21 February 2024

Attention: Chris Simmons
Chancery Green

Email: chris.simmons@chancerygreen.com

Dear Chris

RE: RESPONSE TO DIRECTION 15 OF THE HEARING PANEL

This is a response to the 'Operational stormwater management information request' contained in Direction 15 of the Hearing Panel dated 1 December 2023.

Items 1-6 are addressed as follows:

1. *A **draft** Stormwater Operations and Maintenance Plan (draft SOMP) including the details set out in condition 219, Draft Proposed NRC Conditions: Northport Ltd (As at Hearing dated 20.11.23).*

   A draft SOMP for the existing Port has been prepared by SLR and is **attached.**

2. *The draft SOMP is to be prepared by a suitably qualified and experienced practitioner with experience in the design and implementation of stormwater quality management practices and procedures for industrial sites. Ideally this person will have experience in managing stormwater quality from sites with similar contaminant treatment needs to the Northport site.*

   The draft SOMP has been prepared by Christine Oakey and Pamela Kane-Sanderson of SLR and reviewed by Trent Sunich and Mark Poynter (also of SLR). The relevant experience of these persons is set out in Section 1.4 of the SOMP.

3. *The primary objective of the draft SOMP is to describe the practices and procedures required to manage stormwater quality from the site in a manner that represents the "Best Practicable Option" (as defined in the RMA) for the discharge of stormwater to the CMA and/or groundwater.*

   The stated purpose in Section 1.1 of the SOMP is consistent with the aforementioned objective. The ancillary Technical Memorandum from Mark Poynter (**attached**) confirms that the practices and procedures described in the SOMP constitute the Best Practicable Option (BPO) to manage stormwater prior to discharge to the CMA.

4. *Additional matters, beyond those required by condition 219, to be included in and/ or addressed by this draft SOMP are*:

    a. *A description of a "treatment train" approach which considers measures to reduce the entrainment of contaminants into stormwater including, but not limited to, source control measures such as sweeping, vacuuming and/ or covering potential contaminant sources.*

        As stated in Section 3.1 of the SLR Technical Memorandum, the treatment train approach is covered in the draft SOMP.

    b. *Methods to remove, as far as practicable, coarse sediment and debris, suspended sediment and adsorbed contaminants and dissolved contaminants.*

        As stated in Section 3.2 of the SLR Technical Memorandum, these methods are covered in the draft SOMP, noting that while there is no specific method or intervention in the stormwater management directed at removing dissolved contaminants, the long period of detention in the pond provides treatment of dissolved compounds through natural physical, biological, and chemical transformation processes.

    c. *Consideration of improving the performance of the existing stormwater treatment pond system which minimises velocities through the canals and ponds and maximises sedimentation and dissolved contaminant removal. This may include incorporating a wetland habitat into, or through enlargement of, the existing system. Reference should be made to the recommendation in Section 5 (iii) of the Northport report, "Stormwater Discharge Review". Ecological and Water Quality Report; prepared by 4 Sight, August 2015. This report is included in a suite of reports making up Appendix 29 of the Port expansion project's Assessment of Effects on the Environment (AEE).*

        As stated in Section 3.3 of the SLR Technical Memorandum, SLR do not feel there is justification to add a wetland habitat to the to "polish" stormwater prior to discharge. They consider that the stormwater quality achieved by the Northport system is high and the system has a significant resilience to accommodate fluctuating volumes and contaminant loads without a deterioration in discharge quality.

    d. *Consideration of a monitoring and reporting regime that includes continuous, real-time monitoring of the system's inflow and outflow which is triggered to stop discharging in the event of a trigger level being reached and before being*

discharged to the CMA and/ or groundwater. Parameters to be considered include flow, pH, turbidity, and conductivity.

As stated in Section 3.4 of the SLR Technical Memorandum, real time monitoring is in place now (see Section 5.10 of the SOMP). Notwithstanding this, SLR consider that, based on the record of water quality data and pond performance, the risk of any contaminant trigger level being reached which would warrant a cessation of discharge is remote.

e. *The practices and procedures required to meet the operational stormwater conditions (Condition 219 to 231 of the Draft Proposed NRC Conditions*: *Northport Ltd (As at Hearing dated 20.11.23).*

As stated in Section 3.5 of the SLR Technical Memorandum, the practices and procedures required to meet the proposed operational stormwater conditions are comprehensively covered in the draft SOMP.

5. *Comment on the management of stormwater discharges to ground water through the base of the canals and ponds. The Applicant's stormwater hydraulic model estimates this exfiltration to be in the order of 20mm/hour. This assessment must include consideration of:*

a. *The practicality of lining the canals and ponds, or other measures to avoid seepage to groundwater.*

b. *A regime to monitor groundwater quality to assess the effects of discharges of untreated stormwater to ground water.*

c. *Options to address any adverse effects on groundwater quality arising from the discharge of contaminated stormwater.*

In responding to item 5 above, Northport engaged experienced hydrogeologist Jon Williamson of Williamson Water and Land Advisory (WWLA).

The WWLA report conclusions in respect to items 5(a)-(c) are as follows:

(a) Given the hydrogeological setting and constructed nature of the site, it is considered unlikely that stormwater has significant interaction with groundwater, such that it is likely to contaminate the underlying sediments. Therefore, there is no need to consider lining the canals and/or ponds.

(b) Given the conclusion in (a), ground water quality monitoring is not required.

(c) Given the conclusion in (a), no measures are required to address adverse effects on groundwater quality.

A copy of the WWLA report is **attached.**

6. *Comment on the potential opportunity to incorporate the port's stormwater management systems with those being contemplated as part of Marsden Maritime Holdings Ltd (MMHL) broader development plans. Evidence presented to the hearing by Ms Mercer, CEO of MMHL identified that MMHL is currently assessing their development's stormwater management options and that this assessment is likely to be complete within the next year. Consideration of a comprehensive approach to stormwater across both sites may create opportunities to better manage the stormwater quality.*

   The bulk of the MMHL development land is located south of Marsden Bay Drive and lies within the existing consented Whangarei District Council (WDC) catchment plan for Marsden Point and Blacksmith Creek. This catchment discharges to Blacksmith Creek without passing through the Northport (or MMHL) pond system and associated outlet.

   Development of the wider MMHL land does not require a further NRC discharge consent and rather needs to comply with the (2007) WDC catchment consent conditions. Accordingly, there is no synergy between future MMHL discharges and the Northport discharges.

WWLA and SLR are available to answer any additional queries in relation to this response.

Yours faithfully

Brett Hood
Planning consultant

Encl. Draft SOMP (7.2.24)/WWLA report (12.2.24)/SLR Technical Memorandum (13.2.24)

Technical Memorandum

To:	Ben Sweeney	**From:**	Mark Poynter
Company:	Northport	**SLR Consulting New Zealand**	
cc:	Pamela Kane-Sanderson; Christine Oakey; Trent Sunich	**Date:**	13 February 2024
		Project No.	16342

RE: Response to Direction 15 (1 December 2023) from the Hearing Panel

1.0 Introduction

This memorandum summarises the response prepared by SLR Consulting as it relates to the Hearing Panel's Direction 15 'Operational Stormwater Management Information Request'.

1.1 Direction 15

The Panel sought information on four points relating to stormwater (information sought in relation to groundwater is not covered by SLR's response). These points are identified and responded to below. The Direction is provided as Appendix A to this memorandum.

2.0 Points 1 to 3 of the Direction

A draft Stormwater Operations and Maintenance Plan (draft SOMP) which responds inter alia to the details set out in condition 219, Draft Proposed NRC Conditions: Northport Ltd (As at Hearing dated 20.11.23. (Point 1) has been prepared and provided to Northport's Ben Sweeney for comment. Mr. Sweeney has advised that this draft will be made available to the Panel for its consideration.

The draft SOMP has been prepared by suitably qualified and experienced practitioners as identified in s1.4 of the SOMP (Point 2).

The draft SOMP comprehensively describes practices and procedures which SLR considers constitute the Best Practicable Option (in terms of the RMA section 2 Interpretation) to manage stormwater and its quality and verifying it is suitable for discharge to the CMA, which we note is an environment of a high ecological value and highwater quality.

3.0 Point 4 of the Direction

The Panel further identifies 5 matters beyond those required by Condition 219, '*to be included in and/or addressed by this draft SOMP'.* These matters are discussed below.

3.1 Point 4a of the Direction

A description of a "treatment train" approach which considers measures to reduce the entrainment of contaminants into stormwater including, but not limited to, source control measures such as sweeping, vacuuming and/ or covering potential contaminant sources.

The SOMP covers the treatment train in Northport's stormwater system. It identifies the source control interventions such as sweeping, vacuuming, covering and proprietary devices in discrete sub-catchments where appropriate (e.g. washdown bay; refueling station;

interceptors); it describes the perimeter and internal canal system which provides an opportunity for primary settlement of particulates and adsorbed contaminants; it identifies the rigorous regime of inspection, maintenance and removal of sludges which are subject to consenting and monitoring requirements as to volume, frequency, and location for land disposal; it describes the pond system which is a critical part of the treatment train which optimises further settlement of particulates and provides opportunity for microbial and other uptake and deactivation (e.g. by sunlight) of both adsorbed and dissolved contaminants including metals, hydrocarbons and organic leachates and residues.

3.2 Point 4b of the Direction

Methods to remove, as far as practicable, coarse sediment and debris, suspended sediment and adsorbed contaminants and dissolved contaminants.

The draft SOMP covers these methods in detail and the supporting documentation that is required to provide appropriate verification. There is no specific method or intervention in the stormwater management on the site directed at removing dissolved contaminants, nor is such required. However, the long period of detention in the pond also provides treatment of dissolved compounds through natural physical, biological and chemical transformation processes. The volume of water in the overall containment system (canals and pond) provides a significant potential for dilution of dissolved contaminants and this is supported by natural microbial processes in the pond which are enhanced by induced reaeration of pond waters.

3.3 Point 4c of the Direction

Consideration of improving the performance of the existing stormwater treatment pond system which minimises velocities through the canals and ponds and maximises sedimentation and dissolved contaminant removal. This may include incorporating a wetland habitat into, or through enlargement of, the existing system.

Reference should be made to the recommendation in Section 5 (iii) of the Northport report, "Stormwater Discharge Review". Ecological and Water Quality Report; prepared by 4 Sight, August 2015.

It is the opinion of the SLR team that the stormwater quality achieved by the Northport system is high and the system has a significant resilience to accommodate fluctuating volume and contaminant load without a deterioration in discharge quality.

The August 2015 report noted by the Panel made a recommendation for a management plan to be developed for the pond and for consideration of inclusion of a wetland. That report is somewhat dated. Northport has significantly expanded its working apron and the pond area since that time. It now aims to maintain the entire pond system largely free of encroaching vegetation although the storage pond (second stage) will be maintained at least 50% clear of vegetation (refer section 4.1.2 of the SOMP).

We do not feel there is a justification to add a wetland habitat to 'polish' the stormwater to improve its quality at Northport prior to discharge. We are mindful of the previous experience at the port when 'natural wetland' established in the stormwater pond due to colonisation by a monoculture of one particular exotic wetland rush species. This quickly reduced the hydraulic capacity of the pond system and created significant maintenance, necessitating the removal and disposal of large volumes of wetland vegetation. There were also odour issues arising from stagnating pockets of water within the pond system and the lack of exposure of the pond surface to natural reaeration.

3.4 Point 4d of the Direction

Consideration of a monitoring and reporting regime that includes continuous, real-time monitoring of the system's inflow and outflow which is triggered to stop discharging in the event of a trigger level being reached before being discharged to the CMA and/or groundwater being reached and before being discharged to the CMA and/ or groundwater. Parameters to be considered include flow, pH, turbidity, and conductivity.

Real time monitoring for parameters which include water level, flow rate, temperature, pH, dissolved oxygen and turbidity is in place in the port (refer SOMP section 5.10). The system is used to provide Northport with a clear picture of pond status, and the pond response to recent rainfall or other events. The data supports the water quality monitoring data (refer section 5.4 SOMP).

SLR consider, based on the record of water quality data and pond performance, that the risk of any contaminant 'trigger level' being reached that is of environmental concern and which would warrant a cessation of discharge, is remote. Nonetheless, in relation to the real time monitoring of the above parameters, that capability exists now.

3.5 Point 4e of the Direction

The practices and procedures required to meet the operational stormwater conditions (Condition 219 to 231 of the Draft Proposed NRC Conditions: Northport Ltd (As at Hearing dated 20.11.23).

These are now comprehensively covered in the draft SOMP.

4.0 Closure

SLR is happy to provide further clarification to any of the above and the draft SOMP.

Regards,

SLR Consulting New Zealand

Mark Poynter
Technical Director (Marine Ecology)

cc Pamela Kane-Sanderson; Christine Oakey; Trent Sunich

Appendix A Panel Direction 15

IN THE MATTER of the Resource Management Act 1991 (**RMA**)

AND

IN THE MATTER **Resource Consent Applications by Northport Ltd - Port Expansion project at Marsden Point**

Application numbers:

- Whangarei District Council: LU2200107
- Northland Regional Council: APP.040976.01.01

DIRECTION 15 (1 DECEMBER 2023) FROM THE HEARING PANEL

COMMENTS ON THE DRAFT CONDITIONS OF CONSENT (SHOULD THE CONSENTS BE GRANTED) AND FURTHER INFORMATION SOUGHT

1. The Hearing Panel has received the Applicant's Memorandum - *Memorandum of Counsel for Northport Limited following adjournment of Hearing*[1]. We provided a response to that Memorandum on 24 November 2023. This Direction more specifically addresses the "*Clarification regarding draft proposed conditions*".

2. The Memorandum set out "*The Panel may have questions or matters of clarification regarding the draft proposed conditions. Counsel suggests that it would be an efficient process for the Panel to utilise the adjournment period to put those questions or matters to Northport"*[2]*.*

3. The Hearing Panel has discussed the interim written closing submissions and the currently proffered conditions of consent (should consents be granted). In response:

    - We have provided some questions and comments on the conditions of consent (comment boxes in the draft conditions attached to this Direction [3]); and
    - We seek the following information/clarification on stormwater as attached below.

[1] Dated 22 November 2023
[2] Paragraph 12 of the Memorandum
[3] We wish to make it very clear that providing these comments in no way assumes we will be granting the consents sought, and does not necessarily mean we will not have further questions on the conditions later in the proceeding. The comments are to ensure that if the consents are granted, the suite of conditions are appropriate to avoid, remedy or mitigate any adverse effects of the proposal.

4. Any enquiries regarding this Direction, or related matters, should be directed to Alissa Sluys - Consents and Hearing Administrator at alissas@nrc.govt.nz

Greg Hill Chairperson
1 December 2023

Operational Stormwater management information request

The request below is for the Hearing Panel to better understand how stormwater quality is to be managed. We request this information be provided to us no later than **mid-February 2024** to give us time to review and understand it prior to the final Reply from Northport.

We note that the management of stormwater from the proposed port expansion's operational phase has been described by the Applicant's expert and reviewed by the Northland Regional Council's expert. The Applicant's evidence assesses the ability of the existing port stormwater treatment pond system to treat the quality of the stormwater arising from Northport's proposed expansion.

The Hearing Panel's questions have raised issues about the system's design parameters being founded on stormwater quality guidelines which are not intended for application to industrial sites. Further issues have been raised over the potential effects of untreated stormwater discharges to ground, and potentially groundwater, through the base of the system's canals and ponds.

To address these matters in a comprehensive manner further information is sought from the Applicant to demonstrate that the best practicable option is being proposed for the management of stormwater quality from the expanded site. The information sought is:

1. *A **draft** Stormwater Operations and Maintenance Plan (draft SOMP) including the details set out in condition 219, Draft Proposed NRC Conditions: Northport Ltd (As at Hearing dated 20.11.23).*

2. *The draft SOMP is to be prepared by a suitably qualified and experienced practitioner with experience in the design and implementation of stormwater quality management practices and procedures for industrial sites. Ideally this person will have experience in managing stormwater quality from sites with similar contaminant treatment needs to the Northport site.*

3. *The primary objective of the draft SOMP is to describe the practices and procedures required to manage stormwater quality from the site in a manner that represents the "Best Practicable Option" (as defined in the RMA) for the discharge of stormwater to the CMA and/ or groundwater.*

4. *Additional matters, beyond those required by condition 219, to be included in and/ or addressed by this draft SOMP are:*

    a. *A description of a "treatment train" approach which considers measures to reduce the entrainment of contaminants into stormwater including, but not limited to, source control measures such as sweeping, vacuuming and/ or covering potential contaminant sources.*

    b. *Methods to remove, as far as practicable, coarse sediment and debris, suspended sediment and adsorbed contaminants and dissolved contaminants.*

    c. *Consideration of improving the performance of the existing stormwater treatment pond system which minimises velocities through the canals and ponds and maximises sedimentation and dissolved contaminant removal. This may include incorporating a wetland habitat into, or through enlargement of, the existing system. Reference should be made to the recommendation in Section 5 (iii) of the Northport report, "Stormwater Discharge Review". Ecological and Water Quality Report; prepared by 4 Sight, August 2015.*

This report is included in a suite of reports making up Appendix 29 of the Port expansion project's Assessment of Effects on the Environment (AEE).

d. *Consideration of a monitoring and reporting regime that includes continuous, real-time monitoring of the system's inflow and outflow which is triggered to stop discharging in the event of a trigger level being reached and before being discharged to the CMA and/ or groundwater. Parameters to be considered include flow, pH, turbidity, and conductivity.*

e. *The practices and procedures required to meet the operational stormwater conditions (Condition 219 to 231 of the Draft Proposed NRC Conditions: Northport Ltd (As at Hearing dated 20.11.23).*

5. *Comment on the management of stormwater discharges to ground water through the base of the canals and ponds. The Applicant's stormwater hydraulic model estimates this exfiltration to be in the order of 20mm/hour. This assessment must include consideration of:*

   a. *The practicality of lining the canals and ponds, or other measures to avoid seepage to groundwater.*

   b. *A regime to monitor groundwater quality to assess the effects of discharges of untreated stormwater to ground water.*

   c. *Options to address any adverse effects on groundwater quality arising from the discharge of contaminated stormwater.*

6. *Comment on the potential opportunity to incorporate the port's stormwater management systems with those being contemplated as part of Marsden Maritime Holdings Ltd (MMHL) broader development plans. Evidence presented to the hearing by Ms Mercer, CEO of MMHL identified that MMHL is currently assessing their development's stormwater management options and that this assessment is likely to be complete within the next year. Consideration of a comprehensive approach to stormwater across both sites may create opportunities to better manage the stormwater quality.*

Stormwater Operation and Maintenance Plan

Northport, Marsden Point

Northport Limited

Prepared by:

SLR Consulting New Zealand

201 Victoria Street West Auckland 1010, New Zealand

SLR Project No.: 16342

7 February 2024

Revision: Draft v1

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By	Comments
Draft v1	7 February 2024	Christine Oakey	Trent Sunich	Mark Poynter	Draft for Northport Review
	Click to enter a date.				
	Click to enter a date.				
	Click to enter a date.				
	Click to enter a date.				

Basis of Report

This report has been prepared by SLR Consulting New Zealand (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Northport Limited (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

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Acronyms and Abbreviations

CDS	Continuous Deflection Separation
COC	Chain of Custody
MMH	Marsden Maritime Holdings
NRC	Northland Regional Council
OHEZ	Outer Harbour Ecological Zone
SOMP	Stormwater Operation and Maintenance Plan

1.0 Introduction

1.1 Background

Northport Limited operate Northport, a deep-water commercial port situated at Marsden Point in Northland. Northport is a multi-purpose port, although the primary activity is the export of forest products. The port also caters for containers, woodchip, fertiliser and coal products.

The purpose of this Stormwater Operations and Management Plan (SOMP) is to provide a comprehensive but practical manual which identifies the stormwater infrastructure and outlines the practices and procedures undertaken at Northport to manage and monitor stormwater and its quality on the site.

1.2 Resource Consents

Two stormwater related resource consents are held for Northport:

- CON20090505532: Consent to discharge stormwater associated with the operation of a port after treatment within a storage and settlement pond system to the Whangarei Harbour via an existing outlet structure (expiry 2 Dec 2034).
- AUT.005055.35.01: Consent to discharge contaminants to land at various locations from the disposal of sediment removed from the stormwater system authorised by CON20090505532. (expiry 2 Dec 2034).

Copies of these resource consents are included in **Appendix A**.

Northport is currently in the process of obtaining a new stormwater discharge consent for the Northport expansion project. This new stormwater discharge consent will supersede the existing consent.

1.3 Plan scope

This SOMP covers the following matters:

- Stormwater management system.
- Practices and procedures to manage stormwater.
- Operational and maintenance details for:
  - Ponds and associated pumps;
  - Stormwater collection canals;
  - Spillways;
  - Removal of silt and any contaminants settled in spillways;
  - Isolation and removal of any spills on the port apron entering a canal;
  - Repair of any erosion; and
  - Removal of blockages.
- Stormwater quality monitoring programme.
- Stormwater system sediment monitoring programme.
- Whole Effluent Toxicity testing.

- Environmental emergency response procedures.
- Site management and reporting.

1.4 Plan preparation

This SOMP has been prepared by Christine Oakey and Pamela Kane-Sanderson. Christine is an Associate Environmental Management Consultant with SLR. She has over 12 years' experience in the environmental management field, with a strong background in stormwater management, high risk industrial site management, and development and implementation of management plans. Christine's experience includes assessing Stormwater Discharge and Industrial or Trade Activity consent applications and providing technical input. Pamela is a Senior Ecologist with SLR and has been involved with stormwater monitoring and reporting at Northport since 2015.Trent Sunich, Principal Environmental Consultant and Mark Poynter, Technical Director – Marine Ecology, have reviewed the SOMP. Trent Sunich has over 20 years of resource management experience in stormwater management, natural resource planning, consent acquisition, surface water quality management, integrated catchment management planning, and freshwater and marine assessment of environmental effects. Mark Poynter has a marine ecology background and wide experience with log yards and wood chip storage and processing facilities in Northland and at Northport (since 1997) and Eastland Port (Gisborne since 2014).

2.0 Site and receiving environment

2.1 Site description

Northport is a deep-water commercial port located at Marsden Point in Northland. The port is located at the entrance to the Whangarei Harbour, between the Marsden Point CINZL facility to the east, and One Tree Point to the west.

Northport currently has three berths available for handling dry cargo vessels, with a total length of 570m. An additional berth (Berth 4) is consented by not yet constructed. Northport is currently applying for resource consents for the further expansion of the port with the construction of Berth 5.

The existing facility totals 49.1ha of land, with most of this area now being used for cargo operations. Of the 49.1ha, 33.615ha is reclaimed land. It is proposed to expand the port apron to 67.3Ha.

2.2 Site activities and potential sources of contaminants

Northport has approximately 20.75ha of forestry product, 2.2ha of woodchip, 0.87ha of coal and the remaining 24ha is miscellaneous/containers (**Figure 1**).

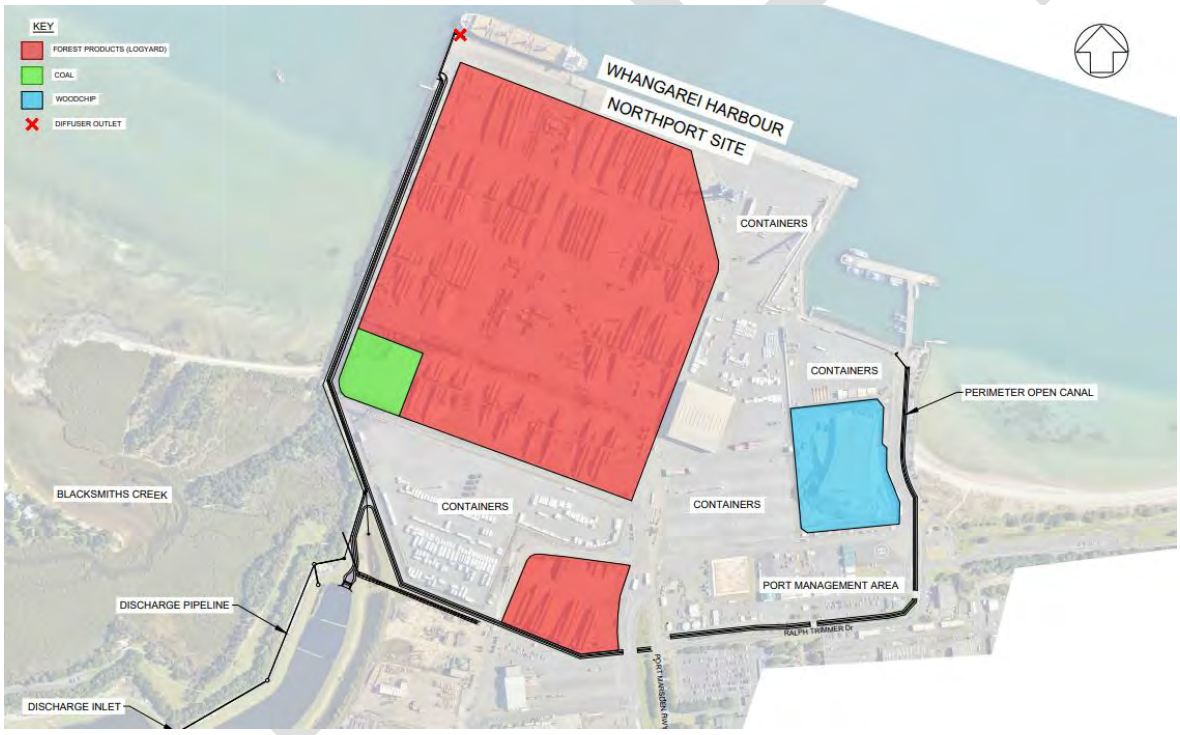


Figure 1: Northport site

2.2.1 Log Yard and Woodchip Pad

Logs are the dominant volume of the port's trade and are the principal influence on stormwater quality. Runoff will contain resin acids, phenolic compounds, suspended solids, dissolved nutrients, and contaminants such as metals and hydrocarbons from operating machinery. Bark and debris in addition to being a source of leachates and organic loading, can enter the stormwater system and reduce the stormwater treatment efficiency.

2.2.2 Washdown Bay

The washdown was introduced as a Hopper Wash, for residues such as fertilisers. Now it is also used for equipment/plant washdown which can be contaminated with oil, grit, dirt, grease and more. Stormwater runoff from the washdown bay is treated by an oil separator and a Hynds Downstream Defender.

2.2.3 Coal

The coal is stockpiled in the open on the western side of the port. Coal can cause stormwater leachate to become acidic, and may contain high concentrations of copper, iron, and aluminium. The coal site is confined with concrete blocks, which helps prevent coal debris from entering the perimeter canal system.

2.2.4 Berths (Bulk Cargo)

Bulk cargos are mostly loaded directly to trucks via hoppers on the berth. Bulk cargo includes products such as fertiliser, palm kernel, grain, and coal. Coal is the only product not in a covered storage. Ultimately there is a potential for small amounts of spillage to occur between the vessel and berth face during product offloading and from hoppers. Some amounts of spillage will enter the slot drains along the wharf or be blown into the perimeter canals. The risk of exposure of most material to rainfall and entrainment in stormwater flow is minimal. A sweeper or forklift with sweeper attachment is always on the berth during a bulk cargo ship load/unload.

2.2.5 Refuelling Station

Possible contaminants from this area include hydrocarbons from minor spillage during refuelling and which is subsequently entrained in stormwater runoff. Stormwater runoff from the refuelling area is treated by a Humes API Oil Interceptor. Z Energy is responsible for the management of the refuelling station.

2.3 Receiving environment

Discharge from the port stormwater pond, which is designed to accommodate almost all runoff except extreme rainfall event diversions, is to the Whangarei Harbour near its entrance which is around 790 m wide and 32 m deep at its deepest point. The discharge is at the seabed at the wharf face in 11m below CD in a high current, high volume location which affords very high dilution and dispersion potential.

Northport sits within the Outer Harbour Ecological Zone (OHEZ) of the Whangarei Harbour. The OHEZ is a discrete and ecologically significant marine ecosystem characterised by high water quality and high biodiversity.

3.0 Stormwater collection and treatment facilities

3.1 Stormwater system

Northport has13 stormwater sub-catchment areas. The site's stormwater system comprises a series of slot drains parallel to the berth face. This collection system then discharges into pipes which traverse to the nearest outlet to the perimeter canal. There are catchpits around the northeastern segment of the site, and these connect to the nearest section of the stormwater perimeter canal.

Figure 2 shows the catchment areas and their direction of flow.

Stormwater from the entire site is diverted to the stormwater treatment pond, and then discharged via an outlet to the harbour.

Figure 2: Catchment Areas

Plans of the stormwater system are included in **Appendix B**.

3.1.1 Berths

Northport has three berths: MP1, 2 and 3. In Figure 2, sub-catchments O and C refer to the berth face. Stormwater runoff in sub-catchments O and C fall to a series of slot drains running the full length of the 570m berth face. The slot drains then fall at a very slight grade toward the east or west side of the berth where culverts take the stormwater to the perimeter canal.

3.1.2 Log Yard

The Log Yard being the greatest catchment area has multiple sources of stormwater collection. The log yard consists of 5 sub-catchments. Sub-catchments L and N slope toward the western perimeter canal, while sub-catchments A and B fall toward the underground

drainage system, and runoff is collected in a series of catchpits and diverted to the northern end of the perimeter canal.

3.1.3 Southwestern Development

The Southwestern Development refers to sub-catchments K and partially L and J. This area is primarily chipseal and approximately 470mm lower than the surrounding pavement level. Stormwater runoff falls to a separate open canal system which is connected to the perimeter canal with 100 diameter conduits.

3.1.4 Port Management Area

The Port Management Area, sub-catchment I, falls toward the southern perimeter canal.

The Administration building was constructed at a different level, 670mm from the surrounding pavement area. Stormwater from around the building is collected in a perimeter ACO surface drain around the building. This is carried to a catchpit which feeds through a 450mm diameter pipe to the perimeter canal.

This sub-catchment area also includes the site car park ‘Admin Car park’, which falls to the perimeter canal but is diverted with kerbs and channels to two catch pits which then feed into the perimeter canal via a 450mm diameter pipe.

Around the workshop area (sheds 1, 2 & 3), the pavement is designed to fall toward two catchpits. A slight channel drain catches the runoff and directs the stormwater to two catchpits between shed 1 and 2. Here the stormwater is piped to the perimeter canal. The workshop area has another two catchpits eastern side of shed 1 and western side of shelter 4 for other runoff in the area. The western side has pipe outlet to the canal, whereas the eastern side pit runs to the catchpits between sheds 1 and 2.

3.1.5 Northeastern Development

The northeastern development consists of sub-catchments M, G and F. M is the U-block catchment which runs to a box canal, which opens to a trapezoid canal which also collects stormwater from sub-catchment G before it flows to the perimeter canal via a culvert. Sub-catchment F flows toward the northern section of the perimeter canal.

3.1.6 C3 Workshop

C3 workshop is not within the Northport area but is used by Northport users. The sub-catchment area flows to Ralph Trimmer Drive. This area is monitored and maintained by Whangarei District Council and doesn’t feed into Northport’s stormwater system.

3.1.7 Scaling Sheds

Scaling Sheds area is located outside the southern end of the port. Runoff from this sub-catchment is collected through a series of catchpits on Kitemoana Road. The area also falls north where another catchpit is located to collect stormwater and discharges to meet the series of catchpit culverts.

Both collection devices are directed through pipework and meets at a Continuous Deflection Separation (CDS). Once the stormwater is treated it is directed to Marsden Maritime Holdings (MMH) settlement/storage ponds. The two ponds are located east of Northport’s stormwater pond system.

Although this stormwater sub-catchment does not fall into the Northport perimeter canal, it is included in this plan as Northport manages the maintenance of the CDS facility.

3.1.8 Woodchip Pad

The woodchip pad is located in sub-catchment G. The sub-catchment falls north toward the series of latitudinal slots on the northern most wall of the pad, then to the box canal between the two G sub-catchments. This collection system filters out the larger woodchip debris from entering the perimeter canal.

3.1.9 Future development

It is proposed that further development of Berth 5 will either be collected and treated in the existing stormwater treatment pond or by proprietary devices.

3.2 Stormwater treatment

Stormwater at Northport is managed in a treatment train approach, with some sub-catchments or activities treated at source and all stormwater runoff being treated in the stormwater ponds prior to discharge to the harbour.

3.2.1 Perimeter canal

The canal system along the perimeter of the port apron collects and directs stormwater to the stormwater pond. With an average depth of 1.4m and base width of 2.6m, the perimeter canal has the capacity to convey flows of up to approximately 3.8m^3/s (ignoring any restrictions resulting from culverts).

The perimeter canal system has two grates that separate grit, bark, and other debris (rubbish). Upstream of both grates there are coarse screens controlled by hand winches to control flow.

3.2.2 Stormwater pond

The stormwater pond was constructed to provide treatment to stormwater runoff from the port prior to discharge to the harbour. In 2016 the pond was extended to accommodate a first stage port expansion, and in 2018 baffles and two forebay bunds were installed within the pond to limit inflow short-circuiting.

An inlet weir from the perimeter canal discharges the flows into the pond forebays. A central bund, which has been constructed with gabion rock, splits the pond in two. Flows discharge both over and through the bund, around the baffles and are then pumped from the second basin into a gravity pipeline to combine with discharges from the Marsden Maritime Holdings (MMH) pond immediately southeast of the Northport pond before being discharged to the harbour via a diffuser at depth under Berth 1.

The discharge from the second basin of the pond is via duty-assist pumping system. Records show the pump rates to be at 290m^3/hr for the duty pump and at 490m^3/hr when the standby pump is activated (i.e. both pumps running concurrently).

Sprinklers which aerate the recirculated stormwater have been added to the pond to enhance microbial action and mitigate odour risk.

The gravity pipeline from the pump discharges to a 525mm pipe which increases to an 825mm pipe at the gravity inlet from the forebay area scruffy dome overflow. The gravity line then increases further to a 1500mm pipe at the point at which the 1200dia outlet pipe from

the MMH pond connects into the line. Stormwater is discharged to the harbour through three diffusers.

3.2.3 Stormwater overflows

There are two formalised overflows from the stormwater system. One is located in the first half of the pond, being a scruffy dome manhole riser approximately 520mm above the pond inlet weir level discharging directly to the 825dia gravity outlet pipeline bypassing the pump limitation. The other, is a 9m long spillway at the northern end of the western perimeter canal, at a level 300mm below the port apron level, which discharges directly to the harbour.

3.2.4 Woodchip Pad

The Woodchip Pad's primary treatment measure is the slot drain filtering the larger woodchip debris out of the runoff. Another coarse screening system is found in the perimeter canal near the woodchip pad reducing contaminant of woodchip in the stormwater system.

3.2.5 Washdown Bay

The Washdown Bay catchment area is controlled by a kerb directing flow into a pit. The pit initially has three coarse screens to filter out debris and sludge before the runoff enters a submergible open pit with an outlet pipe controlled by a gate (Outlet A).

In larger rainfall or high use times, the water level may exceed and enter the submergible pump pit (at the end of the washdown bay). Here there is a submersible pump or outlet that both enter the oil separator behind the pit (western side) (Outlet B).

Outlet A joins into outlet B running south entering the Hynds Down Stream Defender Treatment device. After treatment, wash water is piped to another manhole with a Y valve. Here the flow can be sent to sewer wet well or continue to a stormwater pipe (which later leads to stormwater canal).

The sewer wet well is pumped into the council sewer system. The Y valve system is constantly open to the sewer wet well due to requirements.

Plans of the Washdown Bay treatment system is included in **Appendix C**.

3.2.6 Refuelling area

Two catchpits are located at the refuelling area which discharge to a Humes API Oil Interceptor. This catchment is further treated through the perimeter canal system as it joins into another stormwater pipework fed from a cesspit near the fuel station. The site plan for the refuelling area is included in **Appendix D** and the Humes API Interceptor details are included in **Appendix E**.

3.2.7 Scaling Sheds

Stormwater runoff from the scaling sheds is treated by a Continuous Deflection Separation (CDS). Once the stormwater is treated it is directed to Marsden Maritime Holdings (MMH) settlement/storage ponds.

4.0 Stormwater management programme

4.1 Inspection and Maintenance Programme

The inspection and maintenance schedule for the stormwater system is summarised in Table A.

4.1.1 Perimeter canal

The perimeter canal system is cleaned annually during the dry months (February to March). Clean out of 'Canal Hotspots' is undertaken once a month depending on cargo volumes and rainfall. The canal system is approximately 56% concrete, so the remainder has a sand base which can be damaged while excavating the built-up sludge. Therefore, the contractors clearing the perimeter canal also completely reshape to original grade with fresh sand. The Northport stormwater perimeter canal system, displaying bark pile locations and canal hotspots is attached as **Appendix F**.

Daily inspections are undertaken of the perimeter canal, with a focus on the hot spots. Debris is removed via specific tools which is transported to flatbed truck and added to the nearest bark pile.

4.1.2 Ponds

The pond inlet weir and forebay are inspected weekly and twice daily during rain events. The settlement pond (1st stage) will be clear of vegetation and cleaned out every second year. The storage pond (2nd stage) will be at least 50% clear of vegetation and cleaned out every second year. Accumulation of debris (bark, rubbish, etc) will be removed from the pond inlet grate if impeding the flow of water.

4.1.3 Diffuser and pipelines

An underwater examination of the diffuser and pipelines is undertaken at least once every two years. Maintenance will be undertaken if any erosion, damage, or obstructions are observed.

4.1.4 Slot drains and catchpits

Accumulation of debris is removed from the slot drains on a monthly basis, shipping dependent. The slot drains are flushed out with a submersible pump and catchpit baskets are pulled out to remove debris.

4.1.5 Housekeeping

Northport contracts an outside contractor to blade log rows that have been recently emptied. The contract states the service is on demand 24 hours daily and seven days weekly. Log storage rows are to be cleared whenever possible with one hour of being empty. Northport also sweeps the log storage area and berth face weekly to remove as much of the fines as practical.

The compiled bark piles across the log yard are cleared as soon as practical and no less than twice weekly. This is under the service agreement with a third party, Greenfingers Growing Mixes Limited.

A sweeper is left on the berth with an operator while cargo vessels are unloaded, and any spillages will be swept up as soon as practicable.

4.1.6 Washdown Bay

Those who use the washdown bay are educated to clean down the concrete pad after use, to remove debris/contaminants that could be remaining on the pad.

The accumulated sludge by the initial coarse screens is cleaned out monthly with a small skid loader and emptied into a skip bin on the site. The coarse screens are pressure washed to clear the screens.

The submergible pit outlet is the initial outlet of the system. This shallow pit can accumulate sludge and debris requiring clearing to ensure the outlet doesn't get clogged. A gated system at the entrance of the outlet mitigates the sludge from entering the system and building up further down. This pit is also emptied monthly.

The oil separator and Hynds Down Stream Defender are inspected weekly, prior to a rain event and after usage. The oil separator and Hynds Down Stream Defender are cleaned out every 6 months.

The Hynds Downstream Defender manual is included in **Appendix G**.

4.1.7 Scaling Shed

The Scaling Shed CDS treatment facility is inspected weekly. The basket is pulled out, emptied, cleaned and reinstated monthly. Northport follows the CDS Operation and Maintenance Manual (**Appendix H**). Northport use a crane truck to pull the basket out and clean the basket with a pressure washer, section 2 and 4 in the CDS Manual is followed.

4.1.8 Refuelling area

Appendix I includes the Z Energy Stormwater Management Plan, which is followed for the refuelling area. This plan covers spill kit requirements, inspection, and maintenance of the refuelling station.

Table A: Inspection and Maintenance Programme Summary

Area/Asset	Inspection or Maintenance Task	Person/Party Responsible	Frequency
Western Canal Gate	Inspection	Northport Maintenance Supervisor	Daily (weekdays), prior to rain event, post rain events.
Western Perimeter Canal Grate	Inspection	Northport Maintenance Supervisor	Daily (weekdays) to ensure no excess buildup of water behind canal grate. When weir is raised then grate is inspected to ensure no buildup of material. Post rain events.
Eastern Canal Grate	Inspection	Northport Maintenance Supervisor	Daily (weekdays) to ensure no excess buildup of water behind canal grate. When weir is raised then grate is inspected to ensure no buildup of material. Post rain events.
Perimeter Canal	Clean of canal hotspots	Northport Maintenance Supervisor Contractor	Monthly
	Clean base of canal and reinstated with fresh sand	Northport Maintenance Supervisor Contractor	Annually (Feb/Mar)
Western Berth 1 sump	Inspection	Northport Maintenance Supervisor	Weekly, prior and after rain event, after cleaning out slot drain
Container Storage Area Sump	Inspection	Northport Maintenance Supervisor	Weekly, prior and after rain event, after cleaning out slot drain
Pond - Inlet weir and forebay	Inspection	Northport Maintenance Supervisor	Weekly, post rain events.
Pond - Forebay	Clean out sediment	Northport Maintenance Supervisor Contractor	As required
Pond – Inlet grate	Accumulation of debris (bark, rubbish, etc) removed if impeding water flow	Northport Maintenance Supervisor	As required
	Clear of vegetation	Northport Maintenance Supervisor	As required

Area/Asset	Inspection or Maintenance Task	Person/Party Responsible	Frequency
Pond – Settlement pond (1st stage)	Clean out	Northport Maintenance Supervisor Contractor	2 yearly
Pond – Storage pond (2nd stage)	At least 50% clear of vegetation	Northport Maintenance Supervisor	As required
	Clean out	Contractor	2 yearly
Ponds - Discharge pumps	Inspection	Northport Electrical Team	Monthly
Inner SWD Canal	Inspection	Northport Maintenance Supervisor	Weekly and post rain events.
	At least 80% clear of vegetation/weeds and accumulated sediments removed with skid loader it impeding water flow	Northport Maintenance Supervisor Contractor	As required
Catchpits	Sediment/debris removal	Northport Maintenance Supervisor	Monthly
Slot drains	Inspection	Northport Maintenance Supervisor	Weekly, prior to and post rain events.
	Flush and sediment/debris removal	Northport Maintenance Supervisor	Monthly
Outfall	Inspection	Northport Maintenance Supervisor	Monthly
	Maintenance	Northport Maintenance Supervisor Contractor	As required
Underwater diffuser and pipes	Inspection	New Zealand Diving and Salvage	2 yearly
Washdown Bay – Initial coarse screen	Inspection	Northport Maintenance Supervisor	Weekly, prior to rain event and after usage
	Sediment and sludge removed. Washed and pumped out.	Northport Maintenance Supervisor Contractor	Monthly
Washdown Bay – Submergible Pit Outlet	Inspection	Northport Maintenance Supervisor	Weekly, prior to rain event and after usage
	Sediment and sludge removed. Washed and pumped out.	Northport Maintenance Supervisor Contractor	Monthly
	Inspection	Northport Maintenance Supervisor	Weekly, prior to rain event and after usage

Area/Asset	Inspection or Maintenance Task	Person/Party Responsible	Frequency
Washdown Bay - Oil and water separator	Sediment and sludge removed. Washed and pumped out.	Northport Maintenance Supervisor Contractor	6 monthly
Washdown Bay – Downstream Defender	Inspection	Northport Maintenance Supervisor	Weekly, prior to rain event and after usage
	Sediment and sludge removed. Washed and pumped out.	Northport Maintenance Supervisor Contractor	6 monthly
Refuelling area	Sump inspection	Z Energy	Weekly, post rain events.
	Interceptor maintenance/cleaning	Z Energy	Annually
ISO Scaling Shed CDS	Inspection	Northport Maintenance Supervisor	Weekly and post rain events.
	Basket strainer emptied, power washed and reinstated.	Northport Maintenance Supervisor	Monthly
Log Yard	Blade log rows	Greenfingers Growing Mixes Limited	Within one hour of being empty (when possible)
	Remove bark piles	Greenfingers Growing Mixes Limited	No less than twice weekly
Sprinkler System	Inspection	Northport Maintenance Supervisor	Weekly
	Sprinkler heads cleaned out and end cap taken off to flush main line	Northport Maintenance Supervisor	2 monthly
Operational port area	Sweeping	Northport Operations Team	Weekly
Berths	Sweep up spills while unloading	Northport Operations Team	As required

4.2 Inspection and maintenance checklist

An inspection and maintenance checklist/log is included in **Appendix J**. The Northport Maintenance Supervisor will record the inspections and maintenance undertaken on the stormwater system in the checklist.

4.3 Waste disposal

Disposal of sediment removed from the stormwater system is authorised under AUT.005055.35.01. All sediment removed from the stormwater system is deposited within the sediment disposal areas shown in **Appendix K**, unless otherwise approved by NRC.

At least one week prior to commencement of sediment disposal, NRC will be notified in writing of the date that sediment disposal to land is intended to commence.

A record of the volume of sediment removed in cubic metres and the site(s) where the sediment has been disposed of will be kept. Records are forwarded to Council within two weeks of the disposal.

On completion, all areas of newly deposited sediment will be, as soon as practicable, covered with not less than 50mm of topsoil and sown with a suitable grass mixture. At least 80% vegetation groundcover will be established within three months of the completion of the deposition.

5.0 Stormwater quality monitoring

5.1 Basis of the monitoring programme and frequency of monitoring

The stormwater monitoring programme is undertaken in accordance with Conditions 4, 5, 10 and Schedule 1 (to be updated when new consent granted) of the stormwater discharge resource consent.

Schedule 1 states stormwater sampling is to be undertaken during the first discharge event of the season, and two other discharge events each year. When the pond system reaches its design level it triggers the stormwater outflow pumps to discharge and this occurs multiple times a year in response to rainfall events. As such, the condition has been interpreted and it is considered appropriate to target representative discharge conditions, which could occur at any time during the year.

5.2 Stormwater sampling locations

Stormwater samples are collected from four sites, based on the requirements of Schedule 1 of the resource consent:

- Discharge from the treatment pond system prior to mixing with the harbour receiving waters.
- The pond influent.
- Two samples, one each from the eastern and western arm of the stormwater perimeter canal. These are to be representative based on 3 sub-samples from different points of each arm composited for analytical purposes.

The locations of the samples are shown in **Figure 3**.

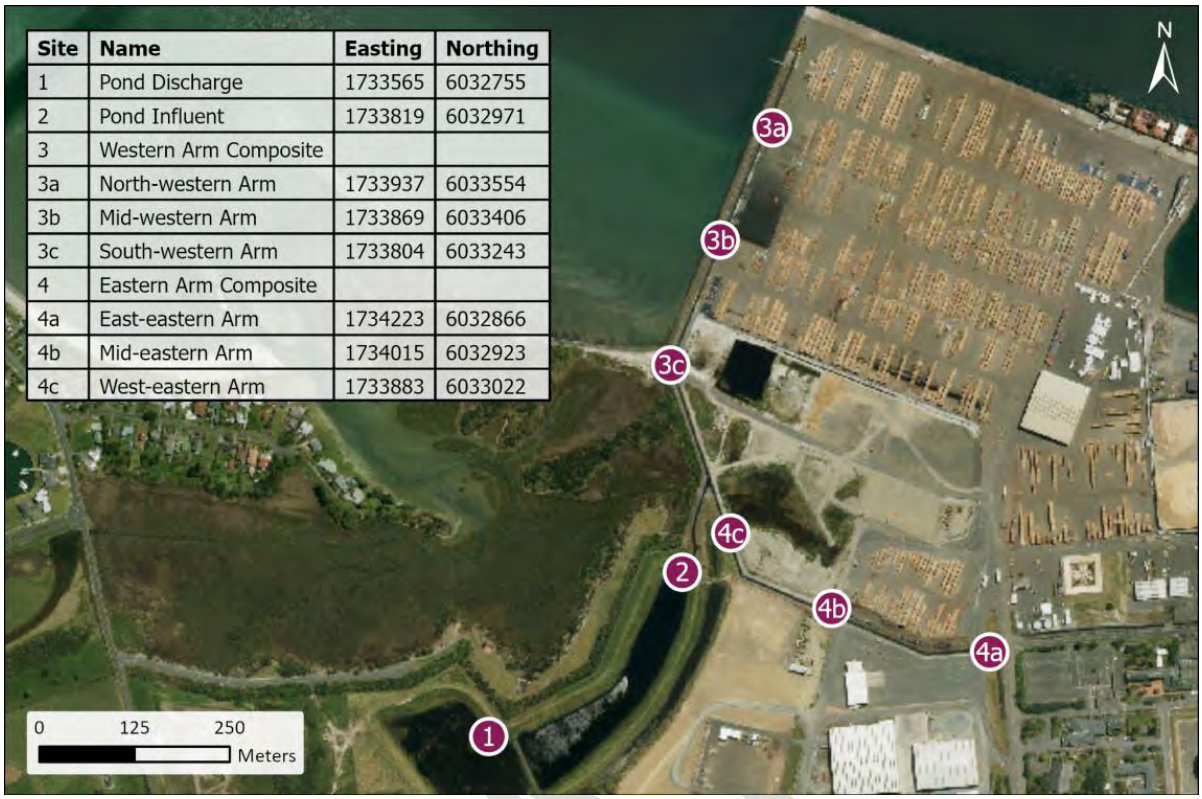


Figure 3: Stormwater sampling locations

5.3 Sampling methodology

Eight grab samples are collected from the eight sampling locations either by hand or using a 'mighty gripper'. Samples collected at sites 3a, 3b, 3c (Western Arm) and 4a, 4b, 4c (Eastern Arm) are composited for analytical purposes.

