



Design Report

REDLAND BAY FERRY TERMINAL

Pensar Structures

April 2026

Rev C

Prepared by:

ProjexPartners

PROJECT MANAGEMENT | ENGINEERING | PLANNING

Building community through our people



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DOCUMENT ISSUE RECORD

Revision Code	Date Revised	Revision Details	Author	Checked	Approved
A	30/03/2021	Original Issue	RK	DB	DB
B	29/11/2021	EDQ Additional Issues and RFI Response	DAB	DAB	DAB
C	10/04/2026	Additional southern ramp added	DAB	DAB	DAB

Approved

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1 INTRODUCTION

Projex Partners have been engaged by Pensar Structures on behalf of SeaLink Travel Group (SeaLink) to undertake the detailed design of the Redland Bay Ferry Terminal upgrade. Currently, the facility consists of a single ramp used for vehicle services plus a service ramp and disused ramp on the northern side of the vehicular loading ramp. To improve services for their customers, SeaLink are proposing to upgrade the existing facility to provide two vehicle access locations to accommodate a new fleet of ferries while also providing a separate access for the existing fleet, with associated improvements to queuing, ticketing and access.

The site is located within Redland Bay vehicular ferry terminal is located at the eastern end of Weinam Street, Redland Bay. It is also within the Weinam Creek Priority Development Area (PDA) with development approvals coordinated by Economic Development Queensland (EDQ).



Figure 1-1: Redland Bay Vehicular Ferry Terminal Location

1.1 Purpose of Project

The project has been initiated by SeaLink following ongoing and increasing demand for vehicular ferry services within the southern Moreton Bay islands associated with development of the islands and commercial and recreational activities.

The current SeaLink fleet servicing southern Moreton Bay is aged, with limited capacity and ongoing maintenance needs.

SeaLink has initiated a program to replace their existing vehicular ferry fleet with new, larger vessels capable of providing enhanced vehicular services to the southern Moreton Bay islands.

The existing vehicular ferry terminal at Redland Bay is not capable of accommodating the enhanced fleet due to the increased vessel width, draft and length.

This project is intended to upgrade the existing Redland vehicular ferry terminal to provide:

- Berthing and loading facilities for three vessels (including one dedicated barge ramp suitable for the existing smaller fleet)
- Increased dredge basin and mooring facilities for the three loading vessels
- Enhanced vehicle storage capability within the site
- Upgraded and relocated fuel storage facilities to replace aged infrastructure
- Enhanced passenger facilities, including improved access and waiting facilities adjacent to the waterfront
- Enhanced site operational safety and facilities
- Compatibility with the Weinam Creek PDA master planning, including provision for the proposed Esplanade path
- Associated administration and administration facilities, storage and public utility plant to support the above.

Note that there is an additional project being undertaken by Redland City Council and SeaLink to upgrade the facilities on the islands to accommodate the upgraded vessels.

1.2 Future Operators

The proposed development enhances and supports the operation of a second vehicular ferry operator as nominated in the PDA planning by providing:

- A secondary berth to facilitate parallel operations.
- Additional vehicle storage and queuing for potential additional operator use
- Refueling, watering and waste disposal allowing parallel operations
- Additional ticketing facilities

It is noted that due to the leasehold arrangements, use of the berths by a second operator will be under a commercial arrangement with SeaLink (leaseholder).

Similar arrangements are currently in use elsewhere by SeaLink and others and are an accepted industry practice.

2 SITE DESCRIPTION

2.1 General Description

The site is located on Lots 1 & 2 SP261696 and 186 SL8029 at the end of Weinam Street, Redland Bay as shown in Figure 2.1 below. The property is 7039m² with approximately 4540m² within tidal zones.



Figure 2-1: Current Site Layout

2.2 Existing Features and Services

Currently, the facility consists of a single ramp used for vehicle services plus a service ramp and disused ramp on the northern side of the vehicular loading ramp. There are four entry lanes and one exit lane along with site carparking, fuel storage, ticketing and maintenance and operations facilities.

Underground, electrical, water, sewer and telecommunications services and an overhead electrical service are also present within the site.

2.3 Geotechnical Investigations

Initial geotechnical investigations have been undertaken to provide an assessment of the existing ground conditions expected under the expansion.

The Geotechnical Investigations Report is included as **Appendix C** and has provided input to the development of the design embankment and structures including:

- Specification requirements for the proposed embankment and revetment wall materials (including resistance to salt water)
- Pile depths for the major, load bearing structure at the ramp

- Design parameters for high level footings for lightly loaded structures (including storage shed and the ticket booth)
- Retaining structure parameters used in the sheet pile wall design

2.4 Survey and Bathymetric Survey

Survey of the existing site and underwater surface levels have taken place to inform the design and determine dredging requirements for the work. The survey was undertaken on 09/10/2020 and 13/01/2021.

3 ENVIRONMENTAL AND PLANNING

An environmental and planning constraints investigation has been undertaken on the site with the following key issues identified:

- The land is included in a priority development area (PDA), which exempts the works from assessment under the local Council planning scheme. Instead, the works will require assessment against the PDA by the Minister for Economic Development Queensland (EDQ).
- The works extend over land described as Lot 2 on SP261696, Lot 1 on SP261696, Lot 186 SL8029 and Lot 1 on AP1696 and is under lands lease tenure, and include an area of unallocated State land.
- Landowners consent is required for works on land below high water mark. This is obtained from the Department of Resources.
- Land below HAT is located within the Moreton Bay Marine Park and will require a marine parks permit to be obtained prior to commencement of construction.
- The proposed development includes tidal works defined under the *Coastal Protection and Management Act 1995*, including the reconstruction of revetment walls, dredging of the seabed and provision of mooring piles to guide ferries berthing at the terminal. The works are not assessable under the *Planning Act 2016* as the site is confined to the PDA, but will require consideration by EDQ during the material change of use application as following the approval, operational work associated with the material change of use, including tidal works, will be exempt development. Due to the State Assessment and Referral Agency (SARA) typically assessing matters relevant to tidal work, the following codes have been assessed and provided with the supporting documentation: State Code 7 and State Code 8 and *Coastal Protection and Management Regulation 2017, Schedule 3*.
- The western extent of the allotments is mapped as being located within a koala priority area. However, field investigations have confirmed that the site does not harbour non juvenile koala habitat trees.
- Marine plants (mangroves) are present and impacts to these species will require consideration as mangroves are protected under the *Fisheries Act 1994*. However, Schedule 10, Part 6, Division 3 s.1(11)(c) of the *Planning Regulation 2017* precludes operational work that is the removal, destruction or damage of marine plants from being assessable development where the operational work is PDA-related development. Therefore, will require consideration by EDQ during the material change of use application as following the approval, operational work associated with the material change of use, including tidal works, will be exempt development, including the removal, destruction or damage of marine plants, will be exempt development. The will include assessment against State Code 11. Due to the construction/works of the proposed Redland Bay Vehicle Ferry Terminal Upgrade occurring within an urban area, it is arguable that all offset requirements are precluded under the *Environmental Offset Regulation 2014*.
- Where dredging of material in a year ranges between 1,000 to 10,000 tonnes an application for an Environmental Authority is required. Due to the dredging works involving the removal of 4500m³ material from Moreton Bay, an application for an *ERA 16-(2)(a) dredging, in a year, 1,000t to 10,000t of material* is required. This will include assessment against State Code 22. The application will be lodged directly with SARA for assessment.
- Acid sulfate soils have been identified as present within the dredging site. Results of analysis indicate that the soils exhibit an absence of total actual acidity and high SCR results, however the presence of shell in the sediment significantly buffers the acid generating potential through neutralisation, resulting in only a low to moderate level of lime required to neutralise the acid generating potential of the soil; and
- Elevated levels of tributyltin were identified at one sampling location (S2). Nickel contamination was also identified at three locations. The most significant of these was located at the same point as the sample from which the elevated TBT analysis result was obtained.
- The existing ponded area on the northern side of the site (between the existing wall and the pier) is subject to intermittent tidal inundation only. The proposed works are not intended to change the tidal characteristics of

this area. Plans showing the existing and proposed tidal levels and extent of inundation on the northern side of the site are included in **Appendix A**.

The environmental report is a standalone document produced by Future Plus Environmental and is not included within this design report.

4.3 Coastal Processes Assessment

A coastal processes assessment was undertaken by JBP. This included the below:

- Tidal assessment
- Extreme wave assessment
- Peak currents
- Rock size estimation.

The findings are summarised below with the full report in **Appendix D**.

4.3.1 Design Levels and Tidal Planes

Due to the location of the site, tidal levels will drive the design. Table 4-1 outlines the adopted design tidal planes and appropriate water levels used in the design.

Table 4-1: 2021 Tidal Plane Levels

Tidal Plane	Reduced Level (m) [Relative to AHD]	+0.8m (2100)
Highest Astronomical Tide (HAT)	1.65	2.45
Mean High Water Springs (MHWS)	1.04	1.84
Mean Sea Level (MSL)	0.02	0.82
Mean Low Water Springs (MLWS)	-0.93	-0.13
Lowest Astronomical Tide (LAT)	-1.33	-0.53
Seabed level	-3.35	-3.35

These tidal levels were derived from the Maritime Safety Queensland (MSQ) 2021 Semidiurnal and diurnal tidal planes.

4.3.2 Storm Tide Levels

Storm tide levels have been determined based on the 2100 storm tide level within Redland City Council's planning scheme.

Table 4-2: Storm Tide Levels (1% AEP Storm Event)

Year	Reduced Level (m) [Relative to AHD]
2021	2.51
2070	2.96
2100	3.23

4.3.3 Peak Currents

The peak currents were modelled at five locations. These are listed in the table below with the velocity.

Table 4-3: Peak Currents

Location	Pre Development (m/s)	Post Development (m/s)
Mangrove Area	0.02	0.01
End of Ramp	0.08	0.04

Location	Pre Development (m/s)	Post Development (m/s)
Dredging Area	0.06	0.07
100m offshore	0.14	0.13
200m offshore	0.50	0.50

4.3.4 Peak Wave Height

Waves encountered at the site are wind driven. Modelling was undertaken to determine peak wave heights at 5 locations during different storm events for the present day, 2070 and 2100. These are shown in the table below.

Table 4-4: Peak Wave Heights

Location	Depth (mAHD)	Present Day 1% AEP		2070 1% AEP		2100 1% AEP	
		Hs (m)	Tp (s)	Hs (m)	Tp (s)	Hs (m)	Tp (s)
1	-1.16	1.42	3.48	1.52	4.47	1.58	4.47
2	-3.55	1.50	3.48	1.59	3.95	1.64	4.47
3	-2.66	1.51	3.95	1.59	4.47	1.65	4.47
4	-2.35	1.54	4.47	1.62	4.47	1.67	5.07
5	-2.25	1.59	4.47	1.67	5.07	1.72	5.07

Locations are shown in Figure 4.2 below.

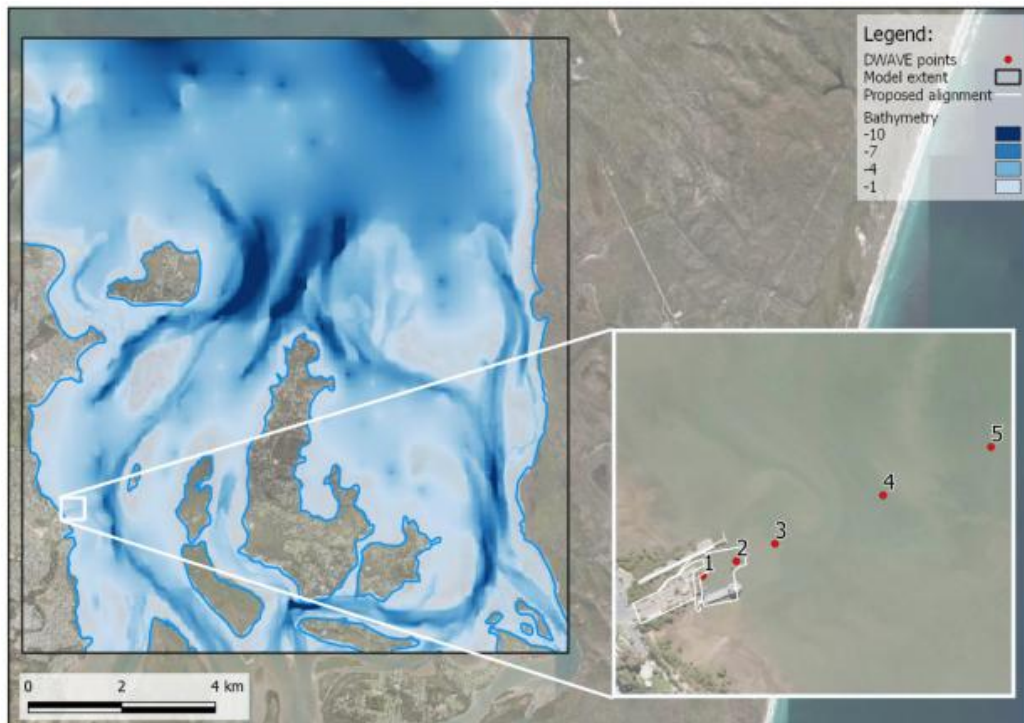


Figure 4-2: Peak Wave Height Locations

4.3.5 Rock Armour Size

Rock armour size was investigated as a possible batter stabilisation for the site. The rock was proposed to be used for the abutments and batters for the site. Two layers of rock, primary and secondary, can be used to protect the site. Rock has been sized for 0.5%, 1 % and 2% storm events with a factor of safety of 1.5 as well as 2 across present day, 2070 and 2100 conditions. The rock sizes range from $Dn_{50} = 0.8\text{m}$ to 1.1m .

4.4 Vessel Details

SeaLink have provided plans for the proposed vessel upgrades (44.9m Catamaran Ropax Ferry) proposed for the route using the Redland Bay terminal (refer **Appendix F**).

It is also noted the vessels in the existing fleet will utilise the terminal.

Table 4-5 outlines the key parameters in developing the design of the terminal infrastructure:

Table 4-5: Vessel Parameters

Vessel Draft (Loaded)	1.55m
Minimum hull clearance to seabed	0.5m approx.
Vessel Mass	145 Tonne

4.5 Loading Bridge

To enable access to the ferries, a floating loading bridge will be used. This bridge is similar to bridges used by SeaLink in other locations around Australia.

Large polyethylene floats are connected to the bridge via legs. With the bridge connected to the abutment, this allows the bridge to rise and fall with the tides to match the deck level of the ferries. The air within the polyethylene floats can be adjusted to allow the bridge to sink or float to match the deck level of empty or fully loaded ferries.

The loading bridge design drawings are attached in **Appendix A**.

4.6 Loading Ramp

SeaLink intends to continue operating its existing fleet of smaller barges from the Weinam Creek facility to service lower-demand routes, alongside the newly commissioned larger vessels. As these smaller barges cannot utilise the specialised loading facilities at the northern and central berths, a dedicated trafficable barge ramp is required. The proposed ramp is designed to accommodate a range of barges and vehicles, as detailed in the longitudinal sections (refer **Appendix A**), including vehicle clearances and accessible tidal ranges.

The southern loading ramp will incorporate the following elements:

- Channel graded to a bioretention basin
- 100 mm subsoil connection pipe beneath the concrete, linking the field inlet from the swale drain to the bioretention basin
- Concertina gate
- Support piles
- Retaining wall returns to the ramp

The loading ramp design drawings are attached in **Appendix A**.

4.7 Abutment Design

The abutment for the site is proposed to be dumped rock, sized in accordance with the JBP report (**Appendix D**). This rock is sized appropriately to withstand the predicted wave actions during storm events.

Thrust generated from the vessels will also impact the abutment. To ensure the thrust does not dislodge the rock armour, the abutment across the front of the site where vessels land will have sheet piles installed to mean sea level with rock placed behind the wall. The sheet piles will protect the abutment and prevent rocks from dislodgement and becoming a hazard for the hull of vessels.

4.8 Fuel Storage

A future fuel storage is proposed on site to fuel vessels. A self-bunded fuel storage system with 68 kilolitre capacity has been incorporated in the design for future installation as part of a staged implementation plan subject to budget constraints. The capacity of this tank is to be limited to 58.8kL to comply with environmental regulation.

The tank will be located at the entrance to the site on the northern side of the ticket booth to facilitate easy access for refuelling operations and increase the distance to the Moreton Bay frontage compared to the existing fuel storage.

The tanks will connect to a pump located at the loading ramps via underground pipe network. The loading pump will be located within a bunded area to capture any spills or leaks that may occur.

The fuel tank systems are self-bunded to capture any leaks or spills.

4.9 Access Road and Carpark

The access road and carpark have been designed to provide maximum vehicle storage.

The design vehicle for developing vehicle turn paths is a Class 9 six axle articulated vehicle (19m semi).

The facility provides storage for 59 standard vehicles (cars).

Additional overflow storage for 6 vehicles exists at the entrance to the facility without impacting on operations of the adjacent carpark.

A layout for the site can be found in General Arrangement Sheet 2 within **Appendix A** and further details on the Traffic Impacts included in **Appendix G**.

4.10 Pedestrian Access

Significantly improved access to the site, foreshore and ferries will be provided for pedestrians by providing improved pedestrian routes through the site.

Footpaths will be compliant to the Disability Discrimination Act (DDA) until the landing ramp. The landing ramp may not be compliant due to fluctuations in tidal levels impacting the angle of the ramp. Staff are present at all times to provide assistance, if required however it is noted that the primary function of this loading facility is for vehicular traffic. Passenger services are provided via the separate southern Moreton Bay islands passenger ferry service at Weinam Creek.

4.11 Structures

The existing administration / ticketing building on site is to be retained as part of the proposal and five new structures are proposed for the facility.

These include a ticket booth, storage shed (part of a future stage), a picnic shelter and a vessel servicing building. All these buildings are prefabricated and are able to be removed from site if required in the future.

4.11.1 Combined Ticket Booth and Administration

This building is intended to be up to 4.5m long x 3m wide and will include a service window to check vehicle tickets and provide tickets to passengers if required.

This building will be located at the entrance to the facility and is positioned to provide a single vehicle entry lane to access the ticket booth.

This building is to be a pre-fabricated structure of a single storey height.

4.11.2 Storage Shed

Provision has been made for a future storage shed as part of a future stage of the project on the western side of the existing administration building.

The storage shed will 7.5m x 3m and will have two doors located on the front for access. This building will be used to store maintenance equipment, vessel spares and other general items.

This building is to be pre-fabricated structure of single storey height with Colourbond finish to match the other buildings on site.

4.11.3 Vessel Service Building

The vessel servicing building is located as close as possible to the vessel loading ramps to facilitate crew access for water-side vessel activities. This building replaces the existing facility adjacent to the existing fuel storage at the eastern extent of the site.

The building will store an air compressor, spill kit, waste oil tank, main switchboard and will also have an external shower and hose reel. A service pillar which includes air, power, water and light will also be installed next to this building.

This building is to be pre-fabricated structure of single storey height with Colourbond finish to match the other buildings on site.

4.12 Utilities

4.12.1 Power

Power is currently supplied to the site via overhead electrical lines. A power pole is located in the north western corner of the site.

Energex are currently undertaken a reconfiguration of the lighting and electrical service supply on the Weinam Road and carpark frontage of the site. Energex have been requested to provide a point of supply for a new internal underground power supply network.

Concept designs for the electrical design (based on initial Energex advice for Point of Supply Location) are included in **Appendix H**.

4.12.2 Lighting

The site is currently lit by a non-compliant network of overhead lights co-located with the electrical services.

It is proposed to upgrade this network to a lighting system suitable for the intended carparking use and SeaLink's operational requirements. It is noted that the area will be under traffic control for all hours of use, therefore a level of service appropriate to the use is being considered by the project team to reduce lighting spill and luminance impacts.

Concept designs of the lighting are included in **Appendix H**.

4.12.3 Water

An existing 25mm water meter is located on the southwestern corner of the site. To improve water supply, this service is to be upgraded to a 63mm metered supply.

The old 25mm pipe within site is to be removed and replaced with the larger 63mm pipe.

25mm water services will be maintained to the existing administration building and provided to the ticket booth and the storage shed.

Approval for this service connection has been received from City Water (Redland City Council).

4.12.4 Sewer

Sewer for the site will connect to the existing sewer manhole via the existing discharge connection point within the site. Approval for this service connection has been received from City Water (Redland City Council) (refer **Appendix I**).

The sewer line will service the facilities buildings and will also connect to the sewer pump used to pump waste from vessels.

Vessel sewer discharge is to be undertaken using a combined internal pumped rising main and gravity fed network from the vessel unloading point to the existing sewer discharge point.

4.12.5 Fuel

Fuel lines will be installed underground to connect the fuel discharge points at each berth with the fuel storage tank located at the facility entrance.

These are to be a proprietary system in accordance with the fuel supplier's specifications.

4.13 Miscellaneous Items

Due to the coastal environment, all items proposed for the upgrade of the development are to be suitable for the marine environment.

Equipment to be installed as part of the upgrade include service pedestals, spill kits, waste bins, hose reels, pumps (fuel, sewerage and water), waste oil tank, bike rack area, picnic setting and shade shelter.

Further details on these items can be found in **Appendix G** and in the Landscape Schedule in **Appendix A**.

APPENDIX A

Drawings / Plans

1. These drawings shall be read in conjunction with the specifications, other consultants drawings and specifications, and all authority standard drawings and specifications.
2. Before proceeding with the work any discrepancies in the contract documents shall be referred for decision to the Superintendent.
3. The Contractor shall verify all locations of services prior to construction. The Contractor is responsible for the costs involved in the protection and the repair of any damaged services as a result of the work.
4. All materials and workmanship shall be in accordance with the relevant authority requirements. Where the relevant authority does not stipulate requirements, the Queensland Department of Transport and Main Roads Standard Specifications shall apply.
5. The Contractor shall prepare a Workplace Health and Safety Plan for the project and shall not commence work until it is complete and evidence of such has been provided to the Superintendent.
6. The Contractor shall not commence works until all required insurances are in place and evidence of such has been provided to the Superintendent.
7. The Contractor shall be responsible for notifying all relevant authorities before commencing work. Works shall not commence until pre-start meetings are held with the relevant authorities.
8. Where traffic management is required as part of the works the Contractor shall submit a traffic management plan for approval by the relevant authority prior to commencing work, and shall be responsible for the management of traffic throughout the construction period.
9. The Contractor is responsible for preparing Erosion and Sediment Control Plans, and undertaking Erosion and Sediment Control during construction in accordance with Council and other relevant authority's requirements.
10. The Contractor shall provide a consolidated set of test certificates demonstrating compliance with all construction requirements, along with the required authority CCTV reports at the completion of construction.
11. The Contractor shall be responsible for organising and co-ordinating any required private works that need to be undertaken by the approval authorities.
12. Unless otherwise advised, the Contractor shall be responsible for undertaking As Constructed survey of the works, including ADAC XML files with correct layering, labeling, co-ordinates and level information as per Council and water authority requirements.
13. The Contractor shall make allowance for works to be carried out by other Contractors or the Principal e.g. Electrical, Communications and Landscaping Contractors.
14. All levels are AHD.
15. All dimensions are in metres unless noted otherwise.
16. Scales shown are A1 size unless noted otherwise.
17. Do not scale from drawings.

1. Subgrade test results shall be forwarded to the Superintendent for the determination of pavement thickness prior to the excavation of the pavement box.
2. Tests shall include soaked CBR tests in accordance with Local authority requirements and other tests as requested by the Superintendent.

1. The Contractor shall remove all structures, debris and fences from the site to the satisfaction of the Superintendent.
2. All environmental weeds are to be removed from the site.
3. The existing surface is to be cleared of vegetation matter prior to the start of earthworks operations.
4. All trees that are removed are to be mulched. The mulch is to be stockpiled on site for use in erosion and sediment control or landscaping in a location approved by the Superintendent.
5. Topsoil is to be stripped from all areas of proposed earthworks prior to the start of earthworks operations, and stockpiled in an approved location for re-use at a later date. The depth of topsoil stripping is to be agreed with the Superintendent.
6. If topsoil depth varies from that noted on plans, the Contractor shall advise the Superintendent immediately and seek direction to any required changes to the earthworks operations.
7. All earthworks operations shall be in accordance with Council Standards. Where not specified, allotment fill is to be carried out in accordance with Australian Standard AS3798 "Guidelines on Earthworks for Commercial and Residential Developments (Level 1 Supervision)". All other earthworks operations are to be carried out in accordance with MRTS04.
8. Imported fill material shall be approved by the Superintendent prior to commencing filling operations.
9. Earthworks are not to proceed past the following hold points until approval to proceed by the Superintendent is issued in writing:
 - After stripping topsoil, prior to undertaking any filling operations.
 - After laying subsoil drainage pipes, prior to backfilling.
 - After subgrade preparation, prior to placing pavement materials. (Note that a subgrade proof roll, inspected by the Superintendent, will be done after the installation of subsoil drains, unless the subsoil drains extend through the subbase, in which case the subgrade and subbase proof rolls will be required).
 - After completion of earthworks (including any necessary batter tining), prior to commencing topsoiling.
 - After completion of topsoiling, prior to laying turf, spraying hydromulch, spreading seed or mulch, or laying geofabric.
10. Topsoil is to be re-spread 75mm to 100mm thick on all footpaths, batters and lots within the limits of earthworks shown on the drawings unless noted otherwise in writing by the Superintendent.
11. Unless noted otherwise, the finished surface levels shown on the plans shall be the final levels after placement of surface coverings e.g. topsoil, turf, mulch, rock-lining etc.

1. The bioretention swale is to be used as a sedimentation basin during construction. De-watering shall not occur from the swale until testing confirms that it complies with Council Regulation.
2. Stormwater drainage infrastructure will not be accepted as on-maintenance until the site is stabilised through the provision of at least 80-90% ground cover as determined on site by Council's Compliance Coordinator.
3. The subsoil drains, filter media, topsoil and jute matting in the bioretention basin shall not be installed until 80-90% ground cover is achieved across the site. Council inspection hold points are required after installation of subsoil drains and after installation of filter media.
4. Immediately following installation of the filter media with the bioretention basin, the base of the entire swale shall be covered with BIDIM A24 Geofabric, 100mm of topsoil and turf.
5. All Materials to meet FAWB – Guidelines for Filter Media and Biofiltration Systems (V3.01 June 2009).

1. All stormwater drainage materials and construction standards including pipes, box culverts, pits, manholes, bedding, backfilling and testing (including CCTV) shall be in accordance with Council requirements.
2. All pipe sizes are in millimetres. All dimensions, lengths etc are in metres unless noted otherwise.
3. All Stormwater pipes (except inter-allotment drainage) to be RCP class 2 with RRJ joints unless noted otherwise, or otherwise required by Council.
4. The stormwater pipe classes have been designed for service loads only. The Contractor shall assess anticipated construction loads and upgrade the pipe classes, if necessary, in accordance with the Australian Standards at their own cost.
5. All manholes and property pits shall be constructed to match finished surface levels and slopes. The Contractor should confirm finished surface levels prior to pit construction.
6. Unless noted otherwise or otherwise required by the local authority, gully pits to be in accordance with IPWEAQ Standard Drawing DS-063. Field inlet pits to be in accordance with IPWEAQ Standard Drawing DS-050.
7. For pit reinforcement details refer to TMR Standard Drawings 1311 and 1307.
8. Setout for field inlets and manholes are to the centre of chamber unless otherwise noted.
9. All pipe/box culvert extensions will be on the same grade and alignment as existing unless noted otherwise.
10. The line, level and cross section of all open drains shall be inspected by the Superintendent prior to the installation of lining (e.g. geofabric, rock, topsoil and turf). The Contractor shall not proceed past this hold point until the Superintendent's approval is issued in writing.

1. Prior to the construction of slab on ground, all topsoil and organic material shall be stripped from the site.
2. The subgrade beneath the concrete pavement shall be well compacted so as to provide no visible movement when proof rolled with a fully loaded water truck. Soft material shall be removed if required.
3. Unbound sub-base shall be well compacted type 2.5 crushed rock.
4. Unless noted otherwise PE plastic watertight membrane (minimum 200µm thickness) shall be placed over the subbase.
5. Unless noted otherwise, concrete pavements shall be N32 grade with SL72 mesh. Where pavement depths are greater than 150mm use SL82 mesh.
6. Minimum cover to be 40mm for slab thicknesses <150mm, and 50mm for slab thicknesses >150mm.
7. All joints to be Connolly preformed steel straight up contraction joints with permanent PVC capping with tear off strip unless otherwise shown or approved in writing by the Superintendent.
8. Contraction joints shall be provided at a maximum spacing of (1.5 x width) centres and expansion joints shall be provided at a maximum spacing of (6.0xWidth) unless approved otherwise.
9. If alternative joints are approved, saw cutting for joints shall occur whilst the concrete is still "green". i.e. as soon as the concrete can be walked on.
10. For expansion joints the material for the expansion wedge shall be a 10mm thick closed cell PE foam or approved equivalent.
11. The method of concrete curing shall generally be in accordance with the requirements of MRTS70 and shall be approved by the Superintendent prior to construction commencing.
12. To prevent evaporation during finishing an evaporation retardant shall be applied to the surface of the concrete immediately after the initial spreading has been completed, unless otherwise approved by the Superintendent.
13. Concrete testing requirements shall generally be in accordance with the requirements of MRTS70. A copy of the test results shall be given to Superintendent following construction.
14. Laps shall be such that the two outermost wires of one sheet of fabric overlap with the outermost wire of the sheet being overlapped.
15. Lapped portions shall be tied with wire at a maximum spacing of 500mm.
16. Reinforcement mesh shall be supported on chairs in a regular grid not exceeding 1.0m.
17. All dowels shall be 450mm long. For slab thicknesses <140mm use 16x16 square dowels; for slab thicknesses <160mm use 20x20 square dowels; for slab thicknesses <190mm use 24x24 square dowels.
18. Joint sealants shall be silicon and shall be installed in accordance with the manufacturers recommendations.
19. Unless noted otherwise all concrete shall be broomed finished. If exposed aggregate surfacing is specified a minimum aggregate PSV of 48 shall be used.
20. All concrete shall be thoroughly compacted with surface and/or immersion vibrators particularly around reinforcement and at corners of forms.
21. Concrete pavements shall not be trafficked inside of 7 days after placement.
22. All dowels shall be supported by preformed joints or on cradles and should not be tied to the reinforcement mesh.
23. The Superintendent shall undertake subgrade and prepour inspections. The Contractor shall not proceed past these hold points until the Superintendent's approval is issued in writing.

1. All Water reticulation materials and construction standards including pipes, valves, hydrants, conduits, tees, bends, markers, bedding, backfilling and testing shall be in accordance with the Water Authority's requirements.
2. All work on existing water reticulation to be coordinated by Contractor and carried out by the Water Authority (or Contractor if approved by the Water Authority) at Developer's expense.
3. Unless noted otherwise or otherwise required by the Water Authority.
 - All water mains to be PVC-O series 2 PN16 RRJ:
 - All water service conduits to be Ø100 PVC-U Class 12
 - Water services shall be 32mm OD PE100 PN16 MDPE
 - Fire Hydrant Tee's and risers to be DN100
4. The nominated material types and classes do not allow for construction loading. The Contractor shall assess construction loadings and upgrade the pipe types or classes as necessary and obtain the Water Authority's approval.
5. Blue raised reflective pavement markers are required on the road centreline adjacent to hydrants. (In addition to pavement marking and hydrant marker post requirements.)
6. Brass "W" markers to be installed in kerb where water mains or water service conduits cross below.
7. Unless otherwise specified all materials and workmanship shall comply with the relevant Australian Standard.
8. All fittings, pipes etc. to be provided by the Contractor, except water meters, which shall be purchased from the Water Authorities.

	Lease boundary
	Property boundary
	Stormwater
	Stormwater (DBYD)
	Sewer (DBYD)
	Sewer rising main (DBYD)
	Sewer main
	Sewer rising main
	Water (DBYD)
	Water
	Telecomms underground (DBYD)
	Telecomms NBN (DBYD)
	Electrical aboveground
	Eeectrical underground
	Compressed air line
	Fuel line
	Top of wall
	1.2m High weld mesh fence
	1.5m High pool type fence
	Safety bollard (Staged construction)
	Dredging base
	HAT level
	MHWS level
	M.S.L level
	LAT level
	Priority development area boundary

	Road pavement		TURFPRO™ grass pavers
	Landscaping		Landscaping bioswale
	Footpath		Planter box and landscaping
	Rock batters		Indisposable dredging material
	Gravel base		

1. All Sewer materials and construction standards including pipes, manholes, bedding, backfilling and testing (including CCTV) shall be in accordance with the Sewer Authority's requirements.
2. Sewers to be laid in accordance with the Sewer Authority's Standard Drawings and Specifications.
3. Where sewers are laid in fill, such fill shall be compacted 95% standard A.A.S.H.O. in maximum layers of 150mm. Proof of compaction is to be submitted to the Superintendent.
4. Unless noted otherwise on sewer longitudinal section or otherwise required by Council, Sewer pipes shall be spigot/socket $\varnothing 150\text{mm}$ PVC-U (SN8) or (PN12) where depth is greater than 3.0m. Where ductile iron pipe is specified, it shall be class PN35 heavy cement lined.
5. All work on existing sewers to be coordinated by Contractor and carried out by the Sewer Authority (or Contractor if approved by the Sewer Authority) at Developer's expense. This includes requests for quotations for live connections.
6. Minimum clear cover to be 0.6m in all lots and 0.9m in road reserve. Additional depth may be required by Service Authority in lots and footpaths where access driveways are to be constructed.
7. The preferred sewer alignment is 1.0m to 1.5m from side and rear boundaries.
8. Drops to be internal in D.I.C.L. or PVC.
9. Manhole covers shall be Class B 600mm clear opening ductile iron covers and cast iron frames. Class D covers to be used in roads and driveways. Where finished manhole surface levels are below Q100, bolt down lids to be used.
10. Where sewer manholes are located in roads or driveways, the finished surface of the manhole cover shall be constructed to match the level and grade of the finished surface and have class D cast iron cover.

1. All works to join smoothly and neatly to existing works.
2. All signs, pavement markings, chevron pavement markings and raised pavement markers shall be in accordance with TMR's Manual of Uniform Traffic Control Devices (MUTCD).
3. Tactile Ground Surface Indicators are to be installed as per TMR standard drawing KRG1.
4. Pavement Markings to be verified by the Superintendent.
5. Sign clearances of 1.0m for cyclists in accordance with Austroads Guide to Road Design Part 6A Section 7.7.1.
6. All existing pavement marking within the extents of works that is not being removed by pavement works is to be removed by grinding.

ProjexPartners PROJECT MANAGEMENT ENGINEERING PLANNING Ph: 1300 789 214 www.projexpartners.com.au	PENSAR STRUCTURES	CLIENT										ENGINEERING CERTIFICATION (RPEQ)										SCALE	REDLAND BAY FERRY TERMINAL									
												ENG. AREA	NAME	SIGNATURE				No.	DATE		NOTES AND LEGEND											
												CIVIL	D BERRY					6343	10/4/2026													
		A	ISSUED FOR CONSTRUCTION										10/4/2026	JDB	JM	DB	6343	DB	DRAWING NUMBER 497-001.02-C001-01 No IN SET 2 OF 35 REVISION A													
		Rev.	Description										Date	Drawn	Design	Check	RPEQ No. & Initial															



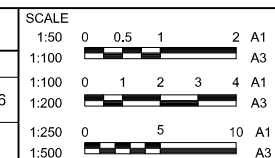
- D50 = 0.40m
- M50 = 173kg
- Armour is to be placed to ensure interlocking is achieved

The diagram illustrates a cross-section of a coastal defense structure. The top layer is 'New pavement - refer Pavement Details drawing' with a width of 2.9. Below this is 'Site won material (General Fill as per TMR MRTS04)'. The structure is built on a slope with a 1 on 1.5 ratio. The slope is covered with 'Type A - Primary Rock Armour d50 - 0.90m nom.' and 'Type B - Secondary Rock Armour d50 - 0.4m nom.'. A 'Geotextile - refer table for material properties' is shown at the base of the slope. The 'Existing ground surface' is indicated by a dashed line. 'Crushed Rock. Refer TMR Standard Drawing 4021' is shown in the lower part of the structure. The bottom layer is 'Seabed -3.35'. The diagram also shows 'Geofabric A34 or approved equivalent' and 'Minimum 0.5 x d50 embedment to sound material as approved Administrator (refer Note 5)'. The diagram includes a table with 'G Rating' and '3000'.

G Rating	3000
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H.A.T. 1.65
M.H.W.S. 1.04
M.S.L. 0.02
L.A.T. -1.33
Seabed -3.35

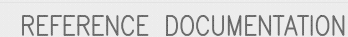
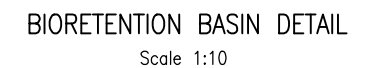
Labels in diagram:
- Site won material (General Fill as per TMR MRTS04)
- New pavement - refer Pavement Details drawing
- 2.9
- Geofabric A34 or approved equivalent
- Existing ground surface
- Crushed Rock. Refer TMR Standard Drawing 4021
- Type A - Primary Rock Armour d50 - 0.90m nom.
- Type B - Secondary Rock Armour d50 - 0.4m nom.
- Geotextile - refer table for material properties
- 1 on 1.5
- Minimum 0.5 x d50 embedment to sound material as approved Administrator (refer Note 5)
- Seabed -3.35



1	DRAWING NUMBER	497-001.02-C005-01	No IN SET	REVISION
3			3 OF 35	A

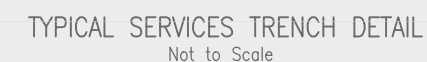


- ## SPECIES LIST
- Landscaping with salt tolerant planting:
- Lucia – *Dianella Caerulea*
 - Aussie Rambler – *Carbottus Glaucescens*
 - Little Jess – *Dianella Caerulea*
 - *Ficinia Nodosa* (Knotted Clubrush)
 - *Juncus Kraussii* (Rush)
- Spacing at 3 plants per linear metre

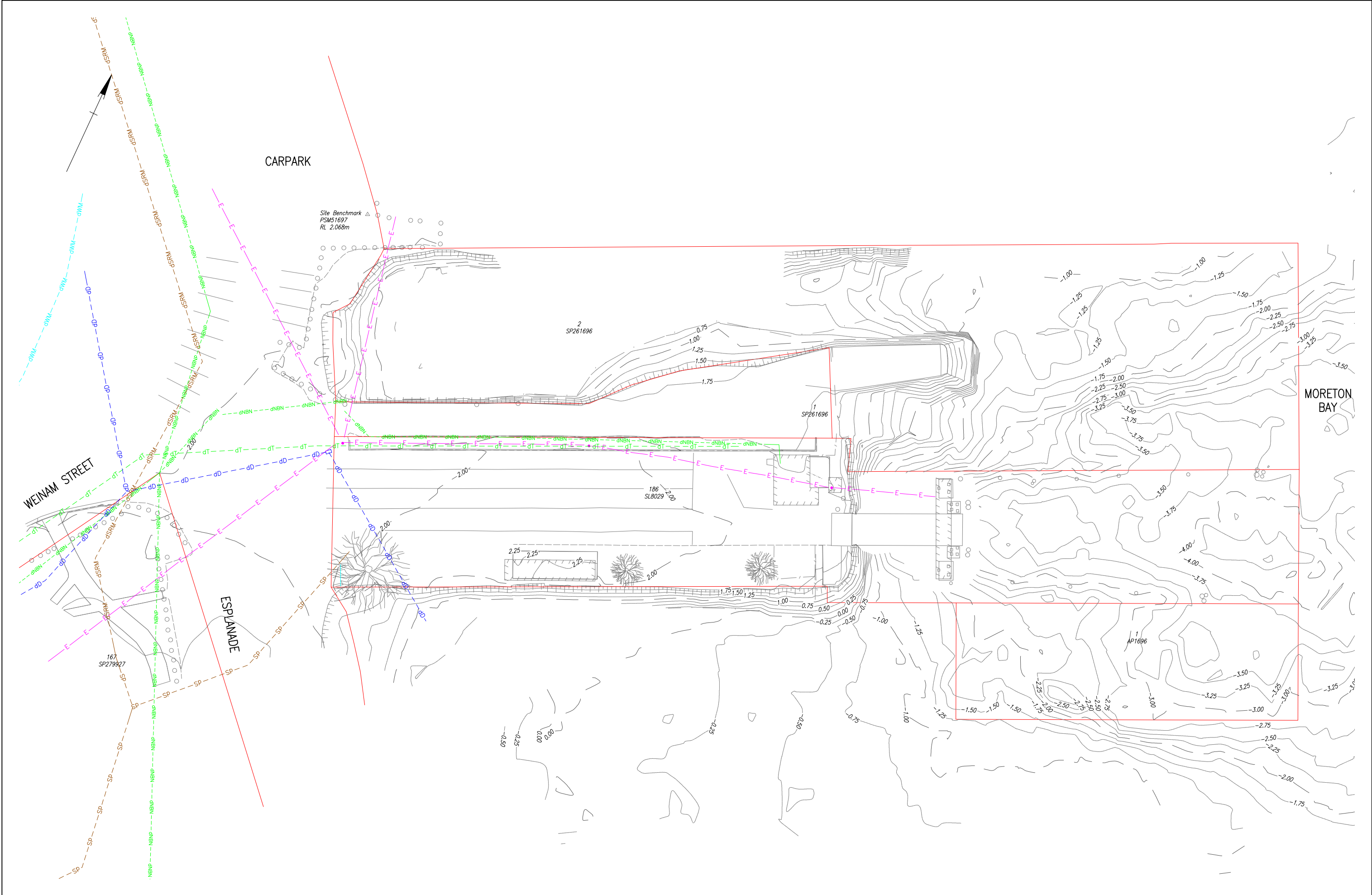


1. Landing Ramp Terminal Link Span detail refer to Hardwood Marine Dwg HWM210206-S-01.
2. Landing ramp vessel beggers information provided by Sea Transport.
3. Landing ramp abutment details refer to Marsden Glersing DWG 1716A-DWG-001.
4. End stop pile details refer International Marina Consultants DWG 5963-SK1/A.

TYPICAL SECTION LANDING RAMP
Scale 1:125



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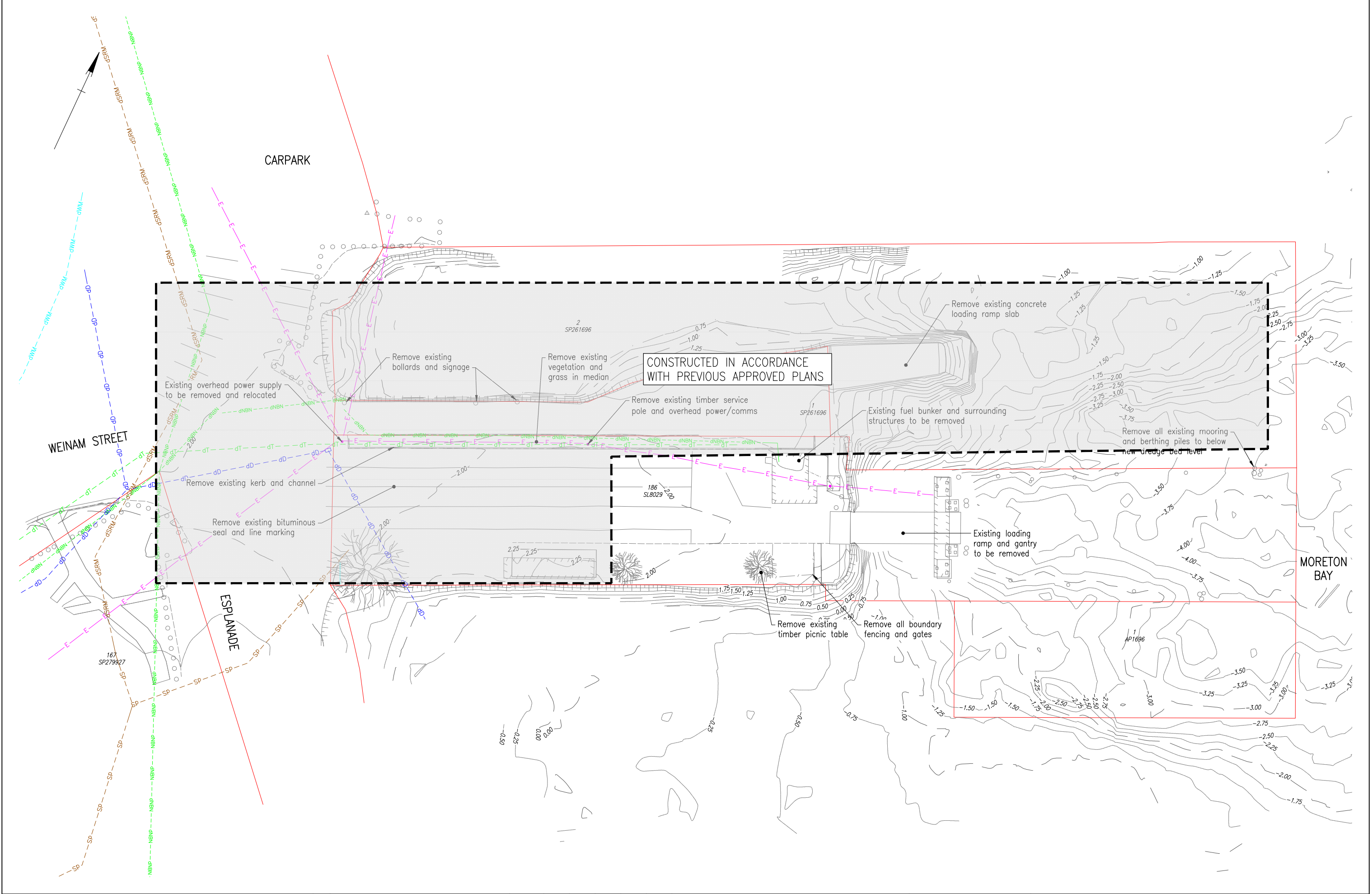
Rev.	Description	Date	Drawn	Design	Check	RPEQ No. & Initial
A	ISSUED FOR CONSTRUCTION	10/4/2026	JDB	JM	DB	6343 DB

ENGINEERING CERTIFICATION (RPEQ)			
ENG. AREA	NAME	SIGNATURE	No. DATE
CIVIL	D BERRY		6343 10/4/2026

SCALE	
1:250	0 5 10 A1
1:500	A3

REDLAND BAY FERRY TERMINAL		
EXISTING FEATURES AND SERVICES		
DRAWING NUMBER	497-001.02-C010-01	No IN SET 5 OF 35
		REVISION A

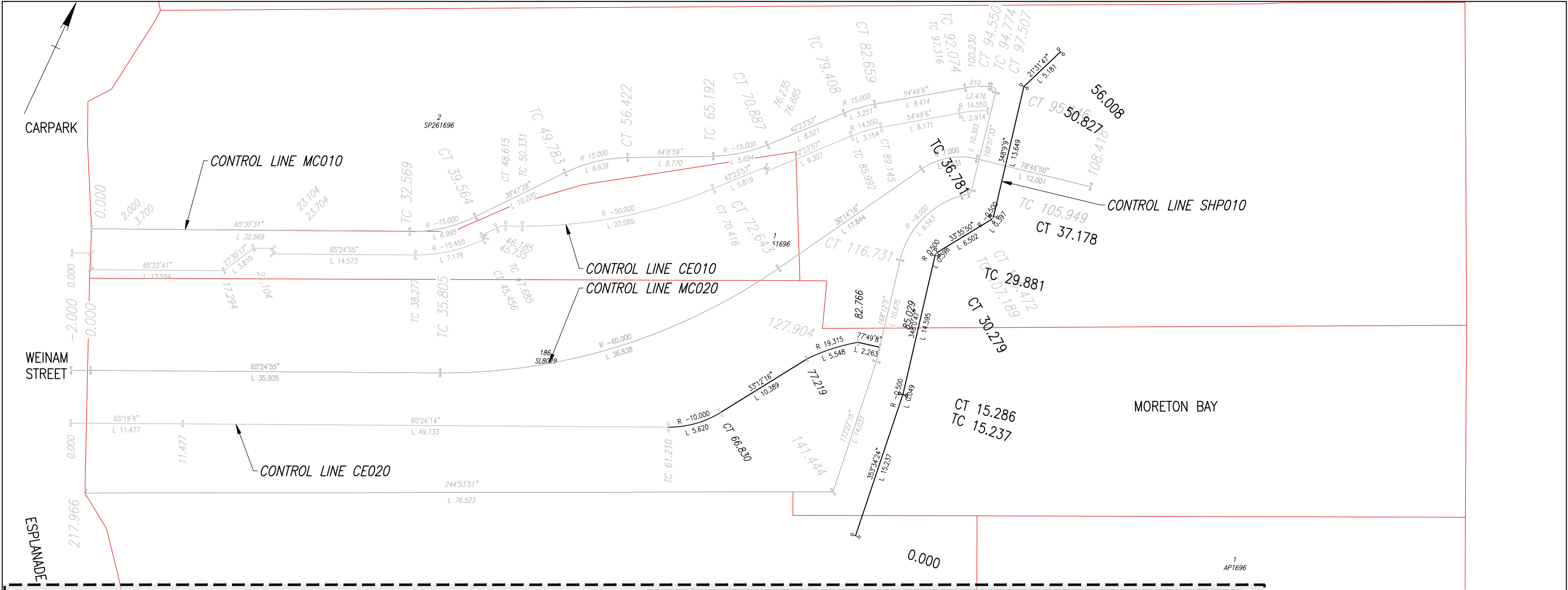
Last Modified - Apr 10, 2026 - 3:25pm C:\124\SiteData\AS-P-01497-001 RBay Ferry_22540\Design\AutoCAD\DRAWINGS STG2497-001.02-C020-DP-01.dwg By - JaredBraganza



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CONTROL LINE MC010 SETOUT								
PT	CHAINAGE	EASTING	NORTHING	HEIGHT	BEARING	RAD/SPIRAL	A.LENGTH	DEFL.ANGLE
IP 1	0.000	530468.404	6945349.212	1.817	65°30'30.81"			
TC	32.569	530498.043	6945362.713	1.817	65°30'30.81"			
IP 2	36.066	530501.284	6945364.190	1.817		R = -15.000	6.995	26°43'02.65"
CT	39.564	530503.516	6945366.967	1.817	38°47'28.16"			
TC	49.783	530509.918	6945374.932	1.817	38°47'28.16"			
IP 3	53.103	530512.033	6945377.562	1.817		R = 15.000	6.639	25°21'31.09"
CT	56.422	530515.070	6945379.034	1.817	64°08'59.25"			
TC	65.192	530522.962	6945382.858	1.817	64°08'59.25"			
IP 4	68.040	530525.556	6945384.114	1.817		R = -15.000	5.694	21°45'02.13"
CT	70.887	530527.499	6945386.243	1.817	42°23'57.12"			
TC	79.408	530533.245	6945392.535	1.817	42°23'57.12"			
IP 5	81.034	530534.345	6945393.741	1.817				
CT	82.659	530535.679	6945394.681	1.817	54°49'06.45"			
TC	92.074	530543.374	6945400.105	1.817	54°49'06.45"			
IP 6	93.312	530544.391	6945400.822	1.817		R = 10.000	2.476	14°11'14.70"
CT	94.550	530545.553	6945401.268	1.817	69°00'21.15"			
TC	94.774	530545.762	6945401.348	1.817	69°00'21.15"			
IP 7	95.210	530546.318	6945401.561	1.817		R = 0.500	0.872	99°57'11.90"
CT	95.646	530546.432	6945400.977	1.817	168°57'33.05"			
TC	105.949	530548.405	6945390.865	1.817	168°57'33.05"			
IP 8	106.210	530548.460	6945390.582	1.817		R = 0.500	0.524	59°59'29.80"
CT	106.472	530548.242	6945390.392	1.817	228°57'02.85"			
TC	107.189	530547.702	6945389.922	1.817	228°57'02.85"			
IP 9	111.960	530543.724	6945386.458	1.817		R = -9.000	9.543	60°44'58.09"
CT	116.731	530544.802	6945381.294	1.817	168°12'04.76"			
IP 10	127.406	530546.985	6945370.845	1.817				
IP 11	141.444	530548.606	6945356.901	1.851				
IP 12	217.966	530479.310	6945324.437	2.157	244°53'50.80"			

CONSTRUCTED IN ACCORDANCE
WITH PREVIOUS APPROVED PLANS

CONTROL LINE MC020 SETOUT								
PT	CHAINAGE	EASTING	NORTHING	HEIGHT	BEARING	RAD/SPIRAL	A.LENGTH	DEFL.ANGLE
TC	35.805	530506.996	6945350.923	2.250	65°24'54.70"			
IP 2	54.224	530524.292	6945358.836	2.136		R = -60.000	36.838	35°10'38.59"
CT	72.643	530533.871	6945375.268	2.021	30°14'16.11"			
TC	90.487	530542.856	6945390.684	1.911	30°14'16.11"			
IP 3	93.452	530544.446	6945393.411	1.893		R = 7.000	5.931	48°32'33.91"
CT	96.417	530547.542	6945394.025	1.874	78°46'50.02"			
IP 4	108.418	530559.313	6945396.360	1.800	78°46'50.02"			

CONTROL LINE SHP010 SETOUT							
PT	CHAINAGE	EASTING	NORTHING	HEIGHT	RADIUS	A.LENGTH	DEFL.ANGLE
IP 1	0.000	530552.593	6945353.775	-1.000			
IP 2	15.261	530550.885	6945368.940	0.101	-0.500	0.049	5°33'36.66"
IP 3	30.080	530547.805	6945383.447	0.020	0.500	0.398	45°35'02.69"
IP 4	36.979	530551.635	6945389.212	0.020	-0.500	0.397	45°26'40.52"
IP 5	50.827	530548.790	6945402.776	0.020			
IP 6	56.008	530550.691	6945407.595	0.020			



ENGINEERING CERTIFICATION (RPEQ)							
ENG. AREA	NAME	SIGNATURE	No.	DATE			
CIVIL	D BERRY		6343	10/4/2026			
A	ISSUED FOR CONSTRUCTION		10/4/2026	JDB	JM	DB	6343
Rev.	Description	Date	Drawn	Design	Check	RPEQ No. & Initial	

SCALE	
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1:400	A3

REDLAND BAY FERRY TERMINAL		
CONTROL LINE SETOUT		
DRAWING NUMBER	497-001.02-C025-01	
No IN SET	7 OF 35	REVISION A

Last Modified - Apr 10, 2026 - 3:26pm C:\2d\data\A-P-01\497-001 RBay Ferry_22540\Design\AutoCAD_DRAWINGS ST\G2\497-001.02-C025-CL-02.dwg By - JaredBraganza

CONTROL LINE CE010 SETOUT								
PT	CHAINAGE	EASTING	NORTHING	HEIGHT	BEARING	RAD/SPIRAL	A.LENGTH	DEFL.ANGLE
IP 1	0.000	530467.626	6945346.106	1.866	65°24'54.70"			
IP 2	2.000	530469.444	6945346.938	1.832				
IP 3	3.700	530470.152	6945345.392	1.839				
	5.000	530471.334	6945345.934	1.850	65°22'41.12"			
	10.000	530475.879	6945348.017	1.893	65°22'41.12"			
	15.000	530480.424	6945350.100	1.937	65°22'41.12"			
	17.294	530482.509	6945351.056	1.956				
	20.000	530483.759	6945353.456	1.912	27°30'16.82"			
IP 5	21.104	530484.269	6945354.436	1.887				
	23.104	530486.088	6945355.268	1.867				
	23.704	530486.337	6945354.722	1.907				
	25.000	530487.516	6945355.261	1.906	65°24'54.70"			
	30.000	530492.063	6945357.342	1.900	65°24'54.70"			
	35.000	530496.609	6945359.422	1.895	65°24'54.70"			
TC	38.277	530499.589	6945360.785	1.892	65°24'54.70"			
	40.000	530501.113	6945361.588	1.891	59°01'25.71"			
IP 8	41.866	530502.913	6945362.306	1.889		R = −15.450	7.179	26°37'26.54"
	45.000	530504.913	6945364.804	1.883	40°28'53.34"			
CT	45.456	530505.203	6945365.155	1.882	38°4	CONSTRUCTED IN ACCORDANCE WITH PREVIOUS APPROVED PLANS		
IP 9	45.735	530505.378	6945365.373	1.881				
IP 10	46.185	530505.028	6945365.655	1.841				
TC	47.685	530505.967	6945366.824	1.866	38°47'28.16"			
IP 11	48.150	530506.264	6945367.193	1.867		R = 2.000	0.929	26°37'26.54"
	48.615	530506.694	6945367.390	1.869	65°24'54.70"			
CT	50.000	530507.954	6945367.966	1.880	65°24'54.70"			
	50.331	530508.255	6945368.104	1.882	65°24'54.70"			
TC	55.000	530512.404	6945370.242	1.905	60°03'54.26"			
	60.000	530516.605	6945372.949	1.912	54°20'07.78"			
IP 12	60.374	530517.512	6945372.339	1.912		R = −50.000	20.085	23°00'57.58"
	65.000	530520.515	6945376.062	1.899	48°36'21.30"			
	70.000	530524.094	6945379.550	1.877	42°52'34.82"			
CT	70.416	530524.376	6945379.857	1.875	42°23'57.12"			
	75.000	530527.467	6945383.241	1.826	42°23'57.12"			
IP 13	76.235	530528.300	6945384.153	1.816				
IP 14	76.685	530528.632	6945383.850	1.857				
	80.000	530530.867	6945386.298	1.854	42°23'57.12"			
	85.000	530534.239	6945389.990	1.850	42°23'57.12"			
	85.992	530534.907	6945390.723	1.849	42°23'57.12"			
IP 15	87.568	530535.975	6945391.892	1.848		R = 14.550	3.154	12°25'09.35"
	89.145	530537.269	6945392.804	1.848	54°49'06.47"			
	90.000	530537.967	6945393.296	1.848	54°49'06.47"			
	95.000	530542.054	6945396.177	1.845	54°49'06.47"			
	97.316	530543.947	6945397.511	1.841	54°49'06.47"			
TC	98.773	530545.142	6945398.354	1.839		R = 14.550	2.914	11°28'33.35"
	100.000	530546.270	6945398.847	1.837	65°23'16.22"			
IP 17	100.230	530546.481	6945398.942	1.836	66°17'39.82"			

CONTROL LINE CE020 SETOUT								
PT	CHAINAGE	EASTING	NORTHING	HEIGHT	BEARING	RAD/SPIRAL	A.LENGTH	DEFL.ANGLE
IP 1	0.000	530474.873	6945330.266	1.893	65°19'06.22"			
	5.000	530479.416	6945332.354	1.957	65°19'06.22"			
	10.000	530483.959	6945334.442	2.065	65°19'06.22"			
IP 2	11.477	530485.301	6945335.059	2.097				
	15.000	530488.505	6945336.525	2.173	65°24'13.59"			
	20.000	530493.051	6945338.606	2.225	65°24'13.59"			
	25.000	530497.597	6945340.687	2.194	65°24'13.59"			
	30.000	530502.144	6945342.768	2.163	65°24'13.59"			
	35.000	530506.690	6945344.849	2.132	65°24'13.59"			
	40.000	530511.236	6945346.930	2.101	65°24'13.59"			
	45.000	530515.783	6945349.011	2.071	65°24'13.59"			
	50.000	530520.329	6945351.093	2.041	65°24'13.59"			
	55.000	530524.875	6945353.174	2.002	65°24'13.59"			
	60.000	530529.422	6945355.255	1.947	65°24'13.59"			
TC	61.210	530530.521	6945355.758	1.933	65°24'13.59"			
IP 3	64.020	530533.146	6945356.960	1.906		R = −10.000	5.620	32°11'57.96"
	65.000	530533.590	6945357.944	1.900	43°41'13.95"			
CT	66.830	530534.726	6945359.375	1.892	33°12'15.63"			
	70.000	530536.463	6945362.027	1.883	33°12'15.63"			
	75.000	530539.201	6945366.211	1.862	33°12'15.63"			
IP 4	77.219	530540.416	6945368.067	1.850				
	79.992	530542.162	6945370.247	1.825		R = 19.315	5.548	16°27'22.66"
IP 5	80.000	530542.305	6945370.106	1.825	46°56'52.13"			
	82.766	530544.454	6945371.843	1.789				
IP 6	85.000	530546.638	6945372.314	1.747	77°49'07.93"			
	85.029	530546.666	6945372.321	1.747	77°49'07.93"			

CONTROL LINE DG010 SETOUT							
PT	CHAINAGE	EASTING	NORTHING	HEIGHT	RADIUS	A.LENGTH	DEFL.ANGLE
IP 1	0.000	530543.701	6945400.369	−3.350			
IP 2	4.980	530542.437	6945406.319	−3.350	5.000	7.912	90°40'10.60"
IP 3	63.620	530601.018	6945418.043	−3.350			
IP 4	63.765	530601.162	6945418.061	−3.350			
IP 5	105.878	530616.684	6945378.914	−3.350			
IP 6	122.398	530620.156	6945359.692	−3.350	15.000	23.136	88°22'20.50"
IP 7	186.656	530553.022	6945345.585	−3.350	5.000	8.322	95°22'00.94"
IP 8	208.959	530550.347	6945369.067	−3.350			
IP 9	223.764	530547.272	6945383.548	−3.350			
IP 10	230.686	530551.103	6945389.315	−3.350			
IP 11	246.289	530547.899	6945404.585	−3.350			

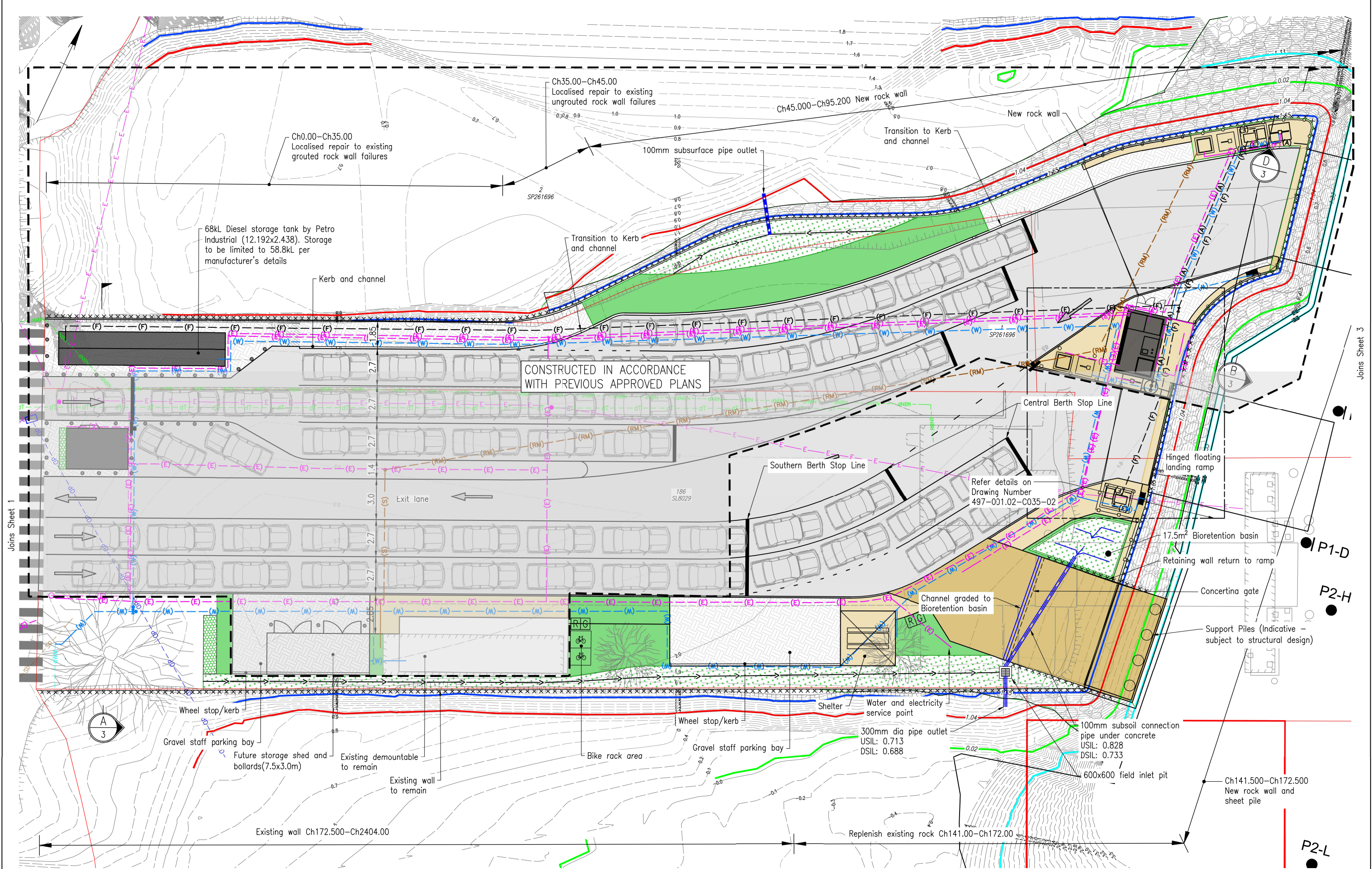
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Rev.	Description	Date	Drawn	Design	Check	RPEQ No.	& Initial		

ENGINEERING CERTIFICATION (RPEQ)				
ENG. AREA	NAME	SIGNATURE	No.	DATE
CIVIL	D BERRY		6343	10/4/2026

SCALE

REDLAND BAY FERRY TERMINAL		
CONTROL LINE SETOUT TABLES		
DRAWING NUMBER	497-001.02-C025-02	
No IN SET	8 OF 35	REVISION
		A

Last Modified - Apr 10, 2026 - 3:27pm C:\24\5\4\1\A\1\497-001 RBay Ferry_22540\Design\AutoCAD_ DRAWINGS STG\497-001.02-C030-GA-02.dwg By - Jared Braganza



REVISION		DATE		DRAWN		DESIGN		CHECK		RPEQ No. & Initial	
A	ISSUED FOR CONSTRUCTION	10/4/2026	JDB	JM	DB	6343	DB				
Rev.	Description	Date	Drawn	Design	Check	RPEQ No.	Initial				

ENGINEERING CERTIFICATION (RPEQ)			
ENG. AREA	NAME	SIGNATURE	DATE
CIVIL	D BERRY		10/4/2026

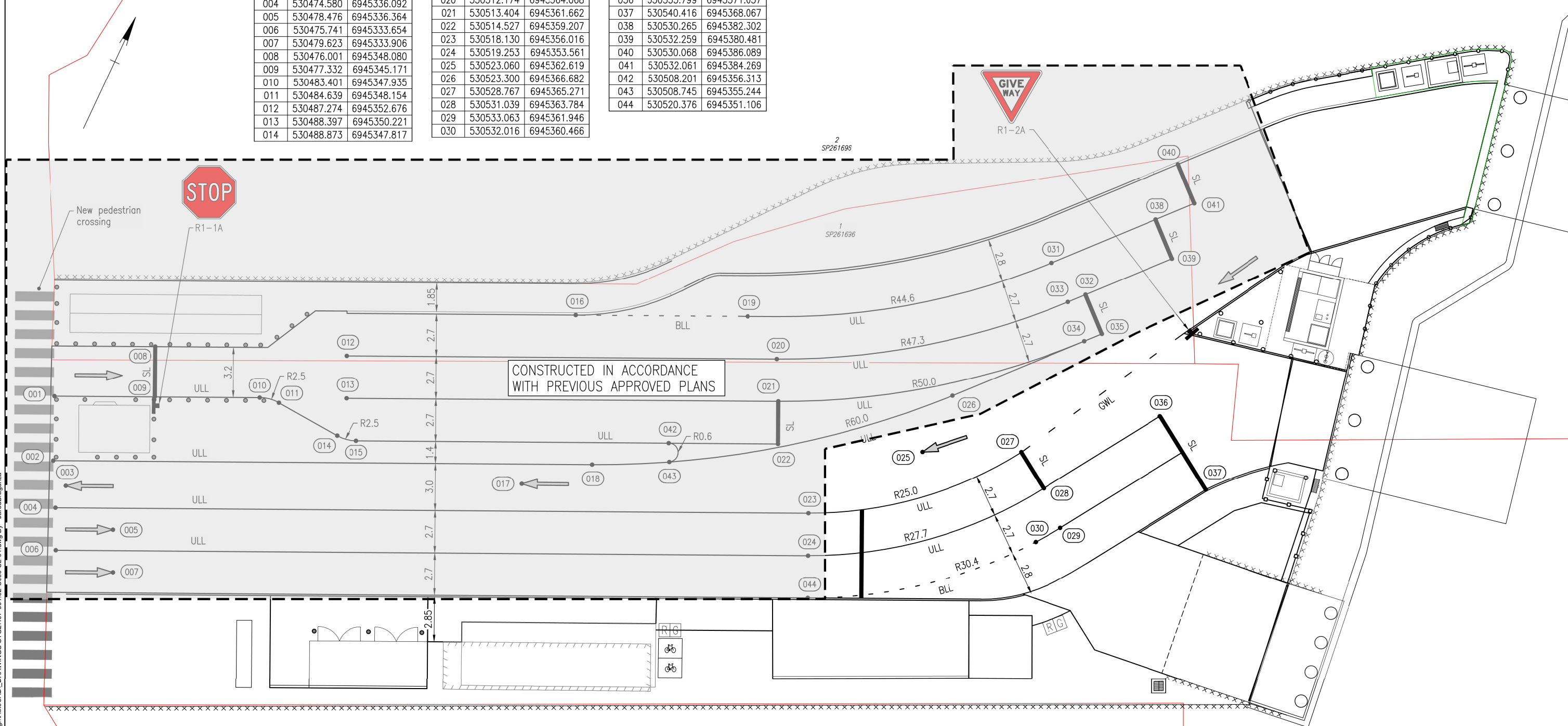
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REDLAND BAY FERRY TERMINAL		
GENERAL ARRANGEMENT SHEET 2		
DRAWING NUMBER	497-001.02-C030-02	NO IN SET 10 OF 35
REVISION	A	

POINT	EASTING	NORTHING
001	530471.528	6945342.503
002	530473.189	6945338.754
003	530474.590	6945337.631
004	530474.580	6945336.092
005	530478.476	6945336.364
006	530475.741	6945333.654
007	530479.623	6945333.906
008	530476.001	6945348.080
009	530477.332	6945345.171
010	530483.401	6945347.935
011	530484.639	6945348.154
012	530487.274	6945352.676
013	530488.397	6945350.221
014	530488.873	6945347.817

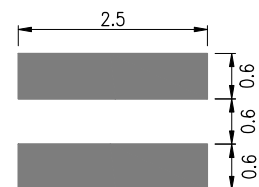
015	530490.111	6945348.036
016	530499.402	6945361.194
017	530500.806	6945350.004
018	530504.355	6945353.013
019	530509.337	6945365.740
020	530512.174	6945364.068
021	530513.404	6945361.662
022	530514.527	6945359.207
023	530518.130	6945356.016
024	530519.253	6945355.516
025	530523.060	6945362.619
026	530523.300	6945366.682
027	530528.767	6945365.271
028	530531.039	6945363.784
029	530533.063	6945361.946
030	530532.016	6945360.466

031	530525.431	6945377.007
032	530528.241	6945376.081
033	530527.425	6945375.186
034	530529.418	6945373.366
035	530530.235	6945374.260
036	530535.799	6945371.157
037	530540.416	6945368.067
038	530530.265	6945382.302
039	530532.259	6945380.481
040	530530.068	6945386.089
041	530532.061	6945384.269
042	530508.201	6945356.313
043	530508.745	6945355.244
044	530520.376	6945351.106



T Proposed Sign

ULL	Unbroken Lane Line
BLL	Broken Lane Line
SL	Stop Line
GWL	Give Way Line
EL	Edge Line



PEDESTRIAN CROSSING DETAIL
Scale 1:50

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									ENGINEERING CERTIFICATION (RPEQ)				
									ENG. AREA	NAME	SIGNATURE	No.	DATE
									CIVIL	D BERRY		6343	10/4/2026
A	ISSUED FOR CONSTRUCTION		10/4/2026	JDB	JM	DB	6343	DB					
Rev.	Description		Date	Drawn	Design	Check	RPEQ No. & Initial						

	SCALE
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REDLAND BAY FERRY TERMINAL

SIGNS AND LINEMARKING

DRAWING NUMBER	497-001.02-C060-01
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No IN SET	REVISION
15 OF 35	A

SHOWN CONTOUR	TIDAL DATUM LEVEL	AHD LEVEL
HAT	2.98	1.65
MHWS	2.37	1.04
M.S.L	1.35	0.02
MLWS	0.40	-0.93
LAT	0.00	-1.33

CONTOUR DATUM/LEVELS

SHOWN CONTOUR	TIDAL DATUM LEVEL	AHD LEVEL
HAT	2.98	1.65
MHWS	2.37	1.04
M.S.L.	1.35	0.02
MLWS	0.40	-0.93
LAT	0.00	-1.33

Contours shown to AHD to match ground survey.

DREDGING LEGEND

- HAT level
- MHWS level
- MSL level
- LAT level
- Priority Development
- Area Boundary
- Earthworks Area of Cut

Dredge Bed Level
 -2.22 Tidal Datum
 -3.35 AHD Level

Cut Volume = 3490m³

HAT level
 MHWS level
 MSL level
 LAT level
 Priority Development Area Boundary
 Earthworks Area of Cut
 Material Unsuitable for Offshore Disposal

NOTE
For Control Line DG010 setout, refer to Control Line Setout Tables plan.

