fractions 1 to 4 (PHCs F1 to F4) and benzene, toluene, ethylbenzene, and xylenes parameters (BTEX), volatile organic compounds (VOCs), and polycyclic aromatic hydrocarbons (PAHs). Soil samples recovered from approximately 0.5 m intervals from each borehole were screened visually for soil texture, moisture content and presence or absence of indicators of contamination (e.g., odours, deleterious materials or staining).

Each soil sample was split into two portions. One portion was placed into a sealable plastic bag for use in screening headspace soil vapour concentrations. The second portion of each sample was placed into laboratory-supplied jars and temporarily stored in a cooler on ice prior to transport to Bureau Veritas (BV) Labs Canada Ltd., an accredited environmental laboratory.

Field duplicate soil samples QC-2, QC-3_A, and QC-4 were collected for quality assurance/quality control (QA/QC) purposes at sample locations BH3 SS2 (QC-2), BH3 SS1 (QC-3_A), and BH2 SS3 (QC-4).

A groundwater sample was collected from BH9 on November 22, 2023, using low-flow sampling methods. The groundwater sample was analyzed for metals and inorganics, PHCs, PAHs, and VOCs. During groundwater monitoring, it was noted that wells MW1 and MW3 were dry.

Reference: Environmental Sampling, 300 Pine Street, Bracebridge, Ontario

RESULTS

Stratigraphy encountered during drilling was described as 0.1 to 0.2 m of topsoil underlain by silty sand. The silty sand in some boreholes was followed by gravel, clay, or silt. One borehole was comprised of sandy silt to the maximum depth (9.8 m). Bedrock (gneiss rock) was encountered from 0.2 m to 9.3 m BGS during this investigation.

Headspace soil vapour concentrations were <5 parts per million by volume (ppmv) for combustible vapour and <0.02 ppmv for total organic vapours (TOV) at all sampling locations.

The soil and groundwater analytical results of the analysis of metals and inorganics, PHCs F1 to F4, PAHs, and VOCs are presented in **Tables 1** and **2**, respectively, both attached. Laboratory certificates of analysis are included as Attachment 3.

The analytical results were compared to the Ontario Ministry of the Environment, Conservation and Parks (MECP) document *Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act*, for sites in a potable groundwater condition with residential/parkland/institutional (RPI) land use and coarse textured soil (the Table 2 RPI SCS), which were considered to be the applicable SCS for the Site's intended future land use (hospital).

The results indicated that the concentrations of analyzed parameters in the submitted soil and groundwater samples were less than the Table 2 RPI SCS, except for pH results in BH5 SS2, BH7 SS1, and BH10 SS1. A total of 7 out of 10 soil samples (including one field duplicate sample) analyzed for pH were within acceptable range for surface (5 to 9) and sub-surface (5 to 11) soil. The average pH value of all ten soil samples is pH 5.1 which is above the lower acceptable pH criteria of pH 5.0. For the purpose of this assessment, it is assumed that the three identified low pH values at BH5, BH7 and BH10 are localized, and it is not an indication of environmental sensitivity across the Phase Two Property.

CONCLUSIONS

The results indicated that all tested parameters in the submitted soil and groundwater samples were less than the MECP Table 2 RPI SCS.

CLOSURE

This report documents work that was performed in accordance with generally accepted professional standards at the time and location in which the services were provided. No other representations, warranties or guarantees are made concerning the accuracy or completeness of the data or conclusions contained within this report, including no assurance that this work has uncovered all potential liabilities associated with the identified property.

This report provides an evaluation of selected environmental conditions associated with the identified portions of the property that were assessed at the time the work was conducted and is based on information obtained by and/or provided to Stantec at that time. There are no assurances regarding the accuracy and completeness of this information. All information received from the client or third parties in the preparation of this report has been assumed by Stantec to be correct. Stantec assumes no responsibility for any deficiency or inaccuracy in information received from others.

Reference: Environmental Sampling, 300 Pine Street, Bracebridge, Ontario

The opinions in this report can only be relied upon as they relate to the condition of the portion of the identified property that was assessed at the time the work was conducted. Activities at the property subsequent to Stantec's assessment may have significantly altered the property's condition. Stantec cannot comment on other areas of the property that were not assessed.

Conclusions made within this report consist of Stantec's professional opinion as of the time of the writing of this report and are based solely on the scope of work described in the report, the limited data available and the results of the work. They are not a certification of the property's environmental condition. This report should not be construed as legal advice.

This report has been prepared for the exclusive use of the client identified herein and any use by any third party is prohibited. Stantec assumes no responsibility for losses, damages, liabilities or claims, howsoever arising, from third party use of this report.

This report is limited by the following:

- Results pertain only to the borehole and monitoring well sampling locations shown on **Figure No.1** and analytical parameters listed in **Tables 1** and **2**.

The locations of any utilities, buildings and structures, and property boundaries illustrated in or described within this report, if any, including pole lines, conduits, water mains, sewers and other surface or sub-surface utilities and structures are not guaranteed. Before starting work, the exact location of all such utilities and structures should be confirmed and Stantec assumes no liability for damage to them.

The conclusions are based on the site conditions encountered by Stantec at the time the work was performed at the specific testing and/or sampling locations, and conditions may vary among sampling locations. Factors such as areas of potential concern identified in previous studies, site conditions (e.g., utilities) and cost may have constrained the sampling locations used in this assessment. In addition, analysis has been carried out for only a limited number of chemical parameters, and it should not be inferred that other chemical species are not present. Due to the nature of the investigation and the limited data available, Stantec does not warrant against undiscovered environmental liabilities nor that the sampling results are indicative of the condition of the entire site.

As the purpose of this report is to identify site conditions which may pose an environmental risk; the identification of non-environmental risks to structures or people on the site is beyond the scope of this assessment.

Should additional information become available which differs significantly from our understanding of conditions presented in this report, Stantec specifically disclaims any responsibility to update the conclusions in this report.

This report was prepared by Marissa Lusito, M.Env.Sc., B.Sc.H., and was reviewed by Eric Veska, PhD., P.Geo., C.Chem., QP_{ESA}.

Reference: **Environmental Sampling, 300 Pine Street, Bracebridge, Ontario**

Should you require additional information, please contact the undersigned.

Sincerely,

Stantec Consulting Ltd.

Digitally signed by Resendes, Philip
Date: 2024.11.19 09:48:11 -05'00'

Digitally signed by Veska, Eric
Date: 2024.11.19 09:51:51 -05'00'

FOR

Marissa Lusito M.Env.Sc., B.Sc.H.
Environmental Assessor
Phone: 905 489 0543
Mobile: 437 388 4832
Marissa.Lusito@Stantec.com

Eric Veska PhD., P.Geo., C.Chem., QP_{ESA}
Principal
Phone: 905 415 6419
Mobile: 416 729 2370
Eric.Veska@stantec.com

EV/ml/vb

Attachments:
Attachment 1: Figure 1
Attachment 2: Table 1 and Table 2
Attachment 3: Laboratory Certificate of Analysis

ATTACHMENT 1:

Figure No.1

Stantec

Legend

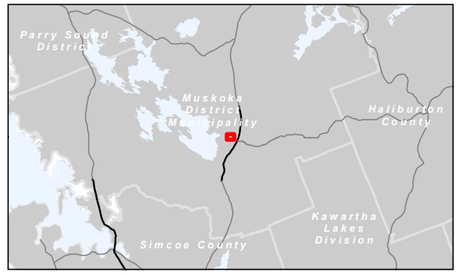
- Approximate Borehole Location
- Approximate Monitoring Well Location
- Site Boundary (Approximate)
- Railway - Operational
- Waterbody
- Provincially Significant Wetland

0 100 200 m

1:5,500 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2023.
3. Orthoimagery © First Base Solutions, 2023. Imagery Date, unknown.



Project Location
Bracebridge, ON

140022038 REV1
Prepared by GB on 2023-12-11
Technical Review by DH on 2023-08-09

Client/Project
MUSKOKA ALQONQUIN HEALTHCARE
ENVIRONMENTAL INVESTIGATION
1975 MUSKOKA BEACH ROAD, BRACEBRIDGE, ON

Figure No.
1

Title
Site Plan Showing Sampling Locations

V:\1609\Active\140022038\03 - data\gis_cad\gis\mxd\remediation\report_figures\sap\2\Muskoka\140022038_esa1_Fig01_1975MBR_siteplan.mxd Revised: 2023-12-11 By: svandamme

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ATTACHMENT 2:

Tables

Table 2
Summary of Soil Analytical Results
1975 Muskoka Beach Road, Bracebridge, Ontario
Muskoka Alqonquin Healthcare

Sample Location			BH1				BH2A2						BH3A2				
Sample Date			24-Oct-23	24-Oct-23		24-Oct-23	23-Oct-23	23-Oct-23		23-Oct-23		24-Oct-23	23-Oct-23	23-Oct-23	23-Oct-23	23-Oct-23	
Sample ID			BH1 SS2	BH1 SS2 Lab-Dup		BH1 SS3	BH2A2 SS2	BH2A2 SS2 Lab-Dup		QC-01		BH2A2 SS7	BH3A2 SS1	BH3A2 SS2	BH3A2 SS5	BH3A2 SS5 Lab-Dup	
Sample Depth			0.76 - 1.37 m	0.76 - 1.37 m		1.52 - 2.13 m	0.76 - 1.37 m	0.76 - 1.37 m		0.76 - 1.37 m		6.1 - 6.71 m	0 - 0.61 m	0.76 - 1.37 m	3.05 - 3.66 m	3.05 - 3.66 m	
Sampling Company			STANTEC	STANTEC		STANTEC	STANTEC	STANTEC		STANTEC		STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	
Laboratory			BV	BV		BV	BV	BV		BV		BV	BV	BV	BV	BV	
Laboratory Work Order			C3X8689	C3X8689		C3X8689	C3X8689	C3X8689		C3X8689		C3X8689	C3X8689	C3X8689	C3X8689	C3X8689	
Laboratory Sample ID			XLG746	XLG746		XLG747	XLG748	XLG748		XLG767		XLG749	XLG750	XLG766	XLG751	XLG751	
Sample Type	Units	Ontario SCS		Lab Replicate	RPD (%)			Lab Replicate	RPD (%)	Field Duplicate	RPD (%)					Lab Replicate	RPD (%)
General Chemistry																	
Available (CaCl2) pH	S.U.	5-9/5-11$_{\leq 12}$[A]	5.96	-	-	-	6.03	-	-	5.37	nc	-	-	-	-	-	-
Cyanide (Free)	µg/g	0.051[A]	<0.01	-	-	-	<0.01	-	-	<0.01	nc	-	-	-	-	-	-
Electrical Conductivity, Lab	mS/cm	0.7[A]	0.019	-	-	-	0.020	-	-	0.015	29%	-	-	-	-	-	-
Moisture Content	%	n/v	8.9	9.7	9%	22	16	-	-	6.3	**87%**	7.2	13	7.6	2.8	2.8	nc
Sodium Adsorption Ratio (SAR)	none	5[A]	0.99 SDC	-	-	-	SDCNC	-	-	1.0 SDC	nc	-	-	-	-	-	-
Metals																	
Antimony	µg/g	7.5[A]	<0.20	-	-	-	<0.20	<0.20	nc	<0.20	nc	-	-	-	-	-	-
Arsenic	µg/g	18[A]	<1.0	-	-	-	<1.0	<1.0	nc	<1.0	nc	-	-	-	-	-	-
Barium	µg/g	390[A]	15	-	-	-	37	37	0%	6.6	**139%**	-	-	-	-	-	-
Beryllium	µg/g	4[A]	<0.20	-	-	-	<0.20	<0.20	nc	<0.20	nc	-	-	-	-	-	-
Boron	µg/g	120$_{\leq 16}$[A]	<5.0	-	-	-	<5.0	<5.0	nc	<5.0	nc	-	-	-	-	-	-
Boron (Available)	µg/g	1.5$_{\leq 16}$[A]	<0.050	-	-	-	<0.050	-	-	<0.050	nc	-	-	-	-	-	-
Cadmium	µg/g	1.2[A]	<0.10	-	-	-	<0.10	<0.10	nc	<0.10	nc	-	-	-	-	-	-
Chromium	µg/g	160[A]	6.3	-	-	-	9.5	9.7	2%	8.5	11%	-	-	-	-	-	-
Chromium (Hexavalent)	µg/g	8[A]	<0.18	-	-	-	<0.18	-	-	<0.18	nc	-	-	-	-	-	-
Cobalt	µg/g	22[A]	2.0	-	-	-	2.4	2.3	4%	1.9	23%	-	-	-	-	-	-
Copper	µg/g	140[A]	3.9	-	-	-	4.3	4.2	2%	2.4	nc	-	-	-	-	-	-
Lead	µg/g	120[A]	1.1	-	-	-	1.3	1.4	nc	<1.0	nc	-	-	-	-	-	-
Mercury	µg/g	0.27[A]	<0.050	-	-	-	<0.050	<0.050	nc	<0.050	nc	-	-	-	-	-	-
Molybdenum	µg/g	6.9[A]	<0.50	-	-	-	<0.50	<0.50	nc	<0.50	nc	-	-	-	-	-	-
Nickel	µg/g	100[A]	3.7	-	-	-	4.7	4.6	2%	3.9	19%	-	-	-	-	-	-
Selenium	µg/g	2.4[A]	<0.50	-	-	-	<0.50	<0.50	nc	<0.50	nc	-	-	-	-	-	-
Silver	µg/g	20[A]	<0.20	-	-	-	<0.20	<0.20	nc	<0.20	nc	-	-	-	-	-	-
Thallium	µg/g	1[A]	<0.050	-	-	-	<0.050	<0.050	nc	<0.050	nc	-	-	-	-	-	-
Uranium	µg/g	23[A]	0.30	-	-	-	0.35	0.39	11%	0.25	33%	-	-	-	-	-	-
Vanadium	µg/g	86[A]	18	-	-	-	25	27	8%	31	21%	-	-	-	-	-	-
Zinc	µg/g	340[A]	8.4	-	-	-	11	11	nc	13	nc	-	-	-	-	-	-
Polycyclic Aromatic Hydrocarbons																	
Acenaphthene	µg/g	7.9[A]	-	-	-	-	<0.0050	-	-	-	-	-	<0.0050	<0.0050	-	-	-
Acenaphthylene	µg/g	0.15[A]	-	-	-	-	<0.0050	-	-	-	-	-	<0.0050	<0.0050	-	-	-
Anthracene	µg/g	0.67[A]	-	-	-	-	<0.0050	-	-	-	-	-	<0.0050	<0.0050	-	-	-
Benzo(a)anthracene	µg/g	0.5[A]	-	-	-	-	<0.0050	-	-	-	-	-	<0.0050	<0.0050	-	-	-
Benzo(a)pyrene	µg/g	0.3[A]	-	-	-	-	<0.0050	-	-	-	-	-	<0.0050	<0.0050	-	-	-
Benzo(b/j)fluoranthene	µg/g	0.78$_{\leq 0}$[A]	-	-	-	-	<0.0050	-	-	-	-	-	<0.0050	<0.0050	-	-	-
Benzo(g,h,i)perylene	µg/g	6.6[A]	-	-	-	-	<0.0050	-	-	-	-	-	<0.0050	<0.0050	-	-	-
Benzo(k)fluoranthene	µg/g	0.78[A]	-	-	-	-	<0.0050	-	-	-	-	-	<0.0050	<0.0050	-	-	-
Chrysene	µg/g	7[A]	-	-	-	-	<0.0050	-	-	-	-	-	<0.0050	<0.0050	-	-	-
Dibenzo(a,h)anthracene	µg/g	0.1[A]	-	-	-	-	<0.0050	-	-	-	-	-	<0.0050	<0.0050	-	-	-
Fluoranthene	µg/g	0.69[A]	-	-	-	-	<0.0050	-	-	-	-	-	<0.0050	<0.0050	-	-	-
Fluorene	µg/g	62[A]	-	-	-	-	<0.0050	-	-	-	-	-	<0.0050	<0.0050	-	-	-
Indeno(1,2,3-cd)pyrene	µg/g	0.38[A]	-	-	-	-	<0.0050	-	-	-	-	-	<0.0050	<0.0050	-	-	-
Methylnaphthalene (Total)	µg/g	0.99$_{\leq 3}$[A]	-	-	-	-	<0.0071	-	-	-	-	-	<0.0071	<0.0071	-	-	-
Methylnaphthalene, 1-	µg/g	$_{\leq 3}$[A]	-	-	-	-	<0.0050	-	-	-	-	-	<0.0050	<0.0050	-	-	-
Methylnaphthalene, 2-	µg/g	$_{\leq 3}$[A]	-	-	-	-	<0.0050	-	-	-	-	-	<0.0050	<0.0050	-	-	-
Naphthalene	µg/g	0.6[A]	-	-	-	-	<0.0050	-	-	-	-	-	<0.0050	<0.0050	-	-	-
Phenanthrene	µg/g	6.2[A]	-	-	-	-	<0.0050	-	-	-	-	-	<0.0050	<0.0050	-	-	-
Pyrene	µg/g	78[A]	-	-	-	-	<0.0050	-	-	-	-	-	<0.0050	<0.0050	-	-	-

See notes on last page

Table 2
Summary of Soil Analytical Results
1975 Muskoka Beach Road, Bracebridge, Ontario
Muskoka Alqonquin Healthcare

Sample Location			BH1				BH2A2						BH3A2				
Sample Date			24-Oct-23	24-Oct-23		24-Oct-23	23-Oct-23	23-Oct-23		23-Oct-23		24-Oct-23	23-Oct-23	23-Oct-23	23-Oct-23	23-Oct-23	
Sample ID			BH1 SS2	BH1 SS2 Lab-Dup		BH1 SS3	BH2A2 SS2	H2A2 SS2 Lab-Dup		QC-01		BH2A2 SS7	BH3A2 SS1	BH3A2 SS2	BH3A2 SS5	H3A2 SS5 Lab-Dup	
Sample Depth			0.76 - 1.37 m	0.76 - 1.37 m		1.52 - 2.13 m	0.76 - 1.37 m	0.76 - 1.37 m		0.76 - 1.37 m		6.1 - 6.71 m	0 - 0.61 m	0.76 - 1.37 m	3.05 - 3.66 m	3.05 - 3.66 m	
Sampling Company			STANTEC	STANTEC		STANTEC	STANTEC	STANTEC		STANTEC		STANTEC	STANTEC	STANTEC	STANTEC	STANTEC	
Laboratory			BV	BV		BV	BV	BV		BV		BV	BV	BV	BV	BV	
Laboratory Work Order			C3X8689	C3X8689		C3X8689	C3X8689	C3X8689		C3X8689		C3X8689	C3X8689	C3X8689	C3X8689	C3X8689	
Laboratory Sample ID			XLG746	XLG746		XLG747	XLG748	XLG748		XLG767		XLG749	XLG750	XLG766	XLG751	XLG751	
Sample Type	Units	Ontario SCS		Lab Replicate	RPD (%)			Lab Replicate	RPD (%)	Field Duplicate	RPD (%)					Lab Replicate	RPD (%)
BTEX and Petroleum Hydrocarbons																	
Benzene	µg/g	0.21[A]	-	-	-	<0.0060	<0.020	-	-	-	-	<0.0060	-	-	<0.0060	-	-
Toluene	µg/g	2.3[A]	-	-	-	<0.020	<0.020	-	-	-	-	<0.020	-	-	<0.020	-	-
Ethylbenzene	µg/g	1.1[A]	-	-	-	<0.010	<0.020	-	-	-	-	<0.010	-	-	<0.010	-	-
Xylene, m & p-	µg/g	[A]	-	-	-	<0.020	<0.040	-	-	-	-	<0.020	-	-	<0.020	-	-
Xylene, o-	µg/g	[A]	-	-	-	<0.020	<0.020	-	-	-	-	<0.020	-	-	<0.020	-	-
Xylenes, Total	µg/g	3.1[A]	-	-	-	<0.020	<0.040	-	-	-	-	<0.020	-	-	<0.020	-	-
PHC F1 (C6-C10 range)	µg/g	[A]	-	-	-	<10	<10	-	-	-	-	<10	-	-	-	-	-
PHC F1 (C6-C10 range) minus BTEX	µg/g	55[A]	-	-	-	<10	<10	-	-	-	-	<10	-	-	-	-	-
PHC F2 (>C10-C16 range)	µg/g	98[A]	-	-	-	<10	<10	-	-	-	-	<10	-	-	-	-	-
PHC F3 (>C16-C34 range)	µg/g	300[A]	-	-	-	<50	<50	-	-	-	-	<50	-	-	-	-	-
PHC F4 (>C34-C50 range)	µg/g	2,800[A]	-	-	-	<50	<50	-	-	-	-	<50	-	-	-	-	-
Chromatogram to baseline at C50	none	n/v	-	-	-	YES	YES	-	-	-	-	YES	-	-	-	-	-
Volatile Organic Compounds																	
Acetone	µg/g	16[A]	-	-	-	<0.49	-	-	-	-	-	<0.49	-	-	<0.49	-	-
Bromodichloromethane	µg/g	1.5[A]	-	-	-	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	-
Bromoform (Tribromomethane)	µg/g	0.27[A]	-	-	-	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	-
Bromomethane (Methyl bromide)	µg/g	0.05[A]	-	-	-	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	-
Carbon Tetrachloride (Tetrachloromethane)	µg/g	0.05[A]	-	-	-	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	-
Chlorobenzene (Monochlorobenzene)	µg/g	2.4[A]	-	-	-	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	-
Chloroform (Trichloromethane)	µg/g	0.05[A]	-	-	-	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	-
Dibromochloromethane	µg/g	2.3[A]	-	-	-	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	-
Dichlorobenzene, 1,2-	µg/g	1.2[A]	-	-	-	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	-
Dichlorobenzene, 1,3-	µg/g	4.8[A]	-	-	-	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	-
Dichlorobenzene, 1,4-	µg/g	0.083[A]	-	-	-	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	-
Dichlorodifluoromethane (Freon 12)	µg/g	16[A]	-	-	-	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	-
Dichloroethane, 1,1-	µg/g	0.47[A]	-	-	-	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	-
Dichloroethane, 1,2-	µg/g	0.05[A]	-	-	-	<0.049	-	-	-	-	-	<0.049	-	-	<0.049	-	-
Dichloroethene, 1,1-	µg/g	0.05[A]	-	-	-	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	-
Dichloroethene, cis-1,2-	µg/g	1.9[A]	-	-	-	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	-
Dichloroethene, trans-1,2-	µg/g	0.084[A]	-	-	-	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	-
Dichloropropane, 1,2-	µg/g	0.05[A]	-	-	-	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	-
Dichloropropene, 1,3- (sum of isomers cis + trans)	µg/g	0.05[A]	-	-	-	<0.050	-	-	-	-	-	<0.050	-	-	<0.050	-	-
Dichloropropene, cis-1,3-	µg/g	[A]	-	-	-	<0.030	-	-	-	-	-	<0.030	-	-	<0.030	-	-
Dichloropropene, trans-1,3-	µg/g	[A]	-	-	-	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	-
Ethylene Dibromide (Dibromoethane, 1,2-)	µg/g	0.05[A]	-	-	-	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	-
Hexane (n-Hexane)	µg/g	2.8[A]	-	-	-	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	-
Methyl Ethyl Ketone (MEK) (2-Butanone)	µg/g	16[A]	-	-	-	<0.40	-	-	-	-	-	<0.40	-	-	<0.40	-	-
Methyl Isobutyl Ketone (MIBK)	µg/g	1.7[A]	-	-	-	<0.40	-	-	-	-	-	<0.40	-	-	<0.40	-	-
Methyl tert-butyl ether (MTBE)	µg/g	0.75[A]	-	-	-	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	-
Methylene Chloride (Dichloromethane)	µg/g	0.1[A]	-	-	-	<0.049	-	-	-	-	-	<0.049	-	-	<0.049	-	-
Styrene	µg/g	0.7[A]	-	-	-	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	-
Tetrachloroethane, 1,1,1,2-	µg/g	0.058[A]	-	-	-	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	-
Tetrachloroethane, 1,1,2,2-	µg/g	0.05[A]	-	-	-	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	-
Tetrachloroethene (PCE)	µg/g	0.28[A]	-	-	-	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	-
Trichloroethane, 1,1,1-	µg/g	0.38[A]	-	-	-	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	-
Trichloroethane, 1,1,2-	µg/g	0.05[A]	-	-	-	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	-
Trichloroethene (TCE)	µg/g	0.061[A]	-	-	-	<0.010	-	-	-	-	-	<0.010	-	-	<0.010	-	-
Trichlorofluoromethane (Freon 11)	µg/g	4[A]	-	-	-	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	-
Vinyl Chloride	µg/g	0.02[A]	-	-	-	<0.019	-	-	-	-	-	<0.019	-	-	<0.019	-	-

See notes on last page

Table 2
Summary of Soil Analytical Results
1975 Muskoka Beach Road, Bracebridge, Ontario
Muskoka Alqonquin Healthcare

Sample Location			BH5		BH6			BH7						BH8	BH9		BH10	
Sample Date			26-Oct-23	26-Oct-23	31-Oct-23	31-Oct-23		26-Oct-23	26-Oct-23		26-Oct-23	26-Oct-23		2-Nov-23	2-Nov-23	2-Nov-23	24-Oct-23	24-Oct-23
Sample ID			BH5 SS2	BH5 SS5	BH6 SS1	BH6 SS1 Lab-Dup		BH7 SS2	BH7 SS2 Lab-Dup		BH7 SS6	BH7 SS6 Lab-Dup		BH8 SS1	BH9 SS2	BH9 SS5	BH10 SS1	BH10 SS3
Sample Depth			0.76 - 1.37 m	3.05 - 3.66 m	0 - 0.61 m	0 - 0.61 m		0.76 - 1.37 m	0.76 - 1.37 m		4.57 - 5.18 m	4.57 - 5.18 m		0 - 0.61 m	0.76 - 1.37 m	3.05 - 3.66 m	0 - 0.61 m	1.52 - 2.13 m
Sampling Company			STANTEC	STANTEC	STANTEC	STANTEC		STANTEC	STANTEC		STANTEC	STANTEC		STANTEC	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory			BV	BV	BV	BV		BV	BV		BV	BV		BV	BV	BV	BV	BV
Laboratory Work Order			C3X8689	C3X8689	C3Y9296	C3Y9296		C3X8689	C3X8689		C3X8689	C3X8689		C3Y9296	C3Y9296	C3Y9296	C3X8689	C3X8689
Laboratory Sample ID			XLG752	XLG753	XNN664	XNN664		XLG754	XLG754		XLG755	XLG755		XNN665	XNN666	XNN667	XLG756	XLG757
Sample Type	Units	Ontario SCS				Lab Replicate	RPD (%)		Lab Replicate	RPD (%)		Lab Replicate	RPD (%)					
General Chemistry																		
Available (CaCl2) pH	S.U.	5-9/5-11$_{\leq 12}$[A]	6.19	-	5.49	-	-	6.67	-	-	-	-	-	5.56	6.19	-	6.12	-
Cyanide (Free)	µg/g	0.051[A]	<0.01	-	<0.01	<0.01	nc	<0.01	-	-	-	-	-	<0.01	<0.01	-	<0.01	-
Electrical Conductivity, Lab	mS/cm	0.7[A]	0.013	-	0.022	-	-	0.043	-	-	-	-	-	0.020	0.038	-	0.012	-
Moisture Content	%	n/v	6.1	20	9.8	-	-	9.8	-	-	16	16	0%	12	24	25	6.7	19
Sodium Adsorption Ratio (SAR)	none	5[A]	1.6 SDC	-	0.87 SDC	-	-	0.41 SDC	-	-	-	-	-	1.4 SDC	0.73 SDC	-	1.2 SDC	-
Metals																		
Antimony	µg/g	7.5[A]	<0.20	-	<0.20	-	-	<0.20	-	-	-	-	-	<0.20	<0.20	-	<0.20	-
Arsenic	µg/g	18[A]	<1.0	-	2.7	-	-	<1.0	-	-	-	-	-	<1.0	1.6	-	<1.0	-
Barium	µg/g	390[A]	7.6	-	6.7	-	-	19	-	-	-	-	-	15	270	-	7.5	-
Beryllium	µg/g	4[A]	<0.20	-	<0.20	-	-	<0.20	-	-	-	-	-	<0.20	0.94	-	<0.20	-
Boron	µg/g	120$_{\leq 16}$[A]	<5.0	-	<5.0	-	-	<5.0	-	-	-	-	-	<5.0	6.6	-	<5.0	-
Boron (Available)	µg/g	1.5$_{\leq 16}$[A]	<0.050	-	<0.050	-	-	<0.050	-	-	-	-	-	<0.050	<0.050	-	<0.050	-
Cadmium	µg/g	1.2[A]	<0.10	-	<0.10	-	-	<0.10	-	-	-	-	-	<0.10	<0.10	-	<0.10	-
Chromium	µg/g	160[A]	6.8	-	4.9	-	-	6.7	-	-	-	-	-	10	52	-	6.9	-
Chromium (Hexavalent)	µg/g	8[A]	<0.18	-	<0.18	<0.18	nc	<0.18	-	-	-	-	-	<0.18	0.82	-	<0.18	-
Cobalt	µg/g	22[A]	1.5	-	1.7	-	-	2.1	-	-	-	-	-	2.2	16	-	1.8	-
Copper	µg/g	140[A]	2.5	-	2.2	-	-	3.6	-	-	-	-	-	3.6	31	-	2.7	-
Lead	µg/g	120[A]	<1.0	-	1.0	-	-	1.2	-	-	-	-	-	1.1	6.6	-	<1.0	-
Mercury	µg/g	0.27[A]	<0.050	-	<0.050	-	-	<0.050	-	-	-	-	-	<0.050	<0.050	-	<0.050	-
Molybdenum	µg/g	6.9[A]	<0.50	-	<0.50	-	-	<0.50	-	-	-	-	-	<0.50	<0.50	-	<0.50	-
Nickel	µg/g	100[A]	3.1	-	3.3	-	-	3.9	-	-	-	-	-	3.6	33	-	3.7	-
Selenium	µg/g	2.4[A]	<0.50	-	<0.50	-	-	<0.50	-	-	-	-	-	<0.50	<0.50	-	<0.50	-
Silver	µg/g	20[A]	<0.20	-	<0.20	-	-	<0.20	-	-	-	-	-	<0.20	<0.20	-	<0.20	-
Thallium	µg/g	1[A]	<0.050	-	<0.050	-	-	<0.050	-	-	-	-	-	<0.050	0.30	-	<0.050	-
Uranium	µg/g	23[A]	0.27	-	0.19	-	-	0.22	-	-	-	-	-	0.43	0.91	-	0.27	-
Vanadium	µg/g	86[A]	26	-	15	-	-	18	-	-	-	-	-	34	70	-	24	-
Zinc	µg/g	340[A]	7.1	-	19	-	-	10	-	-	-	-	-	16	85	-	12	-
Polycyclic Aromatic Hydrocarbons																		
Acenaphthene	µg/g	7.9[A]	<0.0050	-	<0.0050	-	-	-	-	-	-	-	-	<0.0050	<0.0050	-	-	-
Acenaphthylene	µg/g	0.15[A]	<0.0050	-	<0.0050	-	-	-	-	-	-	-	-	<0.0050	<0.0050	-	-	-
Anthracene	µg/g	0.67[A]	<0.0050	-	<0.0050	-	-	-	-	-	-	-	-	<0.0050	<0.0050	-	-	-
Benzo(a)anthracene	µg/g	0.5[A]	<0.0050	-	<0.0050	-	-	-	-	-	-	-	-	<0.0050	<0.0050	-	-	-
Benzo(a)pyrene	µg/g	0.3[A]	<0.0050	-	<0.0050	-	-	-	-	-	-	-	-	<0.0050	<0.0050	-	-	-
Benzo(b/j)fluoranthene	µg/g	0.78$_{\leq 0}$[A]	<0.0050	-	<0.0050	-	-	-	-	-	-	-	-	<0.0050	<0.0050	-	-	-
Benzo(g,h,i)perylene	µg/g	6.6[A]	<0.0050	-	<0.0050	-	-	-	-	-	-	-	-	<0.0050	<0.0050	-	-	-
Benzo(k)fluoranthene	µg/g	0.78[A]	<0.0050	-	<0.0050	-	-	-	-	-	-	-	-	<0.0050	<0.0050	-	-	-
Chrysene	µg/g	7[A]	<0.0050	-	<0.0050	-	-	-	-	-	-	-	-	<0.0050	<0.0050	-	-	-
Dibenzo(a,h)anthracene	µg/g	0.1[A]	<0.0050	-	<0.0050	-	-	-	-	-	-	-	-	<0.0050	<0.0050	-	-	-
Fluoranthene	µg/g	0.69[A]	<0.0050	-	<0.0050	-	-	-	-	-	-	-	-	<0.0050	<0.0050	-	-	-
Fluorene	µg/g	62[A]	<0.0050	-	<0.0050	-	-	-	-	-	-	-	-	<0.0050	<0.0050	-	-	-
Indeno(1,2,3-cd)pyrene	µg/g	0.38[A]	<0.0050	-	<0.0050	-	-	-	-	-	-	-	-	<0.0050	<0.0050	-	-	-
Methylnaphthalene (Total)	µg/g	0.99$_{\leq 3}$[A]	<0.0071	-	<0.0071	-	-	-	-	-	-	-	-	<0.0071	<0.0071	-	-	-
Methylnaphthalene, 1-	µg/g	$_{\leq 3}$[A]	<0.0050	-	<0.0050	-	-	-	-	-	-	-	-	<0.0050	<0.0050	-	-	-
Methylnaphthalene, 2-	µg/g	$_{\leq 3}$[A]	<0.0050	-	<0.0050	-	-	-	-	-	-	-	-	<0.0050	<0.0050	-	-	-
Naphthalene	µg/g	0.6[A]	<0.0050	-	<0.0050	-	-	-	-	-	-	-	-	<0.0050	<0.0050	-	-	-
Phenanthrene	µg/g	6.2[A]	<0.0050	-	<0.0050	-	-	-	-	-	-	-	-	<0.0050	<0.0050	-	-	-
Pyrene	µg/g	78[A]	<0.0050	-	<0.0050	-	-	-	-	-	-	-	-	<0.0050	<0.0050	-	-	-

See notes on last page

Table 2
Summary of Soil Analytical Results
1975 Muskoka Beach Road, Bracebridge, Ontario
Muskoka Alqonquin Healthcare

Sample Location			BH5		BH6			BH7						BH8	BH9		BH10	
Sample Date			26-Oct-23	26-Oct-23	31-Oct-23	31-Oct-23		26-Oct-23	26-Oct-23		26-Oct-23	26-Oct-23		2-Nov-23	2-Nov-23	2-Nov-23	24-Oct-23	24-Oct-23
Sample ID			BH5 SS2	BH5 SS5	BH6 SS1	BH6 SS1 Lab-Dup		BH7 SS2	BH7 SS2 Lab-Dup		BH7 SS6	BH7 SS6 Lab-Dup		BH8 SS1	BH9 SS2	BH9 SS5	BH10 SS1	BH10 SS3
Sample Depth			0.76 - 1.37 m	3.05 - 3.66 m	0 - 0.61 m	0 - 0.61 m		0.76 - 1.37 m	0.76 - 1.37 m		4.57 - 5.18 m	4.57 - 5.18 m		0 - 0.61 m	0.76 - 1.37 m	3.05 - 3.66 m	0 - 0.61 m	1.52 - 2.13 m
Sampling Company			STANTEC	STANTEC	STANTEC	STANTEC		STANTEC	STANTEC		STANTEC	STANTEC		STANTEC	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory			BV	BV	BV	BV		BV	BV		BV	BV		BV	BV	BV	BV	BV
Laboratory Work Order			C3X8689	C3X8689	C3Y9296	C3Y9296		C3X8689	C3X8689		C3X8689	C3X8689		C3Y9296	C3Y9296	C3Y9296	C3X8689	C3X8689
Laboratory Sample ID			XLG752	XLG753	XNN664	XNN664		XLG754	XLG754		XLG755	XLG755		XNN665	XNN666	XNN667	XLG756	XLG757
Sample Type	Units	Ontario SCS				Lab Replicate	RPD (%)		Lab Replicate	RPD (%)		Lab Replicate	RPD (%)					
BTEX and Petroleum Hydrocarbons																		
Benzene	µg/g	0.21[A]	-	<0.0060	<0.0060	-	-	-	-	-	<0.0060	-	-	<0.0060	-	<0.0060	-	<0.0060
Toluene	µg/g	2.3[A]	-	<0.020	<0.020	-	-	-	-	-	<0.020	-	-	<0.020	-	<0.020	-	<0.020
Ethylbenzene	µg/g	1.1[A]	-	<0.010	<0.010	-	-	-	-	-	<0.010	-	-	<0.010	-	<0.010	-	<0.010
Xylene, m & p-	µg/g	[A]	-	<0.020	<0.020	-	-	-	-	-	<0.020	-	-	<0.020	-	<0.020	-	<0.020
Xylene, o-	µg/g	[A]	-	<0.020	<0.020	-	-	-	-	-	<0.020	-	-	<0.020	-	<0.020	-	<0.020
Xylenes, Total	µg/g	3.1[A]	-	<0.020	<0.020	-	-	-	-	-	<0.020	-	-	<0.020	-	<0.020	-	<0.020
PHC F1 (C6-C10 range)	µg/g	[A]	-	<10	<10	-	-	-	-	-	-	-	-	<10	-	<10	-	<10
PHC F1 (C6-C10 range) minus BTEX	µg/g	55[A]	-	<10	<10	-	-	-	-	-	-	-	-	<10	-	<10	-	<10
PHC F2 (>C10-C16 range)	µg/g	98[A]	-	<10	<10	-	-	<10	<10	nc	-	-	-	<10	-	<10	-	<10
PHC F3 (>C16-C34 range)	µg/g	300[A]	-	<50	<50	-	-	<50	<50	nc	-	-	-	<50	-	<50	-	<50
PHC F4 (>C34-C50 range)	µg/g	2,800[A]	-	<50	<50	-	-	<50	<50	nc	-	-	-	<50	-	<50	-	<50
Chromatogram to baseline at C50	none	n/v	-	YES	YES	-	-	YES	YES	nc	-	-	-	YES	-	YES	-	YES
Volatile Organic Compounds																		
Acetone	µg/g	16[A]	-	<0.49	<0.49	-	-	-	-	-	<0.49	-	-	<0.49	-	<0.49	-	<0.49
Bromodichloromethane	µg/g	1.5[A]	-	<0.040	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	<0.040	-	<0.040
Bromoform (Tribromomethane)	µg/g	0.27[A]	-	<0.040	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	<0.040	-	<0.040
Bromomethane (Methyl bromide)	µg/g	0.05[A]	-	<0.040	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	<0.040	-	<0.040
Carbon Tetrachloride (Tetrachloromethane)	µg/g	0.05[A]	-	<0.040	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	<0.040	-	<0.040
Chlorobenzene (Monochlorobenzene)	µg/g	2.4[A]	-	<0.040	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	<0.040	-	<0.040
Chloroform (Trichloromethane)	µg/g	0.05[A]	-	<0.040	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	<0.040	-	<0.040
Dibromochloromethane	µg/g	2.3[A]	-	<0.040	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	<0.040	-	<0.040
Dichlorobenzene, 1,2-	µg/g	1.2[A]	-	<0.040	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	<0.040	-	<0.040
Dichlorobenzene, 1,3-	µg/g	4.8[A]	-	<0.040	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	<0.040	-	<0.040
Dichlorobenzene, 1,4-	µg/g	0.083[A]	-	<0.040	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	<0.040	-	<0.040
Dichlorodifluoromethane (Freon 12)	µg/g	16[A]	-	<0.040	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	<0.040	-	<0.040
Dichloroethane, 1,1-	µg/g	0.47[A]	-	<0.040	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	<0.040	-	<0.040
Dichloroethane, 1,2-	µg/g	0.05[A]	-	<0.049	<0.049	-	-	-	-	-	<0.049	-	-	<0.049	-	<0.049	-	<0.049
Dichloroethene, 1,1-	µg/g	0.05[A]	-	<0.040	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	<0.040	-	<0.040
Dichloroethene, cis-1,2-	µg/g	1.9[A]	-	<0.040	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	<0.040	-	<0.040
Dichloroethene, trans-1,2-	µg/g	0.084[A]	-	<0.040	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	<0.040	-	<0.040
Dichloropropane, 1,2-	µg/g	0.05[A]	-	<0.040	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	<0.040	-	<0.040
Dichloropropene, 1,3- (sum of isomers cis + trans)	µg/g	0.05[A]	-	<0.050	<0.050	-	-	-	-	-	<0.050	-	-	<0.050	-	<0.050	-	<0.050
Dichloropropene, cis-1,3-	µg/g	[A]	-	<0.030	<0.030	-	-	-	-	-	<0.030	-	-	<0.030	-	<0.030	-	<0.030
Dichloropropene, trans-1,3-	µg/g	[A]	-	<0.040	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	<0.040	-	<0.040
Ethylene Dibromide (Dibromoethane, 1,2-)	µg/g	0.05[A]	-	<0.040	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	<0.040	-	<0.040
Hexane (n-Hexane)	µg/g	2.8[A]	-	<0.040	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	<0.040	-	<0.040
Methyl Ethyl Ketone (MEK) (2-Butanone)	µg/g	16[A]	-	<0.40	<0.40	-	-	-	-	-	<0.40	-	-	<0.40	-	<0.40	-	<0.40
Methyl Isobutyl Ketone (MIBK)	µg/g	1.7[A]	-	<0.40	<0.40	-	-	-	-	-	<0.40	-	-	<0.40	-	<0.40	-	<0.40
Methyl tert-butyl ether (MTBE)	µg/g	0.75[A]	-	<0.040	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	<0.040	-	<0.040
Methylene Chloride (Dichloromethane)	µg/g	0.1[A]	-	<0.049	<0.049	-	-	-	-	-	<0.049	-	-	<0.049	-	<0.049	-	<0.049
Styrene	µg/g	0.7[A]	-	<0.040	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	<0.040	-	<0.040
Tetrachloroethane, 1,1,1,2-	µg/g	0.058[A]	-	<0.040	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	<0.040	-	<0.040
Tetrachloroethane, 1,1,2,2-	µg/g	0.05[A]	-	<0.040	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	<0.040	-	<0.040
Tetrachloroethene (PCE)	µg/g	0.28[A]	-	<0.040	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	<0.040	-	<0.040
Trichloroethane, 1,1,1-	µg/g	0.38[A]	-	<0.040	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	<0.040	-	<0.040
Trichloroethane, 1,1,2-	µg/g	0.05[A]	-	<0.040	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	<0.040	-	<0.040
Trichloroethene (TCE)	µg/g	0.061[A]	-	<0.010	<0.010	-	-	-	-	-	<0.010	-	-	<0.010	-	<0.010	-	<0.010
Trichlorofluoromethane (Freon 11)	µg/g	4[A]	-	<0.040	<0.040	-	-	-	-	-	<0.040	-	-	<0.040	-	<0.040	-	<0.040
Vinyl Chloride	µg/g	0.02[A]	-	<0.019	<0.019	-	-	-	-	-	<0.019	-	-	<0.019	-	<0.019	-	<0.019

See notes on last page

Table 1
Summary of Soil Analytical Results
1975 Muskoka Beach Road, Bracebridge, Ontario
Muskoka Alqonquin Healthcare

Notes:
Ontario SCS Soil, Ground Water and Sediment Standards for Use under Part XV.I of the Environmental Protection Act (MOE, 2011) Site Condition Standards (SCS)

A	Table 2 - Residential / Parkland / Institutional Property Use - Coarse Textured Soils
6.5[A]	Concentration exceeds the indicated standard.
15.2	Measured concentration did not exceed the indicated standard.
<0.50	Laboratory reporting limit was greater than the applicable standard.
<0.03	Analyte was not detected at a concentration greater than the laboratory reporting limit.
n/v	No standard/guideline value.
-	Parameter not analyzed / not available.
s1	Standard is applicable to total xylenes, and m & p-xylenes and o-xylenes should be summed for comparison.
s2	Standard is for benzo(b)fluoranthene; however, the analytical laboratory can not distinguish between benzo(b)fluoranthene and benzo(j)fluoranthene, and therefore, the result is a combination of the two isomers, against which the standard has been compared.
s3	Standard is applicable to both 1-methylnaphthalene and 2-methylnaphthalene, with the provision that if both are detected the sum of the two must not exceed the standard.
s7	Standard is applicable to PHC in the F1 range minus BTEX.
s8	Standard is applicable to PHC in the F3 range, minus PAHs (other than naphthalene). If PAHs were not analyzed, the standard is applied to F3.
s10	If baseline is not reached during F4 analysis, then gravimetric analysis is to be performed, and the standard is applied to the higher of the two results.
s11	Standard is applicable to 1,3-Dichloropropene, and the individual isomers (cis + trans) should be added for comparison.
s12	The criteria for pH in surface soils (0 to 1.5 m) is 5 - 9, whereas the criteria for pH in sub-surface soils (> 1.5 m depth) is 5 - 11.
s15	Standard is applicable to PHC in the F2 range minus naphthalene. If naphthalene was not analyzed, the standard is applied to F2.
s16	For surface soil, the boron standard is for hot water soluble extract. For subsurface soil, the standard is for total boron (mixed strong acid digest), as ecological criteria are not considered.
SDC	Sodium was not detected. To report SAR the sodium detection limit was used in the calculation. This value represents a maximum ratio.
RPD	Relative Percent Difference.
61%	RPD exceeds data quality objective of 50%.
nc	RPD is not calculated if one or more values is non detect or if one or more values is less than five times the reportable detection limit.

ATTACHMENT 3:

Laboratory Certificates of Analysis

Your Project #: 140022038.801.200
Site#: MAHC,SITE B
Site Location: 1975 MUSKOKA BEACG RD,BRACEBRIDGE
Your C.O.C. #: n/a

Attention: Philip Resendes

Stantec Consulting Ltd
300 Hagey Blvd
Suite 100
Waterloo, ON
CANADA N2L 0A4

Report Date: 2023/11/07
Report #: R7900491
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3X8689
Received: 2023/10/30, 14:00

Sample Matrix: Soil
Samples Received: 14

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Methylnaphthalene Sum	4	N/A	2023/11/06	CAM SOP-00301	EPA 8270D m
Hot Water Extractable Boron	6	2023/11/02	2023/11/03	CAM SOP-00408	R153 Ana. Prot. 2011
1,3-Dichloropropene Sum	6	N/A	2023/11/04		EPA 8260C m
Free (WAD) Cyanide	3	2023/11/02	2023/11/02	CAM SOP-00457	OMOE E3015 m
Free (WAD) Cyanide	2	2023/11/02	2023/11/03	CAM SOP-00457	OMOE E3015 m
Free (WAD) Cyanide	1	2023/11/03	2023/11/03	CAM SOP-00457	OMOE E3015 m
Conductivity	2	2023/11/02	2023/11/02	CAM SOP-00414	OMOE E3530 v1 m
Conductivity	4	2023/11/03	2023/11/03	CAM SOP-00414	OMOE E3530 v1 m
Hexavalent Chromium in Soil by IC (1)	1	2023/11/02	2023/11/03	CAM SOP-00436	EPA 3060A/7199 m
Hexavalent Chromium in Soil by IC (1)	2	2023/11/03	2023/11/04	CAM SOP-00436	EPA 3060A/7199 m
Hexavalent Chromium in Soil by IC (1)	3	2023/11/03	2023/11/06	CAM SOP-00436	EPA 3060A/7199 m
Petroleum Hydro. CCME F1 & BTEX in Soil (2)	1	N/A	2023/11/01	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Soil (3)	2	2023/11/03	2023/11/05	CAM SOP-00316	CCME CWS m
Petroleum Hydrocarbons F2-F4 in Soil (3)	4	2023/11/03	2023/11/06	CAM SOP-00316	CCME CWS m
Acid Extractable Metals by ICPMS	6	2023/11/02	2023/11/03	CAM SOP-00447	EPA 6020B m
Moisture	1	N/A	2023/10/31	CAM SOP-00445	Carter 2nd ed 51.2 m
Moisture	13	N/A	2023/11/01	CAM SOP-00445	Carter 2nd ed 51.2 m
PAH Compounds in Soil by GC/MS (SIM)	4	2023/11/03	2023/11/04	CAM SOP-00318	EPA 8270E
pH CaCl2 EXTRACT	3	2023/11/02	2023/11/02	CAM SOP-00413	EPA 9045 D m
pH CaCl2 EXTRACT	3	2023/11/03	2023/11/03	CAM SOP-00413	EPA 9045 D m
Sodium Adsorption Ratio (SAR)	2	N/A	2023/11/02	CAM SOP-00102	EPA 6010C
Sodium Adsorption Ratio (SAR)	4	N/A	2023/11/06	CAM SOP-00102	EPA 6010C
Volatile Organic Compounds and F1 PHCs	4	N/A	2023/11/04	CAM SOP-00230	EPA 8260C m
Volatile Organic Compounds in Soil	2	N/A	2023/11/03	CAM SOP-00228	EPA 8260D

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCCFP, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in

Your Project #: 140022038.801.200
Site#: MAHC,SITE B
Site Location: 1975 MUSKOKA BEACG RD,BRACEBRIDGE
Your C.O.C. #: n/a

Attention: Philip Resendes

Stantec Consulting Ltd
300 Hagey Blvd
Suite 100
Waterloo, ON
CANADA N2L 0A4

Report Date: 2023/11/07
Report #: R7900491
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3X8689

Received: 2023/10/30, 14:00

writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Soils are reported on a dry weight basis unless otherwise specified.
(2) No lab extraction date is given for F1BTEX & VOC samples that are field preserved with methanol. Extraction date is the date sampled unless otherwise stated.
(3) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following “Alberta Environment’s Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003”. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Julie Clement, Technical Account Manager
Email: Julie.CLEMENT@bureauveritas.com
Phone# (613)868-6079

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O.REG 153 METALS & INORGANICS PKG (SOIL)

Bureau Veritas ID		XLG746		XLG748			XLG748		
Sampling Date		2023/10/24 15:00		2023/10/23 15:50			2023/10/23 15:50		
COC Number		n/a		n/a			n/a		
	UNITS	BH1 SS2	QC Batch	BH2A2 SS2	RDL	QC Batch	BH2A2 SS2 Lab-Dup	RDL	QC Batch
Calculated Parameters									
Sodium Adsorption Ratio	N/A	0.99 (1)	9018931	NC (1)		9018931			
Inorganics									
Conductivity	mS/cm	0.019	9023381	0.020	0.002	9023381			
Available (CaCl2) pH	pH	5.96	9024090	6.03		9024624			
WAD Cyanide (Free)	ug/g	<0.01	9026168	<0.01	0.01	9023313			
Chromium (VI)	ug/g	<0.18	9024558	<0.18	0.18	9026382			
Metals									
Hot Water Ext. Boron (B)	ug/g	<0.050	9025089	<0.050	0.050	9025089			
Acid Extractable Antimony (Sb)	ug/g	<0.20	9024596	<0.20	0.20	9024596	<0.20	0.20	9024596
Acid Extractable Arsenic (As)	ug/g	<1.0	9024596	<1.0	1.0	9024596	<1.0	1.0	9024596
Acid Extractable Barium (Ba)	ug/g	15	9024596	37	0.50	9024596	37	0.50	9024596
Acid Extractable Beryllium (Be)	ug/g	<0.20	9024596	<0.20	0.20	9024596	<0.20	0.20	9024596
Acid Extractable Boron (B)	ug/g	<5.0	9024596	<5.0	5.0	9024596	<5.0	5.0	9024596
Acid Extractable Cadmium (Cd)	ug/g	<0.10	9024596	<0.10	0.10	9024596	<0.10	0.10	9024596
Acid Extractable Chromium (Cr)	ug/g	6.3	9024596	9.5	1.0	9024596	9.7	1.0	9024596
Acid Extractable Cobalt (Co)	ug/g	2.0	9024596	2.4	0.10	9024596	2.3	0.10	9024596
Acid Extractable Copper (Cu)	ug/g	3.9	9024596	4.3	0.50	9024596	4.2	0.50	9024596
Acid Extractable Lead (Pb)	ug/g	1.1	9024596	1.3	1.0	9024596	1.4	1.0	9024596
Acid Extractable Molybdenum (Mo)	ug/g	<0.50	9024596	<0.50	0.50	9024596	<0.50	0.50	9024596
Acid Extractable Nickel (Ni)	ug/g	3.7	9024596	4.7	0.50	9024596	4.6	0.50	9024596
Acid Extractable Selenium (Se)	ug/g	<0.50	9024596	<0.50	0.50	9024596	<0.50	0.50	9024596
Acid Extractable Silver (Ag)	ug/g	<0.20	9024596	<0.20	0.20	9024596	<0.20	0.20	9024596
Acid Extractable Thallium (Tl)	ug/g	<0.050	9024596	<0.050	0.050	9024596	<0.050	0.050	9024596
Acid Extractable Uranium (U)	ug/g	0.30	9024596	0.35	0.050	9024596	0.39	0.050	9024596
Acid Extractable Vanadium (V)	ug/g	18	9024596	25	5.0	9024596	27	5.0	9024596
Acid Extractable Zinc (Zn)	ug/g	8.4	9024596	11	5.0	9024596	11	5.0	9024596
Acid Extractable Mercury (Hg)	ug/g	<0.050	9024596	<0.050	0.050	9024596	<0.050	0.050	9024596

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
(1) Sodium was not detected. To report SAR the sodium detection limit was used in the calculation. This value represents a maximum ratio.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C3X8689
Report Date: 2023/11/07

Stantec Consulting Ltd
Client Project #: 140022038.801.200
Site Location: 1975 MUSKOKA BEACG RD,BRACEBRIDGE
Sampler Initials: MK

O.REG 153 METALS & INORGANICS PKG (SOIL)

Bureau Veritas ID		XLG752		XLG754		XLG756		XLG767		
Sampling Date		2023/10/26 11:00		2023/10/26 13:45		2023/10/24 12:10		2023/10/23		
COC Number		n/a		n/a		n/a		n/a		
	UNITS	BH5 SS2	QC Batch	BH7 SS2	QC Batch	BH10 SS1	QC Batch	QC-01	RDL	QC Batch
Calculated Parameters										
Sodium Adsorption Ratio	N/A	1.6 (1)	9018931	0.41 (1)	9019077	1.2 (1)	9018931	1.0 (1)		9018931
Inorganics										
Conductivity	mS/cm	0.013	9026931	0.043	9026931	0.012	9026931	0.015	0.002	9026931
Available (CaCl2) pH	pH	6.19	9026654	6.67	9026654	6.12	9026694	5.37		9024624
WAD Cyanide (Free)	ug/g	<0.01	9023744	<0.01	9023744	<0.01	9023313	<0.01	0.01	9023313
Chromium (VI)	ug/g	<0.18	9026403	<0.18	9026403	<0.18	9026382	<0.18	0.18	9026382
Metals										
Hot Water Ext. Boron (B)	ug/g	<0.050	9024986	<0.050	9024986	<0.050	9024986	<0.050	0.050	9024986
Acid Extractable Antimony (Sb)	ug/g	<0.20	9023984	<0.20	9023984	<0.20	9023984	<0.20	0.20	9023984
Acid Extractable Arsenic (As)	ug/g	<1.0	9023984	<1.0	9023984	<1.0	9023984	<1.0	1.0	9023984
Acid Extractable Barium (Ba)	ug/g	7.6	9023984	19	9023984	7.5	9023984	6.6	0.50	9023984
Acid Extractable Beryllium (Be)	ug/g	<0.20	9023984	<0.20	9023984	<0.20	9023984	<0.20	0.20	9023984
Acid Extractable Boron (B)	ug/g	<5.0	9023984	<5.0	9023984	<5.0	9023984	<5.0	5.0	9023984
Acid Extractable Cadmium (Cd)	ug/g	<0.10	9023984	<0.10	9023984	<0.10	9023984	<0.10	0.10	9023984
Acid Extractable Chromium (Cr)	ug/g	6.8	9023984	6.7	9023984	6.9	9023984	8.5	1.0	9023984
Acid Extractable Cobalt (Co)	ug/g	1.5	9023984	2.1	9023984	1.8	9023984	1.9	0.10	9023984
Acid Extractable Copper (Cu)	ug/g	2.5	9023984	3.6	9023984	2.7	9023984	2.4	0.50	9023984
Acid Extractable Lead (Pb)	ug/g	<1.0	9023984	1.2	9023984	<1.0	9023984	<1.0	1.0	9023984
Acid Extractable Molybdenum (Mo)	ug/g	<0.50	9023984	<0.50	9023984	<0.50	9023984	<0.50	0.50	9023984
Acid Extractable Nickel (Ni)	ug/g	3.1	9023984	3.9	9023984	3.7	9023984	3.9	0.50	9023984
Acid Extractable Selenium (Se)	ug/g	<0.50	9023984	<0.50	9023984	<0.50	9023984	<0.50	0.50	9023984
Acid Extractable Silver (Ag)	ug/g	<0.20	9023984	<0.20	9023984	<0.20	9023984	<0.20	0.20	9023984
Acid Extractable Thallium (Tl)	ug/g	<0.050	9023984	<0.050	9023984	<0.050	9023984	<0.050	0.050	9023984
Acid Extractable Uranium (U)	ug/g	0.27	9023984	0.22	9023984	0.27	9023984	0.25	0.050	9023984
Acid Extractable Vanadium (V)	ug/g	26	9023984	18	9023984	24	9023984	31	5.0	9023984
Acid Extractable Zinc (Zn)	ug/g	7.1	9023984	10	9023984	12	9023984	13	5.0	9023984
Acid Extractable Mercury (Hg)	ug/g	<0.050	9023984	<0.050	9023984	<0.050	9023984	<0.050	0.050	9023984

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Sodium was not detected. To report SAR the sodium detection limit was used in the calculation. This value represents a maximum ratio.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

O.REG 153 PAHS (SOIL)

Bureau Veritas ID		XLG748	XLG750	XLG752	XLG766		
Sampling Date		2023/10/23 15:50	2023/10/23 11:15	2023/10/26 11:00	2023/10/23 11:35		
COC Number		n/a	n/a	n/a	n/a		
	UNITS	BH2A2 SS2	BH3A2 SS1	BH5 SS2	BH3A2 SS2	RDL	QC Batch
Calculated Parameters							
Methylnaphthalene, 2-(1-)	ug/g	<0.0071	<0.0071	<0.0071	<0.0071	0.0071	9017101
Polyaromatic Hydrocarbons							
Acenaphthene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	9027312
Acenaphthylene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	9027312
Anthracene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	9027312
Benzo(a)anthracene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	9027312
Benzo(a)pyrene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	9027312
Benzo(b/j)fluoranthene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	9027312
Benzo(g,h,i)perylene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	9027312
Benzo(k)fluoranthene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	9027312
Chrysene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	9027312
Dibenzo(a,h)anthracene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	9027312
Fluoranthene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	9027312
Fluorene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	9027312
Indeno(1,2,3-cd)pyrene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	9027312
1-Methylnaphthalene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	9027312
2-Methylnaphthalene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	9027312
Naphthalene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	9027312
Phenanthrene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	9027312
Pyrene	ug/g	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	9027312
Surrogate Recovery (%)							
D10-Anthracene	%	115	111	122	111		9027312
D14-Terphenyl (FS)	%	102	111	105	100		9027312
D8-Acenaphthylene	%	86	93	82	74		9027312

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

O.REG 153 PHCS, BTEX/F1-F4 (SOIL)

Bureau Veritas ID		XLG748			XLG754	XLG754		
Sampling Date		2023/10/23 15:50			2023/10/26 13:45	2023/10/26 13:45		
COC Number		n/a			n/a	n/a		
	UNITS	BH2A2 SS2	RDL	QC Batch	BH7 SS2	BH7 SS2 Lab-Dup	RDL	QC Batch
BTEX & F1 Hydrocarbons								
Benzene	ug/g	<0.020	0.020	9020343				
Toluene	ug/g	<0.020	0.020	9020343				
Ethylbenzene	ug/g	<0.020	0.020	9020343				
o-Xylene	ug/g	<0.020	0.020	9020343				
p+m-Xylene	ug/g	<0.040	0.040	9020343				
Total Xylenes	ug/g	<0.040	0.040	9020343				
F1 (C6-C10)	ug/g	<10	10	9020343				
F1 (C6-C10) - BTEX	ug/g	<10	10	9020343				
F2-F4 Hydrocarbons								
F2 (C10-C16 Hydrocarbons)	ug/g	<10	10	9027211	<10	<10	10	9027211
F3 (C16-C34 Hydrocarbons)	ug/g	<50	50	9027211	<50	<50	50	9027211
F4 (C34-C50 Hydrocarbons)	ug/g	<50	50	9027211	<50	<50	50	9027211
Reached Baseline at C50	ug/g	Yes		9027211	Yes	Yes		9027211
Surrogate Recovery (%)								
1,4-Difluorobenzene	%	98		9020343				
4-Bromofluorobenzene	%	104		9020343				
D10-o-Xylene	%	97		9020343				
D4-1,2-Dichloroethane	%	87		9020343				
o-Terphenyl	%	88		9027211	89	87		9027211

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

O.REG 153 VOCS BY HS & F1-F4 (SOIL)

Bureau Veritas ID		XLG747	XLG749	XLG753	XLG757		
Sampling Date		2023/10/24 15:45	2023/10/24 08:55	2023/10/26 11:35	2023/10/24 13:20		
COC Number		n/a	n/a	n/a	n/a		
	UNITS	BH1 SS3	BH2A2 SS7	BH5 SS5	BH10 SS3	RDL	QC Batch
Calculated Parameters							
1,3-Dichloropropene (cis+trans)	ug/g	<0.050	<0.050	<0.050	<0.050	0.050	9019122
Volatile Organics							
Acetone (2-Propanone)	ug/g	<0.49	<0.49	<0.49	<0.49	0.49	9021193
Benzene	ug/g	<0.0060	<0.0060	<0.0060	<0.0060	0.0060	9021193
Bromodichloromethane	ug/g	<0.040	<0.040	<0.040	<0.040	0.040	9021193
Bromoform	ug/g	<0.040	<0.040	<0.040	<0.040	0.040	9021193
Bromomethane	ug/g	<0.040	<0.040	<0.040	<0.040	0.040	9021193
Carbon Tetrachloride	ug/g	<0.040	<0.040	<0.040	<0.040	0.040	9021193
Chlorobenzene	ug/g	<0.040	<0.040	<0.040	<0.040	0.040	9021193
Chloroform	ug/g	<0.040	<0.040	<0.040	<0.040	0.040	9021193
Dibromochloromethane	ug/g	<0.040	<0.040	<0.040	<0.040	0.040	9021193
1,2-Dichlorobenzene	ug/g	<0.040	<0.040	<0.040	<0.040	0.040	9021193
1,3-Dichlorobenzene	ug/g	<0.040	<0.040	<0.040	<0.040	0.040	9021193
1,4-Dichlorobenzene	ug/g	<0.040	<0.040	<0.040	<0.040	0.040	9021193
Dichlorodifluoromethane (FREON 12)	ug/g	<0.040	<0.040	<0.040	<0.040	0.040	9021193
1,1-Dichloroethane	ug/g	<0.040	<0.040	<0.040	<0.040	0.040	9021193
1,2-Dichloroethane	ug/g	<0.049	<0.049	<0.049	<0.049	0.049	9021193
1,1-Dichloroethylene	ug/g	<0.040	<0.040	<0.040	<0.040	0.040	9021193
cis-1,2-Dichloroethylene	ug/g	<0.040	<0.040	<0.040	<0.040	0.040	9021193
trans-1,2-Dichloroethylene	ug/g	<0.040	<0.040	<0.040	<0.040	0.040	9021193
1,2-Dichloropropane	ug/g	<0.040	<0.040	<0.040	<0.040	0.040	9021193
cis-1,3-Dichloropropene	ug/g	<0.030	<0.030	<0.030	<0.030	0.030	9021193
trans-1,3-Dichloropropene	ug/g	<0.040	<0.040	<0.040	<0.040	0.040	9021193
Ethylbenzene	ug/g	<0.010	<0.010	<0.010	<0.010	0.010	9021193
Ethylene Dibromide	ug/g	<0.040	<0.040	<0.040	<0.040	0.040	9021193
Hexane	ug/g	<0.040	<0.040	<0.040	<0.040	0.040	9021193
Methylene Chloride(Dichloromethane)	ug/g	<0.049	<0.049	<0.049	<0.049	0.049	9021193
Methyl Ethyl Ketone (2-Butanone)	ug/g	<0.40	<0.40	<0.40	<0.40	0.40	9021193
Methyl Isobutyl Ketone	ug/g	<0.40	<0.40	<0.40	<0.40	0.40	9021193
Methyl t-butyl ether (MTBE)	ug/g	<0.040	<0.040	<0.040	<0.040	0.040	9021193
Styrene	ug/g	<0.040	<0.040	<0.040	<0.040	0.040	9021193

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

O.REG 153 VOCS BY HS & F1-F4 (SOIL)

Bureau Veritas ID		XLG747	XLG749	XLG753	XLG757		
Sampling Date		2023/10/24 15:45	2023/10/24 08:55	2023/10/26 11:35	2023/10/24 13:20		
COC Number		n/a	n/a	n/a	n/a		
	UNITS	BH1 SS3	BH2A2 SS7	BH5 SS5	BH10 SS3	RDL	QC Batch
1,1,1,2-Tetrachloroethane	ug/g	<0.040	<0.040	<0.040	<0.040	0.040	9021193
1,1,2,2-Tetrachloroethane	ug/g	<0.040	<0.040	<0.040	<0.040	0.040	9021193
Tetrachloroethylene	ug/g	<0.040	<0.040	<0.040	<0.040	0.040	9021193
Toluene	ug/g	<0.020	<0.020	<0.020	<0.020	0.020	9021193
1,1,1-Trichloroethane	ug/g	<0.040	<0.040	<0.040	<0.040	0.040	9021193
1,1,2-Trichloroethane	ug/g	<0.040	<0.040	<0.040	<0.040	0.040	9021193
Trichloroethylene	ug/g	<0.010	<0.010	<0.010	<0.010	0.010	9021193
Trichlorofluoromethane (FREON 11)	ug/g	<0.040	<0.040	<0.040	<0.040	0.040	9021193
Vinyl Chloride	ug/g	<0.019	<0.019	<0.019	<0.019	0.019	9021193
p+m-Xylene	ug/g	<0.020	<0.020	<0.020	<0.020	0.020	9021193
o-Xylene	ug/g	<0.020	<0.020	<0.020	<0.020	0.020	9021193
Total Xylenes	ug/g	<0.020	<0.020	<0.020	<0.020	0.020	9021193
F1 (C6-C10)	ug/g	<10	<10	<10	<10	10	9021193
F1 (C6-C10) - BTEX	ug/g	<10	<10	<10	<10	10	9021193
F2-F4 Hydrocarbons							
F2 (C10-C16 Hydrocarbons)	ug/g	<10	<10	<10	<10	10	9027211
F3 (C16-C34 Hydrocarbons)	ug/g	<50	<50	<50	<50	50	9027211
F4 (C34-C50 Hydrocarbons)	ug/g	<50	<50	<50	<50	50	9027211
Reached Baseline at C50	ug/g	Yes	Yes	Yes	Yes		9027211
Surrogate Recovery (%)							
o-Terphenyl	%	89	89	91	89		9027211
4-Bromofluorobenzene	%	92	92	92	92		9021193
D10-o-Xylene	%	94	90	93	90		9021193
D4-1,2-Dichloroethane	%	103	103	101	103		9021193
D8-Toluene	%	97	97	98	98		9021193

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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O.REG 153 VOCS BY HS (SOIL)

Bureau Veritas ID		XLG751	XLG755		
Sampling Date		2023/10/23 12:45	2023/10/26 14:10		
COC Number		n/a	n/a		
	UNITS	BH3A2 SS5	BH7 SS6	RDL	QC Batch
Calculated Parameters					
1,3-Dichloropropene (cis+trans)	ug/g	<0.050	<0.050	0.050	9019122
Volatile Organics					
Acetone (2-Propanone)	ug/g	<0.49	<0.49	0.49	9020877
Benzene	ug/g	<0.0060	<0.0060	0.0060	9020877
Bromodichloromethane	ug/g	<0.040	<0.040	0.040	9020877
Bromoform	ug/g	<0.040	<0.040	0.040	9020877
Bromomethane	ug/g	<0.040	<0.040	0.040	9020877
Carbon Tetrachloride	ug/g	<0.040	<0.040	0.040	9020877
Chlorobenzene	ug/g	<0.040	<0.040	0.040	9020877
Chloroform	ug/g	<0.040	<0.040	0.040	9020877
Dibromochloromethane	ug/g	<0.040	<0.040	0.040	9020877
1,2-Dichlorobenzene	ug/g	<0.040	<0.040	0.040	9020877
1,3-Dichlorobenzene	ug/g	<0.040	<0.040	0.040	9020877
1,4-Dichlorobenzene	ug/g	<0.040	<0.040	0.040	9020877
Dichlorodifluoromethane (FREON 12)	ug/g	<0.040	<0.040	0.040	9020877
1,1-Dichloroethane	ug/g	<0.040	<0.040	0.040	9020877
1,2-Dichloroethane	ug/g	<0.049	<0.049	0.049	9020877
1,1-Dichloroethylene	ug/g	<0.040	<0.040	0.040	9020877
cis-1,2-Dichloroethylene	ug/g	<0.040	<0.040	0.040	9020877
trans-1,2-Dichloroethylene	ug/g	<0.040	<0.040	0.040	9020877
1,2-Dichloropropane	ug/g	<0.040	<0.040	0.040	9020877
cis-1,3-Dichloropropene	ug/g	<0.030	<0.030	0.030	9020877
trans-1,3-Dichloropropene	ug/g	<0.040	<0.040	0.040	9020877
Ethylbenzene	ug/g	<0.010	<0.010	0.010	9020877
Ethylene Dibromide	ug/g	<0.040	<0.040	0.040	9020877
Hexane	ug/g	<0.040	<0.040	0.040	9020877
Methylene Chloride(Dichloromethane)	ug/g	<0.049	<0.049	0.049	9020877
Methyl Ethyl Ketone (2-Butanone)	ug/g	<0.40	<0.40	0.40	9020877
Methyl Isobutyl Ketone	ug/g	<0.40	<0.40	0.40	9020877
Methyl t-butyl ether (MTBE)	ug/g	<0.040	<0.040	0.040	9020877
Styrene	ug/g	<0.040	<0.040	0.040	9020877

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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O.REG 153 VOCS BY HS (SOIL)

Bureau Veritas ID		XLG751	XLG755		
Sampling Date		2023/10/23 12:45	2023/10/26 14:10		
COC Number		n/a	n/a		
	UNITS	BH3A2 SS5	BH7 SS6	RDL	QC Batch
1,1,1,2-Tetrachloroethane	ug/g	<0.040	<0.040	0.040	9020877
1,1,2,2-Tetrachloroethane	ug/g	<0.040	<0.040	0.040	9020877
Tetrachloroethylene	ug/g	<0.040	<0.040	0.040	9020877
Toluene	ug/g	<0.020	<0.020	0.020	9020877
1,1,1-Trichloroethane	ug/g	<0.040	<0.040	0.040	9020877
1,1,2-Trichloroethane	ug/g	<0.040	<0.040	0.040	9020877
Trichloroethylene	ug/g	<0.010	<0.010	0.010	9020877
Trichlorofluoromethane (FREON 11)	ug/g	<0.040	<0.040	0.040	9020877
Vinyl Chloride	ug/g	<0.019	<0.019	0.019	9020877
p+m-Xylene	ug/g	<0.020	<0.020	0.020	9020877
o-Xylene	ug/g	<0.020	<0.020	0.020	9020877
Total Xylenes	ug/g	<0.020	<0.020	0.020	9020877
Surrogate Recovery (%)					
4-Bromofluorobenzene	%	107	106		9020877
D10-o-Xylene	%	87	86		9020877
D4-1,2-Dichloroethane	%	107	107		9020877
D8-Toluene	%	91	91		9020877

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C3X8689
Report Date: 2023/11/07

Stantec Consulting Ltd
Client Project #: 140022038.801.200
Site Location: 1975 MUSKOKA BEACG RD,BRACEBRIDGE
Sampler Initials: MK

