

Stormwater Pollution Prevention Plan

Katzie Reserve No. 1, Pitt Meadows BC

PREPARED FOR: Katzie First Nation and EPTA Development Corp.



PREPARED BY:



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List of Acronyms

BCWQG	British Columbia Water Quality Guidelines
BMPs	Best Management Practices
CBs	Catch Basins
CEMP	Construction Environmental Management Plan
DFO	Fisheries and Oceans Canada
EMA	<i>Environmental Management Act</i>
ESC	Erosion and Sediment Control
FA	<i>Fisheries Act</i>
FSA	<i>Fire Services Act</i>
MOE	Ministry of Environment
MSDS	Material Safety Data Sheet
OCP	Official Community Plan
PLG	Pacific Land Group
PEng	Professional Engineer
QEP	Qualified Environmental Professional
RPBio	Registered Professional Biologist
SPEA	Streamside Protection and Enhancement Area
SPPP	Stormwater Pollution Prevention Plan
VFPA	Vancouver Fraser Port Authority
WHMIS	Workplace Hazardous Materials Information System
WMA	<i>Waste Management Act</i>
WSA	<i>Water Sustainability Act</i>

1.0 INTRODUCTION

Pacific Land Group (PLG) has been retained by EPTA Development Corporation (Client) to complete a Stormwater Pollution Management Plan (SPPP) as part of a Development Permit ("DP") application for a warehouse/distribution facility ("Eagle Meadows Business Park", or "Project"), comprised of six (6) properties and one (1) unopened road (Lots 6-2; 6-1-2; 6-1-3; 6-1-4; 6-1-5; 6-1-7 within Katzie Reserve No. 1) (referred to as the "Subject Site"). The six legal lots and one unopened road right of way, total approximately 7.1 hectares (17.52 acres).

Measures, as set forth in this SPPP, have been developed based on site-specific information and have been customized to address and reduce the risk of stormwater pollution on-site. This SPPP will be used as a guide and resource for the VFPA, Contractors, the designated SPPP Manager, and government agencies (if applicable) to measure compliance with the environmental protection and mitigation requirements of the Project. This report has been collaboratively prepared by PLG and Hub Engineering.

Environmental measures apply to all Contractors and personnel, including SPPP Managers that are on-Site during Project activities. Therefore, the words "Contractor" or "Operator" used in this document apply to any company or personnel responsible for practices as described within. It is the Contractors' responsibility to ensure their employees and subcontractors are familiar and comply with the contents of this SPPP.

2.0 OVERVIEW

Due to the proposed development occurring within the VFPA's jurisdiction, there is an increased concern of stormwater quality discharged from site that may have an impact on adjacent environments. Stormwater management plans and quality control measures are presented within this report to ensure water quality is protected.

The objectives of this SPPP are to:

- Design site specific treatment systems;
- Minimize the amount of stormwater discharge into nearby environments;
- Prevent and/or reduce the quantity of pollutant being discharged through stormwater; and
- Manage and treat stormwater if pollutant loading cannot be prevented.

Additional mitigation measures can be found in the project's Construction Environmental Management Plan (CEMP).

2.1 Background

EDC is proposing to construct a warehouse/distribution facility ("Eagle Meadows Business Park"), comprised of six (6) properties and one (1) unopened road (Lots 6-2; 6-1-2; 6-1-3; 6-1-4; 6-1-5; 6-1-7 within Katzie Reserve No. 1). The six legal lots and one unopened road right of way total approximately 7.1 hectares (17.52 acres) as shown in Figure 1, below.

The Subject Site is currently undeveloped and bounded by Wharf Street (also referred to as Fraser Way) to the south, single family residential uses and Bonson Road to the west, a mini storage/outdoor storage uses to the north, and a soil/gravel material storage use to the east.

The Subject Site is in close proximity to Golden Ears Way and the Golden Ears Bridge, providing regional connections to Lougheed Highway, Trans-Canada Highway, and South Fraser Perimeter Road

3.0 SITE INVENTORY

The Site is approximately 7.1 hectares (17.52 acres) and is located within the Katzie Reserve No. 1, bordering Pitt Meadows, BC and is comprised of six (6) properties and one (1) unopened road (Figure 1, below). Katzie Slough is located north of the Subject Properties and the Fraser River is located immediately due north. Several drainage ditches are proposed to be infilled in favour of an upgraded storm system and a new ditch located within a greenway south of the project.



Figure 1. Project location and proposed work area (red outline).

3.1 Project Activities

It is understood that the proposed Project will consist of the following activities:

- Phase 1: Site Preparation;
- Phase 2a: Off-Site Servicing
 - Ditch infill and creation of new habitat within a greenway

- Installation of a new outfall to the Fraser River; and
- Phase 2b: On-Site construction.

In order to carry out these activities, material handling (i.e., transport, storage, disposal), and fuelling and servicing of construction equipment is necessary. Mitigation measures will be considered throughout all phases of development to ensure stormwater quality is not negatively impacted from construction activities.

3.2 Potential Project Materials and Pollutants

Activities from the proposed development involve the use of certain materials and substances. Sediment runoff and toxic wastes produced by construction works can negatively affect the adjacent aquatic habitat and accumulate overtime, causing environmental concern.

Potential materials and substances involved in the proposed project include, but are not limited to the following:

- | | |
|---------------------------|--------------------|
| ● Concrete/asphalt | ● Nails |
| ● Aggregate | ● Plastic sheeting |
| ● Wood chips | ● Organic waste |
| ● Soils | ● Steel |
| ● Paints | ● Lumber |
| ● Fuels, oils and greases | ● Dewatering |
| ● Cleaning agents | |

Fuel handling and storage facilities will also comply with the provincial *Fire Services Act* and its regulations. Workers and contractor will adhere to established fire prevention and response protocols and standard best practices.

3.2.1 Hazardous Materials

The Contractor will comply with all applicable laws, regulations and permit conditions when handling, transporting, and disposing hazardous materials related to this Project. Hazardous materials on-site will be identified, stored and documented appropriately. Workplace Hazardous Materials Information System (WHMIS) and Material Safety Data Sheets (MSDS) will be available for all individuals on-site.

3.2.2 Storage Areas

Prior to construction, laydown areas will be identified for storage of construction equipment and materials. Designated areas will be located on a flat, stable area at least 30 m away from any waterbody. Storage procedures should be documented.

4.0 HYDROLOGIC ASSESSMENT

The existing and proposed storm sewer infrastructure and hydrologic patterns will be detailed in the sections below, followed by descriptions of the water quality event and storm drainage event for the proposed site.

4.1 Existing Drainage Infrastructure

The existing site is a forested site (previously a fill site) with trails running through the property. There is currently no onsite storm sewer infrastructure. The existing offsite storm sewer infrastructure consists of ditches along the south (Wharf Street) and west (Bonson Road) property lines. Runoff from the site is currently collected in these offsite ditches and discharged northwards into the City of Pitt Meadows storm sewer system via a headwall north of the site along Bonson Road. Eventually this runoff is discharged into the Fraser River at a new outfall west of the site in Pitt Meadows.

4.2 Proposed Drainage Infrastructure

The storm runoff from the site will be collected via catchbasins and bioswales onsite and will be detained up to the 100-year storm event. The flow from the site will be controlled via a flow control manhole designed to release at the pre-development flows up to the 100-year storm. The bioswales and an oil and grit interceptor will be installed to treat the runoff from the site prior to it being discharged into the offsite storm sewer system. These requirements will be implemented for all future industrial sites within Katzie Reserve 1.

There is a very small area of the site that is too low to drain to the proposed offsite storm sewer system along Wharf Street and Bonson south the Fraser River. This runoff will be collected, treated, flow controlled, and discharged to the existing City of Pitt Meadows storm sewer system along Bonson Road north of the site.

Please refer to **Appendix A** the Site Grading Plan prepared by Hub Engineering for the grading of the site.

The offsite storm sewer system is proposed along Wharf Street fronting the site and south on Bonson Road to the Fraser River. The proposed storm sewer system will direct all the flow from Katzie Reserve 1, both the future industrial sites and the existing residential site, to the proposed outfall at the south end of Bonson Road.

Please refer to **Appendix B** for the Storm Water Catchment Plan of the area.

4.2.1 Water Quality Event

The City of Pitt Meadows requires the treatment of the single event runoff for a 24-hour storm with a 6-month return frequency with a target discharge of water that meets the City of Pitt Meadows ESC Bylaw for all sites during construction and once developed. For the ultimate developed condition an oil and grit interceptor system capable of meeting these requirements will be engineered for this site and required for every other industrial site that connects to the proposed and existing storm sewer system.

4.2.2 Storm Drainage Event

To ensure the offsite storm sewer system has capacity to prevent flooding and ensure safe drainage the proposed site, and all future industrial sites within Katzie Reserve 1, will detain up to the 100-year storm runoff event and discharge at the pre-development levels up to the 100-year storm event.

5.0 SITE SPECIFIC ISSUES AND RISKS

5.1 Applicable Legislation

5.1.1 Federal Legislation

The Project team will follow and comply with the following Federal Acts and Guidelines, including, but not limited to:

- Federal *Fisheries Act (FA)*
- Ministry of Environment (MOE) and Fisheries and Oceans Canada (DFO) Land Development Guidelines for the Protection of Aquatic Habitat

5.1.2 Provincial Legislation

The Project team will follow and comply with the following Provincial Acts and Regulations, including, but not limited to:

- BC *Environmental Management Act (EMA)*
 - Spill Reporting Regulations
 - Contaminated Sites and Hazardous Waste Regulations
- BC *Fire Services Act (FSA)*
- BC *Water Sustainability Act (WSA)*
- BC *Waste Management Act (WMA)*
- BC *Water Quality Guidelines (BCWQG)*
- WorkSafeBC Occupational Health and Safety Regulations

5.1.3 Municipal Legislation

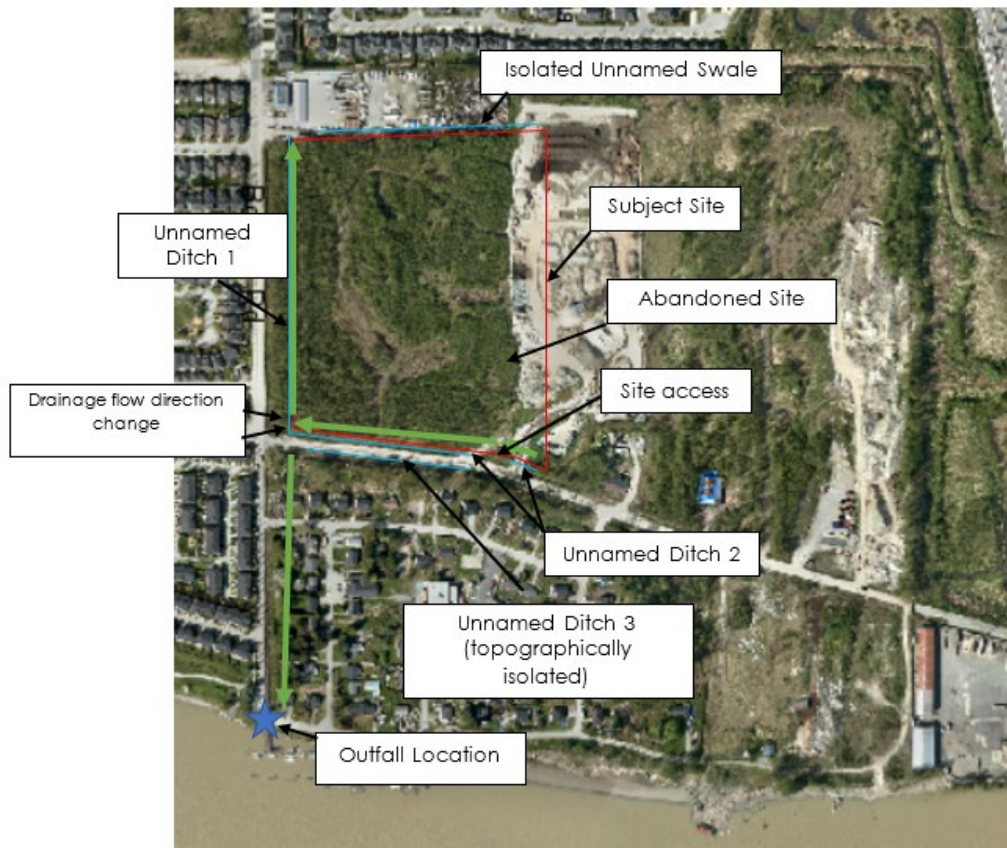
Given that those lands in Katzie Reserve No. 1 rely on agreements with the City of Pitt Meadows to establish adequate servicing, the following City of Pitt Meadows Bylaws may apply to some or all of the Project Off-Site Works.