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STRUCTURES

								ENGINEERING CERTIFICATION (RPEQ)				
								ENG. AREA	NAME	SIGNATURE	No.	DATE
								CIVIL	D BERRY		6343	10/4/2026
A	ISSUED FOR CONSTRUCTION		10/4/2026	JDB	JM	DB	6343	DB				
Rev.	Description		Date	Drawn	Design	Check	RPEQ No. & Initial					

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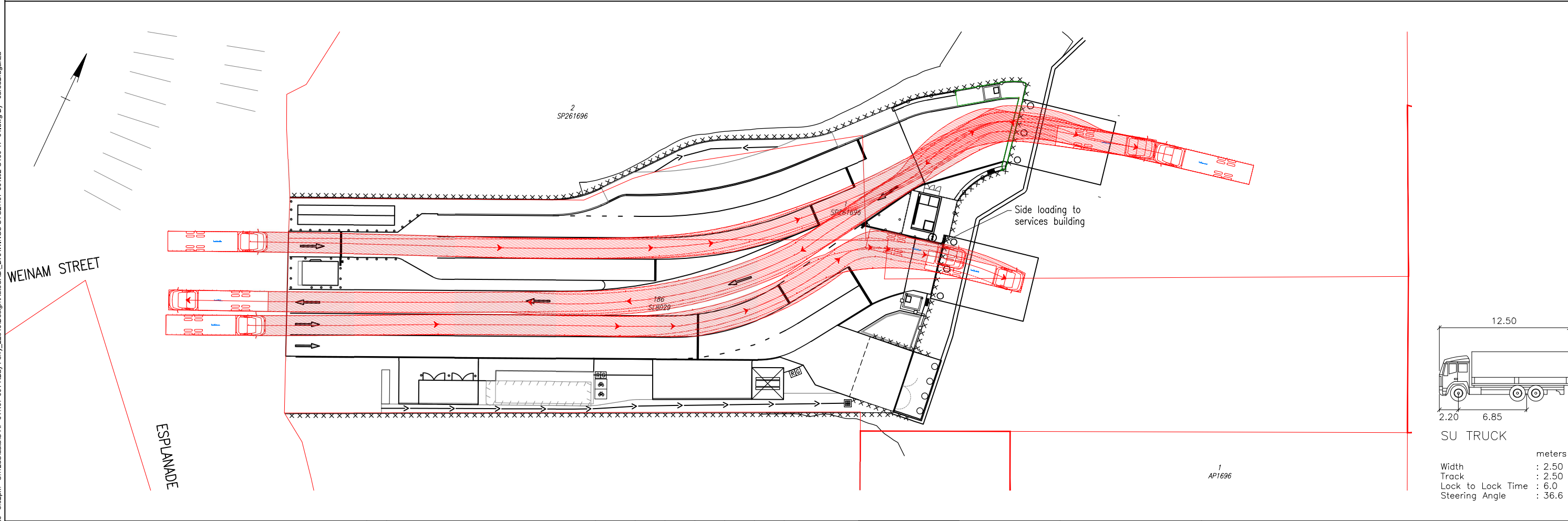
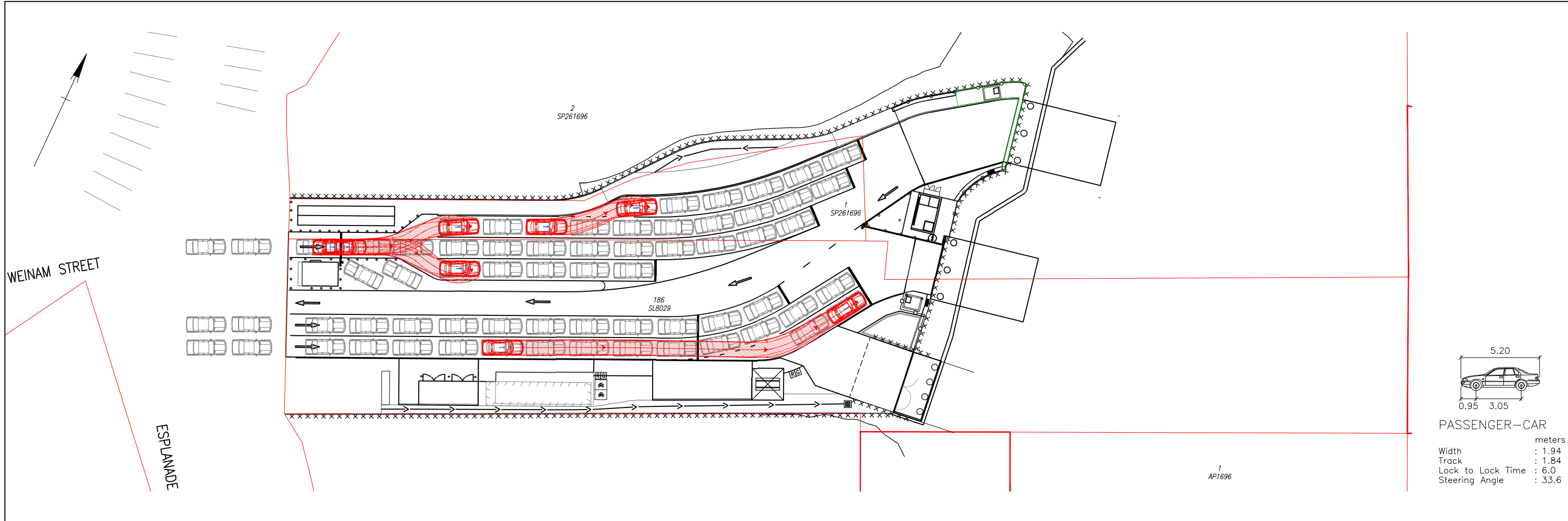
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REDLAND BAY FERRY TERMINAL

DREDGING PLAN

DRAWING NUMBER	497-001.02-C090-01	No IN SET 18 OF 35	REVISION A
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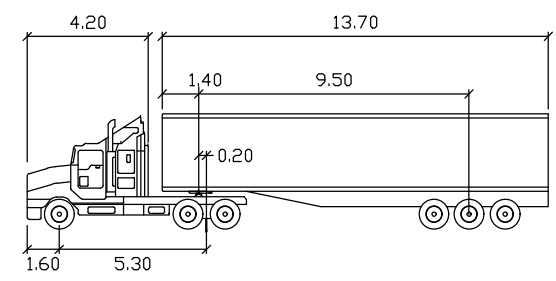
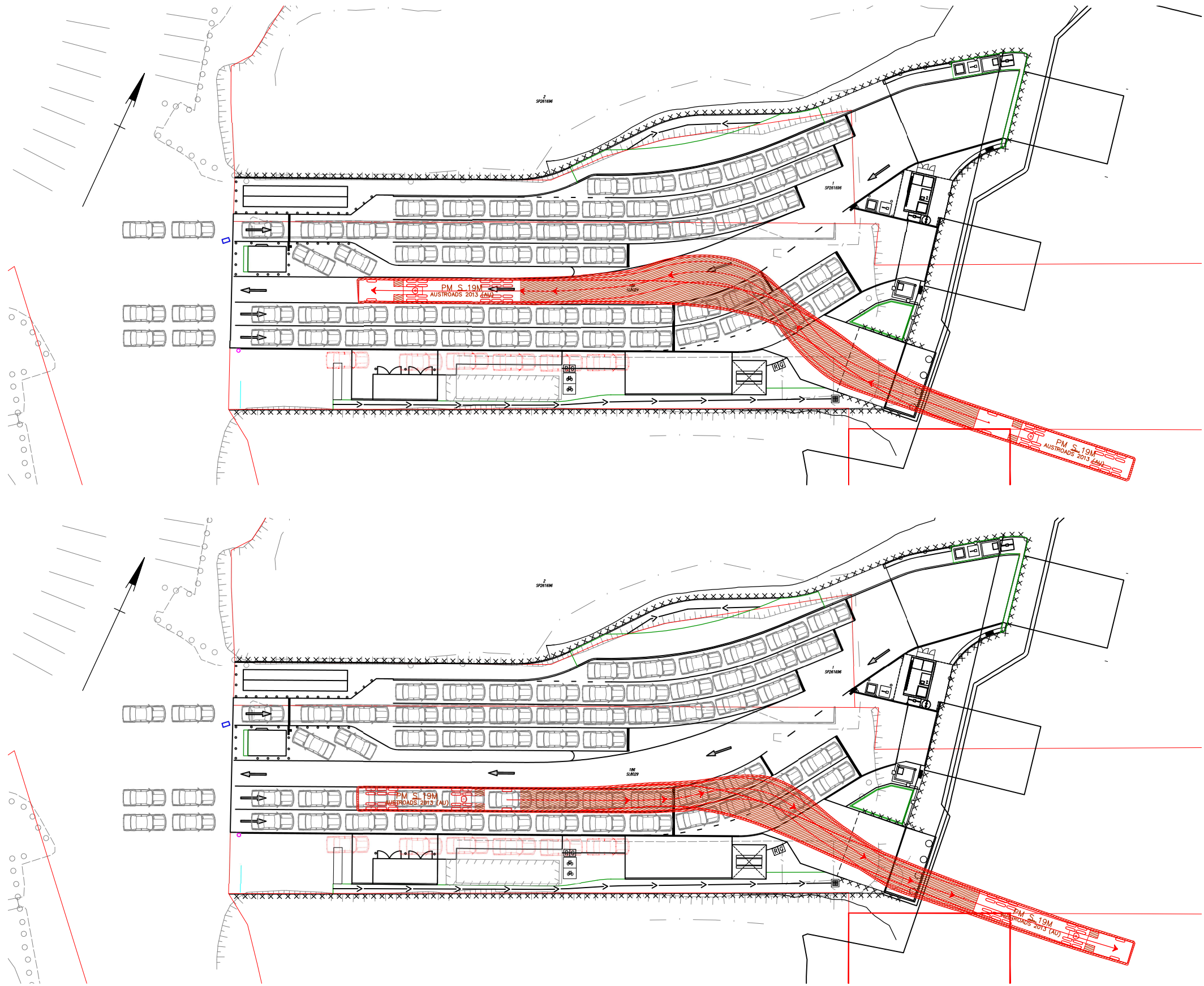


ProjexPartners PROJECT MANAGEMENT ENGINEERING PLANNING Ph: 1300 789 214 www.projexpartners.com.au	CLIENT PENSAR STRUCTURES								ENGINEERING CERTIFICATION (RPEQ)				SCALE		REDLAND BAY FERRY TERMINAL			
										ENG. AREA	NAME	SIGNATURE	No.	DATE	1:250 0 5 10 A1 1:500 	VEHICLE TURNPATHS SHEET 1		
										CIVIL	D BERRY		6343	10/4/2026				

Last Modified - Apr 10, 2026 - 3:32pm C:\24S\data\A-P-01\497-001 RBay Ferry_22540\Design\AutoCAD\DRAWINGS\STC2497-001.02-C100-TP-01.dwg By - Jared Braganza

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PM S 19M		Lock to Lock Time	: 6.0
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Trailer Width	: 2.50	Articulating Angle	: 70.0
Tractor Track	: 2.50		
Trailer Track	: 2.50		



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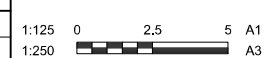
**PENSAR
STRUCTURES**

Rev.	Description	Date	Drawn	Design	Check	RPEQ No. & Initial
A	ISSUED FOR CONSTRUCTION	10/4/2026	JDB	JM	DB	6343 DB

ENGINEERING CERTIFICATION (RPEQ)

ENG. AREA	NAME	SIGNATURE	No.	DATE
CIVIL	D BERRY		6343	10/4/2026

SCALE



REDLAND BAY FERRY TERMINAL

**VEHICLE TURNPATHS
SHEET 3**

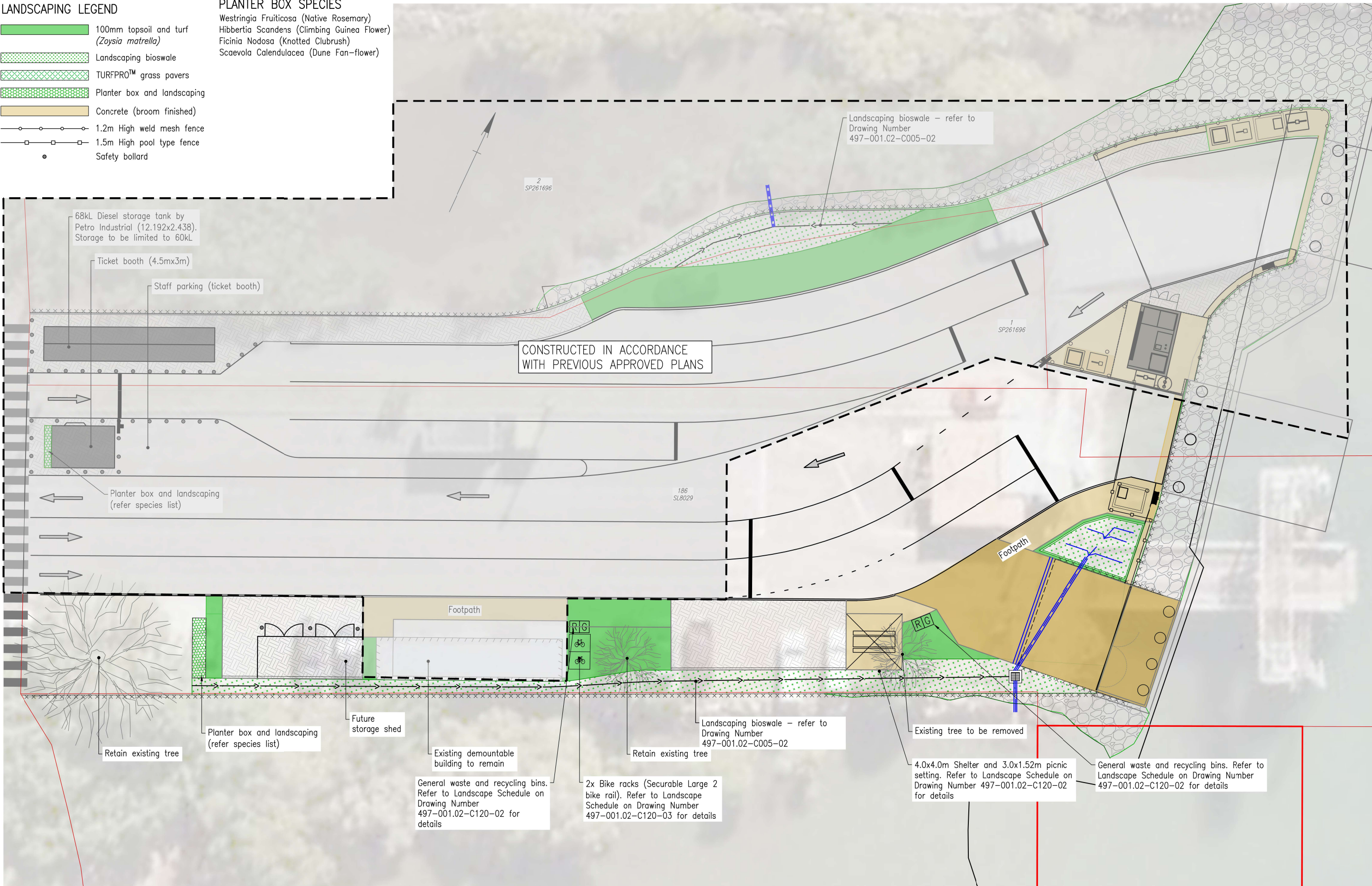
DRAWING NUMBER	497-001.02-C100-03	No IN SET	23 OF 35	REVISION	A
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LANDSCAPING LEGEND

- 100mm topsoil and turf (*Zoysia matrella*)
- Landscaping bioswale
- TURFPRO™ grass pavers
- Planter box and landscaping
- Concrete (broom finished)
- 1.2m High weld mesh fence
- 1.5m High pool type fence
- Safety bollard

PLANTER BOX SPECIES

- Westringia Fruiticosa (Native Rosemary)
- Hibbertia Scandens (Climbing Guinea Flower)
- Ficinia Nodosa (Knotted Clubrush)
- Scaevola Calendulacea (Dune Fan-flower)



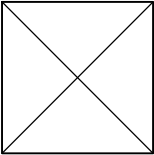
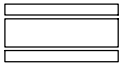
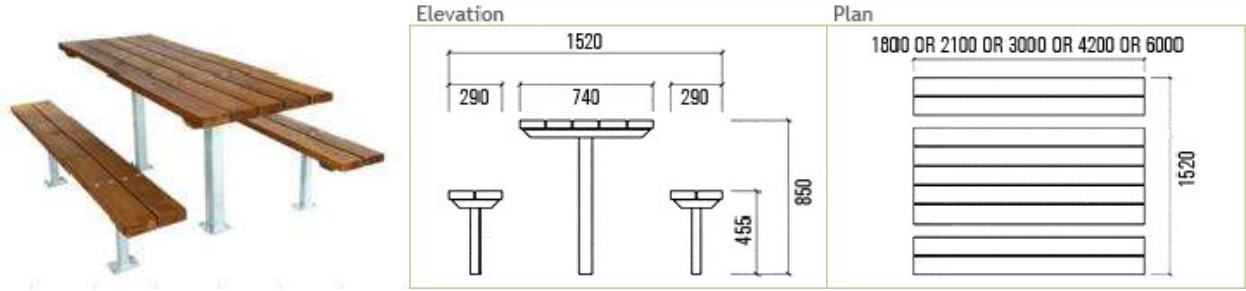
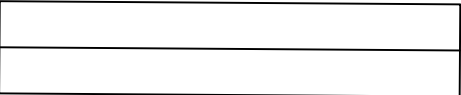
Rev.	Description	Date	Drawn	Design	Check	RPEQ No. & Initial
A	ISSUED FOR CONSTRUCTION	10/4/2026	JDB	JM	DB	6343 DB

ENGINEERING CERTIFICATION (RPEQ)			
ENG. AREA	NAME	SIGNATURE	No. DATE
CIVIL	D BERRY		6343 10/4/2026

SCALE	
1:125	0 2.5 5 A1
1:250	A3

REDLAND BAY FERRY TERMINAL		
LANDSCAPE PLAN		
DRAWING NUMBER	497-001.02-C120-01	No. IN SET 24 OF 35
		REVISION A

LANDSCAPE SCHEDULE

SYMBOL	ELEMENT	SPECIFICATIONS	IMAGE/S
	Shelter	Peninsula Series K302 (4.0m x 4.0m) skillion roof park shelter by LandmarkPRO. Refer to Supplementary Drawing SD1 for details.	
	Picnic Setting	Taroom Picnic Setting (3.0m Length) by LandmarkPRO	
	General Waste Bin	MS Avenue Litter Receptacle – 240L (Side Entry) bin by LandmarkPRO. Refer to Supplementary Drawing SD2 for details.	
	Recycling Bin	MS Avenue Recycle Unit – 240L (Side Entry) bin by LandmarkPRO. Refer to Supplementary Drawing SD3 for details.	
	Diesel Storage Tank	68kL Diesel Storage Tank by Petro Industrial (12.192x2.438). Storage to be limited to 60kL. Refer to Supplementary Drawing SD4 for details.	



Rev.	Description	Date	Drawn	Design	Check	RPEQ No.	&	Initial	
A	ISSUED FOR CONSTRUCTION	10/4/2026	JDB	JM	DB	6343		DB	

ENGINEERING CERTIFICATION (RPEQ)				
ENG. AREA	NAME	SIGNATURE	No.	DATE
CIVIL	D BERRY		6343	10/4/2026

SCALE
Not to Scale

REDLAND BAY FERRY TERMINAL		
LANDSCAPE SCHEDULE SHEET 1		
DRAWING NUMBER	497-001.02-C120-02	No IN SET 25 OF 35
		REVISION A

LANDSCAPE SCHEDULE

SYMBOL	ELEMENT	SPECIFICATIONS	IMAGE/S
	Bike Racks	Securabike Large 2 Bike Rail	

A	ISSUED FOR CONSTRUCTION	10/4/2026	JDB	JM	DB	6343	DB	
Rev.	Description	Date	Drawn	Design	Check	RPEQ No. & Initial		

ENGINEERING CERTIFICATION (RPEQ)				
ENG. AREA	NAME	SIGNATURE	No.	DATE
CIVIL	D BERRY		6343	10/4/2026

SCALE
Not to Scale

REDLAND BAY FERRY TERMINAL		
LANDSCAPE SCHEDULE SHEET 2		
DRAWING NUMBER	497-001.02-C120-03	REVISION
		A

Last Modified - Apr 10, 2026 - 3:34pm C:\24\data\A-P-01\497-001 RBay Ferry_22540\Design\AutoCAD\DRAWINGS STG2\497-001.02-C150-XS-01.dwg By - JaredBraganza

CONTROL LINE MC010
X = 530503.789
Y = 6945367.307
Z = 1.800

Datum 0.00

DESIGN HEIGHT		1.154	1.800	1.800
EXISTING SURFACE		-1.069 1.154	-0.100 1.404	0.000 1.430
OFFSETS				

CHAINAGE 40.000

CONTROL LINE MC010
X = 530547.266
Y = 6945396.704
Z = 1.800

Datum -4.00

DESIGN HEIGHT		0.020	1.800	
EXISTING SURFACE			-0.100 0.109	
OFFSETS		-2.739		

CHAINAGE 100.000

CONTROL LINE MC010
X = 530531.802
Y = 6945349.029
Z = 1.908

Datum 0.00

DESIGN HEIGHT		1.908	
EXISTING SURFACE		-0.100 1.836	
OFFSETS			

CHAINAGE 160.000

CONTROL LINE MC010
X = 530548.439
Y = 6945358.335
Z = 1.845

Datum -4.00

DESIGN HEIGHT		0.091	1.190	1.296
EXISTING SURFACE		-4.018 0.091	-0.100 0.765	0.450 1.033
OFFSETS				

CHAINAGE 140.000

CONTROL LINE MC010
X = 530486.605
Y = 6945357.503
Z = 1.850

Datum 0.00

DESIGN HEIGHT		1.574	1.850	
EXISTING SURFACE		-0.103 1.574	0.000 1.719	
OFFSETS				

CHAINAGE 20.000

CONTROL LINE MC010
X = 530533.653
Y = 6945392.964
Z = 1.800

Datum 0.00

DESIGN HEIGHT		0.133	1.800	1.800
EXISTING SURFACE		-2.601 0.133	-0.100 0.246	0.000 0.249
OFFSETS				

CHAINAGE 80.000

CONTROL LINE MC010
X = 530545.471
Y = 6945378.094
Z = 1.800

Datum -4.00

DESIGN HEIGHT		0.020	1.800	
EXISTING SURFACE				
OFFSETS		-3.395	-0.100	

CHAINAGE 120.000

CONTROL LINE MC010
X = 530468.404
Y = 6945349.212
Z = 1.950

Datum 0.00

DESIGN HEIGHT		1.816	1.950	
EXISTING SURFACE		-0.101 1.816	0.000 1.817	
OFFSETS				

CHAINAGE 0.000

CONTROL LINE MC010
X = 530518.290
Y = 6945380.594
Z = 1.800

Datum 0.00

DESIGN HEIGHT		0.987	1.800	1.800
EXISTING SURFACE		-1.320 0.987	-0.100 1.137	0.000 1.162
OFFSETS				

CHAINAGE 60.000

CONTROL LINE MC010
X = 530479.311
Y = 6945324.437
Z = 2.140

Datum 0.00

DESIGN HEIGHT		2.140	
EXISTING SURFACE		-0.100 1.950	
OFFSETS			

CHAINAGE 217.966

CONTROL LINE MC010
X = 530495.580
Y = 6945332.059
Z = 2.068

Datum 0.00

DESIGN HEIGHT		2.068	
EXISTING SURFACE		-0.100 1.878	
OFFSETS			

CHAINAGE 200.000

CONTROL LINE MC010
X = 530513.691
Y = 6945340.544
Z = 1.988

Datum 0.00

DESIGN HEIGHT		1.988	
EXISTING SURFACE		-0.100 1.935	
OFFSETS			

CHAINAGE 180.000

LEGEND

Proposed Finished Surface
Existing Surface

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PENSAR
STRUCTURES

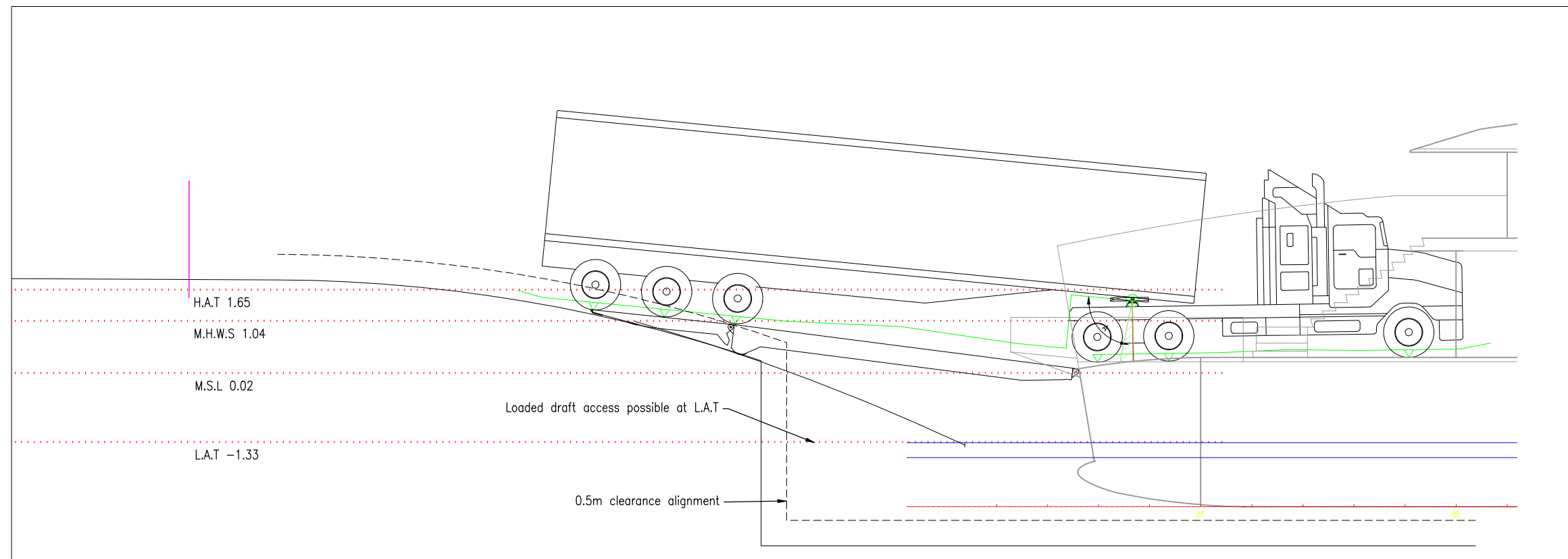
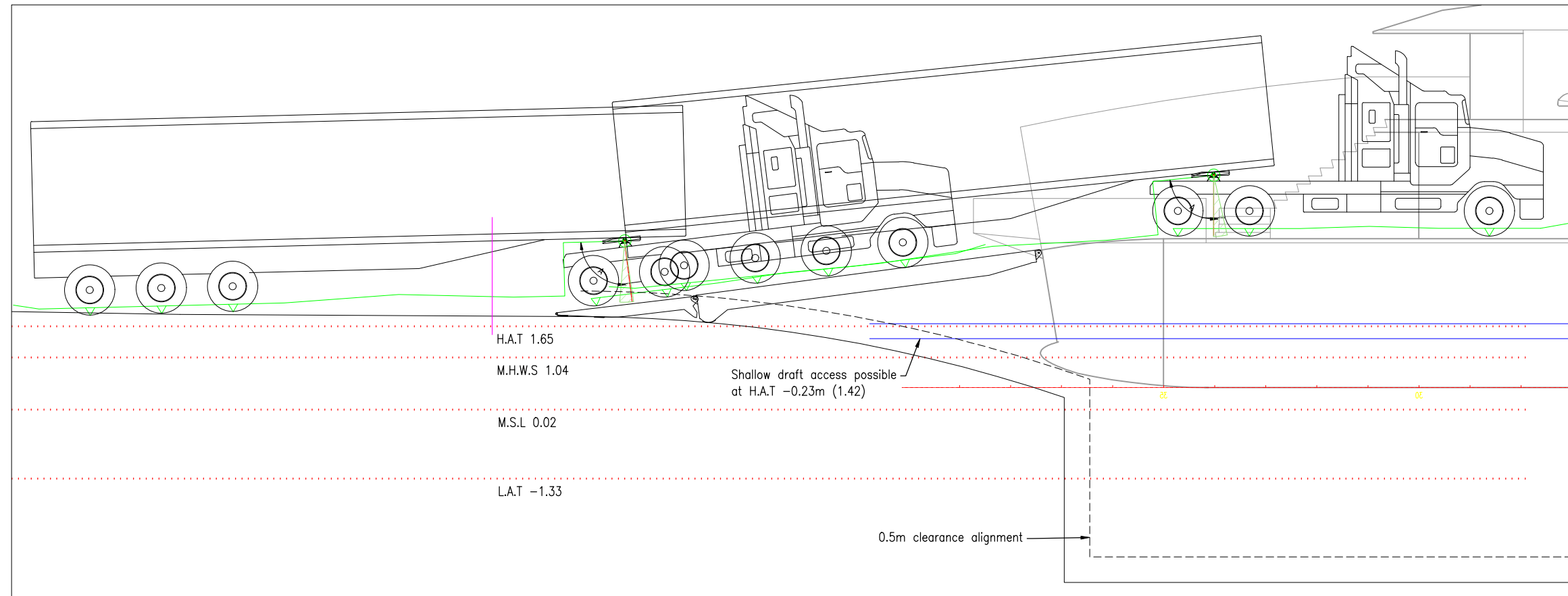
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A	ISSUED FOR CONSTRUCTION	10/4/2026	JDB	JM	DB	6343 DB

ENGINEERING CERTIFICATION (RPEQ)				
ENG. AREA	NAME	SIGNATURE	No.	DATE
CIVIL	D BERRY		6343	10/4/2026

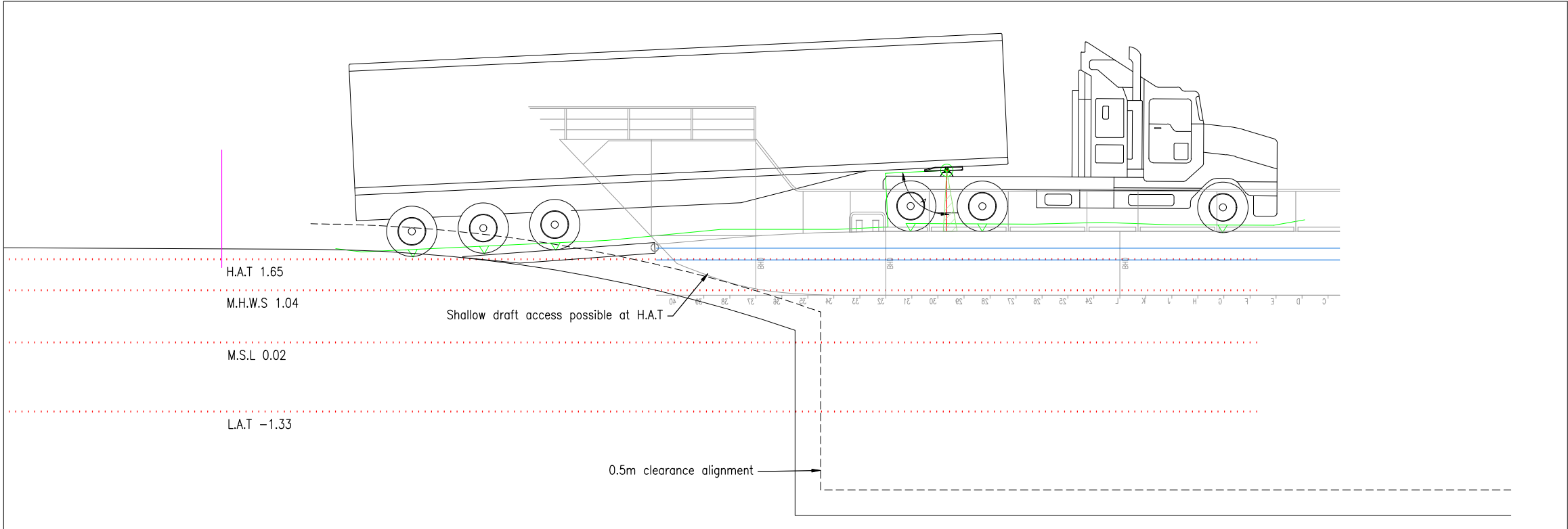
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REDLAND BAY FERRY TERMINAL		
MC010 CROSS SECTIONS		
DRAWING NUMBER	497-001.02-C150-01	No IN SET 27 OF 35
REVISION		A

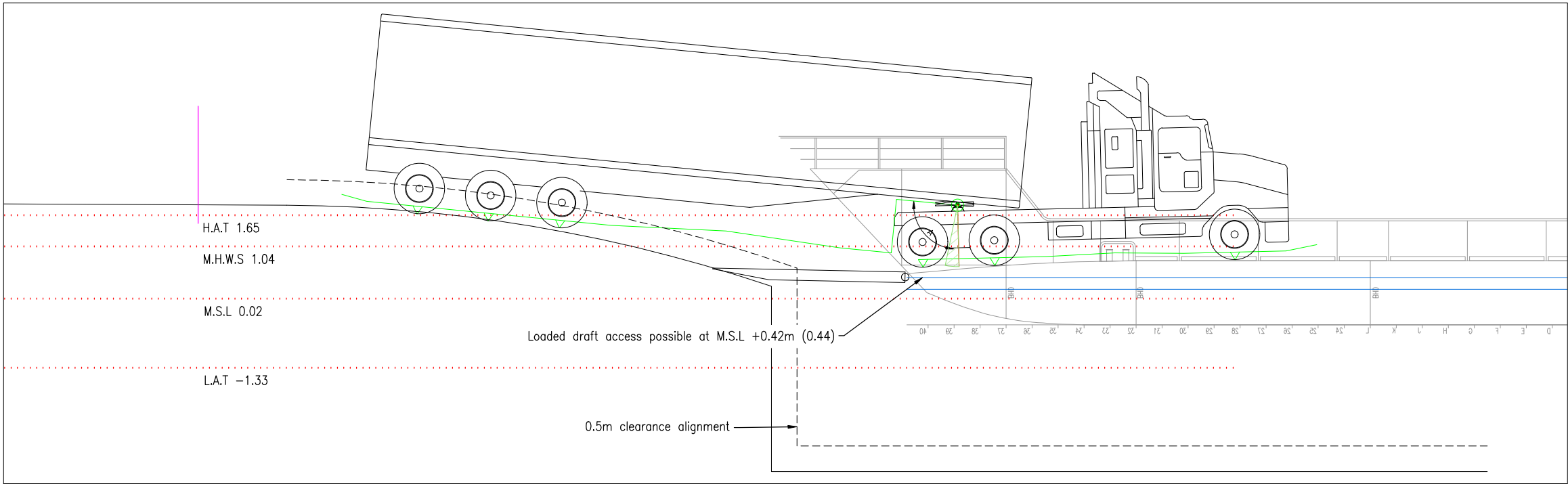
THIS DRAWING MAY ONLY BE USED FOR THE PURPOSE FOR WHICH IT WAS PREPARED BY PARTIES AGREED TO BY PROJEX PARTNERS & MUST NOT BE USED BY ANYONE ELSE OR FOR ANY OTHER PURPOSE



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BAY ISLANDER – HIGHEST ACCESSIBLE LEVEL



BAY ISLANDER – LOWEST ACCESSIBLE LEVEL



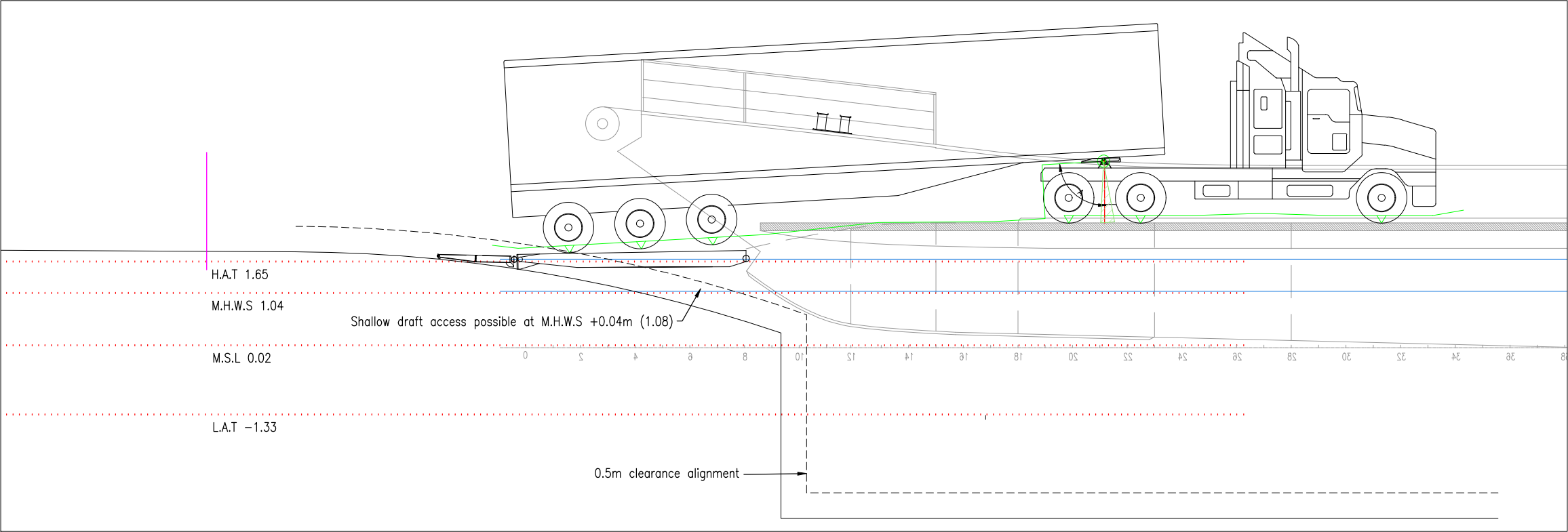
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Rev.	Description	Date	Drawn	Design	Check	RPEQ No.	& Initial	

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ENG. AREA	NAME	SIGNATURE	No.	DATE
CIVIL	D BERRY		6343	10/4/2026

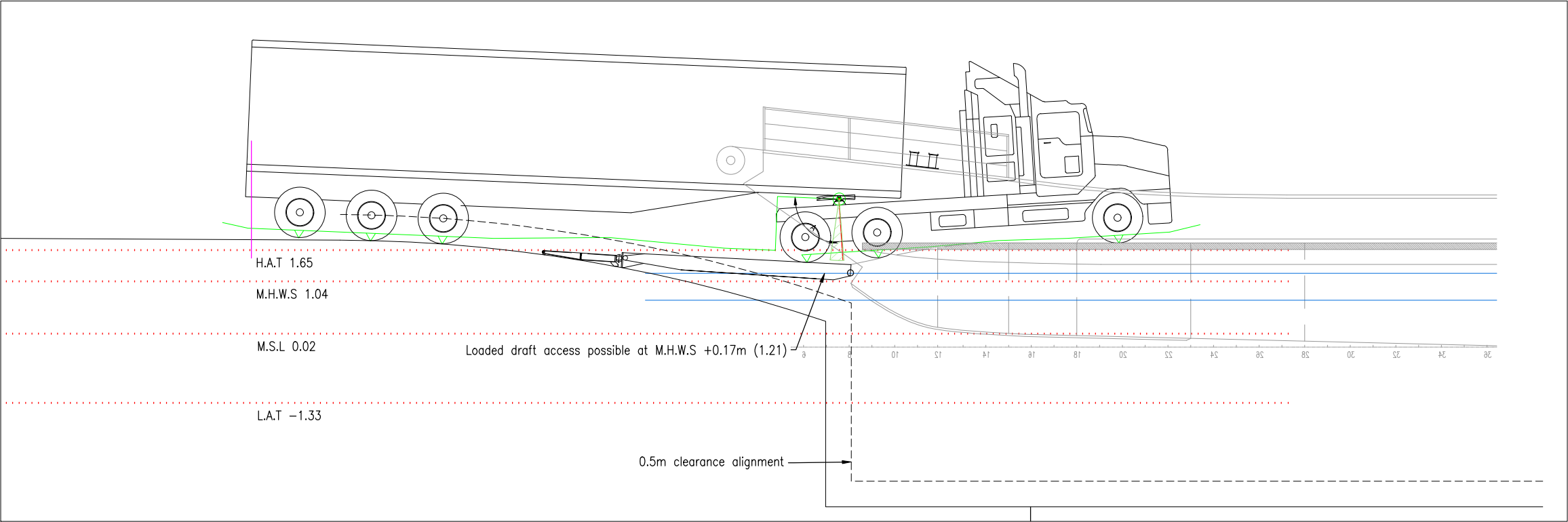
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REDLAND BAY FERRY TERMINAL		
BAY ISLANDER SEMI RAMP SECTIONS		
DRAWING NUMBER	497-001.02-C200-02	
No IN SET	29 OF 35	REVISION
		A

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LAKARMA – HIGHEST ACCESSIBLE LEVEL



LAKARMA – LOWEST ACCESSIBLE LEVEL

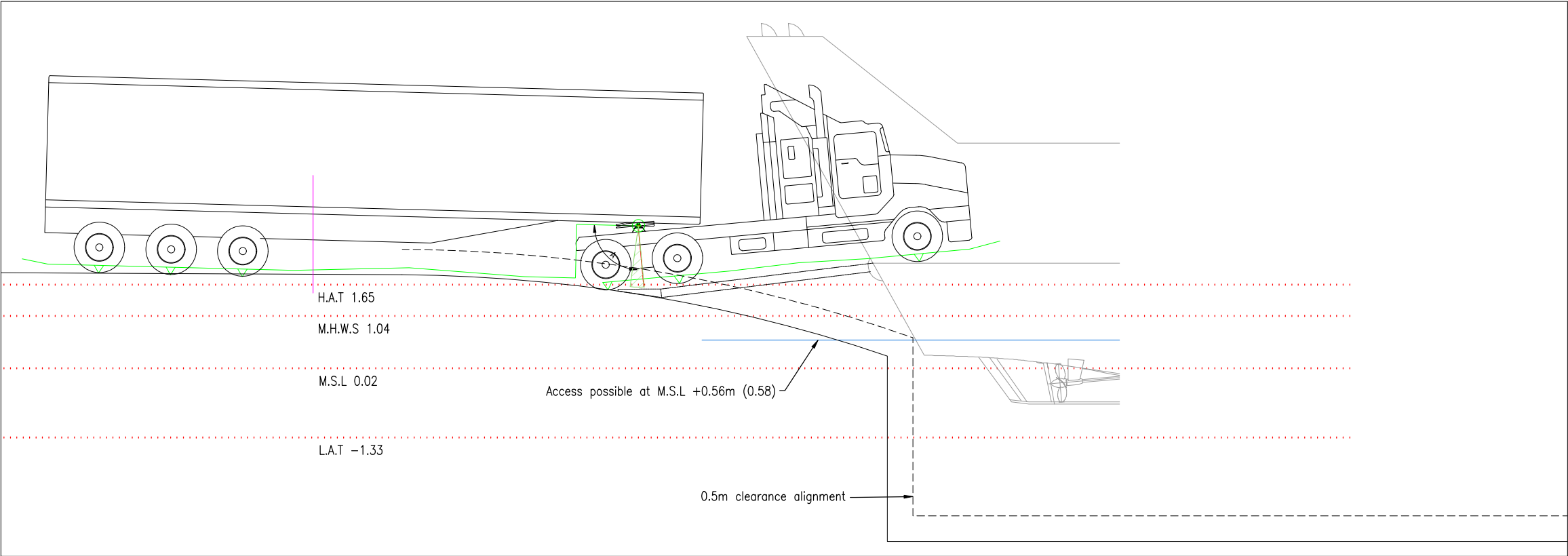


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A	ISSUED FOR CONSTRUCTION	10/4/2026	JDB	JM	DB	6343 DB

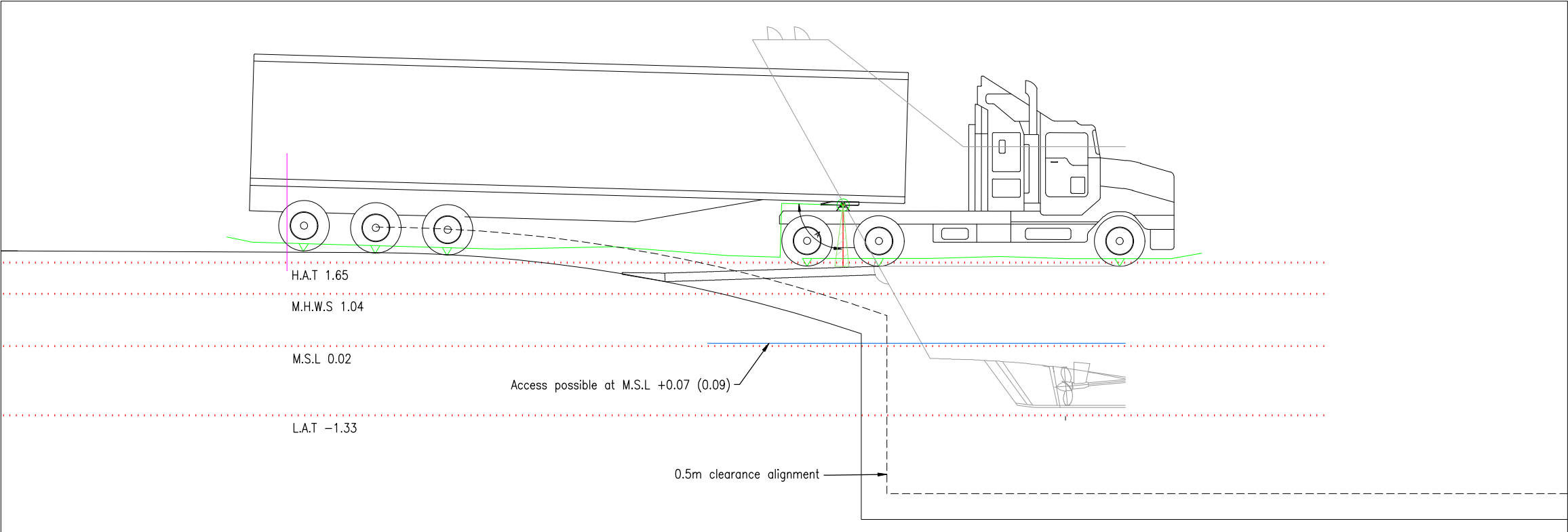
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ENG. AREA	NAME	SIGNATURE	No.	DATE
CIVIL	D BERRY		6343	10/4/2026

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REDLAND BAY FERRY TERMINAL		
LAKARMA SEMI RAMP SECTIONS		
DRAWING NUMBER	497-001.02-C200-03	No IN SET 30 OF 35
		REVISION A



SEABREEZE – HIGHEST ACCESSIBLE LEVEL

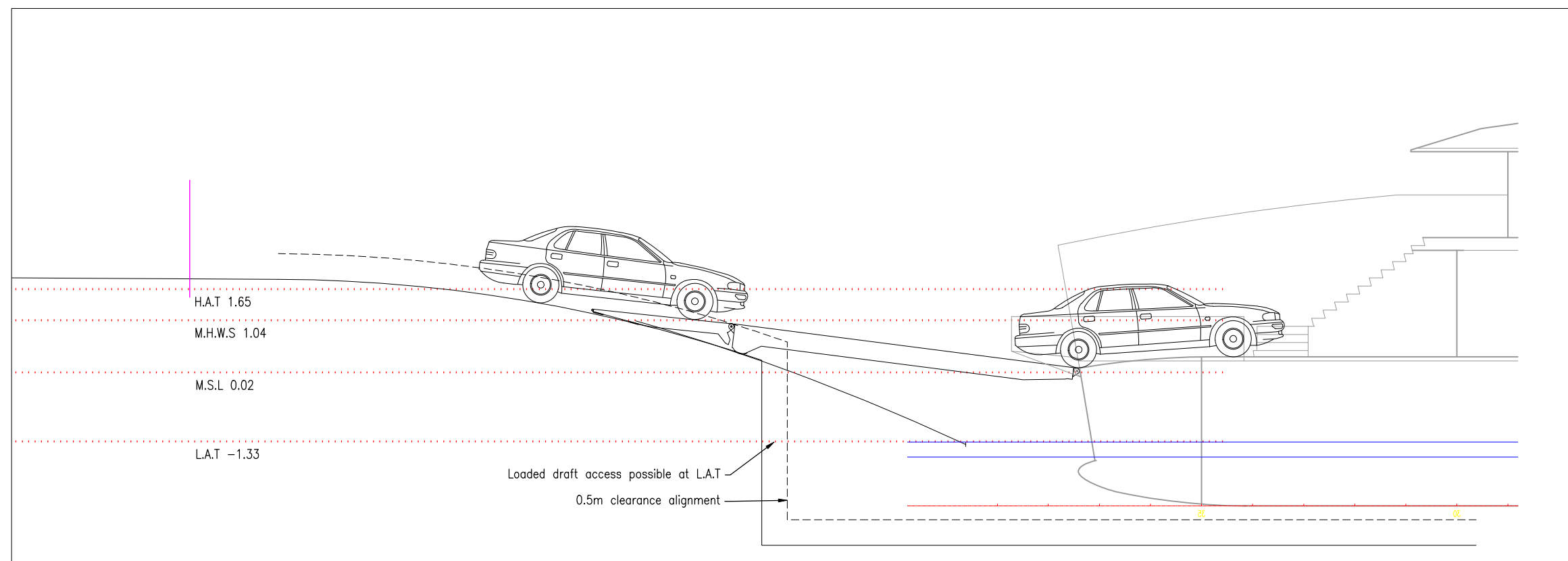
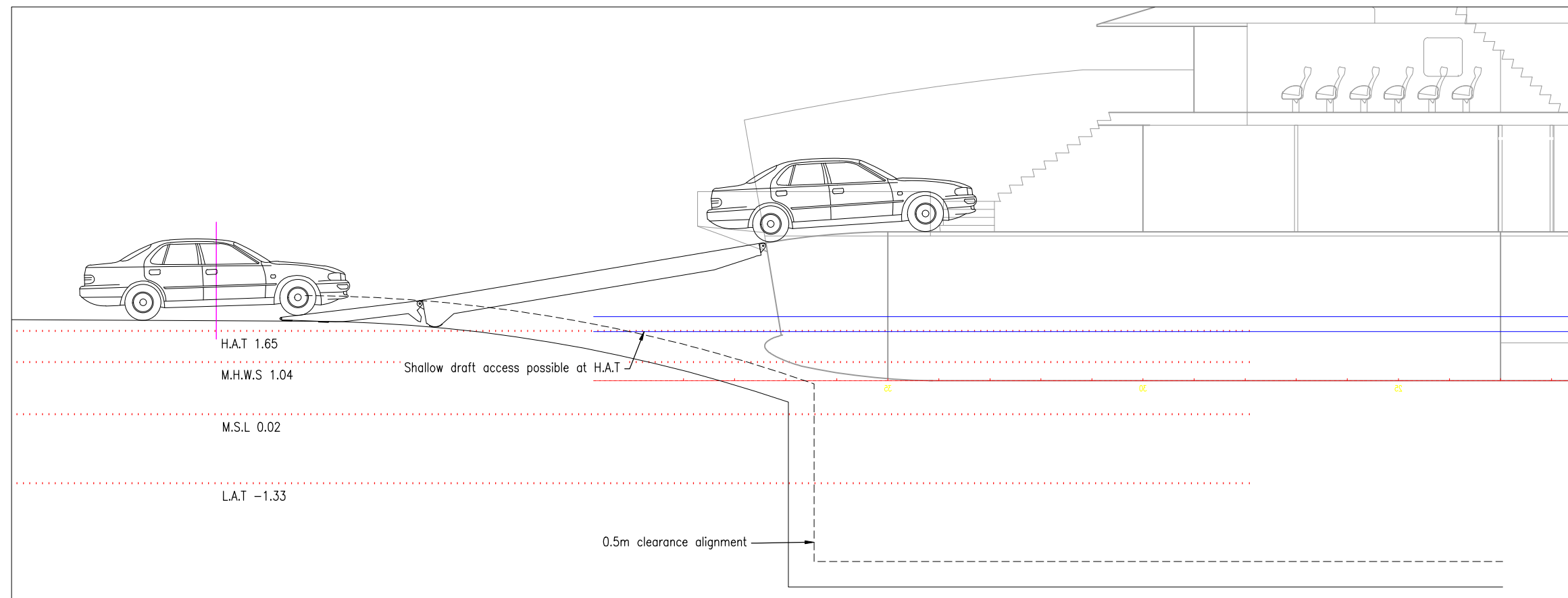


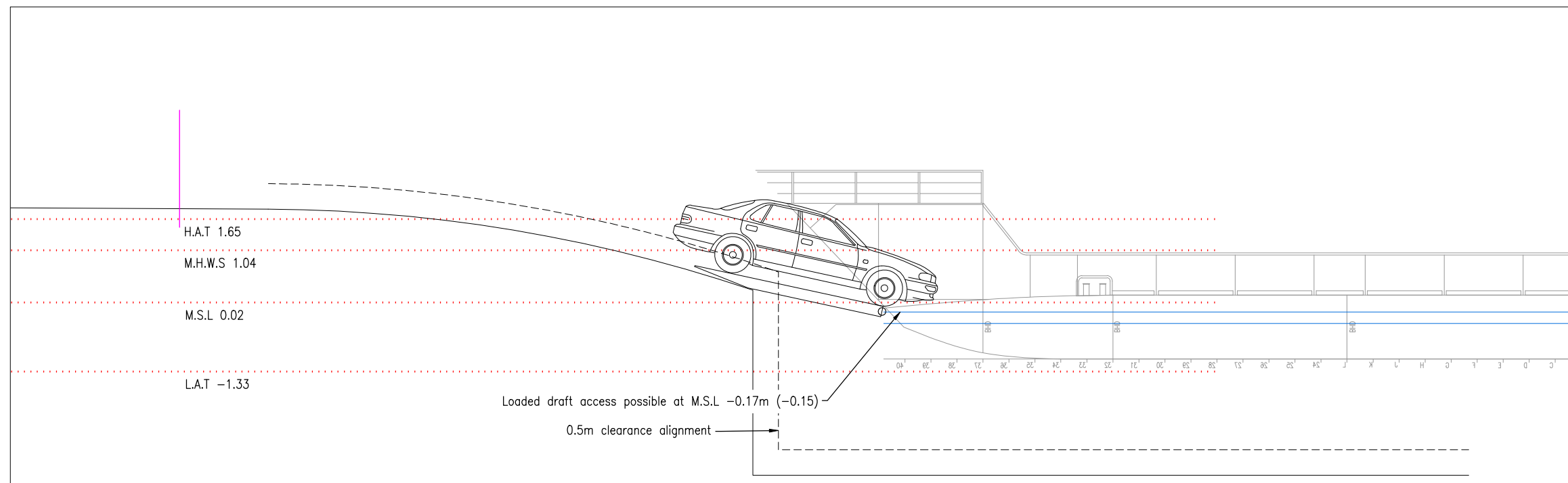
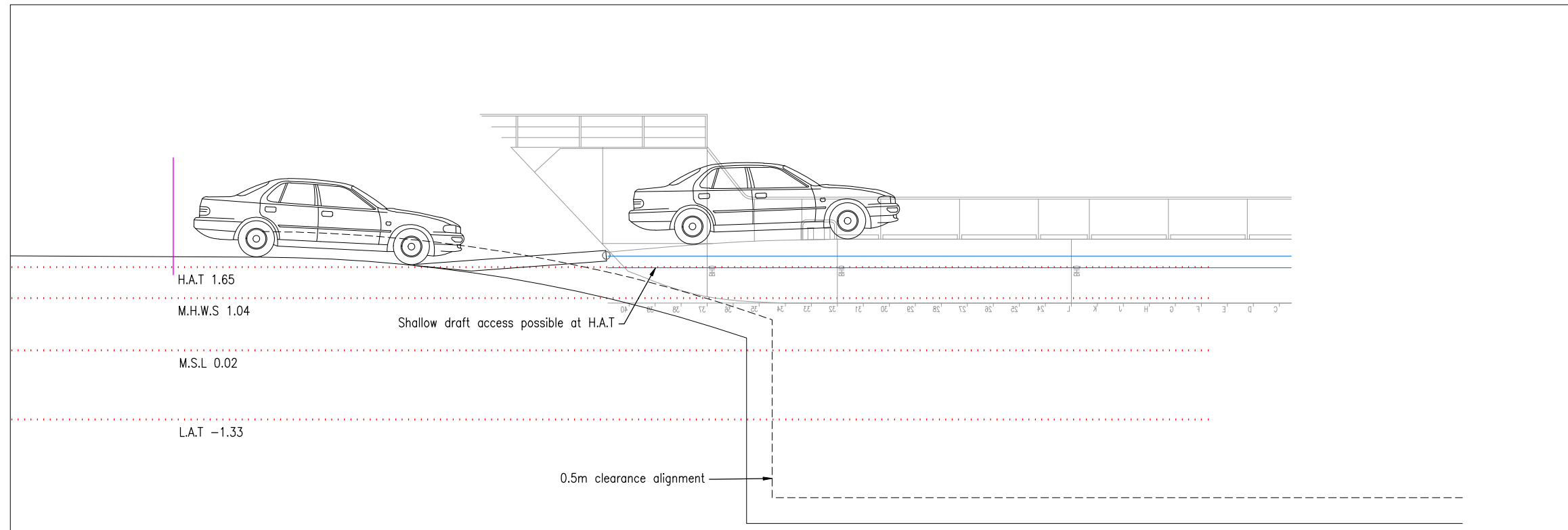
SEABREEZE – LOWEST ACCESSIBLE LEVEL

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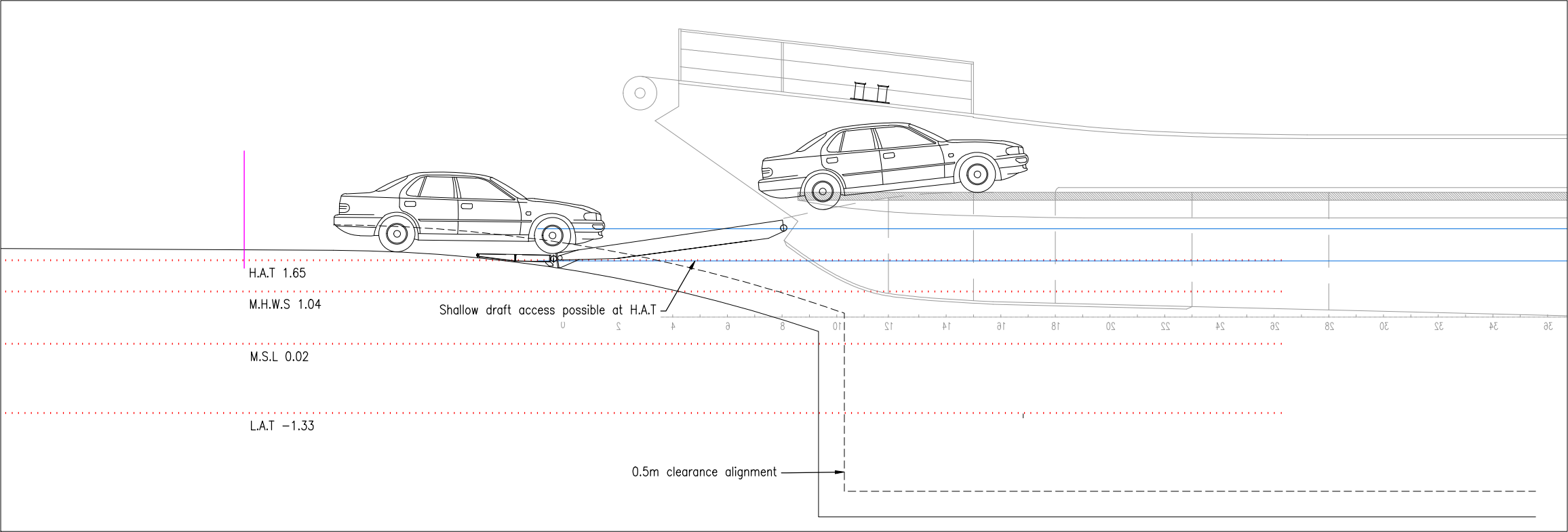


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A	ISSUED FOR CONSTRUCTION	10/4/2026	JDB	JM	DB	6343	DB

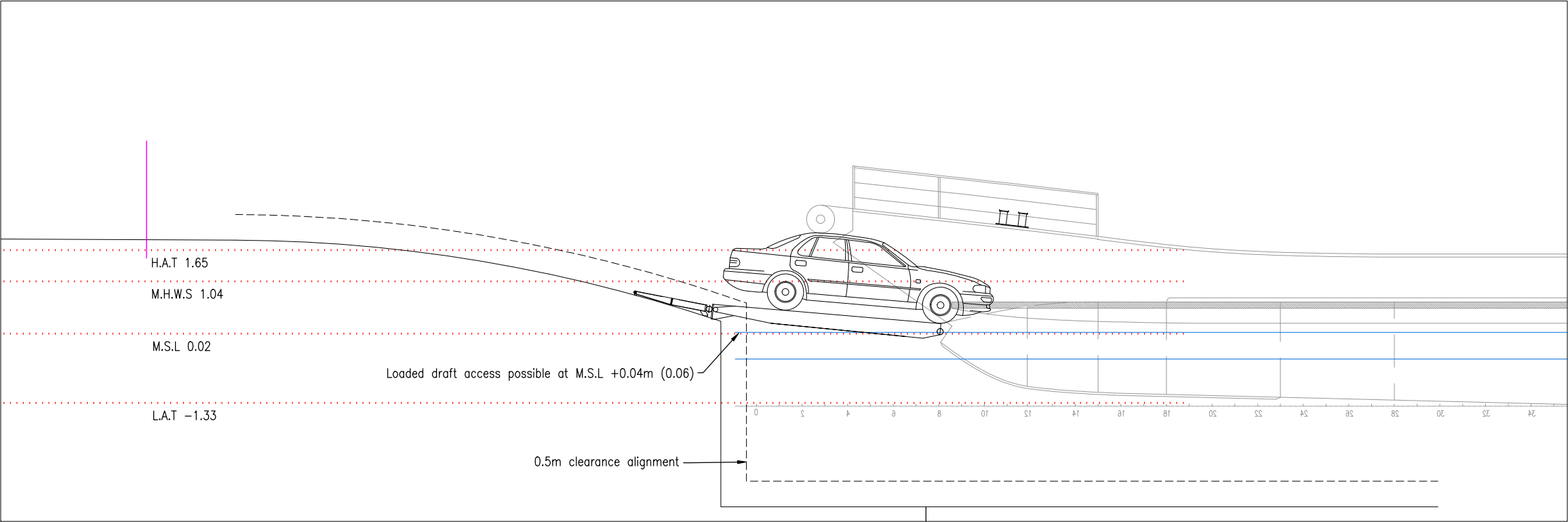




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LAKARMA – HIGHEST ACCESSIBLE LEVEL



LAKARMA – LOWEST ACCESSIBLE LEVEL



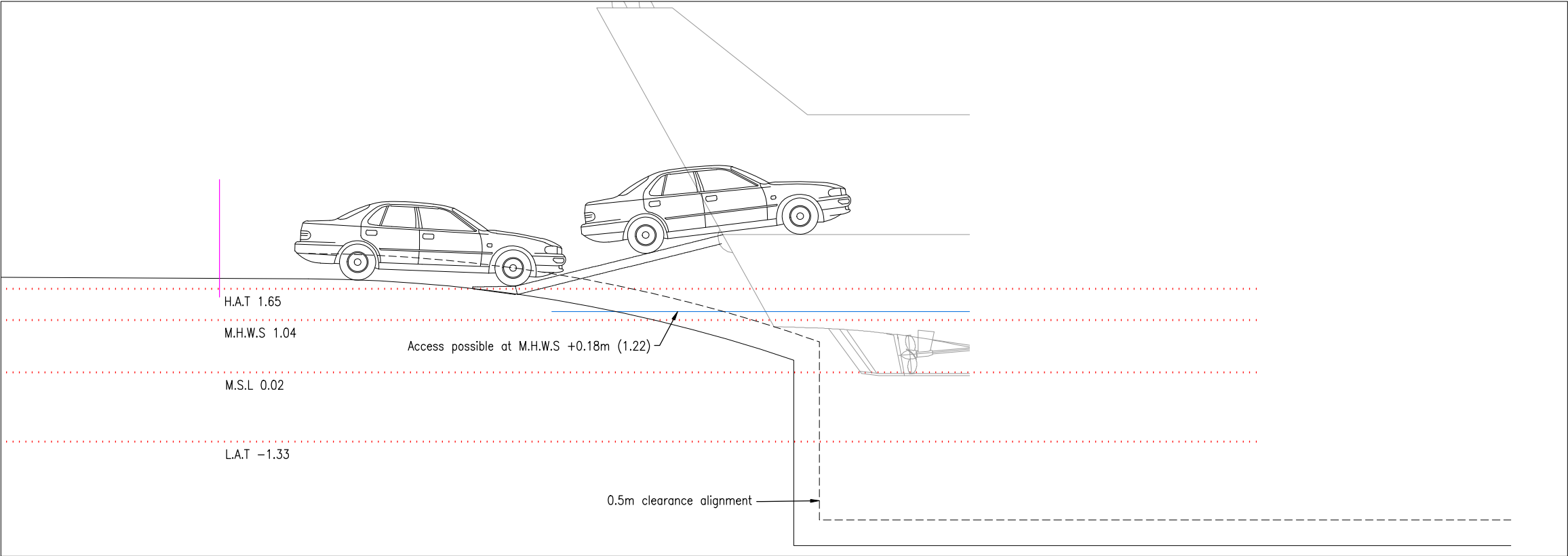
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A	ISSUED FOR CONSTRUCTION	10/4/2026	JDB	JM	DB	6343 DB

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ENG. AREA	NAME	SIGNATURE	No.	DATE
CIVIL	D BERRY		6343	10/4/2026

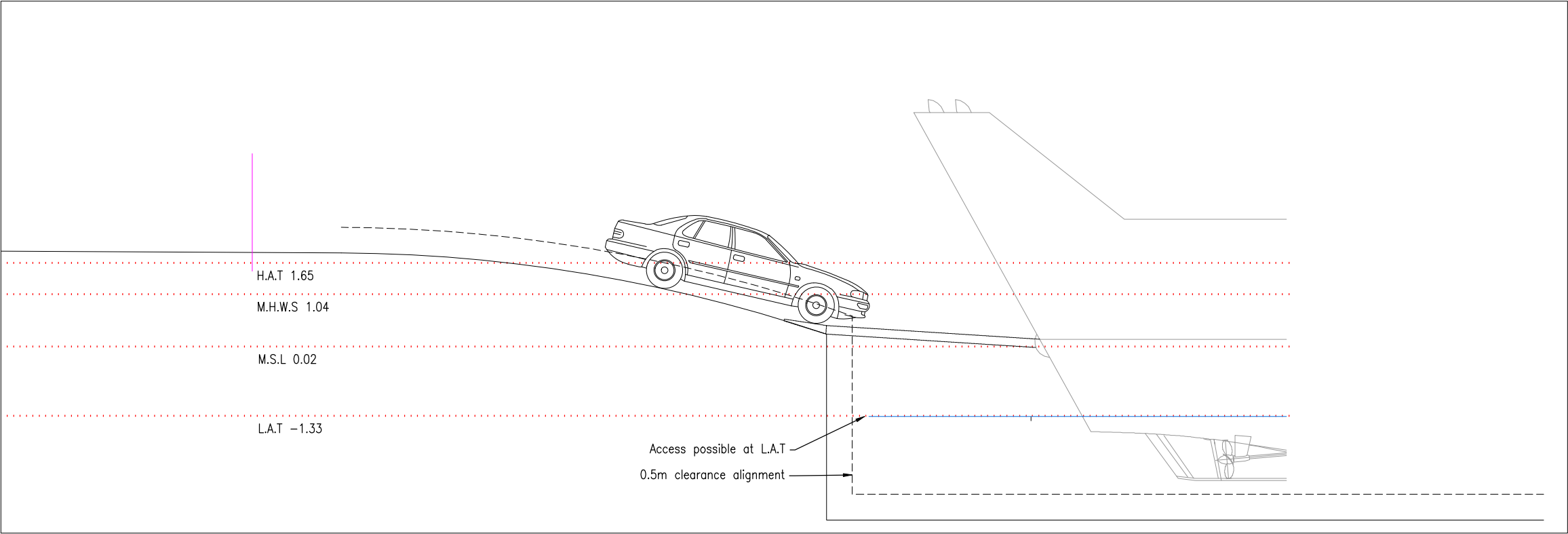
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REDLAND BAY FERRY TERMINAL		
LAKARMA B99 RAMP SECTIONS		
DRAWING NUMBER	497-001.02-C200-07	REVISION A

Last Modified - Apr 10, 2026 - 3:51pm C:\Users\JaredBraganza\appdata\local\temp\AcPublish_59864497-001.02-C200-TC-08.dwg By - JaredBraganza



SEABREEZE – HIGHEST ACCESSIBLE LEVEL



SEABREEZE – LOWEST ACCESSIBLE LEVEL



A	ISSUED FOR CONSTRUCTION	10/4/2026	JDB	JM	DB	6343	DB	
Rev.	Description	Date	Drawn	Design	Check	RPEQ No. & Initial		

ENGINEERING CERTIFICATION (RPEQ)				
ENG. AREA	NAME	SIGNATURE	No.	DATE
CIVIL	D BERRY		6343	10/4/2026

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REDLAND BAY FERRY TERMINAL		
SEABREEZE B99 RAMP SECTIONS		
DRAWING NUMBER	497-001.02-C200-08	
No IN SET	35 OF 35	REVISION A

N22

M2

N20

M1

N19

N18

N17

N16

N15

N14

N13

N12

N11

N10

N9

N21

N1

N2

N3

N4

N5

N6

N7

N8

Tank Assembly

40FT ISO Container Footprint

2896.00

12192.00

Vent Riser

High Level Alarm

Foldable Ladder With Platform

2438.00

571.22

Nozzle Schedule		
Nozzle ID	Connection Type	Service
N1	DN50 - ISO4144 - BSP Socket	Spare (Plugged)
N2	DN50 - ISO4144 - Male	Interstitial Dipstick (Capped)
N3	DN50 - ISO4144 - BSP Socket	Interstitial Vent
N4	DN80 - ISO4144 - BSP Socket	Spare (Plugged)
N5	DN50 - ISO4144 - Male	Secondary Suction (Capped)
N6	DN50 - ISO4144 - BSP Socket	Spare (Plugged)
N7	DN50 - ISO4144 - BSP Socket	Pump Bay Entry (Plugged)
N8	DN80 - ANSI 150 - Flange	Primary Suction Spool With Prime Point
N9	DN50 - ISO4144 - BSP Socket	Pump Bay Entry (Plugged)
N10	DN50 - ISO4144 - Male	Dip (Capped)
N11	DN80 - ANSI 150 - Flange	Primary Fill Spool (c/w Ball Valve, Check Wafer, Type F Camlock and Dustcap)
N12	DN50 - ISO4144 - BSP Socket	Pump Bay Entry (Plugged)
N13	DN50 - ISO4144 - BSP Socket	Spare (Plugged)
N14	DN50 - ISO4144 - BSP Socket	Pump Bay Entry (Plugged)
N15	DN80 - ISO4144 - BSP Socket	Spare (Plugged)
N16	DN50 - ISO4144 - BSP Socket	High Level Alarm
N17	DN200 - Flanged	Interstitial Vent
N18	DN50 - ISO4144 - BSP Socket	Spare (Plugged)
N19	DN200 - Flanged	Pressure Vent
N20	DN50 - ISO4144 - BSP Socket	Free To Air Vent
N21	DN200 - Flanged	Inspection Hatch
N22	DN50 - ISO4144 - BSP Socket	Spare (Plugged)
M1	Flanged (OD=750, ID=600)	Primary Manway
M2	Flanged (OD=900, ID=750)	Secondary Manway
M3	Flanged (OD=750, ID=600)	Tertiary Manway

Tank Data	
DESIGN CODE	AS 1692, AS 1940
BUILT TO	AS 4100, AS 1554
PLATE THICKNESS	6MM/6MM Q235B
EXTERNAL DIMENSIONS	12192mm x 2438mm x 2896mm
GROSS VOLUME	69023 L
SAFE VOLUME	65570 L
NDT	MPT/DPT
TARE WEIGHT	13476 KG

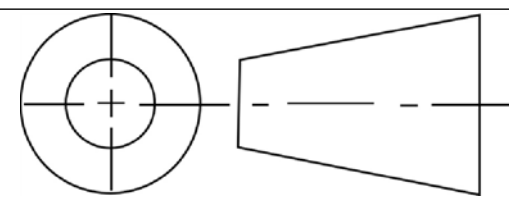


Factory 2, 106 Potassium street
PO Box 407
Narangba QLD 4504
p: 07 3204 9558
e: sales@petroindustrial.com.au

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THIRD ANGLE PROJECTION



TITLE: GA Cover

DRAWN BY:

CHECK DRW:

DRAWING SIZE: A1

CLIENT:

PROJECT NO:

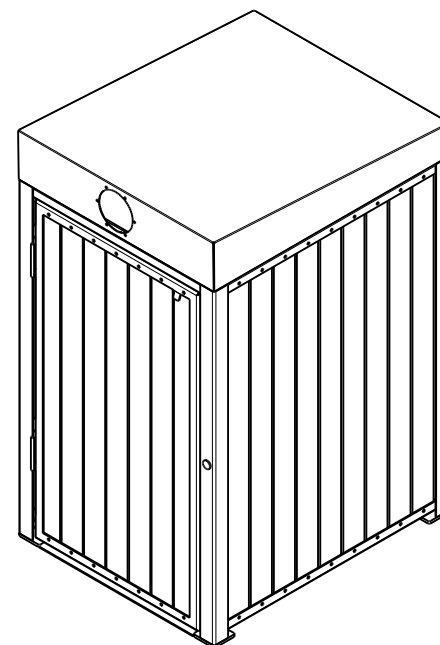
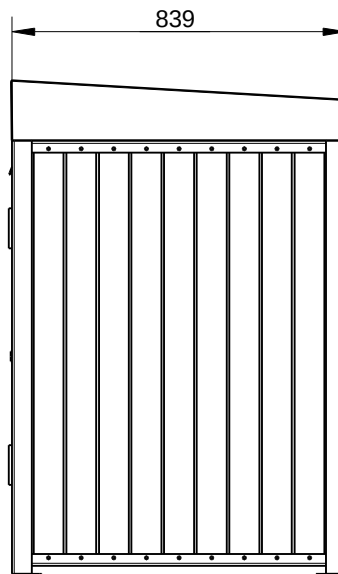
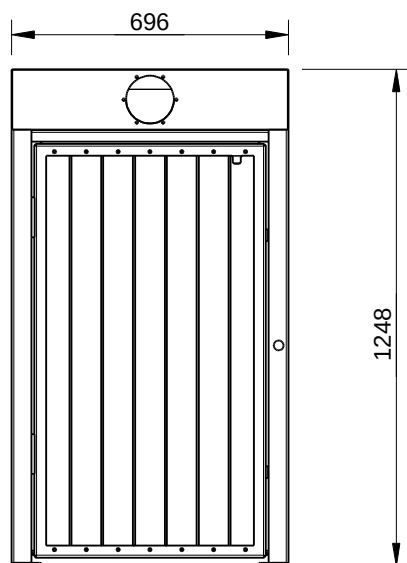
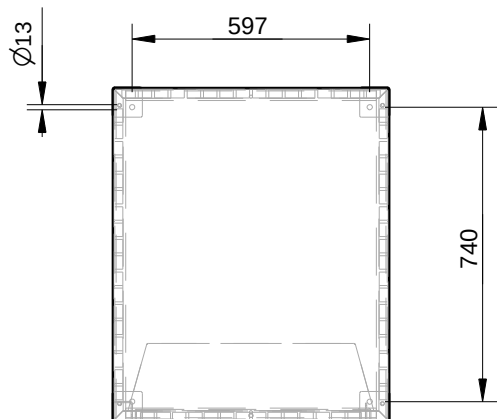
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DRAWING NUMBER: LT68-GA

REV.

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												FINISH: RAL9003: Signal White
												PAGE: 1 OF 1

DRAWING SIZE: A1		SCALE 1:40		DRAWING NUMBER: LT68-GA		REV.	
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SPECIFICATION:

MATERIAL:

Mild steel unless otherwise stated
Slats: Hardwood timber

DIMENSIONS:

All in mm unless otherwise stated

FINISH:

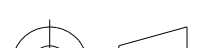
Steel - Galvanised and optional Powder Coat
Timber - Oil Based

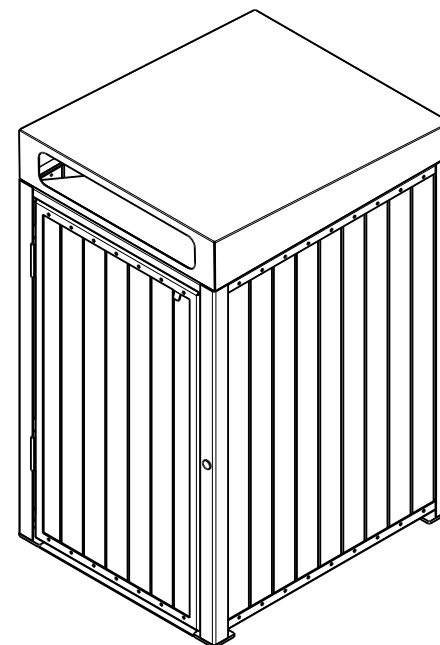
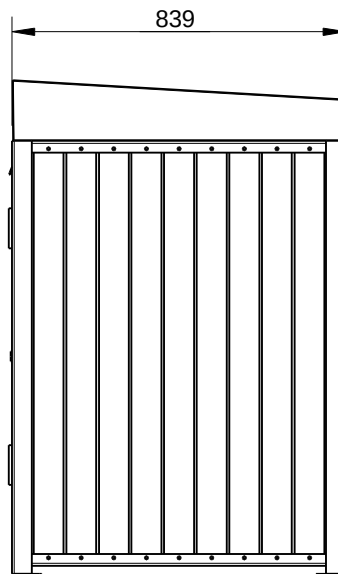
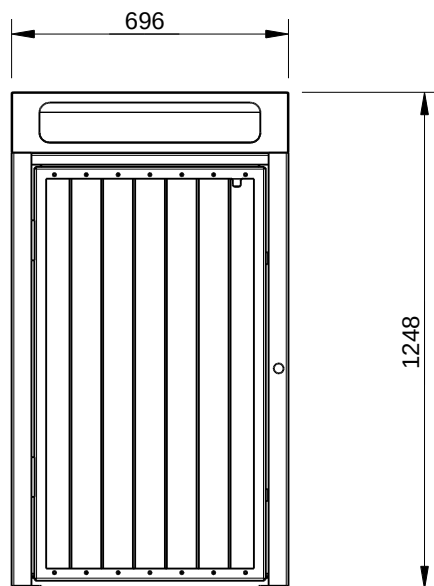
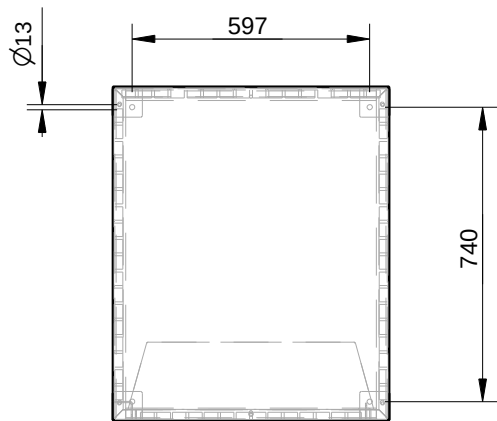


Quality
ISO 9001



CONFIDENTIAL

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	2	FULL PRODUCT REVIEW	RBC	15.4.14			MS AVENUE RECYCLE UNIT 240L - SIDE ENTRY - SPEC.				
	3										
	4						FFSB013005				
	5										REV. 2



SPECIFICATION:

MATERIAL:

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Slats: Hardwood timber

DIMENSIONS:

All in mm unless otherwise stated

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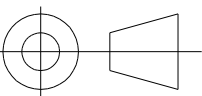
Steel - Powder Coat
Timber - Oil Based



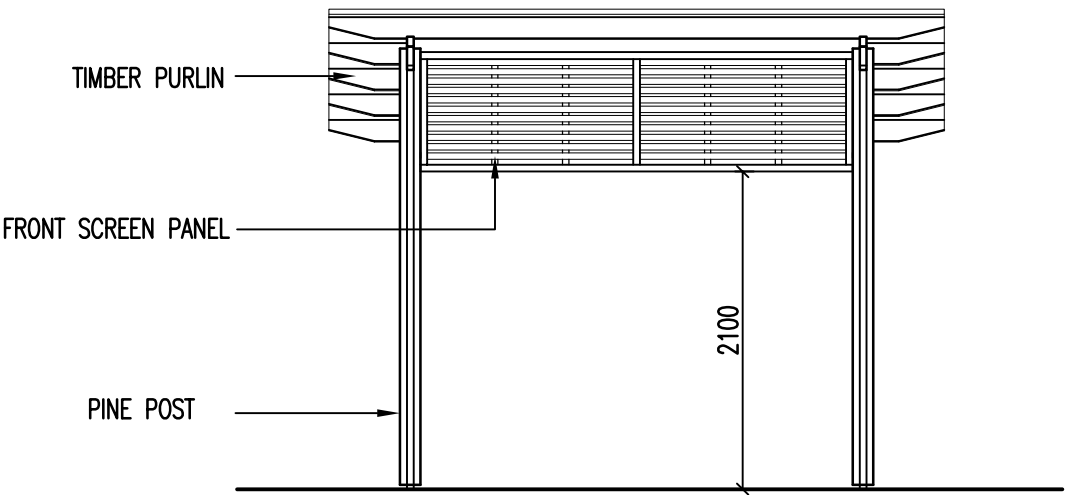
Quality
ISO 9001



CONFIDENTIAL

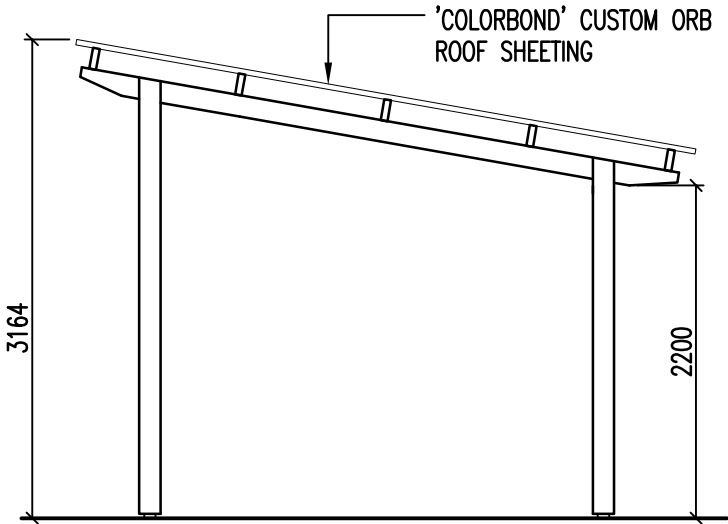
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	3									
	4									
	5									
							MS AVENUE LITTER RECEPTACLE 240L - SIDE ENTRY - SPEC.			
							FFSB013003		REV. 2	SHEET 1 OF 3

ALL DIMENSIONS IN MILLIMETRES - DO NOT SCALE



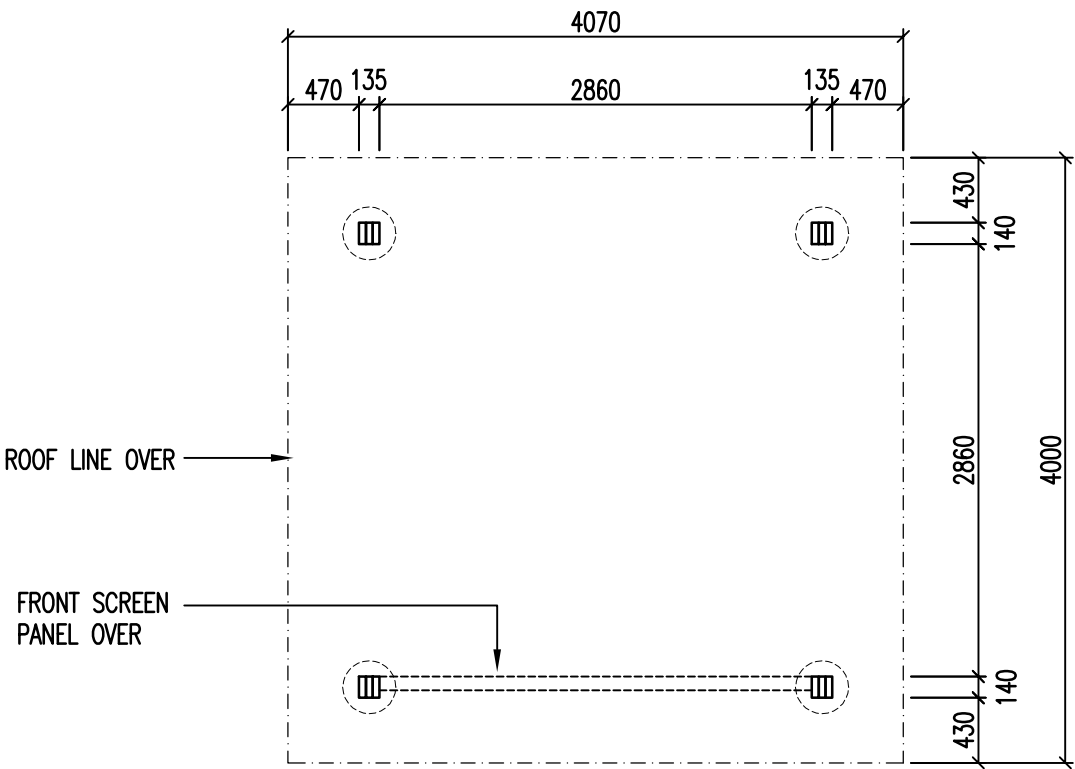
FRONT ELEVATION

(1:50)



SIDE ELEVATION

(1:50)



PLAN

(1:50)

GENERAL NOTES:

- G1. DURING CONSTRUCTION THE STRUCTURE SHALL BE MAINTAINED IN A STABLE CONDITION AND NO PART SHALL BE OVER STRESSED.
- G2. PRIOR TO COMMENCEMENT OF WORKS THE BUILDER SHALL SATISFY THEMSELVES OF THE CORRECT LOCATIONS OF ALL EXISTING SERVICES WHETHER INDICATED OR NOT ON THE PLANS.
- G3. LOCATING OF THE STRUCTURE, INCLUDING CO-ORDINATES IF APPLICABLE, IS THE RESPONSIBILITY OF THE CLIENT AND/OR THE CLIENT'S SITE REPRESENTATIVE.
- G4. STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE TO THE FOLLOWING AUSTRALIAN STANDARDS:
- AS1170.1, AS1170.2, AS1720.1, AS3600 AND AS4100, AS1664.
- G5. STRUCTURE IS SUITABLE FOR N3 AREAS AND HAS BEEN DESIGNED WITH AN AVERAGE RECURRENCE INTERVAL OF 100 YEARS.
- G6. SITE COVERAGE IS 16m² (ROOF AREA).
- G7. THE FOOTING HAS BEEN DESIGNED ASSUMING:
- SITE CLASS S OR M
- ALLOWABLE SOIL BEARING CAPACITY OF 100kPa
- SOIL ADHESION OF 10kPa
(TO BE VERIFIED ON SITE).
- G8. FOR SLABS ON GROUND, ALL TOPSOIL AND UPPER STRATA CONTAINING SOFT OR ORGANIC MATTER ARE TO BE REMOVED AND REPLACED WITH SELECT COMPACTED FILL.
- G9. ALL FILL TO BE CLEAN, PLACED IN LAYERS NOT EXCEEDING 200mm AND COMPACTED TO 95% STANDARD COMPACTION.
- G10. EARTHWORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH CRITERIA AND PROCEDURES SET OUT IN AS3798 *GUIDELINES ON EARTHWORKS FOR COMMERCIAL AND RESIDENTIAL DEVELOPMENTS*.

