

Pelican Waters Northern Lake Management Plan

2019 – 2029

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1 Introduction

This Lake Management Plan has been prepared by Sunshine Coast Council to promote effective long-term management of the Northern Pelican Waters Lake system. It is a 10 year plan that supersedes the original Lake Management Plan developed by Cardno in 2011.

1.1 Purpose

The purpose of the Lake Management Plan is to:

- outline the rights and responsibilities of the lake owners, residents and users;
- develop an appropriate inspection and maintenance schedule to meet objectives and performance standards;
- provide guidelines and management actions for ensuring compliance with secondary contact water quality guidelines;
- provide guidelines for acceptable use of the lake such as sport and recreation; and
- define permitted uses subject to approval such as commercial operations and private structures.

1.2 Objectives

The objectives of the Lake Management Plan are specified in Table 1 below.

Table 1: Management plan objectives

Objective	Performance standard	Refer
Public use complies with guidelines outlined in this management plan	<ul style="list-style-type: none"> • Public, residents and sporting bodies are informed of acceptable uses, their rights and responsibilities 	Section 5
Water quality is maintained to a standard suitable for secondary contact recreation use ¹	<ul style="list-style-type: none"> • Compliance with water quality guidelines • Effective operation and maintenance of salinity exchange system, weir and stormwater infrastructure • Growth of undesirable marine organisms is absent or regulated 	Section 6
Amenity and visual quality of the lake is of an acceptable standard	<ul style="list-style-type: none"> • The lake is free of litter and debris and/or removed in a timely manner • Growth of undesirable marine organisms is absent or regulated • Structures are designed and located suitably 	Section 6 and 8
Lake assets are maintained in a structurally sound and safe condition	<ul style="list-style-type: none"> • Routine inspections and maintenance are undertaken in accordance with relevant schedules • Funding adequate to maintain assets 	Section 8
The lake facilitates effective drainage of stormwater run-off	<ul style="list-style-type: none"> • Compliance with relevant design criteria • Maintain lake to acceptable tolerances from design profile • Effective operation and maintenance of weirs, revetment walls and stormwater pipes 	Section 8.2

¹¹ Secondary contact recreation is any activity where only the limbs are regularly wet, and swallowing water is unusual. Examples of secondary contact recreation are boating, fishing, rowing, kayaking, dragon boating, wading etc.

2 Background

2.1 Site overview

Pelican Waters Northern Lake is a brackish artificial tidally restricted lake, 24 ha in area, built in accordance with the relevant planning approvals granted by the Department of Natural Resources and Mines, Environmental Protection Agency and the former Caloundra City Council.

The lake is defined as the area contained within the concrete revetment walls and beaches from the three inlet weirs adjacent to Tweddell Drive in the north (lotplan 966SP248483) to the lock and outlet weir structure adjacent to Columba Place in the south (lotplan 932SP179112). Figure 1 represents the Pelican Waters Northern Lake system and locality.

The inlet weirs regulate inflows, including flooding from the external catchments of Lamerough Creek and Duck Holes Creek. The structures also act as a barrage between the saline environment of the lake and the existing wetlands north of the development buffer zone.

The outlet weir acts as a barrage between the tidal waters of Lamerough Canal and the predominately steady-state water level of RL 0.60m AHD within the lake. High tides up to RL 0.85m AHD (HAT) over top the weir approximately one hundred (100) occasions per year.

Rock protection exists along areas of the bank where design velocities determined such protection was needed.

Stormwater drainage enters the lake from the adjoining land development through controlled outlet structures and pipes into the lake.

The land abutting the lake is primarily urban residential that has been progressively developed since the 1980s in accordance with a Development Control Plan.

Residents can navigate their motor-powered vessels to Lamerough Canal and Pumicestone Passage via the lock structure in the south.

Public access is available at designated places along the banks which have been created as public park or road reserve abutting the lake.

Use of the lake system for recreational purposes is an added benefit and subject to guidelines outlined in this management plan.



Figure 1: Locality plan

2.2 Assets

The assets included in this management plan are specified in Table 2 below. Only assets managed and maintained by council are included.

Table 2: Lake assets

Assets	Description	Quantity
Weirs	<p data-bbox="371 436 1110 470">Broad crested weirs that assist in controlling lake water levels.</p>  <p>The first photograph shows a wide, low weir structure with a wooden post in the foreground, situated in a large body of water under an overcast sky. The second photograph shows a metal walkway structure supported by concrete pillars, crossing a body of water. The third photograph shows a concrete weir structure with a concrete walkway, surrounded by lush green vegetation.</p>	<p data-bbox="1316 436 1380 470">4</p> <p data-bbox="1316 481 1420 548">(approx. 129 m)</p>

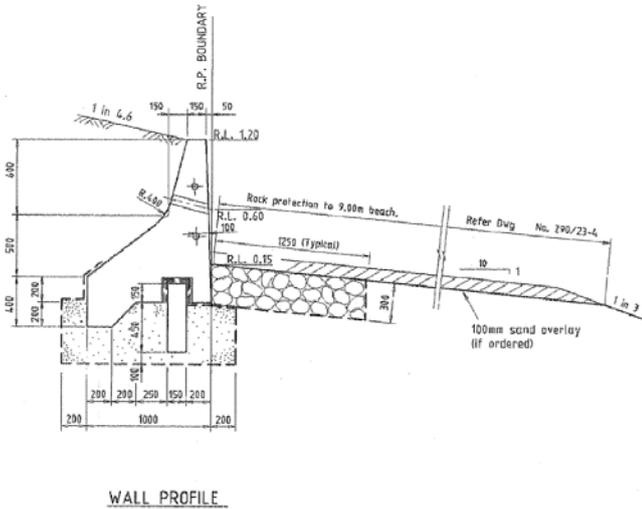
Lock

The navigation lock provides a mechanism whereby the difference in water level between the lake and the tidal canal can be traversed via watercraft (refer design drawings in Appendix A). Whilst there is no height limitation for vessels using the lock, the downstream bridges and bridge within the lake will cause height restrictions. Vessels up to 15 metres in length, 4.5 metres in width and 2.0 metres draft can generally pass through safely at low tide.

1



Assets	Description	Quantity
<p>Salinity exchange system</p>	<p>The water quality maintenance pumping system consists of an intake jetty located in the Pumicestone Passage at Golden Beach, an underground pumpwell, pumps and associated controls in Fraser Park, a pipeline, and outlet structures.</p> <p>An overview plan of the salinity exchange system is shown in Appendix B.</p> <p>Control board:</p>  <p>Inlet:</p> 	

Assets	Description	Quantity
Revetment walls	<p>Lake edge abutting public land only - required to maintain the stability of the lake edge, whilst contributing to the aesthetics and usefulness of the lake.</p> <p>The top of the revetment wall is approximately RL 1.2 m AHD.</p> 	Approx. 1,920 m
Rock scour	<p>Rock scour provides protection to revetment walls and associated land assets.</p>  <p style="text-align: center;">WALL PROFILE</p>	Approx. 6,541 m

Assets	Description	Quantity
Pontoons	<p data-bbox="370 212 1236 302">Floating platforms built over the water to facilitate lake access and enjoyment. There are two pontoons in the lake, both located close to the lock.</p> 	2

Assets	Description	Quantity
Viewing platform	<p data-bbox="371 212 1275 275">Platforms built partially over or adjacent to the water to facilitate lake viewing and enjoyment.</p> 	7

Assets	Description	Quantity
<p>Foot/cycle bridge and boardwalks</p>	<p>Bridges and boardwalks to facilitate access and connectivity for amenity and enjoyment. The 3 foot/cycle bridges located within and adjacent to Lamerough Creek Environmental Reserve are built over weirs.</p>  <p>The top photograph shows a wooden bridge with a metal railing crossing a body of water. The bridge is supported by several concrete pillars. The surrounding area is lush with green vegetation and trees. The bottom photograph shows a wooden boardwalk winding through a forest of tall, thin trees. The boardwalk is made of dark wood and has a concrete base at the start. The forest floor is covered with dry leaves and grass.</p>	<p>5 (153 m)</p>

Assets	Description	Quantity
Constructed beaches	Beach artificially created to facilitate enjoyment of the lake foreshore areas.	4 (1,096m ²)
		

Assets	Description	Quantity
Waterway access	<p>Infrastructure facilitating access from public land to the water, e.g. stairs and ramps. There is 1 access ramp for non-motor powered craft.</p> 	1

Assets	Description	Quantity
<p>Gross pollutant trap (GPT)</p>	<p>Gross pollutant traps (GPT's) are provided at most outlets from stormwater drainage systems to the lake. The GPT's provide primary treatment to all road runoff and secondary treatment to surface runoff.</p> 	<p>20</p>

Assets	Description	Quantity
Stormwater drainage	<p>Stormwater pipes draining directly into the lake. Most are fitted with a GPT.</p> 	17
Lighting	<p>Lighting provided to assist watercraft access and navigation.</p> 	2

Assets	Description	Quantity
<p>Navigation aids</p>	<p>Aids to navigation are usually in the form of a channel marker, buoy or pile and may house a sign, light or beacon.</p> <p>There are 15 piles in total, with 5 either side of the southern weir.</p> <p>There are no channel markers or buoys.</p>  	<p>15</p>

Assets	Description	Quantity
Signs	<p data-bbox="371 215 986 248">Public signage associated with lake use and safety.</p> 	13

3 Land tenure and statutory requirements

3.1 History

Pelican Waters Estate has been progressively developed since the mid-1980s.

An Environmental Impact Statement (EIS) on the project (as it was envisaged at that time) was prepared in 1984. In 1995 a major EIS was undertaken in relation to the proposed development of the Golf Course and associated residential areas. A further EIS was compiled in May 2001 for the development of two (2) separate non-tidal lakes with navigation locks associated with Stages 5 & 7 of the Pelican Waters Estate.

Based on the 1984 document, approval was given (by the then Department of Harbours and Marine) that a percentage of the proposed waterway area could be developed as a fully tidal canal, with the remaining waterway area to have either limited or no tidal connection. This decision was made to ensure that the increase in tidal compartment generated by the development would be within acceptable limits, in order that sediment transport processes and associated ecology in the Passage would not be affected. Canal development since 1984 has accounted for the majority of this allowable tidal compartment.

For this reason, the Northern Lake was constructed without direct tidal connection to Lamerough Canal. The lake was separated from the canal by an artificial weir with a crest level of 0.60 m AHD. Water quality was to be maintained by the pumping of estuarine water from Pumicestone Passage and circulation of this water through the lake system.

The overall project was regulated in strategic terms by Development Control Plan No. 2. The DCP provides detailed planning and land use controls for the Pelican Waters area. It also reviews development of other areas of Golden Beach to ensure that Pelican Waters is satisfactorily integrated into the existing urban area and community of Golden Beach without any adverse impacts. The DCP identifies various areas which are called Special Design Precincts (SDP) together with other designations such as medium or high density residential and provides a statement of intent and detailed land use and development guidelines for each precinct. The Northern Lake forms part of SDP3.

From 1946 the land was held in freehold title by the Henzell and Ford families (and their associated companies) and, as outlined earlier, developed in a series of stages. As the result of a series of development approvals (commencing with the Development Approvals granted by the Caloundra City Council on 27 October 2003 for Stages 5A, B and C and including a non-tidal waterway), the lake once constructed was to be developed and surrendered out of (then) parts of Lot 46 SP 138679 and Lot 10 SP147339 for recreational use and transferred into council's ownership.

Consistent with best environmental practice, council and Pelican Waters prepared a Lake Management Plan to control use and maintenance of the lake.

All adjoining reserves for park and environmental purposes have progressively been transferred to council since then.

3.2 Lake ownership details

Name: Sunshine Coast Regional Council

3.3 Lake owner's responsibilities

As owner, council is responsible for ensuring that the lake system and its infrastructure:

- is maintained to a safe and reasonable standard to the best of council's ability;
- provides adequate amenity for residents and general public; and
- facilitates effective drainage of stormwater run-off.

Facilitating water-based recreational use is not a responsibility of council, however guidelines are provided in this plan to allow for this additional community benefit of the lake (refer section 5).

3.4 Private landowners responsibilities

Private landowners abutting the lake are responsible for:

- their private property and infrastructure, including any constructed ramp, jetty, deck and/or pontoon;
- stormwater management within their property boundary;
- any pollution or run-off from their property that adversely affects lake water quality; and
- revetment walls fronting their property.

If any maintenance of privately owned revetment walls are required, owners are advised to first speak with council staff and also refer to the following:

- *Sunshine Coast Council Residents' Handbook: Artificial Waterways*;
- standards in section 8.3; and
- recommended typical revetment wall section in Appendix C.

3.5 Legislation

The Lake Management Plan complies with the following statutory legislation and its associated regulations and policies:

- Local Government Act 2009
 - Sunshine Coast Council Local Laws
- Coastal Protection and Management Act 1995
- Planning Act 2016
- Environmental Protection Act 1994
- Waste Reduction and Recycling Act 2011
- Fisheries Act 1994
- Nature Conservation Act 1992
- Transport Operations (Marine Safety) Act 1994
- Transport Operations (Marine Pollution) Act 1995
- Aboriginal Cultural Heritage Act 2003

4 Lake purpose and function

4.1 Intent for use

The primary purpose of the lake is to provide amenity and visual quality for the surrounding Pelican Waters residential development. Additional benefits include water-based recreation and a range of passive recreation opportunities associated with an extensive park and pathways network.

The design intent also considered that the lake facilitate effective drainage of stormwater from the upstream catchment and urban run-off.

The cadastral boundary of the Pelican Waters Northern Lake is configured so that all revetment walls adjacent to private property are contained within adjacent private allotments and thus the responsibility of the individual land owner.

The lake has been designed to achieve a semi-saline state via pumping from Pumicestone Passage to assist in maintaining water quality.

The land abutting the lake has been generally developed for urban purposes and access to the lake for the public is available at specific locations around its perimeter as public road reserve or parkland. There is one facility for launching non-motor powered watercraft only.

The lake is intended to be used by the community in a responsible way for their recreational enjoyment, with minimal adverse impact upon the amenity of those dwellings in proximity to the lake. Contact with the water is proposed as secondary contact only (e.g. kayaks, canoes and stand-up paddle board). Fishing is also allowed within the lake, except as precluded in section 5.3.

5 Lake use

Permitted and prohibited uses are detailed in the following section and must be adhered to at all times.

5.1 Permitted uses

Lake use is open to the general public or 'sports-based' user groups providing the use is a 'permitted use' as described below.

With the exception of enforcement/safety/disaster response craft in emergency situations, the maximum speed must not exceed 6 knots.

Access to the lake is provided via the navigation lock, from private dwellings with direct frontage to the lake, from parks or road reserve.

Council, as the owner, may from time to time utilise the lake and/or surrounding open space for public events (e.g. markets and public displays).

The following uses and/or actions are permitted in or on the lake:

- human powered craft (e.g. canoe, kayak, row boat and stand-up paddle board);
- wind powered sail craft;
- model boat;
- motor powered pleasure craft;
- recreational fishing, except as precluded in section 5.3;
- mobile structures (e.g. dry docks, seapens and float bricks) that are secured to an approved privately owned pontoon or jetty;
- approved maintenance, safety, disaster response and enforcement craft;
- approved construction craft (e.g. barges, dredges and support craft);
- use of lake water for fire control purposes (e.g. helicopter fire services); and
- any other activity prescribed by council from time to time.

Please note:

All lake users are encouraged to exercise a personal duty of care when accessing the lake system and/or participating in water-based recreation. Recreating in constructed tidal lakes has inherent risks, including but not limited to potentially hazardous marine creatures such as sharks and stingers.

The water quality in the lake is maintained to a secondary contact standard. At times post major rainfall events the water quality within the lake may be diminished below secondary contact standards (refer section 6 for an overview of council's water quality management of the lake).

Due to the above reasons, direct exposure through swimming is not advised.

5.2 Permitted uses subject to approval

5.2.1 Events, recreational clubs and commercial operations

Council may agree to allow certain low-use/low-impact events, group/club recreational activities and commercial operations to occur on the lake that do not negatively impact on surrounding residents and the overall amenity. The activity must be a permitted use as specified in section 5.1, including (but not limited to) water taxi, vessel hire and other water-based activities/events e.g. SUP lessons, dragon boat user groups, model boats etc. For such operations to be considered for approval, council requires a written submission detailing the type of activity and any potential impact the activity will have on surrounding residents, other users of the lake, water quality, council-owned assets and overall amenity.

Refer to council's [Community Land and Complementary Commercial Activity Policy](#) for more information.

5.2.2 Structures and permanent moorings within the lake

The location of private structures, namely a boat ramp, pontoon, deck or jetty for lot owners abutting the lake, must be approved by council. All works must comply with the standards outlined in the Planning Scheme Policy for Development Works within the Sunshine Coast Planning Scheme 2014.

A Quay Line Plan defines the allowable location of any structures available to an adjacent landowner. These areas have been described/defined in the design standards in Appendix C and outlined in the lease survey plans.

All works must be constructed in accordance with the Quay Line Plans.

5.2.2.1 Tenure

Prior to any adjoining lot owner lodging an application for approval to construct a boat ramp, pontoon, deck or jetty on part of the lake, they must enter into a lease over the area containing the proposed structure or works and its appurtenances, from council. Council will charge an application fee and an annual lease fee for the leased area as determined by council from time to time. The lease term is a maximum of 10 years. If a lease over 10 years is desired, a Development Application for reconfiguring a lot is required (maximum of 30 years permitted).

The registration on title of the lease into the name of the adjoining lot owner, must be completed before any applications to council for the proposed structure may be made.

5.2.2.2 Approval of works

Private boat ramps, pontoons, decks and jetties contained within the quay line designated area may be approved by council on application by that lot owner, subject to lodgement of engineering plans for the proposed structure and any/all conditions applied by council.

For lots that directly abut the lake, if part of a pontoon, deck or jetty is proposed to be located within 1.5 metres of the rear boundary of the lot, an application for relaxation under the Standard Building Law 1993, will also be required.

Construction of any permanent works must be approved by council and a private building certifier before any onsite work commences. Use of the works or structure must not commence until a final inspection and approval to use has been granted by the relevant authority. Failure to obtain the relevant approval or the carrying out of works to a lesser standard than required, may result in an order to remove the offending works.

The use of standard appropriate design structures is encouraged and provided in Appendix C.

5.2.2.3 Exclusivity and restrictions

By the action of granting a lease over the mooring structure or works, exclusivity of use is secured to the adjacent lot owner to whom the lease was granted, to the exclusion of any other user of the lake.

5.3 Prohibited uses and practices

The following uses or actions are prohibited in the lake:

- events/recreational clubs/commercial operations (SCC approved permits excepted, refer section 5.2.1);
- construction of ramps/pontoons/decks/jetties (SCC approved structures excepted, refer section 5.2.2);
- temporary moorings² (SCC approved event/recreational club/commercial permits excepted, refer section 5.2.1);
- diving or jumping off any structure over or in the lake;
- fishing from the following public infrastructure:
 - bridge;
 - deck/boardwalk;
 - jetty;
 - pontoon;
 - weir; or
 - lock structure.
- motor powered craft navigating at speeds exceeding 6 knots (with the exception of approved enforcement/safety/disaster response craft in emergency situations);
- waterskiing, freestyling or wave jumping whilst operating any watercraft;
- living on watercraft whether temporarily, intermittently or permanently;
- the construction, reconstruction, refitting or undertaking of structural repairs on or to watercraft;
- unmarked fishing equipment (e.g. crab pots and fish traps);
- refuelling of watercraft;
- releasing, dumping or depositing of any wastes (including garden wastes), contaminants or other pollutants into the lake, adjoining waterways or in a place (e.g. road-side gutter or stormwater drain) where it could reasonably be expected to enter, blow or wash into the lake or adjoining waterways; and
- any other activity prescribed by council from time to time.

No public boat ramps are provided in the Pelican Waters Northern Lake.

² Temporary moorings include the use of dry docks, seapens, float bricks etc. that are not secured to an approved pontoon or jetty.

5.4 Lock and weirs

The navigation lock allows vessels of a size up to 15m in length, 4.5m in width and 2m draft to pass through safely at low tide. Whilst there is no height limitation for vessels using the lock, three main downstream bridges restrict height. These are the Loch Lamerough Bridge (immediately downstream of the lock) and the Bevan Henzell Bridge, providing 4.3m clearance at mean high water spring tides (MHWS). The Pelican Waters Boulevard Bridge (north of Westminster Avenue) provides a 3m clearance above the nominal lake level of RL 0.6m AHD. The water level in the lake is generally unaffected by tidal variation.

5.4.1 Lock access

The lock may only be accessed by using a lock access card. Lock access cards are currently issued by Pelican Waters Land Sales Office on behalf of council.

For more information contact Pelican Waters on (07) 5492 4888 or visit their sales office at Pelican Waters Blvd & The Corso, Pelican Waters.

5.5 Temporary restricted use

Council reserves the right to restrict lake use for a specific purpose at any time, if such action is required to either protect public health and safety or prevent pollution of the lake.

5.6 Abutting public land

Abutting public land is under the control of council. All normal activities that are permitted in parks and on roads are permitted on abutting public land fronting the lake except as may be restricted elsewhere in this Lake Management Plan, or by approved signs erected on such land.

5.7 Future development

No further development within the Lake or on adjacent public land is intended by council, unless determined necessary to support the primary purpose and function of the lake.

6 Water quality management

The lake system is best described as a lower catchment flow through system, i.e., an artificial waterway which acts as an estuary in some part, where the flow through rate is determined by a weir and salinity exchange system.

Influences on water quality in the lake system are therefore principally impacted by:

- sufficient salinity exchange;
- up-stream catchment practices;
- surrounding urban runoff (e.g. hydrocarbons, particulates, pesticides and herbicides);
- activities associated with vessel maintenance; and
- colonisation by marine organisms. Certain species may proliferate at times of elevated nutrient levels and cause other environment and human health risks (e.g. algal blooms)

Table 3 provides a framework to effectively manage these influences to ensure acceptable water quality is maintained.

Table 3: Water quality management overview

Objective	Water quality is maintained to a standard suitable for secondary contact recreation
Performance standards	<ul style="list-style-type: none"> • Water quality is maintained in accordance with scheduled water quality objectives for secondary contact recreation in the Environmental Protection (Water and Wetland Biodiversity) Policy 2019 and Guidelines for Managing Risks in Recreational Water (NHMRC 2008) • Reactive water quality sampling is in accordance with the methods prescribed in the Queensland Monitoring and Sampling Manual (2018) • Growth of undesirable marine organisms is absent or regulated
Management controls	<ol style="list-style-type: none"> 1. Maintain impervious and/or vegetated overland flow paths in accordance with routine inspection and maintenance schedules 2. Maintain stormwater drainage systems and GPTs in accordance with routine inspection and maintenance schedules 3. Maintain weir and salinity exchange system in accordance with routine inspection and maintenance schedules 4. Educate residents and public to reduce pollutant run-off and/or input (e.g. signage, residents' handbook and website) 5. Live water quality testing undertaken at 3 locations via remote sensors (physical and chemical analysis to inform effective pump operation)
Corrective action	<ul style="list-style-type: none"> • Respond to issues negatively affecting water quality in a timely manner • Erection of temporary signage if determined necessary • If the relevant water quality guidelines are exceeded, or a trend of declining water quality develops over an extended period, it will be considered to indicate the need for reassessment of the appropriateness and effectiveness of existing water quality management controls • Adjust pumping operation in accordance with water quality parameters recorded via remote sensors
Monitoring	<ul style="list-style-type: none"> • Visual monitoring to be undertaken concurrent with routine inspections and/or maintenance schedules • Live water quality testing records • Water quality sampling will be undertaken on a reactive basis if requested and determined necessary

	<ul style="list-style-type: none">• Maintain customer service request records and incident/non-compliance register
Reporting	The results of monitoring will be made available to the public at council's discretion and by request only
Responsibility	SCC

7 Incident, non-compliance and complaint management

Table 4: Incident, non-compliance and complaint management overview

Objective	To ensure prompt and efficient response to pollution, incidents, complaints and non-compliance
Performance standards	<ul style="list-style-type: none"> • Prompt removal of pollution spillages from waterways with minimum risk to the public and the environment • All incidents, complaints and non-compliance are dealt with promptly and efficiently, in accordance with council's Compliance and Enforcement Policy 2018 (or referred to the relevant agency if not already outlined in the policy) • Appropriate investigations are undertaken to determine the source of pollution and the cause of environmental incidents (e.g. oil spills, fish kills and algal blooms)
Management controls	<ol style="list-style-type: none"> 1. Adherence to asset management plans 2. Asset inspections and routine maintenance schedules met 3. Adherence to water quality management procedures (refer section 6) 4. Sufficient signage to communicate safety matters and prohibitions outlined in this management plan (refer section 5.3)
Corrective action	<ul style="list-style-type: none"> • Pollution spill, fish kill or other environmental incident - report to the Department of Environment and Science to ensure that appropriate investigations and testing are undertaken • Address and/or rectify incident, complaint and/or non-compliance • Review customer service requests and incident/non-compliance register and implement improvement to processes and/or signage where deemed necessary
Monitoring	<ul style="list-style-type: none"> • Follow up monitoring to be undertaken in the event of an environmental incident • Maintain customer service request records and incident/non-compliance register
Reporting	Complete the appropriate incident report/debrief when required or requested
Responsibility	SCC

8 Maintenance

8.1 General

Maintenance of the lake and its assets are the responsibility of council and includes routine, planned and reactive maintenance work activities.

Maintenance work is managed through an asset management system and includes activities such as inspection, assessing condition, prioritising, scheduling, actioning the work and reporting what was done to develop a maintenance history and improve maintenance and service delivery performance.

Routine maintenance is performed on a regular cycle to upkeep visual amenity and/or replacement of components/sub-components of assets. This work generally falls below the capital threshold. Planned maintenance comprises larger scale repair work (below the capital threshold) or asset renewal (capital work). Reactive maintenance is unplanned repair work carried out in response to service requests and management/supervisory directions.

Types of maintenance may include:

- on-going maintenance of the navigation lock and inlet/outlet weirs;
- on-going maintenance of the salinity exchange system;
- removal of siltation from bed and banks of the lake, as required, to ensure that it does not become a constraint on the function of the lake;
- removal of debris, rubbish and undesirable marine organisms/weeds from the lake and public foreshore areas;
- maintaining the revetment walls where they front public lands;
- maintaining scour that supports all revetment walls; and
- maintaining navigation aids within the lake etc.

Refer Table 5 which outlines the entire maintenance framework and regimes.

8.2 Maintenance management

The following section provides an overview of the maintenance framework for lake features and public assets to meet specific management plan objectives outlined in Table 1.

