REGIONAL DISTRICT OF NANAIMO

REQUEST FOR PROPOSALS No. 22-064

Coats Marsh Replacement Weir Elevation Study

Addendum 1
Issued: July 8, 2022

Closing Date & Time: on or before 3:00 PM Pacific Time on July 26, 2022

This addendum shall be read in conjunction with and considered as an integral part of the Request for Proposal. Revisions supersede the information contained in the original Proposal or previously issued Addendum. No consideration will be allowed for any extras due to any Proponent not being familiar with the contents of this Addendum. All other terms and conditions remain the same.

Question #1
Does the RDN have any topographic survey data available for the existing weir and within the marsh?

Response #1
Please see the attached documents for the survey data that the RDN has available.

Attachment 1: Survey from JE Anderson & Associates, dated March 22, 2012

Attachment 2: Post Construction Report – Coats Marsh Flood Protection Berm from Madrone Environmental Services Ltd., dated September 12, 2013

End of Addendum 1

SITE PLAN

RDN

LOT 5, SECTION 10, GABRIOLA ISLAND, NANAIMO DISTRICT, PLAN 30051; AND THE NORTH WEST 1/4 OF SECTION 10, GABRIOLA ISLAND, NANAIMO DISTRICT, EXCEPT THOSE PARTS IN PLANS 29152, 30043 AND 30051

ADDRESS : COATS DRIVE	
PROJECT SURVEYOR : D.W. HOLME	
DRAWN BY : DWH	DATE : MAR. 22/12
OUR FILE : 87477	REVISION : 1st

J.E. ANDERSON & ASSOCIATES
SURVEYORS - ENGINEERS

1A - 3411 SHENTON ROAD, NANAIMO, B.C. V9T 2H1
TEL: 250 - 758 - 4631 FAX: 250 - 758 - 4660
E-MAIL : nanaimo@jeanderson.com
NANAIMO - VICTORIA - PARKSVILLE

LEGEND

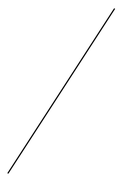
ALL DIMENSIONS ARE IN METRES

SUBJECT TO CHARGES SHOWN ON:
TITLE NO. CA1221463 (P.I.D. 001-300-466) AS TO LOT 5;
TITLE NO. CA2080317 (P.I.D. 009-735-828) AS TO REM. NW 1/4 SECTION 10

DIMENSIONS ARE DERIVED FROM
LAND TITLE OFFICE RECORDS

THIS PLAN HAS BEEN PREPARED IN
ACCORDANCE WITH THE PROFESSIONAL
REFERENCE MANUAL

ELEVATIONS ARE DERIVED FROM AN ASSUMED DATUM



LOT 6

74.40

N

LOT 5

101.74

148.10

REM. NW 1/4
SECTION 10

30051

TYPICAL ELEVATION

TYPICAL LOCATION OF SURVEY POINT

WEIR

TOP OF 200MM PVC PIPE = 99.01M

BENCH MARK REBAR = 99.34M

PRESENT WATER LEVEL (MARCH 22, 2012)

HIGH WATER MARK AS DETERMINED BY MADRONE ENVIRONMENTAL SERVICES LTD.

PRESENT WATER LEVEL (MARCH 22, 2012)

145.05

HIGH WATER MARK AS DETERMINED BY MADRONE ENVIRONMENTAL SERVICES LTD.

PLAN

LOT 4

0 2.5 5 10 15 20 25

The intended plot size of this plan is 560mm in width by 864mm in height, D size, when plotted at a scale of 1:250.

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POST CONSTRUCTION REPORT - COATS MARSH FLOOD PROTECTION BERM

for:

Mr. Chris van Ossenbruggen
Regional Parks Operations Coordinator
Regional District of Nanaimo – Recreation and Parks
830 West Island Highway
Parksville, BC, V9P 2X4

by:

Trystan Willmott, B.Sc., A.Sc.T. and Bruce Grayson, P.Eng.
Madrone Environmental Services Ltd.
1081 Canada Avenue, Duncan, BC, V9L 1V2

September 12th 2013 Dossier 11.0188

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Post Construction Report -
Coats Marsh Flood Protection Berm

1.0 BACKGROUND AND INTRODUCTION

In response to public concerns regarding the potential flooding of private property, the Regional District of Nanaimo (RDN) constructed a berm through part of Coats Marsh during August 2013. The property in question is situated at 1040 Coats Drive, Gabriola Island, BC, which occurs at the western edge of the marsh.

The implementation of flood control on the subject property followed the completion of a preliminary assessment completed by Madrone Environmental Services Ltd. (Madrone): *Stage 1 – Structural and Environmental Assessment – Coats Marsh Regional Park. Prepared for Kelsey Cramer and David Palidwor, Regional District of Nanaimo. Prepared by Trystan Willmott, B.Sc., A.Sc.T., and Bruce Grayson, P.Eng. January 20th 2012.* The construction of the berm was considered as being a practicable option as part of the Stage 1 assessment.