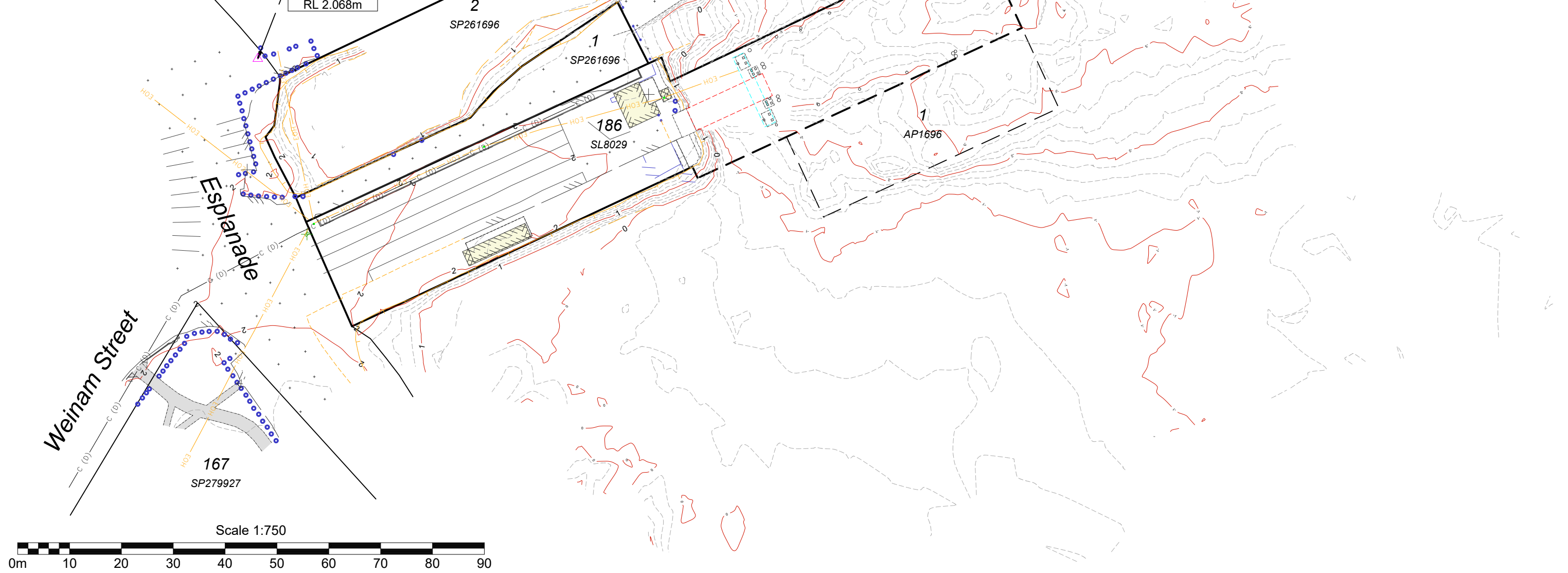
REVISION		DATE:	DRAWN BY.	© LANDMARK PRODUCTS LIMITED THIS DOCUMENT IS AND SHALL REMAIN THE PROPERTY OF LANDMARK PRODUCTS LIMITED. UNAUTHORISED USE OF THIS DOCUMENT IN ANY FORM IS PROHIBITED.	 Landmark Enhancing Open Space Environments Landmark Products Limited. PH: 1300 768 230 A.B.N. 99 112 000 843 FAX: 1300 768 260 55-57 Kabi Circuit, Deception Bay P.O. Box 603, Deception Bay www.landmarkpro.com.au Queensland 4508 landmark@landmarkpro.com.au	CLIENT NAME	PROJECT No.	PAGE
6	-	-	-			LANDMARK PRODUCTS LTD	-	A3
5	-	-	-			-	DATE:	DRAWN
4	-	-	-				28/05/12	BMM
3	-	-	-			STD K302 "PENINSULA" SHELTER - W41, TP, PINE ROOF, IG, GAL	DRAWING No.	SCALE
2	-	-	-				K3024P*P*IG	NTD
1	-	-	-	CHECKED BY:	DATE:	DRAWING TITLE	SHEET No.	REV.
						BA - PLAN AND ELEVATIONS	101	0

APPENDIX B

Survey

LEGEND:

Road	Kerb Back	Terrain	Driveway
	Kerb Invert		Footpath
	Edge of Bitumen		Slab Edge
	Edge of Gravel		Retaining Wall Base
	Road Crown		Retaining Wall Top
	Traffic Park Meter		Change of Grade
	Traffic Light		Top of Bank
	Traffic Pit		Toe of Bank
	Traffic Sign		Waterline
	Traffic Post Box		Garden Edge
Structures	Building Line		Creek Toe of Bank
	Roof Ridgeline		Creek Top of Bank
	Fence Line		Creek Invert
	Gate		Creek Waterline
	Hand Rail		Tree
	Cattle Grid		Tree Canopy
	Bollard		Control Point/PSM
Sewer	Sewer Line	Drainage	Drainage line
	Valve		Open Drain
	Inspection Opening		Manhole
	Manhole		Field Inlet
Electrical	Electricity Line		Downpipe
	Overhead Line	Communications	Communication Line
	Pits/Manholes		Overhead Line
	Pole		Pits/Manholes
	Street Light		Pillar
	Light In-Ground	Gas	Gas Line
Water	Water Line		Valve
	Meter		Marker
	Valve		
	Fire Hydrant		
	Tap		
	Sprinkler		
Fuel	Fuel Line	Subsurface Utility -QL	
	Fitting		



APPENDIX C

Geotechnical Report

Geotechnical Investigation Report

Vehicle Ferry Terminal

Weinam Street, Redland Bay



Prepared for:

Mr Daniel Berry

Projex Partners

Level 3, 135 Horton Parade

Maroochydore, QLD 4558

Report Number: J001183-001-R-Rev0

October 2020



Geotechnical



Environmental

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Figure 1: Test Location Plan

Appendices

Appendix A Reports of Boreholes, DCP's and Explanatory Notes

Appendix B Laboratory Test Results

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1.0 INTRODUCTION

This report presents the results of a geotechnical investigation carried out for proposed upgrade works to the Redland Bay ferry terminal.

The investigation was undertaken for Projex Partners Pty Ltd (Projex) in accordance with proposal Q0026128-001-L-Rev0.

2.0 PROPOSED DEVELOPMENT

The proposed upgrade includes expanding the existing Redland Bay vehicle ferry terminal (located at Weinam Street), to provide additional barge capacity for up to three barges (refer Image 1 below). The conceptual design includes earth fill (land reclamation) and new perimeter retaining walls around the northern and eastern edge. Six mooring piles are also proposed. Design details were not available at the time of reporting.



Image 1: Proposed design upgrade to Redland Bay Ferry Terminal (Extract from Sea Transport Solutions – Project: Redlands Ferry Pier, Drawing No. 1163.1.3.2).

3.0 SITE DESCRIPTION

The existing vehicle ferry terminal is located on an earth-fill pier situated at the end of Weinam Street, Redland Bay. There are two bitumen-sealed car parking areas to the north and south of the pier access, as well as an earth fill jetty to the north. The pier has four bitumen-sealed vehicle lanes to and from the main barge landing jetty, and an unsealed side lane that accesses two secondary barge docking locations to the north. There are also some gravel and grassed car parking areas on the southern side of the pier. Structures on the site include a portable site shed and a block wall building.

The pier and car parking areas are elevated about 1.5 m above the tidal zone, which surrounds the pier on the north, east and southern sides.

The southern side of the pier comprises a boulder fill batter, refer Photograph 3. The northern side of the pier is retained by a brick retaining wall at the western end (refer Photograph 4), while the eastern end comprises a soil/rock fill batter with vegetation (refer Photograph 5).



Photograph 1: Looking north-east toward borehole BH2, at the time of our investigation on 29 September 2020.



Photograph 2: Looking east towards borehole BH2, at the time of our investigation on 29 September 2020.



Photograph 3: Looking west along the southern side of the pier



Photograph 4: Looking north east along the western end of the northern side of the pier



Photograph 5: Looking north east toward the eastern end of the northern side of the pier.

4.0 METHOD OF INVESTIGATION

4.1 Review of Available Information

To assess likely ground conditions a review of published geological maps was undertaken (refer Section 5.1).

4.2 Fieldwork

Fieldwork was carried out on 29 and 30 September 2020 and comprised the drilling of four boreholes (designated BH1 to BH4). The boreholes were drilled to depths between 14.95 m and 22.07 m using a truck-mounted investigation rig using solid flight augering and wash boring techniques. Standard penetration testing (SPT) and undisturbed (U50) tubes were undertaken at approximately 1.5 m intervals in the boreholes.

In addition, five dynamic cone (DCP) tests (designated DCP1 to DCP5) were undertaken to between 1.8 m and 4.8 m depth in the tidal zone at low tide.

Test locations are shown on the attached Figure 1. Borehole and DCP reports are provided in Appendix A, along with Explanatory Notes. Subsurface conditions are discussed in Section 5.2.

All fieldwork was carried out in the presence of a geotechnical engineer from Core, who logged the subsurface conditions in accordance with Australian Standard *AS1726-2017 Geotechnical site investigations*.

4.3 Laboratory Testing

4.3.1 Geotechnical Testing

Laboratory testing as summarised in Table 1 was performed at a NATA-accredited laboratory. The testing was conducted in accordance with procedures described in *AS1289 Methods of testing soils for engineering purposes*.

Laboratory test certificates are attached in Appendix B.

Table 1: Summary of geotechnical classification testing.

Borehole No.	Depth		Material Type	Atterberg Limits			
	From (m)	To (m)		Liquid Limit (%)	Plastic Limit (%)	Plasticity Index	Percent Fines (%)
BH1	10.0	10.45	Clayey SILT (RESIDUAL)	75	34	41	70
BH2	17.5	17.95	Sandy SILT (RESIDUAL)	-	-	-	57
BH3	8.5	8.95	Clayey SILT (RESIDUAL)	98	34	64	87
BH4	5.5	5.95	Clayey SILT (RESIDUAL)	132	31	101	93

The testing generally confirms the field soil classifications.

5.0 RESULTS OF INVESTIGATION

5.1 Published Mapping

Published information¹ indicates that the site is underlain by Cainozoic estuarine deposits typically comprising “*mud, silt, sand and clay and gravel with minor peat and coral debris*”. The site is close to the boundary with the Tertiary age Lamington Group basalt flows, which are likely to underlie the estuarine deposits.

An extract of the geological map is shown in Image 1 below.

The subsurface conditions encountered in the boreholes (described in Section 5.2) generally confirm the published geology.

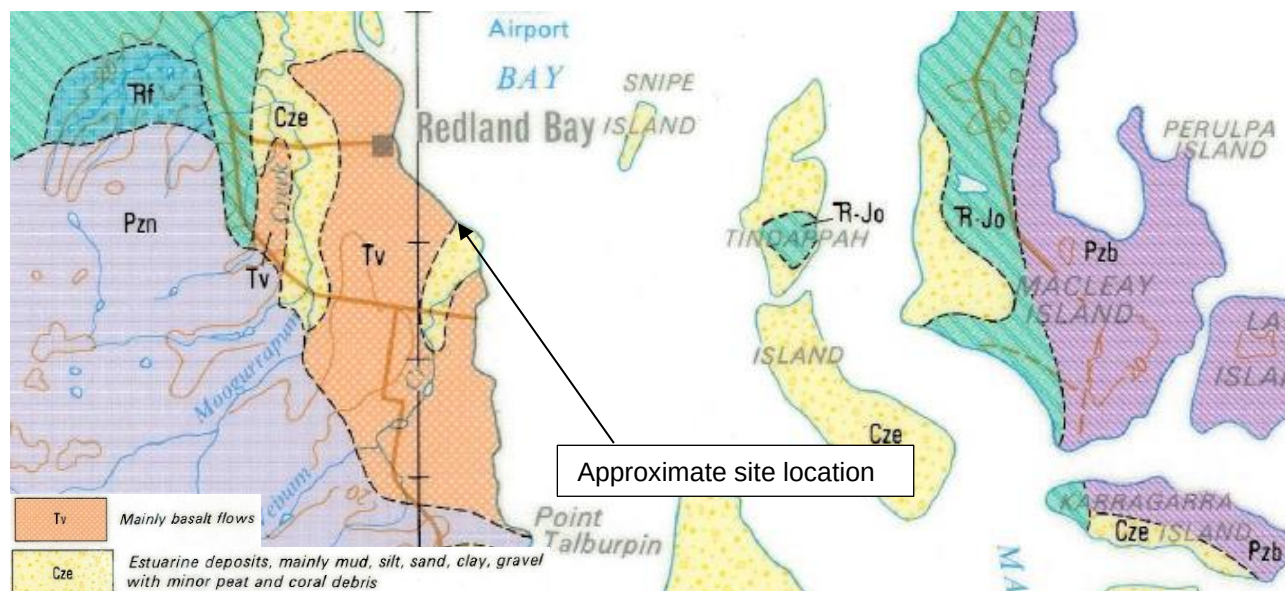


Image 1: Extract from published geology map.

¹ BEENLEIGH 1:100,000 Geol. Map, DME, First Edition 1974

5.2 Subsurface Conditions

The subsurface conditions encountered in the boreholes generally comprised fill over residual soils.

The fill is variable in composition, but is typically at least medium dense or stiff, except for some loose gravel between 2.5 m and 3.2 m depth in BH1 and loose sand between 1 m and 2.5 m depth in BH4. Fill depths range between about 2.5 m and 4 m, with the clay soil in BH3 and BH4 from 2.5 m depth to 5.5 m and 4 m, respectively, classified as possible fill. Documentation stating that the fill was placed under 'Level 1' supervision and testing as per Australian Standard AS 3798-2007 *Guidelines on earthworks for commercial and residential developments* was not available at the time of reporting, therefore the fill is deemed 'uncontrolled'.

A narrow zone of silty clay estuarine soil was encountered in BH1 from 3.2 m to 3.5 m depth.

The residual soils generally comprise firm to very stiff silty clay/clayey silt or medium dense to dense sandy silt. At the investigation depth in BH2, extremely weathered basalt was encountered, and very low strength, highly weathered basalt from 21.5 m to 22.09 m (termination depth) in BH4.

Groundwater seepage was encountered at depths ranging between 1.6 m and 2 m during drilling, with standing water levels between 1.3 m and 1.5 m on completion of drilling. Groundwater levels are likely to be influenced by tidal movement and rainfall and may rise close to the ground surface or occur as perched water tables in the higher permeability zones within the fill.

The DCP testing indicates soft/loose soils (inferred estuarine soils) from the ground/seabed surface to depths ranging between about 0.7 m and 1.2 m.

6.0 GEOTECHNICAL COMMENTS & RECOMMENDATIONS

6.1 Geological Model

The existing pier comprises variable fill soils. Although the fill is deemed 'uncontrolled', it is generally medium dense or stiff, and significant unsuitable material was not encountered during the investigation.

It is likely that the surficial alluvial/estuarine soils were generally removed from the pier footprint prior to fill placement as these were not encountered within most of the boreholes.

With the exception of a narrow zone of 'remnant' estuarine soils (in BH1), the fill is underlain by competent residual soils, over weathered rock at depth.

6.2 Earthworks

It is recommended that the proposed new fill be founded on at least stiff or medium dense residual soils. The overlying soft/loose soils estuarine soils should be removed from the ground/seabed surface, to anticipated depths ranging between about 0.7 m and 1.2 m (possible deeper further east of the existing barge).

Settlement under the anticipated fill and structure loads are anticipated to be less than about 40 mm, provided that the soft/loose soils estuarine soils are removed prior to earthworks.

The batters should comprise rock fill of sound igneous or metamorphic material that will not disintegrate in seawater or when exposed to weather. Rocks should be fresh or slightly weathered, and of very high strength (or stronger) as defined by AS 1726. The least dimension of the rock should not be less than half its greatest dimension.

Earthworks must be carried out in general accordance with the Department of Transport and Main Roads Technical Specification 'MRTS04 General Earthworks', under the direct supervision of a geotechnical engineer (RPEQ).

Temporary working platforms or progressive land reclamation (filling) will be required for construction machinery access to the tidal zone.

6.3 Footings

Lightly-loaded structures on top of the existing or proposed fill could be supported on narrow strip or pad footings, designed using an allowable bearing pressure of 100 kPa.

Retaining wall footings should be founded in the (at least) stiff or medium dense residual soils and can then be designed using an allowable bearing pressure of 100 kPa.

Alternatively, for higher loads or where foundation soils/water depth exclude high-level footings, retaining walls could be supported on a driven pile footing system, embedded in the residual soils or weathered rock. Piles driven into the underlying weathered rock (encountered from about 22 m depth) should be considered for the mooring piles. Design of piles driven into rock will be governed by the pile structural capacity. A specialist contractor should be consulted regarding the design and construction of piles. Further geotechnical input/analysis may be required when design details are available.

Footing excavations must be inspected by a geotechnical engineer from Core prior to construction. All footings should be founded such that they are not adversely affected by any adjacent excavations, batter slopes, trenches, or retaining walls that are not designed to support building loads. To minimise the potential for any adverse interaction effects, footings should be founded at least below a plane extending 1 m horizontally from the base of trenches/batter slopes/excavations/retaining walls, then rising up at 1V:1H. This requirement is illustrated in Diagram 1.

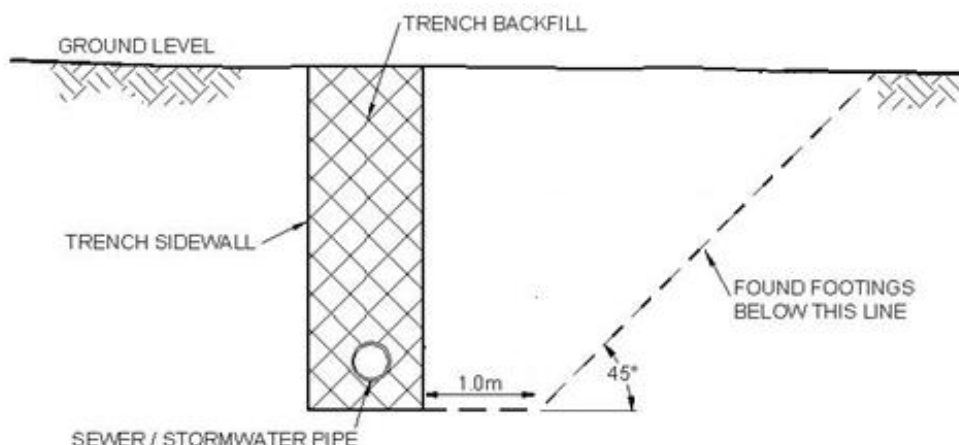


Diagram 1: Exclusion zone for base of footings.

6.4 Retaining Structures

The design of 'flexible' retaining walls may be undertaken using a triangular pressure distribution and the earth pressure coefficients provided in Table 2.

Flexible walls are those which are free to rotate or tilt (i.e. cantilevered walls or single anchored or propped walls) and should be designed using an 'active' earth pressure coefficient (K_a). Where the walls are rigid and cannot rotate or tilt, then an 'at-rest' earth pressure coefficient (K_0) should be used. Passive pressure should be ignored where there is potential for in-ground services trenches (or similar) in front of the wall.

If appropriate, an allowance of 10 kPa should be made for lateral stress induced by compaction plant operating behind the walls. The effects of surcharge should be included by multiplying the vertical pressure developed by the surcharge by the appropriate lateral earth pressure coefficient from Table 2. Allowance should be made for sloping backfill if applicable.

Retaining wall footing recommendations are provided in Section 6.3.

Table 2: Geotechnical design parameters.

Retained material	Unit weight (t/m ³)	Friction angle (degrees)	Cohesion, c_u (kPa)	Lateral earth pressure coefficient		
				Yielding		Non-yielding
				K_a (cantilever)	K_p	K_o
Firm clay	1.8	23	50	0.46	2.20	0.63
Stiff clay	1.8	25	100	0.41	2.46	0.58
Very stiff clay	1.9	28	200	0.36	2.77	0.53
Loose sand	1.7	27	N/A	0.41	2.46	0.58
Medium dense (or denser) sand	1.9	33	N/A	0.3	3.33	0.45
Rock fill (future)	2.4	37	N/A	0.26	3.85	0.41

Notes:

K_a - active; K_o - at rest; K_p - passive

For yielding walls active state develops when: Deflection > 0.001H to 0.004H (granular soil),
or deflection > 0.01H to 0.04H (cohesive soil)

7.0 LIMITATIONS

Should you require any further information please contact the undersigned. We draw your attention to the document, Limitations, which is included in Appendix C.

Core Consultants Pty Ltd



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- LEGEND**
-  Denotes approximate borehole location
 -  Denotes approximate dynamic cone penetration test location

 clarity • commitment • passion www.coreconsultants.com.au	CLIENT PROJEX PARTNERS		PROJECT VEHICLE FERRY TERMINAL - WEINAM STREET, REDLAND BAY							
	DRAWN BY MC	DATE 28/10/2020	DRAWING TITLE TEST LOCATION PLAN							
	CHECKED BY WM	DATE 28/10/2020								
	SCALE 1:400		SHEET SIZE A3	PROJECT No J001183	DOC No 001	DOC TYPE R	FIGURE No 001	REVISION 0	SHEET 1 OF 1	

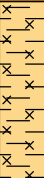
Appendix A

Reports of Boreholes, DCP's and Explanatory Notes

Client Projex Partners
Project Vehicle Ferry Terminal
Location Weinam Street, Redland Bay
Job No. J001183

East 530542.0 m
North 6945384.0 m MGA94 Zone 56
Contractor Redlands Drilling
Drill Rig RD2 Mobile B40L
Inclination -90°

Sheet 1 OF 3
Logged: MC
Logged Date: 29/09/20
Checked: WM
Checked Date: 28/10/20

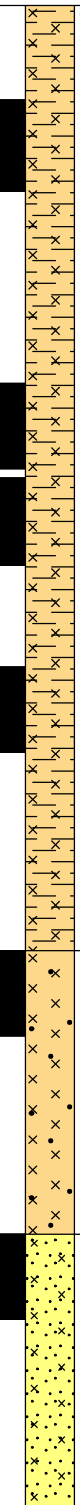
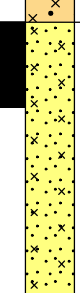
Drilling				Sampling		Field Material Description							
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
ADT	L	Groundwater seepage encountered at 2 m depth	0	0.10	SPT 1.00-1.45 m 11,16,16 N=32			GP-GC	FILL Sandy GRAVEL with clay: fine to medium grained, poorly graded, angular, brown; sand fine to medium grained, poorly graded; clay medium plasticity.	D - M	VD	FILL	
				0.30				CI	FILL Silty CLAY with sand trace gravel: medium plasticity, red brown; sand fine to medium grained; gravel fine grained, sub-angular.	W	PL		St
								GP-GC	FILL Sandy GRAVEL with clay: fine to medium grained, poorly graded, sub-angular, pale brown; sand fine to coarse grained, well graded, sub-angular; clay medium plasticity.				
			1		SPT 2.50-2.95 m 4,2,2 N=4			GP	FILL Sandy GRAVEL: fine to medium grained, poorly graded, sub-angular, pale brown; sand fine to coarse grained, well graded, sub-angular.	W		VL - L	
			2										
			2.50										
			3		SPT 4.00-4.45 m 6,5,3 N=8			CI	Silty CLAY (ESTUARINE SOIL) with sand: medium plasticity, dark grey; sand fine to medium grained.			F	F - St
			3.20					CI-CH	CLAY (RESIDUAL SOIL) with sand trace gravel: medium to high plasticity, pale brown, pale blue grey and orange brown; sand fine to coarse grained, sub-angular; gravel fine to medium grained, sub-angular.				
			3.50										
			4		U50 5.50-5.87 m PP =250 kPa				Mottled pale blue grey and orange brown.	W			St
5													
5.50													
6		SPT 7.00-7.45 m 3,4,3 N=7			CH-MH	Clayey SILT (RESIDUAL SOIL) with sand trace gravel: high plasticity, pale grey to pale green grey and mottled orange brown; sand fine grained; gravel fine to medium grained, sub-angular.			F				
7	7.00												

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Project Vehicle Ferry Terminal
Location Weinam Street, Redland Bay
Job No. J001183

East 530542.0 m
North 6945384.0 m MGA94 Zone 56
Contractor Redlands Drilling
Drill Rig RD2 Mobile B40L
Inclination -90°

Sheet 2 OF 3
Logged: MC
Logged Date: 29/09/20
Checked: WM
Checked Date: 28/10/20

Drilling				Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	STRUCTURE AND ADDITIONAL OBSERVATIONS
WB	L	Not observed due to the introduction of drilling fluids below 2.5 m depth	8		U50 8.50-8.98 m PP =90 kPa		CH-MH	Clayey SILT (RESIDUAL SOIL) with sand trace gravel: high plasticity, pale grey to pale green grey and mottled orange brown; sand fine grained; gravel fine to medium grained, sub-angular.			
			10.00		SPT 10.00-10.45 m 1,1,2 N=3			Mottled orange brown and pale grey to pale green grey.		F	
			11		U50 10.50-10.96 m PP =110 kPa						
			12		SPT 11.50-11.95 m 1,1,2 N=3						
			13.00		SPT 13.00-13.45 m 2,4,7 N=11		ML	Sandy SILT (RESIDUAL SOIL): low plasticity, brown to orange brown and mottled pale green grey; sand fine to medium grained, poorly graded.		St	
L-M			14.50		SPT 14.50-14.95 m 10,21,29 N=50		SM	Silty SAND (RESIDUAL SOIL): fine to medium grained, poorly graded, grey brown and mottled orange brown.			
			16.00						M	D	

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Drilling				Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION		MOISTURE CONDITION	STRUCTURE AND ADDITIONAL OBSERVATIONS
WB	L-M		16		SPT 16.00-16.45 m 4,14,12 N=26		CI	Sandy CLAY (RESIDUAL SOIL) trace gravel: medium plasticity, pale brown and red brown; sand fine to medium grained, poorly graded; gravel fine to medium grained, angular; tending to extremely weathered material.		W PL	VSt
			16.45					Hole Terminated at 16.45 m Target depth Backfilled			
			17								
			18								
			19								
			20								
			21								
			22								
			23								
			24								

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Project Vehicle Ferry Terminal
Location Weinam Street, Redland Bay
Job No. J001183

East 530475.0 m
North 6945351.0 m MGA94 Zone 56
Contractor Redlands Drilling
Drill Rig RD2 Mobile B40L
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Sheet 1 OF 3
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Drilling					Sampling		Field Material Description							
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS		
ADT	L-M	Groundwater seepage encountered at 1.8 m depth	0		SPT 1.00-1.45 m 6,17,14 N=31			GP-GC	BITUMEN WEARING SURFACE.	M	D	FILL		
			0.60					SC	FILL Sandy GRAVEL with clay: fine to medium grained, poorly graded, sub-angular, brown; sand fine to coarse grained, well graded, sub-angular; clay medium plasticity.					
			1						Grey brown; interbedded layers of sandy clay.					
			1.30											
			1.80											
			2							GC	Possibly FILL Clayey GRAVEL with sand: fine to medium grained, poorly graded, sub-angular to angular, red brown; clay medium plasticity; sand fine to coarse grained, sub-angular.	W	MD	
			2.40											
			3							CH	Possibly FILL CLAY trace sand trace gravel: high plasticity, pale grey mottled orange brown and red brown; sand fine to medium grained; gravel fine to medium grained, sub-angular.		St	
			4							CI-CH	CLAY (RESIDUAL SOIL) trace sand trace gravel: medium to high plasticity, mottled pale grey, pale brown, orange brown and green grey; sand fine to medium grained; gravel fine to medium grained, sub-angular to angular.		F - St	
			5									W PL		
WB	L	Not observed due to the introduction of drilling fluids below 2.5 m depth	5.50		SPT 5.50-5.95 m 2,3,6 N=9			CI	Silty CLAY (RESIDUAL SOIL) trace sand: medium plasticity, grey to pale green grey and mottled orange brown; sand fine to coarse grained, sub-angular.		St			
			6											
			7											
			7.00		SPT 7.00-7.45 m 2,3,4 N=7						F			

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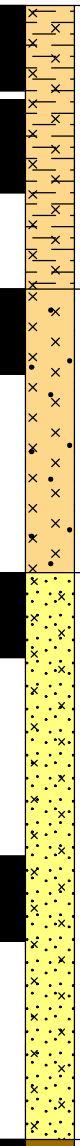
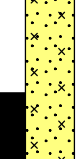
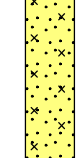
Drilling				Sampling		Field Material Description						
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
WB	L	Not observed due to the introduction of drilling fluids below 2.5 m depth	8					CI	Silty CLAY (RESIDUAL SOIL) trace sand: medium plasticity, grey to pale green grey and mottled orange brown; sand fine to coarse grained, sub-angular.			F
			8.50	SPT 8.50-8.95 m 1,2,3 N=5		MH	Clayey SILT (RESIDUAL SOIL) with sand: high plasticity, pale blue grey and mottled orange brown; sand fine to medium grained.					
			9									
			10	10.00	U50 10.00-10.45 m PP >600 kPa			With sand: dark red brown and mottled white; sand fine grained; increase in sand content.				
			11									
WB	L	Not observed due to the introduction of drilling fluids below 2.5 m depth	11.80	SPT 11.50-11.95 m 3,4,7 N=11					Pale blue grey and mottled orange brown; decrease in sand content.	W PL	St	F
			12									
			13	13.00	SPT 13.00-13.45 m 3,2,4 N=6			Grey brown mottled orange brown, black and pale blue grey; increase in sand content.				
			14									
			14.50	SPT 14.50-14.95 m 1,3,3 N=6			Brown to orange brown and pale blue grey.					
WB	L	Not observed due to the introduction of drilling fluids below 2.5 m depth	15									
			16.00									

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Drilling				Sampling		Field Material Description					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
WB	L	Not observed due to the introduction of drilling fluids below 2.5 m depth	16		SPT 16.00-16.45 m 1,1,2 N=3 U50 16.50-16.99 m PP =200 kPa		MH	Clayey SILT (RESIDUAL SOIL) with sand: high plasticity, pale blue grey and mottled orange brown; sand fine to medium grained. Grey brown mottled orange brown and pale grey.		F	
			17							St	
			17.50		SPT 17.50-17.95 m 1,1,1 N=2		ML	Sandy SILT (RESIDUAL SOIL); low plasticity, grey brown mottled orange brown and black; sand fine to medium grained, poorly graded.	w PL		
			18							S - F	
			19	19.00	SPT 19.00-19.45 m 7,8,11 N=19		SM	Silty SAND (RESIDUAL SOIL) trace gravel: fine to medium grained, poorly graded, grey brown mottled orange brown and black; gravel fine grained, sub-angular.		MD	
L-M			20								
			20.50		SPT 20.50-20.95 m 11,21,27 N=48			Trace gravel: gravel fine grained, sub-rounded; increase in silt content.	M - W		
M			21							D	
			22	22.00	SPT 22.00-22.07 m 30/70mm HB		CL	Silty CLAY (EXTREMELY WEATHERED MATERIAL) with sand: low plasticity, grey brown and mottled orange brown; sand fine to medium grained; remnant rock structure evident. Hole Terminated at 22.07 m Target depth Backfilled	w < PL	H	
			23								
			24								

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Client Projex Partners
Project Vehicle Ferry Terminal
Location Weinam Street, Redland Bay
Job No. J001183

East 530529.0 m
North 6945348.0 m MGA94 Zone 56
Contractor Redlands Drilling
Drill Rig RD2 Mobile B40L
Inclination -90°

Sheet 1 OF 2
Logged: MC
Logged Date: 30/09/20
Checked: WM
Checked Date: 28/10/20

Drilling				Sampling		Field Material Description								
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
ADT	H		0		SPT 1.00-1.45 m 5,3,2 N=5			CI	FILL Sandy CLAY trace gravel: medium plasticity, dark red brown; sand fine to medium grained, poorly graded; gravel fine to medium grained, sub-rounded.	w < PL	St	FILL		
			0.30					GP	FILL Sandy GRAVEL: fine to medium grained, poorly graded, sub-angular to angular, brown; sand fine to medium grained, poorly graded.	D - M	VD			
			1.00					GC	FILL Clayey GRAVEL with sand trace cobbles: medium to coarse grained, poorly graded, sub-angular to angular, brown to orange brown and grey; clay medium plasticity; sand fine to coarse grained, angular; cobbles probable.	M	L			
			2.20						Grey; tending to clay.	M - W				
			2.50					CH	Possibly FILL Gravelly CLAY: high plasticity, red brown mottled pale grey and yellow brown; gravel fine to medium grained, poorly graded, sub-rounded.		St - VSt			
			3		SPT 4.00-4.45 m 5,11,13 N=24				With sand: dark red brown mottled pale grey and orange brown; sand fine to coarse grained, sub-angular; decrease in gravel content.	w ≈ PL	VSt			
			4.00											
			5											
			5.50					CH	Silty CLAY (RESIDUAL SOIL) trace sand: high plasticity, pale blue grey mottled orange brown and red brown; sand fine to medium grained.					
			6					CI	Silty CLAY (RESIDUAL SOIL): medium plasticity, mottled white, pale brown and pale green grey and orange brown.					F - St
7		SPT 7.00-7.45 m 2,3,5 N=8												
WB			Not observed due to the introduction of drilling fluids below 2.5 m depth											

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Sheet 2 OF 2
 Logged: MC
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Drilling				Sampling		Field Material Description							
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY	DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
WB	L	Not observed due to the introduction of drilling fluids below 2.5 m depth	8					CI	Silty CLAY (RESIDUAL SOIL): medium plasticity, mottled white, pale brown and pale green grey and orange brown.		F - St		
			8.50	SPT 8.50-8.95 m 2,2,3 N=5		MH	Clayey SILT (RESIDUAL SOIL) trace sand trace gravel: high plasticity, grey to pale grey mottled orange brown and pale green grey; sand fine to medium grained; gravel fine grained, sub-rounded.		F				
			9										
			10	10.00	U50 10.00-10.46 m PP =300 kPa			Dark red brown; fine grained sand.					
			11										
			11.50	SPT 11.50-11.95 m 6,9,10 N=19			Dark brown to dark red brown mottled pale brown and white.		VSt				
			12										
			13	13.00	SPT 13.00-13.45 m 5,9,13 N=22			Dark brown to dark red brown mottled pale brown, white and grey.					
			14										
			14.50	SPT 14.50-14.95 m 8,12,16 N=28			Grey brown mottled orange brown, white and black; tending to silty clayey sand.						
	14.95												
			15					Hole Terminated at 14.95 m Target depth Backfilled					

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Client Projex Partners
Project Vehicle Ferry Terminal
Location Weinam Street, Redland Bay
Job No. J001183

East 530492.0 m
North 6945337.0 m MGA94 Zone 56
Contractor Redlands Drilling
Drill Rig RD2 Mobile B40L
Inclination -90°

Sheet 1 OF 3
Logged: MC
Logged Date: 30/09/20
Checked: WM
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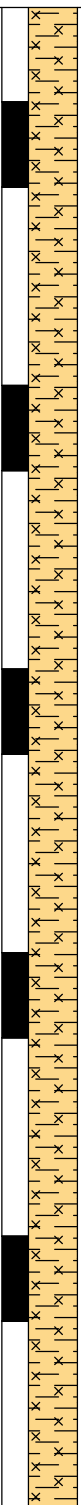
Drilling				Sampling		Field Material Description																					
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION		MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS														
ADT	H			Groundwater seepage encountered at 1.6 m depth	SPT 1.00-1.45 m 7,9,10 N=19			GP	FILL GRAVEL with sand: medium to coarse grained, poorly graded, sub-angular to angular, grey; sand fine to coarse grained, angular.	D	VD	FILL															
								CI	FILL Sandy CLAY: medium plasticity, dark brown; sand fine to medium grained, poorly graded.	w < PL	St																
								GW	FILL Sandy GRAVEL: fine to coarse grained, well graded, sub-angular to angular, brown to orange brown; sand fine to medium grained, poorly graded.	D - M	MD																
								GC	FILL Clayey GRAVEL with sand: fine to coarse grained, well graded, sub-angular to angular, orange brown and pale grey; clay medium plasticity; sand fine to medium grained.	M																	
								CH	FILL Sandy CLAY trace gravel: high plasticity, mottled pale blue grey, green grey and orange brown; sand fine to coarse grained, well graded, sub-angular; gravel fine to medium grained, sub-angular.	w ≈ PL	St																
								CH	Possibly FILL CLAY with gravel trace sand: high plasticity, red brown mottled pale grey and orange brown; gravel fine to coarse grained, sub-angular to angular; sand fine to medium grained.																		
								CI-CH	Silty CLAY (RESIDUAL SOIL) with sand trace gravel: medium to high plasticity, mottled pale brown, pale blue grey, green grey, white and orange brown; sand fine to medium grained; gravel fine to medium grained, sub-angular.																		
								WB		Not observed due to the introduction of drilling fluids below 2.5 m depth	SPT 2.50-2.95 m 2,4,7 N=11				CH	Possibly FILL CLAY with gravel trace sand: high plasticity, red brown mottled pale grey and orange brown; gravel fine to coarse grained, sub-angular to angular; sand fine to medium grained.	w ≈ PL	St									
																				SPT 4.00-4.45 m 5,6,6 N=12			CI-CH	Silty CLAY (RESIDUAL SOIL) with sand trace gravel: medium to high plasticity, mottled pale brown, pale blue grey, green grey, white and orange brown; sand fine to medium grained; gravel fine to medium grained, sub-angular.	w ≈ PL	St	
U50 7.00-7.35 m PP =300 kPa			MH	Clayey SILT (RESIDUAL SOIL) trace sand trace gravel: high plasticity, mottled pale green grey, white, pale brown and orange brown; sand fine grained; gravel medium grained, sub-rounded.	w ≈ PL	St																					

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Client Projex Partners
 Project Vehicle Ferry Terminal
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 Job No. J001183

East 530492.0 m
 North 6945337.0 m MGA94 Zone 56
 Contractor Redlands Drilling
 Drill Rig RD2 Mobile B40L
 Inclination -90°

Sheet 2 OF 3
 Logged: MC
 Logged Date: 30/09/20
 Checked: WM
 Checked Date: 28/10/20

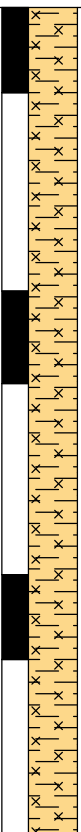
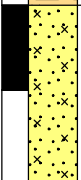
Drilling				Sampling		Field Material Description						
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION	MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS
WB	L	Not observed due to the introduction of drilling fluids below 2.5 m depth	8				MH	Clayey SILT (RESIDUAL SOIL) trace sand trace gravel: high plasticity, mottled pale green grey, white, pale brown and orange brown; sand fine grained; gravel medium grained, sub-rounded.		St		
			8.50	SPT 8.50-8.95 m 1,2,3 N=5	Orange brown mottled red brown and pale blue grey.				F			
			10	10.00	SPT 10.00-10.45 m 3,5,7 N=12			Dark red brown mottled white; decrease in silt and sand content.		St		
			11.50	SPT 11.50-11.95 m 1,2,3 N=5	Dark red brown mottled white and green; interbedded lenses of sandy silt.			W PL				
			13	13.00	SPT 13.00-13.45 m 1,3,3 N=6			Trace gravel: brown to dark red brown mottled orange brown, white and pale green grey; gravel fine to medium grained, sub-angular.		F		
			14.50		SPT 14.50-14.95 m 1,3,3 N=6							
			16	16.00								

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Client Projex Partners
 Project Vehicle Ferry Terminal
 Location Weinam Street, Redland Bay
 Job No. J001183

East 530492.0 m
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 Contractor Redlands Drilling
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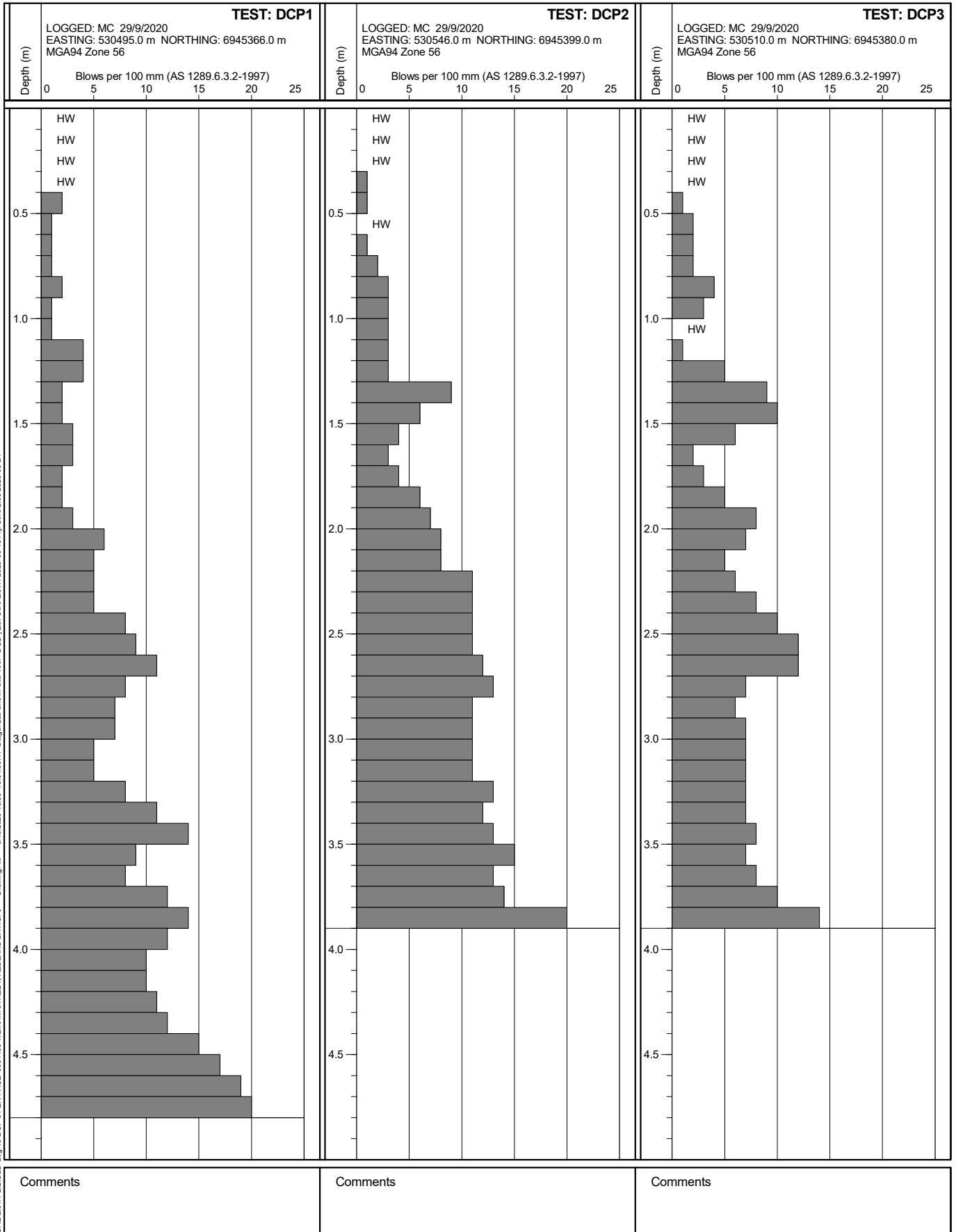
Sheet 3 OF 3
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Drilling				Sampling		Field Material Description								
METHOD	PENETRATION RESISTANCE	WATER	DEPTH (metres)	DEPTH RL	SAMPLE OR FIELD TEST	RECOVERED	GRAPHIC LOG	GROUP SYMBOL	SOIL/ROCK MATERIAL DESCRIPTION		MOISTURE CONDITION	CONSISTENCY DENSITY	STRUCTURE AND ADDITIONAL OBSERVATIONS	
WB	L	Not observed due to the introduction of drilling fluids below 2.5 m depth	16		SPT 16.00-16.45 m 1,3,4 N=7		MH	Clayey SILT (RESIDUAL SOIL) trace sand trace gravel: high plasticity, mottled pale green grey, white, pale brown and orange brown; sand fine grained; gravel medium grained, sub-rounded. Orange brown mottled white and dark red brown.		F	w < PL	VSt		
			17											
			18		U50 17.50-17.99 m PP =240 kPa									
			19	19.00	SPT 19.00-19.45 m 3,6,10 N=16									
			20											
M	M		21	20.50	SPT 20.50-20.95 m 8,23,26 N=49		SM	Silty SAND (RESIDUAL SOIL): fine grained, uniformly graded, dark red brown mottled white and orange brown.	D - M	D				
			22	21.50										
			23											
H	H		22	22.09	SPT 22.00-22.09 m 30/90mm HB			BASALT: fine to medium grained, dark red brown mottled white and orange brown, very low strength, highly weathered.	D					
			23					Hole Terminated at 22.09 m Target depth Backfilled						

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CLIENT : Projex Partners
CONTRACTOR : Core Consultants
PROJECT : Vehicle Ferry Terminal
LOCATION : Weinam Street, Redland Bay
PROJECT No. : J001183

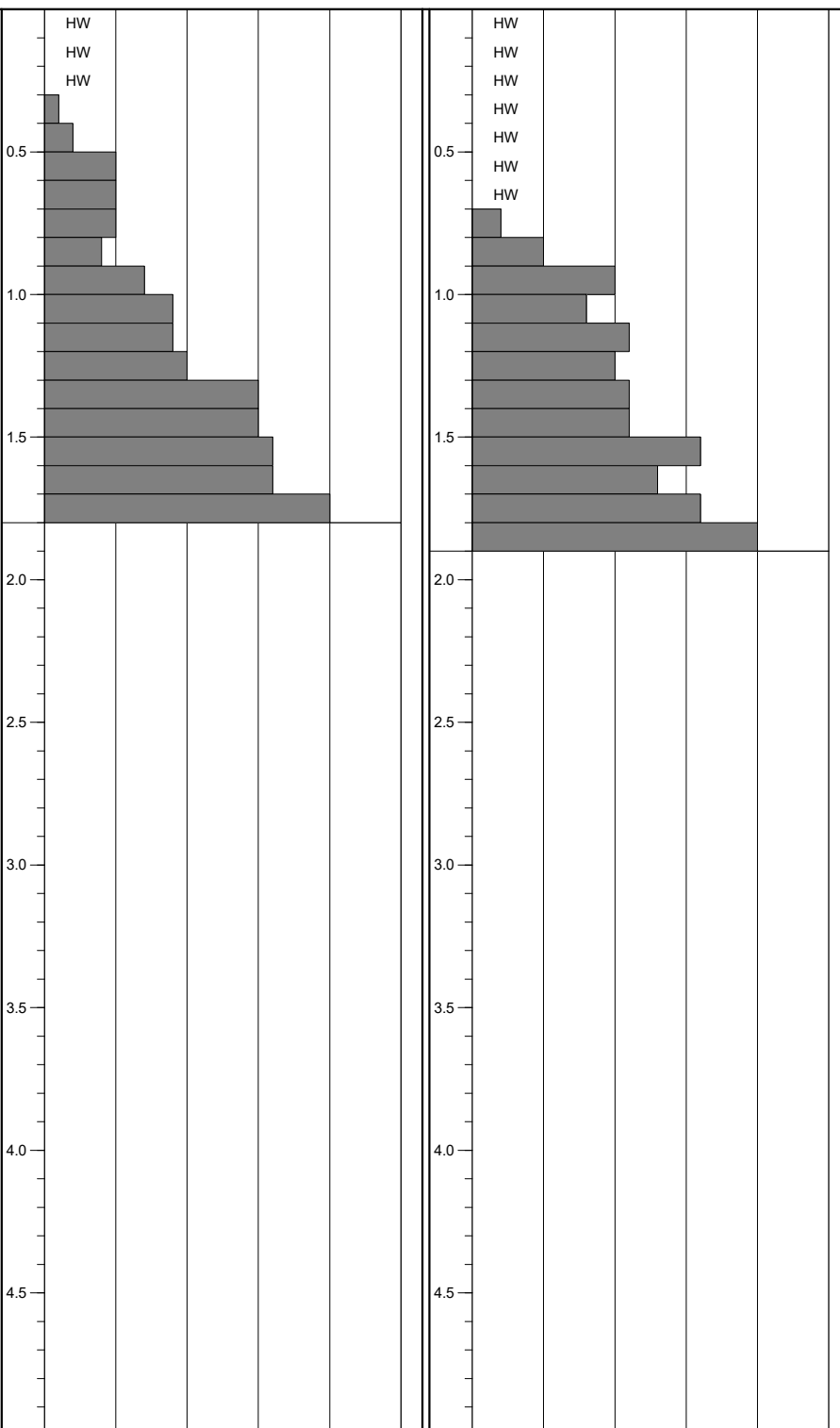
SHEET : 1 OF 2



CLIENT : Projex Partners
CONTRACTOR : Core Consultants
PROJECT : Vehicle Ferry Terminal
LOCATION : Weinam Street, Redland Bay
PROJECT No. : J001183

SHEET : 2 OF 2

TEST: DCP4		TEST: DCP5	
LOGGED: MC 29/9/2020 EASTING: 530550.0 m NORTHING: 6945353.0 m MGA94 Zone 56		LOGGED: MC 29/9/2020 EASTING: 530520.0 m NORTHING: 6945343.0 m MGA94 Zone 56	
Blows per 100 mm (AS 1289.6.3.2-1997)		Blows per 100 mm (AS 1289.6.3.2-1997)	
Depth (m)	0 5 10 15 20 25	Depth (m)	0 5 10 15 20 25



Comments

Comments

EXPLANATION OF NOTES, ABBREVIATIONS & TERMS USED ON BOREHOLE AND TEST PIT REPORTS

DRILLING/EXCAVATION METHOD

AS	Auger Screwing	RD	Rotary blade or drag bit	NQ	Diamond Core - 47 mm
AD	Auger Drilling	RT	Rotary Tricone bit	NMLC	Diamond Core - 52 mm
*V	V - Bit	RAB	Rotary Air Blast	HQ	Diamond Core - 63 mm
T	TC - Bit, e.g. ADT	RC	Reverse Circulation	HMLC	Diamond Core – 63mm
HA	Hand Auger	PT	Push Tube	BH	Tractor Mounted Backhoe
ADH	Hollow Auger	CT	Cable Tool Rig	EX	Tracked Hydraulic Excavator
DTC	Diatubre Coring	JET	Jetting	EE	Existing Excavation
WB	Washbore or Bailer	NDD	Non-destructive digging	HAND	Excavated by Hand Methods

PENETRATION/EXCAVATION RESISTANCE

L	Low resistance . Rapid penetration possible with little effort from the equipment used
M	Medium resistance . Excavation possible at an acceptable rate with moderate effort from equipment used
H	High resistance to penetration/excavation . Further penetration is possible at a slow rate
R	Refusal or Practical Refusal . No further progress possible without the risk of damage or unacceptable wear to the digging implement or machine.

These assessments are subjective and are dependent on many factors including the equipment power, weight, condition of excavation or drilling tools, and the experience of the operator.

WATER

	Water level shown at date		Partial water loss
	Water inflow		Complete water loss
GROUNDWATER NOT OBSERVED	The observation of groundwater whether present or not, was not possible due to drilling water, surface seepage or cave in of the borehole/test pit.		
GROUND WATER NOT ENCOUNTERED	The borehole/test pit was dry soon after excavation. However, groundwater could be present in less permeable strata. Inflow may have been observed had the borehole/test pit been left open for a longer period.		

SAMPLING AND TESTING

SPT	Standard Penetration Test to AS1289.6.3.1-2004	
4,7,11 N=18	4,7,11 = Blows per 150mm	N = Blows per 300mm penetration following 150mm seating
30/80mm	Where practical refusal occurs, the blows and penetration for that interval are reported	
RW	Penetration occurred under the rod weight only	
HW	Penetration occurred under the hammer and rod weight only	
HB	Hammer double bouncing on anvil	
DS	Disturbed Sample	
BDS	Bulk disturbed sample	
G	Gas Sample	
W	Water sample	
FP	Field permeability test over section noted	
FV	Field vane shear test expressed as uncorrected shear strength (sv = peak value)	
PID	Photoionisation Detector reading in ppm	
PM	Pressuremeter test over section noted	
PP	Pocket penetrometer test expressed as instrument reading in kPa	
U63	Thin walled tube sample - number indicates nominal sample diameter in millimetres	
WPT	Water pressure tests	
DCP	Dynamic cone penetration test	
CPT	Dynamic cone penetration test	
CPTu	Static cone penetration test with pore pressure (u) measurement	

ROCK CORE RECOVERY

TCR = Total Core Recovery (%)

SCR = Solid Core Recovery (%)

RQD = Rock Quantity Designation (%)

$$= \frac{\text{Length of core recovered}}{\text{Length of core run}} \times 100$$

$$= \frac{\sum \text{Length of cylindrical core recovered}}{\text{Length of core run}} \times 100$$

$$= \frac{\sum \text{Axial lengths of core} > 100 \text{ mm}}{\text{Length of core run}} \times 100$$

METHOD OF SOIL DESCRIPTION USED ON BOREHOLE AND TEST PIT REPORTS

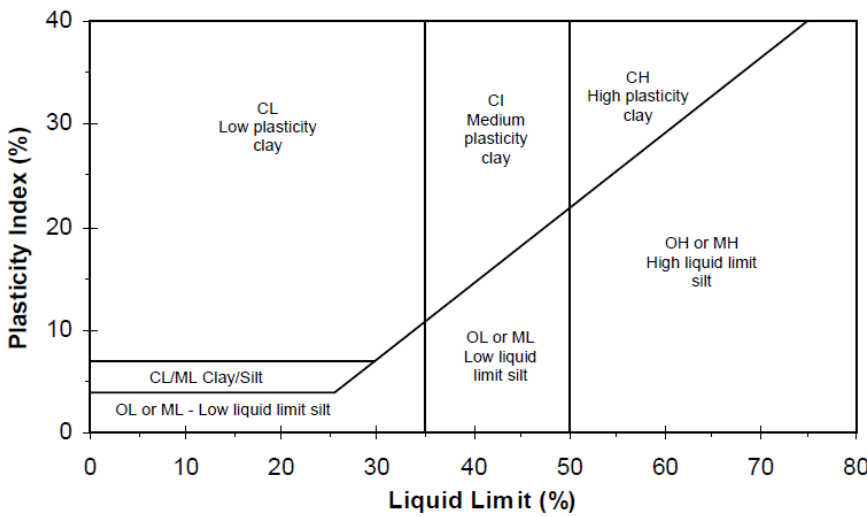
	FILL		CLAY (CL, CI, or CH)
	GRAVEL (GP or SW)		ORGANIC SOILS (OL or OH or Pt)
	SAND (SP or SW)		COBBLES or BOULDERS
	SILT (ML or MH)		

Combinations of these basic symbols may be used to indicate mixed materials such as sandy clay.

CLASSIFICATION AND INFERRED STRATIGRAPHY

Soil and Rock is classified and described in Reports of Boreholes and Test Pits using the preferred method given in AS 1726 - 2017. The material properties are assessed in the field by visual/tactile methods.

PARTICLE SIZE		
Major Division	Sub Division	Particle Size
Boulders		>200 mm
Cobbles		63 - 200 mm
Gravel	Coarse	20 - 63 mm
Gravel	Medium	6.7 - 20 mm
Gravel	Fine	2.36 - 6.7 mm
Sand	Coarse	0.6 - 2.36 mm
Sand	Medium	0.21 - 0.6 mm
Sand	Fine	0.075 - 0.21 mm
Silt		0.002 - 0.075 mm
Clay		<0.002 mm

PLASTIC PROPERTIES	
Plasticity Index (%)	
	Liquid Limit (%)

MOISTURE CONDITION FOR COARSE GRAINED SOIL AS 1726 - 2017

Symbol	Term	Description
D	Dry	Non-cohesive and free running
M	Moist	Soil feels cool, darkened in colour, tends to stick together
W	Wet	Soil feels cool, darkened in colour, soil sticks together, free water forms when handling

MOISTURE CONDITION FOR FINE GRAINED SOIL AS1726 - 2017

Symbol	Term	Description
W<PL	Moist dry of liquid limit	Hard and friable or powdery
W = PL	Moist near plastic limit	Soils can be molded at a moisture condition approximately equal to the plastic limit
W >PL	Moist, wet of plastic limit	Soils usually weakened and free water forms on hands when handling
W = LL	Wet near plastic limit	
W > LL	Wet, wet of liquid limit	

CONSISTENCY TERMS FOR COHESIVE SOILS		AS1726—2017	RELATIVE DENSITY OF COARSE GRAINED SOILS			AS1726—2017
Symbol	Term	Undrained Shear Strength	Symbol	Term	Density Index %	SPT 'N' #
VS	Very Soft	0 to 12 kPa	VL	Very Loose	Less than 15	0 to 4
S	Soft	12 to 25 kPa	L	Loose	15 to 35	4 to 10
F	Firm	25 to 50 kPa	MD	Medium Dense	35 to 65	10 to 30
St	Stiff	50 to 100 kPa	D	Dense	65 to 85	30 to 50
VSt	Very Stiff	100 to 200 kPa	VD	Very Dense	Above 85	Above 50
H	Hard	Above 200 kPa	In the absence of test results, consistency and density may be assessed from correlations with the observed behaviour of the material.			

TERMS FOR ROCK MATERIAL STRENGTH & WEATHERING AND ABBREVIATIONS FOR DEFECT DESCRIPTIONS

ROCK MATERIAL STRENGTH CLASSIFICATION				AS1726—2017
Symbol	Term	Uniaxial Compressive Strength (MPa)	Point Load Strength I_s (50) (MPa)	Field Guide
VL	Very Low Strength	0.6 to 2	0.03 to 0.1	Material crumbles under firm blows with sharp end of pick. Pieces up to 30 mm thick can be broken with finger pressure.
L	Low Strength	2 to 6	0.1 to 0.3	Easily scored with knife. Indentations 1 mm to 3 mm show in the specimen with firm blows of the pick point. A piece of core 150 mm by 50 mm may be broken by hand. Sharp edges of core are friable and break during handling.
M	Medium Strength	6 to 20	0.3 to 1	Readily scored with a knife. A piece of core 150 mm by 50 mm can be broken by hand with difficulty.
H	High Strength	20 to 60	1 to 3	A piece of core 150 mm by 50 mm cannot be broken by hand but can be broken by a pick with a single firm blow. Rock rings under hammer.
VH	Very High Strength	60 to 200	3 to 10	Hand specimen breaks with pick after more than one blow. Rock rings under hammer.
EH	Extremely High Strength	Above 200	Above 10	Specimen requires many blows with geological pick to break through intact material. Rock rings under hammer.

● = Diametral Point Load Test ▼ = Axial Point Load Test

CLASSIFICATION OF MATERIAL WEATHERING		AS1726—2017
Symbol	Term	Field Guide
RS	Residual Soil (<i>Note 1</i>)	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are no longer visible but the soil has not been significantly transported.
XW	Extremely Weathered (<i>Note 1</i>)	Material is weathered to such an extent that it has soil properties. Mass structure and material texture and fabric of original rock are still visible.
HW	Highly Weathered (<i>Note 2</i>)	The whole rock mass is discoloured, usually by iron staining or beaching to the extent that the colour of the original rock is not recognizable. Rock strength is significantly changed by weathering. Some primary minerals have weathered to clay minerals. Porosity may be increased by leaching, or may be decreased due to deposition of weathering products in pores.
MH	Moderately Weathered (<i>Note 2</i>)	The whole of the rock material is discoloured, usually by iron staining or bleaching to the extent that the colour of the original rock is not recognizable, but shows little or no change in strength from fresh rock.
SW	Slightly Weathered	Rock is partially discoloured with staining or bleaching along joints but shows little or no change of strength from fresh rock.
FR	Fresh	Rock shows no signs of decomposition of individual minerals or colour change.
Note 1	The term 'Extremely Weathered rock' is misleading as the material has soil properties. The word 'rock' should be replaced with the name of the original rock of the word 'material', eg. Extremely Weathered granite or Extremely Weathered material.	
Note 2	Where it is not possible to distinguish between 'Highly Weathered' and 'Moderately Weathered' rock the term 'Distinctly Weathered' may be used.	

DEFECT TYPE/DESCRIPTION				DEFECT PROFILE		DEFECT ROUGHNESS	
				Symbol	Description	Symbol	Description
B	Bedding Parting	V	Vein	PL	Planar	SI	Slickenside
J	Joint	HB/DB	Handling/Drilling Break	St	Stepped	Sm	Smooth
EW	Extremely Weathered Seam	C	Contact	Un	Undulating	Ro	Rough
FZ	Fracture Zone	L	Cleavage	DEFECT INFILL DESCRIPTION		Vertical Boreholes - The dip (inclination from horizontal) for the defect is given. Inclined Boreholes - The inclination is measured as the acute angle to the core axis.	
CZ/S	Crushed Zone/Seam	X	Foliation	Symbol	Description		
IS	Infilled Seam	S	Schistosity	Cn	Clean: No visible coating		
SZ/S	Sheared Zone/Seam			Sn	Stain: Coated 1 to 3 mm		
				Vr	Veneer: < 1 mm		
				Ct	Coating: 1 to 3 mm		

Appendix B

Laboratory Test Results

Material Test Report

Report No: BRIS20S-03082-1

Issue No: 1

Client: Core Consultants Pty Ltd
52 Second Avenue
Maroochydore QLD 4558

Principal:
Project No.: TESTBRIS00119AA
Project Name: J001183 - Vehicle Ferry Terminal
Lot No.: **TRN:**



Accredited for compliance with ISO/IEC 17025 - Testing.
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.



Royce Smith
Approved Signatory: Royce Smith
(Project Laboratory Manager)
NATA Accredited Laboratory Number: 431
Date of Issue: 20/10/2020

Sample Details

Sample ID: BRIS20S-03082
Client Sample:
Date Sampled: 29/09/2020
Source: On site
Material: In Situ
Specification: AS Grading
Sampling Method: Submitted by client
Project Location: Weinam Street, Redland Bay
Sample Location: BH1 - SPT (10.0-10.45m)

Sample Description:

Atterberg Limit:

Liquid Limit: 75
Plastic Limit: 34
Plasticity Index: 41
Linear Shrinkage (%): 18.0

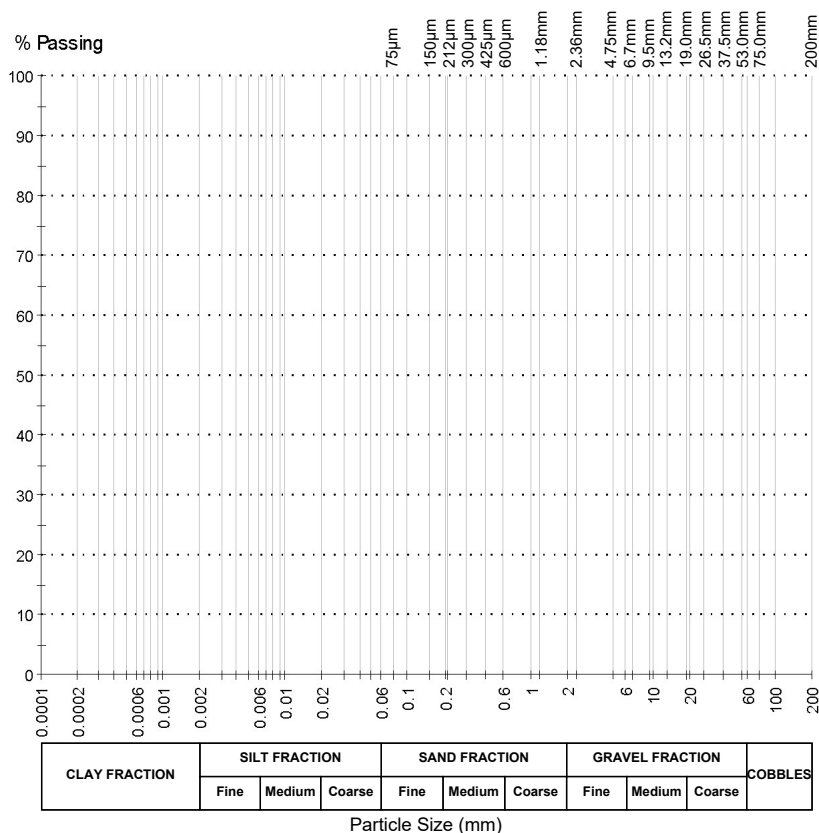
Grading: AS 1289.3.6.1

Drying by: Oven
Date Tested: 13/10/2020

Note: Sample Washed

Sieve Size	% Passing	Limits
75µm	70	

Particle Size Distribution



Material Test Report

Report No: BRIS20S-03082-1

Issue No: 1

Client: Core Consultants Pty Ltd
52 Second Avenue
Maroochydore QLD 4558

Principal:

Project No.: TESTBRIS00119AA

Project Name: J001183 - Vehicle Ferry Terminal

Lot No.: **TRN:**



Accredited for compliance with ISO/IEC 17025 - Testing.
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.



Royce Smith
Approved Signatory: Royce Smith
(Project Laboratory Manager)
NATA Accredited Laboratory Number: 431
Date of Issue: 20/10/2020

Sample Details

Sample ID: BRIS20S-03082
Client Sample:
Date Sampled: 29/09/2020
Source: On site
Material: In Situ
Specification: AS Grading
Sampling Method: Submitted by client
Project Location: Weinam Street, Redland Bay
Sample Location: BH1 - SPT (10.0-10.45m)

Other Test Results

Description	Method	Limits	Result
Moisture Content (%)	AS 1289.2.1.1		65.0
Date Tested			8/10/2020
Sample History	AS 1289.1.1		Oven-dried
Preparation	AS 1289.1.1		Dry Sieved
Linear Shrinkage (%)	AS 1289.3.4.1		18.0
Mould Length (mm)			150.3
Crumbling			No
Curling			Yes
Cracking			Yes
Liquid Limit (%)	AS 1289.3.1.2		75
Plastic Limit (%)	AS 1289.3.2.1		34
Plasticity Index (%)	AS 1289.3.3.1		41
Date Tested			14/10/2020

Comments

N/A

Material Test Report

Report No: BRIS20S-03083-1

Issue No: 1

Client: Core Consultants Pty Ltd
52 Second Avenue
Maroochydore QLD 4558

Principal:

Project No.: TESTBRIS00119AA

Project Name: J001183 - Vehicle Ferry Terminal

Lot No.: **TRN:**



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Royce Smith
Approved Signatory: Royce Smith
(Project Laboratory Manager)
NATA Accredited Laboratory Number: 431
Date of Issue: 20/10/2020

Sample Details

Sample ID: BRIS20S-03083
Client Sample:
Date Sampled: 29/09/2020
Source: On site
Material: In Situ
Specification: AS Grading
Sampling Method: Submitted by client
Project Location: Weinam Street, Redland Bay
Sample Location: BH2 - SPT (17.5-17.95m)

Sample Description:

Grading: AS 1289.3.6.1

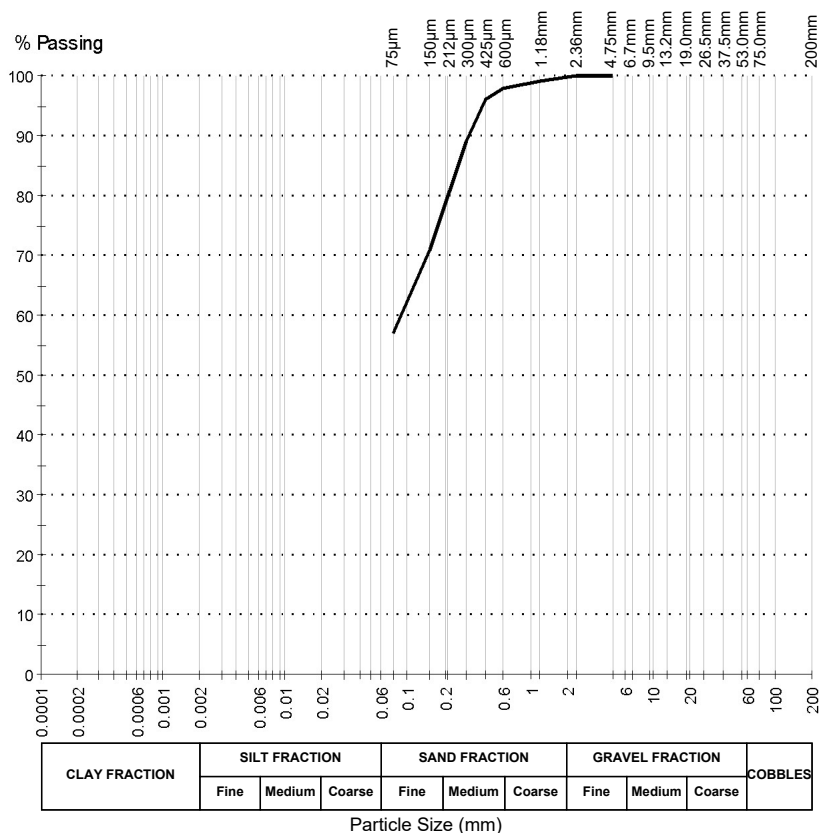
Drying by: Oven

Date Tested: 13/10/2020

Note: Sample Washed

Sieve Size	% Passing	Limits
4.75mm	100	
2.36mm	100	
1.18mm	99	
600µm	98	
425µm	96	
300µm	89	
150µm	71	
75µm	57	

Particle Size Distribution



Material Test Report

Report No: BRIS20S-03083-1

Issue No: 1

Client: Core Consultants Pty Ltd
52 Second Avenue
Maroochydore QLD 4558

Principal:
Project No.: TESTBRIS00119AA
Project Name: J001183 - Vehicle Ferry Terminal
Lot No.: **TRN:**



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Royce Smith
Approved Signatory: Royce Smith
(Project Laboratory Manager)
NATA Accredited Laboratory Number: 431
Date of Issue: 20/10/2020

Sample Details

Sample ID: BRIS20S-03083
Client Sample:
Date Sampled: 29/09/2020
Source: On site
Material: In Situ
Specification: AS Grading
Sampling Method: Submitted by client
Project Location: Weinam Street, Redland Bay
Sample Location: BH2 - SPT (17.5-17.95m)

Other Test Results

Description	Method	Limits	Result
Moisture Content (%)	AS 1289.2.1.1		64.0
Date Tested			8/10/2020

Comments

N/A

Material Test Report

Report No: BRIS20S-03084-1

Issue No: 1

Client: Core Consultants Pty Ltd
52 Second Avenue
Maroochydore QLD 4558

Principal:
Project No.: TESTBRIS00119AA
Project Name: J001183 - Vehicle Ferry Terminal
Lot No.: **TRN:**



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Royce Smith
Approved Signatory: Royce Smith
(Project Laboratory Manager)
NATA Accredited Laboratory Number: 431
Date of Issue: 20/10/2020

Sample Details

Sample ID: BRIS20S-03084
Client Sample:
Date Sampled: 30/09/2020
Source: On site
Material: In Situ
Specification: AS Grading
Sampling Method: Submitted by client
Project Location: Weinam Street, Redland Bay
Sample Location: BH3 - SPT (8.5-8.95m)

Sample Description:

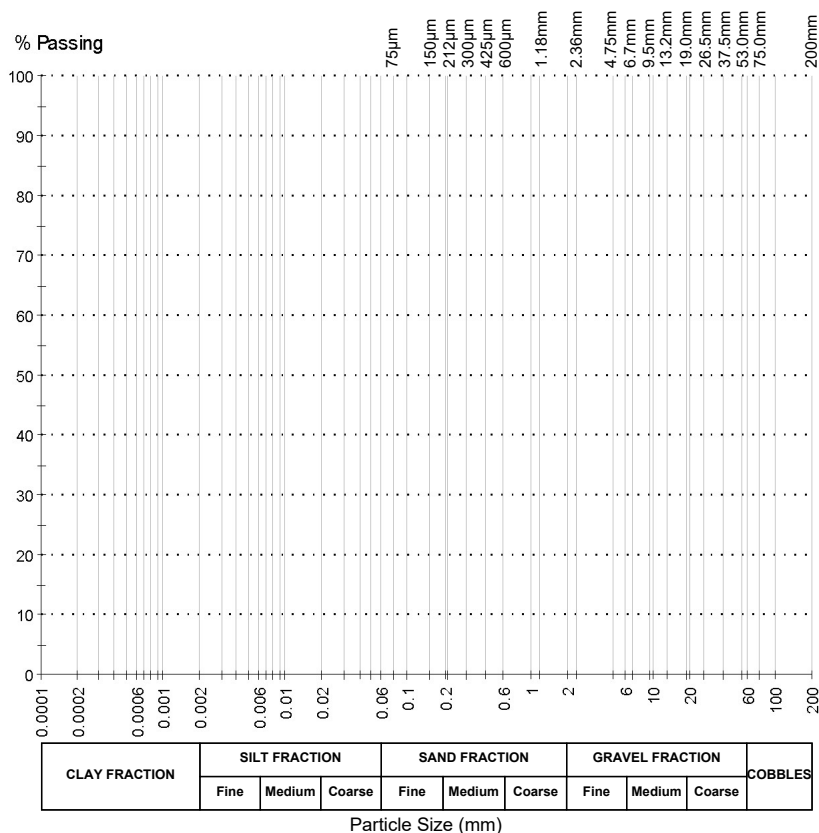
Grading: AS 1289.3.6.1

Drying by: Oven
Date Tested: 13/10/2020

Note: Sample Washed

Sieve Size	% Passing	Limits
75µm	87	

Particle Size Distribution



Material Test Report

Report No: BRIS20S-03084-1
Issue No: 1

Client: Core Consultants Pty Ltd
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Maroochydore QLD 4558

Principal:

Project No.: TESTBRIS00119AA

Project Name: J001183 - Vehicle Ferry Terminal

Lot No.: **TRN:**



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Approved Signatory: Royce Smith
(Project Laboratory Manager)

NATA Accredited Laboratory Number: 431
Date of Issue: 20/10/2020

Sample Details

Sample ID: BRIS20S-03084
Client Sample:
Date Sampled: 30/09/2020
Source: On site
Material: In Situ
Specification: AS Grading
Sampling Method: Submitted by client
Project Location: Weinam Street, Redland Bay
Sample Location: BH3 - SPT (8.5-8.95m)

Other Test Results

Description	Method	Limits	Result
Moisture Content (%)	AS 1289.2.1.1		63.0
Date Tested			8/10/2020
Sample History	AS 1289.1.1		Oven-dried
Preparation	AS 1289.1.1		Dry Sieved
Linear Shrinkage (%)	AS 1289.3.4.1		22.5
Mould Length (mm)			249.8
Crumbling			No
Curling			Yes
Cracking			Yes
Liquid Limit (%)	AS 1289.3.1.2		98
Plastic Limit (%)	AS 1289.3.2.1		34
Plasticity Index (%)	AS 1289.3.3.1		64
Date Tested			14/10/2020

Comments

N/A

Material Test Report

Report No: BRIS20S-03085-1

Issue No: 1

Client: Core Consultants Pty Ltd
52 Second Avenue
Maroochydore QLD 4558

Principal:

Project No.: TESTBRIS00119AA

Project Name: J001183 - Vehicle Ferry Terminal

Lot No.: **TRN:**



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Royce Smith

Approved Signatory: Royce Smith
(Project Laboratory Manager)
NATA Accredited Laboratory Number: 431
Date of Issue: 20/10/2020

Sample Details

Sample ID: BRIS20S-03085
Client Sample:
Date Sampled: 30/09/2020
Source: On site
Material: In Situ
Specification: AS Grading
Sampling Method: Submitted by client
Project Location: Weinam Street, Redland Bay
Sample Location: BH4 - SPT (5.5-5.95m)

Sample Description:

Grading: AS 1289.3.6.1

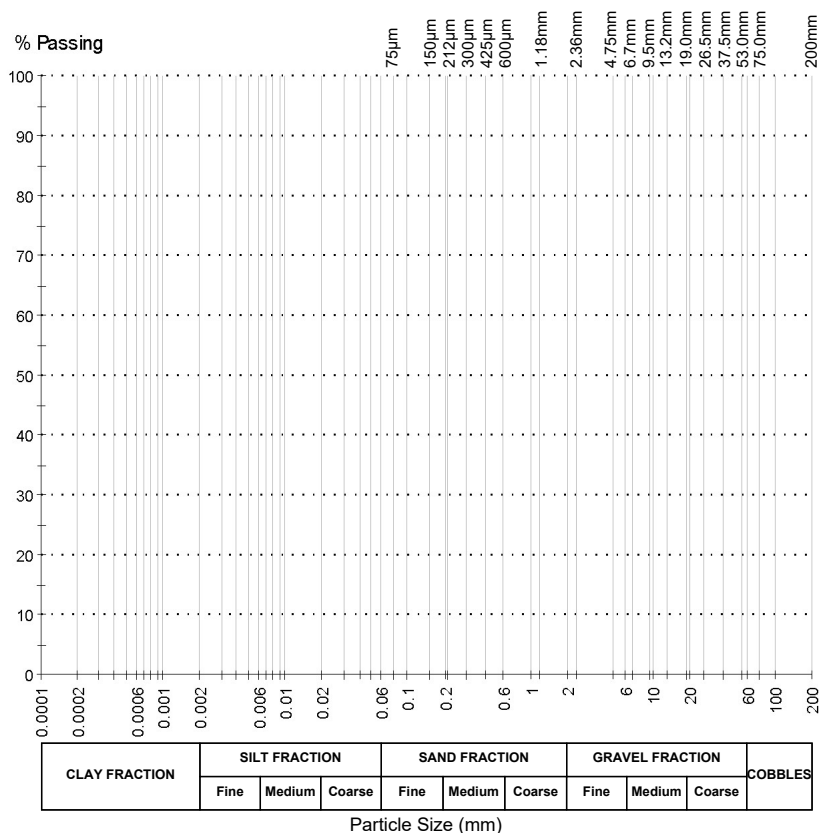
Drying by: Oven

Date Tested: 13/10/2020

Note: Sample Washed

Sieve Size	% Passing	Limits
75µm	93	

Particle Size Distribution



Material Test Report

Report No: BRIS20S-03085-1

Issue No: 1

Client: Core Consultants Pty Ltd
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Principal:

Project No.: TESTBRIS00119AA

Project Name: J001183 - Vehicle Ferry Terminal

Lot No.: **TRN:**



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Royce Smith

Approved Signatory: Royce Smith
(Project Laboratory Manager)

NATA Accredited Laboratory Number: 431
Date of Issue: 20/10/2020

Sample Details

Sample ID: BRIS20S-03085
Client Sample:
Date Sampled: 30/09/2020
Source: On site
Material: In Situ
Specification: AS Grading
Sampling Method: Submitted by client
Project Location: Weinam Street, Redland Bay
Sample Location: BH4 - SPT (5.5-5.95m)

Other Test Results

Description	Method	Limits	Result
Moisture Content (%)	AS 1289.2.1.1		59.5
Date Tested			8/10/2020
Sample History	AS 1289.1.1		Oven-dried
Preparation	AS 1289.1.1		Dry Sieved
Linear Shrinkage (%)	AS 1289.3.4.1		25.0
Mould Length (mm)			249.9
Crumbling			No
Curling			Yes
Cracking			Yes
Liquid Limit (%)	AS 1289.3.1.2		132
Plastic Limit (%)	AS 1289.3.2.1		31
Plasticity Index (%)	AS 1289.3.3.1		101
Date Tested			14/10/2020

Comments

N/A

Appendix C

Limitations

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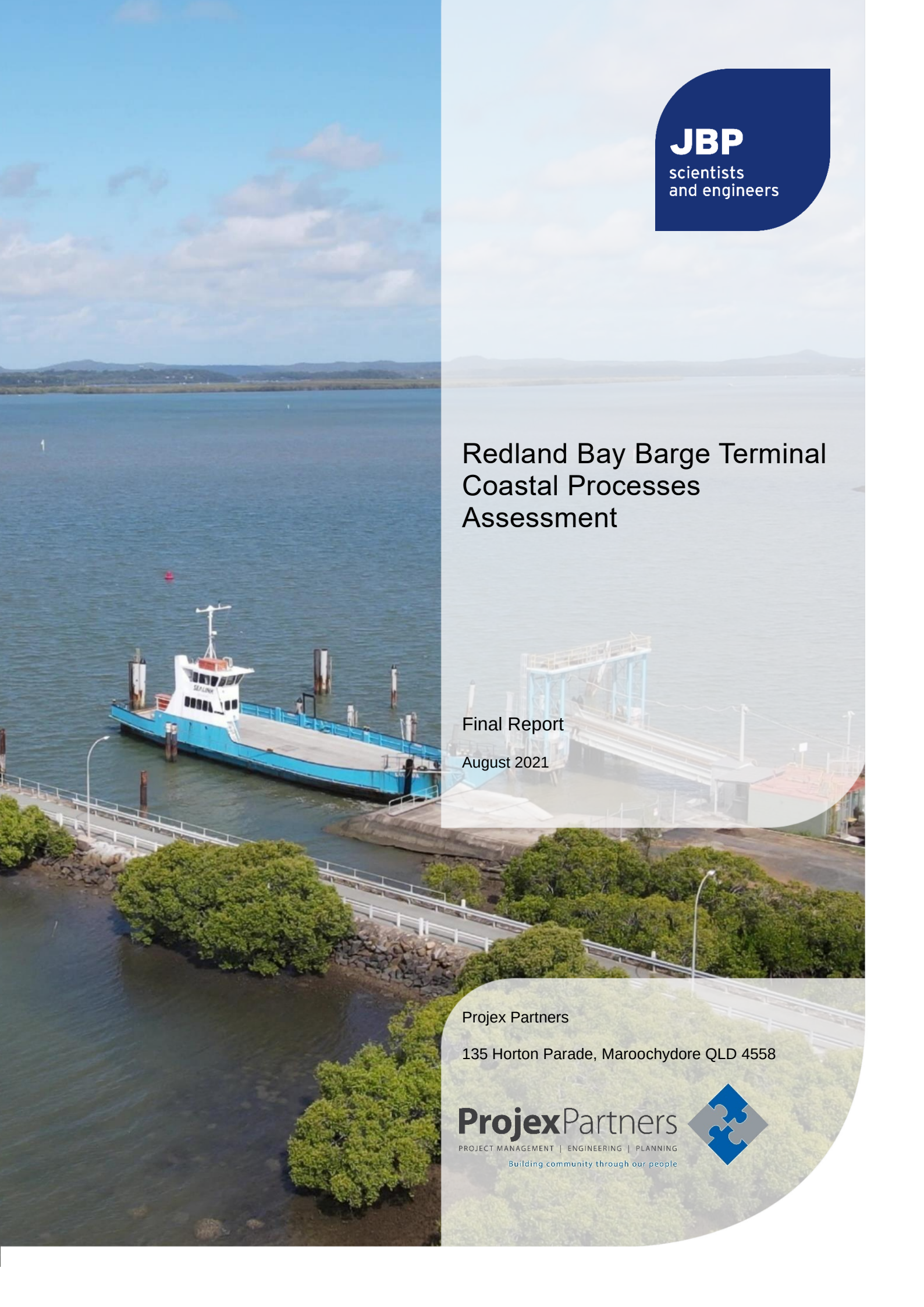
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APPENDIX D

Coastal Processes Assessment



JBP

scientists
and engineers

Redland Bay Barge Terminal Coastal Processes Assessment

Final Report

August 2021

Projex Partners

135 Horton Parade, Maroochydore QLD 4558

ProjexPartners

PROJECT MANAGEMENT | ENGINEERING | PLANNING

Building community through our people



JBP Project Manager

Daniel Rodger
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Revision History

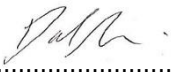
Revision Ref / Date Issued	Amendments	Issued to
1.0 (DRAFT) / February 2020		DB
1.1 (DRAFT) / February 2020	Current afflux and reporting points	DB, JM
1.2 (DRAFT) / February 2020	Tidal datum	DB, JM, RK
2.0 / March 2020	Comments addressed	DB
2.1 / August 2021	RPEQ	DB

Contract

This report describes work commissioned by Daniel Berry of Projex Partners by email dated 17 December 2020. Michael Thomson and Daniel Rodger of JBP carried out this work.