Table 5: Maintenance framework overview

Feature / asset	Performance standard	Performance indicator	Comments / considerations	Inspection frequency	Routine maintenance frequency	Responsibility
Waterway feature						
Litter, debris etc.	Waterways are free of litter and debris that are impacting on amenity, health and/or safety	a) Inspection and maintenance schedules met b) Reactive works undertaken in a timely manner c) No complaints	<ul style="list-style-type: none"> Officers undertaking litter removal should ensure that appropriate precautions are taken against hazardous objects such as discarded hypodermic syringes Collected litter should be recorded in AMDI database and disposed of at council's refuse tip A public education programme should be considered by council if litter is a persistent problem If fishing equipment (e.g. crab pot or fish trap) is found either unmarked and/or in state of disrepair to a point of it being non-functional then it shall be removed as marine litter (report to DAFF for their agency to remove) 	Monthly	Monthly	SCC Waterways team Engagement with Response Services where required for litter investigation
Undesirable* marine organisms / weeds	Growth of undesirable marine organisms is absent or regulated	a) Inspection schedule met b) Reactive works undertaken in a timely manner c) No complaints	<ul style="list-style-type: none"> Any vegetation or plant material, living or dead, located below the level of the highest astronomical tide (Approximately RL 1.05m AHD) is classified as "marine vegetation" under the Fisheries Act. Refer to relevant fisheries accepted development requirements before undertaking any works involving marine vegetation Although herbicides are a possible means of weed control, only herbicides registered for use in aquatic environments should be used All removed vegetation should be disposed of at council's refuse tip In the event of algal blooms, refer to Queensland Harmful Algal Bloom Response Plan 2014. Appropriate laboratory testing should be undertaken to determine the species present and likely cause of the outbreak. If testing indicates the presence of toxic species, specialist advice should be sought regarding any necessary health precautions. 	6 monthly	No routine maintenance. Any required works are determined based on inspection condition assessment	SCC Lakes and Wetlands team
<i>*Undesirable - not wanted or welcomed because harmful</i>						
Lake profile	Lake is maintained to acceptable tolerances from design profile	a) Survey completed as scheduled b) Maintenance is undertaken in a timely manner before degradation of waterway profile affects vessel movement or the stability of revetment walls c) No complaints	<ul style="list-style-type: none"> Appropriate geotechnical and chemical testing should be undertaken of material proposed to be dredged or excavated in maintenance operations Approvals to undertake dredging, or other excavation, within a waterway are required under the Planning Act 2016, Coastal Protection and Management Act 1995 (Tidal Works) and the Environmental Protection Act 1994 (ERA 16) (dependant on volume of material to be managed) 	7 yearly	No routine maintenance performed. Any required works are determined based on visual observation and 7 yearly lake survey	SCC Coast & Canals team
Constructed beaches	Accessible, safe and provides adequate amenity and visual quality	a) Open for use 90% of the time b) Clear of marine fouling and debris c) Safe d) Inspection schedule met e) Reactive works undertaken in a timely manner f) No complaints	<ul style="list-style-type: none"> Weeding is performed by physical / mechanical means, no herbicides to be used Sand profiles are maintained as designed 	Annually	No routine maintenance. Any required works are determined based on inspection condition assessment	SCC Coast & Canals team
Infrastructure						
Weirs	The system is operating as designed and	a) Structures are not impeded by marine growth or sedimentation	Refer Appendix A for weir design.	6 monthly	Annually	SCC Coast & Canals team

Feature / asset	Performance standard	Performance indicator	Comments / considerations	Inspection frequency	Routine maintenance frequency	Responsibility
	providing effective drainage of stormwater run-off	b) Inspection and maintenance schedules met c) Reactive works undertaken in a timely manner d) No complaints	Underwater inspections of the structures are likely to be required, approximately every 6-12 months. A qualified commercial diver should be employed for this work and the required safety measures implemented			Contractor
Lock	Provides effective and safe access for marine vessels transporting in and out of the lake system	a) Inspection and maintenance schedules met b) Reactive works undertaken in a timely manner c) No complaints from lock access card holders	Contractor to perform work in accordance with maintenance procedures. Refer Section 5.4.1 for more information on lock access and cards.	Fortnightly	Annually	SCC Coast & Canals team Contractor
Tidal exchange system	The system is operating as designed and providing sufficient saline water inflow	a) Water is turned over every 30 days b) Inlet and outlet structures are not impeded by marine growth or sedimentation c) Inspection and maintenance schedules met d) Reactive works undertaken in a timely manner e) No complaints	Underwater inspections of the structures are likely to be required, approximately every 6-12 months. This applies particularly to the inlet structure. A qualified commercial diver should be employed for this work and the required safety measures implemented	6 monthly	Annually	SCC Coast & Canals team
Revetment walls	Revetments are maintained in a suitable condition to provide satisfactory protection to adjacent land and assets	a) Structure maintained to design b) Inspection schedules met c) Reactive works undertaken in a timely manner d) No complaints	<ul style="list-style-type: none"> The stability of revetment walls and other concrete structures is heavily reliant on the condition of the associated scour (see scour maintenance below) The maintenance of revetments is the responsibility of the abutting landowner (i.e. council for public land only). However, council are responsible for the associated scour and thus must ensure it is adequate to protect private landowners' revetment 	Annually	No routine maintenance. Any required works are determined based on inspection condition assessment	SCC Coast & Canals team
Scour	Scour are maintained in a suitable condition to provide satisfactory protection to revetment walls	a) Structure maintained to design b) Inspection schedules met c) Reactive works undertaken in a timely manner d) No complaints	<ul style="list-style-type: none"> The stability of revetment walls and other concrete structures can be rapidly compromised due to the loss of foundation support if the associated scour are not well maintained Council are responsible for maintaining all scour including those abutting private land 	Annually	No routine maintenance. Any required works are determined based on inspection condition assessment	SCC Coast & Canals team
Stormwater outlets	Provides effective drainage of stormwater run-off	a) Structure maintained to design standards b) Inspection and maintenance schedules met c) Reactive works undertaken in a timely manner d) No complaints	Piping failures, resulting in loss of support behind and beneath stormwater drainage outlet structures can result in rapid deterioration of these structures. This damage can quickly spread to adjacent revetment walls. It is important, for the longevity of these structures, to ensure that piping problems are promptly addressed	Annually	Annually	SCC Stormwater Services team
GPT's	Provides an effective pollutant trap to minimise litter, debris and sediment from entering the lake system	a) Structure maintained to design b) Inspection and maintenance schedules met c) Reactive works undertaken in a timely manner d) No complaints	Refer to manufacturer for design standard details	Monthly	Annually	SCC Stormwater Services team

Feature / asset	Performance standard	Performance indicator	Comments / considerations	Inspection frequency	Routine maintenance frequency	Responsibility
		e) Minimal litter, debris and sediment entering the lake directly from stormwater outlets				
Viewing platform	Accessible and safe, providing additional enjoyment of the lake amenity	a) Structure maintained to design b) Open for use 90% of the time c) Inspection schedule met d) Reactive works undertaken in a timely manner e) No complaints		6 monthly	No routine maintenance. Any required works are determined based on inspection condition assessment	SCC Transport Infrastructure team
Jetty/pontoon	Accessible, user-friendly and safe, providing additional access and enjoyment of the lake	a) Structure maintained to design b) Open for use 90% of the time c) Clear of marine fouling and debris d) Inspection schedule met e) Reactive works undertaken in a timely manner f) No complaints		Annually	No routine maintenance. Any required works are determined based on inspection condition assessment	SCC Coast & Canals team
Waterway accesses	Accessible, user-friendly and safe, providing additional access and enjoyment of the lake	a) Structure maintained to design b) Open for use 90% of the time c) Clear of marine fouling and debris d) Inspection schedule met e) Reactive works undertaken in a timely manner f) No complaints		Annually	No routine maintenance. Any required works are determined based on inspection condition assessment	SCC Coast & Canals team
Signs	Signs are reader-friendly, clearly visible, safe, and do not impact on the visual qualities of the lake	a) Structure maintained to design b) Inspection schedule met c) Reactive works undertaken in a timely manner d) Vessel operators are compliant with marine safety laws e) No complaints	If non-compliance and/or complaints register indicate a growing trend of users whom are not complying with regulations, assess suitability of all forms of public education, including signage. Implement any improvements where determined necessary (see more section 7)	Annually	No routine maintenance. Any required works are determined based on inspection condition assessment	SCC Coast & Canals team
Navigation aids	Effectively assist vessel operators to safely navigate the lake, without negatively impacting on vessel traffic or amenity	a) Structure maintained to design b) Inspection schedule met c) Reactive works undertaken in a timely manner d) No complaints or on-water incidents		Annually	No routine maintenance. Any required works are determined based on inspection condition assessment	SCC Coast & Canals team
Lighting	Effectively assist vessel operators to safely launch, exit and/or navigate the lake, without negatively impacting on vessel traffic or amenity	a) Structure maintained to design b) Inspection schedule met c) Reactive works undertaken in a timely manner d) No complaints or on-water incidents		Annually	No routine maintenance. Any required works are determined based on inspection condition assessment	SCC Coast & Canals team

8.3 Standards and specifications

Maintenance work is carried out in accordance with the following standards and specifications:

1. Building Code of Australia
 - a) BCA Vol 2 Part 3.1.2.0 – Drainage (AS 3500.3.2)
 - b) BCA Vol 2 Part 3.1.2.2 (d) – Excavation and Piling near Sewers and Drains
 - c) BCA Vol 2 Part 3.1.1 – Earthworks
2. Australian Standards
 - a) AS 1141: Methods for sampling and testing aggregates
 - b) AS 1428: Design for Access and Mobility
 - c) AS 1604: Treatment of piles
 - d) AS 1664.1: Aluminium Structures Code
 - e) AS 1665: Welding
 - f) AS 1170.1 and 1170.2: Loading Codes
 - g) AS 1650 Galvanising
 - h) AS 1720: Timber Structures Code
 - i) AS 2159: Piling Code
 - j) AS 2239: Galvanic (Sacrificial) Anodes for Cathodic protection
 - k) AS 2312 Two Pack Epoxy Paints
 - l) AS 2832.3 Guide to the Cathodic protection of metals-fixed immersed structures.
 - m) AS 3500: Part 3.2, Stormwater Drainage – Acceptable Solutions
 - n) AS 3600: Concrete Structures Code
 - o) AS 3700: Masonry Structures Code
 - p) AS 3706: Geotextiles Methods of test
 - q) AS/NZ 3004: Marinas and Recreational Boats
 - r) ANZECC: Guidelines for fresh and Marine Water Quality
 - s) AS 3962: Guidelines for Design of Marinas Code
 - t) AS 4110: Steel Structures Code
 - u) AS 4133: Methods of testing rocks for engineering purposes
 - v) AS 4997: Guidelines for the design of maritime structures
3. SEQ Restoration Framework, Guideline & Manual
4. Healthy Waterways – Water sensitive Urban Design – Technical Design Guidelines for SEQ
5. Healthy Waterways – Water by Design Construction and Establishment Guidelines
6. Any other relevant regulations, policies, codes and/or guidelines that fall under the Acts listed in section 3.4

9 Contacts

Entity	Contact details	Enquiry type
Sunshine Coast Council - Customer Service	(07) 5475 7272 1300 007 272	All
Maritime Safety Queensland	(07) 5373 2310 A/H (07) 3305 1700	Marine safety and marine pollution, including oil spills
Caloundra Coast Guard	Radio: 88-9, 16-73 (07) 5491 3533	Marine safety
Sunshine Coast District Water Police	(07) 5457 6711 A/H 0438 200 705	Search and rescue, on-water criminal matters and marine safety complaints
Queensland Boating and Fisheries Patrol	(07) 5444 4599 (Mooloolaba)	Marine safety and fisheries complaints
Department of Environment & Science	1300 130 372	Involving pollution, environmental harm, fish kills and marine strandings
Department of Agriculture and Fisheries	(07) 3404 6999	Involving marine plants
RSPCA QLD	1300 ANIMAL (1300 264 625)	Involving injured wildlife. Will likely be attended by Queensland Parks and Wildlife Service (QPWS)

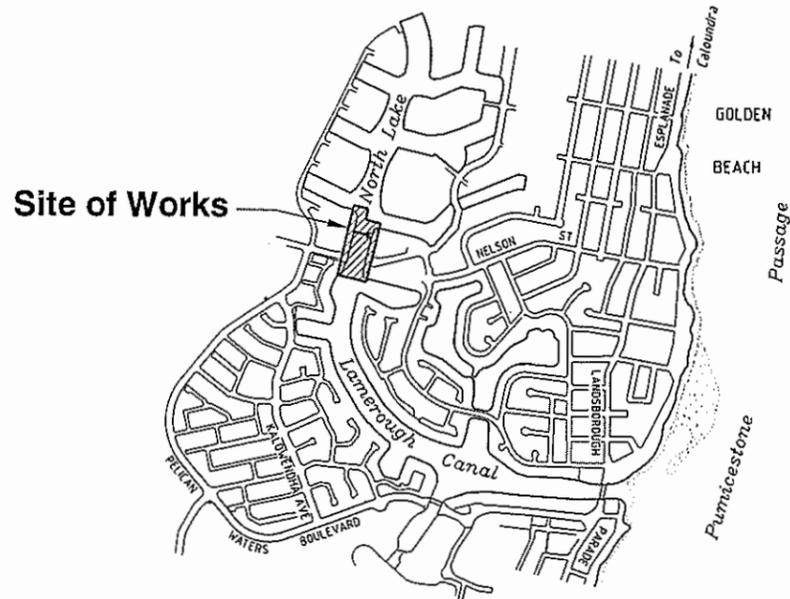
10 Review

This document may be reviewed and updated as determined necessary by council in response to new information, challenges in implementation or changing external factors such as technology, land use, the environment, legislation and community values.

Appendix A: Lock and weir design drawings

PELICAN WATERS DEVELOPMENT - STAGE 5

NORTH LAKE LOCK AND WEIR



LOCALITY PLAN
1: 15000

PROJECT DRAWINGS

DWG. No.	DESCRIPTION
290/75-1	LOCK & WEIR - LOCALITY PLAN AND DRAWING SCHEDULE
290/75-2	LOCK & WEIR SETOUT - COASTAL ACT APPROVAL APPLICATION AREA
290/75-3	LOCK & WEIR SETOUT - GENERAL ARRANGEMENT PLAN
290/75-4	LOCK & WEIR SETOUT - ACCESS AND PARK LAYOUT
290/75-5	LOCK & WEIR SETOUT - MARKER PILE AND SIGN DETAILS
290/75-6	LOCK & WEIR SETOUT - ROCK SCOUR PROTECTION LAYOUT
290/75-7	LOCK & WEIR SETOUT - ROCK SCOUR PROTECTION DETAILS
290/75-8	RETAINING WALLS - NOTES AND MISCELLANEOUS DETAILS
290/75-9	RETAINING WALLS - WALL 1 - PLAN AND ELEVATION - SHEET 1 of 2
290/75-10	RETAINING WALLS - WALL 1 - PLAN AND ELEVATION - SHEET 2 of 2
290/75-11	RETAINING WALLS - WALL 2 - PLAN AND ELEVATION - SHEET 1 of 1
290/75-12	RETAINING WALLS - WALL 3 - PLAN AND ELEVATION - SHEET 1 of 3
290/75-13	RETAINING WALLS - WALL 3 - PLAN AND ELEVATION - SHEET 2 of 3
290/75-14	RETAINING WALLS - WALL 3 - PLAN AND ELEVATION - SHEET 3 of 3
290/75-15	RETAINING WALLS - TYPE SECTIONS
290/75-16	RETAINING WALLS - WALL REINFORCEMENT - SHEET 1 of 3
290/75-17	RETAINING WALLS - WALL REINFORCEMENT - SHEET 2 of 3
290/75-18	RETAINING WALLS - WALL REINFORCEMENT - SHEET 3 of 3
290/75-19	RETAINING WALLS - HANDRAIL, LIGHT POLE AND LADDER DETAILS
290/75-20	REVTMENT WALLS - TYPICAL SECTIONS AND DETAILS
290/75-21	WEIR STRUCTURE - LAYOUT PLAN & ELEVATION
290/75-22	WEIR STRUCTURE - CONCRETE PROFILES
290/75-23	WEIR STRUCTURE - SHEET PILING CUT OFF WALLS
290/75-24	WEIR STRUCTURE - REINFORCEMENT DETAILS - SHEET 1 of 2
290/75-25	WEIR STRUCTURE - REINFORCEMENT DETAILS - SHEET 2 of 2
290/75-26	LOCK STRUCTURE - CONCRETE PROFILES - SHEET 1 of 2
290/75-27	LOCK STRUCTURE - CONCRETE PROFILES - SHEET 2 of 2
290/75-28	LOCK STRUCTURE - REINFORCEMENT DETAILS - SHEET 1 of 5
290/75-29	LOCK STRUCTURE - REINFORCEMENT DETAILS - SHEET 2 of 5
290/75-30	LOCK STRUCTURE - REINFORCEMENT DETAILS - SHEET 3 of 5
290/75-31	LOCK STRUCTURE - REINFORCEMENT DETAILS - SHEET 4 of 5
290/75-32	LOCK STRUCTURE - REINFORCEMENT DETAILS - SHEET 5 of 5
290/75-33	LOCK STRUCTURE - ELECTRICAL CONDUIT LAYOUT AND DETAILS
290/75-34	LOCK STRUCTURE - MISCELLANEOUS CONDUIT AND ELECTRICAL DETAILS
290/75-35	LOCK STRUCTURE - GATE SEAL PLATES AND SEALS
290/75-36	LOCK STRUCTURE - GATE FABRICATION DETAILS - SHEET 1 of 2
290/75-37	LOCK STRUCTURE - GATE FABRICATION DETAILS - SHEET 2 of 2
290/75-38	LOCK STRUCTURE - LOCK GATE WALKWAY DETAILS
290/75-39	LOCK STRUCTURE - GATE ACTUATOR AND MOUNTING DETAILS
290/75-40	LOCK STRUCTURE - SECURITY FENCE, SIGNS AND LADDERS LAYOUT
290/75-41	LOCK STRUCTURE - LADDER DETAILS
290/75-42	LOCK STRUCTURE - LOCK SECURITY FENCE BASE PLATE SETOUT
290/75-43	LOCK STRUCTURE - SECURITY FENCE DETAILS
290/75-44	LOCK STRUCTURE - SIGN DETAILS
290/75-45	TIMBER JETTY - PLAN, ELEVATION AND DETAILS - DELETED
290/75-46	TIMBER JETTY - SECTIONS AND DETAILS - DELETED
290/75-47	FLOATING PONTOON - PLAN AND DETAILS
290/75-48	FLOATING PONTOON - GANGWAY DETAILS
290/75-49	LOCK BULKHEADS - LOCK BULKHEAD GATES
290/75-50	LOCK BULKHEADS - BULKHEAD STORAGE BAY
290/75-51	STORMWATER OUTLET DETAILS FOR 8/1 TO 9/1
290/75-52	STORMWATER OUTLET DETAILS FOR 7/27 TO 8/27
290/75-53	STORMWATER OUTLET DETAILS FOR 7/G TO 8/G
290/75-54	TYPICAL APRON HEAD & W'WALL CONC. REINFORCEMENT DETAILS FOR S'WATER PIPES 300φ TO 675φ
290/75-55	TYPICAL APRON HEAD & W'WALL CONC. REINFORCEMENT DETAILS FOR S'WATER PIPES 750φ TO 1500φ

11-08-2005	Drawing 46 L 46 deleted		
09-03-2004	Drawing title 290/75-2 amended	DH	S.G.
28-09-2003	New Client Name	DH	S.G.
24-07-2003	Drawing Schedule Amended	S.G.	S.G.
Rv.	DATE	REVISIONS	REC. APPR.

DESIGNED: <i>C. Hagen</i>	A3	OATUM. A.H.D.
DRAWN: <i>C. Hagen</i>		
CHECKED: <i>A. Howard</i>		
RECOMMENDED: <i>A. Howard</i>	PROJ. MAN.	APPROVED: <i>S. Gesch</i>
AUTOCAD R15 FILENAME: P75-01-02 B.DWG DATE: 24-7-2003 TIME: 3:00 PM		

Cardno MBK
Cardno MBK (Qld) Pty Ltd
ACN: 051 074 952

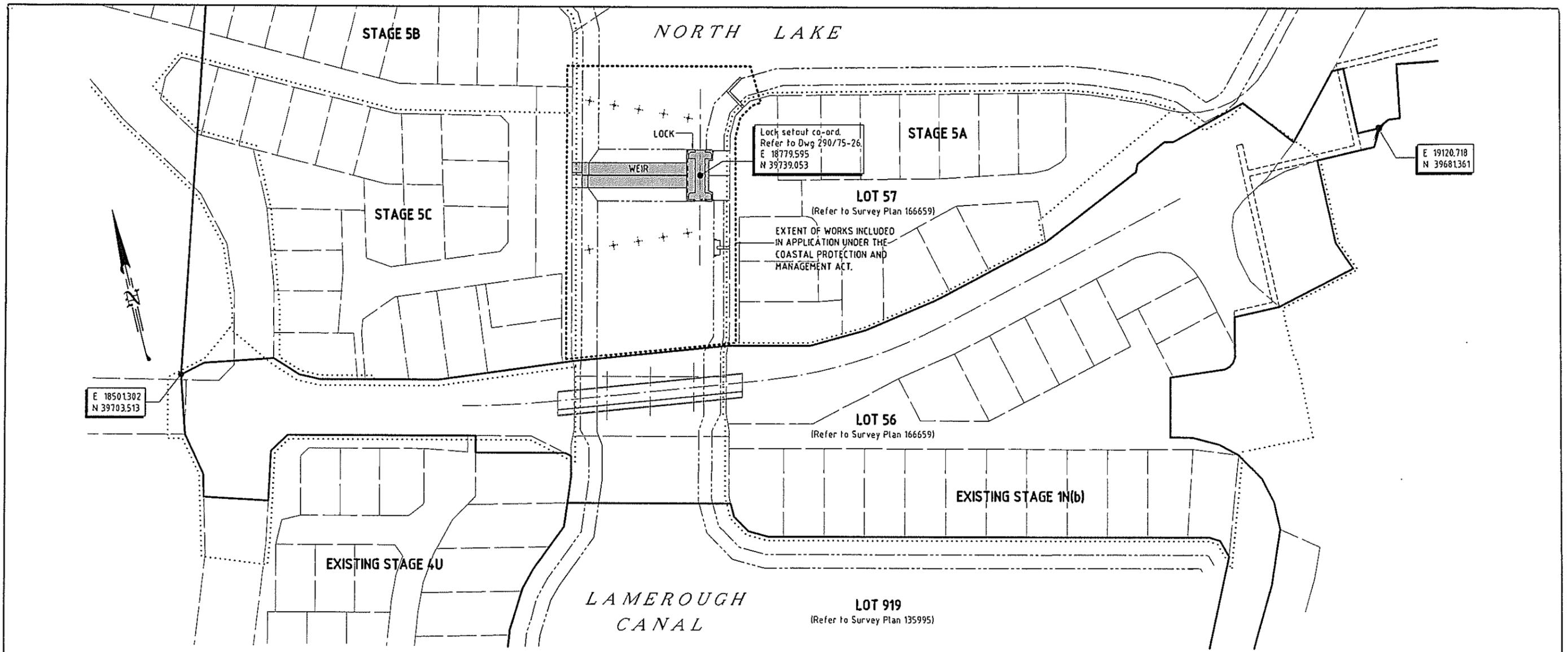
SUNSHINE COAST OFFICE: 60 Dupont Avenue Maroochydore, Qld 4558
Email: sc@cardno.com.au Ph: (07) 5443 2556 Fax: (07) 5443 3042

OFFICES: Brisbane (07) 3369 9822 Sydney (02) 9416 8233 Gold Coast (07) 5539 9333 Sunshine Coast (07) 5443 2556 Townsville (07) 4772 1166 Harvey Bay (07) 4124 5455 Bundaberg (07) 4151 1211 Central Coast (02) 4323 2558 INTERNATIONAL Perth (08) 9438 2222 Melbourne (03) 9438 2222 Auckland (09) 438 5146

Pumicestone Passage Developments Pty Ltd

PELICAN WATERS DEVELOPMENT - STAGE 5
NORTH LAKE LOCK AND WEIR
LOCK AND WEIR
SITE PLAN & SCHEDULE OF DRAWINGS

DATE: 24-07-2003
DRAWING No: 290/75-1

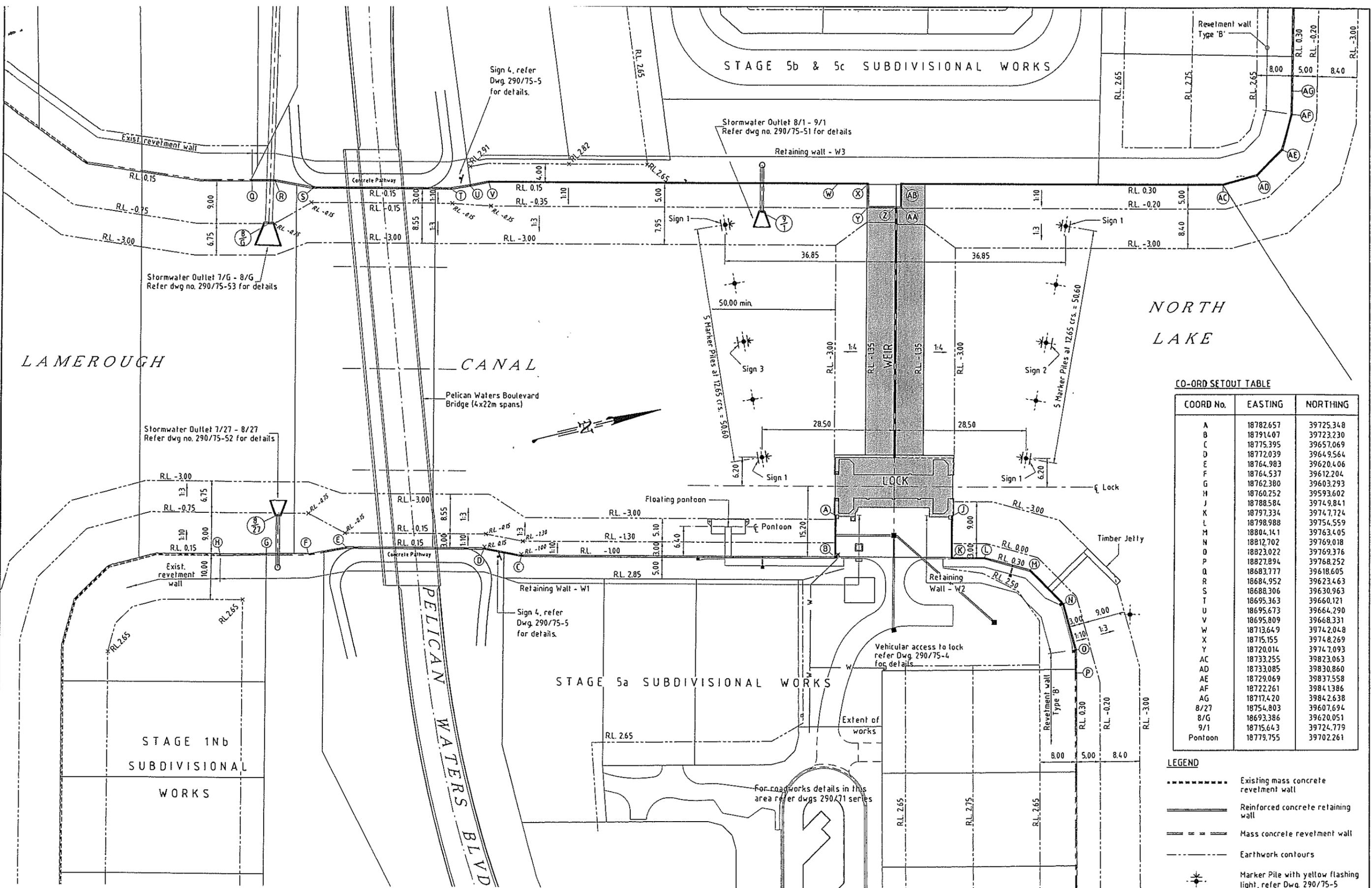


PLAN
1:2000

NOTES:

1. Internal dimensions of lock chamber are 17.0m x 5.0m.
2. Nominal dimensions of largest vessel capable of using lock are 15.0m x 4.5m.
3. Electronic interlocks within the lock Programmable Logic Control (PLC) system will ensure that, during normal operation, one pair of lock gates would be closed at all times.
4. In the event of a power failure, manual operation of the lock gates will be possible using handwheels to operate the actuators.
5. Removable bulkhead gates will be used to seal the lock to permit dewatering for maintenance purposes. The locations of these gates are shown on Drawing No. 290/75-26. Structural details of the bulkhead gates are shown on Drawing no. 290/75-49.
6. Coordinates are on an site based datum. Refer to Sunshine Coast Survey and Planning for details.

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D 04-03-2004 COASTAL PROTECTION & MGT ACT REFERENCED & BOYS AMENDED. <i>CH</i> C 28-08-2003 New Client Name B 24-07-2003 LOT LAYOUT AMENDED A 27-03-2003 CONTRACT 290/74.1 WORKS SHOWN	D.H. S.G. S.G. S.G. REC. APPR.	AUTOCAD R15 FILENAME - P75-01-07 80DWG DATE - 24-7-2003 TIME - 4:37 PM	REVISIONS					



NORTH LAKE

CO-ORD SETOUT TABLE

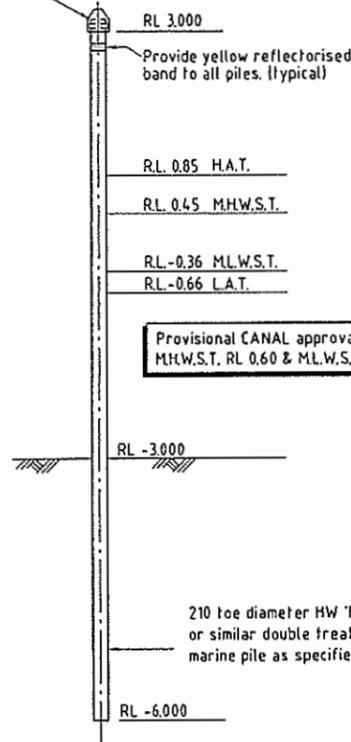
COORD No.	EASTING	NORTHING
A	18782.657	39725.348
B	18791.407	39723.230
C	18775.395	39657.069
D	18772.039	39649.564
E	18764.983	39620.406
F	18764.537	39612.204
G	18762.380	39603.293
H	18760.252	39593.602
J	18788.584	39749.841
K	18797.334	39747.724
L	18798.988	39754.559
M	18804.141	39763.405
N	18812.702	39769.018
O	18823.022	39769.376
P	18827.894	39768.252
Q	18683.777	39618.605
R	18684.952	39623.463
S	18688.306	39630.963
T	18695.363	39660.121
U	18695.673	39664.290
V	18695.809	39668.331
W	18713.649	39742.048
X	18715.155	39748.269
Y	18720.014	39747.093
AC	18733.255	39823.063
AD	18733.085	39830.860
AE	18729.069	39837.558
AF	18722.261	39841.386
AG	18717.420	39842.638
8/27	18754.803	39607.694
8/G	18693.386	39620.051
9/1	18715.643	39724.779
Pontoon	18779.755	39702.261

- LEGEND**
- Existing mass concrete revetment wall
 - ==== Reinforced concrete retaining wall
 - ===== Mass concrete revetment wall
 - - - - Earthwork contours
 - ⊙ Marker Pile with yellow flashing light, refer Dwg. 290/75-5 for details.
 - ⊙ Marker Pile refer Dwg. 290/75-5 for details.