A follow-up report was completed by Madrone describing the methodology for construction of the berm and measures to be followed during its construction to ensure protection of sensitive habitat: *Revised Environmental Management Plan – Coats Marsh Flood Protection Berm. Prepared for David Palidwor, Regional District of Nanaimo. Prepared by Trystan Willmott, B.Sc., A.Sc.T., and Bruce Grayson, P.Eng.*

Flooding concerns have been prompted by the apparent recent increase in the wetted extent of Coats Marsh, as indicated by the fringe of dead coniferous trees around the margins that are now inundated by water on a seasonal basis.

The interactions of a beaver dam at the main outlet from Coats Marsh with a pond leveler and concrete weir have likely led to the increase in the high water mark of the wetland. The construction of the berm will give the property owner peace of mind regarding potential flooding from the water upstream of the weir.

Coats Marsh represents an ecologically-significant resource, as identified in the Stage 1 assessment and Environmental Management Plan (EMP). As recommended in the EMP, monitoring of the work was required to ensure that appropriate construction methods were employed and proper mitigation techniques implemented during the construction process.

2.0 REGULATORY LIAISON AND SUBMISSIONS

2.1 Provincial Water Act and Riparian Area Regulation

Prior to the works occurring, correspondence with agencies responsible for regulating work of this nature confirmed that a project submission and subsequent permit acquisition were not required through Section 9 of the provincial Water Act (*i.e.,* for "Works in and About a Stream"). Based on advice from the Section Head of the West Coast Region of the Ministry of Forests, Lands and Natural Resource Operations (MFLNRO), Coats Marsh does not qualify as a "stream" under the Water Act (including the outlet drainage).

Coats Marsh connects by surface flow via the outlet drainage to documented fish habitat (Hoggan Lake), meaning that it does qualify as a "stream" under the provincial Riparian Area Regulations (RAR). Any works within 30 m of a stream usually trigger the completion of a detailed assessment under the RAR. Instream works and associated disturbances within the Streamside Protection and Enhancement Area (SPEA), such as the construction of the berm at Coats Marsh, are managed through the implementation of a review and approval under Section 9 of the Water Act. In this case, no Section 9 was required, and it was, therefore, difficult to regulate disturbance along the high water mark and inside the SPEA under the RAR.

The RAR is administered by the local level of government (in this case the RDN). Correspondence with MFLNRO staff responsible for the implementation of the RAR confirmed that no RAR assessment was required in this case. The reasoning was based on the fact that the work would be undertaken by the local government to prevent flooding of private property adjacent to park-

land ("institutional" activity). These types of institutional activity are not considered under the RAR. In this particular case, the construction of the berm was managed through direct correspondence and planning with the RDN and the site contractor, guided by the EMP.

It is important to note that any new "developments" on the residential property that are within the 30 m Riparian Assessment Area (RAA) would trigger the completion of a detailed assessment under the RAR. Developments on the property would need to respect a 15 m SPEA measured from the High Water Mark (HWM).

2.2 Fisheries and Oceans Canada

As per the Fisheries and Oceans (DFO) "Working near Water" project review process, the construction of the berm required submission of a Project Review and Application Form (PRAF). Correspondence with both DFO and MFLNRO staff members confirmed this requirement. Based on the scope of the work and distal location of the subject property in relation to fish habitat (Hoggan Lake) and associated low risk to fish or fish habitat, a Notification was submitted as opposed to a full project review. As per the requirements of a Notification, the on-line submission was made on July 25th 2013, which exceeded the required 10 days notice prior to construction.

3.0 BERM CONSTRUCTION PROCESS AND MITIGATION

3.1 Pre-Construction Meeting

The contractor responsible for constructing the berm was Steve Rhicard, proprietor of Steve's Backhoe Service (the contractor). A pre-construction meeting was held between the contractor, Trystan Willmott, Bruce Grayson (Madrone), David Palidwor and Chris van Ossenbruggen (RDN) on August 9th 2013.

During this meeting, details of the construction methodology were discussed, in addition to measures to be employed to decrease risk to sensitive habitats (e.g. limiting tree/vegetation removal as much as possible). Limited clearing of riparian vegetation occurred after the meeting, which consisted of limbing the lower stems of some of the larger trees in order to allow machine access to the work site. This vegetation clearing work complied with the seasonal breeding bird restriction date of August 1st.

3.2 Chronological Sequence of Events

Operations associated with construction of the berm began on August 14th 2013. In addition to the contractor, Trystan Willmott, Bruce Grayson (Madrone), David Palidwor and Chris van Ossenbruggen (RDN) were also present. The access road down to the site followed an existing old road bed vegetated with low growing salal (*Gaultheria shallon*). No grubbing had occurred on the access road, with machines running over the vegetated surface.

Two Douglas fir (*Pseudotsuga menziesii*) trees had been removed from the riparian area to the north of the weir to allow adequate maneuvering space for machinery. These trees were approximately 20 cm Diameter at Breast Height (DBH) and had been placed into the wetland, as requested, with root wads attached. The trees will provide cover and security habitat for amphibians around the margins of the wetland. The configuration of the northern end of the berm had been modified during the previous onsite meeting to avoid removal of a significant Douglas fir from the riparian zone.

An area of approximately 10 m^2 had been cleared at the end of the access road to provide an area for machine turn around and also to allow for the stockpiling of fill material. Prior to being cleared, this area consisted of low growing shrubs, dominated by salal, with sword fern (*Polystichum munitum*) also occurring. As requested, the vegetation and topsoil were "peeled" off this cleared area and placed nearby, to allow for potential regeneration of the removed vegetation from root stock.