RESULTS OF ANALYSES OF SOIL

Bureau Veritas ID		XLG746	XLG746		XLG747	XLG748	XLG749	XLG750		
Sampling Date		2023/10/24 15:00	2023/10/24 15:00		2023/10/24 15:45	2023/10/23 15:50	2023/10/24 08:55	2023/10/23 11:15		
COC Number		n/a	n/a		n/a	n/a	n/a	n/a		
	UNITS	BH1 SS2	BH1 SS2 Lab-Dup	QC Batch	BH1 SS3	BH2A2 SS2	BH2A2 SS7	BH3A2 SS1	RDL	QC Batch
Inorganics										
Moisture	%	8.9	9.7	9020971	22	16	7.2	13	1.0	9020752

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Bureau Veritas ID		XLG751	XLG751		XLG752	XLG753	XLG754		
Sampling Date		2023/10/23 12:45	2023/10/23 12:45		2023/10/26 11:00	2023/10/26 11:35	2023/10/26 13:45		
COC Number		n/a	n/a		n/a	n/a	n/a		
	UNITS	BH3A2 SS5	BH3A2 SS5 Lab-Dup	QC Batch	BH5 SS2	BH5 SS5	BH7 SS2	RDL	QC Batch
Inorganics									
Moisture	%	2.8	2.8	9021300	6.1	20	9.8	1.0	9020752

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Bureau Veritas ID		XLG755	XLG755		XLG756		XLG757	XLG766		
Sampling Date		2023/10/26 14:10	2023/10/26 14:10		2023/10/24 12:10		2023/10/24 13:20	2023/10/23 11:35		
COC Number		n/a	n/a		n/a		n/a	n/a		
	UNITS	BH7 SS6	BH7 SS6 Lab-Dup	QC Batch	BH10 SS1	QC Batch	BH10 SS3	BH3A2 SS2	RDL	QC Batch
Inorganics										
Moisture	%	16	16	9020052	6.7	9021574	19	7.6	1.0	9020752

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C3X8689
Report Date: 2023/11/07

Stantec Consulting Ltd
Client Project #: 140022038.801.200
Site Location: 1975 MUSKOKA BEACG RD,BRACEBRIDGE
Sampler Initials: MK

RESULTS OF ANALYSES OF SOIL

Bureau Veritas ID		XLG767		
Sampling Date		2023/10/23		
COC Number		n/a		
	UNITS	QC-01	RDL	QC Batch
Inorganics				
Moisture	%	6.3	1.0	9021574

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

TEST SUMMARY

Bureau Veritas ID: XLG746
Sample ID: BH1 SS2
Matrix: Soil

Collected: 2023/10/24
Shipped:
Received: 2023/10/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	9025089	2023/11/02	2023/11/03	Jolly John
Free (WAD) Cyanide	TECH	9026168	2023/11/03	2023/11/03	Prgya Panchal
Conductivity	AT	9023381	2023/11/02	2023/11/02	Leily Karimi
Hexavalent Chromium in Soil by IC	IC/SPEC	9024558	2023/11/02	2023/11/03	Harpuneet Kaur
Acid Extractable Metals by ICPMS	ICP/MS	9024596	2023/11/02	2023/11/03	Prempal Bhatti
Moisture	BAL	9020971	N/A	2023/11/01	Muhammad Chhaidan
pH CaCl2 EXTRACT	AT	9024090	2023/11/02	2023/11/02	Gurparteek KAUR
Sodium Adsorption Ratio (SAR)	CALC/MET	9018931	N/A	2023/11/02	Automated Statchk

Bureau Veritas ID: XLG746 Dup
Sample ID: BH1 SS2
Matrix: Soil

Collected: 2023/10/24
Shipped:
Received: 2023/10/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	9020971	N/A	2023/11/01	Muhammad Chhaidan

Bureau Veritas ID: XLG747
Sample ID: BH1 SS3
Matrix: Soil

Collected: 2023/10/24
Shipped:
Received: 2023/10/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	9019122	N/A	2023/11/04	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	9027211	2023/11/03	2023/11/05	(Kent) Maolin Li
Moisture	BAL	9020752	N/A	2023/11/01	Joe Thomas
Volatile Organic Compounds and F1 PHCs	GC/MSFD	9021193	N/A	2023/11/04	Dina Wang

Bureau Veritas ID: XLG748
Sample ID: BH2A2 SS2
Matrix: Soil

Collected: 2023/10/23
Shipped:
Received: 2023/10/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	9017101	N/A	2023/11/06	Automated Statchk
Hot Water Extractable Boron	ICP	9025089	2023/11/02	2023/11/03	Jolly John
Free (WAD) Cyanide	TECH	9023313	2023/11/02	2023/11/02	Jency Sara Johnson
Conductivity	AT	9023381	2023/11/02	2023/11/02	Leily Karimi
Hexavalent Chromium in Soil by IC	IC/SPEC	9026382	2023/11/03	2023/11/06	Lusine Khachatryan
Petroleum Hydro. CCME F1 & BTEX in Soil	HSGC/MSFD	9020343	N/A	2023/11/01	Domnica Andronescu
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	9027211	2023/11/03	2023/11/05	(Kent) Maolin Li
Acid Extractable Metals by ICPMS	ICP/MS	9024596	2023/11/02	2023/11/03	Prempal Bhatti
Moisture	BAL	9020752	N/A	2023/11/01	Joe Thomas
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	9027312	2023/11/03	2023/11/04	Mitesh Raj
pH CaCl2 EXTRACT	AT	9024624	2023/11/02	2023/11/02	Gurparteek KAUR
Sodium Adsorption Ratio (SAR)	CALC/MET	9018931	N/A	2023/11/02	Automated Statchk

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TEST SUMMARY

Bureau Veritas ID: XLG748 Dup
Sample ID: BH2A2 SS2
Matrix: Soil
Collected: 2023/10/23
Shipped:
Received: 2023/10/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Acid Extractable Metals by ICPMS	ICP/MS	9024596	2023/11/02	2023/11/03	Prempal Bhatti

Bureau Veritas ID: XLG749
Sample ID: BH2A2 SS7
Matrix: Soil
Collected: 2023/10/24
Shipped:
Received: 2023/10/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	9019122	N/A	2023/11/04	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	9027211	2023/11/03	2023/11/06	(Kent) Maolin Li
Moisture	BAL	9020752	N/A	2023/11/01	Joe Thomas
Volatile Organic Compounds and F1 PHCs	GC/MSFD	9021193	N/A	2023/11/04	Dina Wang

Bureau Veritas ID: XLG750
Sample ID: BH3A2 SS1
Matrix: Soil
Collected: 2023/10/23
Shipped:
Received: 2023/10/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	9017101	N/A	2023/11/06	Automated Statchk
Moisture	BAL	9020752	N/A	2023/11/01	Joe Thomas
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	9027312	2023/11/03	2023/11/04	Mitesh Raj

Bureau Veritas ID: XLG751
Sample ID: BH3A2 SS5
Matrix: Soil
Collected: 2023/10/23
Shipped:
Received: 2023/10/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	9019122	N/A	2023/11/04	Automated Statchk
Moisture	BAL	9021300	N/A	2023/11/01	Joe Thomas
Volatile Organic Compounds in Soil	GC/MS	9020877	N/A	2023/11/03	Manpreet Sarao

Bureau Veritas ID: XLG751 Dup
Sample ID: BH3A2 SS5
Matrix: Soil
Collected: 2023/10/23
Shipped:
Received: 2023/10/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	9021300	N/A	2023/11/01	Joe Thomas

Bureau Veritas ID: XLG752
Sample ID: BH5 SS2
Matrix: Soil
Collected: 2023/10/26
Shipped:
Received: 2023/10/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	9017101	N/A	2023/11/06	Automated Statchk
Hot Water Extractable Boron	ICP	9024986	2023/11/02	2023/11/03	Jolly John
Free (WAD) Cyanide	TECH	9023744	2023/11/02	2023/11/03	Prgya Panchal

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TEST SUMMARY

Bureau Veritas ID: XLG752
Sample ID: BH5 SS2
Matrix: Soil

Collected: 2023/10/26
Shipped:
Received: 2023/10/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Conductivity	AT	9026931	2023/11/03	2023/11/03	Leily Karimi
Hexavalent Chromium in Soil by IC	IC/SPEC	9026403	2023/11/03	2023/11/04	Sousan Besharatlou
Acid Extractable Metals by ICPMS	ICP/MS	9023984	2023/11/02	2023/11/03	Prempal Bhatti
Moisture	BAL	9020752	N/A	2023/11/01	Joe Thomas
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	9027312	2023/11/03	2023/11/04	Mitesh Raj
pH CaCl2 EXTRACT	AT	9026654	2023/11/03	2023/11/03	Gurparteek KAUR
Sodium Adsorption Ratio (SAR)	CALC/MET	9018931	N/A	2023/11/06	Automated Statchk

Bureau Veritas ID: XLG753
Sample ID: BH5 SS5
Matrix: Soil

Collected: 2023/10/26
Shipped:
Received: 2023/10/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	9019122	N/A	2023/11/04	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	9027211	2023/11/03	2023/11/06	(Kent) Maolin Li
Moisture	BAL	9020752	N/A	2023/11/01	Joe Thomas
Volatile Organic Compounds and F1 PHCs	GC/MSFD	9021193	N/A	2023/11/04	Dina Wang

Bureau Veritas ID: XLG754
Sample ID: BH7 SS2
Matrix: Soil

Collected: 2023/10/26
Shipped:
Received: 2023/10/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	9024986	2023/11/02	2023/11/03	Jolly John
Free (WAD) Cyanide	TECH	9023744	2023/11/02	2023/11/03	Prgya Panchal
Conductivity	AT	9026931	2023/11/03	2023/11/03	Leily Karimi
Hexavalent Chromium in Soil by IC	IC/SPEC	9026403	2023/11/03	2023/11/04	Sousan Besharatlou
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	9027211	2023/11/03	2023/11/06	(Kent) Maolin Li
Acid Extractable Metals by ICPMS	ICP/MS	9023984	2023/11/02	2023/11/03	Prempal Bhatti
Moisture	BAL	9020752	N/A	2023/11/01	Joe Thomas
pH CaCl2 EXTRACT	AT	9026654	2023/11/03	2023/11/03	Gurparteek KAUR
Sodium Adsorption Ratio (SAR)	CALC/MET	9019077	N/A	2023/11/06	Automated Statchk

Bureau Veritas ID: XLG754 Dup
Sample ID: BH7 SS2
Matrix: Soil

Collected: 2023/10/26
Shipped:
Received: 2023/10/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	9027211	2023/11/03	2023/11/06	(Kent) Maolin Li

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

TEST SUMMARY

Bureau Veritas ID: XLG755
Sample ID: BH7 SS6
Matrix: Soil
Collected: 2023/10/26
Shipped:
Received: 2023/10/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	9019122	N/A	2023/11/04	Automated Statchk
Moisture	BAL	9020052	N/A	2023/10/31	Nisargsinh Takhatsinh Parihar
Volatile Organic Compounds in Soil	GC/MS	9020877	N/A	2023/11/03	Manpreet Sarao

Bureau Veritas ID: XLG755 Dup
Sample ID: BH7 SS6
Matrix: Soil
Collected: 2023/10/26
Shipped:
Received: 2023/10/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Moisture	BAL	9020052	N/A	2023/10/31	Nisargsinh Takhatsinh Parihar

Bureau Veritas ID: XLG756
Sample ID: BH10 SS1
Matrix: Soil
Collected: 2023/10/24
Shipped:
Received: 2023/10/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	9024986	2023/11/02	2023/11/03	Jolly John
Free (WAD) Cyanide	TECH	9023313	2023/11/02	2023/11/02	Jency Sara Johnson
Conductivity	AT	9026931	2023/11/03	2023/11/03	Leily Karimi
Hexavalent Chromium in Soil by IC	IC/SPEC	9026382	2023/11/03	2023/11/06	Lusine Khachatryan
Acid Extractable Metals by ICPMS	ICP/MS	9023984	2023/11/02	2023/11/03	Prempal Bhatti
Moisture	BAL	9021574	N/A	2023/11/01	Joe Thomas
pH CaCl2 EXTRACT	AT	9026694	2023/11/03	2023/11/03	Gurparteek KAUR
Sodium Adsorption Ratio (SAR)	CALC/MET	9018931	N/A	2023/11/06	Automated Statchk

Bureau Veritas ID: XLG757
Sample ID: BH10 SS3
Matrix: Soil
Collected: 2023/10/24
Shipped:
Received: 2023/10/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	9019122	N/A	2023/11/04	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	9027211	2023/11/03	2023/11/06	(Kent) Maolin Li
Moisture	BAL	9020752	N/A	2023/11/01	Joe Thomas
Volatile Organic Compounds and F1 PHCs	GC/MSFD	9021193	N/A	2023/11/04	Dina Wang

Bureau Veritas ID: XLG766
Sample ID: BH3A2 SS2
Matrix: Soil
Collected: 2023/10/23
Shipped:
Received: 2023/10/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	9017101	N/A	2023/11/06	Automated Statchk
Moisture	BAL	9020752	N/A	2023/11/01	Joe Thomas
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	9027312	2023/11/03	2023/11/04	Mitesh Raj

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C3X8689
Report Date: 2023/11/07

Stantec Consulting Ltd
Client Project #: 140022038.801.200
Site Location: 1975 MUSKOKA BEACG RD,BRACEBRIDGE
Sampler Initials: MK

TEST SUMMARY

Bureau Veritas ID: XLG767
Sample ID: QC-01
Matrix: Soil

Collected: 2023/10/23
Shipped:
Received: 2023/10/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Hot Water Extractable Boron	ICP	9024986	2023/11/02	2023/11/03	Jolly John
Free (WAD) Cyanide	TECH	9023313	2023/11/02	2023/11/02	Jency Sara Johnson
Conductivity	AT	9026931	2023/11/03	2023/11/03	Leily Karimi
Hexavalent Chromium in Soil by IC	IC/SPEC	9026382	2023/11/03	2023/11/06	Lusine Khachatryan
Acid Extractable Metals by ICPMS	ICP/MS	9023984	2023/11/02	2023/11/03	Prempal Bhatti
Moisture	BAL	9021574	N/A	2023/11/01	Joe Thomas
pH CaCl2 EXTRACT	AT	9024624	2023/11/02	2023/11/02	Gurparteek KAUR
Sodium Adsorption Ratio (SAR)	CALC/MET	9018931	N/A	2023/11/06	Automated Statchk

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.0°C

Sample XLG748 [BH2A2 SS2] : F1/BTEX analysis: Soil weight exceeds the protocol specification of approximately 5g in the field preserved vial. Additional methanol was added to the vial to ensure extraction efficiency
SAR Analysis: NC = Not Calculable as Calcium and Magnesium were not detected.

Sample XLG755 [BH7 SS6] : VOC Analysis: Soil weight exceeds the protocol specification of approximately 5g in the field preserved vial. Additional methanol was added to the vial to ensure extraction efficiency.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9020343	1,4-Difluorobenzene	2023/11/01	93	60 - 140	97	60 - 140	96	%		
9020343	4-Bromofluorobenzene	2023/11/01	106	60 - 140	106	60 - 140	111	%		
9020343	D10-o-Xylene	2023/11/01	100	60 - 140	95	60 - 140	97	%		
9020343	D4-1,2-Dichloroethane	2023/11/01	86	60 - 140	87	60 - 140	84	%		
9020877	4-Bromofluorobenzene	2023/11/03	111	60 - 140	109	60 - 140	108	%		
9020877	D10-o-Xylene	2023/11/03	105	60 - 130	88	60 - 130	79	%		
9020877	D4-1,2-Dichloroethane	2023/11/03	98	60 - 140	101	60 - 140	107	%		
9020877	D8-Toluene	2023/11/03	111	60 - 140	101	60 - 140	88	%		
9021193	4-Bromofluorobenzene	2023/11/03	96	60 - 140	96	60 - 140	93	%		
9021193	D10-o-Xylene	2023/11/03	113	60 - 130	96	60 - 130	91	%		
9021193	D4-1,2-Dichloroethane	2023/11/03	97	60 - 140	99	60 - 140	98	%		
9021193	D8-Toluene	2023/11/03	106	60 - 140	106	60 - 140	98	%		
9027211	o-Terphenyl	2023/11/05	84	60 - 130	86	60 - 130	92	%		
9027312	D10-Anthracene	2023/11/04	98	50 - 130	97	50 - 130	122	%		
9027312	D14-Terphenyl (FS)	2023/11/04	102	50 - 130	95	50 - 130	106	%		
9027312	D8-Acenaphthylene	2023/11/04	89	50 - 130	84	50 - 130	85	%		
9020052	Moisture	2023/10/31							5.0	20
9020343	Benzene	2023/11/01	80	50 - 140	85	50 - 140	<0.020	ug/g	NC	50
9020343	Ethylbenzene	2023/11/01	89	50 - 140	95	50 - 140	<0.020	ug/g	NC	50
9020343	F1 (C6-C10) - BTEX	2023/11/01					<10	ug/g	0.77	30
9020343	F1 (C6-C10)	2023/11/01	NC	60 - 140	96	80 - 120	<10	ug/g	0.77	30
9020343	o-Xylene	2023/11/01	88	50 - 140	89	50 - 140	<0.020	ug/g	NC	50
9020343	p+m-Xylene	2023/11/01	83	50 - 140	93	50 - 140	<0.040	ug/g	NC	50
9020343	Toluene	2023/11/01	79	50 - 140	85	50 - 140	<0.020	ug/g	NC	50
9020343	Total Xylenes	2023/11/01					<0.040	ug/g	NC	50
9020752	Moisture	2023/11/01							0	20
9020877	1,1,1,2-Tetrachloroethane	2023/11/03	106	60 - 140	99	60 - 130	<0.040	ug/g	NC	50
9020877	1,1,1-Trichloroethane	2023/11/03	109	60 - 140	101	60 - 130	<0.040	ug/g	NC	50
9020877	1,1,2,2-Tetrachloroethane	2023/11/03	112	60 - 140	92	60 - 130	<0.040	ug/g	NC	50
9020877	1,1,2-Trichloroethane	2023/11/03	90	60 - 140	88	60 - 130	<0.040	ug/g	NC	50
9020877	1,1-Dichloroethane	2023/11/03	87	60 - 140	91	60 - 130	<0.040	ug/g	NC	50

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9020877	1,1-Dichloroethylene	2023/11/03	96	60 - 140	91	60 - 130	<0.040	ug/g	NC	50
9020877	1,2-Dichlorobenzene	2023/11/03	102	60 - 140	93	60 - 130	<0.040	ug/g	NC	50
9020877	1,2-Dichloroethane	2023/11/03	95	60 - 140	92	60 - 130	<0.049	ug/g	NC	50
9020877	1,2-Dichloropropane	2023/11/03	99	60 - 140	86	60 - 130	<0.040	ug/g	NC	50
9020877	1,3-Dichlorobenzene	2023/11/03	107	60 - 140	96	60 - 130	<0.040	ug/g	NC	50
9020877	1,4-Dichlorobenzene	2023/11/03	120	60 - 140	109	60 - 130	<0.040	ug/g	NC	50
9020877	Acetone (2-Propanone)	2023/11/03	80	60 - 140	89	60 - 140	<0.49	ug/g	NC	50
9020877	Benzene	2023/11/03	95	60 - 140	86	60 - 130	<0.0060	ug/g	NC	50
9020877	Bromodichloromethane	2023/11/03	107	60 - 140	102	60 - 130	<0.040	ug/g	NC	50
9020877	Bromoform	2023/11/03	94	60 - 140	93	60 - 130	<0.040	ug/g	NC	50
9020877	Bromomethane	2023/11/03	105	60 - 140	91	60 - 140	<0.040	ug/g	NC	50
9020877	Carbon Tetrachloride	2023/11/03	108	60 - 140	101	60 - 130	<0.040	ug/g	NC	50
9020877	Chlorobenzene	2023/11/03	104	60 - 140	99	60 - 130	<0.040	ug/g	NC	50
9020877	Chloroform	2023/11/03	107	60 - 140	99	60 - 130	<0.040	ug/g	NC	50
9020877	cis-1,2-Dichloroethylene	2023/11/03	104	60 - 140	97	60 - 130	<0.040	ug/g	NC	50
9020877	cis-1,3-Dichloropropene	2023/11/03	90	60 - 140	91	60 - 130	<0.030	ug/g	NC	50
9020877	Dibromochloromethane	2023/11/03	96	60 - 140	95	60 - 130	<0.040	ug/g	NC	50
9020877	Dichlorodifluoromethane (FREON 12)	2023/11/03	108	60 - 140	79	60 - 140	<0.040	ug/g	NC	50
9020877	Ethylbenzene	2023/11/03	92	60 - 140	86	60 - 130	<0.010	ug/g	NC	50
9020877	Ethylene Dibromide	2023/11/03	93	60 - 140	94	60 - 130	<0.040	ug/g	NC	50
9020877	Hexane	2023/11/03	85	60 - 140	86	60 - 130	<0.040	ug/g	NC	50
9020877	Methyl Ethyl Ketone (2-Butanone)	2023/11/03	94	60 - 140	89	60 - 140	<0.40	ug/g	NC	50
9020877	Methyl Isobutyl Ketone	2023/11/03	85	60 - 140	91	60 - 130	<0.40	ug/g	NC	50
9020877	Methyl t-butyl ether (MTBE)	2023/11/03	88	60 - 140	99	60 - 130	<0.040	ug/g	NC	50
9020877	Methylene Chloride(Dichloromethane)	2023/11/03	95	60 - 140	104	60 - 130	<0.049	ug/g	NC	50
9020877	o-Xylene	2023/11/03	88	60 - 140	83	60 - 130	<0.020	ug/g	NC	50
9020877	p+m-Xylene	2023/11/03	106	60 - 140	98	60 - 130	<0.020	ug/g	NC	50
9020877	Styrene	2023/11/03	114	60 - 140	108	60 - 130	<0.040	ug/g	NC	50
9020877	Tetrachloroethylene	2023/11/03	110	60 - 140	100	60 - 130	<0.040	ug/g	NC	50
9020877	Toluene	2023/11/03	95	60 - 140	89	60 - 130	<0.020	ug/g	NC	50
9020877	Total Xylenes	2023/11/03					<0.020	ug/g	NC	50

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9020877	trans-1,2-Dichloroethylene	2023/11/03	91	60 - 140	96	60 - 130	<0.040	ug/g	NC	50
9020877	trans-1,3-Dichloropropene	2023/11/03	90	60 - 140	85	60 - 130	<0.040	ug/g	NC	50
9020877	Trichloroethylene	2023/11/03	107	60 - 140	103	60 - 130	<0.010	ug/g	NC	50
9020877	Trichlorofluoromethane (FREON 11)	2023/11/03	111	60 - 140	100	60 - 130	<0.040	ug/g	NC	50
9020877	Vinyl Chloride	2023/11/03	102	60 - 140	81	60 - 130	<0.019	ug/g	NC	50
9020971	Moisture	2023/11/01							8.6	20
9021193	1,1,1,2-Tetrachloroethane	2023/11/03	96	60 - 140	97	60 - 130	<0.040	ug/g	NC	50
9021193	1,1,1-Trichloroethane	2023/11/03	90	60 - 140	89	60 - 130	<0.040	ug/g	NC	50
9021193	1,1,2,2-Tetrachloroethane	2023/11/03	104	60 - 140	107	60 - 130	<0.040	ug/g	NC	50
9021193	1,1,2-Trichloroethane	2023/11/03	96	60 - 140	99	60 - 130	<0.040	ug/g	NC	50
9021193	1,1-Dichloroethane	2023/11/03	105	60 - 140	104	60 - 130	<0.040	ug/g	NC	50
9021193	1,1-Dichloroethylene	2023/11/03	102	60 - 140	101	60 - 130	<0.040	ug/g	NC	50
9021193	1,2-Dichlorobenzene	2023/11/03	96	60 - 140	98	60 - 130	<0.040	ug/g	NC	50
9021193	1,2-Dichloroethane	2023/11/03	86	60 - 140	86	60 - 130	<0.049	ug/g	NC	50
9021193	1,2-Dichloropropane	2023/11/03	102	60 - 140	102	60 - 130	<0.040	ug/g	NC	50
9021193	1,3-Dichlorobenzene	2023/11/03	99	60 - 140	102	60 - 130	<0.040	ug/g	NC	50
9021193	1,4-Dichlorobenzene	2023/11/03	109	60 - 140	112	60 - 130	<0.040	ug/g	NC	50
9021193	Acetone (2-Propanone)	2023/11/03	91	60 - 140	94	60 - 140	<0.49	ug/g	NC	50
9021193	Benzene	2023/11/03	93	60 - 140	93	60 - 130	<0.0060	ug/g	NC	50
9021193	Bromodichloromethane	2023/11/03	97	60 - 140	97	60 - 130	<0.040	ug/g	NC	50
9021193	Bromoform	2023/11/03	83	60 - 140	85	60 - 130	<0.040	ug/g	NC	50
9021193	Bromomethane	2023/11/03	99	60 - 140	100	60 - 140	<0.040	ug/g	NC	50
9021193	Carbon Tetrachloride	2023/11/03	86	60 - 140	85	60 - 130	<0.040	ug/g	NC	50
9021193	Chlorobenzene	2023/11/03	97	60 - 140	99	60 - 130	<0.040	ug/g	NC	50
9021193	Chloroform	2023/11/03	98	60 - 140	98	60 - 130	<0.040	ug/g	NC	50
9021193	cis-1,2-Dichloroethylene	2023/11/03	96	60 - 140	96	60 - 130	<0.040	ug/g	NC	50
9021193	cis-1,3-Dichloropropene	2023/11/03	89	60 - 140	91	60 - 130	<0.030	ug/g	NC	50
9021193	Dibromochloromethane	2023/11/03	90	60 - 140	91	60 - 130	<0.040	ug/g	NC	50
9021193	Dichlorodifluoromethane (FREON 12)	2023/11/03	85	60 - 140	83	60 - 140	<0.040	ug/g	NC	50
9021193	Ethylbenzene	2023/11/03	86	60 - 140	87	60 - 130	<0.010	ug/g	NC	50
9021193	Ethylene Dibromide	2023/11/03	96	60 - 140	98	60 - 130	<0.040	ug/g	NC	50

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9021193	F1 (C6-C10) - BTEX	2023/11/03					<10	ug/g	NC	30
9021193	F1 (C6-C10)	2023/11/03	105	60 - 140	96	80 - 120	<10	ug/g	NC	30
9021193	Hexane	2023/11/03	103	60 - 140	100	60 - 130	<0.040	ug/g	NC	50
9021193	Methyl Ethyl Ketone (2-Butanone)	2023/11/03	98	60 - 140	101	60 - 140	<0.40	ug/g	NC	50
9021193	Methyl Isobutyl Ketone	2023/11/03	89	60 - 140	93	60 - 130	<0.40	ug/g	NC	50
9021193	Methyl t-butyl ether (MTBE)	2023/11/03	92	60 - 140	94	60 - 130	<0.040	ug/g	NC	50
9021193	Methylene Chloride(Dichloromethane)	2023/11/03	100	60 - 140	100	60 - 130	<0.049	ug/g	NC	50
9021193	o-Xylene	2023/11/03	80	60 - 140	82	60 - 130	<0.020	ug/g	NC	50
9021193	p+m-Xylene	2023/11/03	86	60 - 140	87	60 - 130	<0.020	ug/g	NC	50
9021193	Styrene	2023/11/03	99	60 - 140	102	60 - 130	<0.040	ug/g	NC	50
9021193	Tetrachloroethylene	2023/11/03	94	60 - 140	94	60 - 130	<0.040	ug/g	NC	50
9021193	Toluene	2023/11/03	92	60 - 140	93	60 - 130	<0.020	ug/g	NC	50
9021193	Total Xylenes	2023/11/03					<0.020	ug/g	NC	50
9021193	trans-1,2-Dichloroethylene	2023/11/03	97	60 - 140	96	60 - 130	<0.040	ug/g	NC	50
9021193	trans-1,3-Dichloropropene	2023/11/03	96	60 - 140	99	60 - 130	<0.040	ug/g	NC	50
9021193	Trichloroethylene	2023/11/03	93	60 - 140	93	60 - 130	<0.010	ug/g	0.84	50
9021193	Trichlorofluoromethane (FREON 11)	2023/11/03	92	60 - 140	90	60 - 130	<0.040	ug/g	NC	50
9021193	Vinyl Chloride	2023/11/03	106	60 - 140	105	60 - 130	<0.019	ug/g	NC	50
9021300	Moisture	2023/11/01							0	20
9021574	Moisture	2023/11/01							0	20
9023313	WAD Cyanide (Free)	2023/11/02	98	75 - 125	102	80 - 120	<0.01	ug/g	NC	35
9023381	Conductivity	2023/11/02			101	90 - 110	<0.002	mS/cm	5.7	10
9023744	WAD Cyanide (Free)	2023/11/02	86	75 - 125	95	80 - 120	<0.01	ug/g	NC	35
9023984	Acid Extractable Antimony (Sb)	2023/11/03	80	75 - 125	100	80 - 120	<0.20	ug/g	NC	30
9023984	Acid Extractable Arsenic (As)	2023/11/03	91	75 - 125	100	80 - 120	<1.0	ug/g	1.0	30
9023984	Acid Extractable Barium (Ba)	2023/11/03	NC	75 - 125	102	80 - 120	<0.50	ug/g	1.3	30
9023984	Acid Extractable Beryllium (Be)	2023/11/03	96	75 - 125	101	80 - 120	<0.20	ug/g	3.8	30
9023984	Acid Extractable Boron (B)	2023/11/03	97	75 - 125	102	80 - 120	<5.0	ug/g	8.2	30
9023984	Acid Extractable Cadmium (Cd)	2023/11/03	94	75 - 125	96	80 - 120	<0.10	ug/g	2.6	30
9023984	Acid Extractable Chromium (Cr)	2023/11/03	NC	75 - 125	95	80 - 120	<1.0	ug/g	2.6	30
9023984	Acid Extractable Cobalt (Co)	2023/11/03	88	75 - 125	93	80 - 120	<0.10	ug/g	2.4	30

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9023984	Acid Extractable Copper (Cu)	2023/11/03	91	75 - 125	96	80 - 120	<0.50	ug/g	0.79	30
9023984	Acid Extractable Lead (Pb)	2023/11/03	94	75 - 125	101	80 - 120	<1.0	ug/g	0.87	30
9023984	Acid Extractable Mercury (Hg)	2023/11/03	97	75 - 125	115	80 - 120	<0.050	ug/g	NC	30
9023984	Acid Extractable Molybdenum (Mo)	2023/11/03	89	75 - 125	92	80 - 120	<0.50	ug/g	NC	30
9023984	Acid Extractable Nickel (Ni)	2023/11/03	94	75 - 125	98	80 - 120	<0.50	ug/g	4.4	30
9023984	Acid Extractable Selenium (Se)	2023/11/03	93	75 - 125	99	80 - 120	<0.50	ug/g	NC	30
9023984	Acid Extractable Silver (Ag)	2023/11/03	92	75 - 125	95	80 - 120	<0.20	ug/g	NC	30
9023984	Acid Extractable Thallium (Tl)	2023/11/03	96	75 - 125	105	80 - 120	<0.050	ug/g	1.7	30
9023984	Acid Extractable Uranium (U)	2023/11/03	91	75 - 125	95	80 - 120	<0.050	ug/g	0.35	30
9023984	Acid Extractable Vanadium (V)	2023/11/03	NC	75 - 125	92	80 - 120	<5.0	ug/g	2.1	30
9023984	Acid Extractable Zinc (Zn)	2023/11/03	NC	75 - 125	96	80 - 120	<5.0	ug/g	4.9	30
9024090	Available (CaCl2) pH	2023/11/02			100	97 - 103			0.58	N/A
9024558	Chromium (VI)	2023/11/03	89	70 - 130	90	80 - 120	<0.18	ug/g	NC	35
9024596	Acid Extractable Antimony (Sb)	2023/11/03	95	75 - 125	101	80 - 120	<0.20	ug/g	NC	30
9024596	Acid Extractable Arsenic (As)	2023/11/03	102	75 - 125	101	80 - 120	<1.0	ug/g	NC	30
9024596	Acid Extractable Barium (Ba)	2023/11/03	NC	75 - 125	104	80 - 120	<0.50	ug/g	1.8	30
9024596	Acid Extractable Beryllium (Be)	2023/11/03	102	75 - 125	100	80 - 120	<0.20	ug/g	NC	30
9024596	Acid Extractable Boron (B)	2023/11/03	97	75 - 125	91	80 - 120	<5.0	ug/g	NC	30
9024596	Acid Extractable Cadmium (Cd)	2023/11/03	99	75 - 125	98	80 - 120	<0.10	ug/g	NC	30
9024596	Acid Extractable Chromium (Cr)	2023/11/03	102	75 - 125	97	80 - 120	<1.0	ug/g	2.0	30
9024596	Acid Extractable Cobalt (Co)	2023/11/03	98	75 - 125	96	80 - 120	<0.10	ug/g	4.7	30
9024596	Acid Extractable Copper (Cu)	2023/11/03	99	75 - 125	99	80 - 120	<0.50	ug/g	0.50	30
9024596	Acid Extractable Lead (Pb)	2023/11/03	105	75 - 125	105	80 - 120	<1.0	ug/g	4.5	30
9024596	Acid Extractable Mercury (Hg)	2023/11/03	105	75 - 125	111	80 - 120	<0.050	ug/g	NC	30
9024596	Acid Extractable Molybdenum (Mo)	2023/11/03	95	75 - 125	95	80 - 120	<0.50	ug/g	NC	30
9024596	Acid Extractable Nickel (Ni)	2023/11/03	102	75 - 125	100	80 - 120	<0.50	ug/g	2.5	30
9024596	Acid Extractable Selenium (Se)	2023/11/03	102	75 - 125	102	80 - 120	<0.50	ug/g	NC	30
9024596	Acid Extractable Silver (Ag)	2023/11/03	98	75 - 125	96	80 - 120	<0.20	ug/g	NC	30
9024596	Acid Extractable Thallium (Tl)	2023/11/03	109	75 - 125	110	80 - 120	<0.050	ug/g	NC	30
9024596	Acid Extractable Uranium (U)	2023/11/03	98	75 - 125	98	80 - 120	<0.050	ug/g	11	30
9024596	Acid Extractable Vanadium (V)	2023/11/03	NC	75 - 125	95	80 - 120	<5.0	ug/g	5.2	30

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9024596	Acid Extractable Zinc (Zn)	2023/11/03	103	75 - 125	101	80 - 120	<5.0	ug/g	0.24	30
9024624	Available (CaCl2) pH	2023/11/02			100	97 - 103			0.082	N/A
9024986	Hot Water Ext. Boron (B)	2023/11/03	112	75 - 125	104	75 - 125	<0.050	ug/g	5.0	40
9025089	Hot Water Ext. Boron (B)	2023/11/03	100	75 - 125	95	75 - 125	<0.050	ug/g	0.96	40
9026168	WAD Cyanide (Free)	2023/11/03	92	75 - 125	99	80 - 120	<0.01	ug/g	NC	35
9026382	Chromium (VI)	2023/11/06	92	70 - 130	97	80 - 120	<0.18	ug/g	NC	35
9026403	Chromium (VI)	2023/11/04	88	70 - 130	94	80 - 120	<0.18	ug/g	NC	35
9026654	Available (CaCl2) pH	2023/11/03			100	97 - 103			0.89	N/A
9026694	Available (CaCl2) pH	2023/11/03			100	97 - 103			2.0	N/A
9026931	Conductivity	2023/11/03			102	90 - 110	<0.002	mS/cm	3.1	10
9027211	F2 (C10-C16 Hydrocarbons)	2023/11/06	88	60 - 130	90	80 - 120	<10	ug/g	NC	30
9027211	F3 (C16-C34 Hydrocarbons)	2023/11/06	88	60 - 130	91	80 - 120	<50	ug/g	NC	30
9027211	F4 (C34-C50 Hydrocarbons)	2023/11/06	88	60 - 130	89	80 - 120	<50	ug/g	NC	30
9027312	1-Methylnaphthalene	2023/11/04	101	50 - 130	96	50 - 130	<0.0050	ug/g	30	40
9027312	2-Methylnaphthalene	2023/11/04	95	50 - 130	84	50 - 130	<0.0050	ug/g	NC	40
9027312	Acenaphthene	2023/11/04	94	50 - 130	93	50 - 130	<0.0050	ug/g	21	40
9027312	Acenaphthylene	2023/11/04	96	50 - 130	89	50 - 130	<0.0050	ug/g	NC	40
9027312	Anthracene	2023/11/04	99	50 - 130	99	50 - 130	<0.0050	ug/g	NC	40
9027312	Benzo(a)anthracene	2023/11/04	99	50 - 130	93	50 - 130	<0.0050	ug/g	NC	40
9027312	Benzo(a)pyrene	2023/11/04	86	50 - 130	81	50 - 130	<0.0050	ug/g	NC	40
9027312	Benzo(b/j)fluoranthene	2023/11/04	99	50 - 130	95	50 - 130	<0.0050	ug/g	NC	40
9027312	Benzo(g,h,i)perylene	2023/11/04	90	50 - 130	86	50 - 130	<0.0050	ug/g	31	40
9027312	Benzo(k)fluoranthene	2023/11/04	87	50 - 130	98	50 - 130	<0.0050	ug/g	NC	40
9027312	Chrysene	2023/11/04	95	50 - 130	91	50 - 130	<0.0050	ug/g	24	40
9027312	Dibenzo(a,h)anthracene	2023/11/04	107	50 - 130	90	50 - 130	<0.0050	ug/g	NC	40
9027312	Fluoranthene	2023/11/04	97	50 - 130	95	50 - 130	<0.0050	ug/g	NC	40
9027312	Fluorene	2023/11/04	100	50 - 130	93	50 - 130	<0.0050	ug/g	NC	40
9027312	Indeno(1,2,3-cd)pyrene	2023/11/04	94	50 - 130	87	50 - 130	<0.0050	ug/g	NC	40
9027312	Naphthalene	2023/11/04	95	50 - 130	92	50 - 130	<0.0050	ug/g	NC	40
9027312	Phenanthrene	2023/11/04	94	50 - 130	86	50 - 130	<0.0050	ug/g	33	40

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9027312	Pyrene	2023/11/04	101	50 - 130	100	50 - 130	<0.0050	ug/g	27	40

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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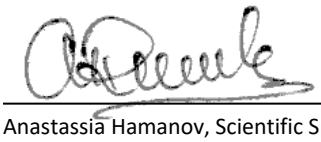
Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Anastassia Hamanov, Scientific Specialist

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

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Phone: 905-817-5700 Fax: 905-817-5779 Toll Free: 800-563-6266

CHAIN OF CUSTODY RECORD

ENV COC - 00014v5

30-Oct-23 14:00
BV Labs - Lake Zurich
C3X8689

RJM ENV-1125

Invoice Information	Invoice to (requires report) ☐	Report Information (if differs from invoice)		Project Information	
Company:	Stantec Consulting Ltd.	Company:		Quotation #:	
Contact Name:	Philip Resendes	Contact Name:		P.O. #/ AFE#:	
Street Address:	100-300 Hagey Blvd.	Street Address:		Project #:	140022038.801.200
City: Waterloo Prov: ON Postal Code:	N2L 0A4	City: Prov: Postal Code:		Site #:	MAHC, Site B
Phone:	226-338-9164	Phone:		Site Location:	1975 Muskoka Beach Rd., Bracebridge
Email:	Philip.Resendes@stantec.com	Email:		Site Location Province:	Ontario
Copies:	SAPInvoices@stantec.com	Copies:		Sampled By:	M. Karanfil

Regulatory Criteria

REG 153: ☐ Table 1 ☑ Table 2 ☐ Table 3 ☐ Table ____ ☑ Res/Park ☐ Ind/Comm ☐ Agri/other ☑ Med/Fine ☐ Coarse ☐ For RSC

OTHER: ☐ CCME ☐ Reg 558* ☐ *min 3 day TAT ☐ MISA ☐ PWQO ☐ Reg 406, Table: ____ ☐ Sanitary Sewer Bylaw ☐ Storm Sewer Bylaw Municipality ____ ☐ Other: ____

Include Criteria on Certificate of Analysis (check if yes): ☐

SAMPLES MUST BE KEPT COOL (<10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

	Sample Identification (Please print or Type)	Date Sampled YYYY	MM	DD	Time (24hr) HH	MM	Matrix	1 FIELD FILTERED	2 FIELD PRESERVED	3 LAB FILTRATION REQUIRED	4 BTEX/ F1	5 F2 - F4	6 VOCs	7 Reg 153 metals and inorganics	8 Reg 153 ICPMS metals	9 Reg 153 metals (Hg, Cr VI, ICPMS metals, HWS - B)	10 PAHs	11	12	13	14	15	16	17	18	19	20	21 # OF CONTAINERS SUBMITTED	22 HOLD - DO NOT ANALYZE
1	✓ BH1 SS2	2023	10	24	15	00	Soil							X														1	
2	✓ BH1 SS3	2023	10	24	15	45	Soil				X	X	X															2	
3	✓ BH2A2 SS2	2023	10	23	15	50	Soil				X	X		X			X											3	
4	✓ BH2A2 SS7	2023	10	24	08	55	Soil				X	X	X															2	
5	✓ BH3A2 SS1	2023	10	23	11	15	Soil				●	●		●			+											2	
6	✓ BH3A2 SS5	2023	10	23	12	45	Soil						X															2	
7	BH5 SS2	2023	10	26	11	00	Soil							X			X											1	
8	✓ BH5 SS5	2023	10	26	11	35	Soil				X	X	X															2	
9	✓ BH7 SS2	2023	10	26	13	45	Soil				X	X		X														1	
10	✓ BH7 SS6	2023	10	26	14	10	Soil						X															2	
11	✓ BH10 SS1	2023	10	24	12	10	Soil							X														2	
12	✓ BH10 SS3	2023	10	24	13	20	Soil				X	X	X															2	

Regular Turnaround Time (TAT)

☑ 5 to 7 Day ☐ 10 Day

Rush Turnaround Time (TAT) Surcharges apply

☐ Same Day ☐ 1 Day ☐ 2 Day ☐ 3 Day ☐ 4 Day

Date Required: YYYY MM DD

Comments

*UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS AND CONDITIONS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/TERMS-AND-CONDITIONS OR BY CALLING THE LABORATORY LISTED ABOVE TO OBTAIN A COPY

LAB USE ONLY	Yes	No	°C	1	2	3
Seal present		✓				
Seal intact		✓				
Cooling media present	✓			2	3	1

LAB USE ONLY	Yes	No	°C	1	2	3
Seal present						
Seal intact						
Cooling media present						

LAB USE ONLY	Yes	No	°C	1	2	3	Temperature reading by:
Seal present							
Seal intact							
Cooling media present							

Relinquished by: (Signature/ Print)	Date YYYY	MM	DD	Time HH	MM	Received by: (Signature/ Print)	Date YYYY	MM	DD	Time HH	MM	Special instructions
1 ML	23	10	30	12	00	1 BUREAU VERITAS	2023	10	30	14	00	
2						2	2023	10/30				

#714374

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Phone: 905-817-5700 Fax: 905-817-5779 Toll Free: 800-563-6266

CHAIN OF CUSTODY RECORD

ENV COC - 00014v5

Invoice Information		Invoice to (requires report) ☐
Company :	Stantec Consulting Ltd.	
Contact Name:	Philip Resendes	
Street Address:	100-300 Hagey Blvd.	
City:	Waterloo	Prov: ON Postal Code: N2L 0A4
Phone:	226-338-9164	
Email:	Philip.Resendes@stantec.com	
Copies:	SAPInvoices@stantec.com	

Report Information (if differs from invoice)	
Company:	
Contact Name:	
Street Address:	
City:	Prov: Postal Code:
Phone:	
Email:	
Copies:	

Project Information	
Quotation #:	
P.O. #/ AFE#:	
Project #:	140022038.801.200
Site #:	MAHC, Site B
Site Location:	1975 Muskoka Beach Rd., Bracebridge
Site Location Province:	Ontario
Sampled By:	M. Karanfil

LAB USE ONLY - PLACE STICKER HERE

Rush Confirmation #:

Regulatory Criteria

REG 153: ☐ Table 1 ☑ Table 2 ☐ Table 3 ☐ Table _____ ☑ Res/Park ☐ Ind/Comm ☐ Agri/other ☑ Med/Fine ☐ Coarse ☐ For RSC

OTHER: ☐ CCME ☐ Reg 558* ☐ *min 3 day TAT ☐ MISA ☐ PWQO ☐ Reg 406, Table: _____ ☐ Sanitary Sewer Bylaw ☐ Storm Sewer Bylaw Municipality _____ ☐ Other: _____

Include Criteria on Certificate of Analysis (check if yes): ☐

SAMPLES MUST BE KEPT COOL (<10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

	Sample Identification (Please print or Type)	Date Sampled YYYY	MM	DD	Time (24hr) HH	MM	Matrix	1 FIELD FILTERED	2 FIELD PRESERVED	3 LAB FILTRATION REQUIRED	4 BTEX/ F1	5 F2 - F4	6 VOCs	7 Reg 153 metals and inorganics	8 Reg 153 ICPMS metals	9 Reg 153 metals (Inc. Cr VI, ICPMS metals, HWS - B)	10 PAHs	11	12	13	14	15	16	17	18	19	20	21 # OF CONTAINERS SUBMITTED	22 HOLD - DO NOT ANALYZE
1	BH3A2 SS2	2023	10	23	11	35	Soil										X											2	
2							Soil																						
3							Soil																						
4							Soil																						
5							Soil																						
6							Soil																						
7							Soil																						
8							Soil																						
9	QC-1	2023	10	23	—		Soil							X														2	
10							Soil																						
11							Soil																						
12							Soil																						

Regular Turnaround Time (TAT)

☑ 5 to 7 Day ☐ 10 Day

Rush Turnaround Time (TAT) Surcharges apply

☐ Same Day ☐ 1 Day ☐ 2 Day ☐ 3 Day ☐ 4 Day

Date Required: YYYY MM DD

Comments

*UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS AND CONDITIONS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/TERMS-AND-CONDITIONS OR BY CALLING THE LABORATORY LISTED ABOVE TO OBTAIN A COPY

LAB USE ONLY	Yes	No	°C	1	2	3
Seal present						
Seal intact						
Cooling media present						

LAB USE ONLY	Yes	No	°C	1	2	3
Seal present						
Seal intact						
Cooling media present						

LAB USE ONLY	Yes	No	°C	1	2	3	Temperature reading by:
Seal present							
Seal intact							
Cooling media present							

	Relinquished by: (Signature/ Print)	Date YYYY	MM	DD	Time HH	MM	Received by: (Signature/ Print)	Date YYYY	MM	DD	Time HH	MM	Special Instructions
1	MK	23	10	30	12	00	See page 1						
2													

Your Project #: 140022038
Site Location: SITE B-1975, MUSKOKA BEACH
Your C.O.C. #: 961731-01-01

Attention: Marissa Lusito

Stantec Consulting Ltd
675 Cochrane Dr W.
West Tower Suite 300
Markham, ON
CANADA L3R 0B8

Report Date: 2023/11/14
Report #: R7910776
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3Y9296
Received: 2023/11/07, 15:25

Sample Matrix: Soil
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Methylnaphthalene Sum	3	N/A	2023/11/10	CAM SOP-00301	EPA 8270D m
Hot Water Extractable Boron	3	2023/11/10	2023/11/10	CAM SOP-00408	R153 Ana. Prot. 2011
1,3-Dichloropropene Sum	3	N/A	2023/11/10		EPA 8260C m
Free (WAD) Cyanide	1	2023/11/09	2023/11/13	CAM SOP-00457	OMOE E3015 m
Free (WAD) Cyanide	2	2023/11/09	2023/11/14	CAM SOP-00457	OMOE E3015 m
Conductivity	3	2023/11/10	2023/11/10	CAM SOP-00414	OMOE E3530 v1 m
Hexavalent Chromium in Soil by IC (1)	3	2023/11/13	2023/11/13	CAM SOP-00436	EPA 3060A/7199 m
Petroleum Hydrocarbons F2-F4 in Soil (2)	2	2023/11/09	2023/11/10	CAM SOP-00316	CCME CWS m
Petroleum Hydrocarbons F2-F4 in Soil (2)	1	2023/11/09	2023/11/09	CAM SOP-00316	CCME CWS m
Acid Extractable Metals by ICPMS	3	2023/11/10	2023/11/10	CAM SOP-00447	EPA 6020B m
Moisture	4	N/A	2023/11/08	CAM SOP-00445	Carter 2nd ed 51.2 m
PAH Compounds in Soil by GC/MS (SIM)	3	2023/11/09	2023/11/10	CAM SOP-00318	EPA 8270E
pH CaCl2 EXTRACT	3	2023/11/10	2023/11/10	CAM SOP-00413	EPA 9045 D m
Sodium Adsorption Ratio (SAR)	3	N/A	2023/11/10	CAM SOP-00102	EPA 6010C
Volatile Organic Compounds and F1 PHCs	3	N/A	2023/11/09	CAM SOP-00230	EPA 8260C m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCCFP, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Your Project #: 140022038
Site Location: SITE B-1975, MUSKOKA BEACH
Your C.O.C. #: 961731-01-01

Attention: Marissa Lusito

Stantec Consulting Ltd
675 Cochrane Dr W.
West Tower Suite 300
Markham, ON
CANADA L3R 0B8

Report Date: 2023/11/14
Report #: R7910776
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3Y9296

Received: 2023/11/07, 15:25

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

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Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Soils are reported on a dry weight basis unless otherwise specified.

(2) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Julie Clement, Technical Account Manager
Email: Julie.CLEMENT@bureauveritas.com
Phone# (613)868-6079

==========

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Bureau Veritas Job #: C3Y9296
Report Date: 2023/11/14

Stantec Consulting Ltd
Client Project #: 140022038
Site Location: SITE B-1975, MUSKOKA BEACH
Sampler Initials: ND

O.REG 153 METALS & INORGANICS PKG (SOIL)

Bureau Veritas ID		XNN664			XNN664			XNN665		
Sampling Date		2023/10/31 13:30			2023/10/31 13:30			2023/11/02 10:15		
COC Number		961731-01-01			961731-01-01			961731-01-01		
	UNITS	**BH6 SS1**	**RDL**	**QC Batch**	**BH6 SS1 Lab-Dup**	**RDL**	**QC Batch**	**BH8 SS1**	**RDL**	**QC Batch**
Calculated Parameters										
Sodium Adsorption Ratio	N/A	0.87 (1)		9035325				1.4 (1)		9035325
Inorganics										
Conductivity	mS/cm	0.022	0.002	9041696				0.020	0.002	9041696
Available (CaCl2) pH	pH	5.49		9041636				5.56		9041636
WAD Cyanide (Free)	ug/g	<0.01	0.01	9039216	<0.01	0.01	9039216	<0.01	0.01	9039216
Chromium (VI)	ug/g	<0.18	0.18	9045293	<0.18	0.18	9045293	<0.18	0.18	9045293
Metals										
Hot Water Ext. Boron (B)	ug/g	<0.050	0.050	9041584				<0.050	0.050	9041459
Acid Extractable Antimony (Sb)	ug/g	<0.20	0.20	9042145				<0.20	0.20	9042145
Acid Extractable Arsenic (As)	ug/g	2.7	1.0	9042145				<1.0	1.0	9042145
Acid Extractable Barium (Ba)	ug/g	6.7	0.50	9042145				15	0.50	9042145
Acid Extractable Beryllium (Be)	ug/g	<0.20	0.20	9042145				<0.20	0.20	9042145
Acid Extractable Boron (B)	ug/g	<5.0	5.0	9042145				<5.0	5.0	9042145
Acid Extractable Cadmium (Cd)	ug/g	<0.10	0.10	9042145				<0.10	0.10	9042145
Acid Extractable Chromium (Cr)	ug/g	4.9	1.0	9042145				10	1.0	9042145
Acid Extractable Cobalt (Co)	ug/g	1.7	0.10	9042145				2.2	0.10	9042145
Acid Extractable Copper (Cu)	ug/g	2.2	0.50	9042145				3.6	0.50	9042145
Acid Extractable Lead (Pb)	ug/g	1.0	1.0	9042145				1.1	1.0	9042145
Acid Extractable Molybdenum (Mo)	ug/g	<0.50	0.50	9042145				<0.50	0.50	9042145
Acid Extractable Nickel (Ni)	ug/g	3.3	0.50	9042145				3.6	0.50	9042145
Acid Extractable Selenium (Se)	ug/g	<0.50	0.50	9042145				<0.50	0.50	9042145
Acid Extractable Silver (Ag)	ug/g	<0.20	0.20	9042145				<0.20	0.20	9042145
Acid Extractable Thallium (Tl)	ug/g	<0.050	0.050	9042145				<0.050	0.050	9042145
Acid Extractable Uranium (U)	ug/g	0.19	0.050	9042145				0.43	0.050	9042145
Acid Extractable Vanadium (V)	ug/g	15	5.0	9042145				34	5.0	9042145
Acid Extractable Zinc (Zn)	ug/g	19	5.0	9042145				16	5.0	9042145
Acid Extractable Mercury (Hg)	ug/g	<0.050	0.050	9042145				<0.050	0.050	9042145

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
(1) Sodium was not detected. To report SAR the sodium detection limit was used in the calculation. This value represents a maximum ratio.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

O.REG 153 METALS & INORGANICS PKG (SOIL)

Bureau Veritas ID		XNN666		
Sampling Date		2023/11/02 15:00		
COC Number		961731-01-01		
	UNITS	**BH9 SS2**	**RDL**	**QC Batch**
Calculated Parameters				
Sodium Adsorption Ratio	N/A	0.73 (1)		9035325
Inorganics				
Conductivity	mS/cm	0.038	0.002	9041696
Available (CaCl2) pH	pH	6.19		9041494
WAD Cyanide (Free)	ug/g	<0.01	0.01	9039216
Chromium (VI)	ug/g	0.82	0.18	9045293
Metals				
Hot Water Ext. Boron (B)	ug/g	<0.050	0.050	9041584
Acid Extractable Antimony (Sb)	ug/g	<0.20	0.20	9041633
Acid Extractable Arsenic (As)	ug/g	1.6	1.0	9041633
Acid Extractable Barium (Ba)	ug/g	270	0.50	9041633
Acid Extractable Beryllium (Be)	ug/g	0.94	0.20	9041633
Acid Extractable Boron (B)	ug/g	6.6	5.0	9041633
Acid Extractable Cadmium (Cd)	ug/g	<0.10	0.10	9041633
Acid Extractable Chromium (Cr)	ug/g	52	1.0	9041633
Acid Extractable Cobalt (Co)	ug/g	16	0.10	9041633
Acid Extractable Copper (Cu)	ug/g	31	0.50	9041633
Acid Extractable Lead (Pb)	ug/g	6.6	1.0	9041633
Acid Extractable Molybdenum (Mo)	ug/g	<0.50	0.50	9041633
Acid Extractable Nickel (Ni)	ug/g	33	0.50	9041633
Acid Extractable Selenium (Se)	ug/g	<0.50	0.50	9041633
Acid Extractable Silver (Ag)	ug/g	<0.20	0.20	9041633
Acid Extractable Thallium (Tl)	ug/g	0.30	0.050	9041633
Acid Extractable Uranium (U)	ug/g	0.91	0.050	9041633
Acid Extractable Vanadium (V)	ug/g	70	5.0	9041633
Acid Extractable Zinc (Zn)	ug/g	85	5.0	9041633
Acid Extractable Mercury (Hg)	ug/g	<0.050	0.050	9041633

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Sodium was not detected. To report SAR the sodium detection limit was used in the calculation. This value represents a maximum ratio.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

O.REG 153 PAHS (SOIL)

Bureau Veritas ID		XNN664	XNN665	XNN666		
Sampling Date		2023/10/31 13:30	2023/11/02 10:15	2023/11/02 15:00		
COC Number		961731-01-01	961731-01-01	961731-01-01		
	UNITS	**BH6 SS1**	**BH8 SS1**	**BH9 SS2**	**RDL**	**QC Batch**
Calculated Parameters						
Methylnaphthalene, 2-(1-)	ug/g	<0.0071	<0.0071	<0.0071	0.0071	9035238
Polyaromatic Hydrocarbons						
Acenaphthene	ug/g	<0.0050	<0.0050	<0.0050	0.0050	9038396
Acenaphthylene	ug/g	<0.0050	<0.0050	<0.0050	0.0050	9038396
Anthracene	ug/g	<0.0050	<0.0050	<0.0050	0.0050	9038396
Benzo(a)anthracene	ug/g	<0.0050	<0.0050	<0.0050	0.0050	9038396
Benzo(a)pyrene	ug/g	<0.0050	<0.0050	<0.0050	0.0050	9038396
Benzo(b/j)fluoranthene	ug/g	<0.0050	<0.0050	<0.0050	0.0050	9038396
Benzo(g,h,i)perylene	ug/g	<0.0050	<0.0050	<0.0050	0.0050	9038396
Benzo(k)fluoranthene	ug/g	<0.0050	<0.0050	<0.0050	0.0050	9038396
Chrysene	ug/g	<0.0050	<0.0050	<0.0050	0.0050	9038396
Dibenzo(a,h)anthracene	ug/g	<0.0050	<0.0050	<0.0050	0.0050	9038396
Fluoranthene	ug/g	<0.0050	<0.0050	<0.0050	0.0050	9038396
Fluorene	ug/g	<0.0050	<0.0050	<0.0050	0.0050	9038396
Indeno(1,2,3-cd)pyrene	ug/g	<0.0050	<0.0050	<0.0050	0.0050	9038396
1-Methylnaphthalene	ug/g	<0.0050	<0.0050	<0.0050	0.0050	9038396
2-Methylnaphthalene	ug/g	<0.0050	<0.0050	<0.0050	0.0050	9038396
Naphthalene	ug/g	<0.0050	<0.0050	<0.0050	0.0050	9038396
Phenanthrene	ug/g	<0.0050	<0.0050	<0.0050	0.0050	9038396
Pyrene	ug/g	<0.0050	<0.0050	<0.0050	0.0050	9038396
Surrogate Recovery (%)						
D10-Anthracene	%	88	89	95		9038396
D14-Terphenyl (FS)	%	89	89	97		9038396
D8-Acenaphthylene	%	74	80	86		9038396

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

O.REG 153 VOCS BY HS & F1-F4 (SOIL)

Bureau Veritas ID		XNN664	XNN665	XNN667		
Sampling Date		2023/10/31 13:30	2023/11/02 10:15	2023/11/02 15:55		
COC Number		961731-01-01	961731-01-01	961731-01-01		
	UNITS	**BH6 SS1**	**BH8 SS1**	**BH9 SS5**	**RDL**	**QC Batch**
Calculated Parameters						
1,3-Dichloropropene (cis+trans)	ug/g	<0.050	<0.050	<0.050	0.050	9035329
Volatile Organics						
Acetone (2-Propanone)	ug/g	<0.49	<0.49	<0.49	0.49	9038768
Benzene	ug/g	<0.0060	<0.0060	<0.0060	0.0060	9038768
Bromodichloromethane	ug/g	<0.040	<0.040	<0.040	0.040	9038768
Bromoform	ug/g	<0.040	<0.040	<0.040	0.040	9038768
Bromomethane	ug/g	<0.040	<0.040	<0.040	0.040	9038768
Carbon Tetrachloride	ug/g	<0.040	<0.040	<0.040	0.040	9038768
Chlorobenzene	ug/g	<0.040	<0.040	<0.040	0.040	9038768
Chloroform	ug/g	<0.040	<0.040	<0.040	0.040	9038768
Dibromochloromethane	ug/g	<0.040	<0.040	<0.040	0.040	9038768
1,2-Dichlorobenzene	ug/g	<0.040	<0.040	<0.040	0.040	9038768
1,3-Dichlorobenzene	ug/g	<0.040	<0.040	<0.040	0.040	9038768
1,4-Dichlorobenzene	ug/g	<0.040	<0.040	<0.040	0.040	9038768
Dichlorodifluoromethane (FREON 12)	ug/g	<0.040	<0.040	<0.040	0.040	9038768
1,1-Dichloroethane	ug/g	<0.040	<0.040	<0.040	0.040	9038768
1,2-Dichloroethane	ug/g	<0.049	<0.049	<0.049	0.049	9038768
1,1-Dichloroethylene	ug/g	<0.040	<0.040	<0.040	0.040	9038768
cis-1,2-Dichloroethylene	ug/g	<0.040	<0.040	<0.040	0.040	9038768
trans-1,2-Dichloroethylene	ug/g	<0.040	<0.040	<0.040	0.040	9038768
1,2-Dichloropropane	ug/g	<0.040	<0.040	<0.040	0.040	9038768
cis-1,3-Dichloropropene	ug/g	<0.030	<0.030	<0.030	0.030	9038768
trans-1,3-Dichloropropene	ug/g	<0.040	<0.040	<0.040	0.040	9038768
Ethylbenzene	ug/g	<0.010	<0.010	<0.010	0.010	9038768
Ethylene Dibromide	ug/g	<0.040	<0.040	<0.040	0.040	9038768
Hexane	ug/g	<0.040	<0.040	<0.040	0.040	9038768
Methylene Chloride(Dichloromethane)	ug/g	<0.049	<0.049	<0.049	0.049	9038768
Methyl Ethyl Ketone (2-Butanone)	ug/g	<0.40	<0.40	<0.40	0.40	9038768
Methyl Isobutyl Ketone	ug/g	<0.40	<0.40	<0.40	0.40	9038768
Methyl t-butyl ether (MTBE)	ug/g	<0.040	<0.040	<0.040	0.040	9038768
Styrene	ug/g	<0.040	<0.040	<0.040	0.040	9038768

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

O.REG 153 VOCS BY HS & F1-F4 (SOIL)

Bureau Veritas ID		XNN664	XNN665	XNN667		
Sampling Date		2023/10/31 13:30	2023/11/02 10:15	2023/11/02 15:55		
COC Number		961731-01-01	961731-01-01	961731-01-01		
	UNITS	**BH6 SS1**	**BH8 SS1**	**BH9 SS5**	**RDL**	**QC Batch**
1,1,1,2-Tetrachloroethane	ug/g	<0.040	<0.040	<0.040	0.040	9038768
1,1,2,2-Tetrachloroethane	ug/g	<0.040	<0.040	<0.040	0.040	9038768
Tetrachloroethylene	ug/g	<0.040	<0.040	<0.040	0.040	9038768
Toluene	ug/g	<0.020	<0.020	<0.020	0.020	9038768
1,1,1-Trichloroethane	ug/g	<0.040	<0.040	<0.040	0.040	9038768
1,1,2-Trichloroethane	ug/g	<0.040	<0.040	<0.040	0.040	9038768
Trichloroethylene	ug/g	<0.010	<0.010	<0.010	0.010	9038768
Trichlorofluoromethane (FREON 11)	ug/g	<0.040	<0.040	<0.040	0.040	9038768
Vinyl Chloride	ug/g	<0.019	<0.019	<0.019	0.019	9038768
p+m-Xylene	ug/g	<0.020	<0.020	<0.020	0.020	9038768
o-Xylene	ug/g	<0.020	<0.020	<0.020	0.020	9038768
Total Xylenes	ug/g	<0.020	<0.020	<0.020	0.020	9038768
F1 (C6-C10)	ug/g	<10	<10	<10	10	9038768
F1 (C6-C10) - BTEX	ug/g	<10	<10	<10	10	9038768
F2-F4 Hydrocarbons						
F2 (C10-C16 Hydrocarbons)	ug/g	<10	<10	<10	10	9040689
F3 (C16-C34 Hydrocarbons)	ug/g	<50	<50	<50	50	9040689
F4 (C34-C50 Hydrocarbons)	ug/g	<50	<50	<50	50	9040689
Reached Baseline at C50	ug/g	Yes	Yes	Yes		9040689
Surrogate Recovery (%)						
o-Terphenyl	%	95	98	102		9040689
4-Bromofluorobenzene	%	94	95	94		9038768
D10-o-Xylene	%	85	81	87		9038768
D4-1,2-Dichloroethane	%	102	101	103		9038768
D8-Toluene	%	94	95	94		9038768

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C3Y9296
Report Date: 2023/11/14

Stantec Consulting Ltd
Client Project #: 140022038
Site Location: SITE B-1975, MUSKOKA BEACH
Sampler Initials: ND

RESULTS OF ANALYSES OF SOIL

Bureau Veritas ID		XNN664	XNN665	XNN666	XNN667		
Sampling Date		2023/10/31 13:30	2023/11/02 10:15	2023/11/02 15:00	2023/11/02 15:55		
COC Number		961731-01-01	961731-01-01	961731-01-01	961731-01-01		
	UNITS	**BH6 SS1**	**BH8 SS1**	**BH9 SS2**	**BH9 SS5**	**RDL**	**QC Batch**
Inorganics							
Moisture	%	9.8	12	24	25	1.0	9036852

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C3Y9296
Report Date: 2023/11/14

Stantec Consulting Ltd
Client Project #: 140022038
Site Location: SITE B-1975, MUSKOKA BEACH
Sampler Initials: ND

TEST SUMMARY

Bureau Veritas ID: XNN664
Sample ID: BH6 SS1
Matrix: Soil

Collected: 2023/10/31
Shipped:
Received: 2023/11/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	9035238	N/A	2023/11/10	Automated Statchk
Hot Water Extractable Boron	ICP	9041584	2023/11/10	2023/11/10	Medhat Nasr
1,3-Dichloropropene Sum	CALC	9035329	N/A	2023/11/10	Automated Statchk
Free (WAD) Cyanide	TECH	9039216	2023/11/09	2023/11/13	Jency Sara Johnson
Conductivity	AT	9041696	2023/11/10	2023/11/10	Leily Karimi
Hexavalent Chromium in Soil by IC	IC/SPEC	9045293	2023/11/13	2023/11/13	Sousan Besharatlou
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	9040689	2023/11/09	2023/11/09	(Kent) Maolin Li
Acid Extractable Metals by ICPMS	ICP/MS	9042145	2023/11/10	2023/11/10	Japneet Gill
Moisture	BAL	9036852	N/A	2023/11/08	Joe Thomas
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	9038396	2023/11/09	2023/11/10	Jonghan Yoon
pH CaCl2 EXTRACT	AT	9041636	2023/11/10	2023/11/10	Kien Tran
Sodium Adsorption Ratio (SAR)	CALC/MET	9035325	N/A	2023/11/10	Automated Statchk
Volatile Organic Compounds and F1 PHCs	GC/MSFD	9038768	N/A	2023/11/09	Dina Wang

Bureau Veritas ID: XNN664 Dup
Sample ID: BH6 SS1
Matrix: Soil

Collected: 2023/10/31
Shipped:
Received: 2023/11/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Free (WAD) Cyanide	TECH	9039216	2023/11/09	2023/11/13	Jency Sara Johnson
Hexavalent Chromium in Soil by IC	IC/SPEC	9045293	2023/11/13	2023/11/13	Sousan Besharatlou

Bureau Veritas ID: XNN665
Sample ID: BH8 SS1
Matrix: Soil

Collected: 2023/11/02
Shipped:
Received: 2023/11/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	9035238	N/A	2023/11/10	Automated Statchk
Hot Water Extractable Boron	ICP	9041459	2023/11/10	2023/11/10	Jaswinder Kaur
1,3-Dichloropropene Sum	CALC	9035329	N/A	2023/11/10	Automated Statchk
Free (WAD) Cyanide	TECH	9039216	2023/11/09	2023/11/14	Jency Sara Johnson
Conductivity	AT	9041696	2023/11/10	2023/11/10	Leily Karimi
Hexavalent Chromium in Soil by IC	IC/SPEC	9045293	2023/11/13	2023/11/13	Sousan Besharatlou
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	9040689	2023/11/09	2023/11/10	(Kent) Maolin Li
Acid Extractable Metals by ICPMS	ICP/MS	9042145	2023/11/10	2023/11/10	Japneet Gill
Moisture	BAL	9036852	N/A	2023/11/08	Joe Thomas
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	9038396	2023/11/09	2023/11/10	Jonghan Yoon
pH CaCl2 EXTRACT	AT	9041636	2023/11/10	2023/11/10	Kien Tran
Sodium Adsorption Ratio (SAR)	CALC/MET	9035325	N/A	2023/11/10	Automated Statchk
Volatile Organic Compounds and F1 PHCs	GC/MSFD	9038768	N/A	2023/11/09	Dina Wang

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C3Y9296
Report Date: 2023/11/14

Stantec Consulting Ltd
Client Project #: 140022038
Site Location: SITE B-1975, MUSKOKA BEACH
Sampler Initials: ND

TEST SUMMARY

Bureau Veritas ID: XNN666
Sample ID: BH9 SS2
Matrix: Soil

Collected: 2023/11/02
Shipped:
Received: 2023/11/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Methylnaphthalene Sum	CALC	9035238	N/A	2023/11/10	Automated Statchk
Hot Water Extractable Boron	ICP	9041584	2023/11/10	2023/11/10	Medhat Nasr
Free (WAD) Cyanide	TECH	9039216	2023/11/09	2023/11/14	Jency Sara Johnson
Conductivity	AT	9041696	2023/11/10	2023/11/10	Leily Karimi
Hexavalent Chromium in Soil by IC	IC/SPEC	9045293	2023/11/13	2023/11/13	Sousan Besharatlou
Acid Extractable Metals by ICPMS	ICP/MS	9041633	2023/11/10	2023/11/10	Daniel Teclu
Moisture	BAL	9036852	N/A	2023/11/08	Joe Thomas
PAH Compounds in Soil by GC/MS (SIM)	GC/MS	9038396	2023/11/09	2023/11/10	Jonghan Yoon
pH CaCl2 EXTRACT	AT	9041494	2023/11/10	2023/11/10	Kien Tran
Sodium Adsorption Ratio (SAR)	CALC/MET	9035325	N/A	2023/11/10	Automated Statchk

Bureau Veritas ID: XNN667
Sample ID: BH9 SS5
Matrix: Soil

Collected: 2023/11/02
Shipped:
Received: 2023/11/07

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
1,3-Dichloropropene Sum	CALC	9035329	N/A	2023/11/10	Automated Statchk
Petroleum Hydrocarbons F2-F4 in Soil	GC/FID	9040689	2023/11/09	2023/11/10	(Kent) Maolin Li
Moisture	BAL	9036852	N/A	2023/11/08	Joe Thomas
Volatile Organic Compounds and F1 PHCs	GC/MSFD	9038768	N/A	2023/11/09	Dina Wang