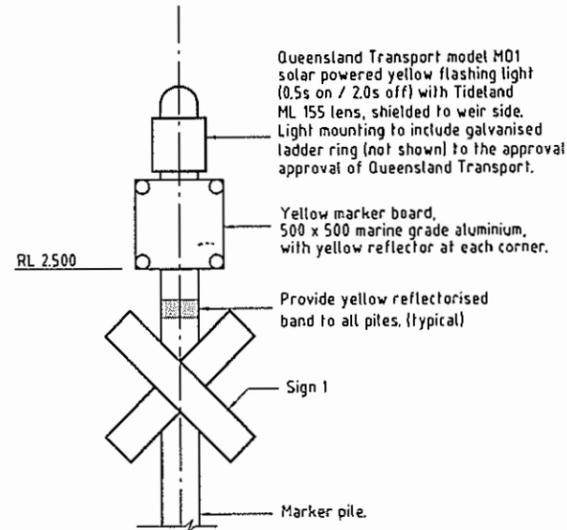
PLAN 1750

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09-03-2004 CO-ORD TABLE ADDED 28-08-2003 NEW CLIENT NAME 24-07-2003 STORMWATER OUTLETS ADDED, RP BOUNDARY AMENDED 27-03-2003 CONTRACT 290/75-1 WORKS SHOWN	REC. APPR.	This document is produced by Cardno MBK (Cld) Pty Ltd solely for the benefit of and use by the client in accordance with the terms of the contract. Cardno MBK (Cld) Pty Ltd does not and shall not assume any responsibility or liability whatsoever to any third party arising out of any use or reliance by third party on the content of this document.		AUTOCAD FILE NAME: P75-018-01A-05DWG DATE: 21-1-2004 TIME: 8:53 AM SUNSHINE COAST OFFICE: 66 Duporth Avenue Maroochydore, Qld 4558 Email: sco@sun.cardno.com.au Ph: (07) 5443 2555 Fax: (07) 5443 5642				

Top of pile to be cut off at specified level, coated with bitumen emulsion, fitted with galvanised steel confining ring, formed from 60x6 FL PL.



MARKER PILE DETAIL
1: 100



YELLOW FLASHING LIGHT
& SIGN 1
1: 40



SIGN 4
1: 20

RL 1800
WARNING
DO NOT PROCEED BEYOND
MARKER PILES. USE LOCK TO
ACCESS LAMEROUGH CANAL

SIGN 2
1: 40

RL 1800
WARNING
DO NOT PROCEED BEYOND
MARKER PILES. USE LOCK
TO ACCESS LAKE

SIGN 3
1: 40

RL 1800
WARNING
LOW BRIDGE AHEAD
CHECK CLEARANCES

SIGN 5
1: 40

NOTE:
Sign 5 to be installed with
Stage 5G operational works.

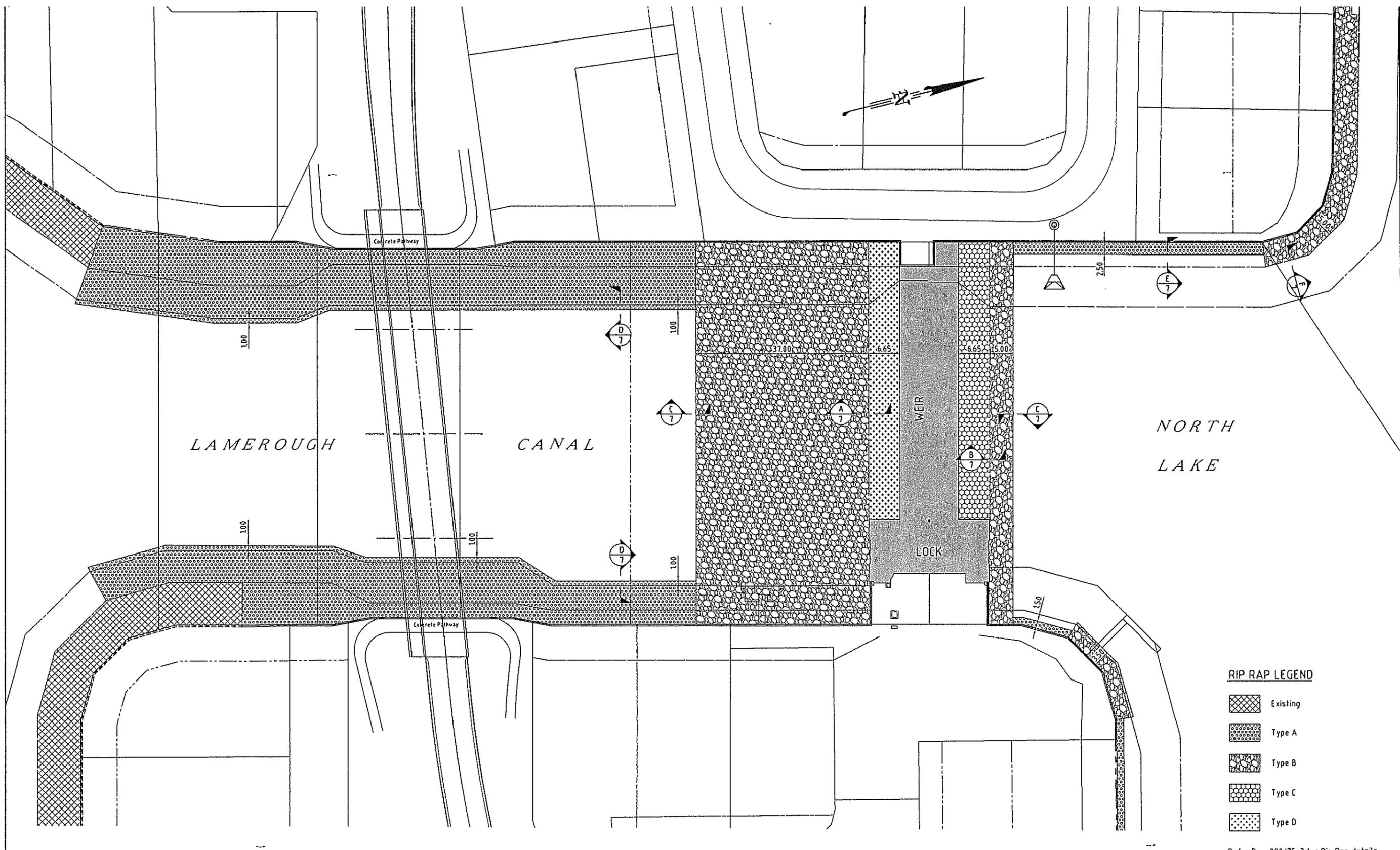
SIGN SPECIFICATION

SIGN	LETTERING SIZE(mm) SERIES	COLOUR	SIZE (mm)	QUANTITY (No.)
1	-	Yellow	Queensland Transport special mark.	4
2	75 EM	Black on yellow	1600 x 600 approx	1
3	75 EM	Black on yellow	1500 x 600 approx	1
4	MUTCD STANDARD SIGN			1
5	150/100 EM	Black on yellow	1800 x 750 approx	2

NOTES :

- 1) All signs are reflectorised
- 2) All signs shall meet the requirements of Queensland Transport - Marine Operations.
- 3) Actual sign sizes to be confirmed by lettering requirements.
- 4) Ground clearance to underside of signs shall be 2.0m minimum.
- 5) All signs to be marine grade aluminium with stainless steel or marine grade aluminium fixings.

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B 04-03-2004 Sign 4 & 5 specifications added A 28-08-2003 New Client Name & flashing lights etc colour changed to yellow	REVISIONS REC. APPR.	This document is produced by Cardno MBK (Old) Pty Ltd solely for the benefit of and use by the client in accordance with the terms of the contract. Cardno MBK (Old) Pty Ltd does not and shall not assume any responsibility or liability whatsoever to any third party arising out of any use or reliance by third party on the contents of this document.		REF: 1: base/P; conf: 1: P2-15C-BASE; 02/17/5146			



LAMEROUGH

CANAL

NORTH
LAKE

WEIR

LOCK

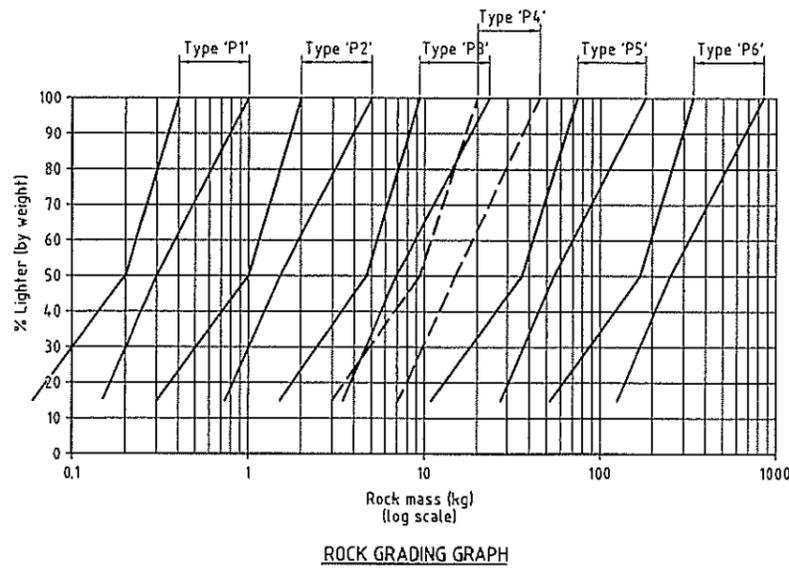
RIP RAP LEGEND

-  Existing
-  Type A
-  Type B
-  Type C
-  Type D

Refer Dwg. 290/75-7 for Rip Rap details

PLAN
1: 750

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ROCK GRADING TABLE :

PARAMETER	RANGE	ROCK TYPE					
		P1 (Nom. 50)	P2 (Nom. 90)	P3 (Nom. 150)	P4 (Nom. 200)	P5 (Nom. 300)	P6 (Nom. 500)
W ₁₅	min.	0.06	0.30	1.50	3.00	11	53
	max.	0.15	0.75	3.50	7.40	28	128
W ₅₀	min.	0.20	1.00	4.70	9.80	37	170
	max.	0.30	1.50	7.00	14.70	56	255
W ₁₀₀	min.	0.40	2.00	9.40	19.60	75	340
	max.	1.00	5.00	24.00	49.00	187	850

All gradings given in dry mass (kg).

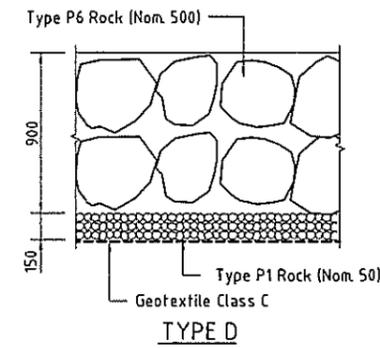
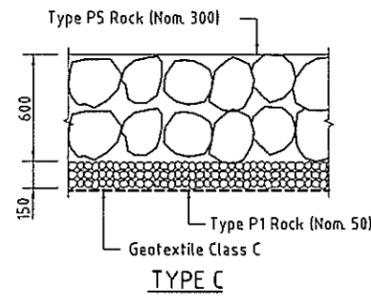
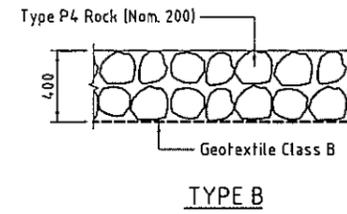
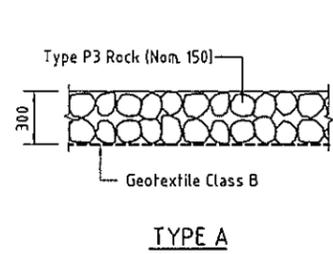
GEOTEXTILE SPECIFICATION TABLE :

Property	Test	Geotextile Class	
		B	C
Minimum grab tensile strength (N)	AS2001.2.3	1000	1800
Minimum G Rating	Austrroads	2500	4200
Minimum trapezoidal tear strength (N)	AS3706.3	400	600
Maximum pore size (EOS μm)	AS3706.7	200	200
Minimum permativity (s ⁻¹)	AS3706.9	0.5	0.5

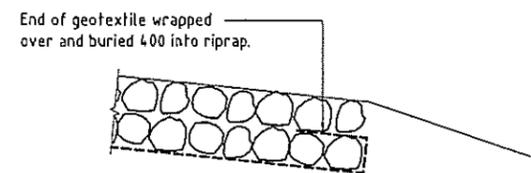
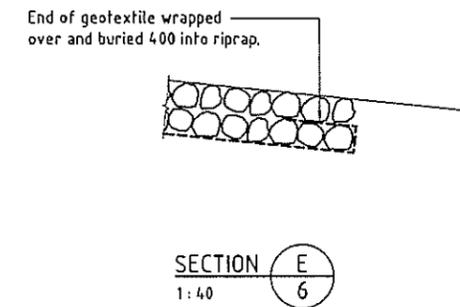
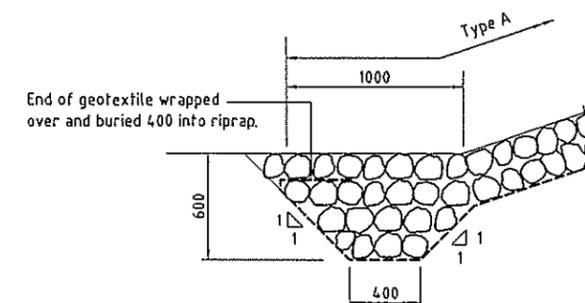
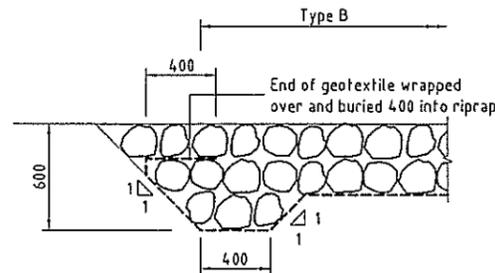
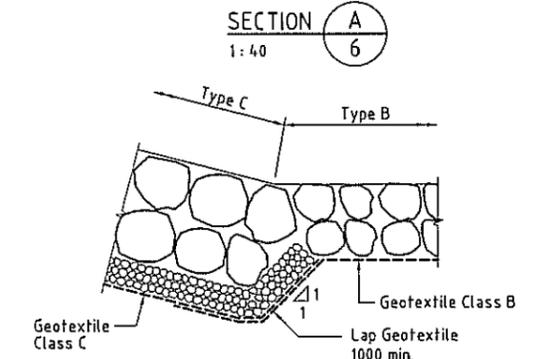
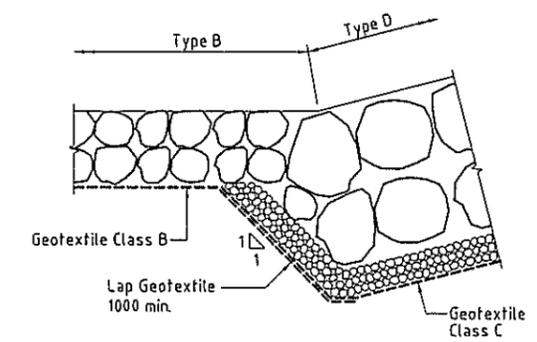
Refer Note No.8

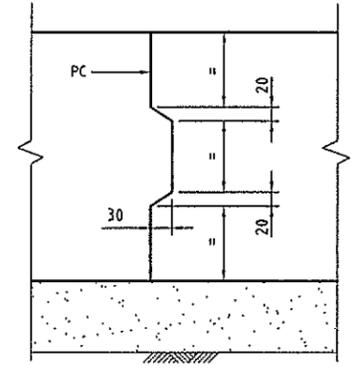
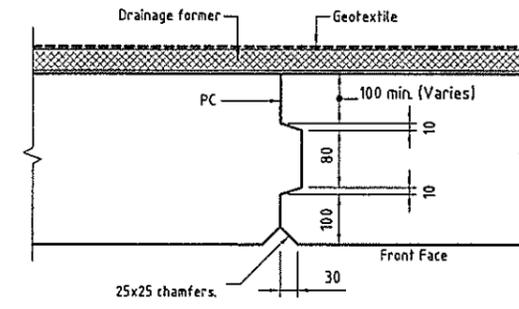
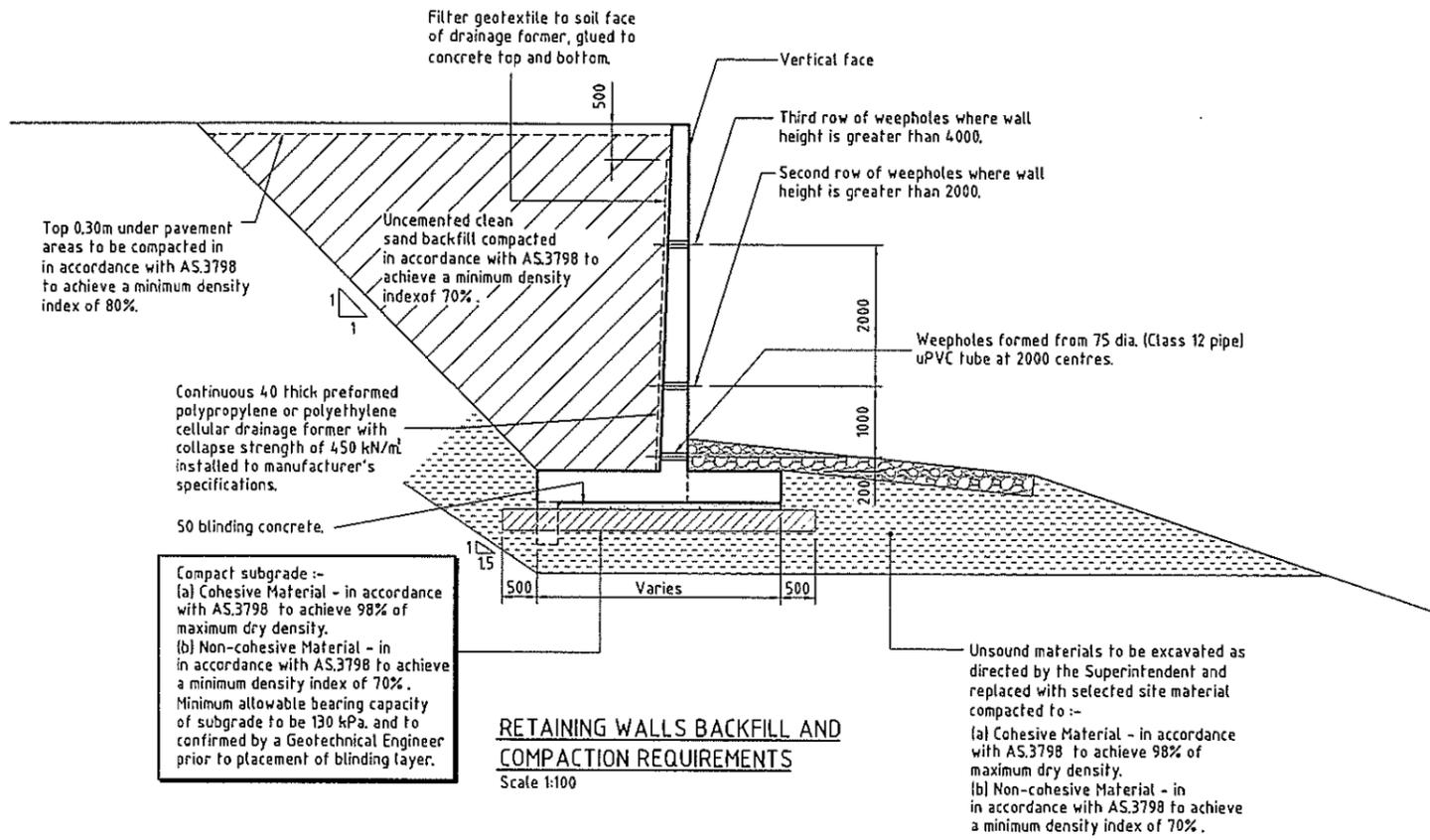
NOTES:

1. A representative sample of rock shall be obtained from the quarry in accordance with AS114.1.3.
2. The dry density of the rock shall not be less than 2500 kg/cum. in accordance with AS4133.2.12.
3. The ratio of maximum to minimum dimensions of any rock shall not exceed three.
4. The Los Angeles value of the rock shall not exceed 20 in accordance with AS114.1.23.
5. The maximum permissible loss for each fraction shall be 12% in accordance with AS114.1.24.
6. Geotextile fabric shall be lapped 0.50m minimum and shall be keyed at the edges to the satisfaction of the Superintendent.
7. Rock of larger size may be substituted if approved by the Superintendent. If larger rock is used, specified layer thicknesses must be increased whilst maintaining nominated finished levels and profiles.
8. Geotextiles shall be non-woven, needle punched fabrics consisting of polyester or polypropylene polymers.



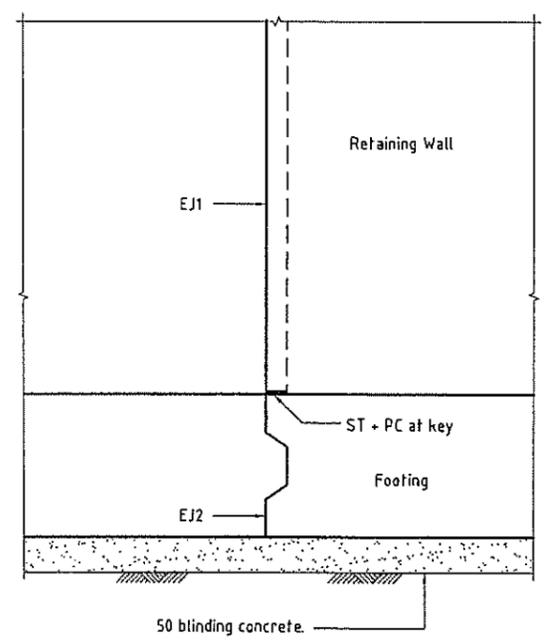
RIP RAP TYPE SECTIONS
1:40





Note:
Expansion joint EJ1 to align with expansion joint EJ2.

RETAINING WALL EXPANSION JOINTS



GENERAL

- G1. These drawings are to be read in conjunction with the specifications. Any discrepancy or omission shall be immediately referred to the Superintendent for resolution.
- G2. All dimensions to be checked by the Contractor before fabrication and construction. DIMENSIONS SHALL NOT BE SCALED.
- G3. All dimensions are in millimetres and reduced levels in metres unless stated otherwise.
- G4. Workmanship and materials shall comply with the Building Code of Australia, and the appropriate S.A.A. Standards, or to such statutory requirements as are deemed to apply to the works.
- G5. The structure has been designed to resist the following loads:-
 a. Structure Dead Load
 b. Imposed Dead Load
 c. Live Load
- | ELEMENT | LOAD | ELEMENT | LOAD |
|-------------------------------|---------|----------------|--------|
| Retaining Wall | 5.0kPa | Retaining Wall | 5.0kPa |
| Walls W1-1, W1-2, W2-1 & W2-2 | 12.5kPa | | |
- G6. During construction the structure shall be maintained in a stable condition and no part shall be overstressed.
- G7. No penetrations, chases or temporary fixtures are permitted without prior approval of the Superintendent.
- G8. All props and formwork for beams and slabs shall be removed before construction of any permanent loading on the slab.
- G9. Building material or other temporary loading shall not be placed on suspended floors without the prior approval of the Superintendent.

FOUNDATIONS

- F1. The foundations have been designed for the following maximum allowable bearing capacities.
- | ELEMENT | PRESSURE (kPa) |
|----------|----------------|
| Footings | 130 |
- F2. Foundations shall be inspected by the Superintendent before placing footings. Footings shall be poured as soon as possible after approval of the foundation and shall be maintained free from water and loose material. Foundations which are allowed to soften or are exposed to excessive water shall be over excavated and backfilled with blinding concrete to the design founding level.
- F3. The site shall be stripped of all topsoil and organic material.
- F4. Sand bedding, if used shall be a clean well graded sand, spread in an uniform layer and well compacted.

Legend:

- ST Steel trowel finish to surface
- PC 2 Coats Water Base Paint before pouring second concrete (Note: no paint near any joint sealant.)
- Geotextile Type B (Refer to Dwg. No. 290/75-7 for specifications)

CONCRETE

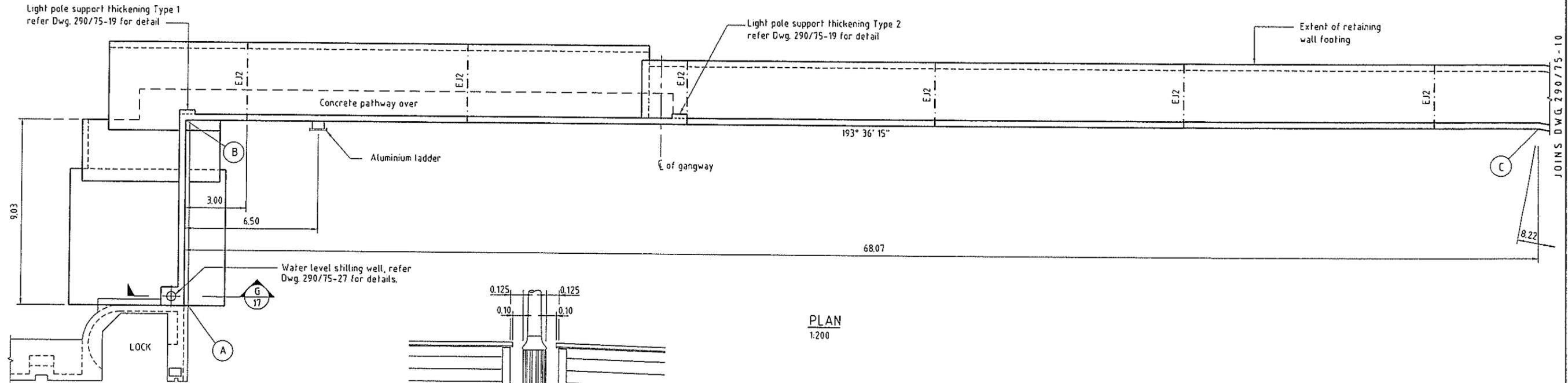
- C1. Concrete shall comply with the requirements of AS3600. Concrete grade refers to the minimum 28 day compressive strength f_c in MPa and the prefix N or S refers to Normal Class or Special Class concrete as specified.
- | ELEMENT | GRADE(MPa) | MIN. COVER (mm) | MAX. AGGREGATE SIZE (mm) |
|----------------|------------|-----------------|--------------------------|
| Retaining Wall | S50 | 65 | 20 |
| Retevment Wall | S40 | N/A | 20 |
| Footings | N40 | 65 | 20 |
- S40 Concrete shall have minimum 470kg cement per cubic metre with maximum water cement ratio of 0.45, suitable for durability exposure classification C or N50.
 S50 Concrete shall have minimum 550kg cement per cubic metre with maximum water cement ratio of 0.40.
- C2. Concrete sizes do not include applied finishes.
- C3. No construction joints, other than those shown on the drawings, shall be used without the approval of the Superintendent.
- C4. The following finishes shall be provided to concrete surfaces.
- | ELEMENT | FINISH |
|-----------------|---------|
| Retaining walls | Class 2 |
| Retevment walls | Class 2 |
- Where not specified, formed finishes shall be Class 3 to AS3610 and unformed surfaces shall be a steel trowel finish.
- C6. Exposed edges shall be chamfered 20mm.
- C7. Concrete shall not be placed until reinforcement, formwork etc. are inspected and approved by the Superintendent.
- C8. Concrete shall be mechanically vibrated to give maximum compaction without segregation.
- C9. Concrete elements shall be cured by methods appropriate to their final application.