It was noted that site access over the weir/outlet drainage had been achieved through the placement of clear-span steel girders and heavy wooden timbers at the terminus of the access road. The banks and channel of the outlet drainage remained undisturbed, due to the fact that the access bridge spanned from bank to bank.

As per the EMP, an adequate spill kit was located on site, in an easily-accessible location. The excavator and backhoe that were on site were clean and free from leaks, and the contractor confirmed that the hydraulic fluid in the machines had been changed to a non-toxic biodegradable product.

A trench had already been constructed for installation of the PVC pipe to be installed on the landward side of the berm, which would drain to the Coats

Marsh outlet drainage. Discussions regarding the purpose of the pipe resulted in the decision to set the elevation of the pipe invert at a height that would drain water collecting on the landward side of the berm through seepage and run-off. Setting the elevation lower, effectively draining the wetland on the landward side of the berm, would have involved breaking through rock. The rock breaking work would have led to unacceptable contamination of the wetland, based on the fact that oil from the rock breaker during its normal operation would have entered the water. Turbidity levels would also have been high, based on the fact that some of the rock breaking work would have occurred within the wetted portion of the wetland. Draining the wetland on the landward side would also have isolated any amphibians occurring in that wetted area and decreased potential amphibian habitat.

The RDN decided that the function of the drainage pipe was not to dry the landward side, but rather to remove water that collected through seepage under the berm. This decision avoided the requirement for rock breaking work and would also allow for water to remain, albeit at a lower level.

The inlet side of the pipe (end capped) was placed into the wetland in the area that was to be on the landward side of the berm. Placement of the drainage pipe necessitated the breaching of the wetland edge at the end of the trench. Removing the "plug" resulted in turbid water flowing through the trench and into the outlet drainage. After removing the plug, the pipe was set at the correct elevation, and material was quickly placed back over the pipe, thus sealing the temporary breach.

Removing the plug, placing the pipe and re-sealing the breach took approximately 2 minutes. During this short period of time, turbid water flowed into the Coats Marsh outlet drainage, but was effectively contained within the ponds on the subject property. Based on the time of year, the outlet drainage was completely dry immediately downstream of the ponds, which prevented any of the turbid water flowing further downstream. Following installation of the pipe, the trench was backfilled.

On August 15th, Trystan Willmott, Bruce Grayson (Madrone), David Palidwor and Chris van Ossenbruggen were on site with the contractor. Trystan Willmott and/or Bruce Grayson monitored the project from August 16th. On August 15th, construction of the berm commenced, with the placement of geofabric and fill in

the wetted portion of the wetland. The material used to construct the berm consisted of a component of flat, angular rock, with a significant component of fine material. A stockpile of fill had been placed in the cleared area close to the terminus of the access road to the north of the weir.

After placing the geofabric over the water, the backhoe and excavator worked in tandem, with the backhoe delivering fill to the excavator. The excavator then placed the fill on top of the geofabric. For the most part, the geofabric contained the turbidity associated with the fill placement process, due to the fact that there was always at least 1 m of overlap at the end of the geofabric.

As the filling proceeded, the excavator walked out on the fill, always placing geofabric prior to applying the fill. It was noted that there were no residual signs of turbidity in the outlet drainage downstream of the weir or in the ponds immediately downstream of the subject property following the placement of the drainage pipe the previous day.

Snags situated in the wetted footprint of the berm construction area were removed by attaching straps to the snags and pulling them out with the excavator arm. All woody debris that was removed was stockpiled on the edge of the site access road for habitat enhancement purposes.

As expected, numerous red-legged frogs (*Rana aurora*) and Pacific chorus frogs (*Pseudacris regilla*) were observed around the moist margins of the wetland and in the outlet drainage downstream of the weir. These areas, containing suitable cover/security habitat in the form of large woody debris, were beyond the immediate footprint of the work occurring in the wetted portion of the wetland. It was noted, however, that both species of frog also occurred in the drier portion of the wetland located within the berm construction footprint to the south of the permanently wetted area. In anticipation of potential direct impacts, Trystan Willmott collected amphibians from the drier portion of the berm construction footprint on August 16th, 2013 and moved them to an area of the wetland at least 100 m to the east.

Construction operations ceased over the weekend of August 17th – 18th, 2013 and commenced on August 19th, 2013. By mid-morning on August 19th, 2013 filling operations were almost within the more sensitive drier portion of the wetland. Trystan Willmott worked immediately in front of the excavator, capturing amphibians prior to the placement of geofabric and fill. Most of the amphibians

were this year's juveniles (2013), with the vast majority consisting of Pacific chorus frogs. During the salvage operation, several hundred Pacific chorus frogs and approximately fifty red-legged frogs were moved beyond the area to be impacted. One northwestern salamander (*Ambystoma gracile*) larva was also moved.

By the morning of August 20th, 2013, fill material extended all the way across the wetland. The excavator was working on building up the slopes of the berm and extending the height, all within the confines of the geofabric. On August 21st, 2013 the clay liner was being placed over the surface of the geofabric on the wetland side of the berm. The drainage pipe on the landward side of the berm had been opened, and was draining at a rate of 1.3 litres per second.