The samples are collected and handled according to the sampling Standard Operating Procedures:

- Standard Operating Procedure for Sample Handling, Storage, Shipping, Recordkeeping, and Chain of Custody.
- Standard Operating Procedure for Equipment Decontamination.
- Standard Operating Procedure for Stormwater Sampling.
- Standard Operating Procedure for Surface Water Sampling.

Appendix L contains a copy of the abovementioned standard operating procedures.

Sample bottles used are acquired from the testing laboratory (where the samples are to be analysed). Care should be taken to avoid cross contamination during handling and storage of the samples and to avoid personal contact with sample or the interior surfaces of sample container/lid.

pH, temperature and dissolved oxygen are measured in the field using a calibrated water quality meter.

5.4 Sampling Parameters and Consent Trigger Levels for Assessing Effects

The stormwater quality parameters for the sampling are outlined in **Table B**, as required by resource consent conditions and Schedule 1. Schedule 1 also identifies actions values which are intended to act as an early warning to identify if concentrations are increasing relative to previously documented monitoring values/trends and warrant investigation not withstanding that they may be well below levels of environmental concern taking into account predicted mixing and dilution. Condition 5 also outlines limits for pH and total suspended solids.

Table B: Sampling site parameters, action values, and condition limits

Parameter	Sampling frequency	Action Value	Condition limit
Sampling location 1 – Pond Discharge			
Total Aluminium	First sample from first discharge event.	5 mg/m^3	N/A
Total Copper		13 mg/m^3	N/A
Total Lead		44 mg/m^3	N/A
Total Zinc		150 mg/m^3	N/A
PAHs • Acenaphthene • Anthracene • Benzo(α)anthracene • Benzo(α)pyrene • Fluoranthene • Fluorene • Napthalene • Phenanthrene • Pyrene		 • 58 mg/m^3 • 0.1 mg/m^3 • 0.18 mg/m^3 • 0.1 mg/m^3 • 10 mg/m^3 • 30 mg/m^3 • 500 mg/m^3 • 6 mg/m^3 • 0.25 mg/m^3	N/A
pH	One sample per day (operational hours) until discharge has ceased. First sample as close as possible to when discharge first occurs.	N/A	6.5 – 9.0
Total Suspended Solids		N/A	Median ≤ 50 g/m^3 95th percentile ≤ 100 g/m^3
Volatile Suspended Solids		N/A	N/A
Turbidity		N/A	N/A
Total Resin Acids	First sample from first discharge event.	N/A	N/A
Total Nitrogen	First sample from first discharge event – if fertiliser products have been stored on site in the previous season.	N/A	N/A
Total Phosphorus		N/A	N/A
Sampling location 2 – Pond Influent			
Phenols	First discharge event.	N/A	N/A
Total Copper		N/A	N/A

Parameter	Sampling frequency	Action Value	Condition limit
Total Lead		N/A	N/A
Total Zinc		N/A	N/A
PAHs • Acenaphthene • Anthracene • Benzo(α)anthracene • Benzo(α)pyrene • Fluoranthene • Fluorene • Napthalene • Phenanthrene • Pyrene		N/A	N/A
pH		N/A	N/A
Temperature		N/A	N/A
Dissolved oxygen		N/A	N/A
Total Suspended Solids		N/A	N/A
Volatile Suspended Solids		N/A	N/A
Total Resin Acids		N/A	N/A
Sampling locations 3 and 4 – Stormwater Perimeter Canals, western/eastern arms			
Phenols	One off – winter months when ponding in canals following rainfall.	N/A	N/A
Total Copper		N/A	N/A
Total Lead		N/A	N/A
Total Zinc		N/A	N/A
PAHs • Acenaphthene • Anthracene • Benzo(α)anthracene • Benzo(α)pyrene • Fluoranthene • Fluorene • Napthalene • Phenanthrene • Pyrene		N/A	N/A
pH		N/A	N/A
Total Resin Acids		N/A	N/A

Condition 4 outlines concentration limits for Total Copper, Total Lead, and Total Zinc at or beyond the harbour mixing zone, of 1.3 mg/m^3, 4.4 mg/m^3, and 15 mg/m^3 respectively. However, no direct harbour mixing zone monitoring for these metals is required by way of consent condition or Schedule 1 of the resource consent. Mixing zone concentrations are

predicted based on sampling of the stormwater discharge and applying an estimated 200 times reasonable mixing (which for this discharge has been accepted by NRC as the minimum potential mixing).

5.5 Field Sheets

A field sheet will be filled in during each sampling event in order to have a direct record of information which will assist in interpretation of the results.

The field sheets record the following information:

- Sample site location/identification number;
- Date and time sample is taken;
- Sampler's name;
- Rainfall depth (of the rainfall event);
- Depth of flow at the sample location; and
- Any other relevant information or observations, including photographs where possible (i.e. changes in water colour, any visible sediment plumes in the receiving environment, the presence of debris or conspicuous objects etc.).

Appendix M contains the prepared field sheet template.

Rainfall data is taken from Whangārei Harbour at Marsden Point Oil Refinery from NRC Environmental Data Hub. (https://www.nrc.govt.nz/environment/environmental-data/environmental-data-hub/). This site is less than 1km away from Northport. Photographs are also recorded for further discussions.

5.6 Chain of Custody & Laboratory Requests

A Chain of Custody (COC) form provided by the analytical laboratory is filled in providing all relevant information required for sample identification and laboratory analyses. One copy of the COC is sent to the laboratory and one copy is retained by the sampler and logged as part of the Northport record. This is described in detail in the Standard Operating Procedure: Sample Handling, Storage, and Shipping, Recordkeeping and Chain of Custody.

5.7 Stormwater Sample Analysis

The samples are sent to an IANZ accredited laboratory for analysis. The sample collector requests bottles from the testing laboratory for the collection of the stormwater samples prior to sampling.

5.8 Monitoring Reports

As required by Schedule 1 an Annual Monitoring Report for the previous period 1 July to 30 June, will be provided to NRC by 31 August each year. The report will detail the results of the monitoring undertaken under the stormwater monitoring programme and an assessment of compliance with the conditions of consent.

5.9 Trigger Value Exceedance 'Follow Up' Investigation, Re-Testing and Corrective Action Protocols

If the Action Values in Table A are exceeded, NRC will be notified within two weeks of receiving the sample result and investigate the source of the contaminant and advise NRC as to the findings of the investigation and any management response.

5.10 Water quality sensor monitoring

In addition to the sampling undertaken as outlined above, sensors are installed at the inlet to the Stormwater Pond and at the discharge pumps.

The inlet weir records the following parameters:

- Water level of the weir
- Water level of the settlement pond
- Temperature
- Dissolved Oxygen %
- Dissolved Oxygen mg/L
- Turbidity
- pH

Discharge pump records following parameters:

- Temperature
- Dissolved Oxygen %
- Dissolved Oxygen mg/L
- Turbidity
- Total Discharge
- Flow Rate
- pH
- Storage Pond Depth

Readings are collected at 5-minute intervals. The data is sent via a Telemetry (4G) and stored in the Northport HydroTel database.

This additional water quality and physical measurements are used to provide a better understanding of the physical state of the pond and changes in water quality through the stormwater pond. This assists with understanding the effectiveness of treatment in the pond and compliments the stormwater quality monitoring programme outlined above.

The sensors are calibrated each quarter by The Environmental Collective.

6.0 Stormwater system sediment monitoring programme

6.1 Basis of the monitoring programme and frequency of monitoring

The stormwater system sediment monitoring programme is undertaken in accordance with Conditions 5 to 8 of resource consent AUT.005055.35.01 and the 'Sediment Monitoring Plan', prepared by 4Sight Consulting Limited (now SLR), dated 22 March 2023. A copy of the Sediment Monitoring Plan is included in **Appendix N**.

Sediment sampling will be undertaken once every three years.

6.2 Monitoring Reports

As required by Condition 8 a Monitoring Report, will be provided to NRC within one month of receipt of the test results from the analytical laboratory.

7.0 Environmental emergency response procedures

In the event of a spillage of a potential contaminant which may pose a risk to the stormwater system the following Emergency Response Procedure shall be implemented:

1. Stop spill at source.
2. Isolate the spill from the drainage system via temporarily bunding of surfaces and blocking drains.
3. Utilise the emergency spill kit.
4. Clean up the spill using methods appropriate to the spilled materials.
5. If the spill enters the stormwater system (i.e. the drainage system leaving the site) immediately notify the NRC Incident Hotline (0800 504 639).
6. Once the spill is cleaned up and there is no risk of stormwater contamination, remove temporary blocks in the drainage system.
7. Report spill to the Northport Port Services Centre.
8. Record the spill in Northport document system.
9. Restock the spill kit.
10. Send copies of a written report to the Council (if required) and Port Civil Engineer within 7 days of the spill.

The Emergency Spill Response Procedure is posted in key areas of the site, it is also appended to the spill kits.

8.0 Site management and reporting

8.1 Roles and responsibilities

The Port Civil Engineer is responsible for the overall stormwater management at Northport and ensuring that this SOMP is implemented and complied with. The Port Civil Engineer is also responsible for ensuring that the resource consent conditions are complied with. This includes the regular inspection and maintenance programmes for the stormwater system and other facilities, along with associated stormwater quality monitoring. The Port Civil Engineer is responsible for ensuring all records are kept.

Staff and contractors are responsible for ensuring they follow the direction of the Port Civil Engineer and assist with the implementation of and adherence to this SOMP.

8.2 Staff training

The Port Civil Engineer will generally be responsible for ensuring all Northport staff and contractors involved in the day-to-day management of the stormwater system are aware of the consent conditions and this SOMP. Staff are trained using a buddy training and familiarisation system.

8.3 Reporting

The Northport reporting to NRC is outlined in Table C.

Table C: Northport Reporting requirements

Reporting requirement	Date	Condition reference
Record of the volume of sediment collected from the stormwater system and where the sediment has been disposed of.	Within two weeks of the sediment removal work being completed	AUTH.005055.35.01 - 4
The three yearly stormwater system sediment monitoring report.	Every three years, within one month of receipt of the test results from the laboratory	AUTH.005055.35.01 - 8
A report on the underwater examination of the diffuser and pipelines.	At least once every two years, within one month of examination being completed	CON20090505532 - 3
Sediment collected from the maintenance of the stormwater system, including internal drains and any debris traps, shall be disposed of at a site that is authorised to accept such wastes. Details of the quantity of material disposed of and the location of where the material has been disposed of.	Within two weeks of the disposal of any such material	CON20090505532 - 8
The annual stormwater quality monitoring report.	31 August each year	CON20090505532 - Schedule 1

8.4 Record keeping

The following records will be kept by Northport:

- Northport stormwater inspection forms;
- Records of stormwater maintenance;
- Stormwater and sediment testing results;
- Monitoring reports;
- Underwater examination of the diffuser and pipelines reports;
- Stormwater system sediment disposal records;
- Pumping hours records; and
- Spill or environmental incident reports.

8.4.1 Pumping hours

As required by Schedule 1 of the stormwater discharge resource consent the pumping hours, the date, the time, and the quantity of water discharged to the harbour will be measured and recorded.

8.5 Plan updates

This SOMP will be reviewed on an annual basis and updated as required. A record of any updates by Northport and reviews by the NRC will be kept. The reasons for making changes to the SOMP will be documented in the Version Record at the beginning of the SOMP.

A copy of the original SOMP document and subsequent versions will be kept for Northland records, and marked as obsolete. Each new/updated version of the SOMP documentation will be issued with a version number and date to eliminate obsolete SOMP documentation being used. Any revised SOMP will be submitted to NRC for approval and then be certified by that person as still meeting the conditions of consent.

Appendix A Resource Consents

Stormwater Operation and Maintenance Plan

Northport, Marsden Point

Northport Limited

SLR Project No.: 16342

7 February 2024

NORTHPORT LIMITED, C/O DLA PHILLIPS FOX, PO BOX 160, SHORTLAND STREET, AUCKLAND 1140

To discharge stormwater associated with the operation of a port after treatment within a storage and settlement pond system to the Whangarei Harbour via an existing outlet structure at location co-ordinates 1733997E 6033711N, on Crown Land comprising foreshore and seabed

Note: All location co-ordinates in this document refer to Geodetic Datum 2000, New Zealand Transverse Mercator Projection.

Subject to the following conditions:

1. The stormwater discharge outlet structure at the Marsden Point port terminal berthface shall be in general accordance with the attached drawings entitled "Marsden Point Port Development Stage 1 Stormwater Outfall" prepared by Civil Structural, drawing number 9101101 SO 33^{A}, and entitled "Northport Development Layout at Western End of Wharf" prepared by Northport, drawing number D60-30-06-01-015 dated June 2002 (**attached**).

   Advice Note: *The drawings attached to this consent are reduced copies and therefore may not be to scale and may be difficult to read. In the event that compliance and/or enforcement action is to be based on compliance with the attached drawings, it is important that the original drawings are sighted and used. The Council holds an electronic copy of these drawings and can be viewed at the Council's Whangarei Office.*

2. The Consent Holder shall make an underwater examination of the diffuser and pipelines at least once every two years, and take such measures as are necessary to ensure that the diffuser operates as designed and that all the stormwater discharges, except for the emergency overflow, pass through the diffuser.

3. A report on all such examinations and action taken to remedy defects, as required under Condition 2, shall be forwarded to Council Monitoring Manager within one month of the examination being completed.

4. Notwithstanding any other condition, the exercise of this consent shall not result in any of the following effects on coastal water quality at or beyond the mixing zone, as shown on Northland Regional Council Plan No: 3259A:

   (a) The temperature shall not be changed by more than 3°C;

   (b) The pH shall not be changed by more than 0.2;

   (c) The concentration of dissolved oxygen shall not be reduced below 80% saturation;

   (d) The visual clarity shall not be reduced by more than 20% of the median background visual clarity at the time of measurement, as measured by black disk or an authorised alternative method;

   (e) The hue shall not be changed by more than 10 Munsell units of the median background hue at the time of measurement;

   (f) There shall be no conspicuous oil or grease films, scums or foams, or floatable or suspended materials, or emissions of objectionable odour;

   (g) There shall be no destruction of natural aquatic life by reason of a concentration of toxic substances; and

   (h) The concentrations for the following determinands shall not be exceeded;

Determinands	Concentration in milligrams per cubic metre
Total copper	1.3
Total lead	4.4
Total zinc	15

5. The quality of stormwater discharged from the storage and settlement pond system by the pumps shall meet the following:

   (a) A pH within the range of 6.5 to 9.0;

   (b) A total suspended solids median concentration not greater than 50 grams per cubic metre and a 95 percentile concentration not greater than 100 grams per cubic metre.

6. The stormwater storage and settlement pond system shall, as far as is practicable, be maintained free of floatable solids, oil and grease, and foams, and shall not emit objectionable odours.

7. To minimise the potential for the contamination of stormwater by natural wood chemicals, the Consent Holder shall, as far as is practicable, maintain log storage areas, internal drains and any debris traps, so that they are free of wood material that is being stored on-site.

8. Sediment collected from the maintenance of the stormwater system, including internal drains and any debris traps, shall be disposed off at a site that is authorised to accept such wastes. The Consent Holder shall forward to the Council Monitoring Manager within two weeks of the disposal of any such material, details of the quantity of material disposed off and the location of where the material has been disposed off.

9. The Consent Holder shall surrender resource consent CON20060505510 before 1 May 2010.

10. The Consent Holder shall notify the Council Monitoring Manager as soon as practicable once the stormwater storage and settlement pond system reaches its design discharge level and shall then commence stormwater monitoring in accordance Schedule 1 (**attached)**. The Consent Holder may make changes to Schedule 1 with the written approval of the Council Monitoring Manager.

11. The Consent Holder shall notify the Council Monitoring Manager in writing of any proposed change(s) to the materials handled through the Port Terminal as detailed in the application, at least one week prior to the proposed change(s) occurring.

    Advice Note: *The current Port Terminal activities as described in the application are for forestry products, containers, and fertiliser & coal products. The Council will need to consider any proposed change(s) to the new materials(s) handled and determine whether the conditions of consent require reviewing as a result of the proposed change(s) due to a change in the nature or quantity of contaminants discharged.*

12. Where from any cause a contaminant (including fuel) associated with the Consent Holder's operations escapes otherwise than in conformity with this consent, the Consent Holder shall:

    (a) Immediately take such action or execute such work as may be necessary to stop and/or contain such escape; and

    (b) Immediately notify the Council by telephone of an escape of contaminant; and:

    (c) Take all reasonable steps to remedy or mitigate any adverse effects on the environment resulting from the escape; and

    (d) Report the escape to the Council within one week of its occurrence and the steps taken or being taken to clean up, remedy any adverse effects and prevent any recurrence of such escape.

13. The Council may in accordance with Section 128 of the Resource Management Act 1991, serve notice on the Consent Holder of its intention to review the conditions of these consents. Such notice may be served annually during the month of March. The review may be initiated for any one or more of the following purposes:

    (a) To deal with any adverse effects on the environment that may arise from the exercise of the consents and which it is appropriate to deal with at a later stage, or to deal with any such effects following assessment of the results of the monitoring of the consents and/or as a result of the Council's monitoring of the state of the environment in the area;

    (b) To require the adoption of the Best Practicable Option to remove or reduce any adverse effect on the environment;

    (c) To provide for compliance with rules in any regional plan that has been made operative since the commencement of the consents;

    (d) To deal with any change(s) to the materials handled through the Port Terminal. (Notice may be served at any time for this reason.); and

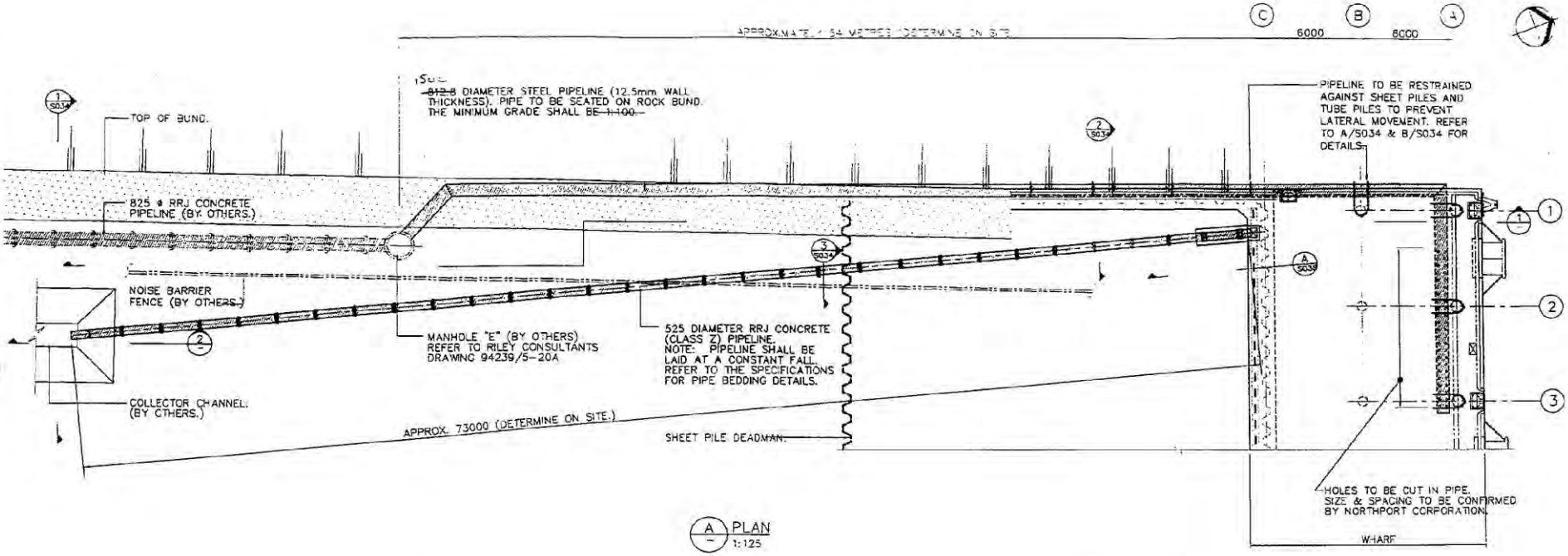
(e) To deal with any material inaccuracies that may be found in the information made available with the application. (Notice may be served at any time for this reason.)

The Consent Holder shall meet all reasonable costs of any such review.

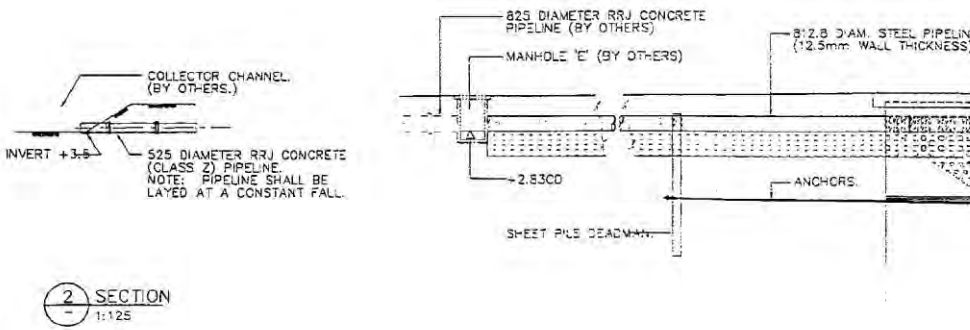
EXPIRY DATE:	**2 DECEMBER 2034**

This consent is granted this Thirteenth Day of April 2010 under delegated authority from the Council by:

Allan Richards
Acting Senior Consents Programme Manager



A PLAN
1:125



2 SECTION
1:125

1 ELEVATION OF STORMWATER DISCHARGE PIPE
1:125

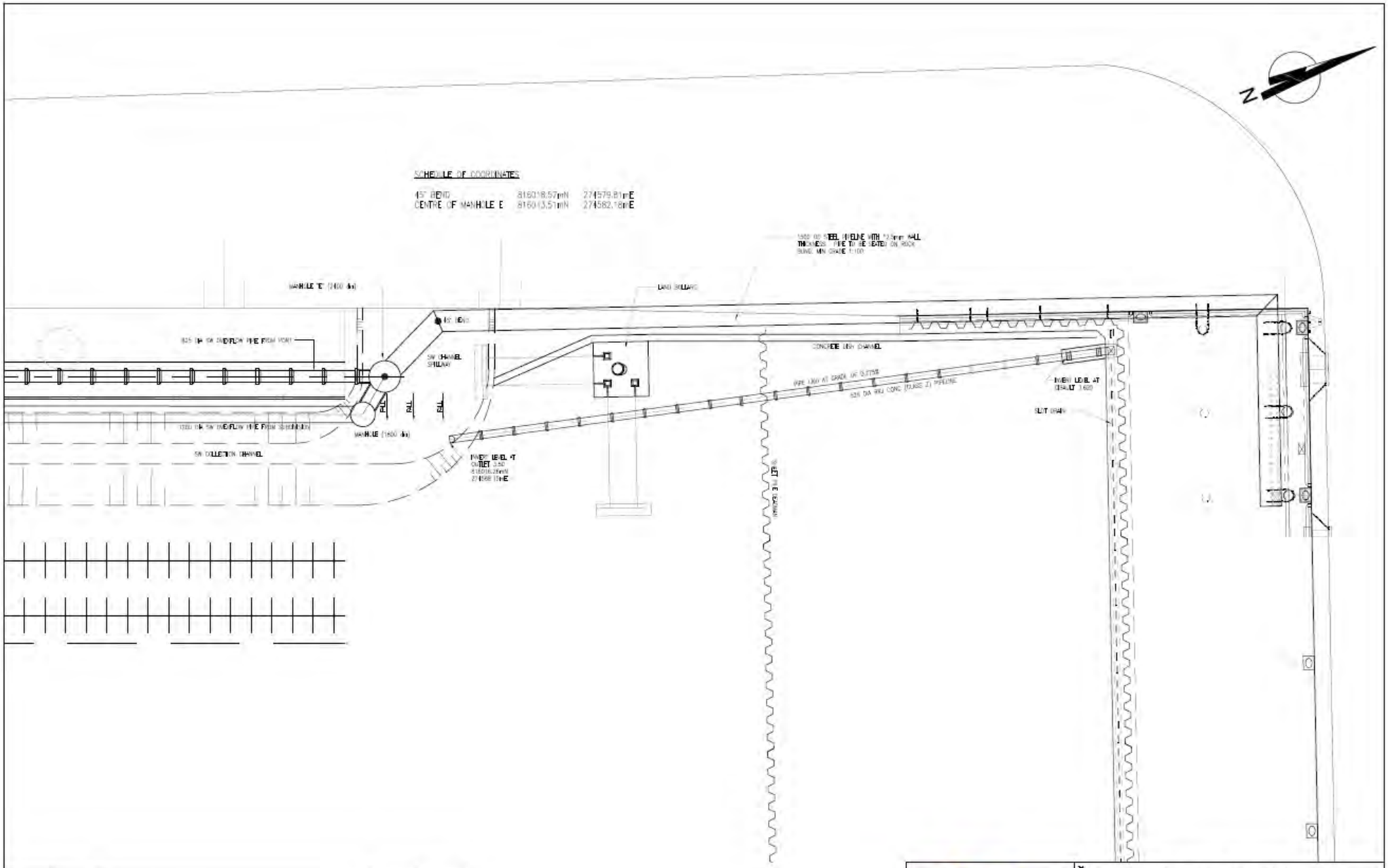
FOR REVIEW

MARSDEN POINT
PORT DEVELOPMENT
STAGE 1

STORMWATER OUTFALL

CIVIL STRUCTURAL

9101101 S033 A

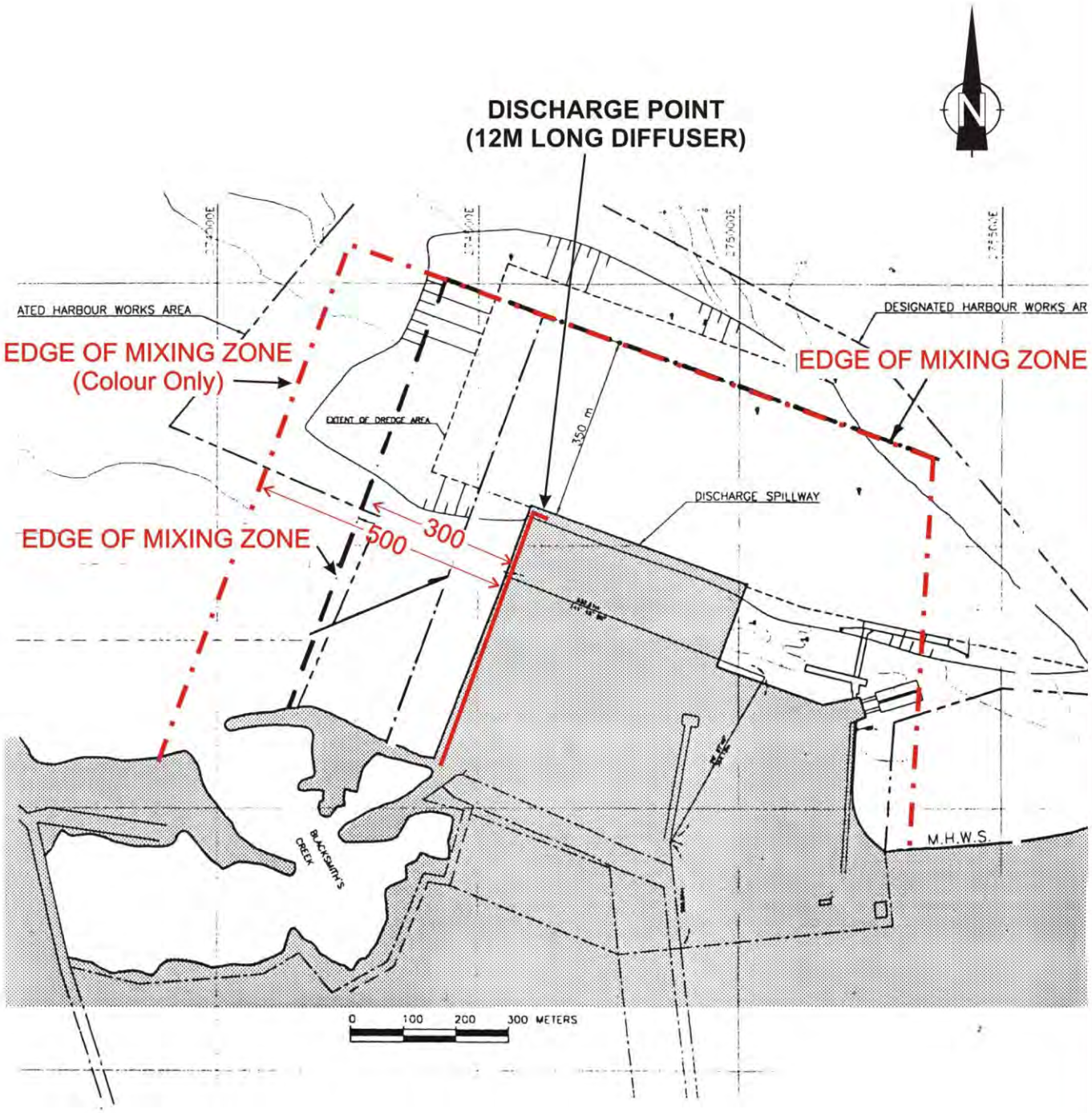


Issue	Date	Details	Approved	By
A	29.8.03	AMEND PIPE DIFFUSER DIA		GJS
0	12.9.02	ISSUED FOR CONSTRUCTION		BMP

Northport
P.O. BOX 848
WHANGAREI, NEW ZEALAND
TEL 09 432 8740, FAX 09 432 8749
EMAIL bruce@northlandport.co.nz

NORTHPORT DEVELOPMENT
LAYOUT AT WESTERN END OF WHARF

Drawn: G PRESTON		Drawing No: D60-30-06-01-015		Issue: A
		Scale: 1:125(A1) 1:250(A3)	Date: JUNE 2002	Sheet: 1



Location Co-ordinates:
Datum: NZTM
Easting: 1733997
Northing: 6033711

NORTHLAND REGIONAL COUNCIL

RESOURCE CONSENT CON20090505532
for
Northport Ltd
Stormwater Mixing Zone

Scale:	N.T.S.
Drawn:	CNA 02/10
App'd:	
Plan No.	**3259A**

SCHEDULE 1

MONITORING PROGRAMME – RESOURCE CONSENT CON20090505532

The Consent Holder shall undertake the monitoring as follows:

1 WATER QUALITY OF DISCHARGES FROM THE STORMWATER SETTLEMENT AND STORAGE POND SYSTEM

1.1 Routine Water Monitoring for Discharges from the stormwater settlement and storage pond to Whangarei Harbour

The stormwater system and discharges shall be monitored in accordance with Table 1 attached below

If any of the following determinands in the stormwater being discharged to the coastal marine area exceed the Action Values specified in Table A, the Consent Holder will notify the NRC within two weeks of receiving the sample result and investigate the source of the contaminant and advise the NRC as to the findings of the investigation and any management response.

Table A

Determinands	Action values: Concentration in milligrams per cubic metre
Total Aluminium	5
Total copper	13
Total lead	44
Total zinc	150
PAHs	
– Acenaphthene	58
– Anthracene	0.1
– Benzo(α)anthracene	0.18
– Benzo(α)pyrene	0.1
– Fluoranthene	10
– Fluorene	30
– Napthalene	500
– Phenanthrene	6
– Pyrene	0.25

Note: ANZECC for PAH, 99% protection level as recommended in Section 8.3.7.7 and also CEQG (Canadian aquatic guidelines). For aluminium, ANZECC 8.3.7 Marine guidelines recommend 0.5 mg/m as an indicative low reliability figure.

Values in Table A are intended to act as an early warning to identify if concentrations are increasing relative to previously documented monitoring values/trends and warrant investigation notwithstanding that they may be well below levels of environmental concern taking into account mixing and dilution.

TABLE 1: SCHEMATIC MONITORING DIAGRAM –

Location	Sampling Frequency	Parameters	Criteria	Notes
Point of discharge from treatment pond system	First discharge per season, and two other discharge events each year			Advice NRC when ponds reach design discharge level for the first time each year prior to discharge occurring
	Three samples spaced evenly over each day (operational hours) until discharge has ceased. First sample to be taken as close as possible to when discharge first occurs.	TSS, VSS, NTU and pH	TSS as in Condition 5(b)	T and DO are considered not useful in this situation as they will reflect conditions intrinsic to the wetland and in any event cannot have any influence on water quality in this particular marine receiving environment.
	Taken with first sample from first discharge event only.	Al, Cu, Pb, Zn, PAH, and resin acids. Total N and Total P to be included if fertiliser products have been stored on site in the previous season.	**Action values** see table A in 1.1 above. Resin acids, Total N and P concentrations will be assessed against available literature and previous concentrations to determine potential for adverse effects. All parameters to be assessed for any increasing trends over time.	If the resin acid results for the first discharge of the season are below any applicable ANZECC effect threshold after theoretical mixing, resin acids need not be further analysed in that season.
	One-off under existing regime	WETT (Toxicity Testing)	As specified in point 1.3 below	One further WETT will be undertaken under the present port conditions. The need for any further WETT will be considered only if new port operations introduce new contaminant(s) into the stormwater.
Pond Influent	To be done with "*First discharge per season*" referred to above	T, pH, DO, TSS, Cu, Pb, Zn, resin acids, phenols, PAH, VSS	Trend data only, no compliance limits.	Test to be used as an indication of pond effectiveness under different conditions eg size of storm, contributing area

Stormwater Canals, western/eastern arms	One off	*Sediment samples:* Cu, Pb, Zn, PAH *Water :Winter months (when ponding in canals following rainfall)* pH, Cu, Pb, Zn, resin acids, phenols, PAH	 Trend data only but reference to ANZECC ISQG values to assess pollution status. Trend data only. No compliance limits	Samples to be taken at: Join of arms, 100m upstream on eastern arm, 100m upstream on western arm Test to be used to determine any disposal issues for sediment Both sediment and water samples to be representative based on 3 sub-samples from different points of each arm composited for analytical purposes
Groundwater				All results from the water quality and sediment quality monitoring will be reviewed after 5 years of exercise of this consent for the purpose of determining if groundwater quality is at risk.

Abbreviations

ANZECC	The Australian and New Zealand Environment and Conservation Council
T	Temperature
DO	Dissolved oxygen (both g/m^3 and % saturation)
TSS	Total Suspended Solids
Total N	Total Nitrogen
Total P	Total Phosphorus
FC	Faecal Coliforms
Cu	Copper
Pb	Lead
Zn	Zinc
PAH	Polycyclic aromatic hydrocarbon
WETT	Whole Effluent Toxicity Test
VSS	Volatile Suspended Solids
NTU	Nephelometric Turbidity Unit

1.2 Pumping Hours

The Consent Holder shall measure the pumping hours, the date, the time, and the quantity of water when the discharge to Whangarei Harbour occurs.

Advice Note: *The application states that the approximately average volume of stormwater to be discharged is assessed at 200,000 cubic metres per annum. The size of the discharge pipe and the proposed capacity of the pumps limit the pumped discharge rate to approximately 2,520 cubic metres per hour.*

1.3 Wett Method

The WETT method for toxicity analyses shall be undertaken on not less than three representative marine species, including at least one algae, one invertebrate, and one fish. The choice of toxicity test species, dilutions, test endpoints to be measured, and "toxicity effect" shall be submitted to the Council for approval at least twenty working days prior to stormwater sampling. For each of the three [3] toxicity tests the EC_{25} (the concentration of stormwater estimated to produce a toxic effect in 25% of the test organisms) shall be greater than the equivalent of a 200-fold dilution of the stormwater. The dilution water used for toxicity tests shall be an uncontaminated sample of Whangarei Harbour water, collected on an incoming tide at the harbour entrance, at a point agreed to by the Council. There shall be no significant toxicity after a 200-fold dilution of the stormwater. For the purposes of this condition "significant toxicity" is defined as no more than a 25% toxic effect measured in the most sensitive test species used. Testing of the samples shall be carried out in accordance with the methodology outlined in the NIWA document entitled "Standard Methods for Whole Effluent Toxicity Testing: Development and Application" dated November 1998.

1.4 The pH and TSS results taken in accordance with Table 1 will be recorded in an ongoing spreadsheet a copy of which shall be forwarded to the Council Monitoring Manager as required by Condition 2 below. Any results recorded which do not achieve the criteria included in Condition 5 shall be reported to the Council Monitoring Manager together with an explanation within seven days of their receipt by Northport.

2 REPORTING

2.1 The Consent Holder shall forward to the Council Monitoring Manager by 31 August each year an annual report for the previous period 1 July to 30 June detailing the results of the monitoring required by Section 1 of this monitoring programme and an assessment of compliance with the conditions of consent.

3 REVIEW

The Regional Council, in conjunction with the Consent Holder, may undertake a review of the monitoring programme every two years. The review will take into account the Consent Holders monitoring results, any monitoring undertaken by the Regional Council and the level of development within the catchment areas. The Consent Holder shall meet the reasonable costs of any such review.

4 FIELD MEASUREMENTS, RECORDS, SAMPLE COLLECTION, SAMPLE TRANSPORT, DETECTION LIMITS, AND LABORATORY REQUIREMENTS

4.1 Records

A record of rainfall conditions preceding and during sampling shall be kept. This record shall be based on a nearby rainfall recording site agreed by the Council.

4.2 Sample Collection

All samples collected as part of this monitoring programme shall be collected using standard methods and approved containers.

4.3 Sample Transport

All samples collected as part of this monitoring programme shall be transported in accordance with standard procedures and under chain of custody to the laboratory.

4.4 Detection Limits

The detection limits for the analysis of metals in sediment and water samples collected shall be equivalent to, or better than, those specified below:

Metal	Sediment samples (milligrams per kilogram)	Water samples (milligrams per cubic metre)
total copper	2	1.0
total lead	0.4	0.2
total zinc	4	2.0
total arsenic	2	N/A
total cadmium	0.1	N/A
total chromium	2	N/A

4.5 Laboratory Requirements

All samples collected as part of this monitoring programme shall be analysed at a laboratory with registered quality assurance procedures (see definition below), and all analyses shall be conducted using standard methods.

Registered quality assurance procedures are procedures that ensure that the laboratory meets good management practices and would include registrations such as ISO 9000, ISO Guide 25, and Ministry of Health Accreditation.

File: 5055
35
New

Document date: 22 July 2015

Resource Consent

Pursuant to the Resource Management Act 1991, the Northland Regional Council (hereinafter called "the Council") does hereby grant a Resource Consent to:

NORTHPORT LIMITED, PO BOX 44, RUAKAKA 0151

To undertake the following activity on Part Lot 2 and Lot 3, DP 315167 (Marsden Point), at or about location co-ordinates 1733521E 6032730N:

AUT.005055.35.01: To discharge contaminants to land at various locations from the disposal of sediment removed from the stormwater system authorised by **CON20090505532**.

Note: All location co-ordinates in this document refer to Geodetic Datum 2000, New Zealand Transverse Mercator Projection.

Subject to the following conditions:

1 For the purposes of this consent, 'sediment' includes fine sludge and coarser debris removed from within the stormwater system.

2 All sediment removed from the stormwater system shall be deposited within the Sediment Disposal Area's shown on the **attached** Northport plan entitled 'Northport Indicative Canal Sediment Disposal Sites Site Plan', Sheet 1, Date: June 2015, unless otherwise approved in writing by the Council's monitoring officer.

3 At each time of exercise of this consent, the Consent Holder shall notify the Council's assigned monitoring officer in writing of the date that sediment disposal to land is intended to commence, at least one week beforehand.

4 The Consent Holder shall keep a record of the volume of sediment removed in cubic metres and the site(s) where the sediment has been disposed of. A copy of this record for each time this consent is exercised shall be forwarded to the Council's assigned monitoring officer within two weeks of the sediment removal work being completed. In addition, a copy of this record shall be forwarded immediately to the Council's assigned monitoring officer on written request. The records shall be in an electronic format that has been agreed to by the Council's monitoring officer.

Advice Note: *The keeping of records is also required under Condition 8 of CON20090505532.*

5 On completion of each exercise of this consent, all areas of newly deposited sediment shall be, as soon as is practicable, covered with not less than 50 millimetres of topsoil and sown with a suitable grass mixture. At least 80% vegetation groundcover shall be established within three months of the completion of the sediment removal work.

6 The Consent Holder shall sample and test the stormwater system sediment for the following determinands prior to 30 November 2018, and then at least once every three years thereafter:

(a) Total Arsenic

(b) Total Cadmium

(c) Total Chromium

(d) Total Copper

(e) Total Lead

(f) Total Nickel

(g) Total Zinc

(h) Total Petroleum Hydrocarbons.

7 Prior to undertaking the three-yearly sediment sampling for the first time, the Consent Holder shall submit a Monitoring Plan showing the proposed number and location of sediment sampling sites, and the proposed sediment sampling methodology, to the Council's monitoring officer for approval. Sampling sites shall include at least one site in each of the stormwater canals and the main settlement pond. The three yearly sediment sampling shall then be undertaken in accordance with the approved Monitoring Plan.

8 The Consent Holder shall report the results of the three-yearly sediment sampling to Council's assigned monitoring officer within one month of the receipt of the test results from the analytical laboratory.

9 The Council may, in accordance with Section 128 of the Resource Management Act 1991, serve notice on the Consent Holder of its intention to review the conditions annually during the month of March for any one or more of the following purposes:

(a) To deal with any adverse effects on the environment that may arise from the exercise of the consent and which it is appropriate to deal with at a later stage; or

(b) To require the adoption of the best practicable option to remove or reduce any adverse effect on the environment; or

(c) To deal with any significant changes in sediment quality.

The Consent Holder shall meet all reasonable costs of any such review.

10 This consent shall not lapse until its expiry.

EXPIRY DATE: 2 DECEMBER 2034

This consent is granted this Twenty-second day of July 2015 under delegated authority from the Council by:

S J Savill
Consents Programme Manager –
Water and Wastes

ISSUE	DATE	DETAILS	APPRVD	BY

NOTES

1. AVERAGE SEDIMENT CREATION FROM EXISTING STORMWATER COLLECTION SYSTEM = 95m³
2. VOLUME OF EXISTING MATERIAL STOCKPILED INSIDE PORT = 1,050m³

Northport
P.O. BOX 848
WHANGAREI, NEW ZEALAND
TEL 09 432 5010, FAX 09 432 8749
EMAIL, ben.sweeny@northport.co.nz

NORTHPORT
INDICATIVE CANAL SEDIMENT DISPOSAL SITES
SITE PLAN

				0
B SWEENY	B SWEENY	1:1000(A1) 1:2000(A3)	JUNE 2015	1

Appendix B Stormwater Plans

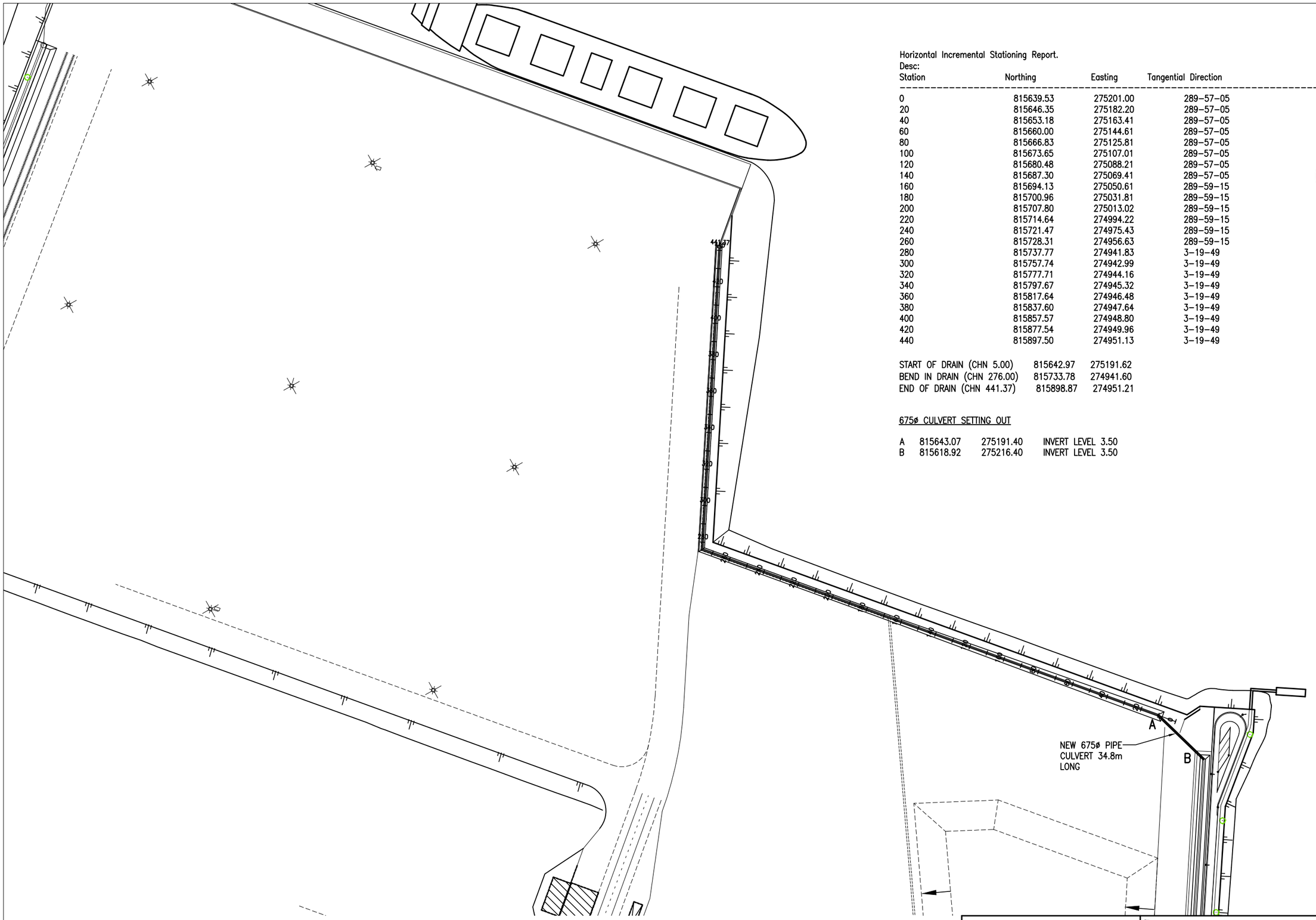
Stormwater Operation and Maintenance Plan

Northport, Marsden Point

Northport Limited

SLR Project No.: 16342

7 February 2024



Horizontal Incremental Stationing Report.
Desc:

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60	815660.00	275144.61	289–57–05
80	815666.83	275125.81	289–57–05
100	815673.65	275107.01	289–57–05
120	815680.48	275088.21	289–57–05
140	815687.30	275069.41	289–57–05
160	815694.13	275050.61	289–59–15
180	815700.96	275031.81	289–59–15
200	815707.80	275013.02	289–59–15
220	815714.64	274994.22	289–59–15
240	815721.47	274975.43	289–59–15
260	815728.31	274956.63	289–59–15
280	815737.77	274941.83	3–19–49
300	815757.74	274942.99	3–19–49
320	815777.71	274944.16	3–19–49
340	815797.67	274945.32	3–19–49
360	815817.64	274946.48	3–19–49
380	815837.60	274947.64	3–19–49
400	815857.57	274948.80	3–19–49
420	815877.54	274949.96	3–19–49
440	815897.50	274951.13	3–19–49

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BEND IN DRAIN (CHN 276.00) 815733.78 274941.60
END OF DRAIN (CHN 441.37) 815898.87 274951.21

675ø CULVERT SETTING OUT

A 815643.07 275191.40 INVERT LEVEL 3.50
B 815618.92 275216.40 INVERT LEVEL 3.50

NOTE:
– COORDINATES ARE IN TERMS OF GEODETIC DATUM 1949, Mt EDEN CIRCUIT.
– LEVELS ARE TERMS OF CHART DATUM.