REINFORCEMENT

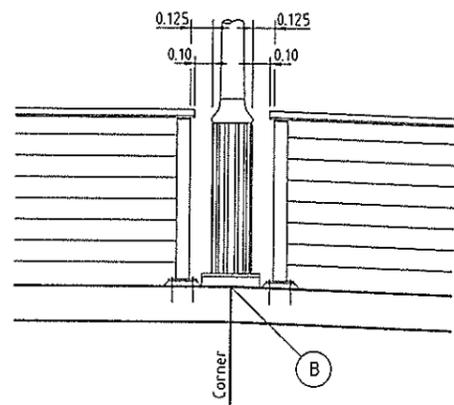
- R1. Reinforcing bars and mesh shall comply with AS4671.
- R2. Reinforcement Symbols
 N - Hot Rolled Grade 500N Deformed Bar
 R - Structural Grade Round Bar
 RL, SL, L - Welded Wire Mesh
 W - Steel Wire
- R3. Bars shall be bent in accordance with AS3600.
- R4. Reinforcement is shown diagrammatically and is not necessarily shown in true projection.
- R5. Splices in reinforcement are to be made only in the positions shown on the drawings or as otherwise approved by the Superintendent.
- R6. Welding of reinforcement is not permitted without the approval of the Superintendent.
- R7. Reinforcement is to be supported in its correct position within the tolerances of AS3600 by approved bar chairs, spaces or support bars.
- R8. Minimum lap lengths for Grade 500N bars unless shown otherwise shall be
 N12 - 300 N16 - 400 N20 - 500 N24 - 700 N28 - 900 N32 - 1100 N36 - 1400
 Top bars in slabs and beams greater than 300 thick to have laps increased by 25%.
- R9. Provide 500 x 500 'L' bars to all corners. (2-N12 top & bottom to footings UNO.)

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REV.	DATE	REVISIONS	REC.	APPR.							

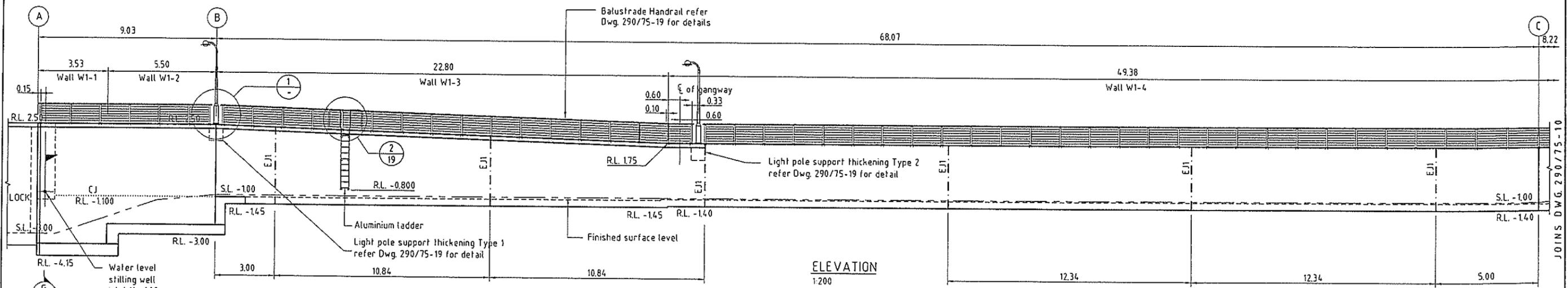
PARK



PLAN
1:200



DETAIL 1
1:40



ELEVATION
1:200

REV.	DATE	REVISIONS	REC.	APPR.
E	12-05-2005	Tubular Handrail replaced with Balustrade Handrail		
D	08-01-2004	Handrails to revetment wall extended	DH	S.G.
C	28-08-2003	New Client Name & extent of retaining wall construction removed	DH	S.G.
B	24-07-2003	Contract 290/74.1 works amended	S.G.	S.G.
A	27-03-2003	Contract 290/74.1 works shown	S.G.	S.G.

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DRAWN: *C. Hagen*
CHECKED: *A. Howard*
RECOMMENDED: PROJ. MGR. *A. Howard*
APPROVED: PROJ. DIR. *S. Gasch*

A3 DATUM. A.H.D.

AUTOCAD FILENAME: P15-098-11.dwg - DATE: 16/5/05 - 17:35pm
XREF's

Cardno MBK
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ACN: 051 074 022

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Sydney	(02) 9418 8233	(02) 9416 6520
Gold Coast	(07) 5539 8333	(07) 5538 4647
Sunshine Coast	(07) 5445 2555	(07) 5443 2642
Townsville	(07) 4772 1166	(07) 4721 2508
Harvey Bay	(07) 1124 5455	(07) 4124 5155
Bundaberg	(07) 4181 1211	(07) 4151 0710
Central Coast (NSW)	(02) 4323 2550	(02) 4324 3251
Port Moresby	(0011675) 325 2322	(0011675) 325 0251
Manila	(0011632) 910 5146	(0011632) 910 5146

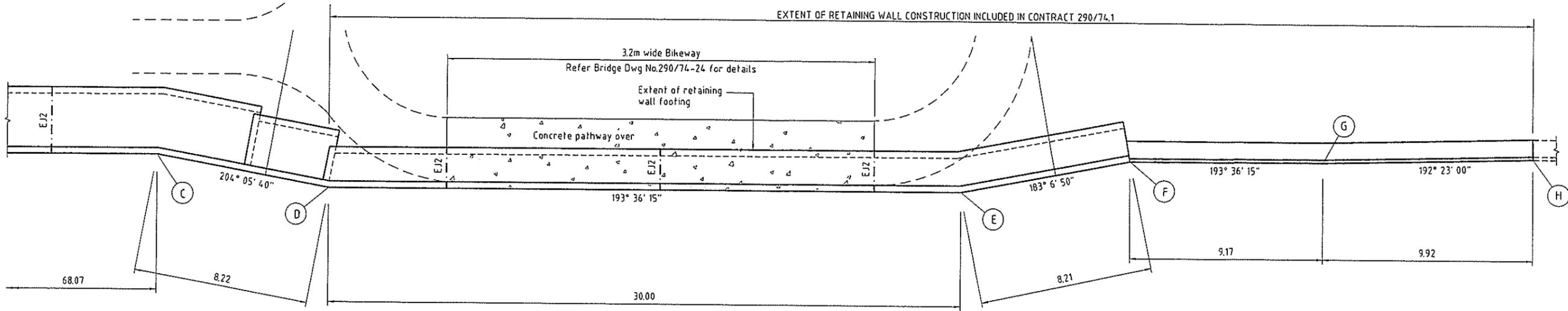
Pumicestone Passage Developments Pty Ltd

PELICAN WATERS DEVELOPMENT - STAGE 5
NORTH LAKE LOCK AND WEIR
RETAINING WALLS - WALL 1

DATE: 27-08-2002
DRAWING No: 290/75-9

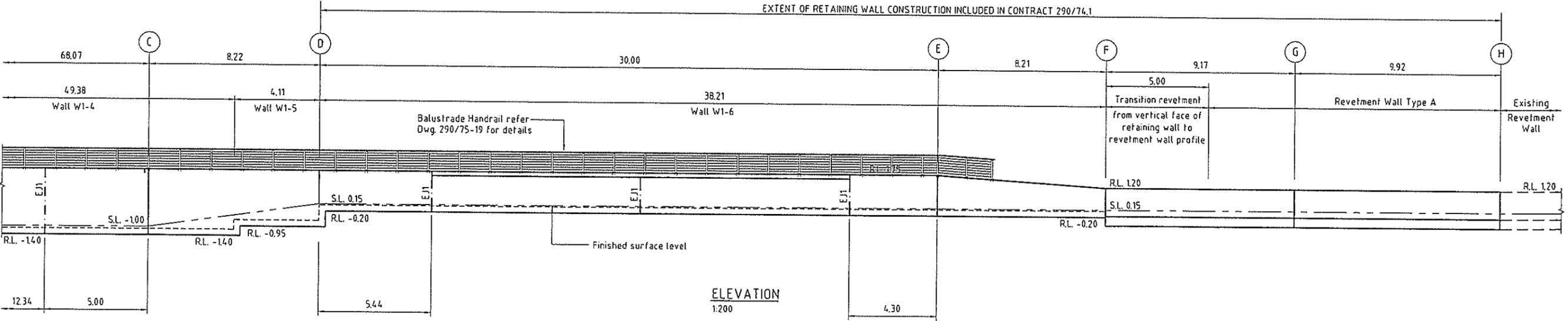
PLAN AND ELEVATION - SHEET 1 of 2

JOINS DWG. 290/75-9



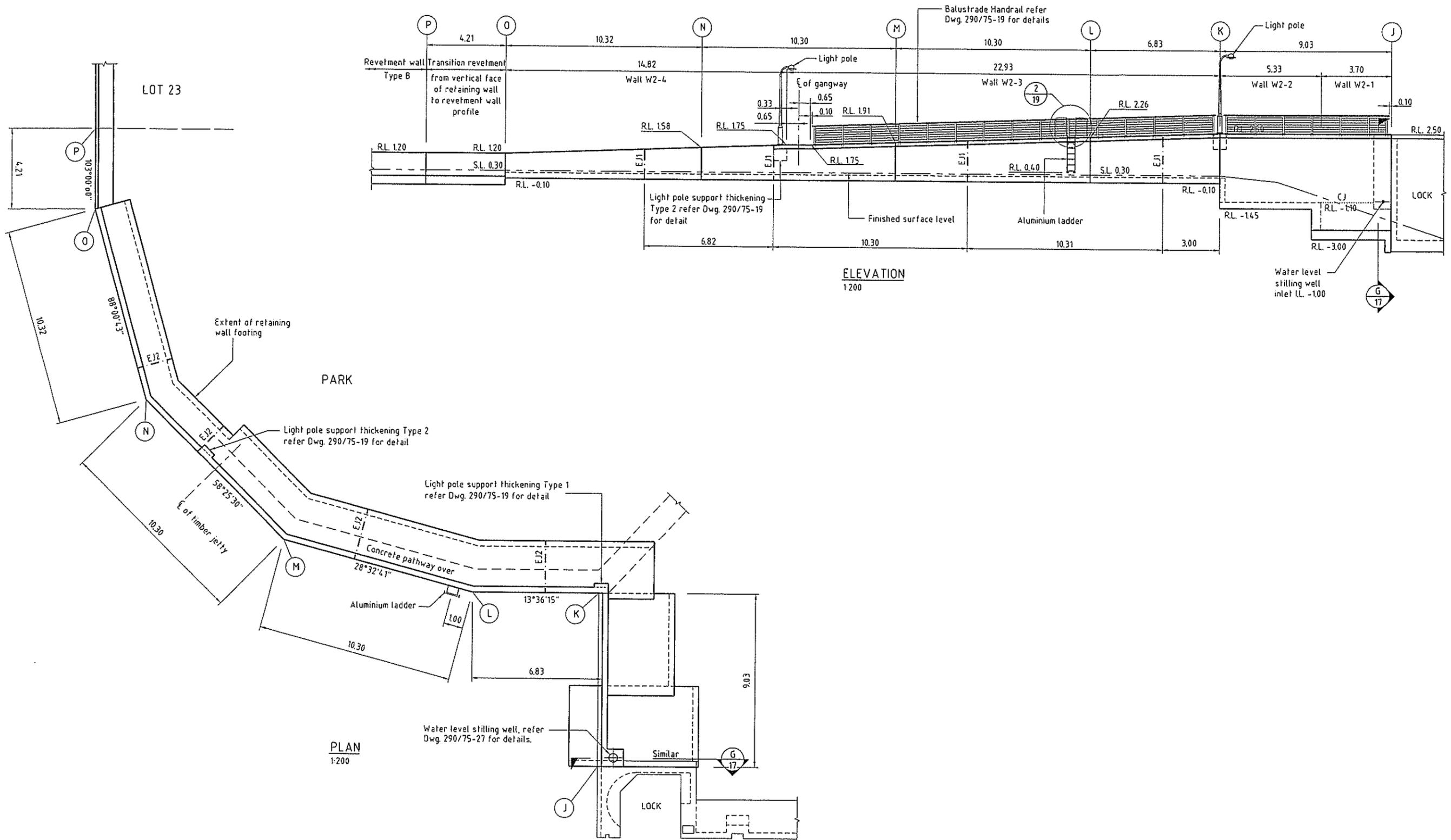
PLAN
1:200

JOINS DWG. 290/75-9



ELEVATION
1:200

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E 12-05-2005 Tubular Handrail replaced with Balustrade Handrail D 08-01-2004 Handrails to revetment wall extended C 28-08-2003 New Client Name & extent of retaining wall construction altered B 24-07-2003 Contract 290/74.1 works amended A 27-03-2003 Contract 290/75.1 works shown	REC. APPR. REC. APPR.	AUTOCAD FILENAME P75-010-14.dwg - DATE 16/5/05 - 12:05pm XREF:					

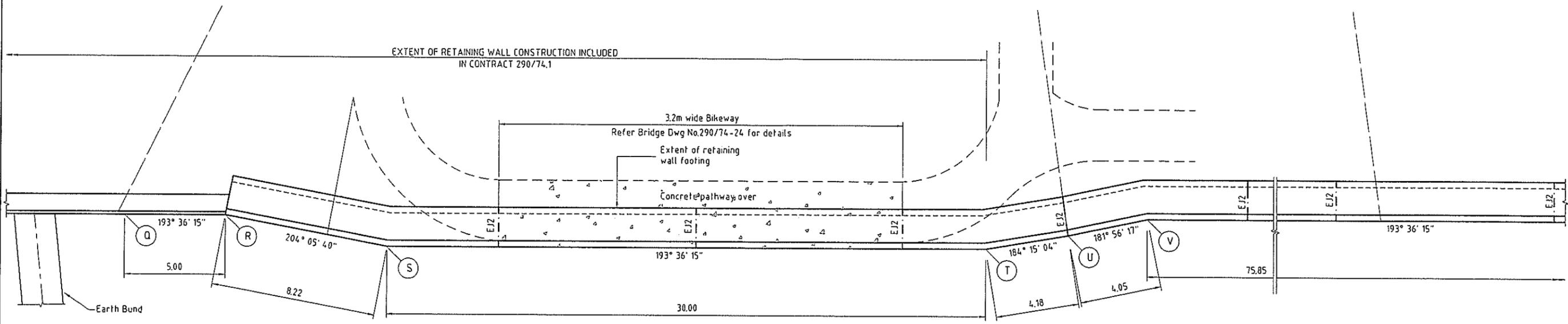


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B 12-05-2005 Tubular Handrail replaced with Balustrade Handrail	<i>CH</i>	RECOMMENDED: PROJ. MGR. <i>A. Howard</i>	APPROVED: PROJ. DIR. <i>S. Gesch</i>
A 28-08-2003 New Client Name	<i>DH</i> <i>SG</i>	AUTOCAD FILENAME P75-098-14.dwg - DATE 16/05/05 - 12:07pm	
Rv. DATE REVISIONS	REC. APPR.	XREF:1	

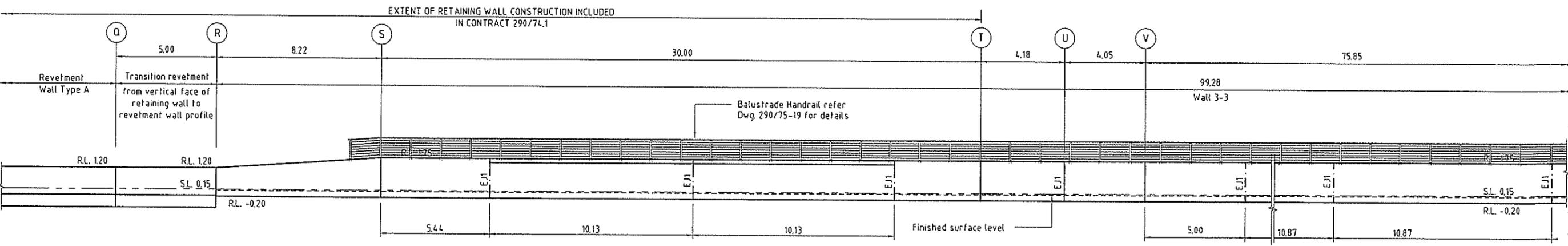
OFFICES Brisbane (07) 3209 9022 Sydney (02) 9416 8233 Gold Coast (07) 5539 9333 Sunshine Coast (07) 5443 2556 Townsville (07) 4772 1166 Harvey Bay (07) 4124 5455 Bundaberg (07) 4151 1211 Central Coast NSW (02) 4323 2558	TELEPHONE (07) 3209 9022 (02) 9416 8233 (07) 5539 9333 (07) 5443 2556 (07) 4772 1166 (07) 4124 5455 (07) 4151 1211 (02) 4323 2558	FAX (07) 3269 0722 (02) 9416 6229 (07) 5539 4047 (07) 5443 2542 (07) 4721 2508 (07) 4124 5165 (07) 4151 5710 (02) 4324 3251
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Pumicestone Passage Developments Pty Ltd PELICAN WATERS DEVELOPMENT - STAGE 5 NORTH LAKE LOCK AND WEIR RETAINING WALLS - WALL 2 PLAN AND ELEVATION		DATE: 27-08-2002 DRAWING No: 290/75-11
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PLAN
1:200



ELEVATION
1:200

REV.	DATE	REVISIONS	REC.	APPR.
E	12-05-2005	Tubular Handrail replaced with Balustrade Handrail		
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A	27-03-2003	Contract 290/74.1 works shown		

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DESIGNED: <i>A. Reckentin</i>	A3	DATUM.	A.H.D.
DRAWN: <i>C. Hagen</i>			
CHECKED: <i>A. Howard</i>	RECOMMENDED: PROJ. MAN.	APPROVED: PROJ. DIR.	
	<i>A. Howard</i>	<i>S. Gesch</i>	
AUTOCAD FILENAME: P75-013-14.dwg - DATE: 16/5/05 - 12:25pm			

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Sunshine Coast	(07) 5443 2555	(07) 5443 2642
Townsville	(07) 4772 1166	(07) 4772 2508
Harvey Bay	(07) 4124 5455	(07) 4124 5155
Bundaberg	(07) 4151 1211	(07) 4151 5710
Central Coast (NSW)	(02) 4323 2558	(02) 4324 3251
INTERNATIONAL		
Port Moresby	(0011675) 325 2322	(0011675) 325 0051
Mankato	(0011637) 910 5146	(0011637) 910 5146

Pumicestone Passage Developments Pty Ltd

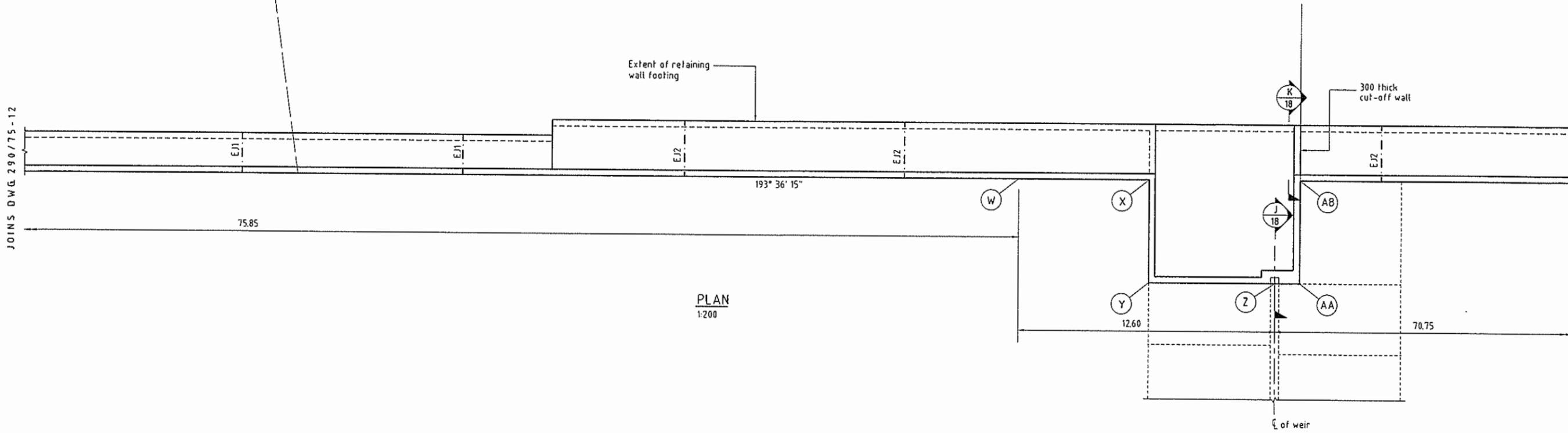
PELICAN WATERS DEVELOPMENT - STAGE 5
NORTH LAKE LOCK AND WEIR
RETAINING WALLS - WALL 3

DATE: 24-07-2003
DRAWING No: 290/75-12

PLAN AND ELEVATION - SHEET 1 of 3

JOINS DWG 290/75-12

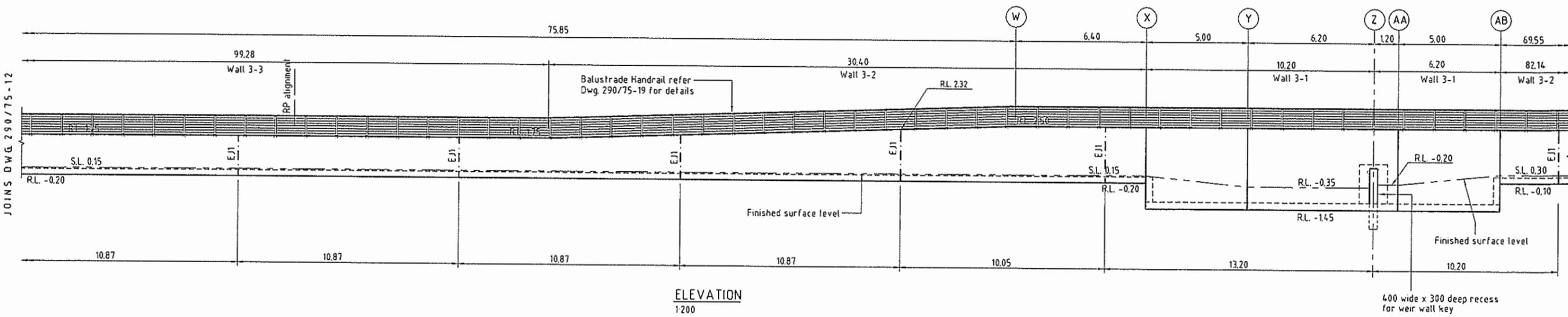
JOINS DWG 290/75-14



PLAN
1:200

JOINS DWG 290/75-12

JOINS DWG 290/75-14



ELEVATION
1:200

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D 12-05-2005	Tubular Handrail replaced with Balustrade Handrail
C 08-01-2004	Handrails to revetment wall extended
B 28-08-2003	New Client Name
A 27-03-2003	CONCRETE JOINT SPACING AMENDED
Rv.	DATE
	REVISIONS
	REC. APPR.

DESIGNED: <i>A. Rackliff</i>	A3 DATUM. A.H.D.
DRAWN: <i>C. Hagen</i>	
CHECKED: <i>A. Howard</i>	
RECOMMENDED: PROJ. MAN. <i>A. Howard</i>	APPROVED: PROJ. DIR. <i>S. Gesch</i>
AUTOCAD FILENAME: P75-018-14.dwg - DATE: 11/5/05 - 12:04pm	
XREF: 1	

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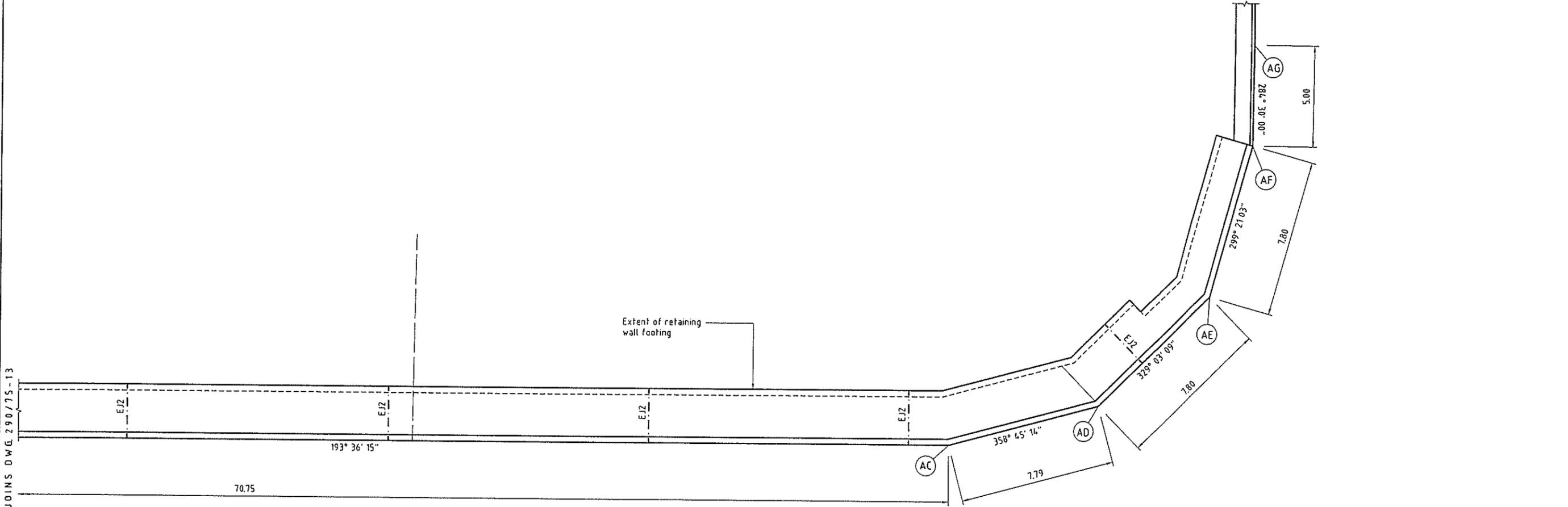
OFFICES	TELEPHONE	FAX
Brisbane	(07) 3369 5622	(07) 3369 9722
Sydney	(02) 9416 8233	(02) 9416 8229
Gold Coast	(07) 5528 9233	(07) 5528 4547
Sunshine Coast	(07) 5443 2555	(07) 5443 5642
Townsville	(07) 4772 1165	(07) 4721 2508
Harvey Bay	(07) 4124 5455	(07) 4124 6165
Bundaberg	(07) 4151 1211	(07) 4151 5710
Central Coast (NSW)	(02) 4323 2556	(02) 4324 3251
INTERNATIONAL		
Port Moresby	(0011879) 325 2322	(0011879) 325 0051
Manila	(0011827) 910 5146	(0011827) 910 5146

Pumicestone Passage Developments Pty Ltd
 PELICAN WATERS DEVELOPMENT - STAGE 5
 NORTH LAKE LOCK AND WEIR
 RETAINING WALLS - WALL 3
 PLAN AND ELEVATION - SHEET 2 of 3

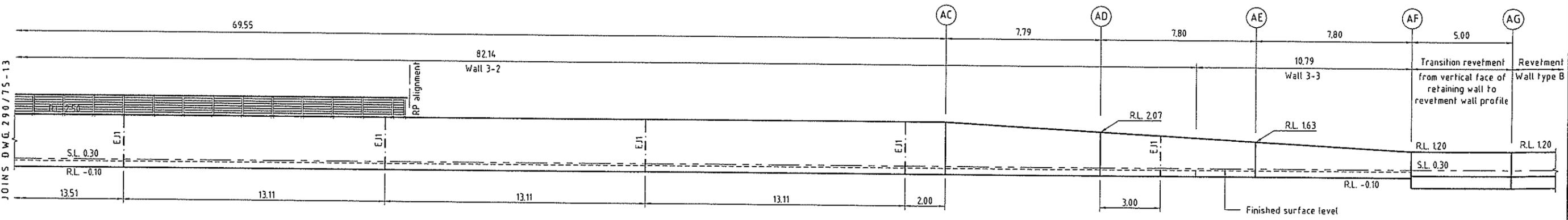
DATE: 27-08-2002
 DRAWING No: 290/75-13

JOINS DWG. 290/75-13

JOINS DWG. 290/75-13



PLAN
1:200



ELEVATION
1:200

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CHECKED: <i>A. Howard</i>	RECOMMENDED: PROJ. MAN. <i>A. Howard</i>
APPROVED: PROJ. DIR. <i>S. Gesch</i>	AUTOCAD FILENAME: P15-05B-N.dwg DATE: 16/5/05 - 12:05pm XREF: 1
DATE	REVISIONS
28-05-2005	Tubular Handrail replaced with Balustrade Handrail
28-05-2003	New Client Name

DESIGNED: <i>A. Recklin</i>	DRAWN: <i>C. Hagen</i>	CHECKED: <i>A. Howard</i>	RECOMMENDED: PROJ. MAN. <i>A. Howard</i>	APPROVED: PROJ. DIR. <i>S. Gesch</i>
A3 DATUM. A.H.D.				