- Boulevard Maintenance Bylaw No. 2377 (2008)
- Drainage System Protection Bylaw No. 2266 (2007)
- Floodplain Designation and Construction Control Bylaw No. 2384 (2008)
- Noise Control Bylaw No. 2138 (2004)
- Soil Removal and Fill Deposit Regulation Bylaw No. 2593 (2013)
- Waterworks Bylaw No. 2343 (2008)

The approval process to manage the municipal requirements is understood to require the establishment of a Servicing Agreement between KFN and Pitt Meadows.

Numerous Best Management Practices (BMPs) have been developed by industry associations and government agencies for activities near environmentally sensitive areas. In addition, the provincial document, *Develop with Care 2014 – Environmental Guidelines for Urban and Rural Land Development in British Columbia*, provides a comprehensive set of guidelines and BMPs (e.g., Urban Environment).

In this SPPP, Project works are addressed with respect to various environmental protection measures that can be applied directly or with modification, as required. These measures aim to promote environmental management by protecting the existing Site conditions and reducing the potential for migration of Project-related materials and products off-Site. Prior to the execution of all infrastructure improvements, including ditch infills and outfall works, all required permits (i.e., Section 11 and DFO) and service agreements will be in place.



5.2 Potential Pollutant Sources

Materials and substances that may be introduced through activities of the proposed project and have the potential to act as pollutants have been described in the below sections.

5.2.1 Soils

Excavation will involve removing vegetation and soils from unpaved areas, resulting in exposed surfaces and stockpile formations. Increased risk of off-site sediment runoff is of main concern during this construction phase.

5.2.2 Concrete/asphalt

Paving will involve the use of concrete and asphalt. Increased risk of off-site sediment runoff materials and dust will be present. Works associated with the outfall installation also has a risk to sedimentation and pollutants as a result of pre-cast outfall installation works.

5.2.3 Metals

Upgraded storm upgrades will include welding works. Potential risks of metal debris washing into adjacent aquatic environment are present.

5.2.4 Wood Wastes

During vegetation clearing, mitigation measures must be implemented to contain construction activities to the proposed area of development. This will help ensure that wood waste (i.e., woodchips, sawdust) do not enter adjacent aquatic environments.

5.2.5 Liquid Wastes

Risk of accidental fuel and oil spills from construction equipment is present throughout operations. Paints and cleaning agents may be used, and appropriate measures should be taken to avoid environmental contamination.

5.2.6 Solid Wastes

Solid waste (i.e., paper products, oil filters, spent batteries, discarded food items) may be present during development and proper disposal methods should be used to prevent materials from being washed into nearby drainage infrastructure and the Fraser River.

5.3 Potential Sensitive Receptors

To our knowledge, no stormwater issues have been identified by the public, stakeholder or First Nations. The natural grade of the site is sloped toward the south to the Fraser River and therefore, stormwater effects are not anticipated to the public or First Nations.

Table 1 below summarizes watercourses with potential sensitivity to stormwater.

Table 1. Watercourses Potentially Affected by Site Stormwater Discharge

Watercourse	Location	Potential to be affected (N/Y)
Fraser River and its shoreline	The River borders the Site to the south.	Y - The Fraser River has the potential to be temporarily impacted by a sudden accidental discharge. An accidental discharge event is considered to be short in duration, temporary and correctable.
Bonson Ditch	Western border of the Subject Property	Y - The Bonson Street ditch has the potential to be temporarily affected during infill and the creation of new water feature. As long as appropriate steps to mitigate (i.e., seasonal construction, dewatering, appropriate monitoring), an accidental impact is expected to be correctable.
Topographically isolated ditches	Two topographically isolated ditches are located to the north of the Subject Property and immediately south of Wharf Street.	No - Given these features are not connected to a higher order stream, proposed work activities will have no impact on these features.

5.4 Identified Issues

No large tank fuel storage will be required for project works. Where small amounts of fuel are required to operate small pieces of equipment (i.e., oils, lubricants etc.), these items will be placed within appropriate spill containment areas. In the event of an accidental spill, all workers will respond in accordance with the Project's Spill Prevention and Emergency Response Plan (please refer to the Project CEMP for the Spill Prevention and Emergency Response Plan).

5.5 Potential Pollutant Pathways

Pollutant pathways for the Subject Property will be by way of the stormwater drainage system and overland flow.

6.0 STORMWATER POLLUTION PREVENTION PLAN

The project will be subject to the potential pollutants outlined in Section 5 which would be transported by stormwater to the proposed bioswale along the north side of the project. In the design of the storm water infrastructure, reducing and eliminating the potential pollutants was the highest priority. The proposed bioswale is the solution to collecting and treating the stormwater before the runoff is discharged from the site. It is important to develop a management plan to effectively prevent, contain/reduce, and treat the pollutants in the stormwater before the clean water is discharged into the Fraser River.

6.1.1 Prevention and Management Strategy

Preventing the release or presence of the polluting materials on the site is the most effective measure to reduce the amount of pollutants in the stormwater. The site is currently covered

in gravel which makes for an efficient pollutant control method. Any rainfall will drain through the voids in the gravel and into the groundwater. The gravel also acts as a cover for the erodible surfaces such as native soil.

During construction, any excavation is to only expose the amount of area that can be expected to be covered by non-erodible material by the end of the day to limit the time and area of exposed soil. Once the site has been prepared with the granular sub-base and granular base as per the geotechnical report, the potential of sediment pollution from construction is greatly diminished.

Upon completion of the project, the site will be paved and used for lumber storage. It is noted that the owner is currently sweeping the existing lumber yard daily and owns his own sweeper to keep the paved areas clean. The owner of the property is to extend the usage of the sweeper to the new site and keep all paved areas clean and free of debris. Daily sweeping, especially before a rainfall event, is critical to minimizing the pollutants interaction with stormwater.

6.1.2 Containment/Reduction

The containment and reduction of potential pollutants is the secondary goal if prevention is not achievable.

To contain and reduce pollutants during construction, an Erosion and Sediment Control will be completed by Hub Engineering for the development and construction of the site. Attached to this report in **Appendix C** is the ESC Plan for the mass excavation stage of the subject site. For both the mass excavation stage and construction stage a silt fence will be installed around the perimeter of the site, a treatment system will be implemented to treat the water discharged and testing will be performed to confirm the discharge water quality, and there will be a rock access pad at the site entrance to ensure no sediment is being tracked into the site or out onto the public roads. In addition, the onsite pavement should be swept to keep all paved surfaces free of debris, sediment or other potential pollutants. Additionally, there will be polyethylene sheeting used to cover any stockpiled material that contains pollutants.

To contain and reduce pollutants after construction once the site is built out, as stated in Section 4.2.1, an oil and grit interceptor will be engineered for the specific site to control the water quality of the storm water discharge. The oil and grit interceptor will be a Rainwater Management RWM unit or equivalent.

6.1.3 Treatment

An erosion and sediment control plan during construction will be completed to minimize and prevent pollutants from entering into stormwater during the project construction phase. The erosion and sediment control measures have been denoted in the section above.

For the ultimate developed condition, the development is proposing a new greenway ditch and upgraded infrastructure along the south property line and an oil and grit interceptor to treat the stormwater runoff as noted in Section 4.2.1 of this document. These systems will allow clean stormwater runoff to discharge into the Fraser River.

7.0 EROSION AND SEDIMENT CONTROL

Erosion and Sediment Control (ESC) measures are designed to be Site-specific and adaptable, and will vary depending on Site conditions and local weather. ESC measures must be implemented and adhered to as follows:

- Prior to commencement of Project works, the limits of construction will be clearly marked, including the installation of protective fencing where necessary to protect waterways while soil removal is underway;
- Utilize existing access areas where possible, to avoid cutting new access trails and minimize soil/sediment disturbance and erosion, especially on soft soils within the work areas;
- Take reasonable care to avoid damage to freshly disturbed areas and where soils have been recently disturbed so as not to generate sediments that could potentially migrate or become tracked off-Site;
- Minimize the potential to generate sediment-laden water within the Site (e.g., undertaking a section of work that can reasonably be completed within a work shift, and covering exposed stockpiles to remain on-Site for an extended period of time);
- Imported fill and soils to be utilized during grading work shall be protected when stockpiled with tarpaulin or polyethylene sheeting to prevent the dispersal of silts and fines outside of the delineated work zone;
- Soils of any kind shall not be placed on roads, curbs or walkways;
- Temporary silt fencing and catch basin inserts will be installed by qualified personnel along the boundary of the work area and within catch basins, respectively, to act as sediment barriers by preventing the dispersal of silts and fines outside of the delineated work zone for the duration of the Project; and
- Re-grading of the Site will be completed as soon as possible in order to ensure that disturbed areas and exposed soils are stabilized.

Mass Excavation ESC Plan has been provided for the site by Hub Engineering. Refer to Appendix C for this ESC plan. The remaining ESC Plan for the building and site services construction at the site will be completed by Hub Engineering and as per the above.

8.0 IMPLEMENTATION AND MONITORING REQUIREMENTS

The overall objective of the SPPP monitoring program is to prevent pollutants produced through construction activities from entering aquatic resources and wildlife ecosystems through stormwater discharge. Monitoring and implementation of mitigation measures are intended to protect these valuable resources.

8.1 Implementation and Monitoring

Maintaining existing and proposed drainage infrastructure is critical to ensure functionality and effectiveness.

The planting material specified for the proposed greenway ditch is native, which will also help maintaining water quality and will establish quickly to aid in erosion control. Establishment

maintenance is required within the first growing season following initial installation. After establishment, the maintenance of the vegetation associated with the new greenway ditch should occur annually for 5 years (or as outlined in the Section 11 Approval). During the establishment period, monitor the planting material on a monthly basis following initial installation and remove any invasive vegetation and litter. No chemicals, fertilizers, pesticides or herbicides are to be used within the bioswale. Water newly installed vegetation on a weekly basis and as recommended by the QEP.

Exposed soil is subject to weeds and invasive plants. Hand cultivate the mulch layer and remove any weeds, invasive plants and refuse materials at least once per month.

The outlet headwall where storm water runoff flows enter the Fraser River should be monitored for erosion. The monitoring is to ensure that the specified rip rap rock size and amount at the headwall outlet for erosion protection is maintained.

8.2 Adaptive Management and Continuous Improvement

The overall goal of this SPPP is to implement a set of BMPs to target and prevent the release of potential pollutant sources (identified above) from entering identified sensitive receptors (also identified above). If BMPs as set out by the project CEMP are not working effectively, the contents of that plan and associated projects plans (i.e., ESC Plan) will be reviewed and updated, as necessary. Please refer to the project CEMP for specific mitigation measures developed for this project.