ISSUE	DATE	DETAILS	APPRVD	BY
0	5–7–02	ISSUED FOR CONSTRUCTION		BWP

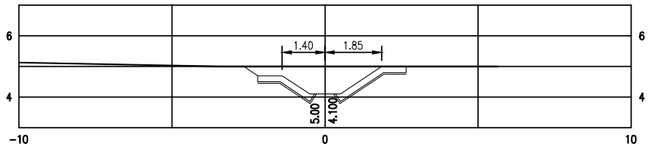
Northport
P.O BOX 848
WHANGAREI, NEW ZEALAND
TEL 09 432 8740, FAX 09 432 8749
EMAIL brucep@northlandportcorp.co.nz

Title:
NORTHPORT DEVELOPMENT
EASTERN COLLECTOR DRAIN SETTING OUT
EXISTING WHARF TO NEW WHARF – PLAN

Designed By		Dwg No	Issue:
		D60–30–06–01–008	0
Drawn: B PRESTON	**Checked:**	**Scale:** 1:1000(A1) 1:2000(A3) / **Date:** JULY 2002	**Sheet:** 1

ORIGINAL SIZE A1

100



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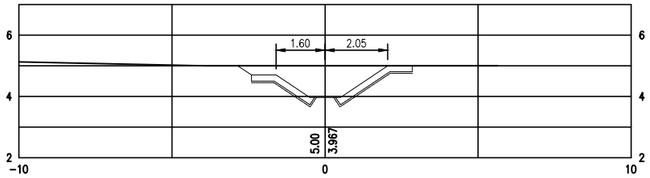

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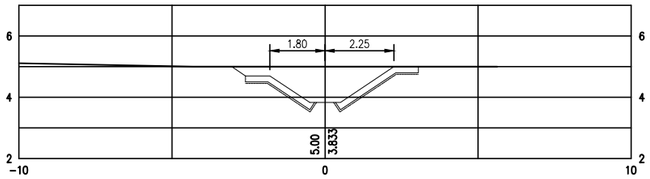

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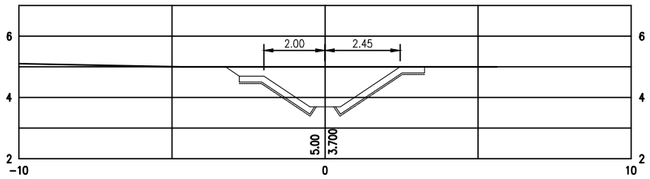

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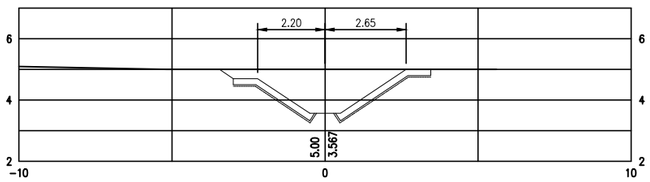

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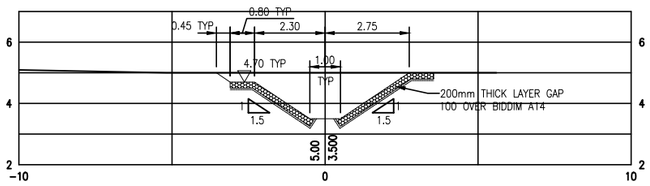

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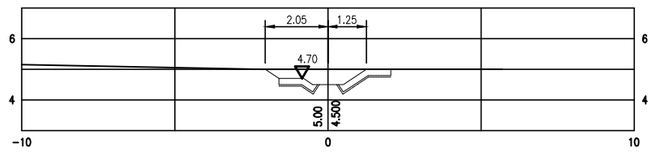

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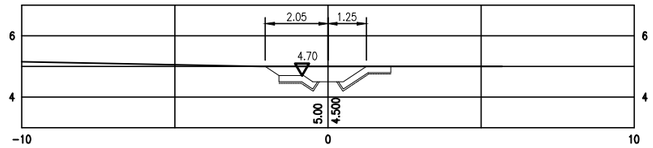

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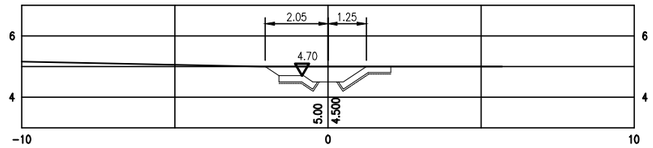

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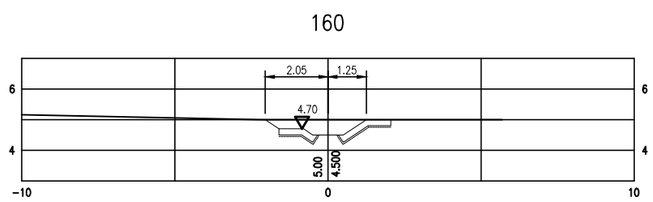

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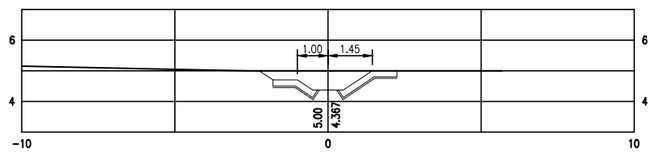

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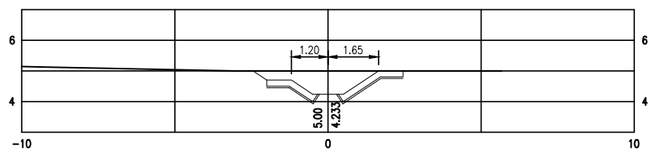
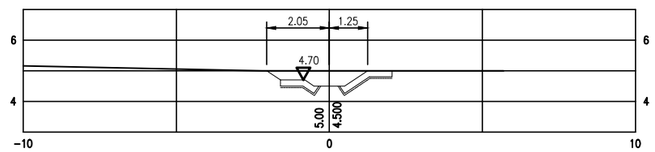


276 TO 441.37 (DESIGN TO BE VERIFIED ON SITE)

260



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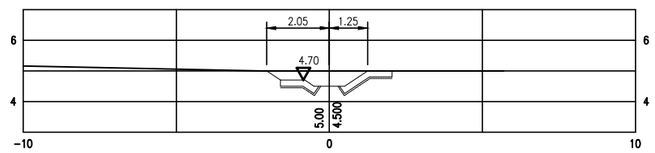

NOTE:
– LEVELS ARE IN TERMS OF CHART DATUM

0	5-7-02	ISSUED FOR CONSTRUCTION		BWP
ISSUE	DATE	DETAILS	APPRVD	BY

Northport

P.O BOX 848
WHANGAREI, NEW ZEALAND
TEL 09 432 8740, FAX 09 432 8749
EMAIL brucep@northlandportcorp.co.nz

Title:

NORTHPORT DEVELOPMENT
EASTERN COLLECTOR DRAIN SETTING OUT
EXISTING WHARF TO NEW WHARF – CROSS SECTIONS

Designed By		Dwg No	Issue:
		D60-30-06-01-009	0
Drawn: B PRESTON	**Checked:**	**Scale:** 1:100(A1) 1:200(A3)	**Date:** JULY 2002	**Sheet:** 1

ORIGINAL SIZE A1

Horizontal Incremental Stationing Report.
Alignment: Eastern SW Collector Drain Wharf to Marsden Point Road
Desc:

Station	Northing	Easting
0	815619.00	275216.68
20	815599.04	275215.50
40	815579.07	275214.32
60	815559.11	275213.14
80	815539.14	275211.96
100	815519.18	275210.78
120	815499.20	275210.46
140	815479.42	275213.30
160	815460.38	275219.33
180	815442.36	275227.62
200	815422.36	275227.62
220	815402.36	275227.62
240	815382.36	275227.62
260	815362.36	275227.62
280	815342.36	275227.62
300	815322.36	275227.62
320	815302.50	275226.28
340	815287.69	275212.84
360	815283.06	275193.58
380	815280.78	275173.72
400	815278.69	275153.83
420	815276.60	275133.94
440	815274.50	275114.05
460	815272.41	275094.16
480	815270.32	275074.27
500	815268.22	275054.38
520	815267.53	275034.40
540	815266.93	275014.41
560	815265.19	274994.49
580	815263.09	274974.60
600	815261.00	274954.71
620	815258.91	274934.82
640	815256.81	274914.93
660	815254.72	274895.04

Horizontal Incremental Stationing Report.
Alignment: Eastern SW Collector Drain – Marsden Point Road to SW Settlement Pond
Desc:

Station	Northing	Easting
0	815237.61	274867.22
20	815235.53	274847.33
40	815233.44	274827.44
60	815231.36	274807.55
80	815229.27	274787.66
100	815229.27	274768.06
120	815236.74	274749.50
140	815244.21	274730.95
160	815251.68	274712.40
180	815259.15	274693.84
200	815266.62	274675.29
220	815274.08	274656.74
240	815281.55	274638.18
260	815289.02	274619.63
280	815296.49	274601.08
300	815303.96	274582.53
320	815311.43	274563.97
340	815318.90	274545.42
360	815326.37	274526.87
380	815333.83	274508.31

ISSUE	DATE	DETAILS	APPRVD	BY

NOTE:
- COORDINATES ARE IN TERMS OF GEODETIC DATUM 1949, Mt EDEN CIRCUIT.
- LEVELS ARE IN TERMS OF CHART DATUM.
- THIS PLAN TO BE READ IN CONJUNCTION WITH DRAWING D60-30-06-01-011.

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Title:
EASTERN SW COLLECTOR DRAIN
WHARF TO MARSDEN POINT RD,
MARSDEN POINT RD TO SW SETTLEMENT POND

Path	Dwg No		Issue:
k:\engineer\gregb\stormwater\smp\canals.dwg	D60-30-06-01-010		R0
Drawn: B SWEENY	Checked:	Scale: 1:2000 (A1) 1:4000(A3)	Date: JULY 2002	Sheet: 01

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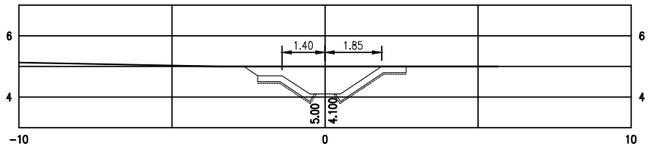

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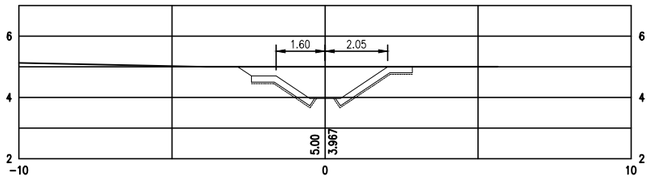

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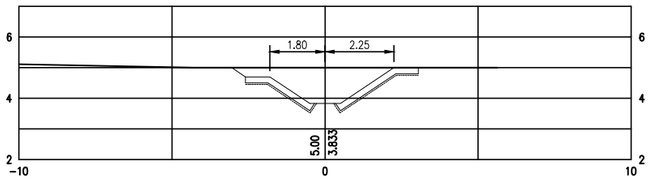

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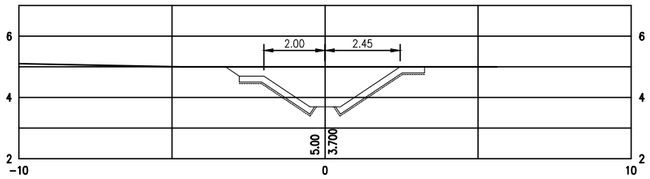

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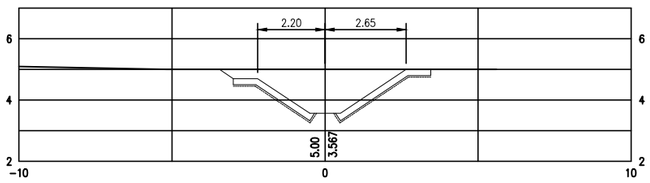

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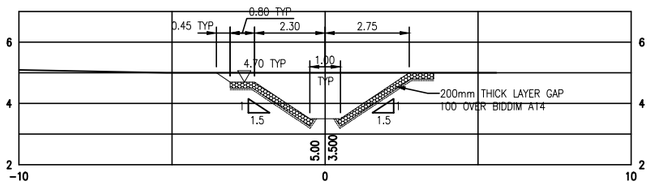

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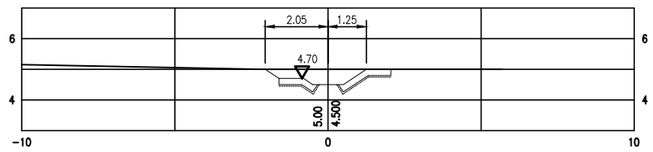

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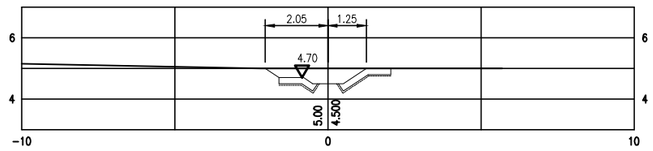

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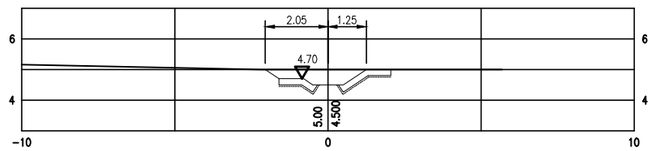

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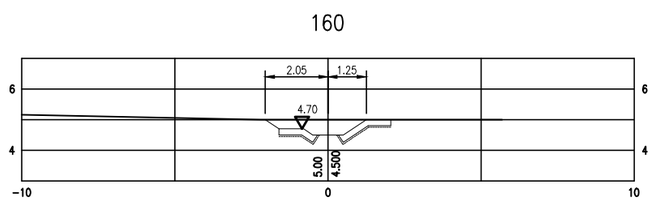

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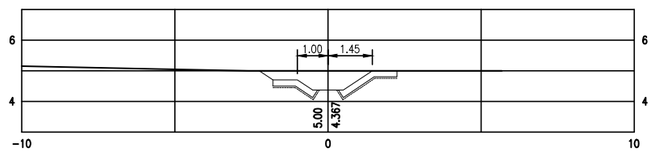

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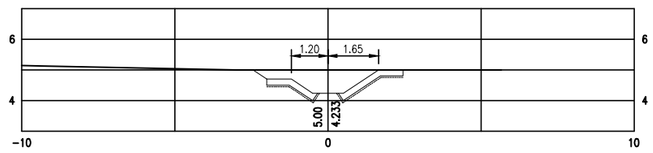
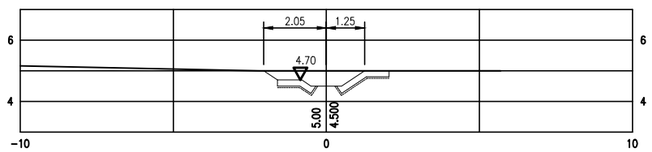


276 TO 441.37 (DESIGN TO BE VARIFIED ON SITE)

260



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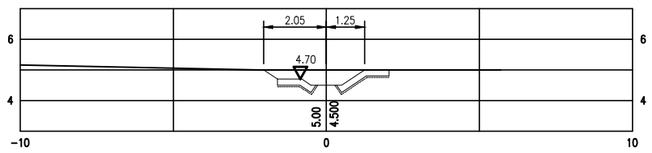

ISSUE	DATE	DETAILS	APPRVD	BY
0	5-7-02	ISSUED FOR CONSTRUCTION		BWP

NOTE:
- LEVELS ARE IN TERMS OF CHART DATUM

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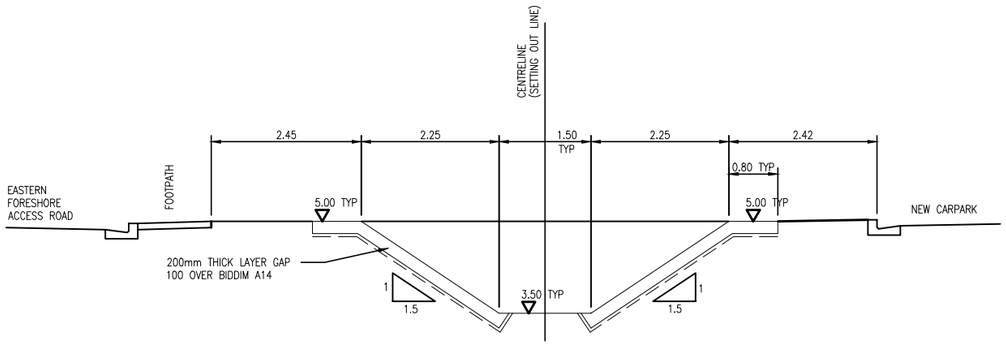
Title:

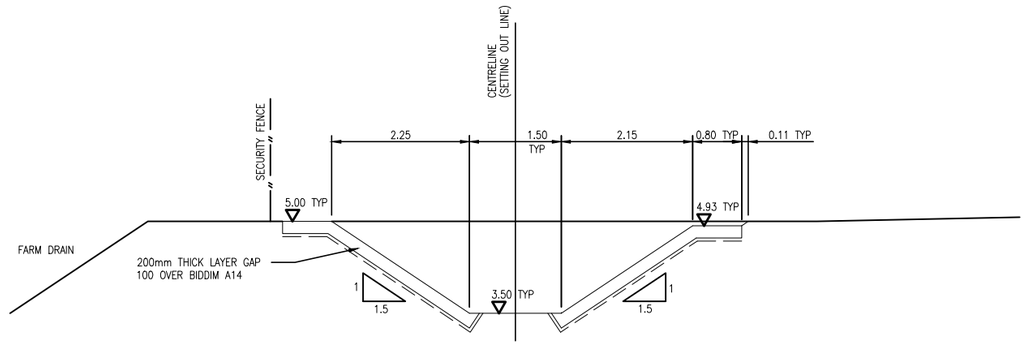
NORTHPORT DEVELOPMENT
EASTERN COLLECTOR DRAIN SETTING OUT
EXISTING WHARF TO NEW WHARF

Designed By		Dwg No		Issue:
				0
Drawn: B PRESTON	Checked:	Scale: 1:100(A1) 1:200(A3)	Date: JULY 2002	Sheet: 1

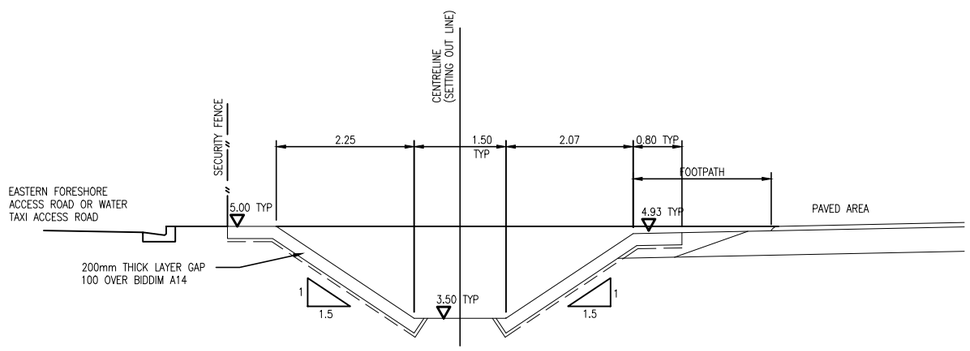
ORIGINAL SIZE A1



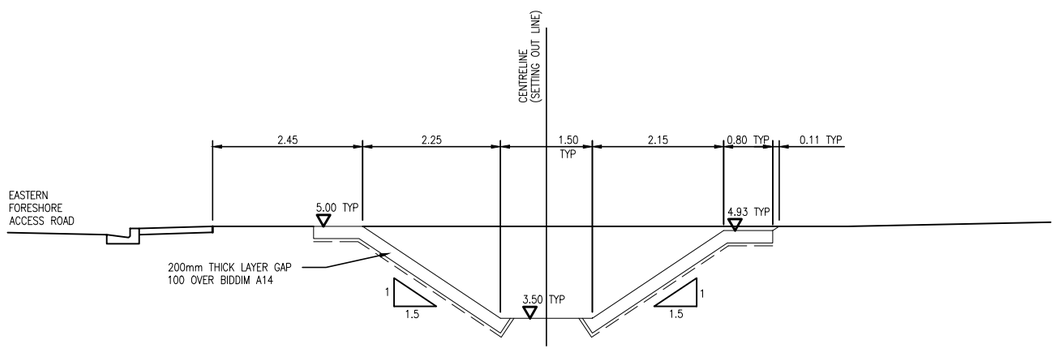
TYPICAL CROSS SECTION WHARF TO MARSDEN POINT ROAD CHN 315.5 TO 530



TYPICAL CROSS SECTION MARSDEN POINT ROAD TO SW SETTLEMENT POND CHN 0 TO 320



TYPICAL CROSS SECTION WHARF TO MARSDEN POINT ROAD CHN 0 – 305



TYPICAL CROSS SECTION WHARF TO MARSDEN POINT ROAD CHN 530 TO 660

ISSUE	DATE	DETAILS	APPRVD	BY
0	19-7-02	ISSUED FOR CONSTRUCTION		BWP

NOTE:
- COORDINATES ARE IN TERMS OF GEODETIC DATUM 1949, Mt EDEN CIRCUIT.
- LEVELS ARE IN TERMS OF CHART DATUM.
- THIS PLAN TO BE READ IN CONJUNCTION WITH DRAWING D60-30-01-010.

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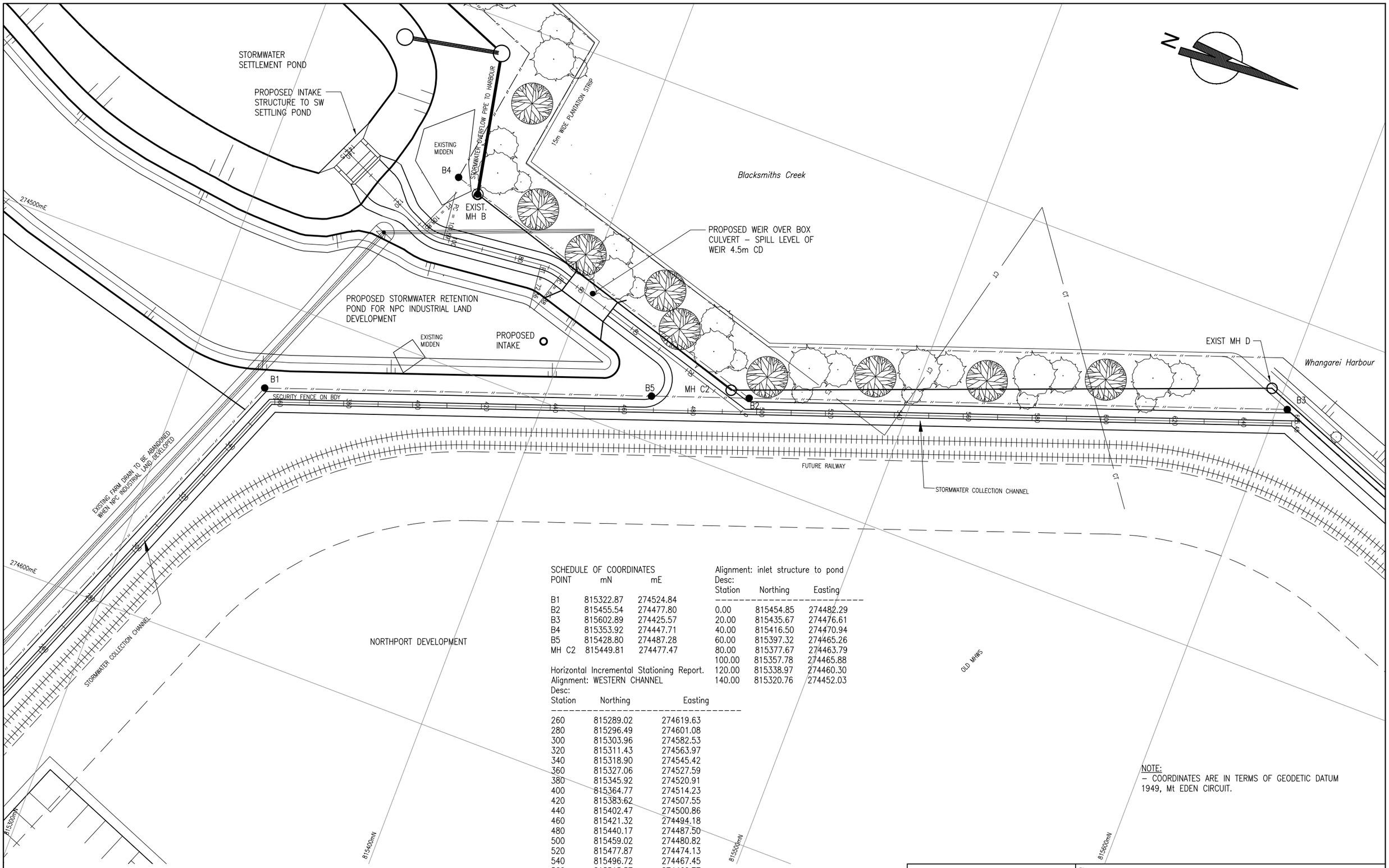
Title:

NORTHPORT DEVELOPMENT
EASTERN STORMWATER COLLECTOR CHANNEL
CROSS SECTIONS

Designed By		Dwg No		Issue:
				0
Drawn: B PRESTON	Checked:	Scale: 1:50(A1) 1:100(A3)	Date: JULY 2002	Sheet: 1

ORIGINAL SIZE A1



SCHEDULE OF COORDINATES

POINT	mN	mE
B1	815322.87	274524.84
B2	815455.54	274477.80
B3	815602.89	274425.57
B4	815353.92	274447.71
B5	815428.80	274487.28
MH C2	815449.81	274477.47

Horizontal Incremental Stationing Report.
Alignment: WESTERN CHANNEL
Desc:

Station	Northing	Easting
260	815289.02	274619.63
280	815296.49	274601.08
300	815303.96	274582.53
320	815311.43	274563.97
340	815318.90	274545.42
360	815327.06	274527.59
380	815345.92	274520.91
400	815364.77	274514.23
420	815383.62	274507.55
440	815402.47	274500.86
460	815421.32	274494.18
480	815440.17	274487.50
500	815459.02	274480.82
520	815477.87	274474.13
540	815496.72	274467.45
560	815515.57	274460.77
580	815553.27	274447.40
620	815572.12	274440.72
640	815590.97	274434.04

Alignment: inlet structure to pond
Desc:

Station	Northing	Easting
0.00	815454.85	274482.29
20.00	815435.67	274476.61
40.00	815416.50	274470.94
60.00	815397.32	274465.26
80.00	815377.67	274463.79
100.00	815357.78	274465.88
120.00	815338.97	274460.30
140.00	815320.76	274452.03

NOTE:
– COORDINATES ARE IN TERMS OF GEODETIC DATUM 1949, Mt EDEN CIRCUIT.

ISSUE	DATE	DETAILS	APPRVD	BY
2	27.9.02	SWEEPING CURVE IN CHANNEL REMOVED		BWP
1	17.9.02	WESTERN COLLECTOR CHANNEL REDUCED TO 6m IN WIDTH		BWP
0	4.9.02	ISSUED FOR CONSTRUCTION		BWP

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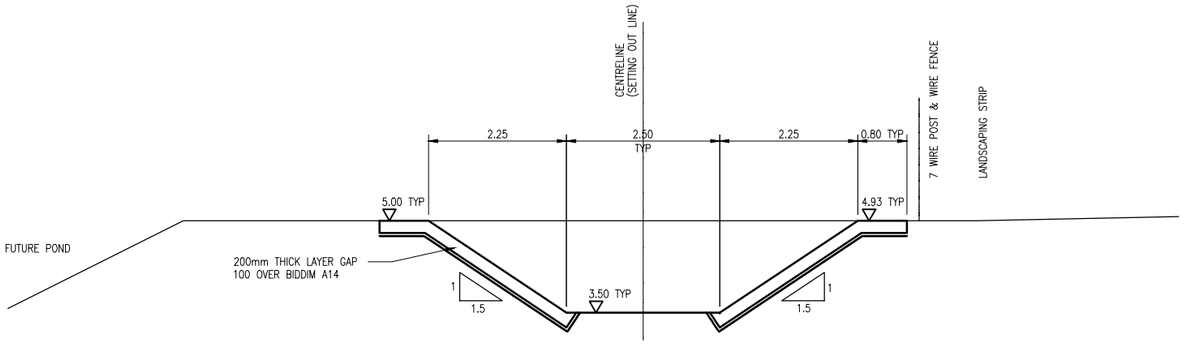
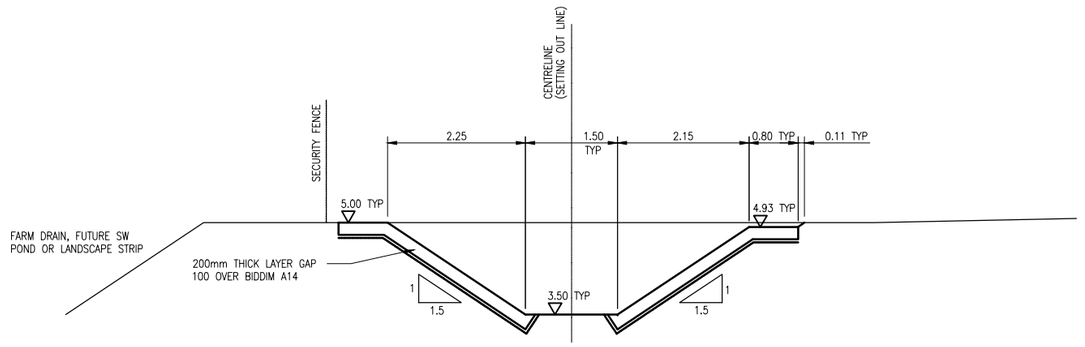
Title:
NORTHPORT DEVELOPMENT
LAYOUT OF AREA ADJACENT TO STORMWATER PONDS PLAN & SETTING OUT DATA

Designed By		Dwg No	Issue:
		D60–30–01–013	2
Drawn: B PRESTON	Checked:	Scale: 1:500(A1) 1:1000(A3)	Date: SEPT 2002	Sheet: 1



TYPICAL CROSS SECTION CHANNEL ENTRANCE TO SW SETTLEMENT POND



TYPICAL CROSS SECTION CHN 0 TO 648.32

ISSUE	DATE	DETAILS	APPRVD	BY
2	27.9.02	RE-ISSUE		BWP
1	17.9.02	WESTERN COLLECTOR CHANNEL REDUCED TO 6m IN WIDTH		BWP
0	5.9.02	ISSUED FOR CONSTRUCTION		BWP

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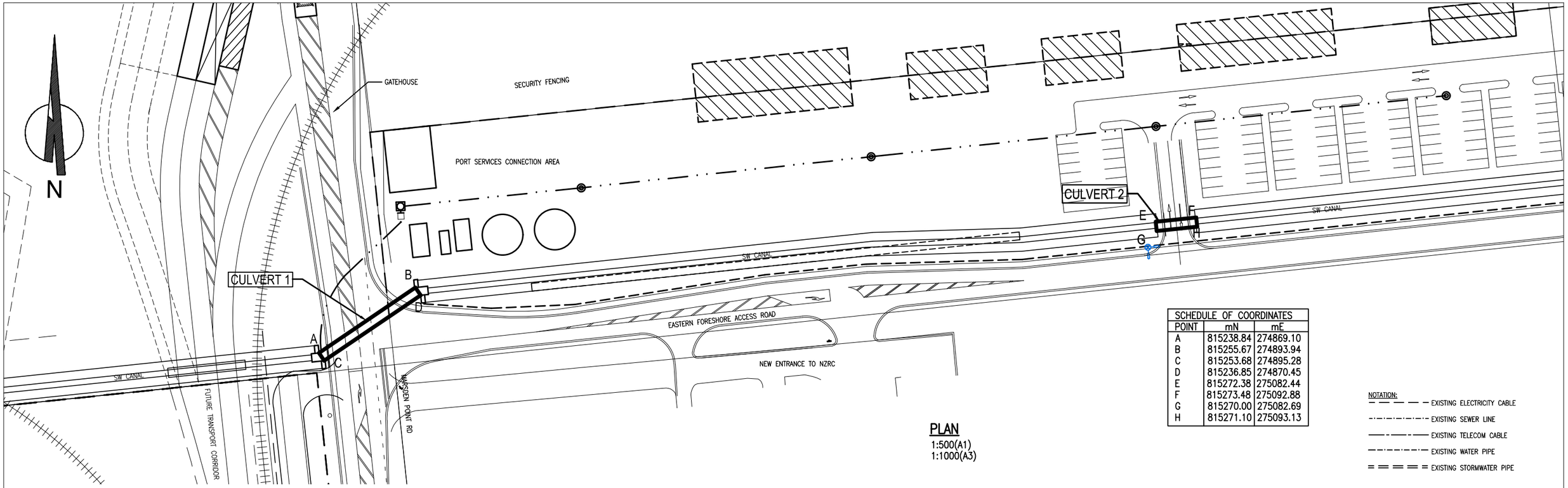
Title:
NORTHPORT DEVELOPMENT
LAYOUT OF AREA ADJACENT TO STORMWATER PONDS
TYPICAL CROSS SECTIONS

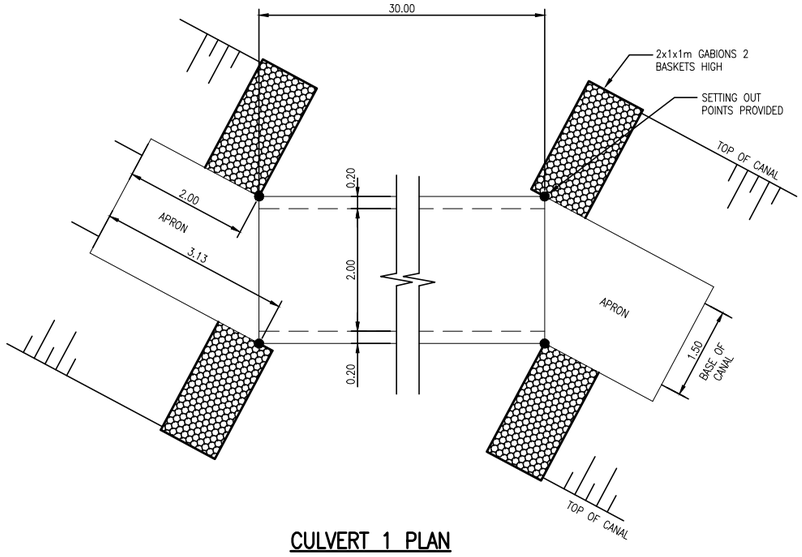
Designed By		Dwg No	Issue:
		D60-30-01-014	2
Drawn: B PRESTON	Checked:	Scale: 1:50(A1) 1:100(A3) / Date: SEPT 2002	Sheet: 1



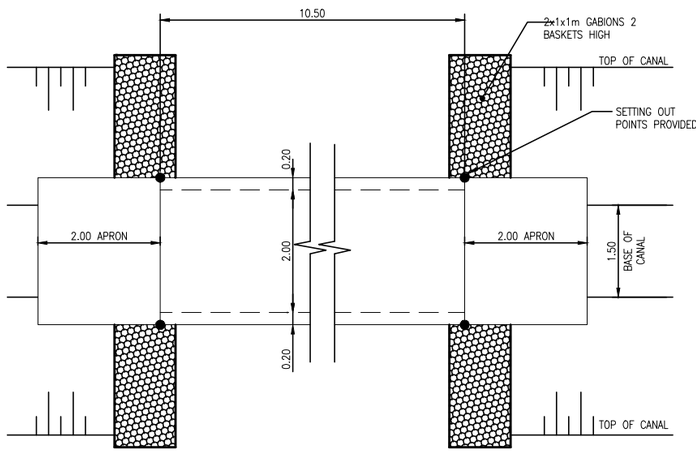
PLAN
1:500(A1)
1:1000(A3)

SCHEDULE OF COORDINATES		
POINT	mN	mE
A	815238.84	274869.10
B	815255.67	274893.94
C	815253.68	274895.28
D	815236.85	274870.45
E	815272.38	275082.44
F	815273.48	275092.88
G	815270.00	275082.69
H	815271.10	275093.13

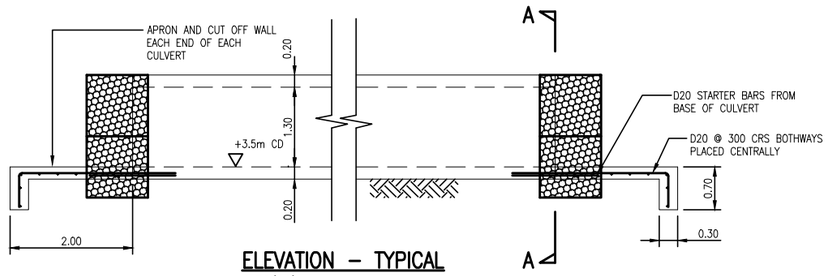
NOTATION:
- EXISTING ELECTRICITY CABLE
- EXISTING SEWER LINE
- EXISTING TELECOM CABLE
- EXISTING WATER PIPE
- EXISTING STORMWATER PIPE



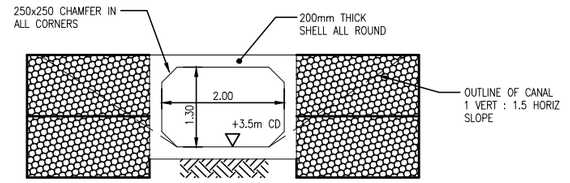
CULVERT 1 PLAN
1:50(A1)
1:100(A3)



CULVERT 2 PLAN
1:50(A1)
1:100(A3)



ELEVATION – TYPICAL
1:50(A1)
1:100(A3)



TYPICAL SECTION A–A @ HEADWALLS
1:50(A1)
1:100(A3)

ISSUE	DATE	DETAILS	APPRVD	BY
1	17.12.01	LOCATION OF CULVERT 1 CHANGED, INTERNAL DIMENSION CHANGED		BWP
0	11.10.01	ISSUED FOR TENDER		BWP

NOTE:
- COORDINATES ARE IN TERMS OF GEODETIC DATUM 1949, Mt EDEN CIRCUIT.
- LEVELS ARE IN TERMS OF CHART DATUM

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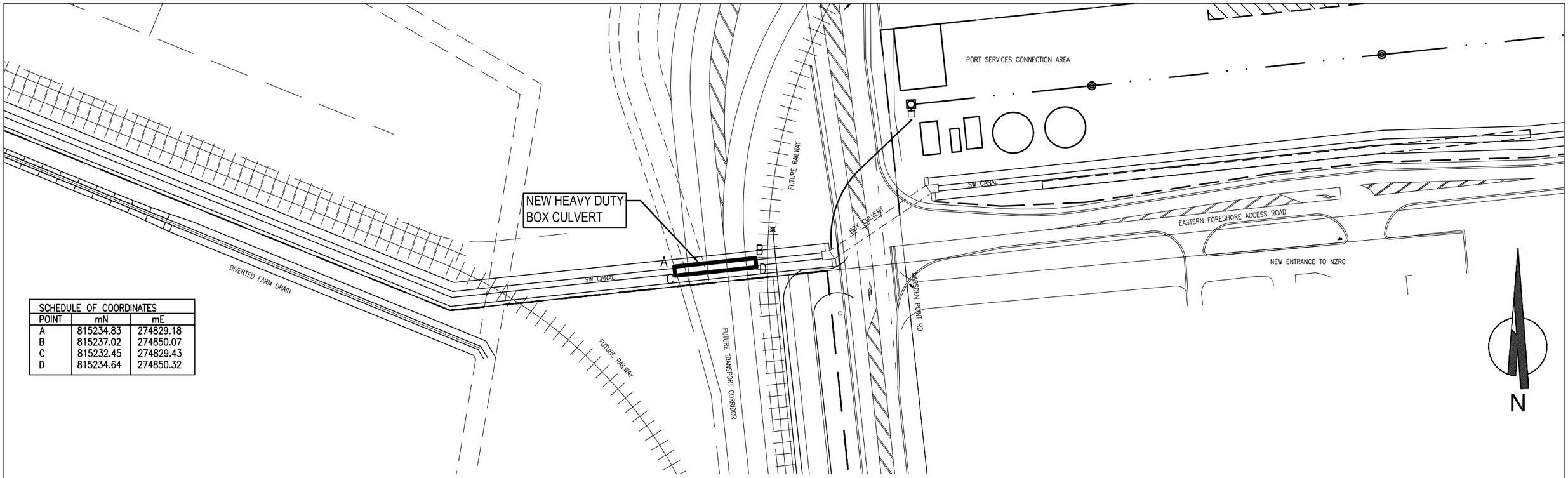
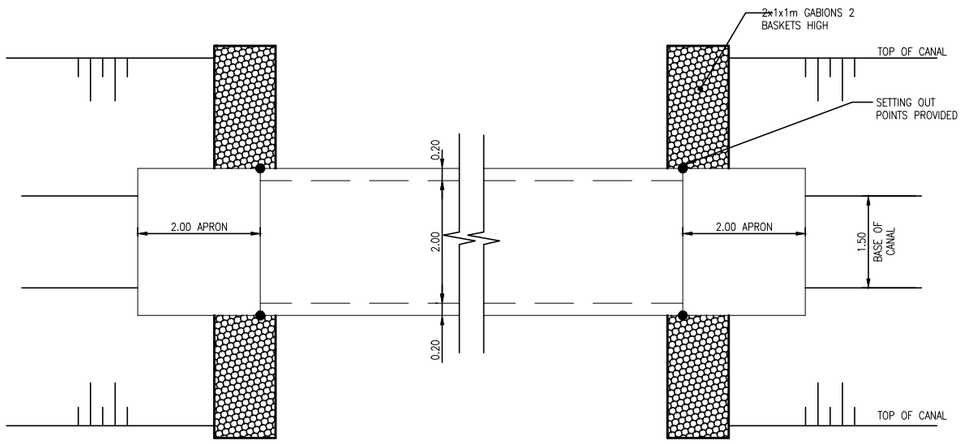
Title:
NORTHPORT DEVELOPMENT
BOX CULVERTS
LOCALITY PLAN & TYPICAL DETAILS

Designed By		Dwg No	Issue:
		D60–30–06–004	1
Drawn: B PRESTON	Checked:	Scale: AS SHOWN	Date: OCTOBER 2001 / Sheet: 1

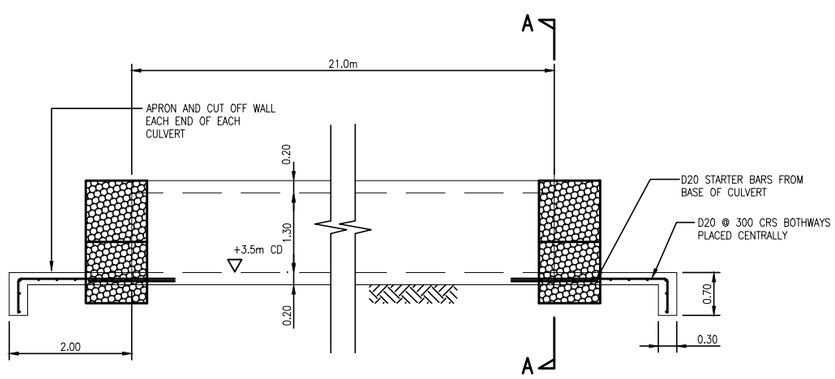
ORIGINAL SIZE A1



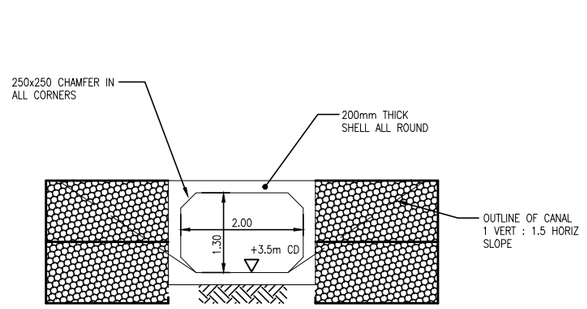
SCHEDULE OF COORDINATES		
POINT	mN	mE
A	815234.83	274829.18
B	815237.02	274850.07
C	815232.45	274829.43
D	815234.64	274850.32



PLAN
1:50(A1)
1:100(A3)



ELEVATION
1:50(A1)
1:100(A3)



TYPICAL SECTION A–A @ HEADWALLS
1:50(A1)
1:100(A3)

ISSUE	DATE	DETAILS	APPRVD	BY
0	17.12.01	ISSUED		BWP

NOTE:
COORDINATES ARE IN TERMS OF GEODETIC DATUM 1949 Mt EDEN CIRCUIT

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EMAIL brucep@northlandportcorp.co.nz

Title:
NORTHPORT DEVELOPMENT
HEAVY DUTY BOX CULVERT
LOCALITY PLAN & DETAILS

Designed By		Dwg No	Issue:
		D60–30–06–005	0
Drawn: B PRESTON	Checked:	Scale: AS SHOWN	Date: DEC 2001	Sheet: 1

ORIGINAL SIZE A1

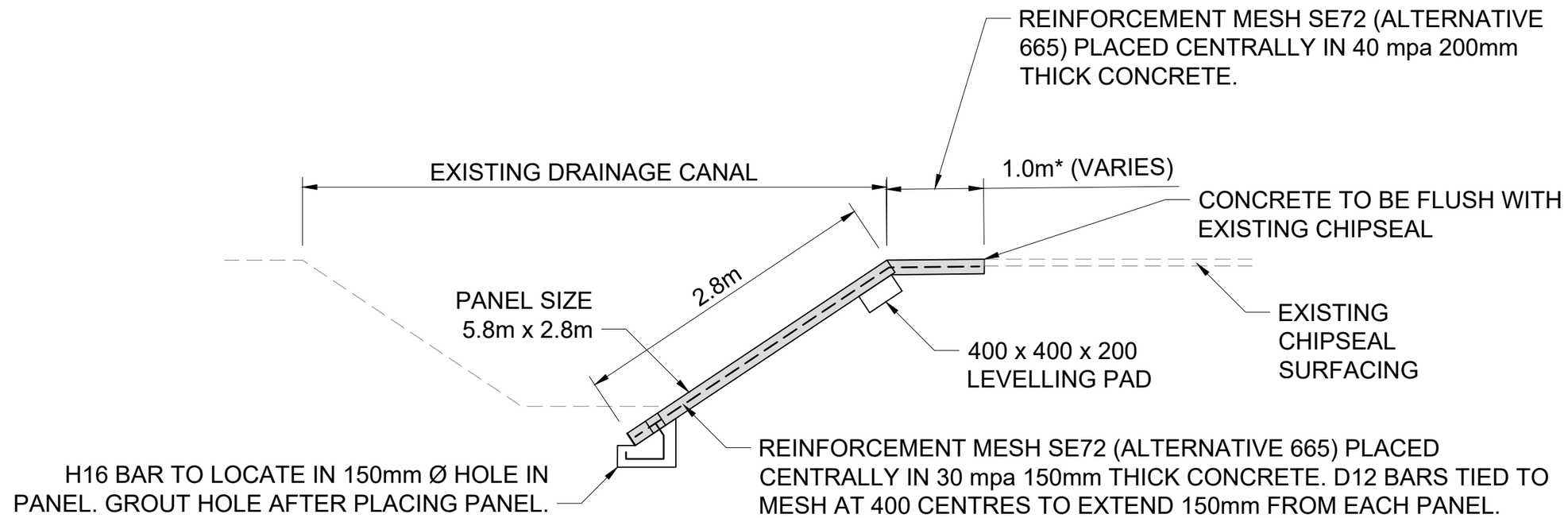
ISSUE	DATE	DETAILS	APPRVD	BY

Northport
P.O BOX 44
RUAKAKA, NEW ZEALAND
TEL 09 432 5010
vision4growth.co.nz

Title:
NORTHPORT
PERIMETER CANAL
EXTENT OF CONCRETE CANAL LINING

Path	Dwg No	Issue:
k:\engineer\gregb\canal lining project\canal lining 2022 - 2023\concrete lining location 2022.dwg	D60-X	R0