Based on the fact that the more sensitive period of construction had been completed, the site was not visited again until August 23rd, 2013. The berm structure was complete by this date, and Large Woody Debris (LWD), which had originated from the berm construction process, had been placed along the landward side of the berm. This material will provide suitable cover/security habitat for amphibians. LWD had not yet been placed over the cleared area where the fill had been stockpiled, or over the machine turn around area at the northern terminus of the berm.

The last site visit was conducted on September 11th, 2013, in order to inspect the final configuration of the berm. The only change to the berm was that a layer of gravel had been placed over the surface of the berm, in order to provide a surface for walking on. It is understood that the surface of the berm will be used as a walking trail for the public.

As requested, LWD had been placed over the cleared fill stockpile area and the machine turnaround area. This will help provide terrestrial cover/security habitat for amphibians.

It was noted that flow through the drainage pipe had slowed considerably (discussed in more detail in Section 3.3). The area on the landward side of the berm still contained water (albeit at a lower level than before). The water level may decrease in this area over time, as seepage under the berm decreases. It is likely that it will continue to contain water on a seasonal basis, due to inundation from rainfall and surface run off, with complete drying possible during the late summer months if seepage through the berm ceases.

The area on the landward side of the berm will, therefore, continue to provide breeding habitat for native amphibians, which can complete their lifecycle in seasonally inundated areas. As the area will dry slowly over a long time period during each summer period, associated with an expected drop in seepage through the berm each year, any northwestern salamander larvae or neotenes will be able to metamorphose.

This area should not be pumped out and dried, as this would impact upon northwestern salamander larvae and northwestern salamander neotenes, which require permanently wetted areas. A slow drying of the wetted area would likely trigger the larvae and neotenes to metamorphose, where-as pumping the area would not allow this to happen. If it is permanently dry, breeding habitat for native amphibians would also be impacted.

During the September 11th, 2013 site visit, it was also noted that a new pond leveler had been installed. This work was beyond the scope of the berm construction monitoring. Confirmation of the elevation and capacity of the leveler indicates that the winter high water mark of the wetland will remain unchanged, which will retain the existing area of seasonally wetted habitat around the margins of the wetland.

3.3 Summary of Geotechnical Observations during Construction

Mr. Bruce Grayson, P.Eng was responsible for monitoring the geotechnical aspects of the construction. The following were the days that Mr. Grayson was on site: August 9th, 14th, 15th, 19th, 21st, and 22nd, 2013.

The berm was constructed in accordance with the design as shown on Drawings Nos. 11.0188-2 and -3 (refer to Appendix II), except for variations in depth and hence plan area where the depth of water required a greater width to maintain the 2H:1V side slopes. Also, a variation to the northern end of the berm was made to avoid unnecessarily falling a large Douglas fir.

The drain on the downstream side of the berm was constructed as low as practicable using an excavator without using a hydraulic rockbreaker or blasting techniques to excavate the rock. It was not desired to utilize a rockbreaker within the water, as our biologist regarded the pollution hazard as too high. Notwithstanding the above, the highest invert level of the pipe (which was "bent" down during construction over a high point in the bedrock), which

controls the water level downstream of the berm, is at approximately the design invert level.
These changes are reflected in the "As-Built" drawing, which (as noted on the drawing – Appendix II) is not supported by a survey. Should you wish to have a more accurate as-built drawing, then a surveyor should be engaged to provide this service.

We had expected the leakage rate through and underneath the berm to slow with time, and this appears to be the case to date. The drain was observed to be flowing at a rate of about 1.3 l/s immediately following construction of the berm. This flow rate dropped to about 0.5 l/s the following day. The flow rate was estimated to be about 10 ml/s on September 11th, 2013. It is also possible that the drain may be blocked, and we suggest that annual maintenance should be scheduled in mid to late fall (and maintenance at other times as may be required) in order to check for, and clear, blockages.

4.0 FUTURE REQUIREMENTS

As per the EMP, live staking of the berm needs to be implemented this fall. During the monitoring process, a suitable donor site consisting of sitka willow (*Salix sitchensis*) was located. The donor site occurs in a moist area at the end of Stanley Road, which is located on property owned by the Regional District of Nanaimo. The moist area is adjacent to a trail at the end of the road used to access the edge of Coats Marsh.

Stakes should be harvested and planted using the methodology set out in the EMP. Precise harvesting dates will depend on the season, but harvesting should take place at approximately the same time as leaf drop (likely the end of October). The wetland side of the berm should be planted from the water level along a strip that extends approximately 1.5 m up the side of the berm. Planting on the landward side of the berm should be focused on areas between the placed piles of LWD.

Based on the beaver activity in close proximity to the berm, consideration should be given to protecting the live stakes from beaver damage. Chicken wire fencing placed around the planted area may be enough of a deterrent.

Vegetation disturbance as a result of the berm construction operation was minimal. Two 20 cm DBH Douglas firs and three sapling Douglas-firs were removed. As per the EMP, these trees should be replaced at a 2:1 ratio, using one gallon pots. At least ten trees, therefore, should be planted throughout the riparian area to compensate for the loss of these trees. Each tree should be planted using a guard, to prevent damage from browsing deer.