8.3 Storm Water Quality

The proposed site and all future industrial sites within Katzie Reserve 1 will have an oil and grit interceptor system onsite to treat the discharge from the site prior to entering the storm system that ultimately discharges into the Fraser River. The storm water oil and grit interceptor system will be engineered specifically for this site to separate any suspended oils caused from upstream paved surfaces. The oil and grit interceptor will be a Rainwater Management (RWM) system or equivalent capable of removing a minimum 85% of the total suspended solids of pollutants 50 microns to 250 microns in size.

The technical summary below was provided by Rainwater Management regarding their water treatment systems.

The system is a true hydrodynamic (swirl concentrator) oil/grit separator that combines screening and enhanced gravity settling to remove floating, neutral, and non-buoyant solids from stormwater runoff. The non-blocking screen captures 100% of the pollutants equal to the screen aperture size (2,400 microns and larger). All non-buoyant solids are directed to a sump that separates the captured pollutants from the treatment flow path to prevent the larger storm events from re-suspending previously trapped material. The floatable debris and oil/grease are trapped upstream of the baffle for easy removal.

The RWM system can be installed as a bend structure, can accommodate multiple inlets, and does not require an elevation difference between the inlet and outlet pipes. Please refer to their website www.rainwatermanagement.ca for further product information and

specifications. Rainwater Management is also on the British Columbia Ministry of Transportation's approved products list.

8.4 Maintenance Procedures

The onsite storm water management system will be designed to require limited maintenance while provided high efficiency. The respective property owner(s) will undertake maintenance as outlined and described below.

Entry into confined spaces (such as storm sewer pipe systems or manholes) shall be completed in accordance with WorkSafeBC regulations and requirements.

To ensure normal operation of the underground storm sewer pipe systems; manholes, catch basins, lawn drains, oil/grit interceptor, and vegetated bioswales need to be inspected at least semi-annually. Routine maintenance to include clearing grates and sumps of any leaves and debris and any debris visible inside the catch basin/lawn drains, manholes, and oil/grit interceptor. A plugged grate and/or a plugged outlet will prevent storm water runoff from entering the storm system and result in water ponding on the surface. Catch basins, the vegetated bioswale, and oil/grit interceptor are critical to capturing silt and preventing it from entering the downstream storm drainage systems.

8.5 Outfall Monitoring, Stormwater Sampling and Reporting

Outfall monitoring should be completed by a qualified individual (e.g., QEP) assigned to this Project for Project activities, as described above. The responsibilities of the monitor may consist of, but are not limited to, the following:

- Completing a pre-construction site visit to establish and confirm baseline conditions and prepare a comfort letter confirming that all ESC and pre-construction requirements are in place;
- Conducting regular monitoring Site visits during active construction, specifically during construction of the two new outfalls;
- Conducting water quality monitoring, as required, for surface water runoff that may be required to be directed off-Site;
- Preparation of environmental monitoring reports, including photographic documentation, which describe Site conditions, on-Site construction observations, work progress, recommendations for environmental protection and mitigation, and scheduled upcoming Project activities;
- Ensure the Fraser River foreshore is appropriately protected during construction activities.

8.5.1 Water Quality Sampling and Frequency

For **one year** following construction of the new ditch and outfall, storm water quality monitoring should take place **monthly** to establish a database of results to properly assess continued effectiveness of the newly installed system. Sampling should be scheduled during a high rain event to properly evaluate the systems function and appropriately capture

temporary or potential increases in contaminants in runoff during a higher rain event (i.e., >25 mm of rain in a 24-hour period).

Sampling may include testing for parameters such as LEPH, HEPH, PAH, metals, sodium, chloride, NTU, pH etc. Additional parameters can be added at the discretion of the QEP completing the sampling. Laboratory analysis should be compared to the BC Water Quality Guidelines (BCWQG) for Aquatic Life. Following a review of laboratory analysis, results will be compared to applicable standards (i.e., BCWQG) and a monthly storm water monitoring report will be prepared.

Following the completion of one year's worth of storm water outfall monitoring, outfall monitoring and associated laboratory analysis could be reduced to quarterly, to continue monitoring the overall effectiveness of the system.

8.5.2 Reporting

Monitoring reports will be submitted by the QEP/monitor to VPA, the Client, and the Contractor following each visit to the Project Location. Reports will include a list of construction activities, water quality monitoring, and any environmental protection measures implemented. Monthly (Year 1)/Quarterly (after Year 1) water quality reports will also be distributed, as noted above, and will include laboratory analysis following sampling of the two outfall locations. Monthly/Quarterly storm outfall reports will be compared to previous reports to evaluate the overall effectiveness of the greenway ditch. Where required, the monthly/quarterly sampling reports will include recommendations for adjustment (if necessary), depending on the storm water quality analysis results. Any additional events of non-compliance will be tracked with the measures taken to correct those deficiencies.

9.0 STATEMENT OF LIMITATIONS

This SPPP is meant to be a living and flexible document that can be used to provide guidance in environmental protection measures that can be implemented during routine Project activities, as well as unanticipated events or requirements that may arise during the course of construction.

This report has been prepared solely for the internal use of PLG, Hub Engineering, Epta and the VFPA. Any use which other parties make of this report, or any reliance on or decisions made based on it, are the responsibility of such parties. PLG accepts no responsibility for damages, if any, suffered by other parties as a result of decisions made or actions based on this report.

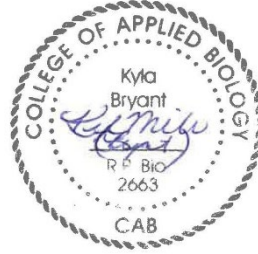
10.0 PROFESSIONAL STATEMENT

This report entitled *Stormwater Pollution Prevention Plan*, has been prepared Kyla Milne (Biologist; PLG) and Rod Gonzales (Engineer; Hub).

Please contact the undersigned should you have comments or questions regarding this correspondence.

Sincerely,

HUB ENGINEERING LTD./PACIFIC LAND RESOURCE GROUP INC.



Rod Gonzalez, P.Eng.
Hub Engineering Inc., Principal
EGBC Permit to Practice: 1003404

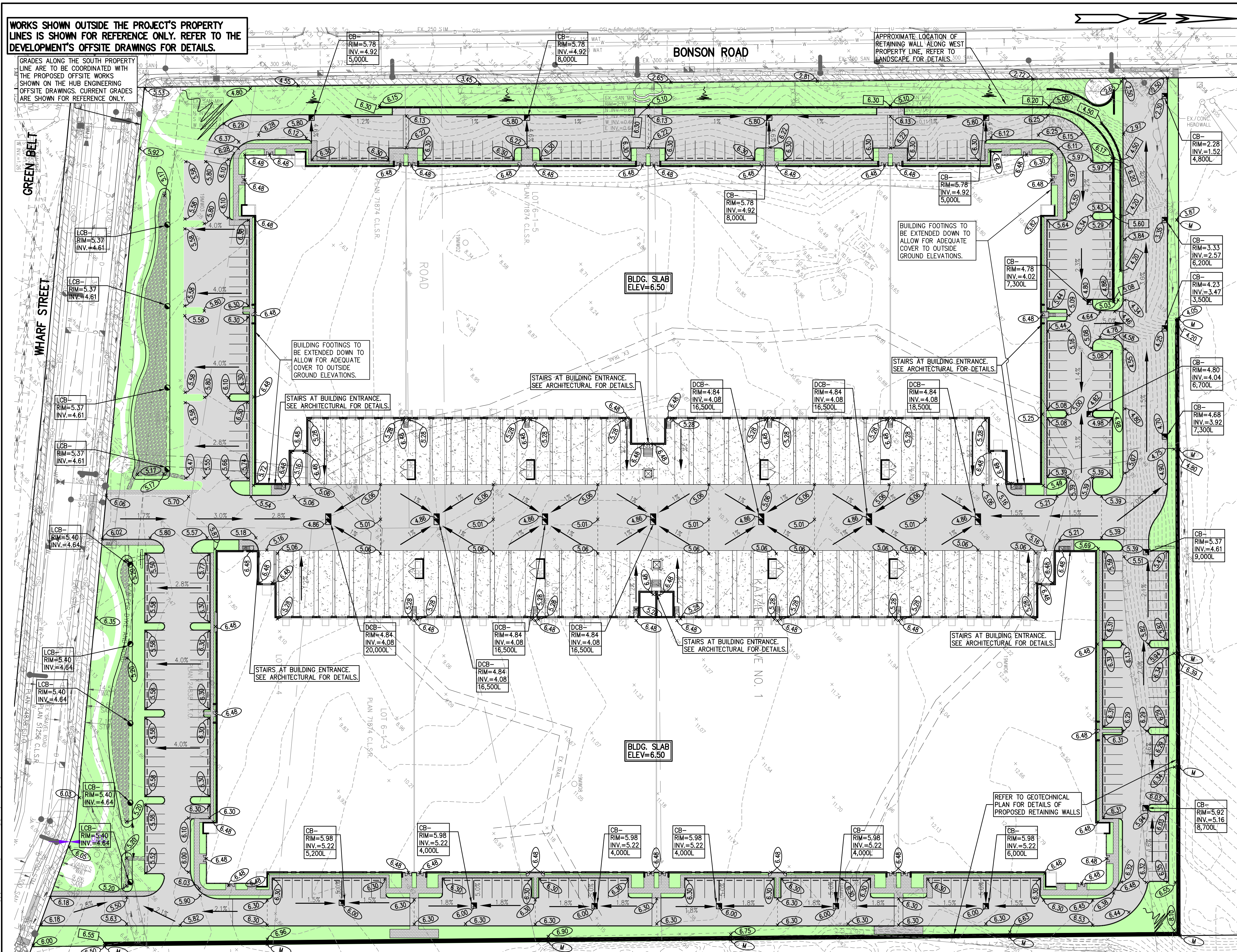
Kyla Milne, RPBio, QEP
Pacific Land Group, Biologist

APPENDIX A. Site Grading Plan

WORKS SHOWN OUTSIDE THE PROJECT'S PROPERTY LINE ARE TO BE COORDINATED WITH THE DEVELOPMENT'S OFFSITE DRAWINGS FOR DETAILS.

GRADES ALONG THE SOUTH PROPERTY LINE ARE TO BE COORDINATED WITH THE PROPOSED OFFSITE WORKS SHOWN ON THE HUB ENGINEERING OFFSITE DRAWINGS. CURRENT GRADES ARE SHOWN FOR REFERENCE ONLY.

APPROXIMATE LOCATION OF RETAINING WALL ALONG WEST PROPERTY LINE, REFER TO LANDSCAPE FOR DETAILS.