Prepared by Michael Thomson BEng
Coastal and Civil Engineer

Reviewed by Oliver Poynter MEng
Civil and Structural Engineer

Approved by  Daniel Rodger BSc MEng CEng CMarEng MIEAust
Director

17794

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Trading as Jeremy Benn Pacific and JBP Scientists and Engineers

ABN: 56 610 411 508

ACN: 610 411 508

Purpose

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The methodology adopted and the sources of information used by JBP in providing its services are outlined in this report. The work described in this report was undertaken between December 2020 and January 2021 and is based on the conditions encountered and the information available during this period of time. The scope of this report and the services are accordingly factually limited by these circumstances.

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Acknowledgements

JBP would like to acknowledge the bathymetry data provided by Projex Partners, and the use of publicly available tide records from Department of Environment and Science for this project.

Executive Summary

This report has been prepared by JBPacific (JBP) on behalf of Projex Partners, to undertake a coastal modelling assessment at Redland Bay, Queensland. The study will support the detailed design of a proposed ferry terminal expansion at the Redland Barge Terminal.

A numerical model was used to simulate the tide characteristics within Moreton Bay, which was calibrated against tide data collected within Shorncliffe and Scarborough. It was used to simulate a double spring-neap tidal cycle, which included individual tides reaching a Mean High Water Spring level. In an existing scenario, during the flood (incoming) tide, water flowed southward towards the site and was deflected around the northern rockwall jetty, before forming a slow-moving eddy current at the seaward end of the ramp. During an ebb (receding) tide, the patterns are reversed, with the tide draining to the north, with a reversed eddy current forming in the nearshore.

A numerical model was used to simulate the tide characteristics within Moreton Bay. Two design scenarios were considered: conditions during a Mean High Water Springs (MHWS) tide, and peak conditions over a 14-day spring-neap tidal cycle.

- A Mean High Water Spring (MHWS) tide was first simulated to understand potential changes around the proposed upgrade. There was no measured change to water levels, however minor changes to current speeds, ranging from -0.04 to 0.01 m/s. These changes occurred during very low current speeds. The greatest reduction in current speed (-0.04 m/s) occurred during a current of 0.0 m/s. The greatest increase in current speed (-0.01 m/s) occurred during a current of 0.06 m/s.
- Further assessment of the magnitude and extent of these changes has been tested during a full 14-day spring neap tidal simulation. No changes to water levels were predicted within the tidal simulation. Minor changes to nearshore tidal currents were observed, which ranged between -0.1 m/s up to +0.04m/s adjacent to the proposed upgrade. Beyond 50m of the proposed terminal this impact reduces to between -0.02 to +0.02 m/s. At the seaward end of the public jetty there is no significant change in peak current speed. At this magnitude, these changes are not believed to have a significant change to coastal hydrodynamics, coastal sediment transport or scour and sedimentation patterns.

Nearshore wave conditions have been estimated using Delft3D. Only wind-driven wave effects have been considered, due to the protected location of the study area within the lower Moreton Bay channel system. For a 1% AEP event the nearshore wave conditions ranged between 1.4 to 1.7m, with peak periods between 3.5-5.0s. A range of scenarios have been considered to estimate stable rock sizes, using varied return periods, planning horizons and Safety Factors. Rock sizes range from a D_{n50} of 0.8m for a present day, 2% AEP, 1.5 FoS, to a D_{n50} of 1.1m for 2100 planning horizon, 0.5% AEP event with a 2.0 FoS. These can be considered for incorporation into the detailed design, which will need to consider relevant legislation, codes, standards and risks.

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Abbreviations

AEP	Average Exceedance Probability
AHD	Australian Height Datum
CEM	Coastal Engineering Manual
CH	Chainage
D50	Medium required rock diameter
DES	Department of Environment and Science
DTMR	Department of Transport and Main Roads
GBR	Great Barrier Reef
HAT	Highest Astronomical Tide
JBP	Jeremy Benn Pacific (JBPacific)
LAT	Lowest Astronomical Tide
LGA	Local Government Area
M50	Medium required rock mass
MHWN	Mean High Water Neap
MHWS	Mean High Water Spring
MLWN	Mean Low Water Neap
MLWS	Mean Low Water Spring
MSL	Mean Sea Level
MSLP	Mean Sea Level Pressure
TC	Tropical Cyclone
TIN	Triangular Irregular Network
USACE	United States Army Corps of Engineers
VDM	Van der Meer equations

1 Introduction

This report has been prepared by JBPacific (JBP) on behalf of Projex Partners, to undertake a coastal modelling and engineering assessment at the Redland Barge Terminal, Queensland. The study will support the detailed design of a proposed expansion of facilities at 254 Esplanade, Redland Bay QLD 4165. The location of the sites is shown in Figure 1-1.

The study area is within Moreton Bay. At a regional scale it is offered protection from ocean swell by Moreton Island and North Stradbroke Island. However, the area is prone to extreme coastal processes, including strong currents within Moreton Bay, storm surges and wind-generated waves.

The proposed expansion includes an extension of the existing landing ramp, the addition of a second landing ramp, and upgraded rock walls on the eastern and northern side. This report supports the detailed design of the project by providing new coastal modelling on tides, hydrodynamics, extreme wave conditions, and stable rock size estimates.

This report contains the following sections:

- **Section 2: Background to coastal processes and available data**
- **Section 3: Tidal assessment**
- **Section 4: Extreme wave assessment**
- **Section 5: Rock size estimation**

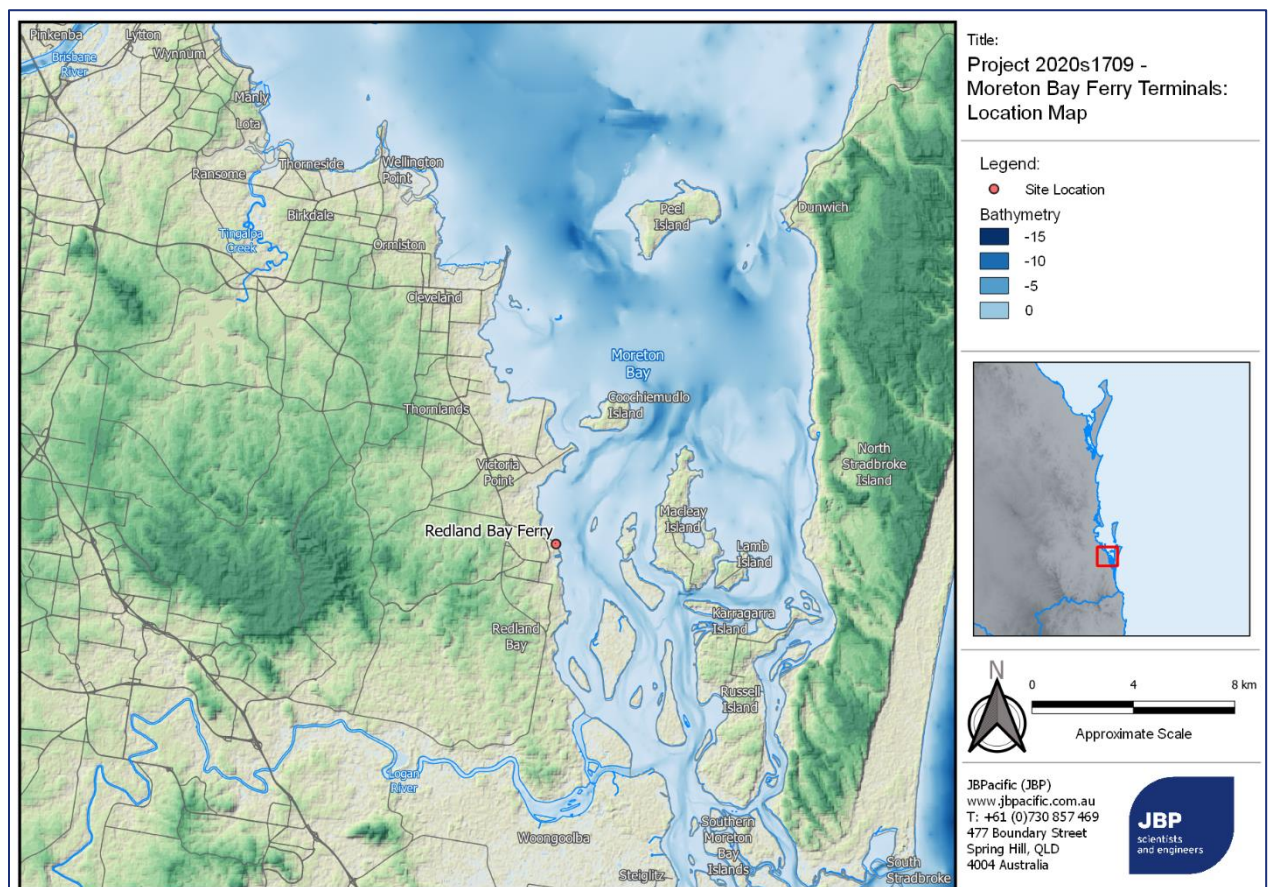


Figure 1-1: Redland Barge Terminal study site

2 Coastal processes and available data

Before undertaking any studies involving coastal modelling, it is first important to consider the underlying coastal processes affecting the site. Moreton Bay experiences a range of hydrodynamic, waves, and morphologic processes that are linked through dependant and independent variables. This includes the underlying astronomical tide, the passage of local storms and cyclones, the interaction of storm surges along the open coastline and within the bay, the local wave climate and any sheltering provided by inner bay islands such as Coochiemudlo, Macleay and Garden Island. A range of these coastal processes are shown in Figure 2-1.

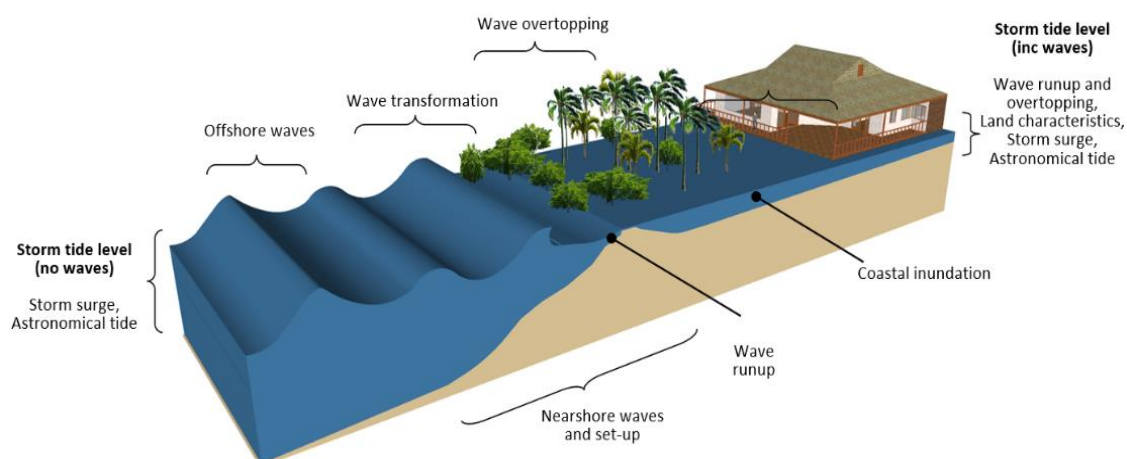


Figure 2-1: Drivers of coastal risk

The way in which the different coastal processes interact will determine the tidal and wave conditions experienced at any location. As shown in Figure 2-1, these may include the following:

- **Astronomical tide:** This is the regular periodic variation in water levels due to the gravitational effects of the moon and sun, which can be predicted with generally very high accuracy at any point in time (past and present) if sufficient measurements are available. The highest expected tide level at any location is termed the Highest Astronomical Tide (HAT) and occurs once each 18.6 year period, although, at some sites, high tide levels similar to HAT may occur several times per year and the level of HAT is often exceeded by the combination of a high tide and a non-astronomical weather-related event.
- **Storm surge:** This is the combined result of the severe atmospheric pressure gradients and wind shear stress of the storm acting on the underlying ocean. The storm surge is a long period “wave” capable of sustaining above-normal water levels over several hours or even days. The wave travels with and ahead of the storm and may be amplified as it progresses into shallow waters or is confined by coastal features. The magnitude of the surge is affected by several factors such as storm intensity, size, speed and angle of approach to the coast and the coastal bathymetry.
- **Wave setup:** As waves break, they create a localised effect to increase the sea level, known as breaking wave setup. It predominately occurs at a sloping beach or structure and becomes less significant within river mouths or protected low-lying mangrove or swampy lands.
- **Nearshore waves and wave runup:** If broken waves reach the shoreline any residual energy may intermittently run up and down the beach face, known as wave runup. This may cause localised impacts as waves can reach elevations higher than the underlying storm tide level. The vertical elevation the waves may reach will be dependent on the slope of the shoreline, the porosity, vegetation and the coastal (wave and sea) conditions.

The scope of this project considers tidal processes and extreme wave conditions only.

2.1 Available data

A range of studies and datasets are available at a regional scale throughout the Moreton Bay region. These provide information on tides, storm tides, waves and the underlying bathymetry.

2.1.1 Offshore Tidal Planes

Offshore tidal data is available through the global TPXO tidal model¹, which has a typical spatial resolution of around 4km along the Queensland coastline. The TXPO v8 model was used to extract tidal harmonics for eight primaries (M2, S2, N2, K2, K1, O1, P1, Q1), two long periods (Mf, Mm) and three non-linear (M4, MS4, MN4) constituents. These were extracted immediately offshore of Moreton and North Stradbroke Islands (to the north of the site) and between North Stradbroke and South Stradbroke Islands (to the south of the site).

2.1.2 Nearshore Tidal planes

Tidal planes are published in the 2021 Queensland Tide Tables² for Redland Bay (-27°37', 153°18') and are presented in Table 2-1, including an allowance for sea level rise under a 2070 and 2100 planning horizon of + 0.5m and 0.8m respectively.

Table 2-1: Tide levels from QLD Tide Tables, including future sea level rise estimates

Tidal Planes at Redland Bay				
Tidal Plane	2020 (mLAT)	2020 (mAHD)	+0.5m (circa 2070)	+0.8m (circa 2100)
HAT	3.0	1.6	2.1	2.4
MHWS	2.4	1.0	1.5	1.8
MHWN	1.9	0.6	1.1	1.4
MSL	1.4	0.0	0.5	0.8
MLWN	0.8	-0.5	0.0	0.3
MLWS	0.4	-0.9	-0.4	-0.1
LAT	0.0	-1.3	-0.8	-0.5
AHD	1.3			
Note: AHD height above survey level*	2.2			
Note: Survey reference level	3.5			
AHD quoted based on Permanent Mark 42645, referenced from MSQ tide tables.				

2.1.3 Storm tide levels and extreme wave conditions

Storm tide levels for a range of return periods and planning horizons are believed to be estimated within the Redlands Storm Tide Inundation Study (Cardno 2011), however this could not be provided by Council. Instead, extreme storm tide level are based on review of Council planning information and new analysis of wave estimates.

Future (2100), 1% Annual Exceedance Probability (AEP) storm tide levels have been accessed through Councils Red-e-map and PD Online system for the Stradbroke Ferries Barge Ramp Redland Bay (260 Esplanade Redland Bay). The 2100 1% AEP storm tide level is 3.23 mAHD. This is the maximum storm tide level predicted to be reached on the subject property during a 1% AEP Storm Tide event in the year 2100. It considers the effects of climate change through the inclusion of a sea level rise of 0.8m and an increase in cyclone maximum potential intensity of 10%.

The present day 1% AEP storm tide has been estimated based on the difference of the future 1% AEP conditions above the future Highest Astronomical Tide (HAT). Applying the same storm surge to present day HAT levels will result in a slightly conservative estimate, due to the future conditions

1 OSU (2020) TPXO Global Tidal Models, Oregon State University, USA.

2 Maritime Safety Queensland 2020, Queensland Tide Tables. Published at:

<https://www.msq.qld.gov.au/-/media/MSQInternet/MSQFiles/Home/Tides/Online-tide-tables/2020/2020queenslandtidetables.pdf?>

including the effects of increased cyclone intensity. Finally, a 2070 storm tide level was interpolation from the two planning horizons. The three storm tide estimates are therefore:

- 2100, 1% AEP storm tide: 3.23 mAHD (from Council)
- 2070, 1% AEP storm tide: 2.96 mAHD (interpolated)
- Present day, 1% AEP storm tide: approximately 2.51 mAHD (approximate estimation)

2.1.4 Recorded tide levels

Recorded water level information is available for two locations within Moreton Bay, through the storm tide monitoring network run by the Department of Environment and Science (DES). This data was used for the calibration of a tidal model.

Data is available at two locations:

- Scarborough monitoring site
 - Date of installation: 29 April 2015
 - Location: Scarborough boat harbour
 - Coordinates: Latitude: 27° 11.616' S, Longitude: 153° 6.557' E
- Shorncliffe monitoring site
 - Date of installation: 25 May 2016
 - Location: Shorncliffe Pier
 - Coordinates: Latitude: 27 ° 19.2589 E, Longitude: 153 ° 05.2311 S

2.2 Topography and Bathymetry

Four elevation datasets have been used within the study.

- Bathymetry within Moreton Bay is based on the DeepReef 30m dataset³. The GBR30 bathymetric dataset was developed in collaboration between James Cook University, Geoscience Australia, and the Australian Hydrographic Office to compile all available digital bathymetry data to develop regional-scale, 30m resolution grids. This contains deep-water multibeam surveys, airborne lidar bathymetry and chart data, all edited as point clouds to remove noise, and merged into a consistent WGS84 horizontal datum, and an approximate mean sea level vertical datum.
- Nearshore bathymetry was provided by Projex Partners for the project⁴. High detail contour data was provided, which was used to develop a nearshore bathymetric elevation model.
- An elevation model of the proposed ferry expansion was provided by Projex Partners for the project. This includes a ramp extension, batters and dredged area.
- Topographic data is based on 1m LiDAR elevation dataset sourced from the Queensland Department of Natural Resources, Mines and Energy. This data was captured between June and October of 2014 using airborne laser scanning.

³ Beaman, R.J. (2018) "100/30 m-resolution bathymetry grids for the Great Barrier Reef", SSSI Hydrography Commission Seminar, March 2018. Surveying and Spatial Sciences Institute (SSSI), Canberra, Australia.

⁴ Supplied by Project Partners (Daniel Berry) on 17 December 2020. "[#497-001] Redland Barge Terminal - Coastal - Go Ahead"

3 Tidal estimation and afflux

Tidal processes throughout the study area have been estimated through numerical modelling, which was calibrated at the two storm tide monitoring stations within Moreton Bay.

3.1 Model development

Numerical modelling has been undertaken using Delft3D, an integrated model capable of estimating tides, extreme water levels, currents, cyclones and wave conditions. It is an open-source model⁵. As schematised in Figure 3-1, several modules of Delft3D can be used within modelling scenarios. For this tidal assessment the Delft3D-FLOW module was used to simulate hydrodynamics. The Delft3D-Wave module was used separately to estimate wave conditions (see Section 4).

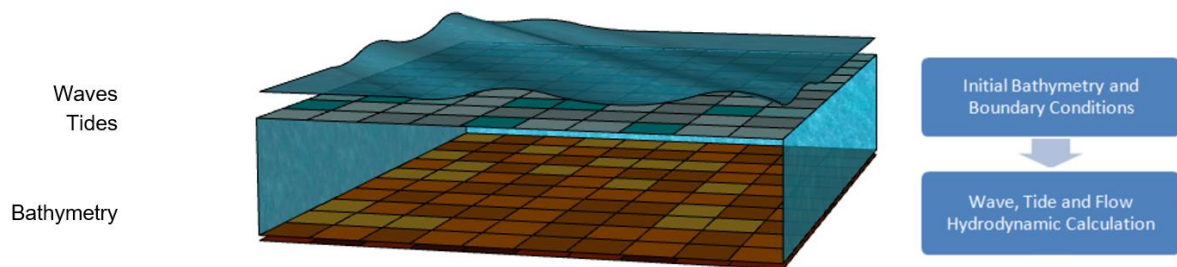


Figure 3-1: Delft3D hydrodynamic and wave calculations

3.2 Modelling extent

The model spans approximately 80km, covering Moreton Bay (approximately 1500km²). Three tidal boundaries have been used, positioned along the following channels:

- The northern channel adjacent to Bribie Island
- The eastern channel between Moreton and North Stradbroke Islands
- The southern channels between North and South Stradbroke Islands.

A nested approach was used, where the Delft3D tidal model was established to use external boundary conditions from the TXPO v8 tidal harmonics model. A high detail sub-model was then established at the Redlands Ferry Terminal site.

The Moreton Bay model was constructed using a computational grid with a regular spatial resolution of 100m. The high-resolution nested model at the study site has a spatially-varying grid with a minimum cell size of 1.25m. A bathymetry grid was constructed for the model domain based on several sources of data.

- Offshore data is based on the DeepReef 30m bathymetry dataset.
- Nearshore bathymetric data is based on survey provided by Projex Partners for this project.
- Above-ground features are based on 1m LiDAR data accessed through ELVIS.

This data was processed and merged over the Delft3D grid. Once merged, the grid was inspected to ensure that the locations where datasets intersected did not contain abnormal changes in bathymetry, which could distort coastal processes. Any gaps in the bathymetry were smoothed and averaged with the adjacent grid cell.

⁵ Website: <http://oss.deltares.nl/web/delft3d/download>

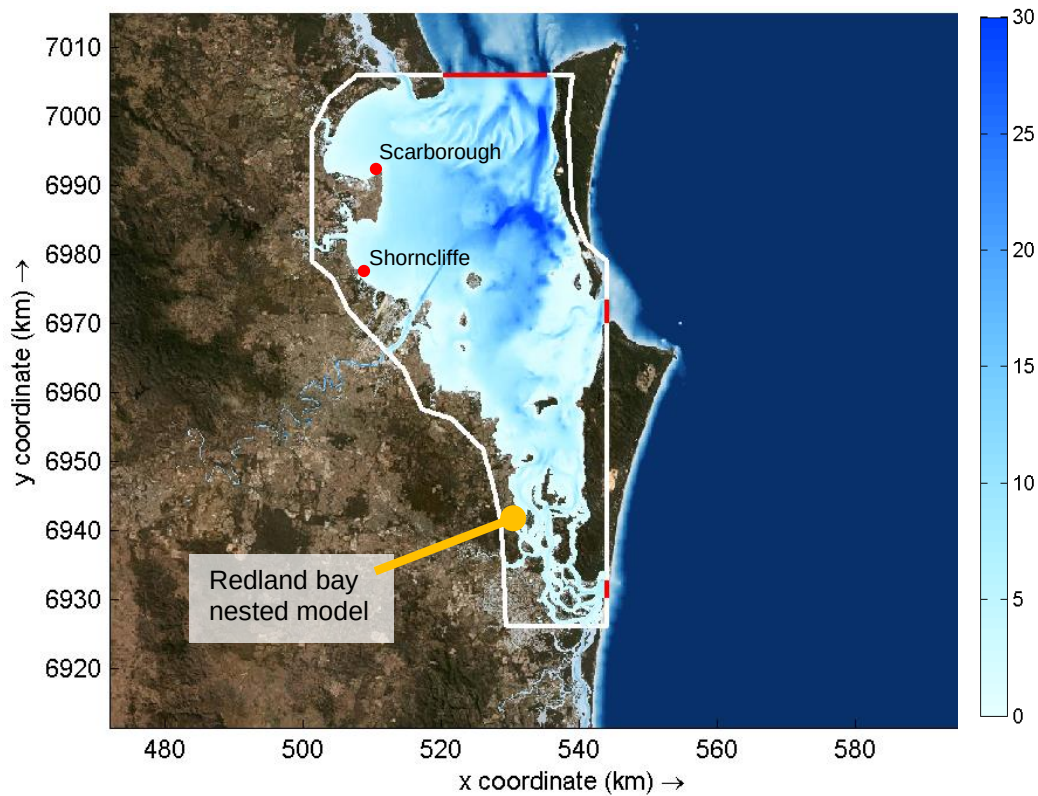


Figure 3-2: Computational grid extent and bathymetry for overall Delft3D model (top) and nested Redland Bay grid (bottom), open boundaries shown in red.

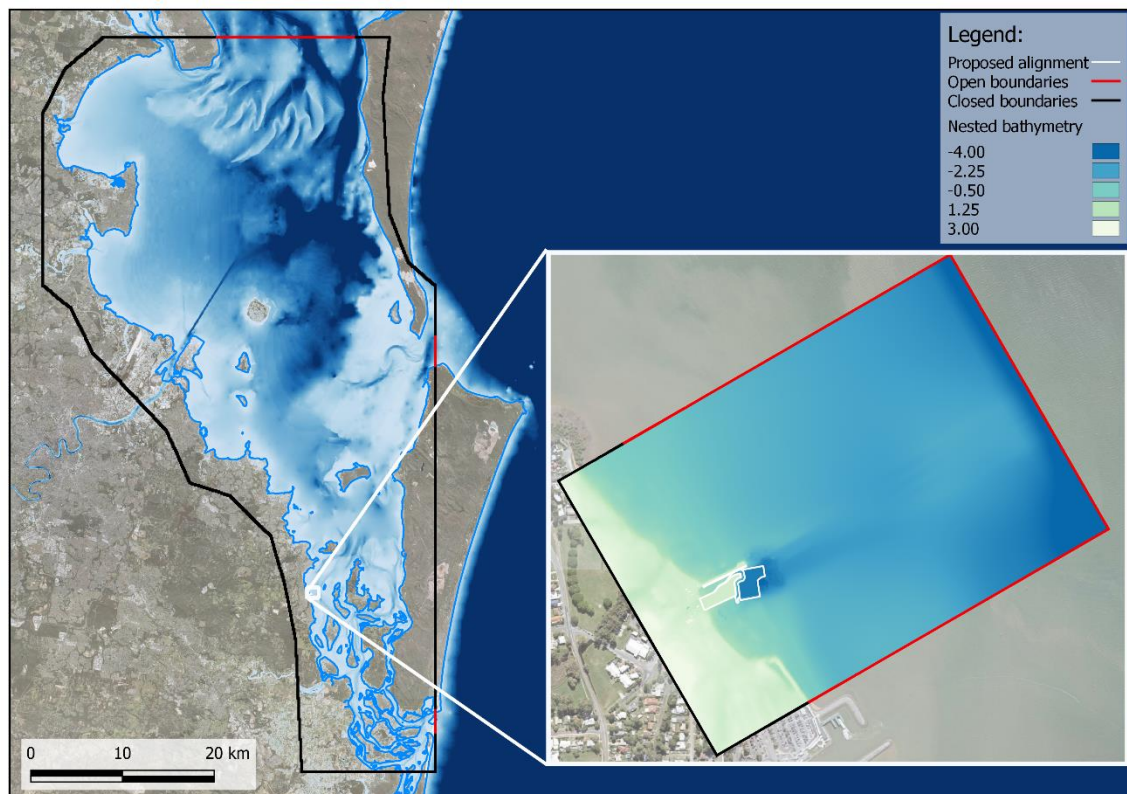


Figure 3-3: Nested model domain and locations of tidal current extraction points

3.3 Boundary conditions

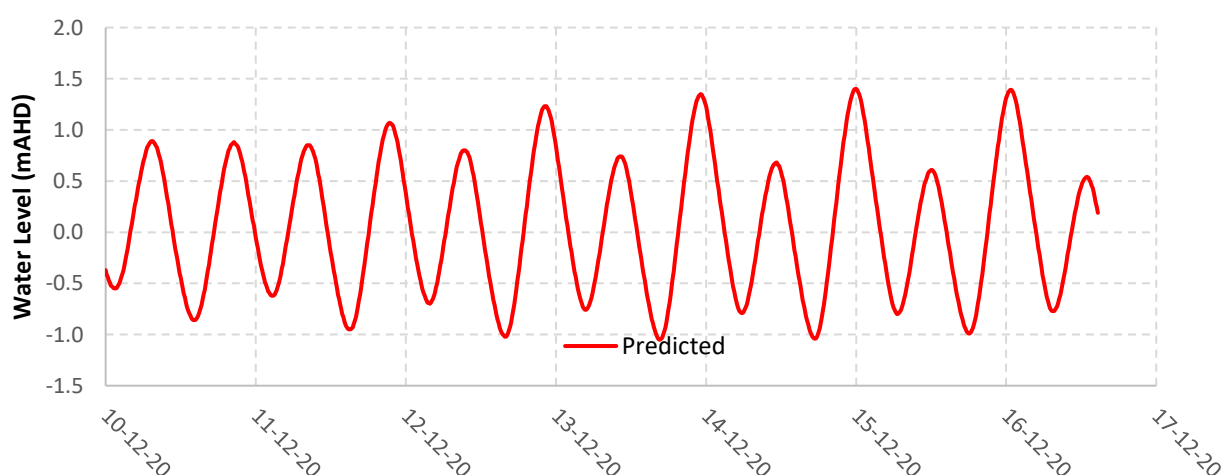
Offshore tidal conditions throughout the model have been based on tidal harmonics extracted from TXPO v8 global tidal harmonic model.

Three boundary conditions were used across the model domain, spanning the channels to the north, east and south of the bay. Tidal constituents were applied at the start and end of each boundary based on the TXPO model, as described in Section 2.1.1. The bottom depths within the model exceed 30m along much of the model ocean boundary.

From these tidal constituents a tide time series has been generated and applied to the overall model boundaries and modelled with the Moreton Bay and lower channel region. The modelled flow velocities and water level fluctuations induced by the astronomical tide have been extracted throughout Redland Bay as a time series. The extracted tide cycle is then applied in the nested sub-model as an offshore input timeseries. The nested offshore boundary is located approximately 700m offshore, at a depth of 5m.

3.4 Calibration and validation data

The overall model was calibrated against 7 days of near real-time astronomical tide data at the Shorncliffe and Scarborough gauge locations⁶. This period spanned 10 to 17 December 2020. Two datasets were provided by QLD State Government; the astronomical tide predictions and the observed (recorded) water levels, relative to Lowest Astronomical Tide (LAT). An adjustment from LAT to AHD of 1.31m for Shorncliffe and 1.17m for Scarborough was applied based on QLD Tidal Predictions⁷. Figure 3-4 shows the predicted astronomical tide levels for each gauge location during the model period. As the TXPO harmonic boundary conditions are purely astronomical, the Delft3D model has been compared to this data for calibration.



⁶ QLD Gov. (2020) Storm tide monitoring | Environment, land and water | Queensland Government (www.qld.gov.au)

⁷ MSQ (2020) Queensland Tide Tables Standard Port Tide Times 2020. The State of Queensland (Department of Transport and Main Roads).

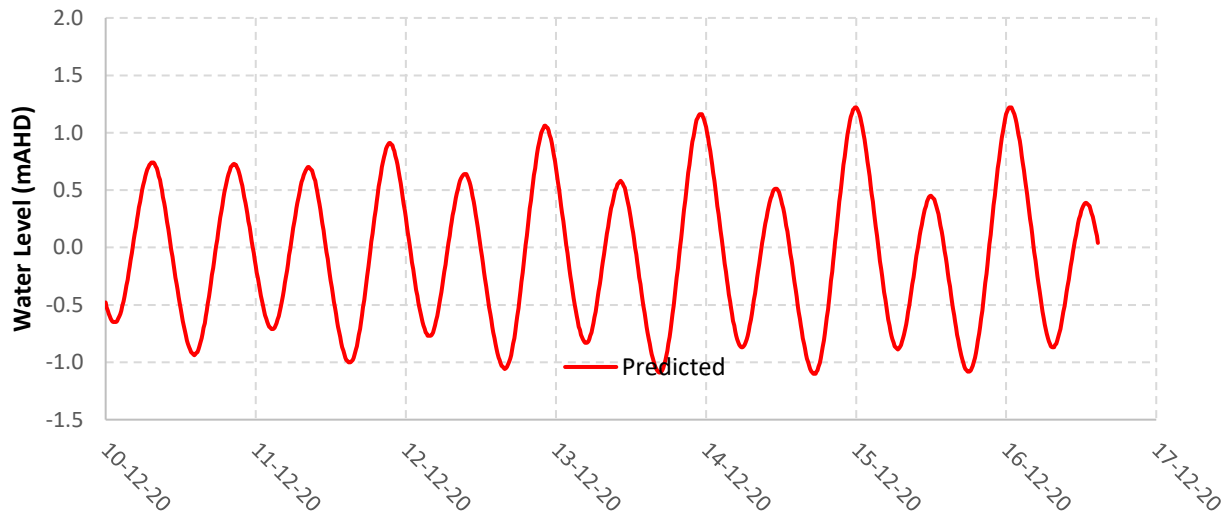
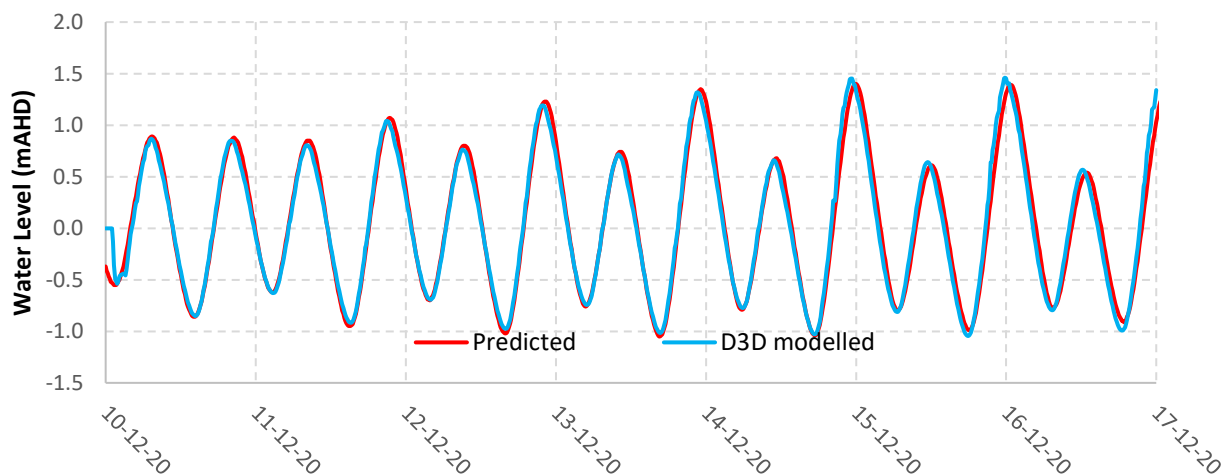


Figure 3-4: Astronomical tide series for Shorncliffe (top) and Scarborough (bottom) during December 2020, as sourced from QLD State Government.

The overall model has been run with the boundary TXPO tide harmonics for the period of 10th to 17th of December and results extracted at the Shorncliffe and Scarborough locations. Figure 3-5 and Figure 3-6 show a comparison of the D3D model results to the predicted tide level at each site. The model results show:

- Over the timeseries the absolute error is 8cm and 12cm for Shorncliffe and Scarborough respectively. This represents a difference of 4% and 6% respectively over the 2m spring tide range.
- There is an average difference between peak (maximum) modelled and astronomical tides of 0.04m and 0.1m at Shorncliffe and Scarborough respectively. This results in an absolute peak difference of 2% and 5% respectively.
- A comparison of all modelled and astronomical data shows an R^2 value of over 0.97, indicating the model is reproducing the tidal signal extremely well.

Any minor discrepancies between the model and astronomical data may be attributed to nonlinear tide-surge interactions (including contributions from frictional and shallow water effects within the Delft3D model), and minor differences in amplitude and timing within the TXPO harmonic predictions. These errors are considered within an acceptable range to proceed with the design stage of modelling.



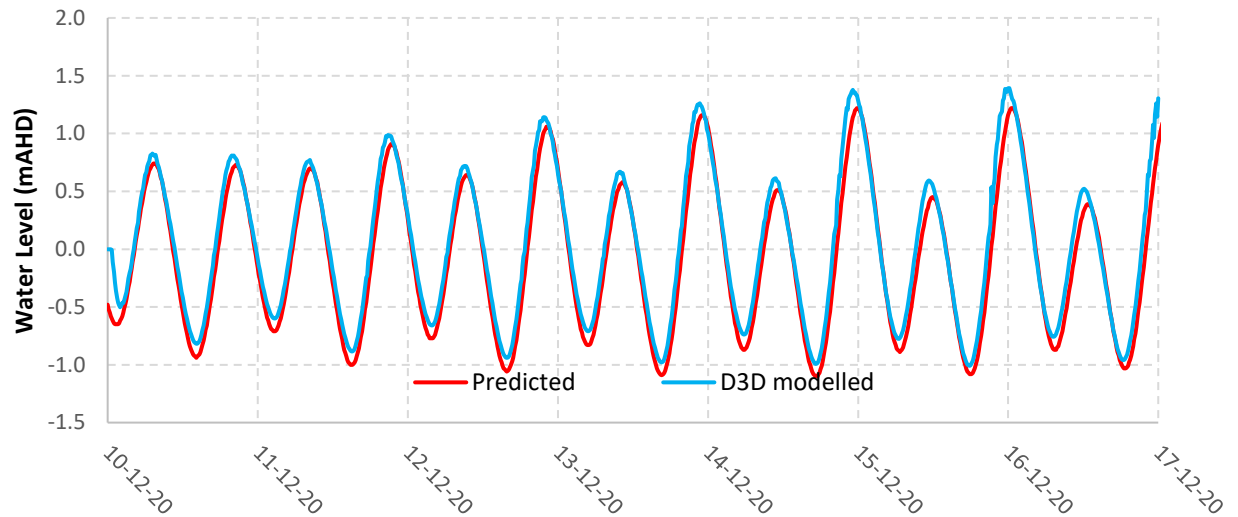


Figure 3-5: Astronomical and modelled tide series for Shorncliffe (top) and Scarborough (bottom) during the December 2020 model period.

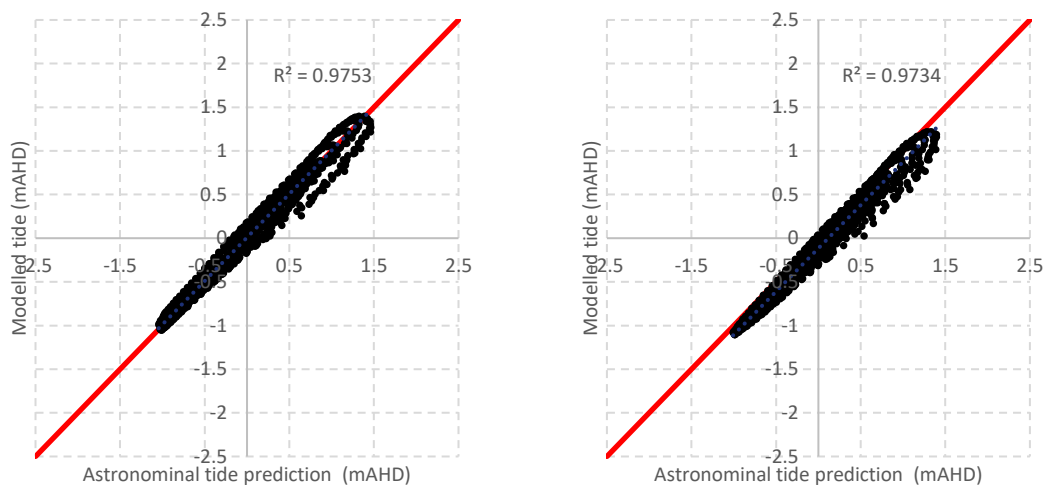


Figure 3-6: Astronomical and modelled tide series correlation for Shorncliffe (left) and Scarborough (right) during December 2020 model period.

3.5 Design simulations

The period from 3rd to 18th of January 2020 period was adopted as the design simulation. This includes individual tides matching a MHWS level (1.04m AHD) at Redland Bay, and up to approximately 1.4m AHD. Figure 3-7 shows the TXPO-generated spring-neap tide series simulated in the overall model. Two design scenarios have been considered:

1. Mean High Water Springs (MHWS) tide, where currents and water levels were extracted for tide level approximating MHWS
2. Peak tide level and current speed over a 14-day Spring-Neap tidal cycle

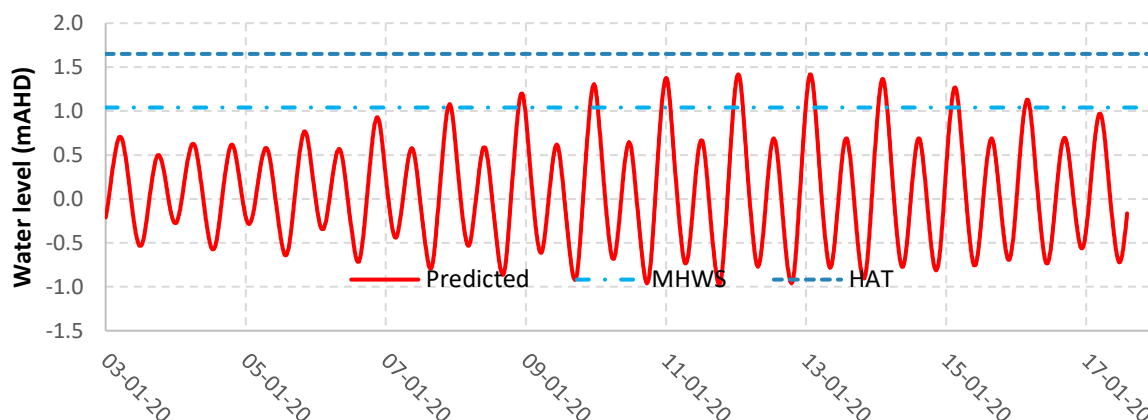
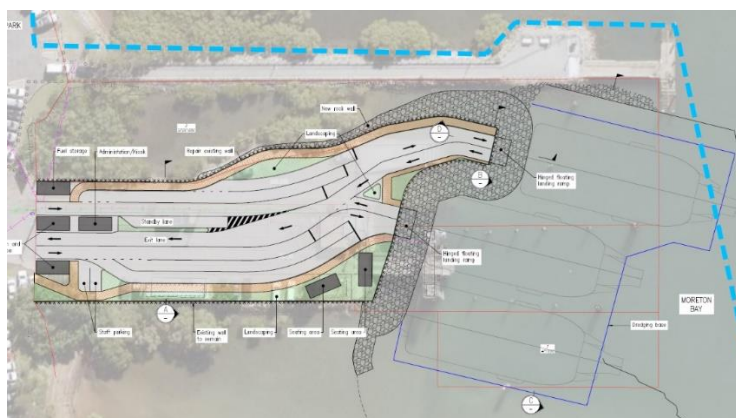


Figure 3-7: Design TXPO spring-neap tide series applied to overall model

Each design scenario considered existing conditions and the proposed terminal upgrade, which was incorporated into the Delft3D model based on the layout shown in Figure 3-8, and bathymetry data supplied by Projex Partners⁸. Figure 3-9 shows the changes in the model bathymetry from the existing terminal layout. Changes have been applied directly into the model bathymetry, which include:

- Extension of the existing landing ramp
- Addition of a second landing ramp
- Sloping rockwall of 1:1.5 along the eastern and northern sides
- Formalised dredged base with uniform depth = -3.55mAHD
- Formalised deck surface at 1.8mAHD.



⁸ Development layout and survey bathymetry supplied by Project Partners (Daniel Berry) on 17 December 2020. " [#497-001] Redland Barge Terminal - Coastal - Go Ahead"

Figure 3-8: Proposed ferry terminal layout plan (Source: Projex Partners).

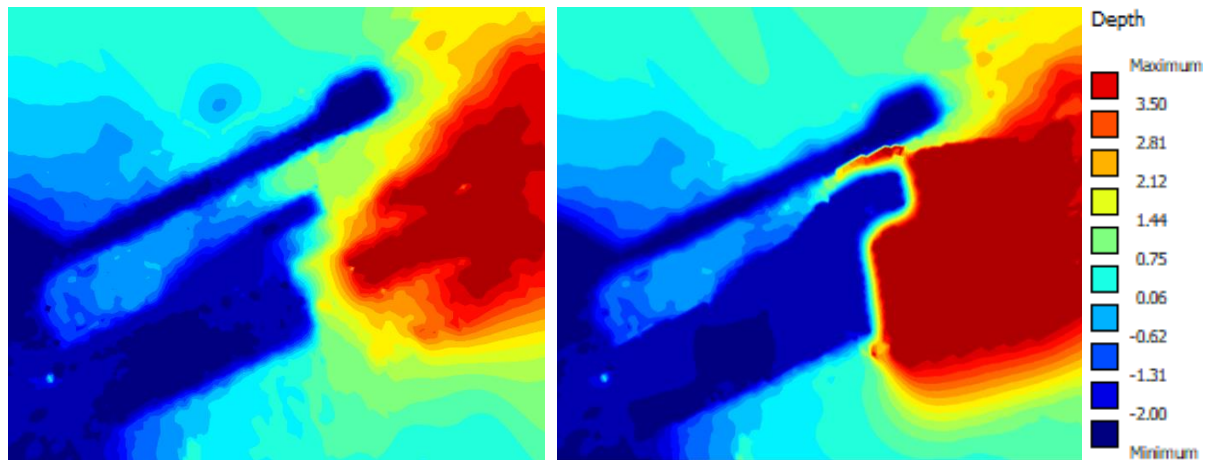


Figure 3-9: Model bathymetry for existing (left) and upgraded (right) ferry terminal configuration.

3.5.1 MHWS tide scenario (initial testing of nearfield changes)

This simulation has been used to screen potential changes to water levels and currents during a MHWS tide, which occurred on 8 January 2021 and reached a level of 1.04mAHD. The model was run for the existing structure and the proposed upgraded structure.

A number of nearshore reporting points have been used to estimate changes to tidal hydrodynamics and currents around the proposed extension. These are shown in Figure 3-10 and include the following:

1. Within the mangrove area between the ramp and rockwall jetty (depth = -0.5mAHD)
2. The end of the proposed ramp (depth = -1.5mAHD)
3. Within the proposed dredged base (depth = -3.4mAHD)
4. 100m offshore (depth = -3.5mAHD)
5. 200m offshore within the main channel (depth = -2.5mAHD).

3.5.1.1 Existing structure

During the MHWS, the flood tide (incoming) flowed southward towards the site before being deflected around the northern rockwall jetty. A slow-moving eddy current was formed at the seaward end of the ramp, with the tide also flowing between the rockwall jetty and ferry terminal to fill the mangrove area. During an ebb tide (receding), the mangrove area is drained and the dominant flow direction in the channel is northward, with a reversed eddy current formed within the ferry area. The modelled tide and current speeds adjacent to the ramp are shown in Table 3-1 and Table 3-2. At the reporting points, there was no measured change to water levels. There were minor changes to current speeds, ranging from -0.04 to 0.01 m/s. These changes occurred during very low current speeds. The greatest reduction in current speed (-0.04 m/s) occurred during a current of 0.08 m/s. The greatest increase in current speed (-0.01 m/s) occurred during a current of 0.06 m/s. Further assessment of the extent of these changes has been tested during a full 14-day spring neap tidal simulation.

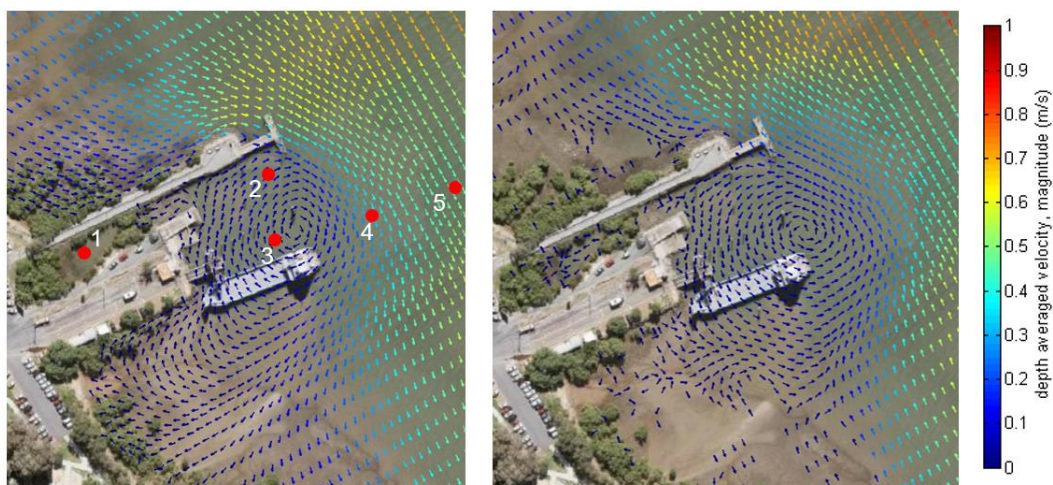


Figure 3-10: Tidal currents around existing ferry structure for incoming (left) and receding (right) MHWS high tide, recording points shown as red dots.

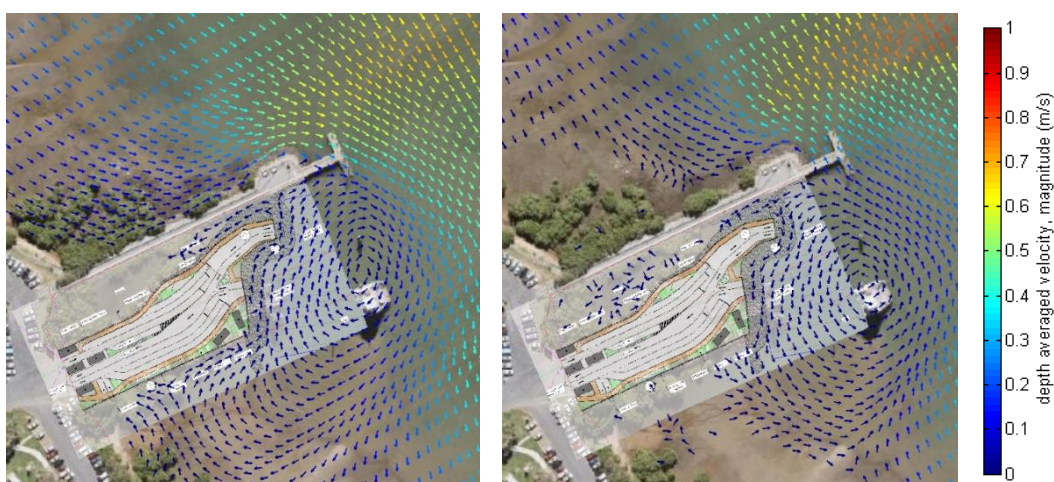


Figure 3-11: Tidal currents around proposed ferry structure for incoming (left) and receding (right) during a MHWS tide

Table 3-1: Peak tide conditions around the proposed terminal for MHWS

Location	Existing-case MHWS ⁹ water level (mAHD)	Proposed-case MHWS water level (mAHD)	Change (m)	Change (%)
1. Mangrove area	1.08	1.08	0.00	0.0%
2. End of proposed ramp	1.08	1.08	0.00	0.0%
3. Dredging base area	1.08	1.08	0.00	0.0%
4. 100m offshore	1.08	1.08	0.00	0.0%
5. 200m offshore	1.08	1.08	0.00	0.0%

⁹ Based on the astronomic tide occurring on 18 January 2021, which approximated the MHWS level of 1.04mAHD

Table 3-2: Peak currents around the proposed terminal for MHWS tide

Location	Proposed-case MHWS current (m/s)	Proposed-case MHWS current (m/s)	Change (m/s)	Change (%)
1. Mangrove area	0.02	0.01	-0.01	-50.0%
2. End of proposed ramp	0.08	0.04	-0.04	-50.6%
3. Dredging base area	0.06	0.07	0.01	14.8%
4. 100m offshore	0.14	0.13	-0.01	-6.5%
5. 200m offshore	0.50	0.50	0.00	0.0%

3.5.2 Peak Spring-Neap scenario

A full spring-neap tidal cycle was run to understand the magnitude and extent of changes during the largest conditions during the simulation. Reporting points were extended to allow detailed analysis of current changes (see Figure 3-12).

The peak changes to tide height and current speed were extracted from the model for the entire spring-neap tide cycle for the existing structure and proposed structure. Water level and current speed differences are presented in Table 3-3 and Table 3-4 respectively.

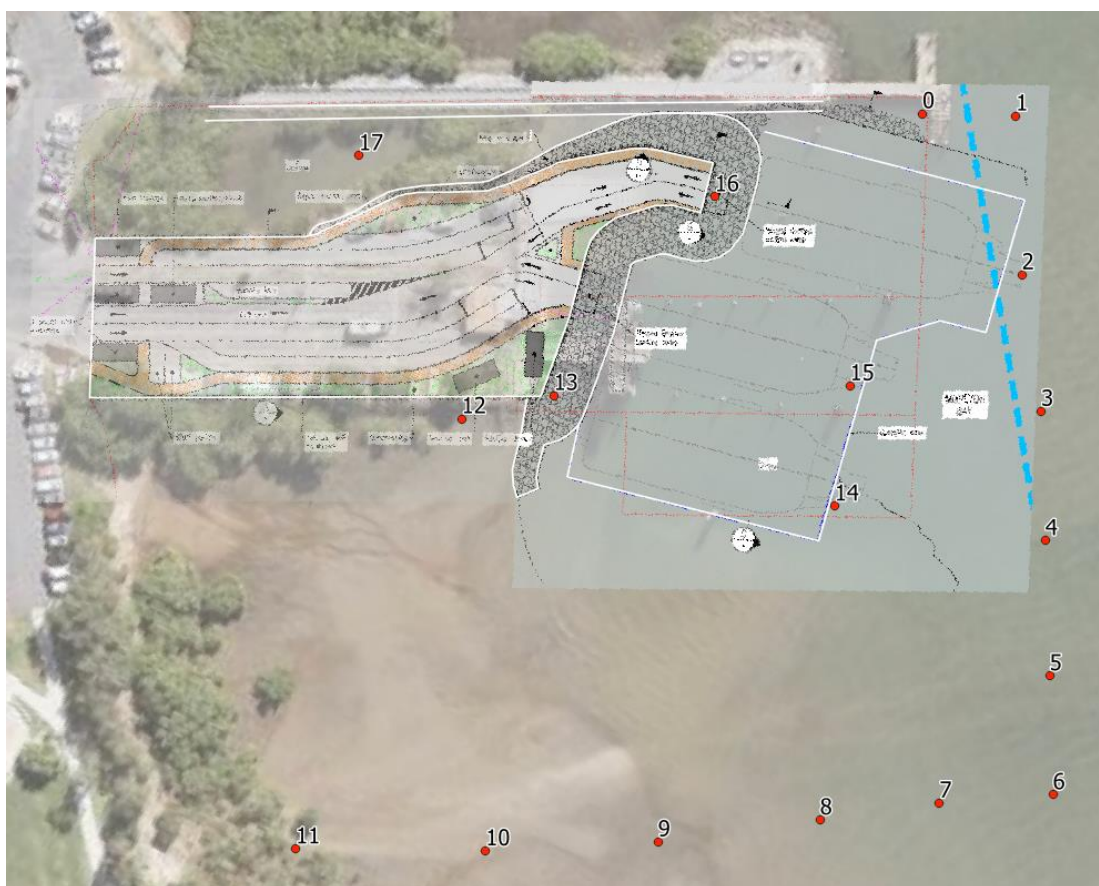


Figure 3-12: Proposed ferry terminal layout plan view showing Delft3D model recording points for Spring-Neap period (Projex Partners).

Table 3-3: Peak tide conditions around the proposed terminal during simulated tidal period

Location	Existing-case peak water level (mAHD)	Proposed-case peak water level (mAHD)	Change (m)	Change (%)
Reporting points around 50m perimeter				
0 - jetty end	1.59	1.59	0.00	0.0%
1 - 50m perimeter	1.59	1.59	0.00	0.0%
2 - 50m perimeter	1.59	1.59	0.00	0.0%
3 - 50m perimeter	1.59	1.59	0.00	0.0%
4 - 50m perimeter	1.59	1.59	0.00	0.0%
5 - 50m perimeter	1.59	1.59	0.00	0.0%
6 - 50m perimeter	1.59	1.59	0.00	0.0%
7 - 50m perimeter	1.59	1.59	0.00	0.0%
8 - 50m perimeter	1.59	1.59	0.00	0.0%
9 - 50m perimeter	1.59	1.59	0.00	0.0%
10 - 50m perimeter	1.59	1.59	0.00	0.0%
11 - 50m perimeter	1.59	1.59	0.00	0.0%
Reporting points adjacent to proposed structure				
12 - south wall	1.59	1.59	0.00	0.0%
13 - south wall	1.59	1.59	0.00	0.0%
14 - dredge area	1.59	1.59	0.00	0.0%
15 - dredge area	1.59	1.59	0.00	0.0%
16 - ramp end	1.59	1.59	0.00	0.0%
17 - mangroves	1.59	1.59	0.00	0.0%

Table 3-4: Changes to peak currents around the upgraded terminal during simulated tidal period

Location	Existing-case peak current (m/s)	Proposed-case peak current (m/s)	Change (m/s)	Change %
Reporting points around 50m perimeter				
0 - jetty end	0.40	0.40	0.00	-0.6%
1 - 50m perimeter	0.78	0.78	0.00	0.0%
2 - 50m perimeter	0.41	0.40	0.00	-1.0%
3 - 50m perimeter	0.41	0.41	0.00	-0.3%
4 - 50m perimeter	0.47	0.48	0.01	2.7%
5 - 50m perimeter	0.64	0.63	-0.02	-2.3%
6 - 50m perimeter	0.67	0.67	0.00	-0.4%
7 - 50m perimeter	0.50	0.50	0.00	-0.4%
8 - 50m perimeter	0.34	0.34	0.00	-0.2%
9 - 50m perimeter	0.28	0.29	0.02	5.8%
10 - 50m perimeter	0.25	0.27	0.02	8.0%
11 - 50m perimeter	0.17	0.18	0.01	8.7%
Reporting points adjacent to proposed structure				
12 - south wall	0.14	0.18	0.04	27.7%
13 - south wall	0.16	0.07	-0.10	-59.5%
14 - dredge area	0.14	0.10	-0.04	-30.2%
15 - dredge area	0.15	0.16	0.02	11.1%
16 - ramp end	0.09	0.04	-0.06	-60.6%
17 - mangroves	0.03	0.04	0.00	6.7%

3.5.3 Changes to water levels

No significant change to water levels was predicted within the tidal simulation. The tidal levels within the post-development scenario correspond with the existing scenario.

3.5.4 Changes to currents

The extended ramp and rock wall will cause a minor deflection to tidal currents, causing a variation in the slow-moving eddy currents in the nearshore. Figure 3-13 shows this change in flood and ebb tidal currents.

Within the simulation, in close proximity to the proposed terminal (Reporting points 12-17) the change in current speed could change between -0.1 m/s up to +0.04m/s. These patterns align with the MHWS simulation, which also showed a tendency for a greater reduction in currents.

Beyond 50m of the proposed terminal, recording points 0-11 show a reduced impact, with changes to current speed between -0.02 to +0.02 m/s. At the seaward end of the public jetty there is no significant change in peak current speed. At this magnitude, these changes are not believed to have a significant change to coastal hydrodynamics, coastal sediment transport or scour and sedimentation patterns.

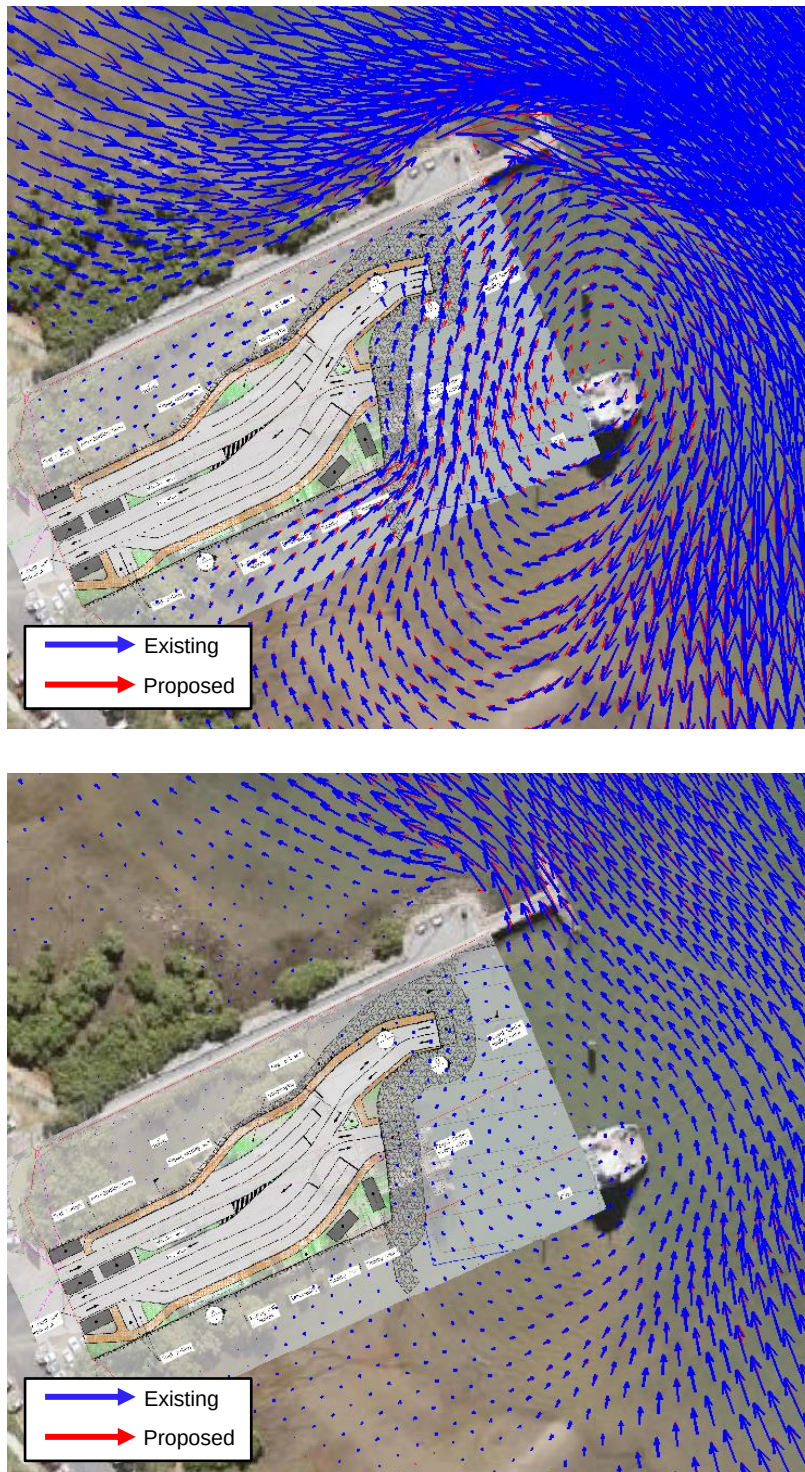


Figure 3-13: Change in current around structure for an incoming (top) and receding (bottom) tide during peak modelled tide.

4 Wave estimation

Wave conditions have been estimated using the D-Wave standalone module within Delft3D. Only wind-driven wave effects have been considered, due to the protected location of the study area within the lower Moreton Bay channel system. Wind conditions for a 0.5%, 1% and 2% Annual Exceedance Probability (50-year, 100-year and 200-year) event have been modelled during a Present Day, 2070 and 2100¹⁰ water level scenario.

4.1 Approach

The Delft3D model uses the SWAN spectral wave formulae, which is a third-generation wave model that simulates wave propagation in coastal and inland areas. The model accounts for the following physics:

- Wind-wave interactions, which is the transfer of wind energy into wave energy, leading to the growth of waves.
- Shoaling, which is the build-up of energy as a wave enters shallow water, causing an increase in wave height.
- Refraction, which is the change in wave speed as waves propagate through areas of changing depth, causing a change in wave direction.
- Wave breaking, which is the destabilisation of a wave as it enters shallow water, causing broken waves with the characteristic whitewash or foam on the crest.
- Wave dissipation, which limits the size of waves through white-capping, bottom friction and depth-induced breaking.
- Diffraction, which is the spreading of wave energy behind structures, headlands and islands, which causes waves to change direction.

4.2 Model domain

The spatial domain of the wave model has been constructed using a computational grid with a spatially-varying resolution. Offshore areas used a grid size of around 50m, with the nearshore minimum grid resolution 12.5m at the Redland ferry terminal site. Spatial elevation and bathymetry data used in the model has been sourced from topographical and bathymetry survey data from the Deep Reef 30m GBR dataset, 1m LiDAR and bathymetric survey provided by Projex Partners.

4.3 Input conditions

4.3.1 Input wind conditions

Extreme wave conditions are a function of wind speed, direction, fetch, and water level. Within the lower Moreton Bay channel system wave conditions are assumed to fetch-limited, i.e. restricted by the distance over which a wind field can apply energy to the water's surface. The longest fetch applicable to the Redland ferry terminal site is approximately 13.5km, from the west coast of North Stradbroke Island.

A detailed assessment of climatology and probabilistic wind modelling was not within the scope of this project, and no wave calibration data exists for the Redland area. Instead, extreme wind speeds have been calculated from the Australian Standard AS1170.2-2011 (Wind Actions) and methods described in the USACE Coastal Engineering Manual (CEM)¹¹. This approach has been validated by comparing against recorded wind data at nearby gauges by determining the maximum recorded wind speed within a given interval.

Extreme wind speeds for the 0.5%, 1% and 2% AEP have been applied as a time and spatially-constant input within the wave model. A range of wind directions were tested between 0°N to 135°N in increments of 7.5° to identify the worst-case wind direction producing the maximum wave heights. Figure 4-1 shows the location of observation points within the D-WAVE model domain.

¹⁰ Redland City Council - Property Detail Online, pdonline.redland.qld.gov.au

¹¹ USACE, EM 1110-2-1100 (Part II) 30 Sept 2015: Ch. 2, Sec. 3, pp II-2-3, Temporal variability of wind speeds

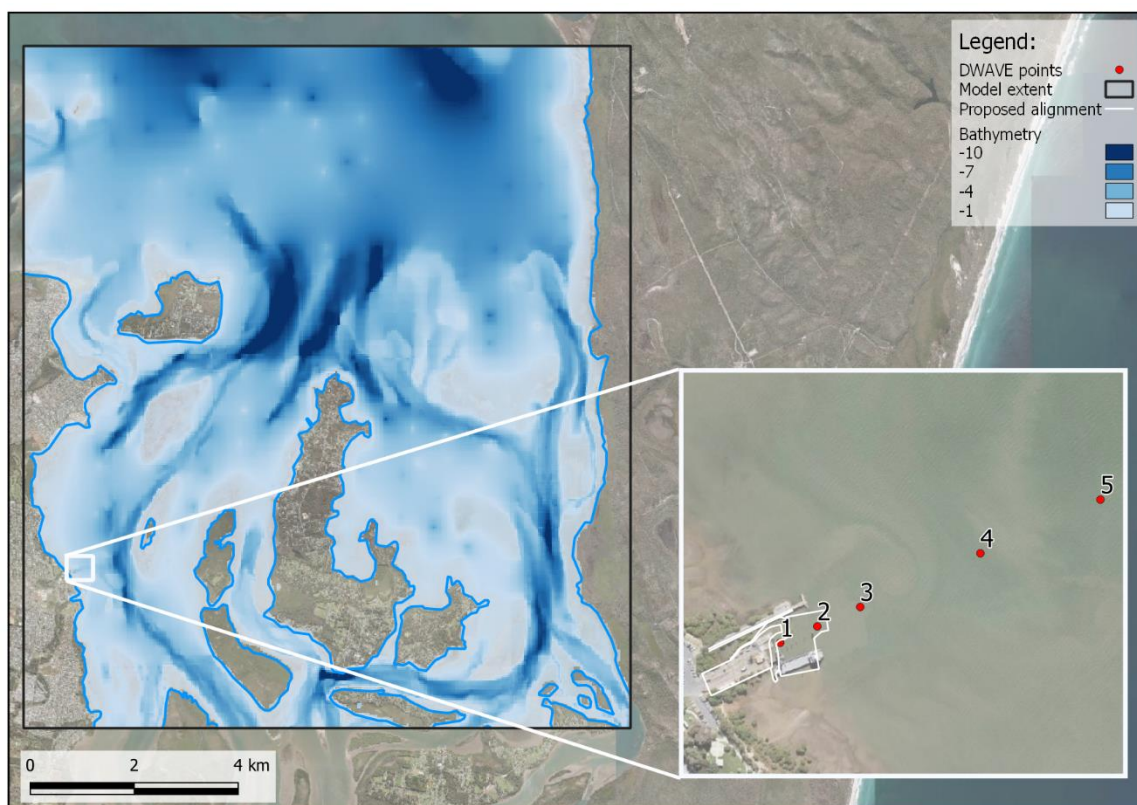


Figure 4-1: D-WAVE modelling domain and location of output points at Redland ferry terminal

4.3.2 Input storm tide conditions

The D-WAVE model has been run for three planning horizons: Present Day, 2070, and 2100.

Each planning horizon has used a static 1% AEP storm tide level. This is based on the 2100 1% AEP storm tide level provided by Redland City Council, and the approaches defined in Section 2.1.3.

Table 4-1: Peak tide conditions around the proposed terminal during simulated tidal period

	Present day	2070	2100
1% AEP Storm tide level	2.51 mAHd	2.96 mAHd	3.23 mAHd

4.4 Nearshore wave conditions at Redland Ferry Terminal

The model was used to simulate a 0.5%, 1% and 2% AEP wind-driven wave conditions, under Present Day, 2070 and 2100 planning horizons at the proposed boat ramp. Wave characteristics were extracted at locations adjacent to the Redland ferry terminal. The significant wave height (Hs) and peak periods (Tp) are shown in Table 4-2 and Table 4-3 for present day, 2070 and 2100 planning horizons.

Table 4-2: Design conditions at Ferry terminal for 1% AEP events.

	Present Day 1% AEP			2070 1% AEP		2100 1% AEP	
Output location	Depth (mAHd)	Hs (m)	Tp (s)	Hs (m)	Tp (s)	Hs (m)	Tp (s)
1	-1.16	1.42	3.48	1.52	4.47	1.58	4.47
2	-3.55	1.50	3.48	1.59	3.95	1.64	4.47
3	-2.66	1.51	3.95	1.59	4.47	1.65	4.47
4	-2.35	1.54	4.47	1.62	4.47	1.67	5.07
5	-2.25	1.59	4.47	1.67	5.07	1.72	5.07

Table 4-3: Design conditions at Ferry terminal for 0.5% AEP events.