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.0°C

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
9036852	JTS	RPD	Moisture	2023/11/08	1.3		%	20
9038396	JYO	Matrix Spike	D10-Anthracene	2023/11/10		94	%	50 - 130
			D14-Terphenyl (FS)	2023/11/10		94	%	50 - 130
			D8-Acenaphthylene	2023/11/10		89	%	50 - 130
			Acenaphthene	2023/11/10		95	%	50 - 130
			Acenaphthylene	2023/11/10		97	%	50 - 130
			Anthracene	2023/11/10		93	%	50 - 130
			Benzo(a)anthracene	2023/11/10		95	%	50 - 130
			Benzo(a)pyrene	2023/11/10		84	%	50 - 130
			Benzo(b/j)fluoranthene	2023/11/10		80	%	50 - 130
			Benzo(g,h,i)perylene	2023/11/10		88	%	50 - 130
			Benzo(k)fluoranthene	2023/11/10		80	%	50 - 130
			Chrysene	2023/11/10		91	%	50 - 130
			Dibenzo(a,h)anthracene	2023/11/10		87	%	50 - 130
			Fluoranthene	2023/11/10		92	%	50 - 130
			Fluorene	2023/11/10		97	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2023/11/10		84	%	50 - 130
			1-Methylnaphthalene	2023/11/10		NC	%	50 - 130
			2-Methylnaphthalene	2023/11/10		NC	%	50 - 130
			Naphthalene	2023/11/10		89	%	50 - 130
			Phenanthrene	2023/11/10		100	%	50 - 130
			Pyrene	2023/11/10		91	%	50 - 130
9038396	JYO	Spiked Blank	D10-Anthracene	2023/11/09		95	%	50 - 130
			D14-Terphenyl (FS)	2023/11/09		98	%	50 - 130
			D8-Acenaphthylene	2023/11/09		73	%	50 - 130
			Acenaphthene	2023/11/09		93	%	50 - 130
			Acenaphthylene	2023/11/09		80	%	50 - 130
			Anthracene	2023/11/09		94	%	50 - 130
			Benzo(a)anthracene	2023/11/09		85	%	50 - 130
			Benzo(a)pyrene	2023/11/09		82	%	50 - 130
			Benzo(b/j)fluoranthene	2023/11/09		89	%	50 - 130
			Benzo(g,h,i)perylene	2023/11/09		95	%	50 - 130
			Benzo(k)fluoranthene	2023/11/09		92	%	50 - 130
			Chrysene	2023/11/09		93	%	50 - 130
			Dibenzo(a,h)anthracene	2023/11/09		87	%	50 - 130
			Fluoranthene	2023/11/09		97	%	50 - 130
			Fluorene	2023/11/09		92	%	50 - 130
			Indeno(1,2,3-cd)pyrene	2023/11/09		91	%	50 - 130
			1-Methylnaphthalene	2023/11/09		111	%	50 - 130
			2-Methylnaphthalene	2023/11/09		100	%	50 - 130
			Naphthalene	2023/11/09		89	%	50 - 130
			Phenanthrene	2023/11/09		92	%	50 - 130
			Pyrene	2023/11/09		98	%	50 - 130
9038396	JYO	Method Blank	D10-Anthracene	2023/11/09		94	%	50 - 130
			D14-Terphenyl (FS)	2023/11/09		96	%	50 - 130
			D8-Acenaphthylene	2023/11/09		69	%	50 - 130
			Acenaphthene	2023/11/09	<0.0050		ug/g	
			Acenaphthylene	2023/11/09	<0.0050		ug/g	
			Anthracene	2023/11/09	<0.0050		ug/g	
			Benzo(a)anthracene	2023/11/09	<0.0050		ug/g	
			Benzo(a)pyrene	2023/11/09	<0.0050		ug/g	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Benzo(b/j)fluoranthene	2023/11/09	<0.0050		ug/g	
			Benzo(g,h,i)perylene	2023/11/09	<0.0050		ug/g	
			Benzo(k)fluoranthene	2023/11/09	<0.0050		ug/g	
			Chrysene	2023/11/09	<0.0050		ug/g	
			Dibenzo(a,h)anthracene	2023/11/09	<0.0050		ug/g	
			Fluoranthene	2023/11/09	<0.0050		ug/g	
			Fluorene	2023/11/09	<0.0050		ug/g	
			Indeno(1,2,3-cd)pyrene	2023/11/09	<0.0050		ug/g	
			1-Methylnaphthalene	2023/11/09	<0.0050		ug/g	
			2-Methylnaphthalene	2023/11/09	<0.0050		ug/g	
			Naphthalene	2023/11/09	<0.0050		ug/g	
			Phenanthrene	2023/11/09	<0.0050		ug/g	
			Pyrene	2023/11/09	<0.0050		ug/g	
9038396	JYO	RPD	Acenaphthene	2023/11/09	26		%	40
			Acenaphthylene	2023/11/09	NC (1)		%	40
			Anthracene	2023/11/09	25		%	40
			Benzo(a)anthracene	2023/11/09	14		%	40
			Benzo(a)pyrene	2023/11/09	12		%	40
			Benzo(b/j)fluoranthene	2023/11/09	19		%	40
			Benzo(g,h,i)perylene	2023/11/09	10		%	40
			Benzo(k)fluoranthene	2023/11/09	NC		%	40
			Chrysene	2023/11/09	18		%	40
			Dibenzo(a,h)anthracene	2023/11/09	NC		%	40
			Fluoranthene	2023/11/09	35		%	40
			Fluorene	2023/11/09	30		%	40
			Indeno(1,2,3-cd)pyrene	2023/11/09	14		%	40
			1-Methylnaphthalene	2023/11/09	46 (2)		%	40
			2-Methylnaphthalene	2023/11/09	53 (2)		%	40
			Naphthalene	2023/11/09	NC (1)		%	40
			Phenanthrene	2023/11/09	29		%	40
			Pyrene	2023/11/09	19		%	40
9038768	DW5	Matrix Spike	4-Bromofluorobenzene	2023/11/09		98	%	60 - 140
			D10-o-Xylene	2023/11/09		100	%	60 - 130
			D4-1,2-Dichloroethane	2023/11/09		98	%	60 - 140
			D8-Toluene	2023/11/09		104	%	60 - 140
			Acetone (2-Propanone)	2023/11/09		94	%	60 - 140
			Benzene	2023/11/09		97	%	60 - 140
			Bromodichloromethane	2023/11/09		101	%	60 - 140
			Bromoform	2023/11/09		90	%	60 - 140
			Bromomethane	2023/11/09		106	%	60 - 140
			Carbon Tetrachloride	2023/11/09		86	%	60 - 140
			Chlorobenzene	2023/11/09		100	%	60 - 140
			Chloroform	2023/11/09		101	%	60 - 140
			Dibromochloromethane	2023/11/09		95	%	60 - 140
			1,2-Dichlorobenzene	2023/11/09		99	%	60 - 140
			1,3-Dichlorobenzene	2023/11/09		103	%	60 - 140
			1,4-Dichlorobenzene	2023/11/09		111	%	60 - 140
			Dichlorodifluoromethane (FREON 12)	2023/11/09		95	%	60 - 140
			1,1-Dichloroethane	2023/11/09		108	%	60 - 140
			1,2-Dichloroethane	2023/11/09		87	%	60 - 140
			1,1-Dichloroethylene	2023/11/09		101	%	60 - 140

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			cis-1,2-Dichloroethylene	2023/11/09		101	%	60 - 140
			trans-1,2-Dichloroethylene	2023/11/09		101	%	60 - 140
			1,2-Dichloropropane	2023/11/09		107	%	60 - 140
			cis-1,3-Dichloropropene	2023/11/09		92	%	60 - 140
			trans-1,3-Dichloropropene	2023/11/09		99	%	60 - 140
			Ethylbenzene	2023/11/09		82	%	60 - 140
			Ethylene Dibromide	2023/11/09		102	%	60 - 140
			Hexane	2023/11/09		104	%	60 - 140
			Methylene Chloride(Dichloromethane)	2023/11/09		107	%	60 - 140
			Methyl Ethyl Ketone (2-Butanone)	2023/11/09		104	%	60 - 140
			Methyl Isobutyl Ketone	2023/11/09		94	%	60 - 140
			Methyl t-butyl ether (MTBE)	2023/11/09		93	%	60 - 140
			Styrene	2023/11/09		101	%	60 - 140
			1,1,1,2-Tetrachloroethane	2023/11/09		99	%	60 - 140
			1,1,2,2-Tetrachloroethane	2023/11/09		112	%	60 - 140
			Tetrachloroethylene	2023/11/09		96	%	60 - 140
			Toluene	2023/11/09		92	%	60 - 140
			1,1,1-Trichloroethane	2023/11/09		90	%	60 - 140
			1,1,2-Trichloroethane	2023/11/09		97	%	60 - 140
			Trichloroethylene	2023/11/09		95	%	60 - 140
			Trichlorofluoromethane (FREON 11)	2023/11/09		91	%	60 - 140
			Vinyl Chloride	2023/11/09		111	%	60 - 140
			p+m-Xylene	2023/11/09		83	%	60 - 140
			o-Xylene	2023/11/09		78	%	60 - 140
			F1 (C6-C10)	2023/11/09		89	%	60 - 140
9038768	DW5	Spiked Blank	4-Bromofluorobenzene	2023/11/09		98	%	60 - 140
			D10-o-Xylene	2023/11/09		95	%	60 - 130
			D4-1,2-Dichloroethane	2023/11/09		95	%	60 - 140
			D8-Toluene	2023/11/09		105	%	60 - 140
			Acetone (2-Propanone)	2023/11/09		92	%	60 - 140
			Benzene	2023/11/09		96	%	60 - 130
			Bromodichloromethane	2023/11/09		98	%	60 - 130
			Bromoform	2023/11/09		88	%	60 - 130
			Bromomethane	2023/11/09		104	%	60 - 140
			Carbon Tetrachloride	2023/11/09		85	%	60 - 130
			Chlorobenzene	2023/11/09		101	%	60 - 130
			Chloroform	2023/11/09		99	%	60 - 130
			Dibromochloromethane	2023/11/09		93	%	60 - 130
			1,2-Dichlorobenzene	2023/11/09		101	%	60 - 130
			1,3-Dichlorobenzene	2023/11/09		105	%	60 - 130
			1,4-Dichlorobenzene	2023/11/09		115	%	60 - 130
			Dichlorodifluoromethane (FREON 12)	2023/11/09		96	%	60 - 140
			1,1-Dichloroethane	2023/11/09		107	%	60 - 130
			1,2-Dichloroethane	2023/11/09		85	%	60 - 130
			1,1-Dichloroethylene	2023/11/09		101	%	60 - 130
			cis-1,2-Dichloroethylene	2023/11/09		99	%	60 - 130
			trans-1,2-Dichloroethylene	2023/11/09		100	%	60 - 130
			1,2-Dichloropropane	2023/11/09		106	%	60 - 130
			cis-1,3-Dichloropropene	2023/11/09		89	%	60 - 130
			trans-1,3-Dichloropropene	2023/11/09		96	%	60 - 130
			Ethylbenzene	2023/11/09		84	%	60 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Ethylene Dibromide	2023/11/09		100	%	60 - 130
			Hexane	2023/11/09		103	%	60 - 130
			Methylene Chloride(Dichloromethane)	2023/11/09		105	%	60 - 130
			Methyl Ethyl Ketone (2-Butanone)	2023/11/09		101	%	60 - 140
			Methyl Isobutyl Ketone	2023/11/09		92	%	60 - 130
			Methyl t-butyl ether (MTBE)	2023/11/09		93	%	60 - 130
			Styrene	2023/11/09		103	%	60 - 130
			1,1,1,2-Tetrachloroethane	2023/11/09		99	%	60 - 130
			1,1,2,2-Tetrachloroethane	2023/11/09		110	%	60 - 130
			Tetrachloroethylene	2023/11/09		96	%	60 - 130
			Toluene	2023/11/09		94	%	60 - 130
			1,1,1-Trichloroethane	2023/11/09		89	%	60 - 130
			1,1,2-Trichloroethane	2023/11/09		96	%	60 - 130
			Trichloroethylene	2023/11/09		95	%	60 - 130
			Trichlorofluoromethane (FREON 11)	2023/11/09		91	%	60 - 130
			Vinyl Chloride	2023/11/09		111	%	60 - 130
			p+m-Xylene	2023/11/09		86	%	60 - 130
			o-Xylene	2023/11/09		81	%	60 - 130
			F1 (C6-C10)	2023/11/09		89	%	80 - 120
9038768	DW5	Method Blank	4-Bromofluorobenzene	2023/11/09		93	%	60 - 140
			D10-o-Xylene	2023/11/09		81	%	60 - 130
			D4-1,2-Dichloroethane	2023/11/09		98	%	60 - 140
			D8-Toluene	2023/11/09		95	%	60 - 140
			Acetone (2-Propanone)	2023/11/09	<0.49		ug/g	
			Benzene	2023/11/09	<0.0060		ug/g	
			Bromodichloromethane	2023/11/09	<0.040		ug/g	
			Bromoform	2023/11/09	<0.040		ug/g	
			Bromomethane	2023/11/09	<0.040		ug/g	
			Carbon Tetrachloride	2023/11/09	<0.040		ug/g	
			Chlorobenzene	2023/11/09	<0.040		ug/g	
			Chloroform	2023/11/09	<0.040		ug/g	
			Dibromochloromethane	2023/11/09	<0.040		ug/g	
			1,2-Dichlorobenzene	2023/11/09	<0.040		ug/g	
			1,3-Dichlorobenzene	2023/11/09	<0.040		ug/g	
			1,4-Dichlorobenzene	2023/11/09	<0.040		ug/g	
			Dichlorodifluoromethane (FREON 12)	2023/11/09	<0.040		ug/g	
			1,1-Dichloroethane	2023/11/09	<0.040		ug/g	
			1,2-Dichloroethane	2023/11/09	<0.049		ug/g	
			1,1-Dichloroethylene	2023/11/09	<0.040		ug/g	
			cis-1,2-Dichloroethylene	2023/11/09	<0.040		ug/g	
			trans-1,2-Dichloroethylene	2023/11/09	<0.040		ug/g	
			1,2-Dichloropropane	2023/11/09	<0.040		ug/g	
			cis-1,3-Dichloropropene	2023/11/09	<0.030		ug/g	
			trans-1,3-Dichloropropene	2023/11/09	<0.040		ug/g	
			Ethylbenzene	2023/11/09	<0.010		ug/g	
			Ethylene Dibromide	2023/11/09	<0.040		ug/g	
			Hexane	2023/11/09	<0.040		ug/g	
			Methylene Chloride(Dichloromethane)	2023/11/09	<0.049		ug/g	
			Methyl Ethyl Ketone (2-Butanone)	2023/11/09	<0.40		ug/g	
			Methyl Isobutyl Ketone	2023/11/09	<0.40		ug/g	
			Methyl t-butyl ether (MTBE)	2023/11/09	<0.040		ug/g	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Styrene	2023/11/09	<0.040		ug/g	
			1,1,1,2-Tetrachloroethane	2023/11/09	<0.040		ug/g	
			1,1,2,2-Tetrachloroethane	2023/11/09	<0.040		ug/g	
			Tetrachloroethylene	2023/11/09	<0.040		ug/g	
			Toluene	2023/11/09	<0.020		ug/g	
			1,1,1-Trichloroethane	2023/11/09	<0.040		ug/g	
			1,1,2-Trichloroethane	2023/11/09	<0.040		ug/g	
			Trichloroethylene	2023/11/09	<0.010		ug/g	
			Trichlorofluoromethane (FREON 11)	2023/11/09	<0.040		ug/g	
			Vinyl Chloride	2023/11/09	<0.019		ug/g	
			p+m-Xylene	2023/11/09	<0.020		ug/g	
			o-Xylene	2023/11/09	<0.020		ug/g	
			Total Xylenes	2023/11/09	<0.020		ug/g	
			F1 (C6-C10)	2023/11/09	<10		ug/g	
			F1 (C6-C10) - BTEX	2023/11/09	<10		ug/g	
9038768	DW5	RPD	Acetone (2-Propanone)	2023/11/09	NC		%	50
			Benzene	2023/11/09	NC		%	50
			Bromodichloromethane	2023/11/09	NC		%	50
			Bromoform	2023/11/09	NC		%	50
			Bromomethane	2023/11/09	NC		%	50
			Carbon Tetrachloride	2023/11/09	NC		%	50
			Chlorobenzene	2023/11/09	NC		%	50
			Chloroform	2023/11/09	NC		%	50
			Dibromochloromethane	2023/11/09	NC		%	50
			1,2-Dichlorobenzene	2023/11/09	NC		%	50
			1,3-Dichlorobenzene	2023/11/09	NC		%	50
			1,4-Dichlorobenzene	2023/11/09	NC		%	50
			Dichlorodifluoromethane (FREON 12)	2023/11/09	NC		%	50
			1,1-Dichloroethane	2023/11/09	NC		%	50
			1,2-Dichloroethane	2023/11/09	NC		%	50
			1,1-Dichloroethylene	2023/11/09	NC		%	50
			cis-1,2-Dichloroethylene	2023/11/09	NC		%	50
			trans-1,2-Dichloroethylene	2023/11/09	NC		%	50
			1,2-Dichloropropane	2023/11/09	NC		%	50
			cis-1,3-Dichloropropene	2023/11/09	NC		%	50
			trans-1,3-Dichloropropene	2023/11/09	NC		%	50
			Ethylbenzene	2023/11/09	NC		%	50
			Ethylene Dibromide	2023/11/09	NC		%	50
			Hexane	2023/11/09	NC		%	50
			Methylene Chloride(Dichloromethane)	2023/11/09	NC		%	50
			Methyl Ethyl Ketone (2-Butanone)	2023/11/09	NC		%	50
			Methyl Isobutyl Ketone	2023/11/09	NC		%	50
			Methyl t-butyl ether (MTBE)	2023/11/09	NC		%	50
			Styrene	2023/11/09	NC		%	50
			1,1,1,2-Tetrachloroethane	2023/11/09	NC		%	50
			1,1,2,2-Tetrachloroethane	2023/11/09	NC		%	50
			Tetrachloroethylene	2023/11/09	NC		%	50
			Toluene	2023/11/09	NC		%	50
			1,1,1-Trichloroethane	2023/11/09	NC		%	50
			1,1,2-Trichloroethane	2023/11/09	NC		%	50
			Trichloroethylene	2023/11/09	NC		%	50

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Trichlorofluoromethane (FREON 11)	2023/11/09	NC		%	50
			Vinyl Chloride	2023/11/09	NC		%	50
			p+m-Xylene	2023/11/09	NC		%	50
			o-Xylene	2023/11/09	NC		%	50
			Total Xylenes	2023/11/09	NC		%	50
			F1 (C6-C10)	2023/11/09	NC		%	30
			F1 (C6-C10) - BTEX	2023/11/09	NC		%	30
9039216	JJH	Matrix Spike [XNN664-01]	WAD Cyanide (Free)	2023/11/13		82	%	75 - 125
9039216	JJH	Spiked Blank	WAD Cyanide (Free)	2023/11/13		99	%	80 - 120
9039216	JJH	Method Blank	WAD Cyanide (Free)	2023/11/13	<0.01		ug/g	
9039216	JJH	RPD [XNN664-01]	WAD Cyanide (Free)	2023/11/13	NC		%	35
9040689	KLI	Matrix Spike	o-Terphenyl	2023/11/09		94	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2023/11/09		85	%	60 - 130
			F3 (C16-C34 Hydrocarbons)	2023/11/09		98	%	60 - 130
			F4 (C34-C50 Hydrocarbons)	2023/11/09		104	%	60 - 130
9040689	KLI	Spiked Blank	o-Terphenyl	2023/11/09		94	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2023/11/09		92	%	80 - 120
			F3 (C16-C34 Hydrocarbons)	2023/11/09		94	%	80 - 120
			F4 (C34-C50 Hydrocarbons)	2023/11/09		112	%	80 - 120
9040689	KLI	Method Blank	o-Terphenyl	2023/11/09		95	%	60 - 130
			F2 (C10-C16 Hydrocarbons)	2023/11/09	<10		ug/g	
			F3 (C16-C34 Hydrocarbons)	2023/11/09	<50		ug/g	
			F4 (C34-C50 Hydrocarbons)	2023/11/09	<50		ug/g	
9040689	KLI	RPD	F2 (C10-C16 Hydrocarbons)	2023/11/10	54 (3)		%	30
			F3 (C16-C34 Hydrocarbons)	2023/11/10	NC		%	30
			F4 (C34-C50 Hydrocarbons)	2023/11/10	NC		%	30
9041459	JWK	Matrix Spike	Hot Water Ext. Boron (B)	2023/11/10		90	%	75 - 125
9041459	JWK	Spiked Blank	Hot Water Ext. Boron (B)	2023/11/10		101	%	75 - 125
9041459	JWK	Method Blank	Hot Water Ext. Boron (B)	2023/11/10	<0.050		ug/g	
9041459	JWK	RPD	Hot Water Ext. Boron (B)	2023/11/10	0.29		%	40
9041494	KIT	Spiked Blank	Available (CaCl2) pH	2023/11/10		100	%	97 - 103
9041494	KIT	RPD	Available (CaCl2) pH	2023/11/10	0.62		%	N/A
9041584	MEN	Matrix Spike	Hot Water Ext. Boron (B)	2023/11/10		99	%	75 - 125
9041584	MEN	Spiked Blank	Hot Water Ext. Boron (B)	2023/11/10		101	%	75 - 125
9041584	MEN	Method Blank	Hot Water Ext. Boron (B)	2023/11/10	<0.050		ug/g	
9041584	MEN	RPD	Hot Water Ext. Boron (B)	2023/11/10	3.2		%	40
9041633	DT1	Matrix Spike	Acid Extractable Antimony (Sb)	2023/11/10		87	%	75 - 125
			Acid Extractable Arsenic (As)	2023/11/10		92	%	75 - 125
			Acid Extractable Barium (Ba)	2023/11/10		NC	%	75 - 125
			Acid Extractable Beryllium (Be)	2023/11/10		93	%	75 - 125
			Acid Extractable Boron (B)	2023/11/10		88	%	75 - 125
			Acid Extractable Cadmium (Cd)	2023/11/10		93	%	75 - 125
			Acid Extractable Chromium (Cr)	2023/11/10		95	%	75 - 125
			Acid Extractable Cobalt (Co)	2023/11/10		91	%	75 - 125
			Acid Extractable Copper (Cu)	2023/11/10		93	%	75 - 125
			Acid Extractable Lead (Pb)	2023/11/10		NC	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2023/11/10		90	%	75 - 125
			Acid Extractable Nickel (Ni)	2023/11/10		97	%	75 - 125
			Acid Extractable Selenium (Se)	2023/11/10		94	%	75 - 125
			Acid Extractable Silver (Ag)	2023/11/10		94	%	75 - 125

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acid Extractable Thallium (Tl)	2023/11/10		94	%	75 - 125
			Acid Extractable Uranium (U)	2023/11/10		97	%	75 - 125
			Acid Extractable Vanadium (V)	2023/11/10		96	%	75 - 125
			Acid Extractable Zinc (Zn)	2023/11/10		NC	%	75 - 125
			Acid Extractable Mercury (Hg)	2023/11/10		96	%	75 - 125
9041633	DT1	Spiked Blank	Acid Extractable Antimony (Sb)	2023/11/10		98	%	80 - 120
			Acid Extractable Arsenic (As)	2023/11/10		96	%	80 - 120
			Acid Extractable Barium (Ba)	2023/11/10		95	%	80 - 120
			Acid Extractable Beryllium (Be)	2023/11/10		96	%	80 - 120
			Acid Extractable Boron (B)	2023/11/10		93	%	80 - 120
			Acid Extractable Cadmium (Cd)	2023/11/10		97	%	80 - 120
			Acid Extractable Chromium (Cr)	2023/11/10		95	%	80 - 120
			Acid Extractable Cobalt (Co)	2023/11/10		94	%	80 - 120
			Acid Extractable Copper (Cu)	2023/11/10		95	%	80 - 120
			Acid Extractable Lead (Pb)	2023/11/10		98	%	80 - 120
			Acid Extractable Molybdenum (Mo)	2023/11/10		95	%	80 - 120
			Acid Extractable Nickel (Ni)	2023/11/10		97	%	80 - 120
			Acid Extractable Selenium (Se)	2023/11/10		101	%	80 - 120
			Acid Extractable Silver (Ag)	2023/11/10		99	%	80 - 120
			Acid Extractable Thallium (Tl)	2023/11/10		104	%	80 - 120
			Acid Extractable Uranium (U)	2023/11/10		101	%	80 - 120
			Acid Extractable Vanadium (V)	2023/11/10		93	%	80 - 120
			Acid Extractable Zinc (Zn)	2023/11/10		97	%	80 - 120
			Acid Extractable Mercury (Hg)	2023/11/10		100	%	80 - 120
9041633	DT1	Method Blank	Acid Extractable Antimony (Sb)	2023/11/10	<0.20		ug/g	
			Acid Extractable Arsenic (As)	2023/11/10	<1.0		ug/g	
			Acid Extractable Barium (Ba)	2023/11/10	<0.50		ug/g	
			Acid Extractable Beryllium (Be)	2023/11/10	<0.20		ug/g	
			Acid Extractable Boron (B)	2023/11/10	<5.0		ug/g	
			Acid Extractable Cadmium (Cd)	2023/11/10	<0.10		ug/g	
			Acid Extractable Chromium (Cr)	2023/11/10	<1.0		ug/g	
			Acid Extractable Cobalt (Co)	2023/11/10	<0.10		ug/g	
			Acid Extractable Copper (Cu)	2023/11/10	<0.50		ug/g	
			Acid Extractable Lead (Pb)	2023/11/10	<1.0		ug/g	
			Acid Extractable Molybdenum (Mo)	2023/11/10	<0.50		ug/g	
			Acid Extractable Nickel (Ni)	2023/11/10	<0.50		ug/g	
			Acid Extractable Selenium (Se)	2023/11/10	<0.50		ug/g	
			Acid Extractable Silver (Ag)	2023/11/10	<0.20		ug/g	
			Acid Extractable Thallium (Tl)	2023/11/10	<0.050		ug/g	
			Acid Extractable Uranium (U)	2023/11/10	<0.050		ug/g	
			Acid Extractable Vanadium (V)	2023/11/10	<5.0		ug/g	
			Acid Extractable Zinc (Zn)	2023/11/10	<5.0		ug/g	
			Acid Extractable Mercury (Hg)	2023/11/10	<0.050		ug/g	
9041633	DT1	RPD	Acid Extractable Antimony (Sb)	2023/11/10	6.2		%	30
			Acid Extractable Arsenic (As)	2023/11/10	2.9		%	30
			Acid Extractable Barium (Ba)	2023/11/10	4.9		%	30
			Acid Extractable Beryllium (Be)	2023/11/10	1.8		%	30
			Acid Extractable Boron (B)	2023/11/10	13		%	30
			Acid Extractable Cadmium (Cd)	2023/11/10	3.3		%	30
			Acid Extractable Chromium (Cr)	2023/11/10	2.6		%	30
			Acid Extractable Cobalt (Co)	2023/11/10	2.0		%	30

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acid Extractable Copper (Cu)	2023/11/10	3.0		%	30
			Acid Extractable Lead (Pb)	2023/11/10	1.1		%	30
			Acid Extractable Molybdenum (Mo)	2023/11/10	NC		%	30
			Acid Extractable Nickel (Ni)	2023/11/10	0.58		%	30
			Acid Extractable Selenium (Se)	2023/11/10	NC		%	30
			Acid Extractable Silver (Ag)	2023/11/10	NC		%	30
			Acid Extractable Thallium (Tl)	2023/11/10	5.3		%	30
			Acid Extractable Uranium (U)	2023/11/10	3.1		%	30
			Acid Extractable Vanadium (V)	2023/11/10	0.40		%	30
			Acid Extractable Zinc (Zn)	2023/11/10	3.0		%	30
			Acid Extractable Mercury (Hg)	2023/11/10	9.8		%	30
9041636	KIT	Spiked Blank	Available (CaCl2) pH	2023/11/10		100	%	97 - 103
9041636	KIT	RPD	Available (CaCl2) pH	2023/11/10	0.72		%	N/A
9041696	LKI	Spiked Blank	Conductivity	2023/11/10		103	%	90 - 110
9041696	LKI	Method Blank	Conductivity	2023/11/10	<0.002		mS/cm	
9041696	LKI	RPD	Conductivity	2023/11/10	2.4		%	10
9042145	JGC	Matrix Spike	Acid Extractable Antimony (Sb)	2023/11/10		88	%	75 - 125
			Acid Extractable Arsenic (As)	2023/11/10		93	%	75 - 125
			Acid Extractable Barium (Ba)	2023/11/10		NC	%	75 - 125
			Acid Extractable Beryllium (Be)	2023/11/10		95	%	75 - 125
			Acid Extractable Boron (B)	2023/11/10		95	%	75 - 125
			Acid Extractable Cadmium (Cd)	2023/11/10		91	%	75 - 125
			Acid Extractable Chromium (Cr)	2023/11/10		93	%	75 - 125
			Acid Extractable Cobalt (Co)	2023/11/10		89	%	75 - 125
			Acid Extractable Copper (Cu)	2023/11/10		89	%	75 - 125
			Acid Extractable Lead (Pb)	2023/11/10		94	%	75 - 125
			Acid Extractable Molybdenum (Mo)	2023/11/10		91	%	75 - 125
			Acid Extractable Nickel (Ni)	2023/11/10		90	%	75 - 125
			Acid Extractable Selenium (Se)	2023/11/10		93	%	75 - 125
			Acid Extractable Silver (Ag)	2023/11/10		92	%	75 - 125
			Acid Extractable Thallium (Tl)	2023/11/10		93	%	75 - 125
			Acid Extractable Uranium (U)	2023/11/10		90	%	75 - 125
			Acid Extractable Vanadium (V)	2023/11/10		96	%	75 - 125
			Acid Extractable Zinc (Zn)	2023/11/10		NC	%	75 - 125
			Acid Extractable Mercury (Hg)	2023/11/10		91	%	75 - 125
9042145	JGC	Spiked Blank	Acid Extractable Antimony (Sb)	2023/11/10		95	%	80 - 120
			Acid Extractable Arsenic (As)	2023/11/10		94	%	80 - 120
			Acid Extractable Barium (Ba)	2023/11/10		97	%	80 - 120
			Acid Extractable Beryllium (Be)	2023/11/10		100	%	80 - 120
			Acid Extractable Boron (B)	2023/11/10		93	%	80 - 120
			Acid Extractable Cadmium (Cd)	2023/11/10		93	%	80 - 120
			Acid Extractable Chromium (Cr)	2023/11/10		92	%	80 - 120
			Acid Extractable Cobalt (Co)	2023/11/10		91	%	80 - 120
			Acid Extractable Copper (Cu)	2023/11/10		92	%	80 - 120
			Acid Extractable Lead (Pb)	2023/11/10		101	%	80 - 120
			Acid Extractable Molybdenum (Mo)	2023/11/10		92	%	80 - 120
			Acid Extractable Nickel (Ni)	2023/11/10		102	%	80 - 120
			Acid Extractable Selenium (Se)	2023/11/10		98	%	80 - 120
			Acid Extractable Silver (Ag)	2023/11/10		95	%	80 - 120
			Acid Extractable Thallium (Tl)	2023/11/10		98	%	80 - 120
			Acid Extractable Uranium (U)	2023/11/10		93	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Acid Extractable Vanadium (V)	2023/11/10		91	%	80 - 120
			Acid Extractable Zinc (Zn)	2023/11/10		121 (2)	%	80 - 120
			Acid Extractable Mercury (Hg)	2023/11/10		96	%	80 - 120
9042145	JGC	Method Blank	Acid Extractable Antimony (Sb)	2023/11/10	<0.20		ug/g	
			Acid Extractable Arsenic (As)	2023/11/10	<1.0		ug/g	
			Acid Extractable Barium (Ba)	2023/11/10	<0.50		ug/g	
			Acid Extractable Beryllium (Be)	2023/11/10	<0.20		ug/g	
			Acid Extractable Boron (B)	2023/11/10	<5.0		ug/g	
			Acid Extractable Cadmium (Cd)	2023/11/10	<0.10		ug/g	
			Acid Extractable Chromium (Cr)	2023/11/10	<1.0		ug/g	
			Acid Extractable Cobalt (Co)	2023/11/10	<0.10		ug/g	
			Acid Extractable Copper (Cu)	2023/11/10	<0.50		ug/g	
			Acid Extractable Lead (Pb)	2023/11/10	<1.0		ug/g	
			Acid Extractable Molybdenum (Mo)	2023/11/10	<0.50		ug/g	
			Acid Extractable Nickel (Ni)	2023/11/10	<0.50		ug/g	
			Acid Extractable Selenium (Se)	2023/11/10	<0.50		ug/g	
			Acid Extractable Silver (Ag)	2023/11/10	<0.20		ug/g	
			Acid Extractable Thallium (Tl)	2023/11/10	<0.050		ug/g	
			Acid Extractable Uranium (U)	2023/11/10	<0.050		ug/g	
			Acid Extractable Vanadium (V)	2023/11/10	<5.0		ug/g	
			Acid Extractable Zinc (Zn)	2023/11/10	<5.0		ug/g	
			Acid Extractable Mercury (Hg)	2023/11/10	<0.050		ug/g	
9042145	JGC	RPD	Acid Extractable Antimony (Sb)	2023/11/10	NC		%	30
			Acid Extractable Arsenic (As)	2023/11/10	14		%	30
			Acid Extractable Barium (Ba)	2023/11/10	0.080		%	30
			Acid Extractable Beryllium (Be)	2023/11/10	1.2		%	30
			Acid Extractable Boron (B)	2023/11/10	0.76		%	30
			Acid Extractable Cadmium (Cd)	2023/11/10	NC		%	30
			Acid Extractable Chromium (Cr)	2023/11/10	0.71		%	30
			Acid Extractable Cobalt (Co)	2023/11/10	1.8		%	30
			Acid Extractable Copper (Cu)	2023/11/10	4.4		%	30
			Acid Extractable Lead (Pb)	2023/11/10	2.1		%	30
			Acid Extractable Molybdenum (Mo)	2023/11/10	NC		%	30
			Acid Extractable Nickel (Ni)	2023/11/10	2.8		%	30
			Acid Extractable Selenium (Se)	2023/11/10	NC		%	30
			Acid Extractable Silver (Ag)	2023/11/10	NC		%	30
			Acid Extractable Thallium (Tl)	2023/11/10	0.56		%	30
			Acid Extractable Uranium (U)	2023/11/10	9.8		%	30
			Acid Extractable Vanadium (V)	2023/11/10	0.64		%	30
			Acid Extractable Zinc (Zn)	2023/11/10	5.0		%	30
9045293	SB5	Matrix Spike [XNN664-01]	Chromium (VI)	2023/11/13		64 (4)	%	70 - 130
9045293	SB5	Spiked Blank	Chromium (VI)	2023/11/13		92	%	80 - 120
9045293	SB5	Method Blank	Chromium (VI)	2023/11/13	<0.18		ug/g	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
9045293	SB5	RPD [XNN664-01]	Chromium (VI)	2023/11/13	NC		%	35

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Detection Limit was raised due to matrix interferences.

(2) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(3) Duplicate results exceeded RPD acceptance criteria for flagged analytes. Sample extract was reanalyzed with the same results. This is likely due to sample heterogeneity.

(4) The matrix spike recovery was below the lower control limit. This may be due in part to the reducing environment of the sample. The matrix spike was reanalyzed to confirm result.

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VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Cristina Carriere, Senior Scientific Specialist

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

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CHAIN OF CUSTODY RECORD

Page 1 of 1

INVOICE TO:	REPORT TO:	PROJECT INFORMATION:	Laboratory Use Only:
#3072	13R 0B8	marissa.Lusito@Stantec.com	
Company Name: #623 ~~Trans-Northern Pipelines Inc~~ Stantec Consulting LTD	Company Name: #15877 Stantec Consulting	Quotation #: ~~C13206~~	Bureau Veritas Job #:
Attention: Accounts Payable	Attention: ~~Trent Irwin~~ Marissa Lusito	P.O. #: ~~55875~~	Bottle Order #: 961731
Address: ~~45 Vogell Rd Suite 310~~ 675 Cochrane Drive W #300 ~~Richmond Hill ON L4B 3P6~~ Markham ON L3R 479 - 9526	Address: ~~200-835 Paramount Dr.~~ ~~Stoney Creek ON L8J 0B4~~	Project: ~~122120483~~ 1400220.038	COC #:
Tel: (905) ~~770-3353~~ 944 7777 Fax: (905) ~~770-8675~~	Tel: ~~(905) 381-3277~~ 905 944 7777 Fax:	Project Name:	Project Manager: Kudrat Bajwa
Email: ~~ap@inpi.ca~~ SAPinvoices@Stantec.com	Email: ~~Trent.Irwin@stantec.com~~; edd@stantec.com	Site #: Site B - 1975 Muskoka Beach	C#961731-01-01
		Sampled By: Nathan Davenport	

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011)
- ☐ Table 1 ☑ Res/Park ☐ Medium/Fine
- ☑ Table 2 ☐ Ind/Comm ☐ Coarse
- ☐ Table 3 ☐ Agri/Other ☐ For RSC
- ☐ Table ___

Other Regulations
- ☐ CCME ☐ Sanitary Sewer Bylaw
- ☐ Reg 558. ☐ Storm Sewer Bylaw
- ☐ MISA Municipality ___
- ☐ PWQO ☐ Reg 406 Table ___
- ☐ Other ___

Special Instructions

Include Criteria on Certificate of Analysis (Y/N)? ✓

Turnaround Time (TAT) Required:
Please provide advance notice for rush projects

Regular (Standard) TAT: ✓
(will be applied if Rush TAT is not specified):
Standard TAT = 5-7 Working days for most tests..
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: ___ Time Required: ___ ☐
Rush Confirmation Number: ___ *(call lab for #)*

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field-Filtered (please circle): Metals / Hg / Cr VI	ANALYSIS REQUESTED (PLEASE BE SPECIFIC): O.Reg 153 VOCs by HS & F1-F4 (PHCs) + Vec	CCME PAHs (Low Level)	Acid Extractable Lead by ICPMS	O. Reg PAHs 153	O. Reg 153 metals + inorganics	# of Bottles	Comments
1		BH6 SS1	2023/10/31	13:30	Soil	NA	✓			✓	✓	3	120, vial, 250
2		BH8 SS1	2023/11/02	10:15	↓		✓			✓	✓	3	120, vial, 250
3		BH9 SS2	2023/11/02	15:00		↓				✓	✓	2	250, 60
4		BH9 SS5	2023/11/02	15:55			✓					2	vial, 60
5													
6													
7													
8													
9													
10													

07-Nov-23 15:25
Kudrat Bajwa
C3Y9296
AJH ENV-1239

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
Nathan Davenport	23/11/06	17:20	RAJ MASANI	2023/11/07	1125	0

Laboratory Use Only
Time Sensitive ✓ | Temperature (°C) on Recei 2/2/2 | Custody Seal Present ✓ Intact ✓ | Yes | No

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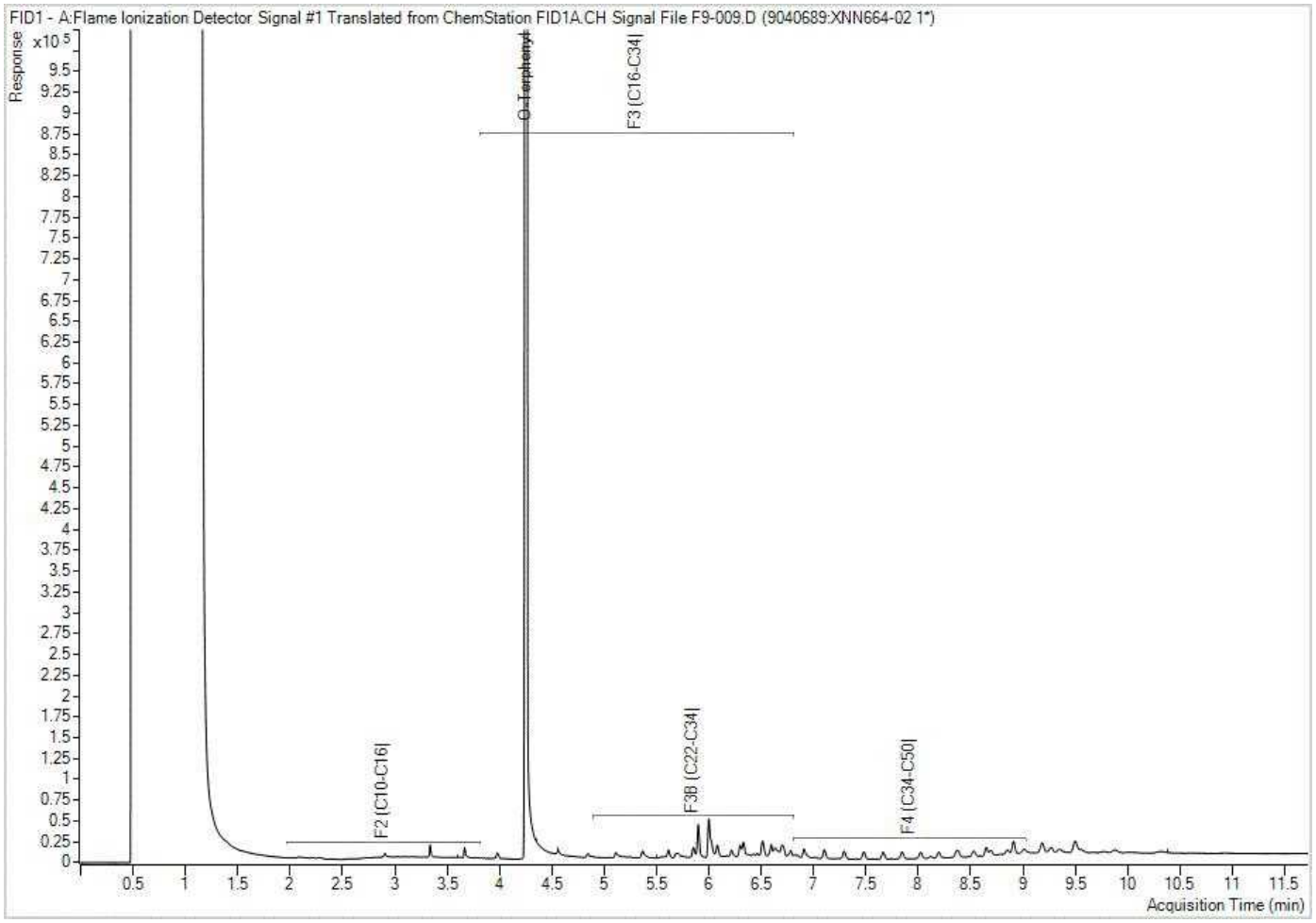
Bureau Veritas Job #: C3Y9296
Report Date: 2023/11/14
Bureau Veritas Sample: XNN664

Stantec Consulting Ltd
Client Project #: 140022038
Project name: SITE B-1975, MUSKOKA BEACH
Client ID: BH6 SS1

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram

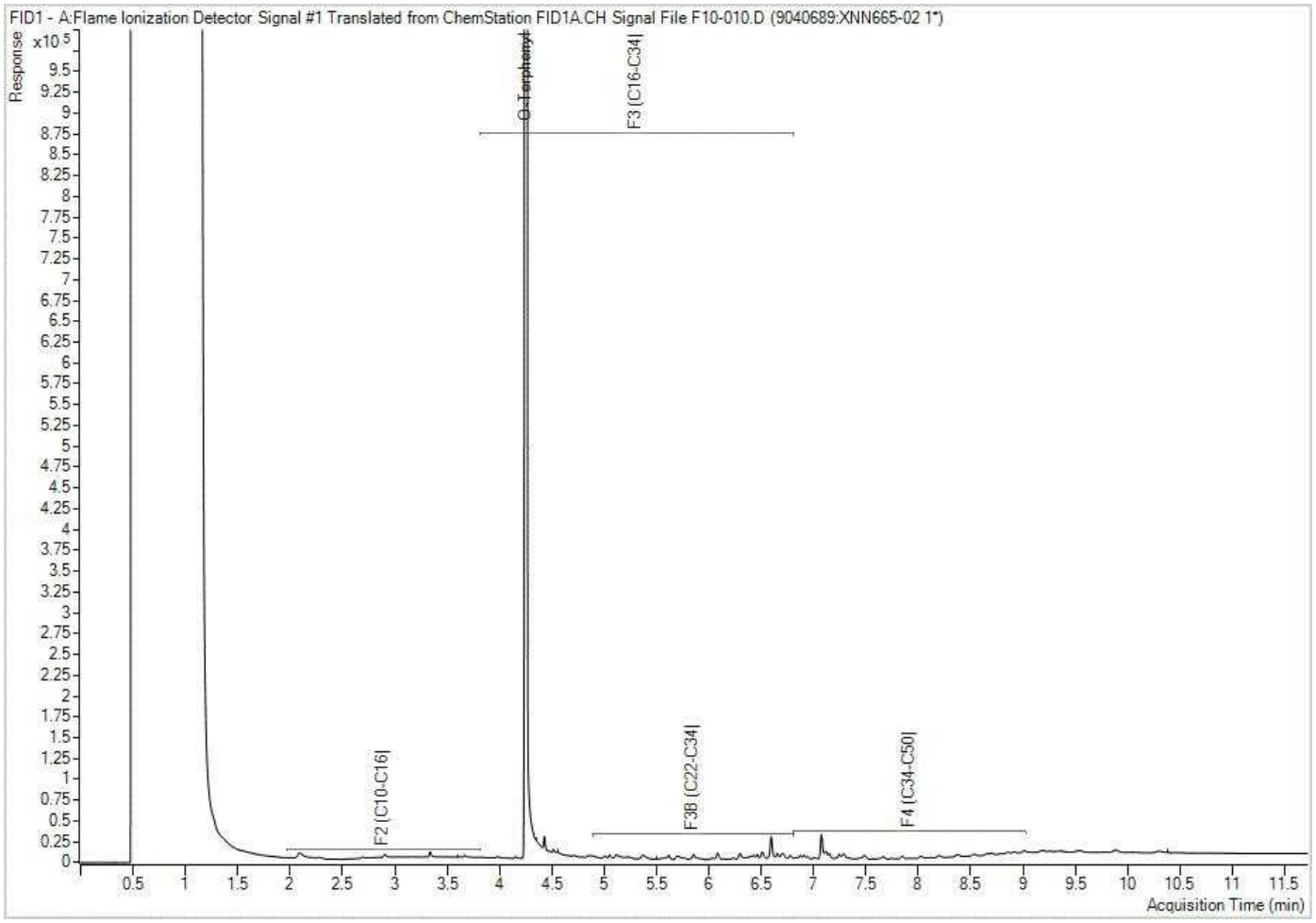


Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Bureau Veritas Job #: C3Y9296
Report Date: 2023/11/14
Bureau Veritas Sample: XNN665

Stantec Consulting Ltd
Client Project #: 140022038
Project name: SITE B-1975, MUSKOKA BEACH
Client ID: BH8 SS1

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



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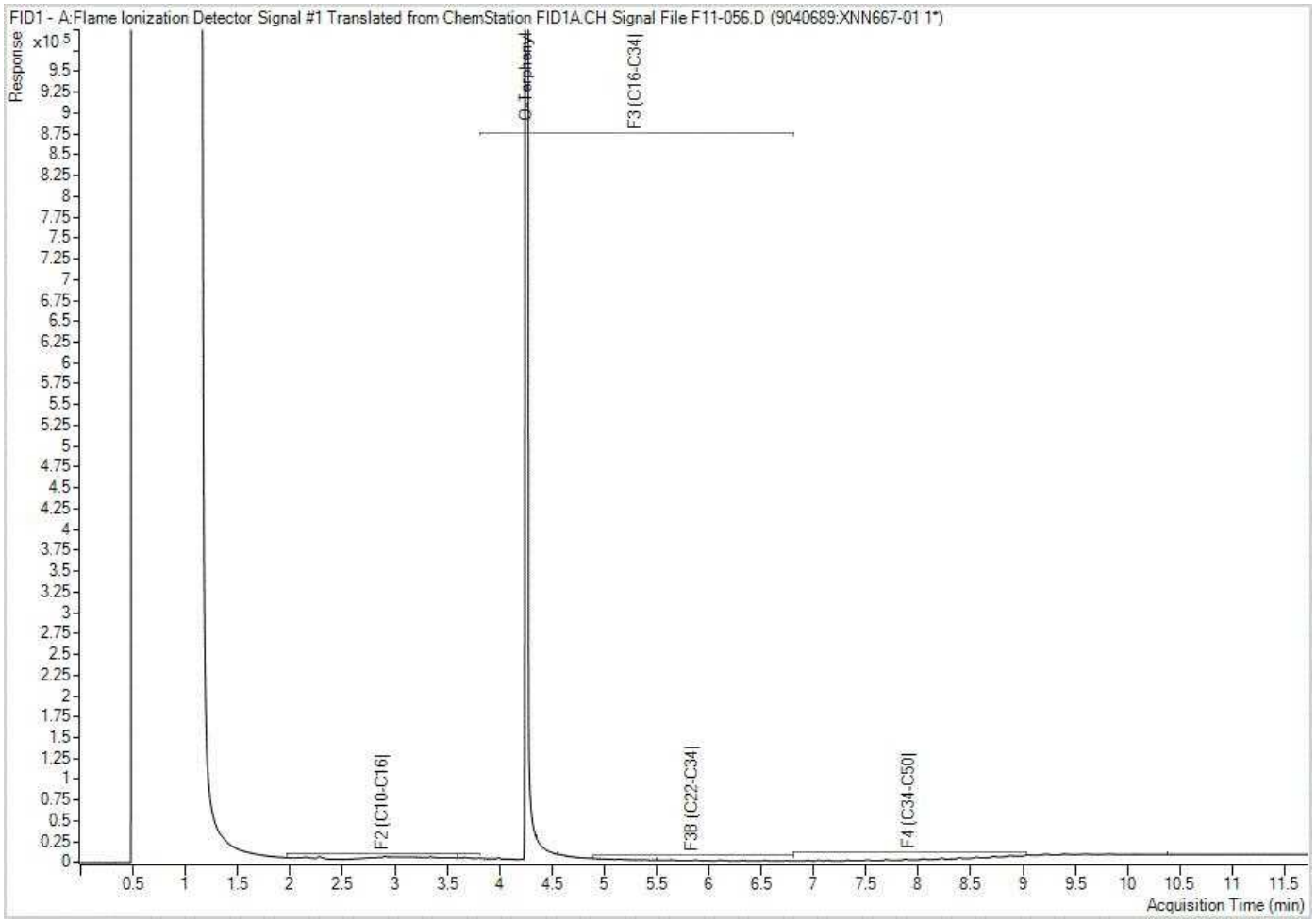
Bureau Veritas Job #: C3Y9296
Report Date: 2023/11/14
Bureau Veritas Sample: XNN667

Stantec Consulting Ltd
Client Project #: 140022038
Project name: SITE B-1975, MUSKOKA BEACH
Client ID: BH9 SS5

Petroleum Hydrocarbons F2-F4 in Soil Chromatogram



Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

Final Preliminary Due Diligence Geotechnical and Hydrogeological Investigation Report – Proposed Hospital at Site A – 300 Pine Street in Bracebridge, Ontario

November 14, 2024

Prepared for:

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FINAL PRELIMINARY DUE DILIGENCE GEOTECHNICAL AND HYDROGEOLOGICAL INVESTIGATION REPORT – PROPOSED HOSPITAL AT SITE A – 300 PINE STREET IN BRACEBRIDGE, ONTARIO

Revision	Date	Description	Prepared By	Reviewed By	Reviewed By
A	December 22, 2023	Issued for Review	Binoy Debnath	Khash Refahi	Gary Zhao
0	January 16, 2023	Issued for Review	Binoy Debnath	Khash Refahi	Gary Zhao

FINAL PRELIMINARY DUE DILIGENCE GEOTECHNICAL AND HYDROGEOLOGICAL INVESTIGATION REPORT – PROPOSED HOSPITAL AT SITE A – 300 PINE STREET IN BRACEBRIDGE, ONTARIO

The conclusions in the Report titled Preliminary Due Diligence Geotechnical and Hydrogeological Investigation Report – Proposed Hospital at Site A – 300 Pine Street in Bracebridge, Ontario are Stantec's professional opinion, as of the time of the Report, and concerning the scope described in the Report. The opinions in the document are based on conditions and information existing at the time the scope of work was conducted and do not take into account any subsequent changes. The Report relates solely to the specific project for which Stantec was retained and the stated purpose for which the Report was prepared. The Report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient's own risk.

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1.0 INTRODUCTION

Muskoka Algonquin Healthcare (MAHC) is going to construct a new hospital in Bracebridge, Ontario. It is understood that two Sites, located at 300 Pine Street ("Site A") and 1975 Muskoka Beach Road ("Site B"), are currently being considered for this purpose. The preferred Site will be selected at a later stage, based on the results of the due diligence investigation among other factors.

Stantec Consulting Ltd. (Stantec) was retained by MAHC to complete a due diligence level geotechnical investigation for the potential construction at both Sites to provide an overview of the subsurface conditions at the proposed area, and potential geotechnical issues or concerns associated with the proposed work. This report provides the results of the preliminary geotechnical investigation at 300 Pine Street in Bracebridge, Ontario ("Site A"). The results of the investigation for Site B are provided under separate cover.

It is also noted that further geotechnical investigation and/or assessment will be required for the selected Site once more information (i.e., Site grading plan, conceptual design, etc.) become available.

A test pit program was completed prior to the borehole drilling program to identify the bedrock depth across the project site in "Site A" under MAHC's instruction after receiving the authorization to proceed from MAHC, in order to support the Client for site selection. A total of ten (10) test pits were excavated beside the proposed borehole locations on October 25 and 26, 2023.

The borehole drilling program for the geotechnical investigation was completed in accordance with the proposal entitled "Fee Proposal for Professional Engineering Services, Muskoka Algonquin Healthcare – Preliminary Due Diligence," dated April 29, 2023.

Limitations associated with this report and its contents are provided in the statement of general conditions included in **Appendix A**.

2.0 PROPOSED NEW HOSPITAL AND SITE DESCRIPTION

2.1 SITE DESCRIPTION

The proposed Site A is located at 300 Pine Street, Bracebridge, Ontario.

The Site is located to the south-west of Highway 11 and Taylor Road and to the east of Cedar Lane. The Site is bounded by a hydro corridor to the north, Highway 11 to the east and south and industrial developments to the west. The Site is currently undeveloped, comprising predominantly of forest/wooded areas on most of east and southwest sections of the Site and a sand pit and an open area on northwest section of the Site. Bedrock outcrop was observed at multiple locations within the Site.

A conceptual site plan developed by Stantec indicated that the development will be located in the central section of the Site (in the forest area).

A topographical drawing of the Site prepared by Stantec and dated October 18, 2023 indicates that the topography at the location of the proposed building descends from approximately Elevation 283.5 m to the west to Elevation 275.0 m to the east, translating to an elevation difference of 8.5 m.

The site plan indicates that the forest area of the Site is at a higher elevation and is separated from the sand pit with a rock cliff as high as approximately 18 m. With the inclusion of the sand pit there is an elevation difference of approximately 26.8 m at the borehole locations ranging from approximately Elevations 255.2 m to 282.0 m.

2.2 PROPOSED DEVELOPMENT

The conceptual design for the proposed development is shown on the Borehole and Test Pit Location Plan drawing, Drawing 1 in **Appendix B**. The sketch indicates that the proposed development will include a new hospital building and associated service roads located in the northeast section of the Site in the existing forest area. No additional details for the development were known at the time of preparation of this report.

3.0 GEOLOGY REFERENCES AND SOURCES OF INFORMATION

3.1 OGS EARTH DATABASE

The Ontario Ministry of Northern Development and Mines (MNDM) has digitized geoscience data created from a variety of sources containing information about the physiography, surficial geology Paleozoic geology and geotechnical boreholes in the province of Ontario.

3.2 MTO GEOCRES FOUNDATION LIBRARY

The Ministry of Transportation of Ontario (MTO) Geocres Foundation Library is an online collection of reports obtained by the Ministry. The reports include information on borehole locations, groundwater conditions, and overburden & rock stratigraphy encountered during drilling for a variety of MTO projects (e.g. highways, interchanges, culverts, bridges, and similar). The reports include data interpretation and recommendations for use in design and construction.

3.3 MECP WELL WATER RECORDS

The Ministry of the Environment, Conservation and Parks (MECP) water well records (WWRs) database includes information on water well locations, groundwater conditions, and overburden & rock stratigraphy encountered during drilling. The MECP WWRs largely include domestic supply wells, municipal supply wells, and ground water monitoring wells. From a geotechnical perspective, the water well records are considered a low-quality dataset. However, the volume of information is extremely useful in understanding “general trends” in the subsurface conditions.

4.0 REGIONAL GEOLOGICAL CONDITIONS

4.1 OVERBURDEN

The Physiography of Southern Ontario by Chapman and Putnam (1984) indicates that the Site is located within a region known as Number 11 Strip, located within the wider Algonquin Highlands region. The map also indicates that the overburden at the Site consists of sand plains.

The Surficial Geology of Southern Ontario mapping data (MRD128-Revised, 2003) indicates that the overburden at the Site consists predominantly of coarse-textured glaciolacustrine deposits (sand, gravel, minor silt and clay). However, zones of ice-contact stratified deposits (sand and gravel, minor silt, clay and till) and Precambrian bedrock are present in the middle sections of the Site.

The Quaternary Geology of Ontario Southern Sheet (Map 2556) indicates that the overburden at the Site location is underlain by Glaciofluvial outwash deposits which described as Pleistocene (gravel and sand, includes proglacial river and deltaic deposits).

A review of the OGS Geotechnical Boreholes database did not yield any records in proximity of the proposed Site.

A review of the MTO Geocres Foundation Library yielded four (4) reports within 800 m of the proposed Site. The reports have little relevance with the current investigation to the proposed Hospital Site given the shallow bedrock encountered at Site.

A review of the MECP water well database identified nine (9) well records with recorded stratigraphy in proximity to the proposed Site. The depths of the wells ranged from 33.5 m to 97.6 m below ground surface. The well records generally indicate presence of sand, clay underlain by bedrock.

4.2 BEDROCK

The Bedrock Geology of Ontario, Southern Sheep Map 2544 indicates that the underlying bedrock at the Site consists mainly of migmatitic rocks and gneisses of undetermined protolith that is commonly layered biotite gneisses and migmatites; locally includes quartzofeldspathic gneisses, orthogneisses, paragneisses.

MECP water well records referenced above recorded the presence of bedrock at depths ranged from approximately 10.7 m to 81.4 m below ground surface.

4.3 GROUNDWATER

The MECP water well records referenced above indicated static water level recorded at depths of 9.1 m to 30.5 m below grade.

5.0 METHOD OF INVESTIGATION

5.1 FIELD INVESTIGATION

Prior to commencing the field investigation, Stantec contacted Ontario One Call to confirm the location of public services and utilities and retained the services of a private utility locate company, Premier Locates, to provide additional utility locate clearances at the intended borehole locations.

At the beginning of the investigation, ten (10) test pits, identified as TP-1 to TP-10, were advanced at the Site to depths ranging from approximately 0.5 m to 4.0 m below grade. The test pits were advanced on October 25 and 26, 2023, prior to the borehole drilling, using a CAT 305E excavator; supplied and operated by Wes Finch & Sons Excavating Ltd. Stantec field personnel recorded the conditions encountered in the test pits. These test pits were advanced near the same numbered boreholes to check the possible bedrock depth. The test pit records indicated almost similar type of materials encountered that recorded in the boreholes. The test pit logs are presented in **Appendix C**.

After the test pitting program, ten (10) boreholes, identified as BH PI-1 to BH PI-10, were drilled at the Site to depths ranging from approximately 0.2 m to 9.8 m below grade. The boreholes were advanced between November 3 to 10, 2023, using a track-mounted drill rig equipped with hollow stem augers; supplied and operated by Walker Drilling Ltd. Stantec field personnel recorded the conditions encountered in the boreholes.

Soil samples were recovered using a 50 mm (outside diameter) split-barrel sampler by conducting Standard Penetration Tests (SPTs) in accordance with the procedures outlined in ASTM D1586. Soil samples were collected at regular intervals. All soil samples recovered from the boreholes were placed in moisture-proof bags.

Field vane shear tests using MTO 'N' vane were performed in the cohesive soils encountered in boreholes BHMW PI-3, BH PI-8 and BHMW PI-9 in accordance with ASTM D2573.

Pocket penetrometer tests were also carried out on selected cohesive soil samples in the field.

Bedrock was inferred based on spoon refusal in boreholes BHMW PI-1, BH PI-2, BH PI-5, BH PI-6, BH PI-7, BH PI-8 and BHMW PI-9, and was cored in BH PI-10 using HQ size rock coring equipment in accordance with the procedures outlined in ASTM D2113. Total Core Recovery (TCR), Solid Core Recovery (SCR) and Rock Quality Designation (RQD) were recorded in the field. Rock samples recovered from the borehole were placed in wooden core box.

Soil samples that remained after environmental sampling and all rock cores were returned to Stantec's geotechnical and construction materials testing laboratory and warehouse facility in Markham, ON.

Three (3) 50 mm diameter groundwater monitoring wells were installed in boreholes BHMW PI-1, BHMW PI-3 and BHMW PI-9. The screen depths relative to the ground surface are noted on the borehole records included in **Appendix C**.

Groundwater conditions were recorded in all monitoring wells and are reported below in Section 6.5 of this report.

Boreholes (without monitoring wells) were backfilled with both soil cuttings and bentonite consistent with the requirements of the MECP Regulation 903.

5.2 SURVEYING

A topographic survey was completed by Stantec Geomatic Team, and the borehole and monitoring well locations and respective ground surface elevations were also surveyed by Stantec Geomatic Team. The approximate Universal Transverse Mercator (NAD83 UTM, Zone 17) northing and easting coordinates and respective ground surface elevations are provided in Table 5.1 below. The termination depth and elevation of each of the boreholes are also provided in the table for reference.

Table 5.1: Borehole Locations Summary

Borehole No.	UTM Coordinates (NAD83 - Zone 17)		Ground Surface Elevation (m)	Termination Depth (m)	Termination Elevation (m)
	Northing	Easting			
BHMW PI-1	4989237	634441	271.5	9.3	262.2
BH PI-2	4989095	634484	255.2	9.2	246.0
BHMW PI-3	4988926	634481	262.5	9.7	252.8
BH PI-4	4988811	634578	256.3	9.8	246.5
BH PI-5[1]	4989339	634594	279.4	3.8	275.6
BH PI-6	4989255	634655	276.2	0.2	276
BH PI-7	4989144	634626	277.5	1.9	275.6
BH PI-8	4989099	634686	273.4	5.0	268.4
BHMW PI-9[1]	4989008	634685	271.8	7.8	264.0
BH PI-10[1]	4989225	634554	282.0	3.5	278.5

Note:
1. The coordinates of BH PI-5, BHMW PI-9 and BH PI-10 were approximate based on the surveyed coordinates of nearby boreholes, and the ground surface elevations of these boreholes were inferred from the topographic drawing.

The borehole coordinates are also shown on the borehole records in **Appendix C** for reference.

5.3 LABORATORY TESTING

Soil (remaining after environmental sampling) and rock samples from the boreholes were subjected to visual and tactile examination on return to the Stantec's geotechnical and construction materials testing laboratory.

The laboratory testing program completed on selected samples consisted of the following:

- Gradation Analysis 9 samples
- Atterberg Limits 4 samples
- Moisture Content 60 samples

Results of the tests are indicated on the Borehole Records in **Appendix C** and are illustrated on the figures in **Appendix D.**

Samples remaining after testing were placed in storage and will be retained for a period of three months after the date of issue of the final report for this project. After the storage period, the samples will be discarded.

6.0 RESULTS OF INVESTIGATION

6.1 FRAME OF REFERENCE

6.1.1 Overburden

The soils encountered in the boreholes and reported herein have been classified in accordance with the Unified Soil Classification System as defined in ASTM D2487 and D2488, with modifications consistent with the methods of the MTO. The modifications specifically include the removal of the descriptions “lean” and “fat” with reference to clay soils and include a “Medium” category with respect to plasticity.

It should be noted that the internal diameter (I.D.) of the SPT sampler is 38 mm and hence the grain size test results and soil classifications may not reflect the entire gravel size fraction which extends to 75 mm diameter. The presence of cobbles (particles from 75 mm to 200 mm) and boulders (particles > 200 mm) where inferred to be present are described separately from the gravel content.

6.2 OVERVIEW

In general, the stratigraphy encountered in the boreholes and test pits consisted of:

- Ground surface cover consisting of topsoil and grass (in all boreholes except BHMW PI-1 and BH PI-2); underlain by,
- Cohesionless fill (in boreholes BHMW PI-1, BH PI-2 and BHMW PI-3); underlain by,
- Cohesive fill (in borehole BHMW PI-3); underlain by,
- Upper very loose to very dense silty sand to sandy silt, silty clayey sand to silty sand and silty sand to sand (in all boreholes except BHMW PI-1 and BH PI-6); underlain by,
- Soft to firm silty clay to clay (in boreholes BHMW PI-3, BH PI-8 and BHMW PI-9); underlain by,
- Lower dense to very dense silty sand (in borehole BHMW PI-3) and loose to compact sandy silt (in boreholes BH PI-8 and BHMW PI-9); underlain by,
- Bedrock inferred at depths of 0.2 m to 9.3 m below grade (BHMW PI-1, BH PI-2, BH PI-5, BH PI-6, BH PI-7, BH PI-8 and BHMW PI-9), and cored at a depth of 2.1 m (BH PI-10) below grade.

Groundwater level could not be measured in open borehole in BH PI-10 due to rock coring. Boreholes BH PI-2, BH PI-6 and BH PI-7 were dry upon completion. Groundwater levels were measured in open boreholes at depths of approximately 2.1 m, 2.3 m and 2.1 m below grade corresponding to approximately elevations 254.2 m, 277.1 m and 271.3 m in boreholes BH PI-4, BH PI-5 and BH PI-8, respectively.

Groundwater levels were recorded at depths of 8.7 m and 6.1 m below grade, corresponding to approximately elevations 253.8 m and 265.7 m in the monitoring wells installed in boreholes BHMW PI-3 and BHMW PI-9, respectively on November 10th, 2023. The groundwater levels were recorded at the

depths of 9.0 m and 6.9 m below grade, corresponding to approximately elevations 253.5 m and 264.9 m in the monitoring wells installed in boreholes BHMW PI-3 and BHMW PI-9, respectively on November 20th, 2023. Borehole BHMW PI-1 was dry on November 20th, 2023.

The subsurface conditions observed in the boreholes are presented in detail on the Borehole Records provided in **Appendix C**. An explanation of the symbols and terms used to describe the Borehole Records is also provided in **Appendix C**.

A fence diagram illustrating the soil conditions encountered in the boreholes is provided in **Appendix B** as well.

6.3 OVERBURDEN

6.3.1 Ground Surface Cover

Topsoil was present at all borehole locations except boreholes BHMW PI-1, BH PI-2 and BHMW PI-3. The topsoil was approximately 50 mm to 200 mm thick. Borehole BH PI-6 was terminated at a depth of approximately 0.2 m below grade, corresponding to approximately elevation 276.0 m due to spoon and auger refusals on inferred bedrock.

6.3.2 Cohesionless Fill

Cohesionless fill materials consisting of dark brown to brown silty sand to silty sand with gravel, brown to grey gravel with sand to gravel were encountered in boreholes BHMW PI-1, BH PI-2 and BHMW PI-3. Samples obtained from the cohesionless fill layer typically contained trace rootlets and trace wood debris.

The cohesionless fill layer was approximately 9.3 m (BHMW PI-1) to 0.8 m (BH PI-2 and BHMW PI-3) thick and extended to depths ranging from approximately 0.8 m to 9.3 m below grade, corresponding to approximately elevations 254.4 m to 262.2 m. The cohesionless soils encountered in boreholes BHMW PI-1 and BHMW PI-3 are considered to be fill materials, due to the high percentage of gravel component encountered in overburden. Borehole BHMW PI-1 was terminated in this stratum at 9.3 m below grade due to refusal on inferred bedrock.

The cohesionless fill layer was also encountered at TP-1 and TP-3 locations and extended to depths ranging from approximately 1.8 m to 1.2 m below grade, respectively.

The N-values obtained from the SPTs advanced in the cohesionless fill materials ranged from 2 to 22, indicating that the cohesionless fill is in a very loose to compact condition.

Based on visual and tactile examination of the samples, the cohesionless fill material was characterized as moist to wet. The moisture contents of the samples tested ranged from approximately 1% to 12%, averaging 8%.

A grain size distribution test was completed on a single sample of the cohesionless fill. The result of the test is shown in Table 6.1 below.

Table 6.1: Grain Size Distribution – Cohesionless Fill

Borehole	Sample	Depth (m)	Description	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
BHMW PI-1	SS4	2.6	Possible FILL: GRAVEL with Sand (GP)	55	40	4	1

The grain size distribution test result is shown on the borehole record in **Appendix C** and is illustrated on Figure 1 in **Appendix D**.

In accordance with the Unified Soil Classification System, the sample tested can be classified as Gravel with Sand (GP).

6.3.3 Cohesive Fill

A stratum of brown possible cohesive fill was encountered below the cohesionless fill described in the preceding section in borehole BHMW PI-3. This cohesive fill stratum was described as brown colored sandy clay, and typically contained trace gravel. The cohesive fill layer was approximately 0.7 m thick and extended to a depth of approximately 1.5 m below grade, corresponding to approximately elevation 261.0 m.

The N-value obtained from the SPT advanced in the cohesive fill material was 3, indicating a soft consistency.

Based on visual and tactile examination of the sample, the cohesive fill material was characterized as moist. The moisture content of a sample tested was approximately 31%.

A grain size distribution test was completed on one sample of the cohesive fill. The result of the test is shown in Table 6.2 below.

Table 6.2: Grain Size Distribution – Cohesive Fill

Borehole	Sample	Depth (m)	Description	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
BHMW PI-3	SS2	1.1	Possible FILL: Sandy CLAY (CL)	4	46	17	33

The grain size distribution test result is shown on the borehole record in **Appendix C** and is illustrated on Figure 2 in **Appendix D**.

An Atterberg Limits test was conducted on the sample referenced above. The test results are summarized in Table 6.3 below.

Table 6.3: Atterberg Limits Test – Cohesive Fill

Borehole	Sample	Depth (m)	Description	Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
BHMW PI-3	SS2	1.1	Possible FILL: Sandy CLAY (CL)	31	29	14	15

The results of the Atterberg Limits test are shown on the borehole record in **Appendix C** and are illustrated on Figure 3 in **Appendix D.**

In accordance with the Unified Soil Classification System, the sample tested can be classified as Sandy Clay (CL).

6.3.4 Upper Sand to Silty Sand to Sandy Silt, Silty Clayey Sand to Silty Sand

A stratum of native brown cohesionless soil (sand to silty sand to sandy silt and silty clayey sand to silty sand) was encountered below the cohesionless fill described in the preceding section in borehole BH PI-2, below the cohesive fill described in the preceding section in borehole BHMW PI-3 and below the topsoil in boreholes BH PI-4 to BH PI-10 (except in borehole BH PI-6). Brown to grey colored silty sand to sandy silt was noted in BH PI-10.

The upper native cohesionless stratum extended to depths ranging from 1.5 m (BH PI-8) to 9.8 m (BH PI-4) below existing grade (Elevations ranging from 246.0 m to 279.9 m). Four (4) boreholes were terminated in this stratum. Borehole BH PI-4 was terminated in this stratum at a depth of approximately 9.8 m corresponding to elevation 246.5 m. Boreholes BH PI-2, BH PI-5 and BHPI-7 were terminated in this stratum at a depth of approximately 9.2 m, 3.8 m, and 1.9 m below grade, respectively, due to refusal on inferred bedrock.

Trace to some gravel and trace clay were noted in the samples obtained from this stratum. Possible cobbles or boulder were inferred in the samples of this stratum in borehole BH PI-2 due to a sampling refusal. One of the spoon samples at approximately 1.1 m depth of this stratum in borehole BH PI-5 contains organic matters.

The upper native cohesionless stratum was also encountered at all test pit locations, except TP-1 and TP-7 below topsoil or fill and extended to depths ranging from approximately 0.5 m to 3.7 m below grade.

The N-values obtained from the SPTs advanced in this stratum ranged from 2 to refusal (in excess of 50 blows/0.3 m), indicating very loose to very dense compactness conditions. The refusal was encountered in boreholes BH PI-2 and BH PI-7 due to possible cobbles or boulder above the bedrock surface and may have been influenced by the presence of bedrock. In this respect, the stratum can be considered to be generally in a very loose to dense condition.

Based on visual and tactile examination of the samples, these soils were assessed as moist to wet. The moisture content of the samples tested ranged from approximately 4% to 26%, averaging 14%.

Grain size distribution tests were completed on four (4) samples of the stratum. The results of the tests are shown in Table 6.4 below.

Table 6.4: Grain Size Distribution – Upper Native Cohesionless Soils

Borehole	Sample	Depth (m)	Description	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
BH PI-2	SS7	6.4	SAND with Silt and Gravel (SW-SM)	27	65	7	1
BH PI-4	SS8	7.9	Silty SAND (SM)	0	74	20	6
BH PI-5	SS5	3.4	SAND (SP)	0	96	3	1
BH PI-7	SS3	1.8	Silty SAND (SM)	9	70	19	2

The grain size distribution test results are shown on the borehole records in **Appendix C** and are illustrated on Figure 1 in **Appendix D**.

In accordance with the Unified Soil Classification System, the samples tested can be classified as Sand with Silt and Gravell (SW-SM), Silty Sand (SM) and Sand (SP).