ON-SITE SITE GRADING LEGEND

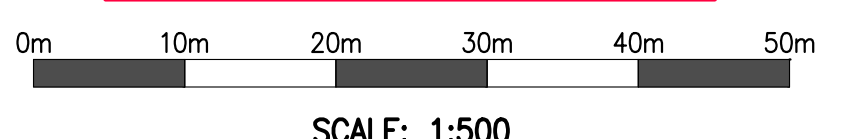
- EXISTING GROUND SURFACE ELEVATION.
- EXISTING GROUND SURFACE CONTOUR ELEVATION.
- EXISTING SWALE.
- PROPOSED SWALE.
- DIRECTION OF PROPOSED SURFACE FLOW.
- TOP
- BOTTOM
- PROPOSED SLOPE AS PER GEOTECHNICAL CONSULTANT'S REQUIREMENTS.
- NEW CATCHBASIN TO MMCD STANDARD S11 WITH DOBNEY B26B FRAME & GRATE c/w ALUMINUM TRAPPING HOOD ON THE OUTLET PIPE.
- PROPOSED LAWN DRAIN TO MMCD STANDARD S12 (TYPE 2) c/w ALUMINUM TRAPPING HOOD ON THE OUTLET PIPE.
- EXISTING GROUND SURFACE ELEVATION.
- PROPOSED FINISHED PAVEMENT/SURFACE ELEVATION.
- MEET EXISTING PAVEMENT/GROUND SURFACE ELEVATION.
- PROPOSED FINISHED TOP OF RETAINING WALL ELEVATION.
- PROPOSED PAVED AREA AS PER GEOTECHNICAL CONSULTANT'S REQUIREMENTS.
- PROPOSED ASPHALT PAVEMENT CUT & PATCH AS PER MMCD AND GEOTECHNICAL CONSULTANT'S REQUIREMENTS.
- PROPOSED CONCRETE AREA AS PER GEOTECHNICAL, LANDSCAPE AND ARCHITECTURAL CONSULTANT'S REQUIREMENTS.
- PROPOSED DECORATIVE PAVERS TO LANDSCAPE, ARCHITECTURAL AND GEOTECHNICAL CONSULTANT'S REQUIREMENTS.
- PROPOSED TOPSOIL AND SOD AS PER LANDSCAPE, ARCHITECTURAL REQUIREMENTS.
- DENOTES PROPOSED 0.6m WIDE x 60mm HIGH CONTINUOUS SPEED BUMP FOR ONSITE DRAINAGE CONTROL.
- APPROXIMATE LOCATION OF PROPOSED RETAINING WALL, DESIGN AND SITE REVIEWS BY OTHERS

ON-SITE SITE GRADING NOTES:

1. ALL DIMENSIONS ARE METRIC UNLESS NOTED OTHERWISE.
2. CONTRACTOR SHALL COMPLY WITH ALL NOTES AND SPECIFICATIONS ON THE "ON-SITE NOTES" SHEET.
3. CONTRACTOR SHALL RESTORE ANY AND ALL DISTURBED WORKS TO PRECONSTRUCTION CONDITION OR BETTER, AND TO THE SATISFACTION OF THE PROPERTY OWNER(S).
4. CONTRACTOR SHALL TIE-IN ALL NEW SURFACE WORKS TO EXISTING SURFACE WORKS FORMING A SMOOTH TRANSITION.
5. CONTRACTOR SHALL RESTORE EXISTING PAVEMENT CUT AND PATCHES TO MMCD STANDARDS. WHERE NEW ASPHALT PAVEMENT MEETS EXISTING ASPHALT PAVEMENT, CONTRACTOR SHALL PROVIDE A MINIMUM 200mm WIDE x 40mm THICK ASPHALT MILL AND LAP JOINT.
6. REFER TO ARCHITECTURAL DRAWINGS FOR SITE LAYOUT, BUILDING LAYOUT, LINE PAINTING, WHEELCHAIR DROPS & RAMPS AND CURB DETAILS.
7. REFER TO STRUCTURAL AND/OR GEOTECHNICAL DRAWINGS FOR RETAINING WALL DETAILS AND SPECIFICATIONS. CONSTRUCTION, INSPECTIONS AND CERTIFICATION OF RETAINING WALLS BY OTHERS.
8. UPON CONSTRUCTION SUBSTANTIAL COMPLETION, THE CONTRACTOR'S SURVEYORS TO PROVIDE HUB ENGINEERING INC. WITH COMPLETE CERTIFIED (B.C.L.S. OR P. ENG. SEAL) AS-BUILT INFORMATION FOR THE NEW WORKS AND SERVICES SHOWN ON THIS DRAWING. SURVEYOR TO COORDINATE WITH HUB ENGINEERING INC. PRIOR TO COMMENCEMENT OF THE AS-BUILT FIELD SURVEY.

FOR COORDINATION ONLY

NOT FOR CONSTRUCTION



BENCHMARK DATA
ALL ELEVATIONS ARE GEODETIC AND METRIC AND REFER TO SURREY MONUMENT No: 88H0617
LOCATED AT:
AND HAVING ELEVATION: 6.525m

NO.	REVISIONS	DATE:
1	UPDATED GRADING PER LATEST ARC BASE	APR. 20/22
2	ISSUED FOR REVIEW	FEB. 18/22
3	UPDATE GRADING PER LATEST ARCH BASE	AUG 27/21
4	ISSUED FOR KFN REVIEW	APR 22/21
5	UPDATE SLAB TO 6.5m	MAR 09/21
6	ADD 5 m RAPP SPEA, UPDATE BIOSWALES, UPDATE RETAINING WALLS	FEB 26/21

CONSULTANT: **Hub Engineering Inc.**
Engineering and Development Consultants
Member **PACIFIC LAND GROUP**
Suite 212, 12992 - 76 Avenue, Surrey, B.C. V3W 2V6
tel: 604-572-4328 | fax: 604-501-1625 | mail@hub-inc.com
www.hub-inc.com

EAGLE MEADOWS BUSINESS PARK

CLIENT: EPTA DEVELOPMENT CORP.
1910 - 117 WEST HASTINGS STREET
VANCOUVER, B.C. V6E 2K3
604-270-1890
PROJECT: EAGLE MEADOWS BUSINESS PARK
KATZIE RESERVE No. 1
KATZIE RESERVE No. 1

DATE: **Jul 28, 2022**

SHEET TITLE: **SITE GRADING PLAN KATZIE RESERVE No. 1**

MUNICIPAL PROJECT: **CTA-ONSITE**

HUB FILENAME: **20001-A**

DRAWING No. **20001-A**

REV. No. **1**

APPENDIX B. Storm Water Catchment Plan

**POST-DEVELOPMENT - BONSON ROAD
STORM SEWER DESIGN - RATIONAL METHOD**

Location: Eagle Meadows Business Park
 Ref. No.: 20001
 DF Curve: Pitt Meadows (Works Yard)
 Return Period: 100 Year

Q_{max} = Design Flow (m³/s)
 A = Area (ha)
 R = Runoff Coefficient
 I = Rainfall Intensity (mm/hr)
 N = 0.00278

$T_c = T_i + T_t$
 T_c = Time of Concentration (min)
 T_i = Inlet Time (min)
 T_t = Travel Time (min)
 $I = aT^b$ where I in mm/hr, T in hr
 a = 29.143
 b = -0.545

n = Roughness Coefficient
 V_{cap} = Velocity at Capacity (m/s)
 Q_{cap} = Flow at Capacity (m³/s)
 Date: 10-Jan-22
 Calc. By: Hub Engineering Inc. - MCKK
 Sheet: 2 of 2

Location		Tributary Area				Runoff				Sewer Design				HGL Condition		HGL Slope (%)				
From MH	To MH	Area No.	A (ha)	R	Σ (AR)	T _i (min)	T _t (min)	T _c (min)	I (mm/hr)	Q _{max} (m ³ /s)	Q _{cap} (m ³ /s)	Diameter (mm)	n	Slope (%)	V _{cap} (m/s)	Length (m)	HGL Condition	HGL Slope (%)		
CITY OF PITT MEADOWS - BONSON ROAD																				
EX-D-1	EX-D-2	A	0.13	0.55	0.07	0.07	10.00	1.69	11.69	71.0	0.014	0.033	250	0.013	0.310	0.67	68.5	IN GROUND	0.056	
EX-D-2	EX-D-3	B	0.74	0.55	0.41	0.48	11.69	2.16	13.86	64.7	0.086	0.032	250	0.013	0.290	0.65	84.7	SURFACE	2.097	
EX-D-3	EX-D-4	C	0.57	0.55	0.31	0.79	13.86	1.00	14.86	62.3	0.137	0.132	375	0.013	0.570	1.20	72.1	SURFACE	0.612	
EX-D-4	EX-D-5	D	0.11	0.55	0.06	0.85	14.86	0.43	15.29	61.3	0.145	0.213	600	0.013	0.120	0.75	19.6	SURFACE	0.056	
MH-D-8		EX-D-5	E	0.15	0.85	0.13	0.13	5.00	0.41	5.41	108.0	0.038	0.268	600	0.013	0.190	0.95	23.2	SURFACE	0.004
EX-D-5		EX-D-6			0.00	0.98	15.29	0.77	16.07	59.7	0.163	0.353	600	0.013	0.330	1.25	58.0	SURFACE	0.070	
		Σ		1.70 ha																

Jan-11-2022 - 4:56 PM G:\Projects\20001.ctb\B1 Design\Storm Analysis\2022-01-07 STMP Calculations.xlsx\100-YR Flow (Bonson Post)

**PRE-DEVELOPMENT - BONSON ROAD
STORM SEWER DESIGN - RATIONAL METHOD**

Location: Eagle Meadows Business Park
 Ref. No.: 20001
 DF Curve: Pitt Meadows (Works Yard)
 Return Period: 100 Year

Q_{max} = Design Flow (m³/s)
 A = Area (ha)
 R = Runoff Coefficient
 I = Rainfall Intensity (mm/hr)
 N = 0.00278

$T_c = T_i + T_t$
 T_c = Time of Concentration (min)
 T_i = Inlet Time (min)
 T_t = Travel Time (min)
 $I = aT^b$ where I in mm/hr, T in hr
 a = 29.143
 b = -0.545

n = Roughness Coefficient
 V_{cap} = Velocity at Capacity (m/s)
 Q_{cap} = Flow at Capacity (m³/s)
 Date: 10-Jan-22
 Calc. By: Hub Engineering Inc. - MCKK
 Sheet: 1 of 2

Location		Tributary Area				Runoff				Sewer Design				HGL Condition		HGL Slope (%)				
From MH	To MH	Area No.	A (ha)	R	Σ (AR)	T _i (min)	T _t (min)	T _c (min)	I (mm/hr)	Q _{max} (m ³ /s)	Q _{cap} (m ³ /s)	Diameter (mm)	n	Slope (%)	V _{cap} (m/s)	Length (m)	HGL Condition	HGL Slope (%)		
CITY OF PITT MEADOWS - BONSON ROAD																				
EX-D-1	EX-D-2	A	0.13	0.55	0.07	0.07	10.00	1.69	11.69	71.0	0.014	0.033	250	0.013	0.310	0.67	68.5	IN GROUND	0.056	
EX-D-2	EX-D-3	B	0.74	0.55	0.41	0.48	11.69	2.16	13.86	64.7	0.086	0.032	250	0.013	0.290	0.65	84.7	SURFACE	2.097	
EX-D-3	EX-D-4	C	0.57	0.55	0.31	0.79	13.86	1.00	14.86	62.3	0.137	0.132	375	0.013	0.570	1.20	72.1	SURFACE	0.612	
EX-D-4	EX-D-5	D	0.11	0.55	0.06	0.85	14.86	0.43	15.29	61.3	0.145	0.213	600	0.013	0.120	0.75	19.6	SURFACE	0.056	
MH-D-8		EX-D-5	E	0.15	0.85	0.13	0.13	5.00	0.41	5.41	110.0	0.038	0.268	600	0.013	0.190	0.95	23.2	SURFACE	3.570
EX-D-5		EX-D-6			0.00	1.31	45.41	0.77	46.18	33.6	1.229	0.353	600	0.013	0.330	1.25	58.0	SURFACE	4.007	
		Σ		32.31 ha																

Jan-11-2022 - 4:57 PM G:\Projects\20001.ctb\B1 Design\Storm Analysis\2022-01-07 STMP Calculations.xlsx\100-YR Flow (Bonson Pre)

**POST-DEVELOPMENT
STORM SEWER DESIGN - INFOWORKS ICM 13.1.5**

LOCATION: Katzie Reserve No.1
 REF. No.: 20001
 Rain Gauge: Katzie Pump Station
 Return Period: 10 Year and 100 Year 24hr Rainstorms