Prepared by:



Trystan Willmott, B.Sc., A.Sc.T.
Aquatic/Terrestrial Biologist



This is a digitally signed duplicate of the official manually signed and sealed document.

Bruce Grayson, B.E.(Civil), P.Eng.
Senior Geotechnical Engineer

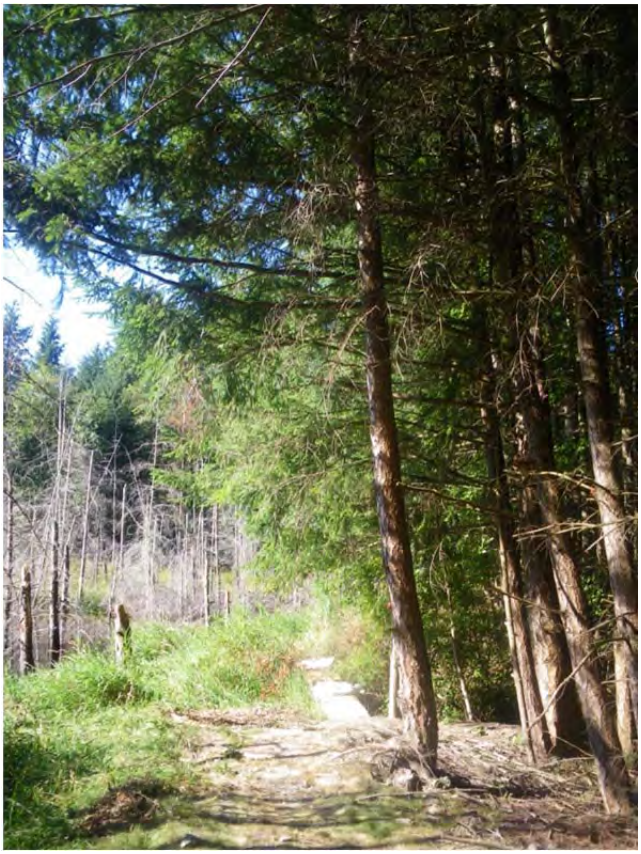
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APPENDIX I - PHOTOS

August 9th, 2013:



Looking south across the berm construction footprint prior to the beginning of construction.



Looking south towards the concrete weir along the existing access road prior to construction beginning.



Looking south towards the concrete weir along the existing access road prior to construction beginning.



Vegetated surface of existing access road prior to machine access.



Site of the fill stockpile area and machine turnaround area prior to disturbance.



Looking north along the existing access road prior to construction beginning.

August 14th, 2013:



Adequate spill kits in central location on site.



Looking south-east across the berm construction footprint prior to the beginning of construction.



Two Douglas-fir trees removed to allow machine access placed within wetted edge of the wetland. These trees will provide cover/security habitat for amphibians.



Surface of access road following use by excavator, backhoe and dump truck.



Clear-span steel girder/timber bridge place over outlet drainage and pond leveler pipe to allow machine access.



Clumps of vegetation removed by excavator during clearance of fill stockpile area set aside to allow potential for regeneration from root stock.



Trench constructed for drainage pipe, connecting to Coats Marsh outflow watercourse downstream of concrete weir.



Backfilling trench following breaching of plug at wetland end of the trench and placement of drainage pipe.



Placing drainage pipe by hand in area to the landward side of the berm.

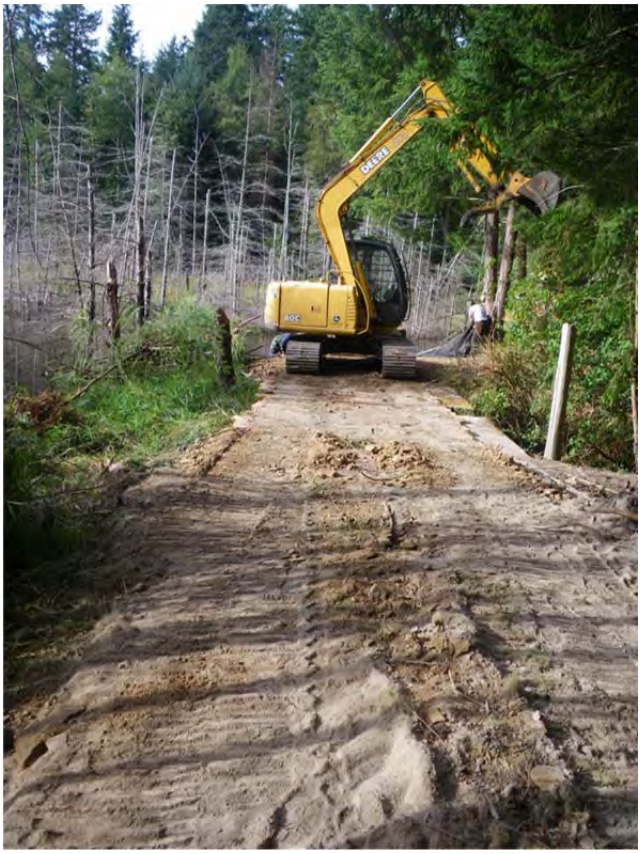


A

Fill for berm being delivered by dump truck at the end of the access road.



Machine turnaround area at end of access road.



Excavator accessing berm construction area.