6.3.5 Silty Clay to Clay

A stratum of native brown to grey silty clay to clay was encountered underlying the native cohesionless soils described in the preceding section in boreholes BHMW PI-3, BH PI-8 and BHMW PI-9. The samples of this layer were typically sandy or contained trace to some sand. This silty clay to silty clay stratum was approximately 2.3 m (BH PI-8) to 3.1 m (BHMW PI-9) thick and extended to depths approximately 7.6 m, 3.8 m and 6.1 m below grade, corresponding to elevations 254.9 m, 269.6 m and 265.7 m, respectively in boreholes BHMW PI-3, BH PI-8, BHMW PI-9.

The silty clay to clay layer was also encountered at test pit locations of TP-8 and TP-9 below silty sand to sandy silt layer and extended to the depths approximately 2.7 m to 4.0 m below grade, respectively.

The N-values obtained from the SPTs advanced in the silty clay to clay soils ranged from 2 to 7, based on this range the consistency of this soil can be interpreted as soft to firm. Shear vane tests using MTO N-vane were also performed in this soil layer during the field investigation to measure the undrained shear strength of the soil. A summary of the results is provided in Table 6.5.

Table 6.5: Field Shear Vane Test Results – Native Cohesive Soils

Borehole	Depth (m)	Sample Material	Undrained Shear Strength (kPa)	Sensitivity
BHMW PI-3	5.5	Silty CLAY (CL-ML) to CLAY (CL)	45	1.6
BHMW PI-3	7.0	Silty CLAY (CL-ML) to CLAY (CL)	38	2.7
BH PI-8	3.2	Silty CLAY (CL-ML) to CLAY (CL)	45	1.8
BHMW PI-9	4.0	Silty CLAY (CL-ML) to CLAY (CL)	24	2.0
BHMW PI-9	5.5	Silty CLAY (CL-ML) to CLAY (CL)	18	1.8

Based on visual and tactile examination of the samples, the cohesive soils were assessed as moist to wet. The moisture contents of the samples tested ranged from approximately 22% to 56%, averaging 41%. The higher moisture content of approximately 56% was noted in the cohesive stratum in boreholes BHMW PI-3 and BHMW PI-9.

Grain size distribution tests were completed on two (2) samples of the native cohesive stratum. The results of the tests are shown in Table 6.6 below.

Table 6.6: Grain Size Distribution – Native Cohesive Soils

Borehole	Sample	Depth (m)	Description	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
BHMW PI-3	SS6	4.9	Sandy Silty CLAY (CL-ML)	0	41	46	13
BH PI-8	SS3	1.8	CLAY with Sand (CL)	0	24	35	41

The grain size distribution test results are shown on the borehole records in **Appendix C** and are illustrated on Figure 2 in **Appendix D**.

Atterberg Limits tests were conducted on the samples referenced above. The test results are summarized in Table 6.7 below.

Table 6.7: Atterberg Limits Test – Native Cohesive Soils

Borehole	Sample	Depth (m)	Description	Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
BHMW PI-3	SS6	4.9	Sandy Silty CLAY (CL-ML)	22	19	15	4
BH PI-8	SS3	1.8	CLAY with Sand (CL)	31	32	16	16

The results of the Atterberg Limits tests are shown on the borehole records in **Appendix C** and are illustrated on Figure 3 in **Appendix D.**

In accordance with the Unified Soil Classification System, the samples tested can be classified as Sandy Silty Clay (CL-ML) and Clay with Sand (CL).

6.3.6 Lower Silty Sand and Sandy Silt

A stratum of native brown silty sand was encountered below the native cohesive soils described in the preceding section in borehole BHMW PI-3. Samples obtained from the lower silty sand stratum typically contained trace to some gravel. Borehole BHMW PI-3 was terminated in this stratum at depth approximately 9.7 m below grade, corresponding to elevation 252.8 m.

A stratum of native brown to grey sandy silt was encountered below the native cohesive soil described in the preceding section in boreholes BH PI-8 and BHMW PI-9. Samples obtained from the lower sandy silt

stratum typically contained trace clay. Boreholes BH PI-8 and BHMW PI-9 were terminated in this stratum at depths of approximately 5.0 m and 7.8 m below grade, corresponding to elevations 268.4 m and 264.0 m, respectively.

The N-values obtained from the SPTs advanced in the lower silty sand soil were 44 and 74, indicating a dense to very dense compactness condition. And the N-values obtained from the SPTs advanced in the lower sandy silt soil were 8 and 12, indicating loose to compact compactness condition.

Based on visual and tactile examination of the samples, these soils were assessed as moist to wet. The moisture contents of the samples tested ranged from approximately 4% to 26%, averaging 18%. The higher moisture content of approximately 26% was noted in borehole BH PI-8 and lower moisture content of approximately 4% was noted in borehole BHMW PI-3.

No grain size distribution and Atterberg Limits tests were completed on the lower native silty sand stratum.

A grain size distribution test was completed on a single sample of the silt/sandy silt stratum. The result of the test is shown in Table 6.8 below.

Table 6.8: Grain Size Distribution – Silt

Borehole	Sample	Depth (m)	Description	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
BHMW PI-9	SS7	6.4	SILT (ML)	0	3	91	6

The grain size distribution test result is shown on the borehole record in **Appendix C** and are illustrated on Figure 2 in **Appendix D**.

An Atterberg Limits test was conducted on the sample referenced above. The test results are summarized in Table 6.9 below.

Table 6.9: Atterberg Limits Test – Silt

Borehole	Sample	Depth (m)	Description	Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index
BHMW PI-9	SS7	6.4	SILT (ML)	24	NP	NP	NP

The results of the Atterberg Limits test are shown on the borehole records in **Appendix C** and are illustrated on Figure 3 in **Appendix D.**

Based on the results of Atterberg Limits tests, the silt sample is non-plastic.

In accordance with the Unified Soil Classification System, the sample tested can be classified as Silt (ML).

6.4 BEDROCK

Presence of bedrock was inferred based on spoon and auger refusal at a depth of approximately 0.2 m to 9.3 m below grade in boreholes BHMW PI-1, BH PI-2, BH PI-5, BH PI-6, BH PI-7, BH PI-8 and BHMW PI-9. The bedrock was encountered at approximately 2.1 m below grade (corresponding elevation of 279.9 m) in borehole BH PI-10 and cored to 3.5 m. The rock core photo is included in **Appendix E**.

Bedrock was contacted in four (4) test pits at depths ranging from 0.5 m to 1.8 m below grade.

Bedrock outcrop was observed or inferred at surface at multiple locations including a rock cliff at the edge of the sand pit within the Site.

The bedrock can be described as dark grey and pink gneissic bending gneiss.

The RQD of the bedrock core was 57%, indicating a fair rock quality. The bedrock can also be described as fresh to slightly weathered.

6.5 GROUNDWATER

Groundwater level could not be measured in open boreholes in BHMW PI-1, BHMW PI-3 and BHMW PI-9 (with monitoring wells) and BH PI-10 due to the use of water for rock coring. Boreholes BH PI-2, BH PI-6 and BH PI-7 were dry upon completion of drilling. Groundwater levels were measured in open boreholes at depths of approximately 2.1 m, 2.3 m and 2.1 m below grade corresponding to approximately elevations 254.2 m, 277.1 m and 271.3 m in boreholes BH PI-4, BH PI-5 and BH PI-8, respectively.

Water seepage was observed at about 1.5 m below grade and water level was measured at about 3.5 m below grade upon completion of TP-5. No water seepage was observed at the other test pit locations.

Groundwater levels were measured in the monitoring wells installed in boreholes BHMW PI-1, BHMW PI-3 and BHMW PI-9, respectively on November 10th and November 20th, 2023, and are presented below in Table 6.10.

Table 6.10: Summary of Monitoring Well Readings

Borehole	November 10, 2023		November 20, 2023	
	Depth (m)	Elevation (m)	Depth (m)	Elevation (m)
BHMW PI-1[1]	-	-	Dry	-
BHMW PI-3	8.7	253.8	9.0	253.5
BHMW PI-9	6.1	265.7	6.9	264.9

Groundwater level is subject to fluctuations due to seasonal changes and precipitation events. The water levels should be expected to be higher during the spring season or during and following periods of heavy precipitation or snow melt. Perched groundwater may also be encountered in the fill materials.

7.0 DISCUSSION AND RECOMMENDATIONS

7.1 SUBSURFACE AND GROUNDWATER CONDITIONS SUMMARY

The following bullets provide a general description and overview of the conditions encountered in the geotechnical investigation as previously summarized:

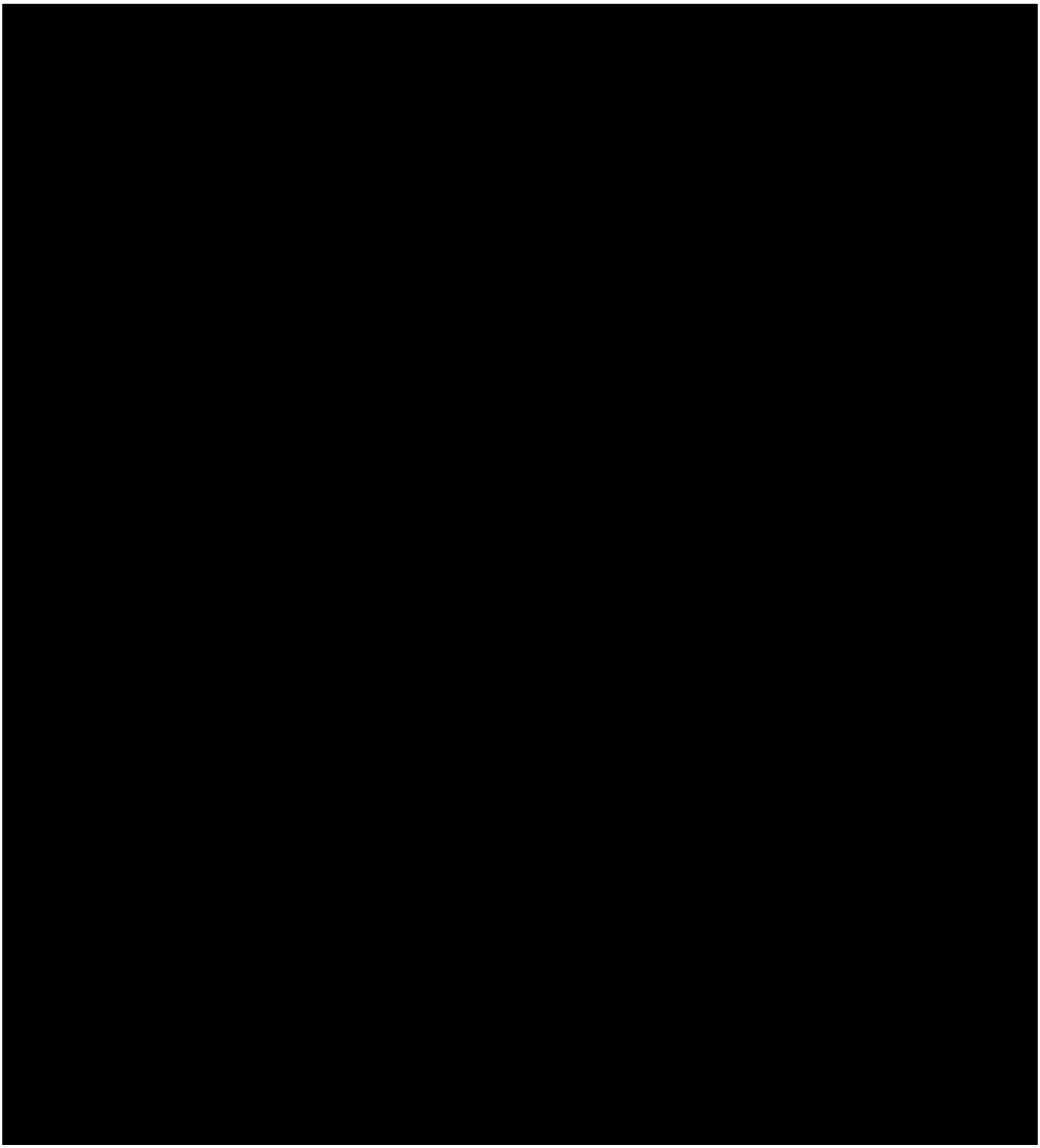
- Ground surface cover consisting of topsoil and grass (in all boreholes except BHMW PI-1 and BH PI-2); underlain by,
- Cohesionless fill (in boreholes BHMW PI-1, BH PI-2 and BHMW PI-3); underlain by,
- Cohesive fill (in borehole BHMW PI-3); underlain by,
- Upper very loose to very dense silty sand to sandy silt, silty clayey sand to silty sand and silty sand to sand (in all boreholes except BHMW PI-1 and BH PI-6); underlain by,
- Soft to firm silty clay to clay (in boreholes BHMW PI-3, BH PI-8 and BHMW PI-9); underlain by,
- Lower dense to very dense silty sand (in borehole BHMW PI-3) and loose to compact sandy silt (in boreholes BH PI-8 and BHMW PI-9); underlain by,
- Bedrock inferred at depths of 0.2 m to 9.3 m below grade (BHMW PI-1, BH PI-2, BH PI-5, BH PI-6, BH PI-7, BH PI-8 and BHMW PI-9), and contacted at a depth of 2.1 m (BH PI-10) below grade.

Groundwater levels were recorded at depths of 8.7 m and 6.1 m below grade, corresponding to approximately elevations 253.8 m and 265.7 m in the monitoring wells installed in boreholes BHMW PI-3 and BHMW PI-9, respectively on November 10th, 2023. The levels were recorded at depths of 9.0 m and 6.9 m below grade, corresponding to approximately elevations 253.5 m and 264.9 m in the monitoring wells installed in respective wells on November 20th, 2023. Borehole BHMW PI-1 was dry on November 20th, 2023.

7.2 EVALUATION OF EXISTING CONDITIONS

The following general development considerations and constraints are provided with respect to observations made during the investigation, the subsurface conditions encountered, and the intended scope of development:

- There is no existing development within the Site and hence, demolition of existing infrastructure is not anticipated to be required. The northwest section of the Site is a sand pit and the rest is covered by mature trees. It is unlikely that there has been any historic development on the Site. In this respect, buried abandoned infrastructure is not anticipated to be present at the Site. However, any services or infrastructure that are encountered will require decommissioning and removal.
- The current planned location of the development is approximately 18 m to 28 m higher than the west portion of the Site (sand pit area) separated with an approximately 18 m high rock cliff. A deep layer of possible fill was encountered in the boreholes drilled in this portion. In this respect, the proposed development is anticipated to remain within the forest portion of the Site.



7.3 CONSTRAINTS DUE TO NATURAL ENVIRONMENT

7.3.1 Frost Depth

The Ontario Building Code and the guidelines in the Canadian Foundation Engineering Manual require any exterior foundations and foundations in unheated areas exposed to freezing temperatures be provided with adequate protection against frost. Based on OPSD 3090.101, Foundation Frost Depths for Southern Ontario, the depth of frost penetration for the Site area is approximately 1.7 m.

All foundations should therefore be protected from frost action by a minimum soil cover of 1.7 m or be provided with equivalent protection using manufactured insulation. Where adequate earth cover for frost protection cannot be provided, the use of rigid insulation can be considered. As a general guideline, 25 mm of rigid insulation may be assumed to provide approximately 300 mm of equivalent soil cover.

7.3.2 Seismic Conditions

The seismic Site class determination is based on the soil conditions in the 30 m of stratigraphy underlying the foundations.

For the purposes of this report, the SPT N-value method has been used to assess the Seismic Site Classification, consistent with the second of three methods stated in the Ontario Building Code (OBC, 2012). This method requires calculation of a mean N-value for each soil stratum present. A weighted harmonic average of the mean N-values is subsequently calculated over the required depth of 30 m. The deepest borehole was 9.8 m deep and terminated in loose sandy silt to silty sand. For the purposes of this report, it is assumed that soils conditions remain the same/improve below this depth. Bedrock was inferred/contacted in seven (7) of the boreholes.

Based on the soil conditions encountered in the boreholes, a weighted harmonic average N-value of 16 was calculated for foundations placed below frost depth. Therefore, in accordance with Table 4.1.8.4.A of the 2012 Ontario Building Code (OBC), Seismic Site Class “D” should be used for design of foundations placed on the native soils. Where buildings are supported on shallow foundations directly placed on bedrock Seismic Site Class “B” can be used.

To confirm the seismic Site class, measurement of the shear wave velocity using a geophysical method (e.g., MASW) could be considered.

A copy of the NBC 2020 Seismic Hazard Calculation Data sheet is provided in **Appendix F** for reference.

7.4 SITE PREPARATION

7.4.1 Erosion and Sediment Control

A Site-specific and project-specific erosion and sediment control program should be implemented prior to commencement of earthwork activities on the Site and extending throughout the period of construction.

The surface of the fill materials may become loose, and loss of strength can occur, when exposed to precipitation and ground surface runoff. This condition will be exacerbated under the application of loads from traffic and construction vehicles and operations.

It is recommended that the erosion and sediment control program contain, in part, a temporary grading plan which will promote ground surface runoff away from areas of planned development and construction activity, to be collected in low-lying areas or temporary ditches and swales.

FFE likely excavation in bedrock, will be required. The use of shallow foundations and slab-on-grade on a combination of bedrock and fill materials should be avoided to mitigate the potential for differential settlement. It is noted that excavation in the very strong bedrock will require blasting. For reference, the bedrock was encountered or inferred at approximately elevations 275.6 m, 268.4 m, 279.9 m in boreholes BH PI-7, BH PI-8 and BH PI-10, respectively, translating an elevation difference of 11.5 m at the conceptual building location.

Following grading and inspection of the exposed sub-grade, the sub-grade must be proof-rolled and compacted using large, vibratory compaction equipment with a minimum static weight of ten tonnes. This will provide a uniform, compact surface for the intended construction. The proof rolling program should consist of a minimum of five passes per unit area to provide a uniform surface for construction and to confirm that the sub-grade has been compacted to achieve a similar condition to that of the engineered fill placed on the native sub-grade surface.

If imported fill is required, the material used for building pad should consist of OPSS Granular B (Type 1 or Type II). Consistent with the recommendations provided above for excavation backfill, the backfill material used in should be placed in 200 mm (8 inch) thick loose lifts. Each lift should be uniformly compacted to achieve a minimum of 98% of the material's SPMDD.

7.6 FOUNDATIONS

7.6.1 Overview

Conventional spread/strip footings founded on the compact to dense upper silty sand to sandy silt, silty clayey sand to silty sand and silty sand to sand soils can be considered to support the building. However, limited geotechnical resistance/reaction is available for these foundations due to the presence of very loose to loose zones in this stratum. Any loose or soft soils should be removed from the foundation sub-grade and replaced with granular engineered fill.

Alternatively, deep foundations (i.e., driven pipe piles, caissons) founded on the bedrock can be considered to support the building. Consideration can also be given to the use of ground improvement methods such as Controlled Modulus Columns (CMC) or Rammed Aggregate Piers (RAP) to improve the bearing capacity for shallow foundations. Deep foundations founded on the bedrock can provide a large capacity. Additional investigation will be required for the design of deep foundations to confirm the bedrock depth and quality once the building location is finalized.

7.6.2 Shallow Foundation

Conventional spread and strip footing foundations can be founded on the compact native cohesionless (silty sand to sandy silt, silty clayey sand to silty sand and silty sand to sand) soils encountered in the boreholes or engineered fill. Foundations should have a minimum soil cover of 1.7 m (or equivalent manufactured insulation).

For preliminary design purposes and based on the conditions encountered in boreholes BH PI-7, BH PI-8 and BH PI-10 located at the concept building location, a factored geotechnical resistance of 175 kPa at Ultimate Limit State (ULS) and 75 kPa at Serviceability Limit State (SLS) can be considered for shallow foundations with widths up to 3 m placed on the compact native cohesionless soils.

The above ULS value includes a resistance factor of 0.5. The SLS values are based on individual footing settlement of 25 mm (typical differential settlement of 19 mm would apply).

Bedrock was encountered/inferred at elevations 275.6 m, 268.4 m, and 279.9 m in boreholes BH PI-7, BH PI-8 and BH PI-10, respectively, located indicating an elevation difference of 11.5 m at the concept building location. In this respect, the use of shallow foundations placed on bedrock may not be feasible at the concept building location. However, subject to design grade and bedrock depth at the final building location the use of shallow or augered footings placed on bedrock may be considered. For preliminary design purposes a factored geotechnical resistance of 1,500 kPa can be considered for shallow foundations or augered footings placed on the bedrock. The ULS value includes a resistance factor of 0.5. Settlement of shallow foundations founded on the bedrock is anticipated to be less than 25 mm, therefore, the geotechnical reaction at SLS is not anticipated to be a governing factor.

The minimum foundation width should be in accordance with the Ontario Building Code (OBC).

7.6.3 Deep Foundation

Where, the bedrock is not available at a shallow depth required for shallow or augered foundations, which is likely the condition for most of the site, the use of caissons founded in the bedrock can be considered. Given the potential slope of the bedrock surface (as discussed in Section 7.6.2), it is suggested that caissons are socketed into the bedrock with a minimum socket length of one caisson diameter. For preliminary design purpose a factored geotechnical resistance of 5.0 MPa may be considered. This includes a resistance factor of 0.4. The settlement of caissons founded on the bedrock is anticipated to be less than 25 mm, therefore, the geotechnical reaction at SLS is not anticipated to be a governing factor. Further investigations will be required for these options.

Additional investigation will be required for the design of deep foundations to confirm the bedrock depth and quality once the building location is finalized.

7.7 SLAB-ON-GRADE

It is presumed that the structural engineer will assess the standard design thickness for the floor slab and make design adjustments as warranted, in consideration of the recommendations provided herein, and the anticipated design loads.

Site preparation for the construction of the building floor slab should be carried out as recommended in Section 7.5. This includes stripping of all vegetation and topsoil, removal of all deleterious materials

where present, proof rolling and compacting the exposed loose surficial subgrade and backfilling to the design sub-grade level with compacted OPSS SSM as a minimum.

The floor slab should be constructed on a layer of compacted granular fill to provide a uniform base for construction and to act as a moisture break beneath the concrete floor slab. For this purpose, a 300 mm thick layer of granular fill meeting the requirements of OPSS Granular A should be placed beneath the floor slab. The granular layer can be placed in a single lift. The layer should be uniformly compacted to a minimum of 100% of the material's SPMDD.

The floor slab(s) should not be connected to any load bearing walls and/or columns.

For preliminary design purposes, a modulus of sub-grade reaction, k_1, of 20 MN/m^3 (for a loaded area of 300 mm x 300 mm) can be used for the design of the floor slab, given the conditions encountered in the boreholes, the Site preparation recommendations as provided herein, and the placement of the granular base layer as recommended. The modulus should be adjusted for the actual size of the loaded area in the structural design of the floor slab.

If the concrete floor slab is required in an unheated area, the slab-on-grade should be placed on a layer of high-density closed-cell insulation (such as Styrofoam) with a thickness consistent with providing adequate frost protection. As a general guideline, 25 mm of insulation provides the equivalent insulation of approximately 300 mm of soil.

Where the Finished Floor Elevation (FFE) is at a minimum of 150 mm higher than the exterior grade and that the surrounding area is sloped away from the building and all related infrastructure the use of under-drains and perimeter drains will not be required.

7.8 LATERAL EARTH PRESSURE PARAMETERS

The recommendations provided in this section of the report can be considered for evaluation of lateral earth pressure for the foundation walls, temporary shoring and retaining wall design, if required.

Retaining walls must be designed with consideration for the influence of lateral earth pressures. Where required, backfill material used around the walls should be free of deleterious material, be free draining and classed as non-frost susceptible. The granular backfill should be capped with a less permeable material and graded to help direct run-off away from the structure.

Lateral earth pressure parameters for use in design are provided below in Table 7.1. The table includes parameters for the use of OPSS 1010 Granular A and B fill which are recommended to be used behind the walls to provide drainage. In addition, we have included values for the native cohesionless soils for reference.

Table 7.1: Un-factored Lateral Earth Pressure Parameters

Parameters	OPSS Granular A and B Type II	Granular Fill (OPSS 1010 B Type I)	Existing Granular Fill	Native Very Loose to Very Dense Cohesionless Soils
Bulk Unit Weight (kN/m^3)	21	21	20	21
Angle of Internal Friction (degrees)	35	32	28	28
Coefficient of Active Earth Pressure, k_a	0.27	0.29	0.36	0.36
Coefficient of Passive Earth Pressure, k_p	3.69	2.77	2.77	2.77
Coefficient of Earth Pressure at Rest, k_o	0.43	0.53	0.53	0.53
Coefficient of Friction between Soil and Cast-In-Place Concrete	0.45	0. 45	0.40	0.40

For rigidly-tied earth retention structures (e.g. non-yielding retaining walls), an at-rest earth pressure coefficient should be used for design. If the walls are allowed to rotate or translate an active earth pressure coefficient should be used in design.

Presuming that free-draining granular materials are used as backfill (where required), a geosynthetic separator fabric is recommended between the face of the adjacent fill and native soils and the granular backfill adjacent to the walls to prevent the migration of fines into the backfill. The granular backfilling materials should be placed in 200 mm thick lift and compacted to 100% material's SPMDD.

The values provided in the table above also presume a horizontal slope at the back of the wall. The effects of surcharge loads would need to be added to these lateral earth pressures.

7.9 ASPHALT PAVEMENT

In absence of design traffic load, the pavement structures provided in Table 7.2 may be considered for preliminary pavement design subject to adopting the recommendations described herein for Site preparation and grade raise.

Table 7.2: Recommended Asphalt Pavement Structure Design

Material	Standard Duty	Heavy Duty	Compaction Requirements
HL3 (surface course asphalt)	40 mm	50 mm	92 % MTRD
HL8 (base course asphalt)	50 mm	80 mm	92 % MTRD
OPSS Granular 'A' Base	150 mm	150 mm	100 % SPMDD
OPSS Granular 'B' Sub-base	200 mm	300 mm	100 % SPMDD

In preparation for construction of new pavements, the finished sub-grade surface should be proof-rolled and compacted to identify the presence of soft, wet, or deflecting areas; such areas should be removed and replaced with approved engineered fill compacted to a minimum of 98% SPMDD.

The base and sub-base materials should be compacted to a minimum of 100% SPMDD. The asphaltic concrete should be compacted to a minimum of 92% of Maximum Theoretical Relative Density (MTRD).

7.10 EXCAVATIONS

Depending on depth and location, excavations for the proposed development are anticipated to encounter fill materials, the native very loose to very dense cohesionless soils (silty sand to sandy silt, silty clayey sand to silty sand and silty sand to sand) and soft to firm silty clay to clay.

Temporary excavations must be carried out in accordance with the latest edition of the Occupational Health and Safety Act (OHSA) & Regulations. For the purpose of this report, it is anticipated that temporary excavations would remain open for a duration of two weeks. For general reference, the following comments are provided with respect to the soils encountered in the geotechnical boreholes and the relevant classification of these soils in accordance with the OH&S Act. The comments provided do not consider the benefits for the use of temporary construction shoring.

The cohesionless fill and native loose to very dense cohesionless soils above groundwater level should be considered as Type 3 soils. The maximum excavation side slope for a Type 3 soil is 1:1 (Horizontal: Vertical) in accordance with the OHSA regulation.

The native soft to firm silty clay to clay soils should be classified as Type 4 soils. The maximum excavation side slope for a Type 4 soil is 3:1 (Horizontal: Vertical) in accordance with the OHSA regulation. Where excavations extend below the groundwater levels observed in open boreholes, or the soils are observed to be water-bearing or in loose/soft conditions, they should be classified as Type 4 soils. The cohesive fill should also be considered as Type 4 soils The maximum excavation side slope for a Type 4 soil is 3:1 (Horizontal: Vertical) in accordance with the OHSA regulation.

Based on the bedrock depths encountered in the boreholes, excavations for the proposed development are anticipated to extend to bedrock. If bedrock encountered, side slopes of temporary excavations in bedrock may be left near vertical. Consistent with the OHSA, the walls of an excavation in bedrock must be stripped of any loose rock or other material that could slide, fall, or roll upon a worker.

Where an excavation contains more than one soil type, the soil shall be classified as the type with the highest number exposed in the excavation.

Excavation side slopes should be protected from exposure to precipitation and associated ground surface runoff and should be inspected regularly for signs of instability. If localized instability is noted at the time of excavation or while an excavation remains open, or if wet conditions are encountered, the side slopes of the excavations should be flattened as required to maintain safe working conditions.

If space is restricted such that the side slopes cannot be safely cut back in accordance with the OHSA Regulation, or sloughing and cave-in are encountered in the excavations, the slopes should be flattened to achieve a stable configuration or temporary shoring must be provided. To prevent overstressing of the shoring structure, the excavated spoil should be placed away from the edge of the excavation at least at a distance equal to the depth of the excavation.

Stockpiling of any materials adjacent to excavations should be avoided. Similarly, traffic should not be permitted in proximity to open excavations. For this purpose, it is recommended that all storage of materials and traffic be restricted from a distance equal to depth of excavation around the excavations, measured from the crest of the excavation designed and constructed in accordance with the OH&S Act.

7.11 GROUNDWATER CONTROL

The groundwater level was recorded at depths ranging from 6.1 m to 9.0 m in the two of the monitoring wells installed at the Site and was observed at depths of 2.1 m to 2.3 m in three open boreholes.

Given the conditions encountered in open boreholes and the presence of overlying granular fill and granular native soils, the rate of perched water seepage into shallow excavations is anticipated to be medium to high in the beginning and decreasing with time. The rate of seepage into excavations that extend below the groundwater should be anticipated to be higher. However, given the presence of the rock cliff and significantly lower elevation of the sand pit area groundwater is not anticipated to be a major concern at this Site. Any seepage encountered during the proposed construction should be handled by pumping from sumps using conventional submersible pumps provided the excavations remain open for a short period of time. More dewatering efforts may be required if deeper and larger excavations are required for the proposed construction.

The above comments are provided for reference. The Contractor should determine the appropriate groundwater control/dewatering measures in accordance with the conditions encountered and the equipment and methods intended for use. The Contractor's methods of dewatering should be provided for the Engineer's/Owner's Representative Civil Engineer's review.

Discharge of accumulated seepage and standing water (regardless of source) should conform to the Ontario Ministry of the Environment Conservation and Park's (MECP) guidelines and City/Municipal requirements.

Where dewatering is undertaken, the design of the dewatering system would need to address the extent of dewatering required, the depth of intended excavation, and the soil and groundwater conditions that prevail at the intended excavation location(s). This is beyond the scope of this geotechnical investigation.

It is noted that under the current MECP regulations, registration with the Environmental Sector and Activity Registry (ESAR) is required for dewatering at rates above 50,000 L/day but below 400,000 L/day. A Permit to Take Water is required for dewatering applications that require exceeding 400,000 L/day.

7.12 SITE MATERIALS REUSE

Fill Materials

The Site excavated topsoil could be used for landscaping purposes only, subject to environmental test results.

The cohesionless fill materials encountered in the investigation can be considered suitable for reuse as general use in backfilling service trenches. Any deleterious materials presented in the fill materials such as topsoil inclusions, or similar materials must be removed prior to reuse.

The existing cohesive fill is not suitable for reuse as engineered fill, granular base, and sub-base materials, or for similar applications where development of frost could jeopardize the serviceability of the planned infrastructure.

Native Cohesionless Soils

The native compact to very dense cohesionless soils can be considered for reuse as excavation backfill and engineered fill, provided that the soil is free of deleterious materials and is within 2% of the material's optimum moisture content.

Native Cohesive Soils

The native cohesive soils are not suitable for reuse as engineered fill, granular base, and sub-base materials, or for similar applications where development of frost could jeopardize the serviceability of the planned infrastructure.

Bedrock (Gneiss)

The bedrock can be considered for reuse as excavation backfill. However, breaking of the material into pieces smaller than 100 mm will be required.

7.13 BACKFILL

7.13.1 Perimeter Foundation Wall Backfill

The free-draining granular backfill placed adjacent to the exterior (perimeter) walls should be placed in loose lifts having a maximum thickness of 300 mm.

Each lift should be uniformly compacted using suitable compaction equipment for the purpose intended, to achieve a minimum of 95% of the material's SPMDD.

Care should be taken immediately adjacent to existing foundation walls to avoid over-compaction of the soil which could result in damage to the walls.

7.13.2 Bedding and Cover Material for Buried Services & Utilities

Pipe bedding and cover materials specifications for buried services and utilities should be in accordance with the manufacturer's and/or the designer's recommendations. The following recommendations are provided in consideration of the geotechnical aspects of design and construction, and with due

consideration for the conditions encountered in the boreholes included in the current geotechnical investigation.

Bedding for services and utilities should consist of OPSS Granular A material. A minimum of 150 mm of bedding is recommended.

Cover material for services and utilities should consist of OPSS Granular A material. A minimum of 300 mm of cover material is recommended.

The bedding and cover material should be placed in lifts that do not exceed 200 mm. Each lift should be uniformly compacted to achieve a minimum of 98% of the material's SPMDD. Cover material should be placed and compacted to 900 mm over the crown of the pipe/utility prior to permitting ride-on compaction equipment to be used. Care must be taken in all cases to avoid incurring damage to the services and utilities. This may require the use of alternative equipment from the norm and/or adjustment to the typical placement and compaction methodologies.

These recommendations should be confirmed with the pipe/utility manufacturer. Pipe manufactures may have additional/alternative requirements that should be reviewed by the Designer and Contractor prior to installation of the services.

A discussion related to the general presence of groundwater is provided in a preceding section of this report. If standing water is present in any open excavation where services and utilities are to be installed, the use of a geosynthetic separator fabric and clear stone bedding/cover is recommended to mitigate concerns with handling, placing, and compacting granular bedding and backfill materials.

7.13.3 Service and Utility Trench Backfill

Backfill for service trenches may consist of approved portions of the native cohesionless soils subject to the constraints and limitations stated above with respect to reuse of these materials/soils.

All trench backfills placed within areas of planned development should be placed in 200 mm thick loose lifts and compacted to a minimum of 98% SPMDD for the full thickness of the backfill.

All trench backfills placed beyond the limits of planned development, such as in landscaped areas, should be placed in 200 mm thick loose lifts and compacted to a minimum of 95% SPMDD.

Water, sewer, and storm lines installed outside of heated areas should be provided with a minimum of 1.7 m of soil cover for adequate frost protection.

7.13.4 Municipal Infrastructure Backfill

Where manholes and catch-basins are required, these components should be constructed and backfilled in accordance with Town of Bracebridge and The District Municipality of Muskoka Sewer and Watermain standards.

Care should be taken in compacting backfill materials around structures to achieve the required compaction, thus avoiding future settlement around the installations.

7.14 ANALYTICAL CHEMISTRY RESULTS

7.14.1 Soil Corrosivity Potential

Three (3) soil samples were submitted to AGAT Laboratories in Mississauga, Ontario for analysis of resistivity, pH, redox potential, and concentrations of sulphides. The purpose of the testing was to evaluate the potential for corrosion of ductile iron pipe in contact with the soil and groundwater at the Site, consistent with the methods of ANSI/AWWA.

The moisture content conditions were assessed based on the results of the moisture content tests conducted as a component of the geotechnical testing program as well as the overall drainage characteristics of the soils. The test results are summarized in below.

Table 7.3: Results of Chemical Analysis for Corrosion Potential

Parameter	**Sample Information**					
Borehole No.	**BH PI-1**		**BH PI-4**		**BH PI-8**	
Sample No.	SS2		SS3		SS4	
Median Depth	1.1 m BGS		1.8 m BGS		2.6 m BGS	
Description	Silty Sand to Silty Sand with Gravel Fill		Sandy Silt to Silty Sand		Silty Clay to Clay	
Parameter	**Measured Values**	**ANSI/AWWA Point Rating**	**Measured Values**	**ANSI/AWWA Point Rating**	**Measured Values**	**ANSI/AWWA Point Rating**
Resistivity, (Ohm-cm)	30300	0	66700	0	28600	0
pH	6.97	0	6.17	0	6.54	0
Redox Potential, (mV)	228	0	241	0	314	0
Sulphides, (%)	<0.01	2	<0.01	2	<0.01	2
Moisture	moist	1	moist to wet	2	moist	1
Total ANSI/AWWA Points	3		4		3	

The ANSI/AWWA rating system considers a score of 10 points or more indicative of the potential for corrosion of buried steel (less than 10 points indicates no potential for corrosion of buried steel). Based on the ANSI/AWWA rating system, the soil samples tested have low potential for corrosion.

It is noted that other factors may influence the corrosion potential, such as the application of de-icing salts that leach into the soil, or the presence of stray electrical currents.

It is also noted that municipal specifications and procedures may supersede the results of the testing as reported herein, and reference should be made to the regulatory authority guidelines and requirements in this respect.

Copies of the results of the chemical analysis are included in **Appendix D** for reference.

7.14.2 Cement Type

The soil samples submitted to AGAT Laboratories for corrosivity were also analyzed for the concentration of soluble sulphates and chlorides. The concentration of soluble sulphates and chlorides provides an indication of the degree of sulphate attack and chloride attack that is expected for concrete in contact with soil and groundwater. The results of the testing are shown in Table 7.4 below.

Table 7.4: Results of Chemical Analysis for Soluble Sulphates and Chlorides

Borehole No	Sample No.	Depth (m BGS)	pH	Sulphate (µg/g)	Chloride (µg/g)
BH PI-1	SS2	1.1	6.97	7	<2
BH PI-4	SS3	1.8	6.17	3	<2
BH PI-8	SS4	2.6	6.54	8	<2

Soluble sulphate concentrations less than 1000 µg/g generally indicate that a low degree of sulphate attack is expected for concrete in contact with soil and groundwater. Consistent with this, the results of testing of the soil samples referenced in the table above indicate that a low degree of sulphate attack is expected for concrete in contact with the respective soils.

In consideration of the results of the testing, Type GU Portland Cement should be suitable for use in buried concrete in contact with the soils referenced in the table.

Copies of the results of the chemical analysis are included in **Appendix D** for reference.

8.0 REFERENCES

ASTM 4.08. Standard D2487-06: Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).

Canadian Geotechnical Society. Canadian Foundation Engineering Manual, 4th Edition. Richmond: BiTech Publisher Ltd, 2006.

Chapman, L.J. and Putnam, D.F. 1984. The Physiography of Southern Ontario; Ontario Geological Survey, Special Volume 2, 270p. Accompanied by Map P.2715 (coloured), scale 1:600 000.

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Ontario Geological Survey 2000. Quaternary geology, seamless coverage of the Province of Ontario; Ontario Geological Survey, Data Set 14---Revised.

Ontario Geological Survey 2011. 1:250 000 scale bedrock geology of Ontario; Ontario Geological Survey, Miscellaneous Release---Data 126-Revision 1

Ontario Geological Survey (OGS) Borehole Record database.

Ontario Geological Survey 2010. Surficial Geology of Southern Ontario; Ontario Geological Survey, Miscellaneous Release--Data 128-REV.

Ontario Ministry of the Environment, Conservation and Park (MECP) Water Well Record database.

9.0 CLOSURE

Use of this report is subject to the Statement of General Conditions provided in **Appendix A**. It is the responsibility of Muskoka Algonquin Healthcare who is identified as "the Client" within the Statement of General Conditions, and its agents to review the conditions and to notify Stantec Consulting Ltd. should any of these not be satisfied. The Statement of General Conditions addresses the following:

- Use of the report;
- Basis of the report;
- Standard of care;
- Interpretation of Site conditions;
- Varying or unexpected Site conditions; and,
- Planning, design, or construction.

Respectfully Submitted,

STANTEC CONSULTING LTD.

APPENDIX A

A.1 STATEMENT OF GENERAL CONDITIONS

STATEMENT OF GENERAL CONDITIONS

USE OF THIS REPORT: This report has been prepared for the sole benefit of the Client or its agent and may not be used by any third party without the express written consent of Stantec Consulting Ltd. and the Client. Any use which a third party makes of this report is the responsibility of such third party.

BASIS OF THE REPORT: The information, opinions, and/or recommendations made in this report are in accordance with Stantec Consulting Ltd.'s present understanding of the site specific project as described by the Client. The applicability of these is restricted to the site conditions encountered at the time of the investigation or study. If the proposed site specific project differs or is modified from what is described in this report or if the site conditions are altered, this report is no longer valid unless Stantec Consulting Ltd. is requested by the Client to review and revise the report to reflect the differing or modified project specifics and/or the altered site conditions.

STANDARD OF CARE: Preparation of this report, and all associated work, was carried out in accordance with the normally accepted standard of care in the state or province of execution for the specific professional service provided to the Client. No other warranty is made.

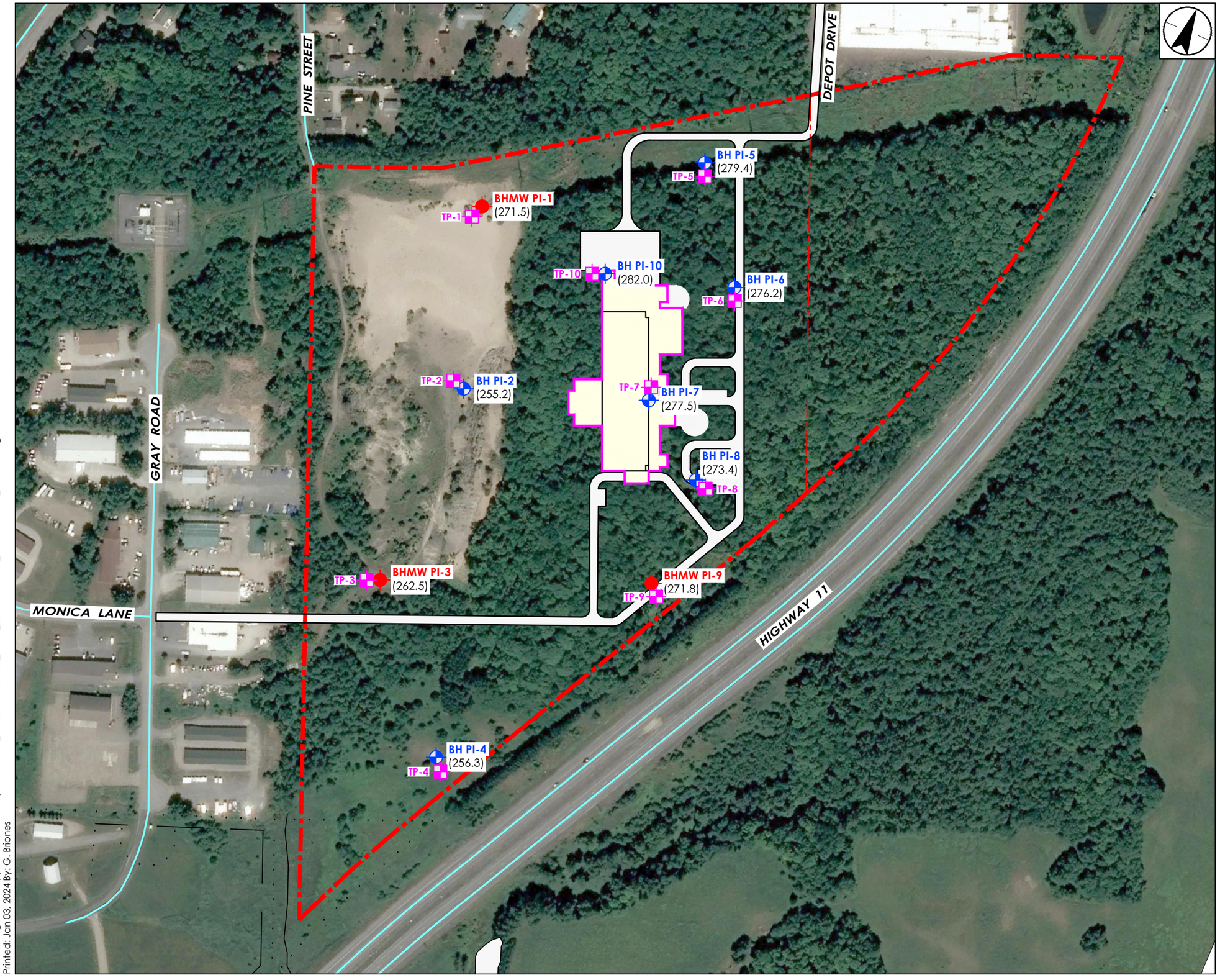
INTERPRETATION OF SITE CONDITIONS: Soil, rock, or other material descriptions, and statements regarding their condition, made in this report are based on site conditions encountered by Stantec Consulting Ltd. at the time of the work and at the specific testing and/or sampling locations. Classifications and statements of condition have been made in accordance with normally accepted practices which are judgmental in nature; no specific description should be considered exact, but rather reflective of the anticipated material behavior. Extrapolation of in situ conditions can only be made to some limited extent beyond the sampling or test points. The extent depends on variability of the soil, rock and groundwater conditions as influenced by geological processes, construction activity, and site use.

VARYING OR UNEXPECTED CONDITIONS: Should any site or subsurface conditions be encountered that are different from those described in this report or encountered at the test locations, Stantec Consulting Ltd. must be notified immediately to assess if the varying or unexpected conditions are substantial and if reassessments of the report conclusions or recommendations are required. Stantec Consulting Ltd. will not be responsible to any party for damages incurred as a result of failing to notify Stantec Consulting Ltd. that differing site or sub-surface conditions are present upon becoming aware of such conditions.

PLANNING, DESIGN, OR CONSTRUCTION: Development or design plans and specifications should be reviewed by Stantec Consulting Ltd., sufficiently ahead of initiating the next project stage (property acquisition, tender, construction, etc), to confirm that this report completely addresses the elaborated project specifics and that the contents of this report have been properly interpreted. Specialty quality assurance services (field observations and testing) during construction are a necessary part of the evaluation of sub-subsurface conditions and site preparation works. Site work relating to the recommendations included in this report should only be carried out in the presence of a qualified geotechnical engineer; Stantec Consulting Ltd. cannot be responsible for site work carried out without being present.

APPENDIX B

B.1 DRAWINGS



Stantec

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LEGEND

- PROPERTY BOUNDARY
- PROPOSED BUILDING
- BOREHOLE (STANTEC, 2023)
- BOREHOLE WITH MONITORING WELL (STANTEC, 2023)
- TEST PIT (STANTEC, 2023)
- (268.0) BOREHOLE ELEVATION (m)

NOTES

1. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N.
2. BASE PLAN PRODUCED BY STANTEC (TORONTO), FILENAME: 300 Pine Street Due Diligence.DWG
3. IMAGERY: © 2023 MICROSOFT CORPORATION © 2023 MAXAR © CNES (2023) DISTRIBUTION AIRBUS DS.

30m 0 30 60m
1 : 3000

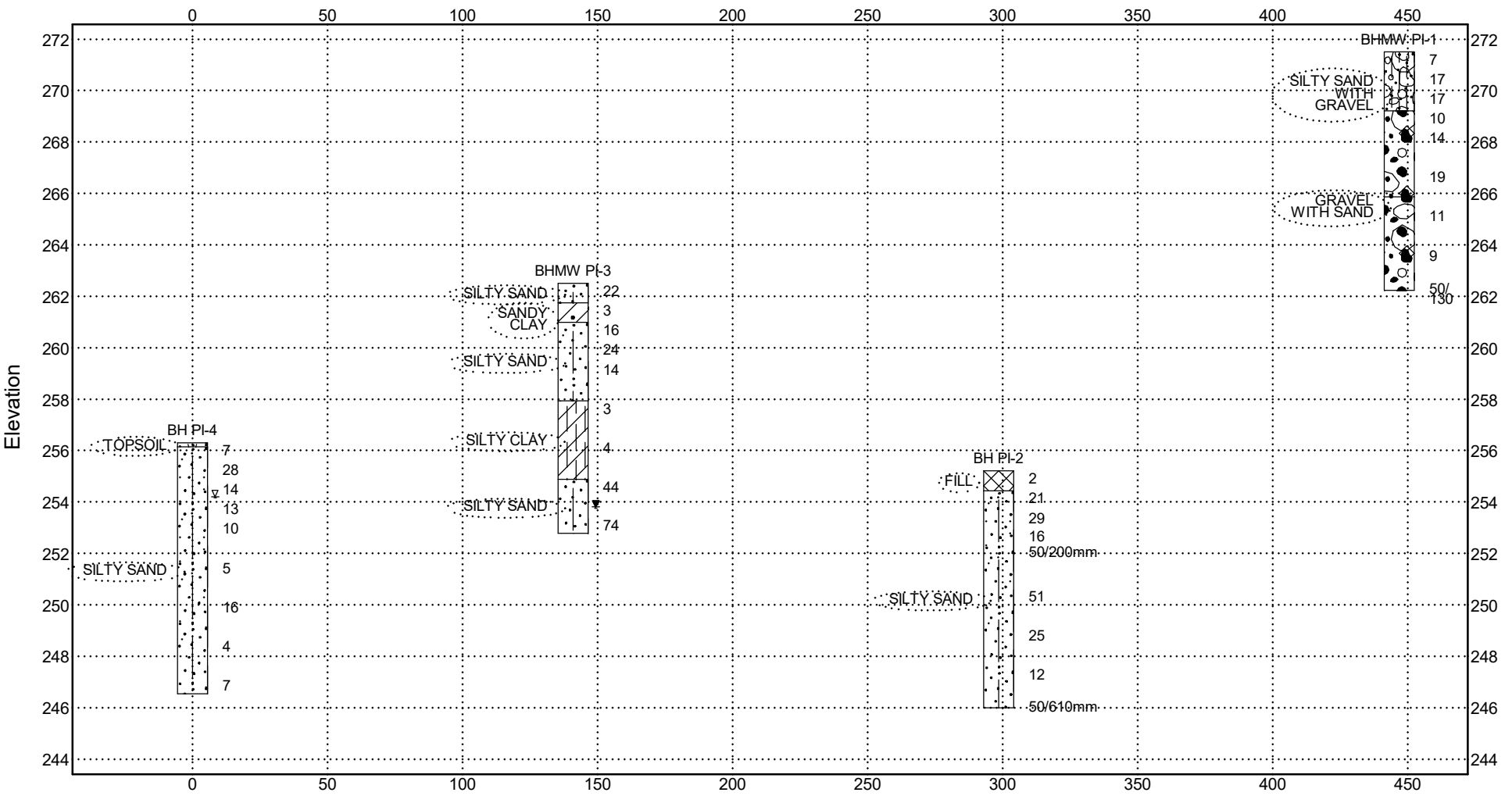
JANUARY 2024
Project No. 140022038

Client/Project
MUSKOKA ALGONQUIN HEALTHCARE
SOUTH MUSKOKA MEMORIAL HOSPITAL
300 PINE STREET, BRACEBRIDGE, ON

Drawing No.
1

Title
BOREHOLE AND TEST PIT LOCATION PLAN

C:\Users\gbriones\appdata\local\temp\AcPublish_12088\140022038_Site A_300 Pine Street_Borehole Plan_240103.dwg
Printed: Jan 03, 2024 By: G. Briones



Borehole	North	East	Elev.	Depth
BH PI-2	4989095	634484	255.2	9.2
BH PI-4	4988811	634578	256.3	9.8
BHMW PI-1	4989237	634441	271.5	9.3
BHMW PI-3	4988926	634481	262.5	9.7

DISTANCES:
Beginning
Ending
VIEWING ANGLES (degrees):
Horizontal
Vertical

Position	North	East
Left, Front		
Right, Front		
Left, Back		
Right, Back		

SUBSURFACE FENCE DIAGRAM

PROJECT: Muskoka Algonquin Stage 1.3 - Bracebridge

LOCATION: 300 Pine Street, Bracebridge, Ontario

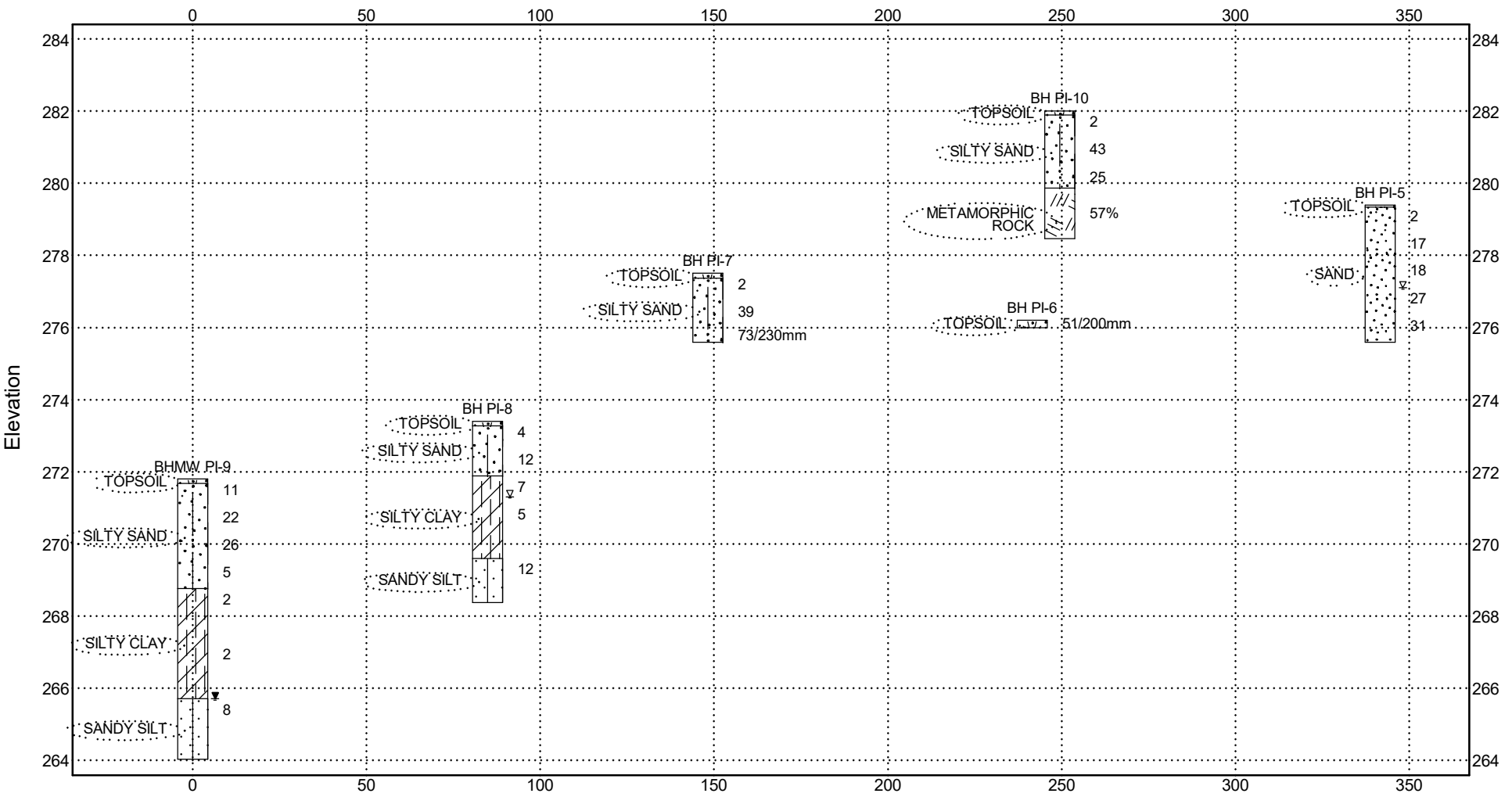
PROJECT No.: 140022038

DATE: Dec 23

FIGURE: 1

Stantec

STN13-FENCE 140022038 (BRACEBRIDGE - SITE A)_20231208.GPJ STANTEC_MARKHAM_DATA_TEMPLATE_2015-05-20.GDT 12/8/23



Borehole	North	East	Elev.	Depth
BH PI-10	4989225	634554	282.0	3.5
BH PI-5	4989339	634594	279.4	3.8
BH PI-6	4989255	634655	276.2	0.2
BH PI-7	4989144	634626	277.5	1.9
BH PI-8	4989099	634686	273.4	5.0
BHMW PI-9	4989008	634685	271.8	7.8

DISTANCES:
Beginning
Ending
VIEWING ANGLES (degrees):
Horizontal
Vertical

Position	North	East
Left, Front		
Right, Front		
Left, Back		
Right, Back		

SUBSURFACE FENCE DIAGRAM

PROJECT: Muskoka Algonquin Stage 1.3 - Bracebridge

LOCATION: 300 Pine Street, Bracebridge, Ontario

PROJECT No.: 140022038

DATE: Dec 23

FIGURE: 2

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STN13-FENCE 140022038 (BRACEBRIDGE - SITE A)_20231208.GPJ STANTEC_MARKHAM_DATA_TEMPLATE_2015-05-20.GDT 12/8/23

APPENDIX C

C.1 SYMBOLS AND TERMS USED ON BOREHOLE RECORDS

C.2 BOREHOLE LOGS

C.3 TEST PIT LOGS

SYMBOLS AND TERMS USED ON BOREHOLE AND TEST PIT RECORDS

SOIL DESCRIPTION

Terminology describing common soil genesis:

Rootmat	- vegetation, roots and moss with organic matter and topsoil typically forming a mattress at the ground surface
Topsoil	- mixture of soil and humus capable of supporting vegetative growth
Peat	- mixture of visible and invisible fragments of decayed organic matter
Till	- unstratified glacial deposit which may range from clay to boulders
Fill	- material below the surface identified as placed by humans (excluding buried services)

Terminology describing soil structure:

Desiccated	- having visible signs of weathering by oxidization of clay minerals, shrinkage cracks, etc.
Fissured	- having cracks, and hence a blocky structure
Varved	- composed of regular alternating layers of silt and clay
Stratified	- composed of alternating successions of different soil types, e.g. silt and sand
Layer	- > 75 mm in thickness
Seam	- 2 mm to 75 mm in thickness
Parting	- < 2 mm in thickness

Terminology describing soil types:
The classification of soil types are made on the basis of grain size and plasticity in accordance with the Unified Soil Classification System (USCS) (ASTM D 2487 or D 2488) which excludes particles larger than 75 mm. For particles larger than 75 mm, and for defining percent clay fraction in hydrometer results, definitions proposed by Canadian Foundation Engineering Manual, 4th Edition are used. The USCS provides a group symbol (e.g. SM) and group name (e.g. silty sand) for identification.

Terminology describing cobbles, boulders, and non-matrix materials (organic matter or debris):
Terminology describing materials outside the USCS, (e.g. particles larger than 75 mm, visible organic matter, and construction debris) is based upon the proportion of these materials present:

Trace, or occasional	Less than 10%
Some	10-20%
Frequent	> 20%

Terminology describing compactness of cohesionless soils:
The standard terminology to describe cohesionless soils includes compactness (formerly "relative density"), as determined by the Standard Penetration Test (SPT) N-Value - also known as N-Index. The SPT N-Value is described further on page 3. A relationship between compactness condition and N-Value is shown in the following table.

Compactness Condition	SPT N-Value
Very Loose	<4
Loose	4-10
Compact	10-30
Dense	30-50
Very Dense	>50

Terminology describing consistency of cohesive soils:
The standard terminology to describe cohesive soils includes the consistency, which is based on undrained shear strength as measured by *in situ* vane tests, penetrometer tests, or unconfined compression tests. Consistency may be crudely estimated from SPT N-Value based on the correlation shown in the following table (Terzaghi and Peck, 1967). The correlation to SPT N-Value is used with caution as it is only very approximate.

Consistency	Undrained Shear Strength		Approximate SPT N-Value
	kips/sq.ft.	kPa	
Very Soft	<0.25	<12.5	<2
Soft	0.25 - 0.5	12.5 - 25	2-4
Firm	0.5 - 1.0	25 - 50	4-8
Stiff	1.0 - 2.0	50 – 100	8-15
Very Stiff	2.0 - 4.0	100 - 200	15-30
Hard	>4.0	>200	>30

ROCK DESCRIPTION

Except where specified below, terminology for describing rock is as defined by the International Society for Rock Mechanics (ISRM) 2007 publication "The Complete ISRM Suggested Methods for Rock Characterization, Testing and Monitoring: 1974-2006"

Terminology describing rock quality:

RQD	Rock Mass Quality
0-25	*Very Poor Quality*
25-50	*Poor Quality*
50-75	*Fair Quality*
75-90	*Good Quality*
90-100	*Excellent Quality*

Alternate (Colloquial) Rock Mass Quality	
Very Severely Fractured	*Crushed*
Severely Fractured	*Shattered or Very Blocky*
Fractured	*Blocky*
Moderately Jointed	*Sound*
Intact	*Very Sound*

RQD (Rock Quality Designation) denotes the percentage of intact and sound rock retrieved from a borehole of any orientation. All pieces of intact and sound rock core equal to or greater than 100 mm (4 in.) long are summed and divided by the total length of the core run. RQD is determined in accordance with ASTM D6032.

SCR (Solid Core Recovery) denotes the percentage of solid core (cylindrical) retrieved from a borehole of any orientation. All pieces of solid (cylindrical) core are summed and divided by the total length of the core run (It excludes all portions of core pieces that are not fully cylindrical as well as crushed or rubble zones).

Fracture Index (FI) is defined as the number of naturally occurring fractures within a given length of core. The Fracture Index is reported as a simple count of natural occurring fractures.

Terminology describing rock with respect to discontinuity and bedding spacing:

Spacing (mm)	Discontinuities	Bedding
>6000	*Extremely Wide*	-
2000-6000	*Very Wide*	*Very Thick*
600-2000	*Wide*	*Thick*
200-600	*Moderate*	*Medium*
60-200	*Close*	*Thin*
20-60	*Very Close*	*Very Thin*
<20	*Extremely Close*	*Laminated*
<6	-	*Thinly Laminated*

Terminology describing rock strength:

Strength Classification	Grade	Unconfined Compressive Strength (MPa)
Extremely Weak	R0	<1
Very Weak	R1	1 – 5
Weak	R2	5 – 25
Medium Strong	R3	25 – 50
Strong	R4	50 – 100
Very Strong	R5	100 – 250
Extremely Strong	R6	>250

Terminology describing rock weathering:

Term	Symbol	Description
Fresh	W1	No visible signs of rock weathering. Slight discoloration along major discontinuities
Slightly	W2	Discoloration indicates weathering of rock on discontinuity surfaces. All the rock material may be discolored.
Moderately	W3	Less than half the rock is decomposed and/or disintegrated into soil.
Highly	W4	More than half the rock is decomposed and/or disintegrated into soil.
Completely	W5	All the rock material is decomposed and/or disintegrated into soil. The original mass structure is still largely intact.
Residual Soil	W6	All the rock converted to soil. Structure and fabric destroyed.

STRATA PLOT

Strata plots symbolize the soil or bedrock description. They are combinations of the following basic symbols. The dimensions within the strata symbols are not indicative of the particle size, layer thickness, etc.

Boulders Cobbles Gravel | Sand | Silt | Clay | Organics | Asphalt | Concrete | Fill | Igneous Bedrock | Meta-morphic Bedrock | Sedi-mentary Bedrock

SAMPLE TYPE

SS	Split spoon sample (obtained by performing the Standard Penetration Test)
ST	Shelby tube or thin wall tube
DP	Direct-Push sample (small diameter tube sampler hydraulically advanced)
PS	Piston sample
BS	Bulk sample
HQ, NQ, BQ, etc.	Rock core samples obtained with the use of standard size diamond coring bits.

WATER LEVEL MEASUREMENT

measured in standpipe, piezometer, or well

inferred

RECOVERY

For soil samples, the recovery is recorded as the length of the soil sample recovered. For rock core, recovery is defined as the total cumulative length of all core recovered in the core barrel divided by the length drilled and is recorded as a percentage on a per run basis.

N-VALUE

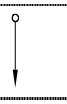
Numbers in this column are the field results of the Standard Penetration Test: the number of blows of a 140 pound (63.5 kg) hammer falling 30 inches (760 mm), required to drive a 2 inch (50.8 mm) O.D. split spoon sampler one foot (300 mm) into the soil. In accordance with ASTM D1586, the N-Value equals the sum of the number of blows (N) required to drive the sampler over the interval of 6 to 18 in. (150 to 450 mm). However, when a 24 in. (610 mm) sampler is used, the number of blows (N) required to drive the sampler over the interval of 12 to 24 in. (300 to 610 mm) may be reported if this value is lower. For split spoon samples where insufficient penetration was achieved and N-Values cannot be presented, the number of blows are reported over sampler penetration in millimetres (e.g. 50/75). Some design methods make use of N-values corrected for various factors such as overburden pressure, energy ratio, borehole diameter, etc. No corrections have been applied to the N-values presented on the log.

DYNAMIC CONE PENETRATION TEST (DCPT)

Dynamic cone penetration tests are performed using a standard 60 degree apex cone connected to 'A' size drill rods with the same standard fall height and weight as the Standard Penetration Test. The DCPT value is the number of blows of the hammer required to drive the cone one foot (300 mm) into the soil. The DCPT is used as a probe to assess soil variability.