Drawn:	Checked:	Scale:	Date:	Sheet:
B SWEENY		1:2000 (A1) 1:4000(A3)	MAR 2023	01

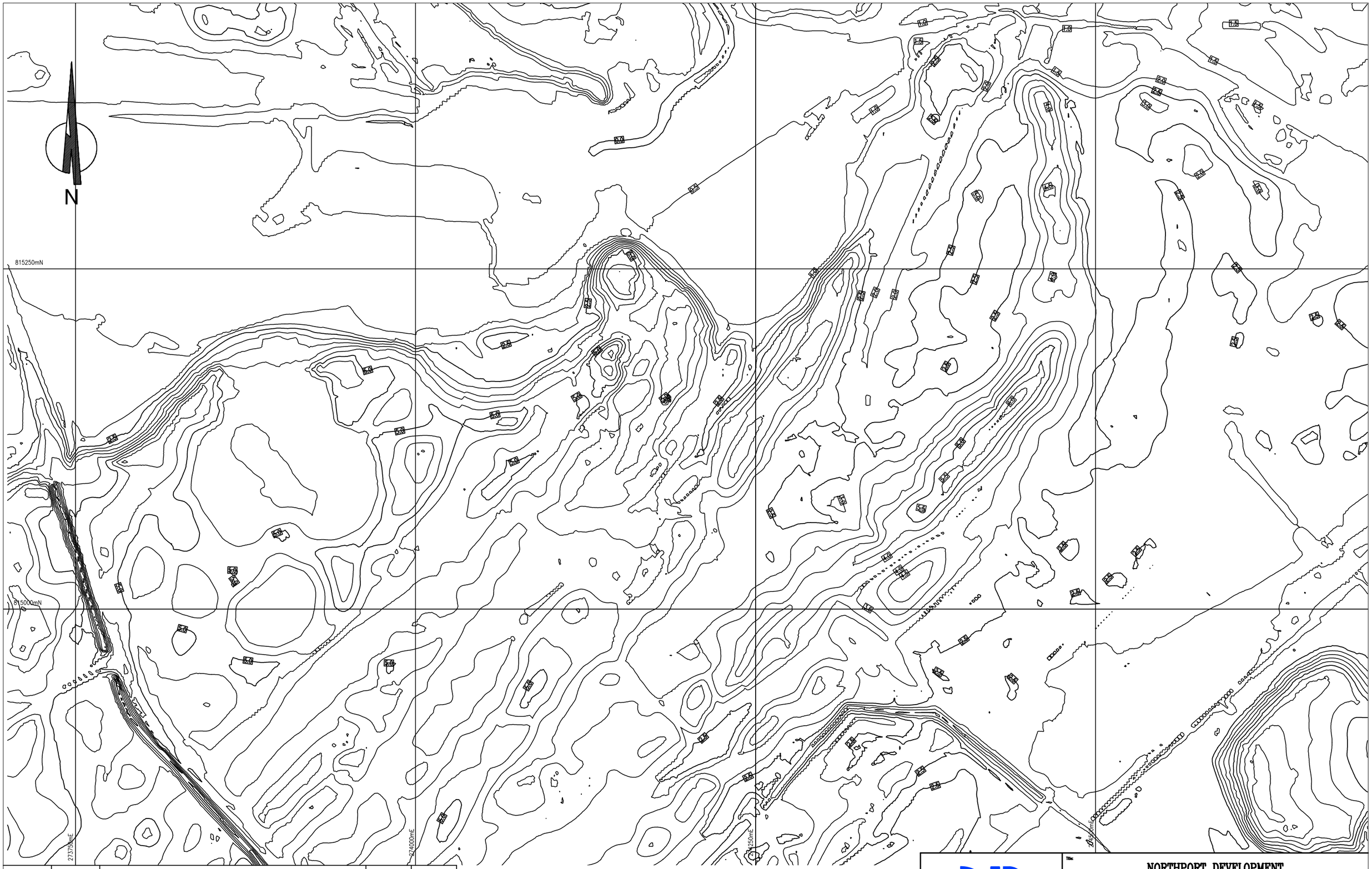


ISSUE	DATE	DETAILS	APPRVD	BY

Northport
P.O BOX 44
RUAKAKA, NEW ZEALAND
TEL 09 432 5010
vision4growth.co.nz

Title: NORTHPORT CONCRETE CANAL TYPICAL CROSS SECTION

Path		Dwg No		Issue:
k:\engineer\gregb\canal lining project\canal lining 2022 - 2023\concrete lining location 2022.dwg		D60-X		R0
Drawn: B SWEENY	Checked:	Scale: 1:25 (A1) 1:50 (A3)	Date: OCT 2022	Sheet: 01



ISSUE	DATE	DETAILS	APPRVD	BY
0	8.03.01	ISSUED		BWP

NOTE:
- COORDINATES ARE IN TERMS OF GEODETIC DATUM 1949, Mt EDEN CIRCUIT.
- LEVELS ARE IN TERMS OF CHART DATUM

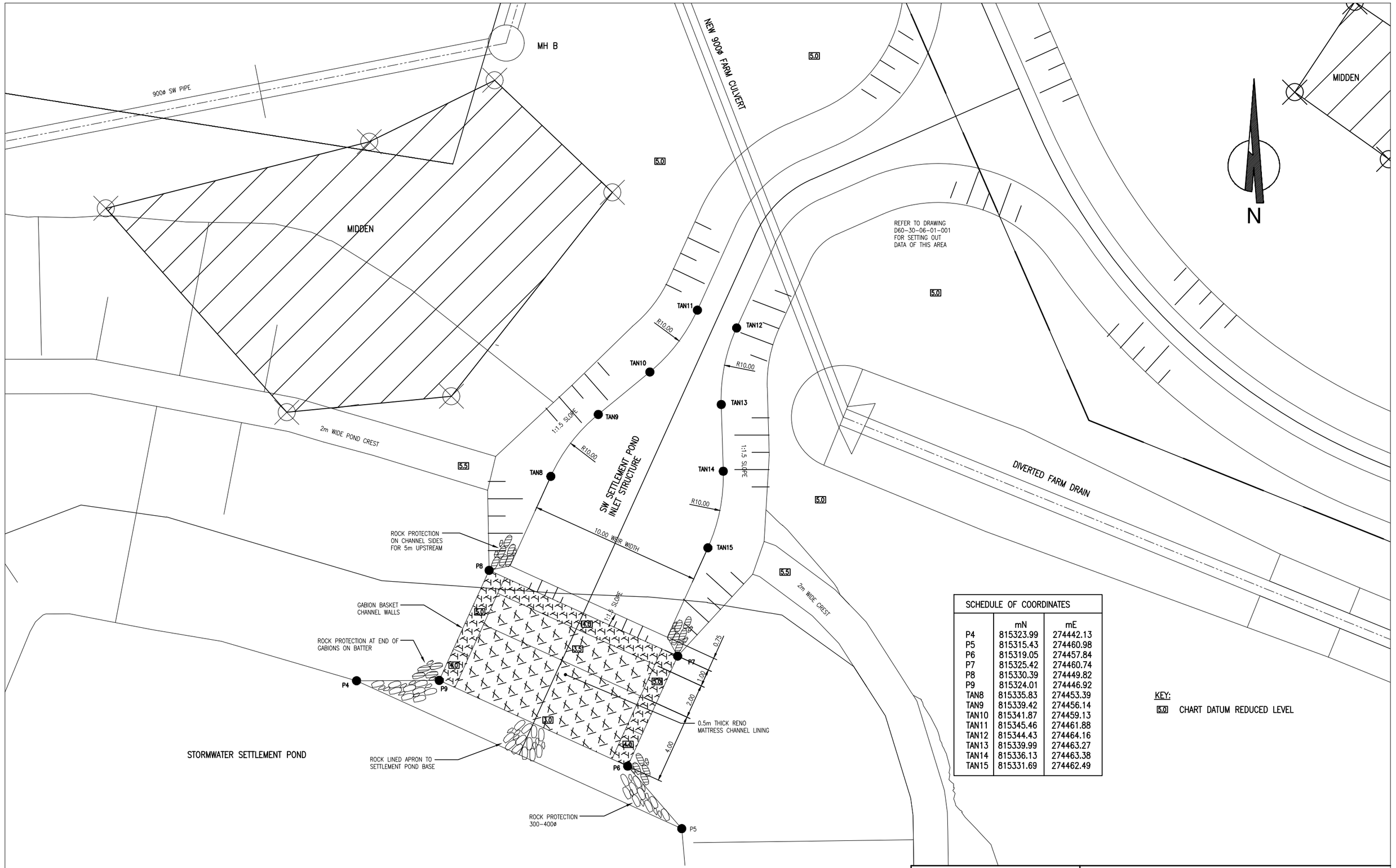
NORTHLAND PORT CORPORATION
P.O BOX 848
WHANGAREI, NEW ZEALAND
TEL 09 438 1279, FAX 09 438 7067
EMAIL brucep@northlandportcorp.co.nz

Title:

NORTHPORT DEVELOPMENT
STORMWATER PONDS

Designed By		Dwg No: D60-30-06-001	Issue: 0
Drawn: B PRESTON	Checked:	Scale: 1:1250(A1) 1:2500(A3)	Date: MARCH 2001
			Sheet: 1

ORIGINAL SIZE A1



SCHEDULE OF COORDINATES		
	mN	mE
P4	815323.99	274442.13
P5	815315.43	274460.98
P6	815319.05	274457.84
P7	815325.42	274460.74
P8	815330.39	274449.82
P9	815324.01	274446.92
TAN8	815335.83	274453.39
TAN9	815339.42	274456.14
TAN10	815341.87	274459.13
TAN11	815345.46	274461.88
TAN12	815344.43	274464.16
TAN13	815339.99	274463.27
TAN14	815336.13	274463.38
TAN15	815331.69	274462.49

KEY:

5.0 CHART DATUM REDUCED LEVEL

NOTE:
- COORDINATES ARE IN TERMS OF GEODETIC DATUM 1949, Mt EDEN CIRCUIT.
- LEVELS ARE IN TERMS OF CHART DATUM.
- FOR FURTHER INFORMATION ON THE CONSTRUCTION OF THE INLET STRUCTURE REFER TO RILEY CONSULTANTS DWG No 94239/5-9B & 5-10A.
- THIS PLAN & D60-30-06-01-001 SUPERCEDE THE SETOUT INFO SHOWN ON 94239/5-9B.

ISSUE	DATE	DETAILS	APPRVD	BY
0	11.12.01	ISSUED FOR CONSTRUCTION		BWP

Northport
P.O BOX 848
WHANGAREI, NEW ZEALAND
TEL 09 432 8740, FAX 09 432 8749
EMAIL brucep@northlandportcorp.co.nz

Title:

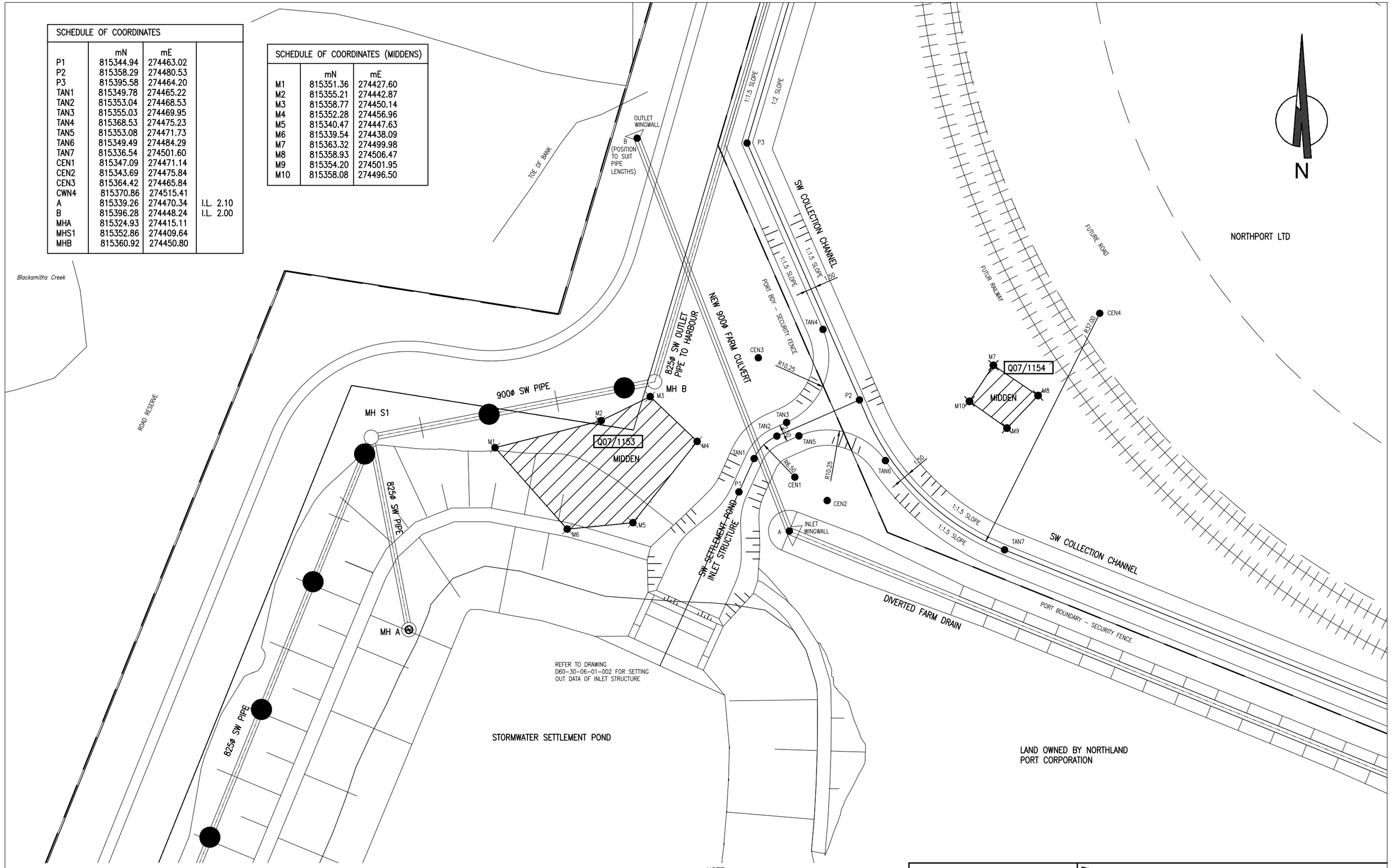
NORTHPORT DEVELOPMENT
MIDDEN SITES
STORMWATER SYSTEM DIVERSION

Designed By		Dwg No	Issue:
		D60-30-06-01-002	0
Drawn: B PRESTON	Checked:	Scale: 1:100(A1) 1:200(A3)	Date: DEC 2001	Sheet: 1

ORIGINAL SIZE A1

SCHEDULE OF COORDINATES			
	mN	mE	
P1	815344.94	274463.02	
P2	815358.29	274480.53	
P3	815395.58	274464.20	
TAN1	815349.78	274465.22	
TAN2	815353.04	274468.53	
TAN3	815355.03	274469.95	
TAN4	815368.53	274475.23	
TAN5	815353.08	274471.73	
TAN6	815349.49	274484.29	
TAN7	815336.54	274501.60	
CEN1	815347.09	274471.14	
CEN2	815343.69	274475.84	
CEN3	815364.42	274465.84	
CWN4	815370.86	274515.41	
A	815339.26	274470.34	I.L. 2.10
B	815396.28	274448.24	I.L. 2.00
MHA	815324.93	274415.11	
MHS1	815352.86	274409.64	
MHB	815360.92	274450.80	

SCHEDULE OF COORDINATES (MIDDENS)		
	mN	mE
M1	815351.36	274427.60
M2	815355.21	274442.87
M3	815358.77	274450.14
M4	815352.28	274456.96
M5	815340.47	274447.63
M6	815339.54	274438.09
M7	815363.32	274499.98
M8	815358.93	274506.47
M9	815354.20	274501.95
M10	815358.08	274496.50



ISSUE	DATE	DETAILS	APPRVD	BY
0	29.11.01	ISSUED		BWP

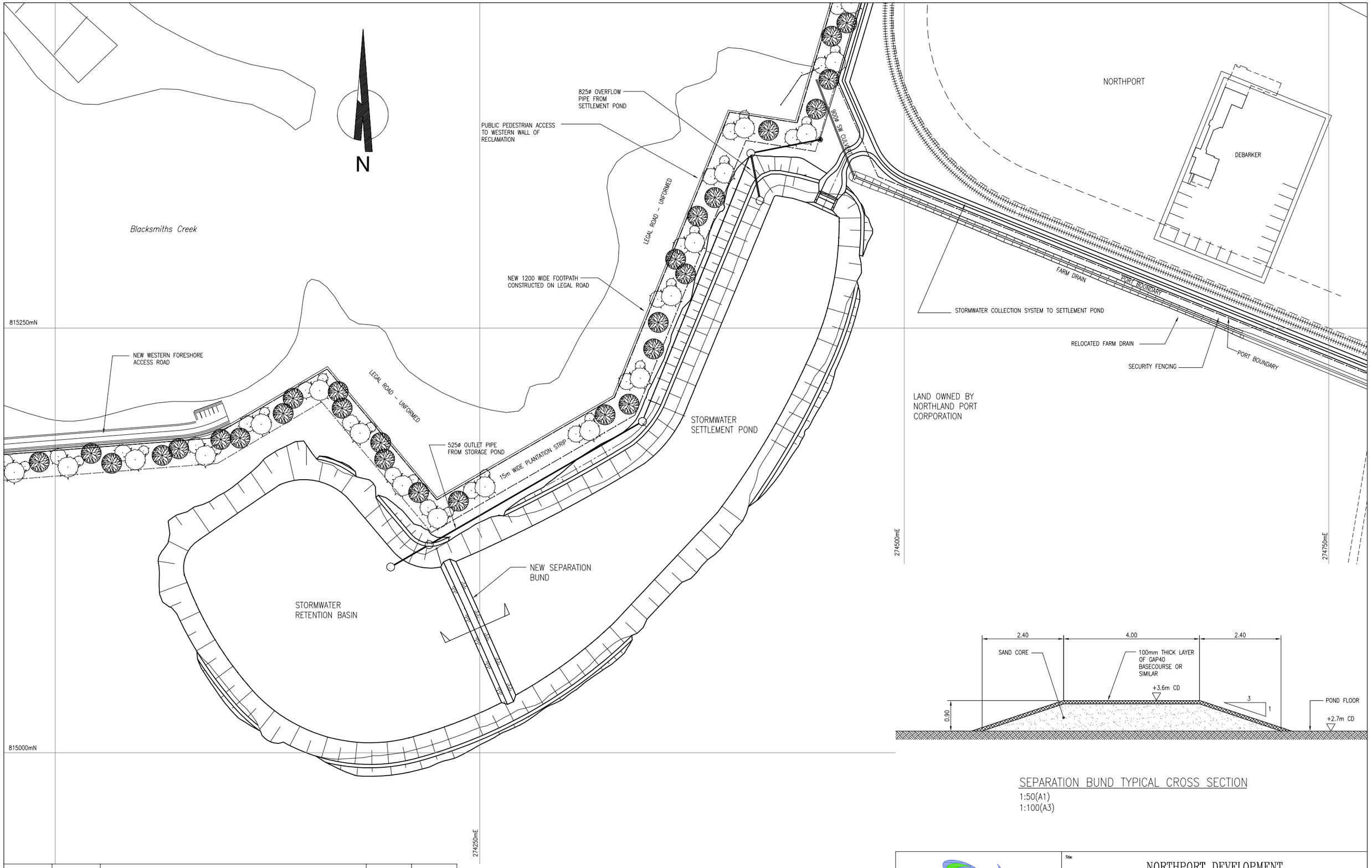
NOTE:
- COORDINATES ARE IN TERMS OF GEODETIC DATUM 1949, Mt EDEN CIRCUIT.
- LEVELS ARE IN TERMS OF CHART DATUM.
- FOR FURTHER INFORMATION ON THE CONSTRUCTION OF THE INLET STRUCTURE REFER TO RILEY CONSULTANTS DWG No 94239/5-9B & 5-10A.
- THIS PLAN & D60-30-06-01-002 SUPERCEDE THE SETOUT INFO SHOWN ON 94239/5-9B.

Northport
P.O BOX 848
WHANGAREI, NEW ZEALAND
TEL 09 432 8740, FAX 09 432 8749
EMAIL brucep@northlandportcorp.co.nz

Title:
NORTHPORT DEVELOPMENT
MIDDEN SITES
STORMWATER SYSTEM DIVERSION

Designed By		Dwg No	Issue:
		D60-30-06-01-001	0
Drawn: B PRESTON	Checked:	Scale: 1:250(A1) 1:500(A3)	Date: NOV 2001	Sheet: 1

ORIGINAL SIZE A1



SEPARATION BUND TYPICAL CROSS SECTION
1:50(A1)
1:100(A3)

NOTE:
-COORDINATES ARE IN TERMS OF GEODETIC DATUM 1949 Mt EDEN CIRCUIT.
-LEVELS ARE IN TERMS OF CHART DATUM

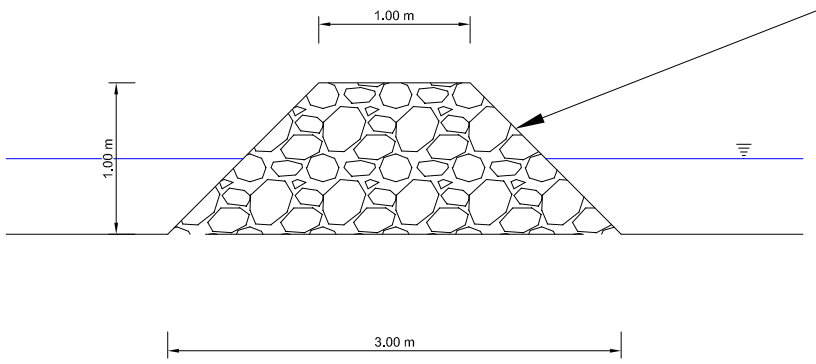
ISSUE	DATE	DETAILS	APPRVD	BY
0	5.3.02	ISSUED		BWP

Northport
P.O BOX 848
WHANGAREI, NEW ZEALAND
TEL 09 432 8740, FAX 09 432 8749
EMAIL brucep@northlandportcorp.co.nz

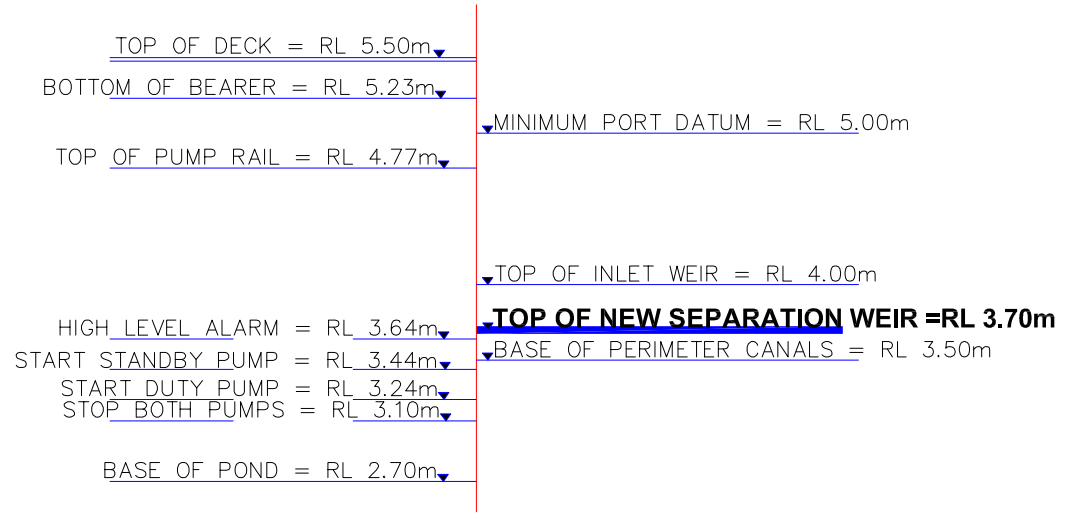
Title:
NORTHPORT DEVELOPMENT
PROPOSED STORMWATER SETTLING & RETENTION BASINS PLAN & DETAIL

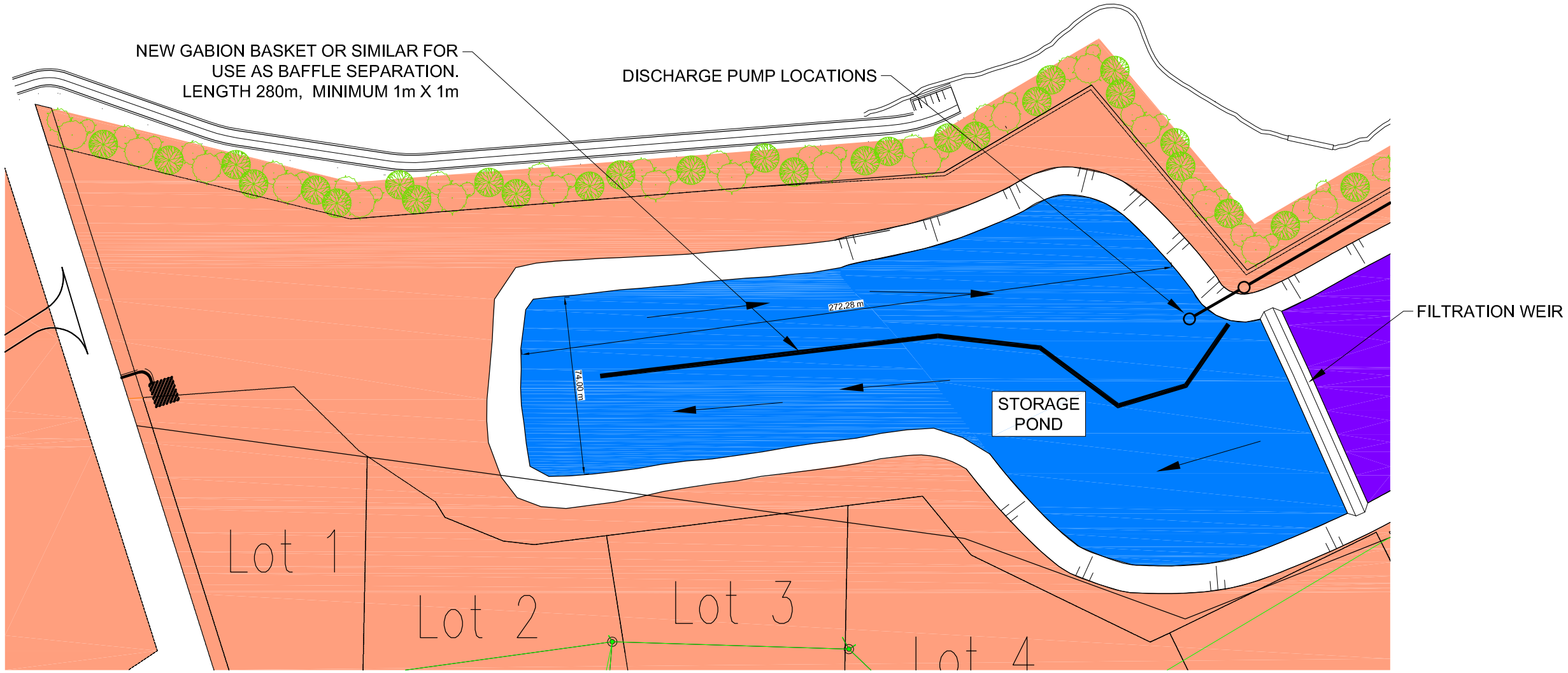
Designed By		Dwg No	Issue:
		D60-30-06-01-004	0
Drawn: B PRESTON	Checked:	Scale: 1:1000(A1) 1:2000(A3)	Date: FEB 2002	Sheet: 1

ORIGINAL SIZE A1



NEW GABION BASKET OR SIMILAR FOR
USE AS BAFFLE SEPARATION.
LENGTH 280m, MINIMUM 1m X 1m





ISSUE	DATE	DETAILS	APPRVD	BY

INCREASED FLOW LENGTH FROM ~100m TO 580m.
LIVENING DEAD STORAGE AREA OF 1.95ha

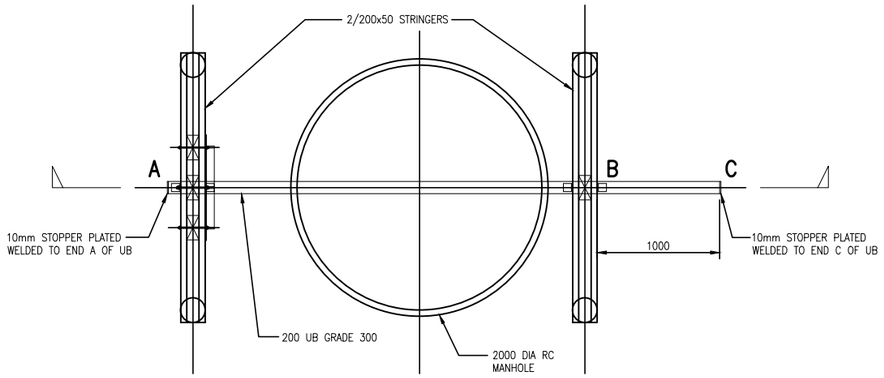
Northport
P.O BOX 848
WHANGAREI, NEW ZEALAND
TEL 09 432 5010, FAX 09 432 8749
EMAIL ben.sweeny@northport.co.nz

Title:
NORTHPORT DEVELOPMENT
PROPOSED SW POND IMPROVEMENTS
BAFFLE SEPARATION SYSTEM

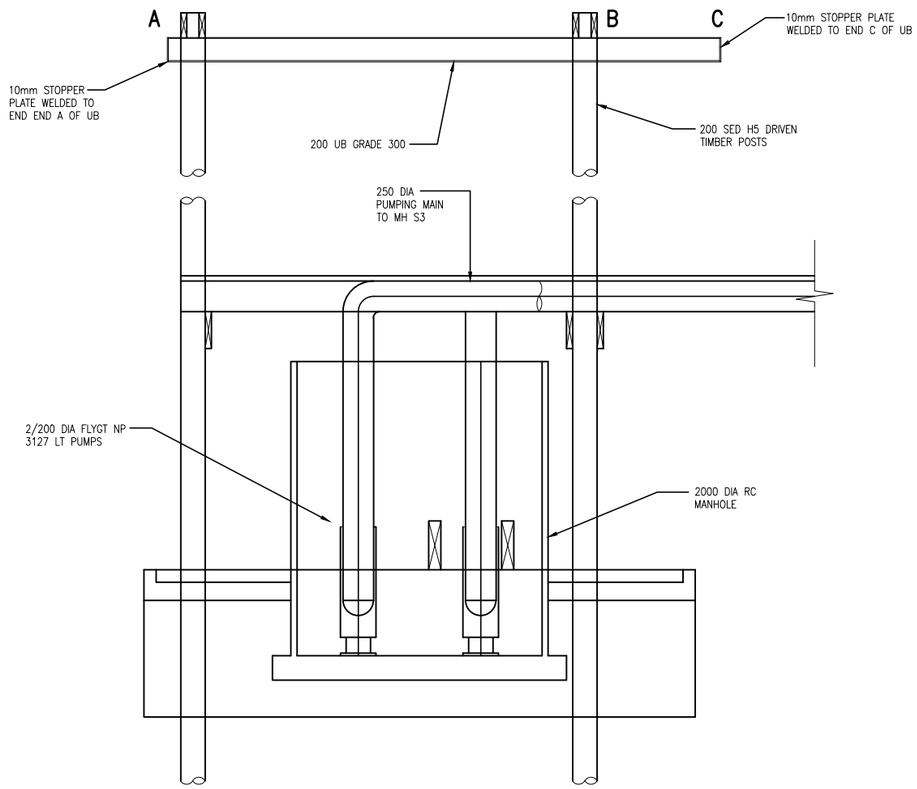
Designed By	Dwg No	Issue:
B SWEENY		

Drawn:	Checked:	Scale:	Date:	Sheet:
B SWEENY		1:1000 @ A1 1:2000 @ A3		

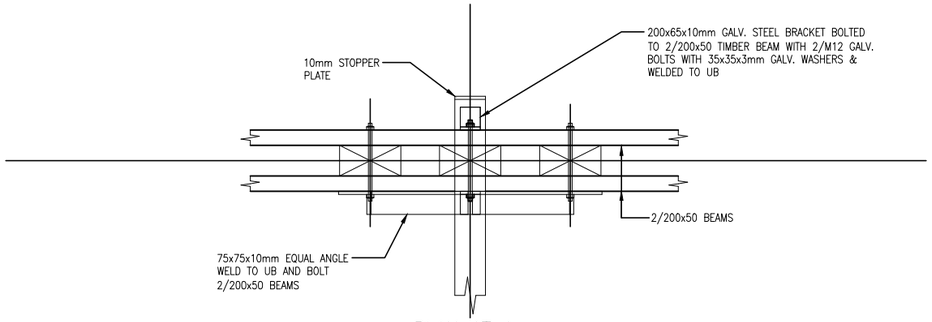
ORIGINAL SIZE A1



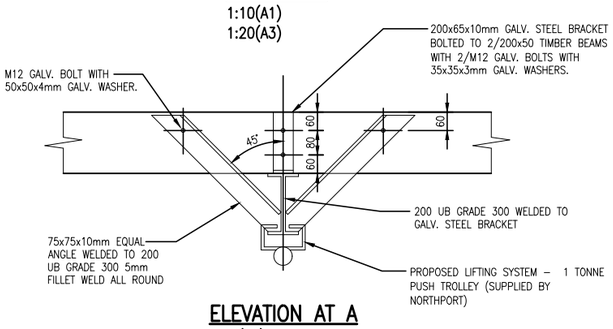
PLAN – LIFTING FRAME
1:25(A1)
1:50(A3)



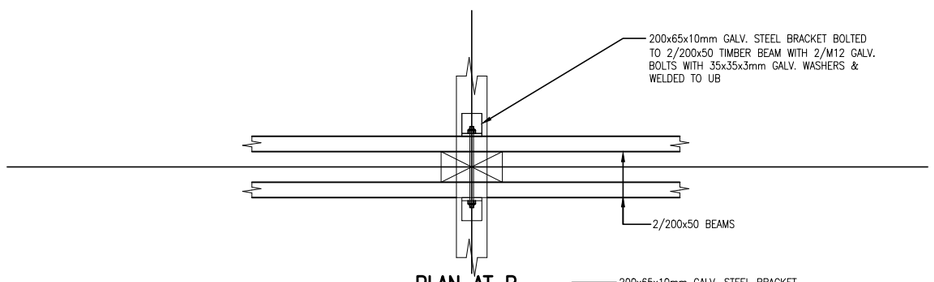
CROSS SECTION THROUGH LIFTING FRAME AND PUMP STATION
1:25(A1)
1:50(A3)



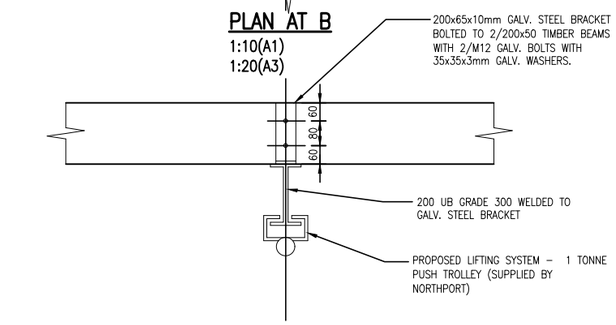
PLAN AT A
1:10(A1)
1:20(A3)



ELEVATION AT A
1:10(A1)
1:20(A3)



PLAN AT B
1:10(A1)
1:20(A3)



ELEVATION AT B
1:10(A1)
1:20(A3)

ISSUE	DATE	DETAILS	APPRVD	BY
1	22–4–03	ISSUED FOR CONSTRUCTION		BWP

NOTES:
1/ ALL MATERIALS HD GALVANIZED AFTER FABRICATION.
2/ CHECK ALL DIMENSIONS ON SITE PRIOR TO FABRICATION.
3/ REMOVE EXISTING GALV. CHANNEL LIFTING BEAM AND RETURN TO NORTHPORT FOR STORAGE.
4/ 1 TONNE PUSH TROLLEY SUPPLIED BY NORTHPORT LTD.

Northport
P.O BOX 848
WHANGAREI, NEW ZEALAND
TEL 09 432 5010, FAX 09 432 8749
EMAIL bruce.preston@northport.co.nz

Title:
NORTHPORT DEVELOPMENT
STORMWATER POND PUMP STATION
LIFTING FRAME DETAILS

Designed By	Dwg No	Issue:
F. PATTEN	D60–30–06–007	0

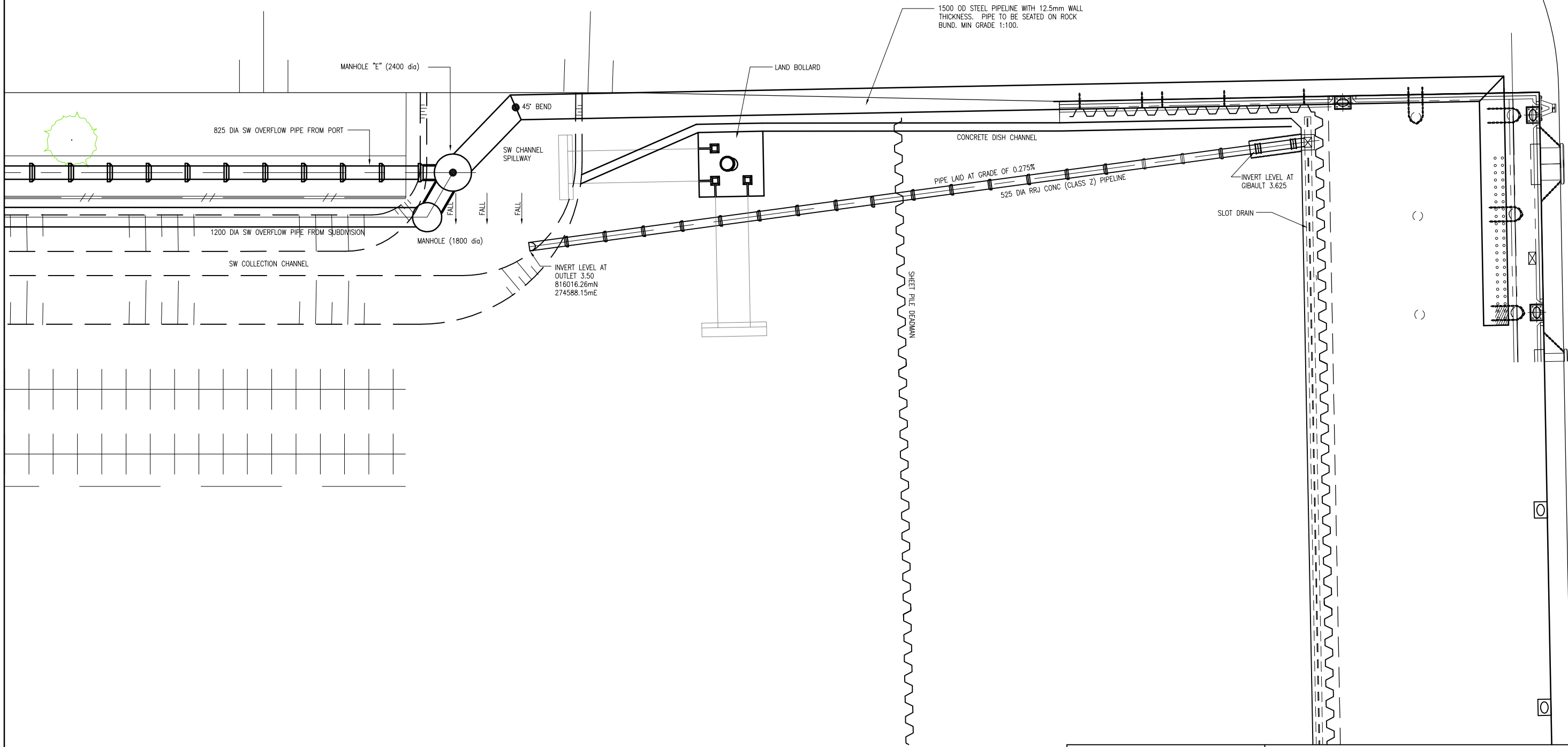
Drawn:	Checked:	Scale:	Date:	Sheet:
B PRESTON		AS SHOWN	APRIL 2003	1

ORIGINAL SIZE A1

N

SCHEDULE OF COORDINATES

45° BEND	816018.57mN	274579.81mE
CENTRE OF MANHOLE E	816013.51mN	274582.18mE



ISSUE	DATE	DETAILS	APPRVD	BY
A	29.9.09	AMMEND PIPE DIFFUSER DIA.		GJB
0	12.9.02	ISSUED FOR CONSTRUCTION		BWP

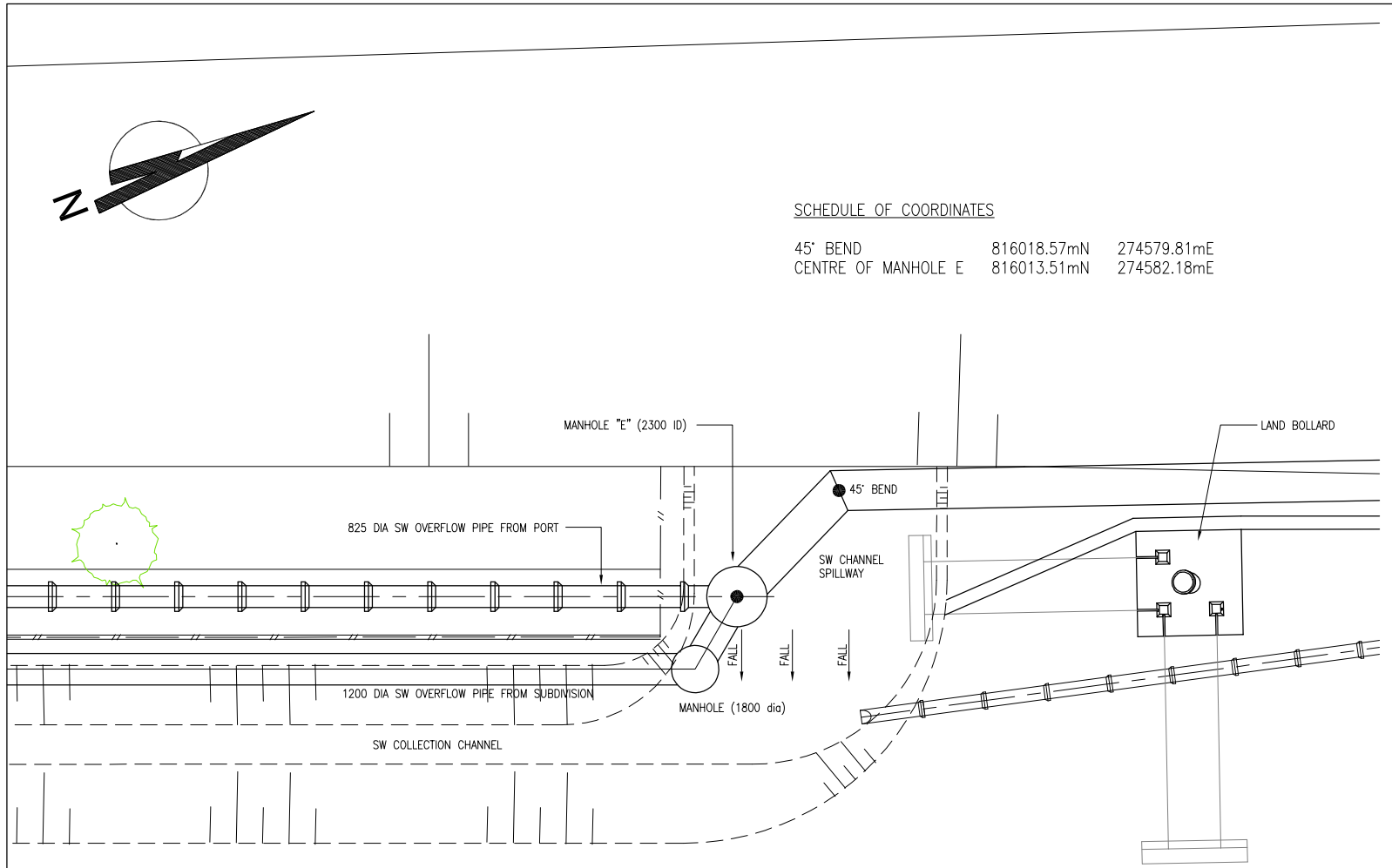
Northport

P.O BOX 848
WHANGAREI, NEW ZEALAND
TEL 09 432 8740, FAX 09 432 8749
EMAIL brucep@northlandportcorp.co.nz

Title:

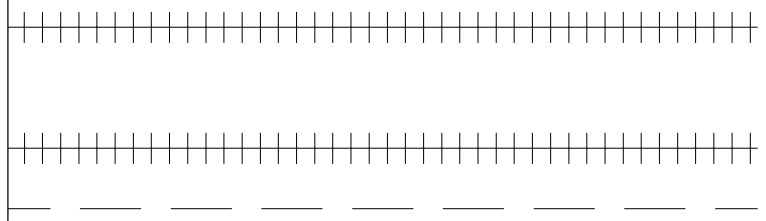
NORTHPORT DEVELOPMENT
LAYOUT AT WESTERN END OF WHARF

Designed By		Dwg No D60-30-06-01-015		Issue: A
Drawn: B PRESTON	Checked:	Scale: 1:125(A1) 1:250(A3)	Date: JUNE 2002	Sheet: 1