Q=Pipe Diameter (mm)
 n=Roughness Coefficient
 S=Slope of Pipe (%)
 Vcap=Velocity at Capacity (m/s)
 L=Length of Pipe (m)
 Qcap=Flow at Capacity (m³/s)

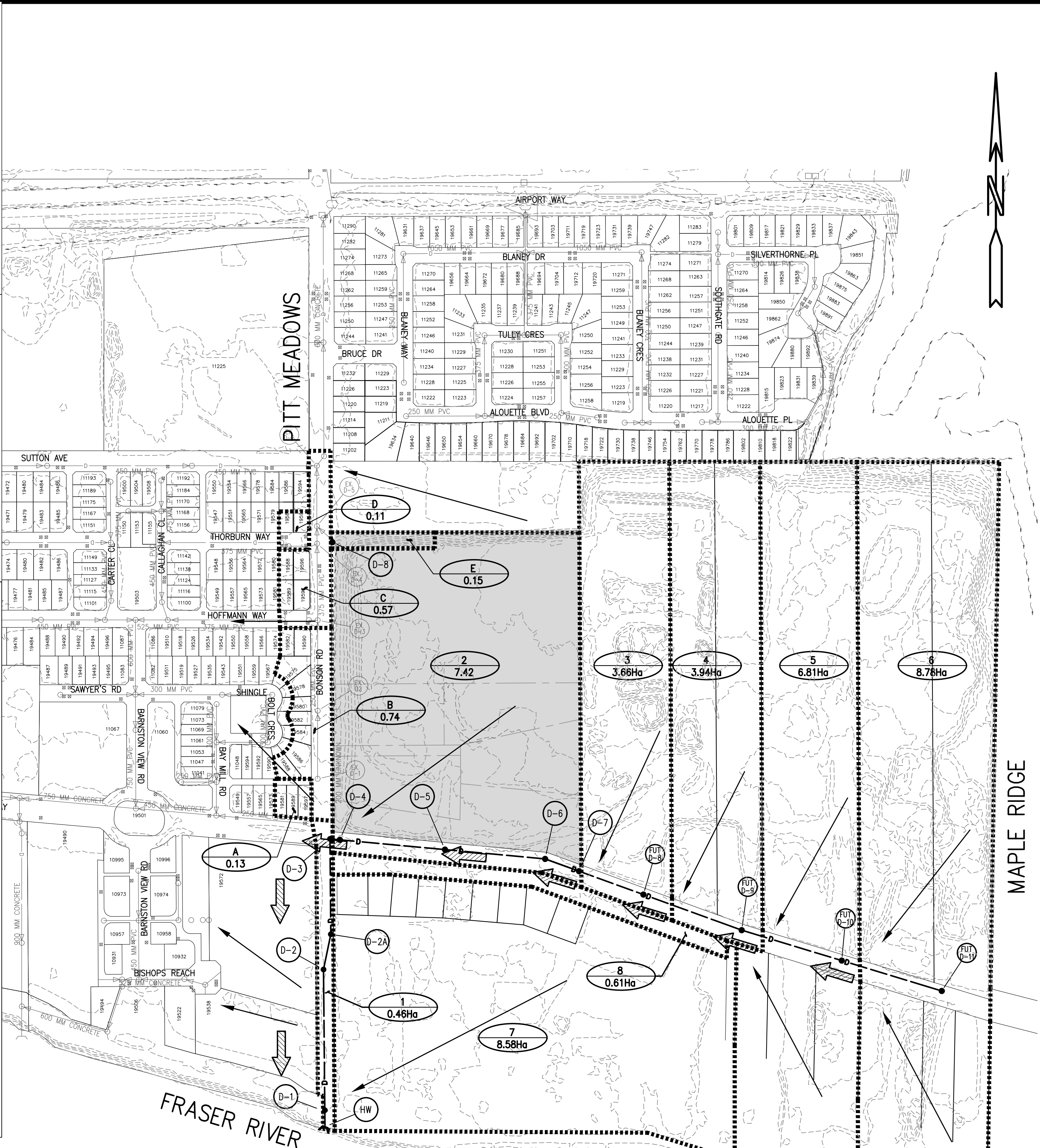
Date: January 27, 2022
 Calc. By: MN
 Sheet: 1 of 1

Location		Segment		Tributary Area		Max Flow in Pipe		Sewer Design				100 yr. HGL Condition at Upstream Node		
From	To	Link Name	Area No.	A (ha)	Impervious (%)	Q - 10 Year (m ³ /s)	Q - 100 Year (m ³ /s)	Qcap (m ³ /s)	Ø (mm)	n	S (%)	Vcap (m/s)	L (m)	100 yr. HGL Condition at Upstream Node
Fraser Way														
FUT-D-11	FUT-D-10	MH-D-11.1	6	8.78	90	0.130	0.284	0.905	900	0.013	0.250	1.42	100.0	IN GROUND
FUT-D-10	FUT-D-9	MH-D-10.1	5	6.81	90	0.222	0.511	0.905	900	0.013	0.250	1.42	100.0	IN GROUND
FUT-D-9	FUT-D-8	MH-D-9.1	4	3.94	90	0.281	0.596	1.221	1050	0.013	0.200	1.41	100.0	IN GROUND
FUT-D-8	D-7	MH-D-8.1	3	3.66	90	0.343	0.715	1.489	1200	0.013	0.146	1.32	65.5	IN GROUND
D-7	D-6	MH-D-7.1	-	-	-	0.344	0.715	1.488	1200	0.013	0.146	1.32	34.3	IN GROUND
D-6	D-5	MH-D-6.1	-	-	-	0.345	0.715	1.486	1200	0.013	0.145	1.31	96.3	IN GROUND
D-5	D-4	MH-D-5.1	-	-	-	0.435	0.920	1.452	1200	0.013	0.139	1.28	100.9	IN GROUND
D-4	D-3	MH-D-4.1	2	7.42	90	0.435	0.920	2.054	1200	0.013	0.278	1.82	10.8	IN GROUND
Bonson Road														
D-3	D-2A	MH-D-3.1	1	0.46	90	0.483	0.952	2.149	1200	0.013	0.304	1.90	92.0	IN GROUND
D-2A	D-2	-	-	-	-	0.483	0.952	2.149	1200	0.013	0.304	1.90	34.0	IN GROUND
D-2	D-1	MH-D-2.1	-	-	-	0.483	0.952	2.123	1200	0.013	0.297	1.88	134.8	IN GROUND
D-1	HW	MH-D-1.1	7	8.58	40	1.113	1.746	2.522	1200	0.013	0.419	2.23	19.1	IN GROUND
Note: Fraser River HGL elevations provided by Northwest Hydraulics Consultants (10yr = 3.7m) (100yr = 4.7m) Note: All commercial lots are assumed to restrict 100yr and 10yr flows to pre-development conditions.														
Imperv. Roughness = 0.013 Perv. Roughness = 0.250 Imperv. Storage Depth = 0.071 mm Perv. Storage Depth = 0.280 mm Initial Infiltration = 76.00 mm/hr Limiting Infiltration = 2.50 mm/hr Decay Factor = 2.00 hr ⁻¹ Maximum Infiltration = 50 mm														

Apr/29/2022 - 1:54 PM G:\Projects\20001.ctb\B1 Design\Storm Analysis\ICM Model\2022-01-27 SWCP for 20001.xlsx\Infoworks ICM INTERM

SUSTAINABLE DRAINAGE FEATURES FOR KATZIE INDUSTRIAL/COMMERCIAL SITES

- EACH KATZIE INDUSTRIAL/COMMERCIAL SITE SHALL PROVIDE THE FOLLOWING
- MINIMUM 150mm TOPSOIL ON ALL PERVIOUS AREAS. TO BE DETAILED ON LANDSCAPE DRAWINGS.
 - ALL IMPERVIOUS AREAS TO BE GRADED TOWARDS THE PERVIOUS AREAS TO MAXIMIZE THE ON-LOT TOPSOIL LAYER, WHEN POSSIBLE.
 - LIMIT 10-YEAR AND 100-YEAR POST DEVELOPMENT RETURN PERIOD STORM RELEASE RATE TO PRE-DEVELOPMENT RETURN PERIOD RELEASE RATES.
 - ADEQUATELY SIZED OIL AND GRIT INTERCEPTOR TO BE INSTALLED FOR WATER QUALITY TREATMENT AS PER KATZIE/CITY OF PITT MEADOWS REQUIREMENTS.



LEGEND

- (D-X) MANHOLE NUMBER
- 4 2.30Ha LOT NUMBER AND AREA (Ha)
- DIRECTION OF FLOW FOR SURFACE RUNOFF AND SIDEYARD SWALE
- STORM SEWER
- SUB-CATCHMENT BOUNDARY
- CATCHMENT BOUNDARY
- 100 YR. FLOOD PATH IN PIPE
- 100 YR. FLOOD PATH BELOW GROUND SURFACE
- 100 YR. FLOOD PATH OVERLAND
- EXISTING GROUND CONTOUR
- EXISTING DITCH
- SUBJECT SITE

LEGAL DESCRIPTION: ----
 SURVEY BENCHMARK: MON: 88H0617
 SCALE FACTOR: ELEV.: 6.525m (GEOID/TIC)

REV.	DATE	DESCRIPTION	BY
6	APR 25/22	ADD NOTES ON SUSTAINABLE DRAINAGE	KK
5	FEB 10/22	ADDRESS COMMENTS	KK
4	NOV 17/21	ISSUED FOR MUNICIPAL REVIEW	KK
3	OCT 07/21	ISSUED FOR REVIEW	KK
2	JUL 25/21	ISSUED FOR MUNICIPAL REVIEW	MC

CONSULTANT
Hub Engineering Inc.
 Engineering and Development Consultants
 EGBC Permit to Practice Number: 1003404
 Suite 212, 12992 - 76 Avenue, Surrey, B.C. V3W 2V6
 Tel: 604-572-4328 | Fax: 604-501-1625 | mail@hub-inc.com
 www.hub-inc.com