OTHER TESTS

S	Sieve analysis
H	Hydrometer analysis
k	Laboratory permeability
γ	Unit weight
G_s	Specific gravity of soil particles
CD	Consolidated drained triaxial
CU	Consolidated undrained triaxial with pore pressure measurements
UU	Unconsolidated undrained triaxial
DS	Direct Shear
C	Consolidation
Q_u	Unconfined compression
I_p	Point Load Index (I_p on Borehole Record equals $I_p(50)$ in which the index is corrected to a reference diameter of 50 mm)

	Single packer permeability test; test interval from depth shown to bottom of borehole
	Double packer permeability test; test interval as indicated
	Falling head permeability test using casing
	Falling head permeability test using well point or piezometer

Stantec

BOREHOLE RECORD

N: 4 989 237 E: 634 441

BHMW PI-1

CLIENT Muskoka Algonquin Healthcare — PROJECT No. 140022038

LOCATION 300 Pine Street, Bracebridge, Ontario — DATUM Geodetic

DATES: BORING November 8 & 9, 2023 — WATER LEVEL — TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0	**271.5**	**Silty Sand**	0					
0		Possible FILL: loose to compact, brown, Silty SAND (SM) to Silty SAND with Gravel (SM) - trace rootlets at SS1 - trace of wooden fragments at SS3 - moist	1	SS	1	460/610	7	
1			3	SS	2	360/610	17	
2			6	SS	3	300/610	17	
	269.2		7					
		Possible FILL: loose to compact, brown, GRAVEL with Sand (GP) to GRAVEL (GP) - trace of wooden fragments at SS4 and SS5 - moist	8	SS	4	230/610	10	55 40 4 1
3			11	SS	5	150/610	14	
4			13					
5			16	SS	6	76/610	19	
6		Brown to grey	19					
			21	SS	7	0.0/610	11	No recovery from SS7 possibly due to gravels. Auger sample taken.
7			23					
8			26	SS	8	76/610	9	
9			28					
	262.2		30	SS	9	0.0/130	50/130	>>
		End of Borehole at approximately 9.3 m below existing grade due to refusal on inferred bedrock.	31					
10			32					

UNDRAINED SHEAR STRENGTH (kPa)
50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

10 20 30 40 50 60 70 80 90 100

Continued Next Page

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

N: 4 989 237 E: 634 441

BHMW PI-1

CLIENT Muskoka Algonquin Healthcare PROJECT No. 140022038

LOCATION 300 Pine Street, Bracebridge, Ontario DATUM Geodetic

DATES: BORING November 8 & 9, 2023 WATER LEVEL TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES: TYPE	SAMPLES: NUMBER	SAMPLES: RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES: N-VALUE OR RQD(%)
	261.5								
10		Monitoring well installed in borehole, screened from approximately 6.1 m to 9.1 m below grade. The groundwater level was measured below existing grade as follows. dry - November 20, 2023			33				
					34				
					35				
11					36				
					37				
					38				
					39				
12					40				
					41				
					42				
13					43				
					44				
					45				
14					46				
					47				
					48				
15					49				
					50				
					51				
16					52				
					53				
					54				
17					55				
					56				
					57				
18					58				
					59				
					60				
19					61				
					62				
					63				
					64				
20					65				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

BOREHOLE RECORD

N: 4 989 095 E: 634 484

BH PI-2

CLIENT Muskoka Algonquin Healthcare — PROJECT No. 140022038

LOCATION 300 Pine Street, Bracebridge, Ontario — DATUM Geodetic

DATES: BORING November 9 & 10, 2023 — WATER LEVEL — TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0	255.2	**Silty Sand**	0					
		FILL: brown, silty sand with gravel - trace rootlets - moist to wet	1	SS	1	300/610	2	
	254.4		2					
1		Compact to very dense, brown, Silty SAND (SM) to Sandy SILT (ML) - trace gravel to with gravel - moist to wet	3	SS	2	510/610	21	
			4					
			5					
2			6	SS	3	380/610	29	
			7					
		- possble cobbles	8	SS	4	460/510	16	
			9					
3			10	SS	5	0.0/180	50/200mm	No recovery from spoons SS5 and SS6 due to possbile cobbles or boulder
			11					
			12					
4			13					
			14					
			15					
5			16	SS	6	0.0/610	51	
			17					
			18					
			19					
6			20					
			21	SS	7	360/610	25	27 65 7 1
			22					
7			23					
			24					
			25					
8			26	SS	8	360/610	12	
			27					
			28					
			29					
9			30	SS	9	25/61	50/610mm	
	246.0	- rock fragments						
		End of Borehole at approximately 9.2 m below existing grade due to refusal on inferred bedrock.	31					
			32					
10								

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

10 20 30 40 50 60 70 80 90 100

Continued Next Page

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

N: 4 989 095 E: 634 484

BH PI-2

CLIENT Muskoka Algonquin Healthcare PROJECT No. 140022038

LOCATION 300 Pine Street, Bracebridge, Ontario DATUM Geodetic

DATES: BORING November 9 & 10, 2023 WATER LEVEL TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
	245.2								
10		Borehole dry and caved-in inside open borehole measured at 5.3 m below existing grade.			33				
					34				
					35				
11		Borehole was backfille with soil cuttings and hole plug.			36				
					37				
					38				
12					39				
					40				
					41				
13					42				
					43				
					44				
14					45				
					46				
					47				
15					48				
					49				
					50				
16					51				
					52				
					53				
17					54				
					55				
					56				
18					57				
					58				
					59				
19					60				
					61				
					62				
20					63				
					64				
					65				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

BOREHOLE RECORD

N: 4 988 926 E: 634 481

BHMW PI-3

CLIENT Muskoka Algonquin Healthcare — PROJECT No. 140022038

LOCATION 300 Pine Street, Bracebridge, Ontario — DATUM Geodetic

DATES: BORING November 10, 2023 — WATER LEVEL November 10, 2023 — TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0	262.5	**Grass**	0					
		Possible FILL: compact, dark brown, silty sand - with gravel - trace rootlets - moist	1	SS	1	300/610	22	
	261.7		2					
1		Possible FILL: soft, brown, Sandy CLAY (CL) - trace gravel - moist	3	SS	2	460/610	3	4 46 17 33
	261.0		4					
		Compact, brown, Silty Clayey SAND (SC-SM) to Silty SAND (SM) - trace gravel - moist	5					
2			6	SS	3	410/610	16	
			7					
			8	SS	4	380/610	24	
3			9					
		SS5 contains trace clay	10					
			11	SS	5	360/610	14	
			12					
4			13					
	257.9		14					
		Soft, brown to grey, Silty CLAY (CL-ML) to CLAY (CL) - sandy to trace sand - moist	15					
			16	SS	6	560/610	3	0 41 46 13
5			17					
			18	VT	1			
			19					
6			20					
			21	SS	7	580/610	4	
			22					
7			23	VT	2			
			24					
	254.9		25					
		Dense to very dense, brown, Silty SAND (SM) - trace gravel to with gravel - moist	26	SS	8	410/610	44	
8			27					
			28					
			29					
9			30					
			31	SS	9	410/590	74	
	252.8		32					
		End of Borehole at approximately						
10								

Continued Next Page

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

10 20 30 40 50 60 70 80 90 100

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

N: 4 988 926 E: 634 481

BHMW PI-3

CLIENT Muskoka Algonquin Healthcare PROJECT No. 140022038

LOCATION 300 Pine Street, Bracebridge, Ontario DATUM Geodetic

DATES: BORING November 10, 2023 WATER LEVEL November 10, 2023 TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES: TYPE	SAMPLES: NUMBER	SAMPLES: RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES: N-VALUE OR RQD(%)
10	252.5				33				
		9.7 m below existing grade.			34				
		Monitoring well installed in borehole, screened from approximately 6.1 m to 9.1 m below grade.			35				
11					36				
					37				
		The groundwater level was measured below existing grade as follows.			38				
		8.7 m - November 10, 2023			39				
12		9.0 m - November 20, 2023			40				
					41				
					42				
13					43				
					44				
					45				
14					46				
					47				
					48				
15					49				
					50				
					51				
16					52				
					53				
					54				
17					55				
					56				
					57				
18					58				
					59				
					60				
19					61				
					62				
					63				
					64				
20					65				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

N: 4 988 811 E: 634 578

BH PI-4

CLIENT Muskoka Algonquin Healthcare PROJECT No. 140022038

LOCATION 300 Pine Street, Bracebridge, Ontario DATUM Geodetic

DATES: BORING November 9, 2023 WATER LEVEL TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0	**256.3**	**Topsoil**	0					
	256.1	150 mm TOPSOIL	1	SS	1	510/610	7	
		Loose to compact, brown, Sandy SILT (ML) to Silty SAND (SM) - trace clay - moist to wet	2					
1			3	SS	2	360/610	28	
			4					
			5					
2			6	SS	3	510/610	14	
			7					
			8	SS	4	460/610	13	
			9					
3			10					
			11	SS	5	430/610	10	
			12					
4			13					
			14					
			15					
5			16	SS	6	430/610	5	Low blow counts were likley due to the disturbance from the groundwater pressure
			17					
			18					
6			19					
			20					
			21	SS	7	580/610	16	
			22					
7			23					
			24					
			25					
8			26	SS	8	610/610	4	0 74 20 6
			27					
			28					
9			29					
			30					
			31	SS	9	480/610	7	
	246.5		32					
10		End of Borehole at approximately						

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

10 20 30 40 50 60 70 80 90 100

Continued Next Page

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

N: 4 988 811 E: 634 578

BH PI-4

CLIENT Muskoka Algonquin Healthcare PROJECT No. 140022038

LOCATION 300 Pine Street, Bracebridge, Ontario DATUM Geodetic

DATES: BORING November 9, 2023 WATER LEVEL TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
10	246.3	9.8 m below existing grade. Water level and caved-in inside open borehole measured at 2.1 m and 3.0 m below grade, respectively. Borehole was backfilled with soil cuttings and hole plug.			33				
					34				
					35				
11					36				
					37				
					38				
					39				
12					40				
					41				
					42				
13					43				
					44				
					45				
14					46				
					47				
					48				
15					49				
					50				
					51				
16					52				
					53				
					54				
17					55				
					56				
					57				
18					58				
					59				
					60				
19					61				
					62				
					63				
20					64				
					65				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

N: 4 989 339 E: 634 594

BH PI-5

CLIENT Muskoka Algonquin Healthcare PROJECT No. 140022038

LOCATION 300 Pine Street, Bracebridge, Ontario DATUM Geodetic

DATES: BORING November 3, 2023 WATER LEVEL TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)	UNDRAINED SHEAR STRENGTH (kPa) 50 100 150 200 / WATER CONTENT & ATTERBERG LIMITS W_P W W_L / DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m / STANDARD PENETRATION TEST, BLOWS/0.3m	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0	279.4	**Topsoil**			0						
		50 mm TOPSOIL									
		Very loose to dense, brown, Silty SAND (SM) to SAND (SP) - trace clay - wet SS2 contains oraginc matters		▽	1	SS	1	150/610	2		
1					2						
					3	SS	2	250/610	17		
					4						
					5						
2					6	SS	3	460/610	18		
					7						
					8	SS	4	300/610	27		
					9						
3					10						
					11	SS	5	610/610	31		0 96 3 1
	275.6				12						
4		End of Borehole at approximately 3.8 m below existing grade due to refusal on inferred bedrock.			13						
					14						
		Water level and caved-in inside open borehole measured at 2.3 m and 2.7 m below grade, respectively.			15						
5					16						
					17						
		Borehole was backfilled with soil cuttings and hole plug.			18						
					19						
6					20						
					21						
					22						
7					23						
					24						
					25						
8					26						
					27						
					28						
9					29						
					30						
					31						
10					32						

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

N: 4 989 255 E: 634 655

BH PI-6

CLIENT Muskoka Algonquin Healthcare PROJECT No. 140022038

LOCATION 300 Pine Street, Bracebridge, Ontario DATUM Geodetic

DATES: BORING November 8, 2023 WATER LEVEL TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
0	**276.2**	**Topsoil**			0				
	276.0	200 mm TOPSOIL with silty sand, trace clay, trace rootlets			1	SS	1	100 5	1/200mm
		End of Borehole at approximately 0.2 m below existing grade due to refusal on inferred bedrock.			2			200	
1					3				
					4				
					5				
2					6				
					7				
					8				
					9				
3					10				
					11				
					12				
4					13				
					14				
					15				
					16				
5					17				
					18				
					19				
					20				
6					21				
					22				
					23				
					24				
7					25				
					26				
					27				
					28				
8					29				
					30				
					31				
					32				
9									
10									

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

N: 4 989 144 E: 634 626

BH PI-7

CLIENT Muskoka Algonquin Healthcare PROJECT No. 140022038

LOCATION 300 Pine Street, Bracebridge, Ontario DATUM Geodetic

DATES: BORING November 8, 2023 WATER LEVEL TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	277.5	**Topsoil**			0				
		125 mm TOPSOIL			1	SS	1	380/610	2
		Very loose to dense, brown, Silty SAND (SM)			2				
1		-trace clay			3	SS	2	410/610	39
		- wet			4				
		SS2 and SS3 contain trace gravel			5				
	275.6				6	SS	3	300/380	73/230mm
2		End of Borehole at approximately 1.9 m below existing grade due to refusal on inferred bedrock.			7				
					8				
		Borehole dry and caved-in inside open borehole measured at 1.6 m below existing grade.			9				
3					10				
		Borehole was backfille with soil cuttings and hole plug.			11				
					12				
4					13				
					14				
					15				
5					16				
					17				
					18				
6					19				
					20				
					21				
7					22				
					23				
					24				
					25				
8					26				
					27				
					28				
					29				
9					30				
					31				
					32				
10									

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

10 20 30 40 50 60 70 80 90 100

REMARKS & GRAIN SIZE DISTRIBUTION (%)

GR SA SI CL

9 70 19 2

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

N: 4 989 099 E: 634 686

BH PI-8

CLIENT Muskoka Algonquin Healthcare PROJECT No. 140022038

LOCATION 300 Pine Street, Bracebridge, Ontario DATUM Geodetic

DATES: BORING November 7, 2023 WATER LEVEL TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	**273.4**	**Topsoil**	0				
		125 mm TOPSOIL					
		Loose to compact, brown, Silty SAND (SM) - trace clay - moist	1	SS	1	360/610	4
1			2				
			3	SS	2	460/610	12
	271.9		4				
		Firm, brown to grey, Silty CLAY (CL-ML) to CLAY (CL) - trace sand to with sand - moist	5				
2			6	SS	3	460/610	7
			7				
			8	SS	4	530/610	5
			9				
3			10	VT	1		
	269.6		11				
		Compact, brown, Sandy SILT (ML) - trace clay - wet	12				
			13	SS	5	430/610	12
4			14				
			15				
	268.4		16				
5		End of Borehole at approximately 5.0 m below existing grade due to refusal on inferred bedrock. Water level and caved-in inside open borehole measured at 2.1 m and 3.7 m below existing grade, respectively. Borehole was backfille with soil cuttings and hole plug.	17				
			18				
			19				
6			20				
			21				
			22				
7			23				
			24				
			25				
8			26				
			27				
			28				
9			29				
			30				
			31				
10			32				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

10 20 30 40 50 60 70 80 90 100

REMARKS & GRAIN SIZE DISTRIBUTION (%)

GR SA SI CL

0 24 35 41

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

BOREHOLE RECORD

N: 4 989 008 E: 634 685

BHMW PI-9

CLIENT Muskoka Algonquin Healthcare PROJECT No. 140022038

LOCATION 300 Pine Street, Bracebridge, Ontario DATUM Geodetic

DATES: BORING November 8, 2023 WATER LEVEL November 10, 2023 TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	271.8	**Topsoil**	0				
		125 mm TOPSOIL					
		Loose to compact, brown, Silty SAND (SM) to Sandy SILT (ML) - trace clay - moist	1	SS	1	410/610	11
1			2				
			3	SS	2	360/610	22
			4				
			5				
2			6	SS	3	530/610	26
			7				
			8	SS	4	410/610	5
			9				
3	268.8		10				
		Soft, brown, Silty CLAY (CL-ML) to CLAY (CL) - trace sand - moist to wet	11	SS	5	610/610	2
			12				
4			13	VT	1		
			14				
			15				
		- grey	16	SS	6	610/610	2
5		SS6 contains sand seam	17				
			18	VT	2		
			19				
6	265.7		20				
		Loose, grey, Sandy SILT (ML) - trace clay - wet	21	SS	7	610/610	8
			22				
7		SS7 contains silt (ML)	23				
			24				
	264.0		25				
8		End of Borehole at approximately 7.8 m below existing grade due to refusal on inferred bedrock.	26				
			27				
		Monitoring well installed in borehole, screened from approximately 4.6 m to 7.6 m below grade.	28				
			29				
9			30				
			31				
10			32				

SAMPLES

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

0 3 91 6

Continued Next Page

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

N: 4 989 008 E: 634 685

BHMW PI-9

CLIENT Muskoka Algonquin Healthcare PROJECT No. 140022038

LOCATION 300 Pine Street, Bracebridge, Ontario DATUM Geodetic

DATES: BORING November 8, 2023 WATER LEVEL November 10, 2023 TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
10	261.8				33				
		The groundwater level was measured below existing grade as follows. 6.1 m - November 10, 2023 6.9 m - November 20, 2023			34				
11					35				
					36				
					37				
					38				
12					39				
					40				
					41				
					42				
13					43				
					44				
					45				
					46				
14					47				
					48				
					49				
					50				
15					51				
					52				
					53				
					54				
16					55				
					56				
					57				
					58				
17					59				
					60				
					61				
					62				
18					63				
					64				
					65				
19									
20									

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

N: 4 989 225 E: 634 554

BH PI-10

CLIENT Muskoka Algonquin Healthcare PROJECT No. 140022038

LOCATION 300 Pine Street, Bracebridge, Ontario DATUM Geodetic

DATES: BORING November 6 & 7, 2023 WATER LEVEL TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	**282.0**	**Topsoil**			0				
		100 mm TOPSOIL			1	SS	1	460/610	2
		Very loose to dense, brown to grey, Silty SAND (SM) to Sandy SILT (ML)			2				
1		- trace gravel and clay			3	SS	2	360/610	43
		- wet			4				
					5				
2	279.9				6	SS	3	410/610	25
		Gneiss			7				
		- dark grey and pink gneissic bending, fair quality			8				
		- fresh (W1) to slightly weathered (W2)			9	HQ	1	100%/68%	57%
3	278.5	- broken core from approximately 2.4 m to 2.6 m below grade			10				
		- flat to dipping discontinuities with close joint spacing			11				
		End of Borehole at approximately 3.5 m below existing grade.			12				
4					13				
		Borehole was backfilled with cuttings and hole plug.			14				
					15				
					16				
5					17				
					18				
					19				
6					20				
					21				
					22				
7					23				
					24				
					25				
8					26				
					27				
					28				
9					29				
					30				
					31				
10					32				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

TEST PIT RECORD

N: 4 989 237 E: 634 441

TP-1

CLIENT Muskoka Algonquin Healthcare PROJECT No. 140022038

LOCATION 300 Pine Street, Bracebridge, Ontario DATUM Geodetic

EXCAVATION DATE: October 26, 2023 WATER LEVEL TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0	271.5	**Silty Sand**			0					
		Possilbe Fill: brown, sand with gravel to gravel with sand			1					
1					2					
					3					
					4					
	269.7	- occasional cobbles			5					
2		End of Test Pit at approximately 1.8 m below existing grade.			6					
					7					
		Early termination due to sloughing of grnular materials.			8					
					9					
3		No seepage was observed upon completion of the test pit.			10					
					11					
		The cooridnates and ground surface elevation of TP-1 were inferred from the survey data of BHMW PI-1.			12					
4					13					
					14					
					15					
					16					
5					17					
					18					
					19					
					20					
6					21					
					22					
					23					
					24					
7					25					
					26					
					27					
					28					
8					29					
					30					
					31					
9					32					
10										

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

10 20 30 40 50 60 70 80 90 100

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

TEST PIT RECORD

Stantec

N: 4 989 095 E: 634 484

TP-2

CLIENT Muskoka Algonquin Healthcare PROJECT No. 140022038

LOCATION 300 Pine Street, Bracebridge, Ontario DATUM Geodetic

EXCAVATION DATE: October 26, 2023 WATER LEVEL TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
0	255.2	**Silty Sand**			0				
		Brown silty sand to sand - trace gravel gravel			1				
1					2				
					3				
2					4				
					5				
					6				
					7				
					8				
					9				
3	252.2				10				
		End of Test Pit at approximately 3.0 m below existing grade. No seepage was observed upon completion of the test pit. The cooridnates and ground surface elevation of TP-2 were inferred from the survey data of BH PI-2.			11				
					12				
4					13				
					14				
					15				
					16				
5					17				
					18				
					19				
					20				
					21				
					22				
6					23				
					24				
					25				
					26				
					27				
					28				
					29				
7					30				
					31				
					32				
8									
9									
10									

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

TEST PIT RECORD

N: 4 988 926 E: 634 481

TP-3

CLIENT Muskoka Algonquin Healthcare

PROJECT No. 140022038

LOCATION 300 Pine Street, Bracebridge, Ontario

DATUM Geodetic

EXCAVATION DATE: October 26, 2023

WATER LEVEL

TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION
0	262.5	**Grass**
		Possible Fill: brown, silty sand with gravel
1	261.3	Brown, silty sand to sandy silt
2		
3	259.5	- with gravel, occasional cobbles
		End of Test Pit at approximately 3.0 m below existing grade.
		No seepage was observed upon completion of the test pit.
		The cooridnates and ground surface elevation of TP-3 were inferred from the survey data of BHMW PI-3.
4		
5		
6		
7		
8		
9		
10		

STRATA PLOT | WATER LEVEL | DEPTH (ft) 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32

SAMPLES: TYPE | NUMBER | RECOVERY (mm) TCR(%) / SCR(%) | N-VALUE OR RQD(%)

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

TEST PIT RECORD

N: 4 988 811 E: 634 578

TP-4

CLIENT Muskoka Algonquin Healthcare PROJECT No. 140022038

LOCATION 300 Pine Street, Bracebridge, Ontario DATUM Geodetic

EXCAVATION DATE: October 26, 2023 WATER LEVEL TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION
0	**256.3**	**Topsoil**
	256.1	Topsoil
		Light brown to brown, silty sand to sandy silt
3	253.3	- appeared to contain more moisture
		End of Test Pit at approximately 3.0 m below existing grade.
		No seepage was observed upon completion of the test pit.
		The cooridnates and ground surface elevation of TP-4 were inferred from the survey data of BH PI-4.
10		

STRATA PLOT

WATER LEVEL

DEPTH (ft): 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32

SAMPLES: TYPE | NUMBER | RECOVERY (mm) TCR(%) / SCR(%) | N-VALUE OR RQD(%)

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

TEST PIT RECORD

N: 4 989 339 E: 634 594

TP-5

CLIENT Muskoka Algonquin Healthcare

PROJECT No. 140022038

LOCATION 300 Pine Street, Bracebridge, Ontario

DATUM Geodetic

EXCAVATION DATE: October 25, 2023

WATER LEVEL

TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION
0	279.4	**Topsoil**
		Topsoil
		Brown, silty sand - with gravel
1		
		- cobble/boulder
2		
3		
	275.7	- grey
4		End of Test Pit at approximately 3.7 m below existing grade. Water seepage was observed at about 1.5 m below exisitng grade, and water level inside open test pit measured at 3.5 m below existing grade upon completion of the test pit The cooridnates and ground surface elevation of TP-5 were inferred from the survey data of BH PI-5.
5		
6		
7		
8		
9		
10		

STRATA PLOT

WATER LEVEL

DEPTH (ft): 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32

SAMPLES

TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

TEST PIT RECORD

N: 4 989 255 E: 634 655

TP-6

CLIENT Muskoka Algonquin Healthcare PROJECT No. 140022038

LOCATION 300 Pine Street, Bracebridge, Ontario DATUM Geodetic

EXCAVATION DATE: October 25, 2023 WATER LEVEL TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
0	**276.2**	**Topsoil**			0				
	276.0	Topsoil			1				
	275.7	Brown, silty sand with rock fragments and cobbles			2				
1		End of Test Pit at approximately 0.5 m below existing grade due to inferred bedrock			3				
					4				
		No seepage was observed upon completion of the test pit.			5				
2					6				
		The cooridnates and ground surface elevation of TP-6 were inferred from the survey data of BH PI-6.			7				
					8				
					9				
3					10				
					11				
					12				
4					13				
					14				
					15				
5					16				
					17				
					18				
6					19				
					20				
					21				
7					22				
					23				
					24				
8					25				
					26				
					27				
9					28				
					29				
					30				
10					31				
					32				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

TEST PIT RECORD

N: 4 989 144 E: 634 626

TP-7

CLIENT Muskoka Algonquin Healthcare PROJECT No. 140022038

LOCATION 300 Pine Street, Bracebridge, Ontario DATUM Geodetic

EXCAVATION DATE: October 25, 2023 WATER LEVEL TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
0	**277.5**	**Topsoil**			0					
		Black to brown, topsoil with grevel and cobbles			1					
	276.7				2					
1		End of Test Pit at approximately 0.8 m below existing grade due to inferred bedrock			3					
					4					
		No seepage was observed upon completion of the test pit.			5					
2					6					
					7					
		The cooridnates and ground surface elevation of TP-7 were inferred from the survey data of BH PI-7.			8					
					9					
3					10					
					11					
					12					
4					13					
					14					
					15					
					16					
5					17					
					18					
					19					
6					20					
					21					
					22					
7					23					
					24					
					25					
					26					
8					27					
					28					
					29					
9					30					
					31					
					32					
10										

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

10 20 30 40 50 60 70 80 90 100

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

TEST PIT RECORD

N: 4 989 099 E: 634 686

TP-8

CLIENT Muskoka Algonquin Healthcare

PROJECT No. 140022038

LOCATION 300 Pine Street, Bracebridge, Ontario

DATUM Geodetic

EXCAVATION DATE: October 25, 2023

WATER LEVEL

TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES: TYPE	SAMPLES: NUMBER	SAMPLES: RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES: N-VALUE OR RQD(%)
0	273.4	**Topsoil**			0				
		Topsoil			1				
		Brown, silty sand			2				
1					3				
					4				
					5				
2	271.3				6				
		Grey, silty clay			7				
					8				
					9				
3					10				
					11				
					12				
4	269.4				13				
		End of Test Pit at approximately 4.0 m below existing grade.			14				
					15				
		No seepage was observed upon completion of the test pit.			16				
5					17				
					18				
		The cooridnates and ground surface elevation of TP-8 were inferred from the survey data of BH PI-8.			19				
					20				
6					21				
					22				
					23				
7					24				
					25				
					26				
8					27				
					28				
					29				
9					30				
					31				
10					32				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

TEST PIT RECORD

N: 4 989 008 E: 634 685

TP-9

CLIENT Muskoka Algonquin Healthcare PROJECT No. 140022038

LOCATION 300 Pine Street, Bracebridge, Ontario DATUM Geodetic

EXCAVATION DATE: October 25, 2023 WATER LEVEL TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES N-VALUE OR RQD(%)
	271.8	**Topsoil**							
0		Topsoil			0				
		Brown, silty sand to sandy silt - with gravel			1				
1					2				
					3				
					4				
					5				
2	269.7				6				
		Grey, silty clay			7				
	269.1				8				
		End of Test Pit at approximately 2.7 m below existing grade.			9				
3					10				
		No seepage was observed upon completion of the test pit.			11				
					12				
4					13				
		The cooridnates and ground surface elevation of TP-9 were inferred from the survey data of BHMW PI-9.			14				
					15				
					16				
5					17				
					18				
					19				
6					20				
					21				
					22				
7					23				
					24				
					25				
8					26				
					27				
					28				
9					29				
					30				
					31				
10					32				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

TEST PIT RECORD

N: 4 989 225 E: 634 554

TP-10

CLIENT Muskoka Algonquin Healthcare

PROJECT No. 140022038

LOCATION 300 Pine Street, Bracebridge, Ontario

DATUM Geodetic

EXCAVATION DATE: October 25, 2023

WATER LEVEL

TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES: TYPE	SAMPLES: NUMBER	SAMPLES: RECOVERY (mm) TCR(%) / SCR(%)	SAMPLES: N-VALUE OR RQD(%)	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	282.0	**Topsoil**			0					
0		Topsoil			0					
		Brown to grey, silty sand to sandy silt - trace gravel to with gravel			1					
1					2					
					3					
					4					
	280.3				5					
		End of Test Pit at approximately 1.7 m below existing grade due to inferred bedrock			6					
2					7					
		No seepage was observed upon completion of the test pit.			8					
					9					
3		The cooridnates and ground surface elevation of TP-10 were inferred from the survey data of BH PI-10.			10					
					11					
					12					
4					13					
					14					
					15					
					16					
5					17					
					18					
					19					
6					20					
					21					
					22					
7					23					
					24					
					25					
					26					
8					27					
					28					
					29					
9					30					
					31					
					32					
10										

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

10 20 30 40 50 60 70 80 90 100

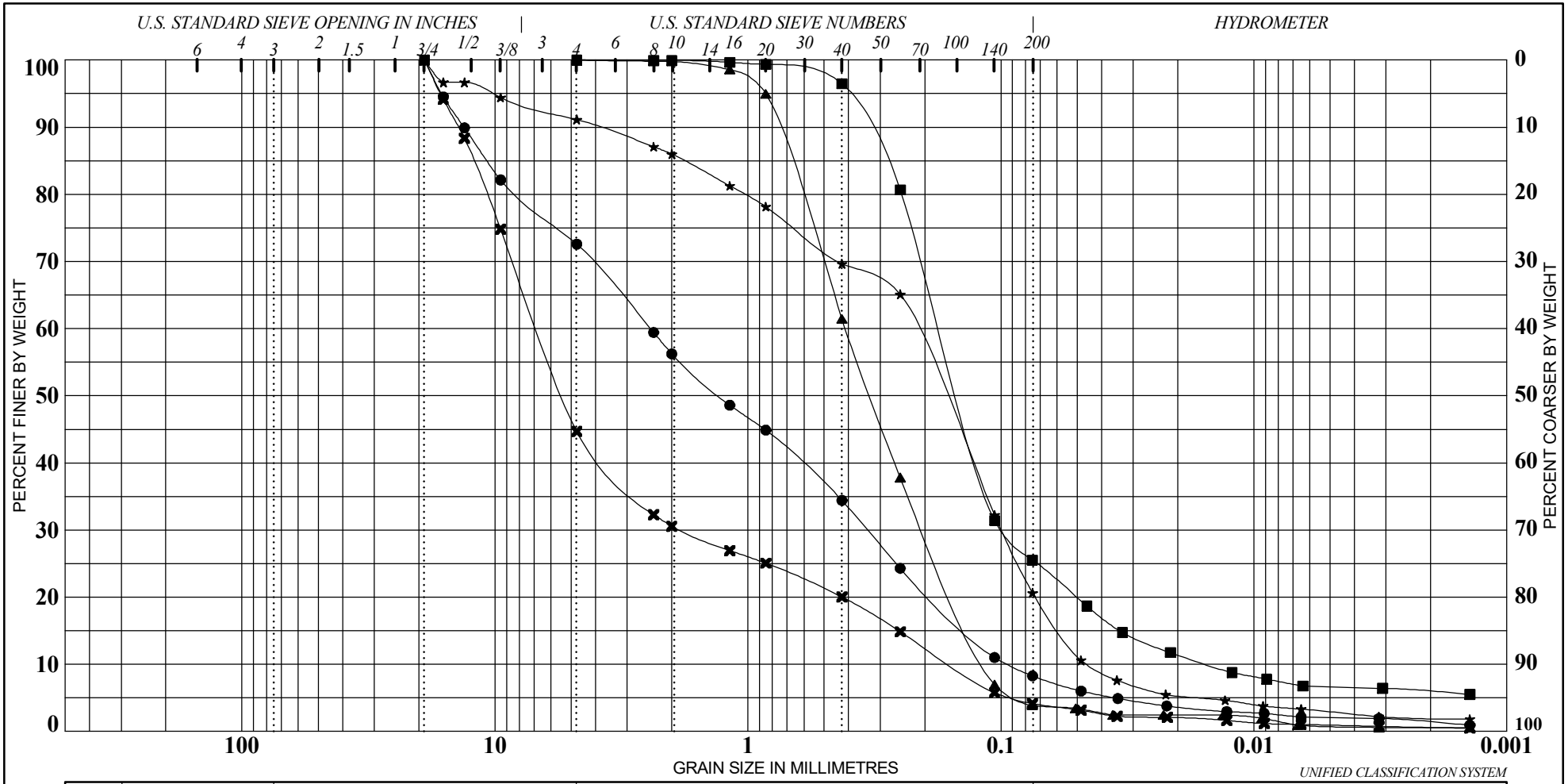
□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

APPENDIX D

D.1 LABORATORY TEST RESULTS



UNIFIED CLASSIFICATION SYSTEM

BLDs	COBBLES	GRAVEL		SAND			SILT & CLAY	
		coarse	fine	coarse	medium	fine	SILT	CLAY

Sample	Depth (m)	Description	W%	W_L	W_P	I_P	%Gravel	%Sand	%Silt	%Clay
● BH PI-2	6.4	SAND with SILT & GRAVEL (SW-SM)	5				27	65	7	1
■ BH PI-4	7.9	SILTY SAND (SM)	7				0	74	20	6
▲ BH PI-5	3.4	SAND (SP)	17				0	96	3	1
★ BH PI-7	1.8	SILTY SAND (SM)	12				9	70	19	2
✖ BHMW PI-1	2.6	GRAVEL with SAND (GP)	3				55	40	4	1

Stantec

Project: Muskoka Algonquin Stage 1.3 - Bracebridge

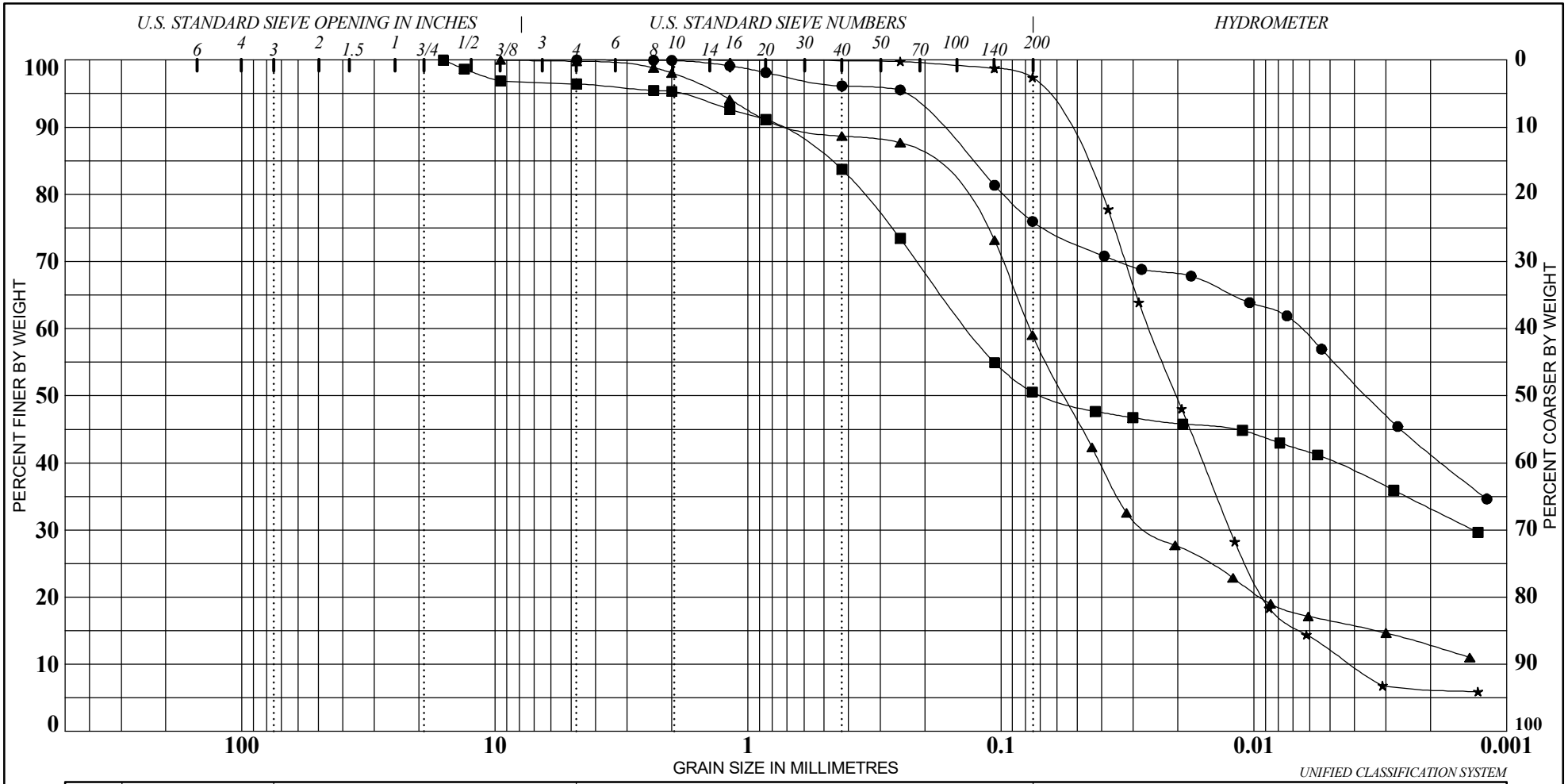
Location: 300 Pine Street, Bracebridge, Ontario

Project No.: 140022038

GRADATION CURVE (ASTM D422)

Figure: 1

Remarks:



UNIFIED CLASSIFICATION SYSTEM

BLDs	COBBLES	GRAVEL		SAND			SILT & CLAY	
		coarse	fine	coarse	medium	fine	SILT	CLAY

Sample	Depth (m)	Description	W%	W_L	W_P	I_P	%Gravel	%Sand	%Silt	%Clay
● BH PI-8	1.8	CLAY with SAND (CL)	31	32	16	16	0	24	35	41
■ BHMW PI-3	1.1	SANDY CLAY (CL)	31	29	14	15	4	46	17	33
▲ BHMW PI-3	4.9	SANDY SILTY CLAY (CL-ML)	22	19	15	4	0	41	46	13
★ BHMW PI-9	6.4	SILT (ML)	24	NP	NP	NP	0	3	91	6

Stantec

Project: Muskoka Algonquin Stage 1.3 - Bracebridge

Location: 300 Pine Street, Bracebridge, Ontario

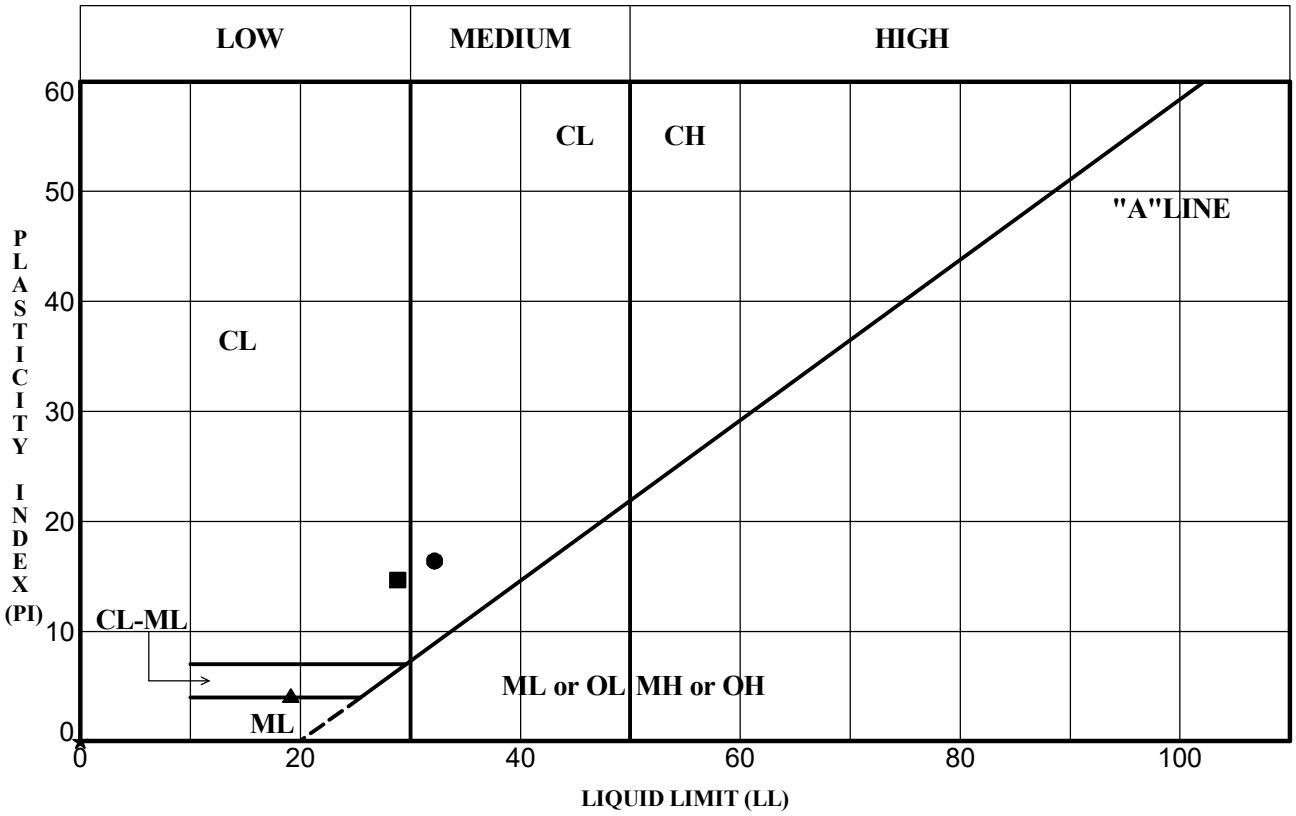
Project No.: 140022038

GRADATION CURVE (ASTM D422)

Figure: 2

Remarks:

PLASTICITY CHART



	Specimen	Depth (m)	LL	PL	PI	Fines	W%	Classification
●	BH PI-8	1.8	32	16	16	76	31	CLAY with SAND (CL)
■	BHMW PI-3	1.1	29	14	15	51	31	SANDY CLAY (CL)
▲	BHMW PI-3	4.9	19	15	4	59	22	SANDY SILTY CLAY (CL-ML)
★	BHMW PI-9	6.4	NP	NP	NP	97	24	SILT (ML)

Stantec

Project: Muskoka Algonquin Stage 1.3 - Bracebridge

Location: 300 Pine Street, Bracebridge, Ontario

Project No.: 140022038

ATTERBERG LIMITS
(ASTM D4318)

Figure: 3

Remarks:

STN13-ATTERBERG 140022038 (BRACEBRIDGE - SITE A).GPJ STANTEC_MARKHAM_DATA_TEMPLATE 2015-05-20.GDT 12/7/23

AGAT Laboratories

2910 12TH STREET NE
CALGARY, ALBERTA
CANADA T2E 7P7
TEL (403)735-2005
FAX (403)735-2771
http://www.agatlabs.com

CLIENT NAME: STANTEC CONSULTING LTD
300-675 Cochrane Drive
MARKHAM, ON L3R0B8
(905) 444-7777

ATTENTION TO: Harpreet Singh

PROJECT: 140022038.801.201

AGAT WORK ORDER: 23T099309

ROCK ANALYSIS REVIEWED BY: Jewel Shibu, Lab Supervisor

SOIL ANALYSIS REVIEWED BY: Sukhwinder Randhawa, Inorganic Team Lead

DATE REPORTED: Dec 08, 2023

PAGES (INCLUDING COVER): 7

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (403) 735-2005

*Notes

Disclaimer:

- *All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.*
- *All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.*
- *AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.*
- *This Certificate shall not be reproduced except in full, without the written approval of the laboratory.*
- *The test results reported herewith relate only to the samples as received by the laboratory.*
- *Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.*
- *All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.*
- *For environmental samples in the Province of Quebec: The analysis is performed on and results apply to samples as received. A temperature above 6°C upon receipt, as indicated in the Sample Reception Notification (SRN), could indicate the integrity of the samples has been compromised if the delay between sampling and submission to the laboratory could not be minimized.*

Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)
Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

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AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 23T099309

PROJECT: 140022038.801.201

CLIENT NAME: STANTEC CONSULTING LTD

ATTENTION TO: Harpreet Singh

SAMPLING SITE:

SAMPLED BY:

(284-042) Sulfide (CGY)

DATE RECEIVED: 2023-11-30

DATE REPORTED: 2023-12-08

				SAMPLE DESCRIPTION:	BH PI-8 SS4	BH PI-1 SS2	BH PI-4 SS3
				SAMPLE TYPE:	Soil	Soil	Soil
				DATE SAMPLED:	2023-11-30	2023-11-30	2023-11-30
Parameter	Unit	G / S	RDL		5506050	5506061	5506062
Sulfide	%		0.01		<0.01	<0.01	<0.01

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

5506050-5506062 Acid Soluble Sulfate Analysis completed at AGAT 2620 Calgary
Total Sulfur Analysis completed at AGAT 2215 Calgary

Analysis performed at AGAT Calgary (unless marked by *)

Certified By: Jewel Shibu

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 23T099309

PROJECT: 140022038.801.201

CLIENT NAME: STANTEC CONSULTING LTD

ATTENTION TO: Harpreet Singh

SAMPLING SITE:

SAMPLED BY:

Corrosivity Package

DATE RECEIVED: 2023-11-30

DATE REPORTED: 2023-12-08

		SAMPLE DESCRIPTION:		BH PI-8 SS4	BH PI-1 SS2	BH PI-4 SS3
		SAMPLE TYPE:		Soil	Soil	Soil
		DATE SAMPLED:		2023-11-30	2023-11-30	2023-11-30
Parameter	Unit	G / S	RDL	5506050	5506061	5506062
Chloride (2:1)	µg/g		2	<2	<2	<2
Sulphate (2:1)	µg/g		2	8	7	3
pH (2:1)	pH Units		NA	6.54	6.97	6.17
Electrical Conductivity (2:1)	mS/cm		0.005	0.035	0.033	0.015
Resistivity (2:1) (Calculated)	ohm.cm		1	28600	30300	66700
Redox Potential 1	mV		NA	309	224	242
Redox Potential 2	mV		NA	314	230	243
Redox Potential 3	mV		NA	319	229	239

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

5506050-5506062 EC, pH, Chloride and Sulphate were determined on the extract obtained from the 2:1 leaching procedure (2 parts DI water: 1 part soil). Resistivity is a calculated parameter.
Redox potential measured on as received sample. Due to the potential for rapid change in sample equilibrium chemistry with exposure to oxidative/reduction conditions laboratory results may differ from field measured results.
Redox potential measurement in soil is quite variable and non reproducible due in part, to the general heterogeneity of a given soil. It is also related to the introduction of increased oxygen into the sample after extraction. The interpretation of soil redox potential should be considered in terms of its general range rather than as an absolute measurement.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

Results relate only to the items tested. Results apply to samples as received.

2910 12TH STREET NE
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Quality Assurance

CLIENT NAME: STANTEC CONSULTING LTD

AGAT WORK ORDER: 23T099309

PROJECT: 140022038.801.201

ATTENTION TO: Harpreet Singh

SAMPLING SITE:

SAMPLED BY:

Rock Analysis

RPT Date: Dec 08, 2023			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
(284-042) Sulfide (CGY)															
Total Sulfur	5506050	5506050	<0.01	<0.01	NA	< 0.01	100%	80%	120%						
Sulfate	5502237	5502237	<0.01	<0.01	NA	< 0.01	100%	80%	120%						

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.
Duplicate/ Replicate NA: Results are less than 10X the RDL and RPD will not be calculated

(284-042) Sulfide (CGY)															
Sulfate	5506050	5506050	<0.01	<0.01	0%	< 0.01		80%	120%						

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.
Duplicate/ Replicate NA: Results are less than 10X the RDL and RPD will not be calculated

Certified By:

Jewel Shibu

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Results relate only to the items tested. Results apply to samples as received.

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FAX (403)735-2771
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: STANTEC CONSULTING LTD

AGAT WORK ORDER: 23T099309

PROJECT: 140022038.801.201

ATTENTION TO: Harpreet Singh

SAMPLING SITE:

SAMPLED BY:

Soil Analysis

RPT Date: Dec 08, 2023			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Corrosivity Package															
Chloride (2:1)	5506050	5506050	<2	<2	NA	< 2	95%	70%	130%	96%	80%	120%	94%	70%	130%
Sulphate (2:1)	5506050	5506050	8	9	NA	< 2	99%	70%	130%	97%	80%	120%	99%	70%	130%
pH (2:1)	5506050	5506050	6.54	6.57	0.5%	NA	95%	80%	120%						
Electrical Conductivity (2:1)	5506050	5506050	0.035	0.037	5.6%	< 0.005	91%	80%	120%						
Redox Potential 1	5506050					NA	100%	90%	110%						

Comments: NA signifies Not Applicable.
pH duplicates QA acceptance criteria was met relative as stated in Table 5-15 of Analytical Protocol document.

Duplicate NA: results are under 5X the RDL and will not be calculated.

Certified By:

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Results relate only to the items tested. Results apply to samples as received.

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http://www.agatlabs.com

Method Summary

CLIENT NAME: STANTEC CONSULTING LTD

AGAT WORK ORDER: 23T099309

PROJECT: 140022038.801.201

ATTENTION TO: Harpreet Singh

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Chloride (2:1)	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Sulphate (2:1)	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
pH (2:1)	INOR 93-6031	modified from EPA 9045D and MCKEAGUE 3.11	PH METER
Electrical Conductivity (2:1)	INOR-93-6075	modified from MSA PART 3, CH 14 and SM 2510 B	PC TITRATE
Resistivity (2:1) (Calculated)	INOR-93-6036	McKeague 4.12, SM 2510 B,SSA #5 Part 3	CALCULATION
Redox Potential 1	INOR-93-6066	modified from G200-20, SM 2580 B	REDOX POTENTIAL ELECTRODE
Redox Potential 2	INOR-93-6066	modified from G200-20, SM 2580 B	REDOX POTENTIAL ELECTRODE
Redox Potential 3	INOR-93-6066	modified from G200-20, SM 2580 B	REDOX POTENTIAL ELECTRODE

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

Have feedback? Scan here for a quick survey!

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Laboratory Use Only

Work Order #: 23T099309

Cooler Quantity: 1 Bag

Arrival Temperatures: 19.3 | 19.4 | 20.6

Custody Seal Intact: ☐ Yes ☐ No ☐ N/A

Notes: no ice

Report Information:

Company: STANTEC CONSULTING LTD
Contact: Manpreet Singh
Address: 300-675 Cochrane Drive
Markham, Ontario
Phone: 647-273-9487 Fax:
Reports to be sent to:
1. Email: Jordan.lee@stantec.com
2. Email: Gary.Thao@stantec.com
Brittany.Sebnath@stantec.com

Project Information:

Project: 140022038.801.201
Site Location:
Sampled By:
AGAT Quote #: PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☑ No ☐

Company:
Contact:
Address:
Email:

Regulatory Requirements:

(Please check all applicable boxes)

☐ Regulation 153/04
Table _____ *Indicate One*
☐ Ind/Com
☐ Res/Park
☐ Agriculture
Soil Texture *(Check One)*
☐ Coarse
☐ Fine

☐ Regulation 406
Table _____ *Indicate One*

☐ Regulation 558

☐ CCME

☐ Sewer Use ☐ Sanitary ☐ Storm
_____ *Region*

☐ Prov. Water Quality Objectives (PWQO)

☐ Other
_____ *Indicate One*

Is this submission for a **Record of Site Condition?** ☐ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☐ Yes ☐ No

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Sample Matrix Legend

GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI, DOC Y/N	O. Reg 153: Metals & Inorganics	O. Reg 153: Metals - ☐ CrVI, ☐ Hg, ☐ HWSB	O. Reg 153: BTEX, F1-F4 PHCs	VOC	PAHs	PCBs	PCBs: Arochlors ☐	O. Reg 558: Landfill Disposal Characterization TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	O. Reg 406: Regulation 406 SPLP Rainwater Leach ☐ Metals ☐ VOCs ☐ SVOCs	O. Reg 406: Regulation 406 Characterization Package pH, ICPMS Metals, BTEX, F1-F4	Corrosivity: ☐ Moisture ☐ Sulphide	SULPHATE	Chloride Content	Resistivity	PH, Redox Potential			Potentially Hazardous or High Concentration (Y/N)
1. BMPT-8 SS4	30 NOV.	AM/PM	1	SOIL	7.5'												X	X	X	X	X			
2. BMPT-1, SS2	↓	AM/PM	1	SOIL	2.5'												X	X	X	X	X			
3. BMPT-4, SS3		AM/PM	1	SOIL	5'												X	X	X	X	X			
4.		AM/PM																						
5.		AM/PM																						
6.		AM/PM																						
7.		AM/PM																						
8.		AM/PM																						
9.		AM/PM																						
10.		AM/PM																						
11.		AM/PM																						

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
			OWNER	11/30/23	15:24
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time

Page _____ of _____

N°: T - 148757

Pink Copy - Client | Yellow Copy - AGAT | White Copy - AGAT

Document ID: DIV-78-1511.022

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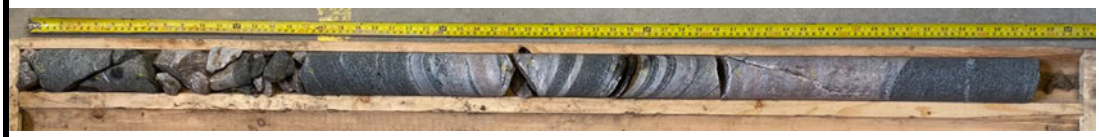
APPENDIX E

E.1 ROCK CORE PHOTO

Stantec	**Project:**	Geotechnical Investigation - Proposed Hospital at Site A - 300 Pine Street		
	Project Number:	140022038		
	Location:	300 Pine Street, Bracebridge, ON		
	Borehole ID:	BH PI-10	**Depth (m):**	2.1 - 3.5 m



2.1 m ← RUN 1 → 3.5 m

APPENDIX F

F.1 NBCC SEISMIC HAZARD CALCULATION

Government of Canada / Gouvernement du Canada

2020 National Building Code of Canada Seismic Hazard Tool

This application provides seismic values for the design of buildings in Canada under Part 4 of the National Building Code of Canada (NBC) 2020 as prescribed in Article 1.1.3.1. of Division B of the NBC 2020.

Seismic Hazard Values

User requested values

Code edition	NBC 2020
Site designation X_S	X_D
Latitude (°)	45.044
Longitude (°)	-79.295

Please select one of the tabs below.

NBC 2020 | Additional Values | Plots | API | Background Information

The NBC 5% damped spectral acceleration values can be viewed in the NBC tab. Additional hazard values for your site can be found below.

The 5%-damped spectral acceleration ($S_a(T)$, where T is the period, in s) and peak ground acceleration (PGA) values are given in units of acceleration due to gravity (g, 9.81 m/s^2). Peak ground velocity (PGV) is given in m/s. Probability is expressed in terms of percent (%) exceedance in 50 years.

By default, all probabilities for the user-specified site designation are shown. Other site designations can be selected from the respective drop-down menu in the table. In low hazard regions, a minimum value of 0.001g for T ≤ 2.0s and of 0.0001g for T > 2.0s is assigned. Further information on the calculation of seismic hazard is provided in the *Background Information* tab.

Site Designation XD	**Probability** All	**S_a(0.05)**	**S_a(0.1)**	**S_a(0.2)**	**S_a(0.3)**	**S_a(0.5)**	**S_a(1.0)**	**S_a(2.0)**	**S_a(5.0)**	**S_a(10.0)**	**PGA**	**PGV**
X_D	2	0.206	0.26	0.286	0.302	0.296	0.181	0.0875	0.0234	0.00737	0.153	0.188
X_D	2.5	0.184	0.233	0.258	0.272	0.267	0.161	0.0772	0.0203	0.00641	0.139	0.166
X_D	3.5	0.153	0.196	0.217	0.229	0.224	0.134	0.0633	0.0162	0.00512	0.117	0.136
X_D	5	0.124	0.16	0.178	0.188	0.184	0.108	0.0504	0.0125	0.00396	0.0958	0.108
X_D	7	0.0999	0.13	0.146	0.154	0.15	0.0872	0.0398	0.00957	0.00304	0.0784	0.0857
X_D	10	0.078	0.103	0.116	0.122	0.118	0.0677	0.0303	0.00699	0.00222	0.0621	0.0656
X_D	14	0.0606	0.0813	0.0917	0.0964	0.0927	0.052	0.0227	0.00501	0.00159	0.049	0.0497
X_D	20	0.0454	0.0617	0.07	0.0733	0.0698	0.0381	0.016	0.00337	0.00106	0.0372	0.0358
X_D	30	0.0313	0.0436	0.0494	0.0515	0.0479	0.0252	0.01	0.00196	0.000603	0.0262	0.0233
X_D	40	0.0232	0.0327	0.0372	0.0385	0.0351	0.0176	0.0067	0.00123	0.000371	0.0196	0.0164

Download CSV

← Go back to the seismic hazard calculator form

Date modified: 2021-04-06

Stantec

Memo

To:	Hellen Scott Stantec Consulting Ltd.	From:	Marla Larson, Lisa Uskov Stantec Consulting Ltd.
File:	140022038	Date:	December 1, 2023

Reference: **Bracebridge Hospital Preliminary Natural Heritage Screening – Site A (300 Pine Street) and Site C (1975 Muskoka Beach Road)**

INTRODUCTION

Muskoka Algonquin Healthcare (MAHC) is proposing the construction of a new hospital building along Highway 11 at 300 Pine Street in Bracebridge, Ontario (Site A) or alternatively at 1975 Muskoka Beach Road (Site C) across from Muskoka Brewing Company in Bracebridge, Ontario.

Stantec Consulting Ltd. (Stantec) conducted a preliminary natural heritage screening, including a desktop review and site reconnaissance field visit (October 17 and 18, 2023) to identify natural heritage features on the Subject Properties and lands within 120 m (hereafter Adjacent Lands). The Subject Properties and Adjacent Lands are hereafter collectively referred to as the Study Areas. The purpose of the desktop review was to identify natural and anthropogenic vegetation and wildlife habitat features to support a general assessment of their significance.

This memo provides a summary of the results of the preliminary screening.

NATURAL HERITAGE POLICY CONTEXT

The following sections discuss legislation and polices that are relevant to the Study Areas. These, along with other background information and data, were used to identify natural features that require consideration through the planning and design process, and which may be constraints to development. Legislation and policy are presented under separate headers for the federal, provincial and municipal planning context.

FEDERAL CONTEXT

The Fisheries Act, 1985

The Fisheries Act, 1985 (amended on August 28, 2019) is the main federal law governing fisheries in Canada and is administered by Fisheries and Oceans Canada (DFO). The Fisheries Act provides for the management and control of fisheries, the conservation and protection of fish, the protection of fish habitat and pollution prevention. Projects that may impact fish, fish habitat, aquatic species at risk (SAR) and aquatic invasive species may be subject to DFO review. The Fisheries Act prohibits causing the death of fish and the harmful alteration, disruption or destruction (HADD) of fish habitat, unless authorized by the Minister of Fisheries, Oceans and the Canadian Coast Guard. Conditions and circumstances for projects to be exempt from review are listed on DFO's Fish and Fish Habitat Protection Program web pages. Following guidance and criteria provided on DFO's website regarding mitigation, waterbody types and codes of practice, proponents determine whether their projects in or near water will require review by DFO. DFO review is requested through the submission of a 'Request for Review' (RfR) form. Following completion of their review, DFO can proceed in two ways: 1) issue a Letter of Advice indicating that the proposed work complies with the Fisheries Act or, 2) refer the project to the Regulatory Review Unit for site specific review. If the project can avoid impacts to fish and fish habitat, project approval is not required. If impacts that cause a HADD cannot be

avoided, proponents must apply for a Fisheries Act Authorization, and may be required to develop a habitat offsetting or compensation plan.

Migratory Birds Convention Act, 1994 and Migratory Birds Regulation, 2022

The Migratory Birds Convention Act, 1994 (MBCA) prohibits the killing or capturing of migratory birds, as well as the damage, destruction, removal, or disturbance of their nests. The Migratory Birds Regulation, 2022 (MBR), further defines when nests of migratory bird species are protected, with special provisions in place for bird species that reuse their nests (e.g., Pileated Woodpecker, Great Blue Heron).

Most bird species in Canada are protected under the MBCA, as defined by Article I, which names the families and subfamilies of birds protected, and provides clarification of which species are included. In southern Ontario, migratory birds generally nest between April 1 and August 31. Environment and Climate Change Canada (ECCC) can issue permits allowing the destruction of nests for scientific, agricultural, or health and safety purposes. New development and site alterations do not qualify as a permitted activity under the MBCA and failure to comply with the MBCA/MBR could result in a charge.

PROVINCIAL CONTEXT

The Planning Act / Provincial Policy Statement

The Provincial Policy Statement (PPS; MMAH 2020) was issued under Section 3 of the Planning Act, 1990 (PA) and came into effect in 1996, with the most recent revision coming into effect on May 1, 2020. The Planning Act requires that decisions made by planning authorities are consistent with the policy statements of the PPS, which includes policies on development and land use patterns, resources and public health and safety. Section 2.1 of the PPS deals with natural heritage and requires that natural heritage systems are identified in certain ecoregions. This includes Ecoregion 5E, where the Study Area is located.

According to Section 2.1.5 of the PPS, development and site alteration are not permitted in the following features, unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions:

a) Significant Woodlands

b) Significant Valleylands

c) Significant Wildlife Habitat

d) Significant Areas of Natural and Scientific Interest

e) Coastal wetlands that are not subject to policy 2.1.4(b)

Development and site alteration are not permitted in the following features, except in accordance with provincial and federal requirements:

a) Habitat of endangered or threatened species

b) Fish habitat

Development and site alteration are not permitted on lands that are adjacent to the natural heritage features and areas identified above unless the ecological function of the Adjacent Lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions.

Endangered Species Act, 2007

The Endangered Species Act, 2007 (ESA) protects species designated as threatened, endangered, or extirpated on the Species at Risk List in Ontario (SARO). The ESA prohibits the killing, harming, harassing, or possessing protected species, as well as prohibiting any damage or destruction to the habitat of the listed species. Listed species are referred to as Species at Risk (SAR) and are provided with general habitat protection under the ESA to protect areas that species depend on to carry out their life processes, such as reproduction, rearing, hibernation, migration or feeding. Some species are also protected by detailed habitat regulations that go beyond the general habitat protection to define the extent and character of protected habitats.

Activities that may impact a protected species or its habitat require the prior issuance of a permit from the Ministry of the Environment, Conservation and Parks (MECP), unless the activities are applicable under O. Reg. 242/08, O. Reg. 830/21, or O. Reg. 829/21. These regulations identify activities that are exempt from the permitting requirements of the ESA and are subject to rigorous controls outside the permit process, including registration of the activity and preparation of a mitigation plan. Activities that are not exempt under these regulations require a complete permit application process.

Fish and Wildlife Conservation Act, 1997

The provincial Fish and Wildlife Conservation Act, 1997 (FWCA) provides protection of wildlife in Ontario including fish, furbearing mammals, game wildlife and specially protected wildlife through regulations for hunting, trapping, and fishing practices. Game and specially protected mammals, birds, reptiles, amphibians and invertebrates are listed on Schedules 1-11 of the FWCA. Definitions provided for hunting include capturing or harassing wildlife (Section 5.0) and would include activities that collect or handle wildlife for inventories or other scientific purposes, or to relocate wildlife out of harm's way (e.g., during construction activities), including individuals and eggs. Sections 7.0 and 8.0 also provide protection for nest and eggs of specified bird species including raptors, and dens of furbearing animals, and beaver dams. Under the FWCA, the Minister has the authority to authorize activities that would otherwise be prohibited such as the safe capture of wildlife and removal of nests, dens and dams, and also to impose conditions on an authorization.

MUNICIPAL PLANNING CONTEXT: THE CORPORATION OF THE TOWN OF BRACEBRIDGE, OFFICIAL PLAN

The Town of Bracebridge Official Plan (2013) (OP) recognizes Natural Environmental Features (NEF), also known as Natural Heritage Features (NHF), and their associated ecological functions as part of a Natural Heritage System (NHS). Within the OP, NHF are defined as features and areas which are important for environmental and social values. NHF considered significant at the provincial, district or local level include:

- Habitat of endangered and threatened species
- Significant wildlife habitat
- Fish habitat

- Deer wintering areas
- Muskoka Heritage Areas
- Provincially significant and other wetlands
- Areas of natural and scientific interest (ANSI's)

BACKGROUND SCREENING

The following background documents and sources of information were consulted during the screening:

- The Corporation of the Town of Bracebridge Official Plan (April 2013)
- Ontario GeoHub datasets (Ontario Ministry of Natural Resources and Forestry 2023d)
- Natural Heritage Information Centre (NHIC) database (Ontario Ministry of Natural Resources and Forestry 2023c)
- Atlas of the Mammals of Ontario (Dobbyn 1994)
- Ontario Reptile and Amphibian Atlas (Ontario Nature 2020)
- Ontario Breeding Bird Atlas (Bird Studies Canada, Environment Canada's Canadian Wildlife Service, Ontario Nature, Ontario Field Ornithologists and Ontario Ministry of Natural Resources 2006)
- Species at Risk in Ontario List (database) (Ontario Ministry of Natural Resources and Forestry 2023a)
- DFO Aquatic Species at Risk Map (Fisheries and Oceans Canada 2023)
- eBird Canada (eBird 2023)
- iNaturalist (iNaturalist 2023a)
- Odonata of Ontario (iNaturalist 2023b)
- Ontario Butterfly Atlas (Toronto Entomologists' Association 2023)
- Ontario Moth Atlas (Toronto Entomologists' Association 2023)
- The Tree Atlas (Ontario Ministry of Natural Resources and Forestry 2023b)

Although the above resources are useful for identifying potential species of interest for the Study Area, exact locations of species occurrences are not available. The accuracy of data records ranges from 1 km² to municipal boundaries or watershed.

VEGETATION COMMUNITIES

A high-level classification of vegetation communities was completed via aerial photo interpretation and field verification (for the Subject Property only) using the Ecological Land Classification (ELC) system for the Great-Lakes St. Lawrence Region (Banton, et al. 2009).

The Town of Bracebridge Official Plan (2013) did not identify any NEF in Site A; and identifies the wetland feature in Site C (discussed further below) as 'wetland' in Appendix A.

SITE A – 300 PINE STREET

The Study Area is composed predominantly of an aggregate pit and deciduous or mixed deciduous forest dominated by sugar maple, ash, elm, oak, beech and hemlock. Maintained hydro lines with forb-dominated vegetation intersect the north Adjacent Lands.

SITE C – 1975 MUSKOKA BEACH ROAD

The Study Area is composed predominantly of deciduous or mixed deciduous forest dominated by sugar maple, beech, alder, tamarack, oak, and hemlock, as well as mixed meadow and meadow marsh habitat. A large unevaluated wetland feature occurs in the northwest half of the Study Area, mainly composed of cattails and other graminoids.

SPECIES AT RISK

For this assessment, SAR are species listed as Threatened or Endangered on the SARO list. The SAR screening included a review of available background sources, preliminary habitat characterization using vegetation community classification, and incidental observations during the field reconnaissance. Table 1 identifies SAR with existing records or overlapping ranges and a preliminary assessment of suitable habitat in the Study Area.

Table 1: Species at Risk Identified as Potentially Present in the Study Areas During the Preliminary Screening

Common Name	Scientific Name	SARO Status	Suitable Habitat Identified During Preliminary Screening – Site A	Suitable Habitat Identified During Preliminary Screening – Site C
Bank Swallow	*Riparia riparia*	Threatened	Yes	No
Blanding's Turtle	*Emydoidea blandingi*	Threatened	No	Yes
Bobolink	*Dolichonyx oryzivorus*	Threatened	No	Yes
Chimney Swift	*Chaetura pelagica*	Threatened	No	No
Eastern Meadowlark	*Sturnella magna*	Threatened	No	Yes
Eastern Whip-poor-will	*Antrostomus vociferus*	Threatened	Yes	Yes
Eastern Wolf	*Canis sp. cf. lycaon*	Threatened	Yes	Yes

Common Name	Scientific Name	SARO Status	Suitable Habitat Identified During Preliminary Screening – Site A	Suitable Habitat Identified During Preliminary Screening – Site C
Least Bittern	*Ixobrychus exilis*	Threatened	No	Yes
Little Brown Myotis	*Myotis lucifugus*	Endangered	Yes	Yes
Northern Myotis	*Myotis septentrionalis*	Endangered	Yes	Yes
Tri-colored Bat	*Perimyotis subflavus*	Endangered	Yes	Yes

SIGNIFICANT WILDLIFE HABITAT

The Significant Wildlife Habitat Criteria Schedules for Ecoregion 5E (Ontario Ministry of Natural Resources and Forestry 2015) supports the PPS by providing ecoregion-specific criteria for Significant Wildlife Habitat (SWH). The following categories of SWH are recognized for the ecoregion:

- Seasonal concentration of animals
- Rare vegetation communities
- Specialized habitat for wildlife
- Habitat for Species of Conservation Concern
- Animal movement corridors

Species of Conservation Concern (SOCC) include species that are listed as Special Concern (SC) on the SARO list, terrestrial species listed as Threatened or Endangered on Schedule 1 of the federal *Species at Risk Act* (SARA), or provincially rare (with a Provincial S-rank of S1 to S3).

Provincial sub-national ranks (S-ranks) are used by the NHIC to set protection priorities for rare species and vegetation communities. They are based on the number of factors such as abundance, distribution, population trends and threats in Ontario and are not legal designations. Provincial S-ranks are defined as follows:

S1: Critically imperiled; usually fewer than 5 occurrences
S2: Imperiled; usually fewer than 20 occurrences
S3: Vulnerable; usually fewer than 100 occurrences
S4: Apparently secure; uncommon but not rare, usually more than 100 occurrences
S5: Secure, common, widespread and abundant

SITE A – 300 PINE STREET

During the preliminary screening, suitable habitat within the Study Area was identified that may support the following candidate SWH:

- Bat maternity colonies (cavity trees identified in Study Area)
- Snake hibernaculum (rock piles with potential subterranean access identified in Study Area)
- Colonially nesting bird breeding habitat (Bank and Cliff)

- Special concern and rare wildlife species
- Habitat for up to 4 SOCC (Canada Warbler, Eastern Wood-Pewee, Wood Thrush and Monarch)

SITE C – 1975 MUSKOKA BEACH ROAD

During the preliminary screening, suitable habitat within the Study Area was identified that may support the following candidate SWH:

- Bat maternity colonies (cavity trees identified within Study Area)
- Raptor wintering area
- Snake hibernaculum (rock piles with potential subterranean access identified within Study Area)
- Turtle overwintering habitat
- Amphibian breeding habitat (woodland)
- Amphibian breeding habitat (wetland)
- Marsh breeding habitat
- Special concern and rare wildlife species
- Amphibian movement corridors
- Habitat for up to 6 SOCC (Canada Warbler, Eastern Wood-Pewee, Midland Painted Turtle, Monarch, Snapping Turtle, and Wood Thrush)

Other notable findings include a potential coyote den in the southern edge of the Study Area, sand surrounding den opening contained deer and coyote tracks.

FISH HABITAT

SITE A – 300 PINE STREET

The background review did not identify any watercourses overlapping the Study Area (**Figure 1**).

SITE C – 1975 MUSKOKA BEACH ROAD

The background review identified one mapped stream connecting three small waterbodies located to the north and west of the Study Area, within environmentally protected areas and an unevaluated wetland (**Figure 2**).

SUMMARY AND CLOSURE

SITE A – 300 PINE STREET

Constraints identified during the preliminary natural heritage screening include:

- Potential habitat for 6 SAR
- Potentially suitable habitat for 4 SWH categories

Potential constraints are present throughout the Subject Property, as both woodland and meadow habitat (such as that found under hydro lines) could potentially support SAR or SWH. Specific site locations with potential constraints identified during the preliminary screening are potential bat maternity colonies throughout the forested habitat in the Study Area, potential snake hibernaculum near the west property boundary.

Reference: Bracebridge Hospital Preliminary Natural Heritage Screening – Site A (300 Pine Street) and Site C (1975 Muskoka Beach Road)

SITE C – 1975 MUSKOKA BEACH ROAD

Constraints identified during the preliminary natural heritage screening include:

- Potential habitat for 9 SAR
- Potentially suitable habitat for 8 SWH categories
- Potential fish habitat.

Potential constraints are present throughout the Subject Property, as both woodland, wetland, and meadow habitat could potentially support SAR or SWH. Specific site locations with potential constraints identified during the preliminary screening are potential bat maternity colonies throughout the forested habitat in the Study Area, potential snake hibernaculum located towards the northern boundary of the Study Area. Significant constraints are anticipated to occur within the amphibian breeding habitat and marsh habitat within the graminoid marsh/wetland in the northwest half of the Subject Property.

Based on our current knowledge and experience, a list of studies that may be required for the Study Area prior to permitting and site plan approval are presented below. This list is subject to change based on the project footprint and new information as it becomes available. It is recommended that a pre-consultation with the Town of Bracebridge is undertaken to confirm the requirements.

- Breeding bird surveys (2 visits in June-July)
- Marsh callback surveys (3 visits in May-July)
- Amphibian call surveys (3 visits in April-June)
- Botanical inventory (3 visits in April-September)
- Fish habitat assessment (1 visit in April-August)
- Bat acoustic monitoring (2 visits/ ARU deployment in June/July)
- Snake emergence surveys (5 visits in April-May)

CLOSURE

Please note that all information contained herein is based on the preliminary site screening and should not be considered a complete and comprehensive study or presentation of results. Additional constraints may be identified during the course of future studies. Please do not hesitate to contact the undersigned with any questions or concerns.

Stantec Consulting Ltd.

Digitally signed by Larson, Marla
Date: 2023.12.01 12:55:16 -05'00'

Marla Larson B.Sc.
Terrestrial Ecologist

Mobile: 226-962-0319
Marla.Larson@stantec.com

Digitally signed by Uskov, Lisa
Date: 2023.12.01 13:20:16 -05'00'

Lisa Uskov Tech. Dipl.
Terrestrial Ecologist

Mobile: 647 212 6181
Lisa.Uskov@stantec.com

Attachment: Figures

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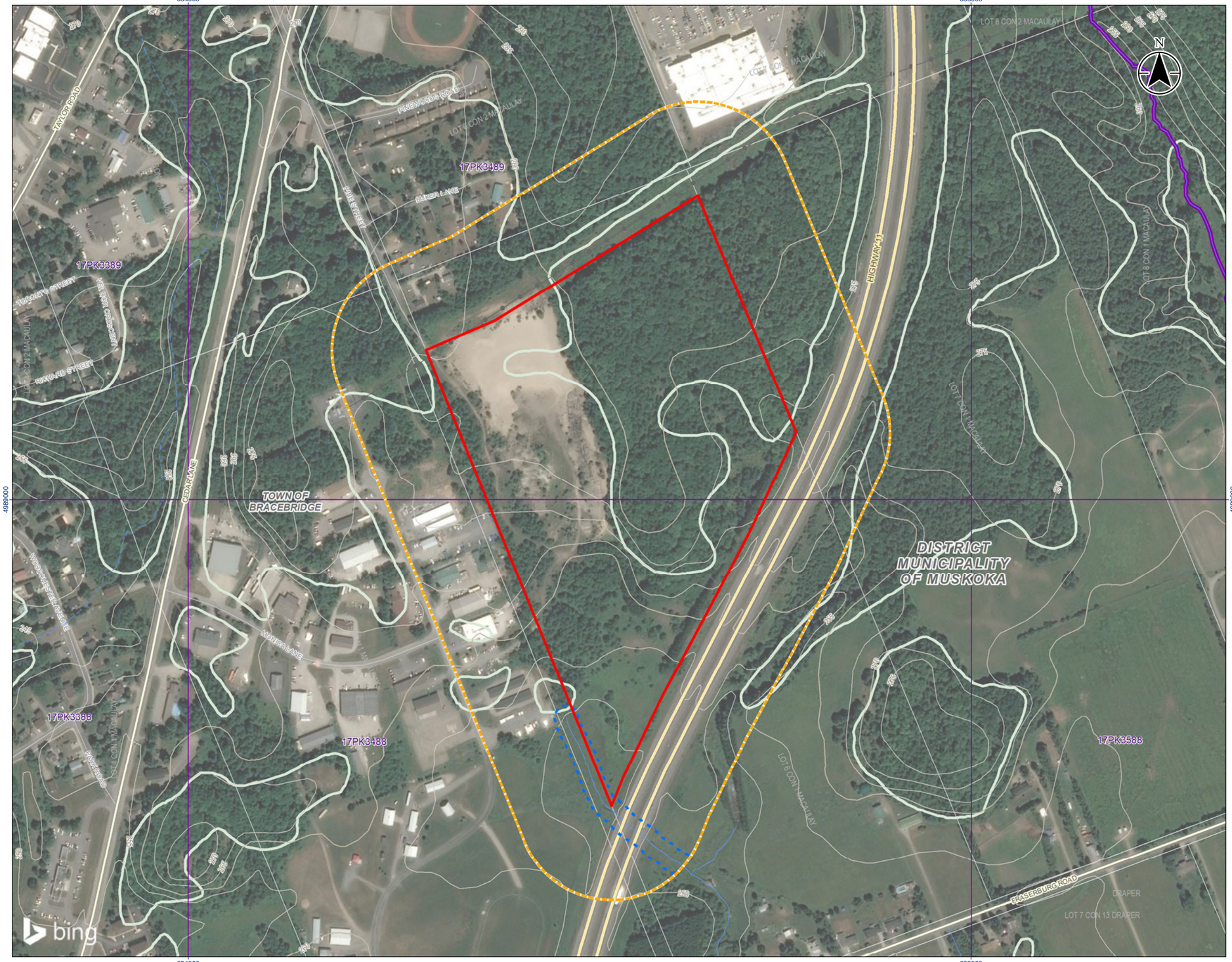

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N

Legend

- Site Boundary (Approximate)
- Study Area (120 m)
- Thermal Regime, Cold
- Hydro Line
- Watercourse (Intermittent)
- Watercourse (Permanent)
- Waterbody 15 m Buffer
- Wooded Area
- Lot
- Municipal Boundary, Upper
- Municipal Boundary, Lower
- 1 km UTM Grid

0 100 200 m

1:5,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2023.
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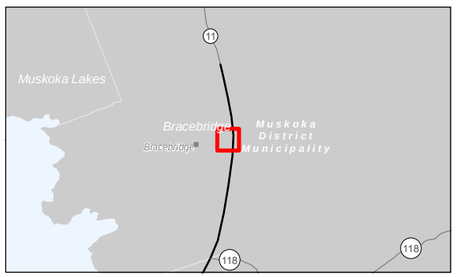

Project Location
Muskoka, ON

140022038 REV4
Prepared by BF on 2023-02-06
Technical Review by DH on 2023-02-06

Client/Project
MUSKOKA ALGONQUIN HEALTHCARE
MAHC HOSPITAL REVELOPMENT

Figure No.
1

Title
Preliminary Due Diligence Natural Environment Screening Site: A - Fowler Construction Property

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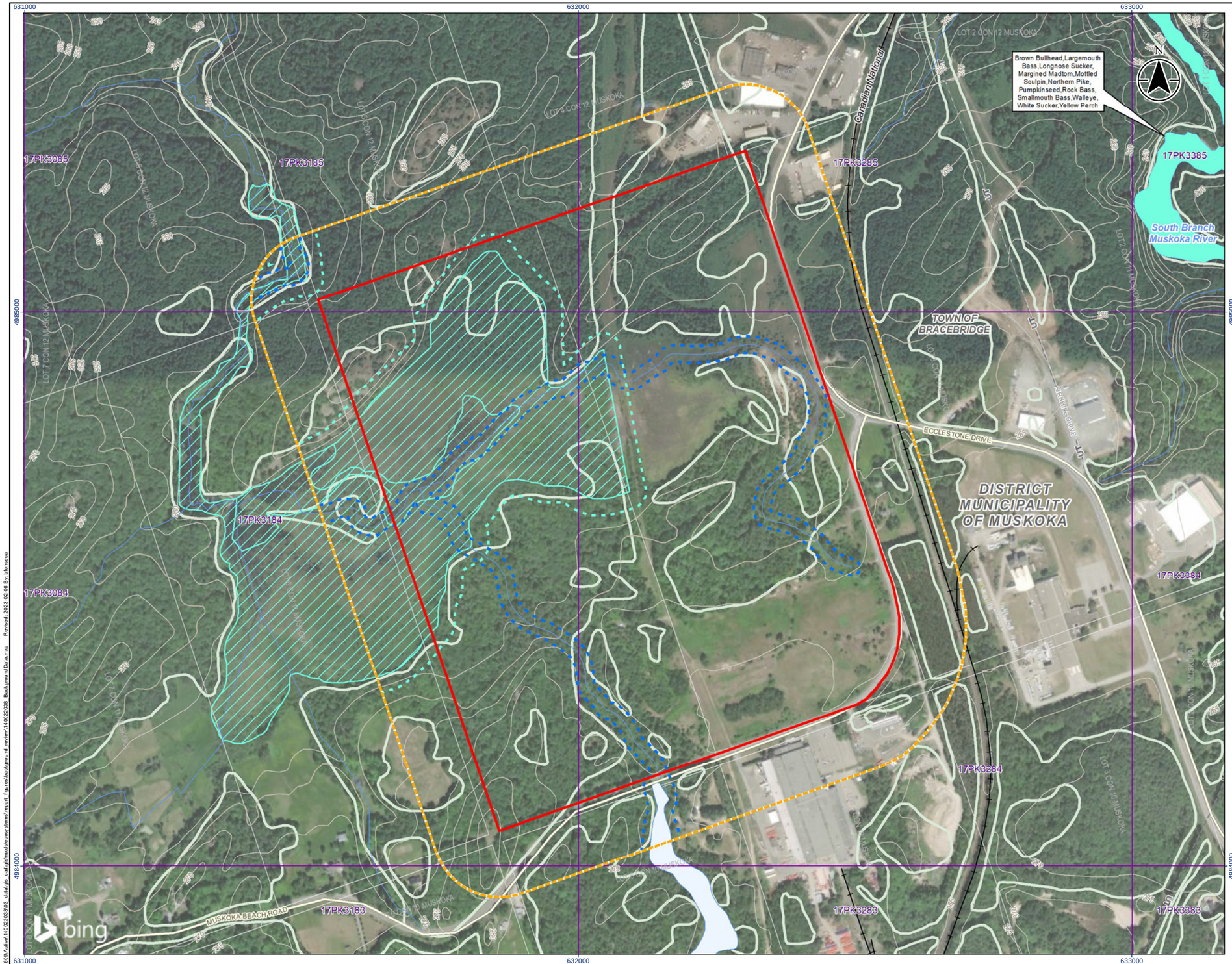

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Legend

- Site Boundary (Approximate)
- Study Area (120 m)
- Railway
- Unknown Transmission Line
- Watercourse (Permanent)
- Waterbody 15 m Buffer
- Thermal Regime, Cool
- Waterbody
- Wetland, Unevaluated
- Wetland 30 m Buffer
- Wooded Area
- Lot
- Municipal Boundary, Upper
- Municipal Boundary, Lower
- 1 km UTM Grid

0 100 200 m

1:7,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
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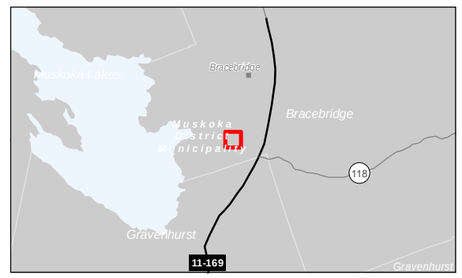

Project Location
Muskoka, ON

140022038 REV4
Prepared by BF on 2023-02-06
Technical Review by DH on 2023-02-06

Client/Project
MUSKOKA ALGONQUIN HEALTHCARE
MAHC HOSPITAL REVELOPMENT

Figure No.
2

Title
Preliminary Due Diligence Natural Environment Screening Site: C - Muskoka Royale Lands

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Stantec Consulting Ltd.
300W-675 Cochrane Drive
Markham ON L3R 0B8

March 21, 2024

File: 140022038

Attention: Muskoka Algonquin Healthcare
South Muskoka Memorial Hospital

Reference: Site Infrastructure Review – 300 Pine Street, Town of Bracebridge ON

As requested, Stantec Consulting Ltd. (Stantec) has completed a site infrastructure review of the property at 300 Pine Street in the Town of Bracebridge (Town), referred to herein as the 'Site'. The Site, depicted in the aerial figure below, is approximately 18 ha in size and is located between Highway 11 and Cedar Lane, east of Gray Road. A hydro corridor traverses the Site along the northern boundary.