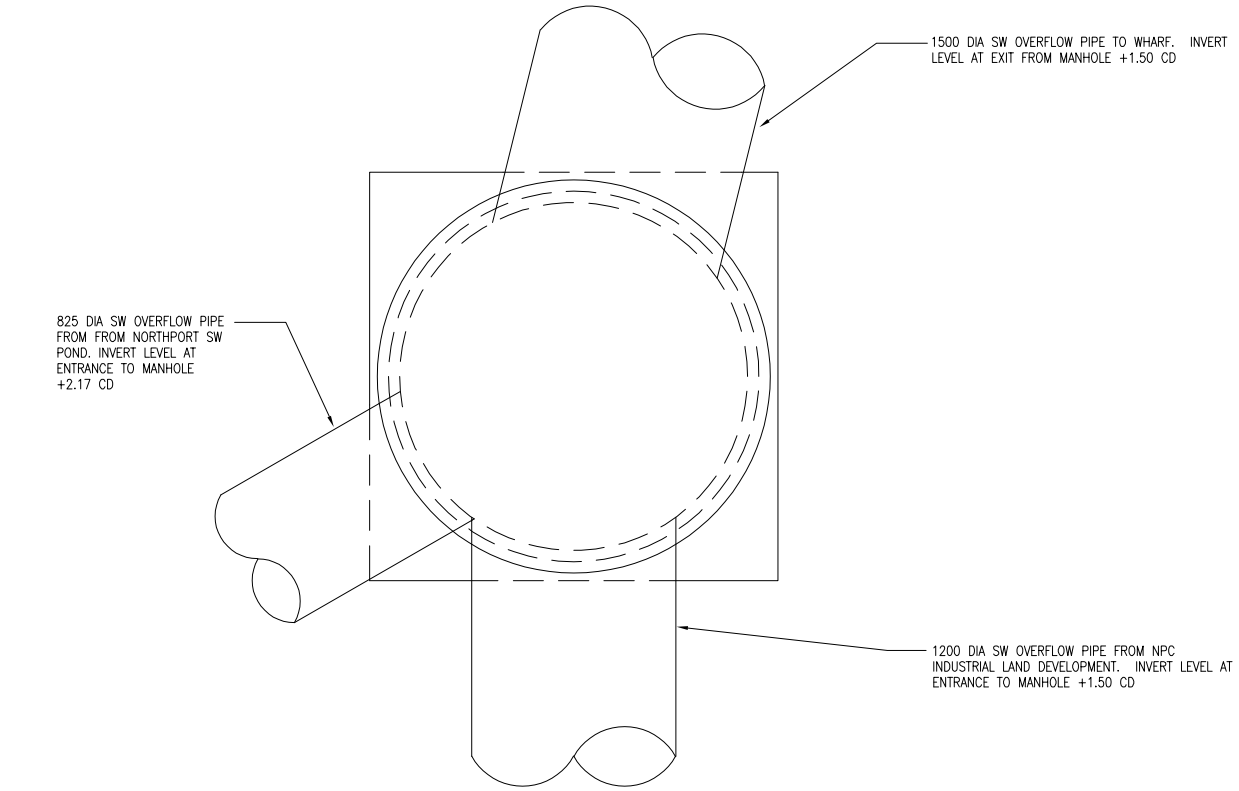
SCHEDULE OF COORDINATES

45° BEND	816018.57mN	274579.81mE
CENTRE OF MANHOLE E	816013.51mN	274582.18mE

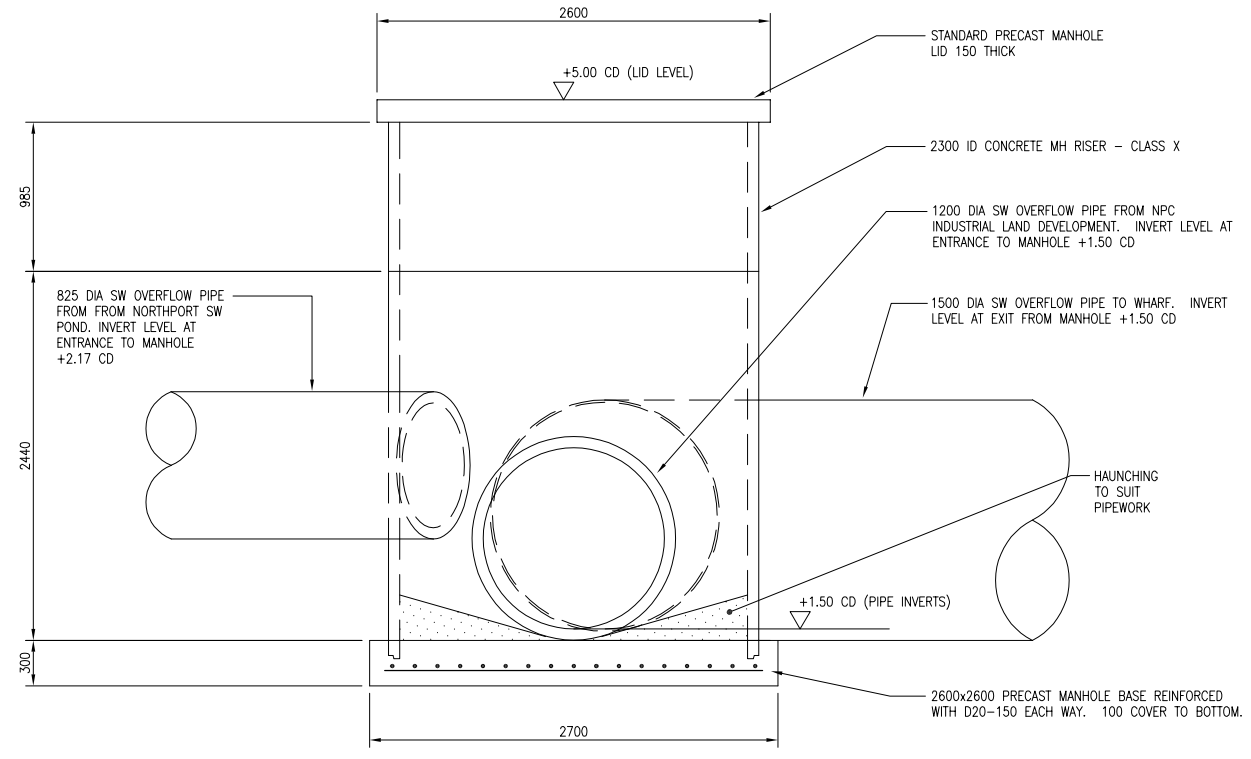


LOCALITY PLAN

1:125(A1)
1:250(A3)



PLAN



ELEVATION

MANHOLE 'E' DETAILS

1:25(A1)
1:50(A3)

ISSUE	DATE	DETAILS	APPRVD	BY
0	20.8.02	ISSUED FOR PRICING		BWP

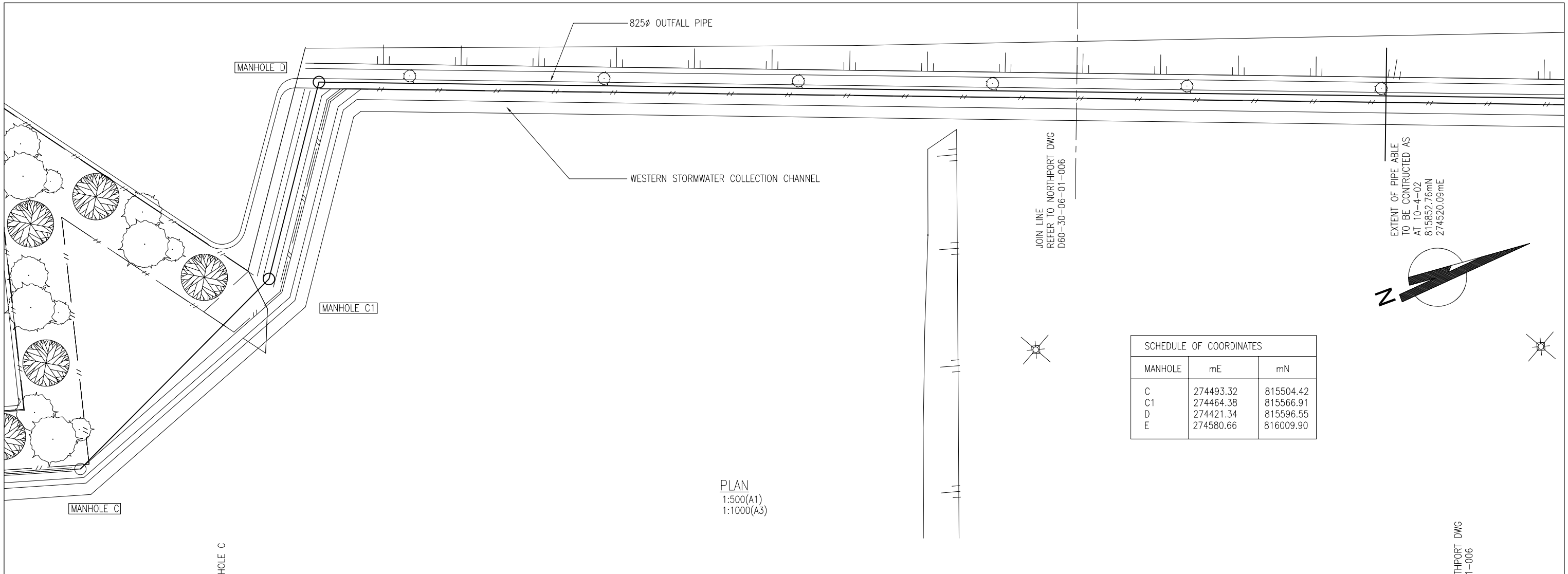
NOTE:
–COORDINATES ARE IN TERMS OF GEODETIC DATUM 1949, Mt EDEN CIRCUIT.
–LEVELS ARE IN TERMS OF CHART DATUM.

Northport
P.O BOX 848
WHANGAREI, NEW ZEALAND
TEL 09 432 8740, FAX 09 432 8749
EMAIL brucep@northlandportcorp.co.nz

Title: NORTHPORT DEVELOPMENT STORMWATER CONTRACT MANHOLE "E" DETAIL

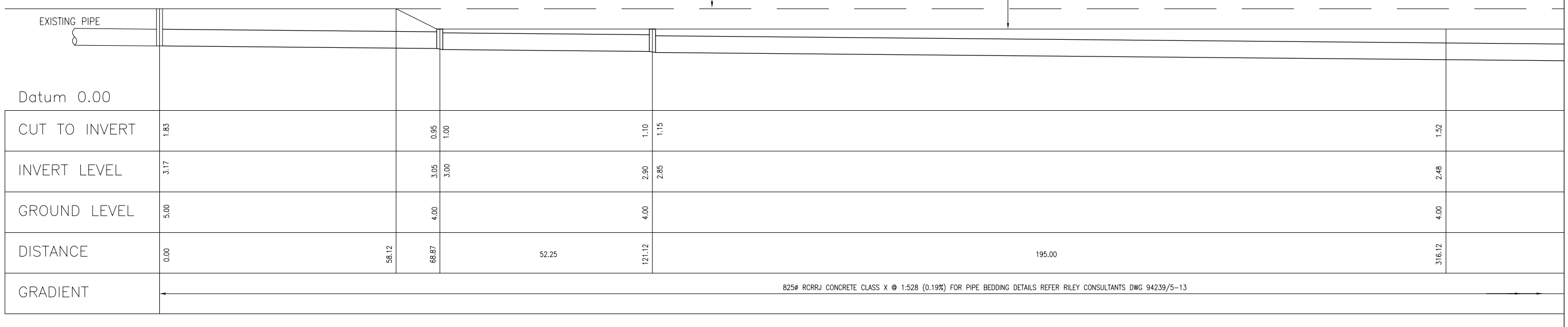
Designed By		Dwg No	Issue:
		D60–30–06–01–012	0
Drawn: B PRESTON	Checked:	Scale: AS SHOWN / Date: AUGUST 2002	Sheet: 1

ORIGINAL SIZE A1



PLAN
1:500(A1)
1:1000(A3)

SCHEDULE OF COORDINATES		
MANHOLE	mE	mN
C	274493.32	815504.42
C1	274464.38	815566.91
D	274421.34	815596.55
E	274580.66	816009.90



Datum 0.00														
CUT TO INVERT	1.83			0.95	1.00		1.10	1.15				1.52		
INVERT LEVEL	3.17			3.05	3.00		2.90	2.85				2.48		
GROUND LEVEL	5.00			4.00			4.00					4.00		
DISTANCE	0.00		58.12	68.87		52.25	121.12		195.00			316.12		
GRADIENT	825ø RCRRJ CONCRETE CLASS X @ 1:528 (0.19%) FOR PIPE BEDDING DETAILS REFER RILEY CONSULTANTS DWG 94239/5-13													

LONG SECTION
HORIZ. 1:500(A1) 1:1000(A3)
VERT. 1:100(A1) 1:200(A3)

NOTE:
- COORDINATES ARE IN TERMS OF GEODETIC DATUM 1949, Mt EDEN CIRCUIT.
- LEVELS ARE IN TERMS OF CHART DATUM.
- ALL MANHOLES TO BE 1500ø STANDARD MANHOLES

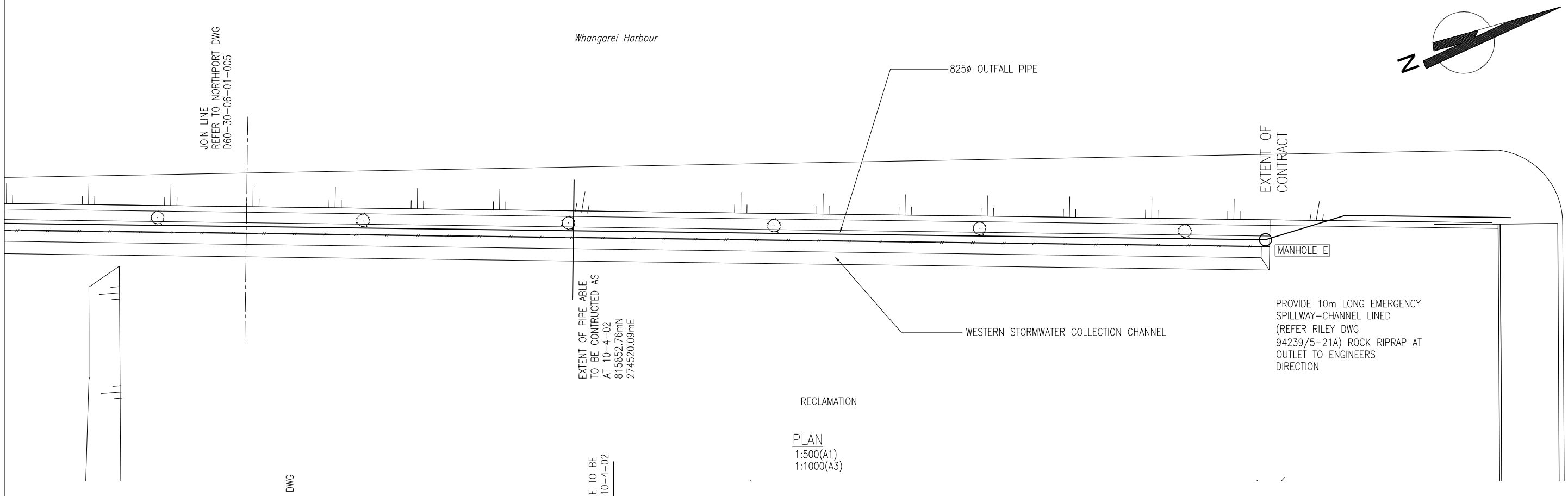
ISSUE	DATE	DETAILS	APPRVD	BY
0	8.4.02	ISSUED		BWP

Northport
P.O BOX 848
WHANGAREI, NEW ZEALAND
TEL 09 432 8740, FAX 09 432 8749
EMAIL brucep@northlandportcorp.co.nz

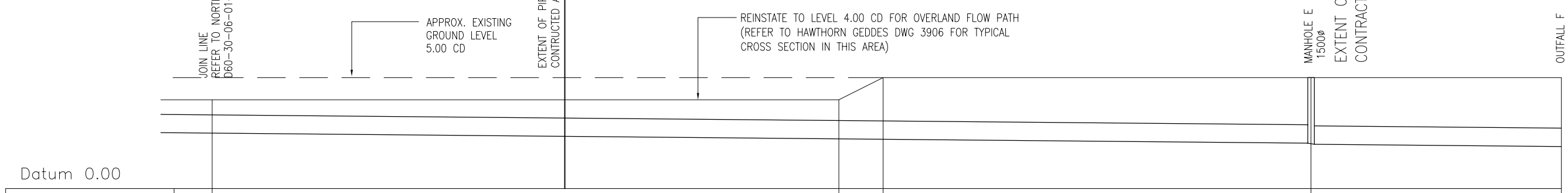
Title:
NORTHPORT DEVELOPMENT
CONTRACT NPSW1
REVISED 825 DIA OUTFALL PIPE LAYOUT

Designed By		Dwg No	Issue:
		D60-30-06-01-005	0
Drawn: B PRESTON	Checked:	Scale: AS SHOWN	Date: APRIL 2002	Sheet: 1

ORIGINAL SIZE A1



PLAN
1:500(A1)
1:1000(A3)



Datum 0.00

CUT TO INVERT	1.52							2.95	3.00			3.15
INVERT LEVEL	2.48							2.01	1.96			1.85
GROUND LEVEL	4.00							5.00				5.00
DISTANCE	316.12		141.42		457.54	10.00	467.54		96.57	564.11	56.50	620.61
GRADIENT	825ø RCRRJ CONCRETE CLASS X @ 1:528 (0.19%) FOR PIPE BEDDING DETAILS REFER RILEY CONSULTANTS DWG 94239/5-13											

LONG SECTION
HORIZ. 1:500(A1) 1:1000(A3)
VERT. 1:100(A1) 1:200(A3)

NOTE:
-COORDINATES ARE IN TERMS OF GEODETIC DATUM 1949, Mt EDEN CIRCUIT.
-LEVELS ARE IN TERMS OF CHART DATUM.
-ALL MANHOLES TO BE 1500ø STANDARD MANHOLES

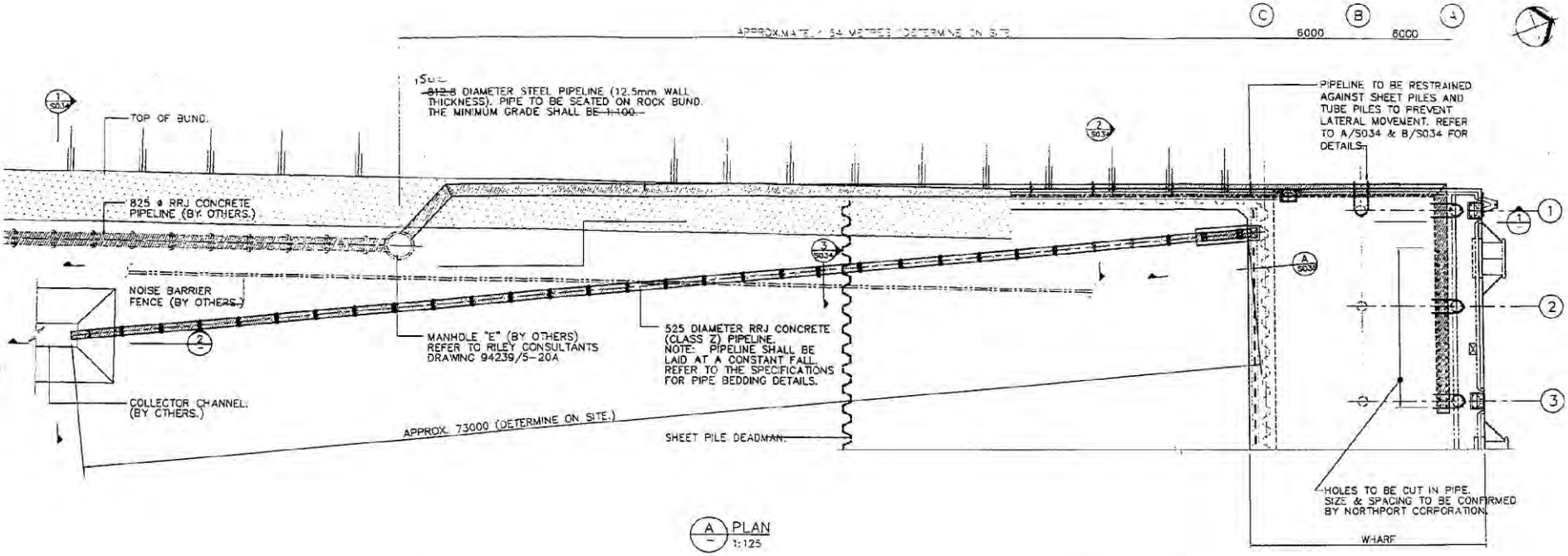
ISSUE	DATE	DETAILS	APPRVD	BY
0	9.04.02	ISSUED		BWP

Northport
P.O BOX 848
WHANGAREI, NEW ZEALAND
TEL 09 432 8740, FAX 09 432 8749
EMAIL brucep@northlandportcorp.co.nz

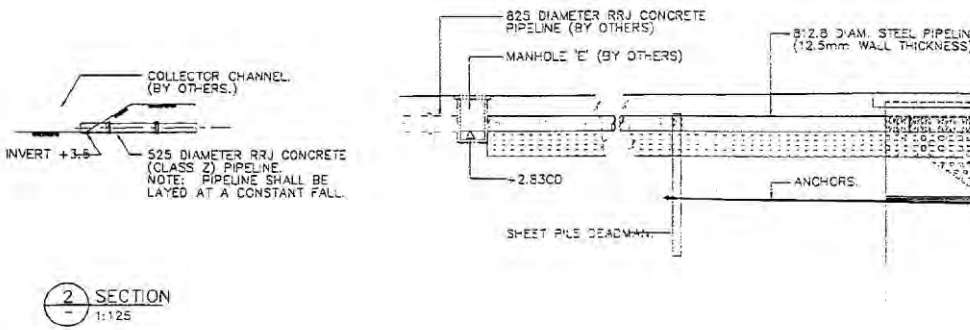
Title:
NORTHPORT DEVELOPMENT
CONTRACT NPSW1
REVISED 825 DIA OUTFALL PIPE LAYOUT

Designed By		Dwg No	Issue:
		D60-30-06-01-006	0
Drawn: B PRESTON	Checked:	Scale: AS SHOWN	Date: APRIL 2002	Sheet: 1

ORIGINAL SIZE A1



A PLAN
1:125



2 SECTION
1:125

1 ELEVATION OF STORMWATER DISCHARGE PIPE
1:125

FOR REVIEW

MARSDEN POINT
PORT DEVELOPMENT
STAGE 1

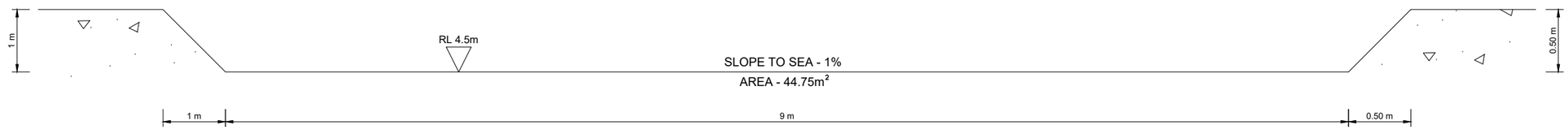
STORMWATER OUTFALL

CIVIL STRUCTURAL

9101101 S033 A

EMERGENCY OVERFLOW PLAN VIEW

1:75



EMERGENCY OVERFLOW CROSS SECTION

A

1:50

ISSUE	DATE	DETAILS	APPRVD	BY

0 0.3 0.6 Meters SCALE 1:10

0 2.25 4.5 Meters SCALE 1:75

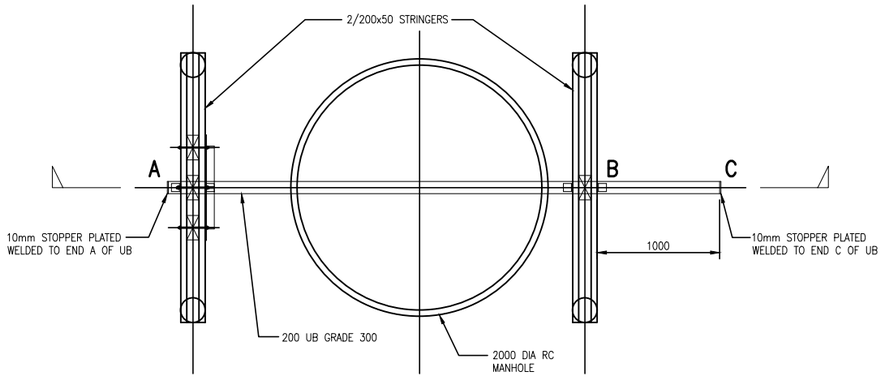
Northport
P.O BOX 44
RUAKAKA, NEW ZEALAND
TEL 09 432 5010

Title:

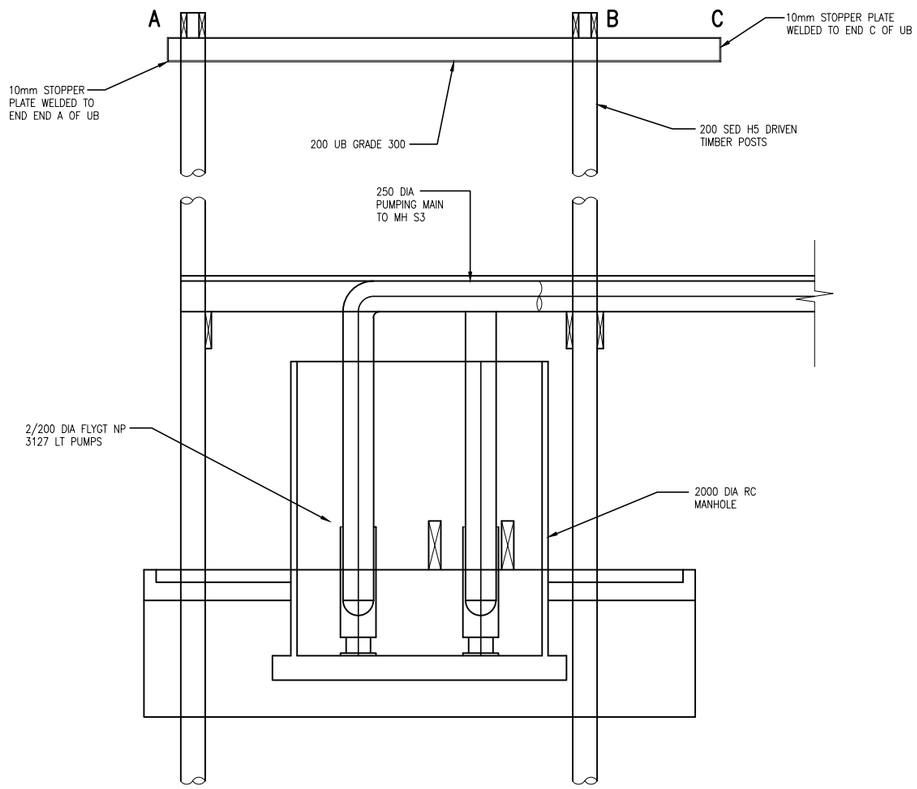
NORTHPORT
WESTERN CANAL SPILL WAY
PLAN VIEW AND DETAIL

Path	Dwg No	Issue:
k:\engineer\gregb\berth 3 extn - 2022\phase 2 - detailed design works\principals requirements\300 - 3 waters.dwg	D60-X	R0

Drawn:	Checked:	Scale:	Date:	Sheet:
T RYAN		VAIRES	JAN 2023	01



PLAN – LIFTING FRAME
1:25(A1)
1:50(A3)



CROSS SECTION THROUGH LIFTING FRAME AND PUMP STATION
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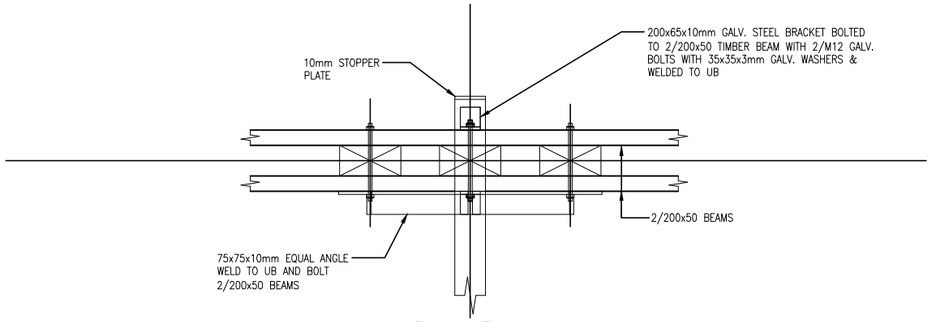
1:50(A3)



PLAN AT A
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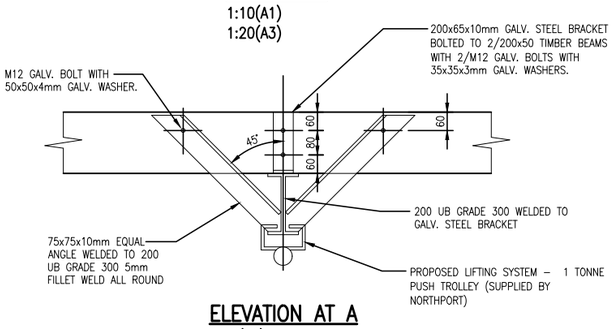
1:20(A3)



ELEVATION AT A
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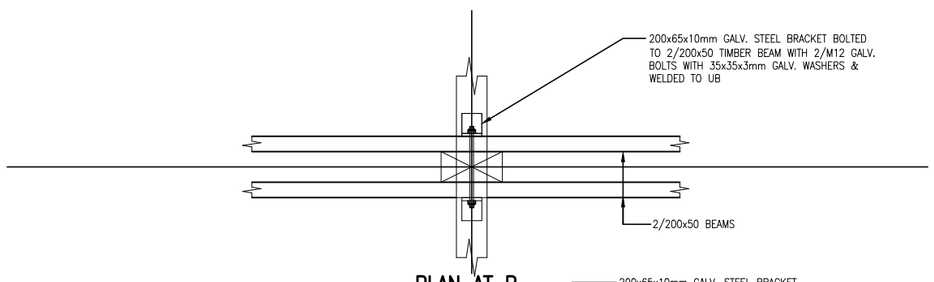

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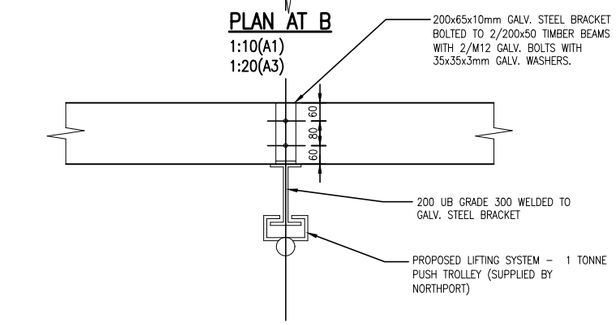
1:20(A3)



ELEVATION AT B
1:10(A1)
1:20(A3)

ISSUE	DATE	DETAILS	APPRVD	BY
1	22–4–03	ISSUED FOR CONSTRUCTION		BWP

NOTES:
1/ ALL MATERIALS HD GALVANIZED AFTER FABRICATION.
2/ CHECK ALL DIMENSIONS ON SITE PRIOR TO FABRICATION.
3/ REMOVE EXISTING GALV. CHANNEL LIFTING BEAM AND RETURN TO NORTHPORT FOR STORAGE.
4/ 1 TONNE PUSH TROLLEY SUPPLIED BY NORTHPORT LTD.

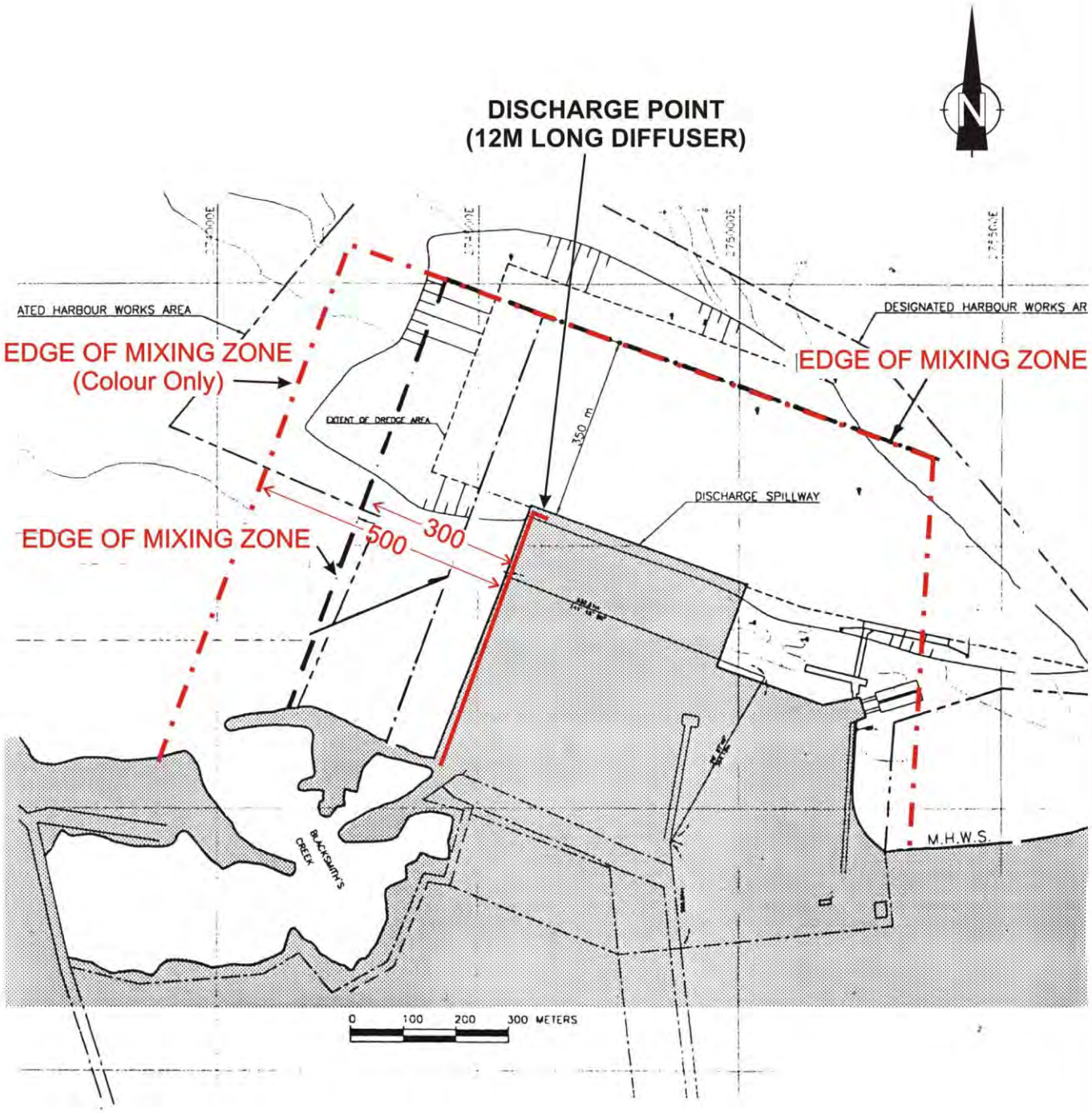
Northport
P.O BOX 848
WHANGAREI, NEW ZEALAND
TEL 09 432 5010, FAX 09 432 8749
EMAIL bruce.preston@northport.co.nz

Title:
NORTHPORT DEVELOPMENT
STORMWATER POND PUMP STATION
LIFTING FRAME DETAILS

Designed By	Dwg No	Issue:
F. PATTEN	D60–30–06–007	0

Drawn:	Checked:	Scale:	Date:	Sheet:
B PRESTON		AS SHOWN	APRIL 2003	1

ORIGINAL SIZE A1



Location Co-ordinates:
Datum: NZTM
Easting: 1733997
Northing: 6033711

NORTHLAND REGIONAL COUNCIL

RESOURCE CONSENT CON20090505532
for
Northport Ltd
Stormwater Mixing Zone

Scale:	N.T.S.
Drawn:	CNA 02/10
App'd:	
Plan No.	**3259A**

Appendix C Washdown Bay Plans

Stormwater Operation and Maintenance Plan

Northport, Marsden Point

Northport Limited

SLR Project No.: 16342

7 February 2024

ISSUE	DATE	DETAILS	APPRVD	BY

0 6 12 Meters

Northport
P.O BOX 44
RUAKAKA, NEW ZEALAND
TEL 09 432 5010

Title:

NORTHPORT
WASHDOWN BAY
SYSTEM AND TREATMENT SYSTEM

Path	Dwg No	Issue:
k:\engineer\gregb\hopper wash\washdown bay treatment system.dwg	D60-X	R0

Drawn:	Checked:	Scale:	Date:	Sheet:
T RYAN		1:200 (A1) 1:400 (A3)	JAN 2024	01

ISSUE	DATE	DETAILS	APPRVD	BY

0 1.5 3 Meters

Northport
P.O BOX 44
RUAKAKA, NEW ZEALAND
TEL 09 432 5010

Title:
NORTHPORT
WASHDOWN BAY
INSET A

Path	Dwg No	Issue:
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Drawn:	Checked:	Scale:	Date:	Sheet:
T RYAN		1:50 (A1) 1:100 (A3)	JAN 2024	02

Appendix D Refuelling Area Plan

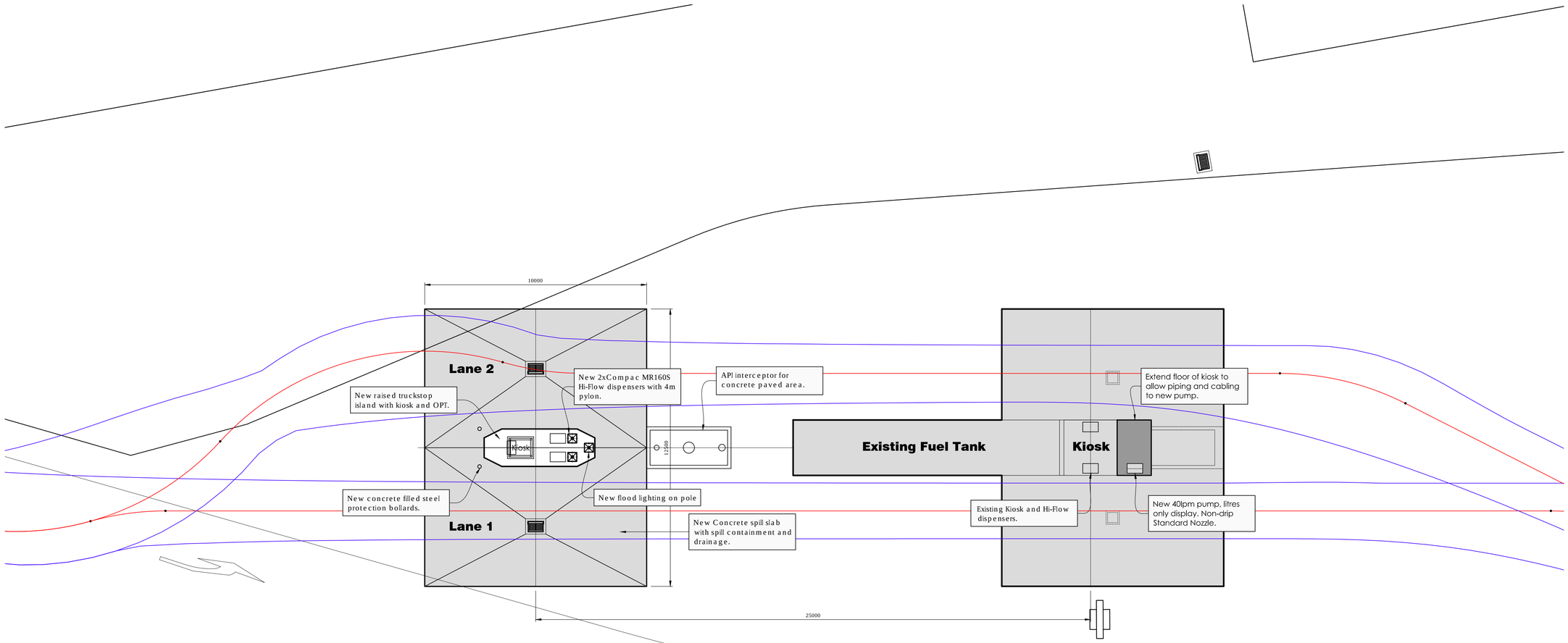
Stormwater Operation and Maintenance Plan

Northport, Marsden Point

Northport Limited

SLR Project No.: 16342

7 February 2024



DRAFT

0

Z Energy Limited
9 Hargreaves Street, Auckland
P.O.Box 2091
Wellington
New Zealand

NO.	DATE	REVISION DETAILS	BY
A	01.09.14	DRAFT ISSUE	PHIL

JOB TITLE

Z ENERGY LIMITED PROPOSED TRUCKSTOP NORTHPOINT, MARSDEN POINT

DRAWING TITLE

SITE PLAN

ICR studio
architectural design
t 0064 9 379 8647 e info@icr.co.nz w www.icr.co.nz
a p.o.box 3745, shortland street, auckland

SIZE	DATE	JOB NUMBER	DRAWN
A1	AUG 14	14670	PHIL
	SCALE 1:100	DRAWING NUMBER U01	REVISION A

Appendix E Humes API Interceptor Details

Stormwater Operation and Maintenance Plan

Northport, Marsden Point

Northport Limited

SLR Project No.: 16342

7 February 2024

API Oil Interceptor

Design meets the standards set by the Oil Industry Guidelines and ARC TP10 (2003)*

The Humes API Oil Interceptor is designed to separate hydrocarbons from stormwater runoff and has the capability to capture an accidental spill up to 2500 litres discharging at 1000 litres per minute. The butterfly shut-off valve closes at capacity allowing containment of excessive accidental spills.

Applications

- Service stations
- Truck stops
- Vehicle service centres
- Terminals and depots
- Blending and manufacturing plants

Benefits

- Cost effective
- Safe and reliable
- Reduced installation cost
- Retention of accidental spill
- Easy access for servicing

Features

- Efficient separation, industry compliance
- Full range to suit individual catchment areas
- Emergency shut-off
- Few moving parts
- Quality precast unit
- Designed to carry legal wheel loadings

Testing and Design

Testing and design of the Humes API Oil Interceptor has been carried out as per requirements of ARC TP10 (2003) and the Environmental Guidelines for Water Discharge from Petroleum Industry sites in New Zealand (MFE):

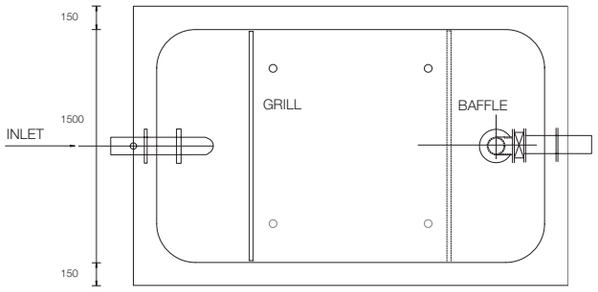
– to retain at least 2500 litres of spill

– to discharge less than 15 parts/million total petroleum hydrocarbons

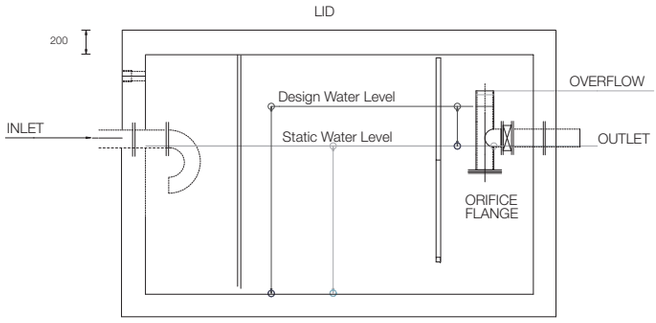
– to not exceed 25m/hour horizontal velocity through unit.

*TP10 is a design guideline manual for Stormwater Management Devices published by the Auckland Regional Council

API Oil Interceptor



PLAN FROM ABOVE



CROSS SECTION

Installation

The Humes API unit must be bedded to a level and uniform surface providing a safe bearing capacity of 100kPa. If for any reason this cannot be achieved an engineer experienced in foundations should be contacted for specialist advice.

The minimum requirement for the prepared bedding is a 100mm layer of compacted granular material. The lid must be bedded uniformly on all sides to a full width layer of mortar.

Units installed below ground or on a sloped finished ground or pavement surface must be designed specifically for those conditions. Wall props are required as tabulated below.

Maintenance and operation

The units must be maintained and operated in accordance with the appropriate industry guidelines and the environmental management plan developed for the site.

Manufacturing standards

All materials comply with the relevant New Zealand standard. Precast manufacture is to NZS 3109:1997 with surface finishes to NZS 3114:1987, F4 and U2 for formed and trowelled respectively. Concrete has a design strength of 40 MPa.

API Oil Interceptor

Oil Industry Guidelines

Model Reference	API3000	API3500
Item Code (API Body fitted out)	04070	04073
Item Code (API lid c/w access covers)	04098	04078
Internal Length	3000	3500
Internal Width	1500	1500
External Height	1850	1850
External Length	3300	3800
External Width	1800	1800
Unit Weight (tonnes)	10.6	11.9
R.H.S. Struts	1	1
Intercepted Length to Baffle	2400	2900
Capacity for AGO (SG 0.9) m^3	3.00	3.63
Design Flow m^3/hr	2.45	2.95
Orifice Size D mm	25	28
Catchment Area m^2		
9mm/hr	272	328
12mm/hr	204	246
15mm/hr	163	197
ARC Chapter 10, TP10		
Design Flow m^3/hr	1.75	2.10
Orifice Size D mm	21	23
Area m^2 15mm/hr	117	140

Appendix F Canal hotspots

Stormwater Operation and Maintenance Plan

Northport, Marsden Point

Northport Limited

SLR Project No.: 16342

7 February 2024

BARK STACK/PILE - A

BARK STACK/PILE - B

BARK STACK/PILE - C

BARK STACK/PILE - D

BARK STACK/PILE - E

ISSUE	DATE	DETAILS	APPRVD	BY

0 60 120 Meters

Northport
P.O BOX 44
RUAKAKA, NEW ZEALAND
TEL 09 432 5010
vision4growth.co.nz

Title:
NORTHPORT
STORMWATER CANAL SYSTEM

Path	Dwg No	Issue:
k:\engineer\gregb\stormwater\sw canal system - bark pile location.dwg	D60-X	R0

Drawn:	Checked:	Scale:	Date:	Sheet:
T RYAN		1:2000 (A1) 1:4000(A3)	MAR 2023	01

Appendix G Hynds Downstream Defender Details

Stormwater Operation and Maintenance Plan

Northport, Marsden Point

Northport Limited

SLR Project No.: 16342

7 February 2024

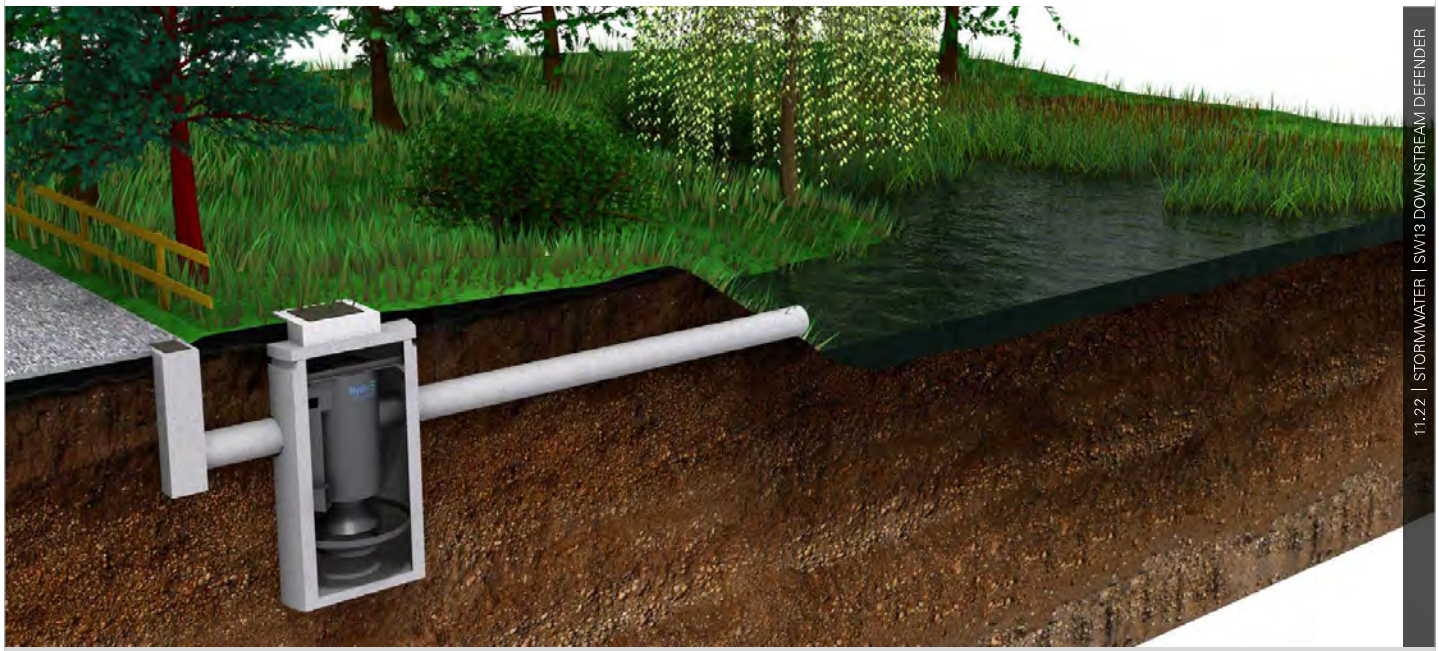
SLR

Downstream Defender®

(Stormwater Treatment)

Technical Guide SW 13

Downstream defender provides a high removal efficiency of settleable solids and floatable material over a wide range of flow rates



Applications

- Roads, carparks, commercial properties
- Ports, airport, construction sites
- Industrial and commercial facilities
- Control of silting upstream of wetlands, ponds and basins
- Offline and online treatment of existing stormwater reticulation

Product Attributes

- Removes up to 60-90% total suspended solids (TSS) with a mean particle size of 150 microns.
- Removes sediments, floatables, oils and grease.
- No re-entrainment of previously captured pollutants
- Small footprint

Approvals/Standards

- NJCAT
- NZS3109, Concrete Construction
- ISO 9001:2008 Quality Management Standard

We are the supply partner of choice for New Zealand's stormwater management and treatment solutions.