CLIENT
EM BUSINESS PARK LTD.
 1910 - 1177 WEST HASTINGS STREET
 VANCOUVER, B.C., V6E 2K3, TEL: (604) 270-1890

TITLE
STORM WATER CATCHMENT PLAN

EAGLE MEADOWS BUSINESS PARK

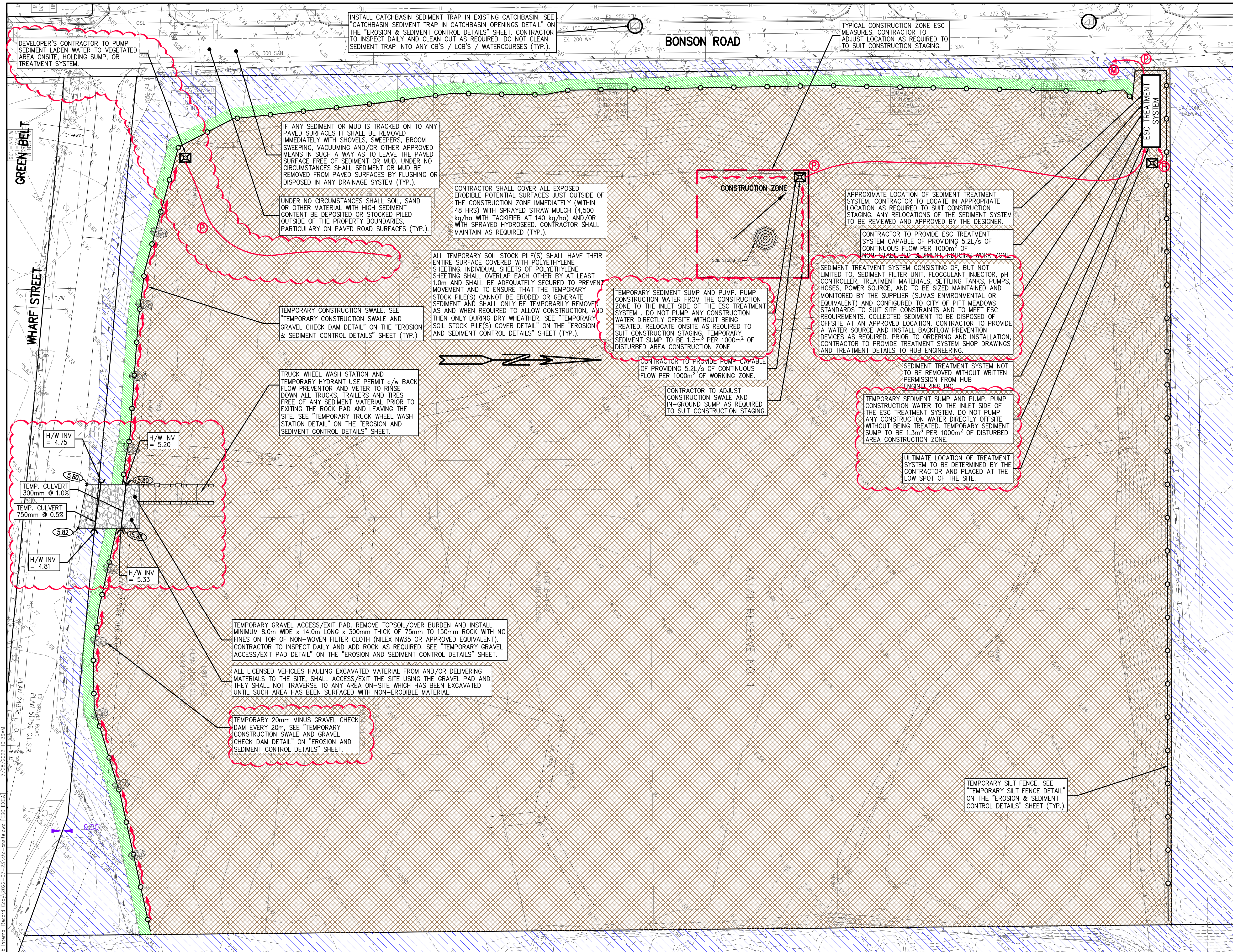
SEAL
 SCALE: HOR. 1:2500 VERT.
 DATE (YYYY.MM.DD) FEB 2020
 CONSULTANT PROJ. NO. 20001
 DESIGNED MC/MN/KK
 DRAWN AKG
 REVIEWED KL/RFG
 REV. 6

MUNICIPAL PROJECT NUMBER
 DRAWING TYPE
DRAINAGE

Jul 28, 2022

DESTROY ALL PRINTS BEARING PREVIOUS NUMBER

APPENDIX C. Mass Excavation Erosion and Sediment Control Plan



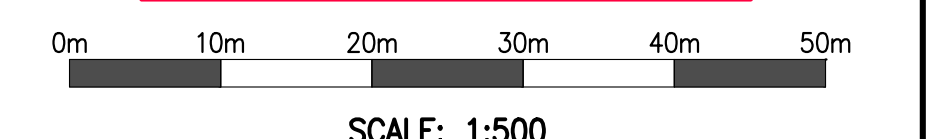
EROSION & SEDIMENT CONTROL LEGEND

- EXISTING GROUND SURFACE ELEVATION.
- EXISTING GROUND SURFACE CONTOUR ELEVATION.
- MEET
- 73.70
- FINISHED GROUND SURFACE ELEVATION.
- NEW CATCHBASIN.
- NEW LAWN DRAIN.
- NEW CLEANOUT.
- TEMPORARY CATCHBASIN SEDIMENT TRAP IN EXISTING CATCHBASIN.
- TEMPORARY CATCHBASIN SEDIMENT TRAP IN NEW CATCHBASIN.
- TEMPORARY CATCHBASIN SEDIMENT TRAP IN NEW LAWNBASIN.
- TEMPORARY OVERFLOW RISER PIPE IN TEMPORARY SEDIMENT CONTROL POND.
- TEMPORARY SILT FENCE.
- TEMPORARY CLEAN WATER CUT OFF SWALE.
- TEMPORARY CONSTRUCTION SWALE.
- TEMPORARY LONGITUDINAL GRAVEL CHECK DAM.
- TEMPORARY STORM PIPE AND SANDBAG HEADWALLS PER CITY OF PITT MEADOWS STANDARDS.
- TEMPORARY EXCAVATED IN-GROUND SUMP.
- TOP
- BOTTOM
- SLOPE AS PER GEOTECHNICAL REQUIREMENTS.
- DIRECTION OF SURFACE RUNOFF FLOW
- SUB BASE AND BASE GRAVELS TO GEOTECHNICAL CONSULTANT'S REQUIREMENTS.
- TEMPORARY GRAVEL ACCESS PAD.
- APPROXIMATE AREA OF CONSTRUCTION
- DO NOT DISTURB AREAS
- APPROXIMATE AREA OF HYDRO SEED.
- MONITORING POINT LOCATION
- APPROXIMATE TEMPORARY PUMP LOCATION

- ### EROSION & SEDIMENT CONTROL NOTES:
1. ALL SEDIMENT & EROSION CONTROL WORKS SHALL BE UNDERTAKEN IN FULL COMPLIANCE WITH THE "EROSION & SEDIMENT CONTROL DETAILS" SHEET, THE "EROSION & SEDIMENT CONTROL NOTES" SHEET.
 2. REFER TO THE "UNDERGROUND SERVICES PLAN" FOR UNDERGROUND SERVICES AND REFER TO THE "LOT GRADING PLAN" FOR FINISHED GROUND SURFACE ELEVATIONS.
 3. THE CONTRACTOR SHALL ENSURE THAT ALL WORK UNDER THIS PROJECT IS UNDERTAKEN AND COMPLETED IN SUCH MANNER AS TO PREVENT THE RELEASE INTO ANY WATER COURSE, STORM SEWER, OR DRAINAGE SYSTEM OF ANY SEDIMENT LADEN WATER WHICH CONTAINS TOTAL SUSPENDED SOLIDS (T.S.S.) IN EXCESS OF 75 MILLIGRAMS PER LITER (mg/L).
 4. RAIN GAUGE STATION: KATZIE PUMP STATION. A SIGNIFICANT RAINFALL EVENT IS CONSIDERED TO BE 25mm OR GREATER OF TOTAL RAINFALL DEPTH IN A 24 HOUR PERIOD.
 5. ALL SEDIMENT CONTROL WORKS SHALL REMAIN IN PLACE UNTIL THE DEVELOPMENT HAS REACHED AT LEAST 90% ULTIMATE CONSTRUCTION COMPLETION AND HUB ENGINEERING PROVIDES WRITTEN PERMISSION TO DECOMMISSION AND REMOVE THE TEMPORARY SEDIMENT CONTROL WORKS.
 6. APPROXIMATE DISTURBED AREA = 7 ha
 7. CONTRACTOR SHALL COMPLY WITH ALL THE GEOTECHNICAL RECOMMENDATION IN THE GEOTECHNICAL REPORT PREPARED BY: GEOPACIFIC.

FOR COORDINATION ONLY

NOT FOR CONSTRUCTION



NO.	REVISIONS	DATE
1	ISSUED FOR REVIEW	MAY 19/22
2	ISSUED FOR REVIEW	FEB. 18/22
3	ISSUED FOR REVIEW	AUG. 14/20

SCALE: HORIZ. : 1:500
VERT. : 1:500

DESIGNED: MC
DRAWN: AKG
CHECKED: KL
APPROVED: KL

DATE: FEB 2020

CONSULTANT: **Hub Engineering Inc.**
Engineering and Development Consultants

Member
PACIFIC LAND GROUP

Suite 212, 12992 - 76 Avenue, Surrey, B.C. V3W 2V6
tel: 604-572-4328 | fax: 604-501-1625 | mail@hub-inc.com
www.hub-inc.com