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Cardno MBK (Qld) Pty Ltd
ACN: 051 074 052

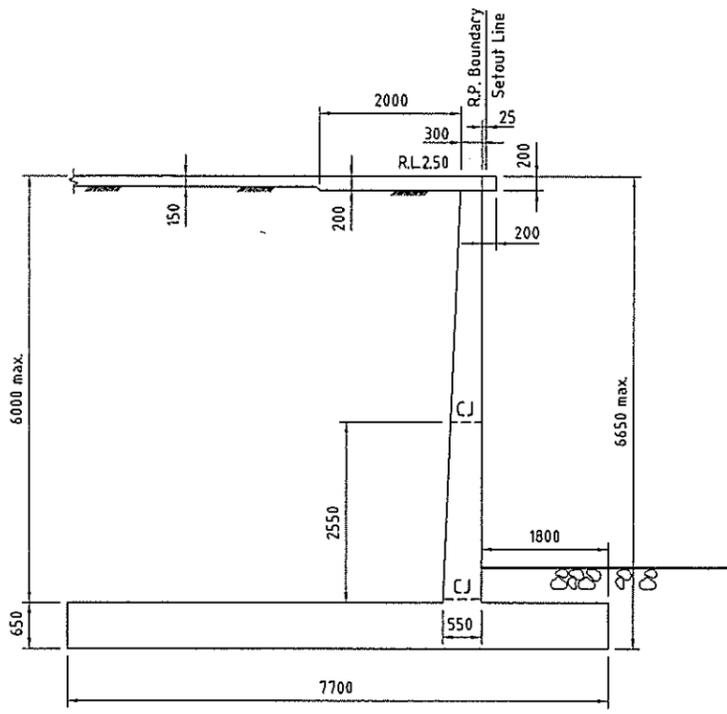
SUNSHINE COAST OFFICE: 65 Duport Avenue Maroochydore, Qld 4558
Email: sco@sun.cardno.com.au Ph: (07) 5443 2555 Fax: (07) 5443 2542

OFFICES: Brisbane (07) 3369 5632, Sydney (02) 9416 6200, Gold Coast (07) 5539 9333, Sunshine Coast (07) 5443 2555, Townsville (07) 4772 1155, Hervey Bay (07) 4124 5155, Bundaberg (07) 4151 1211, Central Coast (07) 4329 2555, Port Moresby (0011675) 325 2322, Mackie (0011632) 910 5146.

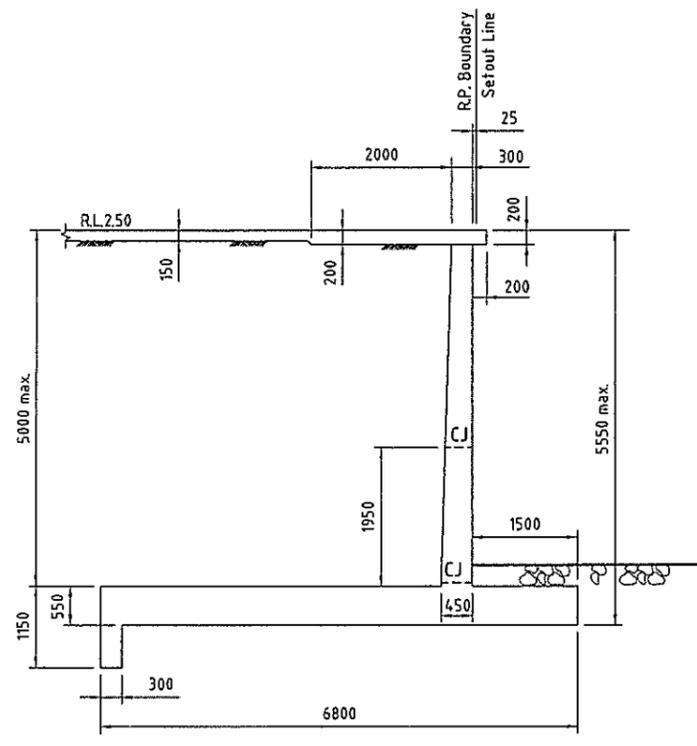
TELEPHONE: (07) 3369 5632, (02) 9416 6200, (07) 5539 9333, (07) 5443 2555, (07) 4772 1155, (07) 4124 5155, (07) 4151 1211, (07) 4329 2555, (0011675) 325 2322, (0011632) 910 5146.

FAX: (07) 3369 0722, (02) 9416 6200, (07) 5538 4647, (07) 5443 2642, (07) 4772 2500, (07) 4124 5155, (07) 4151 0710, (02) 4324 0251, (0011675) 325 0951, (0011632) 910 5146.

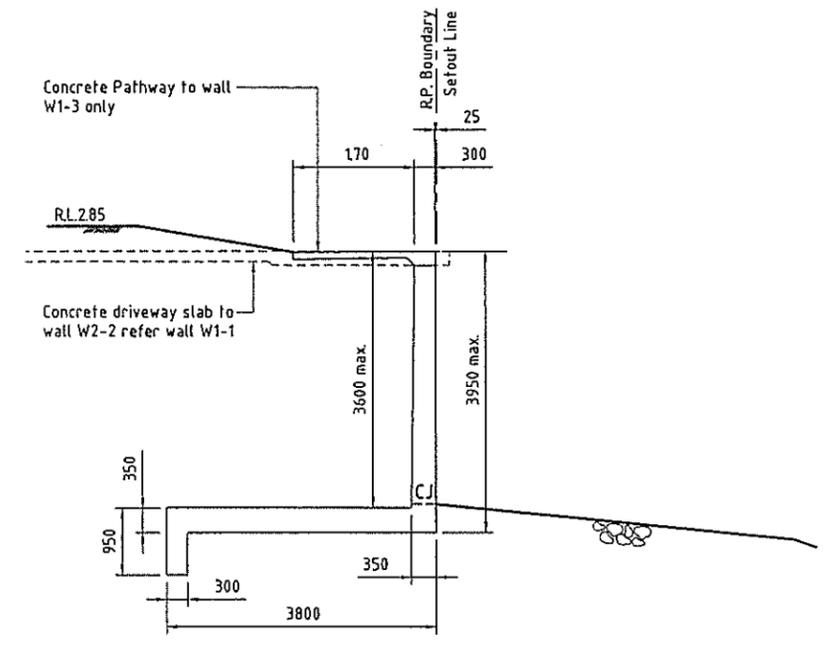
Pumicestone Passage Developments Pty Ltd	
PELICAN WATERS DEVELOPMENT - STAGE 5	
NORTH LAKE LOCK AND WEIR	
RETAINING WALLS - WALL 3	
DATE: 27-08-2002	DRAWING No: 290/75-14
PLAN AND ELEVATION - SHEET 3 of 3	



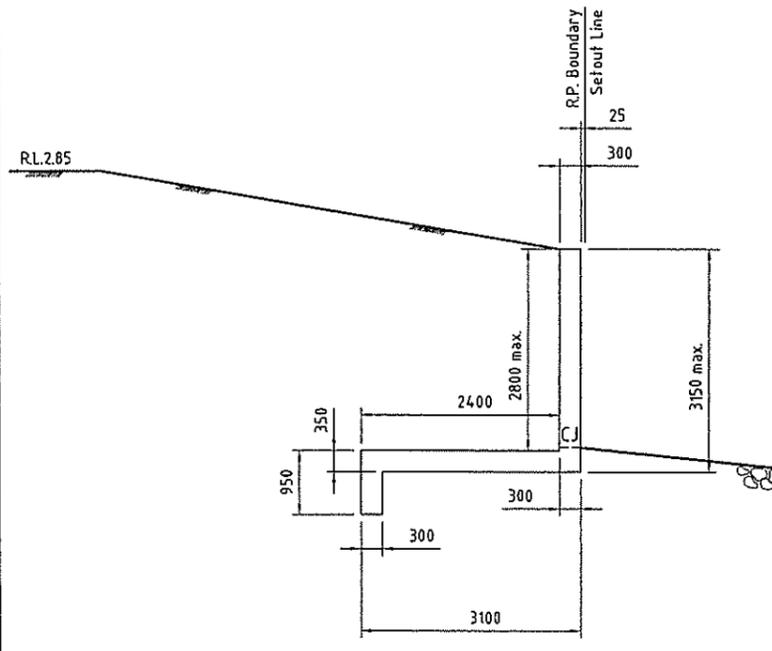
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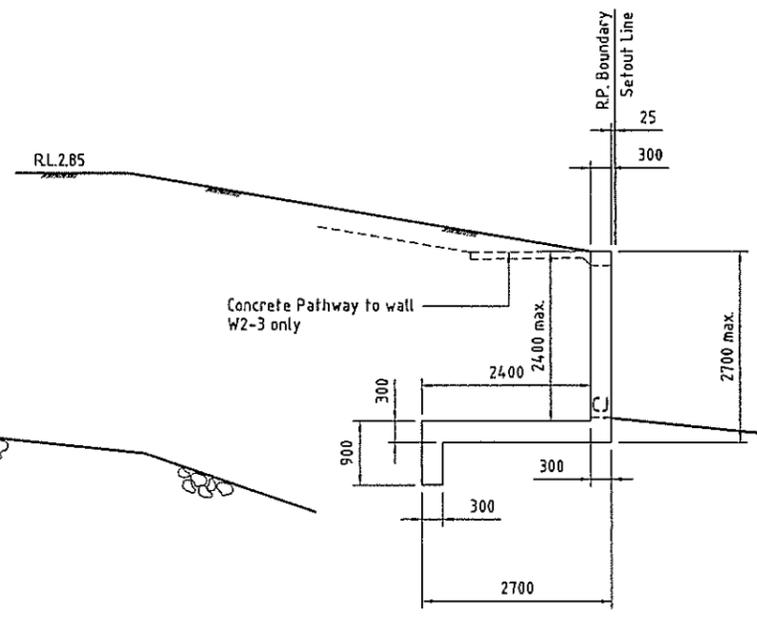
WALL W1-2
WALL W2-1 (Similar)
Scale 1:100



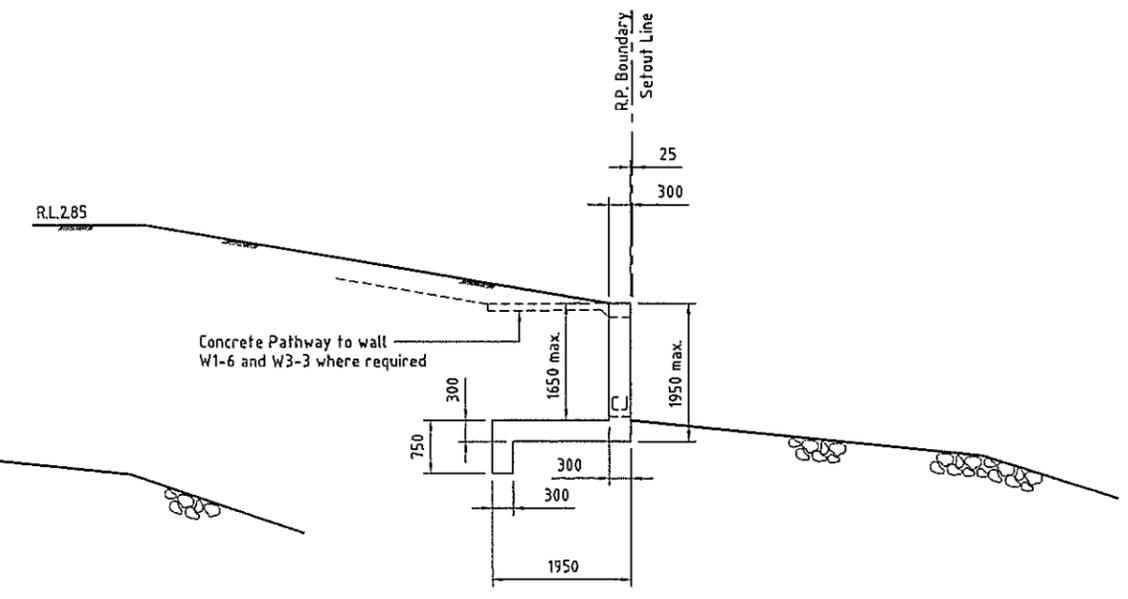
WALL W1-3
WALL W2-2 (Similar)
WALL W3-1 (Similar)
Scale 1:100



WALL W1-4
Scale 1:100



WALL W1-5
WALL W2-3 (Similar)
WALL W3-2 (Similar)
Scale 1:100



WALL W1-6
WALL W2-4 (Similar)
WALL W3-3 (Similar)
Scale 1:100

REV.	DATE	REVISIONS	REC.	APPR.

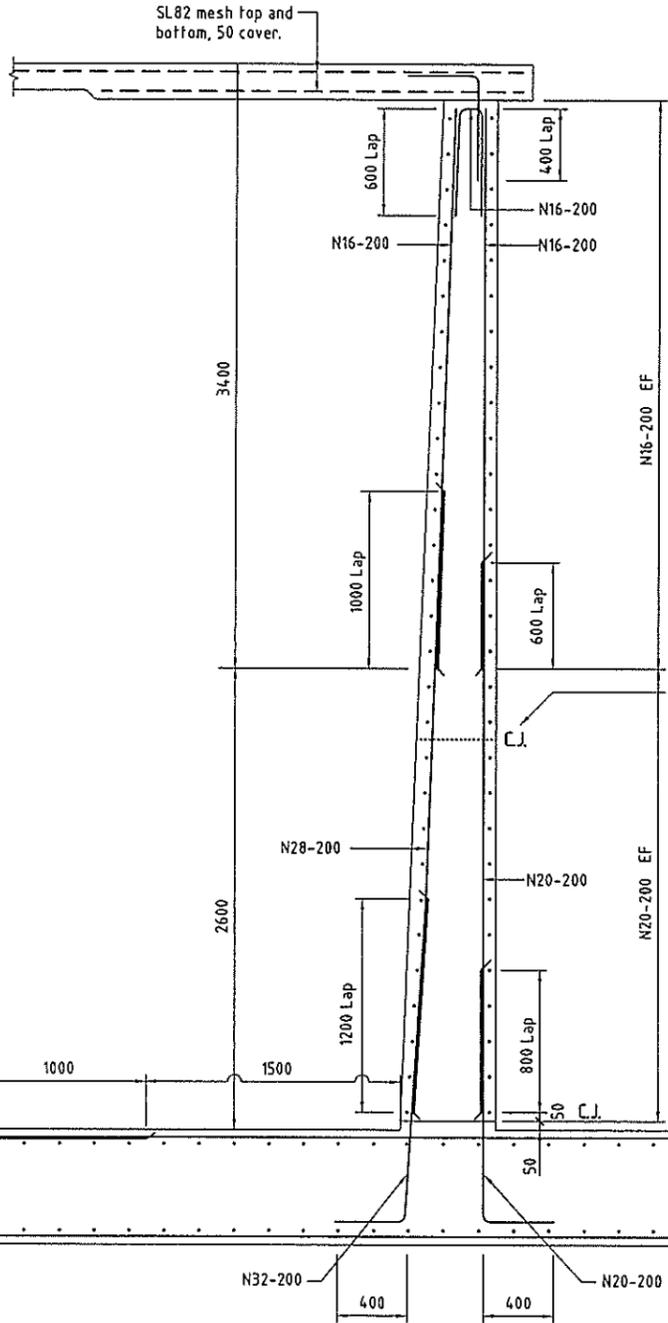
DESIGNED: *[Signature]*
DRAWN: *[Signature]*
CHECKED: *[Signature]*
RECOMMENDED: PROJ. MAN. *[Signature]*
APPROVED: PROJ. DIR. *[Signature]*
AUTOCAD R15 FREEMAN: P57-SK2-BDWG DATE: 22-4-2002 TIME: 11:07 AM

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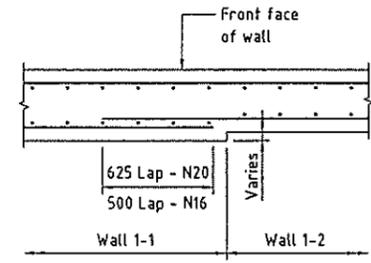
OFFICES: Brisbane (07) 3320 9623 Sydney (02) 9416 8233 Gold Coast (07) 5539 9333 Sunshine Coast (07) 5443 2553 Townsville (07) 4721 1160 Hervey Bay (07) 4124 5455 Bundaberg (07) 4151 1211 Central Coast (NSW) (02) 4323 2598 INTERNATIONAL Port Moresby (0511625) 325 2222 Atlanta (0511625) 910 6146

QVIEW PTY. LTD.
PELICAN WATERS DEVELOPMENT - STAGE 5
NORTH LAKE LOCK AND WEIR
RETAINING WALLS
TYPE SECTIONS

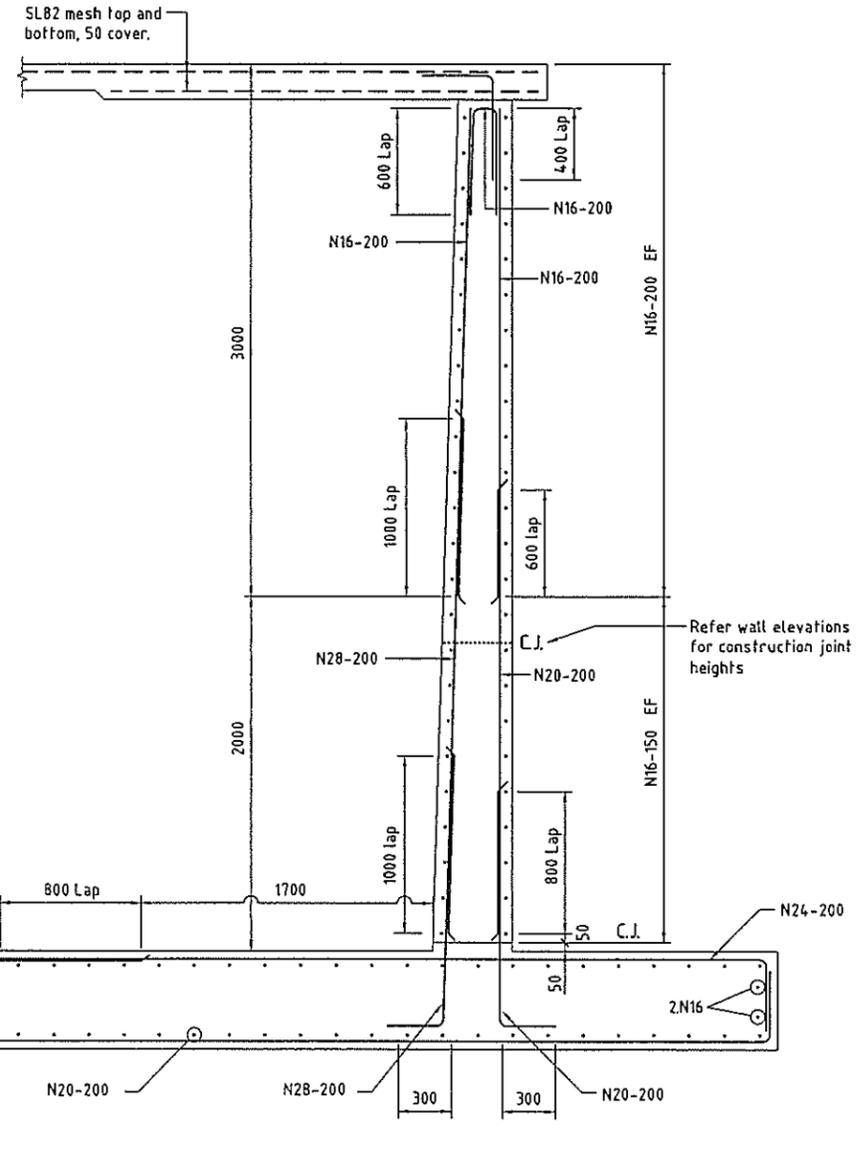
DATE: 27-08-2002
DRAWING No: 290/75-15



WALL W1-1
1:40

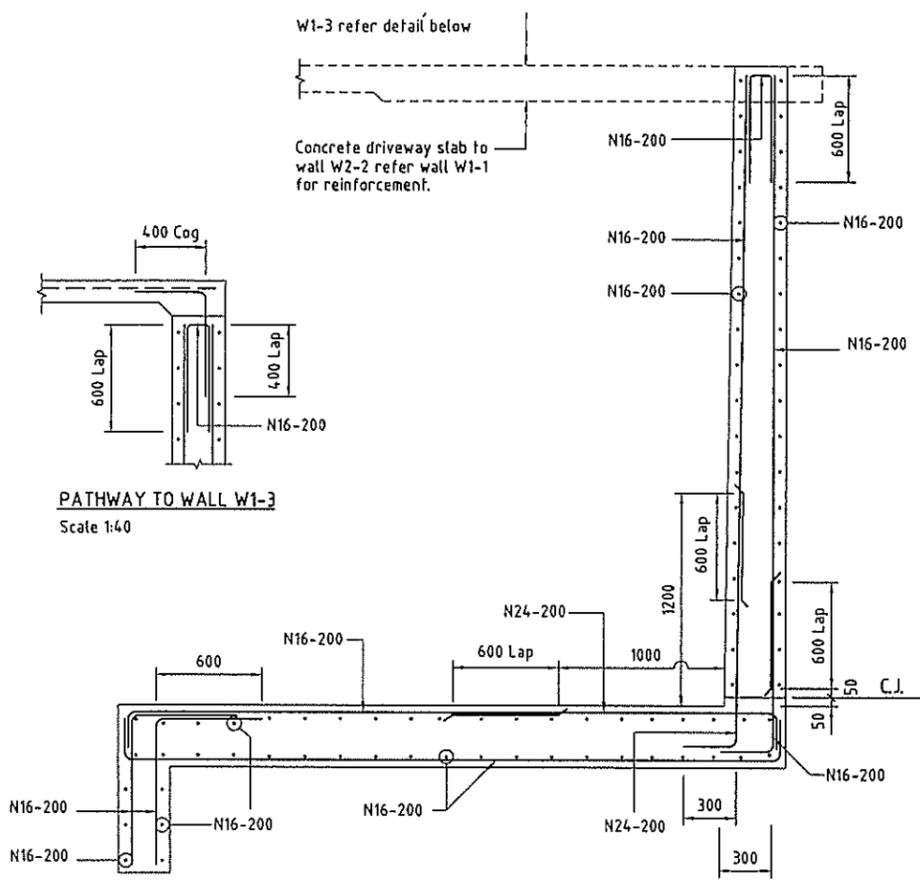


WALL TRANSITION DETAIL (Typical)
Scale 1:40



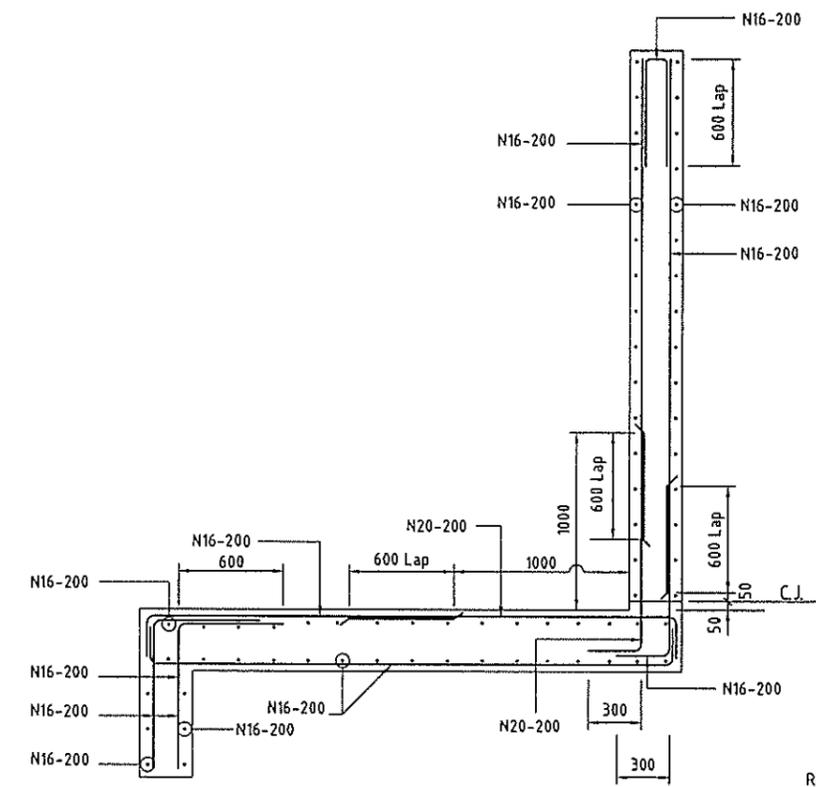
WALL W1-2
WALL W2-1 (Similar)
1:40

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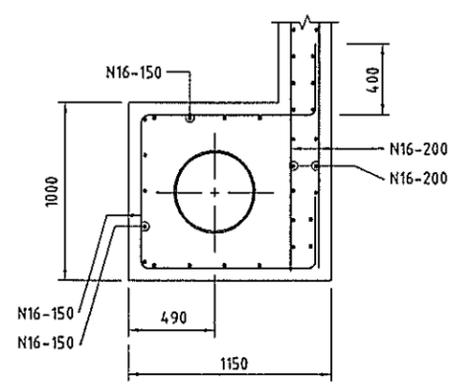


PATHWAY TO WALL W1-3
Scale 1:40

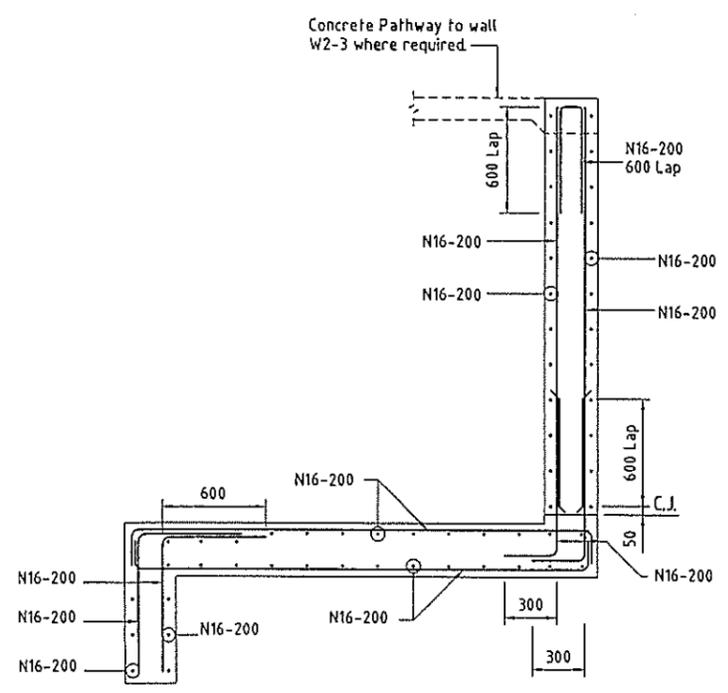
WALL W3-1
WALL W1-3 (Similar)
WALL W2-2 (Similar)
1:40