Output location	Depth (mAHD)	Present Day 0.5% AEP		2070 0.5% AEP		2100 0.5% AEP	
		Hs (m)	Tp (s)	Hs (m)	Tp (s)	Hs (m)	Tp (s)
1	-1.16	1.50	3.95	1.61	4.47	1.67	4.47
2	-3.55	1.59	4.47	1.69	4.47	1.75	4.47
3	-2.66	1.60	4.47	1.71	4.47	1.76	4.47
4	-2.35	1.64	4.47	1.74	4.47	1.80	5.07
5	-2.25	1.70	5.07	1.79	5.07	1.84	5.07

5 Rock armour design

Rock armour sizing has been undertaken using the nearshore wave modelling results. Rock armour is used to dissipate wave energy and protect the structure fill from wave impact. To calculate rock armour stability, the Van der Meer (VDM) deep and shallow water equations have been adopted¹². The formulas are used to predict the stability of armour units on a uniform slope. The method includes the effect of storm duration, wave period, structure permeability, and damage level. The main benefit of this method is its distinction between plunging waves and surging waves, which is typically a result of wave period. The following equations are shown as an example and are used when waves are plunging, therefore must satisfy ($\xi_{s-1,0} < \xi_{cr}$):

$$\frac{H_s}{\Delta D_{n50}} = C_{pl} p^{0.18} \left(\frac{S_d}{\sqrt{N}} \right)^{0.2} \left(\frac{H_s}{H_{2\%}} \right) \xi_{s-1,0}^{-0.5}$$

In which:

$$N = \frac{\text{storm duration}}{\text{wave period}} \leq 3000$$

$$H_{2\%} = 1.4 H_s$$

$$\xi_{s-1,0} = \frac{\tan \alpha}{\sqrt{\frac{2\pi}{g} h_s \frac{1}{T_{m-1,0}^2}}}$$

$$\xi_{cr} = \left(\frac{C_{pl}}{C_s} p^{0.31} \sqrt{\tan \alpha} \right)^{\frac{1}{p+0.5}}$$

Where D_n = rock diameter, S_d = damage factor, H_s = significant wave height, $H_{2\%}$ = Wave height exceeded by 2% of waves, T_m = mean period, N = number of waves, ξ = surf similarity parameter.

5.1 Ramp cross section

Projex Partners are undertaking the detailed design of the ramp, and have provided a section for the eastern exposed slope as shown in Figure 5-1. The cross-section identifies the rock armour slope, with storm tides and the direction of primary wave attack added to the plot for reference. For this cross section, the toe of the rock armour is at -3.55m AHD, with a slope of 1V:1.5H, to a crest level of 1.8m AHD.

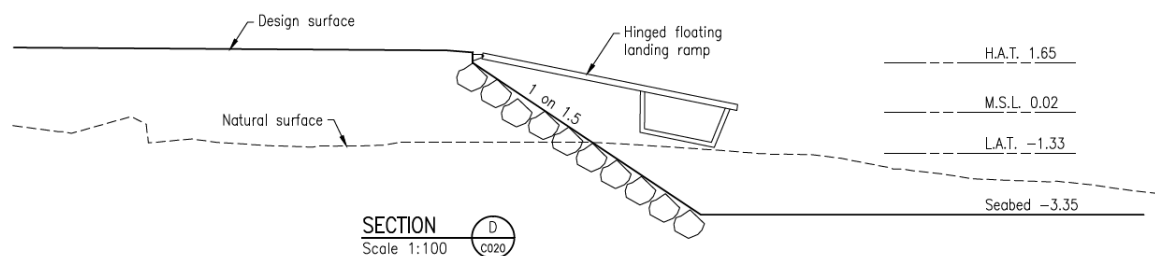


Figure 5-1: Cross section for eastern seaward rockwall slope¹³

5.2 Design scenarios

Three planning horizons have been considered: Present day (2020), 2070, and 2100. For each planning horizon three wave return periods have been considered, a 0.5%, 1% and 2% event. Wave conditions have been applied directly from the results of wave modelling discussed in Section 4.

¹² Van der Meer, J W (1988). "Rock slopes and gravel beaches under wave attack". PhD thesis. Delta University of Technology, Delft.

¹³ Supplied by Project Partners (Daniel Berry) on 17 December 2020. "[#497-001] Redland Barge Terminal - Coastal - Go Ahead"

5.3 Storm duration

Storm duration is a critical factor when determining rock armour size as it influences the number of design waves acting on the exposed slope. A longer duration inherits more wave impacts and an increase in armour rock mass. A worst-case design storm has been assumed wherein each storm event occurs across a 6-hour high tide period.

5.4 Assumptions

- Rock sizing has been estimated based on wind-driven wave attack only
- The effect of scour caused by propelled wash from vessels has not been considered
- The VDM method assumes a double layer (primary and secondary) of rock armour
- Each layer is a double standard layer with an overlapping coefficient of 0.91 and blockiness of 0.65
- Crest effects and overtopping have not been considered
- For rock armour sizing the toe is assumed to be at a depth of -3.55m AHD, with a slope of 1V:1.5H.

Figure 5-2 shows a schematisation of the rock armour layers with wind-driven waves and storm tide level.

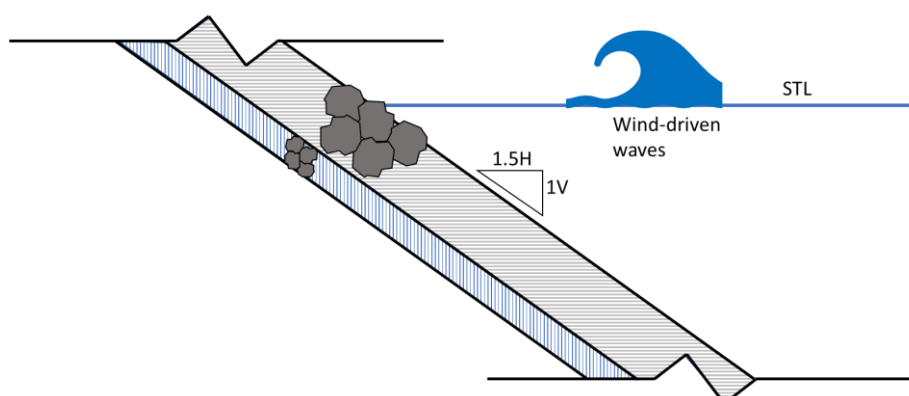


Figure 5-2: Schematisation of rock armour layers

5.5 Rock armour design

Table 5-1 shows the additional parameters that are used to determine the median required rock mass (M50) to achieve stability during the design event. Using the VDM method for rock armour stability and the described parameters, the required median rock armour is shown in Table 5-2.

Table 5-1: Armour design parameters

Parameter	Value
Armour rock density	2.65 t/m ³ providing a practicable minimum that is achievable from quarry sources.
Seawater density	1.025 t/m ³
Storm duration	6.0 hours, duration of high tide.
Storm damage	Sd = 2 correlates with maximum 5% of armour units becoming displaced during the design event.
Notional permeability	0.1 has been selected as the structure utilises a double interlocking armour layer on a filter layer that increases the structure permeability, therefore dissipating wave energy. This is considered conservative building in safety to the design.
Slope	1V:1.5H
Mass Factor of Safety	1.5 and 2.0

A range of scenarios have been considered when estimating stable rock sizes, with varied return periods, planning horizons and Safety Factors. Rock sizes range from a D_{n50} of 0.8m for a present day, 0.5% AEP, 1.5 FoS, to a D_{n50} of 1.1m for 2100 planning horizon, 2% AEP event with a 2.0 FoS. These can be considered for incorporation into the detailed design, which will need to consider relevant legislation, codes, standards and risks.

Table 5-2: Summary of armour design for present day, 2070, 2100

Primary armour					Secondary armour	
Year	RP	FoS	D50 (m)	M50 (kg)	D50 (m)	M50 (kg)
2020	2.0%	1.5	0.80	1372.1	0.36	128.9
	1.0%	1.5	0.80	1380.7	0.37	129.7
	0.5%	1.5	0.93	2125.7	0.42	199.6
	2.0%	2.0	0.88	1829.4	0.40	171.8
	1.0%	2.0	0.89	1840.9	0.40	172.9
	0.5%	2.0	1.02	2834.3	0.46	266.2
2070	2.0%	1.5	0.88	1781.7	0.40	167.3
	1.0%	1.5	0.88	1832.5	0.40	172.1
	0.5%	1.5	0.97	2438.4	0.44	229.0
	2.0%	2.0	0.96	2375.5	0.44	223.1
	1.0%	2.0	0.97	2443.4	0.44	229.5
	0.5%	2.0	1.07	3251.2	0.49	305.3
2100	2.0%	1.5	0.90	1920.9	0.41	180.4
	1.0%	1.5	0.95	2279.1	0.43	214.0
	0.5%	1.5	1.00	2637.5	0.45	247.7
	2.0%	2.0	0.99	2561.2	0.45	240.5
	1.0%	2.0	1.05	3038.8	0.48	285.4
	0.5%	2.0	1.10	3516.7	0.50	330.3

6 Summary

This report has been prepared by JBPacific (JBP) on behalf of Projex Partners, to undertake a coastal modelling assessment at Redland Bay, Queensland. The study will support the detailed design of a proposed ferry terminal expansion at the Redland Barge Terminal.

A numerical model was used to simulate the tide characteristics within Moreton Bay. Two design scenarios were considered: conditions during a Mean High Water Springs (MHWS) tide, and peak conditions over a 14-day spring-neap tidal cycle.

- A Mean High Water Spring (MHWS) tide was first simulated to understand potential changes around the proposed upgrade. There was no measured change to water levels, however minor changes to current speeds, ranging from -0.04 to 0.01 m/s. These changes occurred during very low current speeds. The greatest reduction in current speed (-0.04 m/s) occurred during a current of 0.0 m/s. The greatest increase in current speed (-0.01 m/s) occurred during a current of 0.06 m/s.
- Further assessment of the magnitude and extent of these changes has been tested during a full 14-day spring neap tidal simulation. No changes to water levels were predicted within the tidal simulation. Minor changes to nearshore tidal currents were observed, which ranged between -0.1 m/s up to +0.04m/s adjacent to the proposed upgrade. Beyond 50m of the proposed terminal this impact reduces to between -0.02 to +0.02 m/s. At the seaward end of the public jetty there is no significant change in peak current speed. At this magnitude, these changes are not believed to have a significant change to coastal hydrodynamics, coastal sediment transport or scour and sedimentation patterns.

Nearshore wave conditions have been estimated using Delft3D. Only wind-driven wave effects have been considered, due to the protected location of the study area within the lower Moreton Bay channel system. For a 1% AEP event the nearshore wave conditions ranged between 1.4 to 1.7m, with peak periods between 3.5-5.0s. A range of scenarios have been considered to estimate stable rock sizes, using varied return periods, planning horizons and Safety Factors. Rock sizes range from a D_{n50} of 0.8m for a present day, 2% AEP, 1.5 FoS, to a D_{n50} of 1.1m for 2100 planning horizon, 0.5% AEP event with a 2.0 FoS. These can be considered for incorporation into the detailed design, which will need to consider relevant legislation, codes, standards and risks.



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APPENDIX E

Stormwater Management Plan



Stormwater Management Plan **REDLAND BAY FERRY TERMINAL**

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DOCUMENT ISSUE RECORD

Revision Code	Date Revised	Revision Details	Author	Checked	Approved
A	24/03/2021	Original Issue	RK	DAB	DAB
B	29/11/2021	Updated plans and water quality treatment	RK	DAB	DAB
C	13/04/2026	Bioretention Basin and additional southern ramp added	WB	DAB	DAB

Approved

Daniel Berry (RPEQ 6343)

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1 INTRODUCTION

Projex Partners have been engaged by Pensar Structures to undertake the detailed design of the Redland Bay Ferry Terminal upgrade for SeaLink. Currently, the facility consists of a single ramp used for vehicle services plus a service ramp and disused ramp on the northern side of the vehicular loading ramp. To improve services for their customers, SeaLink are proposing to upgrade the existing facility to provide two vehicle access locations to accommodate a new fleet of ferries while also providing a separate access for the existing fleet, with associated improvements to queuing, ticketing and access.

The site is located within Redland Bay vehicular ferry terminal is located at the eastern end of Weinam Street, Redland Bay. It is also within the Weinam Creek Priority Development Area (PDA) with development approvals coordinated by Economic Development Queensland (EDQ).

This Stormwater Management Plan (SMP) has been prepared to support the development approval application.



Figure 1-1: Redland Bay Vehicular Ferry Terminal Location

2 SITE DESCRIPTION

2.1 General Description

The site is located on Lots 1 & 2 SP261696 and 186 SL8029 at the end of Weinam Street, Redland Bay as shown in figure 2.1 below. The property is 7039m² with approximately 4540m² within tidal zones.



Figure 2-1: Current Site Layout

2.1.1 Topography, Vegetation and Site Drainage

The site is approximately 2m AHD and is relatively flat with no defined fall on the site. All stormwater is conveyed by overland flow paths and discharges directly into Redland Bay.

A small number of trees are present on the southern boundary of the site along with two small, grassed areas. The rest of the site has no landscaping.

A council stormwater inlet pit is present at the entrance to the site. This travels under the southwestern corner of the site and discharges into Redland Bay.

As the site is located below 5m AHD, Acid Sulphate Soils (ASS) may be present. Potential ASS are addressed separately in the environmental reports for the project.



Figure 2-2: Site Topography and Drainage Features

2.1.2 Existing Imperviousness Area

The site located on land is approximately 2500m². Approximately 105m² is pervious. The remainder of the land is sealed or heavily compacted gravel which results in approximately 96% impervious area.

2.2 Previous Studies

Redland City Councils City Plan indicates that the site is within an erosion prone area and storm tide inundation area.

3 DEVELOPMENT DESCRIPTION

3.1 General Description

The proposed development is to consist of three loading ramps along with 6 entry lanes, 1 holding lane and 1 exit lane. Localised footpaths and seating areas are also included in the new development. A grassed area runs along the southern boundary of the site and includes a bioretention swale drain and basin to improve water quality from the site. The northern boundary has a similar bioretention swale drain that will also capture and treat stormwater runoff.

The site also reclaims approximately 150m² due to the extension of the boarding ramps with a resultant area of 2650m². Reclamation fill has been specified as rockfill to minimise the potential for sediment transfer and will be sourced from a registered quarry. Certification will be obtained from the quarry that the materials used are free of contamination.

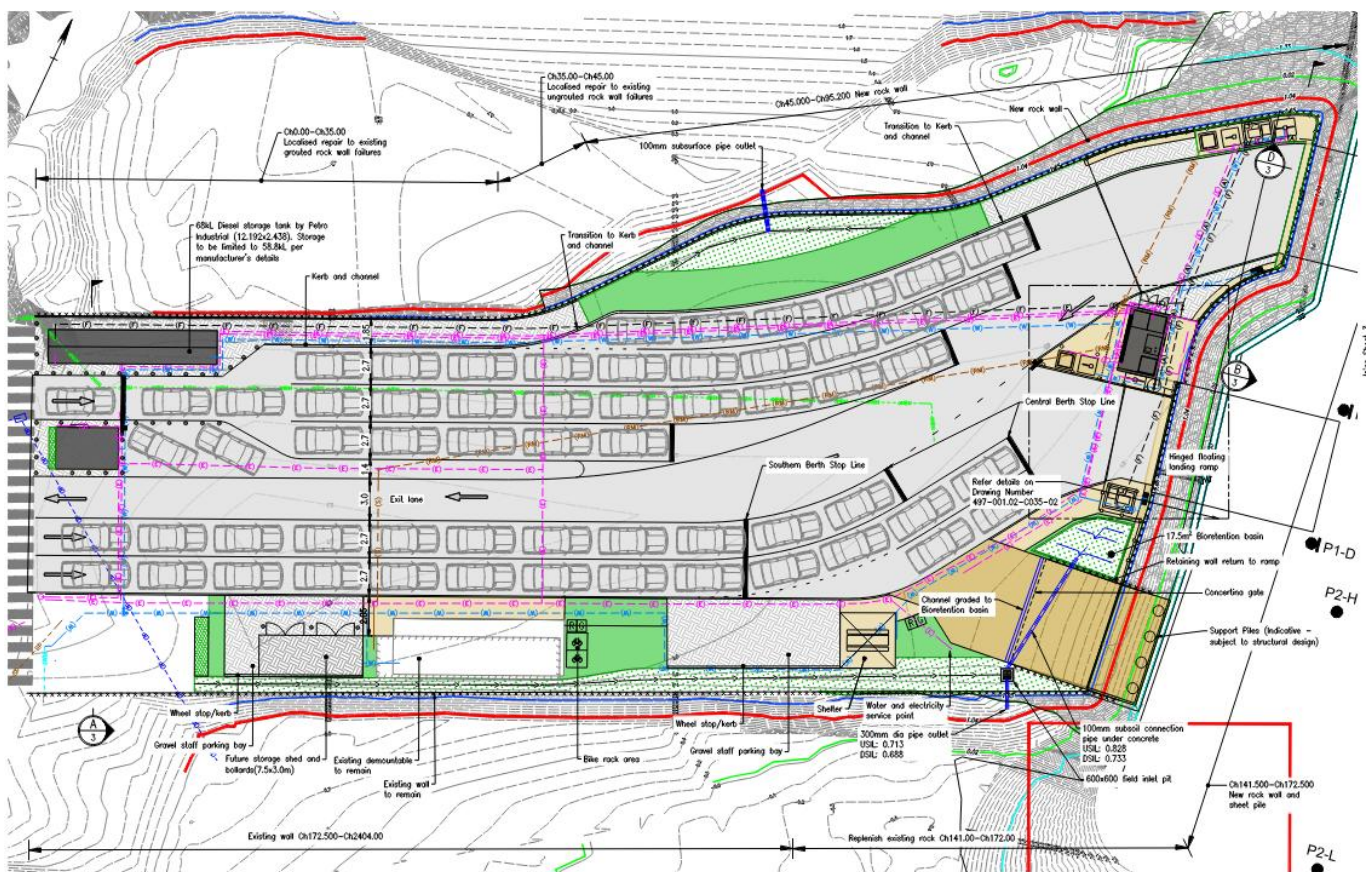


Figure 3-1: Site Plan

Stormwater from the site will be conveyed as per the current drainage regime via overland sheet flow paths. The proposed drainage scheme introduces a series of swale drains to intercept flows prior before discharging to the bioretention basin or bay.

A grated channel beneath the southern loading ramp is proposed to drain to the bioretention basin, catching runoff from the road and ramp. A field inlet will also capture runoff from the southern swale drain and convey it via a pipe beneath the ramp to the bioretention basin. No further underground stormwater network will be installed due to the low-lying nature of the site and tidal conditions restricting outflow from an underground network.

3.2 Lawful Point of Discharge

Currently stormwater flows into the bay via overland flow paths.

No changes to stormwater discharge are proposed.

Water will discharge to Moreton Bay as per the current conditions and will have no impact on surrounding properties or other drainage infrastructure prior to discharge.

4 STORMWATER QUALITY

4.1 Construction Phase Water Quality Issues

Water quality management is required to be implemented during the construction and operational phases of the development. Potential pollutants associated with the construction phase cannot be modelled due to the site-specific nature of the pollutant sources. The major pollutant of concern during the construction phase is suspended solids (silt and sediments) due to potential erosion associated with earthworks operations on site.

Potential pollutant export is largely dependent on the site management practices and varies throughout the construction phase depending on the works being undertaken. The contractor is to prepare a construction Erosion and Sediment Control Plan (CESCP) to suit their construction methodology. This will document the proposed ESC devices to be implemented on site and minimise impacts upon water quality.

4.2 Operational Phase Water Quality Objectives

The State Planning Policy (SPP) water quality targets apply to stormwater discharging from the site. Table 4-1 below documents the water quality targets for sites within South-East Queensland.

Table 4-1: Water Quality Targets

Pollutant	Reduction Requirement
Total Suspended Solids (TSS)	80% of average annual load
Total Phosphorous (TP)	60% of average annual load
Total Nitrogen (TN)	45% of average annual load
Gross Pollutants (GP)	90% of average annual load

4.3 Proposed Water Quality Treatments

Model for Urban Stormwater Improvement Conceptualisation (MUSIC) Version 1.40 was utilised to determine the requirements for the water quality treatment trains. As mentioned previously, bioretention swales and a basin will be implemented to treat all stormwater prior to discharging into Moreton Bay.

Maintenance of the bioretention basin and swales is to be completed as per the recommended maintenance intervals documented in Section 2.4 of Water by Design's *Maintaining Vegetated Stormwater Assets, 2012*. This guideline advises to inspect as detailed below for the sub-tropical area:

- Bioretention Basin
 - 2 months (wet season)
 - 4 months (dry season)
- Swales
 - 4 months (wet and dry season, noting that turf swales will require more frequent mowing)

4.4 MUSIC Modelling

MUSIC modelling of the treatment trains was undertaken using *MUSIC Modelling Guidelines – Version 3 (2018)* to determine the type and quantity of stormwater quality treatments to satisfy the SPP water quality targets. The model was constructed using the following information:

4.4.1 Rainfall Data

6-minute rainfall data obtained from eWater station 40265-Redlands HRS and was used in the development of the MUSIC model. The data from the station is provided below in Table 4-2.

Table 4-2: MUSIC Rainfall Data

Rainfall Station	Modelling Period	Annual Rainfall (mm)	Recording Interval (mins)
Redlands HRS - 40265	1/1/1997-31/12/2006	1088	6

4.5 Catchment Pollutant Parameters

The catchments were modelled using the lumped commercial catchment parameters. The pollutant export parameters for these options are documented below in Table 4-3. These values were obtained from Table 3.8 of the MUSIC Modelling Guidelines.

Table 4-3: Lumped Commercial Pollutant Export Parameters

Land Use	Flow Type	TSS $\log^{10}$ values		TP $\log^{10}$ values		TN $\log^{10}$ values	
		Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Commercial	Baseflow parameters	0.78	0.45	-1.11	0.48	0.14	0.20
Commercial	Stormflow parameters	2.16	0.38	-0.39	0.34	0.37	0.34

4.6 Rainfall Runoff Parameters

The MUSIC Rainfall-Runoff parameters for commercial nodes are documented below in Table 4-4. These parameters were obtained from Table A1.2 of the *MUSIC modelling guidelines*.

Table 4-4: Rainfall Runoff Parameters

Parameter	Value
Rainfall Threshold (mm)	1
Soil Storage Capacity (mm)	18
Initial Storage Capacity (%)	10
Field Capacity (mm)	80
Infiltration Capacity Coefficient A	243
Infiltration Capacity Coefficient B	0.6
Initial Depth (mm)	50
Daily Recharge Rate (%)	0
Daily Baseflow Rate (%)	31
Daily Deep Seepage Rate (%)	0

4.7 Bioretention Node Parameters

The bioretention treatment node parameters used in the MUSIC model are provided in Table 4-5. The parameters were obtained from Section 4.5 of the *MUSIC Modelling Guidelines*.

Table 4-5: Bioretention Treatment Node Parameters

Parameter	Value
Low Flow Bypass (m ³ /s)	0
High Flow Bypass (m ³ /s)	100
Extended Detention Depth (m)	0.2
Surface Area (m ²)	17.5
Filter Area (m ²)	17.5

Parameter	Value
Unlined Filter (m ²)	0.01
Saturated Hydraulic Conductivity (mm/hr)	200
Filter Depth (m)	0.5
TN Content of Filter Media (mg/kg)	400
Orthophosphate Content of Filter Media (mg/kg)	30
Exfiltration Rate (mm/hr)	0
Based Lined	Yes
Overflow Weir Width (m)	2
Underdrain Present	Yes
Submerged Zone with Carbon	No

The treatment train used in the MUSIC model is shown below in Figure 4-1.

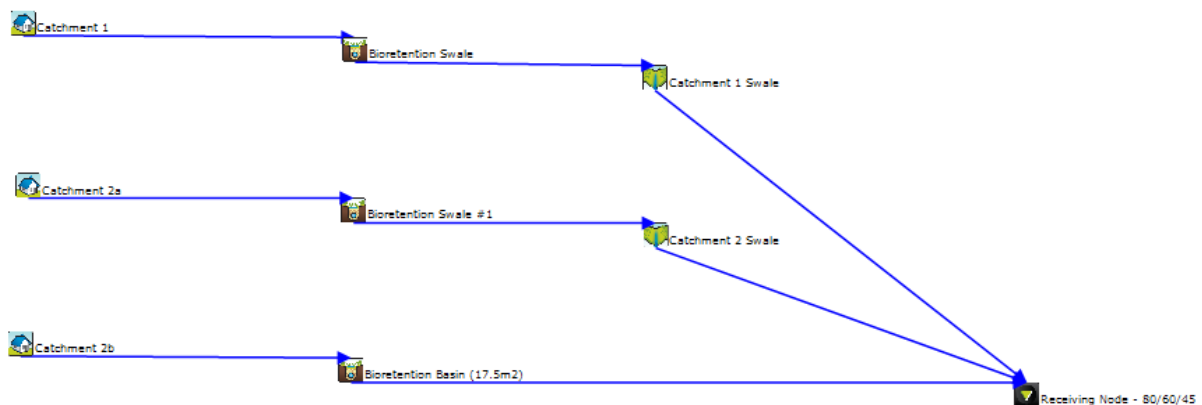


Figure 4-1: MUSIC Model Treatment Trains

The results of the MUSIC modelling are included in Table 4-6 below, which confirms that the proposed 17.5m² bioretention basin area and swales enables the development to comply with the SPP water quality targets.

Table 4-6: MUSIC Modelling Results

Pollutant	SPP Target	Reduction Achieved	Compliant
Total Suspended Solids (TSS)	80%	91.54%	Yes
Total Phosphorous (TP)	60%	84.06%	Yes
Total Nitrogen (TN)	45%	60.27%	Yes
Gross Pollutants (GP)	90%	100%	Yes

Hydrocarbon capture will be assisted by the utilisation of the depth within the swale and basin to capture spills prior to discharge to the Bay. It is noted that the parking areas (likely sources of discharges from parked vehicles) have been directed into the swales and there is no direct outlet (i.e. no direct pipes) from the swales into the bay under normal runoff events. This facilitates the capture of spills utilising the spill kits discussed below.

In addition to the bioretention swales, fuels and oils stored on site will be located within bunds. These bunds are designed to capture any leaks or spills. Spill kits will also be located on site near storage and refuelling stations.

The kits are to contain equipment suitable for capturing and cleaning spills on land and within waterways. Examples of the proposed spill kits are included in **Appendix C**.

Gross pollutants are also captured within the vegetated swale, allowing removal by SeaLink staff during normal site cleaning operations. Additional waste bins are being provided on site to manage gross pollutant load.

5 BIORETENTION BASIN MANAGEMENT

5.1 Bioretention Basin and Swale Design

Typical details for the bioretention basin and swale designs are shown on design drawing number 497-001.02-C005-02 in **Appendix A**. Details of the filter media should comply with the current FAWS Guidelines for Soil Filter Media in Bioretention systems. Any substitution of material should ensure that the material has consistent properties and is capable of supporting vegetation.

5.2 Inspections

Inspections should generally occur in line with the maintenance schedule outlined in Table 5-1.

Table 5-1: Bioretention Basin and Swale Maintenance Schedule

Purpose of Visit	Frequency	April	May	June	July	August	September	October	November	December	January	February	March
Routine Inspection (Basin)	As required		X			X			X		X		X
Routine Inspection (Swale)	As required		X			X			X			X	

Inspections should be made not less than 24 hours and not more than 72 hours after cessation of rainfall if the total rainfall on any day exceeds 30mm.

Inspection results are to be logged and kept for verification of compliance on a need basis.

5.3 Maintenance Requirements

Typical maintenance of bioretention basin and swale elements will involve:

- Routine inspection of the bioretention profile to identify any areas of obvious increased sediment deposition, scouring from storm flows, rill erosion of the batters from lateral inflows, damage to the profile from vehicles and clogging of the bioretention basin (evident by a 'boggy' filter media surface).
- Routine inspection of inflow system, weir and underdrains to identify and clean any areas of scour, litter build up and blockages.
- Removal of sediment where it is smothering the bioretention vegetation.
- Repairing any damage to the profile resulting from scour, rill erosion or vehicle damage by replacement of appropriate fill (to match onsite soils) and revegetating.
- Tilling of the bioretention basin surface, or removal of the surface layer, if there is evidence of clogging.
- Regular watering/irrigation of vegetation until plants are established and actively growing.
- Removal and management of invasive weeds (herbicides should not be used).
- Removal of plants that have died and replacement with plants of equivalent size and species as detailed in the plant schedule.
- Pruning to remove dead or diseased vegetation material and to stimulate growth.
- Vegetation pest monitoring and control.

Resetting (that is, complete replacement of materials) of the bioretention basin will be required if the system fails to drain adequately after tilling of the surface. Maintenance should only occur after a reasonably rain free period when the soil in the bioretention system is dry. Inspections are also recommended following large storm events as the nature and configuration of the bioretention basins varies significantly.

6 STORMWATER QUANTITY

The current site is approximately 2500m² with 96% of the site impervious. The proposed development is 2650m² with 88% of the site impervious. Due to the slightly larger site area, stormwater runoff increases slightly across all storm events. As the site is located at the end of the stormwater catchment and discharges directly into Moreton Bay, a slight increase has no effect on the total stormwater network and does not impact any properties or infrastructure.

The discharges from site are summarised in Table 5-1 below.

Table 6-1: Stormwater Discharge

Storm Event (AEP)	Pre-Development Flow (Q, m ³ /s)	Post Development (Q, m ³ /s)	Difference (Q, m ³ /s)
1%	0.242	0.250	-0.009
2%	0.208	0.215	-0.008
5%	0.161	0.167	-0.006
10%	0.133	0.138	-0.005
63%	0.058	0.060	-0.002

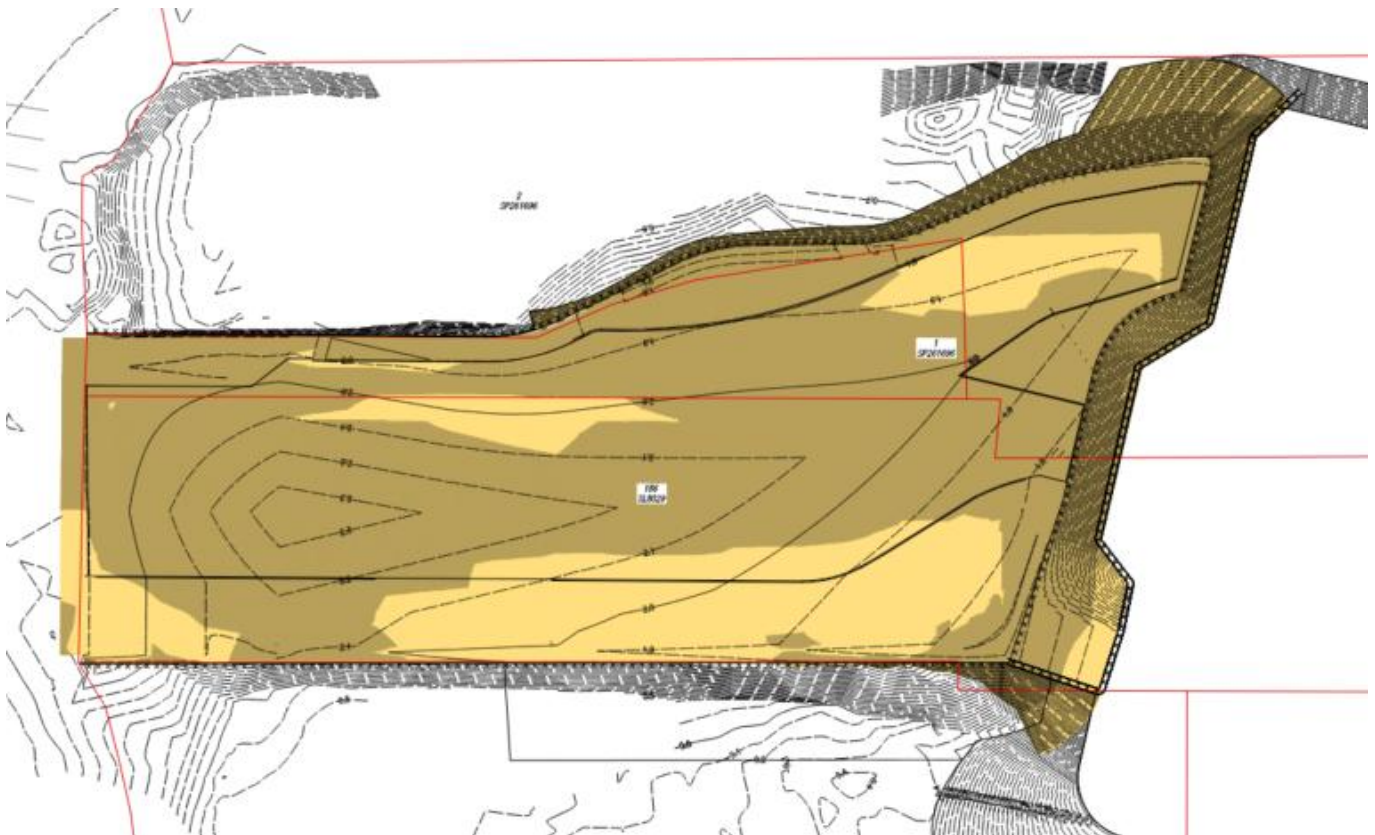


Figure 6-1: Drainage Contours Plan

7 CONCLUSION

Projex Partners were engaged by Pensar Structures on behalf of SeaLink to undertake the design for the upgrade of Redland Bay Ferry Terminal. The development consists of increasing capacity for passenger storage and improving access for a new fleet of ferries. Two additional loading accesses will also be formalised for use by passengers.

The post development site will improve water quality discharging from the site through the use of bioretention swale drains and a basin. Pollutants will be reduced to meet the requirements within the State Planning Policy.

Stormwater runoff will increase slightly but will have no impact on the overall stormwater catchment and will not impact surrounding properties or infrastructure.

8 REFERENCES

This SMP has been prepared with consideration of the following documentation:

- State Planning Policy (2017)
- Queensland Urban Drainage Manual (2017)
- MUSIC Modelling Guidelines
- Redland City Plan – Planning Scheme Policy 2: Infrastructure Works.
- Water by Design – Maintaining Vegetated Stormwater Assets (2012)

APPENDIX A

Drawings / Plans



- D50 = 0.40m
- M50 = 173kg
- Armour is to be placed to ensure interlocking is achieved

The diagram illustrates a cross-section of a road embankment. At the top, a horizontal line represents the 'New pavement - refer Pavement Details drawing' with a width of 2.9. Below this is a layer of 'Site won material (General Fill as per TMR MRTS04)'. The embankment slopes down at a ratio of 1 on 1.5. The slope is reinforced with 'Type A - Primary Rock Armour d50 - 0.90m nom.' and 'Type B - Secondary Rock Armour d50 - 0.4m nom.'. A 'Geotextile - refer table for material properties' is shown at the base of the slope. The 'Existing ground surface' is indicated by a dashed line. 'Crushed Rock. Refer TMR Standard Drawing 4021' is shown in the lower part of the embankment. 'Geofabric A34 or approved equivalent' is shown on the left side. The bottom of the embankment is at 'Seabed -3.35'. A note specifies 'Minimum 0.5 x d50 embedment or to sound material as approved by Administrator (refer Note 5)'. On the right, a table shows the 'G Rating' as 3000. Below the diagram, a vertical scale shows elevations: H.A.T. 1.65, M.H.W.S. 1.04 (highlighted in red), M.S.L. 0.02, L.A.T. -1.33, and Seabed -3.35.

G Rating	3000
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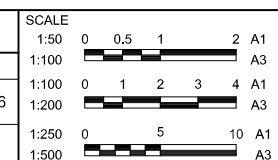
H.A.T. 1.65

M.H.W.S. 1.04

M.S.L. 0.02

L.A.T. -1.33

Seabed -3.35

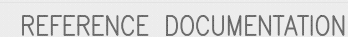
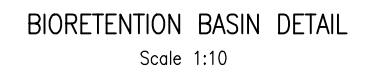


1	DRAWING NUMBER	497-001.02-C005-01	No IN SET	REVISION
3			3 OF 35	A

A	ISSUED FOR CONSTRUCTION	10/4/2026	JDB	JM	DB	6343	DB		
Rev	Description	Date	Drawn	Design	Check	REC'D No.	& Initial		

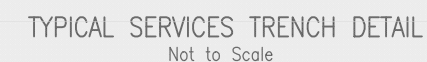


- ## SPECIES LIST
- Landscaping with salt tolerant planting:
- Lucia – Dianella Caerulea
 - Aussie Rambler – Carbotus Glaucescens
 - Little Jess – Dianella Caerulea
 - Ficinia Nodosa (Knotted Clubrush)
 - Juncus Kraussii (Rush)
- Spacing at 3 plants per linear metre

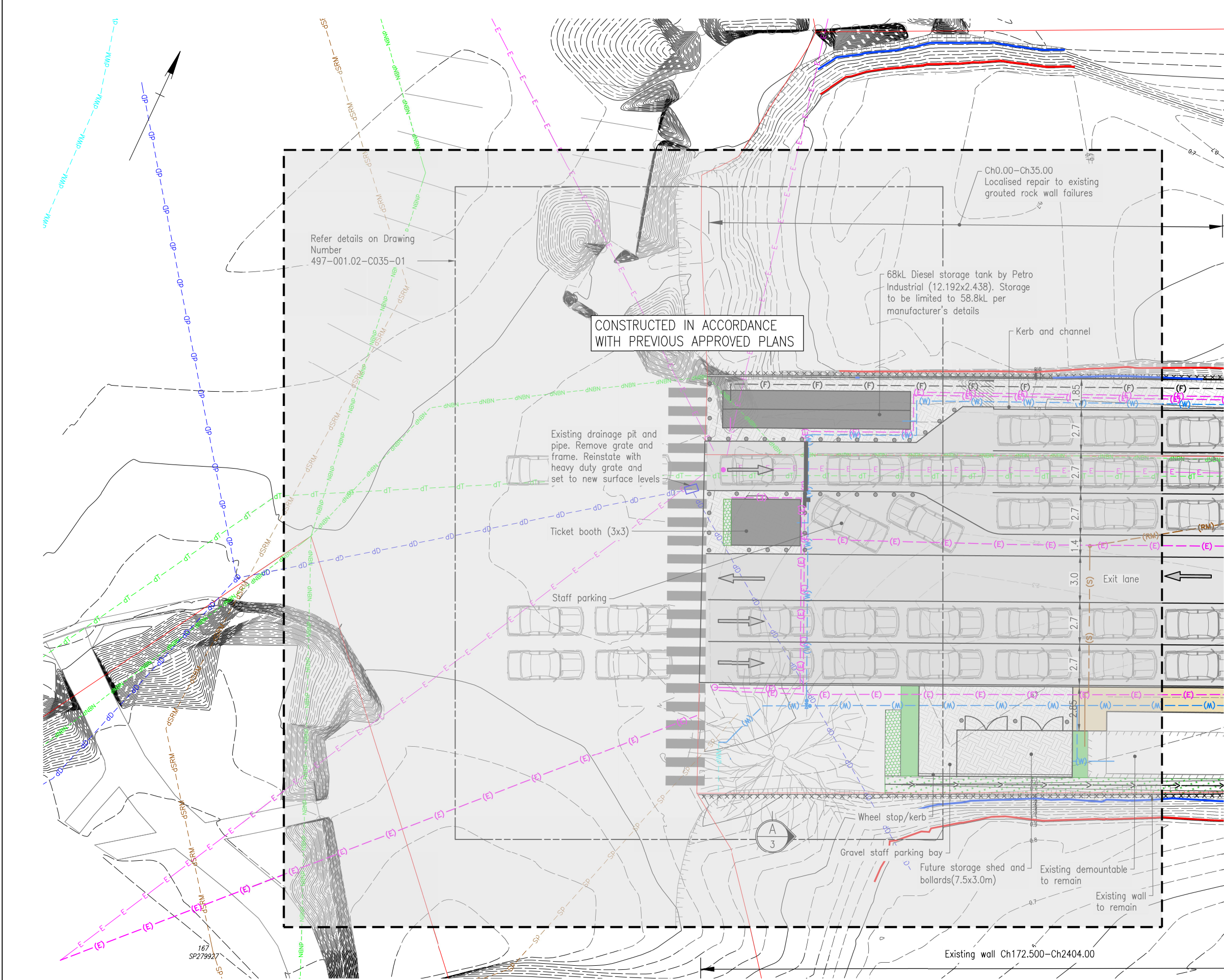


1. Landing Ramp Terminal Link Span detail refer to Hardwood Marine Dwg HWM210206-S-01.
2. Landing ramp vessel beggers information provided by Sea Transport.
3. Landing ramp abutment details refer to Marsden Glersing DWG 1716A-DWG-001.
4. End stop pile details refer International Marina Consultants DWG 5963-SK1/A.

TYPICAL SECTION LANDING RAMP
Scale 1:125



Last Modified - Apr 10, 2026 - 3:51pm C:\Users\JaredBraganza\appdata\local\temp\AcPublish_59864497-001.02-C030-GA-01.dwg By - JaredBraganza



Joins Sheet 2

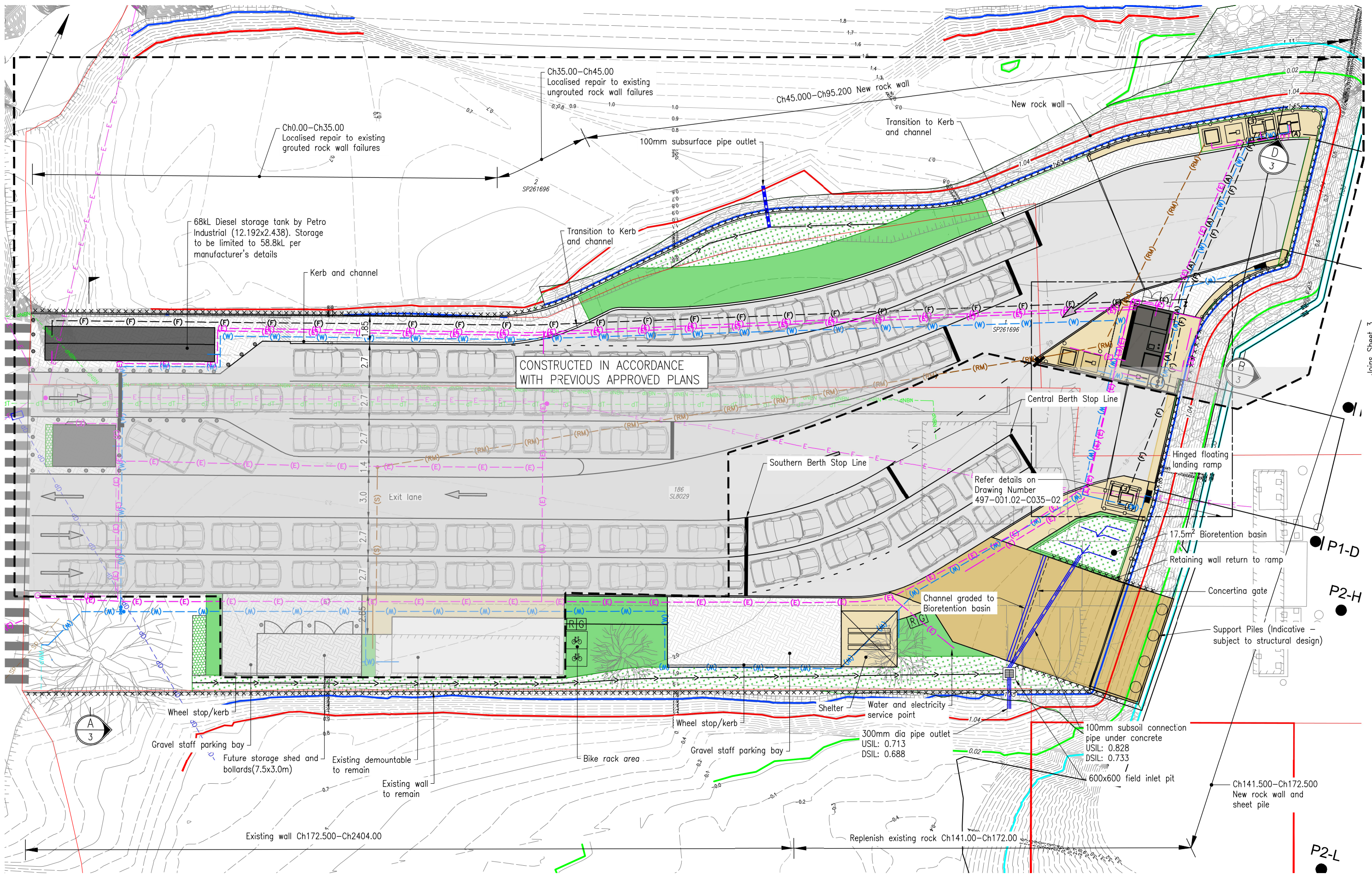
NOTE
For notes and legend, refer to Drawing Number 497-001-C001-01.

ProjexPartners PROJECT MANAGEMENT ENGINEERING PLANNING Ph: 1300 789 214 www.projexpartners.com.au		CLIENT PENSAR STRUCTURES		ENGINEERING CERTIFICATION (RPEQ)						SCALE 1:125 0 2.5 5 A1 1:250		REDLAND BAY FERRY TERMINAL GENERAL ARRANGEMENT SHEET 1	
A ISSUED FOR CONSTRUCTION		10/4/2026	JDB	JM	DB	6343	DB	CIVIL	D BERRY	6343	10/4/2026	DRAWING NUMBER 497-001.02-C030-01	No IN SET 9 OF 35
Rev.		Description	Date	Drawn	Design	Check	RPEQ No. & Initial					REVISION A	

THIS DRAWING MAY ONLY BE USED FOR THE PURPOSE FOR WHICH IT WAS PREPARED BY PARTIES AGREED TO BY PROJEX PARTNERS & MUST NOT BE USED BY ANYONE ELSE OR FOR ANY OTHER PURPOSE

Last Modified - Apr 10, 2026 - 3:27pm C:\24\5\4\1\A\1\497-001 RBay Ferry_22540\Design\AutoCAD_1\DRAWINGS STG\497-001.02-C030-GA-02.dwg By - Jared Braganza

Joins Sheet 1



Joins Sheet 3

NOTE
For notes and legend, refer to Drawing Number 497-001-C001-01.

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Ph: 1300 789 214 www.projexpartners.com.au

CLIENT
**PENSAR
STRUCTURES**

REVISIONS		DATE		DRAWN		DESIGN		CHECK		RPEQ No. & Initial	
A	ISSUED FOR CONSTRUCTION	10/4/2026	JDB	JM	DB	6343	DB				
Rev.	Description	Date	Drawn	Design	Check	RPEQ No.	Initial				

ENGINEERING CERTIFICATION (RPEQ)			
ENG. AREA	NAME	SIGNATURE	No. DATE
CIVIL	D BERRY		6343 10/4/2026

SCALE
1:125 0 2.5 5 A1
1:250 A3

REDLAND BAY FERRY TERMINAL
**GENERAL ARRANGEMENT
SHEET 2**

DRAWING NUMBER	497-001.02-C030-02	No IN SET	10 OF 35	REVISION	A
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APPENDIX B

Stormwater Quantity Calculations

Redland Bay Ferry Terminal

Project: Redland Bay Ferry Terminal, 1% AEP

Catchment	Pre Development	Post Development	Post Development with Treatment
Area in Ha	0.25	0.265	0.265
Fraction Impervious	0.04	0.12	0.12
AEP	1%	1%	0.01
Frequency Factor	1.2	1.2	1.2
Rainfall intensity (Q10, 1hr)	68.3	68.3	68.3
C10 Runoff Coefficients	0.9	0.88	0.88
Time of concentration	5	5	5
Rainfall intensity (ARI, TC)	322	322	
Q (m3/s)=	0.242	0.250	-0.009

Project: Redland Bay Ferry Terminal, 2% AEP

Catchment	Pre Development	Post Development	Post Development with Treatment
Area in Ha	0.25	0.265	0.265
Fraction Impervious	0.04	0.12	0.12
AEP	2%	2%	0.02
Frequency Factor	1.15	1.15	1.15
Rainfall intensity (Q10, 1hr)	68.3	68.3	68.3
C10 Runoff Coefficients	0.9	0.88	0.88
Time of concentration	5	5	5
Rainfall intensity (ARI, TC)	289	289	
Q (m3/s)=	0.208	0.215	-0.008

Project: Redland Bay Ferry Terminal, 5% AEP

Catchment	Pre Development	Post Development	Post Development with Treatment
Area in Ha	0.25	0.265	0.265
Fraction Impervious	0.04	0.12	0.12
AEP	5%	5%	0.05
Frequency Factor	1.05	1.05	1.05
Rainfall intensity (Q10, 1hr)	68.3	68.3	68.3
C10 Runoff Coefficients	0.9	0.88	0.88
Time of concentration	5	5	5
Rainfall intensity (ARI, TC)	245	245	
Q (m3/s)=	0.161	0.167	-0.006

Project: Redland Bay Ferry Terminal, 10% AEP

Catchment	Pre Development	Post Development	Post Development with Treatment
Area in Ha	0.25	0.265	0.265
Fraction Impervious	0.04	0.12	0.12
AEP	10%	10%	0.1
Frequency Factor	1	1	1
Rainfall intensity (Q10, 1hr)	68.3	68.3	68.3
C10 Runoff Coefficients	0.9	0.88	0.88
Time of concentration	5	5	5
Rainfall intensity (ARI, TC)	213	213	
Q (m3/s)=	0.133	0.138	-0.005

Project: Redland Bay Ferry Terminal, 63% AEP

Catchment	Pre Development	Post Development	Post Development with Treatment
Area in Ha	0.25	0.265	0.265
Fraction Impervious	0.04	0.12	0.12
AEP	63%	63%	0.63
Frequency Factor	0.8	0.8	0.8
Rainfall intensity (Q10, 1hr)	68.3	68.3	68.3
C10 Runoff Coefficients	0.9	0.88	0.88
Time of concentration	5	5	5
Rainfall intensity (ARI, TC)	116	116	
Q (m3/s)=	0.058	0.060	-0.002

APPENDIX C

Spill Kits

Redland Barge Terminal

Spill Kits

Spill kits on site: Marine Spill Kits

1x Pallet Bin – 855L Absorbent capacity

- Located between northern and centre berths.

Link for details: <https://wssa.com.au/product/marine-pallet-bin-855l-absorbent-capacity/>



Home / Spill Kits / Spill Kits Marine / Marine Spill Kit: Pallet Bin 855L Absorbent Capacity

Marine Spill Kit: Pallet Bin 855L Absorbent Capacity

\$2,750.00 + GST

afterpay available between \$1.00 - \$2,000.00 [Learn More](#)

1

ADD TO CART

ADD TO QUOTE

Part Number: SKM855 / Categories: [Spill Kits](#), [Spill Kits Marine](#)

Specifications

Description

- Pallet-sized 855 litre capacity marine spill kit designed for spills of oils, fuels, diesel, petrol and other hydrocarbons around harbours, ponds and other inland waterways.
- **Weight:** 50.0 kg
- **Dimensions:** 117 x 117 x 85 cm
- 20 x Oil and fuel absorbent marine boom (3m x 12.5cm)
- 50 x Oil and fuel absorbent pads (45cm x 45cm)
- 4 x PVC gloves – pair (450mm)
- 10 x Disposal bag – labelled (100 micron polyethylene)
- 1 x Barrier Tape (50m x 7.5cm)
- 2 x Rope – polypropylene (15m x 6mm)
- 1 x Nally mega bin 780 litre (117cm x 117cm x 85cm)
- 1 x Spill kit labels and audit tag (Self-adhesive PVC)
- 1 x Spill kit instructions (A4 laminated)
- **Absorbent capacity: Up to 855 litres**
- Please note: absorbent capacity will vary depending on liquid viscosity, specific gravity and temperature.

Redland Barge Terminal Spill Kits

4x Oil and Fuel – 281L Absorbent capacity

- 2x Located between northern and centre berths.
- 2x Located at near storage shed/current demountable.

Link for details: <https://wssa.com.au/product/marine-oil-and-fuel-281l-absorbent-capacity/>



Home / Spill Kits / Spill Kits Marine / Marine Spill Kit: Oil & Fuel 281L Absorbent Capacity

Marine Spill Kit: Oil & Fuel 281L Absorbent Capacity

\$770.00 + GST
or 4 fortnightly payments of **\$192.50** with **afterpay** [More info](#)

1

ADD TO CART

ADD TO QUOTE

Part Number: SKM281 / Categories: [Spill Kits](#), [Spill Kits Marine](#)

Specifications

Description

- 281 litre marine oil spill kit designed for spills of oils, fuels, diesel, petrol and other hydrocarbons around harbours, ponds and other inland waterways.
- **Weight:** 22.0 kg
- **Dimensions:** 60 x 70 x 105 cm
- 6 x Oil and fuel absorbent marine boom (3m x 12.5cm)
- 50 x Oil and fuel absorbent pads (45cm x 45cm)
- 2 x PVC gloves – pair (450mm)
- 8 x Disposal bag – labelled (100 micron polyethylene)
- 1 x Barrier Tape (50m x 7.5cm)
- 2 x Rope – polypropylene (15m x 6mm)
- 1 x Wheelie bin 240 litre (60cm x 70cm x 105cm)
- 1 x Spill kit labels and audit tag (Self-adhesive PVC)
- 1 x Spill kit instructions (A4 laminated)
- **Absorbent capacity: Up to 281 litres**
- Please note: absorbent capacity will vary depending on liquid viscosity, specific gravity and temperature.

APPENDIX F

Miscellaneous Items

PUMP SPECIFICATIONS

MODEL:	DT50
PORT SIZE:	2" (50NB) BSPF
MAX FLOW:	120 L/M
MAX SUCTION LIFT:	6 M
MAX DISCH. HEAD:	6 M
MAX SOLID SIZE:	35mm SPHERE

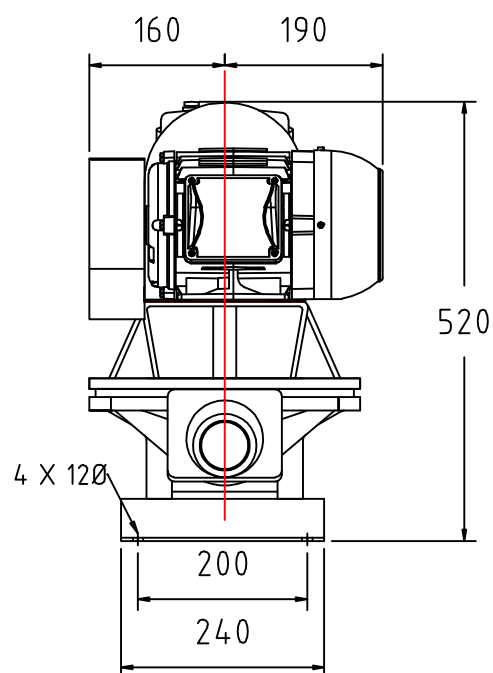
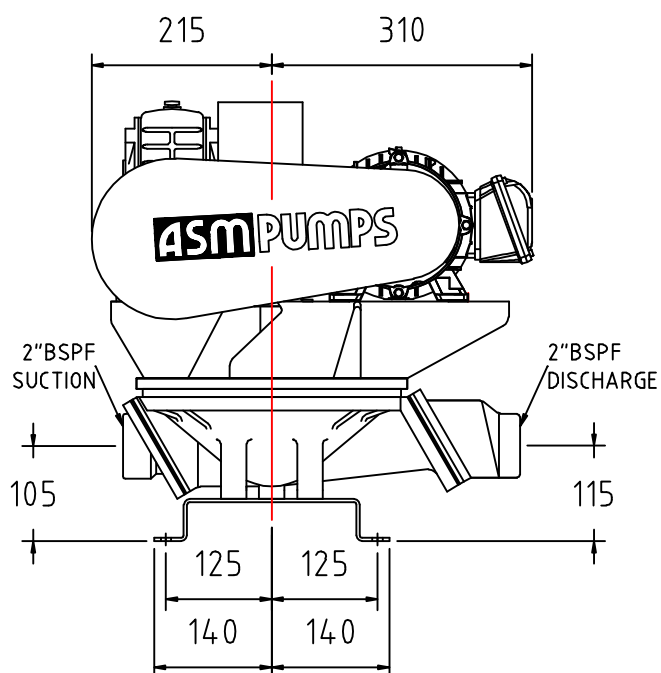
MOTOR SPECIFICATIONS

KW:	1.1
RPM:	1465
VOLTAGE:	415
FULL LOAD CURRENT:	2.4 A
IP RATING:	IP66



MATERIALS OF CONSTRUCTION

DIAPHRAGM:	NEOPRENE	OPTIONS:	NITRILE , NATURAL RUBBER, EPDM, VITON & TEFLON INTERFACE
VALVES:	NEOPRENE	OPTIONS:	NITRILE, EPDM, VITON & POLYURETHANE
CASTINGS:	ALUMINIUM AA601	OPTIONS:	CAST IRON, BRONZE, STAINLESS STEELS



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“ Water, Fuel dispensing,
Fire protection, etc. ”

Manual Rewind Hose Reel



EDH32L

Design & Structure

- Heavy duty steel construction reels designed for long lengths of hose
- Permanent direct crank rewind 3:1 ratio
- Roller guides are option (Specify roller position when ordering.)
- Brake System: cam-lock drag brake or spring actuated pin lock (Supplied with spring actuated pin lock as standard)
- Full flow shaft and swivel
- Standard inlet 90° balanced pressure swivel joint (NBR Packing)
- All (Outlet & inlet) connection threads are female BSP (Other threads can be furnished when you requested)
- All materials are carbon steel as standard (Stainless, Aluminum and other materials are available when you requested)

Painting : Powder Coat.

Type of Bevel Gear crank rewind is options (Pinion brake as standard)

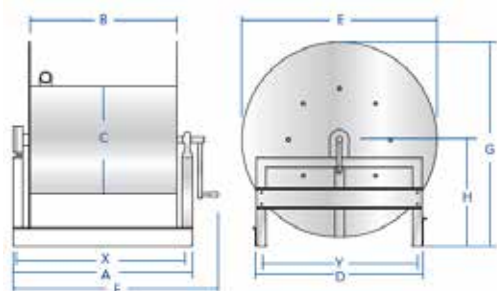
All HD series reels are supplied without hose, hose assemblies will be quoted as you requested.

Other specifications are available.



EDH40L

Item Code	Size (Inch)	Length (Mtr)	Max Pressure	Max Temperature	Rewind Type
EQH32L	1 1/4 "	30Mtr	1000psi/ 69bar	100°C	Manual
EQH40L	1 1/2 "				



Item Code	HOSE CAPACITY(mm)			REEL DIMENSIONS(mm)									
	I.D	O.D	Length	A	B	C	D	E	F	G	H	X	Y
EQH32L	32	43.9	30	510	350	300	590	650	770	700	375	470	490
EQH40L	38	50.8	30	560	400	300	590	650	840	700	375	520	490

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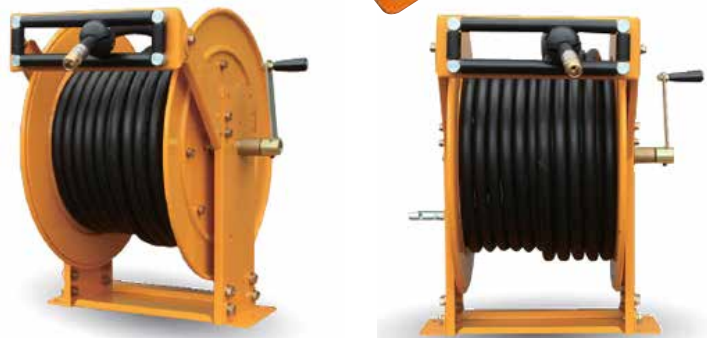
Design & Structure

- Lightweight steel construction , compact design and versatile usage.
- Dual frame ,guide plate & ball bearing support.
- Permanent direct crank rewind .
- Roller guides is option(Specify roller position when ordering.)
- Brake System: cam-lock drag brake or spring actuated pin lock(Supplied with spring actuated pin lock as standard)
- Full flow shaft and swivel.
- Standard inlet 90° balanced pressure swivel joint(NBR Packing)
- All(Outlet & inlet) connection threads are female BSP(Other threads can be furnished when you requested)
- All materials are carbon steel as standard(Stainless, Aluminum and other materials are available when you requested)
- HT series reels are supplied without hose, hose assemblies will be quoted as you requested
- Other specifications are available.

Painting : Powder Coat.

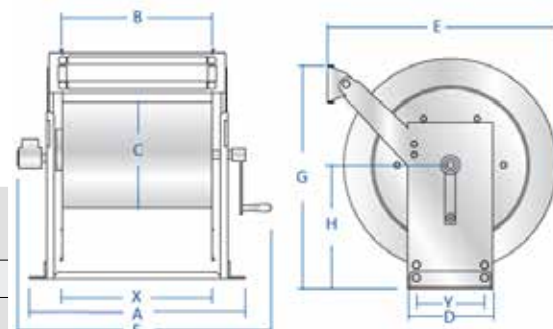


EQH25L



Item Code	Size (Inch)	Length (Mtr)	Max Pressure	Max Temperature	Rewind Type
EQH25L	1 "	20Mtr	1000psi/ 69bar	100°C	Manual

Item Code	HOSE CAPACITY(mm)			REEL DIMENSIONS(mm)									
	I.D	O.D	Length	A	B	C	D	E	F	G	H	X	Y
EQH25L	25	35.6	20	300	240	250	200	500	470	540	290	350	160



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Water, Hydraulic,
Lubrication, Fuel
dispensing etc ”

Design & Structure

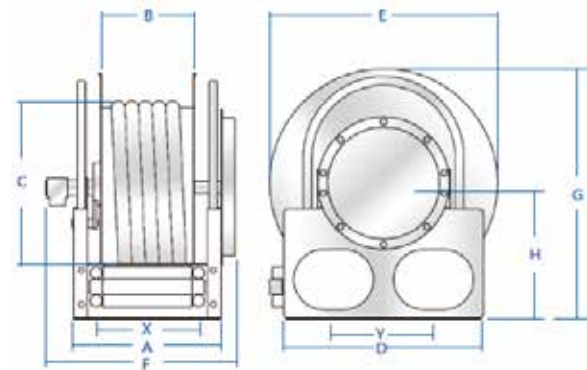
- Heavy duty steel construction & Protect pipe for reel drum.
- All bolted assembly without welding
- Dual frame ,guide plate & ball bearing support.
- Special heat-treatment spring & non-corrosive ratchet.
- 4-way roller assembly.
- Full flow shaft and swivel.
- Standard inlet 90° balanced pressure swivel joint (NBR Packing)
- All(Outlet & inlet) connection threads are female BSP(Other threads can be furnished when you request)
- All materials are carbon steel as standard(Stainless, Aluminum and other materials are available when you request)

Painting : Powder Coat.



Item Code	Size (Inch)	Length (Mtr)	Max Pressure	Max Temperature	Rewind Type
EQS25L	1 "	20Mtr	1000psi/69bar	100°C	Spring
EQS32L	1 1/4"				
EQS40L	1 1/2"				

Item Code	HOSE CAPACITY(mm)			REEL DIMENSIONS(mm)									
	I.D	O.D	Length	A	B	C	D	E	F	G	H	X	Y
EQS25L	25	35.6	20	380	240	250	440	500	510	545	290	340	310
EQS32L	32	43	20	370	230	260	500	600	500	660	360	325	350
EQS40L	40	50.6	20	42	280	260	500	640	550	700	380	375	350







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900 Series / Standard Features

Front

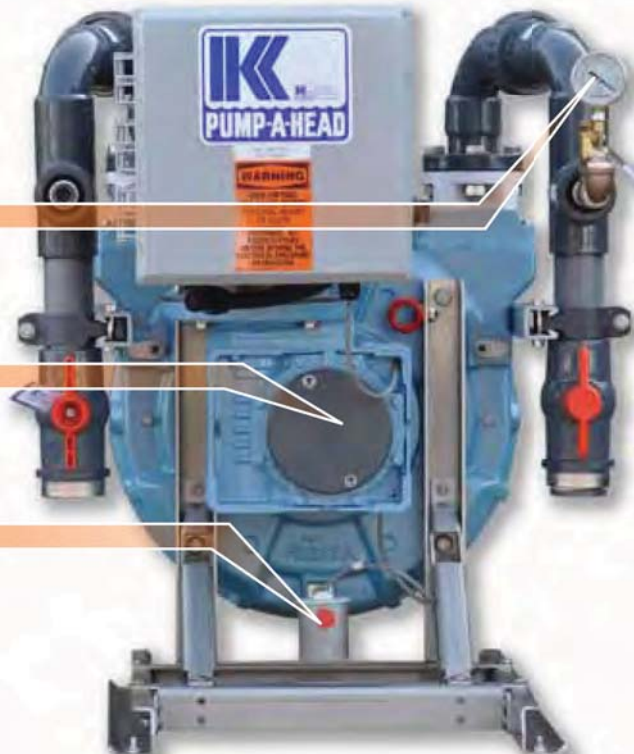


Baldor Industrial
TEFC Electric motor

Clear Viewing Window
Oil Free Pump Housing

Factory Installed Suction &
Discharge Plumbing

Back



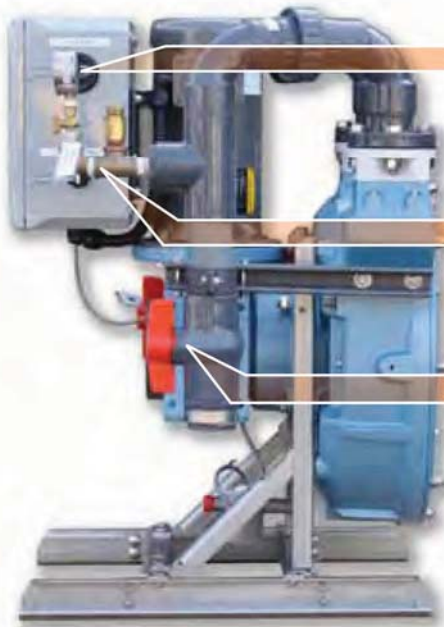
Vacuum Gauge

Direct Drive, Maintenance
Free Gearbox

Leak Detector with
Auto Pump Shut Down

900 Series / Standard Features

Left

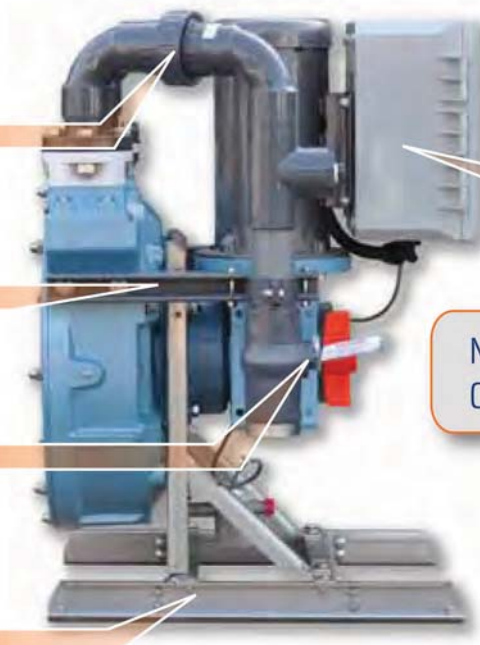


Hour Meter

Integrated Vacuum Relief Valve

Suction Isolation Valve

Right



Factory Installed Plumbing Unions

Non Metallic Pipe Support Strut

Discharge Isolation Valve

+316 Stainless Steel Pump Frame

NEMA 4X Non Metallic Control Panel



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Pump it, Don't Dump it!®

Peristaltic Pump / 900 Series / M34



Model 934-R

Compare it to others - The Keco 900 Series does not require a lubrication bath or vacuum assist which makes it the cleanest, simplest and easiest peristaltic pump to operate and maintain.

Reliability - 3 Year warranty standard, 5 Year warranty available

Operating Principle - 900 Series Peristaltic pump, is a heavy duty, self-priming, positive displacement pump. The valveless design relies on two sealed rollers, which progressively crush a thick walled, fabric reinforced tubular element. The alteration between compression and relaxation of the tubular element generates tremendous suction and impressive discharge pressures. The contents being pumped only come in contact with the inner wall of the thick peristaltic hose.

Maintenance Friendly - All 900 series peristaltic pumps feature a large acrylic viewing window allowing inspection of moving parts without the hassle of dismantling the pump.

Industry First - Keco "M" series pumps feature the ability to replace the internal hose element without the need to remove inlet /discharge piping.

Safety - Pump leak detector will immediately disable the system, alerting the operator that a inspection is required. Adjustable solid state run-timer ensures the pump is shut off after each use.

- Large clear viewing window
- Direct drive gearbox (No couplers, belts or pulleys)
- Leak Detector & Over-current shutdown
- Pulsation dampening technology with vacuum relief
- Stainless steel pump frame
- Epoxy coated aluminum pump housing
- Efficient roller technology-maintenance free-no rotors or shoes
- Heavy Duty quadruple nylon reinforced internal hose
- Dry pump cavity (no oil bath) for simplified serviceability and winterization
- Stainless steel fasteners
- Can run dry without damage



Solid State Variable
Speed Pump Controller



Leak Detector



Stainless Steel Frame



Direct Drive
Maintenance Free Gearbox

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Hour Meter, Vacuum Gauge
& Vacuum Relief Valve



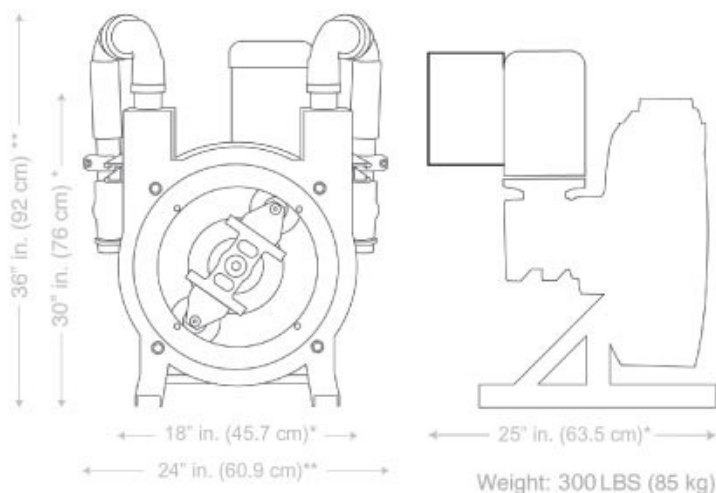
Clear Viewing Window



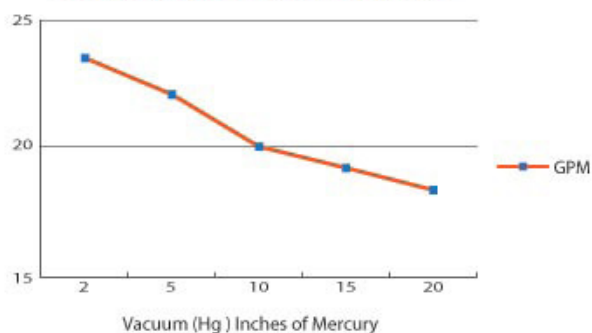
Maintenance Friendly



Inlet & Discharge
Plumbing With Pipe Support



Performance Curve @ 10 PSI Discharge Pressure



* Pump Body Dimensions ** Includes Factory Supplied Plumbing
All Measurements are approximate and do not include optional enclosure

MODEL	CAPACITY (Max)	POWER DRIVE	VACUUM (Max)	PRESSURE (Max)	ENCLOSURE
900.M34	25 Gal / 91 L	2 HP 110/240/380/480V 1/3 PH 50/60 Hz	29 HG / -.98 Bar	40 PSI / 4 Bar	OPTIONAL
900.M34-D	25 Gal / 91 L	2 HP 110/240V 1PH 50/60 Hz	29 HG / -.98 Bar	60 PSI / 4 Bar	DOCKSIDE
900.M34-R	25 Gal / 91 L	2 HP 110/240V 1PH 50/60 Hz	29 HG / -.98 Bar	60 PSI / 4 Bar	REMOTE
900.M34-DC	18 Gal / 68 L	1 HP 12/24V DC	29 HG / -.98 Bar	30 PSI / 2 Bar	OPTIONAL

* Important Note: Consult Factory If Your Application Exceeds Maximum Figures Depicted Above

* Electric Driven Pumps can be run in forward or reverse and may require additional valving to prevent backflow

PERISTALTIC PUMPS





900-Series Peristaltic Pump / M34 – 2HP Specifications

Standard Performance:

Volume.....18 GPM / 68 LPM
Dry Suction Lift.....29ft / 8.8 m
Vacuum Rating.....29 Hg / -.9.5 bar
Discharge Head.....103 ft / 31 m
Discharge Pressure.....60 Psi / 4.0 bar

Maximum Performance:

Volume.....32 GPM / 121 LPM
Dry Suction Lift29 ft / 8.8 m
Vacuum Rating.....29 Hg / -.9.5 bar
Discharge Head550 ft / 161 m
Discharge Pressure.....240 Psi / 16 bar

Standard Features:

2-HP TEFC Baldor Electric Motor
316 – Stainless Steel Pump Frame
Aluminum Pump Housing (Epoxy Coated)
Clear Acrylic Viewing Window
Oil Free Pump Housing
Factory Installed Suction & Discharge Plumbing
Direct Drive, Maintenance Free Gearbox
Leak Detection with Auto Pump Shutdown
Integrated Vacuum Relief Valve
NEMA 4X Control Panel
Textile Reinforced Internal Hose Element
Integrated Solid State Adjustable Run-Timer
NEMA 4X Hour Meter

Optional Features:

UL Listed NEMA 4X Control Panel
Variable Speed Pump Controller
Explosion Proof Leak Detector
Explosion Proof Electric Motor
Main Power Disconnect Switch
Fiberglass, Stainless or Aluminum Pump Enclosure
MarineSync Remote Monitoring
Extended Warranty

Dimensions:

Pump – 24"x25"x36" @ 300lbs
Fiberglass Enclosure – 40"x40"x45" @ 35lbs

Applications:

- Marine / Recreational PumpOuts
- Bilge PumpOuts
- Forward Lift Stations

Design Consideration:

- Pump body shall be constructed of cast aluminum.
- Pump frame shall be constructed of 316 stainless steel.
- Pump body shall NOT be filled with a lubricant bath.
- Pump shall be equipped with a direct drive gearbox (Belts, pulleys or couplers shall NOT be accepted)
- Pump shall be equipped with a natural rubber or nitrile internal hose with an inside diameter of 32mm.
- Pump shall be equipped with two hi-efficiency rollers that gradually compress the elastomeric peristaltic hose.
- Pump rollers shall feature permanently sealed stainless steel bearings with double lipped oil seals.
- Pump rotor shall be supported by double-shaft bearings protected by double lipped oil seals.
- Peristaltic hose and rollers shall be visible through a 12" clear acrylic site window.
- Pump shall be equipped with suction & discharge plumbing manifolds with unions for quick disconnect.
- Pump shall include a vacuum gauge and ball valve on the suction manifold for isolating and testing.
- Leak detection shall instantly disable motor if the peristaltic hose ruptures.
- Pump shall come equipped with an electronic hour meter, displaying hours and decimal hours.





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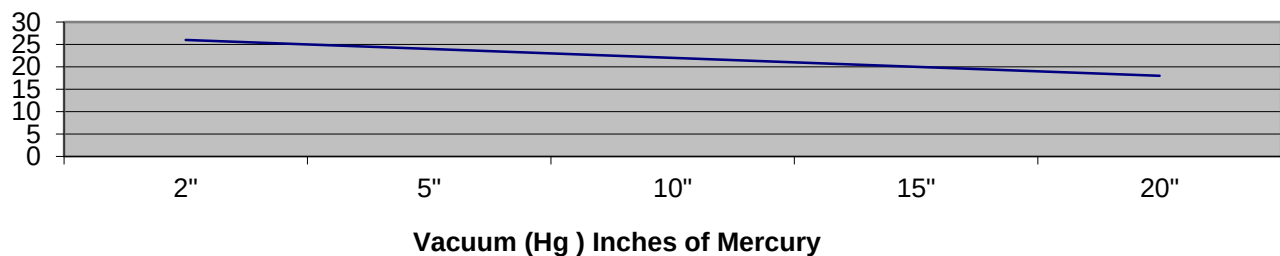
Pump it, Don't Dump it!™

900-Series Peristaltic Pump / M34 – 2HP Specifications

Suction: Performance curve demonstrates how flow rates are impacted more by suction lift than discharge head. The pump curve indicates the 900 series peristaltic (34mm) pump will pump between 26-gpm and 18-gpm at 2-ft. and 10-ft. suction lift respectively. This does not take into friction loss in suction piping or fittings. Additionally, pockets of air are common in suction and discharge piping which will dramatically affect volumes and velocities of fluids being pumped. Always consult factory with pump application / sizing inquiries.

Discharge: The peristaltic pump is a positive displacement pump, with pulses of 2.20 times greater than average flow, or approximately 39.6 GPM if actual flow is 18 GPM. When calculating discharge pressure requirement, assume the higher flow rate (actual x 2.2) when determining discharge dynamic head.

**Performance Curve @ 10 P.S.I Discharge Pressure
900 Series (2HP x 34 mm) Fixed Speed 87.5 RPM**

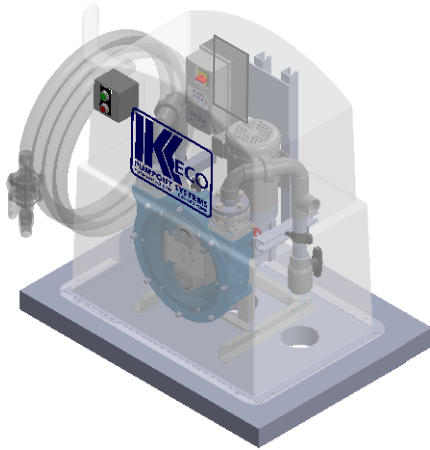


Suction Capabilities	Model 900 (34 mm) 3 HP	Discharge Capabilities	Model 900 (34 mm) 2 HP
	29 HG - 60 PSI		60 PSI – 18-25 GPM
Lift	Horizontal Distance 2" (LF)	Head	Horizontal Distance 2" (LF)
23'	50'	280'	*
21'	92'	200'	*
19'	150'	180'	*
16'	205'	160'	*
13'	260'	140'	*
11'	320'	120'	*
9'	375'	100'	1000'
7'	430'	90'	1200'
5'	485'	80'	1400'
3'	545'	70'	1600'
0'	600'	60'	1800'
		50'	2000'
		40'	2200'
		30'	2400'
		20'	2600'
		10'	2800'
		0'	3000'

Chart Reflects Approximate 2" Suction x 2" Discharge Maximum Pipe Distances. Elbows, Fittings & Valves Have Not Been Taken Into Consideration.