EAGLE MEADOWS
BUSINESS PARK

CLIENT: EPTA DEVELOPMENT CORP.
1910 - 117 WEST HASTINGS STREET
VANCOUVER, B.C., V6E 2K3
604-270-1890

PROJECT: EAGLE MEADOWS BUSINESS PARK
KATZIE RESERVE No. 1

KATZIE RESERVE No. 1

SEAL: **Jul 28, 2022**

SHEET TITLE: ESC - MASS EXCAVATION
KATZIE RESERVE No. 1

MUNICIPAL PROJECT: -

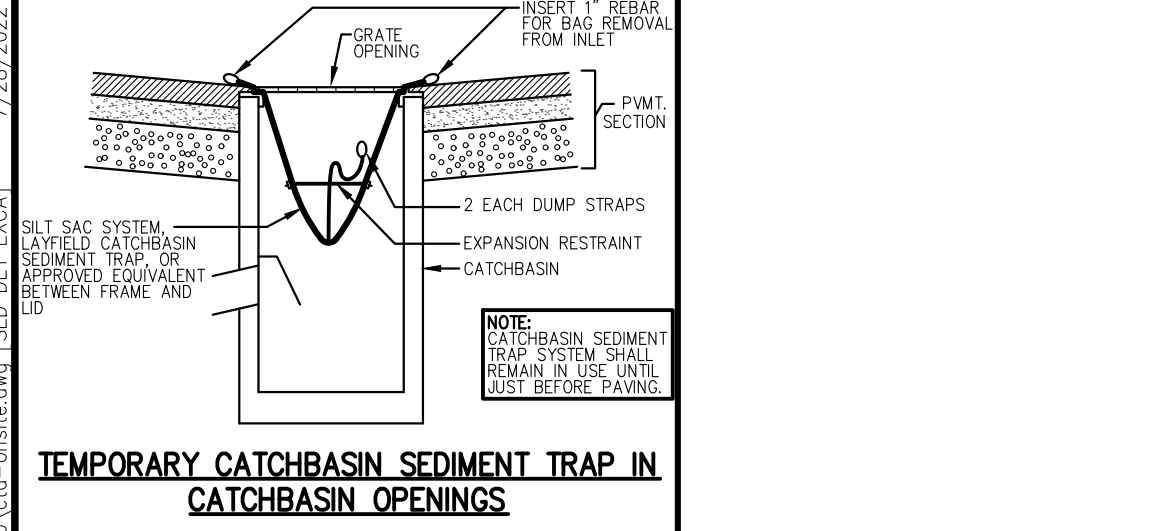
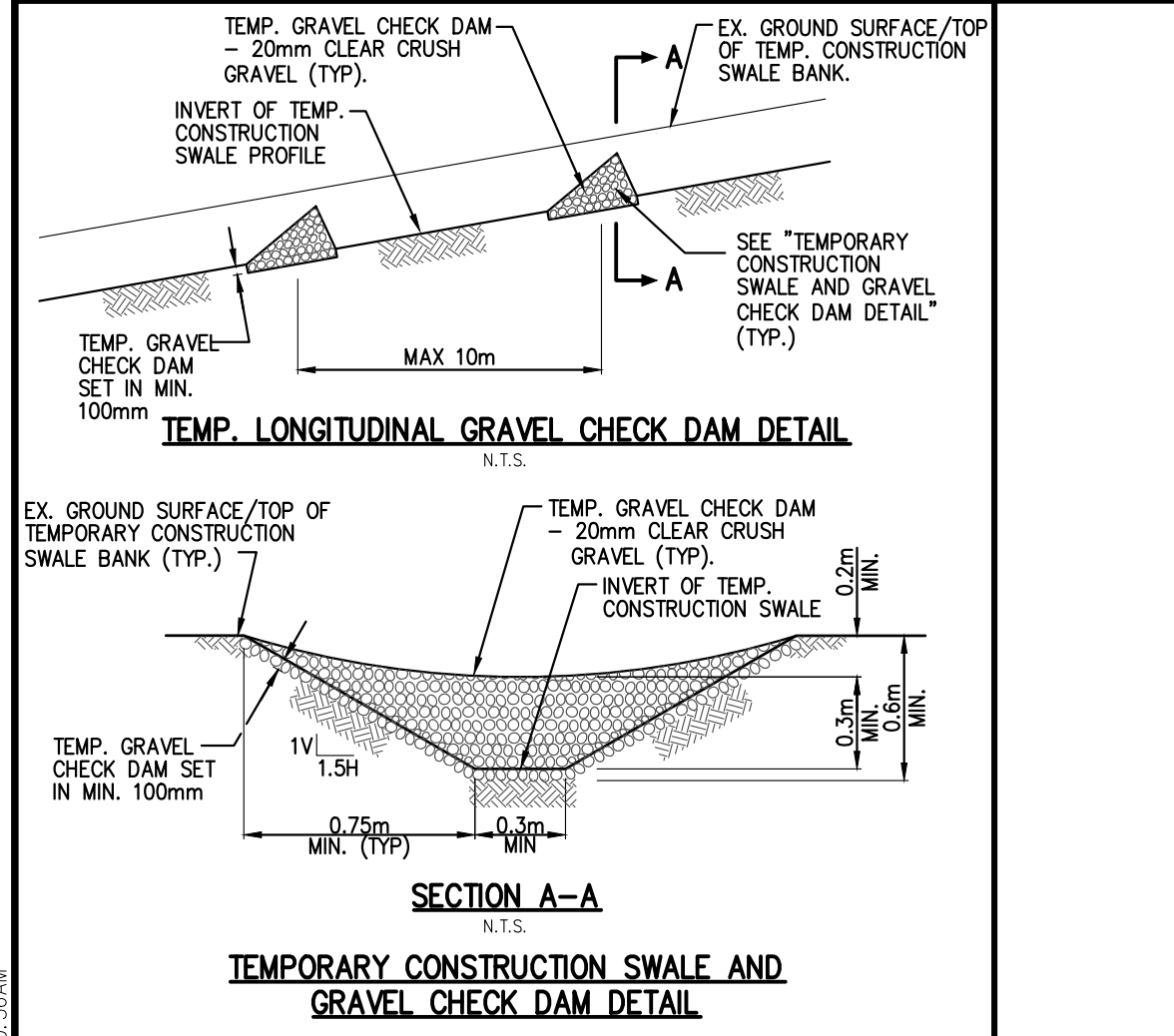
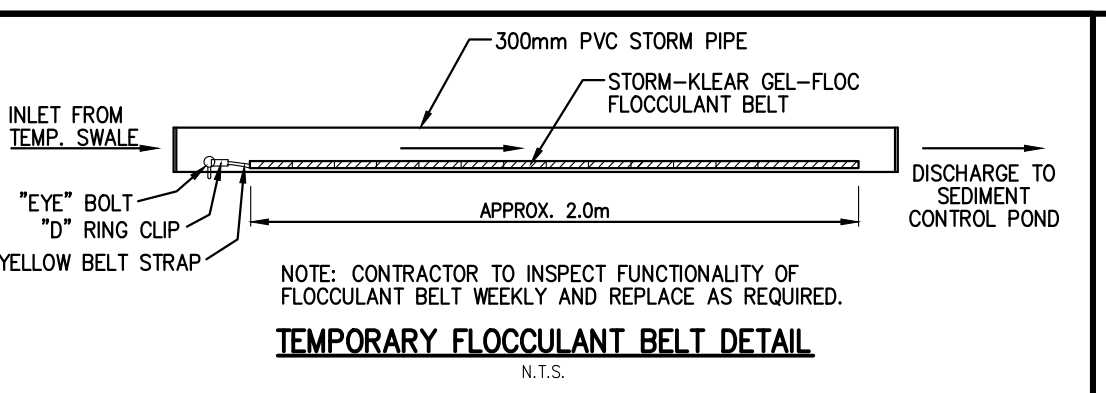
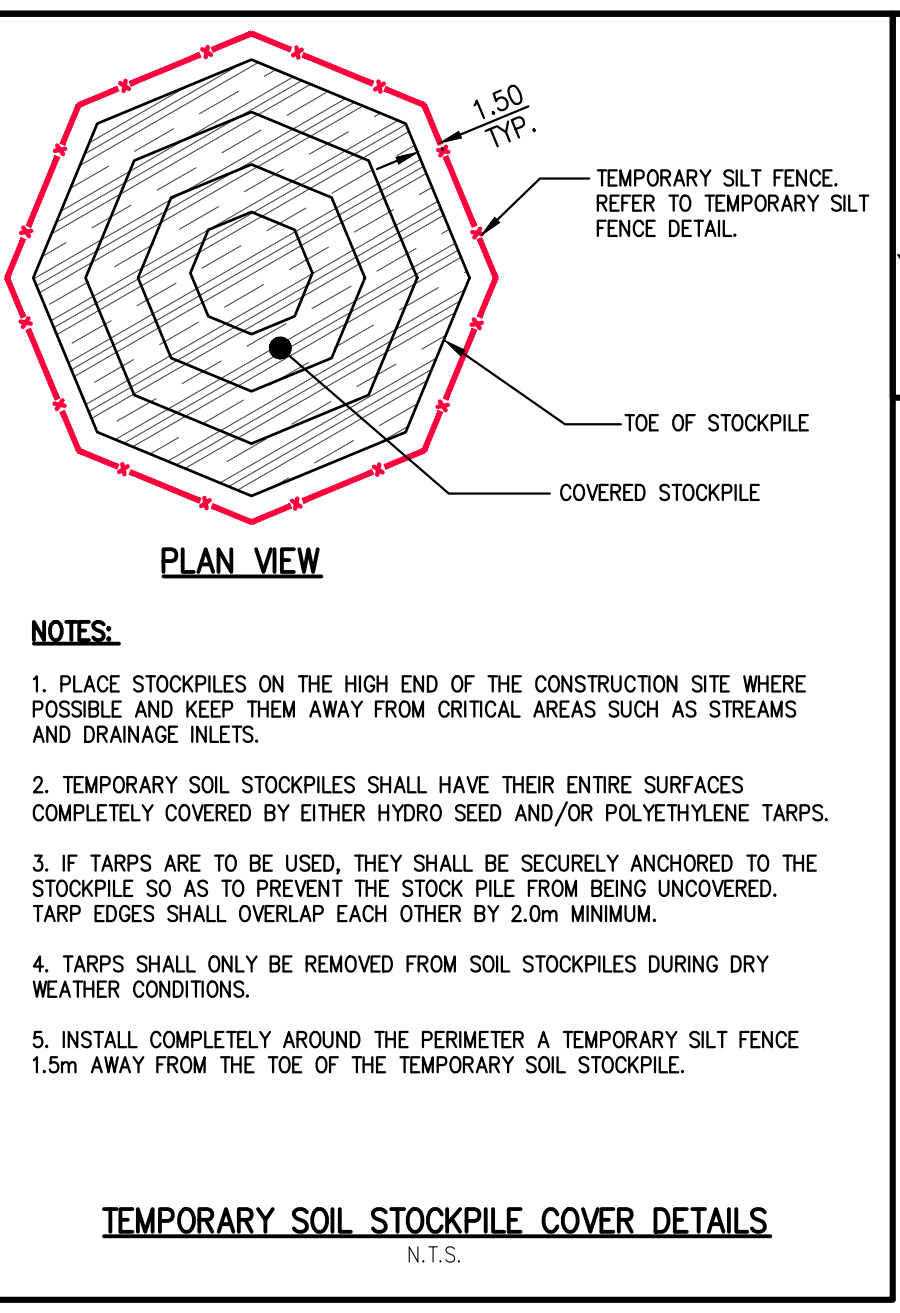
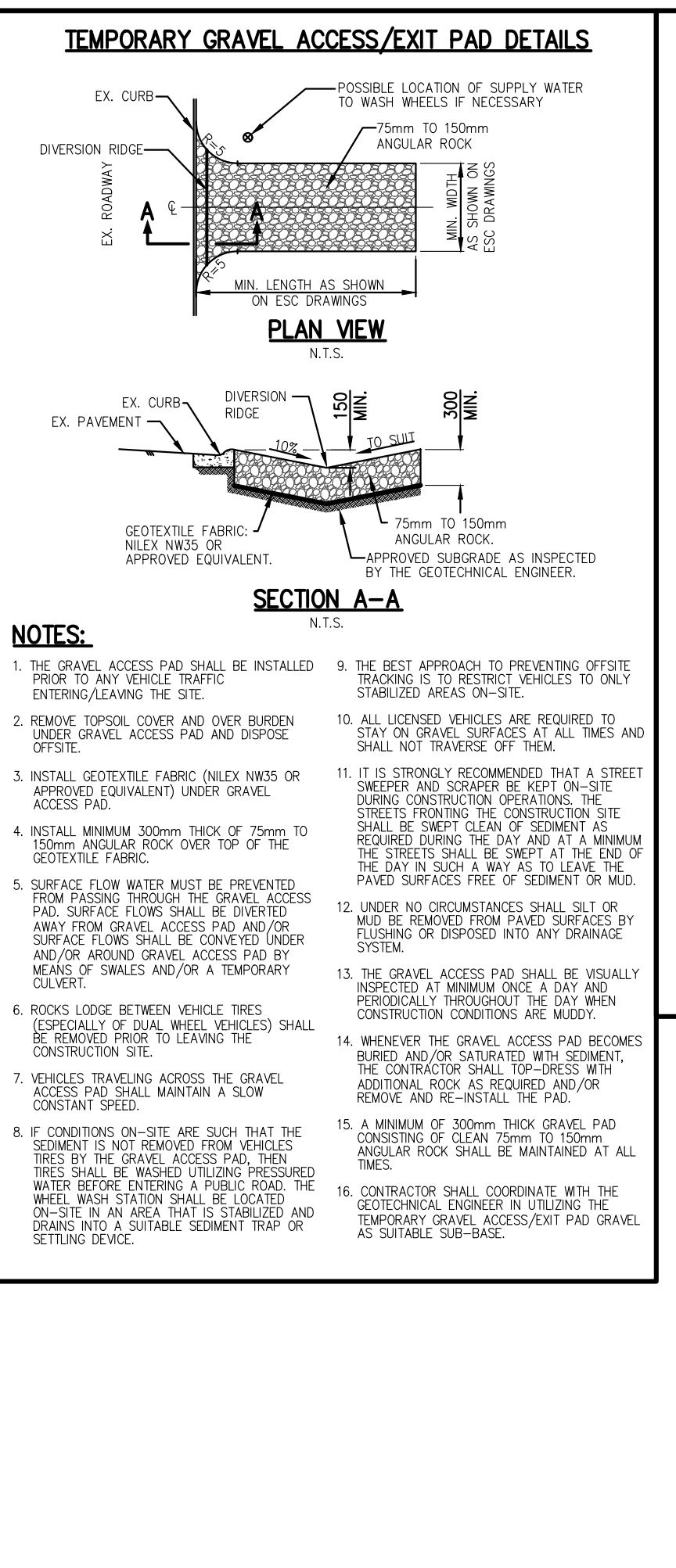
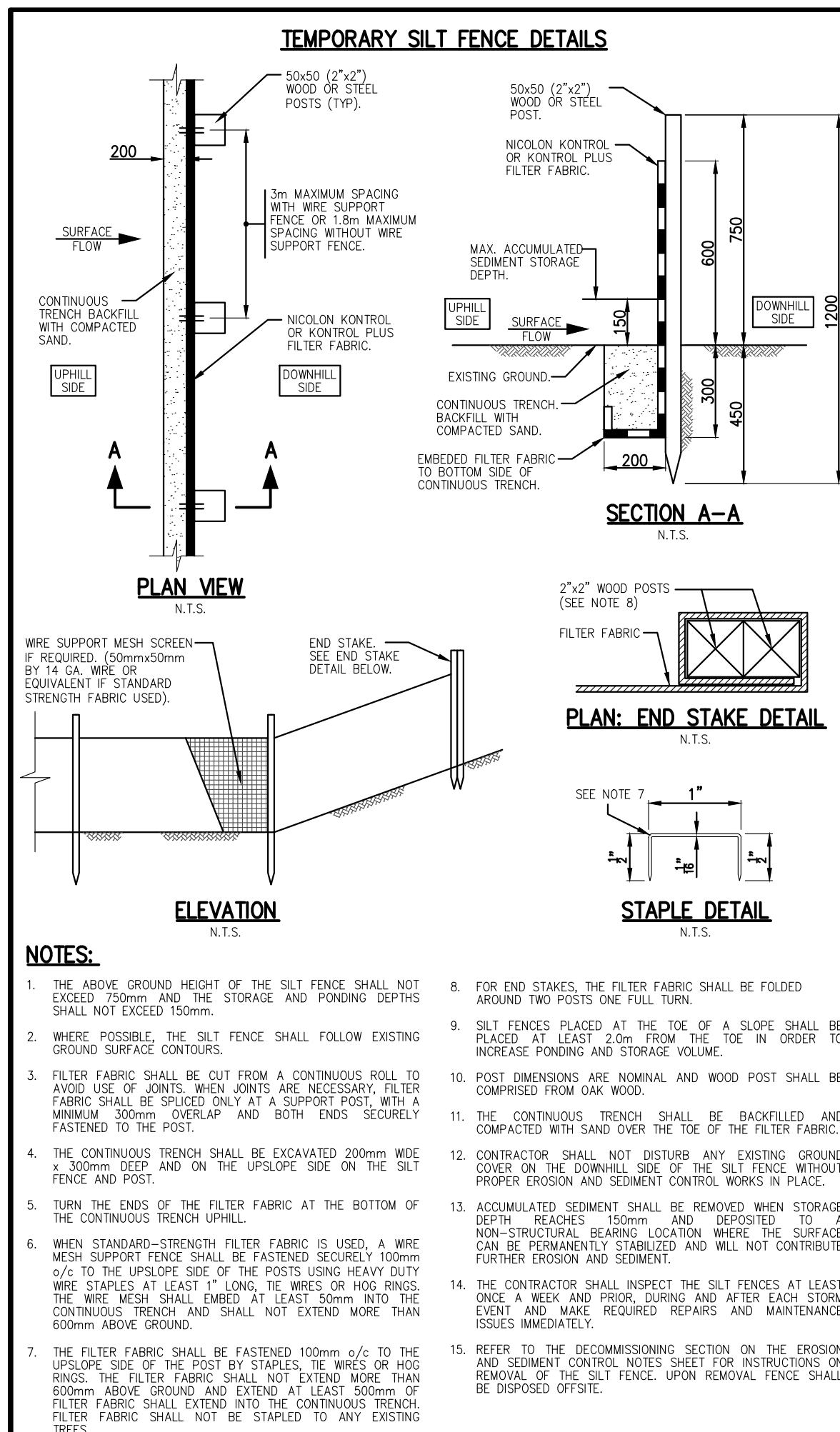
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DRAWING No. **20001-ESC-1**