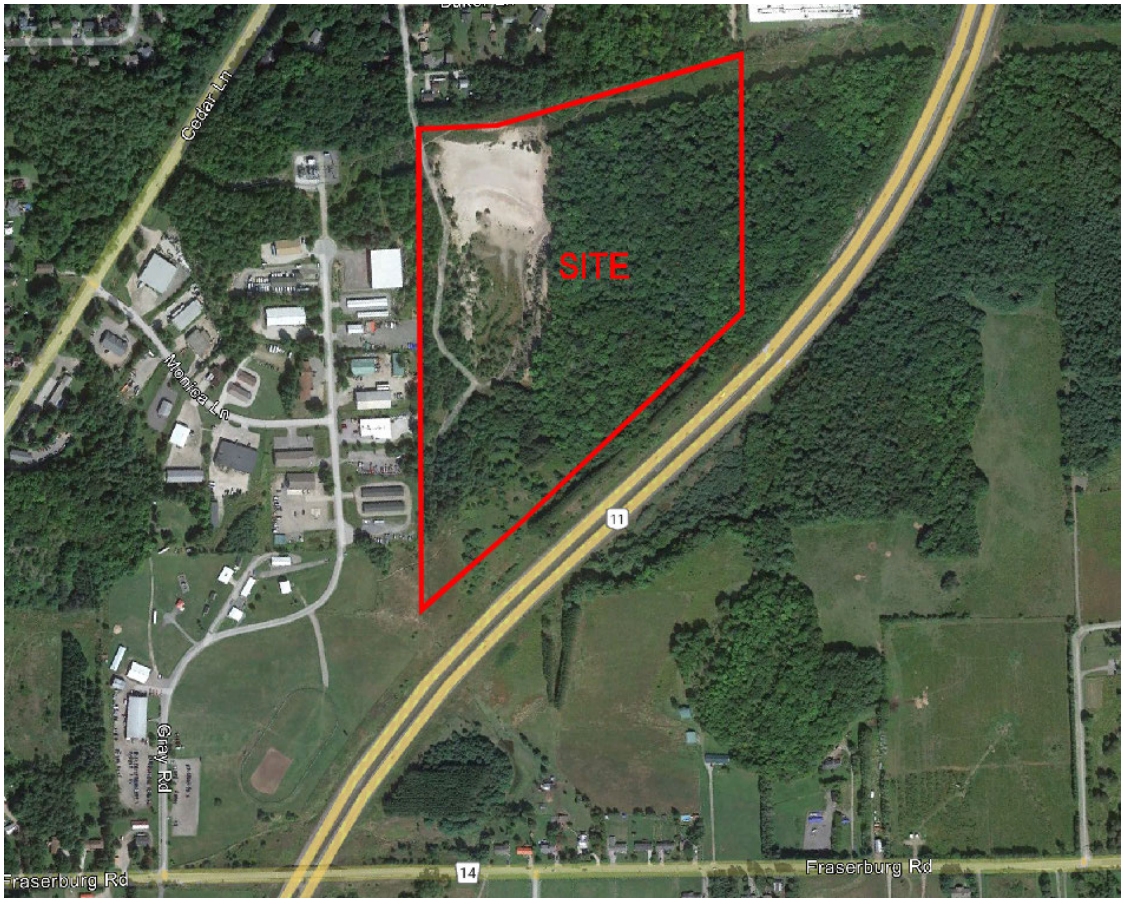

Figure 1: Site Location Plan

Reference: Site Infrastructure Review – 300 Pine Street, Town of Bracebridge ON

The Site is being considered for a proposed hospital development as depicted below with driveway access connections to the private commercial laneway at the northeast (Depot Lane) and Monica Lane to the west.

[redacted]

Figure 2: Site Concept Plan

As part of the review, the following documents were referenced:

1. Contour files and existing sewer infrastructure data obtained from the District of Muskoka
2. Muskoka New Developments W&WW Model – Project No. 11149488-MEM-71 1st, prepared by GHD, September 2021
3. Concept Site Plan, Stantec Consulting Ltd, September 14, 2023

Reference: Site Infrastructure Review – 300 Pine Street, Town of Bracebridge ON

The figure below provides an overview of the existing servicing infrastructure in the vicinity of the Site.

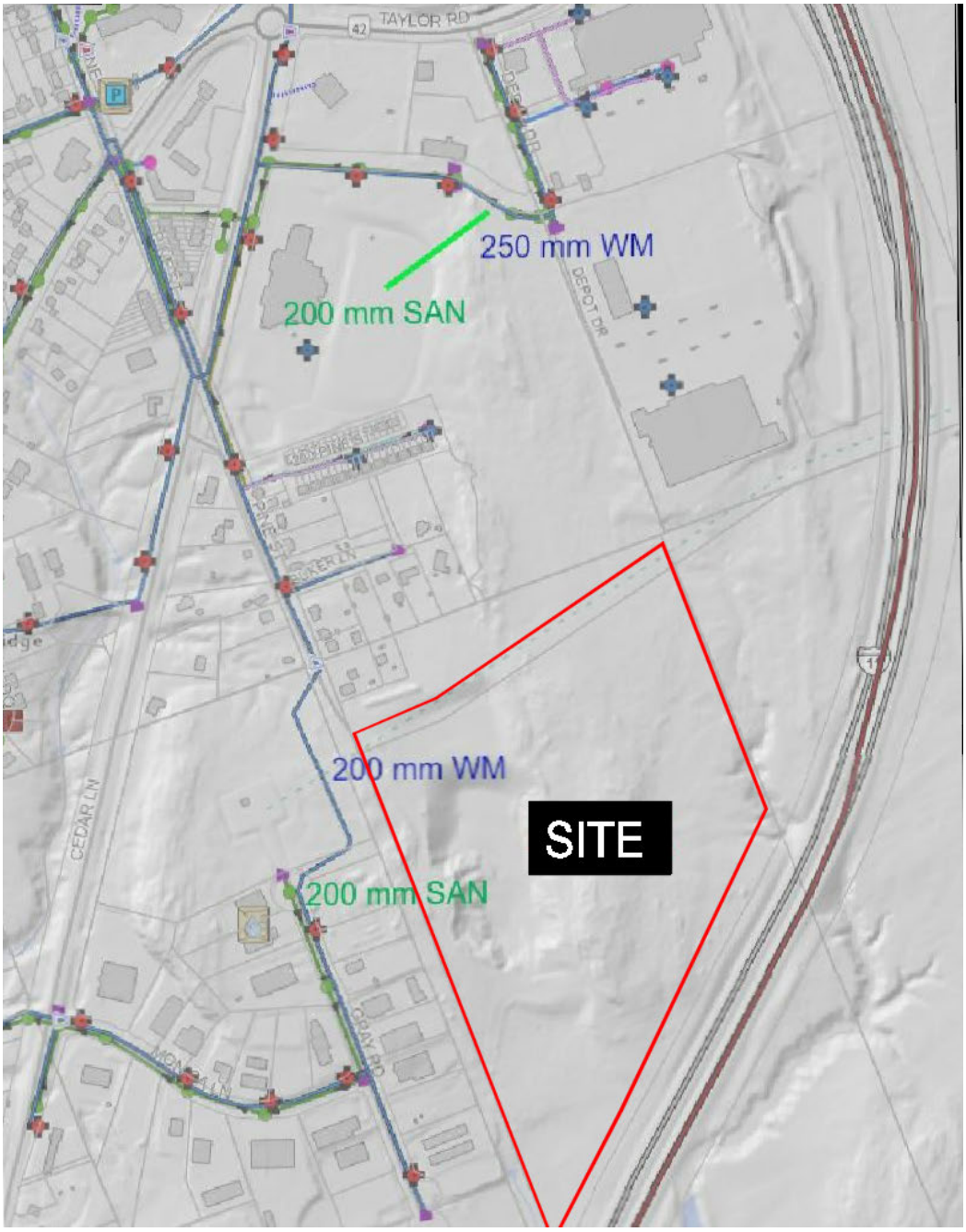

Figure 3: Nearby Servicing Infrastructure

Based on available background documents, the following is provided for review and consideration:

1 Civil

1.1 Grading And Earthworks

In current conditions, extreme grade variations exist within the Site. A perched area in the eastern half sits approximately 10 meters above the eastern property line. An approximately 20 meter deep hole presides within the western half of the Site. The drop from the perched area to this depression is close to 30 meters. The general site gradient is southerly at a vertical relief of close to 30 meters across the property. [redacted]

The most cost effective grading scheme for the proposed hospital is to restrict the footprint of the development only to the area needed for the function of the facility to minimize fill, and to keep the elevations across the majority of the developed land at least 1 meter above bedrock to allow room for servicing under the building slab and around the site to minimize bedrock excavation. [redacted]

1.2 Storm

From the available background documentation, no existing stormwater quantity or quality controls were located on the Site. Per Google Maps Aerial Imagery, there are two existing culverts crossing Highway 11 South that are presumed to convey runoff generated by the Site.

1.3 Sanitary

As shown on **Figure 3**, the closest sanitary sewer is the existing 200 mm sewer approximately 130 m west of the Site on Gray Road which continues west on Monica Lane. This sewer system is upstream of a number of pumping stations prior to discharge into the Lagoon Lane Wastewater Treatment Plant (WWTP). The next closest system is approximately 330 m to the north on Pine Street. This connection option would require crossing the hydro easement along the northern boundary which would trigger additional approval stages and also necessitate pumping of sewage as the area in question is close to 15 m higher than the Site. The recommended sanitary outlet is the 200 mm sewer at Gray Road and Monica Lane. This option requires approximately 140 m of offsite municipal sanitary construction. In order to get sufficient cover for the proposed sewer located north of the gravel pit, the area will need either to be filled to approximately

274.0m, or to install a pump and force main to convey sewage through pressure. A conceptual overview of the sanitary servicing has been provided on **Plan C-101** in **Attachment A**.

According to the available preliminary site statistics, a peak site sewage flow of 17.6 L/s is anticipated. The district had modelling conducted by GHD in July 2023 to review the impact of the introduction of this flow into the existing downstream municipal infrastructure. The study concluded that two (2) pump stations (Woodchester SPS and Muskoka SPS) downstream of the Site do not have the reserve capacity to handle the additional flow. These two pump stations would require upgrades to service the proposed development. The details of these upgrades would require additional study and are beyond the scope of this review. Furthermore, the GHD analysis was based on the preliminary minimum site statistics required for the functioning of the hospital. The analysis results should be reviewed against flows based on final and cemented site statistics once available. The sanitary flow design sheet has been provided in **Attachment C**. The GDH technical memorandum has been included in **Attachment F**.

1.4 Watermain

As shown on **Figure 3**, the closest watermain is the existing 200 mm main approximately 50 m west of the Site that runs through an easement leading to Gray Road. Healthcare facilities normally require two (2) water connections to separate mains on separate streets isolated by a valve chamber in between for redundancy. The closest separate main is the existing 250 mm watermain approximately 400 m north in commercial land, and connection to this system would require crossing the hydro easement along the northern boundary and trigger associated approval stages. The recommended watermain servicing scheme is a connection to the existing 200 mm watermain in the nearby easement to the west near Gray Road and a secondary connection to the existing 200 mm watermain at south of Gray Road for redundancy. A valve chamber would be installed on the existing watermain between the two connection points to create isolation. The district requires the main water line into the Site to be split into separate domestic and fire feeds at property line. Approximately 170 m of offsite municipal watermain construction is required to service the development. A conceptual overview of the water servicing has been provided on **Plan C-101** in **Attachment A**.

According to the available preliminary site statistics, a total Maximum Day Water Demand + Fire Flow of 125.0 L/s is anticipated. The district had modelling conducted by GHD in July 2023 to review the impact of the introduced load on the existing municipal water infrastructure. The study concluded that the existing municipal system does not have the capacity to support the development under fire flow conditions. The recommended mitigation is the use of onsite private storage to increase fire flow capacity. The details and sizing of this storage system would require additional study and are beyond the scope of this review. Furthermore, the GHD analysis was based on the preliminary minimum site statistics required for the functioning of the hospital. The analysis results should be reviewed against flows based on final and cemented site statistics once available. The water demand calculation sheets have been provided in **Attachment D**. The GDH technical memorandum has been included in **Attachment F**.

2 Stormwater Management Criteria

The stormwater management (SWM) criteria for the proposed Site was taken from the following background documents. Relevant excerpts are provided in **Attachment F**.

- The District Municipality of Muskoka Engineering Design Criteria and Standards Manual, prepared by the District Municipality of Muskoka, dated January 2023;

- Muskoka Official Plan, prepared by the District Municipality of Muskoka, dated March 2023;

- Low Impact Development Stormwater Management Guidance Manual (DRAFT), prepared by the Ministry of the Environment, Conservation and Parks, dated January 2022; and

- Stormwater Management Planning and Design Manual, prepared by the Ministry of Conservation and Parks (MECP, formerly MOE), dated March 2003.

2.1 Quantity Control

Per the District Municipality of Muskoka Engineering Design Criteria and Standards Manual, the stormwater quantity control is to be approached using source controls, conveyance controls, and end-of-pipe controls to achieve the following:

- Provide stormwater quantity controls as required to control post-development flows to pre-development levels for all storm events up to and including the 100 Year storm event;
- Provide safe conveyance of stormwater flows in excess of the 100 Year storm event via an emergency spillway designed with suitable erosion protection; and
- Except in extenuating circumstances, incorporate Low Impact Development (LID) principles, such as rainwater harvesting, constructed wetlands, bioretention swales, green roofs, permeable surfaces, clean water collection systems, and the preservation and enhancement of native vegetation cover, to achieve stormwater quantity control objectives.

Stormwater facilities are to be designed in accordance with the preferred criteria specified in the Ministry of the Environment, Conservation and Parks (MECP, formerly MOE) SWM Planning and Design Manual (2003).

A portion of the proposed site is located within a Ministry of Transportation (MTO) Controlled Area. As such, the proposed Site development, specifically the stormwater management controls, must adhere to the following documents:

- MTO Stormwater Management Requirements for Land Development Proposals, prepared by the Ontario Ministry of Transportation Standards and Contracts Branch within the Highway Design Office, dated 2009 (References Updated April 2022); and

- The MTO Drainage Management Manual Part 3, prepared by the Ministry of Transportation Ontario Drainage and Hydrology Section Transportation Engineering Branch Quality and Standards Division, dated 1997.

MTO drainage standards align with those noted in the District Municipality of Muskoka's Engineering Design Criteria and Standards Manual (noted above), and follow the same design criteria for stormwater facilities as noted in the MECP's Stormwater Management Planning and Design Manual except for the following:

- The MTO does not recognise any benefit from the attenuation of stormwater runoff using parking lot or roof top storage, where the control is achieved through an orifice device or a roof top control device;

- The MTO does not accept the location of an infiltration facility, within a proposed land development area, where it may impact the structural integrity of the highway sub-grade; and

- In general, MTO does not accept the benefits from roof leader disconnection and cisterns if the continuing functioning and long-term reliability cannot be guaranteed.

To align with both Municipal and MTO design criteria, it is likely that a stormwater management pond will be utilized as the primary stormwater management infrastructure on the Site.

2.2 Quality Treatment

Per the MECP SWMPDM (2003), the stormwater quality treatment strategy for the proposed Site should achieve the following:

- Provide stormwater quality control to an Enhanced (formerly Level 1) standard of treatment (i.e., 80% TSS removal); and
- Where feasible, incorporate LID principles including treatment train measures to achieve water quality objectives.

2.3 Erosion Control

Per the Muskoka Official Plan, the stormwater management strategy for the proposed Site shall minimize changes in erosion. In accordance with the MECP SWMPGM (2003), erosion control will be provided via detention of the 25 mm design storm over a period of at least 24 hours.

2.4 Water Balance

Per the Muskoka Official Plan, the stormwater management strategy for the proposed Site shall minimize changes in water balance. As such the water balance strategy will attempt to replicate as closely as possible existing hydrologic conditions by maintaining a balance between infiltration, runoff, and evapotranspiration. On Sites in the Muskoka Region, a typical water balance target is 5 mm across the Site; this retention target has been utilized for costing purposes and is to be refined through Site design.

In addition, recent guidance provided by the Draft LID SWM Guidance Manual (MECP, 2022), has quantified a satisfactory retention volume equivalent to the region-specific 90th percentile storm event. The retained runoff volume target is independent of municipality-specific and/or climate adjusted onsite required detention volumes required to achieve stormwater quantity control. Stormwater retention strategies may consist of stormwater reuse, infiltration, or evapotranspiration. Per Figure 3.3 of the Draft LID SWM Guidance Manual (MECP, 2022), the 90th percentile storm event is equivalent to a rainfall depth range of 27 mm to 28 mm in the Town of Bracebridge. It is suggested that retention of the 90th percentile storm event be considered within the water balance strategy for the proposed Site to ensure that the strategy is robust against projected future climate variance and to incorporate a level of sustainability within the Site infrastructure.

2.5 Flow Conveyance

Per Section 4.2 of the District Municipality of Muskoka Engineering Design Criteria and Standards Manual, drainage systems are to be designed to convey the year of the storm associated with the site road classifications without surcharge. Runoff rates in excess of the design capacity of drainage systems shall be conveyed via roadways, swales, walkways, drainage easements, and in special circumstances the storm sewer system, to a sufficient outlet to prevent unacceptable flooding damage to private property.

Furthermore, all new developments must demonstrate that the stormwater generated onsite is directed to a sufficient outlet such as a lake, river or permanently flowing watercourse. A sufficient outlet may also include a public right-of-way with prior approval from the Town of Bracebridge. An easement must be provided in favour of the Town of Bracebridge for any drainage that is directed over private land.

As the roadways within the proposed site are classified as industrial/commercial, the flow conveyance design standards listed in **Table 2.1** are applicable.

Table 2.1: Design Storm (Years) Conveyance Requirements

Road Classification	Bridges/Major Culverts	Road Culverts	Storm Sewers	Ditches/Channels
Industrial/Commercial	1:100	1:10	1:5	1:10

It is recommended that land adjacent to roadways be reserved for conveyance ditches/channels to maintain existing drainage patterns and minimize the use of subsurface infrastructure.

3 Stormwater Management Strategy

The proposed SWM plan is a high-level assessment of potential SWM controls that can be implemented on site to achieve the required criteria while conforming to the site constraints and considerations described above.

3.1 Quantity Control

Per the current Site Plan (**Attachment B**), increased stormwater runoff will be generated when existing pervious areas (e.g., woodlands) are replaced with predominantly impervious areas (e.g., paved or roof areas) which will require stormwater quantity control. Stormwater quantity control typically takes the form of stormwater infrastructure designed to capture and slowly release the excess stormwater. The Site could utilize traditional stormwater infrastructure such as roof control flow drains, surface ponding, and a SWM pond. Based on the available geotechnical information for external adjacent lands, bedrock elevations were recorded at near existing ground surface elevations. Therefore, it is presumed that the same geotechnical condition exists for the Site. Given the potential presence of bedrock near existing ground, a below ground SWM strategy (i.e., underground tank) is not recommended for quantity control. Therefore, quantity control is recommended to be provided by a SWM pond.

Furthermore, it is noted that a portion of the proposed site is located within a Ministry of Transportation (MTO) Controlled Area. Underground stormwater quantity control systems are not permitted within MTO Controlled Areas; therefore, the stormwater quantity control strategy must be above ground. The potential for incorporation of surface-based LIDs as part of a quantity control treatment train strategy with a SWM pond will be further evaluated pending completion of the Site geotechnical and hydrogeological investigations.

The existing Site survey indicates that a natural peak in the topography occurs along the median of the property such that drainage generated by the Site will drain to the east and west. Per the grading plan provided in **Attachment A**, it is recommended that the existing drainage pattern be maintained in the proposed condition in order to minimize the use of underground stormwater conveyance systems. To align with this development strategy, a potential SWM quantity control strategy would be to direct surface drainage to two SWM ponds located at the east and west limits of the Site. To maximize the available active storage volume, the SWM ponds are proposed to be dry pond facilities that will provide quantity control and erosion control only.

Through assessing the Site Plan, two locations were identified within the Site has locations for potential SWM ponds. The first pond (herein referred to as the East SWM Dry Pond) is located at the northeast corner of the property. The second pond (herein referred to as the West SWM Dry Pond) is located at the southwest corner of the property (**Drawing C-101**, **Attachment A**). The SWM ponds are discussed in further detail below.

3.1.1 EAST SWM DRY POND

The East SWM Dry Pond block is approximately 0.25 ha in size and treats a contributing drainage area of 3.52 ha. To approximate a high-level SWM pond configuration, the following assumptions were made:

- The dry pond active storage depth is assumed to be 2.0 m;
- The dry pond is assumed to have a freeboard depth of 0.5 m; and
- The dry pond outlet invert is assumed to be flush with the bottom of pond elevation of 276.50 and to promote positive drainage of the active storage volume to the receiving natural channel.

The resulting top of SWM pond elevation is estimated to be 279.00 m (high-level approximation and subject to further refinement). As the surrounding existing grades within the potential pond block range from 276.00 m to 278.00 m, extensive fill works are not anticipated for the construction of a SWM pond. Next steps should include an overall site cut/fill analysis to confirm earthworks requirements for the Site. As demonstrated by the calculations provided in **Attachment E**, the anticipated storage volumes to achieve stormwater quality treatment and quantity control, respectively, are as follows:

- 1,247 m^3 required active storage volume.

3.1.2 WEST SWM POND

The West SWM Pond block is approximately 0.32 ha in size and treats a contributing drainage area of 3.75 ha. To approximate a high-level SWM pond configuration, the following assumptions were made:

- The dry pond active storage depth is assumed to be 2.0 m;
- The dry pond is assumed to have a freeboard depth of 0.5 m; and
- The dry pond outlet invert is assumed to be flush with the bottom of pond elevation of 270.00 and to promote positive drainage of the active storage volume to the receiving natural channel.

The resulting top of SWM pond elevation is estimated to be minimum 272.50 m (high-level approximation and subject to further refinement). As the surrounding existing grades within the potential pond block range from 277.00 m to 282.50 m, extensive fill works are not anticipated for the construction of a SWM pond. Next steps should include an overall site cut/fill analysis to confirm earthworks requirements for the SWM Pond. As demonstrated by the calculations provided in **Attachment E**, the anticipated storage volumes to achieve stormwater quality treatment and quantity control, respectively, are as follows:

- 1,283 m^3 required active storage volume.

3.2 Quality Treatment

Stormwater quality treatment is required to remove pollutants such as suspended solids and oil from stormwater generated by the Site. The bulk of stormwater quality treatment for runoff discharging from the two dry ponds can be provided by manufactured treatment devices such as oil-grit separators (OGS) to meet Municipality and MECP requirements, with a treatment train approach providing an additional polishing of stormwater runoff via low impact development (LID) techniques or Manufactured Treatment Devices (MTDs).

It is proposed to install one MTD device at the downstream end of each dry pond. It is presumed that Stormceptor EFO12 units (or approved equivalent) will be sufficient to treat runoff discharging from the dry ponds.

Per **Drawing C-101**, road runoff from a portion of the proposed road connecting the Site to Gray Road will drain southwest via uncontrolled overland flow. A 0.11 ha bioretention area is proposed at the southwest corner of the Site to capture the uncontrolled runoff and provide quality treatment. Erosion Control

3.3 Erosion Control

Erosion control is recommended to be achieved by the SWM dry ponds and a downstream orifice control.

3.4 Water Balance

Should site conditions allow, pending the completion of Site geotechnical and hydrogeological investigations, the use of open bottom surface LIDs such as bioretention cells, rain gardens, and enhanced grass swales is preferred. For example, an enhanced bioswale receiving stormwater roof runoff can provide infiltration and filtration as well as conveyance and would reduce the storage volume requirement for the SWM Ponds. However, based on the inferred high bedrock elevation, it is unclear whether surface-based LIDs are feasible. Where possible, the use of surface-based LIDs that can be combined with the stormwater quantity control infrastructure is recommended.

As described in **Section 2.4**, it is suggested that retention of the 5 mm event be carried for costing purposes within the water balance strategy for the proposed Site which is a volume of 397 m^3 (5 mm over the Site area of 7.93 ha).

While it is understood that the target is to minimize changes in water balance (i.e., achieve pre-development infiltration volumes), due to high presumed high bedrock, anticipated servicing constraints, and poor soil conditions, a best-efforts approach to providing infiltration is likely the most feasible.

Based on the current Site Plan, a conceptual stormwater management strategy has been developed as follows. It is noted that this strategy is preliminary in nature and that additional studies as described in **Section 2.4** are required to confirm the feasibility of the strategy.

The stormwater strategy includes:

- The use of localized inlets and swales to capture and convey stormwater runoff;
- The use of two SWM dry ponds within the northeast and southwest corners of the Site to provide stormwater quantity control and erosion control;
- The use of infiltration-based LIDs where feasible to provide retention of stormwater runoff; and
- The use of Oil-Grit Separator (OGS) units to provide stormwater quality pre-treatment upstream of infiltration LIDs (should they be feasible) and outfalls.

As described in **Section 3.4**, it is suggested that retention of the 90th percentile storm event be considered within the water balance strategy for the proposed Site. This is conservatively assumed as a 28 mm rainfall event over the Site area (7.93 ha), equivalent to a 2,220 m^3 required retention volume.

4 Climate Change

Due to Climate Change, it is expected that rainfall events will have increased intensity in the near future. An evaluation of the stormwater impacts of Climate Change on the Bracebridge Hospital development should be completed. The analysis should consider stormwater flow conveyance ensuring that the hospital building and critical infrastructure such as the oxygen/fuel tanks, helipad, etc. are located away from major overland flow routes and outside of the floodplain associated with the watercourse along the to the northern boundary of the Site.

It is recommended that analysis for predicted 2050 and 2080 storm events be considered. The analysis should consider alternative pricing for additional onsite stormwater management conveyance, detention, and retention controls.

Specifically, stormwater management systems should be designed to safely convey proposed, future climate change adjusted, peak flows and follow mitigation recommendations of climate risk and resilience assessments carried out at the next stage of development.

Further to this, stormwater management systems should be designed to safely detain stormwater onsite by attenuating proposed, future climate change adjusted, peak flows to existing allowable release rates

for all storm events up to and including the 100 Year event and follow mitigation recommendations of climate risk and resilience assessments carried out at the next stage of development.

In addition, stormwater management systems should be designed to safely retain stormwater runoff onsite such that the changes from the existing condition water balance are minimized. It is recommended to utilize on-site LID practices to achieve sufficient stormwater retention where site conditions allow; however, it is noted that the use of LIDs will be applied where feasible regardless of the Site sustainability metrics to achieve the water balance criteria as specified by municipal and provincial regulations.

It is also noted that the District of Muskoka is working towards the implementation of a “climate change lens” as the approval authority on Planning Act applications and as a commenting agency to maximize resiliency of ecosystems and communities, manage the risks associated with climate change and provide sustainable natural environmental services for future generations of residents and visitors to Muskoka. As such, the implementation of the climate change lens may result in:

- The implementation of green infrastructure (LIDs)
- Increased setbacks for development adjacent to wetlands, lakes, rivers, headwater areas, and groundwater recharge areas;
- Retention of natural vegetation; and
- More stringent requirements for stormwater management and flood abatement.

5 Conclusions and Recommendations

- [redacted]
- Approximately 140 m of offsite municipal sanitary construction would be required to service the Site. North of the gravel pit will need either to be filled to approximately 274.0m, or to install a pump and force main to convey sewage through pressure. Two (2) existing downstream pumping stations will need to be upgraded to service the Site for sanitary;
- Approximately 170 m of offsite municipal watermain construction would be required to service the Site for domestic and fire support. Onsite storage will be required for supplementary fire protection, as the municipal system does not have the capacity to provide full fire protection for the proposed hospital;
- There is no existing stormwater infrastructure within proximity to the site;
- Stormwater quantity control will be required to control all design events up to and including the 100 Year storm, plus erosion control. This can be achieved through implementation of two SWM dry ponds;

- Stormwater quality treatment is required to meet Enhanced Level 1 controls, which can be provided by a treatment train consisting of OGS units and LIDs; and

- Water Balance requirements will need to be addressed via completion of a Hydrogeological Investigation to confirm if soils are suitable for infiltration.

Reference: Site Infrastructure Review – 300 Pine Street, Town of Bracebridge ON

Should you have any questions, please contact the undersigned.

Regards,

STANTEC CONSULTING LTD.

Hellen Scott, P.Eng.
Senior Associate, Community Development
Phone: 647-808-7594
hellen.scott@stantec.com

Attachments:

Attachment A – Engineering Drawings

Attachment B – Site Plan

Attachment C – Sanitary Calculations

Attachment D – Water Demand Calculations

Attachment E – SWM Calculations

Attachment F – Background Information

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ATTACHMENT A ENGINEERING DRAWINGS

Stantec

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www.stantec.com

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Legend

- 282.00 — PROPOSED ELEVATION
- 272.00 — EXISTING ELEVATION TO MATCH
- OVERLAND FLOW
- EXISTING WATERMAIN
- PROPOSED WATERMAIN
- EXISTING STORM SEWER
- PROPOSED STORM SEWER/CULVERT
- PROPOSED SWALE
- EXISTING SANITARY SEWER
- PROPOSED SANITARY SEWER
- PROPOSED SANITARY MANHOLE
- PROPOSED STORM MANHOLE

Issued	By	Appd.	YY.MM.DD
File Name:	PF	-	23.10.04
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project
MUSKOKA ALGONQUIN HEALTHCARE

SOUTH MUSKOKA MEMORIAL HOSPITAL
300 PINE STREET
Bracebridge, Ontario

Title
CONCEPTUAL GRADING AND SERVICING PLAN

Project No. 140022028
Scale 1:1250 (0, 12.5, 37.5, 62.5m)
Drawing No. C-101
Sheet
Revision
of

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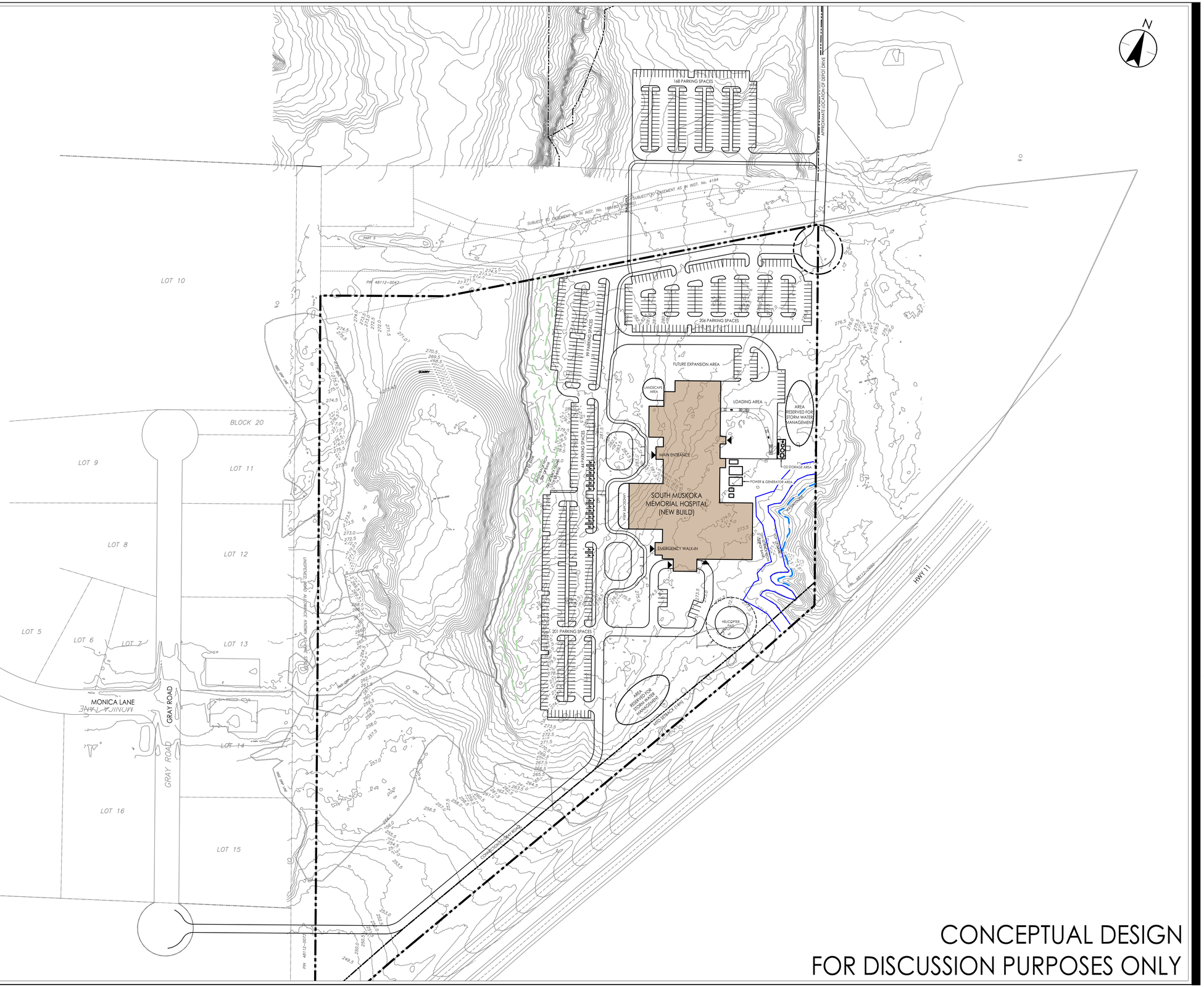
2024/02/21 10:53:44 By: Chen Lindsay

ORIGINAL SHEET - ARCH D

ATTACHMENT B SITE PLAN



CONCEPTUAL DESIGN
FOR DISCUSSION PURPOSES ONLY

Stantec

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Tel. 519-645-2007
www.stantec.com

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Notes

1. THIS IS A COMPILED PLAN AND SHOULD NOT BE CONSIDERED A PLAN OF SURVEY.
2. ONTARIO BASE MAPPING USED FOR AREAS AND DIMENSIONS. LEGAL PLAN REQUIRED FOR PRECISE CALCULATIONS.
3. CONCEPT PLAN IS PRELIMINARY AND HAS NOT BEEN REVIEWED BY THE LOCAL MUNICIPALITY.
4. ZONING BY LAW AMENDMENT MAY BE REQUIRED.

Revision	By	Appd.	YY.MM.DD

Issued	By	Appd.	YY.MM.DD

File Name: 140022038_r-sp_pine_street	RT Dwn.	HS Chkd.	RT Dsgn.	24.02.13 YY.MM.DD

Permit-Seal

Client/Project

MUSKOKA ALGONQUIN HEALTHCARE

SOUTH MUSKOKA MEMORIAL HOSPITAL

Bracebridge, ON Canada

Title

CONCEPTUAL SITE PLAN
300 PINE STREET

Project No.	Scale	
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Drawing No.	Sheet	Revision
1	1 of 1	0

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2024-2-13 4:59 PM by: Turner, Rich

ORIGINAL SHEET - ANSI D

ATTACHMENT C SANITARY DEMAND CALCULATIONS

ESTIMATE of PROPOSED SANITARY FLOW Project #140022038

Muskoka Algonquin Healthcare
Muskoka, Ontario

Program Details:
Patient Tower

Total Number of Beds		=	79	**beds**

TOTAL DESIGN POPULATION = 150

Average Daily Dry Weather Flow

Average Daily Dry Weather Flow =		**1,800**	litres/bed/day *
for a Total Equivalent Population of	**150**	persons	
the Average Daily Dry Weather Flow is:		**270,000**	litres/day
	or,	**3.1**	litres/second

Sanitary Flow Peaking Factor

Harmon Peaking Factor (PF) = 1 + (14/(4+(P/1000)^1/2))
= 4.19

Infiltration Allowance (Site Area Basis)

Inflow/Infiltration allowance calculated on the basis of		**0.28**	L/s/ha of Site Area **
for a total site development area of		**16.20**	Ha.,
the Infiltration Allowance is:		**4.54**	litres/second

Sanitary Design Flow - Proposed Development

Sanitary Design Flow

= **17.6** **litres/second** **(B)**

* Per Table 3-2 of MECP Guidelines
** Per Engineering Design Criteria and Standards Manual - Musoka, dated June 2019

ATTACHMENT D WATER DEMAND CALCULATIONS

PRELIMINARY ESTIMATE of Expected Water Demand

Muskoka Algonquin Healthcare

Muskoka, Ontario

21-Dec-22

Project #140020034

Hospital

Development Details:

	Unit Type	Info	
Patient Tower	Institutional	79	beds

Flow Calculation

Institutional:

Flow Rate =	**1,800**	litres/bed/day *		
For a Number of beds of	**79**	beds		
The total flow is:	**142,200**	litres/day		
Applying a peaking factor of	**4.90**	(maximum day)		
Maximum Day Demand =	**696,780**	litres/day		
or,	**484**	litres/minute	**(A)**	
or,	**8.06**	litres/s		
Fire Flow Demand **	7,000	litres/minute	**(B)**	
Total Flow = (A) + (B) =	**7,484**	**litres/minute**		**(maximum day demand plus fire flow)**
or	125	litres/s		

Check peak hour demand:

Institutional & Industrial:

The total flow is:	**142,200**	litres/day	
or,	**99**	litres/minute	
Applying a peaking factor of	**7.40**	(peak hour)	
Peak Hour Demand =	**731**	litres/minute	
Total Peak Hour Demand =	**731**	litres/minute	

Total water demand (on basis of maximum day demand plus fire flow) = **7,484** **litres/minute**

PRELIMINARY ESTIMATE of Required Fire Flow ***25-Jan-22***
Fire Underwriters Survey "Water Supply for Public Fire Protection", 1999
Muskoka Algonquin Healthcare
Muskoka, Ontario *Project #140020034*

Proposed Hospital Building

F = 220 · C · √A

where,

F = the required fire flow in litres per minute

C = 0.6 for fire resistive construction (fully protected frame, floors, roof)

= **0.60**

A =

The total floor area in square metres (including all storeys, but excluding basements at least 50% below grade) in the building being considered. Note: for fire-resistive buildings, consider the two largest adjoining floors plus 50% of each of any floors immediately above them up to eight, when the vertical openings are inadequately protected. If the vertical openings and exterior vertical communications are properly protected (one hour rating), consider only the area of the largest floor plus 25% of each of the two immediately adjoining floors. *

* **vertical openings and exterior vertical communications properly protected (minimum one hour rating):**

Ground Floor	**7,500**	sq.m.	(Largest floor)		
Level 2	**7,500**	sq.m.	(1st adjoining floor	@	25%
Level 3	**7,500**	sq.m.	(2nd adjoining floo	@	25%

A = **11,250** **sq.m.**

F = 220 · (C) · √(A)

= **14,001** **Lpm**

= **14,000** **Lpm** (Rounded to the nearest 1,000 L/min)

The value obtained above may be reduced by as much as 25% for occupancies having a low contents fire hazard or may be increased by up to 25% surcharge for occupancies having a high fire hazard.

Low Hazard - Hospital **25%**

Apply a reduction of **25%** , or **-3,500** **Lpm**

F = **10,500** **Lpm**

The value obtained above may be reduced by up to 50% for complete automatic sprinkler protection depending upon the adequacy of the system. The credit for the system will be a maximum of 30% for an adequately designed system conforming to NFPA 13 and other NFPA sprinkler standards. Additional credit of up to 10% may be granted if the water supply is standard for both the system and fire department hose lines required.

***Assumption: NFPA 13 sprinkler system**

Apply a reduction of **30%** **(compliance assumed)**, or **-3,150** **Lpm**

Reduction = **-3,150** **Lpm**

To the value obtained, a percentage should be added for structures exposed within 45 metres:

North side	-	>45	m	-	**0%**
East side	-	>45	m	-	**0%**
South side	-	>45	m	-	**0%**
West side	-	>45	m	-	**0%**
					0% (not to exceed 75%)

Increase = **0** **Lpm**

F = 10,500 Lpm
-3,150
0
7,350 **Lpm**

= **7,000** **Lpm** (Rounded to the nearest 1,000 L/min)

= 1849 USGPM

ATTACHMENT E SWM CALCULATIONS

Project Name: 300 Pine Due Diligence
Project #: 140022038
Location: Town of Bracebridge
Date: Feb 2024

CURVE NUMBER CALCULATION

Stantec

SCS TR-55 Table 2-2c - Runoff Curve Numbers For Other Agricultural Lands

Cover Description	Curve Numbers for Hydrologic Soil Group			
	A	B	C	D
Pasture (Poor)	68	79	86	89
Pasture (Fair)	49	69	79	84
Pasture (Good)	39	61	74	80
Meadow	30	58	71	78
Brush (Poor)	48	76	77	83
Brush (Fair)	35	56	70	77
Brush (Good)	30	48	65	73
Woods (Poor)	45	66	77	83
Woods (Fair)	36	60	73	79
Woods (Good)	30	55	70	77

SCS TR-55 Table 2-2a - Runoff Curve Numbers for Urban Areas

Cover Description	Curve Numbers for Hydrologic Soil Group			
	A	B	C	D
Open Space (lawns, parks, golf courses, cemeteries)				
Poor Condition (grass cover < 50%)	68	79	86	89
Fair Condition (grass cover 50% to 75%)	49	69	79	84
Good Condition (grass cover > 75%)	39	61	74	80
Impervious Areas				
Paved parking lots, roofs, driveways	98	98	98	98
Streets and Roads				
Paved; curbs and storm sewers	98	98	98	98
Paved; open ditches	83	89	92	93
Gravel	76	85	89	91
Dirt	72	82	97	89
Urban Districts				
Commercial and business	89	92	94	95
Industrial	81	88	91	93
Residential districts by average lot size				
1/8 acre or less	77	85	90	92
1/4 acre	61	75	83	87
1/3 acre	57	72	81	86
1/2 acre	54	70	80	85
1 acre	51	68	79	84
2 acre	46	65	77	82
Developing urban areas				
Newly graded areas	77	86	91	94

EXISTING CONDITIONS

Catchment 101 (To East)

Land Cover	Land Cover Area (ha) A	B	C	D	Total Area (ha)	Weighted CN
Woods (Good)				4.26	4.26	77
				TOTAL	**4.26**	**77**

Catchment 102 (To West)

Land Cover	Land Cover Area (ha) A	B	C	D	Total Area (ha)	Weighted CN
Woods (Good)				2.14	2.14	77
				TOTAL	**2.14**	**77**

Catchment 201(To East Pond)

Land Cover	Land Cover Area (ha) A	B	C	D	Total Area (ha)	Weighted CN
Good Condition (grass cover > 75%)				0.81	0.81	19
Commercial and business				2.70	2.70	73
				TOTAL	**3.52**	**92**

Catchment 202 (To West Pond)

Land Cover	Land Cover Area (ha) A	B	C	D	Total Area (ha)	Weighted CN
Good Condition (grass cover > 75%)				1.66	1.66	35
Commercial and business				2.09	2.09	53
					3.75	**88**

Project Name: 300 Pine Due Diligence
Project #: 140022038
Location: Town of Bracebridge
Date: Feb 2024

PROPOSED CONDITION
WEIGHTED RUNOFF COEFFICIENT CALCULATION

Catchment 201 (To East Pond)

Land Use	Area (ha)	Runoff Coefficient	TIMP	XIMP	Weighted TIMP	Weighted XIMP
Commercial and Business	2.70	0.90	0.94	0.01	0.73	0.01
Pervious[1]	0.81	0.60	0.61	0.01	0.14	0.00
TOTAL	**3.52**		**-**		**0.87**	**0.01**

Catchment 202 (To South Pond)

Land Use	Area (ha)	Runoff Coefficient	TIMP	XIMP	Weighted TIMP	Weighted XIMP
Commercial and Business	2.09	0.90	0.94	0.01	0.53	0.01
Pervious[1]	1.66	0.60	0.61	0.01	0.27	0.00
TOTAL	**3.75**		**-**		**0.80**	**0.01**

1. Pervious runoff coefficient conservatively assumed as 0.60 to account for anticipated hardscaped areas (e.g., patios, walkways, etc.) that will be incorporated into pervious areas.

Project Name: 300 Pine Due Diligence
Project #: 140022038
Project Location: Town of Bracebridge
Prepared By: SV
Date: Feb 2024

EAST POND
PERMANENT POOL AND EXT DET. CALCULATION

Stantec

Extended Detention Sizing Calculations

Landuse	Area (ha)	C (Runoff Coef.)	C (weighted value)	Imperviousness (%)	Imperviousness (Weighted Value)
Impervious	2.70	0.90	2.43	94	255
Pervious	0.81	0.60	0.49	61	50
Total	3.52		**0.83**		**87%**

* Runoff coef. values from MTO Drainage Manual Design Chart 1.07
** Assumed C values
*** Assumed percent impervious (I) converted from C values based on Simple Method, C = 0.05 + 0.009(I); (Schueler, 1987)

Protection Level	Enhanced	Choose Level Enhanced (80%), Normal (70%) or Basic (60%)	
Pond Type	Wet Pond	Choose Infiltration, Wet Pond, Wetland, Hybrid, or Dry Pond (Basic Only)	
Imperviousness %	87		
MOECC 2003 Table 3.2 Volume	85	m^3/ha	
	45	m^3/ha	Less 40 m^3/ha for active storage

Protection and Pond Type	Active Pond *		Est. Release Rate
	MOE Guideline (m^3)	Extended Detention (m^3)	(m^3/s)
Enhanced Wet Pond	141	782	0.014

Note: *-the greater of the MOE Guideline and the Extended Detention Runoff is used as the Active Pond volume
The extended detention volume has been calculated using the modeled Chicago 4-hour 25 mm event.

RV = 22.22 mm >>>> (For minimum of 24 hr extended detention)

Project Name: 300 Pine Due Diligence
Project #: 140022038
Location: Town of Bracebridge
Prepared By: SV
Date: Feb 2024

WEST POND
PERMANENT POOL AND EXT. DET. CALCULATION

Stantec

Extended Detention Sizing Calculations

Landuse	Area (ha)	C (Runoff Coef.)	C (weighted value)	Imperviousness (%)	Imperviousness (Weighted Value)
Impervious	2.09	0.90	1.88	94	197
Pervious	1.66	0.60	0.99	61	101
Total	3.75		**0.77**		**80%**

* Runoff coef. values from MTO Drainage Manual Design Chart 1.07
** Assumed C values
*** Assumed percent impervious (I) converted from C values based on Simple Method, C = 0.05 + 0.009(I); (Schueler, 1987)

Protection Level	Enhanced	Choose Level Enhanced (80%), Normal (70%) or Basic (60%)
Pond Type	Wet Pond	Choose Infiltration, Wet Pond, Wetland, Hybrid, or Dry Pond (Basic Only)
Imperviousness %	80	
MOECC 2003 Table 3.2 Volume	85	m^3/ha
	45	m^3/ha Less 40 m^3/ha for active storage

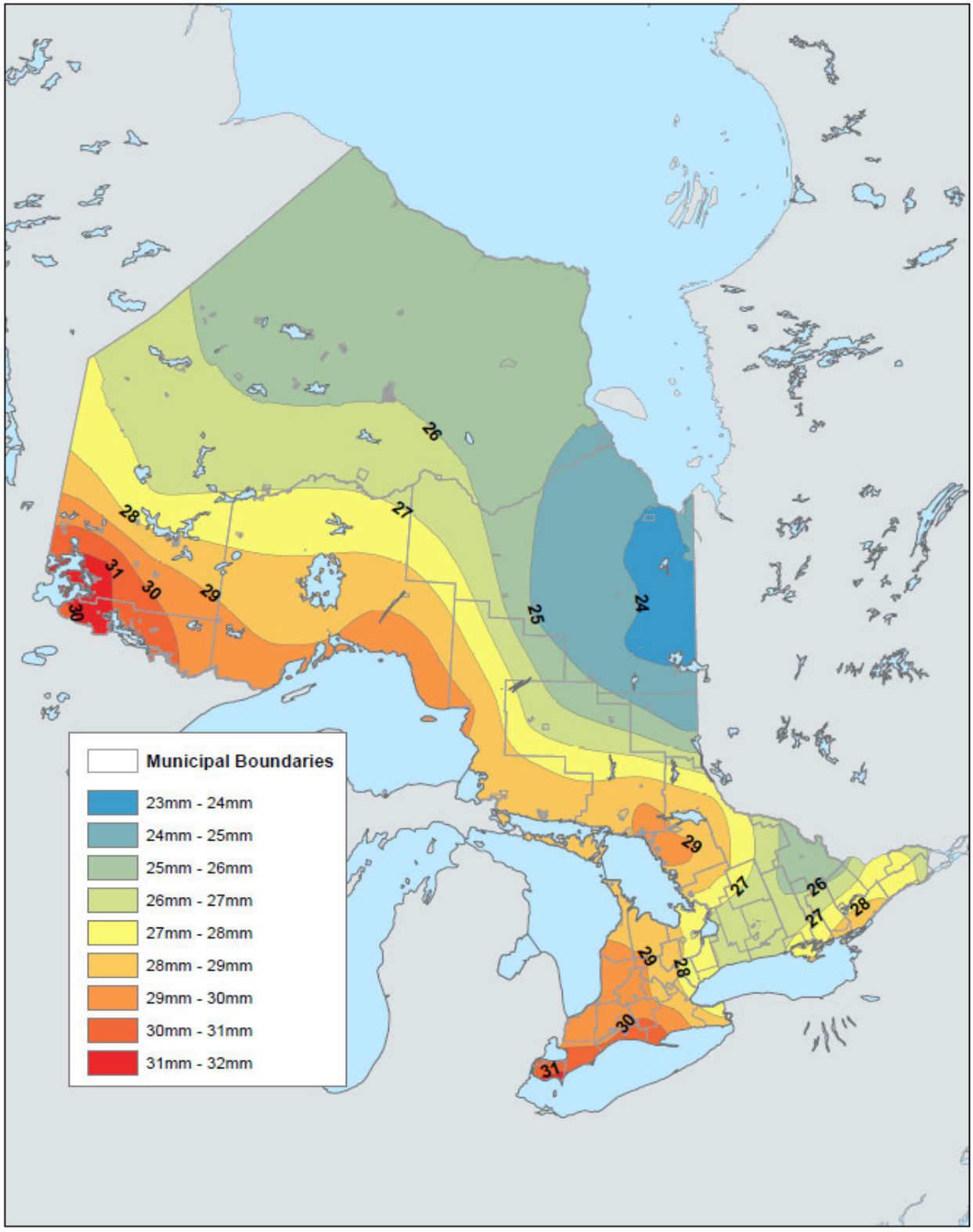
Protection and Pond Type	Active Pond *		Est. Release Rate (m^3/s)
	MOE Guideline (m^3)	Extended Detention (m^3)	
Enhanced Wet Pond	150	723	0.013

Note: *-the greater of the MOE Guideline and the Extended Detention Runoff is used as the Active Pond volume
The extended detention volume has been calculated using the modeled Chicago 4-hour 25 mm event.

RV = 19.29 mm >>>> (For minimum of 24 hr extended detention)

ATTACHMENT F BACKGROUND INFORMATION

Figure 3.3 - Regionally Specific 90th Percentile Precipitation Event Runoff Volume Control Target – Precipitation Isohyets



- security system,
- communication and SCADA system complying with the District Sewage Pumping Station Control Narrative and layout drawings, and compatible with existing system.

Location

The location of sewage pumping stations shall be approved in advance by the District and shall accommodate growth plans outlined in the Official Plans of the District and Area Municipalities.

Wet Wells

Precast concrete wet wells shall include frost straps as per OPSD 701.100, lockable stainless steel access hatches complete with thief hatch providing sufficient opening size to replace pumps, lifting davits for removing pumps and confined space entry equipment. Travel restraint bases as per District specifications and Approved Products List.

Watertight covers shall be provided on wet wells located in areas susceptible to flooding and/or vandalism. The top of the cover shall be at least 0.3m above finished grade. Vents will require filters to reduce odour. The elevation of the vents shall be above Regional storm flood lines as determined by the appropriate authority and illustrated on the plan and profile drawings. Wet wells shall be accessible to maintenance vehicles and equipment and be positioned in a suitable location to allow for venting.

Approved Products List

The products specified in Appendix C shall be utilized in the sanitary sewage system. All requested substitutions, or products for purposes not listed, shall be approved by the District prior to construction.

3.7 Storm Sewer Systems and Storm Water Management

3.7.1 General

District storm sewers and ditches are generally designed to convey run-off from the right-of-way of a District Road only. Where necessary, contributing flows from development sites are to be controlled in accordance with the criteria in this section prior to entering the District storm system.

General conveyance of storm water:

- Rural roads - ditches and culverts shall be provided for conveyance of storm water flow to outlet(s);
- Urban roads with curbs and gutters - provide storm sewers and catchment points equipped with catchbasins.

In general, re-grading within any District right-of-way to support adjacent development will not be permitted, unless it can be demonstrated to the satisfaction of the Commissioner there is a net benefit to an existing situation.

3.7.2 Storm Water Management Requirements

- A storm water management report which addresses quality and quantity control in accordance with Ministry requirements will be required for all developments other than one single family residential dwelling. The report shall illustrate appropriate storm water management techniques and design flows;
- Post-Development flows must be equal to or less than Pre-Development levels for all storm events up to and including the 100 year event. Safe overland conveyance of flows from storms in excess of the 100 year event must be incorporated into the design;
- “Enhanced” level of water quality treatment (80% TSS removal) is to be provided prior to discharging from a site, in accordance with Ministry requirements,
- LID principles, including treatment train measures, shall be employed to achieve water quality and quantity objectives.

3.7.3 Design Flows

Design flows shall be calculated in accordance with the Ministry’s current version of the Stormwater Management Planning and Design Manual, and with the Design Guidelines for Sewage Works, and the following;

- Design storms are to be modelled for 2, 5 10, 25 and 100 year design storms;
- Storm event criteria used in design shall be in accordance with The District’s current Muskoka Rainfall Data - Intensity-Duration-Frequency Values in Appendix D;
- Use of the Rational, or Modified Rational Method, to calculate runoff is to be limited to drainage areas less than 5 ha, in general. Accordingly, the Rational Method shall be used for sizing storm sewer pipes in residential development areas for a 5 year return period storm event, at maximum 80% capacity in a subcritical condition;
- Urban commercial developments on local roads shall utilize a 10 year return period storm event for a minor system;
- Runoff from larger, complex drainage areas for stormwater management design and storage requirements is to be calculated using software programs such as OTTHYMO, MIDDUS or OTTSWMM, as appropriate. The designer shall justify their software selection in their design report;
- Pipe sizing shall be based on actual flow velocity as calculated using the Manning formula, Q = (1/n)AR2/3S1/2, with a minimum velocity of

0.75 metres per second and a maximum velocity of 6.0 m/s during the design event.

3.7.4 Gravity Storm Sewer Pipe Design Minimum Sewer Sizes

The following lists the minimum pipe sizes allowable;

- Single catch basin lead 300mm
- Double catch basin lead 375mm
- Storm sewer main 300mm

Minimum Pipe Slope

The minimum pipe slope shall be 0.5%. Proposed lower slopes may be considered for large diameter trunk sewers or where constraints necessitate and shall require approval by the District or Area Municipality prior to construction.

Location

Sewers shall be located in accordance with the Area Municipality's standard locations. Where local municipal standards for sewer installation locations are not available or when installation is located within a District roadway, installation shall be in accordance with DMM 102. The preferred location of the sewer main is in the centre of the driving lane. The sewer must have a minimum horizontal separation of 2.5 m (edge to edge) and a minimum vertical separation of 0.5 m (bottom of pipe to top of pipe) from any watermain as per Ministry design criteria. Where sewer is constructed in bedrock a common trench design may be permitted in accordance with DMM 210 or 211 so long as the minimum vertical separation of 0.5m (bottom of pipe to top of pipe) between the watermain and sewer is maintained. All non-standard sewer locations will require individual approval by the District and Area Municipality.

A 2.0m horizontal separation between the sanitary sewer and storm sewer will be permitted to allow for common trench construction as long as the inverts of both sewers are relatively at the same elevation. Should the sewer inverts vary by more than 1.0 meter, a 3.0 meter separation shall be maintained.

Depth

The sewer obvert shall be constructed a minimum of 1.2 m below the finished grade. Where frost cover requirements cannot be satisfied, insulation requirements shall be in accordance with OPSD. Approval of the reduced cover must be obtained from The District prior to construction. Applicants shall consider the minimum basement elevations in the adjacent

lands if footing or similar private drains are to be connected to the storm sewer system.

Installation

Sewers shall be installed in accordance with the appropriate OPSD. Bedding class and material shall be confirmed in the geotechnical investigation.

Maintenance Holes/Catch Basins

- Maintenance Holes are required at all junctions, changes in grade, pipe size, pipe material or alignment. All maintenance holes and catch basins shall include frost straps conforming to OPSD 701.100 and be designed according to the following criteria:
- Spacing shall be determined based on inlet capacity of grates.
- The maximum spacing between maintenance holes shall be 110 m for sewers less than 300mm diameter, 120m for sewers 300mm to 900mm diameter and 150m for sewers 975mm to 1350mm diameter.
- The maximum spacing between catch basins shall be 110 m for road gradients between 0.0 and 3.0%, 90 m for road gradients between 3.0 and 4.5% and 75 m for road gradients greater than 4.5%.
- Drops through maintenance holes shall match the incoming and outgoing sewer slopes and be in accordance with the following:

Minimum drop on 0° turn	= 0.01 m
Minimum drop on 1° to 45° turn	= 0.03 m
Minimum drop on 45° to 90° turn	= 0.06 m
Maximum drop (without drop structure)	= 0.30 m

- At maintenance holes where pipe sizes change, the above criteria shall be altered such that the obverts of the pipe are matched.
- Prefabricated internal drop structures are required in maintenance holes where the difference in invert elevation is greater than 0.60 m.
- A minimum 1500 mm diameter maintenance hole is required when there is an internal drop structure.
- Grade adjustment rings shall be in accordance with the Approved Products List and shall not exceed 0.3m in height.
- When a PVC or HDPE sewer is installed into a new maintenance hole a sealing boot is required in accordance with the Approved Products List.
- Catch basin and storm maintenance holes shall include sumps with a minimum depth of 0.6m.

Catchment Points

- The design for catch basin location and type shall take into consideration the lot areas, lot grades, road widths and road grades. Design Consultant shall complete inlet grate review and confirm appropriate inlets types and catch basin spacing to suit.
- Road grading shall be assessed for efficient drainage of storm water to provide safe passage of vehicles.
- At street intersections, catch basins shall be located immediately upstream of sidewalk or pedestrian crosswalks.
- Catch basins shall be located upstream of the curb depression for any driveway and shall not be located within the driveway entrance area.
- Catch basins, inlet grates and connections shall provide for the expected maximum flow.
- Double catch basins are to be provided where flows are to be collected from two directions.
- Catch basin grates shall be to OPSD 400.010.
- Ditch inlet catch basins shall be designed to allow intake of expected flow rates at 50% blockage from debris.

Outfall Structures

All outfalls shall include a headwall to OPSD 804.030 or 804.040 as appropriate and include grating to OPSD 804.050. Design Consultant shall be responsible for confirming suitable erosion protection measures are included at the outfall and downstream of the outfall.

3.7.5 Storm Sewer Laterals

Residential

All residential connections shall utilize materials listed on the current Approved Products list in Appendix C and be in accordance with OPSD 1006.010. The minimum diameter

within the road allowance shall be 135 mm. The minimum cover at street line shall be

1.20 m, unless circumstances require otherwise. Services with less than the minimum cover shall be insulated in accordance with OPSD. Connections directly into maintenance holes shall be minimized and reviewed on an individual basis.

Commercial / Industrial

All commercial or industrial connections shall utilize materials listed on the current Approved Products list in Appendix C. The minimum diameter within the road allowance shall be 150 mm and installed in accordance with OPSD

1006.010. The minimum cover at street line shall be 1.20 m, unless circumstances require otherwise. Services with less than the minimum cover shall be insulated in accordance with OPSD. A maintenance hole will be required at the main for all services exceeding 150 mm diameter.

Approved Products List

The products specified in Appendix C shall be utilized in the storm sewage system. All requested substitutions, or products for purposes not listed, shall be approved by the District prior to construction.

4 Storm Drainage and Stormwater Management

4.1 General

Generally, storm drainage shall be accommodated by a system of curb and gutters as well as storm sewers, with the exception of rural roadways or estate residential subdivisions, where an open ditch and culvert system may be permitted with prior approval from the Director of Public Works.

4.2 Design Flows

Drainage systems are to be designed to convey the year of storm shown in Table 4.1 without surcharge. Runoff rates in excess of the design capacity of drainage systems shall be conveyed via roadways, swales, walkways, drainage easements, etc… and in special circumstances the storm sewer system, to a sufficient outlet to prevent unacceptable flooding damage to private property. Flood lines shall not extend onto private property unless a drainage easement is provided in favour of the Area Municipality.

All new developments must demonstrate that the stormwater generated onsite is directed to a sufficient outlet such as a lake, river or permanently flowing watercourse. Sufficient outlet may also include a public right-of-way with prior approval from the Area Municipality. An easement must be provided in favour of the Area Municipality for any drainage that is directed over private land.

The designer shall provide calculations for the conveyance capacity of the downstream conveyance routes to demonstrate that upstream, downstream and adjacent landowners do not incur significant adverse impacts, including increased runoff volumes, and that the flow is conveyed in a safe manner.

Table 4.1 – Design Storms (Years)

Road Classification	Bridges/Major Culverts	Road Culverts	Storm Sewers	Ditches/ Channels
Urban	1:100	1:25	1:10	1:25
Suburban	1:100	1:10	1:5	1:10
Ind./Comm	1:100	1:10	1:5	1:10
Rural	1:100	1:10	n/a	1:5
Seasonal	1:50	1:5	n/a	1:5

The design flows used to size the storm drainage systems are to be calculated using the Rational Method, or approved equivalent.

The average rainfall intensity for the Site is to be derived from the MTO web-based IDF Curve Look Up application.

Composite runoff coefficients are to be developed in accordance with the MTO Drainage Management Manual.

4.3 Culvert Design

Culverts shall be sized by the MTO conventional culvert design method, or equivalent approved by the Director of Public Works.

4.4 Open Ditch Design

Open ditches shall be designed at a minimum of 0.15m below the sub-grade of the roadway. Where this cannot be achieved, a sub-drain may be provided under the invert of the ditch and day-lighted once the minimum depth can be attained.

The minimum ditch grade shall be 1.0% and the maximum 10%, and shall be suitably protected against erosion based on flow velocities, to the satisfaction of the Area Municipality.

The minimum ditch protection on all ditches shall be 100mm of topsoil and seed and mulch.

4.5 Storm Sewer Design

The full flow capacity of the storm sewer shall be determined by Manning's Formula. Roughness coefficients, minimum/maximum flow velocities, and minimum/maximum pipe slopes shall be in accordance with MOE Design Guidelines for Sewage Works, 2008.

The minimum pipe size is 250 mm.

The minimum depth of cover shall be 1.2 m to the obvert of the sewer, provided that there are no conflicts with utility crossings. Where sufficient cover does not exist, the Area Municipality may consider shallower insulated sewers on an individual basis.

The maximum height of fill is not to exceed OPSD unless pipe strength design calculations are provided for approval by the Area Municipality.

Storm sewers shall generally be located as per the typical road cross-sections. Where storm sewers are located in easements, the easement width shall be a minimum of 5.0 m.

Manholes

Manholes shall be as per OPSD 701 and be pre-benched up to springline, to the satisfaction of the Area Municipality. Sumps shall be provided in lieu of benching when catchbasin manholes are used. Location and spacing shall be in accordance with MOE **Design Guidelines for Sewage Works, 2008.**

All new manholes within an asphalt roadway shall include a self-adjustable autostable frame. Structures outside roadways or existing frame and grates in base asphalt which require adjustment may use lift rings. A minimum of one to a maximum of three adjustment units (Moduloc) shall be installed on the top of the structure. The maximum vertical adjustment of manholes via Moduloc shall not exceed 300 mm. Any adjustment exceeding this amount shall consist of precast concrete riser sections.

Catchbasins

Catchbasins shall be as per OPSD 705 and located upstream of pedestrian crossings. The maximum spacing shall be in accordance with MOE Design Guidelines for Sewage Works, 2008.

When adjusting the top elevation of catchbasins, a minimum of one to a maximum of three adjustment units shall be installed on the top of the structure. The maximum vertical adjustment of shall not exceed 300 mm. Any adjustment exceeding this amount shall consist of precast concrete riser sections.

Leads shall connect to manholes where possible and be minimum 250 mm for single catchbasins and minimum 300 mm for double catchbasins.

Foundation Drainage System

A foundation drainage system is to be provided for each residential lot in the urban and suburban area and consist of either:

- A sump pump discharging to an underground storm sewer service connection; or
- A sump pump discharging to an Area Municipality ditch; or
- A gravity connection to the storm sewer, provided the 100 year hydraulic gradeline is a minimum of 0.5 m below the finished basement floor elevation of the dwelling; or
- A sump pump or gravity connection to a third pipe (foundation drain) collection system that is separate from the storm sewer system, which discharges to a sufficient outlet such as a valley or hillside.

The owner of any sump pump drain that discharges to a Area Municipality ditch is solely responsible for its operation and maintenance. The Area Municipality shall not be liable for any damage to such drain that occurs during regular ditch maintenance.

Storm Service Connections

Single 100mm PVC DR28 service connections for residential lots shall be constructed in accordance with OPSD 1006.010 or 1006.020. Connections for commercial, institutional or multiple use will be considered on an individual basis.

Where a sump pump discharges to a storm service connection, a 25mm air gap shall be provided at the building such that there is no direct connection between the building sump pump outlet and the storm service.

Roof leaders shall not be connected to the storm sewer system and shall discharge to the ground surface onto erosion proof splash pads, and flows shall be directed away from the building in such a way as to prevent ponding or seepage into the foundation weeping tile. Further, roof leader discharge shall not cause an icing condition on municipal sidewalks.

Private Drain

Direct connection from any private storm drain, roof drain, sump pump, etc. to a municipal storm sewer or culvert is not permitted unless prior approval has been received from the Director of Public Works. Where such connection has been granted by the Area Municipality, the applicant is responsible for installing proper back-up devices. The Area Municipality shall not be held responsible for damages caused by water backing up into private drains.

Testing

All newly installed PVC and polyethylene storm sewers shall be subjected to deflection testing in accordance with OPSS 410. Deflection testing is not required for concrete storm sewers.

All newly installed storm sewers shall be subjected to a CCTV Inspection in accordance with OPSS 409. The Consulting Engineer shall review the DVD's and reports prior to submitting to the Area Municipality, to ensure completeness, accuracy and that no deficiencies exist.

All manholes and catchbasins shall be visually inspected by the Area Municipality for deficiencies.

Any sections of sewer or service connections which fail to meet the requirements shall be repaired or replaced at the direction of the Area Municipality.

Approvals

All new sewers require an Environmental Compliance Approval (ECA) from the Ministry prior to construction, a copy of which shall be provided to the Area Municipality prior to construction.

4.6 Stormwater Management Facilities

All stormwater management facilities are to be designed to ensure that post-development peak flows do not exceed pre-development levels for storm events up to and including the 1:100 year event. An emergency spillway shall be provided and designed with suitable erosion protection given the velocities associated with the uncontrolled flow.

All stormwater management facilities are to be designed in accordance with the preferred criteria listed in the Ministry of the Environment “Stormwater Management Planning and Design Manual”.