M34 Dockside (Slimline)



NOTES:

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TWO PLACE DECIMAL $\pm .03$
THREE PLACE DECIMAL $\pm .020$
ANGULAR $\pm .5^\circ$

MATERIAL

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M34 Dockside (Slimline)

DIMENSION: INCHES / (XX) MM

SCALE: 1:10

SHEET 1 OF 5

Components

Fiberglass Enclosure

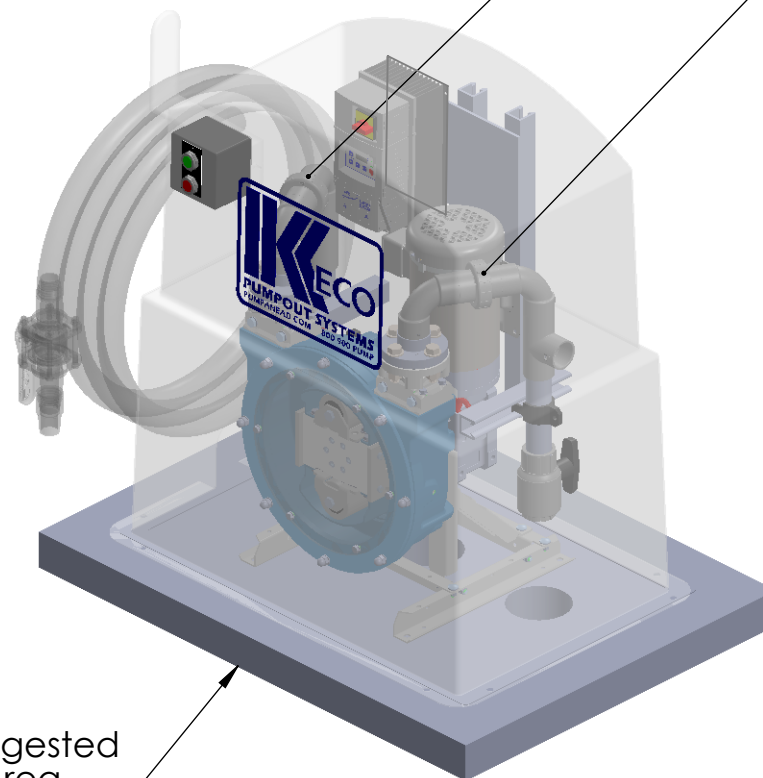
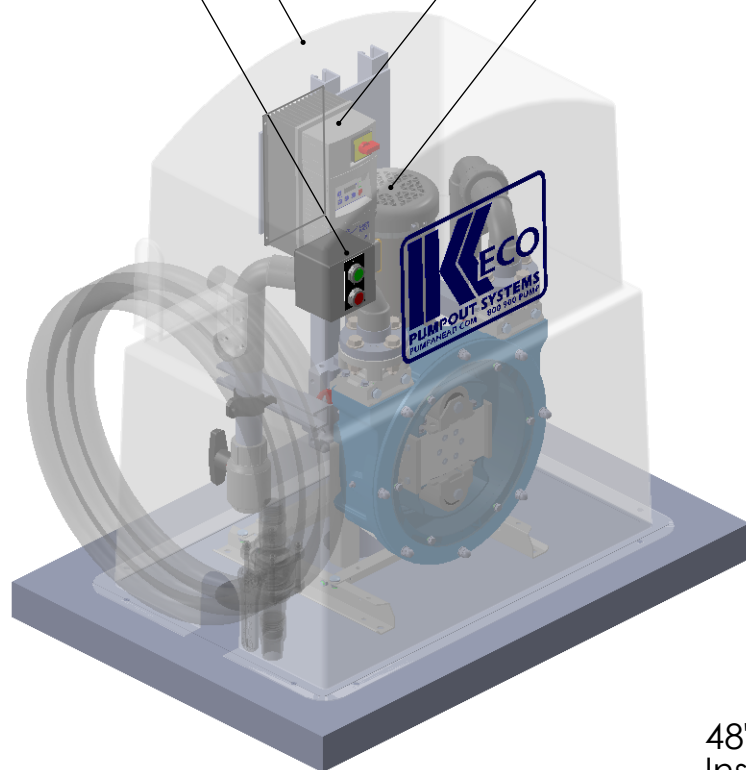
*Start/Stop Control Box

NEMA 4X Control Panel

High Efficiency Electric Motor

*Integrated Discharge Manifold

*Integrated Suction Manifold



48" X 48" Suggested Installation Area

NOTES:

*STANDARD PLUMBING MANIFOLDS INCLUDE DISCONNECT UNIONS, ISOLATION VALVE, AND VACUUM/PRESSURE GAUGE PORTS

*MULTIPLE START/STOP CONTROL OPTIONS AVAILABLE

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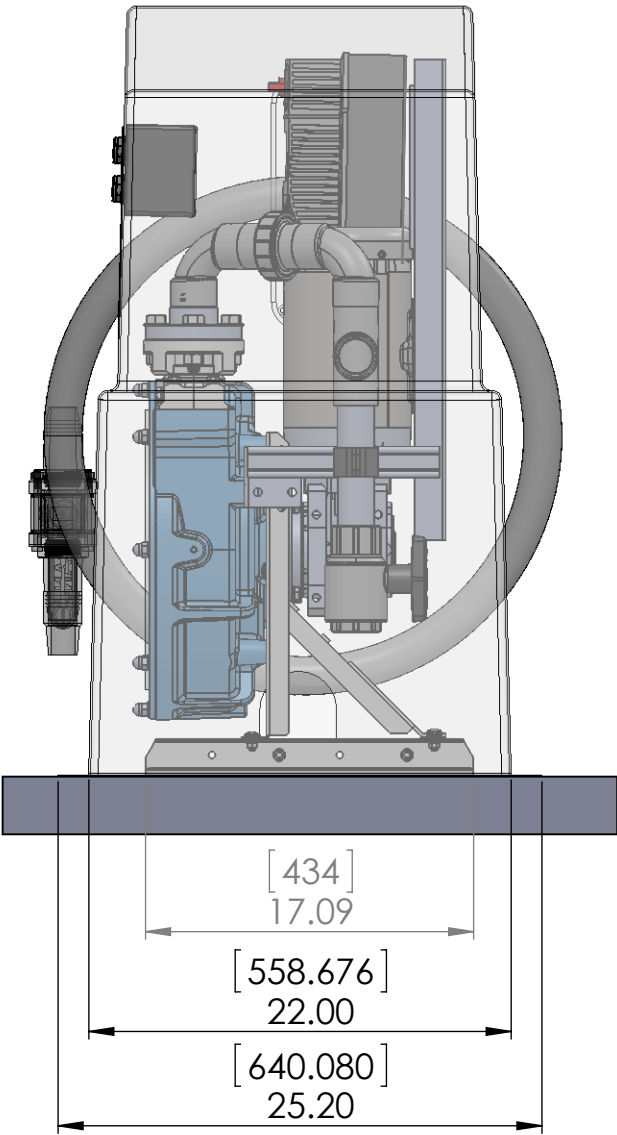
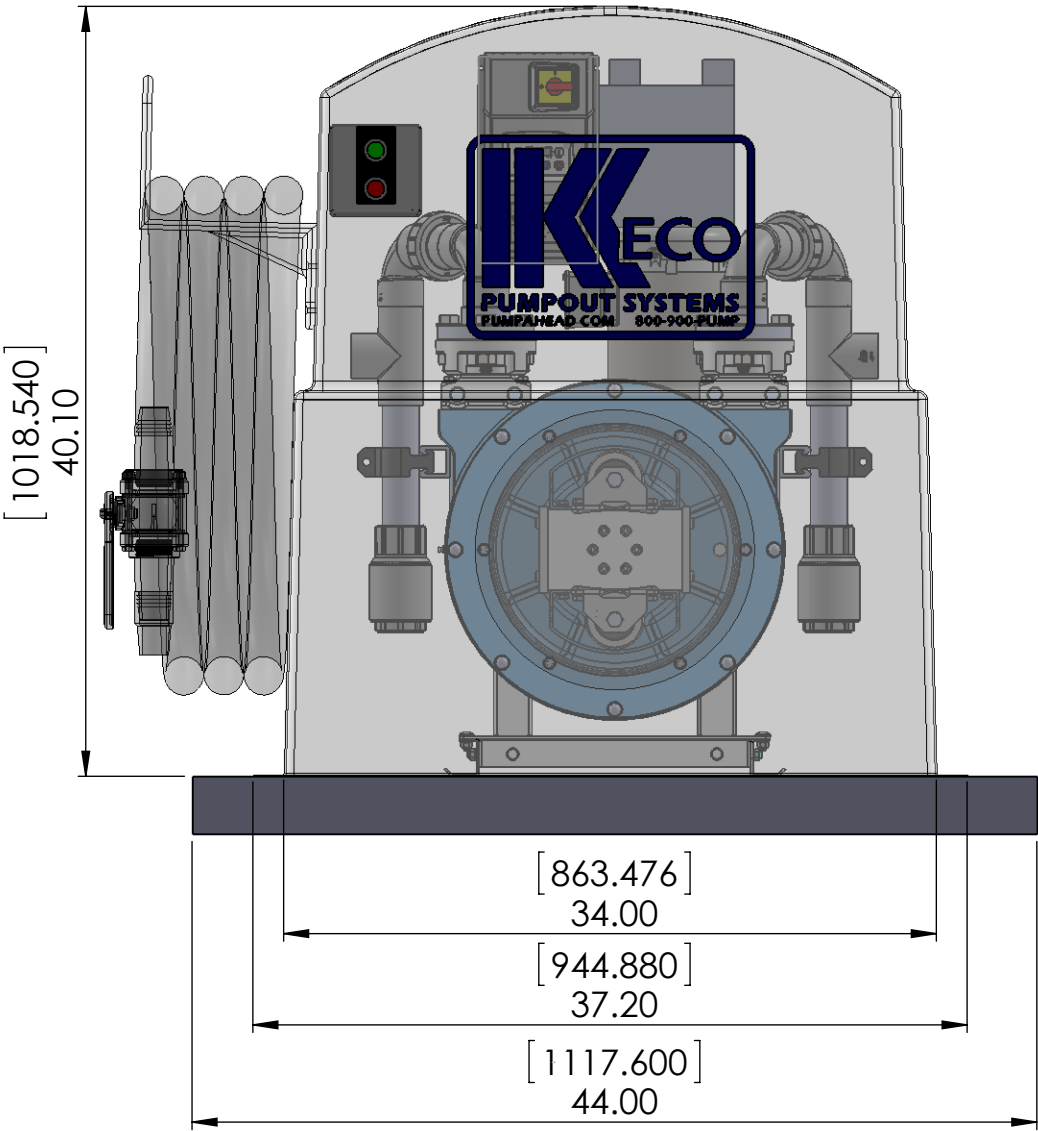
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THREE PLACE DECIMAL $\pm .020$
ANGULAR $\pm .5^\circ$

MATERIAL

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	1.0	1.0			
DATE: 7/22/2015			PART NUMBER - TITLE		
COMMENTS:			M34 Dockside (Slimline)		
			DIMENSION: INCHES / (XX) MM		
			SCALE: 1:14		SHEET 2 OF 5



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THREE PLACE DECIMAL $\pm .020$
ANGULAR $\pm .5^\circ$

MATERIAL

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REVISION #	1.0	1.0

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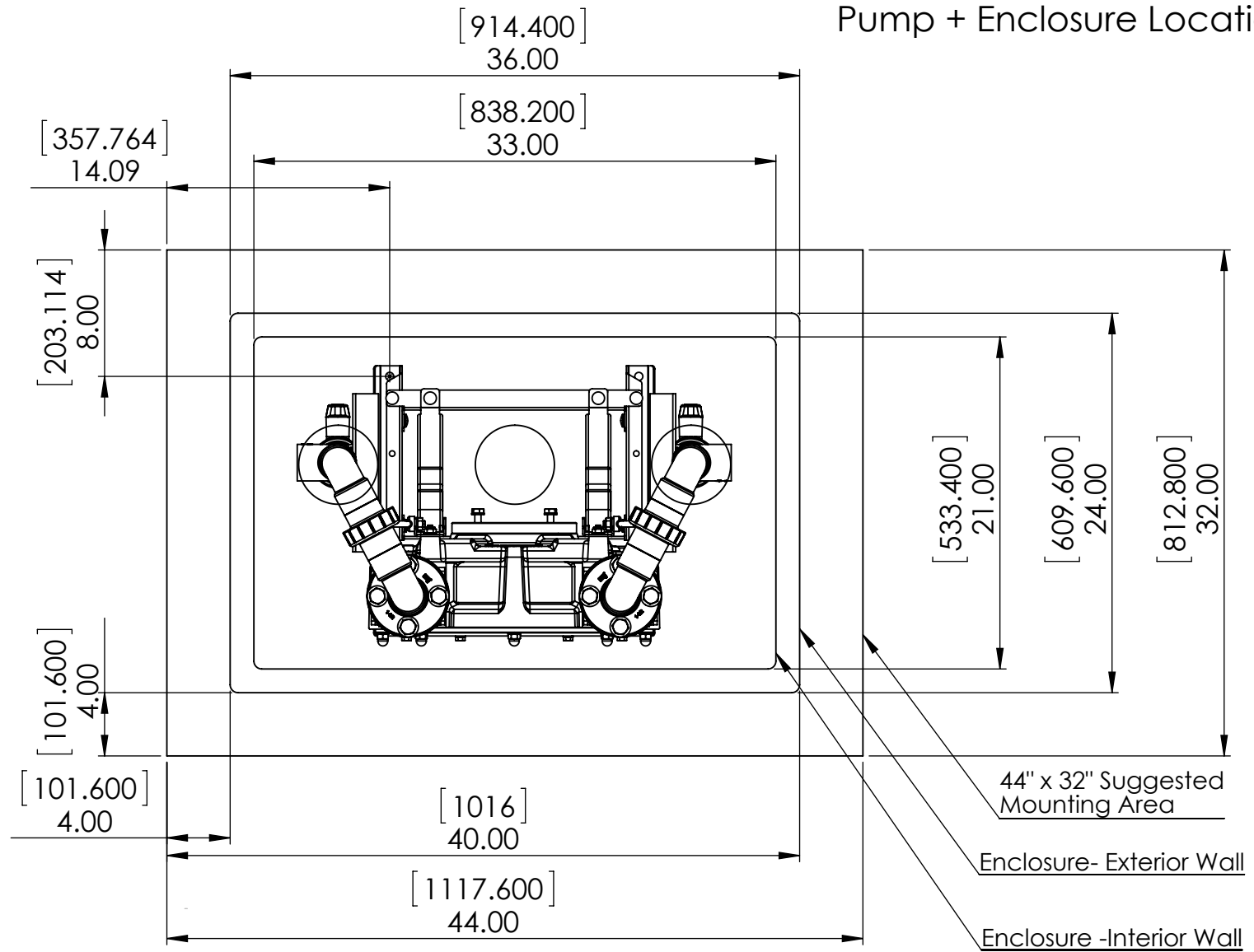
M34 Dockside (Slimline)

DIMENSION: INCHES / (XX) MM

SCALE: 1:10

SHEET 3 OF 5

Pump + Enclosure Locations



NOTES:

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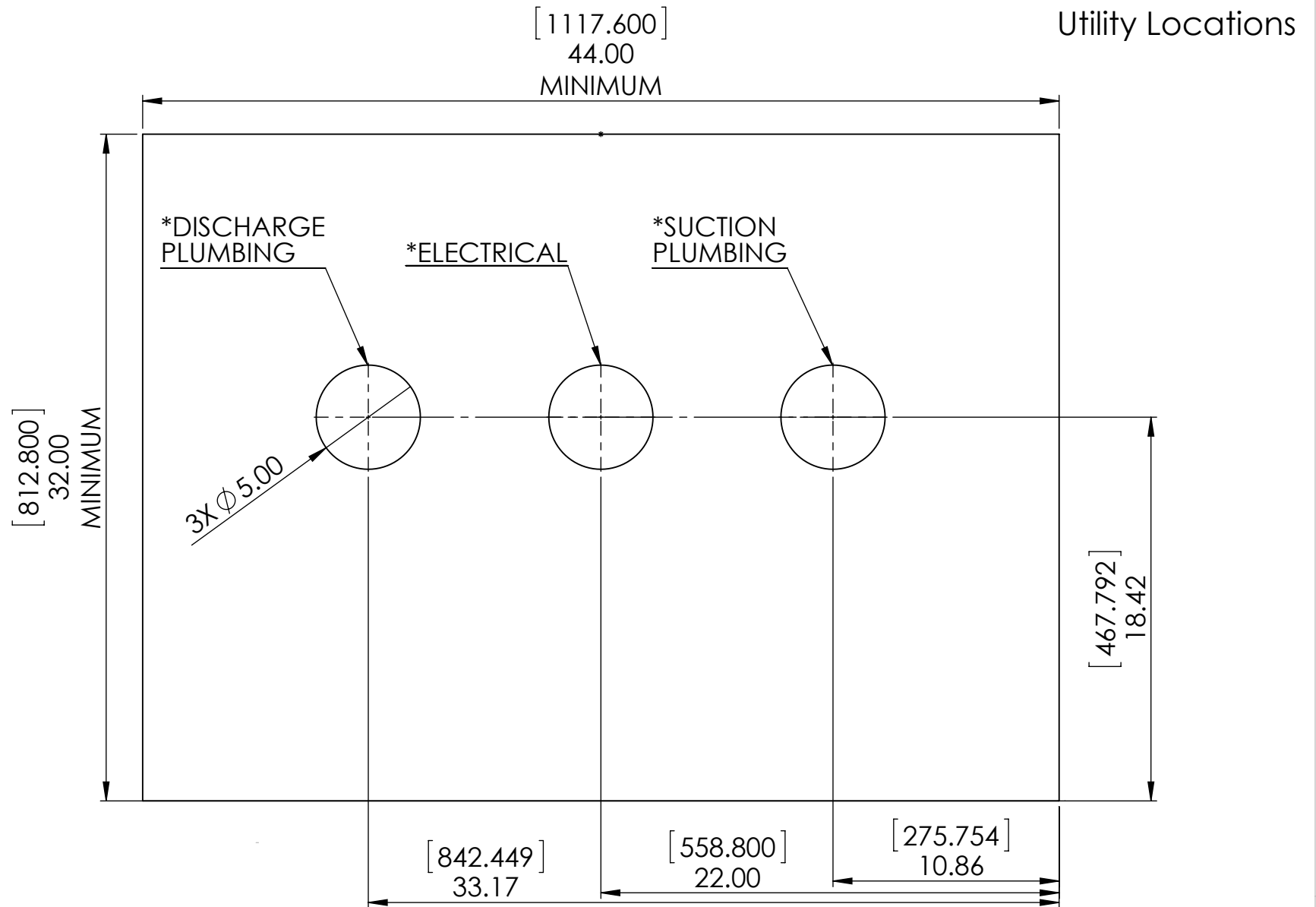
PART NUMBER - TITLE

MOUNTING PLATE SKETCHUP

DIMENSION: INCHES / (XX) MM

SCALE: 1:10

SHEET 4 OF 5



NOTES:

*HOLES SHOWN MUST BE KEPT FREE FROM OBSTRUCTION

*DISCHARGE HOLE OPTIONAL FOR DOCKSIDE (NON-REMOTE) UNITS

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Mounting Plate Specifications

DIMENSION: INCHES / (XX) MM

SCALE: 1:7

SHEET 5 OF 5



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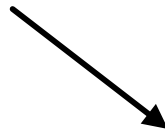
900 Series Peristaltic



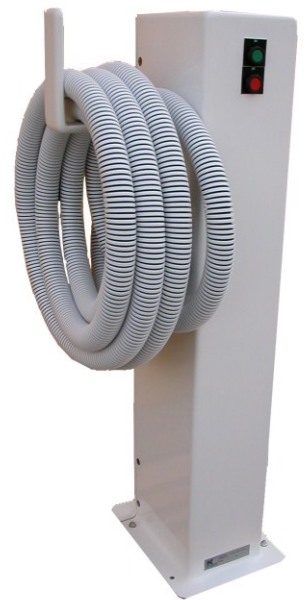
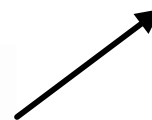
**Model 900 Dockside Enclosure
With Hose Rack**



900 Series Peristaltic



**Model 900 Remote
Fiberglass Enclosure**



**Fiberglass Remote Pumping
Center (RPC)**

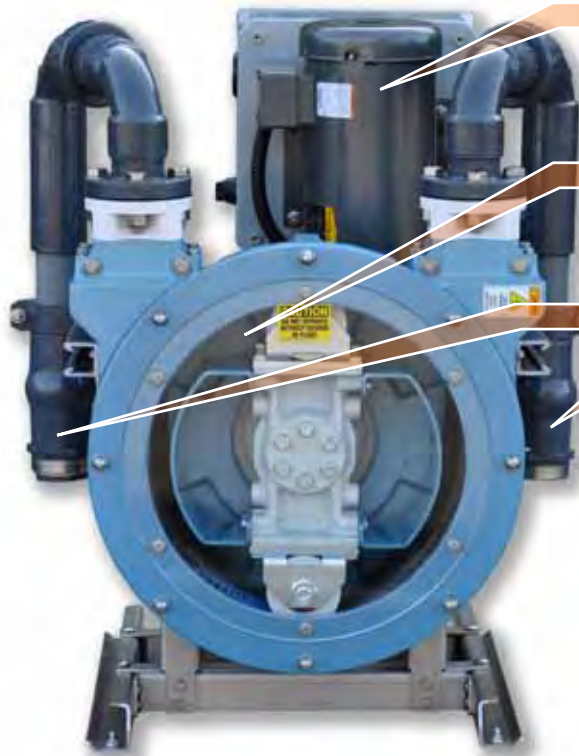




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900 Series / M40 / M55 / Standard Features

Front

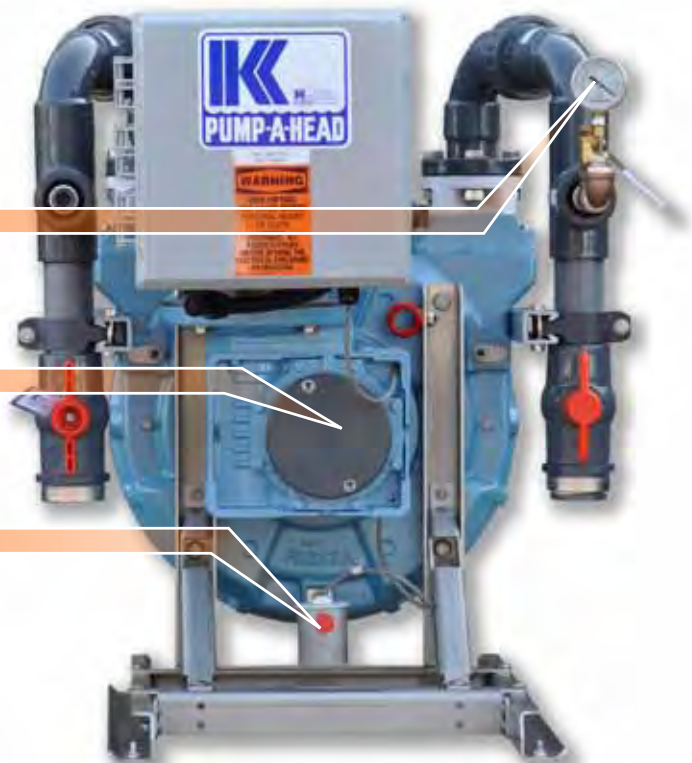


Baldor Industrial
TEFC Electric motor

Clear Viewing Window
Oil Free Pump Housing

Factory Installed Suction &
Discharge Plumbing

Back



Vacuum Gauge

Direct Drive, Maintenance
Free Gearbox

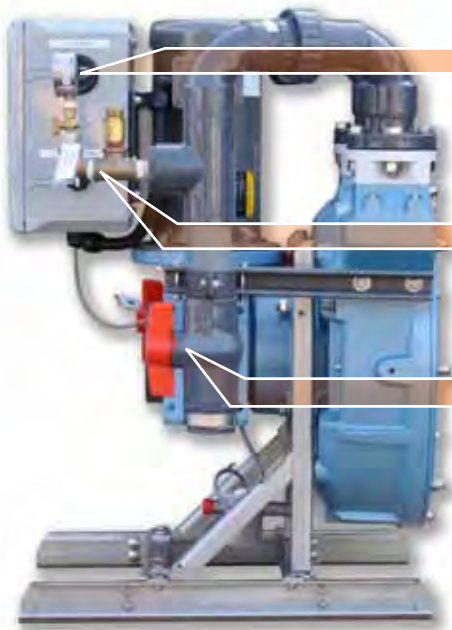
Leak Detector with
Auto Pump Shut Down



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900 Series / M40 / M55 / Standard Features

Left

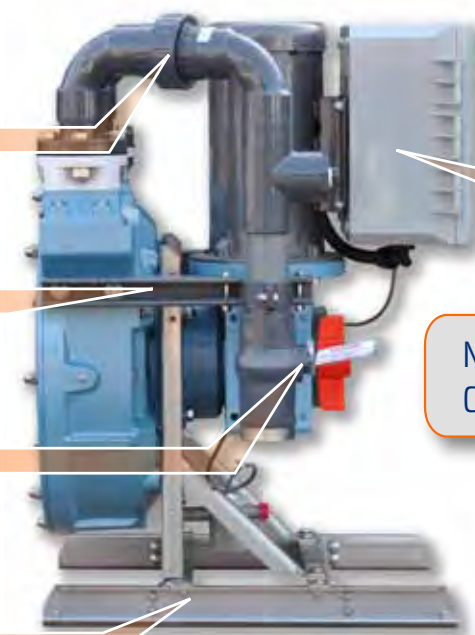


Hour Meter

Integrated Vacuum Relief Valve

Suction Isolation Valve

Right



Factory Installed Plumbing Unions

Non Metallic Pipe Support Strut

Discharge Isolation Valve

+316 Stainless Steel Pump Frame

NEMA 4X Non Metallic Control Panel



900-Series Peristaltic Pump / M40 – 3HP Specifications

Standard Performance:

Volume.....35 GPM / 132 LPM
Dry Suction Lift.....29ft / 8.8 m
Vacuum Rating.....29 Hg / -.9.5 bar
Discharge Head.....103 ft / 31 m
Discharge Pressure.....45 Psi / 3.0 bar

Maximum Performance:

Volume.....45 GPM / 170 LPM
Dry Suction Lift29 ft / 8.8 m
Vacuum Rating.....29 Hg / -.9.5 bar
Discharge Head550 ft / 161 m
Discharge Pressure.....240 Psi / 16 bar

Standard Features:

3-HP TEFC Baldor Electric Motor
316 – Stainless Steel Pump Frame
Aluminum Pump Housing (Epoxy Coated)
Clear Acrylic Viewing Window
Oil Free Pump Housing
Factory Installed Suction & Discharge Plumbing
Direct Drive, Maintenance Free Gearbox
Leak Detection with Auto Pump Shutdown
Integrated Vacuum Relief Valve
NEMA 4X Non Metallic Control Panel
Textile Reinforced Internal Hose Element
Integrated Solid State Adjustable Run-Timer
NEMA 4X Hour Meter

Optional Features:

UL Listed NEMA 4X Control Panel
Variable Speed Pump Controller
Explosion Proof Leak Detector
Explosion Proof Electric Motor
Main Power Disconnect Switch
Fiberglass, Stainless or Aluminum Pump Enclosure
MarineSync Remote Monitoring
Extended Warranty

Dimensions:

Pump – 25"x32"x40" @ 285lbs
Fiberglass Enclosure – 40"x40"x45" @ 35lbs

Applications:

- Marine / Recreational PumpOuts
- Bilge PumpOuts
- Forward Lift Stations

Design Consideration:

- Pump body shall be constructed of cast aluminum.
- Pump frame shall be constructed of 316 stainless steel.
- Pump body shall NOT be filled with a lubricant bath.
- Pump shall be equipped with a direct drive gearbox (Belts, pulleys or couplers shall NOT be accepted)
- Pump shall be equipped with a natural rubber or nitrile internal hose with an inside diameter of 40mm.
- Pump shall be equipped with two hi-efficiency rollers that gradually compress the elastomeric peristaltic hose.
- Pump rollers shall feature permanently sealed stainless steel bearings with double lipped oil seals.
- Pump rotor shall be supported by double-shaft bearings protected by double lipped oil seals.
- Pump rotor shall provide storage capability for roller for long-term storage and/or winterization.
- Peristaltic hose and rollers shall be visible through a 17.5" clear acrylic site window.
- Pump shall be equipped with suction & discharge plumbing manifolds with unions for quick disconnect.
- Pump shall include a vacuum gauge and ball valve on the suction manifold for isolating and testing.
- Leak detection shall instantly disable motor if the peristaltic hose ruptures.
- Pump shall come equipped with an electronic hour meter, displaying hours and decimal hours.





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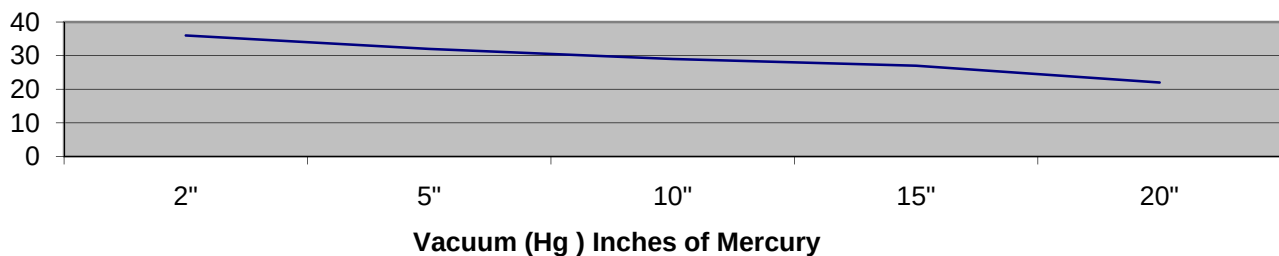
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900-Series Peristaltic Pump / M40 – 3HP Specifications

Suction: Performance curve above indicates flow rates are impacted by more by suction lift than discharge head. The pump curve indicates the 900 series peristaltic (40mm) pump will pump between 35-gpm and 29-gpm at 2-ft. and 10-ft. suction lift respectively. This does not take into friction loss in suction piping or fittings. Additionally, pockets of air are common in suction and discharge piping which will dramatically affect volumes and velocities of fluids being pumped. Always consult factory with pump application / sizing inquiries.

Discharge: The peristaltic pump is a positive displacement pump, with pulses of 2.20 times greater than average flow, or approximately 66 GPM if actual flow is 30 GPM. When calculating discharge pressure requirement, assume the higher flow rate (actual x 2.2) when determining discharge dynamic head.

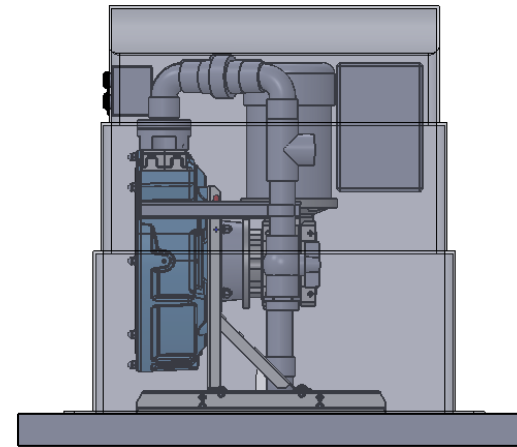
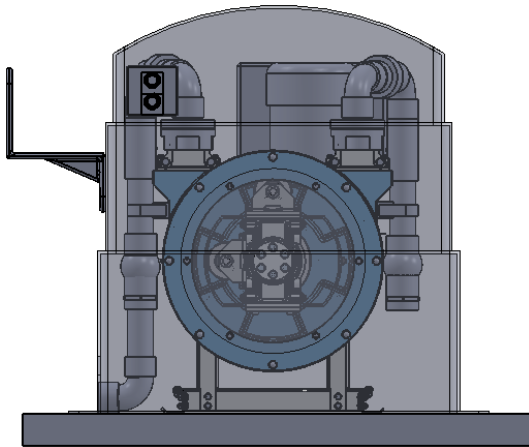
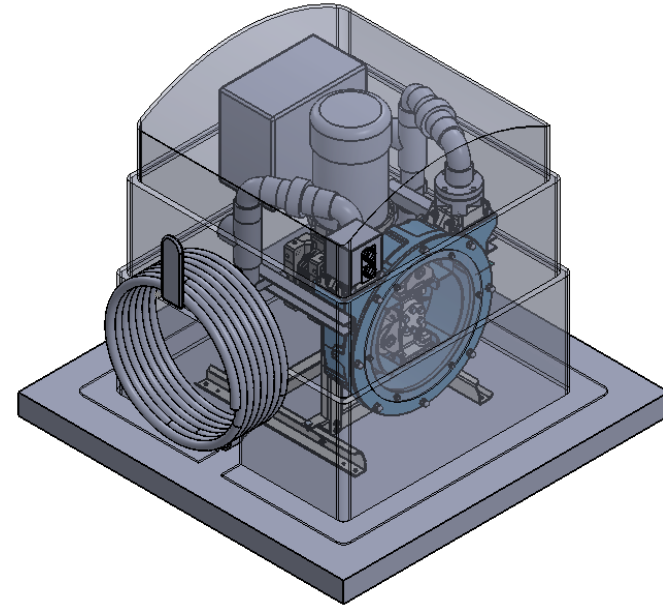
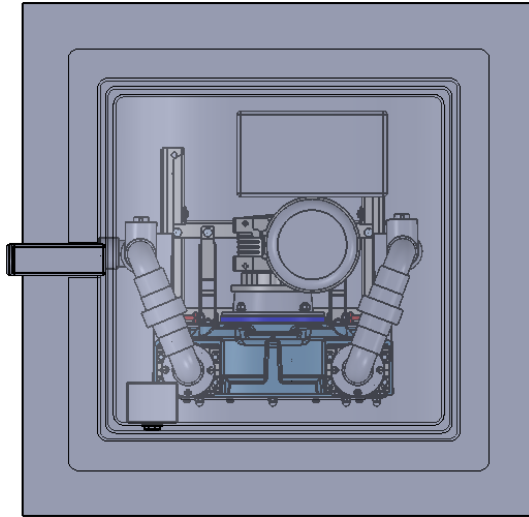
**Performance Curve @ 10 P.S.I Discharge Pressure
900 Series (3HP x 40 mm) Fixed Speed 87.5 RPM**



Suction Capabilities	Model 900R (40 mm) 3 HP	Discharge Capabilities	Model 900R (40 mm) 3 HP
	29 HG - 45 PSI		45 PSI - 35 GPM
Lift	Horizontal Distance 2" (LF)	Head	Horizontal Distance 3" (LF)
23'	50'	280'	*
21'	125'	200'	*
19'	200'	180'	*
16'	275'	160'	*
13'	350'	140'	*
11'	425'	120'	*
9'	500'	100'	200'
7'	575'	90'	800'
5'	650'	80'	1700'
3'	725'	70'	2300'
0'	800'	60'	2900'
		50'	3500'
		40'	4000'
		30'	4600'
		20'	5200'
		10'	5800'
		0'	6500'

Chart Reflects Approximate 2" Suction x 3" Discharge Maximum Pipe Distances. Elbows, Fittings & Valves Have Not Been Taken Into Consideration.





NOTES: PER900D_M40D_3HP

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THREE PLACE DECIMAL $\pm .020$
ANGULAR $\pm .5^\circ$
MATERIAL

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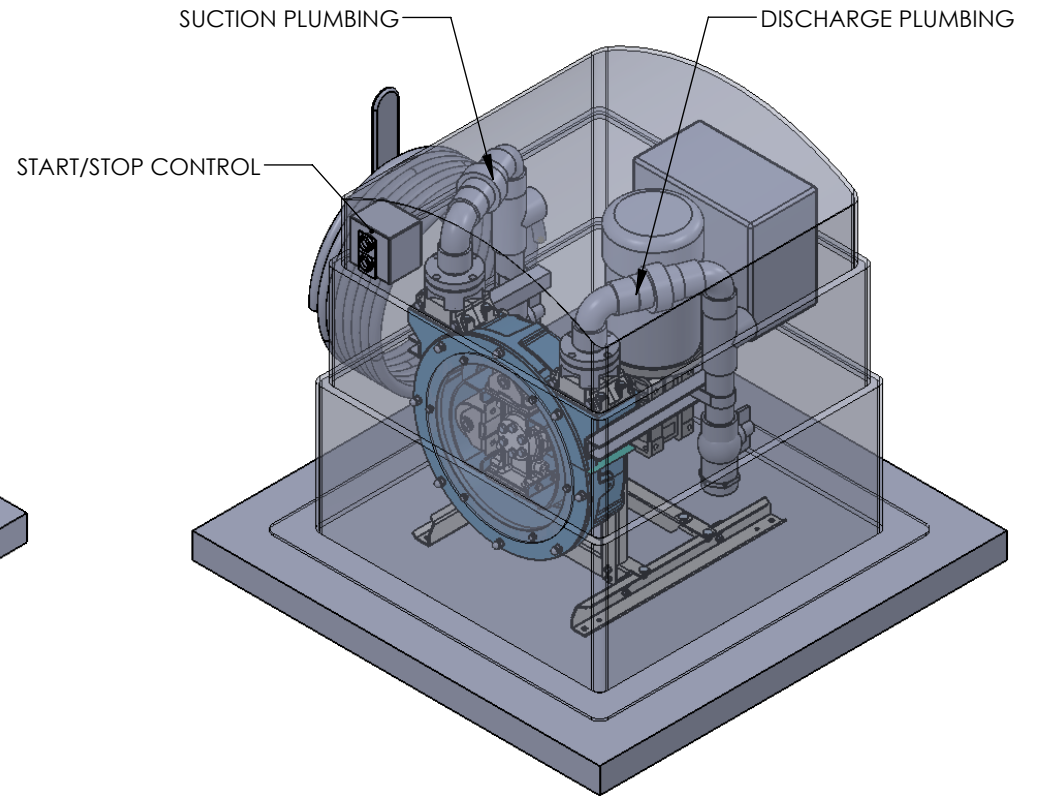
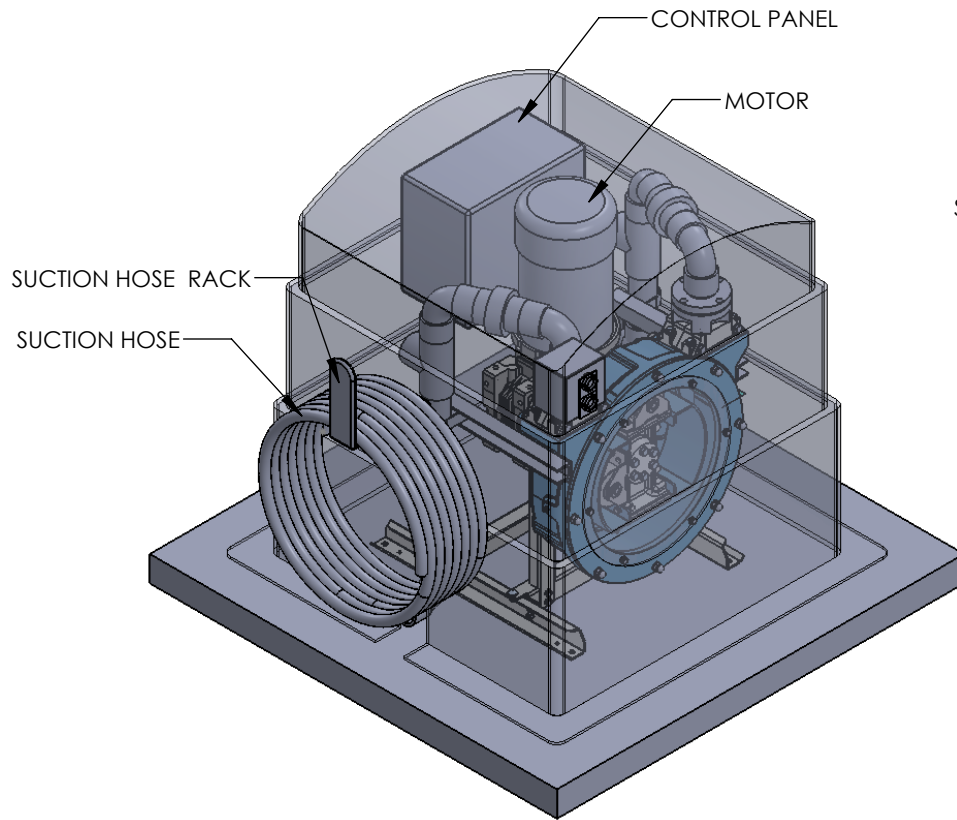
TITLE:

PART NO.

REV

SCALE: 1:18 WEIGHT:

SHEET 1 OF 6



NOTES: PER900D_M40D_3HP

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MATERIAL

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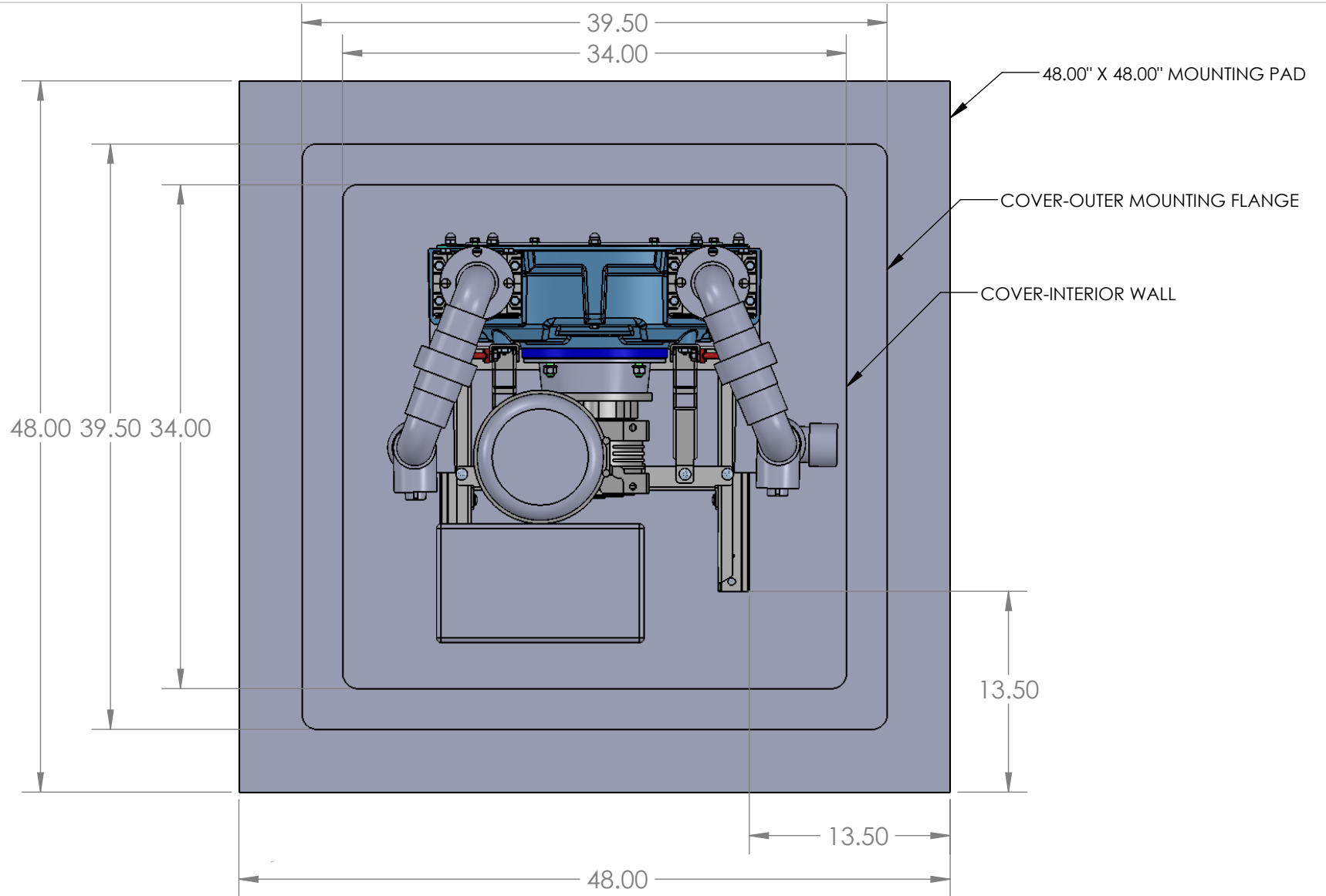
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REV

SCALE: 1:16 WEIGHT:

SHEET 2 OF 6



NOTES: PER900D_M40D_3HP

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ANGULAR $\pm .5^\circ$

MATERIAL

DRAWN

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COMMENTS:



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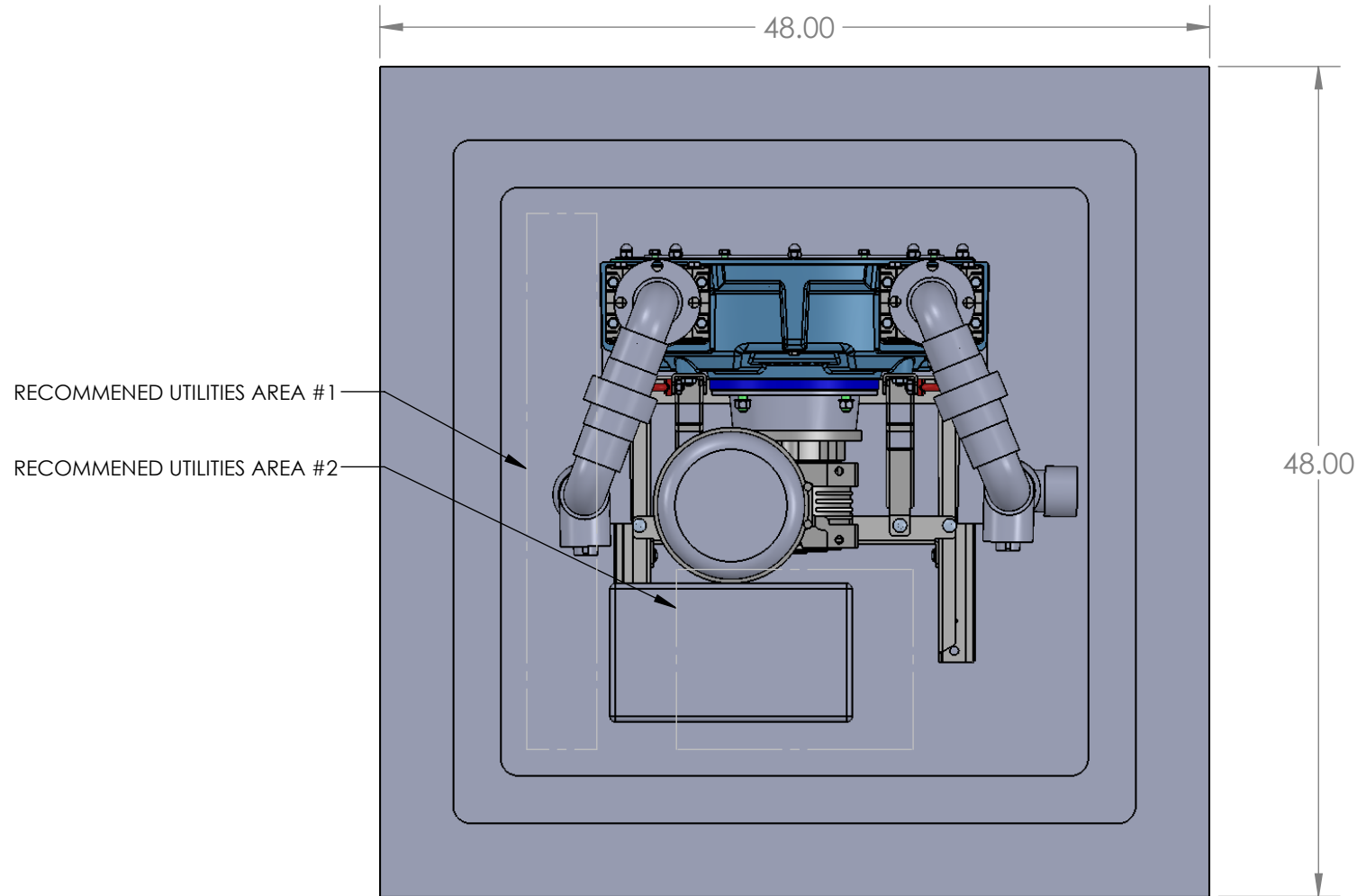
TITLE:

PART NO.

REV

SCALE: 1:10 WEIGHT:

SHEET 3 OF 6



TYPICAL DOCK MOUNT

NOTES: PER900D_M40D_3HP

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TWO PLACE DECIMAL $\pm .03$
THREE PLACE DECIMAL $\pm .020$
ANGULAR $\pm .5^\circ$

MATERIAL

DRAWN

CHECKED

COMMENTS:



KECO PUMP AND EQUIPMENT

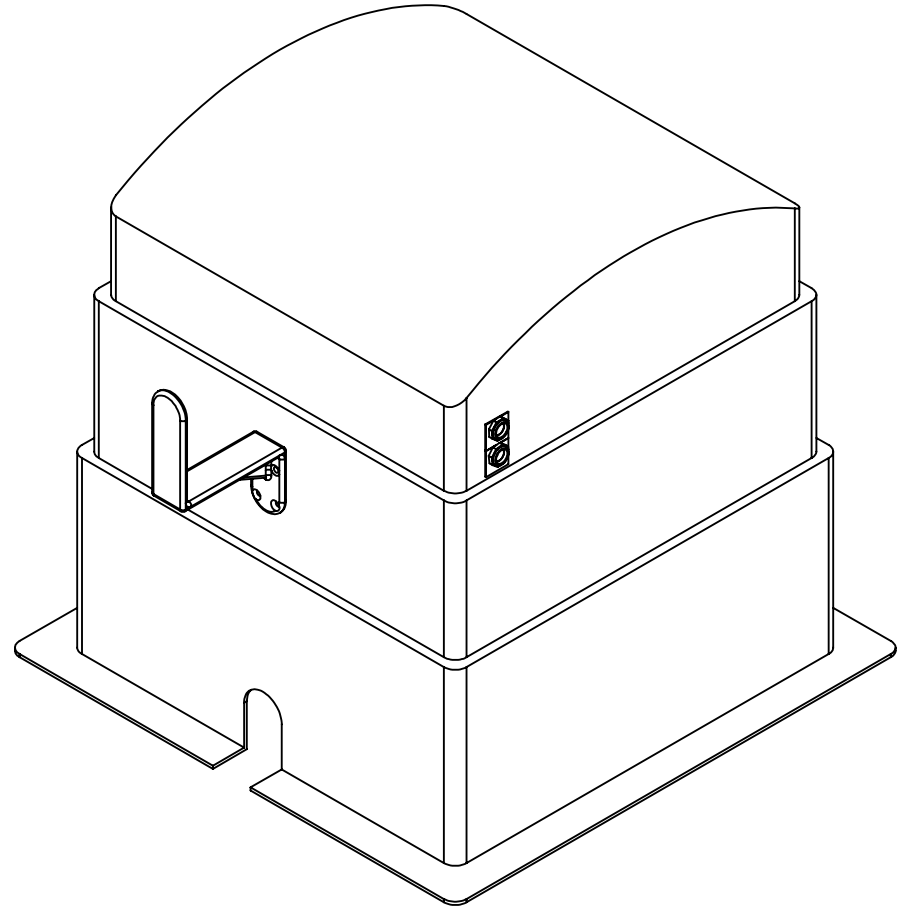
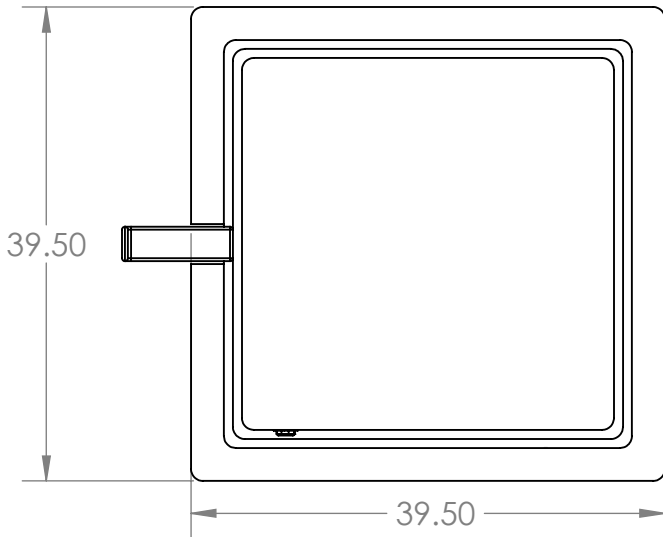
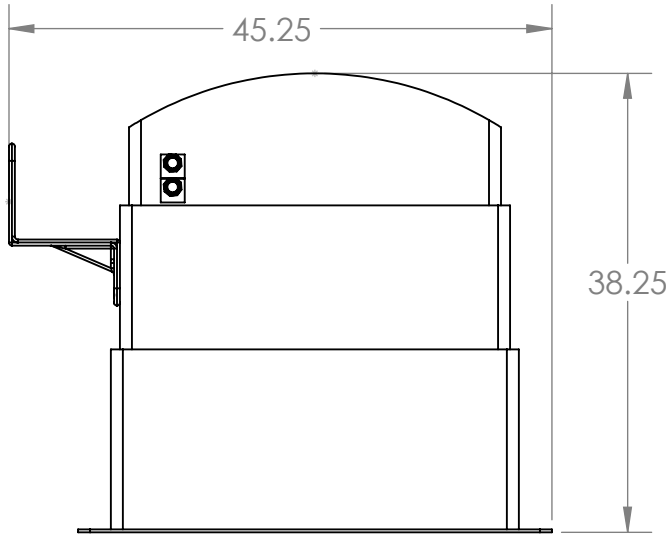
TITLE:

PART NO.

REV

SCALE: 1:10 WEIGHT:

SHEET 4 OF 6



NOTES:

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TWO PLACE DECIMAL $\pm .03$
THREE PLACE DECIMAL $\pm .020$
ANGULAR $\pm .5^\circ$

MATERIAL

DRAWN
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Q.A.

COMMENTS:

LIFTING HANDLES AND VENT NOT SHOWN.
HOUR METER INSPECTION PART NOT SHOWN.



KECO PUMP AND EQUIPMENT

TITLE: DOCKSIDE ENCLOSURE - STANDARD

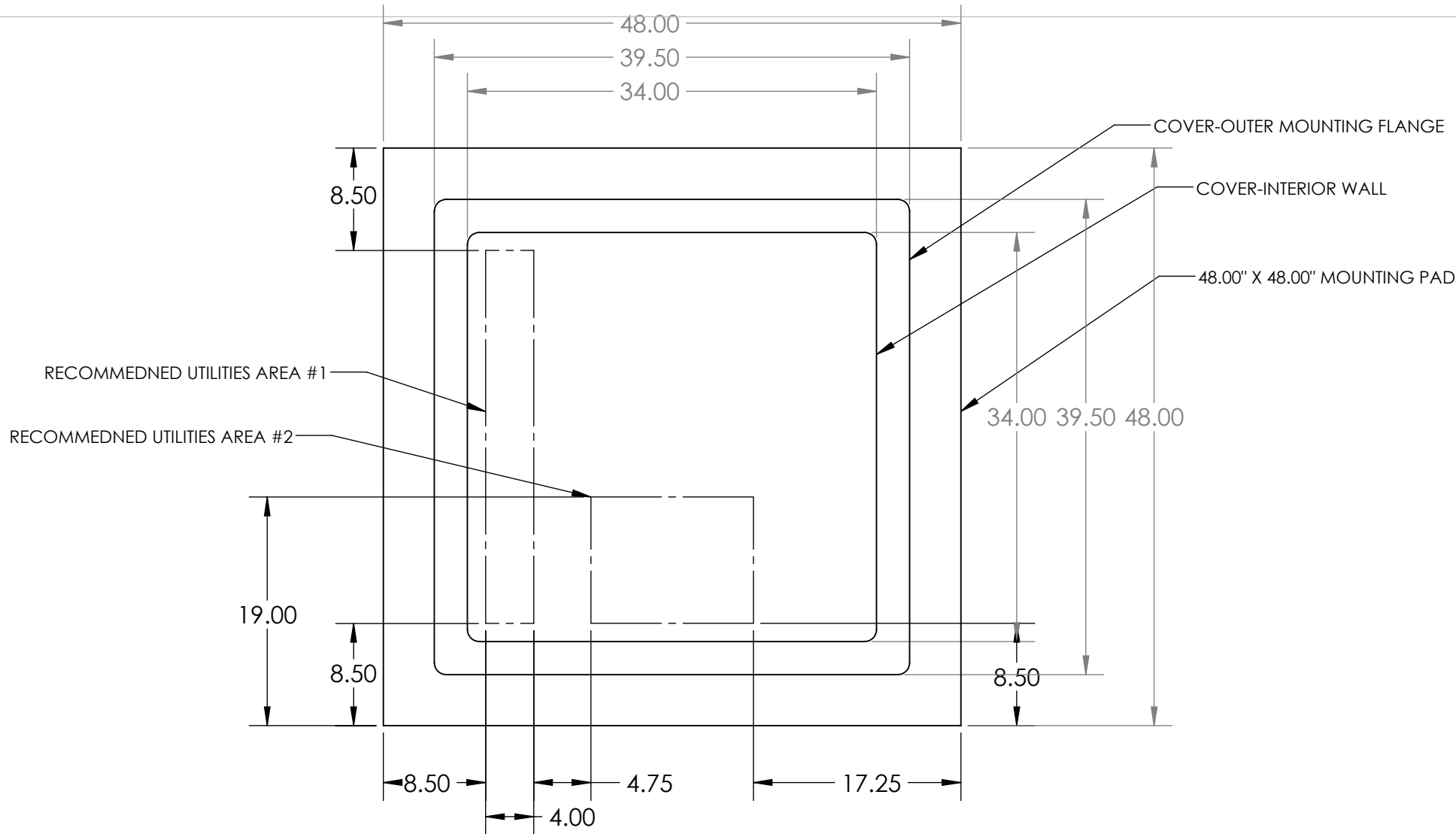
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PART NO.
F0955.SML

REV

SCALE: 1:24 WEIGHT:

SHEET 1 OF 1



NOTES: PER900D_M40D_3HP

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THREE PLACE DECIMAL $\pm .020$
ANGULAR $\pm .5^\circ$

MATERIAL

DRAWN

CHECKED

COMMENTS:



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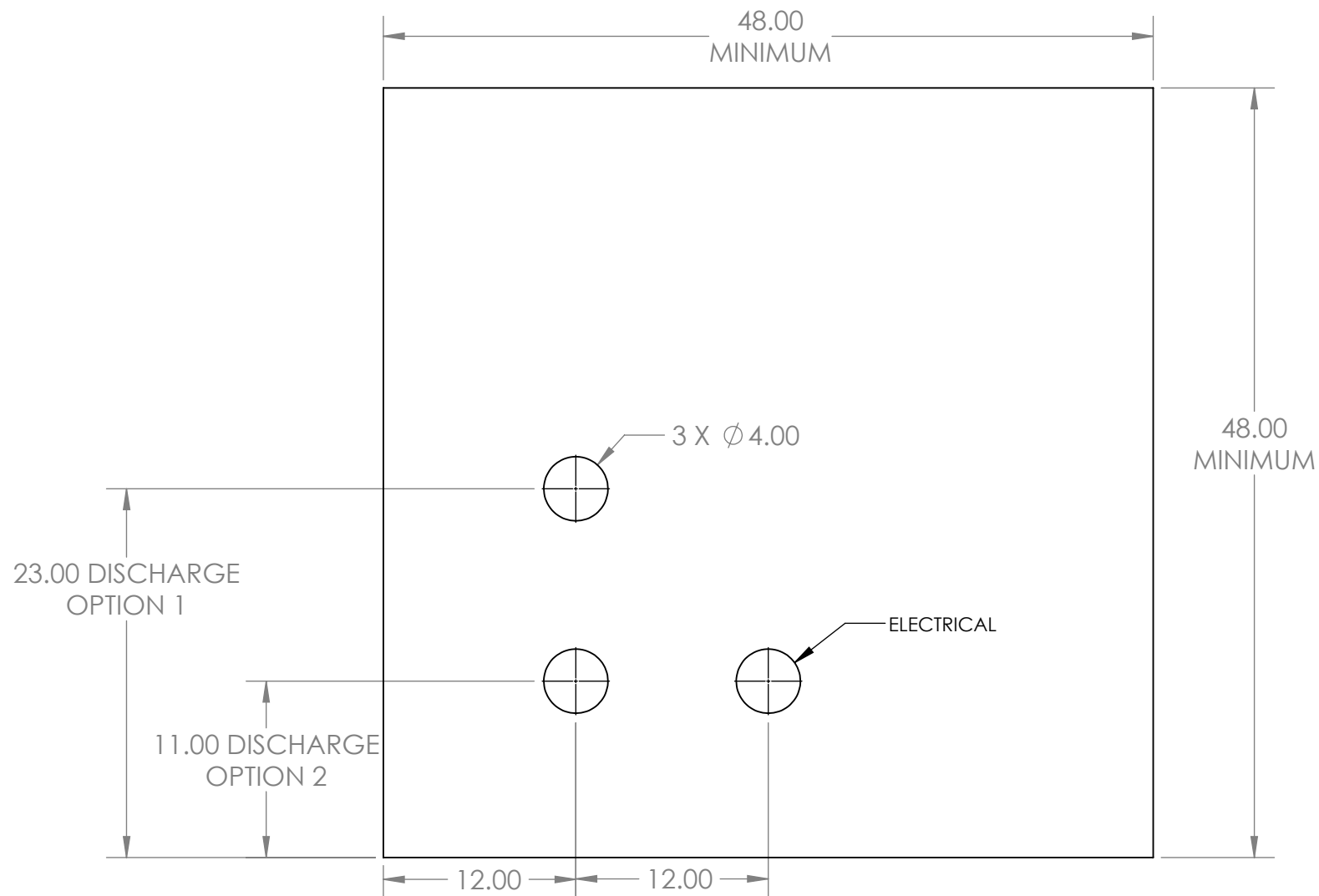
TITLE:

PART NO.

REV

SCALE: 1:12 WEIGHT:

SHEET 5 OF 6



CONCRETE PAD TEMPLATE

NOTES: PER900D_M40D_3HP

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ANGULAR $\pm .5^\circ$

MATERIAL

DRAWN

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COMMENTS:



KECO PUMP AND EQUIPMENT

TITLE:

PART NO.

REV

SCALE: 1:10 WEIGHT:

SHEET 6 OF 6



KECO PUMP-A-HEAD





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Pump it, Don't Dump it!™



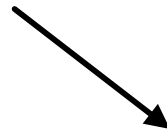
900 Series Peristaltic



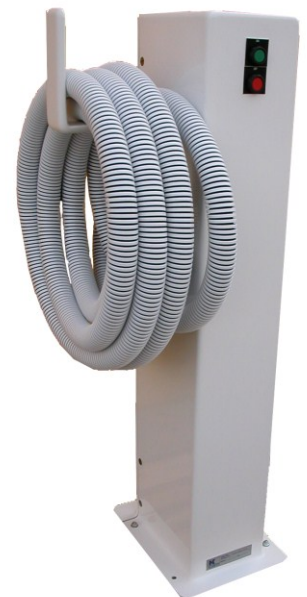
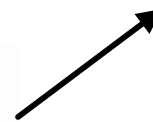
**Model 900 Dockside Enclosure
With Hose Rack**



900 Series Peristaltic



**Model 900 Remote
Fiberglass Enclosure**



**Fiberglass Remote Pumping
Center (RPC)**





Call Toll Free **800.900.PUMP**
ph. 619.298.3800 | fax: 619.298.3300

900 Series / M40 / M55 / Standard Features

Front

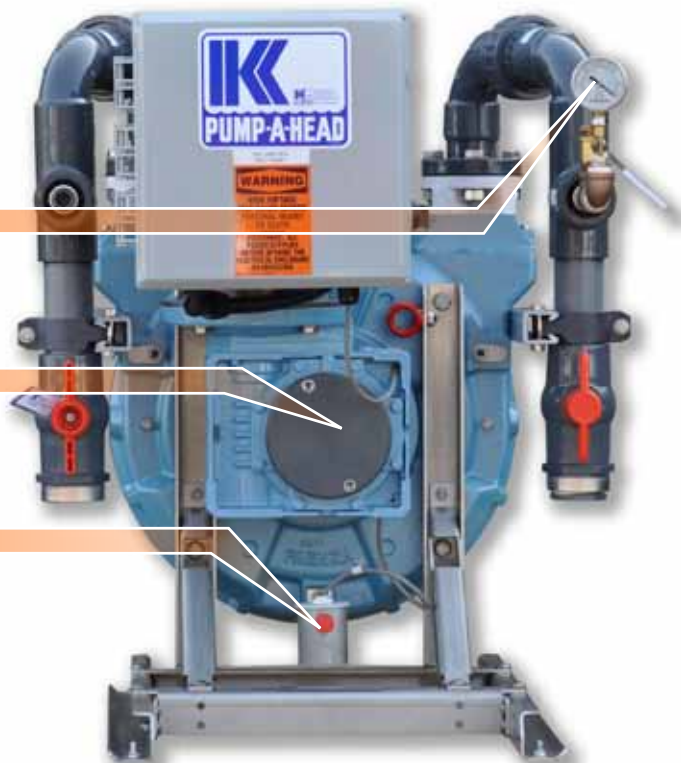


Baldor Industrial
TEFC Electric motor

Clear Viewing Window
Oil Free Pump Housing

Factory Installed Suction &
Discharge Plumbing

Back



Vacuum Gauge

Direct Drive, Maintenance
Free Gearbox

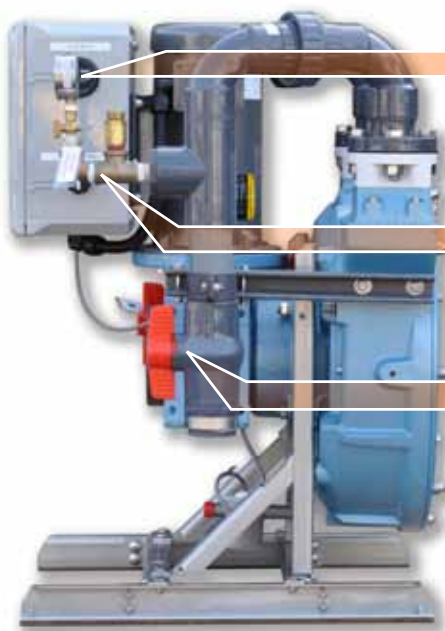
Leak Detector with
Auto Pump Shut Down



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900 Series / M40 / M55 / Standard Features

Left

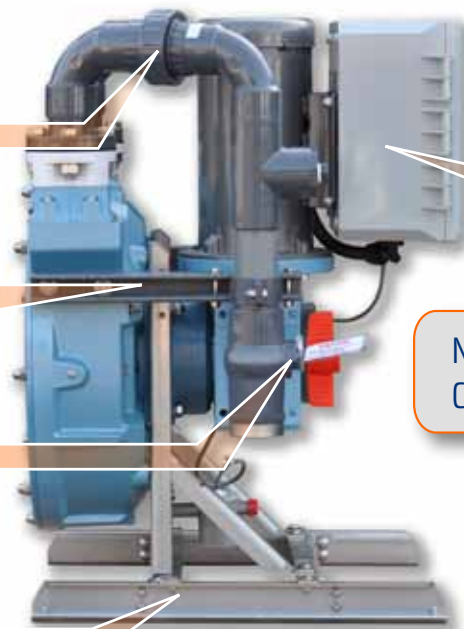


Hour Meter

Integrated Vacuum Relief Valve

Suction Isolation Valve

Right



Factory Installed Plumbing Unions

Non Metallic Pipe Support Strut

Discharge Isolation Valve

+316 Stainless Steel Pump Frame

NEMA 4X Non Metallic Control Panel



900-Series Peristaltic Pump / M55 – 5HP Specifications

Standard Performance:

Volume.....55 GPM / 208 LPM
Dry Suction Lift.....29ft / 8.8 m
Vacuum Rating.....29 Hg / -.9.5 bar
Discharge Head.....103 ft / 31 m
Discharge Pressure.....45 Psi / 3.0 bar

Maximum Performance:

Volume.....80 GPM / 302 LPM
Dry Suction Lift29 ft / 8.8 m
Vacuum Rating.....29 Hg / -.9.5 bar
Discharge Head550 ft / 161 m
Discharge Pressure.....240 Psi / 16 bar

Standard Features:

5-HP TEFC Baldor Electric Motor
316 – Stainless Steel Pump Frame
Aluminum Pump Housing (Epoxy Coated)
Clear Acrylic Viewing Window
Oil Free Pump Housing
Factory Installed Suction & Discharge Plumbing
Direct Drive, Maintenance Free Gearbox
Leak Detection with Auto Pump Shutdown
Integrated Vacuum Relief Valve
NEMA 4X Non Metallic Control Panel
Textile Reinforced Internal Hose Element
Integrated Solid State Adjustable Run-Timer
NEMA 4X Hour Meter

Optional Features:

UL Listed NEMA 4X Control Panel
Variable Speed Pump Controller
Explosion Proof Leak Detector
Explosion Proof Electric Motor
Main Power Disconnect Switch
Fiberglass, Stainless or Aluminum Pump Enclosure
MarineSync Remote Monitoring
Extended Warranty

Dimensions:

Pump – 32"x27"x40" @ 385lbs
Fiberglass Enclosure – 40"x40"x45" @ 35lbs

Applications:

- Marine / Recreational PumpOuts
- Bilge PumpOuts
- Forward Lift Stations

Design Consideration:

- Pump body shall be constructed of cast aluminum.
- Pump frame shall be constructed of 316 stainless steel.
- Pump body shall NOT be filled with a lubricant bath.
- Pump shall be equipped with a direct drive gearbox (Belts, pulleys or couplers shall NOT be accepted)
- Pump shall be equipped with a natural rubber or nitrile internal hose with an inside diameter of 55mm.
- Pump shall be equipped with two hi-efficiency rollers that gradually compress the elastomeric peristaltic hose.
- Pump rollers shall feature permanently sealed stainless steel bearings with double lipped oil seals.
- Pump rotor shall be supported by double-shaft bearings protected by double lipped oil seals.
- Pump rotor shall provide storage capability for roller for long-term storage and/or winterization.
- Peristaltic hose and rollers shall be visible through a 22" clear acrylic site window.
- Pump shall be equipped with suction & discharge plumbing manifolds with unions for quick disconnect.
- Pump shall include a vacuum gauge and ball valve on the suction manifold for isolating and testing.
- Leak detection shall instantly disable motor if the peristaltic hose ruptures.
- Pump shall come equipped with an electronic hour meter, displaying hours and decimal hours.





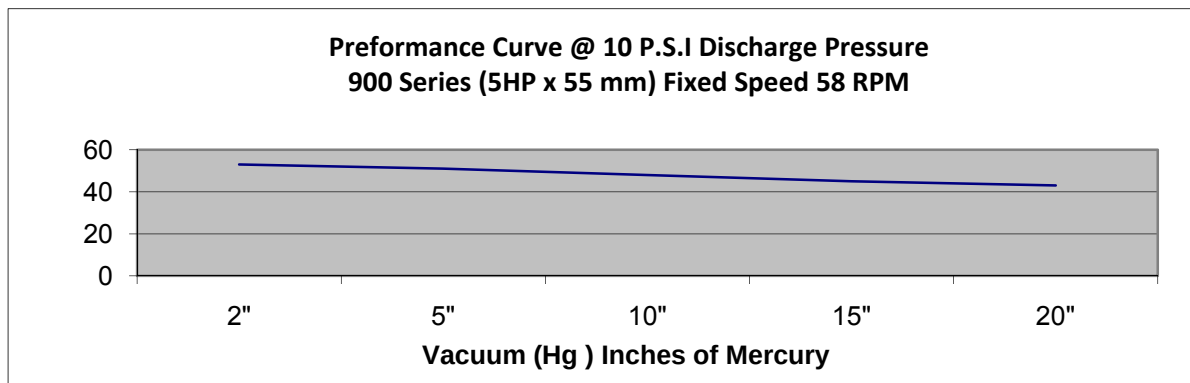
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Pump it, Don't Dump it!™

900-Series Peristaltic Pump / M55 – 5HP Specifications

Suction: Performance curve above indicates flow rates are impacted by more by suction lift than discharge head. The pump curve indicates the 900 series peristaltic (55mm) pump will pump between 55-gpm and 48-gpm at 2-ft. and 10-ft. suction lift respectively. This does not take into friction loss in suction piping or fittings. Additionally, pockets of air are common in suction and discharge piping which will dramatically affect volumes and velocities of fluids being pumped. Always consult factory with pump application / sizing inquiries.

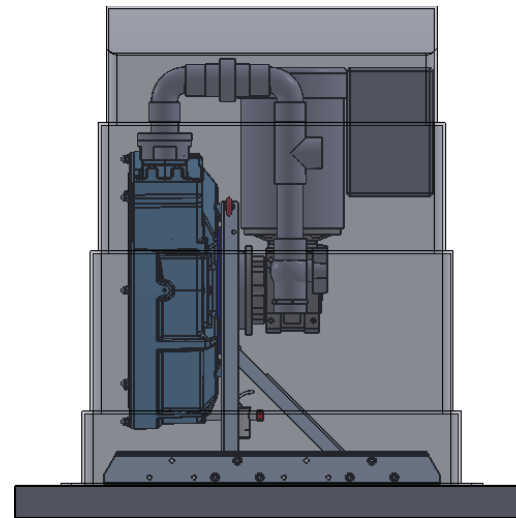
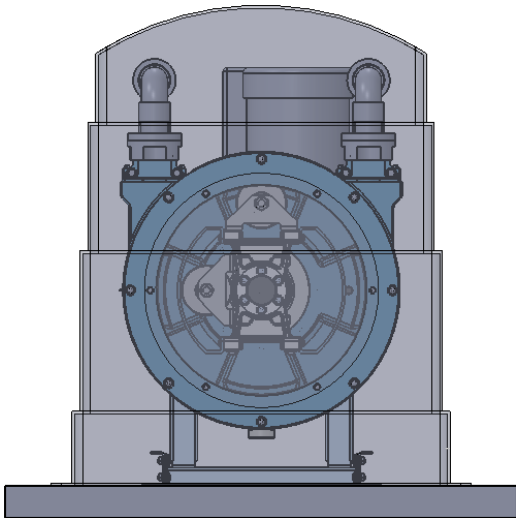
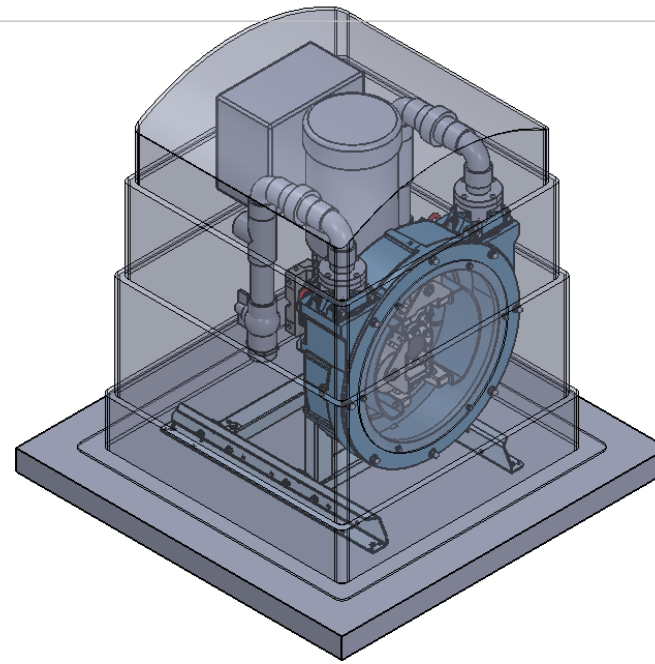
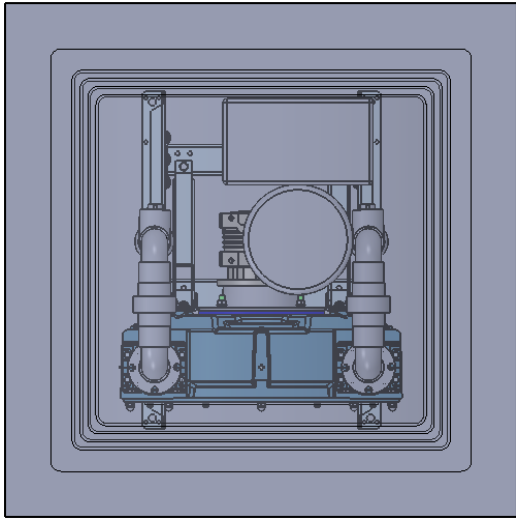
Discharge: The peristaltic pump is a positive displacement pump, with pulses of 2.20 times greater than average flow, or approximately 110 GPM if actual flow is 50 GPM. When calculating discharge pressure requirement, assume the higher flow rate (actual x 2.2) when determining discharge dynamic head.



Suction Capabilities	Model 900R (55 mm) 5 HP	Discharge Capabilities	Model 900R (55 mm) 5 HP
	29 HG - 45 PSI		45 PSI - 55 GPM
Lift	Horizontal Distance 2" (LF)	Head	Horizontal Distance 3" (LF)
23'	100'	280'	*
21'	250'	200'	*
19'	325'	180'	*
16'	450'	160'	*
13'	525'	140'	*
11'	675'	120'	*
9'	725'	100'	50'
7'	850'	90'	150'
5'	975'	80'	300'
3'	1125'	70'	500'
0'	1500'	60'	750'
		50'	950'
		40'	1150'
		30'	1350'
		20'	1600'
		10'	1800'
		0'	2000'

Chart Reflects Approximate 2" Suction x 3" Discharge Maximum Pipe Distances. Elbows, Fittings & Valves Have Not Been Taken Into Consideration.