REV. No. 1

DESTROY ALL PRINTS BEARING PREVIOUS REVISION NUMBER

BENCHMARK DATA
ALL ELEVATIONS ARE
GEODETIC AND METRIC
AND REFER TO SURREY
MONUMENT No:
88H0617
LOCATED AT:
-
AND HAVING
ELEVATION:
6.525m



TEMPORARY ESC STORM WATER RUNOFF SUMP VOLUME CALCS

Client: EPTA Development Corp
 Project Location: Katie Reserve No. 1
 Type of Analysis: Minimum Onsite Sump Size Per 1000m² of Disturbed Area

Date of Analysis: May 20, 2022
 Hub Project Number: 20001

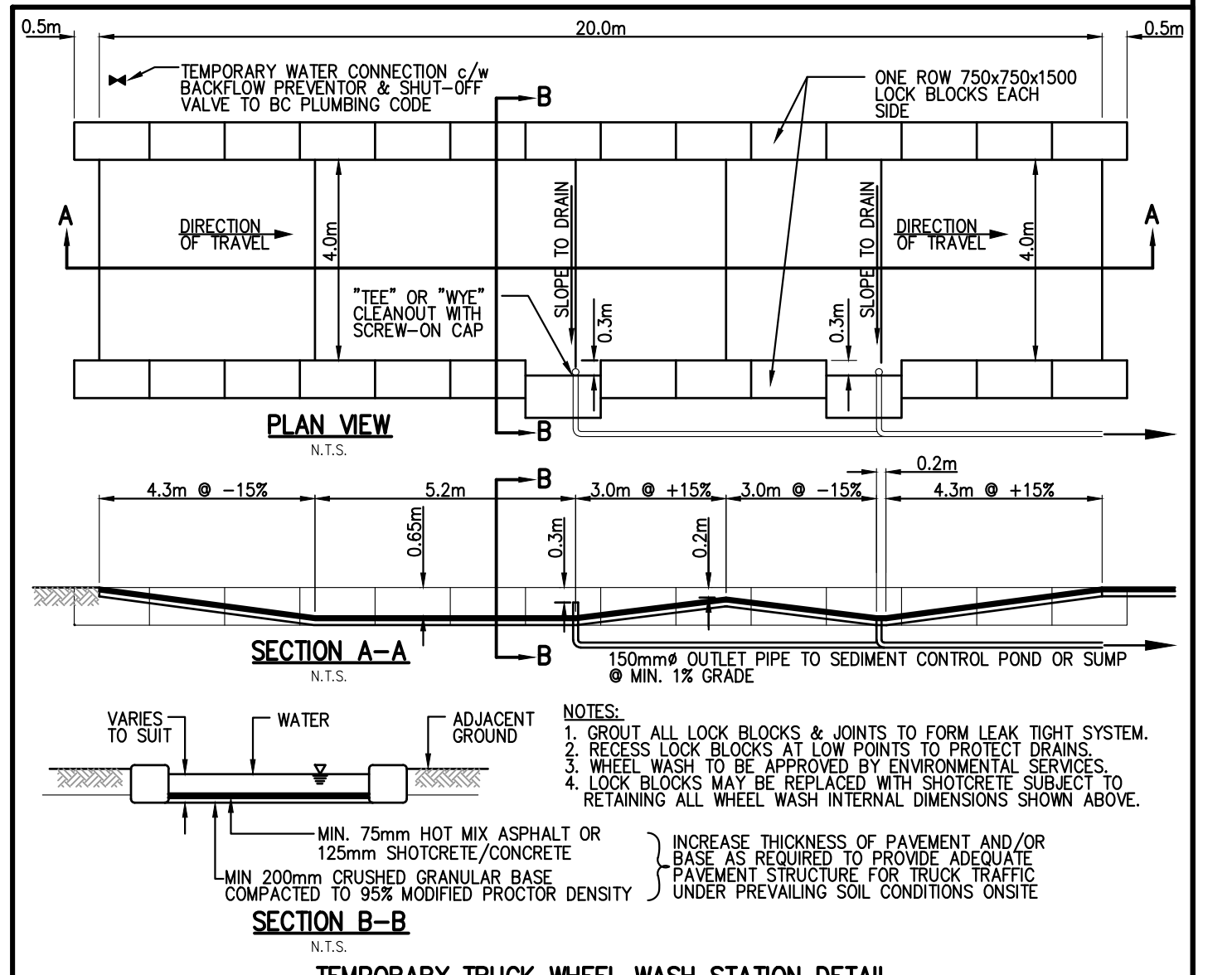
5-yr Stage One ESC Parameters:
 R (Runoff Coef): 0.50
 Catchment Area (ha): 0.100 Ha
 N: 0.002777778

IDF Curve: Pitt Meadows (Works Yard)
 $I = K \cdot w^a \cdot t^b$ where w (mm/hr), t (hr), a & b are constants.
 $a_{5yr} = 16.677$
 $b_{5yr} = -0.491$

Pump Rate: 0.0052 m³/s

Duration (min)	Intensity (mm/hr)	Peak Inflow (m ³ /s)	Inflow Volume (m ³)	Release Rate (m ³ /s)	Outflow Volume (m ³)	Storage Volume (m ³)
5	56.5	0.00942	2.8	0.00520	1.6	1.3
10	40.2	0.00670	4.0	0.00520	3.1	0.9
15	32.9	0.00549	4.9	0.00520	4.7	0.3
20	28.6	0.00477	5.7	0.00520	6.2	0.0
30	23.4	0.00391	7.0	0.00520	9.4	0.0
40	20.4	0.00339	8.1	0.00520	12.5	0.0
50	18.2	0.00304	9.1	0.00520	15.6	0.0
60	16.7	0.00278	10.0	0.00520	18.7	0.0
120	11.9	0.00198	14.2	0.00520	37.4	0.0
180	9.7	0.00162	17.5	0.00520	56.2	0.0
240	8.4	0.00141	20.3	0.00520	74.9	0.0
300	6.9	0.00115	24.9	0.00520	112.3	0.0
480	6.0	0.00100	28.8	0.00520	149.8	0.0
600	5.4	0.00090	32.3	0.00520	187.2	0.0
720	4.9	0.00082	35.4	0.00520	224.6	0.0
1440	3.5	0.00058	50.4	0.00520	449.3	0.0
2000	3.0	0.00050	59.6	0.00520	624.0	0.0
3000	2.4	0.00041	73.3	0.00520	936.0	0.0
4000	2.1	0.00035	84.8	0.00520	1248.0	0.0
5000	1.9	0.00032	95.1	0.00520	1560.0	0.0
6000	1.7	0.00029	104.3	0.00520	1872.0	0.0
7200	1.6	0.00026	114.4	0.00520	2246.4	0.0
8400	1.5	0.00025	123.8	0.00520	2620.8	0.0
10000	1.4	0.00023	135.3	0.00520	3120.0	0.0

MINIMUM DETENTION VOLUME REQUIRED = 1.3



BENCHMARK DATA
 ALL ELEVATIONS ARE GEODETIC AND METRIC AND REFER TO SURREY MONUMENT No: 88H0617
 LOCATED AT: -
 AND HAVING ELEVATION: 6.525m

NO.	REVISIONS	DATE
1	ISSUED FOR REVIEW	MAY 19/22
2	ISSUED FOR REVIEW	FEB. 18/22
3	ISSUED FOR REVIEW	AUG. 14/20

SCALE: HORIZ.: 1:500
 VERT.: -
 DESIGNED: MC
 DRAWN: AKG
 CHECKED: KL
 APPROVED: KL
 DATE: FEB 2020

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EAGLE MEADOWS BUSINESS PARK

CLIENT: EPTA DEVELOPMENT CORP.
 1910 - 117 WEST HASTINGS STREET
 VANCOUVER, B.C. V6E 2K3
 604-270-1890

PROJECT: EAGLE MEADOWS BUSINESS PARK
 KATZIE RESERVE No. 1
 KATZIE RESERVE No. 1

SEAL: Jul 28, 2022

SHEET TITLE: ESC - MASS EXCAVATION DETAILS
 KATZIE RESERVE No. 1

MUNICIPAL PROJECT: -
 HUB FILENAME: CTA-ONSITE
 DRAWING No: 20001-ESC-5
 REV. No: 1

DESTROY ALL PRINTS BEARING PREVIOUS REVISION NUMBER