Maintenance access is required to the inlet and outlet structures, forebays, and emergency spillways. Where possible, the maintenance access is to be looped to provide two access points to all key features. When this is not possible, dead end access may be provided with a turning area with a 13m centreline turning radius.

Water Quality Treatment Units

Consideration will be given to the use of oil/grit separators or other stormwater quality treatment unit where a stormwater management pond is not practical. These should be used in conjunction with additional quality control measures to provide a treatment train approach. Supporting calculations shall be provided to the Area Municipality for approval.

Operations and Maintenance Manual

A detailed operations and maintenance manual shall be required as part of the design of each stormwater management facility, including inspection checklists, maintenance description and frequency, etc.

4.7 Sediment Control

Temporary sediment controls are required for any construction project and must be detailed on a Sediment Control and Construction Mitigation Plan. The controls should be designed using a phased approach whenever feasible to minimize the exposed area of the site at any given time. There must also be a contingency plan for repair, replacement and upgrading of control measures as required to achieve adequate performance at all times.

Protection of all potentially affected storm drain inlets and catchbasins shall be accounted for in the design.

Construction Access Mats shall be installed at all exits from the site, and shall be designed and maintained to remove most of the sediment accumulated on construction vehicle tires.

Effluent from site dewatering operations must be adequately treated prior to discharge into receiving water bodies, ditches or storm sewers.

i) Where **development** exists within the setbacks identified in Sections C2.6.4.2 e) and f), **individual on-site sewage services** and building setbacks are improved or not further reduced;

ii) Where new or updated **individual on-site sewage services** are required to support the proposal, the requirements of Section C2.6.7.1 a) ii) and iii) shall apply;

iii) Section C2.6.7.1 a) iv) is implemented; and

iv) Section C2.6.7.1 b) is applied at the Area Municipality's discretion.

b) Where the setback requirements cannot be met due to insufficient lot depth or the existence of terrain or soil conditions which make other locations on the lot more suitable, or where existing buffers or stormwater management practices do not satisfy the requirements outlined in this Plan, an overall net improvement shall be achieved through on-site phosphorus management and impact mitigation measures in accordance with the standard protection policies of this Plan.

C3 CLIMATE CHANGE

a) Muskoka's climate is changing. Muskoka is predicted to expect hotter, drier summers with more heat waves and more intense rainfall events, and warmer and milder winters. These changes will impact how the District of Muskoka and Area Municipalities plan for **development** and **redevelopment**, **infrastructure** and the public realm to ensure the area remains resilient to changing climate from economic, health, social, emergency services and environmental perspectives;

b) The District of Muskoka recognizes that sustaining and restoring the resistance to and resilience of communities and ecosystems will be required to address local climate change impacts. The District of Muskoka understands that through the implementation of appropriate policies, climate change mitigation, adaptation and resiliency of Muskoka can be improved.

c) The District of Muskoka shall work toward the implementation of a "climate change lens" as the approval authority on Planning Act applications and as a commenting agency to maximize resiliency of ecosystems and communities, manage the risks associated with climate change and provide sustainable natural environmental services for future generations of residents and visitors to Muskoka. Considerations shall include but are not limited to:

i) Reduction of greenhouse gas emissions;

ii) Improvement of air quality;

iii) Promotion of compact form;

iv) Efforts to limit the dispersal of the population and travel times between housing, employment, and amenities and services;

v) Use of **green infrastructure**;

vi) Promotion of design to:

1. Maximize energy efficiency and conservation including consideration of the mitigating effects of vegetation; and

2. Maximize opportunities for the use of renewable and alternative energy sources and systems;

vii) Identification and mitigation of existing hazards which may be compounded or aggravated

by climate change, including flood prone areas and wildland fire areas; and

viii) Identification of natural heritage features that have become more **sensitive** to **development** pressures due to climate change.

d) The implementation of the climate change lens may result in:

i) Requiring resiliency measures such as:

1. Improved **floodplain** mapping and increased restrictions for **redevelopment** of existing structures;
2. Increased setbacks for **development** adjacent to **wetland**s, lakes, rivers, headwater areas and groundwater recharge areas;
3. Retention of natural vegetation;
4. More stringent requirements for stormwater management and flood abatement, and
5. Provisions to increase the resilience of power and data grids.

ii) Establishing more stringent standards for built **infrastructure**; and

iii) Increased energy efficiency through:

1. The use of energy sources that reduce or avoid greenhouse gas emissions;
2. Use of passive solar design principles; and
3. Use of net-zero design principles to reduce or eliminate energy demand by built **infrastructure**.

C4 STORMWATER MANAGEMENT

a) It is acknowledged that stormwater management is a shared responsibility between the Province, District of Muskoka and Area Municipalities. The following policies are intended to provide a framework for Area Municipal Official Plans and to apply directly to any stormwater management facility that has the potential to impact a District interest such as District-owned **infrastructure** and **recreation**al water quality. Planning for stormwater management shall:

i) Minimize, or, where possible, prevent increases in contaminant loads;

ii) Minimize changes in water balance and erosion;

iii) Not increase risks to human health and safety and property damage;

iv) Maximize the extent and function of vegetative and pervious surfaces;

v) Promote stormwater management best practices, including stormwater attenuation and re-use, and low impact **development**; and

vi) Consider the impacts of climate change in the design of stormwater facilities.

b) In order to control flooding, ponding, erosion and sedimentation and to protect water quality and aquatic habitat or other natural habitat that depend on watercourses and other water bodies for their existence, stormwater management plans shall generally be required for any major **development**. Stormwater management shall be undertaken in accordance with Provincial, District of Muskoka or Area Municipal guidelines, strategies or plans.

c) Except in extenuating circumstances proposals for **development** or **redevelopment** shall provide for a low impact **development** approach to stormwater management which may include

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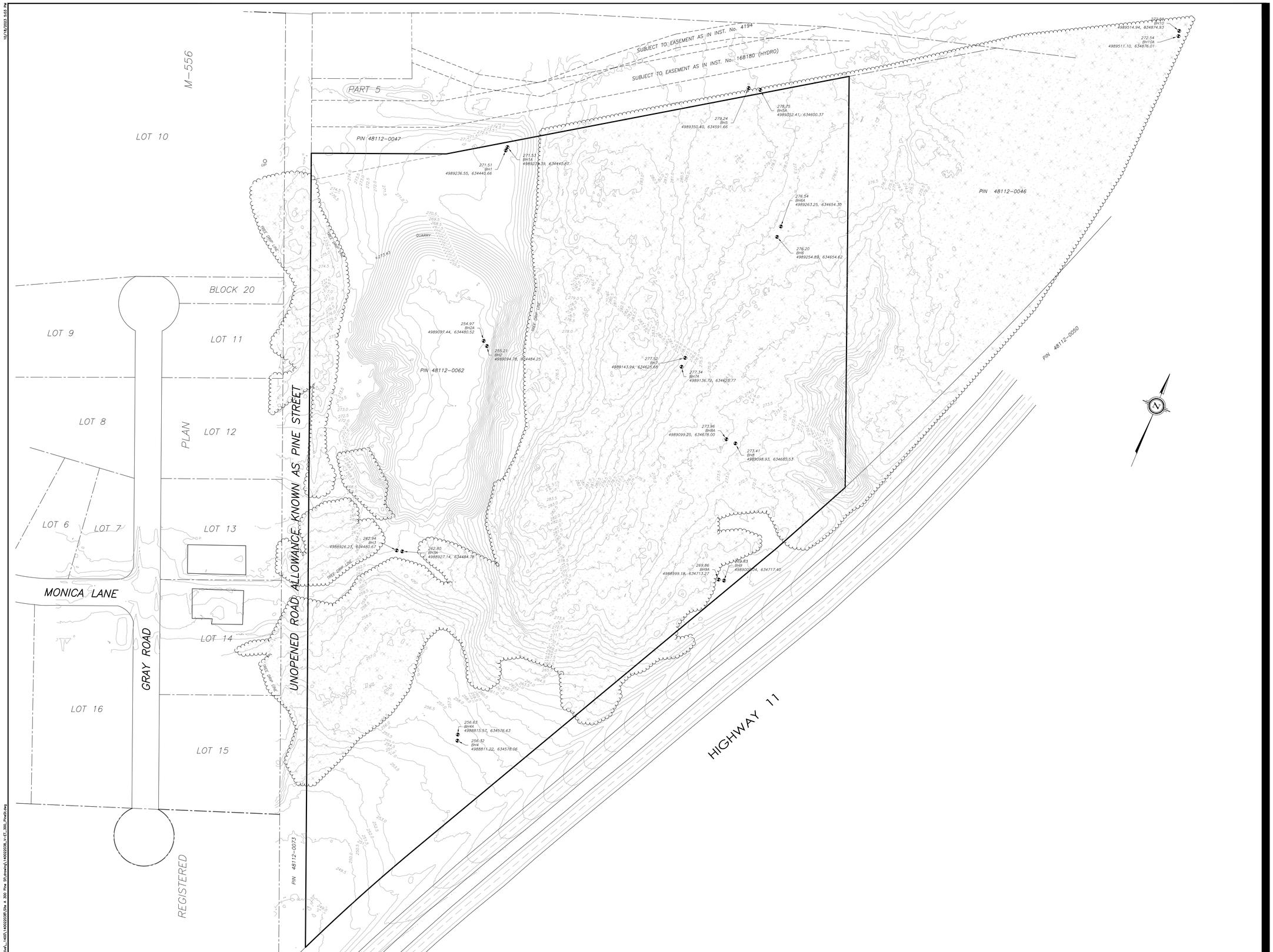

Stantec

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CAUTION

THIS IS NOT A PLAN OF SURVEY AND SHALL NOT BE USED EXCEPT FOR THE PURPOSE INDICATED IN THE TITLE BLOCK.

UTILITIES SHOWN ARE FOR DISCUSSION PURPOSES ONLY AND PRIOR TO CONSTRUCTION SHOULD BE CONFIRMED BY A CONTRACTOR.

VERTICAL DATUM

ELEVATIONS ARE GEODETIC, REFERRED TO CGVD-1928:1978 AND DERIVED FROM GNSS OBSERVATIONS USING A REAL-TIME CORRECTION SERVICE.

DRAWING COORDINATES

UTM ZONE 17, NAD83 (CSRS)
CAUTION: DRAWING COORDINATES HAVE BEEN SCALED TO GROUND LEVEL DISTANCES BASED ON THE APPROXIMATE CENTROID OF THE PARCEL.

CONTOUR NOTE

CONTOURS DISPLAYED ARE DERIVED FROM 2022 LIDAR DATA SOURCED FROM THE DISTRICT MUNICIPALITY OF MUSKOKA .

LEGAL DESCRIPTION

PART OF LOT 6 CON 1 MACAULAY PT 1 35R-3456 EXCEPT PT 1-5 35R-8356 AND PART 1-4 35R-7976; BRACEBRIDGE ; THE DISTRICT MUNICIPALITY OF MUSKOKA.

DESIGNATED AS PIN 48112-0062

TOTAL PARCEL AREA: 18.057 Ha.

BOREHOLE NOTE

BOREHOLES SHOWN REPRESENT AS-STAKED LOCATIONS AND DO NOT REPRESENT THE ACTUAL DRILLED LOCATION.

Revision	By	Appd	YYYY.MM.DD
Issued	**BR**	**MM**	**OCTOBER 18, 2023**
	Dwn.	Chk.	YYYY.MM.DD

Client/Project Logo

Client/Project
MUSKOKA ALGONQUIN HEALTHCARE

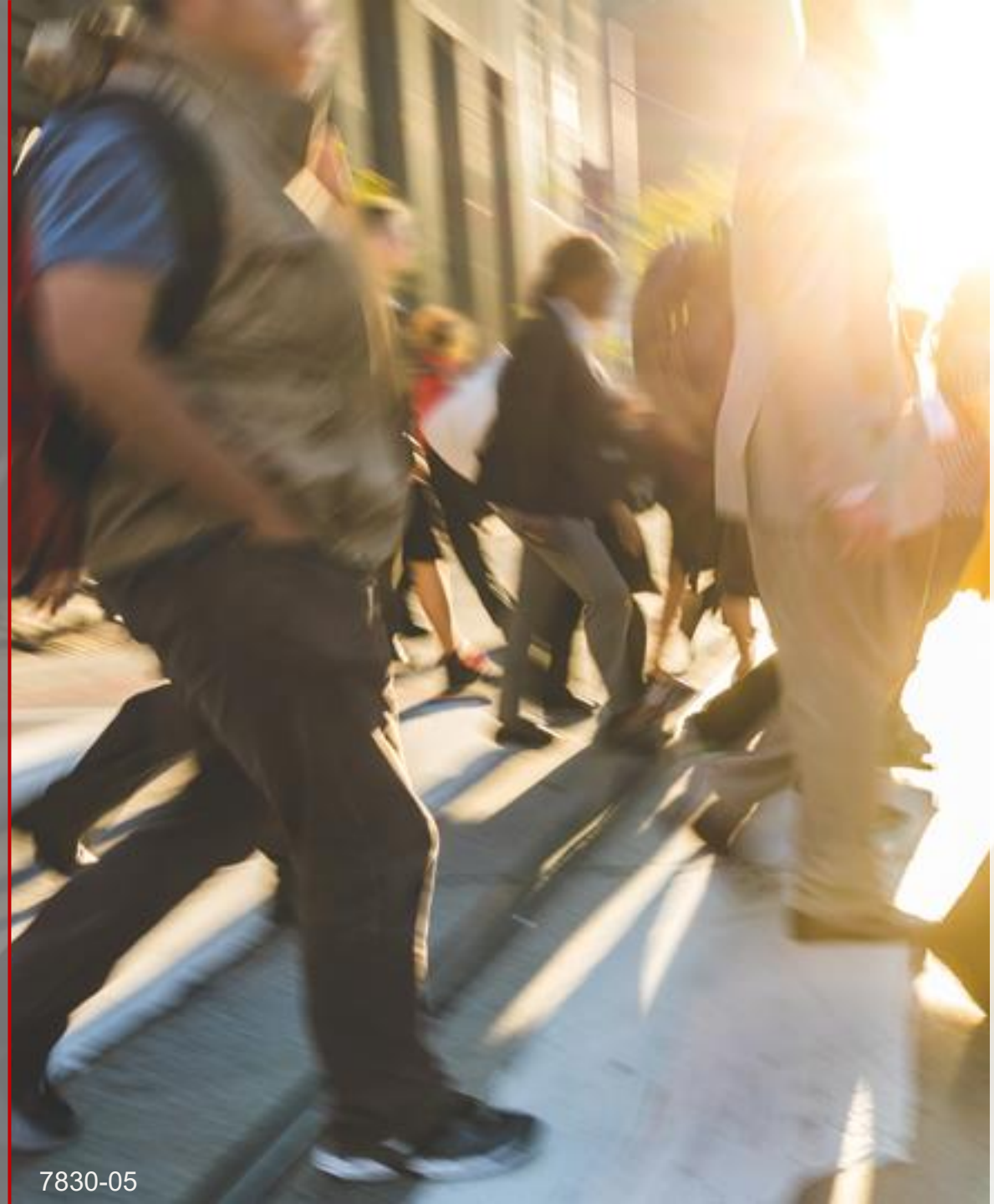
MUSKOKA ALGONQUIN STAGE 1.3

300 PINE STREET, BRACEBRIDGE

Title
COMPILED TOPOGRAPHIC SKETCH

Project No.	Scale
140022038	1:1250
Revision Sheet	Drawing No.
1 of 1	

W:\Active_140\140022038\Site A 300 Pine St\drawings\140022038_v-ET_300_Pine St.dwg



BRACEBRIDGE HOSPITAL FUNCTIONAL PROGRAM

URBAN TRANSPORTATION CONSIDERATIONS

Prepared For:
Stantec Architecture Ltd.

February 2024

BA Group

7830-05

Introduction

BA Group is retained by Stantec Architecture to undertake a due diligence exercise that highlights the transportation constraints and opportunities associated with the future Bracebridge Hospital site.

This report provides an overview of the following:

- Site Context – Existing Site
- Proposed Expansion and Development Changes
- Proposed 300 Pine Street Site
  - Area Transportation Context
  - Site Plan Context
  - MTO Approvals
- Key Findings and Conclusions

Existing Site Context

Figure 1: Existing Hospital Location

Site Location

The Bracebridge Hospital is located at 75 Ann Street in Bracebridge, an urban area in the South Muskoka Region.

The existing site is generally bounded by Liddard Street to the north, existing residential to the east and west, and Ann Street to the south.

Existing Site Context

Building and Services

- 138,401 ft^2 (12,858 m^2) of Building Gross Floor Area (BGFA)
- 59 beds: 43 acute health care beds and 16 complex continuing care beds
- Emergency department, intensive care unit, and a various outpatient programs and services

Staff / Employees

- 438 Full-time Equivalent (FTE)

Patient Activity

- 65,188 annual visits per year

Proposed Expansion and Functional Program Changes

Proposed Hospital Expansion Statistics

The future hospital statistics have been provided by Stantec Architecture Ltd and Muskoka Algonquin Healthcare.

Existing Vehicle Parking

Parking Data Collection

- On October 17 and 18 of 2023, field visits were conducted by BA Group to collect parking data, including the current supply and demand.
- The parking demands were found to be consistent between the two surveyed days, with the hospital parking lots currently operating between 76% and 84% utilization.

Table 2: Existing Hospital Parking Demand Summary

Date	Parking Supply	Max Parking Demand	Total Utilization
Tuesday, October 17, 2023	249	189	76%
Wednesday, October 18, 2023		209	84%

Future Vehicle Parking

- Using the above site statistics and comparing to similar hospitals, the future parking demands is anticipated to be in the range of 400 – 500 parking spaces.
- We recommend that the parking analyses be updated to calculate the future parking demands of the site once the functional program is further refined.

Table 3: Forecasted Hospital Expansion (Ultimate) Parking Demand

Variable	Existing Site	Ultimate Site	Existing Parking Demand	Future Parking Demand

300 Pine Street

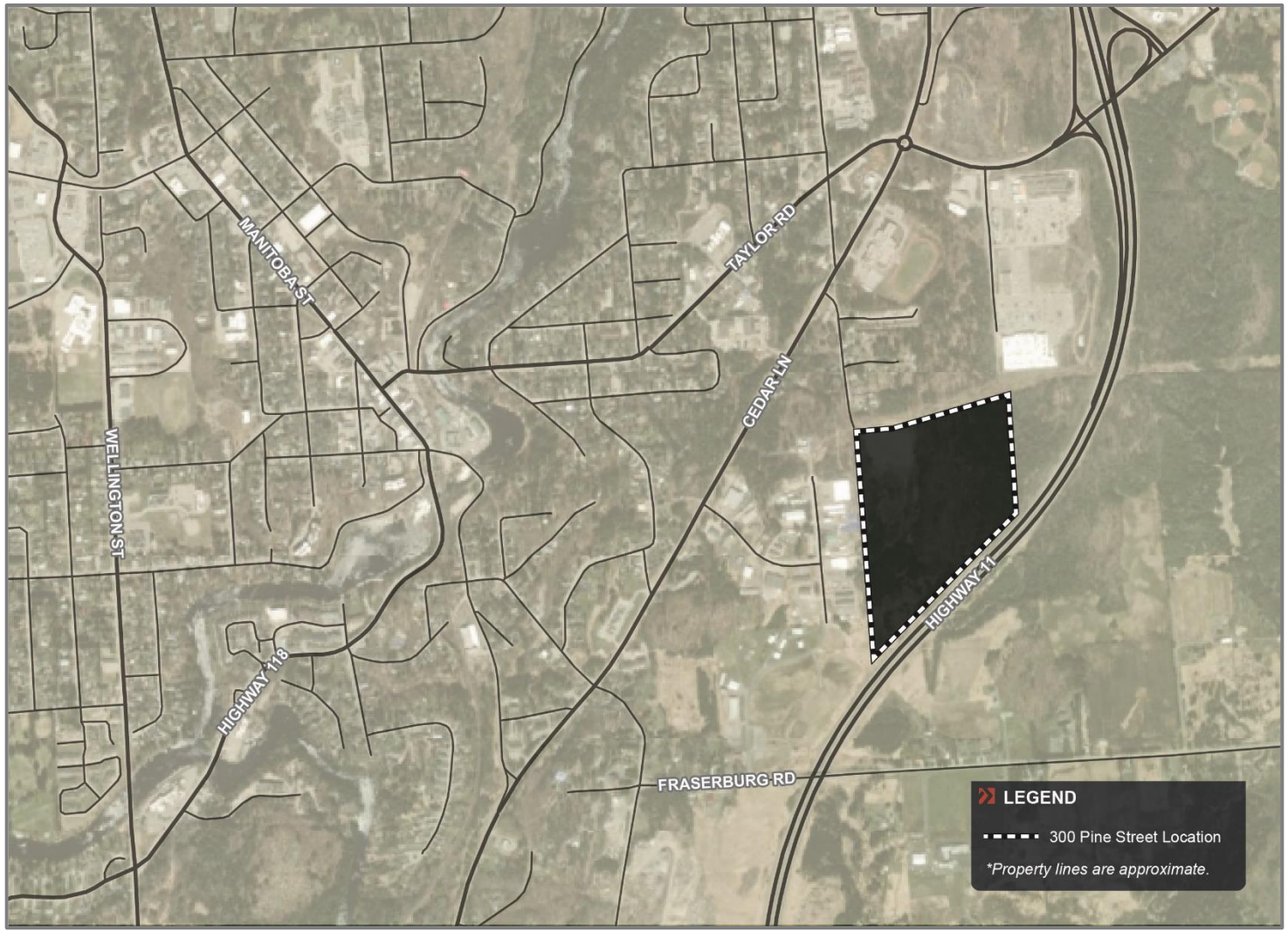


Figure 2: 300 Pine Street

Figure 3: Road Context

Existing Roadways

The classifications of the existing roadways surrounding the site were taken from the Bracebridge Official Plan and are described below:

- **Highway 11** is identified as a provincial highway, which connects to Highway 400 in Barrie
- **Taylor Road** is identified as an arterial roadway and currently includes a two-lane cross-section with paved shoulders. The intersection with Depot Drive is signalized with auxiliary turn lanes in all directions.
- **Cedar Lane** is identified as an arterial roadway and currently includes a two-lane cross-section with paved shoulders
- **Pine Street** is identified as a municipal – year-round road and currently includes a two-lane cross-section with paved shoulders
- **Depot Drive** is identified as a private road and currently includes a two-lane cross-section with curbs on both sides
- **Gray Road** is identified as a municipal – year-round road and currently includes a two-lane cross-section with paved shoulders

Planned Road Improvements

Per the Bracebridge Official Plan, there is a proposed road that is planned to connect Depot Drive, Pine Street, and Gray Road.

This site does not have frontage on an existing or planned collector or higher order road system that would be typical for this type of land use.

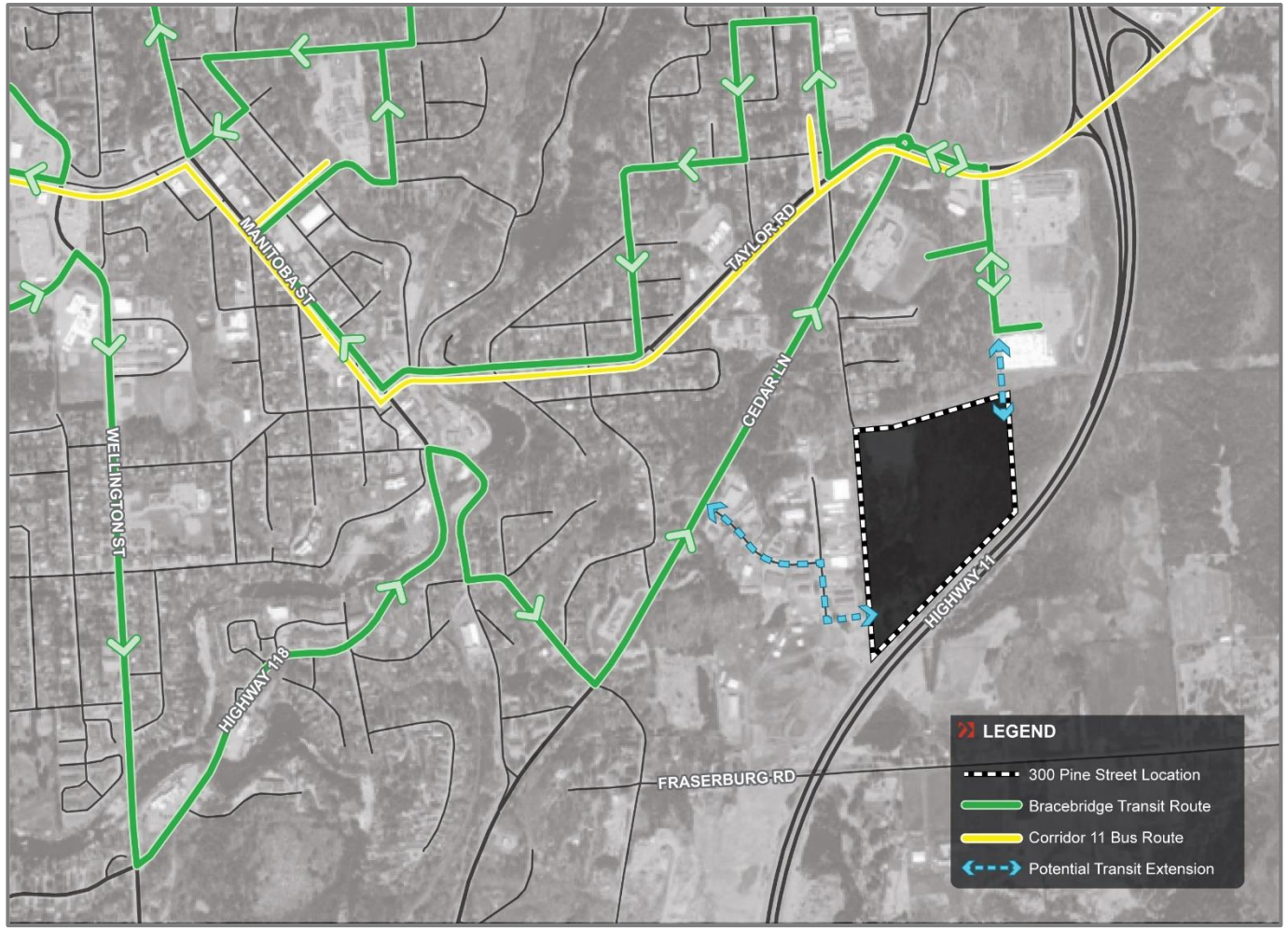


Figure 4: Transit Context

Existing Transit Network

- **Bracebridge Transit** operates one public transit bus route within the Town's urban core that spans 22 kilometers and operates on a 60-minute return schedule. There are several transit stops located in close proximity to the 300 Pine Street site, including three along Depot Drive and one at the intersection of Cedar Lane and Monica Lane.
- **Bracebridge Mobility** is a service provided for those who are unable to use the Bracebridge Transit due to mobility. It operates within the Bracebridge Transit service area and is a door-to-door service.
- **Corridor 11** route runs during the week between Huntsville and Orillia, with stops in Port Sydney, Bracebridge, Gravenhurst, Kilworthy, and Washago.

Future Transit Network

Consideration should be given to extend the Bracebridge Transit and Corridor 11 routes through the hospital campus to provide transit service to staff and visitors. This site does not have frontage on a collector or higher order road system that would be typical for this type of land use.

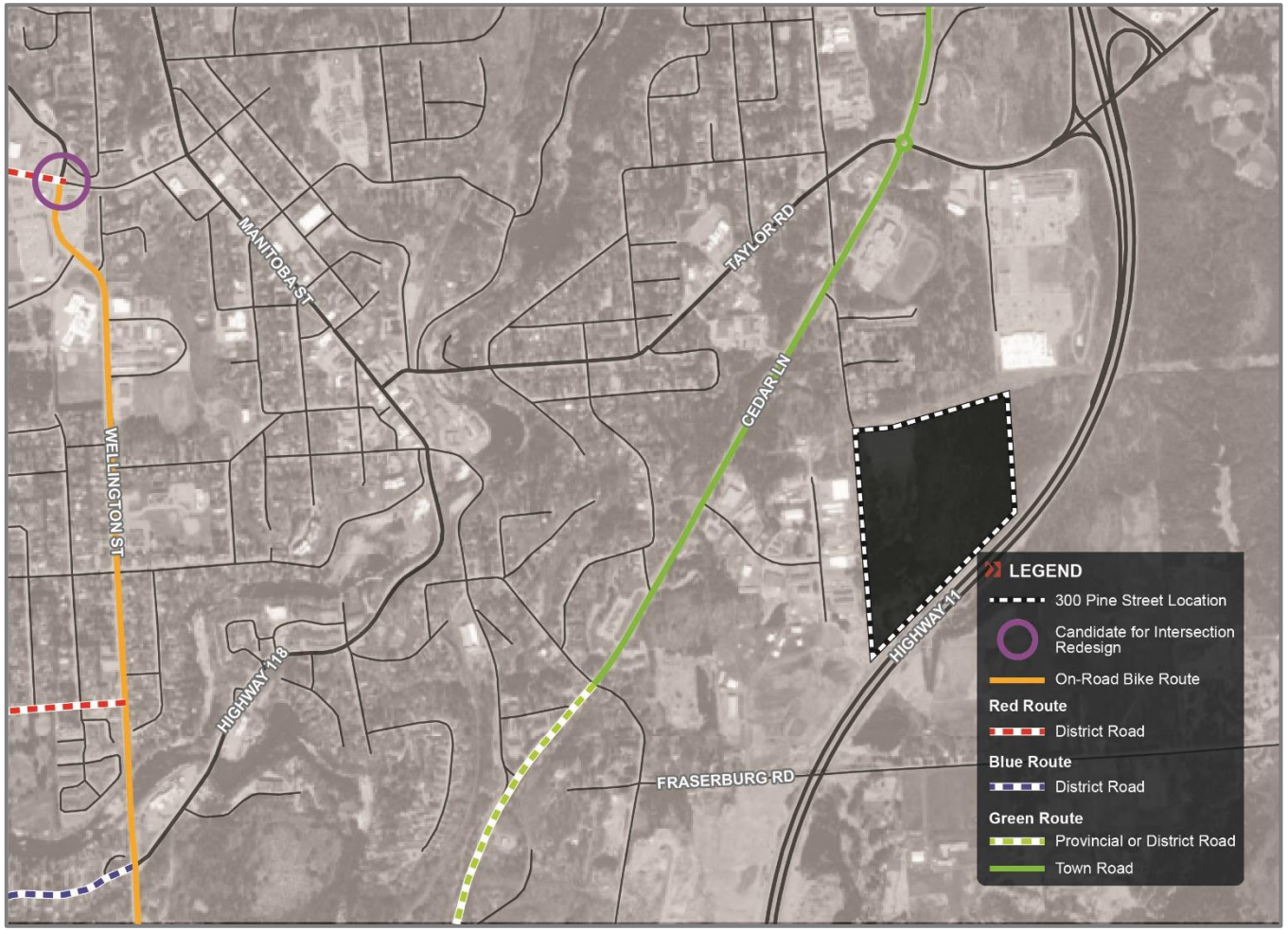


Figure 5: Active Transportation Context

Existing Active Transportation Network

Within the vicinity of the 300 Pine Street site, there is a sidewalk along the east side of Depot Drive, which provides access to the existing commercial development south of Taylor Road.

Planned Active Transportation Network

Per the Bracebridge Plan for Walking and Cycling (2014), the planned on-road bike routes are part of the long-term projects for the Town and are described below:

- **Cedar Lane** is proposed to be part of the future green route, which is planned to run between Highway 117 in the north and Muskoka Beach Road in the south

The Site is not currently well served by active transportation facilities, nor are there plans that will significantly improve them in the future. However, as the site is centrally located within the town, visitors and staff would be more willing to take active modes of transportation, and thus, the Hospital should support facilities that accommodate pedestrians and cyclists. It is unclear whether accessible standards can be met for pedestrians on this site (the ability to regrade to an acceptable standard is unknown).

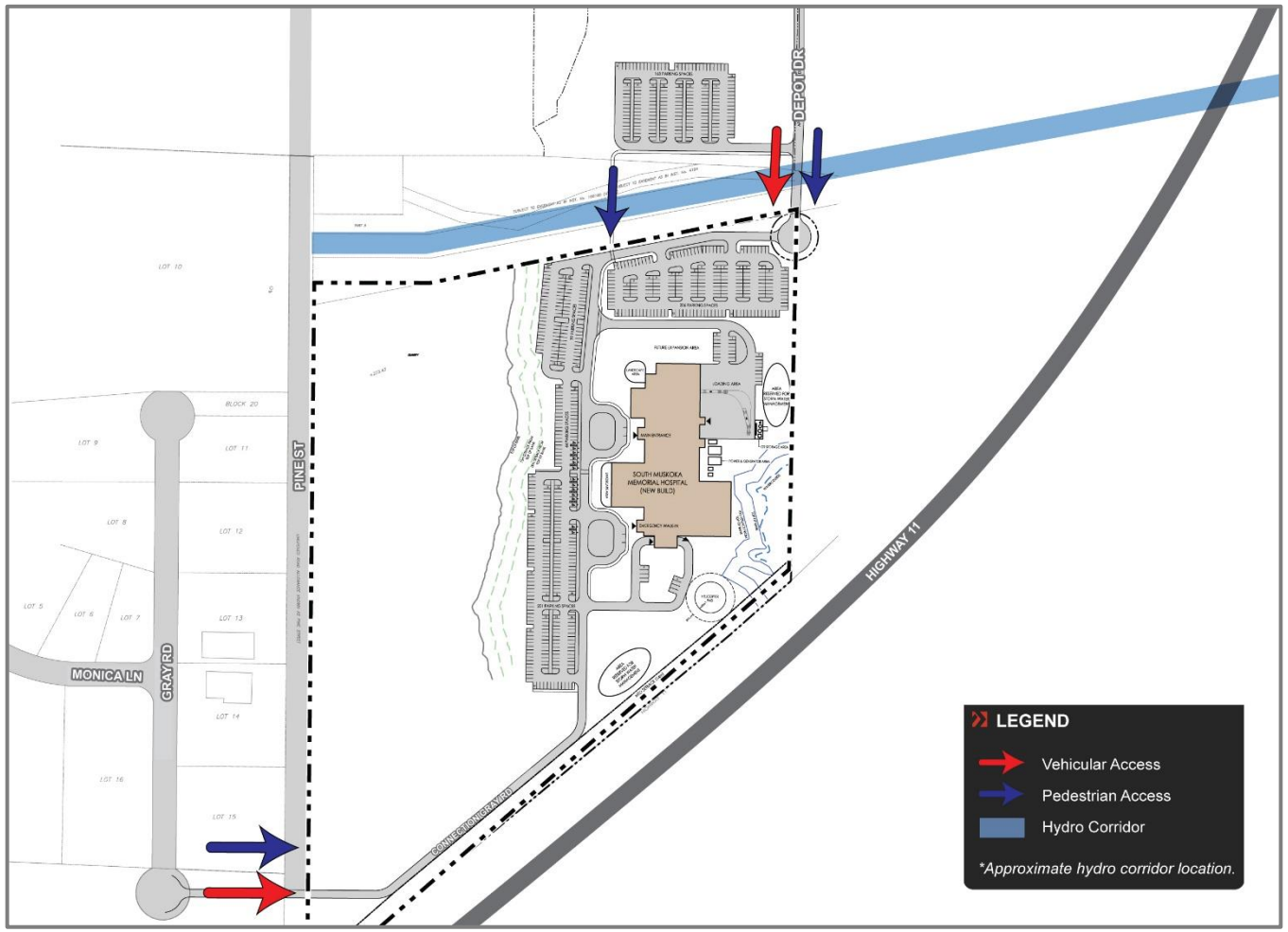


Figure 6: Site Access

Proposed Access

The proposed site at 300 Pine Street provides the following site accesses:

- Depot Drive (private roadway)
- Gray Road (local roadway)

[redacted]

Hydro Corridor

[redacted]

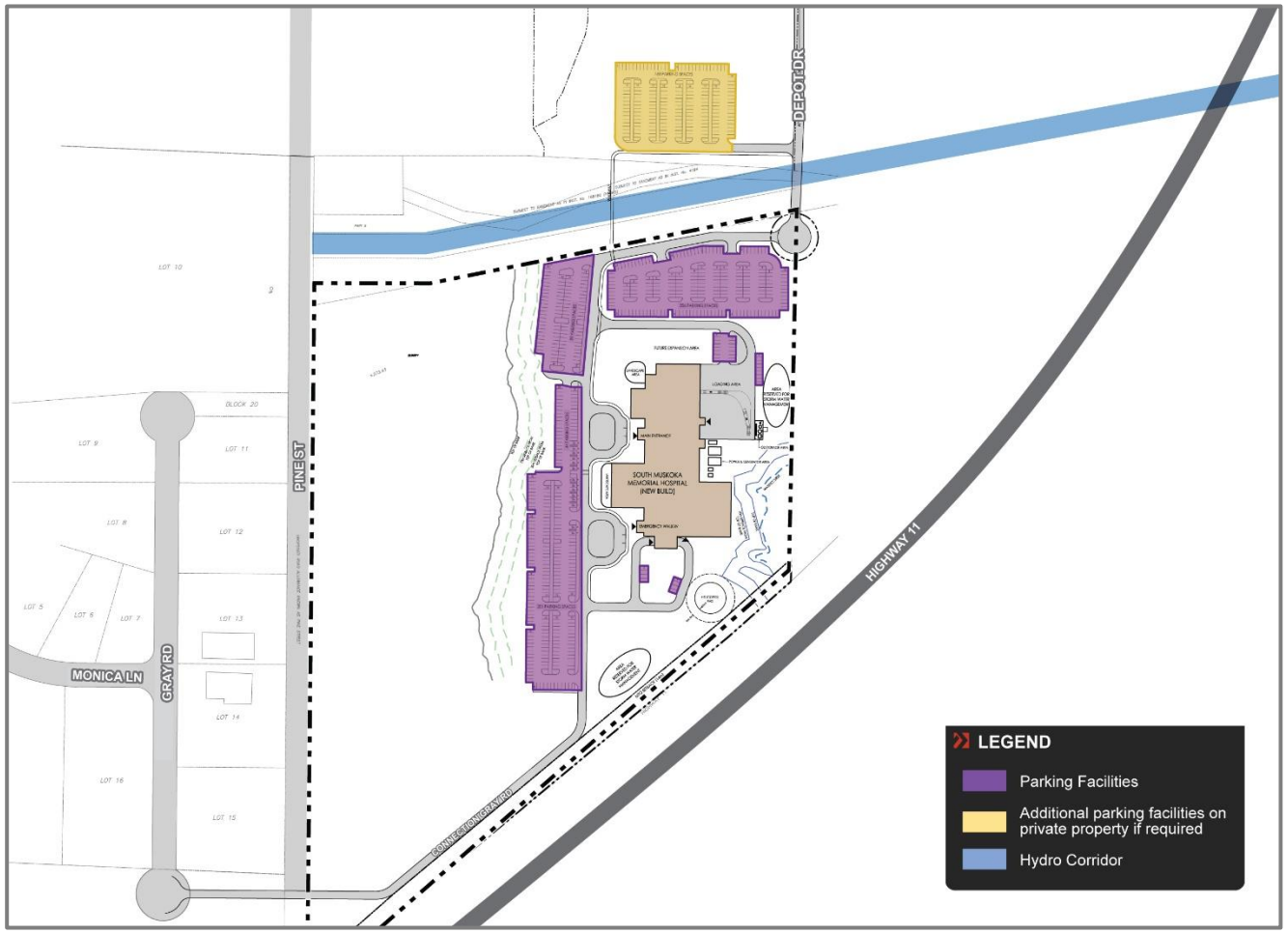


Figure 7: Parking Facilities

Minimum Parking Requirements

As per Section 5.17 of the Town of Bracebridge Zoning By-law 2016-088, the minimum parking supply for Hospitals is 3 car parking spaces for every four beds. Based on the information provided, the future hospital will include 18 beds, and thus, per the by-law, will require a minimum of 14 vehicle parking spaces. The parking needs of the hospital are expected to significantly exceed the Zoning requirements.

Proposed Parking Supply and Facilities

The proposed hospital expansion provides all parking access off Depot Drive and Gray Road. The latest site plan includes 550 parking spaces, provided in surface parking lots on the hospital property in addition to 168 surface parking spaces on the adjacent school board property. There are 14 accessible parking spaces, located outside the main entrance and emergency department.

Based on the parking analyses and current functional program, the proposed site plan can accommodate the projected parking demands on site. Based on the land use, it is recommended to provide 4-5% of the total parking supply as accessible spaces. These spaces should be conveniently located in close proximity to the main entrance and emergency department.

Parking control should be explored as the site plan continues to undergo refinement.

[redacted]

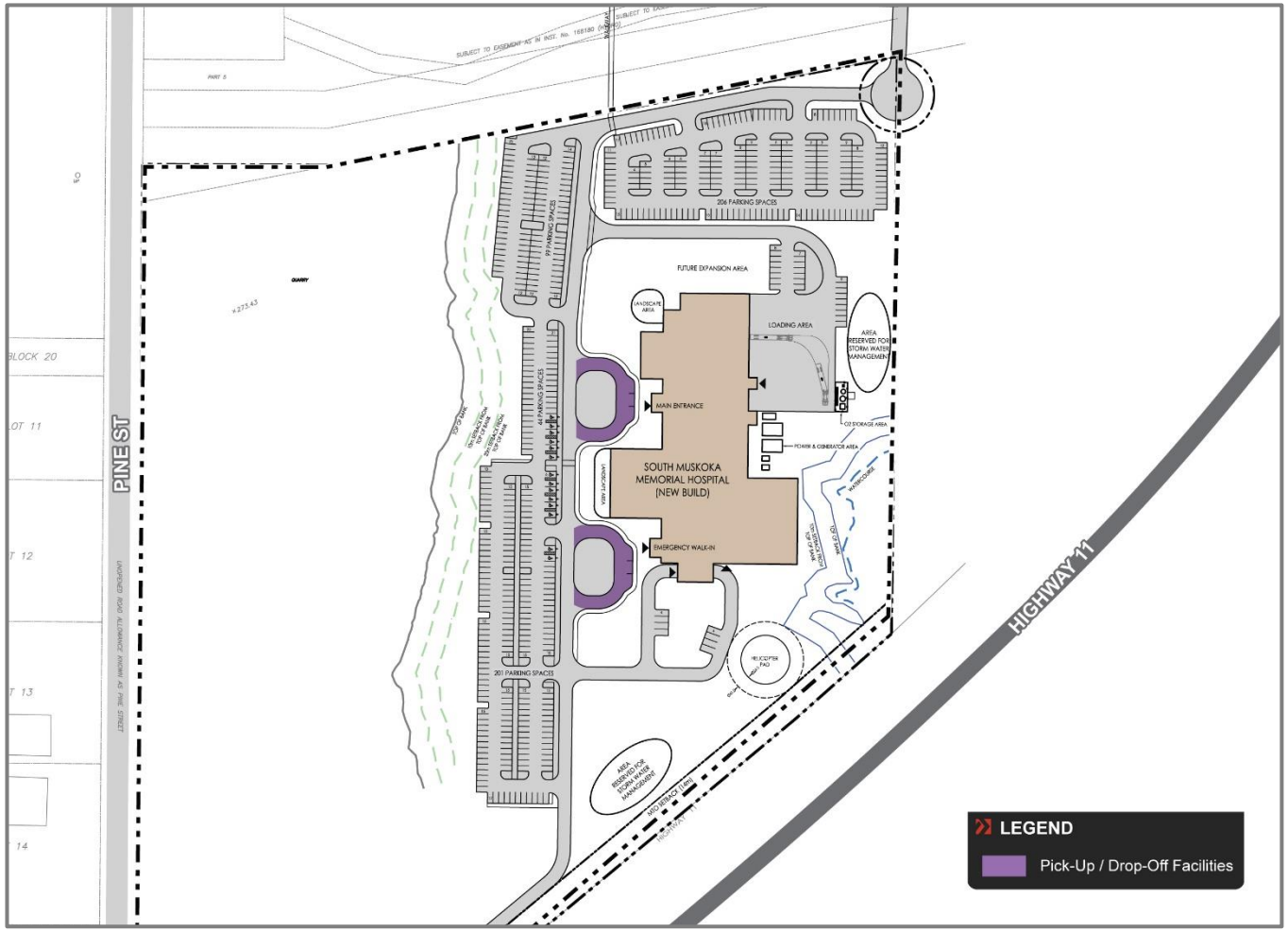


Figure 8: Pick-up / Drop-off Facilities

Proposed Pick-up / Drop-off (PUDO) Facilities

The 300 Pine Street site is proposed to include two PUDO loops: one outside the main hospital entrance and one outside the emergency department. Each PUDO loop can accommodate approximately 11 parked passenger vehicles, based on the length of each drop off. The functional requirements for design vehicles were not assessed in detail for this concept.

The functional requirements of the PUDO loops must consider parked vehicles while allowing sufficient space for other vehicles to maneuver around it. The needs for any additional design vehicle (i.e., fire route, specialized transit, ambulance) should be considered as part of subsequent concept plans.

[redacted]

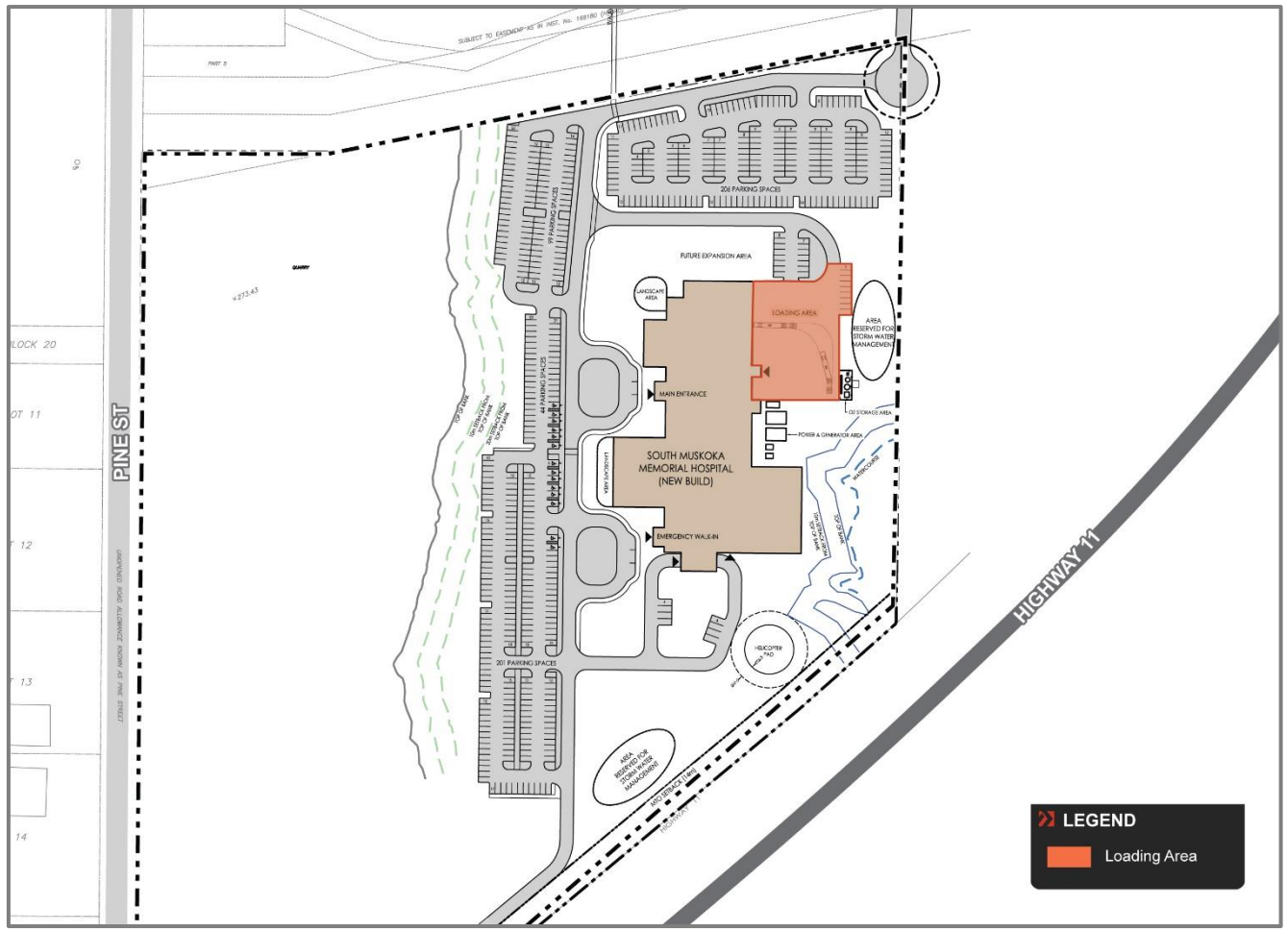


Figure 9: Loading Facilities

Minimum Loading Requirements

As per Section 5.2 of the Town of Bracebridge Zoning By-law 2016-088, the minimum loading supply and dimension requirements for the site is provided below.

Table 4: Zoning By-law 2016-088 Loading Requirements

Minimum Supply	Min. Length	Min. Width	Min. Vertical Clearance
2 loading spaces	9.0 metres	3.5 metres	4.0 metres

Notwithstanding the above By-law requirements, the functional program defines the specific needs of the future hospital. Other considerations includes linen trailer storage (typically an additional soiled dock) and refueling (Medigas and diesel). This site must accommodate meals on wheels, contractor parking, and landscape and snow removal vehicles per the functional program.

The loading needs of the hospital exceed the Zoning requirements.

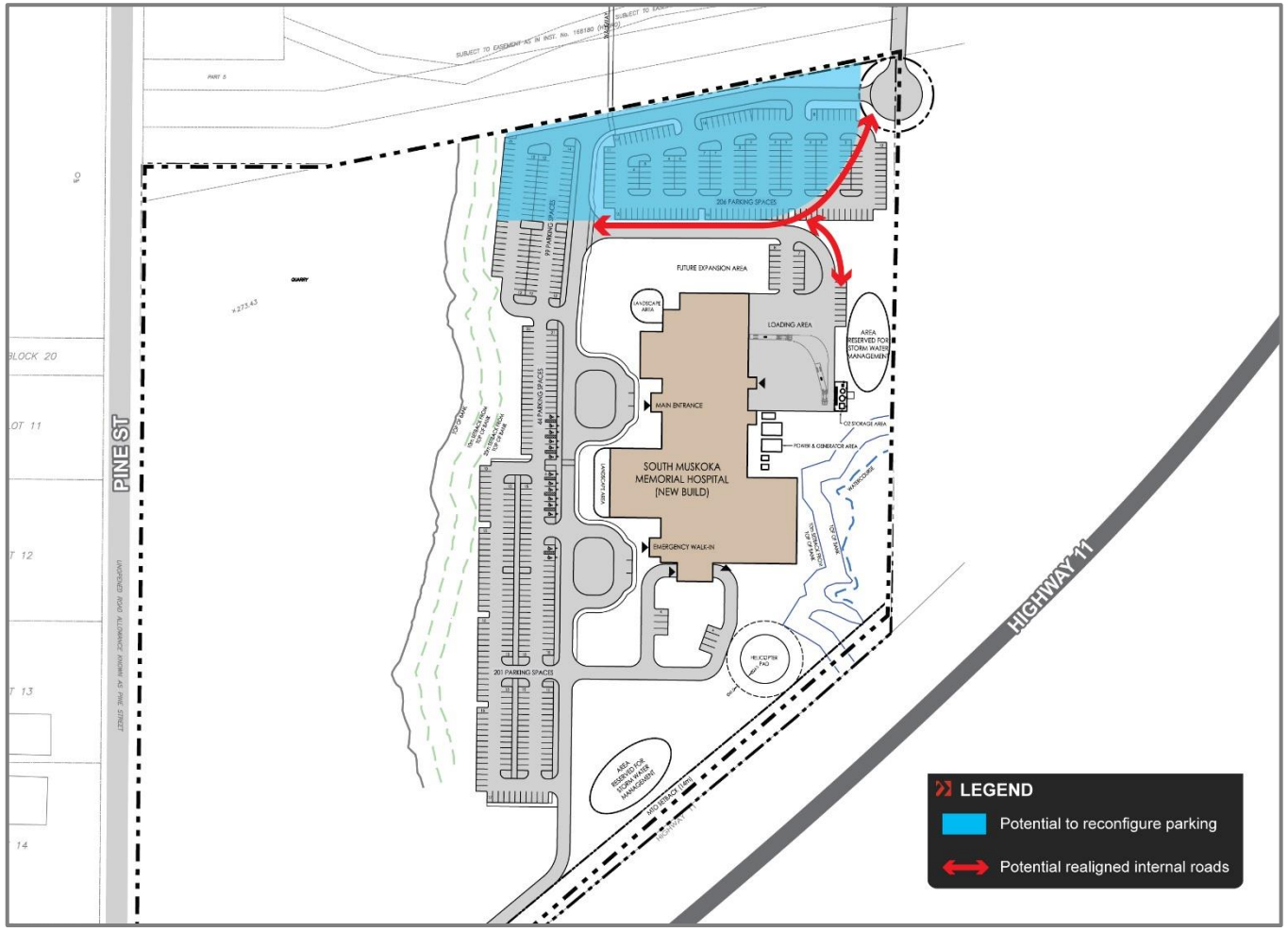


Figure 10: Site Plan Considerations

Site Plan Considerations

As the site plan undergoes further refinement, there's the potential to assess various options with regards to the internal site circulation. Particularly on the north side of the property, the location of the drive aisles can be explored to best accommodate the future needs of the hospital. Figure 10 depicts one potential solution, which brings the internal drive aisle closer to the loading area, thus creating a shorter distance for trucks to manoeuver through the site to access the loading area. This would also eliminate the northern east – west drive aisle allowing it to be repurposed into additional parking.

It is recommended to continue to explore various internal site circulation options as the site plan undergoes refinement.

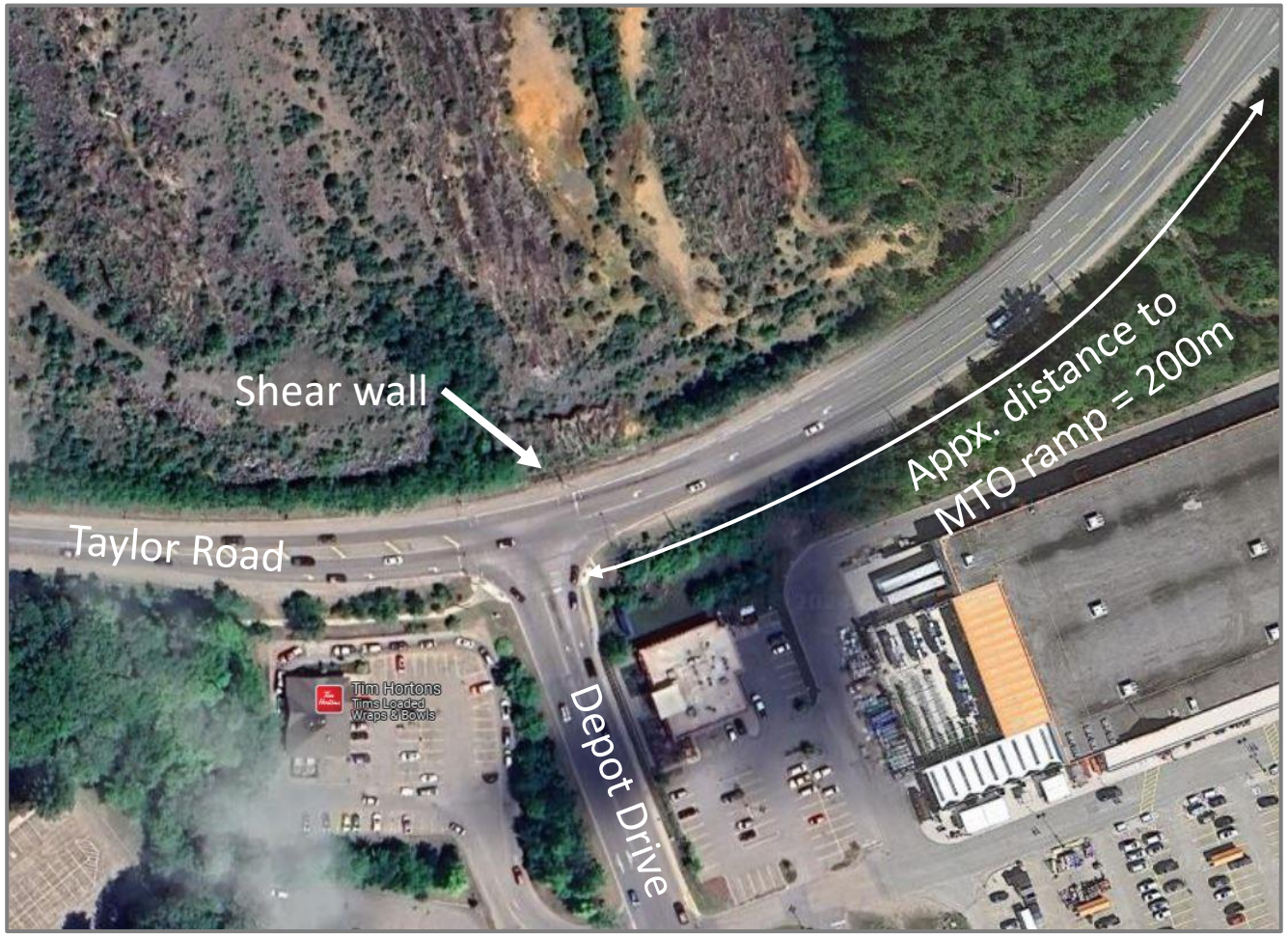


Figure 11: Off-Site Road Improvements

Potential Off-Site Road Improvements

To accommodate the projected increase in traffic due to the future hospital, off-site road improvements may be required, including, but not limited to:

- Upgrading Depot Drive to municipal standards
- Geometric upgrades at the Taylor Road / Depot Drive intersection. These may include dual westbound left turn lanes, extending the westbound left storage lane, or extending the eastbound right turn storage lane.

[redacted]

Off-site roadway improvements noted above are not based on any traffic analyses. It is recommended that a detailed traffic assessment be undertaken at the next stage of development.

Ministry of Transportation of Ontario (MTO) Approval

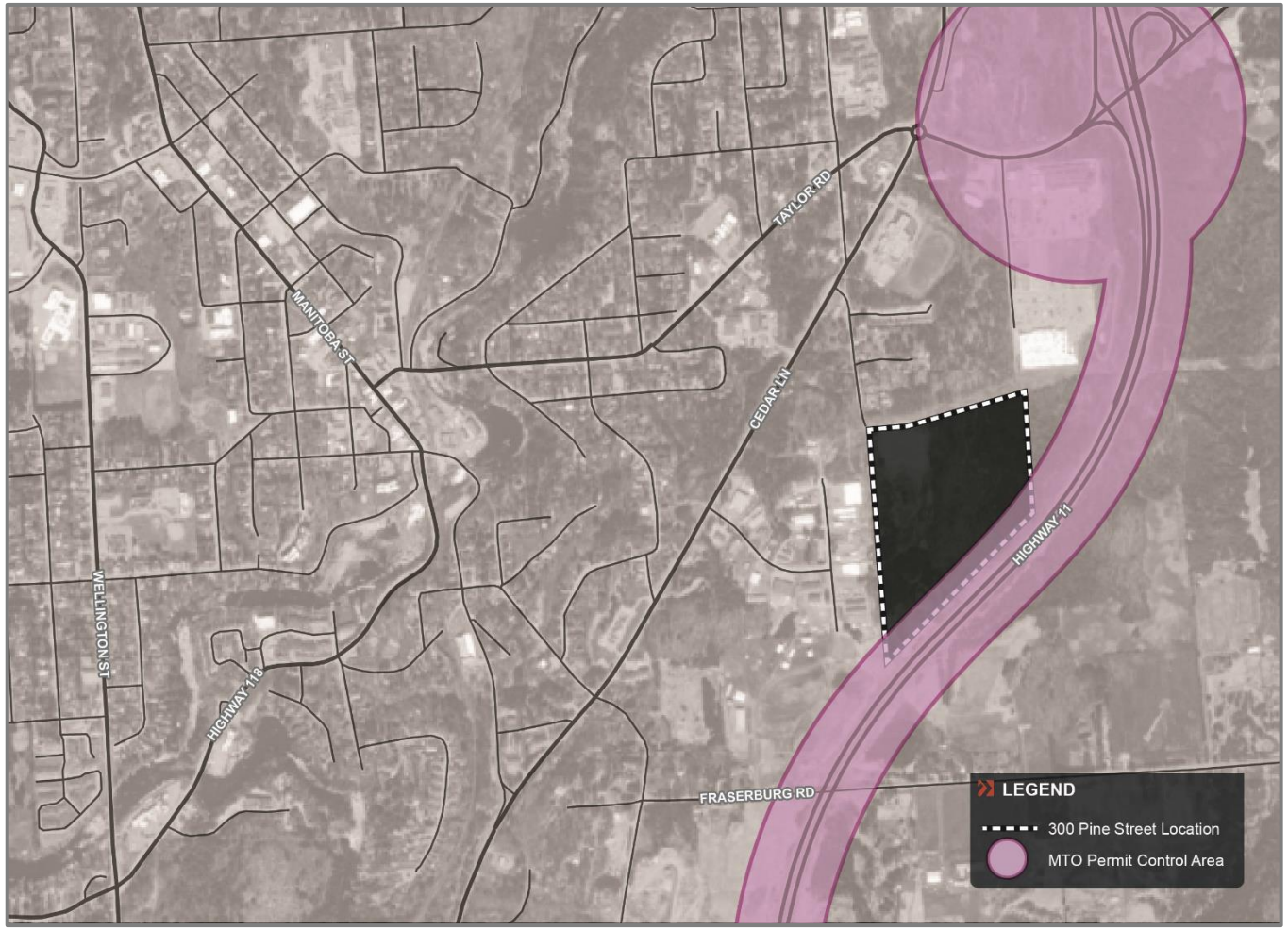


Figure 12: MTO Permit Control Area

In addition to the Town of Bracebridge and District of Muskoka, the Ministry of Transportation of Ontario (MTO) will be a permitting agency / approvals body that will have jurisdiction over the subject hospital expansion if the 300 Pine Street site is selected as the site is located within the MTO's permit control area.

For any site within MTO's permit control area, MTO's approval will be required on several different technical areas, including signage, lighting, traffic impact, and drainage.

[redacted]

Due Diligence Transportation Findings (1/2)

Table 5: Due Diligence Transportation Findings

Criteria	300 Pine Street
Address	No frontage on an existing or planned collector or higher order road system
Off-Site Road Improvements	Off-site road improvements may be required, including: • Upgrading Depot Drive to municipal standards • Geometric upgrades at the Taylor Road / Depot Drive intersection. These may include dual westbound left turn lanes, extending the westbound left storage lane, or extending the eastbound right turn storage lane. [redacted] It is recommended that a detailed traffic assessment be undertaken at the next stage of development.
Transit	Consideration should be given to extend the Bracebridge Transit and Corridor 11 routes through the hospital campus to provide transit service to staff and visitors.
Active Transportation	Not currently well served by active transportation facilities, nor are there plans that will significantly improve them in the future. However, as the site is centrally located within the town, visitors and staff would be more willing to take active modes of transportation, and thus, the Hospital should support facilities that accommodate pedestrians and cyclists. It is unclear whether accessible standards can be met for pedestrians on this site (the ability to regrade to an acceptable standard is unknown).
Site Access	This site does not have frontage on a collector or higher order road system that would be typical for this type of land use. As such, Depot Drive will need to be upgraded to municipal standards to accommodate the future hospital.
Hydro Corridor	The north access relies on a connection to a private road (Depot Drive) and potential modifications across the existing Hydro corridor. It is unclear whether this access can be relied upon or adequately achieved through re-grading and approvals (Hydro).
Site Plan Considerations	It is recommended to continue to explore various internal site circulation options as the site plan undergoes refinement.

Due Diligence Transportation Findings (2/2)

Table 5: Due Diligence Transportation Findings Con't

Criteria`	300 Pine Street
Parking	The proposed site plan includes 550 vehicle parking spaces is anticipated to accommodate the future parking demands of the site. Based on the land use, it is recommended to provide 4-5% of the total parking supply as accessible spaces. These spaces should be conveniently located in close proximity to the main entrance and emergency department. Parking control should be explored as the site plan continues to undergo refinement. There's a significant change in elevation across the site. It is unclear whether acceptable standards can be achieved for supplying surface parking facilities.
Pick-Up / Drop-Off	The functional requirements of the PUDO loops must consider parked vehicles while allowing sufficient space for other vehicles to maneuver around it. The needs for any additional design vehicle (i.e., fire route, specialized transit, ambulance) should be considered as part of subsequent concept plans. There's a significant change in elevation across the site. It is unclear whether acceptable standards can be achieved for supplying appropriate pick-up / drop-off facilities.
Loading	The functional program defines the specific loading needs of the future hospital. Other considerations includes linen trailer storage (typically an additional soiled dock) and refueling (Medigas and diesel). This site must accommodate meals on wheels, contractor parking, and landscape and snow removal vehicles per the functional program.
MTO Approvals	The site is located within an MTO permit control area and subject to a property setback. MTO is an approving authority for this site and will review and focus on the traffic impact of the development and its potential for impacting the Highway operations. This may extend to operational of physical improvements to local area intersections. Specifically, the Taylor Road / Depot Drive intersection may require physical improvements, including but not limited to, dual westbound left turn lanes and extension of the westbound left storage lanes. [redacted]

Conclusions

[redacted]

BA Group

MOVEMENT IN URBAN ENVIRONMENTS

Appendix 2-D

South Muskoka Memorial Hospital Redevelopment
Heliport Feasibility Study

Muskoka Algonquin Healthcare

CONFIDENTIAL

AviaNG.ca

Revision 0
September 16, 2024
23-0165-02

September 16, 2024

BY EMAIL ONLY

Stantec Architecture
100-401 Wellington St. W
Toronto, ON M5V 1E7

RE: South Muskoka Memorial Hospital Redevelopment
Heliport Feasibility Study and Preliminary Design Requirements
Muskoka Algonquin Healthcare
O/Ref: 23-0165-02

Dear Ms. Petricca,

Avia NG Inc. is pleased to submit the *South Muskoka Memorial Hospital Heliport Feasibility Study and Preliminary Design Requirements Report* in supplement to the Stage 1.3B Functional Program for the South Muskoka Memorial Hospital Redevelopment Master Plan.

Should you have any questions in the meantime, please do not hesitate to contact the undersigned.

Sincerely,
AVIA NG INC.

Joshua Horst, MAvnMgt, AvMP
Senior Aviation Planner, Practice Lead

cc: Janine Maurice, Avia NG

REVISION & PUBLICATION REGISTER			
Revision No.	**Date**	**Recorded By**	**Remarks**
0	September 16, 2024	J. Horst	Report for Stakeholder Review.

PREPARED FOR
Client Name:
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APPENDIX A Study Exhibits

INTRODUCTION

Muskoka Algonquin Healthcare (MAHC) has taken steps toward securing a property for the redevelopment of the South Muskoka Memorial Hospital with a new acute care hospital building in replace of the existing Bracebridge site. Avia NG Inc. was retained by Stantec Architecture as part of Stage 1.3 Functional Programming for the South Muskoka Memorial Hospital Redevelopment Master Plan [the Project] to provide an assessment of the proposed greenfield site and determine the feasibility of accommodating a new heliport on the property alongside the new acute care building while meeting the requirements of medevac helicopter operations.

This report has been structured with two (2) parts. Part A provides details from the evaluation of the site and the assessment of heliport feasibility, and is meant to be reviewed in context with the overall campus site plan, as cited within the Stage 1.3B Functional Program report prepared by Stantec Architecture. Part B provides additional details pertaining to the preliminary design requirements of the future heliport.

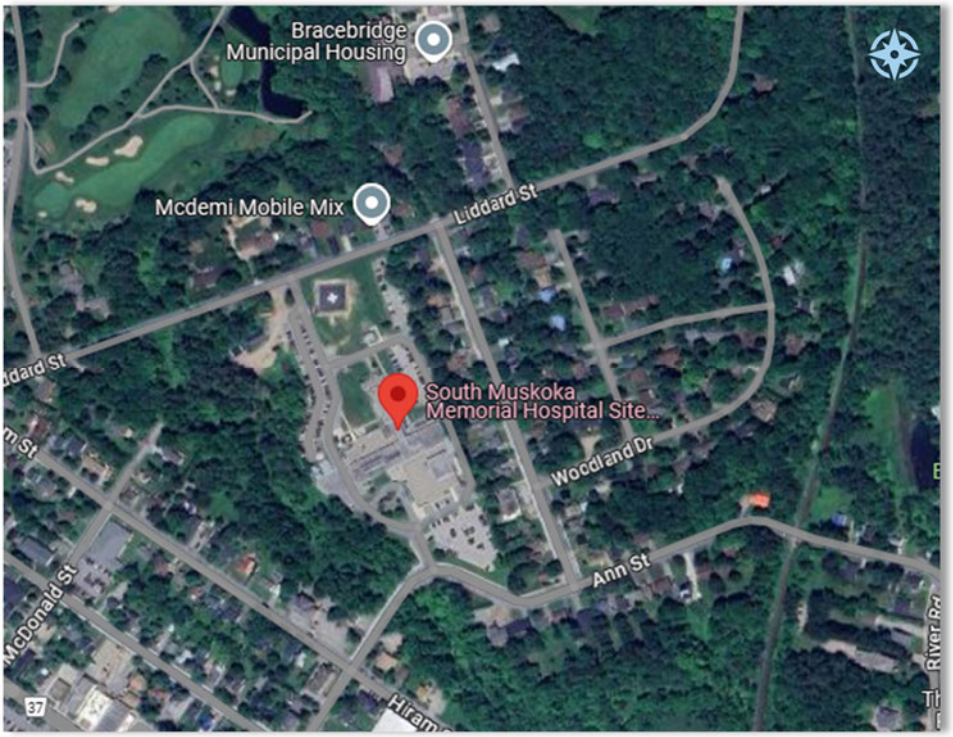

Figure 0-1 Current Hospital Site

BACKGROUND

MAHC is planning for a new hospital on a site located within the Town of Bracebridge, Ontario. Bracebridge is presently served by the existing hospital at 75 Ann Street with its accompanying surface-level helipad. The existing hospital with its heliport is shown in **Figure 0-1**.

The proposed new site will also have a heliport as part of the infrastructure of the hospital to facilitate emergency access and patient transfer for residents of the surrounding area.

HELIPORT OPERATIONAL NEEDS AND FUNCTIONAL REQUIREMENTS

The primary function of a hospital heliport is to cater to patient transfers either from the Hospital or a land ambulance to an air ambulance that would then take the patient to a regional trauma centre with specialized care services. The secondary function will be for transfers to the Hospital or land ambulance from an air ambulance. This transfer in and out function is the defining characteristics of a hospital heliport; however, a third function is to facilitate urgent dispatch of specialized medical personnel as can be required from time to time such as with the need for stabilization of medical trauma case or the assessment of a patient before a decision to transfer is made. The heliport may also serve other functions, such as use by police, dignitaries or military personnel.

In order for the heliport to serve its function and comply with the Canadian Aviation Regulations (CARs), it will require one Final Approach and Take-off Area (FATO) with a collocated Touchdown and Lift-off Area (TLOF) from which a helicopter can arrive to and depart from. It is the TLOF and FATO that are readily identifiable as the Heliport, providing the landing area for helicopters. No additional heliport parking positions are assumed to be required.

The heliport will need to be accessible by vehicles for maintenance as well as for transfer of patients between land ambulance and air ambulance. Similarly, the heliport should be accessible from the roads used by vehicles, and include a walkway to facilitate inspection by staff and patient transfer to/from Hospital and land ambulances that may not have the need or ability to drive to the edge of the helipad.

The facility will be used both during the day and at night, and during all seasons. Inclement weather conditions will prevent use of the heliport, but efforts should be made through careful site planning and facility design to minimize down time of the facility and recovery time from snow events.