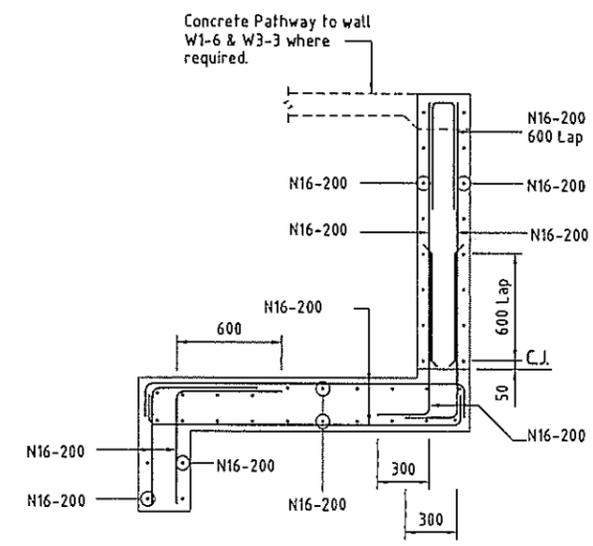
WALL W1-4
1:40



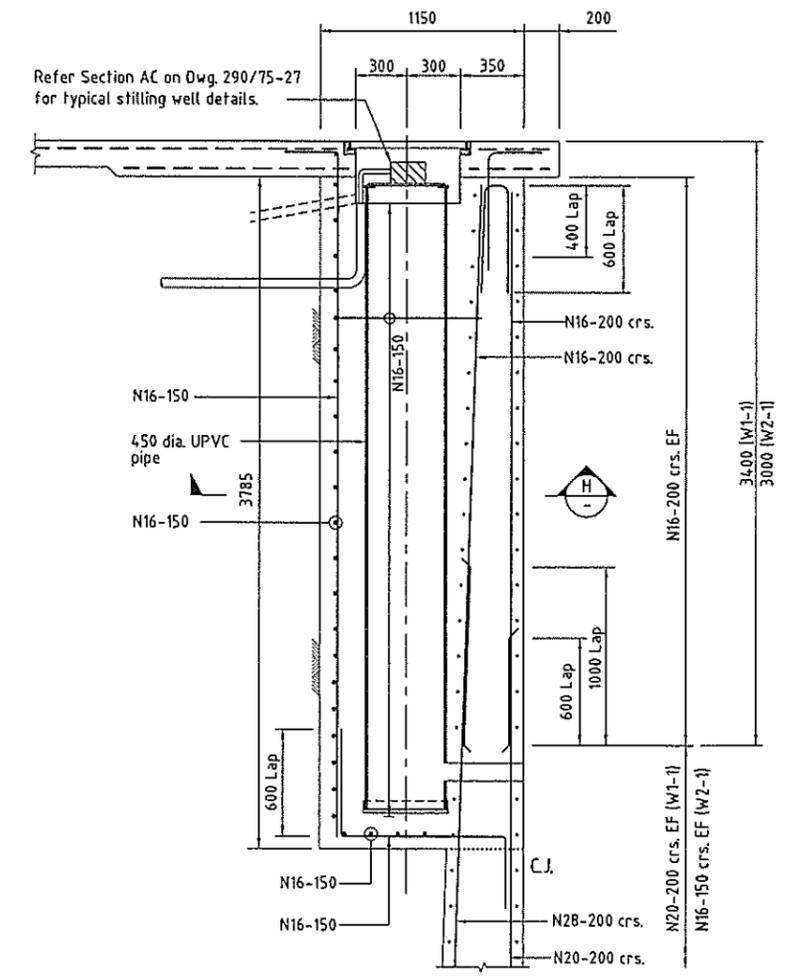
SECTION H
1:40



WALL W1-5
WALL W2-3 (Similar)
WALL W3-2 (Similar)
1:40

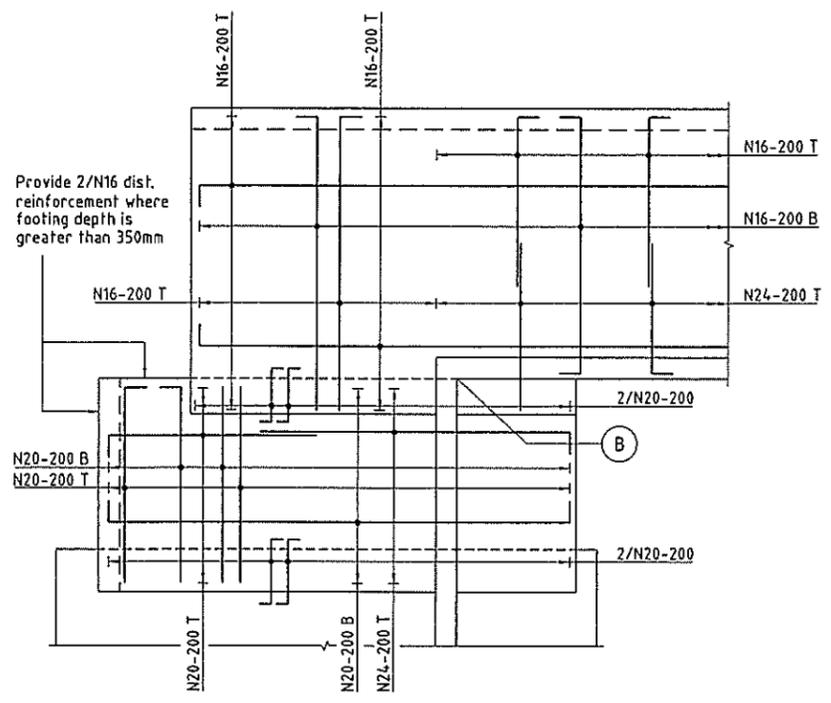


WALL W1-6
WALL W2-4 (Similar)
WALL W3-3 (Similar)
1:40

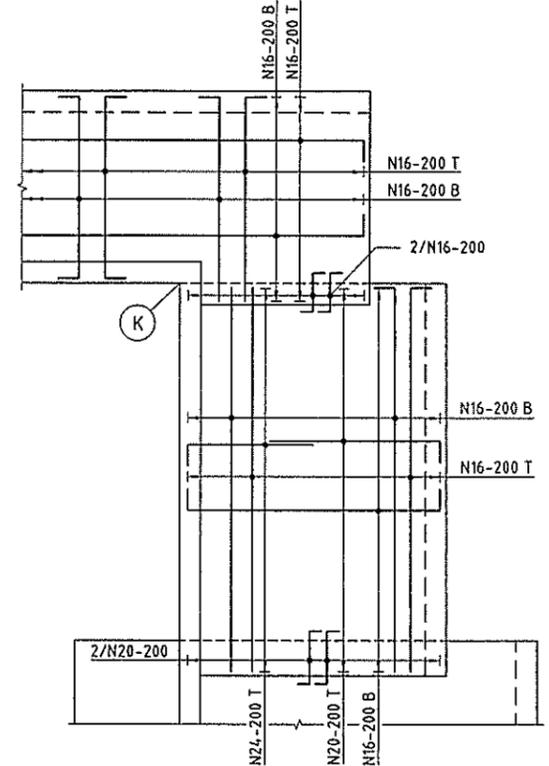


SECTION G
1:40

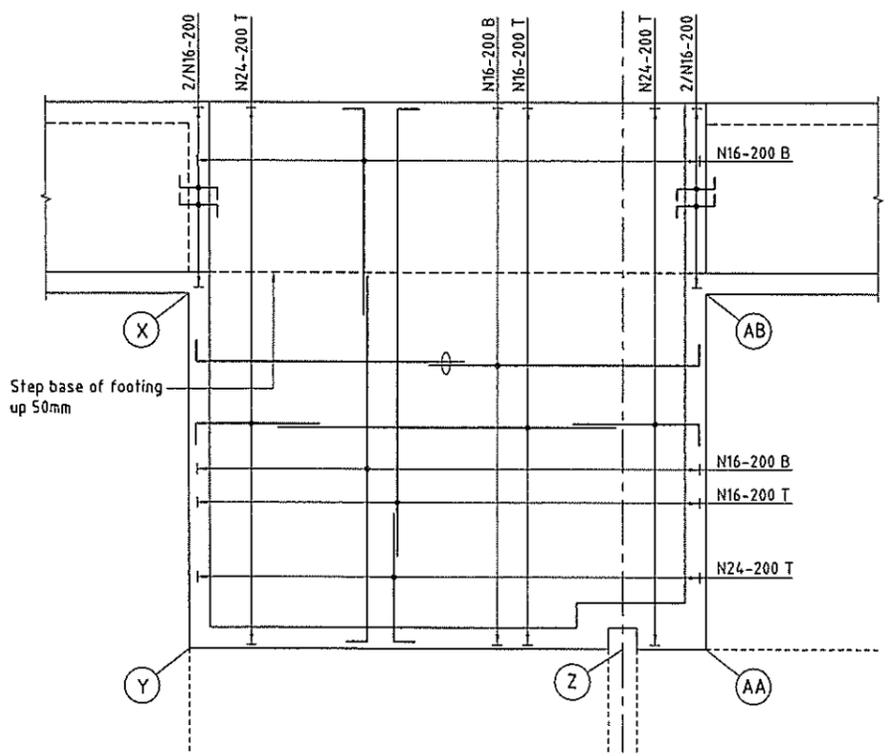
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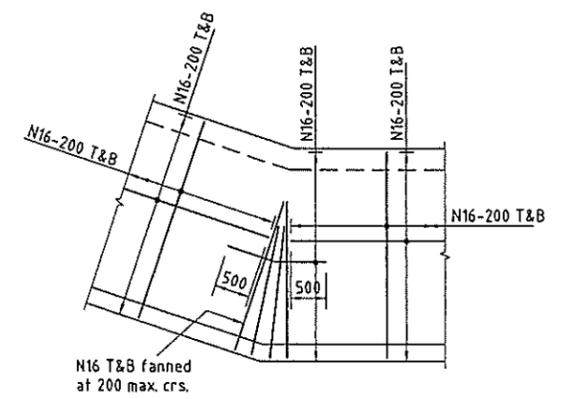
WALL W1-2 & W1-3 CORNER DETAIL
1:100
Wall and key reinforcement omitted for clarity



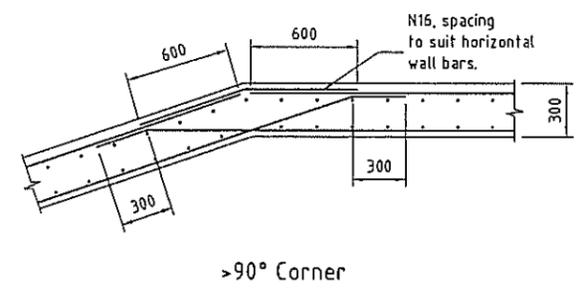
WALL W2-2 & W2-3 CORNER DETAIL
1:100
Wall and key reinforcement omitted for clarity



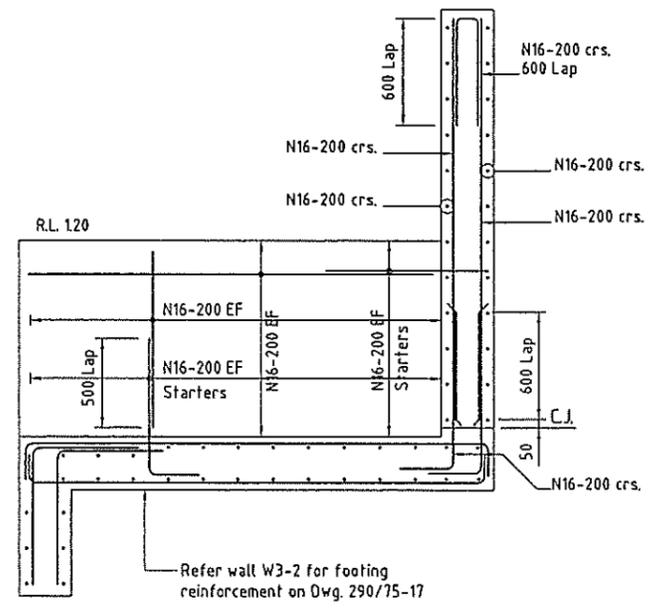
WALL W3-1 CORNER DETAIL
1:100
Wall and key reinforcement omitted for clarity



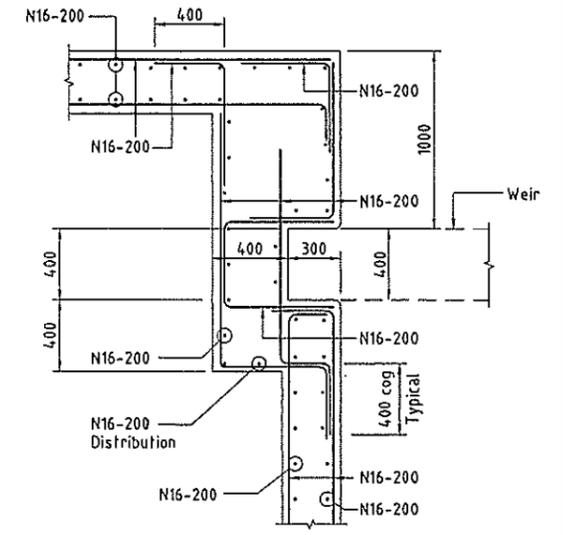
TYPICAL FOOTING TRUNCATION DETAIL
1:100
Wall and key reinforcement omitted for clarity



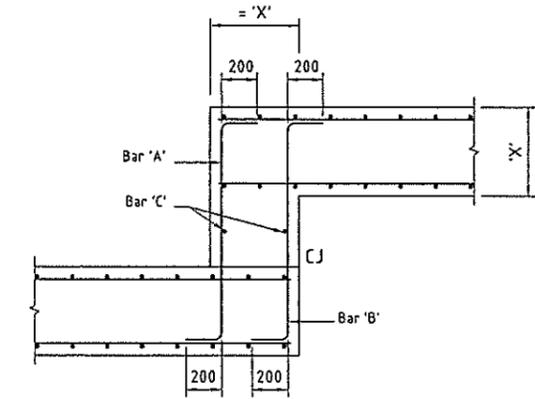
WALL CORNER DETAILS
1:40



SECTION K
1:40

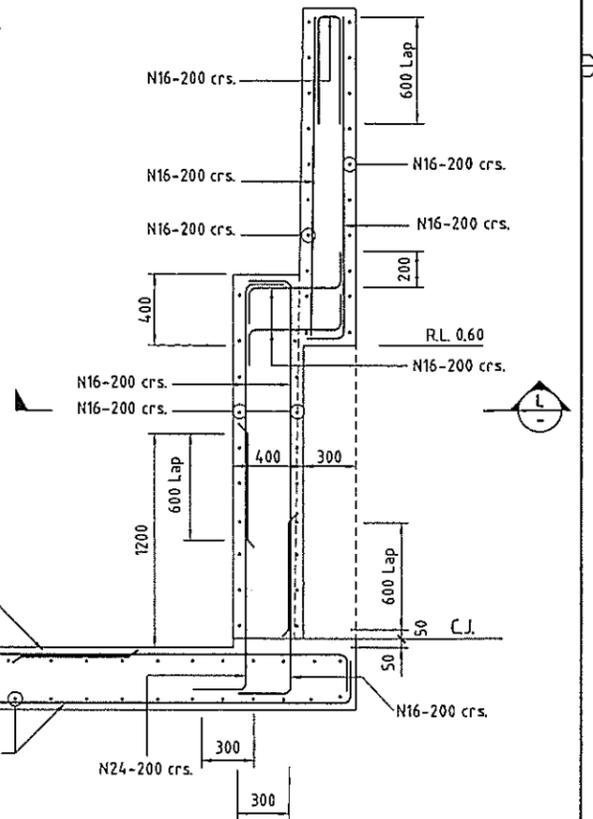


SECTION L
1:40



FOOTING STEP DETAIL
NOT TO SCALE

STEP IN FOOTING AT JUNCTION OF WALLS	BARS 'A'	BARS 'B'	BARS 'C'
W1-1, W2-1, W1-2,	N20-200	N20-200	N20-200
W1-4, W2-2, W3-1, W1-3, W2-3, W1-5, W3-2, W1-6, W2-4, W3-3	N16-200	N16-200	N16-200



SECTION J
1:40

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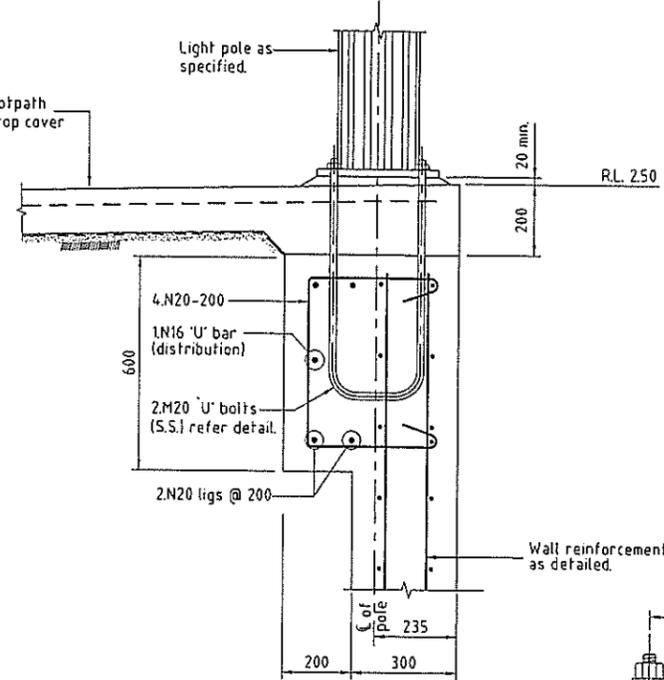
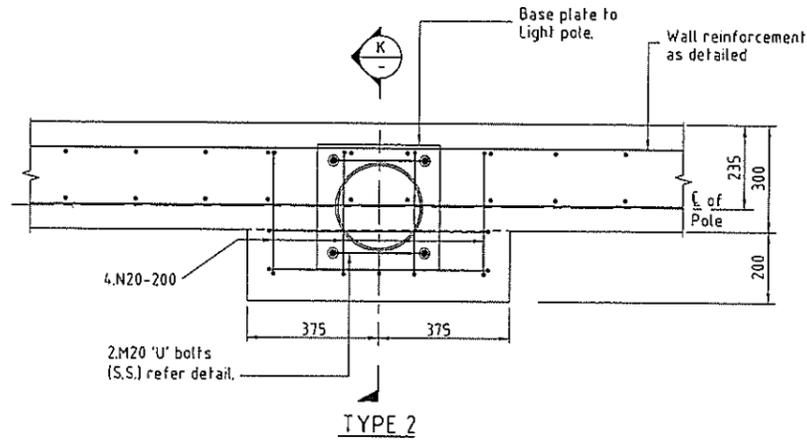
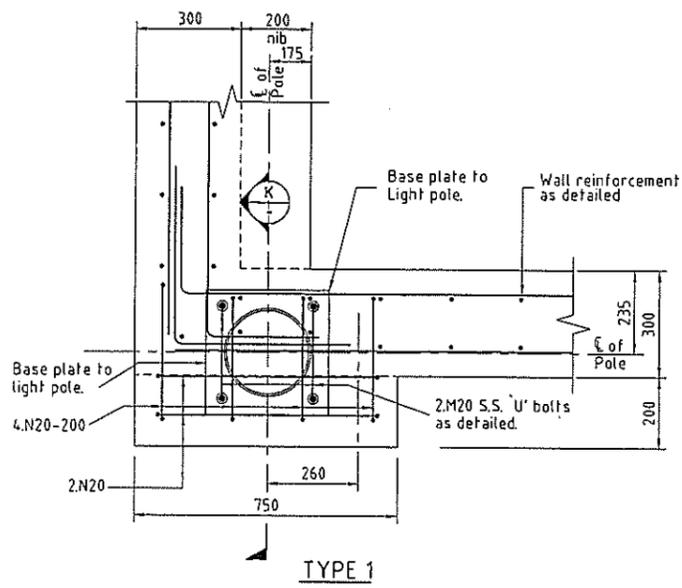
DESIGNED: [Signature]
DRAWN: [Signature]
CHECKED: [Signature]
RECOMMENDED: PROJ. MAN. [Signature]
APPROVED: PROJ. DIR. [Signature]
AUTOCAD R15 FILENAME: P15-RETWDWS DATE: 27-5-2002 TIME: 2:55 PM

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SUNSHINE COAST OFFICE: 60 Osipov Avenue, Meroodhydara, Qld 4558
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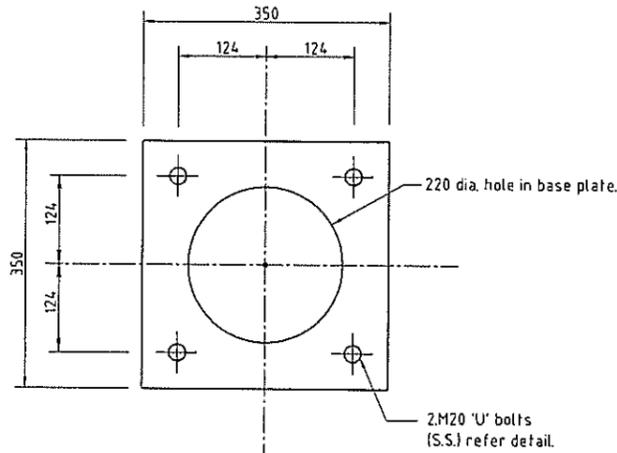
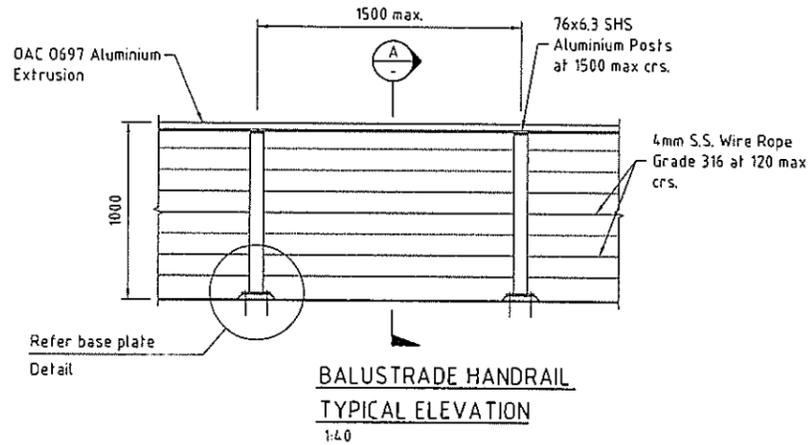
OFFICES
Brisbane (07) 3369 0822
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Gold Coast (07) 5529 0333
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Townsville (07) 4732 1166
Hervey Bay (07) 4124 5455
Bundaberg (07) 4151 1211
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INTERNATIONAL
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QVIEW PTY. LTD.
PELICAN WATERS DEVELOPMENT - STAGE 5
NORTH LAKE LOCK AND WEIR
RETAINING WALLS
WALL REINFORCEMENT - SHEET 3 of 3

DATE: 27-08-2002
DRAWING No: 290/75-18

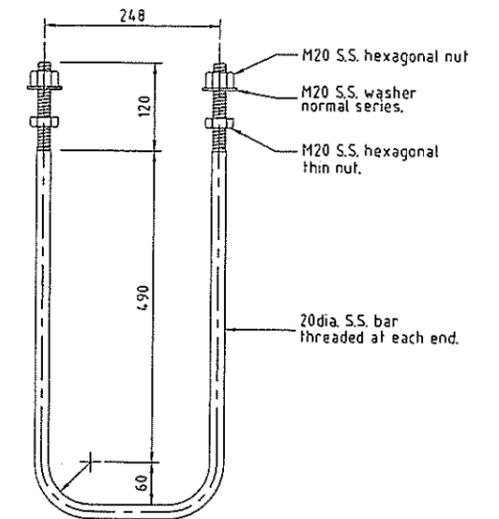


LIGHT POLE SUPPORT THICKENING DETAIL
1:20

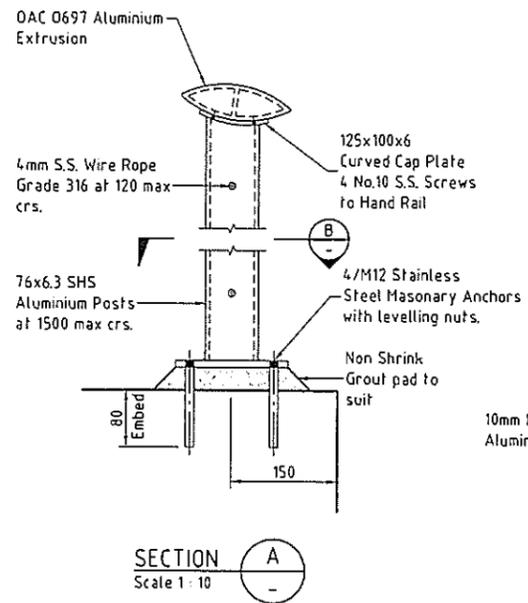


SECTION K
1:20

LIGHT POLE BASE PLATE SETOUT (PL)
1:10

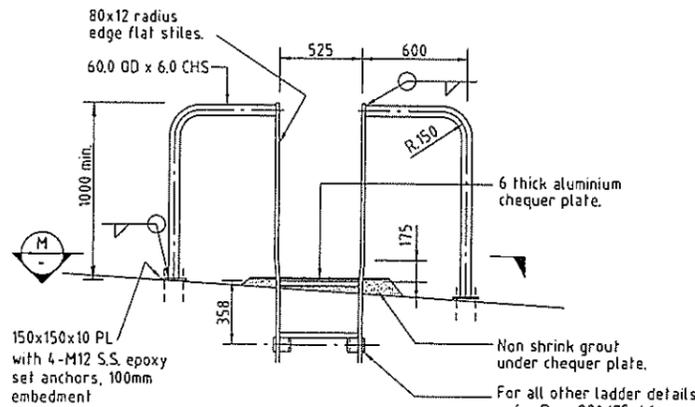


LIGHT POLE S.S. 'U' BOLT
1:10



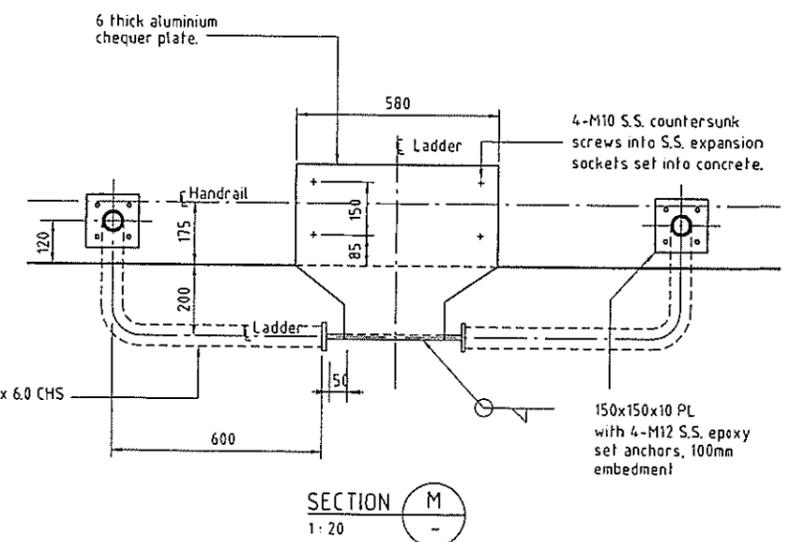
HANDRAIL DESIGN NOTES:

1. Design balustrade loading - C3 to AS1170.
2. All Aluminium to be grade 6061-T6.
3. All bolts, nuts, washers and screws to be Stainless Steel Grade 316L.
4. All interfaces between S.S. and Aluminium shall be separated with approved neprene washers or approved equivalent.
5. All Welding to comply with AS1665 to quality B, with filler rods grade 5556 filler alloy.
6. Coat underside of base plate with two coats of alkali resistant bituminous paint, or approved equivalent.



Detail 2
1:40

Note: At any aluminium/concrete interface, the aluminium shall be painted with 2 coats of bitumen paint.