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ANGULAR $\pm .5^\circ$
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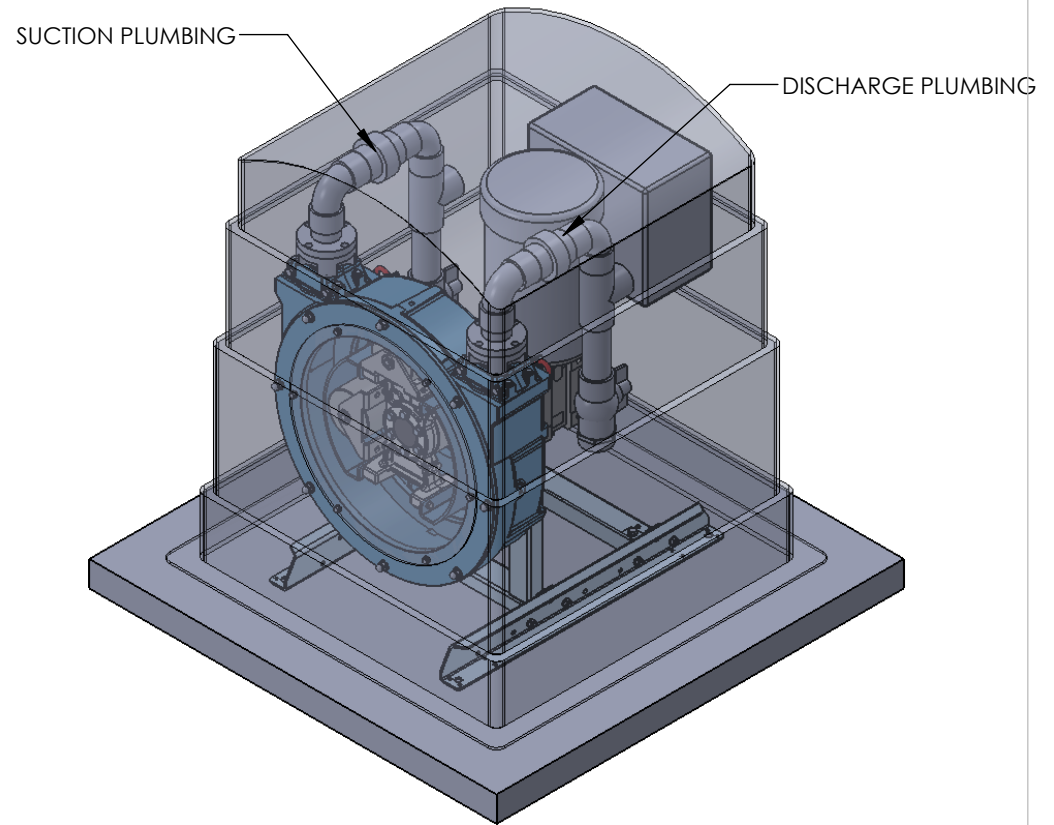
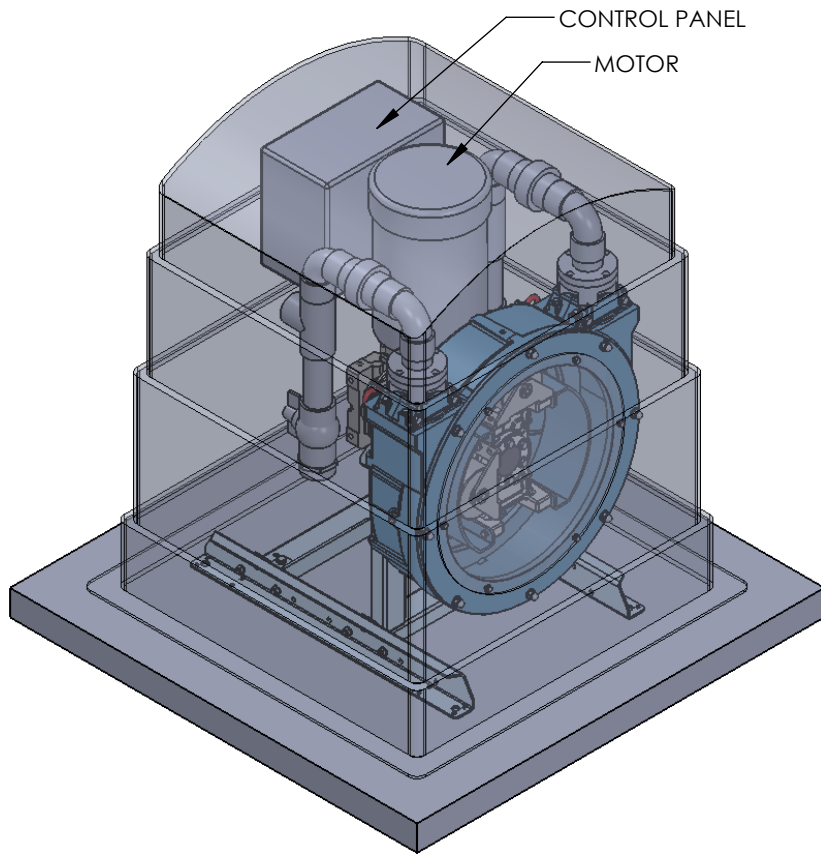
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PART NO.

REV

SCALE: 1:18 WEIGHT:

SHEET 1 OF 5



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MATERIAL

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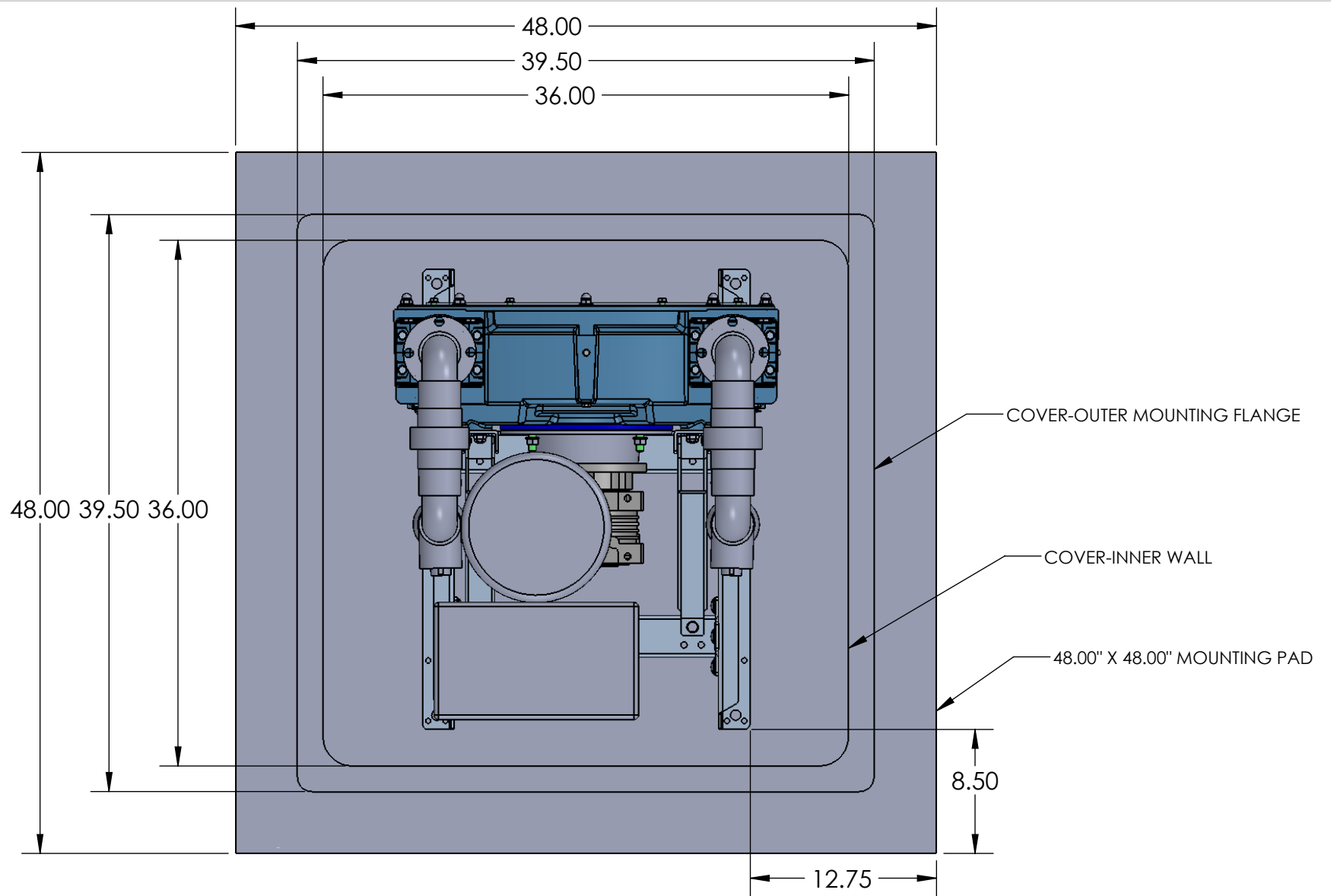
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SCALE: 1:16 WEIGHT:

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MATERIAL

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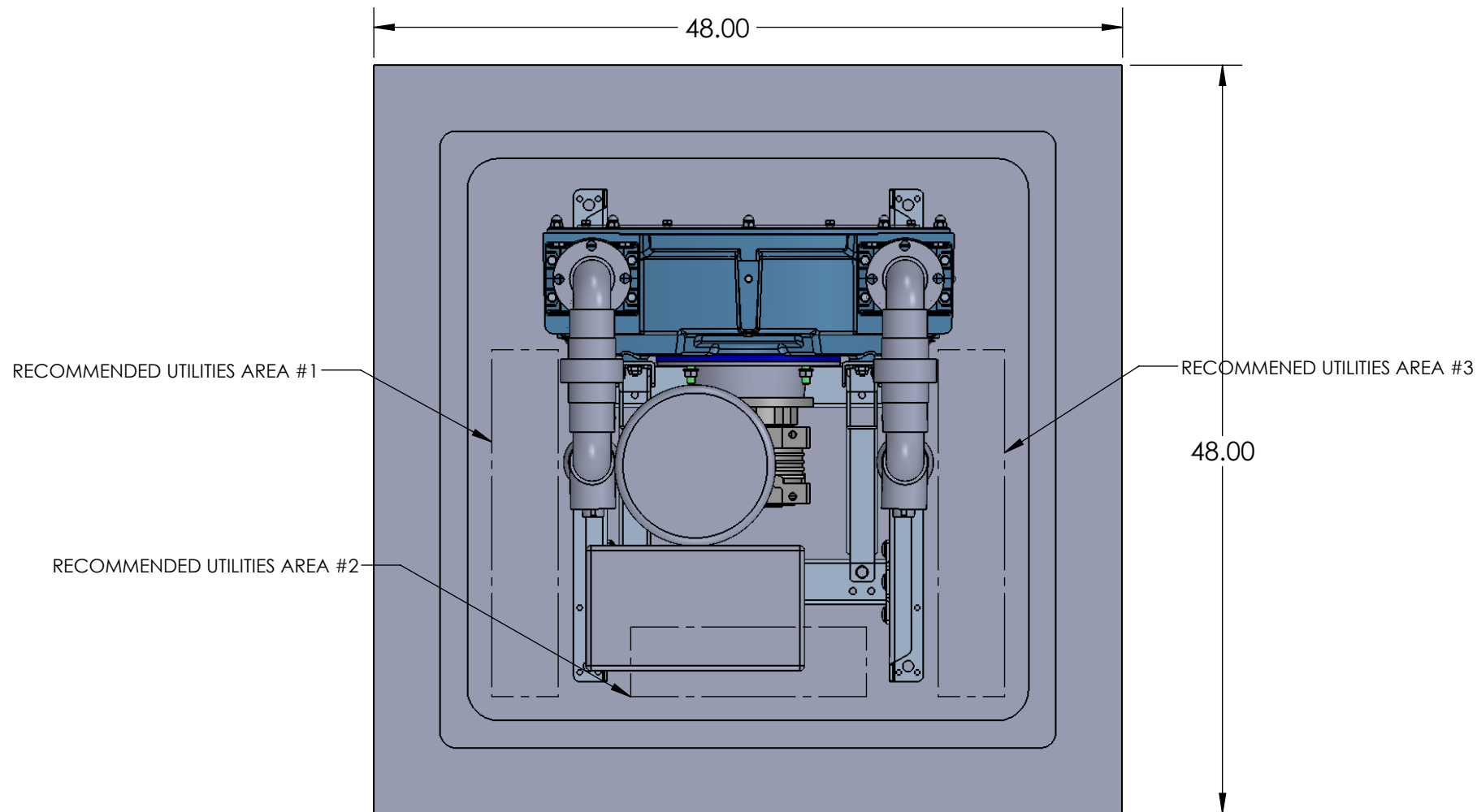
TITLE:

PART NO.

REV

SCALE: 1:10 WEIGHT:

SHEET 3 OF 5



TYPICAL DOCK MOUNT

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MATERIAL

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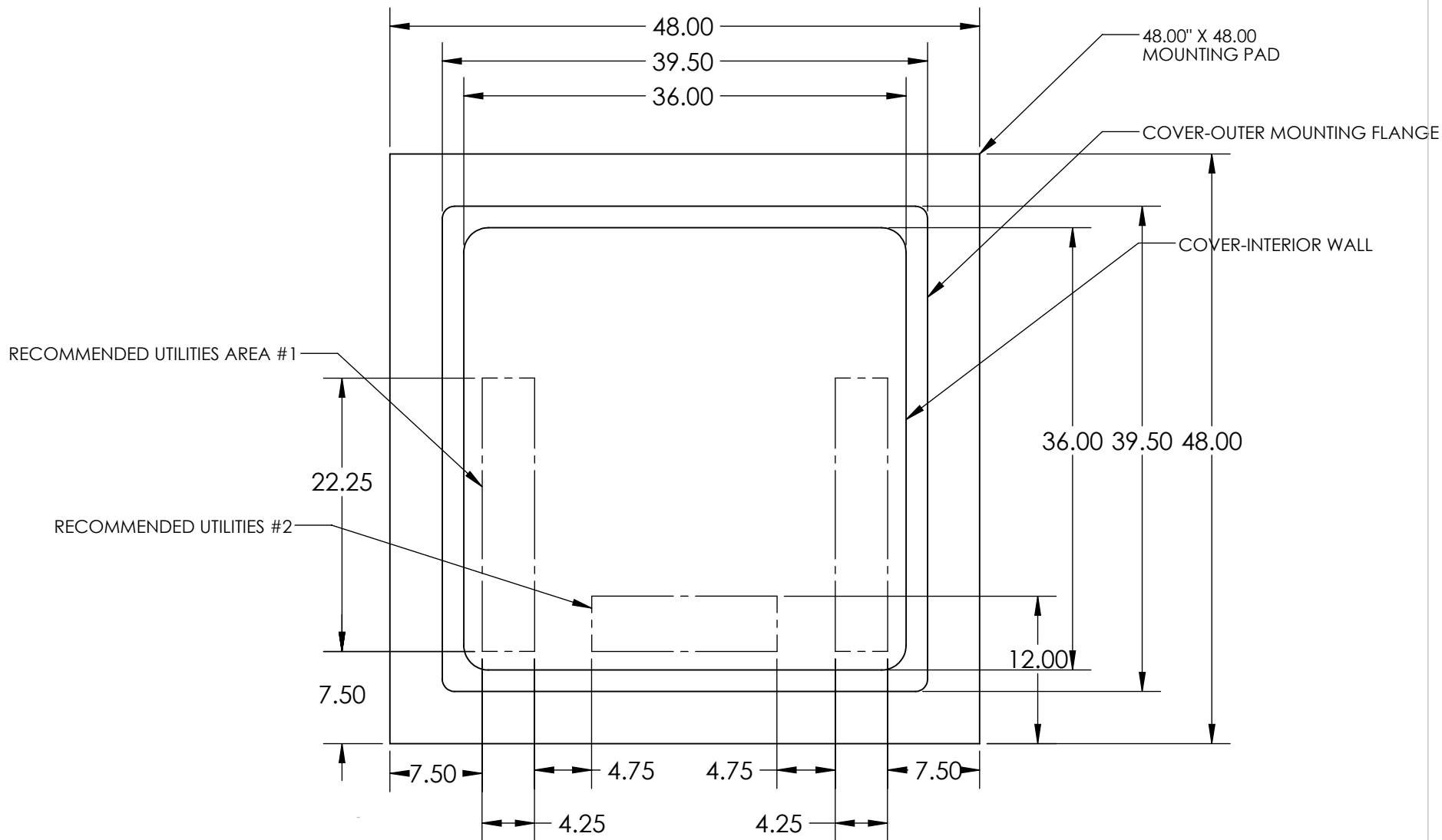
TITLE:

PART NO.

REV

SCALE: 1:10 WEIGHT:

SHEET 4 OF 5



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MATERIAL

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TITLE:

PART NO.

REV

SCALE: 1:12 WEIGHT:

SHEET 5 OF 5

HEAVY DUTY LARGE CAPACITY HOSE REELS

Heavy duty large capacity hose reels are built to handle large hose diameters. Used in applications demanding large volume delivery in low and medium pressures such as diesel fuel. The sturdy box-style frame has heavy duty steel cross supports to all four corners for extra strength and rigidity.

Design & Structure

- Long lasting self-lubricating flange bearings.
- Reinforced steel frame provides maximum strength and stability.
- Auto spring rewind easily wraps, stores and protects hose.
- Full flow swivel for maximum product delivery.
- Viton seals

Code	Description
CX4P-750	1½" Inlet/Outlet Cox heavy duty high capacity spring rewind hose reel - bare reel, no hose. Will handle 15 Mtr x 1½" Hose. 250 PSI max pressure. Suit high flow diesel use.
CX4P-3215	1½" Inlet/Outlet Cox heavy duty hose reel supplied with 15 Mtr x 1½" Hose for diesel high volume transfer. 150 PSI max pressure.
CX5P-850	1½" Inlet/Outlet Cox heavy duty high capacity spring rewind hose reel - bare reel, no hose. Will handle 15 Mtr x 1½" Hose. 250 PSI max pressure. Suit high flow diesel use.
CX5P-4015	1½" Inlet/Outlet Cox heavy duty hose reel supplied with 15 Mtr x 1½" Hose for diesel high volume transfer. 150 PSI max pressure.

ATEX APPROVED HOSE REELS

- Atex approved heavy duty dual pedestal hose reel.
- Suitable for use in some hazardous zones.
- Standard models suitable for petrol, diesel, kerosene and oil.
- Models available for use with aviation fuels.
- Retracting fuel hose reel rated Atex 94/9 IIB 2GD c T4 T135°C X

Code	Description
AAHR-15B	Atex approved reel, suit 15 Mtr x 1" hose - bare reel, no hose. Retracting fuel hose reel rated Atex 94/9 IIB 2GD c T4 T135°C X
AAHR-30B	Atex approved reel, suit 30 Mtr x 1" hose - bare reel, no hose. Retracting fuel hose reel rated Atex 94/9 IIB 2GD c T4 T135°C X
AAHRAV-15B	Atex approved reel for aviation fuel, suit 15 Mtr x 1" hose - bare reel, no hose. Stainless steel fluid path. Retracting fuel hose reel rated Atex 94/9 IIB 2GD c T4 T135°C X





Park Shelters



Skillion Roof

Timber Park Shelters

**KIT FORM
ENGINEERED**

**SITE-SPECIFIC
SOLUTIONS**

PENINSULA SERIES

The clean, contemporary lines of a skillion roof shelter is the modern standard in today's parks.

Materials	Finishes	Fixings
- Pine or hardwood posts - Rebated front screen - Colorbond® XRW or Ultra grade roofing	- Timber colour stain for pine and hardwood - Painted colour for pine - Thermoplastic coating (steel leg brackets) - Gutter and downpipes	- Hot-dipped galvanised or stainless steel fixings - In-ground or bolt-down posts



K302 Peninsula Series

Other options

- Hot-dipped galvanised and powder coated steel or select grade hardwood posts
- Rebated side screens and baluster panels (see page 37)
- Removal of centre post or centre row of posts
- Colorbond® gutters
- Colorbond® or PVC down pipes
- Structural rating upgrades beyond N3 (W41)
- Standard size variations



**10 YR
GUARANTEE**
ON SUPPLY ONLY ORDERS
STRUCTURAL WARRANTY

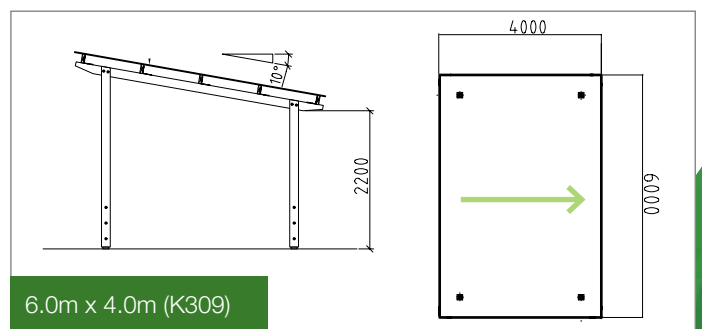
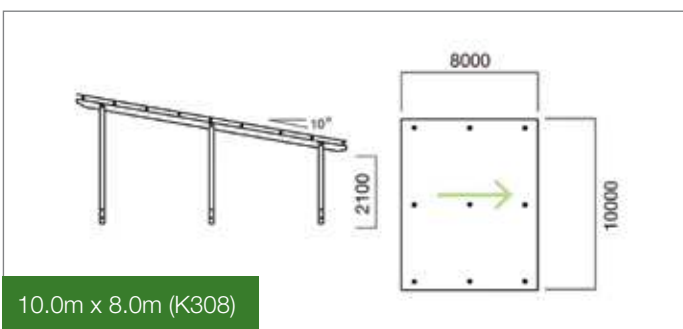
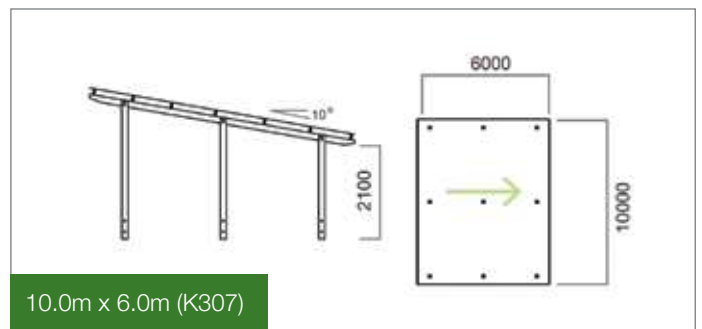
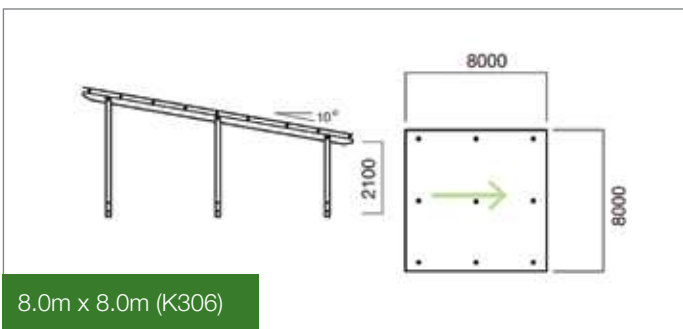
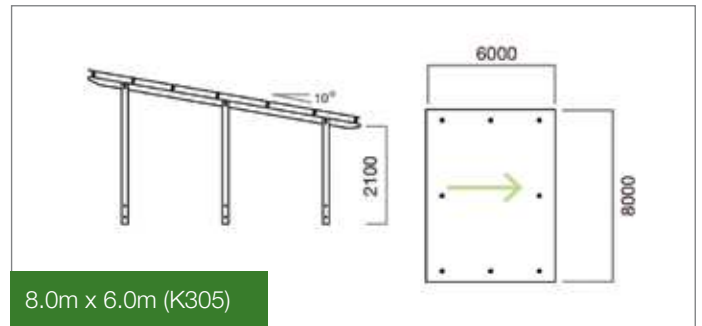
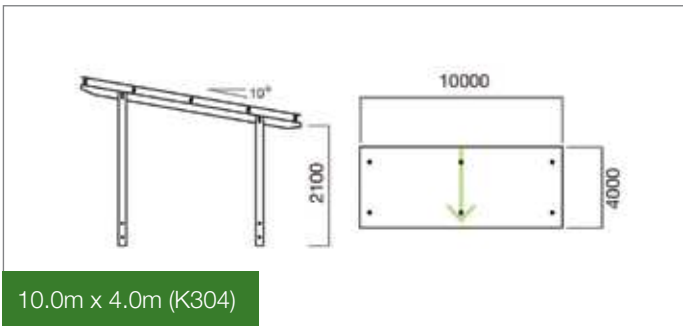
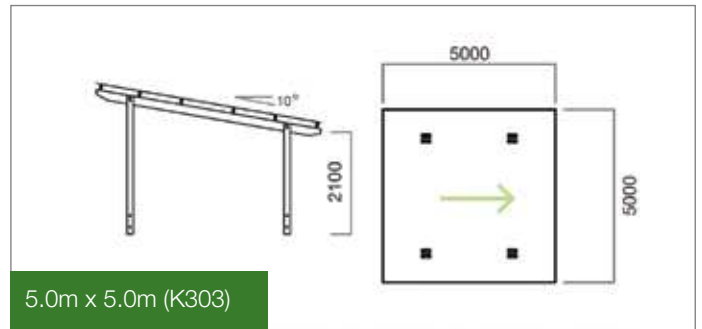
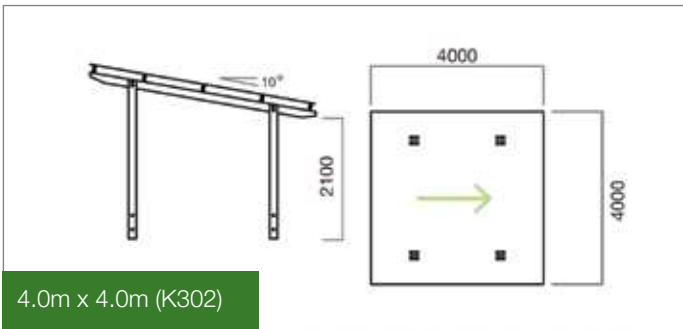
**20 YR
GUARANTEE**
ON SUPPLY & INSTALL ORDERS
STRUCTURAL WARRANTY

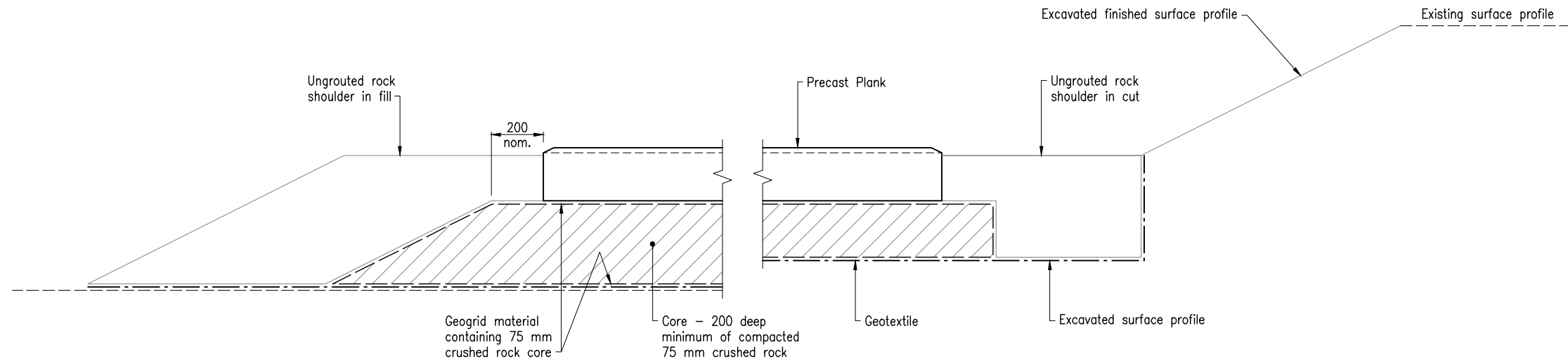


K308 Peninsula Series

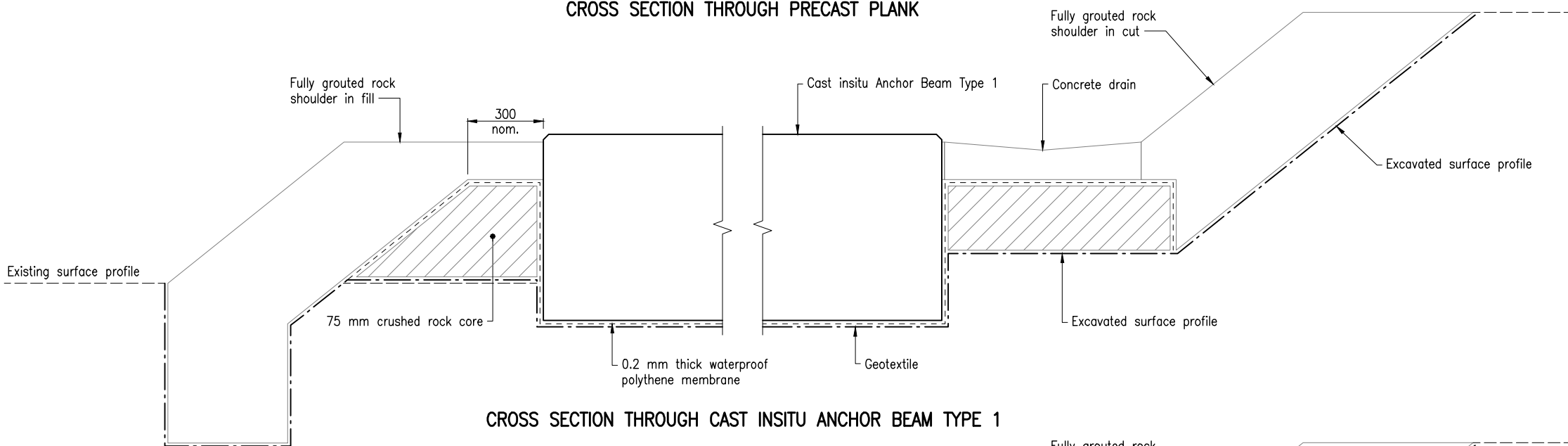


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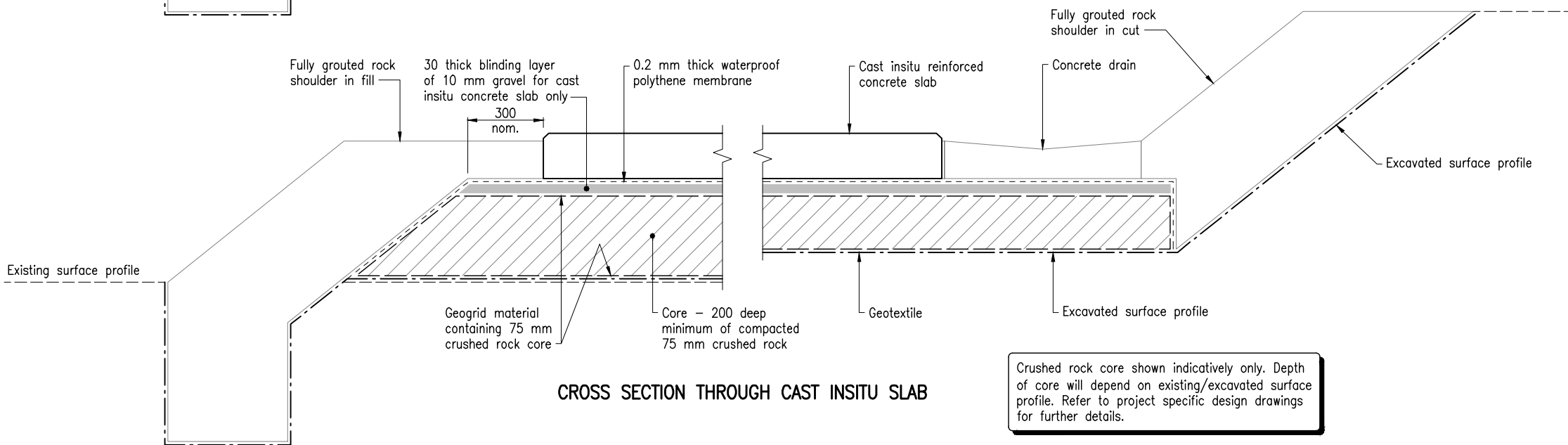




CROSS SECTION THROUGH PRECAST PLANK



CROSS SECTION THROUGH CAST INSITU ANCHOR BEAM TYPE 1



CROSS SECTION THROUGH CAST INSITU SLAB

Crushed rock core shown indicatively only. Depth of core will depend on existing/excavated surface profile. Refer to project specific design drawings for further details.

NOTES:

1. CONSTRUCTION OF BOAT RAMP shall be in accordance with MRTS300.
2. 75 mm CRUSHED ROCK shall have the following grading:

Australian Standard Sieve Size	Percent Passing
100	100
53	< 30
37.5	0

3. CRUSHED ROCK COMPACTION shall be in accordance with MRTS300.
4. 10 mm GRAVEL BLINDING LAYER shall only be used under cast insitu concrete slabs. Blinding layer is not to be used under precast planks.
5. TREATMENT OF ASS/PASS and other contaminants (if required) is defined in the project specific Environmental Management Plan.
6. GEOGRID shall have the following properties:

Parameter	Requirement
Material	Manufactured from polypropylene sheet with transverse and longitudinal ribs of minimum thickness 1.3 mm
Aperture size	Approximately 37x 37 to contain 75 mm crushed rock
Quality Control Strength	30 kN/m with a peak strain of 10% in both directions
Junction strength between the longitudinal and transverse ribs	Greater than 95% of the Quality Control Strength in both directions

Unless shown otherwise laps shall be 250 minimum and braided together so that both edges are fixed to the lapped sheets.

Braid shall have a nominal weight of 6.8 g/m and be made from 3 ply, 19 strands per ply, high density polyethylene (HDPE), and shall have a breaking strength greater than 200 kg.

7. GEOTEXTILE shall have the following properties:

Parameter	Requirement
Material	Non-woven needle punched staple fibre polyester or polypropylene meeting minimum strength Class D and Filtration Class 1
Elongation	>= 30%
Grab Strength	1200 N
Tear Strength	450 N
G Rating	3000

Placement shall be in accordance with MRTS300.

Unless shown otherwise laps shall be 500 minimum.

Construction equipment shall not stand or travel directly over geotextile.

Rock armour (> 150 mm) placed directly on geotextile shall have a maximum drop height of 1.5m.

8. For precast plank installation and anchor beam details refer Standard Drawing 4020.
9. DIMENSIONS are in millimetres unless shown otherwise.

ASSOCIATED DEPARTMENTAL DOCUMENTS:

Standard Drawings
Specifications

REFERENCED DOCUMENTS:

Departmental Standard Drawings:
4022 Boat Ramp Construction – Fully Grouted Shoulders and UngROUTED Shoulders
Departmental Specifications:
MRTS300 Boat Ramps

Department of Transport and Main Roads					
BOAT RAMP		Standard Drawing No		4021	
BOAT RAMP CONSTRUCTION – EARTHWORKS AND CRUSHED ROCK CORE DETAILS		A3		Date 10/15	
Not to Scale		A		B	

Optional PPE storage container
mounted on waste oil tank

Waste Oil spill tray with sloped floor, liquid seal, mesh screen, hinged lid and gas strut.

Optional Fire
extinguisher with bracket

WASTE OIL TANKS

- Mining Contractors
- Building Industry
- Earthmoving
- Transport
- Marine
- Government
- Agriculture
- Industry

Code	Description
MG1000N-O	Mine-Go 1000Ltr tank for waste oil / combustible liquids
MG2000N-O	Mine-Go 2000Ltr tank for waste oil / combustible liquids
MG3000N-O	Mine-Go 3000Ltr tank for waste oil / combustible liquids
MG5000N-O	Mine-Go 5000Ltr tank for waste oil / combustible liquids
WASTE-P	Waste Oil spill tray with sloped floor, liquid seal, mesh screen and hinged lid.
EASTSP-B	Easy access step for access to fill point or bowser

- All steel construction - designed for the most demanding on-site applications in mining, industry and heavy contracting.
- Equipco Mine-Go self banded (double wall) all steel fuel tank.
- Constructed to Australian Standards AS1692 and AS1940.
- 3000 Litre (SFL) genuine safe fill capacity.
- Pump bay with galvanised lockable hinged door, gas strut, suction ports and return ports.
- 2" Fill and 2" dip point with spill/fill pan, galvanised lockable hinged door and gas strut.
- Incremented fluid level dip stick.
- Baffled to reduce product movement.
- Four way forklift pockets for access to all sides

- of tank.
- Galvanised lift lugs for empty only handling (optional certified lift lugs for lifting when full - available).
- Removable inner tank for ease of inspection and maintenance.
- Galvanised inspection hatch for maintenance and inspection of inner tank.
- Stackable design.
- Designed to fit across truck tray and stack inside shipping containers for ease of transportation.
- Hazchem signage for oil/combustible liquids.
- Vent with riser pipe.
- Supplied painted in white.
- Suitable for waste oil



MG2000N-O



WASTE-P



WASTE-P



Waste Oil Spill Pan



Waste Spill Pan

N22

M2

N20

M1

N19

N18

N17

N16

N15

N14

N13

N12

N11

N10

N9

N21

N1

N2

N3

N4

N5

N6

N7

N8

Tank Assembly

40FT ISO Container Footprint

2896.00

12192.00

Vent Riser

High Level Alarm

Foldable Ladder With Platform

2438.00

571.22

Nozzle Schedule

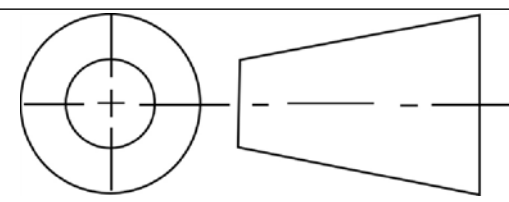
Nozzle ID	Connection Type	Service
N1	DN50 - ISO4144 - BSP Socket	Spare (Plugged)
N2	DN50 - ISO4144 - Male	Interstitial Dipstick (Capped)
N3	DN50 - ISO4144 - BSP Socket	Interstitial Vent
N4	DN80 - ISO4144 - BSP Socket	Spare (Plugged)
N5	DN50 - ISO4144 - Male	Secondary Suction (Capped)
N6	DN50 - ISO4144 - BSP Socket	Spare (Plugged)
N7	DN50 - ISO4144 - BSP Socket	Pump Bay Entry (Plugged)
N8	DN80 - ANSI 150 - Flange	Primary Suction Spool With Prime Point
N9	DN50 - ISO4144 - BSP Socket	Pump Bay Entry (Plugged)
N10	DN50 - ISO4144 - Male	Dip (Capped)
N11	DN80 - ANSI 150 - Flange	Primary Fill Spool (c/w Ball Valve, Check Wafer, Type F Camlock and Dustcap)
N12	DN50 - ISO4144 - BSP Socket	Pump Bay Entry (Plugged)
N13	DN50 - ISO4144 - BSP Socket	Spare (Plugged)
N14	DN50 - ISO4144 - BSP Socket	Pump Bay Entry (Plugged)
N15	DN80 - ISO4144 - BSP Socket	Spare (Plugged)
N16	DN50 - ISO4144 - BSP Socket	High Level Alarm
N17	DN200 - Flanged	Interstitial Vent
N18	DN50 - ISO4144 - BSP Socket	Spare (Plugged)
N19	DN200 - Flanged	Pressure Vent
N20	DN50 - ISO4144 - BSP Socket	Free To Air Vent
N21	DN200 - Flanged	Inspection Hatch
N22	DN50 - ISO4144 - BSP Socket	Spare (Plugged)
M1	Flanged (OD=750, ID=600)	Primary Manway
M2	Flanged (OD=900, ID=750)	Secondary Manway
M3	Flanged (OD=750, ID=600)	Tertiary Manway

Tank Data	
DESIGN CODE	AS 1692, AS 1940
BUILT TO	AS 4100, AS 1554
PLATE THICKNESS	6MM/6MM Q235B
EXTERNAL DIMENSIONS	12192mm x 2438mm x 2896mm
GROSS VOLUME	69023 L
SAFE VOLUME	65570 L
NDT	MPT/DPT
TARE WEIGHT	13476 KG



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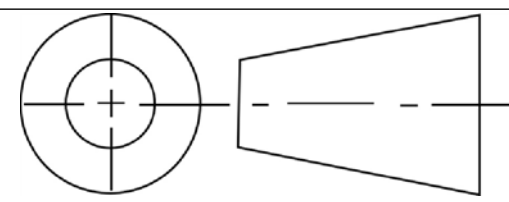
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SCALE 1:40

DRAWING NUMBER: LT68-GA

REV.

REV.	DATE	REVISION DESCRIPTION	CHKD	APPR	REV.	DATE	REVISION DESCRIPTION	CHKD	APPR	REFERENCE DRAWING No.	REFERENCE DRAWINGS	All dimensions are in mm unless specified otherwise Drawn to AS1100.101-1992
												MATERIAL: As Per Manufacturing Drawings
												FINISH: RAL9003: Signal White
												PAGE: 1 OF 1



APPENDIX G

Traffic Impact Assessment



Traffic Impact Assessment **REDLAND BAY FERRY TERMINAL**

Pensar Structures

March 2026

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DOCUMENT ISSUE RECORD

Revision Code	Date Revised	Revision Details	Author	Checked	Approved
A	25/01/2021	Original Issue	RK	DB	DB
B	02/03/2021	Carpark adjusted due to RIC	RK	DB	DB
C	29/11/2021	EDQ Response	DB	DB	DB
D	16/03/2026	Additional southern ramp added	DB	DB	DB

Approved

Daniel Berry (RPEQ 6343)

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1 BACKGROUND

Redland Bay vehicular ferry terminal is located at the eastern end of Weinam Street, Redland Bay. It is owned by SeaLink who provide passenger and vehicle ferry services to the surrounding islands within the southern Moreton Bay.

Currently, the facility consists of a single ramp used for vehicle services plus a service ramp and disused ramp on the northern side of the vehicular loading ramp. To improve services for their customers, SeaLink are proposing to upgrade the existing facility to provide two vehicle access locations to accommodate a new fleet of ferries with associated improvements to queuing, ticketing and access.

The site is located within the Weinam Creek Priority Development Area (PDA) with development approvals coordinated by Economic Development Queensland (EDQ).

This Traffic Impact Assessment has been prepared to support the development approval application as advised by EDQ at the pre-application conference of 18 November 2020.



Figure 1-1: Redland Bay Vehicular Ferry Terminal Location

2 EXISTING TRAFFIC

2.1 Existing Ferry Services

Currently 3 vehicle ferries operate from the facility 7 days a week. The ferries currently operate concurrently from 5:30am to 8:20pm from Monday to Friday and from 5:30am to 7:05pm on Saturday and Sunday. A full timetable can be found in **Appendix A**.

During the week there are 16 departures and 16 arrivals at the facility each day. This is reduced to 10 departures and 9 arrivals on the weekend.

The current ferries and their capacities are provided in Table 2.1 below.

Table 2-1: Current Ferries

Barge	Length	Capacity
Stradbroke Venture	54.41m	34 cars / 400 pax
Bay Islander	33.99m	16 cars / 297 pax
Lakarma	38.77m	18 cars / 204 pax
Moreton Escape (additional)	36.77m	16 cars / 197 pax

2.2 Existing Facility

The current facility consists of:

- One loading point utilising the southern-most ramp providing storage for 39 standard vehicles (cars) across 4 queuing lanes.
- Informal carparks adjacent to the queuing storage with storage of up to 9 cars.
- Ticketing and administration facilities are located to the south of the vehicle queuing area and require passengers to exit their vehicles to obtain a barge ticket.

No dedicated footpaths or pedestrian facilities are provided within the site.

The layout of the existing facility can be found in the “Existing Features and Services” drawing in **Appendix B**.

2.3 Generated Vehicle Traffic (weekday)

The vessel tasking and utilisation varies according the availability of the vessels and demand.

For the purposes of this assessment, the following assumptions regarding vessel tasking have been made for the 16 departures with three ferries.

Stradbroke Venture conducts 6 round trips.

Bay Islander and Lakarma conduct 5 round trips.

There are three departures over a 1 hour and 15 minutes period 5 times a day with a 1 hour and 15 minutes pause with no departure.

With customers advised to arrive 20 minutes before departure time, no overlaps of departing passengers exist with 35-40 minutes separating departure times leaving 15-20 minutes of minimal vehicle queues.

Due to the staggered departure times, it is expected only one full ferry load of passengers will be present at any one time. This equates to a maximum of 34 vehicles within the facility at one time (when the largest ferry is used).

2.4 Generated Vehicle Traffic (weekend)

As there are 10 departures with three ferries it is assumed the Stradbroke Venture conducts 4 round trips while the Bay Islander and Lakarma conduct 3 round trips.

Ferries on the weekend leave every 1 hour and 15 minutes. With passengers advised to arrive 20 minutes before departure, there is no overlap of departing passengers with 55 minutes of minimal vehicle queues.

With departure times separated by 1 hour and 15 minutes, there will be a maximum of 34 vehicles within the facility at one time.

2.5 Peak Holiday Periods

During peak holiday seasons, the demand for services is higher and Sealink has implemented an extra ferry service.

This service is run concurrently with the normal services and slots into the 1 hour and 15 minute break between services. This then creates a service every 35-40 minutes for the entire day.

As passengers are advised to arrive 20 minutes before departure time, no overlap exists, and increased traffic congestion is not considered likely on local roads.

2.6 Vehicular Traffic Management

Traffic management during ferry loading and unloading is undertaken by SeaLink staff in accordance with the following:

- Queues are established based on destination island to manage vehicle loading and unloading order
- Vehicle loading is under the direction of SeaLink staff, including management of vehicle size and position within the vessel
- Vehicle unloading is under the direction of SeaLink staff.

It is proposed to continue to manage the loading and unloading of vessels under SeaLink traffic control.

2.7 Non-Motorised Traffic and Management

There is currently limited demand for non-motorised traffic (including pedestrians and cyclists) utilising the vehicular barge service due to the existing passenger ferry service departing from Weinam Creek. This passenger ferry service provides a more frequent and faster service and is more attractive to non-motorised users.

SeaLink estimates that there is an average of 5 pedestrian and non-motorised users on the barge service each day.

Non-motorised users traffic management during ferry loading and unloading is undertaken by SeaLink staff in accordance with the following:

- Non-motorised users are given priority boarding (ahead of vehicles) under traffic control
- Non-motorised users are located clear of traffic movements within the vessels
- All non-motorised loading is under the direction of SeaLink staff, including management of position within the vessel
- All non-motorised unloading is under the direction of SeaLink staff.

It is proposed to continue to manage the loading and unloading of vessels under SeaLink traffic control.

2.8 Car Parking

The public carpark to the north of Weinam Street adjacent to the terminal has provision for 116 vehicles within the precinct.

The public carpark to the south of Weinam Street adjacent to the terminal has provision for 29 vehicles, including 2 disabled bays.

The Weinam Street carparks are used by the current staff and vessel workers at the existing ferry facility, walk-on patrons of the passenger and vehicular ferry terminals in addition to users of the surrounding parkland and operate in conjunction with the wider carparking facilities at Weinam Creek to cater for Southern Moreton Bay residents and visitors. The Weinam Street carparks also function as overflow parking for the Redland Bay Fishing Club and Redland Bay community hall, noting that these facilities also have off-street parking.

Limited temporary staff carparking is provided for SeaLink personnel on the northern side of the existing queuing area within the lease boundaries (on the approaches to the existing northern berths). This area has been used as temporary staff parking to provide controlled access to the northern berths when they are in use. When the northern berths are in use, parking is not allowed in this area.

Current staff at the Redland facility are:

- 9 Vessel crew
- 3 ticketing / administration staff

The Weinam Street parking is under review by the Redland Investment Corporation (RIC) as part of the larger PDA master planning and upgrades to this carpark are anticipated.

3 PROPOSED TRAFFIC

3.1 Proposed Ferry Services

Sealink has recognised a significant increase in barge services demand in the Southern Moreton Bay Islands since the previous approval was granted by EDQ.

To meet this increased demand by the barge users, Sealink are proposing to continue operating their fleet of older, smaller barges from the Weinam Creek facility to service the lesser-demand routes in the network in parallel with the newly commissioned larger vessel fleet.

Previous planning for the facility had assumed that these older, smaller barges would no longer be needed at Weinam Creek, however this has now changed to the increased demand.

The existing smaller barges will not be able to use the specialised loading facilities on the (approved) northern ramps and will require a dedicated barge ramp.

It is proposed three new larger vehicle ferries will operate from the ferry terminal 7 days a week from the two northern berths.

It is proposed that the existing in-service vessels will operate from the ferry terminal 7 days a week from the southern berth.

The three new ferries and the existing ferries and run as per the current timetable, operating concurrently from 4:15am to 9:20pm from Monday to Friday and from 7:05am to 9:20pm on Saturday and Sunday. A full timetable can be found in **Appendix A**.

The smaller vessels utilising the southern berth will predominantly cater for Karragarra and Lamb Islands as these destinations have lesser demand than Macleay and Russell Islands.

As per the existing conditions, during the week there are 16 departures and 16 arrivals at the facility. This is reduced to 10 departures and 10 arrivals on the weekend.

The new ferries and their capacity are provided in Table 3-1 below.

Table 3-1: Proposed Ferries

Barge	Length	Capacity
New Vessel 1	44m	34 cars
New Vessel 2	44m	34 cars
New Vessel 3	44m	34 cars

3.2 Proposed Facility

The initial new ferries have commenced operations from the recently constructed northern berth. The upgraded facility will provide additional storage for waiting vehicles within the facility boundaries.

The new facility will consist of:

- Two vehicular ferry loading points (two x northern berths) servicing different destination services within the Bay using a floating access ramp system.
- One vehicle ferry loading point using a “traditional” ramped barge loading facility at the southern berth to cater for the existing vessels. Management of the queued vehicles for the southern berth will be undertaken by Sealink personnel and will include utilisation of a secondary stop line to maintain clearance for this berth. There is queuing available for 18 vehicles behind the proposed secondary stop line, sufficient for the capacity of the Bay Islander, Lakarma and Moreton Escape vessels.

- Combined vehicle storage for 59 standard passenger vehicles within the site
- Single exit lane servicing all three loading points
- 6 external spaces servicing all three loading points
- 1 new dedicated ticket booth
- Retaining the existing combined ticket booth / administration facility
- A seating area will also be located on the south eastern corner of the facility. Provision has also been made for the future “Esplanade Path” that is currently planned within the Weinam Creek PDA across the frontage of the site.

The proposed facility can be found in the “General Arrangement” drawing in **Appendix B**.

3.3 Ticket Booth Operation

One new ticket booth is to be provided immediately within the entrance to the site to:

- Reduce pedestrian movements within the site
- Facilitate use of the site by a second operator
- Manage traffic queuing based on destination and minimise errant queuing and associated impact on loading times
- Reduce non-customer access to the site
- Provide additional capacity to manage ticketing and bookings.

It is noted that ticket purchases are predominantly electronic (online) and the majority of ticket booth interaction will be to confirm passenger bookings and provide direction to queue lanes.

3.4 Generated Traffic (weekday)

As per the existing services, there are three departures over a 1 hour period during the morning peak (6:05am to 7:05am). With customers advised of arriving 20 minutes before departure time, no overlaps of departing passengers exist with 30 minutes separating departure times. It is noted that the 6:40am service does not currently stop at Karragarra Island during the morning outbound service.

Due to the staggered departure times, it is expected only one full ferry load of passengers will be present at any one time. This equates to 34 vehicles within the facility at one time.

3.5 Generated Traffic (weekend)

Ferries on the weekend leave every 1 hour and 15 minutes. With passengers advised to arrive 20 minutes before departure, there is no overlap of departing passengers.

With departure times separated by 1 hour and 15 minutes, there will be a maximum of 34 vehicles within the facility at one time.

3.6 Parking

No dedicated long-term car parking for non-motorised users is proposed on site to reduce vehicle conflicts by minimising vehicle turning movements in the queuing area.

Barge user parking is intended to continue to use the existing Weinam Street carparking identified in Section 2.8.

3.6.1 Staff Car Parking

Up to 12 staff are intended to utilise the facility comprised of:

- 9 Vessel crew

- 2 Ticketing staff
- 1 Administration staff / support personnel

The staff numbers are unchanged from the current arrangement.

It is intended that the existing carparking arrangement is maintained where staff utilise unsealed areas adjacent to the administration building. Provision for nine on-site carparks has been made on both sides of the administration building. The future storage shed (part of a potential future project stage) will reduce the number of on-site staff car parks to seven.

Two dedicated staff car parks have been provided adjacent to the ticket booth for the ticket booth operator to manage staff safety during initial “out of hours” and opening operations.

The total on-site allocated staff parking is eleven.

Due to the intended increased frequency of use of the northern berths, the need to manage access on this berth is no longer required.

3.6.2 Bicycle Parking

Bicycle parking facilities are proposed to be installed on the southern side of the development within the open space area. Secure bicycle parking is to be provided using a Securabike Large 2 bike rail (x 2) or similar.

End of trip and other bicycle facilities are not appropriate as the development is not a trip attractor.

4 IMPACT

4.1 Existing Facility

The current facility at Redland Bay has a queued storage capacity of 39 standard vehicles. The maximum vehicles expected at one time is 34 due to vessel capacity constraints. This leaves 5 spaces spare for any additional queuing vehicles that may be present.

4.2 Proposed Vehicle Queue Storage

The new facility has a queue storage capacity for 59 passenger vehicles (cars) within the site plus 6 external spaces.

The maximum vehicles expected at one time is 34 due to the vessel capacity within each service.

This leaves spaces spare for any additional vehicles that may be present. It is noted that the facility is split by the exit lane with 33 vehicle storage spaces on the north and 26 vehicle storage spaces on the south. Vehicles can access both departure points from these locations, if required.

The secondary stop line on the southern berths has capacity for 18 vehicle storage spaces, suitable for the smaller vessels using the facility, plus the southern berth is accessible from the northern queue should it be required.

Due to the staggered operation of the ferry berthing and departure operations, full capacity of all queue lanes is not anticipated. However, should the full queued capacity within the site be utilised, overflow capacity for an additional six vehicles can be provided without impacting on the external carpark operations.

Impacts of vehicles stopped at the ticketing booth (prior to joining the vessel queues) are to be managed by providing:

- Dedicated single vehicle (car) storage contained within the site at the ticket window
- Marked “keep clear” zones within the carpark external to the site on the alignment of the future esplanade path.

4.3 Pedestrians and Passengers

No new pedestrian movements are anticipated to be generated by the development.

The standard vessel specification for the proposed new barges includes a maximum passenger provision of 199 persons (refer Sea Transport Drawings), with seating available for 150 people. The seating and passenger provision includes vehicle drivers and passengers from the 34 car capacity.

The current walk-on patronage volume for the vehicular barges is very low (approximately 5 per day), with the majority of non-motorised patrons utilising the dedicated passenger ferry services due to higher frequency and speed of services compared to the barge service.

It is noted that Translink has introduced (July 2021) a limitation on dangerous goods passage on the passenger-only services, including fuel and other dangerous goods. The proposed ban on dangerous goods will impact on a number of users who currently use the passenger ferry services to transport portable fuel containers for use on the islands. Sealink anticipate this will increase the walk-on patronage usage of the barge service to approximately 20 persons per day. These passengers are anticipated to use the 145 car parking spaces either side of Weinam Street, the existing carparking to the southern side of Neville Stafford Park or the proposed multi-deck parking facility

4.3.1 Pedestrian Movement Management

The pedestrian and other non-motorised access provisions have been established to be consistent with the Weinam Creek PDA masterplan and includes:

- Provision for the continuation of the Esplanade path across the site by inclusion of a marked pedestrian crossing
- Access to Weinam Street is to be a continuation of the proposed provision of a dedicated pedestrian crossing across the carpark to the north of the terminal access.

These access provisions are shown on the extract from Weinam Creek masterplan shown in Figure below:

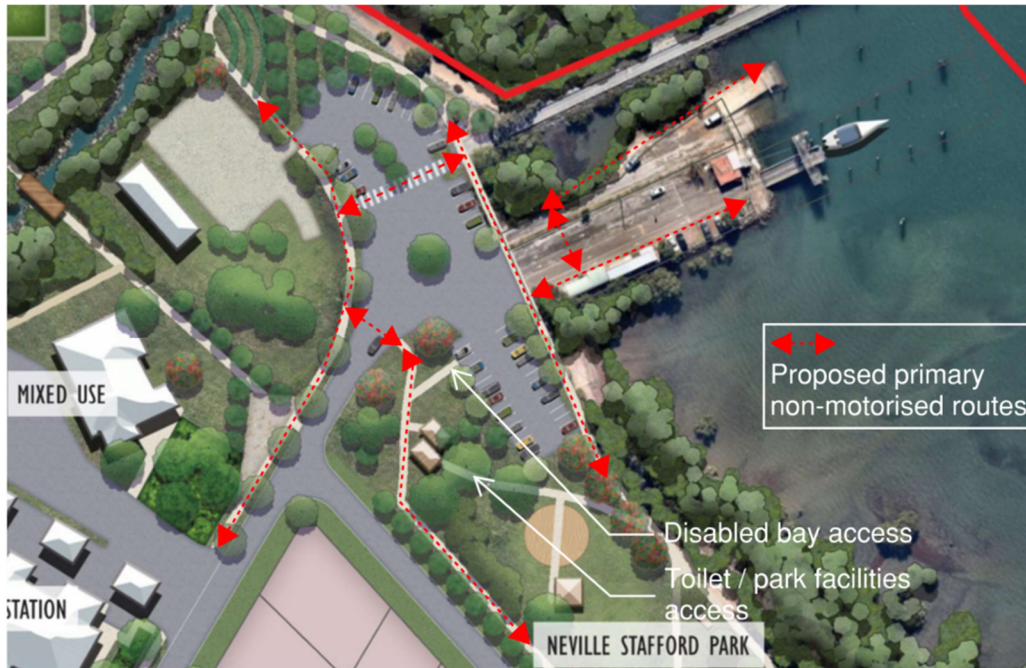


Figure 4-1: Weinam Creek Masterplan Extract (with pedestrian routes shown)

In the interim (prior to the development of the masterplan) the current pedestrian provisions to the jetty and terminal are intended to remain.

Vehicle movements within the site are currently uncontrolled and the intent of the design is to provide additional width adjacent to queued vehicles on pedestrian routes to improve pedestrian safety.

The waiting and queuing areas are very low speed environment (<10km/h) and it is intended that this is reinforced by speed signage at the entrance of the site. It is also noted that traffic control is in place during vehicle loading and unloading activities, further reinforcing the low speed environment.

Walk-on pedestrians and other non-motorised users (either associated with a vehicle or stand-alone) are managed under traffic control direction during the loading and unloading activities, consistent with current practices. Walk-on passengers will be directed from the path area under traffic control (separate to motorised vehicle movements) to the pedestrian facilities on the barge.

4.4 Staff Numbers

As outlined in Section 3.6.1, staff numbers and associated traffic and parking demands are anticipated to remain the same following the development.

4.5 Surrounding Road Network

No additional traffic movements are anticipated to be generated by the development. All traffic demand on this facility is due to demand from the Southern Moreton Bay Islands.

It is noted that the fleet improvements have been generated to replace the existing aged fleet rather than an increase in demand.

The current maximum size vessel within the fleet is the *Stradbroke Venture* (34 passenger car capacity). This capacity is identical to the capacity of the new vessel fleet.

Therefore the peak conditions during unloading of passenger vehicles are the same as the current peak condition during unloading operations of the *Stradbroke Venture*. As demonstrated in Section 2.3, no overlaps of arriving vessels are programmed to occur.

Impacts on the Surrounding Street Network

Each of the major movements has been assessed for potential impacts of the development:

Weinam Street Outbound

- Significant reduction in queuing within Weinam Street and the carpark due to the increased on-site vehicle queuing capacity (refer Section 4.2)

Weinam Street Outbound

- Weinam Street / Hamilton Street intersection is Give Way controlled, with priority on Hamilton Street. The proposed reconfiguration of the road network within the PDA reinforces this priority.
- Current peak discharge volume is 34 vehicles (*Stradbroke Venture* capacity), resulting in a maximum peak queue length of 204m¹. This results in a queue back into the barge terminal, however does not impact on the loading of subsequent barges.
- Banana Street is proposed to be closed as a through route under the PDA masterplan, therefore the queue will only be impacting the Weinam Street / Banana Road precinct, noting that currently multiple routes exist to bypass the Weinam Street / Hamilton Street intersection
- Predicted peak discharge volume is 34 vehicles (*New vessel capacity*), resulting in a similar maximum peak queue length of 204m.

Based on the above, the following conclusions are made:

- Additional traffic is not generated by the development
- Additional demand for the barge service is a result of changes in land use or development on the Southern Moreton Bay Islands and is not attributable to the development
- The peak traffic volume impact on the surrounding road network is unchanged compared to the existing peak situation

4.6 Overall

The proposed facility will provide significantly greater storage capacity than the existing facility and will reduce the overall queue length of vehicles waiting to board the ferries.

As the current and proposed facility have sufficient storage, neither are expected to impact on external road networks.

The maximum number of vehicles (34) using the facility remains the same for the existing facility and proposed facility. Therefore, the overall impact on the surrounding road network will remain unchanged. The new facility will have a higher storage capacity which will provide additional contingency for waiting vehicles if there are delays or early arrivals.

¹ Based on 6m average vehicle length and no available gaps on Hamilton Street due to coincident arrivals and vehicle egress at the Ferry Terminal, Barge Terminal and /or major event. This is a worst case scenario and is expected to very rarely occur.

The new facility will have pedestrian access which will improve accessibility for pedestrians who may utilise public transport or private passenger transport services to the facility. This will allow safer access to the ferries and encourage another mode of transport than private vehicles.

APPENDIX A

Redland Bay Ferry Terminal Timetable



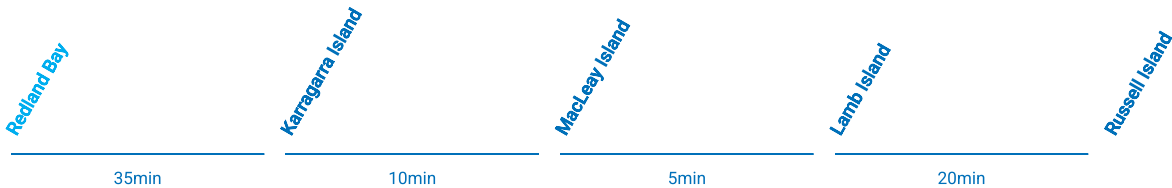
Ferry timetables for Bay Islands

Redland Bay to Russell Island

Russell Island to Redland Bay

Cleveland to Russell Island

Russell Island to Cleveland



📅 Mon 16 Mar

Redland Bay	Karragarra Island	MacLeay Island	Lamb Island	Russell Island
4:15 AM		4:50 AM		5:05 AM
5:35 AM	6:10 AM	6:20 AM	6:25 AM	6:45 AM
6:05 AM	6:40 AM	6:50 AM	6:55 AM	7:15 AM
6:40 AM		7:20 AM	7:25 AM	7:45 AM
7:05 AM	7:40 AM	7:50 AM	7:55 AM	8:15 AM
8:20 AM	8:55 AM	9:05 AM	9:10 AM	9:30 AM
9:15 AM	9:50 AM	10:00 AM	10:05 AM	10:25 AM
9:45 AM	10:20 AM	10:30 AM	10:35 AM	10:55 AM
10:15 AM	10:50 AM	11:00 AM	11:05 AM	11:25 AM
11:30 AM	12:05 PM	12:15 PM	12:20 PM	12:40 PM
12:25 PM	1:00 PM	1:10 PM	1:15 PM	1:35 PM
12:55 PM	1:30 PM	1:40 PM	1:45 PM	2:05 PM
1:25 PM	2:00 PM	2:10 PM	2:15 PM	2:35 PM
2:40 PM	3:15 PM	3:25 PM	3:30 PM	3:50 PM
4:05 PM	4:40 PM	4:50 PM	4:55 PM	5:15 PM
6:50 PM	7:25 PM	7:35 PM	7:40 PM	8:00 PM

☐ : Drop-off only

SeaLink Bay Islands operate regular ferries departing from Redland Bay. Our ferries service the islands of Lamb, Karragarra, Macleay and Russell which lie in the protected waters of Southern Moreton Bay, only one hour from Brisbane. The ferries depart 7 days a week, 365 days a year. Bookings are essential.

Please arrive 20 minutes before departure to allow for loading. There is no cafe at the Redland Bay terminal or on SeaLink Bay Island ferries; however, there are cafes nearby.

[BOOK NOW](#)



SeaLink South East Queensland acknowledges the Quandamooka people, the traditional owners of the land on which we work, live and visit. We recognise their continued custodianship and connection to the land, waters, and community. We pay our respect to Elders past and present, and extend that respect to all Aboriginal and Torres Strait Islander peoples. [Learn more.](#)

- Ferry

Timetable

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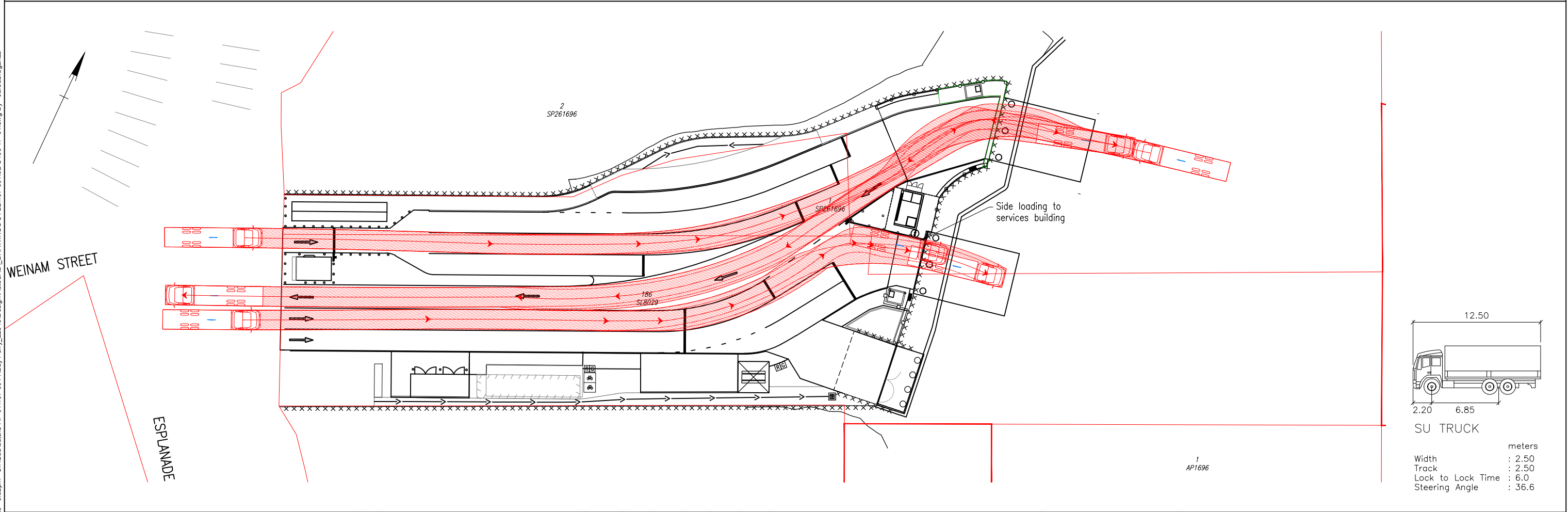
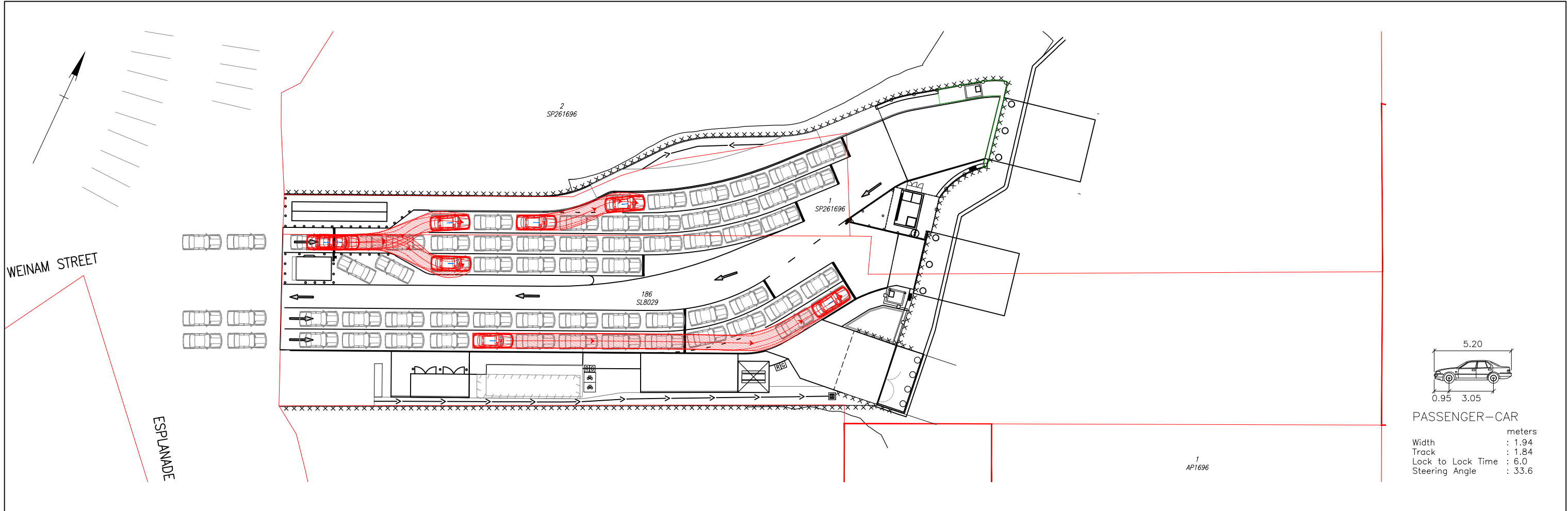
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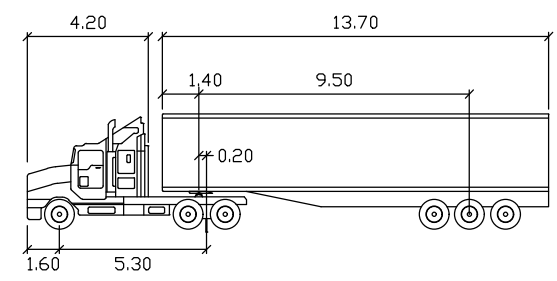
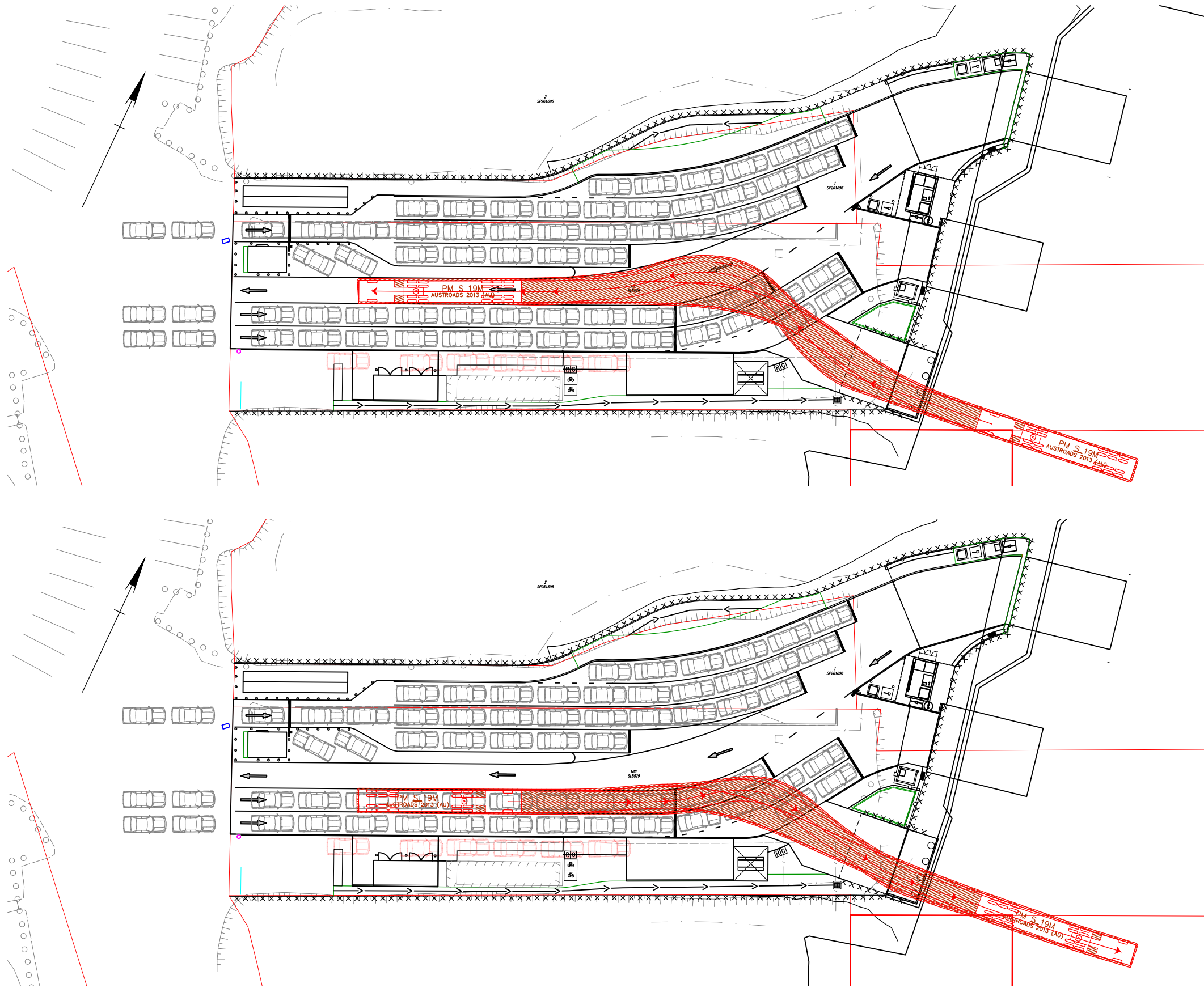
APPENDIX B

Design Drawings



ProjexPartners PROJECT MANAGEMENT ENGINEERING PLANNING Ph: 1300 789 214 www.projexpartners.com.au	CLIENT PENSAR STRUCTURES									ENGINEERING CERTIFICATION (RPEQ)				SCALE		REDLAND BAY FERRY TERMINAL			
											ENG. AREA	NAME	SIGNATURE	No.	DATE	1:250 0 5 10 A1 1:500 A3	VEHICLE TURNPATHS SHEET 1		
											CIVIL	D BERRY		6343	10/4/2026				
		A	ISSUED FOR CONSTRUCTION						10/4/2026	JDB	JM	DB	6343	DB			DRAWING NUMBER 497-001.02-C100-01		
		Rev.	Description						Date	Drawn	Design	Check	RPEQ No. & Initial						

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PM S 19M		Tractor Width	: 2.50	Lock to Lock Time	: 6.0
		Trailer Width	: 2.50	Steering Angle	: 27.8
		Tractor Track	: 2.50	Articulating Angle	: 70.0
		Trailer Track	: 2.50		

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Rev.	Description	Date	Drawn	Design	Check	RPEQ No. & Initial
A	ISSUED FOR CONSTRUCTION	10/4/2026	JDB	JM	DB	6343 DB