STUDY OBJECTIVES

The objective for the study was to conduct an assessment of heliport feasibility and site selection to determine if the site chosen for the new hospital and the lands available [subject lands] would allow for a new surface-level heliport to be established alongside the new acute care hospital building in a location that would allow for suitable use. Additionally, the study has aimed to identify concisely the base design requirements as would need to be considered further in development of design documentation if the project were to move forward.

PART A – FEASIBILITY STUDY AND SITE SELECTION

1. FUTURE SITE CONDITIONS

1.1 GENERAL SITE

After assessing various sites, a greenfield site located at 300 Pine Street [the Site] was chosen for the future hospital and heliport. The Site, depicted in **Figure 1-1** and Appendix A Exhibit 1-1, is an irregularly shaped lot of approximately 18 ha. in size and is located between Highway 11 and Cedar Lane just east of Gray Road. The Site is found approximately 2.3 kilometres east-southeast of the existing South Muskoka Memorial Hospital.

Figure 1-1 Proposed Site Location - 300 Pine Street

The Site is mostly covered in woodland, along with the geological depression or ravine in the northwestern quadrant. Additional information regarding site characteristics is found later in this section.

1.2 SURROUNDING LANDS AND OBSTRUCTION ENVIRONMENT

Figure 1-2 shows the surrounding land uses of the chosen site for the future hospital and heliport. The irregular-shaped lot has the Highway 11 Utility and Transportation Corridor running from the northeast to the southwest along the length of its base. To the north is a high voltage hydro transmission line corridor, with a residential area, athletic facilities, woodland, and a retail park. Along the site's western border is a light industrial area.

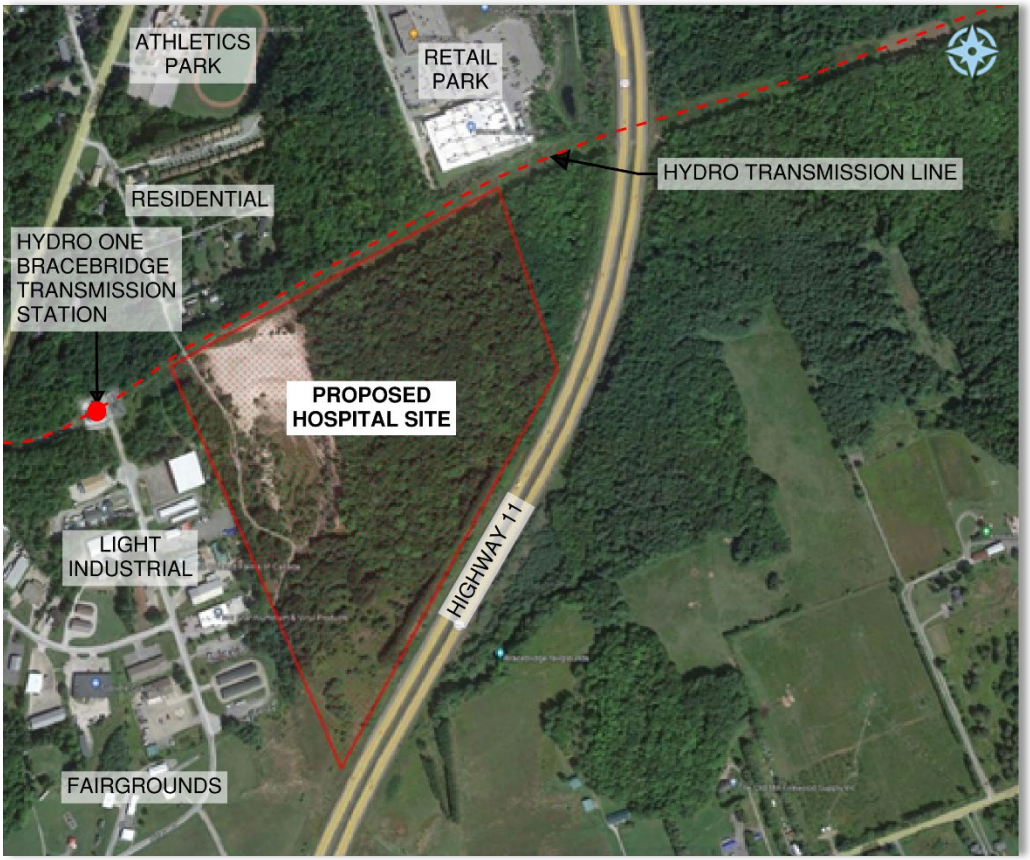

Figure 1-2 Surrounding Area of Chosen Location

1.3 REGIONAL CONTEXT

South Muskoka Memorial Hospital in Bracebridge is one of two hospitals that are part of MAHC, the other being Huntsville District Memorial Hospital in Huntsville, about 45 km north of South Muskoka Memorial Hospital. MAHC provides acute care services to the District Municipality of Muskoka, including Huntsville, Bracebridge, Gravenhurst, and several other smaller communities within the District. MAHC is part of the North Simcoe Muskoka Local Health Integrated Network, providing healthcare services to Huntsville, Bracebridge and Gravenhurst; the townships of Lake of Bays, Muskoka Lakes, Georgian Bay; East Parry Sound; Beaver Creek Federal Penitentiary; Moose Deer Point and the Wahta First Nation.

1.4 PLANNING CONTEXT

According to the Town of Bracebridge Zoning By-law, the western half of the Site is zoned for Business Park Industrial, while the eastern half is zoned for Special Purpose Commercial. The eastern half of the Site is subject to a Special Exception Area related to Zoning By-law parking requirements. Adjacent zoning designations include more Business Park Industrial to the west, Rural to the south and east, Special Purpose Commercial to the north and northeast, and Open Space and Residential to the north and northwest. **Figure 1-3** provides an excerpt of the zoning by-law and corresponding zones for the site and surrounding lands.

Figure 1-3 Future Hospital and Heliport Site Zoning

According to other planning documents available from the Town of Bracebridge, the Site does not have any other significant designations and lies outside of the Town's floodplains.

2. PROPOSED SITE PLAN AND HELIPORT LOCATION

2.1 PROPOSED HELIPORT LOCATION

The initial suggested location of the heliport was to be nearer the centre of the Site, west of the hospital building and overlooking the ravine. While this location would potentially require a retaining wall due to the proximity to the ravine edge, the location was chosen with consideration to the open unobstructed area of the ravine, ideal for helicopter overflight. The original location is shown in **Figure 2-1** below.

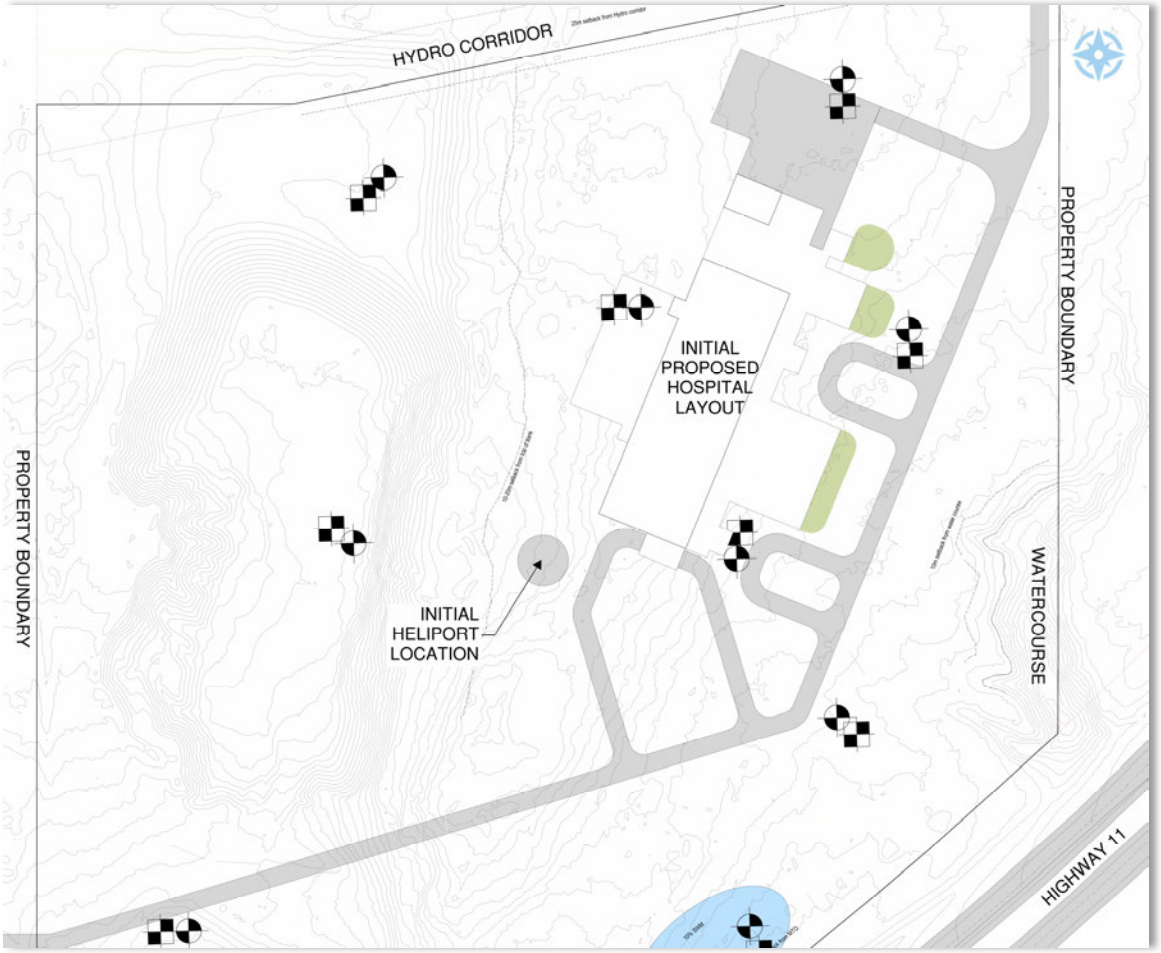

Figure 2-1 Initial Hospital and Heliport Location

However, in later stages of this project, the footprint required for the Hospital building was changed with consideration to vehicle parking and access. Due to the revised layout and a desire to locate the heliport closer to the Emergency Room (ER) entrance, a revised location for the heliport was proposed.

The second iteration of heliport siting resulted in the proposed location shown in **Figure 2-2** and Appendix A Exhibit 2-2. This location would see the heliport sited to the east /southeast of the site.

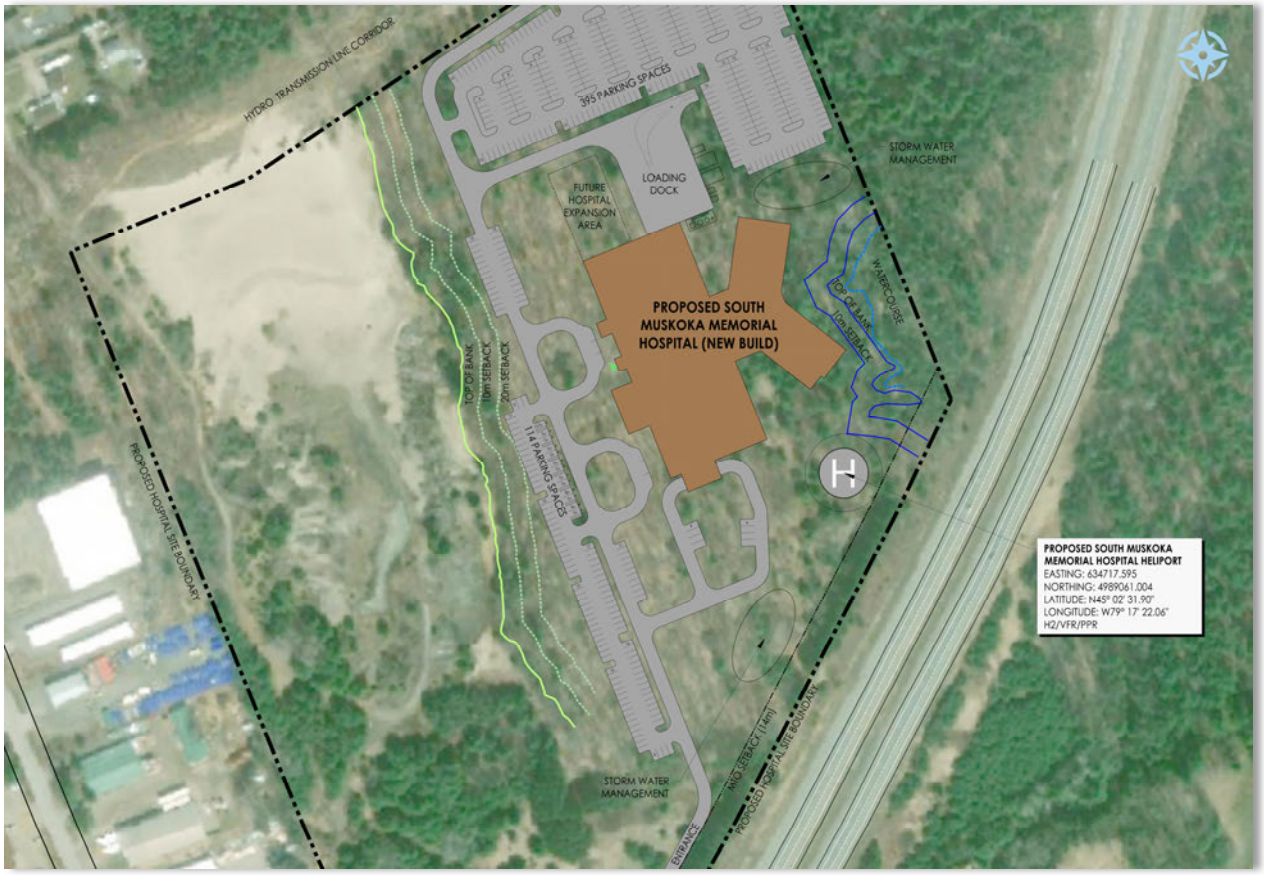

Figure 2-2 Proposed Hospital and Heliport Location

2.2 OPPORTUNITIES AND CONSTRAINTS

The proposed Site location offers an opportunity to provide a heliport that remains located within the community and on hospital property. The Site itself offers a large plot of undeveloped land, with a portion of the lands slightly elevated above lands towards the west, reducing the natural constraints that would otherwise be imposed on establishing usable flight paths. The location, being near the Town's limits, provides multiple areas that could be considered for emergency landing areas, enabling an H2 heliport classification to be pursued. The proximity to Highway 11 provides the added benefit of near direct highway access, reducing time for ground ambulance transfers.

However, the Site is not without several constraints that will have bearing on the design of the heliport and availability of flight paths.

Development on the Site is constrained by the location of the ravine, resulting in relatively few configurations for the proposed acute care building to be situated. This combined with the location of the high voltage power transmission lines running east-west along the northside of the Site, limits significantly the location that a surface-level heliport could be established on the property with any degree of usability. No matter the location of the heliport, extensive tree clearing will be required with use of this Site.

The heliport will need to be located near the southeast end of the Site to allow for flight paths to be establish. The proximity to the highway and proposed hospital parking lots will have further bearing on flight path alignment and use.

2.2.1 PROXIMITY TO ROADWAYS, ENTRANCES AND PARKING LOTS

The proposed location will be linked to the roadway network through access to Gray Road and also potentially to the north connecting with Depot Drive. The heliport is anticipated to be accessed from the Emergency Room Access Road. The proximity of the heliport to the Emergency Room entrance and parking lots will require mitigation of rotor downwash hazards with security personnel and placement of signage in the vicinity of the heliport to inform the public of the dangers of helicopter operations.

2.2.2 PROXIMITY TO ON-SITE AND OFF-SITE OBSTACLES

The main hospital building will be located to the north and northwest of the heliport, and potentially as close as 25-30 metres from the Final Approach and Take-off Area (FATO) edge. The location of the building will be considered the primary obstacle to air navigation and require obstacle marking and lighting.

Other obstacles of interest in the vicinity include the hydro transmission line corridor to the north, the Highway 11 corridor and trees on- and off-site. Additionally, the high mast flood light standards in neighboring retail parking areas may constitute an obstacle for certain flight paths and will need to be further evaluated as part of heliport design development.

Refer to **Figure 2-3** for a photo inventory of these obstacles.

Hydro Transmission Line Corridor (North)

Highway 11

Flood Light Standards in Retail Parking Lot

Figure 2-3 Obstacles of Interest

2.2.3 OBSTACLE REMOVAL

Examining further the obstacle environment surrounding the site, the area towards the south, southeast and east may be conducive to establishing of heliport flight paths, provided sufficient tree clearing is completed on-site and along Highway 11. Similarly, a flight path curving towards the north from a southerly located heliport may be feasible provided sufficient tree clearing is completed and hydro transmission lines are marked and lighted. With the exception of trees located along the Highway 11 corridor, no off-site obstacle removal is anticipated to be required in order to establish two of more usable flight paths. However, additional obstacle marking and lighting of the high voltage hydro transmission lines and high mast flood lighting should be anticipated.

Due to the significant grade change and distance from the east side of the Site to the west, no off-site tree removal is anticipated so long as the finished grade of the heliport remains suitably elevated relative to the existing grade of the west side lands.

2.3 WIND COVERAGE AND HELIPORT USABILITY

Aircraft, including helicopters, are best suited for take-off and landing into the wind, and therefore an important consideration in determining the alignment of flight paths are the prevailing winds. Selecting flight paths with headings that align well with the prevailing winds help to maximize the usability of a heliport and reduce the likelihood that a pilot encounters crosswinds that exceed what is acceptable for the flight. Furthermore, by providing two or more flight paths with an alignment that provides reciprocals to each other, heliport usability can be further improved, helping to ensure that the pilot is able to both land and depart under a greater variety of wind conditions.

An evaluation of the historical wind data and its distribution for the local area has been completed as part of this assessment. It was observed that no suitable weather stations are located within the Town of Bracebridge. **Figure 2-4** illustrates prevailing wind distribution from the last ten years using historical wind data from Muskoka Airport (CYQA), located approximately 7 kilometres from the site by NAV CANADA. This weather station is considered to be the most accurate for weather data in the area.

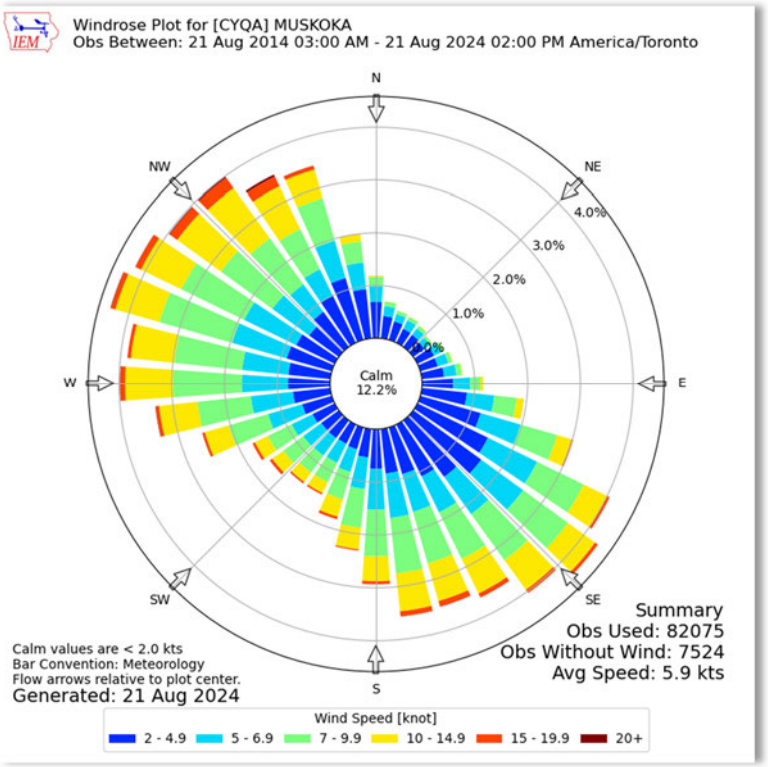

Figure 2-4 - 10-year Wind Rose for Muskoka Airport 2014-2024

The diagram shows that winds originate predominantly from the northwest and southeast. As take-offs and landings are best performed into the wind, the preferred departure and arrival paths would therefore be aligned generally in a west, northwest and east, southeast direction. However, given that the hospital

building is proposed north and northwest of the heliport, west and east or southeast flight paths will be needed to provide suitable heliport usability.

2.4 AERONAUTICAL IMPACT ASSESSMENT

The site for the new South Muskoka Memorial Hospital is, in aviation terms, found to be in relatively close proximity to a number of other aerodromes, including several water aerodromes and land aerodromes. **Figure 2-5** identifies location of these aerodromes within approximately 10 kilometers of the Town of Bracebridge**.** The most significant from an aeronautical impact perspective, is the Muskoka Airport, located 6.5 kilometers south southwest of the proposed site. At this distance, specific aeronautical constraints need to be reviewed to determine if applicable to the development of the site and operation of heliport.

2.4.1 MUSKOKA AIRPORT ZONING REGULATIONS

Airport Zoning Regulations (AZRs) can be found in place for the Muskoka Airport. These federally enacted regulations place restrictions on land use and new development around specific airports for the purpose of preserving safe use of airspace by arriving and departing aircraft. Some AZRs can extend restrictions to distances in excess of 15 kilometres from the Airport and will limit the height of future developments. In the case of Muskoka Airport, the AZRs extend to a distance of approximately 4 kilometres and stop short of the proposed site.

While the Site may not be subject to the AZRs, consideration should still be given to ensuring that the proposed development does not conflict with the Airport. A NAV CANADA Land Use Submission should be made as part of initial design development to determine if the proposed elevation of the building may impact existing Instrument Approach Procedures (IFPs) used by aircraft arriving to Runway 18 at Muskoka Airport. In addition, early application should be made to Transport Canada as part of the identification of obstacles for aeronautical assessment.

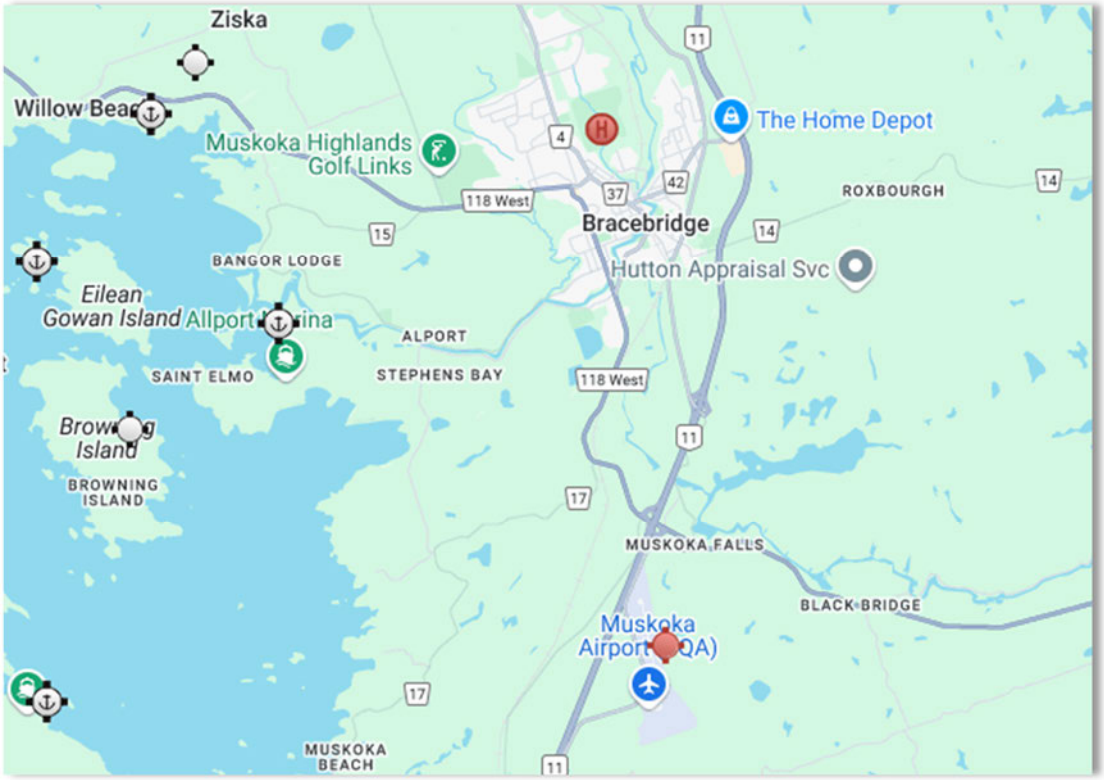

Figure 2-5 Map Showing Proximity of the Site to Nearby Aerodromes

2.4.2 LOCAL AIRSPACE

Due to the site being within five (5) nautical miles (9.26 km) of the Muskoka Airport, it is located within Muskoka's Mandatory Frequency Class 'E' airspace, as seen in **Figure 2-6**. Air traffic, including medevac flights, operating within this airspace are subject to measures administered by NAV CANADA and CARs 602.98. These measures, specific to Class 'E' airspace with a mandatory frequency assigned, applies to air traffic below 3900 feet Above Sea Level (ASL). Consequently, all helicopter movements associated with the future heliport will need to comply with the requirements of operating within Class 'E' airspace both to and from the heliport. Pilots utilizing the heliport would be required to communicate with other Air Traffic and NAV CANADA (Timmins Radio) to advise before utilizing the airspace.

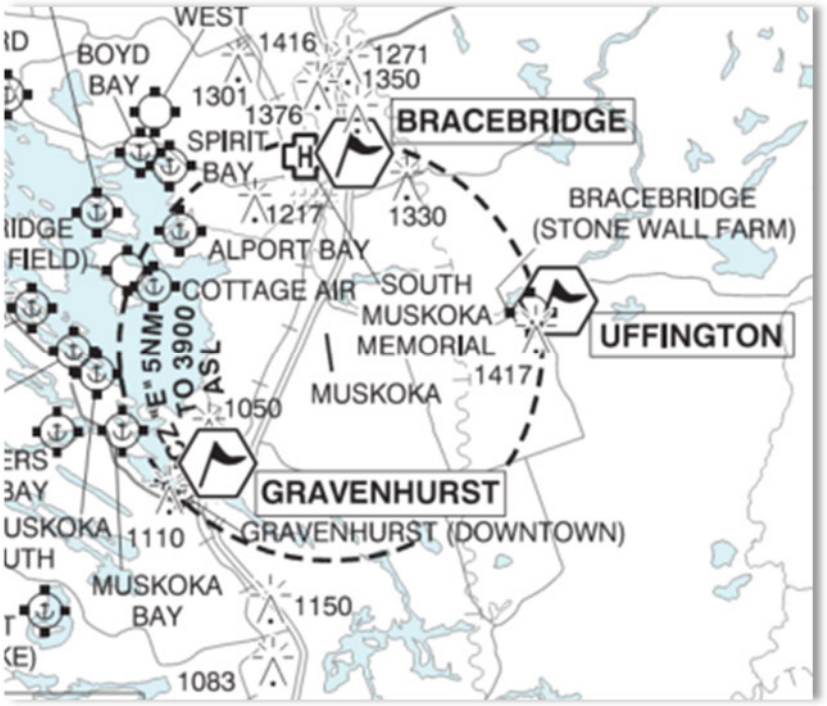

Figure 2-6 Map Showing Extent of Class E Airspace (Source: NAV CANADA)

PART B – Preliminary Design Requirements

3. INTRODUCTION AND BACKGROUND

The preparation of a preliminary design for the heliport is not included as part of this current assignment. However, included here-in are details and design considerations applicable to the preparation of a preliminary design for the future heliport. In some cases, what is typical or recommended has been included for reference but should not be misinterpreted as design direction.

3.1 COMPLIANCE WITH CANADIAN AVIATION REGULATIONS

The identification of these heliport preliminary design requirement has been prepared with due considerations to the applicable Canadian Aviation Regulations (CARs) as prescribed under *Section 305, CARs Standard 325 – Heliports,* and *CARs Standard 621 – Obstruction Marking and Lighting.* The preliminary design should also reference where applicable the standards of the National Fire Protection Association (NFPA) and Canadian Standards Associated (CSA).

4. HELIPORT PHYSICAL CHARACTERISTICS

4.1 GENERAL

The future South Muskoka Memorial Hospital (Bracebridge) heliport is intended to be a surface-level heliport meeting Transport Canada certification requirements, with physical characteristics in accordance with the Canadian Aviation Regulations (CARs) Part III Standard 325 – *Heliports* for use by air ambulance service providers.

4.2 AIRCRAFT USE AND DESIGN AIRCRAFT MIX

The future heliport will be a surface-level heliport designed with the physical dimensions to accommodate a broad mix of helicopters typically used in medevac air ambulance operations. The primary helicopter in Ontario engaged in medevac air ambulance service is the Augusta Westland AW139 as operated by Ornge. In addition to the AW139; other helicopters that may be routinely used in medevac service within Canada can be represented by the inclusion of the Sikorsky S-76 and Bell 412EPI as other design aircraft. **Tables 4-1, 4-2, 4-3** provide a summary of the most relevant technical data for these helicopters which could be referenced in the preparation of a heliport design compatible with their use.

There are additional helicopters, such as the Airbus H145 as utilized by the Ontario Provincial Police or Bell 429 as used by the Canadian Coast Guard, that can also be considered with the heliport's design, but in general these aircraft are of a smaller variety that would be accommodated by a facility designed for use by the primary three helicopters listed earlier in this section: the AW139, Sikorsky S-76 and Bell 412EPI.

Table 4-1 Agusta Westland AW139 Physical Characteristics

Agusta Westland AW139		
Characteristics	**Dimensions**	**Image**
Maximum Take-Off Weight (MTOW)	6,800 kg	
Fuselage Length	13.49 m	
Overall Length	16.66 m	
Overall Height	4.98 m	
Main Rotor Diameter	13.8 m	
Wheel Base / Skid Length	N/A	
Wheel Track / Skid Width	N/A	
Engine(s)	2x PT6C-67C Turboshafts with FADEC	
Fuel Capacity	1,588 L main + 588 L auxiliary	
Source(s): Leonardo Aircraft Company, EASA and Transoft Solutions.		

Table 4-2 Sikorsky S-76 Physical Characteristics

Sikorsky S76C		
Characteristics	**Dimensions**	**Image**
Maximum Take-Off Weight (MTOW), including IGW Kit	5,307 kg	
Fuselage Length	13.21 m	
Overall Length	16.00 m	
Overall Height	3.58 m	
Main Rotor Diameter	13.41 m	
Wheel Base / Skid Length	5.00 m	
Wheel Track / Skid Width	2.58 m	
Engine(s)	2x Turbomeca Arriel 2S1	
Fuel Capacity	1,030 L	
Source(s): Sikorsky Aircraft.		

Table 4-3 Bell 412 EPI Physical Characteristics

Bell 412EPI		
Characteristics	**Dimensions**	**Image**
Maximum Take-Off Weight (MTOW)	5,398 kg	
MTOW with IGW Kit	5,534 kg	
Fuselage Length	12.91 m	
Overall Length	17.31 m	
Overall Height	4.54 m	
Main Rotor Diameter	14.02 m	
Wheel Base / Skid Length	3.27 m	
Wheel Track / Skid Width	2.89 m	
Engine(s)	PT6T-3D or PT6T-3DF Twin Pack	
Fuel Capacity	1,251 L	
Source(s): Bell Aircraft Corporation.		

4.3 TLOF, FATO AND SAFETY AREA REQUIREMENTS

According to CARs Standard 325, the geometric design of a heliport is directly related to the physical characteristics of the design helicopter and shall also consider the requirements as outlined in the Helicopter's approved Rotor Flight Manual (RFM).

Table 4-4 summarizes the requirement for the proposed hospital's surface-level heliport based on use by the proposed design aircraft, the Bell 412 EPI, in accordance with CARs Standard 325.

Table 4-4 Proposed Heliport Physical Characteristics

Surface	Minimum Dimensions	Minimum Criteria
Touchdown and Lift-Off Area (TLOF)	21.03 m dia. concrete/asphalt pad (Equal to width of FATO recommended)	Greater of 1.0x Overall Length or CAT A requirements
Final Approach and Take-Off Area (FATO)	26.25 m dia. concrete/asphalt pad	1.5x Overall Length
Safety Area (SA)	35.00 m dia. asphalt or treated surface	Extending FATO by 0.166 x Overall Length or 3.0 m, whichever is greater
Extent of Load Bearing Surface	21.03 m dia. (Equal to width of FATO recommended)	Based on minimum dimensions of TLOF
Extent of Graded Area	26.25m dia. (Equal to width of SA recommended)	Based on minimum dimensions of FATO
Safety Area Transitional Boundary	3.0 m from SA	Minimum 3.0 m
Note: All dimensions based on a circular landing surface.		

4.3.1 MATERIALS OF CONSTRUCTION

A load-bearing concrete surface measuring 21.03 metres in diameter would be proposed in the centre of the heliport. The concrete centre would be constructed of Portland cement concrete with design as required by local subsurface conditions as determined by a geotechnical report based on the static loading requirement of the design helicopter. The concrete surface should also be prepared to ensure proper paint adherence.

Beyond the limits of the concrete pad, a heavy-duty asphalt pavement should be constructed to support the dynamic load of the design helicopter; this surface would be 26.25 metres in diameter. The FATO should be constructed of hot mix asphaltic cement surface with design as required by local subsurface conditions as determined by geotechnical report based on the loading requirements of a standard ambulance, municipal firefighting or maintenance vehicle.

The heliport safety area would have a proposed overall diameter of 35 metres to accommodate the design helicopter. The safety area ideally should be constructed of topsoil and seeding or other cover that would prevent loose objects or debris that could be uplifted and cause damage as FOD (foreign object debris) during helicopter operations.

4.3.2 GRADE AND ELEVATION

Given that it is generally considered desirable to locate a surface-level hospital heliport as close to the emergency entrance of the hospital as possible without sacrificing safety and heliport usability, it is often found to be advantageous to raise slightly the elevation of the helipad (FATO) in relation to the surrounding grade and nearby lanes or roadways and parking lots. By increasing the height of the helipad above nearby obstacles, the heliport can often be located closer to the Hospital emergency entrance than would otherwise have been possible given the typical obstacle environment.

It is anticipated for the new heliport, that the FATO and associated Safety Area will need to be raised slightly above surrounding grade to facilitate obstacle clearance, snow removal and maintenance activities. An elevation of approximately 1.5 to 2m above the Emergency Room exit lane may be appropriate subject to further evaluation of proposed grade changes. Restrictions on vehicular and pedestrian movements adjacent to the heliport may also be required to ensure that appropriate obstacle clearances are maintained and consideration to rotor downwash hazards mitigated.

5. HELIPORT CLASSIFICATION AND FLIGHT PATHS

5.1 HELIPORT CLASSIFICATION

The size and shape and slope of heliport flight paths and associated obstacle limitation surfaces are determined by the heliport classification. Since the proposed surface level heliport will not have instrument approaches and will be used during the day and at night, the heliport will have a day/night non-instrument classification. Transport Canada further subdivides non-instrument heliports into three (3) categories: H1, H2, and H3. These categories are defined by Transport Canada as follows:

1. *A non-instrument heliport is classified as H1 if the heliport is located with an obstacle environment where:*
    a. *There is no emergency landing area within 625 metres from the FATO; and*
    b. *The helicopters using the heliport can be operated at a weight, and in such a manner that, in case of an engine failure at any time during the approach or take-off, the helicopter can either*
        i. *Land and safely stop on the FATO or TLOF area, or*
        ii. *Safely continue the flight to an appropriate landing area.*
2. *A non-instrument heliport is classified as H2 if the heliport is located within an obstacle environment where:*
    a. *The height of the obstacles are infringing the first section slope of the approach and take-off surface set out in Table 4-1(CARs 325); and*
    b. *There are reachable emergency landing or rejected take-off areas within 625 metres of the FATO in relation to the altitude of the helicopter and its performance with one engine inoperative.*
3. *A non-instrument heliport is classified as H3 if the heliport is located within an obstacle environment where:*
    a. *The height of the obstacles do not penetrate any of the obstacle limitation surfaces (OLS) requirement set out in Table 4-1 (CARs 325);*
    b. *There are reachable emergency landing areas or rejected take-off areas within 625 metres of the FATO in relation to the altitude of the helicopter and its performance during autorotation.*

The new heliport will need to be planned and established to support an initial classification of H2 whilst respecting the more stringent obstacle clearance requirements of an H1 classification, at least on certain select flight paths. Preserving the ability to classify the heliport as H2 will allow aircraft operators the ability to accommodate a greater range of operating conditions with fewer restrictions to aircraft weight. Establishing flight paths that can also remain usable under an H1 classification will help to ensure that the heliport remains viable in the future should there be a loss in suitable emergency landing areas or the encroachment of built-up areas around the Hospital.

5.1.1 EMERGENCY LANDING AREAS

In accordance with CARs 325, where a heliport is classified as H2, it is required to establish at least one (1) Emergency Landing Area (ELA) for each flight path area. According to the Advisory Circular 305-001, Transport Canada defines an ELA as "an area where an unavoidable landing or ditching may take place with a reasonable expectancy of no injuries to persons or damage to property on the surface".

Although Transport Canada does not define the required size of an emergency landing area, it is generally accepted as an area approximately the size of the safety area. In order to be found suitable, ELAs must be located within 625 metres from the FATO located on or within the defined flight path areas, and reachable by the helicopters based on their performance characteristics. Notably, ELAs are not required to ensure protection against damage to the helicopter or injury of the occupants, but only of those on the ground. Therefore, lands with uncontrolled access used by the public, such as parking lots, are not suitable.

Identification of suitable areas will need to take place as part of the design process.

5.2 FLIGHT PATHS

During the review of heliport feasibility, several flight paths were assessed for the proposed heliport location taking into account the obstacle environment. The potential flight paths are illustrated in **Figure 5-1** and Appendix A Exhibit 5-1 and 5-3**.**

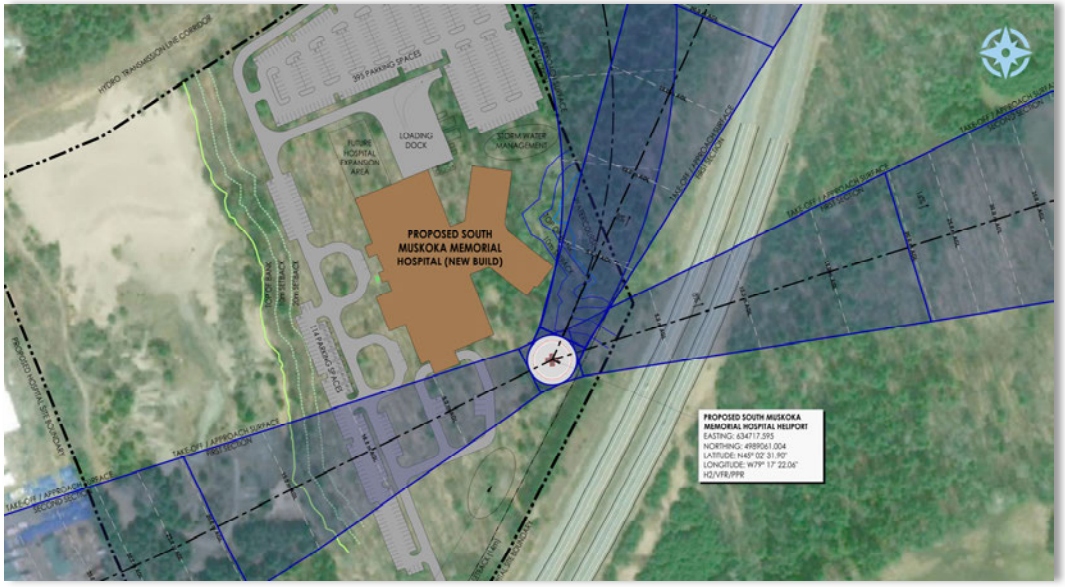

Figure 5-1 Potential Flight Paths

5.3 OBSTACLE LIMITATION SURFACES

The Obstacle Limitation Surfaces (OLS) are a series of trapezoidal inclined planes associated with defined flight path areas that protect established flight paths from obstacles that would be otherwise introduced an unacceptable hazard to aviation safety. These surfaces extend outwards and upwards rising from the heliport along the direction of the declared flight path centreline and are required to be maintained free of obstacles. The characteristics of these surfaces are based on applicable standards and vary depending on the heliport classification.

The OLS characteristics of the flight paths were established based on heliport classification of H2, day/night use, non-instrument and in accordance with the Canadian Aviation Regulations (CARs) Standard 325. The proposed OLS characteristics are listed in **Table 5-1.**

Table 5-1 Proposed (H2) Obstacle Limitation Surfaces Characteristics

Surface and Dimensions	Criteria
Approach / Take-Off Surface	
Inner Edge Length	35.0 m
Divergence	15% (Day/Night)
Length – First Section	245 m
Length – Second Section	830 m
Total Length	1,075 m
Slope – First Section	Between 8% and 12%, and not to exceed 16%
Slope – Second Section	16%
Transitional Surface*	
Height	45 m
Slope	50% [1:2]
*Needed if less than 135 degrees between flight paths.	

5.3.1 OBSTACLE MARKING AND LIGHTING AREA

All heliports certified in accordance with CARs 305 and Standard 325, and intended for use at night, are required to mark and/or light obstacles that intrude upon the Obstacle Marking and Lighting Area (OMLA). The OMLA, illustrated in **Figure 5-2**, is a combination of an inclined conical surface and trapezoidal plane that rise outwards from the periphery of the FATO. The characteristics of this area are linked to the size of the FATO but in general rise outwards at a 1:25 slope to a distance of 150 metres and then continue in the direction of approach/departure to a distance of 1,000 metres at a slope of 1:9.5 and extending 30 metres each side of the flight path area. If obstacles protrude the OMLA, the obstacles must be equipped with obstruction marking and / or lighting in accordance with CARs Standard 621 unless otherwise shielded by another obstacle suitably marked and lit.

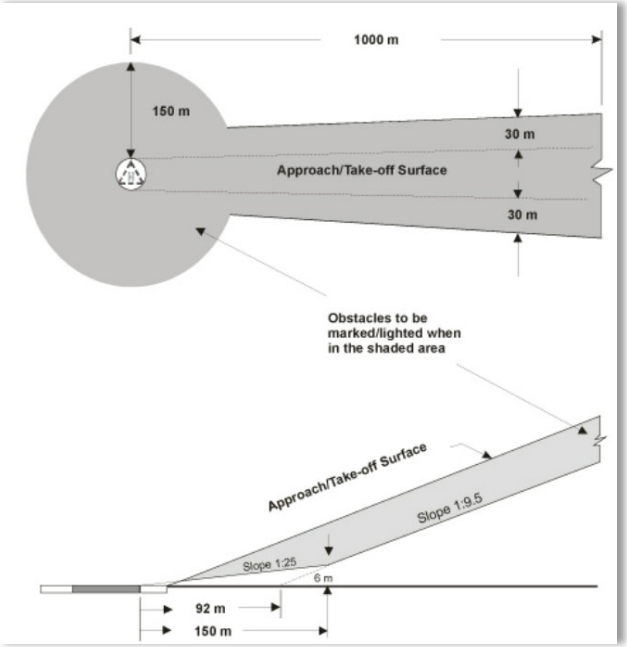

Figure 5-2 Obstacle Marking / Lighting Area (Source: Transport Canada)

A detailed Obstacle Marking and Lighting Assessment will need to be carried out as part of any future design development.

6. VISUAL AIDS

6.1 GENERAL

The heliport will include all heliport visual aids, including wind direction indicators, lighting and paint markings per CARs Standard 325.

6.2 WIND DIRECTION INDICATOR

Transport Canada requires all heliports to be equipped with a wind direction indicator (WDI). If the heliport is to be used at night, as in the case at the proposed future heliport, the wind cone shall be illuminated and equipped with an obstruction light. The wind direction indicator wind cone structure and is a conspicuous colour such as solid red or red and white bands that displays the wind direction and approximate wind velocity in the vicinity of the heliport.

The physical characteristics of the wind cone, including size, shape, and fabric colour shall be in accordance with Transport Canada standards. It is recommended that the minimum windsock size permissible be used, as is common for surface level heliports. The windsock location shall be such that it is easily viewed from any direction of approach and from the surface of the helipad. If the view may be obstructed or in certain conditions the swirling winds may not provide a good indication of the current wind condition on the helipad a second WDI may be required, subject to Transport Canada assessment.

6.3 HELIPORT BEACON

Based on the heliport location, surrounding obstacle environment, and proximity to other lights, a heliport beacon is not anticipated to be required for the future heliport. However, if the pilots indicate it is difficult to visually identify the heliport site, especially during poor weather conditions, such as mist, rain, or blowing snow, a beacon could be considered.

Where provided the heliport beacon shall show a sequence of four white flashes indicating the letter "H" of the International Morse Code, each flash shall have a duration of 0.5 to 2.0 milliseconds, the four flashes shall be equally spaced over a time period of 0.8 +/- 10%, and be repeated over an off period between 1.2 and 2.2 seconds rendering a rate of 20 to 30 cycles per minute. The light from the beacon shall show in all directions when viewed from above, with vertical light distribution of the bean extending upwards from an elevation of not more than 5 degrees. The beacon shall also be provided with a means of intensity adjustment at the time of installation from 2,000 to 20,000 candela to accommodate for ambient background lighting conditions.

6.4 APPROACH/ TAKE-OFF DIRECTION LIGHTING SYSTEM

The Canadian Aviation Regulations (CARs) Standard 325.33(2)(a) states that an approach/take-off direction lighting system shall be provided for FATOs with a single approach/ departure path or where there is an operational need to select a preferred flight path for noise abatement procedures. Given the location and anticipated number of flight paths, a approach/take-off direction lighting system may be required on one or more flight paths.

6.5 HOSPITAL HELIPORT IDENTIFICATION MARKINGS

In accordance with CARs Standard 325.31(2)(b), a hospital heliport identification marking must be provided in the centre of the FATO/TLOF to identify that the heliport serves a hospital. The marking will consist of a white solid cross and a red capital H that is aligned with magnetic north, as illustrated in **Figure 6-1**. Since the pad surface may be concrete, a 15 cm red border should be added to the cross for increased conspicuity.

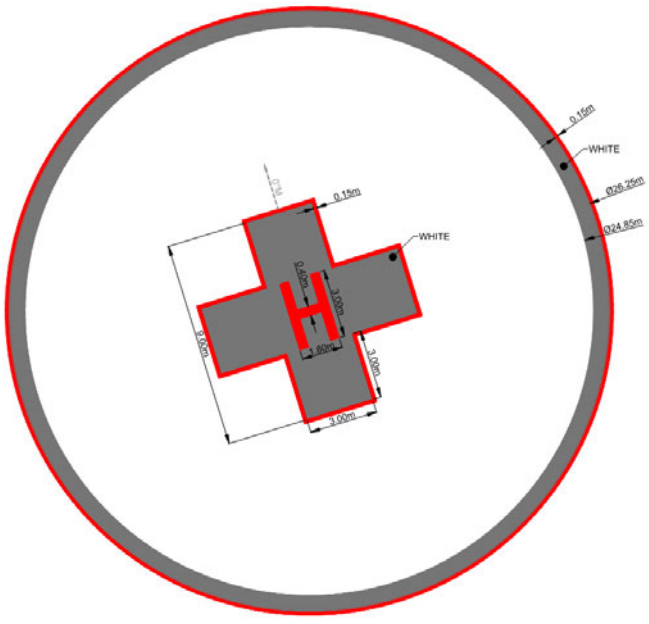

Figure 6-1 Hospital Heliport Identification and FATO Area Edge Markings

6.6 FATO Area Edge Markings

A Final Approach and Take-Off (FATO) area edge marking must be provided to identify the extent of the FATO. The marking shall be in accordance with CARs Standard 325.31(2)(d) and it shall be a 0.7-metre wide solid white line (minimum per standard 0.6 metres). The outer edge of the FATO area edge marking must be coincident with the FATO diameter of 26.25 metres. The inner edge of the FATO area edge marking will be offset by 0.7 metres, resulting in a 24.85 metre diameter. The FATO area edge marking may need to be supplemented with a 15cm red border. The marking will be as illustrated in **Figure 6-1**.

6.7 TLOF and FATO Perimeter Edge Lights

Transport Canada requires in accordance with CARs Standard 325 that all heliports classified for use at night be equipped with suitable lighting to clearly delineate the limits of the TLOF and/or FATO where the TLOF is deemed to be coincident and of the same size and shape of the FATO. FATO perimeter edge lighting is proposed for the heliport. The FATO lights may be inset or elevated, so long as they do not exceed an elevation of 25 cm above the FATO surface. The lights are to be omni-directional, medium intensity green and compatible with night vision goggles. A means of controlling the light intensity will also need to be established through integrated control or by other means. It is typically proposed that elevated LED lights units in compliance with CARs be used to delineate the FATO area. If inset light units are selected instead of elevated light units, the inset light units should be installed so as to be centered on the FATO edge and equally spaced around the FATO. In any case, the light units shall be equally spaced around the FATO and not exceed 7.5 metres spacing. The permissible offset distance for a FATO perimeter edge light shall be in accordance with CARs 325.33(8) as measure from the FATO edge. Based on what is typical of a heliport designed for use by the AW139, a minimum of twelve (12) FATO perimeter edge lights will be required for the heliport equally distributed around the FATO with an offset distance of 0.75 metres from the FATO edge.

6.8 FATO Perimeter Floodlighting

The purpose of the heliport perimeter floodlighting is to ensure adequate lighting is provided for Hospital Staff and Emergency Health Services crews. Low profile perimeter flood lighting is recommended to be installed surrounding the periphery of the paved landing area. Heliport perimeter floodlighting, if provided, shall be designed to not distract or cause glare to pilots in the air or on the ground. Perimeter floodlighting is proposed utilizing adjustable LED flood lights mounted near the perimetry of the safety area. The average horizontal illuminance of each floodlight shall be at least 10 lux with a uniformity ratio (average to minimum) of not more than 8:1. It is anticipated that at least six (6) flood lights could be required to illuminate the area. The perimeter floodlighting may also serve as a backup lighting system to FATO edge lights.

6.9 Obstruction Lighting

Any on- and off-site obstacles that are identified as requiring obstacle marking and lighting to support night use of the Heliport must be lighted in accordance with CARs Standard 621. Typical obstruction lighting within the Obstacle Marking and Lighting Area will be red, steady-burning, LED, CL-810 fixtures, and compatible with Night Vision Imaging Systems. On-site obstruction lighting shall be connected to a dedicated electrical circuit which will provide full-time power supply (daytime and nighttime).

6.10 Heliport Lighting Control

Lighting can be activated either by a ground-located switch and/ or through the use of Aircraft Radio Control of Aerodrome Lighting (ARCAL) if installed. ARCAL allows the pilot to activate the heliport lighting and to control the intensity (depending on the type) by clicking the transmission button on their radio. Installing

ARCAL would require applying for a radio frequency through Innovation, Science, and Economic Development Canada.

6.11 LANDSCAPING

Landscaping elements, including but not limited to shrubs, bushes, trees and decorative elements, surrounding the heliport should be kept to a minimum to ensure they do not protrude into the flight path obstacle limitation surfaces. Slopes extending from the safety area should be limited to a maximum downward slope of 1:4 and tie in as appropriate to existing terrain avoiding creation of a ditch or swale that could hold water.

The surface immediately abutting the paved helipad area and extending include disturbed or regraded areas shall be treated to resist the effects of rotor downwash. Sod is typically appropriate if well secured and shall be maintained appropriately with grass cut to a length that does not attract birds or other wildlife that may look for refuge.

The area surrounding the proposed stormwater management ponds found southwest and north of the proposed heliport site will also need to be assessed for risk as part of a wildlife hazard management to minimize potential conflict between aircraft and birds. Alternatively, consideration could be given to use of underground stormwater management.

6.12 EQUIPMENT AND INSTALLATIONS

6.12.1 FENCING

The heliport may need to have fencing designed to deter unauthorized access by persons to the heliport, including the installation of fencing surrounding the heliport. Access points to the heliport may need to be controlled using lockable, manual sliding (vehicle) and swing gates (pedestrian). Fencing will additionally prevent larger wildlife from entering the heliport area.

6.12.2 SIGNAGE

The heliport and surrounding area should be equipped with signage to enable use of the heliport and its certification. These signs will need to be strategically placed and convey appropriately the following:

- Caution Helicopter Operating Area;
- Caution Low Flying Aircraft;
- Caution High Wind and Noise;
- No Parking;
- Authorized Personnel Only; and
- No Smoking.

6.12.3 FIRE PROTECTION, EXTINGUISHING AGENTS AND EQUIPMENT

The heliport will need to comply with CARs 325 and where practicable NFPA 418 to ensure that the necessary fire-fighting equipment is stationed in the appropriate place on site and be clearly marked.

Other fire safety protocols should be implemented including the following:

- The surface of the heliport shall sloped such to provide drainage away from the access points;
- No smoking signs will need to be installed on the heliport fence; and
- One access point will need to be provided and designated for fire-fighting personnel.

7. HELIPORT CERTIFICATION AND ADDITIONAL CONSIDERATIONS

7.1 HELIPORT CERTIFICATION PROCESS

If it is determined that the proposed heliport is required to be certified, or if voluntary certification is requested, then steps will need to be taken towards obtaining obtain Transport Canada certification of the proposed heliport.

Once it has been determined that a heliport will be constructed and timelines are ascertained, steps will then need to be taken to initiate the heliport certification process. This process starts with an identification of the legal entity that would own the heliport and ultimately be responsible for its compliance with the regulations. An application is then prepared for submission to the Minister of Transport. This application notifies the Minster of the intent to construct and operate a heliport in compliance with CARs 305. This step does not grant certification but rather enables a file to be opened with Transport Canada's regional office to track documentation while the project progresses. The application makes formal request for heliport certification identifying the owner, operator, proposed heliport location and type of heliport. A letter of no objection from the municipality concerning construction of the heliport is also typically requested at this time.

The heliport certification process extends through construction with the preparation of a draft Heliport Operations Manual and training of staff. Following the completion of heliport construction, the Heliport Operations Manual is finalized with as-built information and any remaining staff training is completed. The Heliport Operations Manual is subsequently submitted to Transport Canada for review and processing. Transport Canada is then invited to complete a heliport certification inspection and meet with the Heliport Manager. This process may occur at any time after the heliport is constructed. However, if heliport certification is required by the regulator, the heliport cannot be used until certification is complete and the Heliport Certificate is issued by Transport Canada.

At a minimum, the heliport will be registered with Transport Canada and published by NAV CANADA in the Canadian Flight Supplement and in related aeronautical charts.

7.2 MAINTENANCE AND SNOW REMOVAL

Transport Canada requires that the heliport be free of debris, including snow. Due to the location of the heliport within Ontario, snow is a common event which shall be considered in maintenance planning. To facilitate snow removal, it is proposed that the heliport be equipped with an access ramp that will permit access by snow removal equipment.

7.3 FUEL / WATER SEPARATOR

Transport Canada no longer requires a fuel/water separator for heliports that do not offer aircraft refuelling services. Therefore, as no refuelling facilities are proposed for the future heliport, a fuel/water separator is not required. However, these systems are still common at new heliport developments due to site-specific environmental mitigation requirements.

7.4 ROTOR DOWNWASH

Rotor downwash caused by helicopters in the arrival or departure phases of flight can cause a safety hazard to people and equipment on the ground and in the immediate vicinity of a helicopter. The size and weight of the helicopter, as well as the wind direction and speed, have a significant effect on the extent of this hazard.

Transport Canada suggests that a protection area around the helicopter rotor(s), measured from the tip of the rotor blade, approximately three (3) times the overall length of the largest helicopter using the heliport, is considered suitable in most weather conditions. This area should be considered in the development of Standard Operating Procedures to limit pedestrian traffic during heliport use.

Based on the layout proposed and proximity to the ER entrance, precautions will need to be taken to ensure that rotor downwash hazards are suitably mitigated through design and standard operating procedures by security personnel.

7.5 Restriction on Vehicle and Pedestrian Movement During Heliport Use

Due to rotor downwash and obstacle limitation surfaces, restrictions will apply to vehicle and pedestrian movements on the hospital campus when the heliport is in use. Signs will need to be installed to inform the public in the proximity of the heliport of this hazard. Risk of personal injury or property damage will need to be carefully monitored and mitigation measures put in place to ensure safety of pedestrians. Such mitigation measures may include identification of safe setback distances and installation of wind break fencing.

7.6 Locations of Fuel and Compressed Gas Storage

Fuel storage and compressed gas tanks, including oxygen and propane storage tanks, are prohibited from being placed within certain flight path areas. Based on an inventory of existing conditions, taken by Avia NG during the site visit in 2023, and further supported by a review of satellite imagery from 2022, no compressed gas or fuel storage tanks were observed within 150m of the proposed heliport location.

7.7 Security Surveillance

It is suggested that cameras are used for surveillance of the heliport and surrounding areas.

7.8 Flight Path Protections

7.8.1 Risk of Intrusion by Trees or Future Development

Several trees and obstacles would need to be removed to enable use of the future heliport and increase heliport usability with an H2 classification. Trees will need to be monitored for growth that could result in penetration of required obstacle limitation surfaces or obstacle marking and lighting areas. When intrusion of an obstacle limitation surface occurs, it can result in reduction in heliport usability, closure of a flight path, or in the event of a single flight path heliport, it can result in closure of the heliport until the obstacle is removed. Similarly, if an obstacle is permitted to intrude upon the obstacle marking and lighting area and is unable to be removed or marked and lighted in accordance with CARs Standards 325 and 621, the heliport may be restricted to day-use only, subject to an aeronautical study.

7.8.2 Airport (Heliport) Zoning Regulations

To ensure future compliance and the ability to prevent trees and other obstacles from infringing upon the obstacle limitation surfaces of the Heliport, the Owner may elect to pursue with cooperation of the Provincial Authority the implementation of Airport (Heliport) Zoning Regulations via a Federal-Provincial Process that enables the Provincial Authority to put into place a by-law to protect the flight paths from conflicting land uses. Avia NG's team assigned to this project have led the industry in the development and implementation of AZRs both for airports and heliports across Canada and are uniquely qualified to advise on appropriate zoning measures. It is recommended that the Hospital consider over the long term AZRs as a means to protecting the heliport's flight paths and associated obstacle limitation surfaces from intrusion that may otherwise compromise future heliport certification and use.

8. CLOSING

This Heliport Feasibility Study and Preliminary Design Requirements Report indicates that the proposed site of the new South Muskoka Memorial Hospital provides a location conducive to establishing a new hospital heliport, alongside the new acute care hospital building and compliant with the Canadian Aviation Regulations. Analysis has been undertaken, in context with the Stage 1.3B Functional Program undertaken by Stantec Architecture, with a conceptual illustration of helipad placement on the lands provided as part of the hospital conceptual development and massing. The extent to which tree clearing and site regrading is required for the future heliport will be subject to design development, however it is anticipated to be extensive based on what is known about the current site. Due to the configuration of the site and location proposed for the new hospital building, there will be little flexibility in where to place the surface-level heliport. However, additional measures such as increased heliport mounding or designing the proposed future hospital heliport to be sited atop the hospital rooftop or a parkade would further increase flexibility by mitigating the impacts of the dominant obstacles on the subject lands.

APPENDIX A

Study Exhibits

Notes

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Scale 1:1500

25 0 10 25 50 75 100 METRES

50 0 50 100 200 350 FEET

SCALE BASED ON SHEET SIZE 22" X 34"

GRID NORTH

N W E S

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AIRPORT CONSULTANTS

MUSKOKA ALGONQUIN HEALTHCARE

Client: MUSKOKA ALGONQUIN HEALTHCARE

Project: HUNTSVILLE AND SOUTH MUSKOKA HOSPITAL REDEVELOPMENT HELIPORT SPECIALIST CONSULTING SERVICES

Title: **SOUTH MUSKOKA MEMORIAL HOSPITAL PROPOSED SITE LOCATION 300 PINE STREET**

Revision:	0	Date:	September 16, 2024
QA/QC:	JRM/JJH	Avia NG Project No.	23-0165
Drawn:	JCG	Exhibit:	1-1

ANSI D (22.00 x 34.00 inches)
C:\Users\jcg\Avia NG\Muskoka Area - Documents\23-0165 MAHC Huntsville-Bracebridge Rotex - Documents\CAD\MAHC Bracebridge Heliport Rotex Options r0d 2024-09-16.dwg
September 17, 2024

HYDRO TRANSMISSION LINE CORRIDOR

395 PARKING SPACES

FUTURE HOSPITAL EXPANSION AREA

LOADING DOCK

STORM WATER MANAGEMENT

PROPOSED SOUTH MUSKOKA MEMORIAL HOSPITAL (NEW BUILD)

WATERCOURSE

TOP OF BANK

10m SETBACK

20m SETBACK

114 PARKING SPACES

HYDRO ONE BRACEBRIDGE TRANSMISSION STATION

PROPOSED HOSPITAL SITE BOUNDARY

PROPOSED SOUTH MUSKOKA MEMORIAL HOSPITAL HELIPORT
NORTHING: 4989061.004
EASTING: 634717.595
LATITUDE: N45° 02' 31.90"
LONGITUDE: W79° 17' 22.06"
H2/VFR/PPR

STORM WATER MANAGEMENT

ENTRANCE

MTO SETBACK (114m)

PROPOSED HOSPITAL SITE BOUNDARY

ANSI D (22.00 x 34.00 inches)
Created by: JaredGrant
Last Saved by: JaredGrant on September 17, 2024
C:\Users\JaredGrant\AVIANG\23-0165 MAHC Huntsville-Bracebridge Redev - Documents\CAD\MAHC Bracebridge Heliport Relocation Options r0d 2024-09-16.dwg

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50 0 25 50 100 250 FEET

SCALE BASED ON SHEET SIZE 22" X 34"

GRID NORTH

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MUSKOKA ALGONQUIN HEALTHCARE

Client: MUSKOKA ALGONQUIN HEALTHCARE

Project: HUNTSVILLE AND SOUTH MUSKOKA HOSPITAL REDEVELOPMENT HELIPORT SPECIALIST CONSULTING SERVICES

Title: **SOUTH MUSKOKA MEMORIAL HOSPITAL PROPOSED HOSPITAL AND HELIPORT LOCATION**

Revision:	0	Date:	September 16, 2024
QA/QC:	JRM/JJH	Avia NG Project No.	23-0165
Drawn:	JCG	Exhibit:	2-2

HYDRO TRANSMISSION LINE CORRIDOR

395 PARKING SPACES

FUTURE HOSPITAL EXPANSION AREA

LOADING DOCK

STORM WATER MANAGEMENT

PROPOSED SOUTH MUSKOKA MEMORIAL HOSPITAL (NEW BUILD)

TOP OF BANK

10m SETBACK

20m SETBACK

114 PARKING SPACES

PROPOSED HOSPITAL SITE BOUNDARY

TAKE-OFF / APPROACH SURFACE FIRST SECTION

TAKE-OFF / APPROACH SURFACE SECOND SECTION

20.0 m AGL

15.0 m AGL

10.0 m AGL

5.0 m AGL

8%

16%

25.0 m AGL

30.0 m AGL

35.0 m AGL

40.0 m AGL

45.0 m AGL

WATERCOURSE

TOP OF BANK

10m SETBACK

PROPOSED SOUTH MUSKOKA MEMORIAL HOSPITAL HELIPORT
NORTHING: 4989061.004
EASTING: 634717.595
LATITUDE: N45° 02' 31.90"
LONGITUDE: W79° 17' 22.06"
H2/VFR/PPR

STORM WATER MANAGEMENT

MTO SETBACK (114m)

ENTRANCE

PROPOSED HOSPITAL SITE BOUNDARY

ANSI D (22.00 x 34.00 Inches)
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September 17, 2024

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Scale 1:1000

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SCALE BASED ON SHEET SIZE 22" X 34"

GRID NORTH

N W E S

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MUSKOKA ALGONQUIN HEALTHCARE

Client: MUSKOKA ALGONQUIN HEALTHCARE

Project: HUNTSVILLE AND SOUTH MUSKOKA HOSPITAL REDEVELOPMENT HELIPORT SPECIALIST CONSULTING SERVICES

Title: **SOUTH MUSKOKA MEMORIAL HOSPITAL POTENTIAL FLIGHT PATHS**

Revision:	0	Date:	September 16, 2024
QA/QC:	JRM/JJH	Avia NG Project No.	23-0165
Drawn:	JCG	Exhibit:	5-1

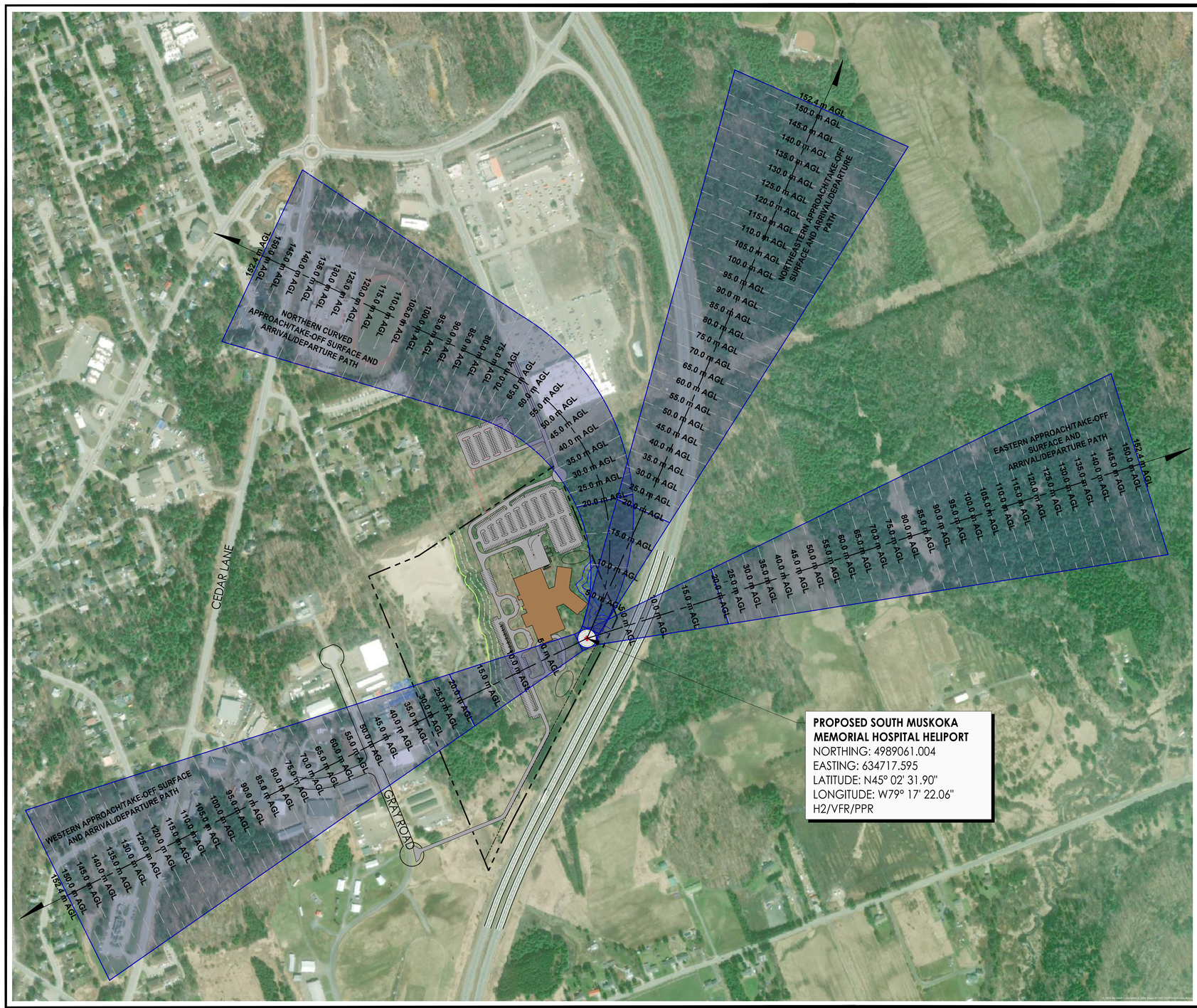
MAHC SOUTH MUSKOKA MEMORIAL HOSPITAL HELIPORT

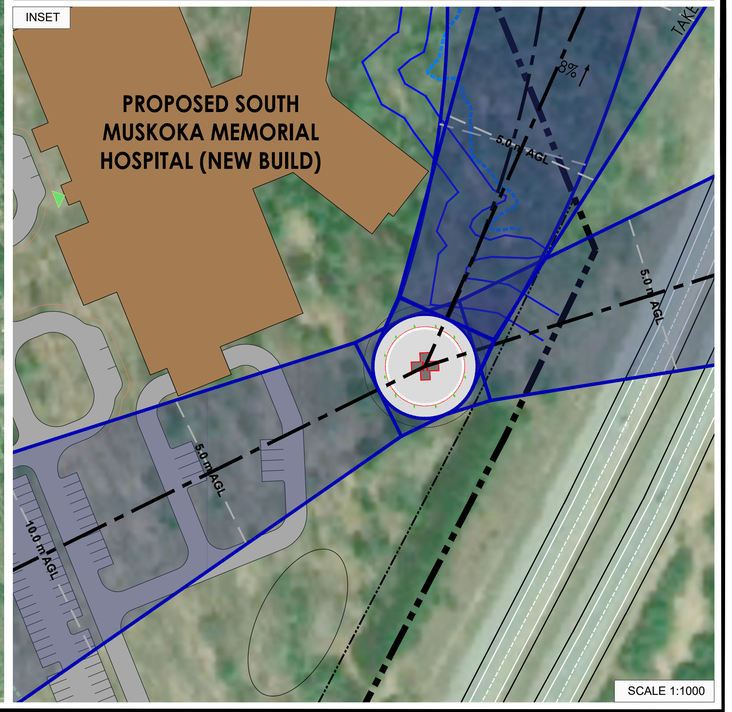
EXISTING HELIPORT CLASSIFICATION		
H2	DAY/NIGHT	VFR

HELIPORT PHYSICAL CHARACTERISTICS	
FATO WIDTH	26.25m
SAFETY AREA WIDTH	35.0m
FATO ELEVATION	TBD

FLIGHT PATH PROTECTIONS

DATA	NORTHERN ARR/DEP PATH	NORTHEASTERN ARR/DEP PATH	EASTERN ARR/DEP PATH	WESTERN ARR/DEP PATH
TYPE	CURVED ARR/DEP	ARR/DEP	ARR/DEP	ARR/DEP
GEOMETRIC CENTRE	STANDARD	STANDARD	STANDARD	STANDARD
SAFETY AREA WIDTH	35.0m			
INNER EDGE ELEVATION	TBD	TBD	TBD	TBD
FLIGHT PATH ORIGIN LOCATION (WGS84)				
NORTHING	4989061.004			
EASTING	634717.595			
LATITUDE	N45° 02' 31.90"			
LONGITUDE	W79° 17' 22.06"			
FLIGHT PATH BEARINGS (FROM)				
GRID NORTH	25.16°/295.16°	23.87°	72.51°	243.69°
OBSTACLE LIMITATION SURFACES - APPROACH/TAKE-OFF SURFACE				
DIVERGENCE	15%	15%	15%	15%
FIRST SECTION LENGTH	245m	245m	245m	245m
FIRST SECTION SLOPE	8%	8%	8%	8%
SECOND SECTION LENGTH	830.0m	830.0m	830.0m	830.0m
SECOND SECTION SLOPE	16%	16%	16%	16%
TOTAL LENGTH	1075m	1075m	1075m	1075m





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Scale 1:4000

50 0 25 50 100 200 300 METRES

200 0 100 200 500 1000 FEET

SCALE BASED ON SHEET SIZE 22" X 34"

GRID NORTH

AVIA • NG AIRPORT CONSULTANTS

MUSKOKA ALGONQUIN HEALTHCARE

Client: MUSKOKA ALGONQUIN HEALTHCARE

Project: HUNTSVILLE AND SOUTH MUSKOKA HOSPITAL REDEVELOPMENT HELIPORT SPECIALIST CONSULTING SERVICES

Title: **SOUTH MUSKOKA MEMORIAL HOSPITAL PROPOSED HELIPORT AND DETAILED OLS**

Revision: 0	Date: September 16, 2024
QA/QC: JRM/JJH	Avia NG Project No. 23-0165
Drawn: JCG	Exhibit: 5-3

ANSI D (22.00 x 34.00 inches)
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September 17, 2024