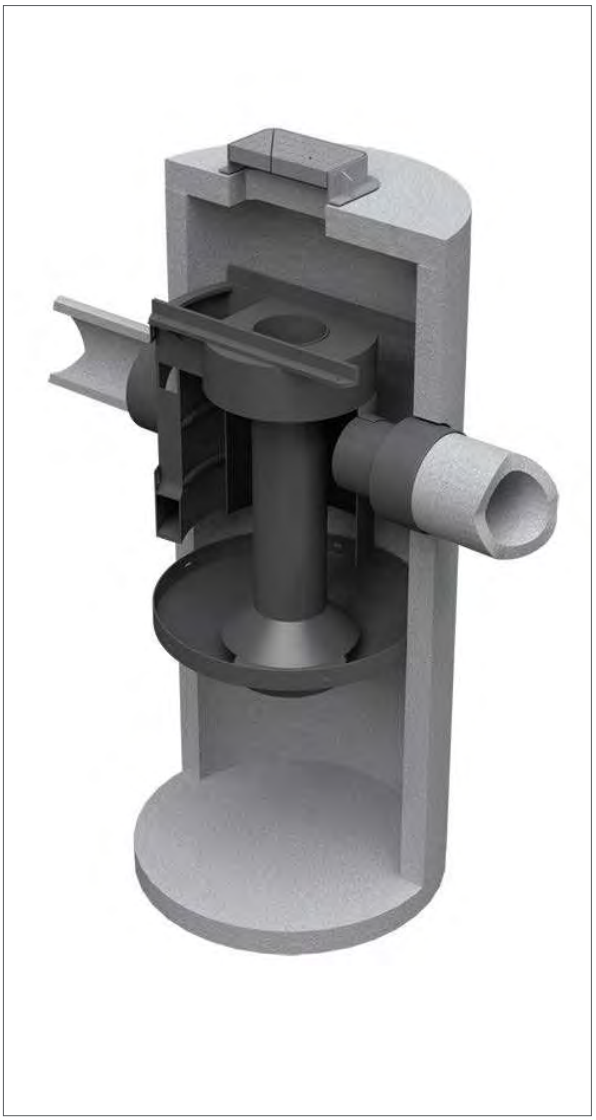
HYNDS STORMWATER

The Hynds Downstream Defender is an advanced hydrodynamic vortex separator designed to meet most stormwater regulations.

It provides highly effective and reliable removals of fine and coarse particles, hydrocarbons and other floatable debris from stormwater runoff, delivering high levels of treatment over a wide range of flow rates in a much smaller footprint. It is the perfect choice for any catchment likely to convey high quantities of contamination.

Design and Sizing

The Downstream defender is available in a range of sizes and can function as either a pretreatment device or as a stand alone device. The Hynds Downstream Defender is sized to treat either a specified catchment area or a design flow rate to meet the water quality design for first flush treatment. Downstream Defender of Ø1200 and Ø1800 comes with an internal bypass with the inlet and outlet at the same level. The Downstream Defender of Ø2550 and Ø3000 have an inlet with an S bend and no internal bypass.



Benefits

- A smaller footprint ensures an easier installation and saves space and money
- Can be used in conjunction with other treatment types to create a treatment train effect.
- Easy to clean
- Can be used in back water environments
- Carefully designed internal components isolate the pollution storage areas ensuring what is captured is retained, even during high flows.

Targetted Pollutants

The Hynds Downstream Defender removes an assortment of pollutants such as:

- Fine particles
- Floatable Debris
- Liquid and sediment bound hydrocarbons
- Sediment bound heavy metals
- Sediment bound nutrients

Installation

Treatment components are installed in a standard precast concrete manhole manufactured to AS/NZS and NZBC requirements. The internals, inlet pipe and outlet pipe are installed at the factory. The device is plug and play and the installation is similar to any other manhole installation on site, with placement in the prepared excavation direct from a hiab.

Note: Large Diameter Downstream Defenders may require an onsite crane to lift into the prepared excavation - refer to table 1 for indicative weight

TABLE 1 **Downstream Defender® variants**

Diameter	Description	Weight of manhole with internal (Excluding lid) *(T)*	Weight of lid and cast iron and frame *(T)*
1200	Ø1200 x 2400mmH Flanged based manhole	2.55	0.742
1800	Ø1800 x 3600mmH Flanged based manhole	9.241	1.876
2550	Ø2550 x 3900 mmH Flanged based manhole	18.5	3.3
3000	Ø3000 x 4200mmH Flanged based manhole	23.5	4.7

TABLE 2 **Key parameters**

Unit Size (mm)	Design Flow *(L/s)*	Capacity Flow (max) *(L/s)*	Inlet Pipe Diameter (mm)	Outlet Pipe Diameter (mm)	Head-loss at Design Flow (mm)	Head-loss at Capacity (mm)	Sediment Storage (m^3)
1200	42	120	300	300	150	500	0.7
1800	96	270	450	450	225	500	1.7
2550	200	425	600	600	71.8	324.2	3.56
3000	370	700	750	750	100.6	360.3	6.65

TABLE 3 **Downstream Defender® variants**

Unit Size (mm)	Emergency spill containment (L)	Oil Cleanout Depth *(cm)*
1200	270	< 41
1800	1350	< 58
2550	2044	< 84
3000	3975	< 107

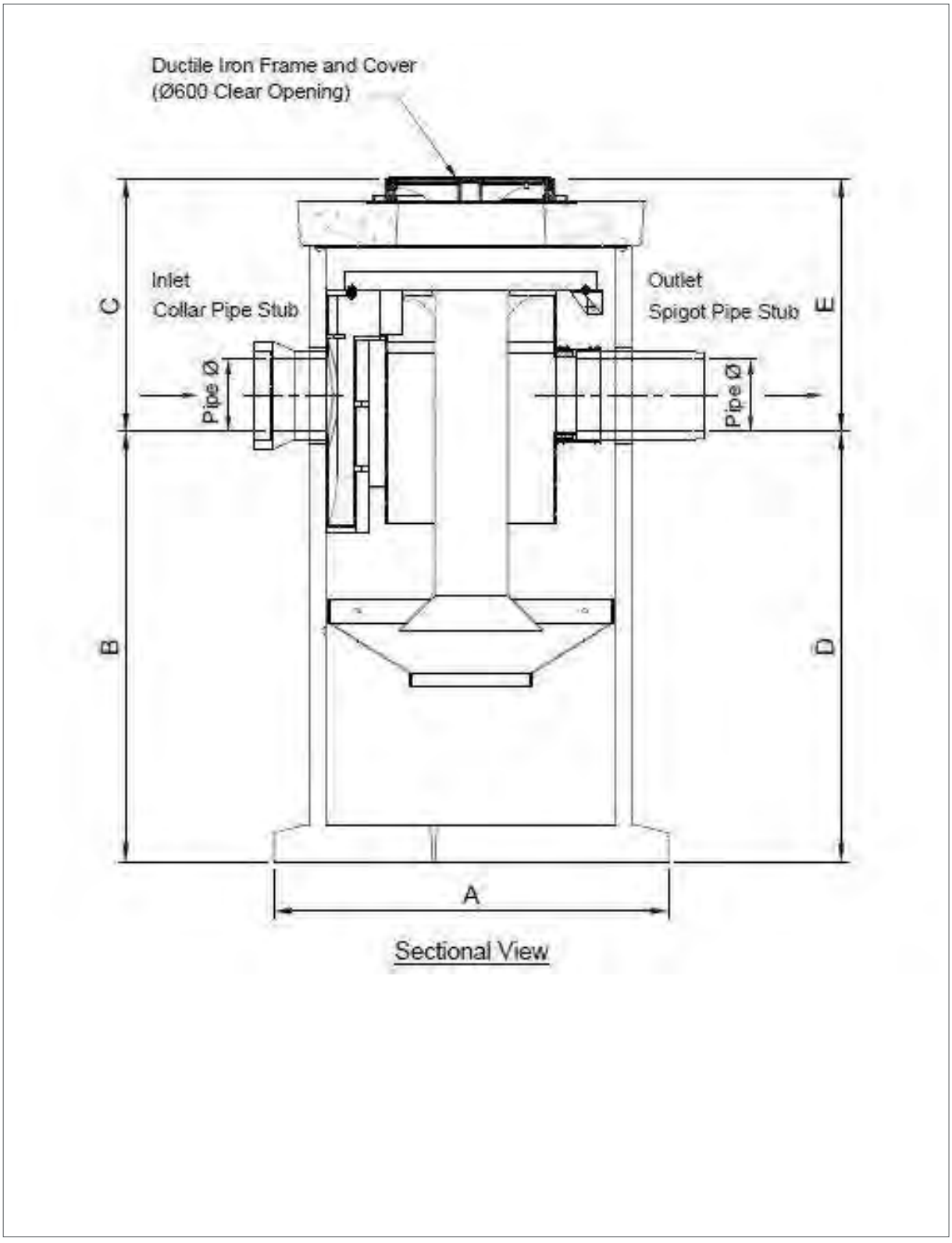

Ductile Iron Frame and Cover
(Ø600 Clear Opening)
Inlet
Collar Pipe Stub
Outlet
Spigot Pipe Stub
Pipe Ø
Pipe Ø
C
E
B
D
A
Sectional View

FIG. 1

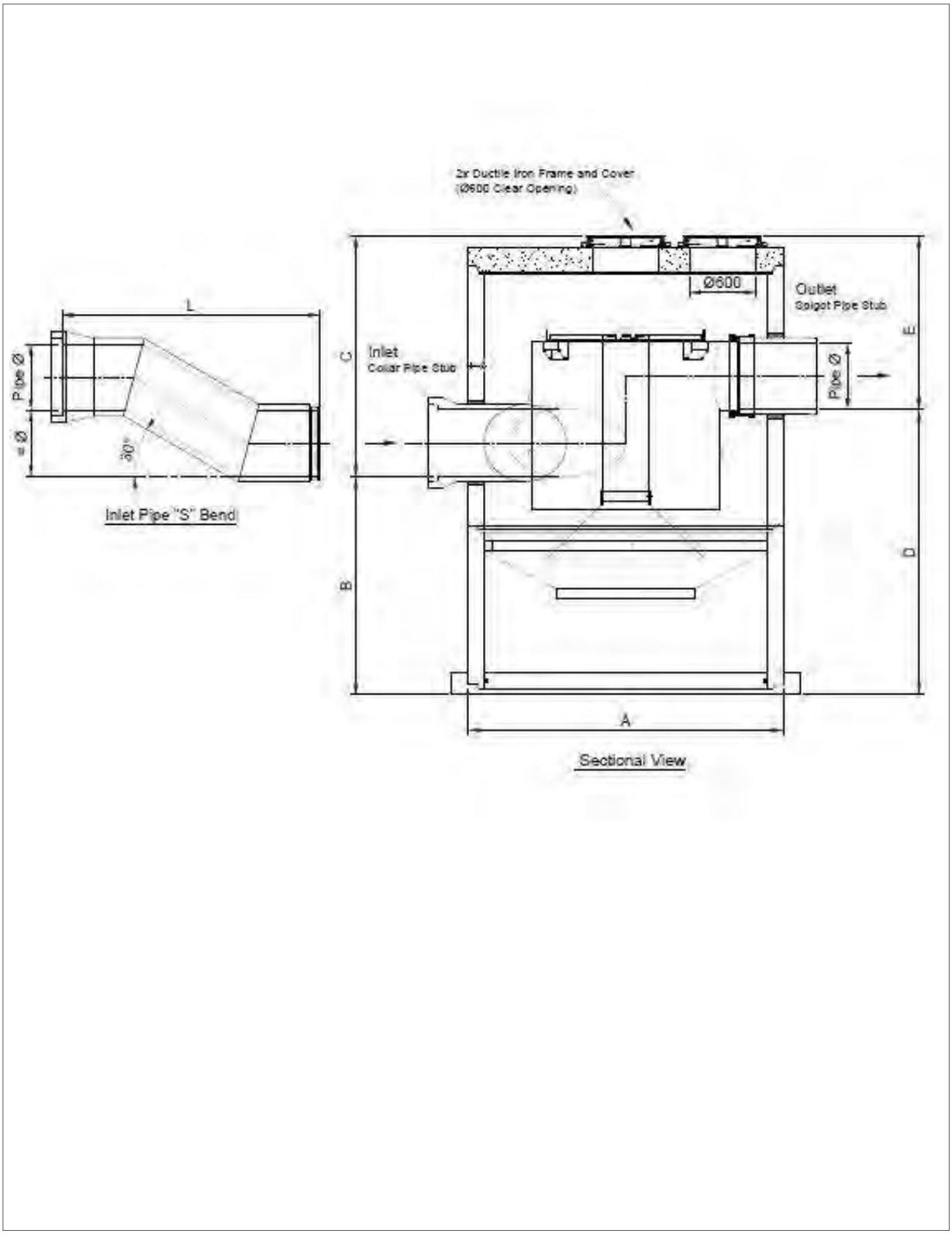

2x Ductile Iron Frame and Cover
(Ø600 Clear Opening)
Ø600
Outlet
Spigot Pipe Stub
Inlet
Collar Pipe Stub
Pipe Ø
Pipe Ø
L
30°
Inlet Pipe "S" Bend
C
B
A
D
E
Sectional View

FIG. 2

TABLE 4 **Downstream Defender Dimensions**

Product Code	Lid Openings	Dimension					S Bend Dimension		Mass Total (T)	Figure reference
		A *(mm)*	**B** (mm)	**C** (mm)	**D** (mm)	**E** (mm)	**Diameter** (mm)	**Total Length**, L (mm)		
DD3.1200KIT	1	1640	1790	1060	1790	1060	-	-	3.29	Figure 1
DD3.1800KIT	1	2431	2757	1498	2757	1498	-	-	11.12	
DD2550KIT	2	3150	2000	2175	2600	1575	600	2335	21.80	Figure 2
DD3000KIT	3	3608	2371	2186	3122	1435	750	2394	28.20	

Note:

- *Each chamber comes complete with a concrete lid, ductile iron cover and frame*
- *Suggested invert level is indicative only and may vary depending on inlet/outlet invert to finish floor levels.Prices may vary depending on your location*
- *DD2550KIT and DD3000KIT come with an S bend. Please note that the S bend is connected to the chamber, the inlet invert depth will match the outlet invert depth.*

Maintenance / Servicing

The Frequency of clean out is determined in the field after installation. During the first year of operation, the unit should be inspected every six months to determine the rate of sediment and floatables accumulation. A simple probe such as a Sludge-Judge can be used to determine the level of accumulated solids stored in the sump.

Activity	Indicative frequency for mid level catchment area
Inspection	Regularly during the first year of installation.
	Every 6 months after the first year of installation
Oil and Floatables removal	Once per year, with sediment removal
	Following a spill in the drainage area
Sediment Removal	Once per year or as needed
	Following a spill in the drainage area

Lifting and Handling

All Downstream Defenders® incorporate Swiftlift lifting anchors for safe lifting and must be used with the correct lifting clutch.

Hynds Pipe Systems has designed and manufactured Downstream Defenders® with a minimum dynamic factor of 1.2. This dynamic factor requires that all the following conditions are observed when lifting, moving or placing the units:

1. Lifting with mobile plant *(such as an excavator or similar)* where equipment is specifically exempt from the requirements of the PECPR Regulations 1999, subject to the conditions outlined in the New Zealand Gazette, No. 104, September 2015 and
2. Lifting, travelling and placing over rough or uneven ground where anchor failure is not anticipated to cause harm or injury, by adopting procedures such as:
   a. Transporting the element as close as practical to ground level (300mm recommended)
   b. Establishing and maintaining exclusion zones
   c. Transporting only precast concrete elements that are unlikely to topple if they were to hit the ground
   d. Inspecting lifting anchors both after transportation and before final lifting into place

Refer to "Safe work with precast concrete - Handling, transportation and erection of precast concrete elements" published by Worksafe New Zealand (October 2018)

Shock loads resulting from travelling with suspended Downstream Defenders® over rough terrain and uneven ground may exceed design, dynamic and safety factors of the lifting systems. It is essential that care is taken during lifting and transporting as additional stresses could result in anchor failure.

Appendix H CDS Operation and Maintenance Manual

Stormwater Operation and Maintenance Plan

Northport, Marsden Point

Northport Limited

SLR Project No.: 16342

7 February 2024

Operation and Maintenance Manual

March 2005

Contents

Appendix

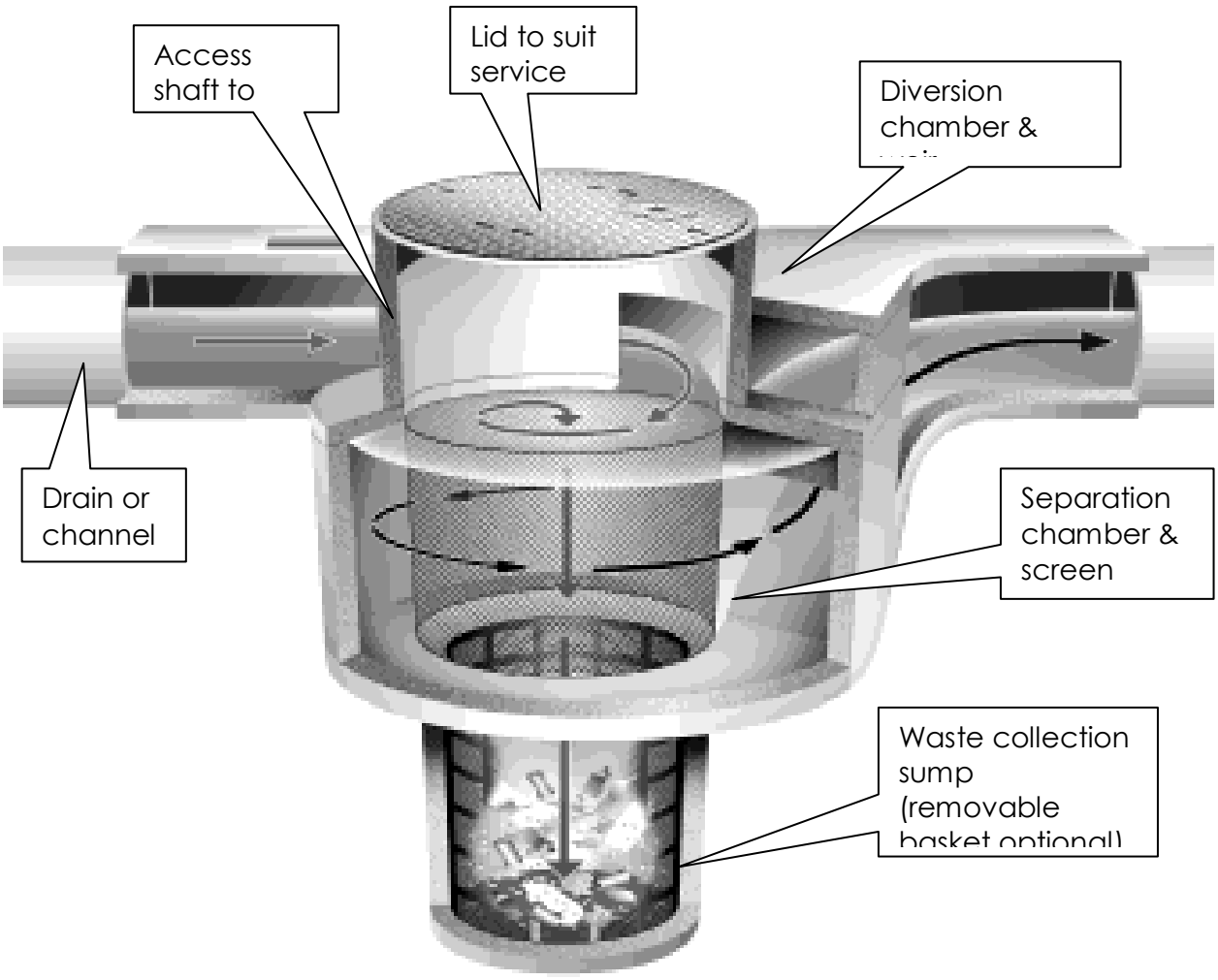
1 Preamble

1.1 CDS Technologies has been established to provide a cost-effective way to achieve environmental sustainability in water quality. The company is committed to its Clients and the environment, however its focus is on the development, manufacture, construction, installation, maintenance and repair of the CDS units.

1.2 The CDS owner may opt to perform their own cleaning or contract the cleaning to a pre-qualified contractor. Pre-qualified contractors are approved by CDS Technologies to perform inspections and cleaning in conformance with CDS Technologies Specification. They have demonstrated that they can meet all safety and environmental legislation and are adequately insured. These contractors can provide very competitive rates, provide valuable feedback on the CDS operation and will take the worry and effort out of the maintenance process.

1.3 Definitions

CDS For simplicity, the letters CDS will be taken to mean a CDS unit.



2 Inspections

2.1 Routine Inspections

2.1.1 Routine inspections are recommended to ensure the CDS is functioning correctly and indicate when cleaning is necessary. These should be carried out on a regular monthly basis. Additionally, it is recommended that a non-scheduled inspection be carried out after any heavy downpour or prolonged period of wet weather. These inspections are the responsibility of the CDS unit owner, unless other arrangements have been made with CDS Pty Ltd. Due to the efficiency of the CDS design, it is likely that they will collect large quantities of pollutants during significant rainfall events. Inspections after heavy rain are therefore even more important than scheduled inspections.

2.1.2 The routine inspection involves removing the access hatch in the CDS main lid and visually checking the visible part of the screen, the percentage of water surface occupied by floatables and measuring the level of accumulated debris in the sump.

2.1.3 This level can be calculated using a survey staff or weighted stringline, by measuring the distance from the estimated top of the debris to the top of the lid. A chart is provided on the data sheet that allows the depth measurement to be converted into a percentage full. The data sheet is located in Appendix D. CDS can also provide simple Excell spreadsheet programs for constructed units on request.

2.1.4 When the accumulated material reaches the level of the top of the sump (100% full), it is recommended that it be emptied.

2.1.5 Should the trapped material be allowed to accumulate and rise into the separation chamber, i.e. above the bottom of the screen, the efficient operation of the unit will be compromised with subsequent flows possibly leading to screen blockage.

2.1.6 A standard report for a routine inspection is shown at Appendix A. This should be faxed to the CDS unit owner and CDS Technologies head office. This information helps in future CDS unit sizing and cleaning frequency estimations.

2.1.7 CDS Technologies should be informed if there is any damage or non-functionality observed with the CDS through the completion and forwarding of the 'Damage and Non-Functionality Report' included in Appendix A.

2.2 Annual Inspection

2.2.1 CDS recommends Annual Inspections involving dewatering the unit and checking the condition of the screen, area behind the screen , diversion chamber , weir, lids and any special features of the unit (Baskets can be excluded from this because they can be inspected at every cleanout).

2.2.2 The Damage or Non-Functionality Report (Appendix C) can be used to record any damage or wear and tear that will require attention.

2.2.3 This is also a good opportunity to apply grease to the frame of any cast iron lids and/or lubricate padlocks.

3 Recommended Cleaning Methods

3.1 There are several factors influencing the choice of cleaning method, the main factor being CDS unit size. Other factors include access, equipment availability, required frequency, cost any restrictions, eg units in tidal locations cannot generally be cleaned by eduction.

Unit Size (Screen Diameter mm)	Recommended Cleaning Method	Comments
700	Suction	Unit not designed for basket; total volume of water and waste is well within range of standard eduction equipment
900	Suction/basket	Suction is the most cost-effective method.
1500	Suction/basket	Suction is the most cost effective method.
2000	Suction/basket/ grab	Grab is the most cost effective method.
3000 or larger	Suction/grab	Grab is the most cost effective method.

3.2 The basket is available for purchase from CDS Technologies and consists of a fabricated fibreglass and steel lifting ring supporting a reinforced fabric basket and connected by SWR slings and shackles. The basket has stainless steel quick-release closures and buckles. A basket is preferred in units which are below low tide or where other methods are not feasible.

3.3 The following chapters detail procedures for each of the recommended methods with illustrations, and include safety information and related regulations.

4 Basket Cleaning

The following is a recommended procedure for emptying the CDS unit fitted with an optional collection basket (this procedure is shown in Figure 4.1). See also Hazard Analysis at Section 4.8.

4.1 Remove lid(s) from access chamber

CDS units in trafficked areas (roadways) are fitted with load-class lids (Gatic). The lids are usually multi-part and have tapered edges. Special lifting levers are required to remove them. Larger units in trafficked areas may have RSJ beams to support the lid structure. These also must be removed. If the lifting tackle for the basket is hanging from the RSJ, it must be disconnected and temporarily connected to the inside of the access shaft while the RSJ is removed.

CDS units in non-trafficked areas (parks or reserves) may be constructed from fibreglass, galvanised steel or timber and may be single or of multi part construction. Fibreglass lids on models F0908/0912 can be easily removed by hand after unlocking with a T bar key.

Galvanised and timber lids have adequate lifting points to assist in removal by crane.

When working in a roadway, utilise appropriate traffic control measures.

For safety reasons, any staff working over the open unit should wear a safety harness tied back to an immovable object.

4.2 Connect lifting tackle

Subject to access, the following crane capacities should be adequate to lift full baskets from the sumps of CDS units.

The estimate of the full basket weight can be obtained from the CDS unit Data Sheet.

900mm CDS	5 tonne capacity crane minimum
1500mm CDS	8 tonne capacity crane minimum
2000mm CDS	12 tonne capacity crane minimum
3000mm CDS	15 tonne capacity crane minimum

The crane needs to be able to raise the bottom of the basket, which is up to 7 metres below the lifting ring, over the side of the truck being used to transport the waste.

The crane should be located on suitably firm ground and operated by a qualified crane operator and guided by a qualified dogman. All staff on the ground in the vicinity of the unit should wear hard hats.

The lifting ring, which is temporarily attached to the side of

the CDS, is to be attached to the crane hook.

4.3 Lifting the basket

If the unit is especially full or there is a great deal of floating material on the surface, it is recommended that the basket be raised slowly to reduce turbulence in the separation chamber which can wash floatable items over the rim of the basket.

Floating material should be pushed towards the centre to ensure it is caught as the basket rises. If some floating material remains in the CDS unit, it will likely be removed next time or it is possible to create a backwash by "dunking" the basket under the surface and quickly back up again. If the basket is found to have a significant amount of material "nesting" on the lifting collar, it is recommended that this material be pushed down into the basket using a broom, rake, shovel or staff before removing the basket completely from the unit.

With the bottom of the basket raised above the water level, allow water to drain back into the CDS unit for a few minutes.

Lift and place basket into truck and allow it to settle to relieve tension in securing straps. Release the Quick-release couplings that hold the basket closed.

Raise basket and allow contents to discharge into truck.

Lower basket and remove any trapped contents. If material is tangled in lifting slings, remove it.

Waste should not be handled unless appropriate protective gloves are worn.

Close basket and secure straps with Quick-release couplings. Place and position basket back in the CDS unit. It is sometimes advisable to weight the basket with two or three bricks to prevent the fabric from billowing up.

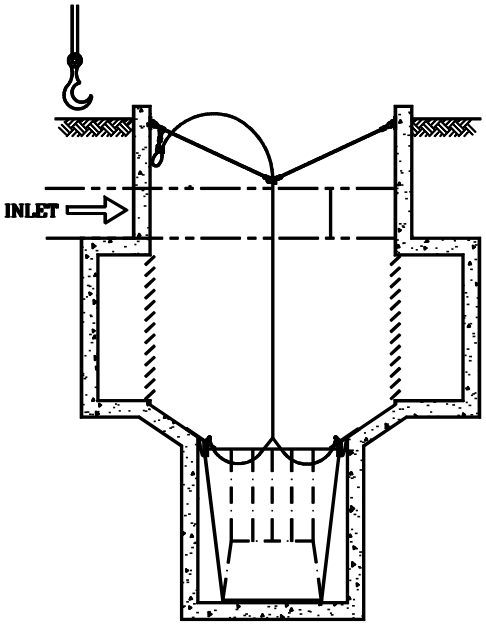
Check the separation screen for blockage or damage. Any material caught on the screen should be hosed or scrubbed off with a hard-bristle broom.

A significant quantity of material blocking the screen can be regarded as evidence of non-functionality and reported to CDS Technologies. If any damage is apparent, it should be reported to CDS as soon as practicable to enable a site inspection to be done. The phone number is listed on the CDS Data Sheet.

Replace lifting tackle and lids to their normal position.

NB It is important that the lifting cable hangs vertically down from the centre of the lid so as not to impede the circular flow of water in the CDS.

4.4	Disposal of Pollutants	Record the quantity of pollutants removed from the CDS with a visual assessment of the breakdown by type: • % silt and sediment • % litter • % vegetation A note should be made of any unusual or large items, eg. oil, paint, car tyres etc. Dispose of pollutant material at an approved tipping site, ie. a tip which is licensed by the Waste Authority in the relevant state. A record of the weight of the material extracted should be kept. The weight may be read by the crane, or the weigh station as the disposal truck enters the tip. The weight should be recorded on the CDS Cleanout Report (Appendix B). Care should be taken to: Cover the load en-route to the tip and to ensure that none of the litter from the load escapes from the truck. Adequately drain the material before leaving the site.
4.5	Tidy Site	Tidy the site of any debris prior to leaving.
4.6	Complete and Forward Cleaning Report	Complete Cleaning Report (Appendix B) and forward to the CDS unit owner. If there is any damage or non-functionality, complete Damage or Non-Functionality Report (Appendix C) and forward to the CDS Contact Person listed on the CDS Data Sheet.
4.7	Annual Clean and Inspection	On an annual basis the CDS should be pumped down as described in the section on Suction Cleaning, the basket removed, the sump pumped out and thoroughly cleaned of any debris that may have accumulated under the basket. The water from the sump is either disposed of appropriately to sewer or pumped upstream so that it can be released and retreated by the CDS unit. A close inspection should be carried out on the screen, basket, lifting tackle etc and any maintenance requirements should be reported. Inform CDS Technologies when this annual service is to occur if they are required to attend. Inspect the return channel behind the screen and remove any accumulated silt or other deposits, if present. Record details in the "Comments" section of the 'Clean Out Report'.



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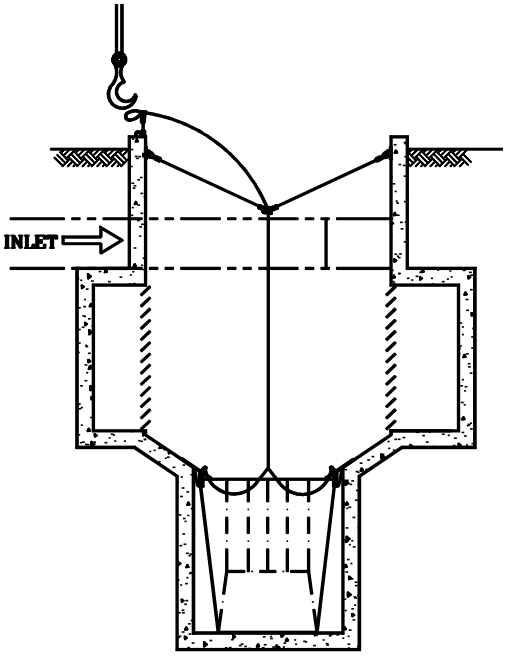

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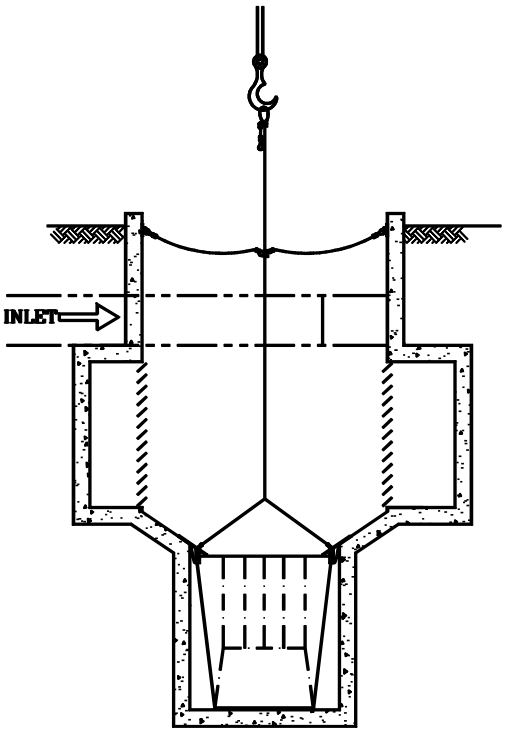

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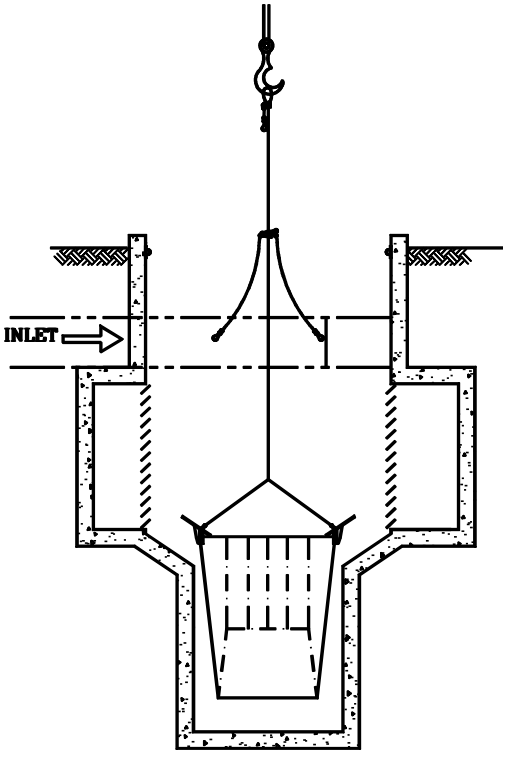

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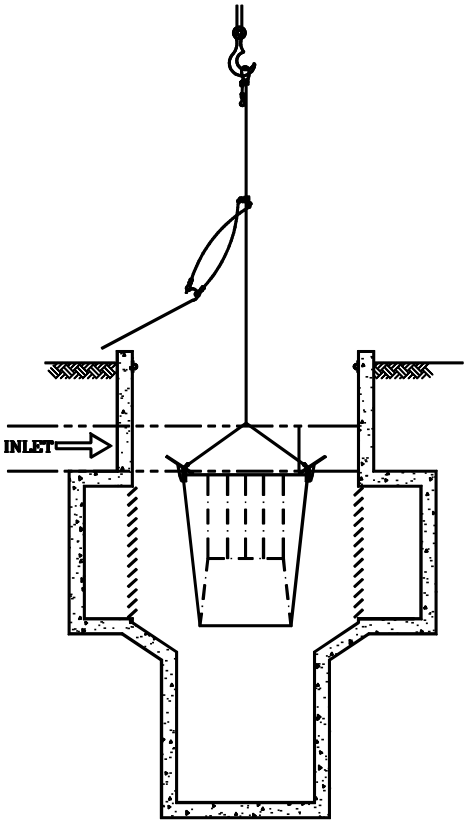
LIFTING OPERATION

Figure



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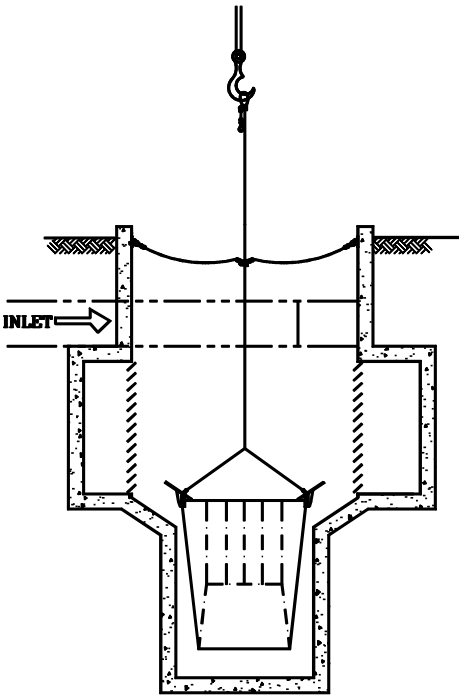

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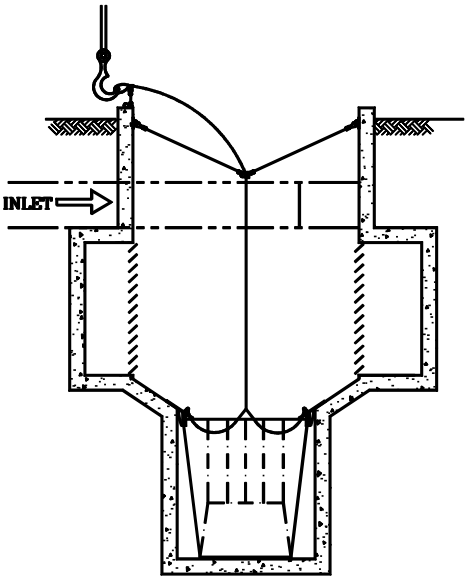

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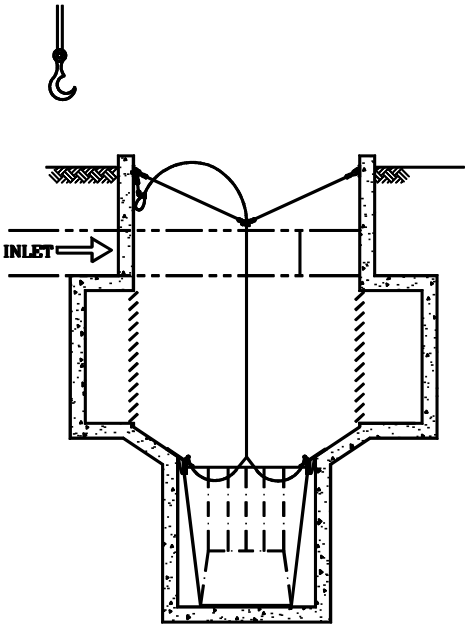


(4)

LOWERING OPERATION

5 4.8 HAZARD ANALYSIS

Activity: Basket Cleaning of CDS Unit

Task	Possible Hazard	Hazard Control
Site Establishment	Traffic Hazards	Implement Traffic Control Plan Obtain Road Closure Approval if necessary
	Risk to Pedestrian	Care to be taken when driving cranes, trucks etc. through public areas. Use assistant to guide reversing vehicle and ward off pedestrians In high pedestrian traffic areas, erect barricades around open CDS unit
Remove CDS Lid	Manual Handling	Correct Manual Lifting Techniques PPE : Steel cap boots, hard hat, gloves Lifting tackle in good condition. Crane in good condition, qualified operators. Crane near overhead electrical cables 3m clearance required to overhead electrical cables
Remove Basket	Lifting Cable Breaks	Check basket lifting tackle for deterioration. Check cable as it emerges from under the water for deterioration. No person to stand under basket as it is removed.
	Person fall into CDS unit	It is not possible to remove the CDS basket whilst barriers are placed around CDS unit. Therefore special care must be taken whilst working around the open CDS unit.
Empty Basket into truck	Biological contamination Basket swings hitting employee	Wear gloves and wash hands afterwards with anti-bacterial soap. PPE, hard hat
Replace Basket	See Remove Basket	
Replace CDS lid	See Remove CDS Lid	

6 SUCTION CLEANING

The following is a procedure for emptying the CDS unit using a truck-mounted suction unit (this procedure is shown in Figure 5.1). See Hazard Analysis at Section 5.8.

Remove lid

6.1 Stop inflow

If necessary, the incoming flow can be blocked using a drop-board or sandbags stacked across the inlet. Ensure that the flow is low enough for a person to safely enter the chamber to place the drop-board.

NB If working in a roadway, erect appropriate traffic control measures.

6.2 Pump down the separation chamber

Place a flex drive pump or suction hose in the outlet of the separation chamber, ie outside the screen. This water can be discharged downstream because it has passed through the screen, therefore it has undergone treatment. Other options that may be considered include pumping the water upstream of the inlet. It may be necessary to remove water removed from the unit and transport it by tanker to an approved disposal site or it may be discharged to sewer if approved by local water authority.

Do not pump water from the inside of the screen directly downstream.

Access to the outside of the screen is via the Diversion Chamber. The water level will drop to the top of the sump.

6.3 Remove debris by suction

Using a "Super sucker" type suction cleaner, remove the debris from the sump (Experience has shown that the common Council Road Sweeper Eductor is not nearly as efficient at removing the debris).

For larger units, removal by suction may require the assistance of a suitably qualified "Confined Spaces" worker, lowered into the CDS unit to manually direct the nozzle of the suction hose and remove blockages. Any large items or sticks blocking the nozzle may be put to one side and removed manually on completion of the suction process.

Confined spaces legislation requires that the employee in the unit be harnessed to a tripod-type hoist that is permanently manned above, while a third operator mans the suction machine.

6.4 Disposal of Pollutants

Record the quantity of pollutants removed from the CDS with a visual assessment of the breakdown by type:

_____ % silt and sediment
_____ % litter
_____ % vegetation

A note should be made of any unusual or large items, eg. oil, paint, car tyres etc.

Dispose of pollutant material at an approved tipping site, ie. a tip which is licensed by the Waste Authority in the relevant state.

The free water removed can be discharged back into the CDS unit to minimise transportation and disposal costs.

The material should be weighed if possible. Weight should be measured when free water no longer drains out of the material. If this is not possible, an estimation of weight should be made.

6.5 Tidy Site

Tidy the site of any debris prior to leaving.

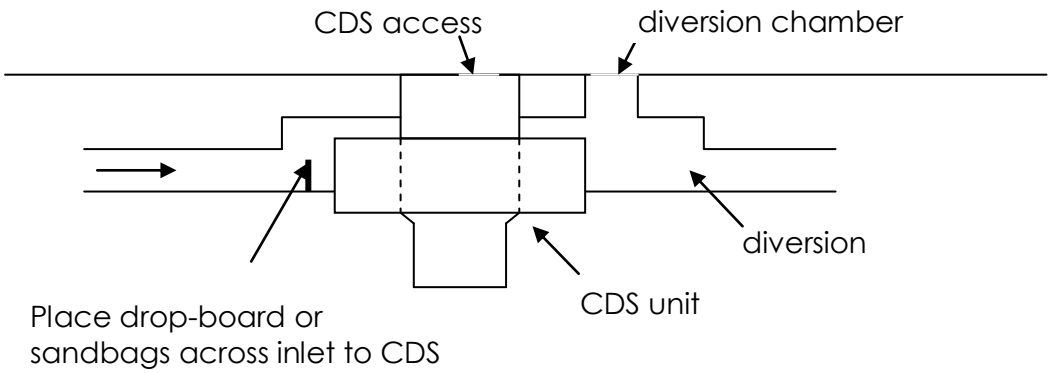
6.6 Complete and Forward Cleaning Report

Complete Cleaning Report (Appendix B) and forward to CDS owner. If there is any damage or non-functionality, complete Damage or Non-Functionality Report (Appendix C) and forward to the CDS Contact Person listed on the CDS Data Sheet.

6.7 Annually the CDS unit should be fully inspected inside and outside the screen to ensure no damage, algal growth or deposition of material has occurred. Any problems should be reported to the CDS owner and to CDS Technologies contact person.

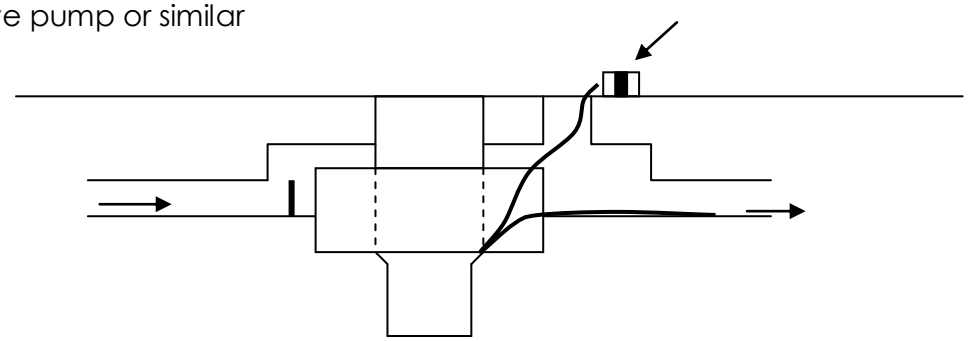
5.7 PROCEDURE

Stop Inflow

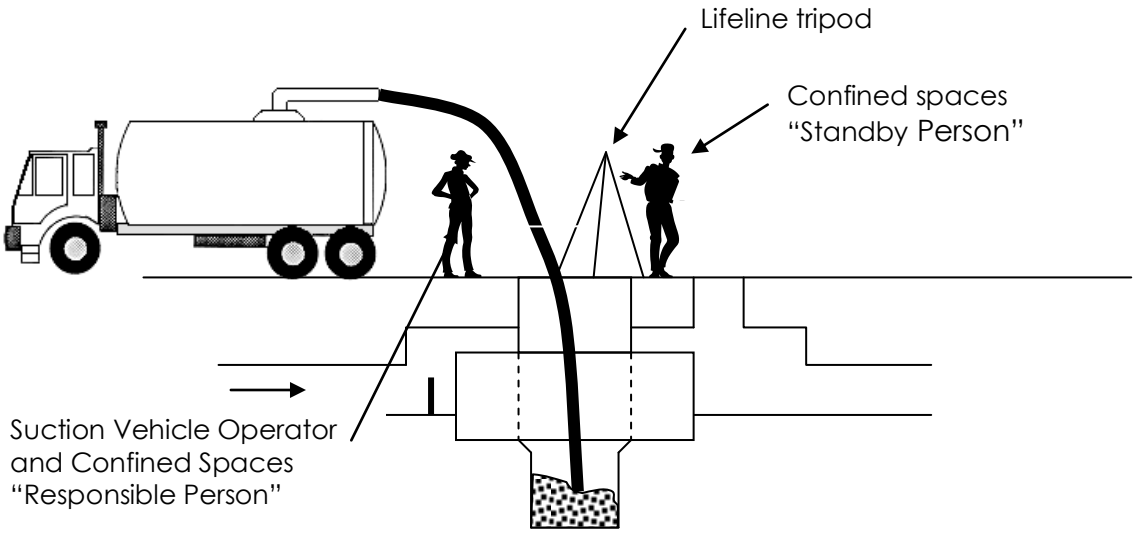


Pump down the separation chamber from the outside of the screen

Flexi-drive pump or similar



Remove debris by suction



NB: A person may be needed inside the CDS unit to guide the head of the suction hose.
All 3 staff in this method require Confined Spaces Training.