Placing geofabric material over wetted portion of wetland prior to placement of fill.



Placement of fill over the geofabric. Note that the geofabric is containing the majority of sediment generated within the immediate construction area.

August 16th, 2013:



Constructing berm out over the geofabric.



Snags being removed from the berm footprint area with straps attached to the excavator bucket.



Looking north west along the berm construction footprint area. Note that the geofabric is containing the majority of sediment generated during the fill placement process.

August 19th, 2013:



Continuation of fill placement over the geofabric.



Typical size of red-legged and Pacific chorus frogs moved from the construction footprint area (this year's juveniles - 2013).

August 20th, 2013:



Looking north west over the berm during the construction process.



Looking south east across the berm spanning the length of the wetland.

August 21st, 2013:



Rolling out geosynthetic clay liner for installation on the wetland side of the berm.



Rolling out geosynthetic clay liner for installation on the wetland side of the berm.

August 23rd, 2013:



Looking south across the berm following the installation of the clay liner and overlapping with geofabric.



Looking north over the berm.



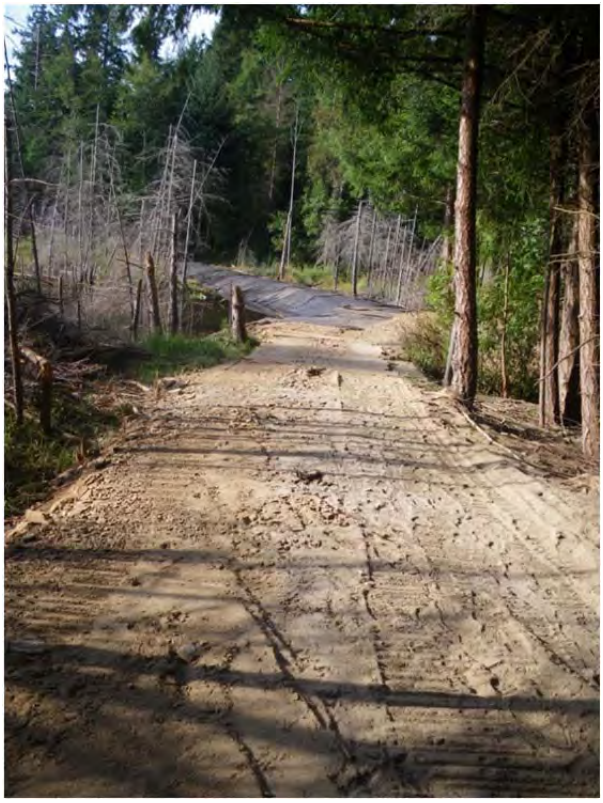
LWD placed along the edge of the berm will provide cover/security habitat for amphibians. Note inlet of PVC drainage pipe in the foreground.



Machine turnaround area prior to placement of LWD.



Fill stockpile/machine turnaround area prior to placement of LWD.



Looking north over the berm from the access road.

September 11th, 2013:



Looking north towards the completed berm, showing the new pond leveler.



Looking north over the berm, showing the gravel surface. Tracks are primarily from deer.



The area on the landward side of the berm will continue to provide, at the least, seasonal breeding habitat for native amphibians.



LWD pile placed over the machine turnaround area to the south of the weir.

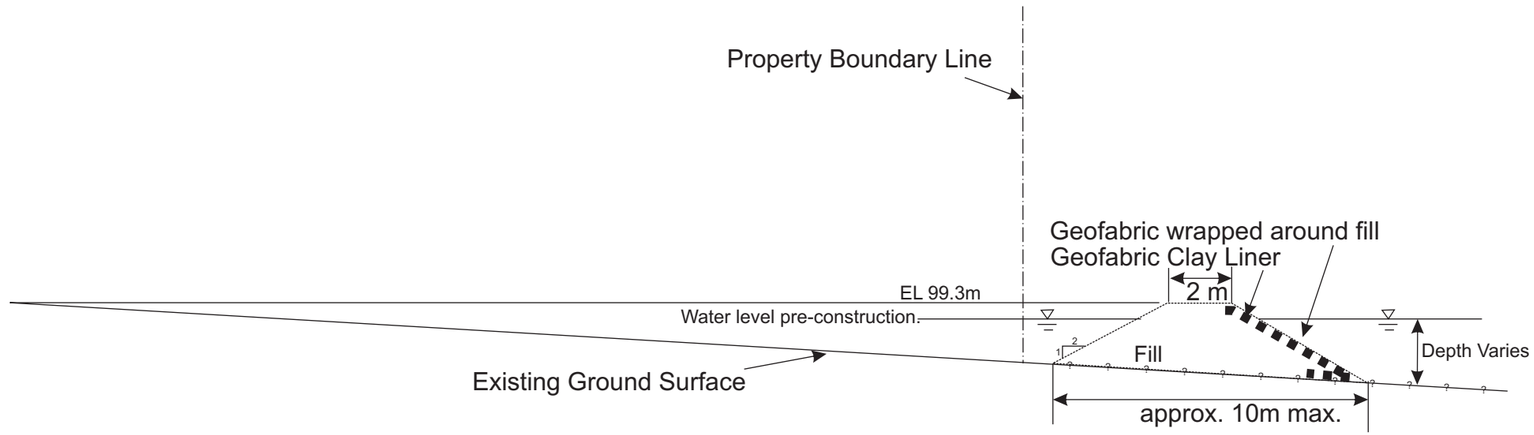


LWD pile placed over the machine turnaround/fill stockpile area.