SECTION M
1:20

DESIGNED: A.R.		DRAWN: C.H.		CHECKED: A.F.H.		RECOMMENDED: PROJ. MAN. A. Howard		APPROVED: PROJ. DIR. S. Gesch	
DATE: 12-05-2005		REVISIONS:		REVISIONS:		REVISIONS:		REVISIONS:	
Tubular handrail replaced with Balustrade Handrail									
New Client Name									

DESIGNED: A.R.	DRAWN: C.H.	CHECKED: A.F.H.	RECOMMENDED: PROJ. MAN. A. Howard	APPROVED: PROJ. DIR. S. Gesch
AUTOCAD FILE NAME: P15-RET16.dwg - DATE: 17/5/05 - 2:50pm				

Cardno MBK
Cardno MBK (Qld) Pty Ltd
AC/N: 051 074 992

BLVD/NE COAST OFFICE: 66 Duporth Avenue Maroochydore, Qld 4558
Email: info@cardno.com.au Ph: (07) 5443 2558 Fax: (07) 5443 2662

OFFICES: Brisbane (07) 5309 9522, Sydney (02) 9418 2233, Gold Coast (07) 5539 0333, Sunshine Coast (07) 5443 2556, Townsville (07) 4772 1166, Hervey Bay (07) 4124 5456, Bundaberg (07) 4151 1211, Central Coast (NSW) (02) 4323 2568

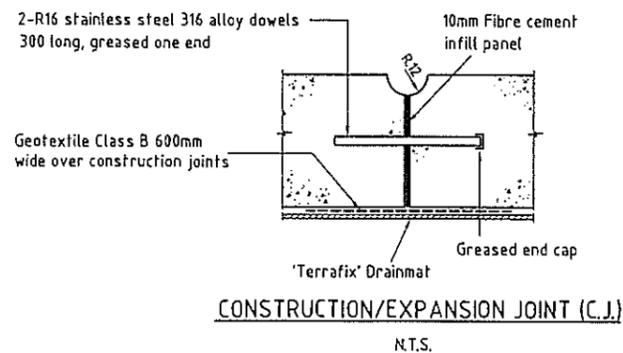
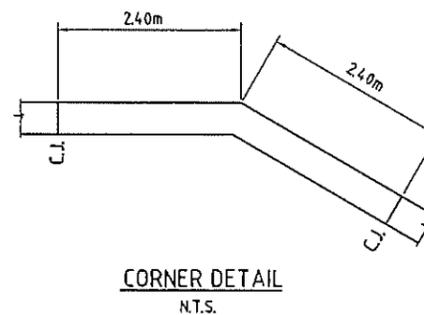
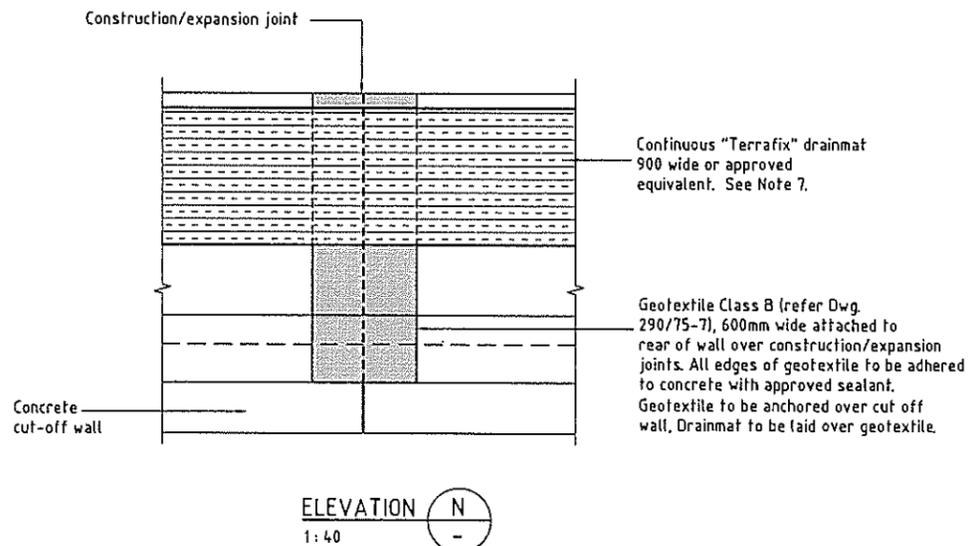
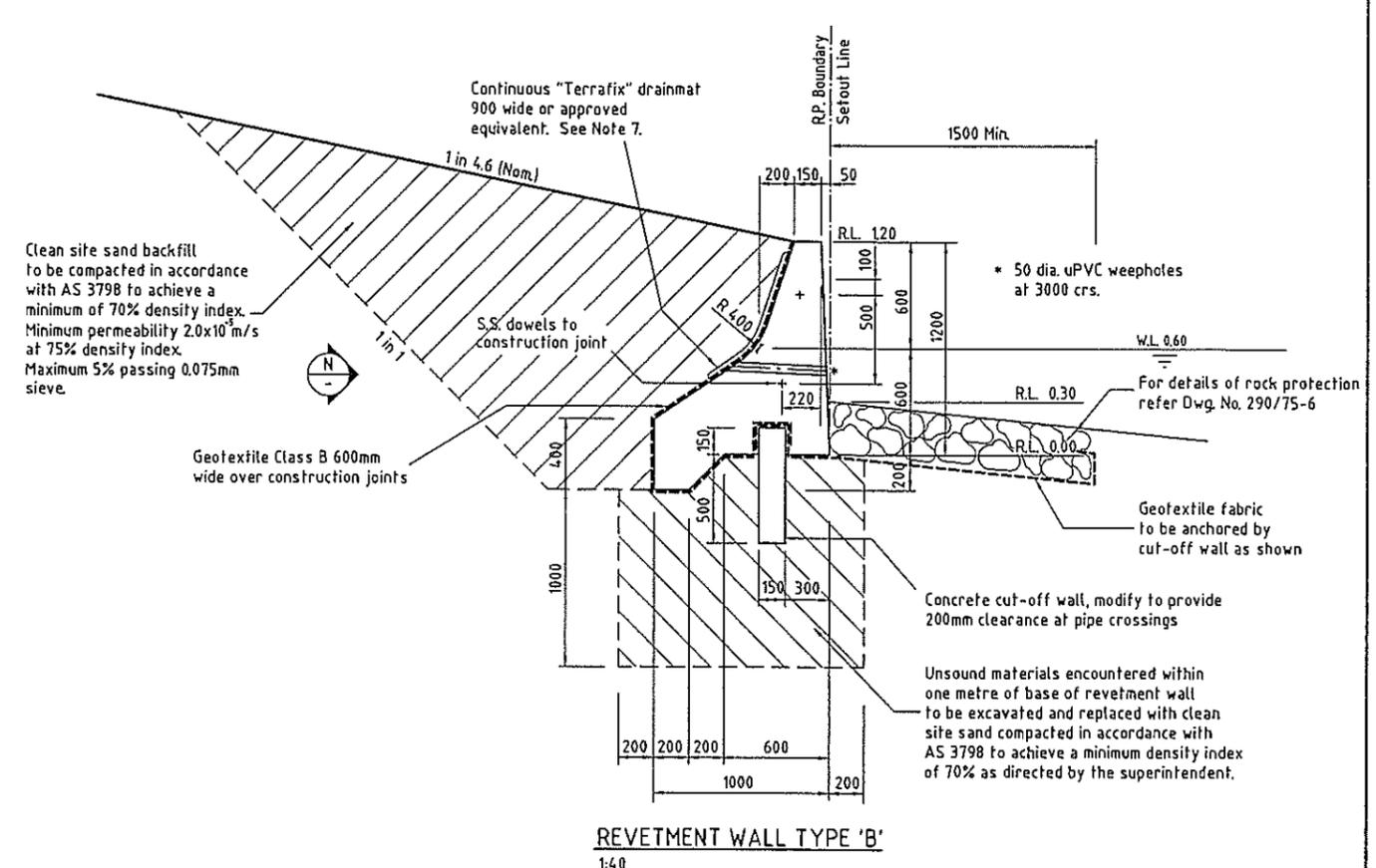
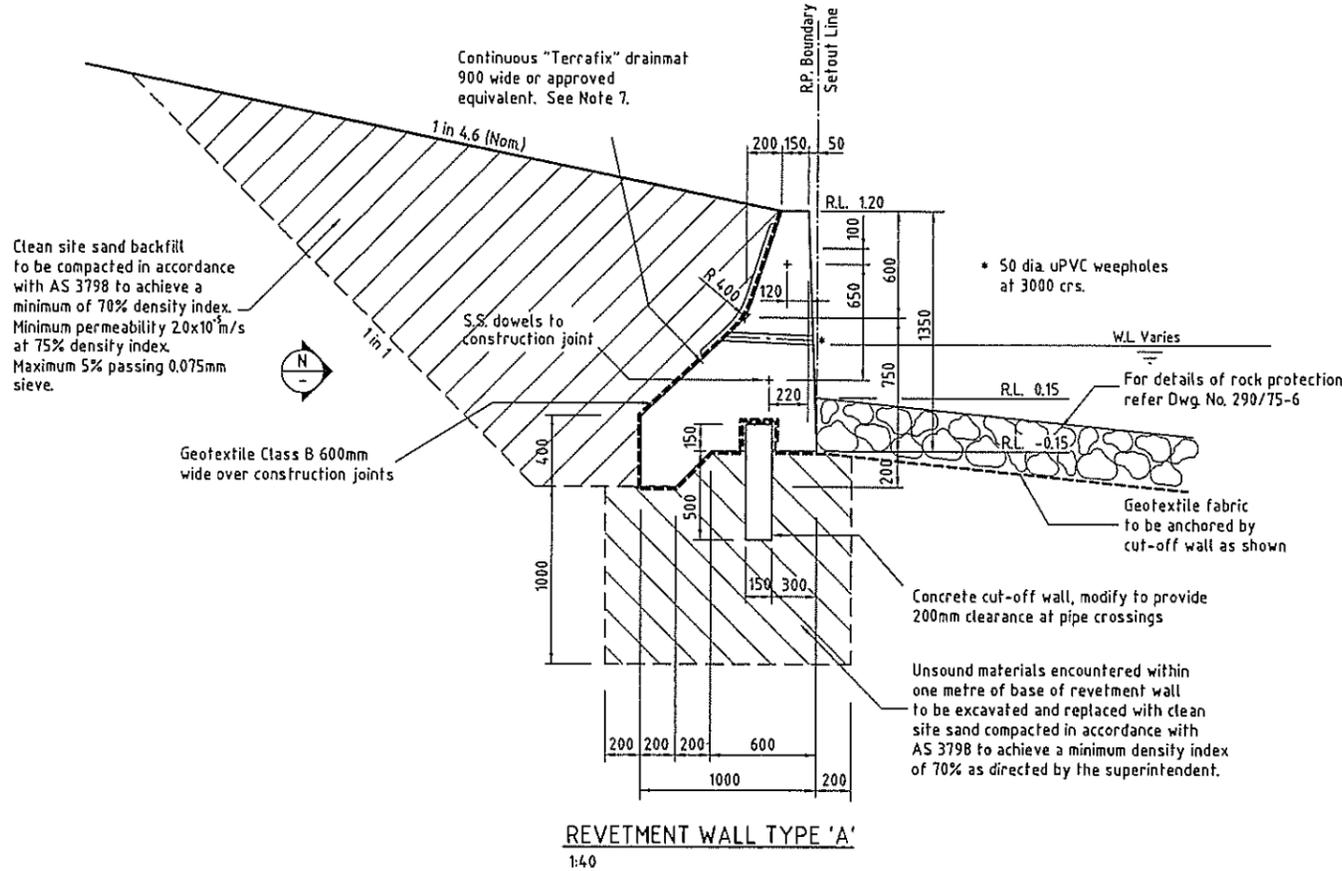
TELEPHONE: (07) 5309 9522, (02) 9418 2233, (07) 5539 0333, (07) 5443 2556, (07) 4772 1166, (07) 4124 5456, (07) 4151 1211, (02) 4323 2568

FAX: (07) 5309 9728, (02) 9418 5570, (07) 5538 4047, (07) 5443 2542, (07) 4721 2500, (07) 4124 5155, (07) 4151 5710, (02) 4324 3251

INTERNATIONAL: Port Moresby (03) 118759 335 2522, Manila (0011632) 910 5146, (0011675) 325 0291, (0011632) 910 5146

Pumicestone Passage Developments Pty Ltd
PELICAN WATERS DEVELOPMENT - STAGE 5
NORTH LAKE LOCK AND WEIR
RETAINING WALLS
HANDRAIL, LIGHT POLE AND LADDER DETAILS

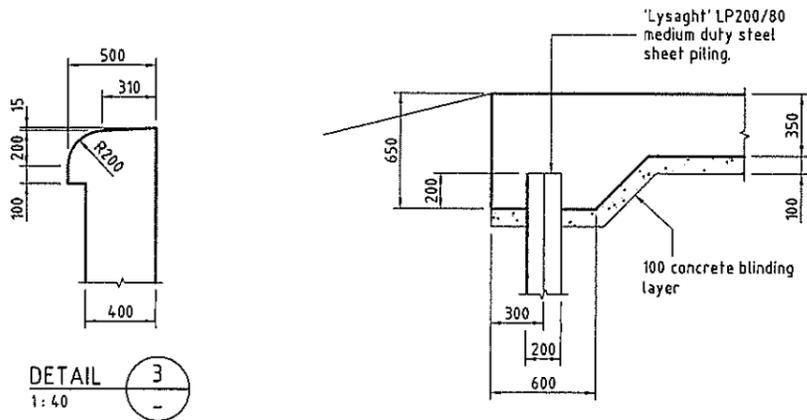
DATE: 27-08-2002
DRAWING No: 290/75-19



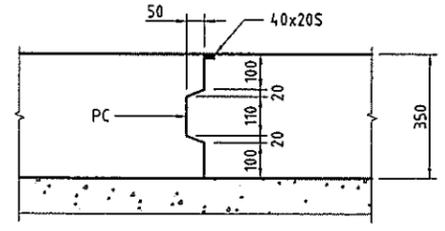
REVETMENT WALL NOTES:

- All concrete quality and construction procedures shall be in accordance with A.S.3600.
- Concrete shall be Class S40 as specified.
- Concrete to be sprayed with approved curing membrane at the application rate specified by the manufacturer. Apply within 1 hour of concrete pour or as directed by the Superintendent.
- All exposed edges shall be chamfered 25mm.
- Expansion joints to be at 6.00m centres.
- A 3.00m return wall shall be constructed at the end of each stage of construction and backfilled to the specified standards.
- 'TerraFix' drainmat to be continuously sealed each end with approved sealant. Lap in accordance with manufacturer's specifications.

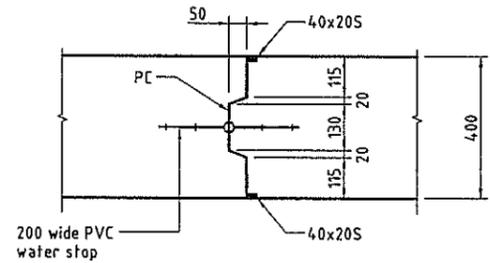
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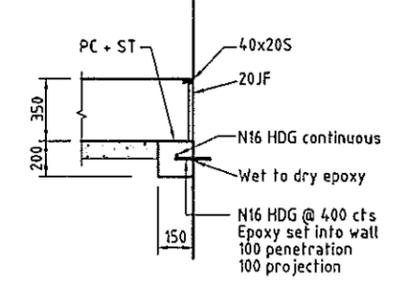
DETAIL 3
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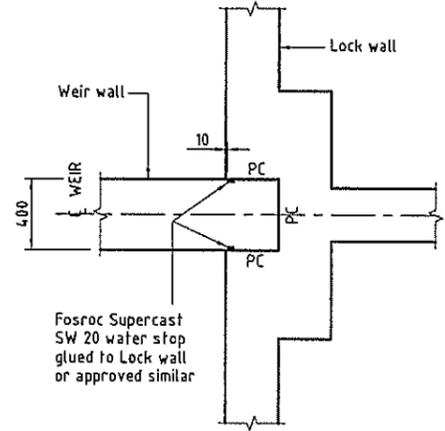
KEYED JOINT KJ1
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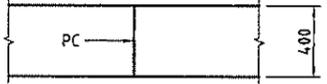
KEYED JOINT KJ2
1:20



EDGE JOINT EJ1
1:40



DETAIL 5
1:40



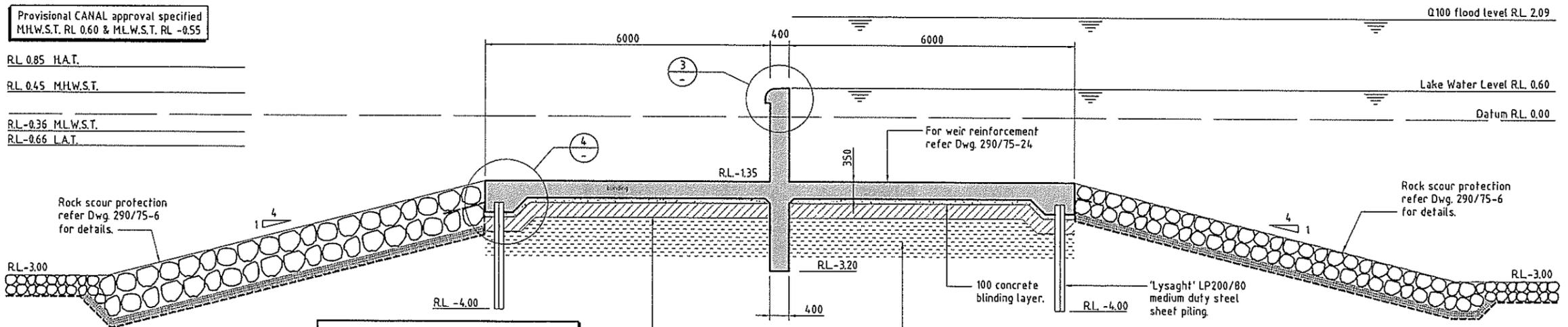
CONSTRUCTION JOINT CJ
1:40

DETAIL 6 Similar
1:40

- LEGEND:**
- ST Steel Trowelled Surface
 - PC 2 Coats Water Base Paint before pouring second concrete (Note: no paint near any placement of joint sealant.)
 - 10JF 10 Joint Filler (fixed to one face with 30 long copper nails at 200 centres)
 - 40x20S Sealant 40wide x 20 deep with bond breaker backing strip.

Provisional CANAL approval specified
M.H.W.S.T. RL 0.60 & M.L.W.S.T. RL -0.55

RL 0.85 H.A.T.
RL 0.45 M.H.W.S.T.
RL -0.36 M.L.W.S.T.
RL -0.66 L.A.T.

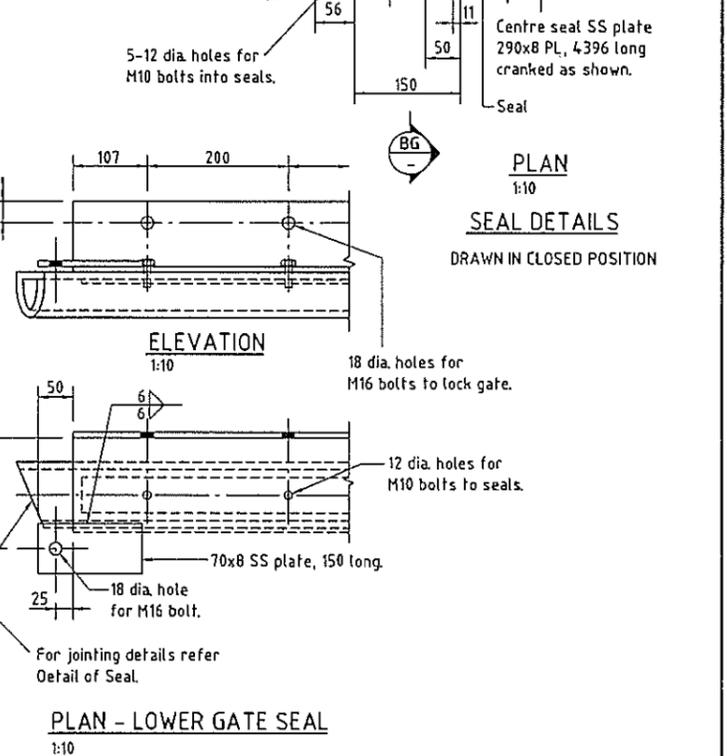
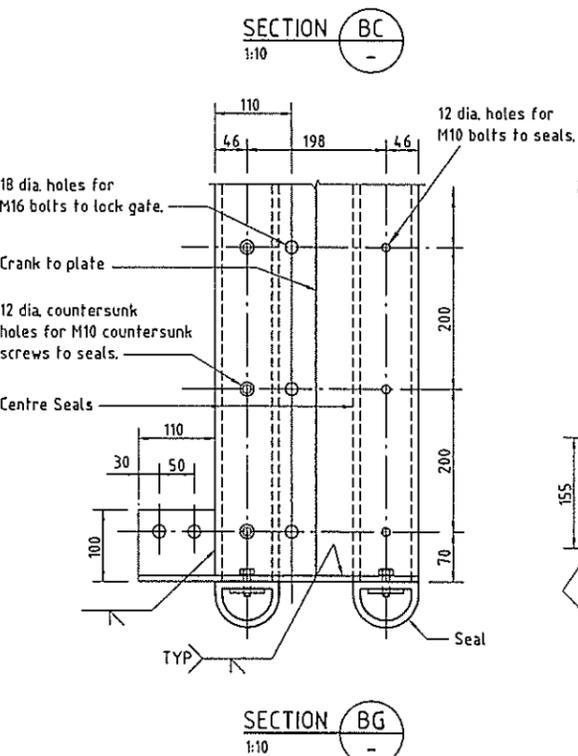
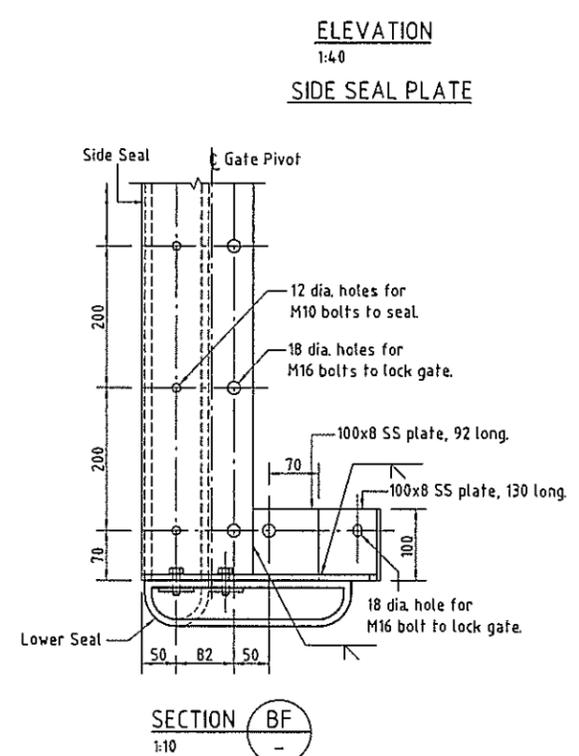
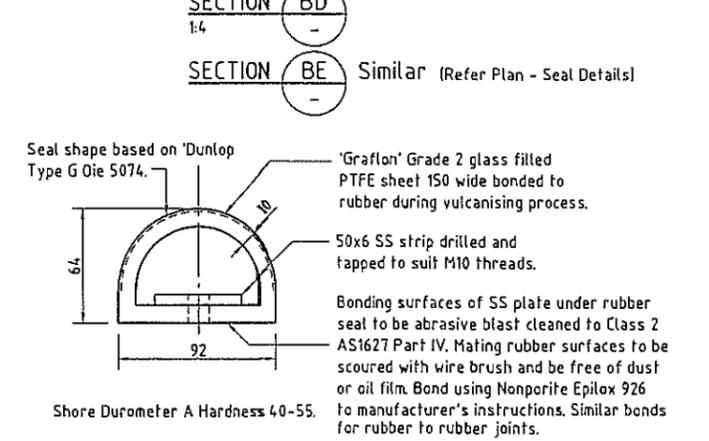
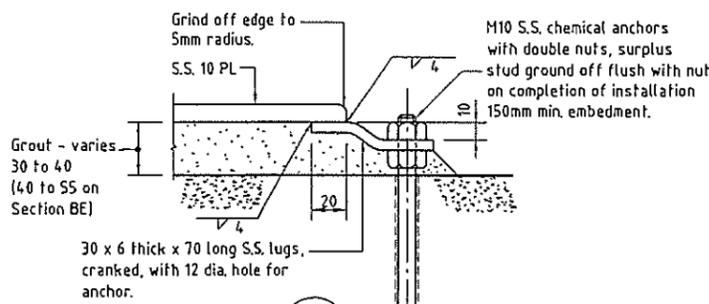
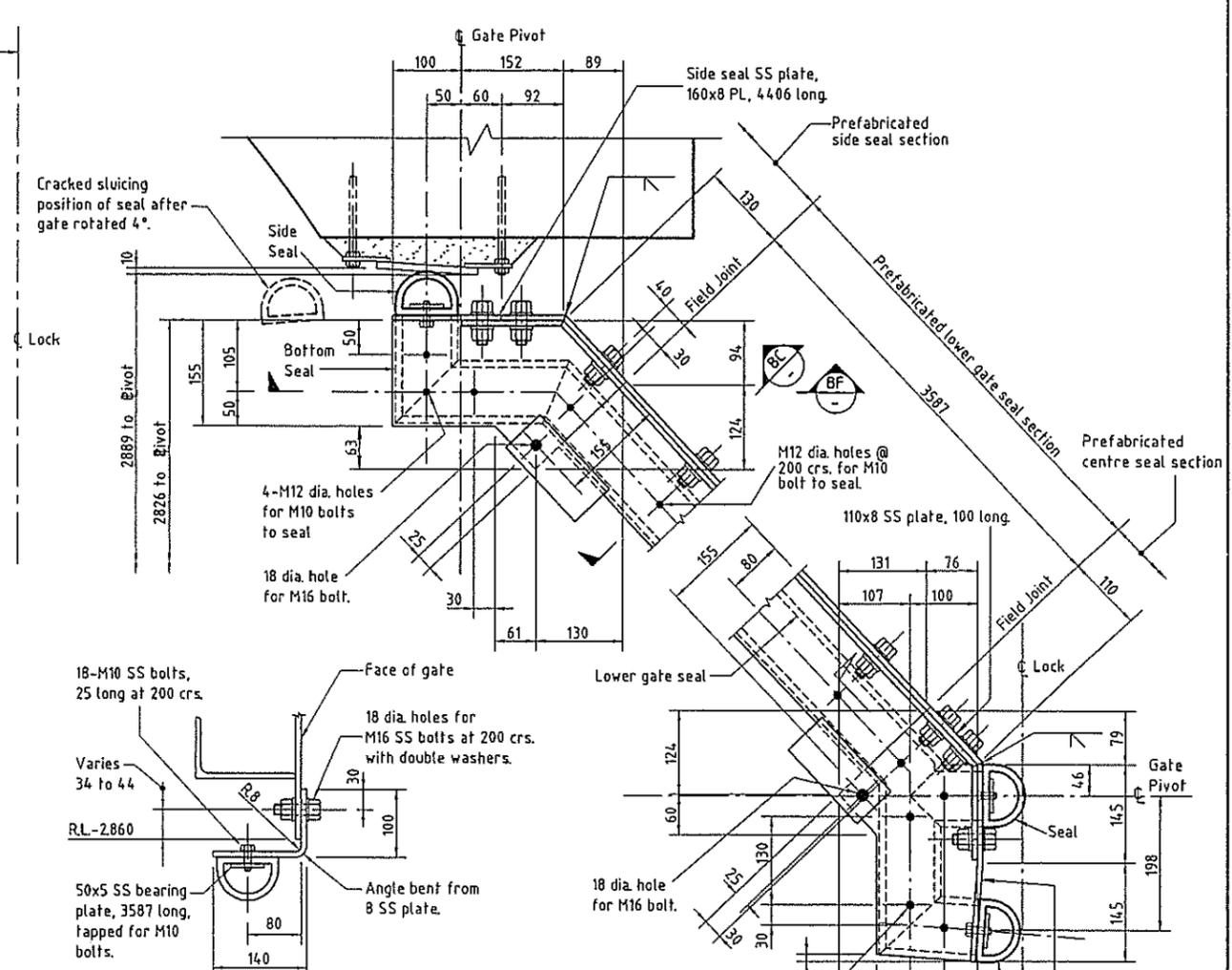
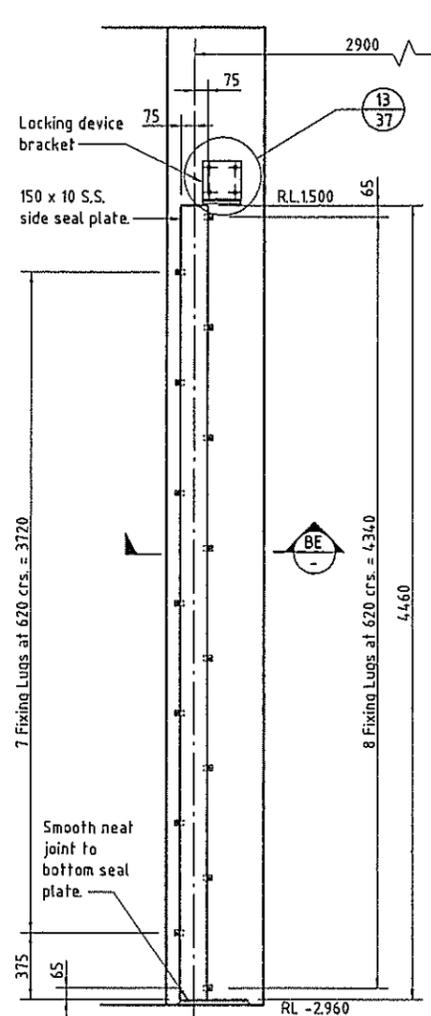
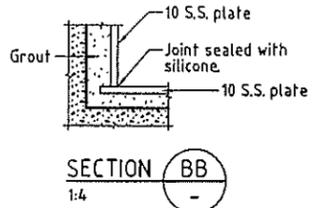
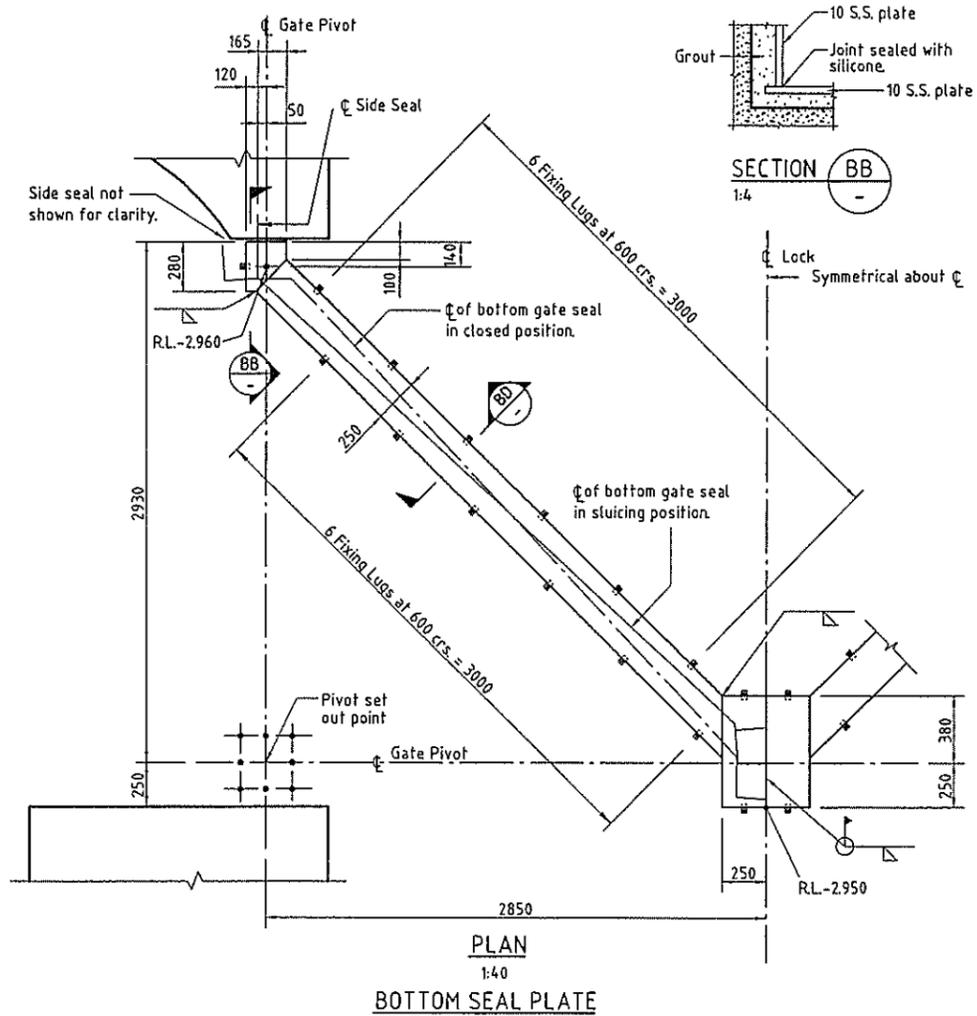