5.8 HAZARD ANALYSIS

Activity : Cleaning CDS units by vacuum loading

WHAT CAN GO WRONG	*HOW WILL IT BE MANAGED*
Proposed Work: Cleaning of C.D.S. units of various sizes by Vacuum Loading at various locations. <u>Consequences</u> Possible Road Work Entry into Confined Spaces	Field staff will be certified through AS2865 and safety inducted prior to commencing fieldwork. A supervisor will issue each crew with a work schedule for the day. The responsible person will ensure each site is handled with extreme care. Should roadwork be required, the crew will have the correct signs, barricades and appropriate dress.
Confined Space Category: Deterioration of air quality may occur within a confined space resulting in a category change. Illegal dumping of trade waste / chemicals may also result in confined space category changes.	The responsible person will ensure: Gas testing is undertaken for the duration of the work. If gas levels are above AS2865 allowable levels postpone work until reasonable levels can be achieved. Force ventilation equipment is available, on site, and can be used if required. Vacuum truck draws fresh air into chamber. Personnel entering the confined space will wear all the appropriate safety gear, including hard hat, steel capped boots, overall, eye protection, gloves and be connected to an approved lifeline/tripod set-up at all times whilst in the confined space. Remove other manhole lids in vicinity of work. Should trade waste chemicals become evident all work will cease, evacuation will proceed. Once evacuation is complete C.D.S. will be notified immediately. Self rescue unit to be worn.

WHAT CAN GO WRONG	*HOW WILL IT BE MANAGED*
Isolation of Work Site: Partial blockage/diversion boards, installed upstream to divert flows, may fail resulting in increased flow conditions.	The responsible person will ensure: Isolation of the work site by ensuring level of flow is at workable levels prior to confined space entry. The work can be done during low flow conditions. Flow levels are monitored upstream of the work location. Personnel entering the confined space will wear all the appropriate safety gear, including hard hat, steel capped boots, overall, eye protection, gloves and be connected to an approved lifeline/tripod set-up at all times whilst in the confined space.
Pre-entry Inspection: Air quality may exceed As2865 limits. Excessive flow conditions Presence of fumes, smells and noxious gases.	Gas detection will be undertaken prior to commencing confined space work. Gas detection is to continue for the entirety of the work. The work crew will complete an Entry Permit once they have tested for gas. Copy of Entry Permit to be forwarded to C.D.S. Should excessive flows be present work is not to proceed until such time that flows are at acceptable levels.

Access: Manhole/Access lid dimensions may not comply with Australian Standards. General public and road access routes may be interrupted. Suction hose restricts size of manhole.	The responsible person will ensure: Access will only be undertaken if it is possible, through the manhole opening. Entry will NOT take place into a manhole/confined space if there is hear lid present. These site-opening sizes do not conform to Australian Standards. The entrant will wear a safety harness. Appropriate signs and barricades will be used around the work area to ensure public and traffic routes are kept to a minimum. All tools, manhole lids and other equipment is to be kept within the barricaded area. Suction hose to be removed whilst assessing/egressing the manhole.
WHAT CAN GO WRONG	***HOW WILL IT BE MANAGED***
Methods of Work: Failure of safety equipment while in use. Noise may impact on the employees and the residents/public.	The responsible person will ensure: Daily inspection of all equipment will take place prior to work commencing. This will ensure equipment is maintained in good condition. Noise levels throughout this contract will comply with the EPA's Noise Control Manual. Personnel will have earplugs available for their use as and when required.
Suitable Workers: Unqualified workers without training working within a Confined Space.	All persons working on a cleaning project will have undertaken and are currently certified to work under AS2865. All staff is trained in the use of the equipment and materials to be used for this project. Other training will include and is not limited to a Safety Induction, First Aid/CPR Training.

	The responsible person will ensure: Only AS2865 certified person could enter a Confined Space to carry out work. All staff members working on-site are carrying their Confined Space tickets.
Rescue Precautions:	The responsible person will ensure: Each field crew will have undertaken a Safety Induction. Each crew will be equipped with a First Aid Kit and a mobile telephone.
Traffic & Public Access: Manholes are located on roads, footpaths and private property. The work may cause disruption to motorists and residents living in the area.	The responsible person will ensure: Traffic control measures including signs, barricades and witches hats are used on roadways. Barricades and pedestrian diversion shall be utilised on footpaths and on private property.

WHAT CAN GO WRONG	***HOW WILL IT BE MANAGED***
Illumination: Poor lighting may result in slips and falls.	The responsible person will ensure: Dolphin torches are used in the confined space in conjunction with miners lights fixed to the entry workers helmet. The stand-by person will have a 12v light that he/she can shine from above to help light up the area.
Ventilation: Fumes, smells and unacceptable gas levels.	The responsible person will ensure: Gas testing is undertaken for the duration of the work. If gas levels are above AS2865 allowable levels postpone work until reasonable levels can be achieved. Force ventilation equipment is available, on site, and can be used if required. Stand-by person will remain at the entry/exit point to allow emergency exit if required. Personnel entering the confined

	space will wear all the appropriate safety gear, including hard hat, steel capped boots, overalls, eye protection, gloves and be connected to an approved lifeline/tripod set-up at all times whilst in the confined space. Should air quality deteriorate work will cease, evacuation will proceed.
Contents / Hazard: Sharp objects, syringes and hazardous materials.	The responsible person will ensure: Site inspection, prior to commencing confined space work, is to take place. Retrieved hazardous materials and sharp objects or syringes are to be disposed of correctly.
Fire / Explosion Risk: Fuels and Oils	The responsible person will ensure: Confined space is evacuated immediately if the Lower Explosive Limit (LEL) exceeds 5% on Gas Detector.

WHAT CAN GO WRONG	***HOW WILL IT BE MANAGED***
Temperature: No hot work is expected.	N/A
Electrical Isolation: Possibility of electrocution.	The responsible person will ensure: Isolation of electrical equipment. All electrical equipment to be used is inspected prior to undertaking any work. All electrical equipment used in confined spaces shall be low-voltage.
Manual Handling of Manhole:	The responsible person will ensure: Mechanical lifting equipment shall be used. All manhole covers are put back on pits and manholes before leaving site.

7 CLAMSHELL (GRAB) CLEANING

The following is a procedure for emptying the CDS unit using a tipper-truck-mounted clamshell or grab bucket (this procedure is shown in Figure 6.1). This method is available for 2m & up diameter CDS units due to the physical size of the bucket. Currently only two of the units exists in Australia, based in Sydney and Melbourne, which can service all states. Contact your CDS representative to arrange for a quotation. See Hazard Analysis at Section 6.7.

7.1	Remove lids	See section 4.1
7.2	Remove debris by clamshell	Ensure clamshell does not contact screen as damage can occur. Clamshell should be perforated and should be lifted clear of water surface and allowed to drain. Using the clamshell, load the waste into the tipping body of the truck. The truck should be positioned so that water draining from the body drains back into the CDS. Drain waste thoroughly before proceeding to tip.
7.3	Scoop floating waste	Using a pool scoop, remove the floating litter from the surface of the water in the separation chamber. Replace lid.

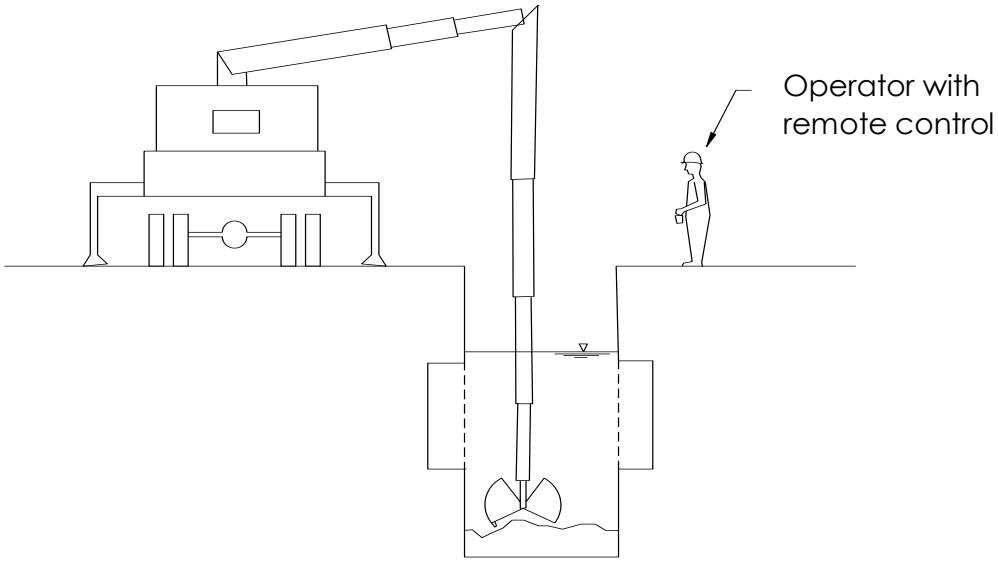


Figure 6.1 Clamshell bucket operation

7.4 Disposal of Pollutants

Record the quantity of pollutants removed from the CDS with a visual assessment of the breakdown by type:

_____ % silt and sediment
_____ % litter
_____ % vegetation

A note should be made of any unusual or large items, eg. oil, paint, car tyres etc.

Dispose of pollutant material at an approved tipping site, ie. a tip which is licensed by the Waste Authority in the relevant state.

Any free water removed can be discharged back into the CDS unit to minimise transportation and disposal costs.

The material should be weighed if possible. Weight should be measured when the free water no longer drains out at the material. If this is not possible, an estimation of weight should be made.

7.5 Tidy Site

Tidy the site of any debris prior to leaving.

7.6 Complete and Forward Cleaning Report

Complete Cleaning Report (Appendix B) and forward to CDS owner. If there is any damage or non-functionality, complete Damage or Non-Functionality Report (Appendix C) and forward to the CDS Contact Person listed on the CDS Data Sheet.

Annually the CDS unit should be fully inspected inside and outside the screen to ensure no damage, algal growth or deposition of material has occurred. Any problems should be reported to the CDS owner and to CDS Technologies contact person.

8 6.7 HAZARD ANALYSIS 1

Activity : Grab Cleaning of CDS Unit

Task	Possible Hazard	Hazard Control
Site Establishment	Traffic Hazards	Implement Traffic Control Plan Obtain Road Closure Approval if necessary
	Risk to Pedestrian	Care to be taken when driving cranes, trucks etc. through public areas. Use assistant to guide reversing vehicle and ward off pedestrians In high pedestrian traffic areas, erect barricades around open CDS unit
Remove CDS Lid	Manual Handling	Correct Manual Lifting Techniques PPE : Steel cap boots, hard hat, gloves Lifting tackle in good condition. Crane in good condition, qualified operators. Crane near overhead electrical cables 3m clearance required to overhead electrical cables
	Person fall into CDS unit	Special care must be taken whilst working around the open CDS unit. Place barricade round open CDS unit. Place wire ladder into CDS unit fixed to truck.
Empty Bucket into truck	Biological contamination Bucket swings hitting employee	Wear gloves and wash hands afterwards with anti-bacterial soap. PPE, hard hat
Replace Basket	See Remove Basket	
Replace CDS lid	See Remove CDS Lid	

9 Safety Regulations

9.1 The safety regulations applying in the State or Territory are to be strictly adhered to.

9.2 The party performing the cleaning is to be fully aware of all applicable safety regulations and ensure that all staff are adequately trained in safe working practices.

9.3 These safety regulations include but are not limited to:

9.3.1 Occupational Health and Safety Legislation
9.3.2 Confined Spaces Legislation
9.3.3 Motor Traffic Legislation
9.3.4 Scaffolding and Lifts Regulations
9.3.5 Health Regulations dealing with handling of hazardous substances
9.3.6 Hazardous Substances Legislation
9.3.7 Manual Handling Regulations
9.3.8 Plant Operating Instructions
9.3.9 Traffic and Pedestrian Safety Standards.

9.4 Adequate insurances should be carried to cover Public Liability and Worker Injury.

10 Environmental Responsibility

10.1 CDS Technologies is committed to improving the environment with its products. It is essential therefore that the process of cleaning the CDS is performed in a manner, which is environmentally responsible. Simply, there must not be any waste left on the site or anything other than the treated water discharged into the environment. The waste must be disposed of in a best practice manner with regard to environmental legislation.

10.2 The party performing the cleaning must be aware of all environmental legislation applicable to these operations and ensure that all employees are trained in work practices complying with the legislation.

10.3 This legislation includes but is not limited to:

10.3.1 Local Government Regulations
10.3.2 Clean Waters Act
10.3.3 Waste Disposal Regulations
10.3.4 Litter Regulations

11 Documentation

11.1 There are only 3 documents generated by the inspection and cleaning of the CDS.

11.2 Inspection Report

Appendix A to be completed for each inspection and copy forwarded to CDS owner.

11.3 Cleaning Report

Appendix B is to be completed for each clean and forwarded to CDS owner.

11.4 Damage or Non-Functionality Report

Appendix C is to be completed upon observance of any damage or extraordinary occurrence affecting the normal operation of the CDS. Examples of these are:

11.4.1 damaged screen
11.4.2 damaged exclusion bars
11.4.3 damaged lids
11.4.4 screen blockage
11.4.5 repeated inlet blockage, and such like.

This report to be faxed to CDS Technologies on 03-5977-0302. CDS Technologies will discuss with the CDS owner any remedial action required.

11.5 CDS Data Sheet

Appendix D - This contains relevant information about each CDS and includes contact phone numbers for CDS Contact Personnel including after hours numbers.

11.6 Any damage or non-functionality of the CDS unit should be reported on a Damage or Non-functionality Report (Appendix C) to CDS Pty Ltd.

Inspection Form

Appendix A

Date: _____

Cleaning Contractor Company: _____

Phone No: _____ Fax No: _____

Inspection Person: _____

Unit Identification: _____

Percent cover of floatables on surface: _____

State of the screen (if visible): _____

Depth from base to lid: _____

Depth of accumulated solids: _____

Percent full: _____

Comments: _____

_____

_____

_____

Signed: _____

The report is to be faxed to the CDS owner.

CDS Clean Out Report

Appendix B

Date:_____

Cleaning Contractor Company:

Phone No:_____

Fax No:

Contact Person:

Unit Identification:

Address:_____

Method of Cleaning:

Time Taken:

Volume or mass of removed material:

Breakdown of material: ____%silt and sand

____%litter

____%vegetation

Safety Procedures implemented in accordance with Hazard Analysis : Yes ☐ No ☐

*Comments:*_____

_____

_____

*Signed:*_____

This report is to be faxed to the CDS owner.

Any damage or non-functionality of the CDS unit should be reported on a Damage or Non-functionality Report Appendix C to CDS Pty Ltd.

Appendix C

Damage or Non-functionality Report

Date:_____

Unit Identification:

Address:_____

Company doing inspection/cleaning:

Contact Person:

Phone:_____Fax:

Nature of damage or problem:

Signed:_____

This report is to be faxed to CDS Pty Ltd on 02 9807-8619.

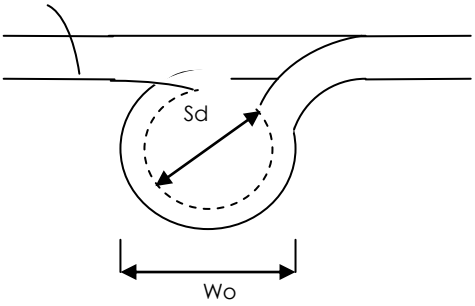
CDS Unit Data Sheet

Appendix D

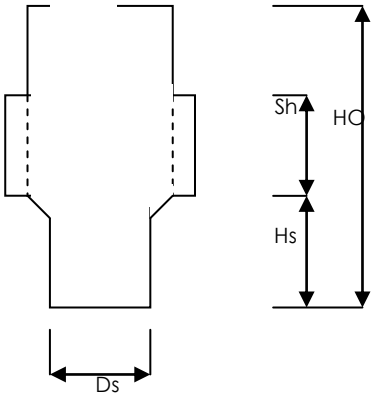
Name:		Unit Name:	
Address:		Unit No:	
		Unit Address:	
Contact Person:		Site:	
Phone:		Truck Instruction:	
Fax:		Keys:	
Mobile:		Lid Type:	
CDS Rep:		Lid Size:	
Phone:		Emptying Method(s):	
After Hours:		Date Operational:	

Technical Data

Screen diameter (Sd) = m
Screen height (Sh) = m
Over all height (H0) = m
Over all width (Wo) = m
Sump diameter (Ds) = m
Sump Height (Hs) = m
Sump total volume (Vt) = m^3
Unit weight of solid material (γ) t/m^3 =
Estimate weight of full basket =



Depth from Lid to Pollution	Volume m^3	Weight kg	Percent Full
Screen			> 100
Sump Top			100
			90
			80
			70
			60
			50
			40
			30
			20
			10
Base =	0.00	0.00	Base of sump



Appendix I Z Energy Stormwater Management Plan

Stormwater Operation and Maintenance Plan

Northport, Marsden Point

Northport Limited

SLR Project No.: 16342

7 February 2024

SLR

Stormwater Management Plan

The stormwater system has been designed to prevent release of hydrocarbons to the environment, but needs to be properly operated and maintained.

Operations

- All drains must be kept clear of sediment and debris.
- In the event of a spill refer to the Emergency Procedures.
- All sites have a Spill Response Kit. This must be stocked accordingly and be readily identifiable and accessible when the facility is operating.
- Contaminants are to be recovered to the extent practicable. Access the Spill Kit and place absorbent material on the spill. Do not use detergents or degreasers or other liquids. Spills contained within the temporary sock bund can be subsequently recovered.
- Used materials are to be stored in the designated bin and are to be disposed of at an approved disposal site
- Contact the Council's 24 hour Pollution Hotline ***0800-653-800*** for any spill over 20 litres.

Maintenance

- Drains are regularly inspected (minimum weekly) and any debris is removed
- The interceptor and drains are scheduled for cleaning annually. More frequent cleaning can be requested if observations indicate it to be necessary.
- If you observe silt build-up of 150mm depth or product thickness greater than 3 mm or product in the interceptor or excessive silt build up in the drains then this should be removed.

Spill Kit – Minimum Contents

Product	**Size**	**Minimum Quantity**
Wheelie bin	240l	1
Drain cover mat		1
Safety Road Cones	450mm high	2
M35 MATASORB Containment absorbent socks	6.1m	2
M30 MATASORB Containment absorbent socks	1.2m	5
M65 MATASORB Containment absorbent pillows		5
M75 MATASORB Containment absorbent pads		50
Heavy duty disposal bag		3
Caution tape roll		1
PVC gloves pair)		1
Wall poster		1
Instruction sheet		1
Class 3 flammable stickers		3
Contents list		1
Security tags		3
Optional Premium floor sweep	10kg	1

Appendix J Inspection and Maintenance Checklists

Stormwater Operation and Maintenance Plan

Northport, Marsden Point

Northport Limited

SLR Project No.: 16342

7 February 2024

Stormwater Inspection and Maintenance Checklist/Log – Daily and Weekly

Area/Asset	Inspection or Maintenance Task	Frequency	Week beginning:							
				Mon	Tues	Wed	Thurs	Fri	Sat	Sun
Western Canal Gate	Inspection	Daily (weekdays), prior to rain event, post rain events.	Inspected Yes / No							
			Action / Comment							
Western Perimeter Canal Grate	Inspection	Daily (weekdays), post rain events.	Inspected Yes / No							
			Action / Comment							
Eastern Canal Grate	Inspection	Daily (weekdays), twice daily during rain events.	Inspected Yes / No							
			Action / Comment							
Western Berth 1 sump	Inspection	Weekly, prior and post rain events, after cleaning out slot drain	Inspected Yes / No							
			Action / Comment							
Container Storage Area Sump	Inspection	Weekly, prior and post rain events, after cleaning out slot drain	Inspected Yes / No							
			Action / Comment							
Pond - Inlet weir and forebay	Inspection	Weekly, post rain events.	Inspected Yes / No							
			Action / Comment							
Inner SWD Canal	Inspection	Weekly and post rain events.	Inspected Yes / No							
			Action / Comment							
Slot drains	Inspection	Weekly, prior to and post rain events.	Inspected Yes / No							
			Action / Comment							
Washdown Bay – Initial coarse screen	Inspection	Weekly, prior to rain event and after usage	Inspected Yes / No							
			Action / Comment							
Washdown Bay – Submergible Pit Outlet	Inspection	Weekly, prior to rain event and after usage	Inspected Yes / No							
			Action / Comment							

Area/Asset	Inspection or Maintenance Task	Frequency	Week beginning:							
				Mon	Tues	Wed	Thurs	Fri	Sat	Sun
Washdown Bay - Oil and water separator	Inspection	Weekly, prior to rain event and after usage	Inspected Yes / No							
			Action / Comment							
Washdown Bay – Downstream Defender	Inspection	Weekly, prior to rain event and after usage	Inspected Yes / No							
			Action / Comment							
ISO Scaling Shed CDS	Inspection	Weekly and post rain events.	Inspected Yes / No							
			Action / Comment							
Sprinkler System	Inspection	Weekly	Inspected Yes / No							
			Action / Comment							
Operational port area	Sweeping	Weekly	Inspected Yes / No							
			Action / Comment							

Stormwater Inspection and Maintenance Checklist/Log – Monthly and Annual

Area/Asset	Inspection or Maintenance Task	Person Responsible	Frequency	Year:											
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Perimeter Canal	Clean of canal hotspots	Contractor	Monthly												
	Clean base of canal and reinstated with fresh sand	Contractor	Annually (Feb/Mar)												
Pond - Forebay	Clean out sediment	Contractor	As required												
Pond – Inlet grate	Accumulation of debris (bark, rubbish, etc) removed if impeding water flow	Northport Maintenance Supervisor	As required												
Pond – Settlement pond (1st stage)	Clear of vegetation	Northport Maintenance Supervisor	As required												
	Clean out	Contractor	2 yearly												
Pond – Storage pond (2nd stage)	At least 50% clear of vegetation	Northport Maintenance Supervisor	As required												
	Clean out	Contractor	2 yearly												
Ponds - Discharge pumps	Inspection	ELEC	Monthly												
Inner SWD Canal	At least 80% clear of vegetation/weeds and accumulated sediments removed with skid loader it impeding water flow	Contractor	As required												
Catchpits	Sediment/debris removal	Northport Maintenance Supervisor	Monthly												
Slot drains	Flush and sediment/debris removal	Northport Maintenance Supervisor	Monthly												
Outfall	Inspection	Northport Maintenance Supervisor	Monthly												
	Maintenance	Contractor	As required												
Underwater diffuser and pipes	Inspection	New Zealand Diving and Salvage	2 yearly												
Washdown Bay – Initial coarse screen	Sediment and sludge removed. Washed and pumped out.	Contractor	Monthly												

Area/Asset	Inspection or Maintenance Task	Person Responsible	Frequency	Year:											
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Washdown Bay – Submergible Pit Outlet	Sediment and sludge removed. Washed and pumped out.	Contractor	Monthly												
Washdown Bay - Oil and water separator	Sediment and sludge removed. Washed and pumped out.	Contractor	6 monthly												
Washdown Bay – Downstream Defender	Sediment and sludge removed. Washed and pumped out.	Contractor	6 monthly												
Refuelling area	Interceptor maintenance/cleaning	Z Energy	Annually												
ISO Scaling Shed CDS	Basket strainer emptied, power washed and reinstated.	Northport Maintenance Supervisor	Monthly												
Sprinkler System	Sprinkler heads cleaned out and end cap taken off to flush main line	Northport Maintenance Supervisor	2 monthly												
Comments															

Appendix K Sediment diposal areas plan

Stormwater Operation and Maintenance Plan

Northport, Marsden Point

Northport Limited

SLR Project No.: 16342

7 February 2024

	Capacity (m^3)	Filled (m^3)	Years used
Area 1	350	350	2018-2020
Area 2	125	125	2017
Area 3	1250	1250	2015-2016
Area 4	1525	508	2020-current
Total	3250	2233	
NOTE: 1,017m^3 Remaining			

ISSUE	DATE	DETAILS	APPRVD	BY

Northport
P.O BOX 44
RUAKAKA, NEW ZEALAND
TEL 09 432 5010
vision4growth.co.nz

Title:
STORM WATER POND SEDIMENT DISPOSAL PLAN

Path	Dwg No	Issue:
k:\engineer\gregb\stormwater\sw pond profiles.dwg	D60-X	R0

Drawn:	Checked:	Scale:	Date:	Sheet:
T RYAN	B Sweeny	1:750 (A1) 1:1500 (A3)	DEC 2022	01

Appendix L Sampling Standard Operating Procedures

Stormwater Operation and Maintenance Plan

Northport, Marsden Point

Northport Limited

SLR Project No.: 16342

7 February 2024

Standard Operating Procedure SLR

SOP Number: 1

SOP Title: **Sample Handling, Shipment, Recordkeeping and Chain of Custody**

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By	Comments
V1	02/02/2024	Christine Oakey	Trent Sunich	Mark Poynter	Final

1.0 Purpose and Scope

1.1 The purpose of this Standard Operating Procedure (SOP) is to establish standard protocols for all field personnel for use in maintaining field and sampling activity records, writing sample logs, labelling samples, ensuring that proper sample custody procedures are utilized, and completing chain-of-custody (COC)/analytical request forms.

1.2 As guidance for specific activities, this procedure does not obviate the need for professional judgment. Deviations from this procedure while planning or executing planned activities must be approved in accordance with Program / Project requirements for technical planning and review.

2.0 Safety

2.1 Refer to Health and Safety Plan.

3.0 Interferences

3.1 The use of clean sampling tools at each location as necessary. Potential interferences could result from cross-contamination between samples or sample locations. Minimisation of cross-contamination will occur through following the SOP 2 Equipment Decontamination.

4.0 Training and Responsibilities

4.1 The individuals executing these procedures must have read and be familiar with and be trained in the requirements of this SOP.

4.2 The Port Civil Engineer is responsible for ensuring that all field personnel follow these procedures. The Port Civil Engineer is responsible for verifying that the COC/analytical request forms have been completed properly and match the sampling and analysis plan.

4.3 All field personnel are responsible for following these procedures while conducting sampling activities. Field personnel are responsible for recording pertinent data

into the field sheet to satisfy project requirements and for attesting to the accuracy of the entries by dated signature.

5.0 Sample Handling

5.1 Immediately prior to or following collection, label all samples as described in Section 8. The lids of the containers shall not be sealed with any tapes or adhesives, but if container integrity is of concern a new container shall be used, or alternatively the container may be placed directly into self-sealing bags.

5.2 Immediately following sample collection, place the sample containers in an insulated chilly bin with frozen gel packs (e.g., “blue ice”) or ice in sealed self-sealing bags. Samples should occupy the lower portion of the chilly bin, while the ice should occupy the upper portion. Place an absorbent material (e.g. proper absorbent cloth material such as a Chucks wipe or paper towels) on the bottom of the chilly bin to contain liquids in case of spillage. Leave as much air as possible in the self-sealing bags to provide cushioning. Pack as required to avoid breakage of sample containers.

5.3 Prior to shipping, wrap glass sample containers on the sides, tops, and bottoms with bubble wrap or other appropriate padding and/or surround them in cushioning material to prevent breakage during transport. Pack all glass containers for water samples in an upright position.

5.4 Prior to shipment, replace the ice or cold packs in the chilly bins so that samples will be maintained as close to 4 degrees Celsius (°C) as possible from the time of collection through transport to the analytical laboratory. Ship samples within 24 hours or on a schedule allowing the laboratory to meet holding times for analyses. The procedures for maintaining sample temperatures at 4°C pertain to all field samples.

5.5 Spread samples over multiple chilly bins if necessary, to ensure chilly bins do not become too heavy / unmanageable. Consider not only manual handling of Site staff, but also courier drivers and laboratory reception staff.

5.6 If samples cannot be shipped the same day as they are collected, the chilly bin should not be sealed. The ice should be replenished/replaced before shipping. In no event may samples be stored in a refrigerator that is used for food; however, samples may be temporarily stored in a refrigerator that is clearly labelled “NOT FOR FOOD”, or similar.

6.0 Shipping

6.1 When a chilly bin is ready for shipment to the laboratory, place the COC form inside a self-sealing bag and tape it to the inside of the insulated chilly bin. Then, seal the chilly bin with waterproof tape and label it with “Fragile,” “This-End-Up” (or directional arrows pointing up), or other appropriate notices. The address label shall also be taped to the top of the chilly bin. Tape any drain plugs shut as well.

7.0 Recordkeeping

7.1 This section provides standards for documenting field activities, labelling the samples, documenting sample custody, and completing COC/analytical request forms. The standards presented in this section shall be followed to ensure that

samples collected are maintained for their intended purpose and that the conditions encountered during field activities are documented. The laboratory-provided COC form or computer-generated COC shall be used.

7.2 The field forms and notes serve as the primary record of field activities. Make entries chronologically and in sufficient detail to allow the writer or a knowledgeable reviewer to reconstruct each day's events. Key information to be recorded includes:

- Arrival and departure times from site of field staff, contractors, site owners and any other personnel;
- Sample collection times;
- Sample descriptions; and
- Observations.

7.3 Field forms such as groundwater sampling; soil sample record forms etc. will also be used (as necessary).

8.0 Sample labelling

8.1 Affix a sample label with adhesive backing to each individual sample container. Record the following information with a waterproof marker on each label, and also on the lid of the sample container (labels can fall off containers during transport):

- COC sample number;
- Date and time of collection;
- Sampler's initials; and
- Analysis to be performed on sample (if possible; there may not be adequate room on the label).

9.0 Sample Collection Custody Procedures

Custody Definition

9.1 For samples intended for analysis, sample custody procedures shall be followed through collection, transfer, analysis, and disposal to ensure that the integrity of the samples is maintained. A description of sample custody procedures is provided below.

9.2 A sample is considered to be in custody if one of the following conditions is met:

- It is in one’s actual physical possession or view;
- It is in one’s physical possession and has not been tampered with (i.e., it is under lock or official seal);
- It is retained in a secured area with restricted access; or
- It is placed in a container and secured with an official seal such that the sample cannot be reached without breaking the seal.

9.3 Field sampler(s) shall also log individual samples onto COC forms (laboratory-supplied or computer-generated) when a sample is collected. These forms may also serve as the request for analyses.

9.4 The field sampler(s) will also sign the COC form signifying that they were the personnel who collected the samples. The COC form shall accompany the samples from the field to the laboratory. When a chilly bin is ready for shipment to the analytical laboratory, the person delivering the samples for transport will sign and indicate the date and time on the accompanying COC form.

9.5 The COC form shall be placed inside a self-sealing bag and taped to the inside lid of the chilly bin. Each chilly bin must be associated with a unique COC form. Whenever a transfer of custody takes place, both parties shall sign and date the accompanying COC forms. One exception is when the samples are shipped; the delivery service personnel will not sign or receive a copy because they do not open the chilly bins. The laboratory shall attach copies of the completed COC forms to the reports containing the results of the analytical tests. Example COC forms are provided in Attachment 1 and the notes on the following page apply to completing COC forms.

9.6 Following are notes related to completing the COC form:

Comments: This area shall be used by the field team to communicate observations, potential hazards, or limitations that may have occurred in the field or additional information regarding analysis (e.g., a specific metals list, samples expected to contain high analyte concentrations). If a sample appears heavily contaminated, field staff must enter this information to alert the laboratory.
Type of Containers: Write the type of container used (e.g., 1-liter glass amber, for a given parameter in that column). **Preservatives:** Field personnel should indicate on the COC the correct preservative used for the analysis requested. Indicate the pH of the sample (if tested) in case there are buffering conditions found in the sample matrix.
Sample Identification (ID) Number: This is typically a five-character or less alphanumeric identifier used by the contractor to identify samples. The use of this identifier is important since the laboratories are restricted to the number of characters they are able to use. Sample numbering shall be in accordance with the project-specific sampling and analysis plan.
Description (Sample ID): This name will be determined by the location and description of the sample, as described in the project-specific sampling and analysis plan. This sample identification should either not be submitted to the laboratory but should be left blank, or alternatively be in a form so that the laboratory cannot identify the location the samples have been collected from. If a computer COC version is used, the sample identification can be input, but printed with this block black. A cross-referenced list of the COC Sample Number and sample identification must be maintained separately.
Date Collected: Record the collection date in order to track the holding time of the sample. Note: for trip blanks, record the date it was placed in company with samples.
Time Collected: When collecting samples, record the time the sample is first collected. Use of the 24-hour military clock will avoid a.m. or p.m. designations (e.g., 1815 instead of 6:15 p.m.). Record local time; the laboratory is responsible for calculating holding times to local time.
Lab Quote Number: Number from the original lab quote.

Matrix/QC: Identify the matrix (e.g., water, soil, air, tissue, fresh water sediment, marine sediment, or product). If a sample is expected to contain high analyte concentrations (e.g., a tank bottom sludge or distinct product layer), notify the laboratory in the comment section. Mark an "X" for the sample(s) that have extra volume for laboratory QC matrix spike/matrix spike duplicate (MS/MSD) purposes. The sample provided for MS/MSD purposes is usually a field duplicate.
Analytical Parameters: Enter the parameter by analysis desired (e.g., BTEX, PAHs, etc.). Whenever practicable, list the parameters as they appear in the laboratory subcontract to maintain consistency and avoid confusion.
If the COC does not have a specific box for number of sample containers, use the boxes below the analytical parameter, to indicate the number of containers collected for each parameter.
Sampler's Signature: The person who collected samples must sign here.
Relinquished By: The person who turned over the custody of the samples to a second party other than an express mail carrier, such as FedEx or DHL, must sign and date here.
Received By: Typically, a representative of the receiving laboratory signs and dates here. Or, a field crew member who delivered the samples in person from the field to the laboratory might sign here.
Received By (Laboratory): This space is for the final destination (e.g., at a subcontracted laboratory). A representative of the final destination (e.g., subcontracted laboratory) must sign and date here.
Lab No. and Questions: This box is to be filled in by the laboratory only.
Total # of Containers: Sum the number of containers in that row.
Totals: Sum the number of containers in each column. Because COC forms contain different formats depending on who produced the form, not all of the information listed above may be recorded; however, as much of this information as possible shall be included.

10.0 Quality Control and Assurance

10.1 Recordkeeping, sample labelling, and COC activities must incorporate quality control measures to ensure accuracy and completeness.

10.2 Deviations from this procedure shall be documented in field records. Significant changes shall be approved by the Port Civil Engineer.

11.0 Data and Records Management

11.1 The COC/analytical request form shall be emailed from the laboratory to the field personnel for verification of accuracy. Field records are scanned and placed in the project file on the server. Any changes to the analytical requests that are required shall be made in writing to the laboratory. The reason for the change shall be included in the project files so that recurring problems can be easily identified.

11.2 Deviations from this procedure or the project-specific sampling and analysis plan shall be documented in the records. Significant changes shall be approved by the Port Civil Engineer.

12.0 References

SOP 2 Equipment Decontamination

Standard Operating Procedure SLR

SOP Number: 2

SOP Title: **Equipment Decontamination**

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By	Comments
V1	02/02/2024	Christine Oakey	Trent Sunich	Mark Poynter	Final

1.0 Purpose and Scope

1.1 The purpose of this Standard Operating Procedure (SOP) is to describe methods of equipment decontamination, to be used for activities where samples for chemical analysis are collected or where equipment will need to be cleaned before leaving the site, or before use in subsequent activities.

1.2 As guidance for specific activities, this procedure does not obviate the need for professional judgment. Deviations from this procedure while planning or executing planned activities must be approved in accordance with Program / Project requirements for technical planning and review.

2.0 Safety

2.1 All Field Personnel responsible for equipment decontamination must adhere to the Health and Safety Plan including wearing the appropriate AS/NZS approved personal protective equipment (PPE), when handling potentially contaminated equipment and decontamination solutions. Generally, this includes, at a minimum, steel-toed boots, long sleeved hi-vis shirt and long pants, safety glasses, and nitrile and/or rubber gloves. The purpose of the PPE is to prevent skin contact with decontamination fluids and contaminants.

Chemical Hazards Associated with Equipment Decontamination

2.2 A range of decontamination solutions may be used for cleaning equipment. These solutions may present a range of hazards to people and the environment. The key risks should be identified in advance of the work being undertaken, and

appropriate safety information should be available for solutions at all times. Specifically:

- Avoid skin contact with and/or incidental ingestion of decontamination solutions and water.
- Utilize PPE as specified in the Health and Safety Plan to maximise splash protection.
- Refer to safety data sheets (SDS), safety personnel, and/or consult sampling personnel regarding appropriate safety measures (i.e., handling, PPE including skin and respiratory).
- SDS sheets are to be carried with solution (even when decanted into smaller labelled bottles).
- Take the necessary precautions when handling detergents and reagents.

Physical Hazards Associated with Equipment Decontamination

2.3 To avoid possible back strain where a dedicated decontamination station is in use, it is recommended to raise the decontamination area approximately 0.5m to 1m above ground level if possible. Surfaces may become slippery when wet; use caution and clean up spills immediately.

2.4 To avoid heat stress, over exertion, and exhaustion, it is recommended to rotate equipment decontamination among all site personnel.

2.5 Take necessary precautions when handling field sampling equipment.

3.0 Training and Responsibilities

3.1 The individuals executing these procedures must have read and be familiar with and be trained in the requirements of this SOP.

3.2 The Port Civil Engineer is responsible for ensuring that all field personnel follow these procedures. The Port Civil Engineer is responsible for verifying that the COC/analytical request forms have been completed properly and match the sampling and analysis plan.

3.3 All field personnel are responsible for following these procedures while conducting sampling activities. Field personnel are responsible for recording pertinent data into the field sheet to satisfy project requirements and for attesting to the accuracy of the entries by dated signature.

4.0 Equipment and Supplies

4.1 A list of equipment required for equipment decontamination is presented in Attachment 1.

5.0 Procedure

Method Summary

5.1 Decontamination of equipment used in soil/sediment sampling, groundwater monitoring, well drilling and well development, as well as equipment used to

sample groundwater, surface water, sediment, waste, and asbestos is necessary to prevent cross-contamination and to maintain the highest integrity possible in collected samples. Planning a decontamination program requires consideration of the following factors:

- Location where the decontamination procedures will be conducted;
- Types of equipment requiring decontamination;
- Frequency of equipment decontamination;
- Cleaning technique and types of cleaning solutions appropriate to the contaminants of concern;
- Method for containing the residual contaminants and wash water from the decontamination process; and
- Use of a quality control measure to determine the effectiveness of the decontamination procedure.

5.2 The following subsections describe standards for decontamination, including the frequency of decontamination, cleaning solutions and techniques, containment of residual contaminants and cleaning solutions, and effectiveness.

Decontamination Area

5.3 Select an appropriate location for the decontamination area at a site based on the ability to control access to the area, the ability to control residual material removed from equipment, the need to store clean equipment, and the ability to restrict access to the area being investigated. Locate the decontamination area an adequate distance away and upwind from potential contaminant sources to avoid contamination of clean equipment.

Types of Equipment

5.4 Sampling equipment that require decontamination include, but are not limited to, submersible pumps, bailers, interface probes, water level meters, peristaltic pumps, water quality meters, sampling containers used to collected water samples, sampling poles.

5.5 Equipment with a porous surface, such as rope, cloth hoses, and wooden blocks, cannot be thoroughly decontaminated and shall be properly disposed of after one use, in a dedicated waste bag. Waste that can be recycled should be separated from non-recyclable waste.

Frequency of Equipment Decontamination

5.6 Decontaminate groundwater, surface water, and soil sampling devices prior to initial use and between collection of each sample to prevent the possible introduction of contaminants into successive samples. Initiate sampling from

where the least contamination is suspected, moving progressively to the more contaminated areas.

Cleaning Solutions and Techniques

5.7 A rinse decontamination procedure is acceptable for equipment such as, water level meters, water quality parameter metres, submersible pumps, and hand tools.

5.8 The decontamination procedure shall consist of the following:

- Remove large debris and waste with a steel wire brush prior to decontamination, rinse with clean potable water;
- Wash with a non-phosphate detergent (Decon 90 or other suitable detergent) and potable water solution;
- Rinse with potable water;
- Rinse with deionized or distilled water; and
- Spray with deionized or distilled water.

5.9 If possible, disassemble equipment prior to cleaning. Add a second wash at the beginning of the process if equipment is very soiled. Rinsing with nitric acid or laboratory-grade isopropyl alcohol may also be required, depending on site-specific conditions and contaminants.

5.10 Decontaminating submersible pumps requires additional effort because internal surfaces become contaminated during usage. Decontaminate these pumps by washing and rinsing the outside surfaces using the procedure described above in 5.8. Decontaminate the internal surfaces by recirculating decontamination fluids through the pump while it is operating. This recirculation may be done using a relatively long (typically 1 m) large-diameter pipe (100 mm or greater) equipped with a bottom cap. Fill the pipe with the decontamination fluids, place the pump within the capped pipe, and operate the pump while recirculating the fluids back into the pipe. The decontamination sequence shall include: (1) detergent and potable water; (2) potable water rinse; (3) potable water rinse; and (4) deionized water rinse. Change the decontamination fluids after each decontamination cycle.

5.11 Some decontamination solvents have health effects that must be considered. Decontamination water shall consist of distilled or deionized water. Steam-distilled water shall not be used in the decontamination process as this type of water usually contains elevated concentrations of metals. Decontamination solvents to be used during field activities will be specified in the scope of works.

5.12 Rinse equipment used for measuring field parameters, such as pH (indicates the hydrogen ion concentration – acidity or basicity), temperature, specific conductivity, and turbidity with deionized or distilled water after each measurement.

Containment of Residual Contaminants and Cleaning Solutions

5.13 A decontamination program for equipment exposed to potentially hazardous materials requires a provision for catchment and disposal of the contaminated material, cleaning solution, and wash water.

5.14 Use wash buckets or tubs to catch fluids from the decontamination of lighter-weight drilling equipment and hand-held sampling devices. Collect the

decontamination fluids and store them on site in secured containers until their disposition is determined by laboratory analytical results, if required. Label containers in and arrange for appropriate disposal.

6.0 Quality Control and Assurance

6.1 A decontamination program must incorporate quality control measures to determine the effectiveness of cleaning methods. Quality control measures typically include collection of equipment blank samples or wipe testing. Equipment blanks consist of analyte-free water that has been poured over or through the sample collection equipment after its final decontamination rinse.

6.2 Wipe testing is performed by wiping a cloth over the surface of the equipment after cleaning. These quality control measures provide "after-the fact" information that may be useful in determining whether or not cleaning methods were effective in removing the contaminants of concern.

7.0 References

SOP 1 Sample Handling, Shipment, Recordkeeping and Chain of Custody

Attachment 1 – Decontamination Equipment

Decontamination Equipment

- Decon 90 or similar phosphate-free detergent
- Clean tap water
- Distilled or deionised water
- Buckets
- Spray bottles
- Plastic sheeting or large rubbish bags
- Brushes (a toilet brush works well)
- Paper towels
- Aluminium foil or plastic (for wrapping clean equipment)
- Drums, buckets, or other suitable containers for waste containerisation
- Personal protective equipment – nitrile and/or rubber gloves, safety glasses and/or face shield, disposable coveralls may also be required, depending on contaminant(s)

Standard Operating Procedure SLR

SOP Number: 3

SOP Title: **Stormwater Sampling**

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By	Comments
V1	14/02/2024	Christine Oakey	Trent Sunich	Mark Poynter	Final

1.0 Purpose and Scope

1.1 The purpose of this Standard Operating Procedure (SOP) is to provide guidance for collecting stormwater grab (also called dip) samples. The scope of this SOP covers the collection of stormwater grab samples. The stormwater samples may be collected from a variety of sources, including outfalls and manholes.

1.2 As guidance for specific activities, this procedure does not obviate the need for professional judgment. Deviations from this procedure while planning or executing planned activities must be approved in accordance with Program / Project requirements for technical planning and review.

2.0 Safety

2.1 Refer to Health and Safety Plan.

2.2 Physical hazards associated with stormwater sampling:

- Use proper tools to lift manhole covers as back strain may result;
- Use poles or similar to collect grab samples from depth within manholes;
- Hazardous gases, fumes and vapours from stormwater network;
- Stay away from manhole edges and do not enter manholes (this includes lowering of head into manhole); and
- Do not collect samples from outfalls where flooding is occurring or where footing is not secure.

3.0 Interferences

3.1 The use of clean sampling tools at each location as necessary. Potential interferences could result from cross-contamination between samples or sample

locations. Minimisation of cross-contamination will occur through by following SOP 2 Equipment Decontamination.

4.0 Training and Responsibilities

4.1 The individuals executing these procedures must have read and be familiar with and be trained in the requirements of this SOP.

4.2 The Port Civil Engineer is responsible for ensuring that all field personnel follow these procedures. The Port Civil Engineer is responsible for ensuring that all field-sampling personnel involved in surface water sampling shall have the appropriate education, experience, and training to perform their assigned tasks..

4.3 All field personnel are responsible for following these procedures while conducting sampling activities.

5.0 Equipment and Supplies

5.1 A list of equipment and supplies for stormwater sampling is presented in ***Attachment 1***.

6.0 Procedure

Method Summary

6.1 Though it is not always feasible to collect discernible stormwater flows (discharges may be too shallow to collect a sample with a sample bottle, for example), a grab sample can be taken from any of several possible locations where water is flowing, including a pipe, manhole, swale or ditch.

6.2 Collect sample in accordance with sampling requirements (i.e., first flush, composite, etc.).

6.3 Put on the clean gloves. This prevents the possibility of your fingers or hands accidentally contaminating the sample. When you remove the bottle's cap, be sure to place it on an uncontaminated surface (not on the ground) to prevent cross-contamination.

6.4 Hold the bottle so the opening is facing upstream.

6.5 Take care not to disturb the bottom of the stormwater flow, or walk in the discharge - both situations could contaminate your sample. Collect the sample from as close to the middle of the stormwater flow as possible; this provides the most representative sample of that discharge.

6.6 Fill a decontaminated 0.5 L bottle with collected water and insert water quality metre (WQM) probes, record reading of pH, temperature, conductivity, and dissolved oxygen as required per sample location.

6.7 Fill the lab's collection bottle as instructed by the lab. When preservatives are present in the bottle, fill a decontaminated container (see SOP 1.1 Equipment Decontamination) from the flowing water and use this to fill the laboratory-

provided bottle. Be sure to handle the preservative carefully; most are acids or bases and can cause skin or eye irritation if not handled correctly.

6.8 Once filled, cap the sample bottle, write the time the sample was collected and place it inside a re-sealable plastic bag. Place the bag into a chilly bin and prepare the chilly bin for pickup or shipment to the lab. Take notes about how the sampling event went, and record a photo to document the facility's conditions. Detailed instructions are provided in the SOP 1.0 Sample Handling, Shipment, Recordkeeping and Chain of Custody.

7.0 Quality Control and Assurance

7.1 Quality control (QC) requirements for sample collection are dependent on project-specific sampling objectives. The project-specific scope of works will provide requirements for sample preservation and holding times, container types, sample packaging and shipment, as well as requirements for the collection of various QC samples such as trip blanks, field blanks, equipment rinse blanks, and field duplicate samples. Typically, duplicates are collected at a minimum rate of 10%.

7.2 Manufacturer's instructions, if any, for calibrating or maintaining the accuracy of the instrument shall be followed.