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APPENDIX II – BERM DESIGN PLANS AND AS-BUILT DIAGRAM

Dossier 11.0188



Note:
1.The fill may be comprised of topsoil, or a mixture of topsoil and clean fill (e.g. pit run gravel).
2.The upper 0.3m should comprise topsoil.
3. Contractor to satisfy the Regional District of Nanaimo that all fill is free of invasive species
4. Refer to text of report.

Original Size = 11”x17”

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Figure 3: Cross-Section A-A’

Client: Regional District of Nanaimo

Project: Proposed Berm

Location: Coat’s Marsh, Gabriola Island, BC

Project: Proposed Berm | Scale: 1:200

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Coat's Marsh - Proposed Berm

Site Plan

Dossier No: 11.0188

Scale: 1:250 on D size Paper

Adapted from J.E. Anderson & Associates Drawing Ref.
File:87477 Rev. 1 Dated Mar 22, 2012

Figure 2

LEGEND

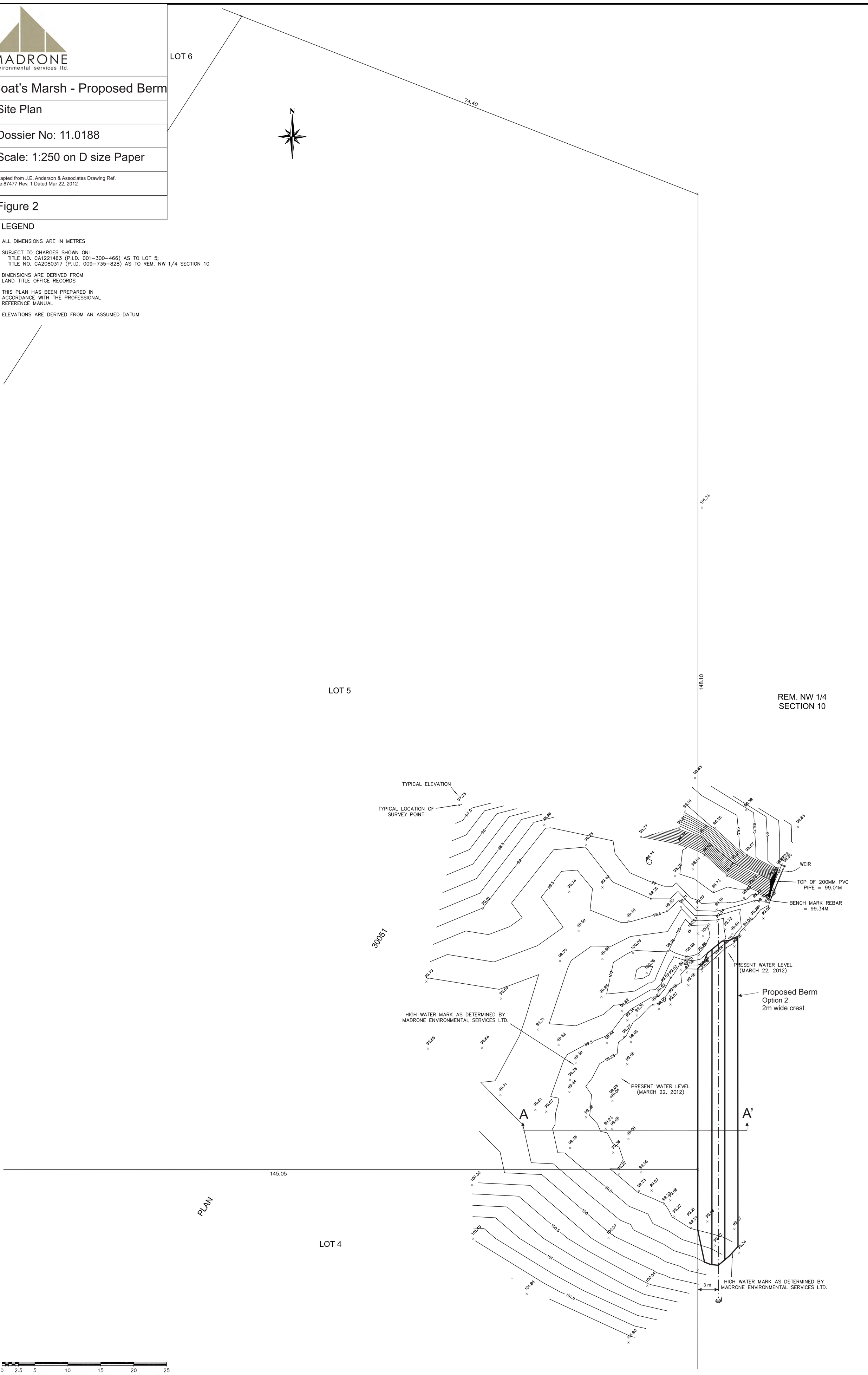
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Coat's Marsh - Berm