ENGINEERING CERTIFICATION (RPEQ)			
ENG. AREA	NAME	SIGNATURE	No. DATE
CIVIL	D BERRY		6343 10/4/2026

SCALE

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1:250 A3

REDLAND BAY FERRY TERMINAL

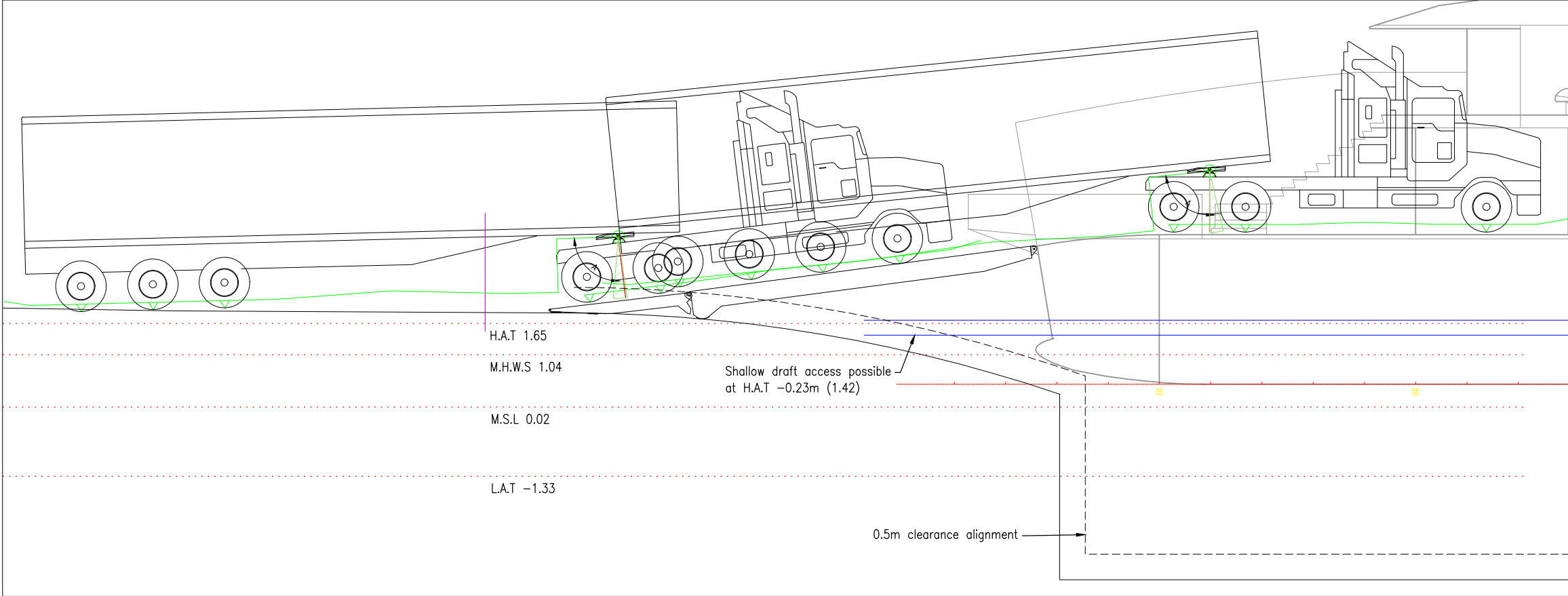
VEHICLE TURNPATHS
SHEET 3

DRAWING NUMBER 497-001.02-C100-03

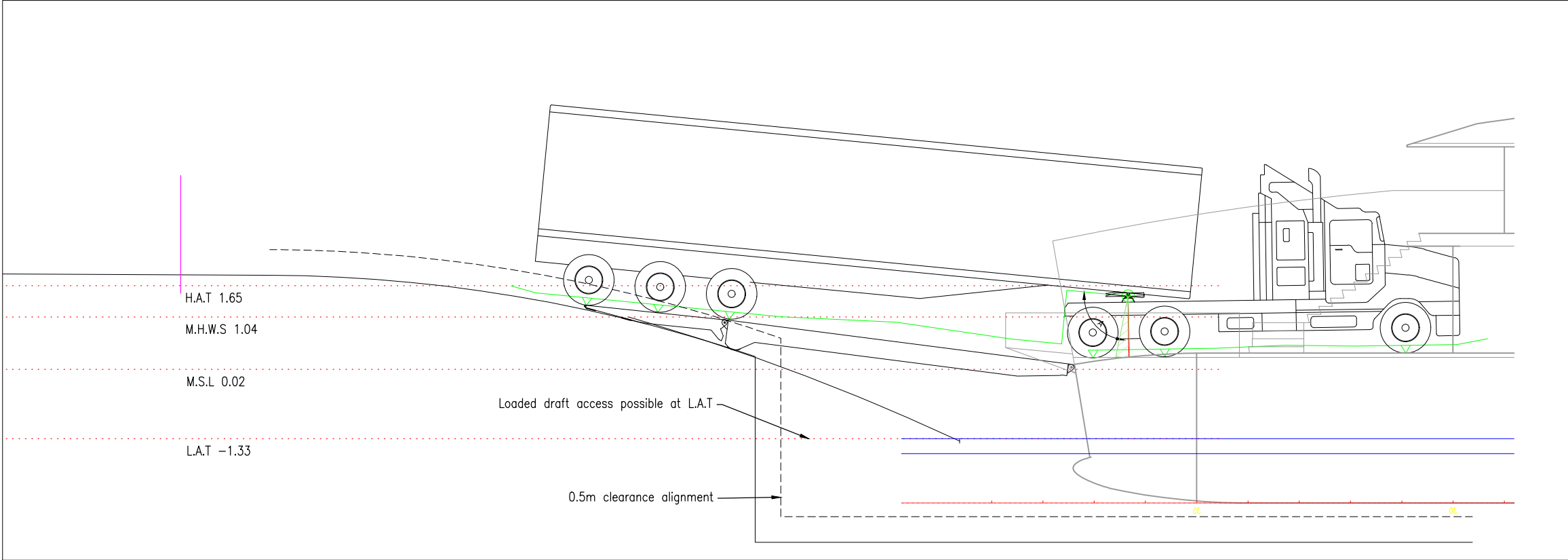
No IN SET 23 OF 35

REVISION A

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ISLAND VENTURE/ODYSSEY – HIGHEST ACCESSIBLE LEVEL



ISLAND VENTURE/ODYSSEY – LOWEST ACCESSIBLE LEVEL

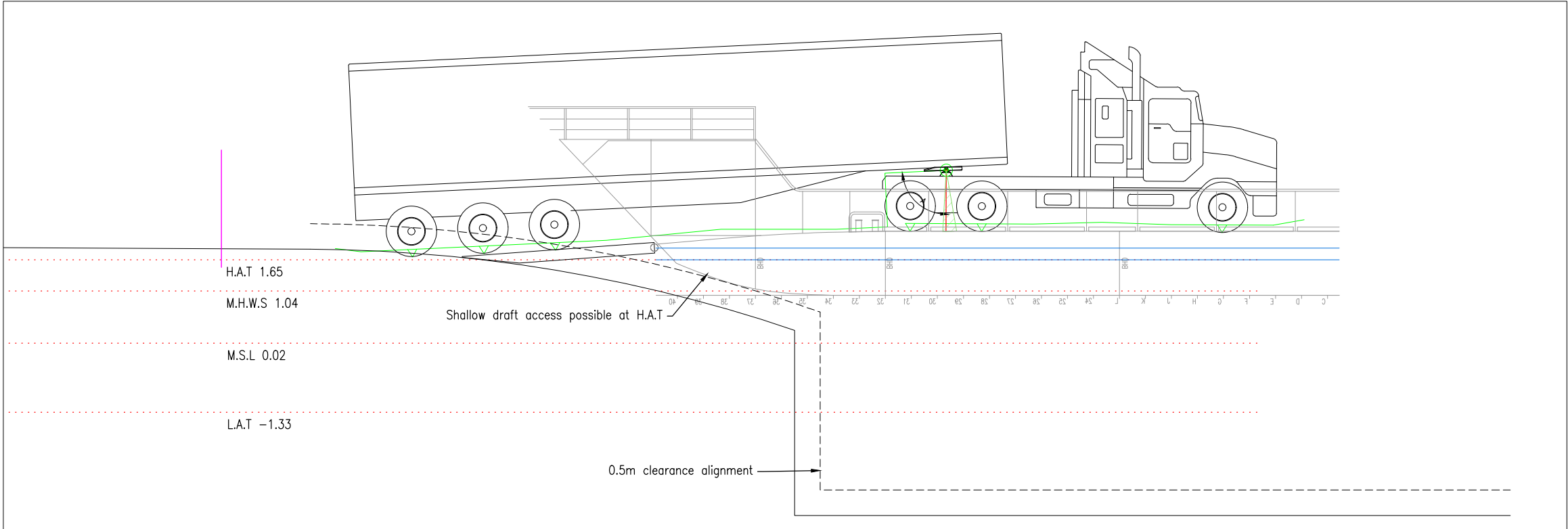
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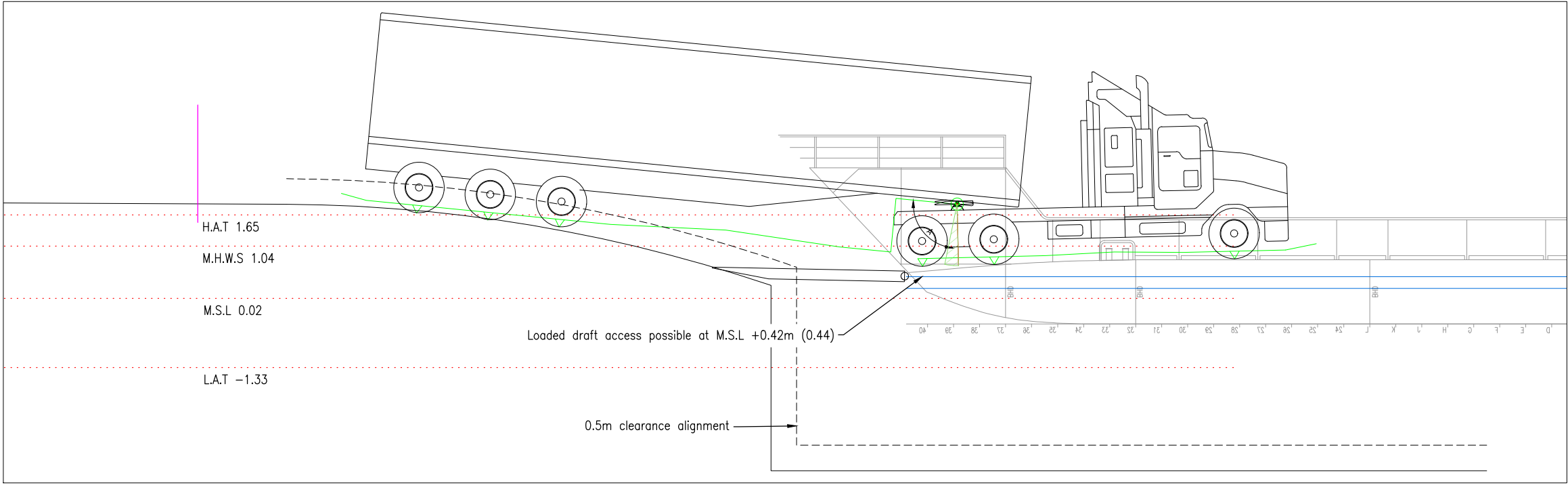
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REDLAND BAY FERRY TERMINAL		
ISLAND VENTURE/ODYSSEY SEMI RAMP SECTIONS		
DRAWING NUMBER	497-001.02-C200-01	
No IN SET	28 OF 35	REVISION A



BAY ISLANDER – HIGHEST ACCESSIBLE LEVEL



BAY ISLANDER – LOWEST ACCESSIBLE LEVEL

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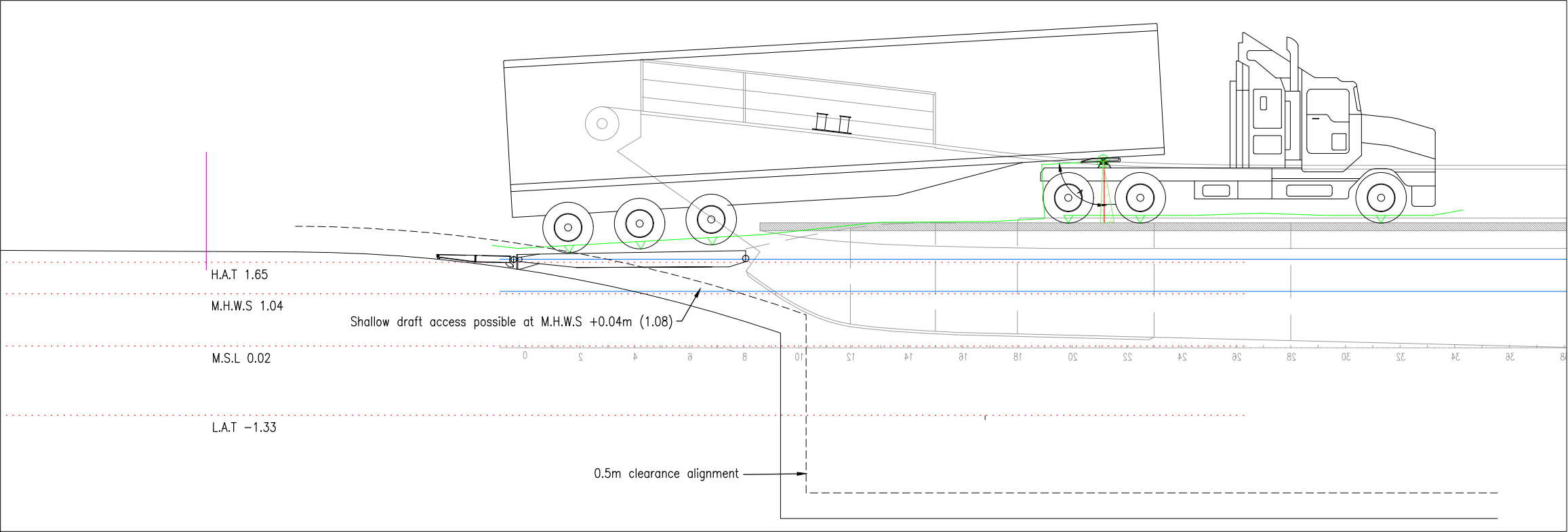
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Rev.	Description	Date	Drawn	Design	Check	RPEQ No.	& Initial	

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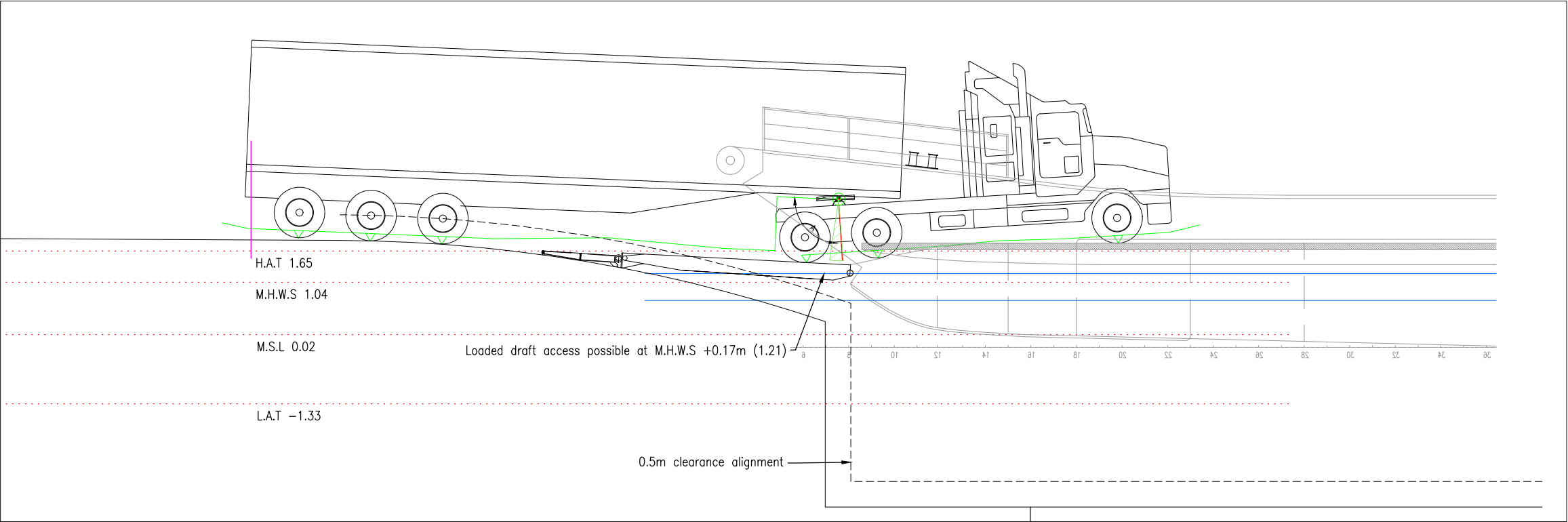
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DRAWING NUMBER	497-001.02-C200-02	
No IN SET	29 OF 35	REVISION A

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LAKARMA – HIGHEST ACCESSIBLE LEVEL



LAKARMA – LOWEST ACCESSIBLE LEVEL



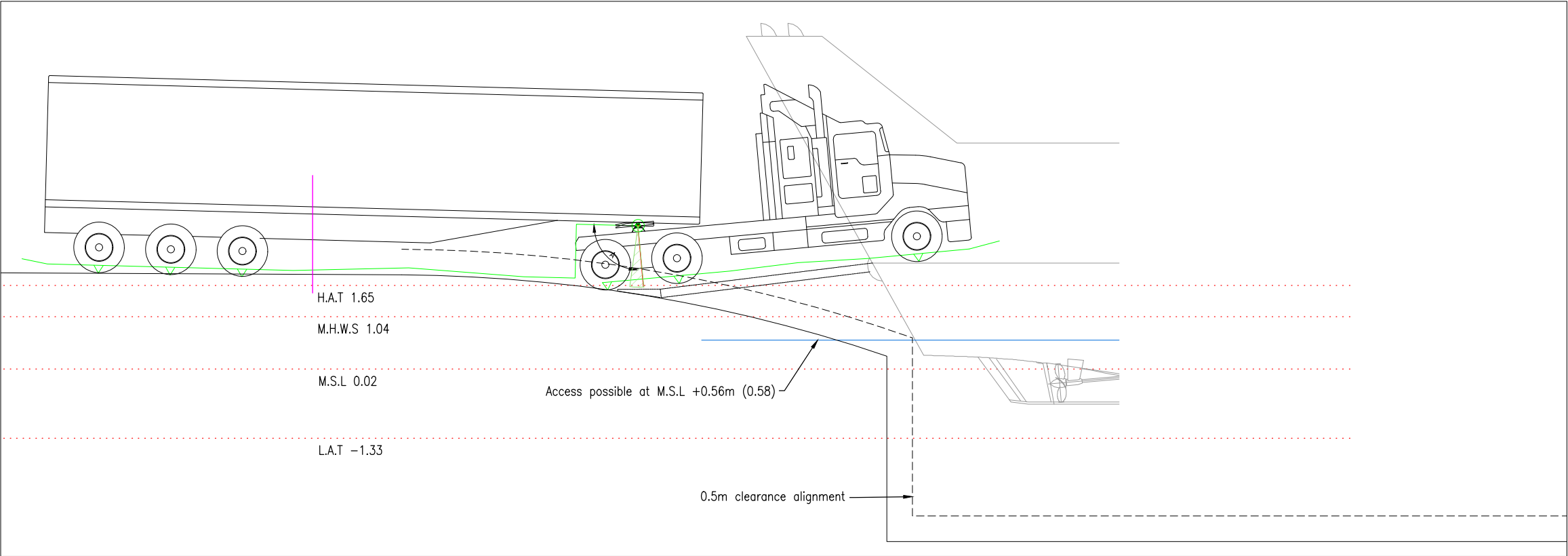
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CIVIL	D BERRY		6343	10/4/2026

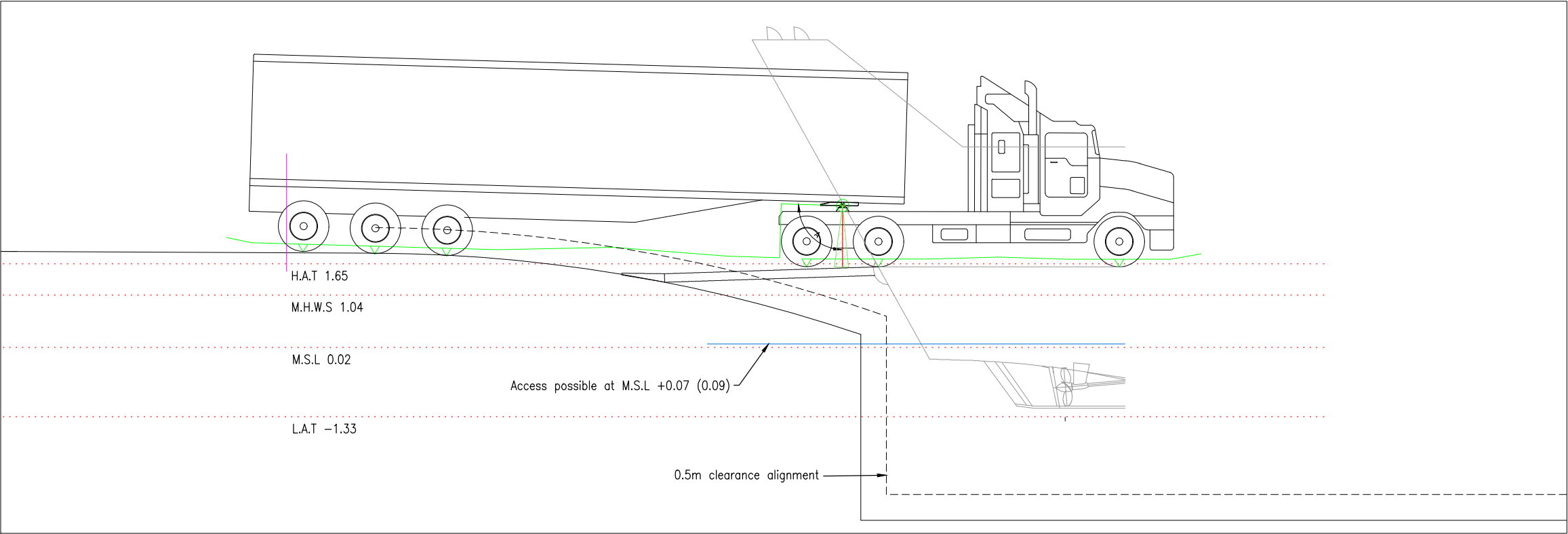
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DRAWING NUMBER	497-001.02-C200-03	REVISION
No IN SET	30 OF 35	A

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SEABREEZE – HIGHEST ACCESSIBLE LEVEL



SEABREEZE – LOWEST ACCESSIBLE LEVEL

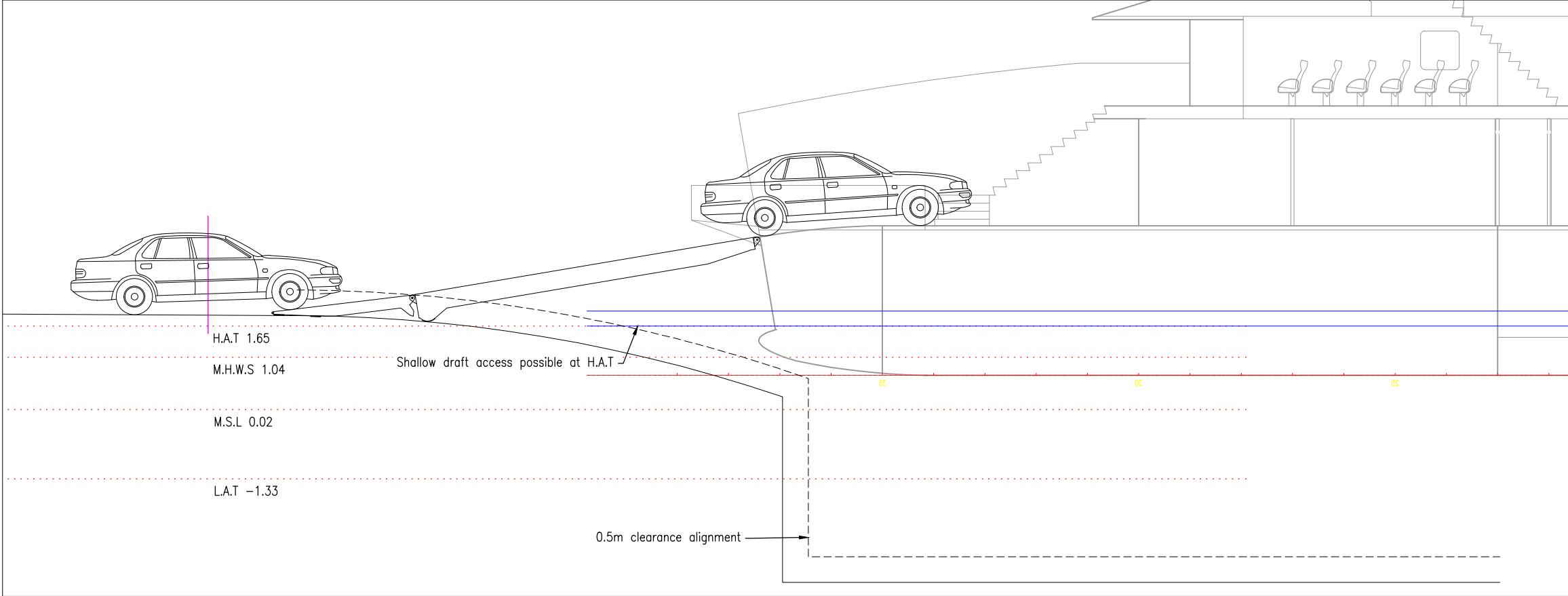


Rev.	Description	Date	Drawn	Design	Check	RPEQ No. & Initial
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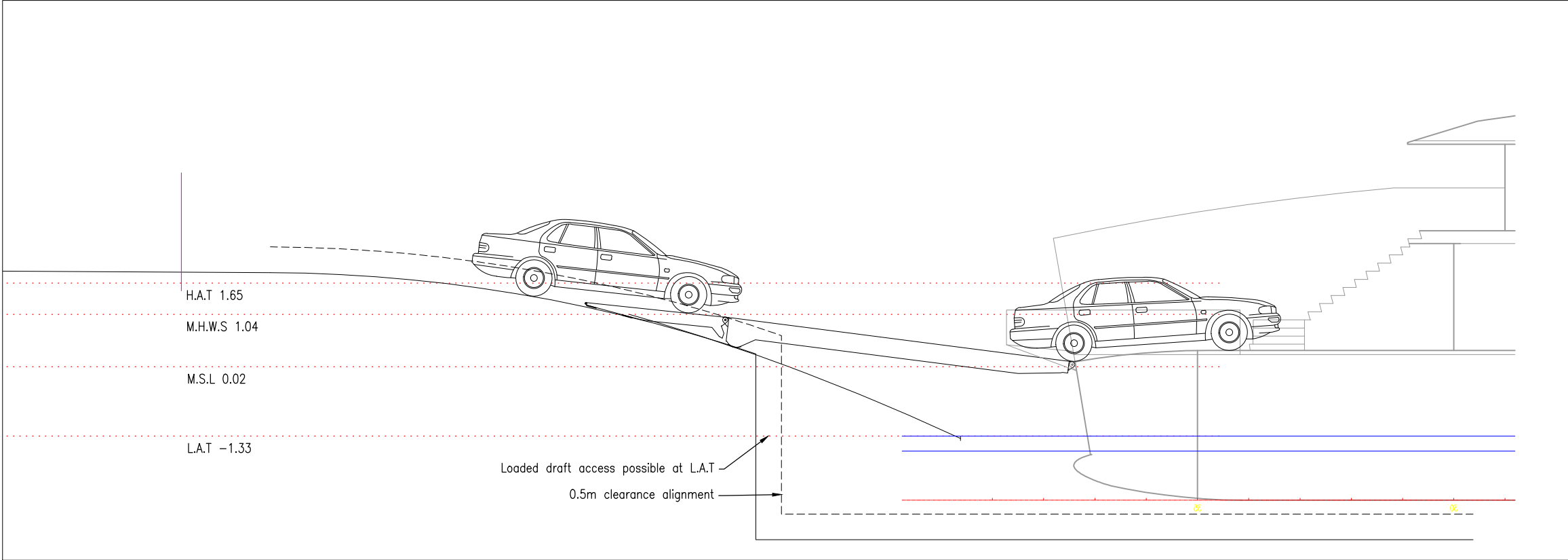
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REDLAND BAY FERRY TERMINAL		
SEABREEZE SEMI RAMP SECTIONS		
DRAWING NUMBER	497-001.02-C200-04	
No IN SET	31 OF 35	REVISION A



ISLAND VENTURE/ODYSSEY – HIGHEST ACCESSIBLE LEVEL



ISLAND VENTURE/ODYSSEY – LOWEST ACCESSIBLE LEVEL

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Rev.	Description	Date	Drawn	Design	Check	RPEQ No. & Initial		

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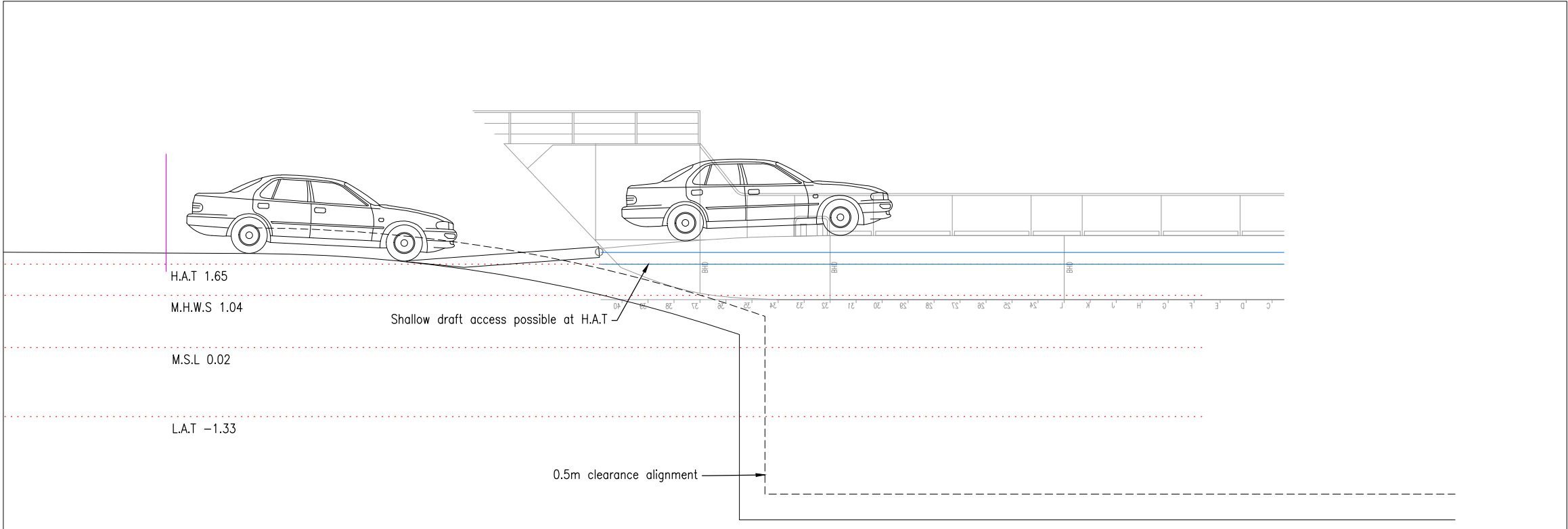
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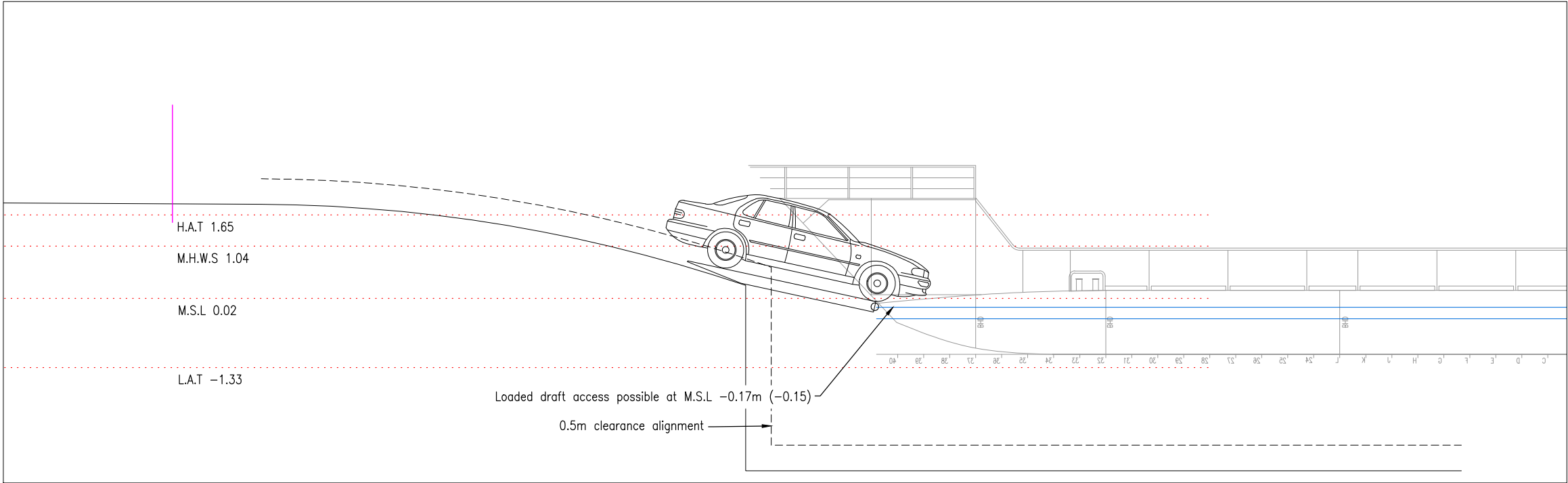
REDLAND BAY FERRY TERMINAL		
ISLAND VENTURE/ODYSSEY B99 RAMP SECTIONS		
DRAWING NUMBER	497-001.02-C200-05	
No IN SET	32 OF 35	REVISION A

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BAY ISLANDER – HIGHEST ACCESSIBLE LEVEL



BAY ISLANDER – LOWEST ACCESSIBLE LEVEL



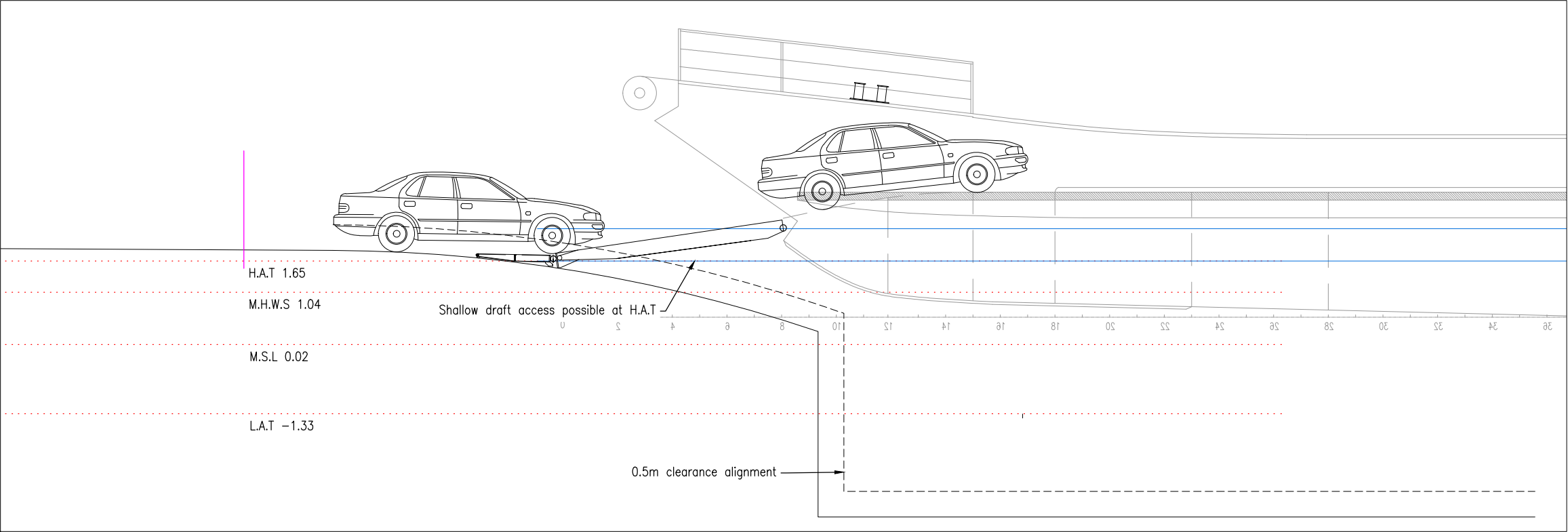
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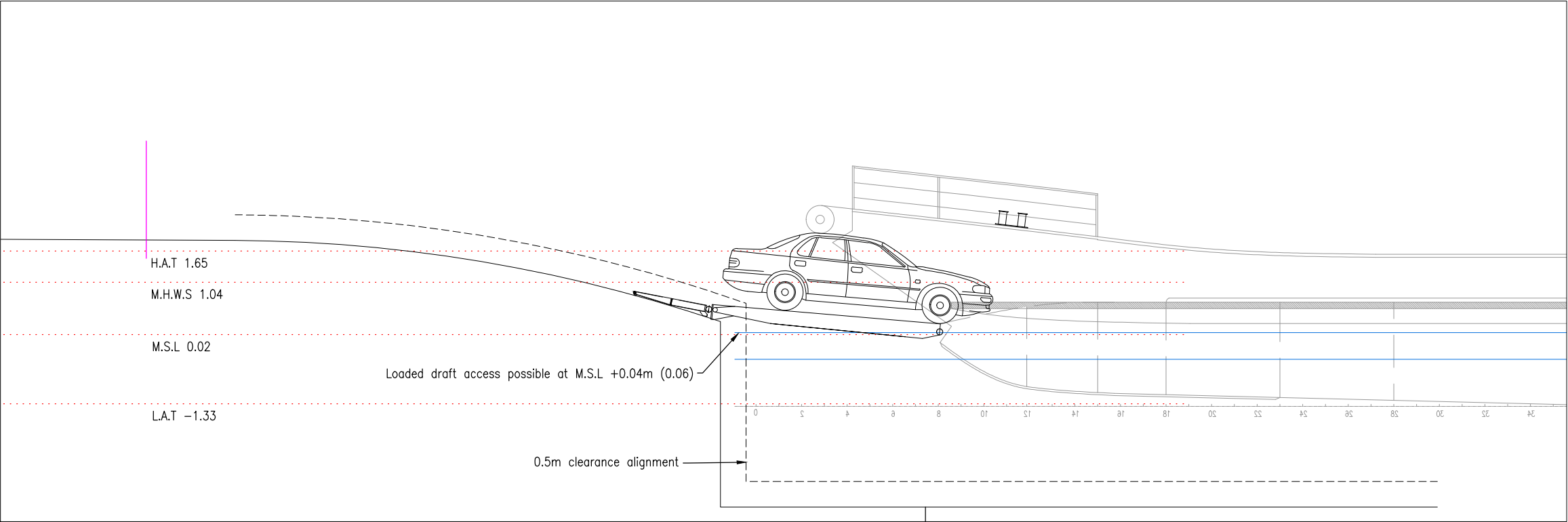
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DRAWING NUMBER	497-001.02-C200-06	
No IN SET	33 OF 35	REVISION A

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LAKARMA – HIGHEST ACCESSIBLE LEVEL



LAKARMA – LOWEST ACCESSIBLE LEVEL



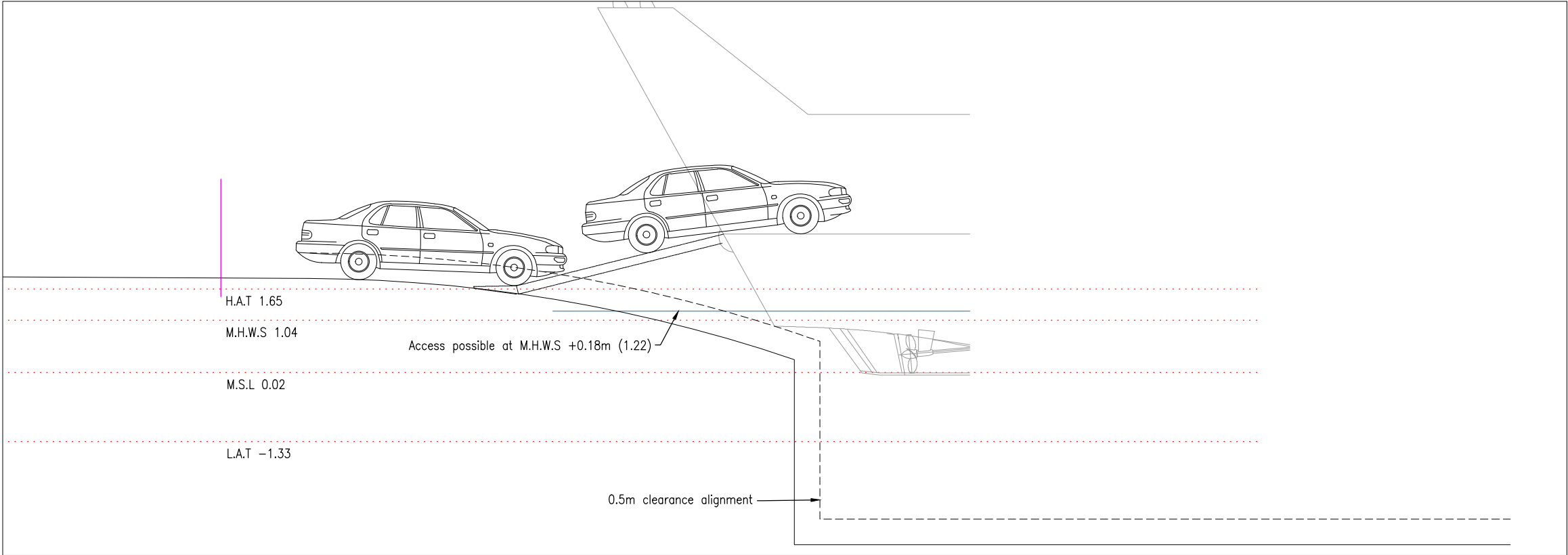
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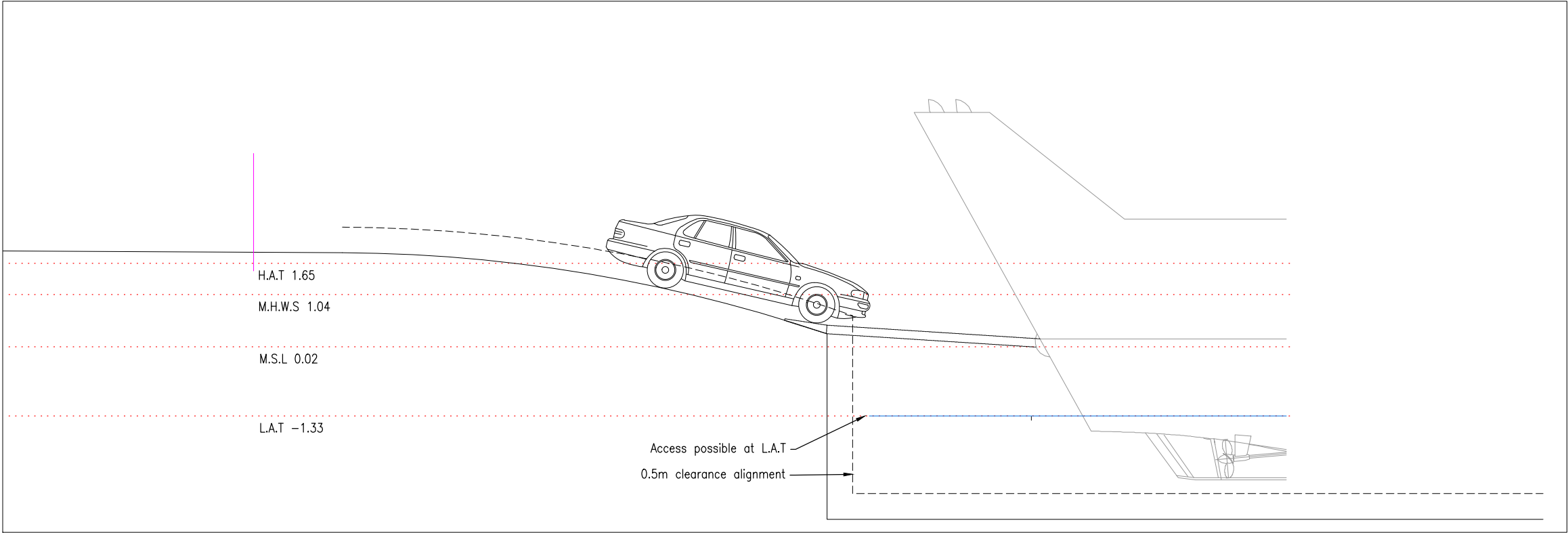
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REDLAND BAY FERRY TERMINAL		
LAKARMA B99 RAMP SECTIONS		
DRAWING NUMBER	497-001.02-C200-07	No IN SET 34 OF 35
		REVISION A

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SEABREEZE – HIGHEST ACCESSIBLE LEVEL



SEABREEZE – LOWEST ACCESSIBLE LEVEL



Rev.	Description	Date	Drawn	Design	Check	RPEQ No. & Initial
A	ISSUED FOR CONSTRUCTION	10/4/2026	JDB	JM	DB	6343 DB

ENGINEERING CERTIFICATION (RPEQ)				
ENG. AREA	NAME	SIGNATURE	No.	DATE
CIVIL	D BERRY		6343	10/4/2026

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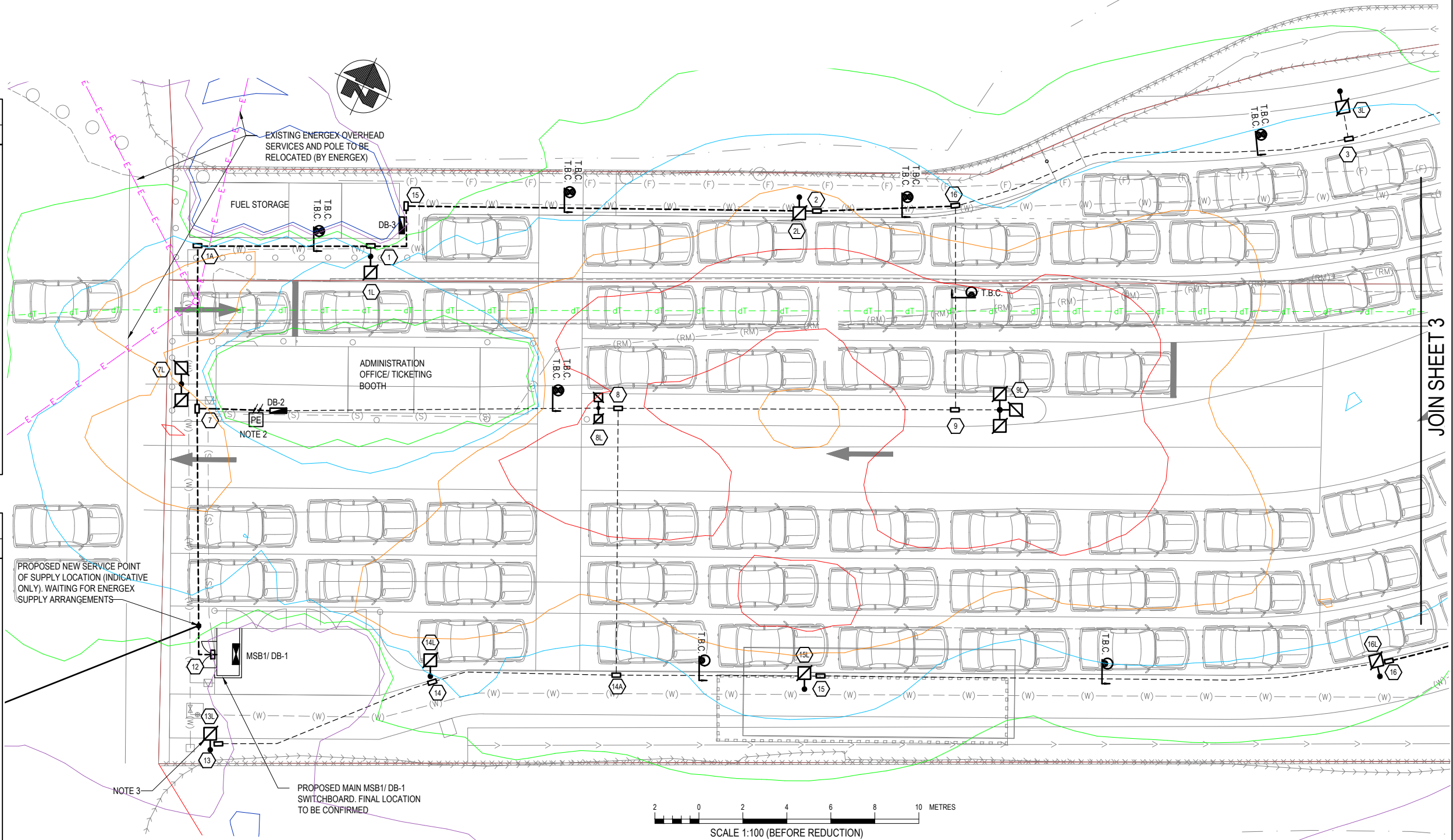
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DRAWING NUMBER	497-001.02-C200-08	
No IN SET	35 OF 35	REVISION A

APPENDIX H

Electrical and Lighting Concept Design

GENERAL LEGEND	
EQUIPMENT	DESCRIPTION
	1 BY 85W LED LUMINAIRE - MASTER 6 0F2H1 S05 - AEC ILLUMINAZIONE (HBW LIGHTING), IP66, 4000K, TILT 0° CW/ 1.0m OUTREACH ON A 10m MOUNTED POLE, DIE-CAST ALUMINIUM UNI EN1706 COLOUR BLACK. GALVANISED STEEL POLE BY HBW LIGHTING (INCLUDING FOOTING DETAILS). REFER NOTE 3 FOR TO STATION 13 REQUIREMENTS.
	AS ABOVE BUT 2 BY 85W LED LUMINAIRES BACK TO BACK
	AS ABOVE BUT 3 BY 85W LED LUMINAIRES ARRANGEMENT AS SHOWN. 3 WAY MOUNTING BRACKET AND POLE BY HBW LIGHTING.
	STATION No
	PIT TYPE 4. UNLESS OTHERWISE INDICATED (REFER NOTES UNDER UNDERGROUND RETICULATION IN SHEET 1)
	UNDERGROUND CONDUIT/ CABLE ROUTE
	CONDUIT/ CABLE DETAIL
	MAIN SWITCHBOARD
	DISTRIBUTION BOARD (FINAL LOCATION TO BE CONFIRMED)
	SERVICE PILLAR

SCHEMATIC LEGEND	
EQUIPMENT	DESCRIPTION
	AUTHORITY KILOWATT HOUR METER
	MULTIFUNCTION METER
	MOULDED CASE CIRCUIT BREAKER (RATING AS SHOWN)
	CIRCUIT BREAKER (DIN RAIL MOUNT TYPE)
	RESIDUAL CURRENT OPERATED CIRCUIT BREAKER WITH OVERCURRENT PROTECTION (RCBO DIN RAIL MOUNT TYPE)
	FUSE
	SURGE ARRESTOR
	PE CELL
	CONTACTOR
	RELAY CONTACTOR
	CURRENT TRANSFORMER
	AUTO OFF MANUAL SWITCH
	CHANGE OVER SWITCH
	TIMER
	GENERATOR



ISOLINE CONTOUR LEGEND	
	1. 3 LUX ISOLINE
	2. 5 LUX ISOLINE
	3. 10 LUX ISOLINE
	4. 20 LUX ISOLINE
	5. 30 LUX ISOLINE
	6. 40 LUX ISOLINE
	7. 50 LUX ISOLINE

CALCULATION SUMMARY				
LIGHTING SUBCATEGORY	AVERAGE HORIZONTAL ILLUMINANCE (Eh)	POINT HORIZONTAL ILLUMINANCE (Eph)	ILLUMINANCE UNIFORMITY (Ue2)	POINT VERTICAL ILLUMINANCE (Epv)
PC1	14	3	≤8	≥3
PC1/ CALCULATED	39	13.2	2.2	5.6
PP1	10	2	≤5	≥1
PP1/ CALCULATED	22.6	4	1.67	1.2

- NOTES:
- FINAL SUB-BOARDS LOCATION TO BE CONFIRMED WITH SEALINK.
 - SUPPLY AND INSTALL PE CELL ON EXTERNAL WALL OF THE ADMINISTRATION BUILDING. LOCATION TO BE CONFIRMED ON SITE. SHROUD THE PE CELL TO AVOID TO HAVE IT ACTIVATED BY NEARBY ARTIFICIAL LIGHT (i.e. EXTERNAL LIGHTING).
 - FOR STATION 13 ONLY LUMINAIRE TYPE AND POLE:
• 1x21W LED MASTER 6 0F2H1 S05 4.7-1M LUMINAIRE BY AEC ILLUMINAZIONE, IP66, 4000K, TILT 0° CW 0.6m OUTREACH ON A 6m MOUNTED POLE, DIE-CAST ALUMINIUM UNI EN1706 COLOUR BLACK. GALVANISED STEEL POLE BY GM POLE OR APPROVED EQUIVALENT.
 - CONFIRM POLE FOOTING REQUIREMENTS WITH POLE MANUFACTURER.

CONCEPT PLAN
(NOT FOR CONSTRUCTION)
18/08/2021 3:20 PM

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REV	DATE	DETAILS	DRAWN	CHECKED	APPRVD
C	18.08.21	PRELIMINARY ISSUE - ISOLUX CONTOURS SHOWN	JAR	SC	BK
B	06.04.21	PRELIMINARY ISSUE	JAR	BH	BK
A	16.03.21	PRELIMINARY ISSUE	JAR	BH	BK

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ampflo
Electrical and Telecommunications Consultants
ABN 28 111 423 842
Phone : (07) 3372 9280
Email : projects@ampflo.com.au
Website : ampflo.com.au

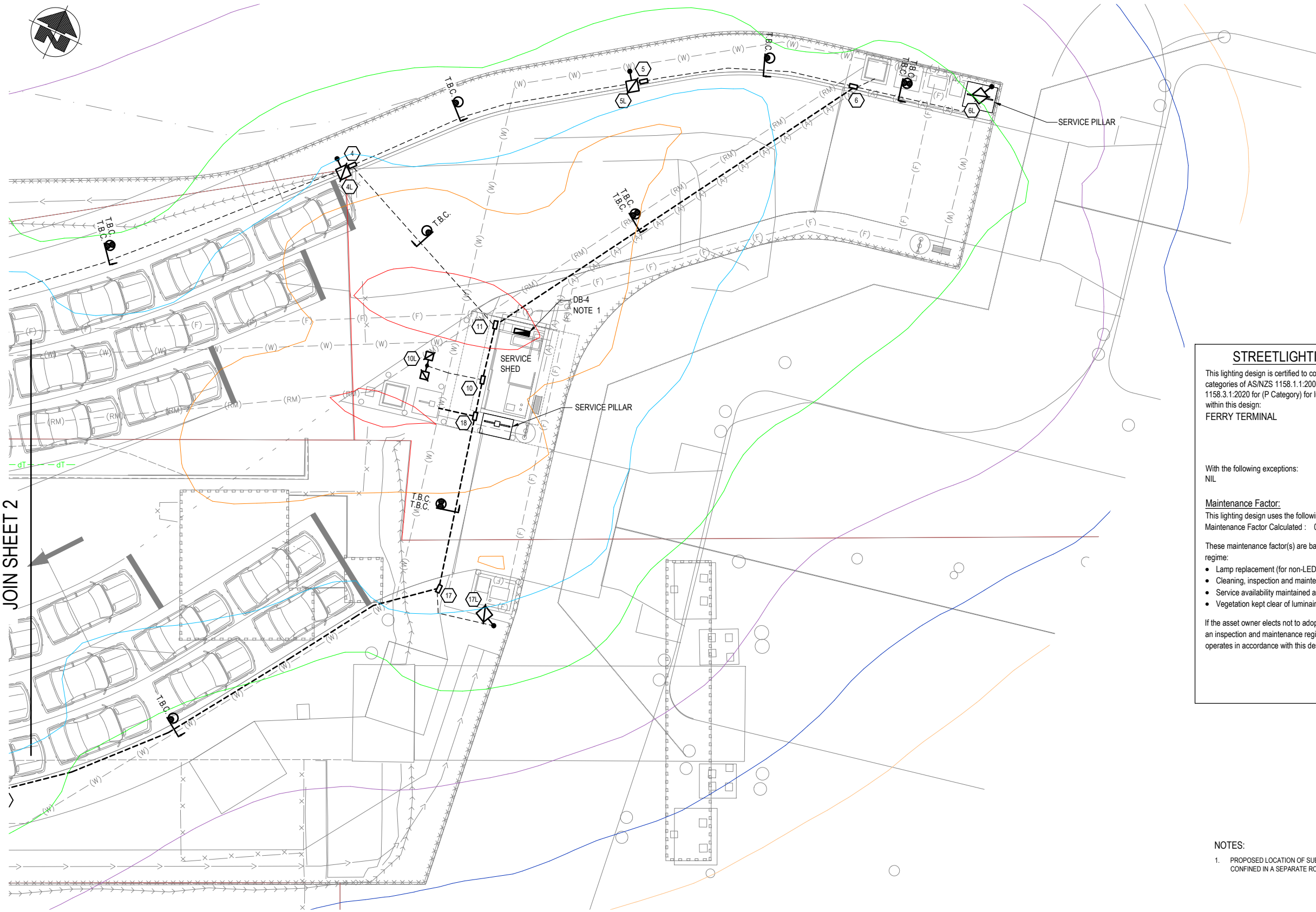
ECAAS
ISO 9001 CERTIFIED
QUALITY MANAGEMENT

CERTIFICATION: APPROVED: RPEQ No: DATE:	CHECKED: B.HYLAND
DESIGNER: J. ROBLES	DRAWING: A211037
ISSUE DATE: 18.08.21	PROJECT: 211037

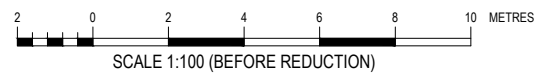
PROJECT WEINAM ST, REDLAND BARGE TERMINAL REDLAND BAY SITE PLAN LAYOUT AND LEGEND SHEET 1 OF 2	ISSUE C
SHEET 2 OF 5	



JOIN SHEET 2



ISOLINE CONTOUR LEGEND	
1.	3 LUX ISOLINE
2.	5 LUX ISOLINE
3.	10 LUX ISOLINE
4.	20 LUX ISOLINE
5.	30 LUX ISOLINE
6.	40 LUX ISOLINE
7.	50 LUX ISOLINE



STREETLIGHTING CERTIFICATION

This lighting design is certified to comply generally with the nominated categories of AS/NZS 1158.1.1:2005 (V Category) and / or AS/NZS 1158.3.1:2020 for (P Category) for luminaires supplied on the following road within this design:
FERRY TERMINAL

PC1

With the following exceptions:
NIL

Maintenance Factor:
This lighting design uses the following maintenance factor(s):
Maintenance Factor Calculated : 0.75

These maintenance factor(s) are based on the following nominal maintenance regime:

- Lamp replacement (for non-LED luminaires) at 36 month intervals.
- Cleaning, inspection and maintenance of all luminaires at 36 month intervals
- Service availability maintained at not less than 95%.
- Vegetation kept clear of luminaires.

If the asset owner elects not to adopt this maintenance regime, they shall develop an inspection and maintenance regime such that the overall lighting installation operates in accordance with this design.

- NOTES:
1. PROPOSED LOCATION OF SUB-BOARD IN THE SERVICE SHED. BOARD TO BE CONFINED IN A SEPARATE ROOM OR SPACE TO THE SHED SERVICE ROOM.

CONCEPT PLAN
(NOT FOR CONSTRUCTION)

18/08/2021 3:20 PM

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C	18.08.21	PRELIMINARY ISSUE - ISOLUX CONTOURS SHOWN	JAR	SC	BK
B	06.04.21	PRELIMINARY ISSUE	JAR	BH	BK
A	16.03.21	PRELIMINARY ISSUE	JAR	BH	BK
REV	DATE	DETAILS	DRAWN	CHECKED	APPRVD

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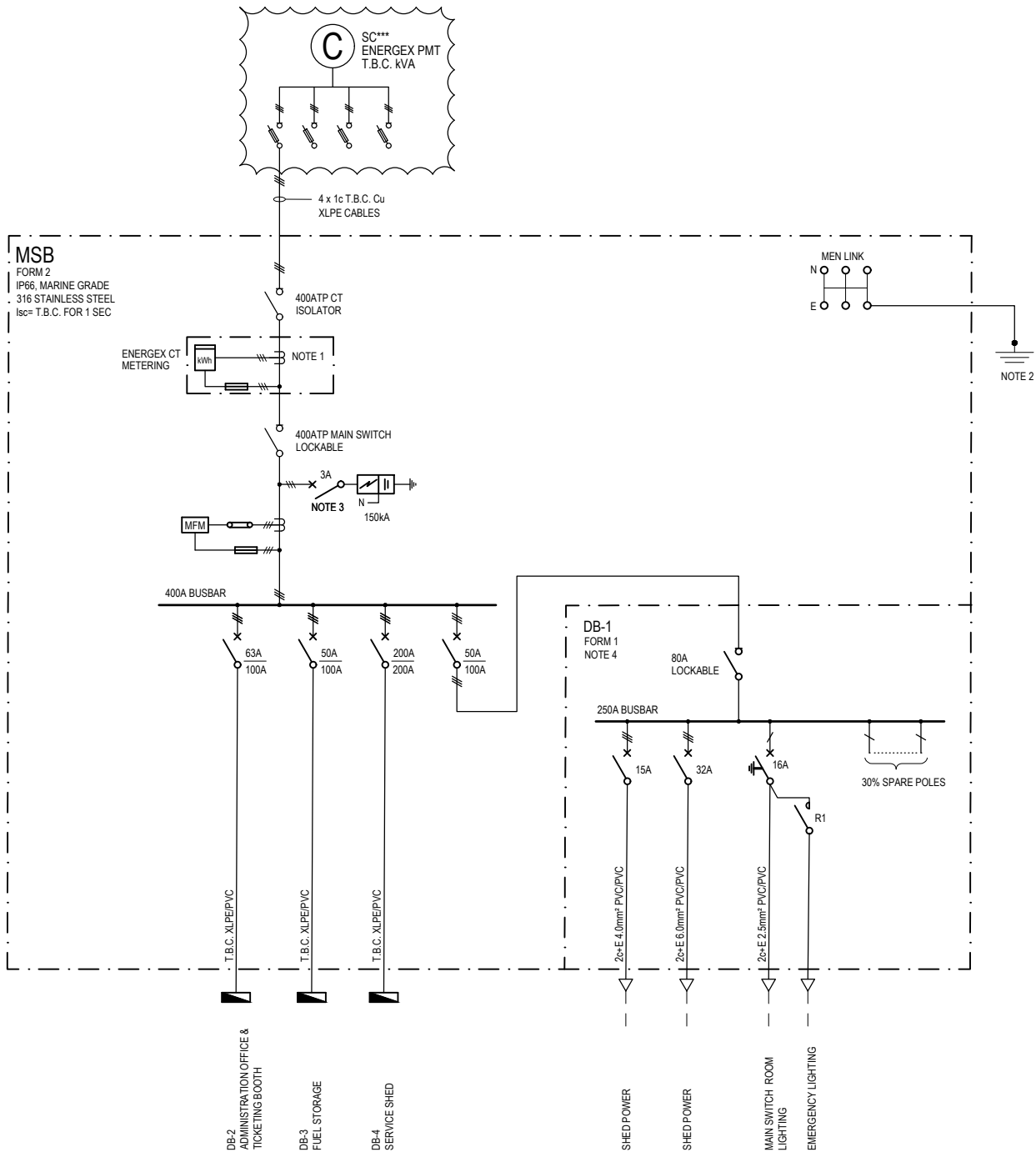
Electrical and Telecommunications Consultants
ABN 28 111 423 842
Phone : (07) 3372 9280
Email : projects@ampflo.com.au
Website : ampflo.com.au

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Electrical and Telecommunications Consultants
Phone : (07) 3372 9280
Email : projects@ampflo.com.au
Website : ampflo.com.au

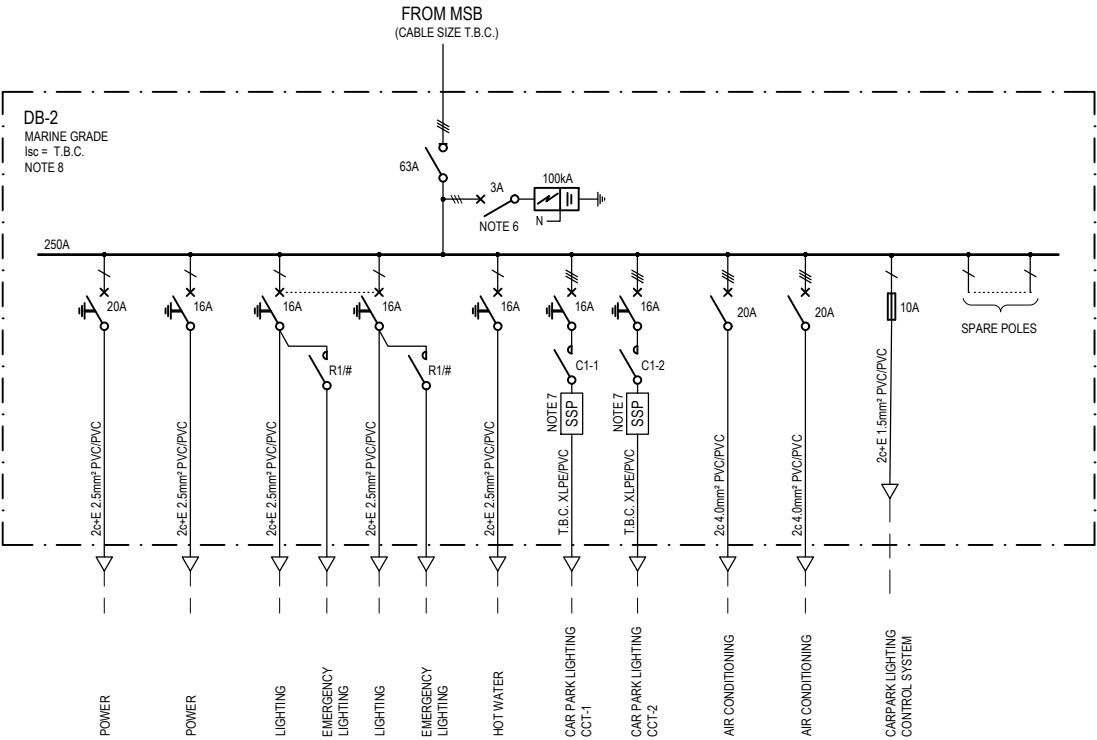
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CHECKED: B.HYLAND	DRAWING: A211037
DESIGNER: J. ROBLES	PROJECT: 211037
ISSUE DATE: 18.08.21	SHEET 3 OF 5

C

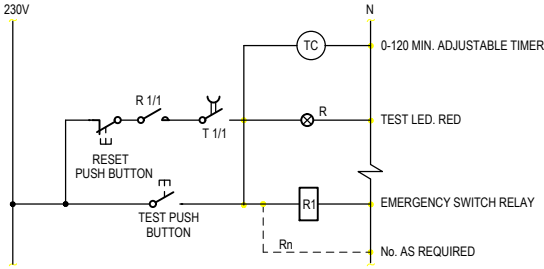
FILE: P21103701 WORKING DRAWINGS A211037C
PLOT: 18/08/2021 3:20:55 PM



MAIN SWITCHBOARD (MSB1/DB1) SINGLE LINE DIAGRAM
RATING OF PROTECTIVE DEVICES FOR SUBMAINS TO BE PROVIDED ONCE
ENERGEX POINT OF SUPPLY IS ARRANGEMENT IS CONFIRMED
N.T.S



ADMINISTRATION BUILDING AND
TICKETING BOOTH
SUB-BOARD GENERAL ARRANGEMENT
N.T.S



EMERGENCY LIGHTING TEST CIRCUIT
SCHEMATIC
N.T.S

- NOTES:
- PROVIDE REMOVABLE LINKS FOR CURRENT TRANSFORMER.
 - SUPPLY AND INSTALL STAINLESS STEEL EARTH ROD FOR THE M.E.N.
 - SUPPLY AND INSTALL SURGE PROTECTION CIRCUIT BREAKER SCB1-3-25 AND SURGE DIVERTER SDN3-150-275 (BY NOVARIS).
 - SEALINK TO CONFIRM POWER REQUIREMENT FOR DB-1.
 - CONSUMERS MAINS AND SUBMAINS CABLE SIZE TO BE CALCULATED ONCE ENERGEX CONFIRM POWER TO SITE ARRANGEMENT.
 - SUPPLY AND INSTALL SURGE PROTECTION CIRCUIT BREAKER SCB1-3-25 AND SURGE DIVERTER SDD3-100-275 (BY NOVARIS).
 - SUPPLY AND INSTALL SERIES SURGE PROTECTORS SSP3-20-50-275-A (BY NOVARIS) TO EACH OUTDOOR LIGHTING CIRCUIT.
 - TYPICAL SUB-BOARD LAYOUT. LOCATION TO BE CONFIRMED. LOAD FOR EACH INDIVIDUAL SUB-BOARD IS INDICATIVE ONLY. SEALINK TO CONFIRM SUB-BOARD POWER LAYOUT REQUIREMENTS. BOARD SHALL HAVE A MINIMUM NUMBER OF 24 POLES (TO BE CONFIRMED). BOARD SHOULD BE IP66, STAINLESS STEEL ORANGE, LOCKABLE WALL MOUNTED BOARD (NHP LEGRAND OR APPROVED EQUIVALENT). CABLE SIZE TO BE ESTIMATED ONCE ENERGEX CONFIRM POWER TO THE SITE ARRANGEMENT.

CONCEPT PLAN
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B	06.04.21	PRELIMINARY ISSUE	JAR	BH	BK
A	16.03.21	PRELIMINARY ISSUE	JAR	BH	BK

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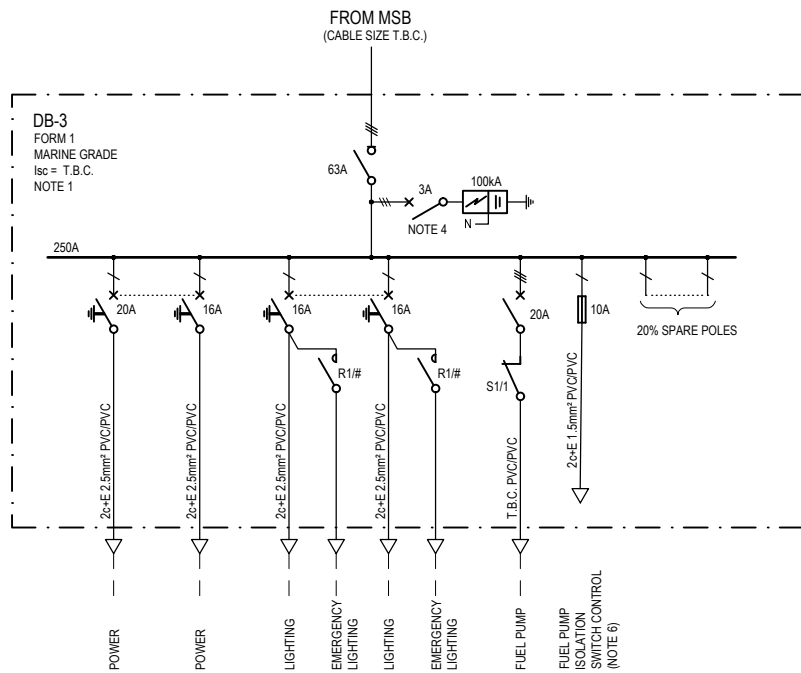
ampflo
ABN 28 111 423 842
Electrical and Telecommunications Consultants
Phone : (07) 3372 9280
Email : projects@ampflo.com.au
Website : ampflo.com.au

ECAAS
ISO 9001
CERTIFIED
QUALITY
MANAGEMENT

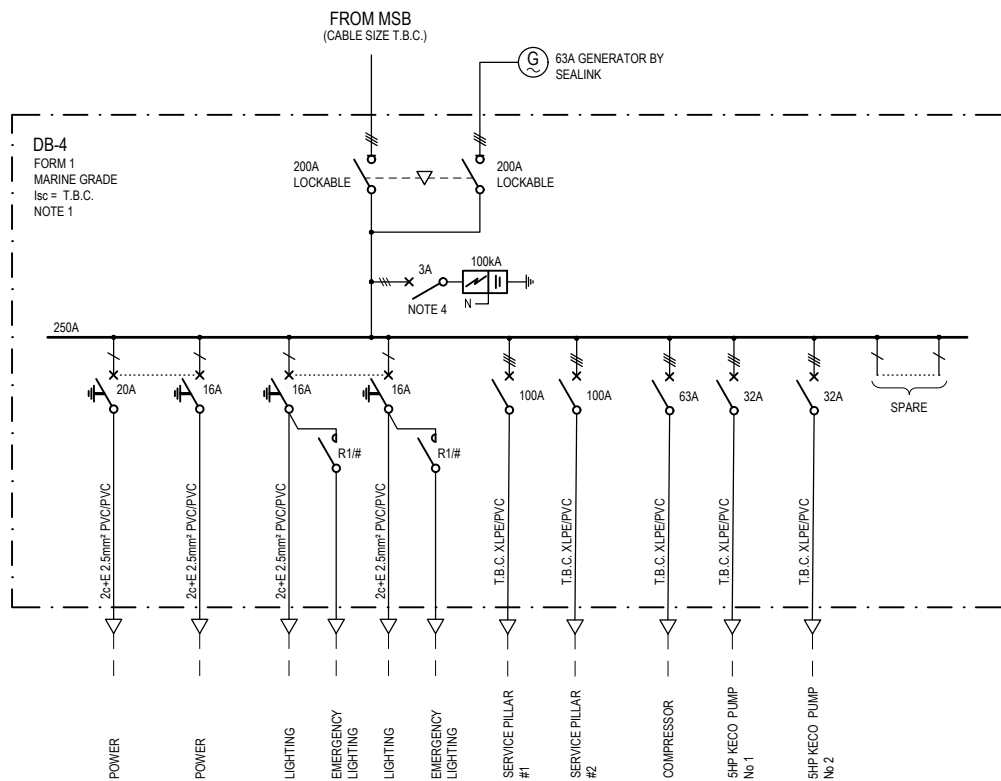
CERTIFICATION: APPROVED: RPEQ No: DATE:
CHECKED: B.HYLAND
DESIGNER: J. ROBLES
ISSUE DATE: 18.08.21

PROJECT WEINAM ST, REDLAND BARGE TERMINAL REDLAND BAY MSB SCHEMATIC
DRAWING: A211037
PROJECT: 211037
SHEET 4 OF 5

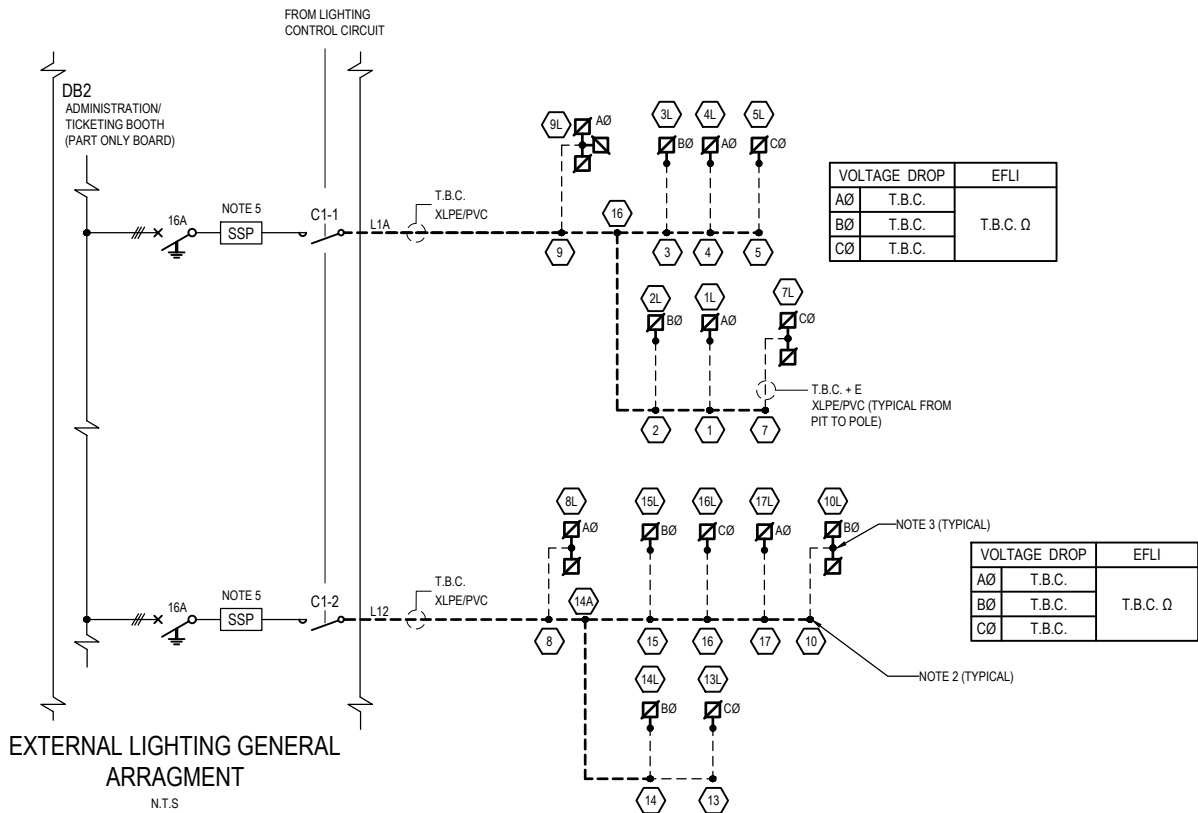
ISSUE
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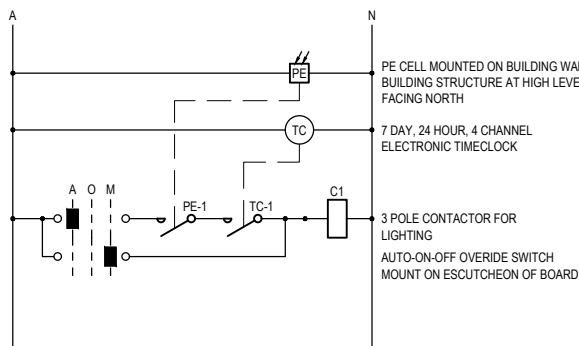
SUB-BOARD GENERAL ARRANGEMENT
FUEL STORAGE
N.T.S



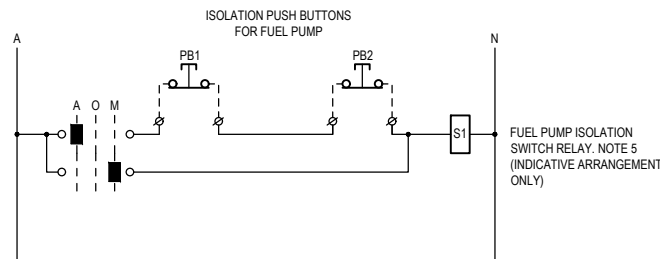
SUB-BOARD GENERAL ARRANGEMENT
SERVICE SCHED
N.T.S



EXTERNAL LIGHTING GENERAL ARRAGMENT
N.T.S



CAR PARK LIGHTING CONTROL SCHEMATIC
N.T.S



FUEL PUMP ISOLATION SWITCH CONTROL SCHEMATIC
N.T.S

- NOTES:
- TYPICAL SUB-BOARD LAYOUT, LOCATION TO BE CONFIRMED. LOAD FOR EACH INDIVIDUAL SUB-BOARD IS INDICATIVE ONLY. SEALINK TO CONFIRM SUB-BOARD POWER LAYOUT REQUIREMENTS. BOARD SHALL HAVE A MINIMUM NUMBER OF 24 POLES (TO BE CONFIRMED). BOARD SHOULD BE IP66, STAINLESS STEEL ORANGE, LOCKABLE WALL MOUNTED BOARD (NHP LEGRAND OR APPROVED EQUIVALENT). CABLE SIZE TO BE ESTIMATED ONCE ENERGEX CONFIRM POWER TO THE SITE ARRANGEMENT.
 - TYPE 4 PIT. SUPPLY AND INSTALL UNDERGROUND WATERPROOF JUNCTION BOX (BY FULTON INDUSTRIES AUSTRALIA, IP68 DOME TYPE, SIMILAR TO THE ONES USE BY TMR OR ENERGEX FOR THE STREET LIGHTING). PIT AS PER NOTES IN SHEET No 1, FOR UNDERGROUND RETICULATION.
 - SUPPLY AND INSTALL THE FOLLOWING ITEMS AT THE BASE OF EACH POLE:
 - 10A CIRCUIT BREAKER (DIN RAIL TYPE)
 - 10A SWITCH (DIN RAIL TYPE)
 - SINGLE PHASE SERIES SURGE PROTECTOR SSP1-16-15-275
 - SUPPLY AND INSTALL SURGE PROTECTION CIRCUIT BREAKER SCB1-3-25 AND SURGE DIVERTER SDD3-100-275 (BY NOVARIIS).
 - FUEL PUMP ISOLATION PUSH BUTTONS, INSTALLATION AND WIRING ARRANGEMENT BY ELECTRICAL CONTRACTOR, LOCATIONS TO BE CONFIRMED ON SITE.
 - SUB-BOARD FEEDING THE FUEL PUMP TO BE CONFIRMED. CURRENTLY SHOWN BEING FED FROM FUEL STORAGE BOARD. SEALINK/ PENSAR TO CONFIRM.

CONCEPT PLAN
(NOT FOR CONSTRUCTION)

18/08/2021 3:20 PM

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C	18.08.21	PRELIMINARY ISSUE - ISOLUX CONTOURS SHOWN	JAR	SC	BK
B	06.04.21	PRELIMINARY ISSUE	JAR	BH	BK
A	16.03.21	PRELIMINARY ISSUE	JAR	BH	BK
REV	DATE	DETAILS	DRAWN	CHECKED	APPRVD

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APPROVED:
RPEQ No:
DATE:

CHECKED: B.HYLAND
DESIGNER: J. ROBLES
ISSUE DATE: 18.08.21

PROJECT
WEINAM ST, REDLAND BARGE TERMINAL
REDLAND BAY
DBs SCHEMATIC AND EXTERNAL LIGHTING ARRANGEMENT

DRAWING: A211037
PROJECT: 211037
SHEET 5 OF 5

C

APPENDIX I

Redland City Council (City Water) Water and Sewer Connection Response

Kimberley Guy

From: Jason Mackenzie
Sent: Tuesday, 24 August 2021 5:54 PM
To: Daniel Berry
Subject: FW: [#497-001] 20210824 - CRAB555624 - Service Agreement Notice - PDA Ferry Terminal

From: Edward McDermott <Edward.McDermott@redland.qld.gov.au>
Sent: Tuesday, 24 August 2021 5:28 PM
To: Jason Mackenzie <jasonmackenzie@projexpartners.com.au>
Cc: Richard Braithwaite <Richard.Braithwaite@redland.qld.gov.au>
Subject: 20210824 - CRAB555624 - Service Agreement Notice - PDA Ferry Terminal

Projex Partners IT Security Team

Warning: Sender @Edward.McDermott@redland.qld.gov.au has never sent any emails to your organization. Please be careful before replying or clicking on the URLs.

[UNSAFE Click to Delete](#) [Click to Mark SAFE](#)

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Hi Jason

As discussed, Redland City Council does not issue "Service Agreement Notifications"

As the works are not impacting Council assets, there is no need for an additional assessment or application to Council.

For the proposed change to the water meter and water service, City Water will provide you a quote to undertake the works.

Please let me know if you require anything else.

Thanks

Eddie McDermott

Assessment Engineer

City Planning & Assessment

Redland City Council

P +617 3843 8067



I acknowledge the traditional custodians of the lands and seas where I work. I pay my respects to Elders, past, present and future.

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