8.0 References

SOP 1 Sample Handling, Shipment, Recordkeeping and Chain of Custody

SOP 2 Equipment Decontamination

Attachment 1 – Sampling Equipment

Sampling Equipment

- Water quality meter.
- Powder-free, disposable nitrile or latex gloves
- Decontaminated bottle(s) for collecting the sample
- Laboratory-supplied bottles
- Chilly bins for shipping the sample
- Ice
- Water Quality Metre (if required)
- Zipper locking bags
- Field Forms, pen & pencil, permanent marker
- One camera for a visual record of sampling conditions
- Grab pole, zip ties, or similar equipment to reach sampling points

Standard Operating Procedure SLR

SOP Number: 4

SOP Title: **Surface Water Sampling**

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By	Comments
V1	14/02/2024	Christine Oakey	Trent Sunich	Mark Poynter	Final

1.0 Purpose and Scope

1.1 The purpose of this Standard Operating Procedure (SOP) is to provide guidance for the collection of liquid samples from streams, rivers, lakes, ponds, lagoons, embayment's, and surface impoundments. It includes samples collected from depth, as well as samples collected at the surface.

1.2 As guidance for specific activities, this procedure does not obviate the need for professional judgment. Deviations from this procedure while planning or executing planned activities must be approved in accordance with Program / Project requirements for technical planning and review.

2.0 Safety

2.1 Refer to Health and Safety Plan.

2.2 When sampling waterways, the person performing the sampling should be wearing an appropriate life saving device (e.g. lifejacket, lifeline) and adequate AS/NZS approved personal protective equipment (PPE).

3.0 Training and Responsibilities

3.1 The individuals executing these procedures must have read and be familiar with and be trained in the requirements of this SOP.

3.2 The Port Civil Engineer is responsible for ensuring that all field personnel follow these procedures. The Port Civil Engineer is responsible for ensuring that all field-

sampling personnel involved in surface water sampling shall have the appropriate education, experience, and training to perform their assigned tasks.

3.3 All field personnel are responsible for following these procedures while conducting sampling activities.

4.0 Equipment and Supplies

4.1 A list of equipment and supplies for stormwater sampling is presented in Attachment 1.

5.0 Procedure

Method Summary

5.1 Sampling situations vary widely, and, therefore, no universal sampling procedure can be recommended. However, sampling of both aqueous liquids from the above-mentioned sources is generally accomplished through the use of one of the following samplers or techniques:

- Dip sampler (using tools such as a mighty gripper);
- Direct method;
- Peristaltic pumps; and
- Automated samplers (such as ISCO sampler).

5.2 These sampling techniques will allow for the collection of representative samples from the majority of surface waters and impoundments encountered.

Preparation

5.3 The following preparation should be undertaken:

- Determine the extent of the sampling effort, the sampling methods to be employed, and which equipment and supplies are needed;
- Obtain necessary sampling and monitoring equipment;
- Decontaminate or pre-clean equipment, and ensure that it is in working order;
- Prepare scheduling and coordinate with staff, clients, and regulatory agency, if appropriate;
- Perform a general site survey prior to site entry in accordance with the site-specific health and safety plan; and
- Use stakes, flags, or buoys to identify and mark all sampling locations. If required, the proposed locations may be adjusted based on site access, property boundaries, and surface obstructions.

Sampling Considerations

5.4 The physical location of the person undertaking the sampling when collecting a sample may dictate the equipment to be used. If surface water samples are required, direct dipping of the sample container into the stream is desirable. This is possible, however, only from a small boat, a pier, etc., or by wading in the stream. Wading, however, may cause the re-suspension of bottom deposits and

bias the sample. Wading is acceptable if the stream has a noticeable current (is not impounded), and the samples are collected while facing upstream. If the stream is too deep to wade or current is strong, or if the sample must be collected from more than one water depth, or the sample must be collected from a bridge, etc., supplemental sampling equipment must be used.

5.5 Note that wading carries special safety risks and the Health and Safety Plan must be followed and a risk analysis conducted prior to entering any surface water body.

Representative Samples

5.6 In order to collect a representative sample, the hydrology and morphometrics (e.g., measurements of volume, depth, etc.) of the stream should be determined prior to sampling. This will aid in determining the flow patterns in streams and appropriate sample locations and depths.

5.7 Generally, the deciding factors in the selection of a sampling device for surface water samplings are:

- Will the sample be collected from the shore or from a boat?
- What is the desired depth at which the sample is to be collected?
- What is the overall depth and flow direction of river or stream?
- What is the chemical nature of the analyte(s) of concern? Do they float on the water surface (collect by skimming the surface) or are they miscible (soluble) and are more likely to be present at depths (collect sub-surface)?

Sampler Composition

5.8 The appropriate sampling device must be of a proper composition. Samplers constructed of glass, stainless steel, PVC of PFTE (Teflon®) should be used based upon the analyses to be performed. For example, devices which are free of metal surfaces should be used for collecting samples for metal analyses.

Dip Sampler

5.9 A dip sampler is useful for situations where a sample is to be recovered from an outfall pipe or along a lagoon bank where direct access is limited. The long handle on such a device allows access from a discrete location. Sampling procedures are as follows:

- Assemble the device in accordance with the manufacturer instructions;
- Extend the device to the sample location and collect the sample; and
- Retrieve the sampler and transfer the sample to the appropriate sample container.

Direct Method

5.10 For streams, rivers, lakes, and other surface waters, the direct method may be utilized to collect water samples from the surface. This method is not to be used

for sampling lagoons or other impoundments where contact with contaminants are a concern.

5.11 Adequate AS/NZS approved personal protective equipment (PPE) will be used, and the sampling station should be accessed by appropriate means. For shallow stream stations, the sampler should face upstream and collect the sample without disturbing the sediment.

5.12 Surface and sub-surface water samples should always be collected prior to a sediment sample at the same location.

5.13 For surface samples, which are generally aimed at sampling contaminants that are floating on or near the surface, the collector partially submerses the sample container beneath the water allowing the top surface of the water body to slowly fill the container. If sampling with a pre-preserved sample bottle be careful not to overflow the sampling bottle and washout the preservative. Alternatively, a suitable bottle can be used for collection of the sample, and then transferred to the laboratory bottle.

5.14 For sub-surface samples, the collector submerses the closed sample container, opens the bottle to collect the sample and then caps the bottle while sub-surface. The collection bottle may be rinsed two times by the sample water. For lakes and other impoundments, collect the sample under the water surface avoiding surface debris and the boat wake. Do not use pre-preserved sample bottles for sub-surface samples as the collection method may washout the preservative necessary for proper sample preservation.

Peristaltic Pump Samplers

5.15 Another device that can be effectively used to sample a water column is the peristaltic pump/vacuum jug system. The use of a metal conduit to which the tubing is attached, allows for the collection of a vertical sample (down to about a 7.5 m depth) which is representative of the water column. Commercially available pumps vary in size and capability, with some being designed specifically for the simultaneous collection of multiple water samples.

Sample Preservation, Containers, Handling and Storage

5.16 Once samples have been collected, follow these procedures:

- Transfer the sample(s) into suitable labelled sample containers;
- Fill a decontaminated 0.5 L bottle with collected water and insert water quality metre (WQM) probes, record reading of pH, temperature, conductivity, and dissolved oxygen as required per sample location;
- Preserve the sample if appropriate, or use pre-preserved sample bottles;
- Cap the container, put it in a Ziploc plastic bag and place it on ice in a chilly bin;
- Record all pertinent data in the site logbook or on a field data sheet;
- Complete the chain of custody form; and
- Decontaminate all sampling equipment prior to the collection of additional samples.

Interferences and Potential Problems

5.17 There are two primary interferences or potential problems with surface water sampling. These include cross-contamination of samples and improper sample collection.

- Cross-contamination problems can be eliminated or minimized through the use of dedicated sampling equipment. Always collect samples from low-contaminant to high-contaminant concentration areas and decontaminate equipment (SOP 2 Equipment Decontamination) between samples; and
- Improper sample collection can involve using contaminated equipment, disturbance of the stream or impoundment substrate, and sampling in an obviously disturbed area.

5.18 Following proper decontamination procedures and minimizing disturbance of the sample site will eliminate these problems.

6.0 Quality Control and Assurance

6.1 Quality control (QC) requirements for sample collection are dependent on project-specific sampling objectives. The project-specific scope of works will provide requirements for sample preservation and holding times, container types, sample packaging and shipment, as well as requirements for the collection of various QC samples such as trip blanks, field blanks, equipment rinse blanks, and field duplicate samples. Typically, duplicates are collected at a minimum rate of 10%.

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7.0 References

SOP 1 Sample Handling, Shipment, Recordkeeping and Chain of Custody

SOP 2 Equipment Decontamination

Attachment 1 – Sampling Equipment

Sampling Equipment

- Dip sampler
- Water Quality Meter
- Line
- Peristaltic pumps (may be required)
- Tarpaulin
- Sample collection bottles
- Self-sealing plastic bags
- Ice
- Chilly bin(s)
- Chain of custody forms, field data sheets
- Decontamination equipment (e.g. Decon 90)
- Maps/plot plan
- Safety equipment
- Compass
- Tape measure
- Camera and batteries
- Logbook/forms and waterproof pen / pencil
- Sample bottle labels

Standard Operating Procedure SLR

SOP Number: 4

SOP Title: **Surface Water Sampling**

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By	Comments
V1	14/02/2024	Christine Oakey	Trent Sunich	Mark Poynter	Final

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5.2 These sampling techniques will allow for the collection of representative samples from the majority of surface waters and impoundments encountered.

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5.3 The following preparation should be undertaken:

- Determine the extent of the sampling effort, the sampling methods to be employed, and which equipment and supplies are needed;
- Obtain necessary sampling and monitoring equipment;
- Decontaminate or pre-clean equipment, and ensure that it is in working order;
- Prepare scheduling and coordinate with staff, clients, and regulatory agency, if appropriate;
- Perform a general site survey prior to site entry in accordance with the site-specific health and safety plan; and
- Use stakes, flags, or buoys to identify and mark all sampling locations. If required, the proposed locations may be adjusted based on site access, property boundaries, and surface obstructions.

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5.4 The physical location of the person undertaking the sampling when collecting a sample may dictate the equipment to be used. If surface water samples are required, direct dipping of the sample container into the stream is desirable. This is possible, however, only from a small boat, a pier, etc., or by wading in the stream. Wading, however, may cause the re-suspension of bottom deposits and

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5.8 The appropriate sampling device must be of a proper composition. Samplers constructed of glass, stainless steel, PVC of PFTE (Teflon®) should be used based upon the analyses to be performed. For example, devices which are free of metal surfaces should be used for collecting samples for metal analyses.

Dip Sampler

5.9 A dip sampler is useful for situations where a sample is to be recovered from an outfall pipe or along a lagoon bank where direct access is limited. The long handle on such a device allows access from a discrete location. Sampling procedures are as follows:

- Assemble the device in accordance with the manufacturer instructions;
- Extend the device to the sample location and collect the sample; and
- Retrieve the sampler and transfer the sample to the appropriate sample container.

Direct Method

5.10 For streams, rivers, lakes, and other surface waters, the direct method may be utilized to collect water samples from the surface. This method is not to be used

for sampling lagoons or other impoundments where contact with contaminants are a concern.

5.11 Adequate AS/NZS approved personal protective equipment (PPE) will be used, and the sampling station should be accessed by appropriate means. For shallow stream stations, the sampler should face upstream and collect the sample without disturbing the sediment.

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5.13 For surface samples, which are generally aimed at sampling contaminants that are floating on or near the surface, the collector partially submerses the sample container beneath the water allowing the top surface of the water body to slowly fill the container. If sampling with a pre-preserved sample bottle be careful not to overflow the sampling bottle and washout the preservative. Alternatively, a suitable bottle can be used for collection of the sample, and then transferred to the laboratory bottle.

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Peristaltic Pump Samplers

5.15 Another device that can be effectively used to sample a water column is the peristaltic pump/vacuum jug system. The use of a metal conduit to which the tubing is attached, allows for the collection of a vertical sample (down to about a 7.5 m depth) which is representative of the water column. Commercially available pumps vary in size and capability, with some being designed specifically for the simultaneous collection of multiple water samples.

Sample Preservation, Containers, Handling and Storage

5.16 Once samples have been collected, follow these procedures:

- Transfer the sample(s) into suitable labelled sample containers;
- Fill a decontaminated 0.5 L bottle with collected water and insert water quality metre (WQM) probes, record reading of pH, temperature, conductivity, and dissolved oxygen as required per sample location;
- Preserve the sample if appropriate, or use pre-preserved sample bottles;
- Cap the container, put it in a Ziploc plastic bag and place it on ice in a chilly bin;
- Record all pertinent data in the site logbook or on a field data sheet;
- Complete the chain of custody form; and
- Decontaminate all sampling equipment prior to the collection of additional samples.

Interferences and Potential Problems

5.17 There are two primary interferences or potential problems with surface water sampling. These include cross-contamination of samples and improper sample collection.

- Cross-contamination problems can be eliminated or minimized through the use of dedicated sampling equipment. Always collect samples from low-contaminant to high-contaminant concentration areas and decontaminate equipment (SOP 2 Equipment Decontamination) between samples; and
- Improper sample collection can involve using contaminated equipment, disturbance of the stream or impoundment substrate, and sampling in an obviously disturbed area.

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6.0 Quality Control and Assurance

6.1 Quality control (QC) requirements for sample collection are dependent on project-specific sampling objectives. The project-specific scope of works will provide requirements for sample preservation and holding times, container types, sample packaging and shipment, as well as requirements for the collection of various QC samples such as trip blanks, field blanks, equipment rinse blanks, and field duplicate samples. Typically, duplicates are collected at a minimum rate of 10%.

6.2 Manufacturer's instructions, if any, for calibrating or maintaining the accuracy of the instrument shall be followed.

7.0 References

SOP 1 Sample Handling, Shipment, Recordkeeping and Chain of Custody

SOP 2 Equipment Decontamination

Attachment 1 – Sampling Equipment

Sampling Equipment

- Dip sampler
- Water Quality Meter
- Line
- Peristaltic pumps (may be required)
- Tarpaulin
- Sample collection bottles
- Self-sealing plastic bags
- Ice
- Chilly bin(s)
- Chain of custody forms, field data sheets
- Decontamination equipment (e.g. Decon 90)
- Maps/plot plan
- Safety equipment
- Compass
- Tape measure
- Camera and batteries
- Logbook/forms and waterproof pen / pencil
- Sample bottle labels

Appendix M Stormwater sampling field sheet

Stormwater Operation and Maintenance Plan

Northport, Marsden Point

Northport Limited

SLR Project No.: 16342

7 February 2024

Stormwater Sampling Field Sheet

Job information			Equipment				
Date:	Time: Arrive: Depart:		Site Location:	Operator:			
Project Name:	Project Number:		Water quality equipment description:	Calibration Records Filed?	Y	N	NA
Weather:	Rainfall event start time/date:		Event Rainfall Depth:	Number of dry days before sampling:			
Reason for sampling:							

Sample details				Water Quality Parameters				Observations		
Site Number	**Sample Time**	**Flow Depth (m)**	**Flow** (Strong/ Moderate/Light)	**Temp (°C)**	**DO (%)**	**DO (mg/L)**	**pH**	**Debris Present** (Y/N: type)	**Foams/ Scums**	**Clarity** (Clear/Slightly Turbid/Turbid/Very Turbid)
1										
2										
3a										
3b										
3c										
4a										
4b										
4c										

ADDITIONAL COMMENTS:

Field Quality Control Checks					
Was sampling equipment pre-cleaned for these samples?	Y	N	Consistent with COC form?	Y	N
Was pre-cleaning sampling equipment properly protected from contamination?	Y	N	COC Filled out?	Y	N
Sampling has been undertaken in accordance with the Site Specific Sampling Protocol and SOPs?	Y	N	Signed:		

Appendix N Stormwater pond sediment disposal plan

Stormwater Operation and Maintenance Plan

Northport, Marsden Point

Northport Limited

SLR Project No.: 16342

7 February 2024

Northport

SEDIMENT MONITORING PLAN

For Northport Ltd

March 2023

REPORT INFORMATION AND QUALITY CONTROL

Prepared for:	Ben Sweeny Northport Ltd

Author:	Pamela Kane-Sanderson Senior Ecology Consultant	
Reviewer:	Mark Poynter Technical Director (Marine)	
Approved for Release:	Mark Poynter Technical Director Marine	

Document Name	Northport Sediment Monitoring Plan_V1.0

Version History:	V1.0	22 March 2023

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1 INTRODUCTION

Northport Limited have consent to discharge contaminants to land at various locations from the disposal of sediment (fine sludge and coarser debris) removed from the stormwater system authorised by CON20090505532 (Consent no. AUT.005055.35.01).

Northport Ltd has engaged 4Sight Consulting Ltd (4Sight) to develop a sediment monitoring plan to comply with consent condition 7 (Appendix A).

Condition 7 states *"Prior to undertaking the three-yearly sediment sampling for the first time, the Consent Holder shall submit a Monitoring Plan showing the proposed number and location of sediment sampling sites, and the proposed sediment sampling methodology, to the Council's monitoring officer for approval. Sampling sites shall include at least one site in each of the stormwater canals and the main settlement pond. The three yearly sediment sampling shall then be undertaken in accordance with the approved Monitoring Plan."*

The purpose of this consent monitoring is to provide information on sediment quality in the Northport stormwater system that could give rise to adverse effects i.e., disposal issues for sediment.

This plan details the monitoring approach, the guideline values that will be used to assess monitoring results and sets out the procedures to be followed if the guideline values are exceeded.

2 MONITORING LOCATIONS

Monitoring location descriptions were specified in the consent as *"Sampling sites shall include at least one site in each of the stormwater canals and the main settlement pond."*

Northport proposes to sample two locations on each arm and two in the main settlement pond (one near the first bay and one near point of discharge in the end bay).

Sediment samples should be accessed and collected from each site listed in Table 1. Locations are shown in Figure 1 and associated location photos are included in Appendix B.

Figure 1: Northport sediment sampling locations.

Table 1: Monitoring locations, sample collection method and GPS coordinate -NZGD 2000 New Zealand Transverse Mercator).

Sample Number	Sample Name	Location	Access	Easting	Northing
1	North-western Arm	Western canal arm, 100m south of beginning of canal	Utilising a ladder, climb down into canal. A plastic trowel is used to transfer sediment into a sample container provided by the analytical laboratory.	1733937.31E	6033554.02N
2	South-western Arm	Western canal arm, at bend near manhole	Utilising a ladder, climb down into canal. Sample collection as above.	1733804.16E	6033242.81N
3	North-eastern Arm	Eastern canal arm, 100m south of beginning of canal	Utilising a ladder, climb down into canal. Sample collection as above.	1734574.77E	6033137.34N
4	South-eastern Arm	Eastern canal arm, west of bridge	Climb down rock face into canal. Sample collection as above.	1734015.41E	6032923.04N
5	Main Settlement Pond, First Bay	Main settlement pond, middle of first bay	Utilising waders and appropriate safety gear the location is accessed by walking into the middle of the first bay of the main settlement pond. A small ponar dredge is dropped by hand, collecting a sediment sample. The ponar dredge is then carried back to shore where it is deposited on a flat surface and a sample is taken using a plastic trowel to transfer sediment into a sample container provided by the analytical laboratory. The ponar should be thoroughly cleaned/rinsed before sampling and between sample sites either with distilled water or pond water.	1733813.14E	6032950.83N
6	Main settlement pond, End Bay	Main settlement pond, middle of end bay, near discharge point	Sampling method and protocol as above for '5'.	1733517.20E	6032740.06N

3 MONITORING APPROACH

The consent conditions are explicit as to the frequency of monitoring and sediment quality parameters to be measured. However, the consent provides no guideline values for each metal concentration to be assessed against. As default, reference to ANZG (2018)[1] default guideline values (DGVs)[2] and 'upper' guideline values (GV-high)[3] have been used. These are provided in Table 2.

Sediment samples are collected as detailed in Table 1.

Once collected, all samples are to be stored in a cooler bin with ice and delivered to an IANZ accredited laboratory within 24 hours of collection.

3.1 Frequency and Timing

Condition 6 of the consent states that *"The Consent Holder shall sample and test the stormwater system sediment for the following determinands prior to 30 November 2018, and then at least once every three years thereafter."*

Sampling and testing of the stormwater sediment was not conducted prior to 30 November 2018 and the first monitoring was carried out on 15 March 2023, prior to scheduled removal of sediment from canals.

Going forward, three yearly sediment sampling shall then be undertaken in accordance with the approved Monitoring Plan.

3.2 Sediment Quality Parameters

Condition 6 of the consent states that *"The Consent Holder shall sample and test the stormwater system sediment for the following determinands…*

(a) Total Arsenic

(b) Total Cadmium

(c) Total Chromium

(d) Total Copper

(e) Total Lead

(f) Total Nickel

(g) Total Zinc

(h) Total Petroleum Hydrocarbons"

[1] ANZG 2018. Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, Australia. Available at www.waterquality.gov.au/anz-guidelines

[2] DGVs in sediment indicate the concentrations below which there is a low risk of unacceptable effects occurring, and should be used, with other lines of evidence, to protect aquatic ecosystems.

[3] GV-high provide an indication of concentrations at which you might already expect to observe toxicity-related adverse effects. As such, the GV-high value should only be used as an indicator of potential high-level toxicity problems, not as a guideline value to ensure protection of ecosystems.

Table 2: ANZG (2018) recommended toxicant default guideline values (DGVs) for sediment quality.

Toxicant	Type of toxicant	DGV	GV-high
Total Arsenic	Metalloids (mg/kg dry weight)	20	70
Total Cadmium	Metals (mg/kg dry weight)	1.5	10
Total Chromium	Metals (mg/kg dry weight)	80	370
Total Copper	Metals (mg/kg dry weight)	65	270
Total Lead	Metals (mg/kg dry weight)	50	220
Total Nickel	Metals (mg/kg dry weight)	21	52
Total Zinc	Metals (mg/kg dry weight)	200	410
Total Petroleum Hydrocarbons (TPHs)	Organics (mg/kg dry weight)	280	550

4 REPORTING AND RESPONSE

Monitoring will be conducted following this plan and Condition 8 of the consent states that *"The Consent Holder shall report the results of the three-yearly sediment sampling to Council's assigned monitoring officer within one month of the receipt of the test results from the analytical laboratory."*

If results exceed any of the values identified in Table 2, the Consent Holder will discuss the significance of the exceedance, the need or otherwise for further monitoring or investigation, and any implications for disposal.

5 MONITORING REVIEW

Condition 9 of the consent states that *"The Council may, in accordance with Section 128 of the Resource Management Act 1991, serve notice on the Consent Holder of its intention to review the conditions annually during the month of March for any one or more of the following purposes:*

(a) To deal with any adverse effects on the environment that may arise from the exercise of the consent and which it is appropriate to deal with at a later stage; or

(b) To require the adoption of the best practicable option to remove or reduce any adverse effect on the environment; or

(c) To deal with any significant changes in sediment quality."

Appendix A:

RESOURCE CONSENT – AUT.005055.35.01

File: 5055
35
New

Document date: 22 July 2015

Resource Consent

Pursuant to the Resource Management Act 1991, the Northland Regional Council (hereinafter called "the Council") does hereby grant a Resource Consent to:

NORTHPORT LIMITED, PO BOX 44, RUAKAKA 0151

To undertake the following activity on Part Lot 2 and Lot 3, DP 315167 (Marsden Point), at or about location co-ordinates 1733521E 6032730N:

AUT.005055.35.01: To discharge contaminants to land at various locations from the disposal of sediment removed from the stormwater system authorised by **CON20090505532**.

Note: All location co-ordinates in this document refer to Geodetic Datum 2000, New Zealand Transverse Mercator Projection.

Subject to the following conditions:

1 For the purposes of this consent, 'sediment' includes fine sludge and coarser debris removed from within the stormwater system.

2 All sediment removed from the stormwater system shall be deposited within the Sediment Disposal Area's shown on the **attached** Northport plan entitled 'Northport Indicative Canal Sediment Disposal Sites Site Plan', Sheet 1, Date: June 2015, unless otherwise approved in writing by the Council's monitoring officer.

3 At each time of exercise of this consent, the Consent Holder shall notify the Council's assigned monitoring officer in writing of the date that sediment disposal to land is intended to commence, at least one week beforehand.

4 The Consent Holder shall keep a record of the volume of sediment removed in cubic metres and the site(s) where the sediment has been disposed of. A copy of this record for each time this consent is exercised shall be forwarded to the Council's assigned monitoring officer within two weeks of the sediment removal work being completed. In addition, a copy of this record shall be forwarded immediately to the Council's assigned monitoring officer on written request. The records shall be in an electronic format that has been agreed to by the Council's monitoring officer.

Advice Note: *The keeping of records is also required under Condition 8 of CON20090505532.*

5 On completion of each exercise of this consent, all areas of newly deposited sediment shall be, as soon as is practicable, covered with not less than 50 millimetres of topsoil and sown with a suitable grass mixture. At least 80% vegetation groundcover shall be established within three months of the completion of the sediment removal work.

6 The Consent Holder shall sample and test the stormwater system sediment for the following determinands prior to 30 November 2018, and then at least once every three years thereafter:

(a) Total Arsenic

(b) Total Cadmium

(c) Total Chromium

(d) Total Copper

(e) Total Lead

(f) Total Nickel

(g) Total Zinc

(h) Total Petroleum Hydrocarbons.

7 Prior to undertaking the three-yearly sediment sampling for the first time, the Consent Holder shall submit a Monitoring Plan showing the proposed number and location of sediment sampling sites, and the proposed sediment sampling methodology, to the Council's monitoring officer for approval. Sampling sites shall include at least one site in each of the stormwater canals and the main settlement pond. The three yearly sediment sampling shall then be undertaken in accordance with the approved Monitoring Plan.

8 The Consent Holder shall report the results of the three-yearly sediment sampling to Council's assigned monitoring officer within one month of the receipt of the test results from the analytical laboratory.

9 The Council may, in accordance with Section 128 of the Resource Management Act 1991, serve notice on the Consent Holder of its intention to review the conditions annually during the month of March for any one or more of the following purposes:

(a) To deal with any adverse effects on the environment that may arise from the exercise of the consent and which it is appropriate to deal with at a later stage; or

(b) To require the adoption of the best practicable option to remove or reduce any adverse effect on the environment; or

(c) To deal with any significant changes in sediment quality.

The Consent Holder shall meet all reasonable costs of any such review.

10 This consent shall not lapse until its expiry.

EXPIRY DATE: 2 DECEMBER 2034

This consent is granted this Twenty-second day of July 2015 under delegated authority from the Council by:

S J Savill
Consents Programme Manager –
Water and Wastes

ISSUE	DATE	DETAILS	APPRVD	BY

NOTES

1. AVERAGE SEDIMENT CREATION FROM EXISTING STORMWATER COLLECTION SYSTEM = 95m³
2. VOLUME OF EXISTING MATERIAL STOCKPILED INSIDE PORT = 1,050m³

Northport
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TEL 09 432 5010, FAX 09 432 8749
EMAIL, ben.sweeny@northport.co.nz

NORTHPORT
INDICATIVE CANAL SEDIMENT DISPOSAL SITES
SITE PLAN

				0
B SWEENY	B SWEENY	1:1000(A1) 1:2000(A3)	JUNE 2015	1

Appendix B:

Northport Sediment Sampling Location Photo

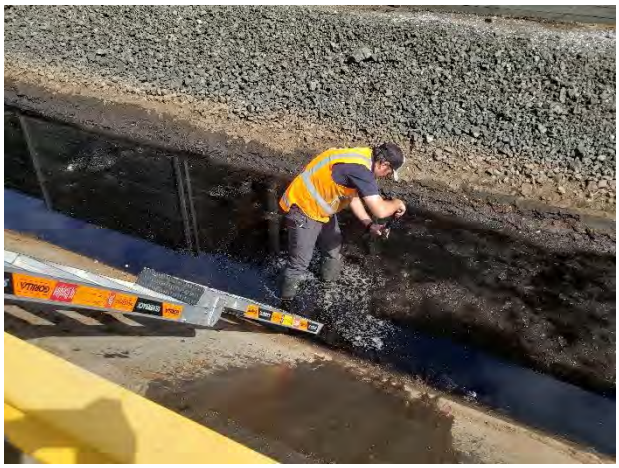

Photo 1: Site 1 – North-western arm.

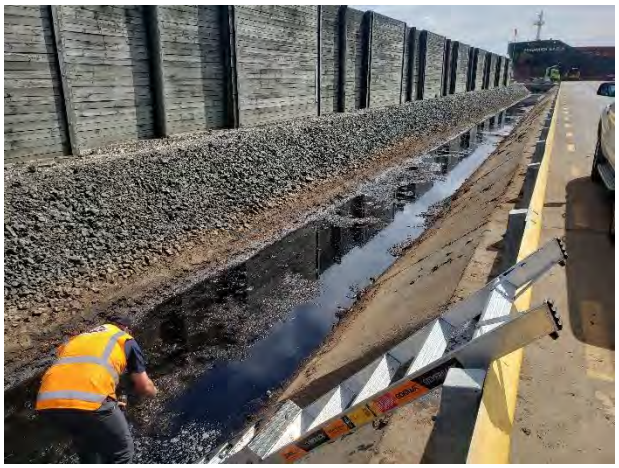

Photo 2: Site 1 – North-western arm, 100m south of beginning of canal.

Photo 3: Site 2 – South-western arm.

Photo 4: Site 2 – South-western arm, at bend near manhole.

Photo 5: Site 3 – North-eastern arm, 100m south of beginning of canal.

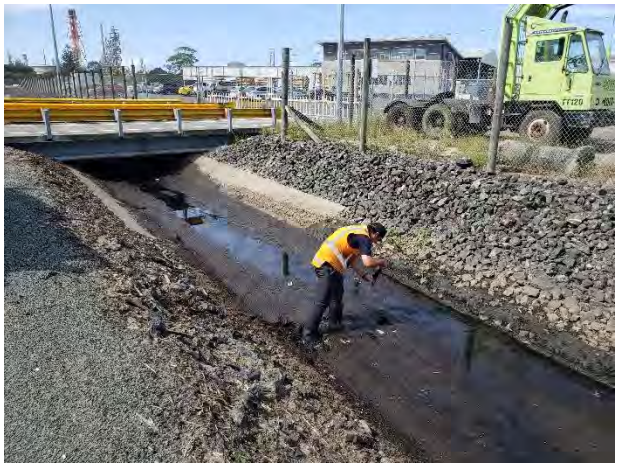

Photo 6: Site 4 – South-eastern arm, west of bridge.

Photo 7: Site 5 – Main settlement pond, middle of first bay.

Photo 8: Ponar dredge used to collect sediment samples at Site 5 and 6 in the main settlement pond.

Photo 9: Site 6 – Main settlement pond, middle of end bay, near discharge point.

Photo 10: Site 6 – Main settlement pond, middle of end bay, near discharge point.

Making Sustainability Happen

WILLIAMSON
WATER & LAND ADVISORY

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Northport Limited

Attention: Ben Sweeney
ben.sweeney@northport.co.nz

12 February 2024 WWLA0000

Northport Expansion Resource Consent Application – Groundwater

1. Introduction

Williamson Water & Land Advisory (WWLA) were commissioned to prepare a response to the questions related to stormwater interaction with groundwater raised in Direction 15 (1 December 2023) from the independent Hearing Panel for the resource consent application appointed by the Regional Council. Specifically, the issue raised addressed in this letter is over the potential effects of untreated stormwater discharges to ground, and potentially groundwater, through the base of the system's canals and ponds.

Information sought related to groundwater is in 5) as follows:

> Comment on the management of stormwater discharges to ground water through the base of the canals and ponds. The Applicant's stormwater hydraulic model estimates this exfiltration to be in the order of 20 mm/hour. This assessment must include consideration of:
>
> a) The practicality of lining the canals and ponds, or other measures to avoid seepage to groundwater.
>
> b) A regime to monitor groundwater quality to assess the effects of discharges of untreated stormwater to ground water.
>
> c) Options to address any adverse effects on groundwater quality arising from the discharge of contaminated stormwater.

1.1 Site Visit

A site visit was conducted by the author (Principal Hydrogeologist Jon Williamson) on 14 December 2023. Groundwater was measured at bore hole B (BHB) (which is located on the bank between Pond 1 and Pond 2) at 3.16 m below the top of the bore collar.

2. Hydrogeological Setting

2.1 Geology

The port terminal site sits on a reclaimed land comprising a mixture of coastal sediments and hard fill materials. The natural geology underlying the landward side of Northport side is described as being Holocene aged sediments of the Kariotahi Group comprising loose to poorly consolidated sand in fixed parabolic and local transverse dunes with minor sand, mud and peat in interdune deposits[1].

[1] Edbrooke, S.W.; Brook, F.J., 2009. Geology of the Whangarei area. Institute of Geological & Nuclear Sciences 1:250,000 Geological Map 2. Sheet 1. Institute of Geological & Nuclear Sciences Ltd., Lower Hutt, New Zealand.

The geological structure is complex due to the processes through which the Peninsula has formed. Dougherty & Nichol[2] have studied the internal structure of the Peninsula locally including One Tree Point and Marsden. Their work has shown that the Port site is located over a recent (last 10,000 years) outer barrier dune system where sea level has fallen in the order of 2 m over the past 6,500 years.

The primary sediment source for the barrier system construction has been near shore and inner shelf deposits that were initially delivered to the continental shelf by the paleo Waikato River during lower sea-level of the last glaciation. This phase of deposition is represented by mudstone, cobbles, peat and coarse shells at depths ranging from 20-30 m below ground level forming the base to the overlying sands. The outer barrier formed as sands moved on shore by the post marine transgression, and after the cessation of sea-level rise, the barrier prograded during the ensuing sea level fall of approximately 2 m. Offshore sediment was reworked onshore by wave action and aeolian processes produced the hummocky dune structures present today.

Geophysical observations have shown that the stratigraphy of the dune structures is parallel to the modern-day shoreline and dipping seaward from relatively high standing areas, prograding outward as the shoreline regressed. Based on site observations it is likely that shell deposits occur in elongated lenses that run parallel to the shoreline, with increasing depth further from the sea and formed through beach deposition as the sea level fell. This conceptual geologic model is illustrated in **Figure 1** below. T1, T2, and T3 represent times over which the MSL dropped. The shell material is illustrated as saucer shaped deposits beneath the dune sands.

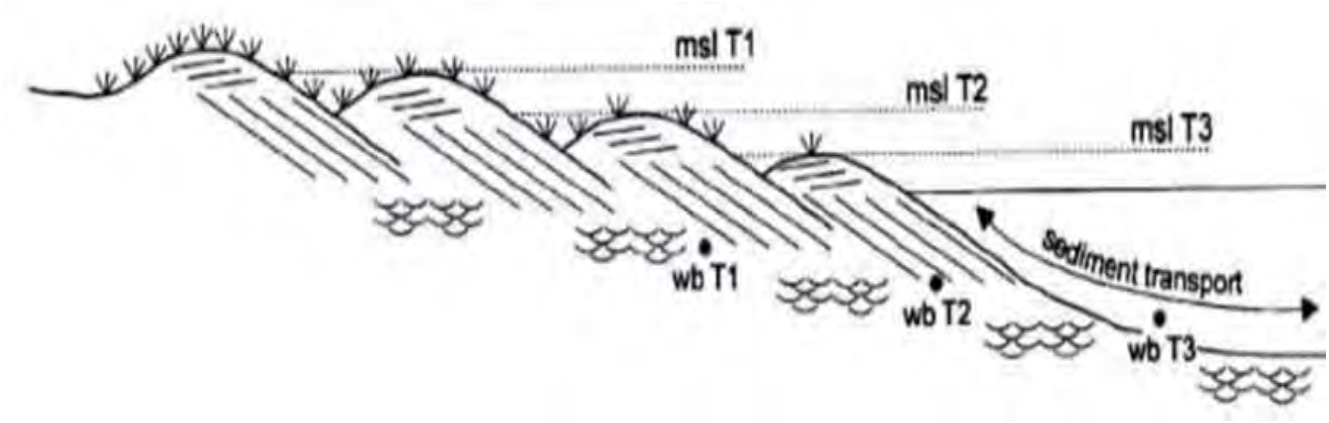


Figure 1. Prograding landform model for barrier dune system at Marsden Point (Nichol, 2002).

2.2 Hydrogeology

2.2.1 Groundwater Recharge

Groundwater recharge to the aquifer is from throughflow from the south and from direct rainfall recharge over the site where impervious cover is not present, which is limited to the southern area around the stormwater pond system.

Where impervious cover is present (Most of the site), rainfall runoff is collected, treated and discharged via the sites stormwater retention system, which includes the perimeter drains and the two stormwater ponds.

[2] Dougherty, A.J. and Nichol, S.L., 2007. 3-D Stratigraphic models of a composite barrier system, northern New Zealand. Journal of Coastal Research, SI 50, 922 - 926. Gold Coast, Australia ISSN 0749-0208.

2.2.2 Hydraulic Conductivity

The permeability of the natural geologic units that form the Marsden Point aquifer vary depending on grainsize with a typical range being 0.1 to 30 m/d ($1.2x10^{-6}$ to $3.5x10^{-4}$ m/s) and a geometric mean of 6 m/d ($6.95x10^{-5}$ m/s). This can be considered moderate to high permeability.

As a generalisation, the surficial layers of the site are homogenised local machine compacted fill materials, which are likely to have permeability at the lower end of the range (if not lower). Underlaying the fill, it is assumed that the site has a dominant permeability <10 m/d, with localised pockets of higher permeability present in coarser grained sands and shell beds, which are typically located at greater depth.

The applicant's stormwater hydraulic model, which used an infiltration rate of 20 mm/hour is equivalent to 0.48 m/day, which is within the lower end of the range reported above. However, in my opinion this value is unlikely to reflect current rates because of aquifer clogging or skin effect around the drains, as discussed in **Section 3**.

2.2.3 Groundwater Depth and Flow Direction

The Marsden Point Peninsula forms an unconfined sand aquifer and under natural conditions the depth to groundwater is in the range of 1 to 4 m below ground level (mBGL). The groundwater flow direction under the Port is north to north-westward (in the west) and over the wider Marsden Point area groundwater flows radially outwards towards the Whangarei Harbour and Bream Bay. The natural groundwater hydraulic gradient across the site is estimated to be between 0.001 and 0.002 (-).

Figure 2 shows the inferred groundwater piezometric surface (water table) and flow vectors under current day conditions, while **Figure 3** shows the same data presented as depth to groundwater (in meters below ground level).

It is evident that over the Port site itself groundwater flows towards the harbour, whilst in the stormwater pond area, groundwater flows towards the Blacksmith Creek.

In coastal situations through out the eastern seaboard, groundwater typically has an upward vertical pressure gradient. This means that groundwater pressures increase with depth. Whilst no information is specifically available on this site, upwards pressure gradients are anticipated.

The implication of this typical conceptual hydrogeological model is that any potential stormwater soakage into the underlying aquifer is prevented from migrating downwards and contaminating the deeper aquifer by the upward pressure gradient i.e. via natural "hydrogeological security". Furthermore, any soakage would be a diffuse discharge into the harbour over a wide area, in contrast to the comparative point discharge of the submerged stormwater diffuser.

Map Title:
Piezometric Surface

Project:
Port Expansion Groundwater Assessment

Client:
Northport Limited

Legend

- Observation Bore
- Road
- State Highway
- Piezometric Surface Contour (m)
- Cross-section Transect
- Flow Direction

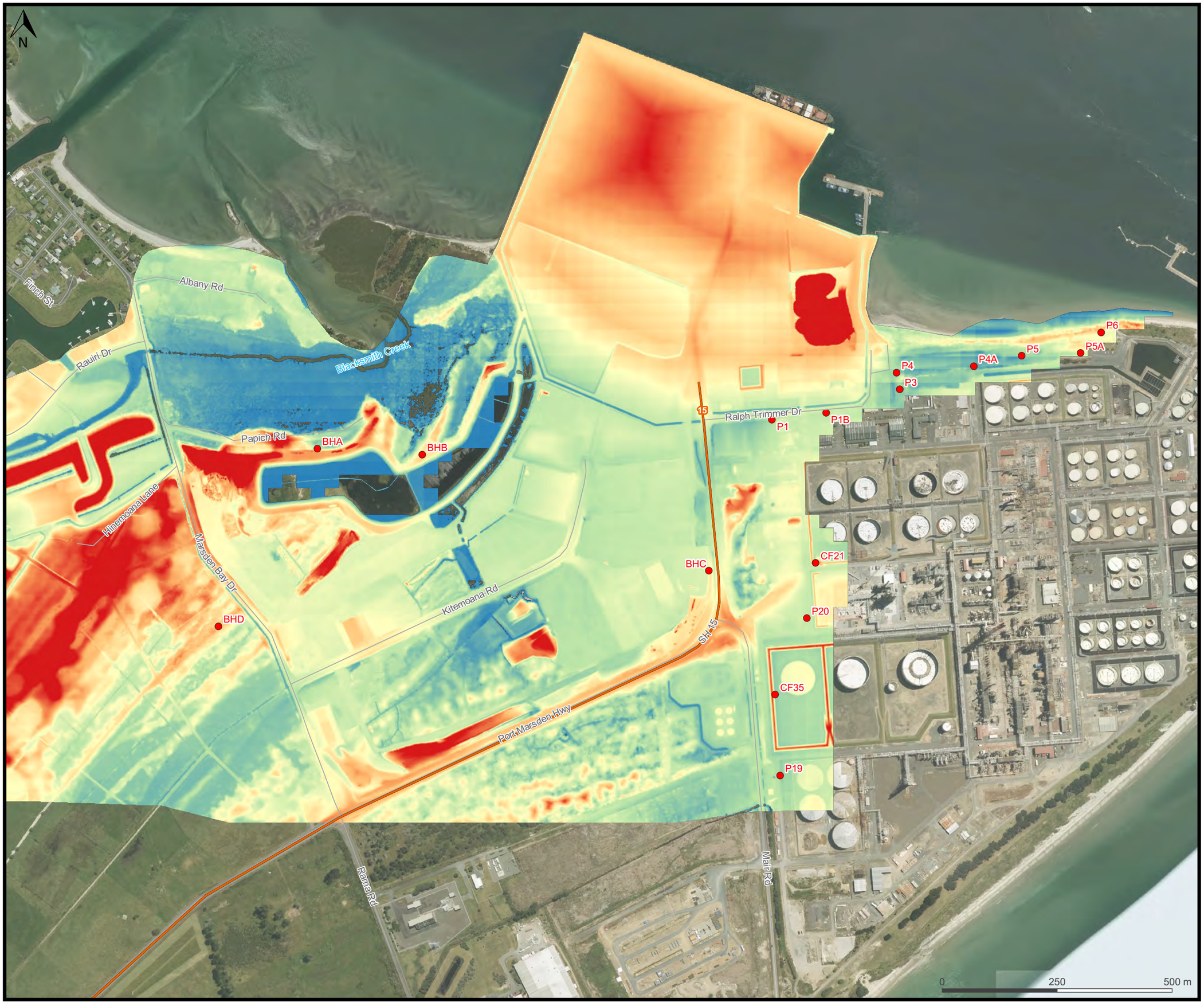
Data Provenance
Aerial Imagery from LINZ

Drawn by: Josh Mawer
12/02/2024

Layout & Project File
Figure 1 - Piezometric Surface -

WILLIAMSON WATER & LAND ADVISORY

Figure 02.



Map Title:
Depth to Groundwater

Project:
Port Expansion Groundwater Assessment

Client:
Northport Limited

Legend

- Observation Bore
- Road
- State Highway

Depth to Groundwater (m)

5

0

Data Provenance
Aerial Imagery from LINZ

Drawn by: Josh Mawer
12/02/2024

Layout & Project File
Figure 2 - Depth to Groundwater -

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Figure 03.

A hydrogeological cross section (location marked on **Figure 2)** is presented in Error! Not a valid bookmark self-reference.. The key features to note from west to east are discussed below:

- Pond 1 has a level from LiDAR of 1.155 mAMSL, which appears to be acting as a sink with groundwater flowing into it from both southward margins;
- Pond 2 has a LiDAR level of 1.655 mAMSL, which also appears to be in connection with groundwater;
- Perimeter drain 1 (PD1) has a LiDAR level of 2.008 mAMSL, which is above the interpolated groundwater level of 1.624 mAMSL in this location.
- Perimeter drain 2 (PD2) has a LiDAR level of 2.156 mAMSL, which is above the interpolated groundwater level of 0 mAMSL in this location.
- The stormwater hydraulic gradient from the outer perimeter drains into the pond system is supported by the LiDAR ground level survey.
- The stormwater system appears to be perched above the groundwater table over the majority of the coastal part of the Port site;
- Whilst the stormwater pond appears to be hydraulically connected with groundwater, sediment deposition within it is likely to limit the exchange of stormwater and groundwater.

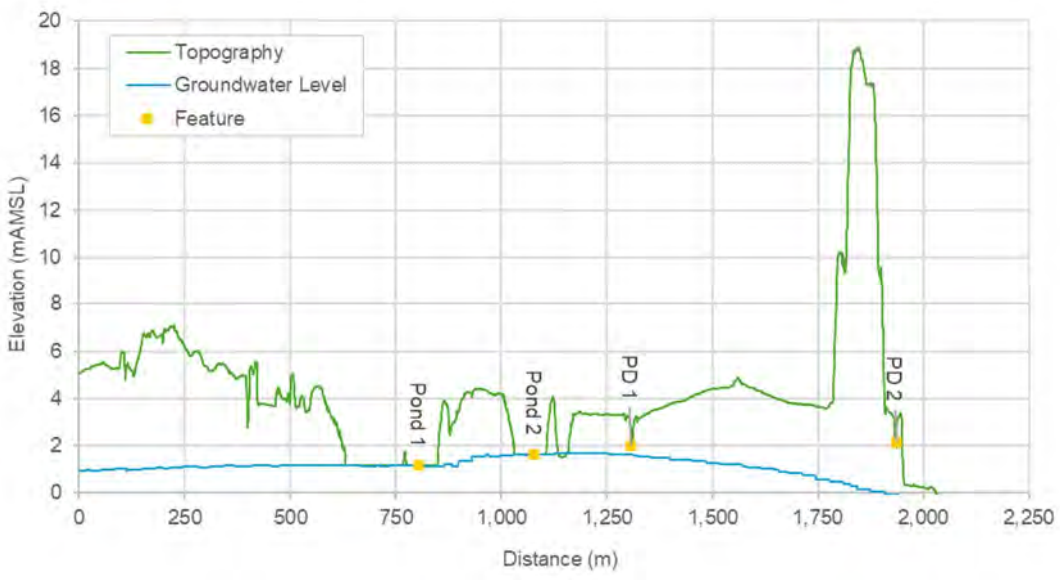

Figure 4. Hydrogeological cross section.

3. Treatment System Design

The canal and pond system has been designed to maximise sedimentation and dissolved contaminant removal. Whilst the effectiveness of contaminant removal is outside of the scope of this assignment, it is evident from visual observation and information provided by port staff that 50 mm of sediments are skimmed off the base of the perimeter drains fairly regularly. When the drains dry in summer, this material forms a cracked skin.

It is my expectation that the hydraulic conductivity of this material, which appears to be a mat of decaying fibres and silt, would be very low, effectively forming a cap within the basin and side walls of the drain.

Whilst removal of this material may assist in the stormwater hydraulic efficiency of the drains, it is likely that over the 20 years of operation, low permeability materials would have clogged the immediate surrounds within the drains, creating a skin effect that is an effective barrier to groundwater seepage. Clogging of aquifer materials in connection with wastewater treatment, stormwater or other systems with high organic detritus loads is extremely common, and often the reason for failure if not considered in design. Fortunately, in this context, clogging is providing a valuable function and preventing significant leaking of stormwater to ground.

4. Conclusion

Given the hydrogeological setting and constructed nature of the site, it is considered unlikely that stormwater has significant interaction with groundwater and certainly not an interaction that is likely to contaminate the underlying sediments. The reasons to support this conclusion include clogging of the drains and ponds base (skin effect), perched stormwater water within the perimeter drains particularly with distance from the ponds, upwards pressure gradients at the coat, and the fact the stormwater system has been functional for approximately 20 years with no reported incidents (to our knowledge).

Given the above findings, groundwater quality monitoring is not required.

5. Closure

We trust this letter satisfactorily addresses the concerns raised by the Commissioners and would be available to address any further questions in person or writing.

Yours sincerely,

Jon Williamson
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