"As-Built" Plan

Dossier No: 11.0188

Scale: 1:250 on D size Paper

Adapted from J.E. Anderson & Associates Drawing Ref.
File:87477 Rev. 1 Dated Mar 22, 2012

Drawn: Bruce Grayson, P.Eng

Figure 6

Date: Sep 3, 2013

LEGEND

ALL DIMENSIONS ARE IN METRES

SUBJECT TO CHARGES SHOWN ON:
TITLE NO. CA1221463 (P.I.D. 001-300-466) AS TO LOT 5;
TITLE NO. CA2080317 (P.I.D. 009-735-828) AS TO REM. NW 1/4 SECTION 10

DIMENSIONS ARE DERIVED FROM
LAND TITLE OFFICE RECORDS

THIS PLAN HAS BEEN PREPARED IN
ACCORDANCE WITH THE PROFESSIONAL
REFERENCE MANUAL

ELEVATIONS ARE DERIVED FROM AN ASSUMED DATUM

Berm

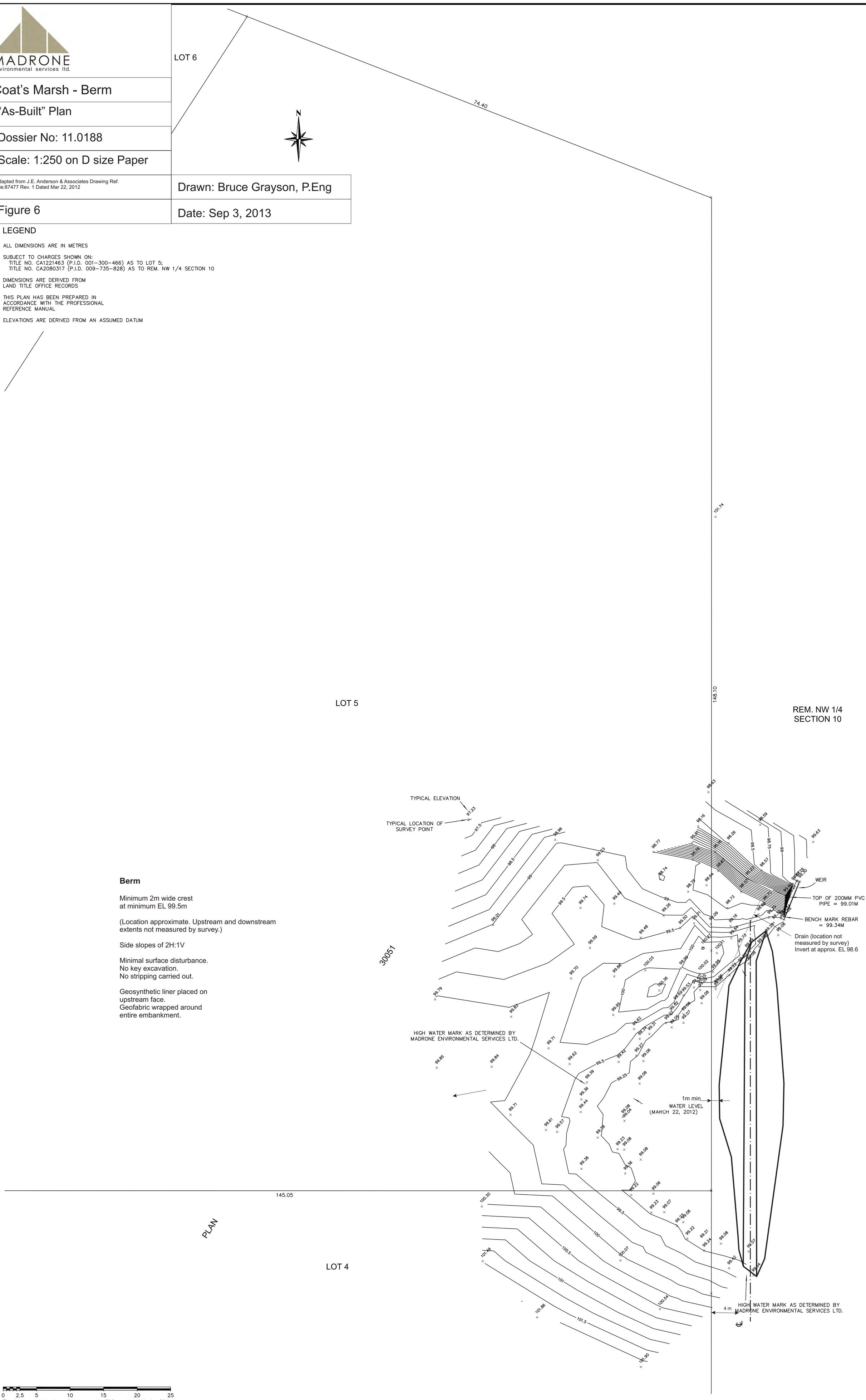
Minimum 2m wide crest
at minimum EL 99.5m

(Location approximate. Upstream and downstream extents not measured by survey.)

Side slopes of 2H:1V

Minimal surface disturbance.
No key excavation.
No stripping carried out.

Geosynthetic liner placed on
upstream face.
Geofabric wrapped around
entire embankment.



0 2.5 5 10 15 20 25

The intended plot size of this plan is 560mm in width by 864mm in height, D size, when plotted at a scale of 1:250.