WEIR TYPICAL SECTION
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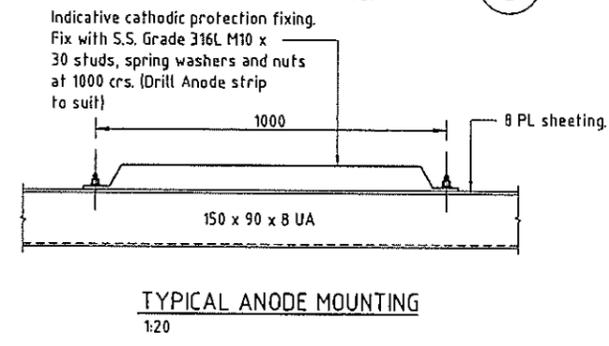
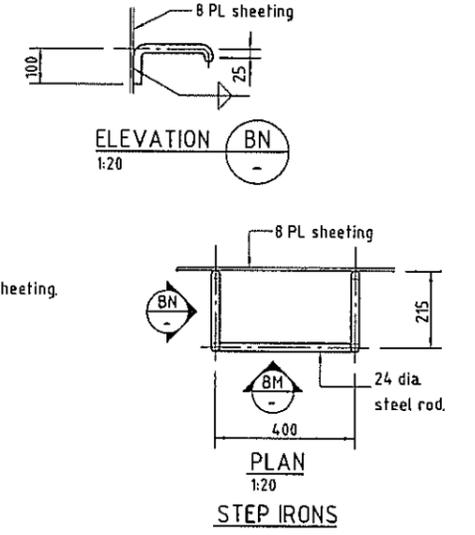
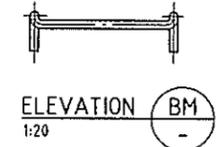
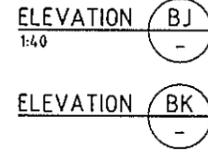
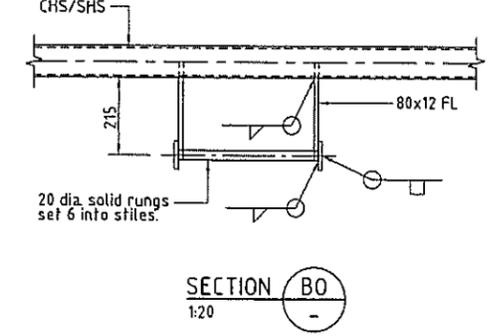
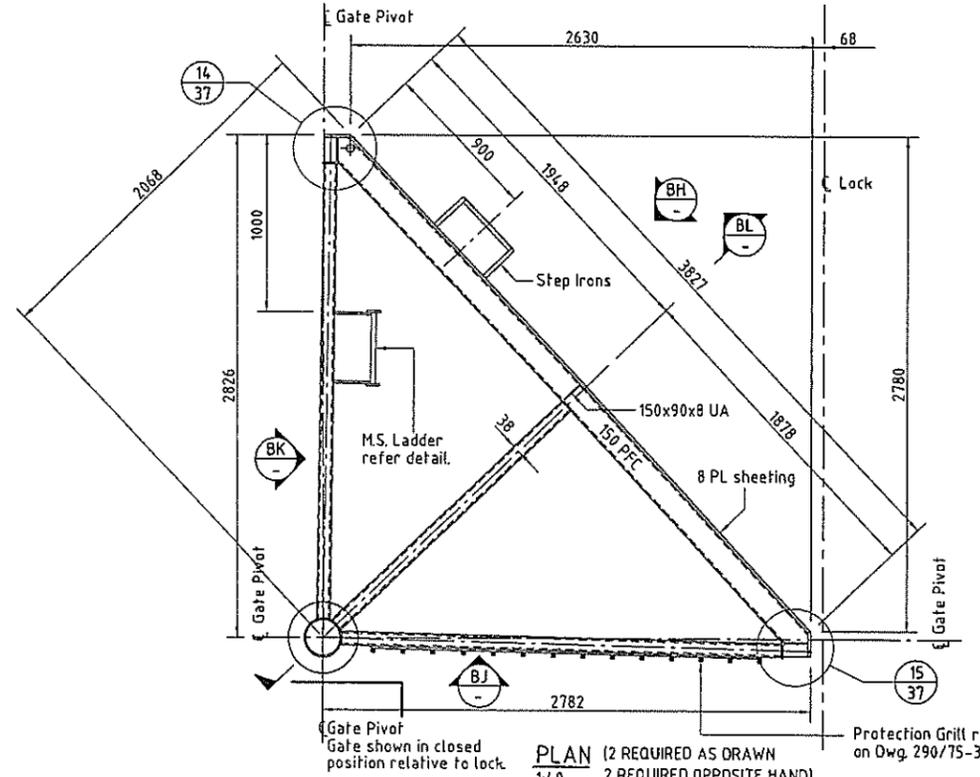
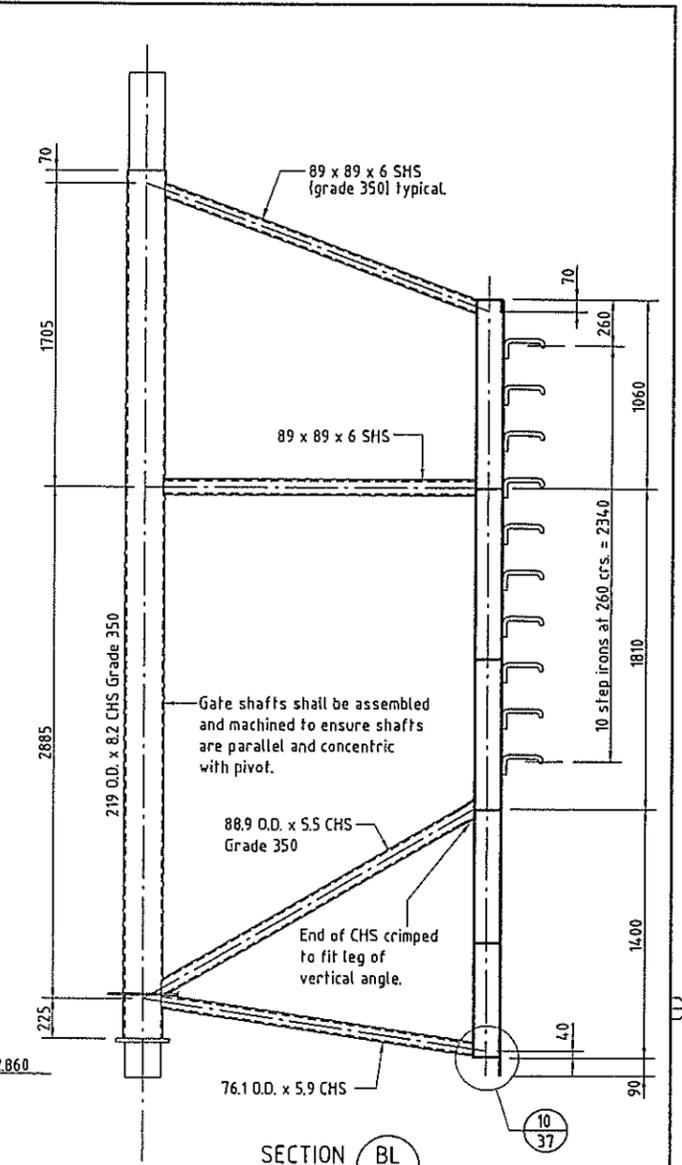
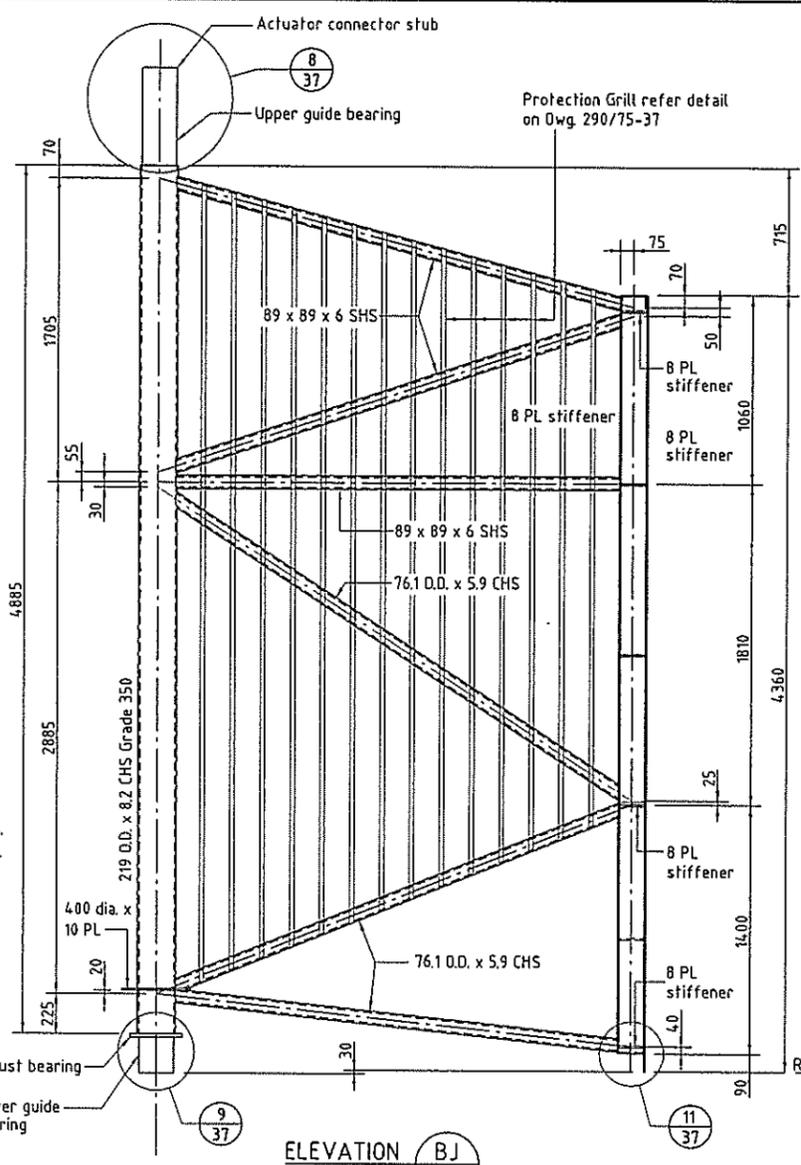
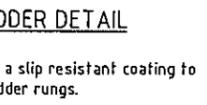
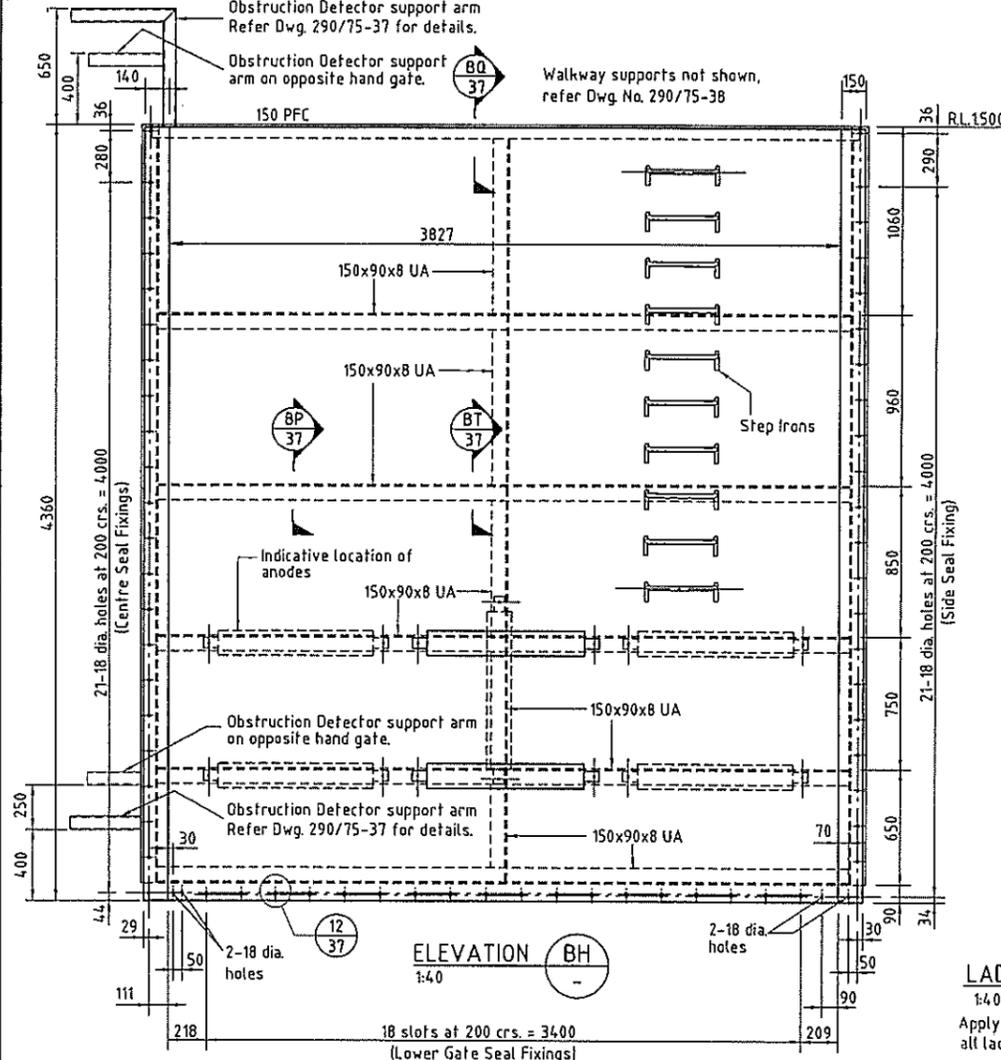
Compact subgrade :-
(a) Cohesive Material - in accordance with AS.3798 to achieve 98% of maximum dry density.
(b) Non-cohesive Material - in accordance with AS.3798 to achieve 70% of minimum density index.
Minimum allowable bearing capacity of subgrade to be 100 kPa. and to be confirmed by a Geotechnical Engineer prior to placement of blinding layer.

Unsound materials to be excavated as directed by the Superintendent and replaced with selected site material compacted to :-
(a) Cohesive Material - in accordance with AS.3798 to achieve 98% of maximum dry density.
(b) Non-cohesive Material - in accordance with AS.3798 to achieve a minimum density index of 70%.

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REV.	DATE	REVISIONS	REC.	APPR.	RECOMMENDED: PROJ. MAN. [Signature]	APPROVED: PROJ. DIR. [Signature]	AUTOCAD FILE NAME: P75-WEIR.DWG DATE: 12-4-2002 TIME: 9:25 AM		SHEPPHORTE COAST OFFICE: 60 Duporth Avenue Maroochydore, Qld 4558 Email: sco@sun.cardno.com.au Ph: (07) 5443 2555 Fax: (07) 5443 2642		Rv.		



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NOTE:
All steel to be Grade 300 to AS4100 unless shown otherwise.

DESIGNED: [Signature]	PROJ. MAN. [Signature]	APPROVED: PROJ. DIR. [Signature]
DRAWN: [Signature]	CHECKED: [Signature]	AUTOCAD RIS FILE NAME: PYS-GATEENG DATE: 15-4-2002 TIME: 11:05 AM
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DRAWN: [Signature]	CHECKED: [Signature]	AUTOCAD RIS FILE NAME: PYS-GATEENG DATE: 15-4-2002 TIME: 11:05 AM
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Cardno MBK (Qld) Pty Ltd
ACR#: 051 074 992

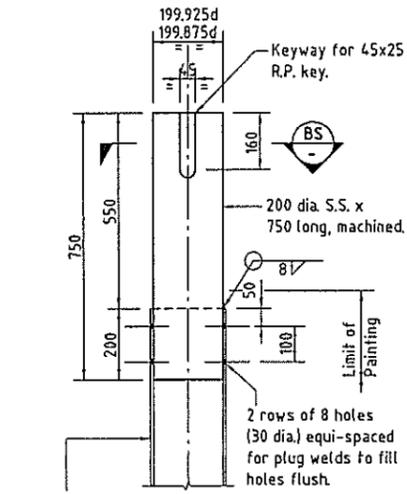
OFFICES: Brisbane (07) 3369 9822, Sydney (02) 9416 8233, Gold Coast (07) 5539 8333, Sunshine Coast (07) 5443 2255, Townsville (07) 4722 1166, Hervey Bay (07) 4124 5455, Bundaberg (07) 4161 1211, Central Coast (07) 4323 2256, INTERNATIONAL Port Moresby (0011675) 325 2228, Manila (0011632) 010 5140.

TELEPHONE: (07) 3369 9822, (02) 9416 8233, (07) 5539 8333, (07) 5443 2255, (07) 4722 1166, (07) 4124 5455, (07) 4161 1211, (02) 4323 2256, (0011675) 325 2228, (0011632) 010 5140.

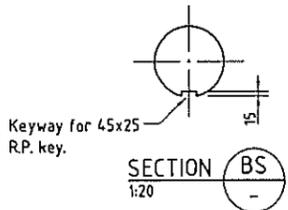
FAX: (07) 3369 9752, (02) 9416 8229, (07) 5538 4647, (07) 5443 0642, (07) 4721 2508, (07) 4124 5155, (07) 4151 5710, (02) 4324 3251, (0011675) 325 0651, (0011632) 010 5146.

QVIEW PTY. LTD.
PELICAN WATERS DEVELOPMENT - STAGE 5
NORTH LAKE LOCK AND WEIR
LOCK STRUCTURE
GATE FABRICATION DETAILS - SHEET 1 of 2

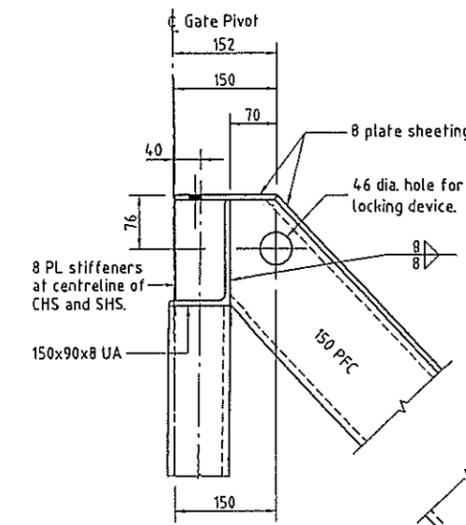
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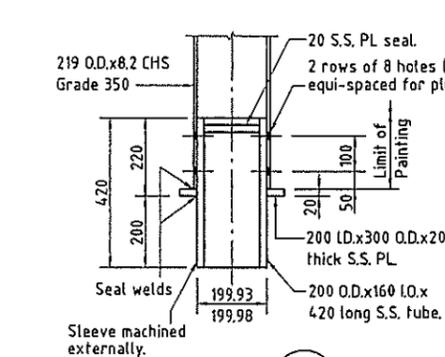
DETAIL 8
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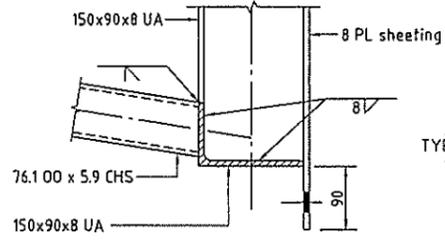
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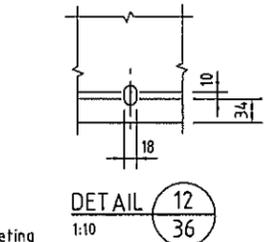
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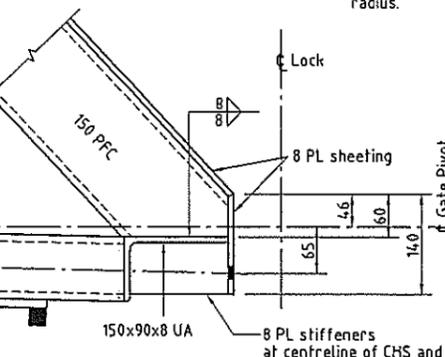
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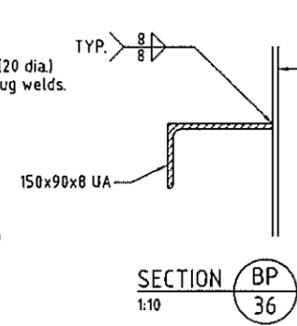
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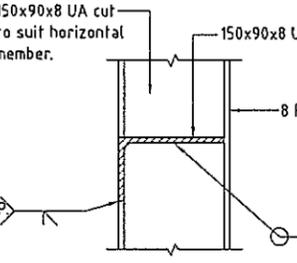
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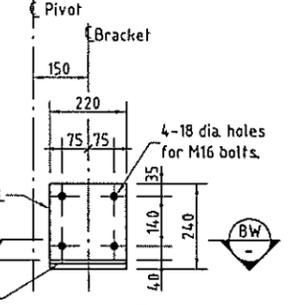
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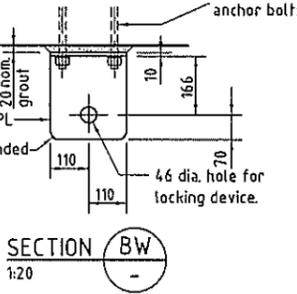
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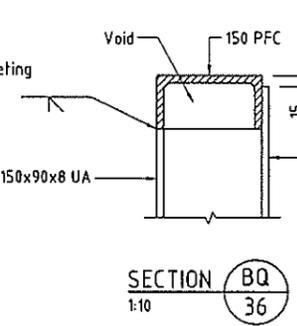
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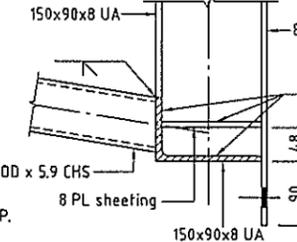
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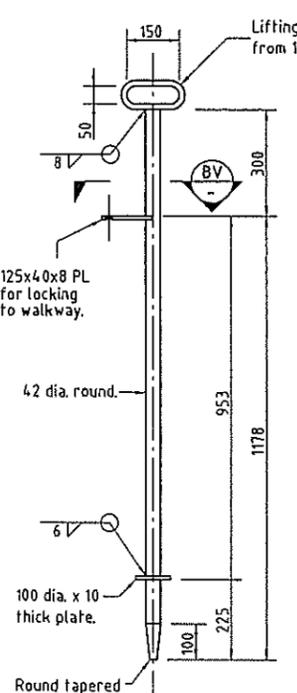
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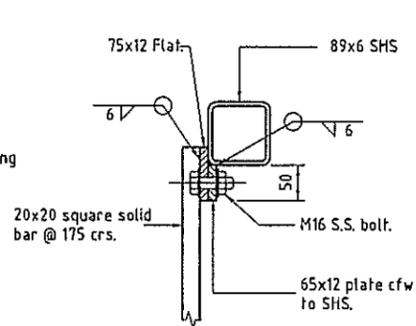
SECTION BQ
1:10



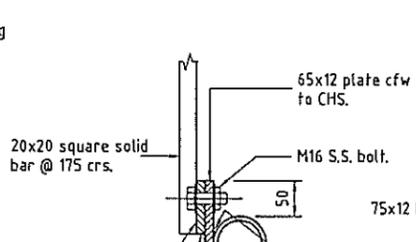
DETAIL 11
1:10



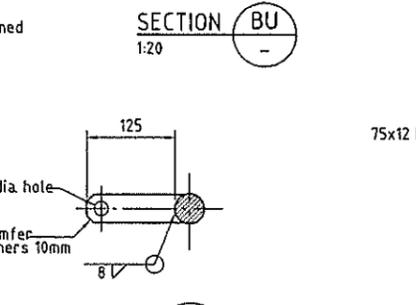
LOCKING DEVICE (2 OF)
1:20



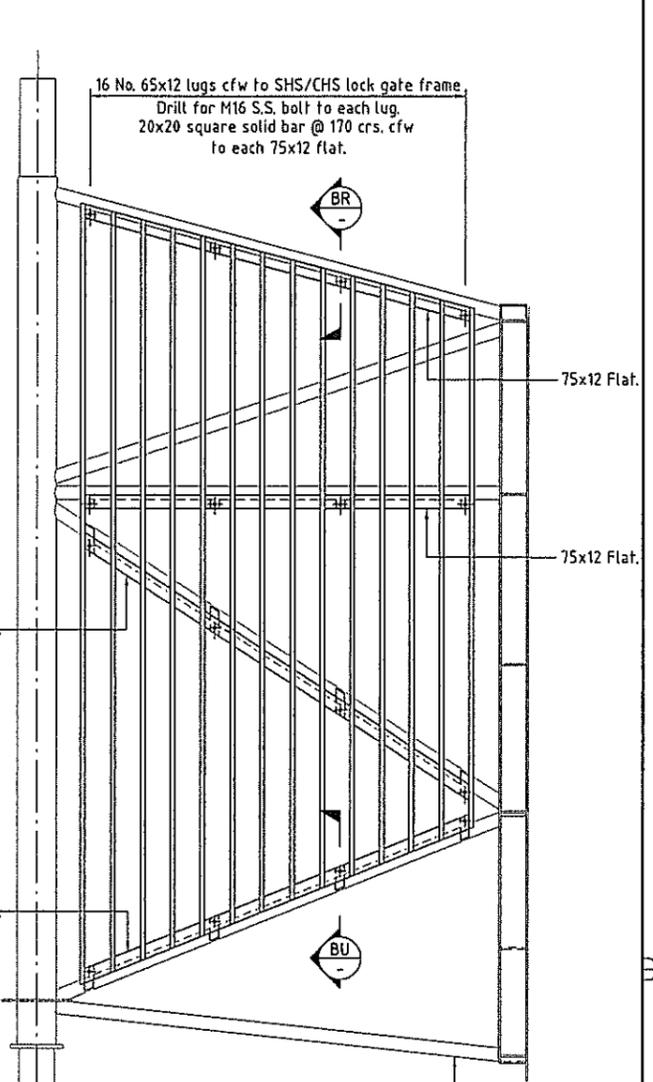
SECTION BR
1:20



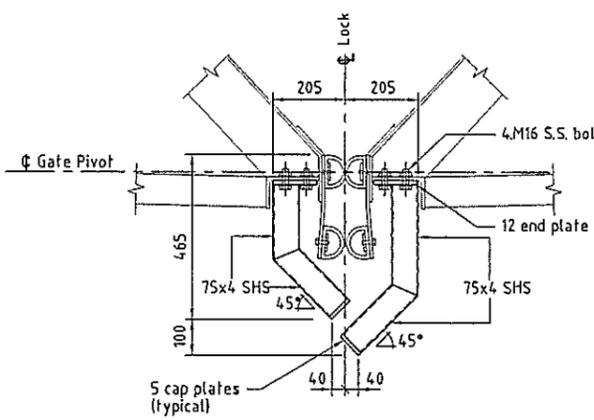
SECTION BU
1:20



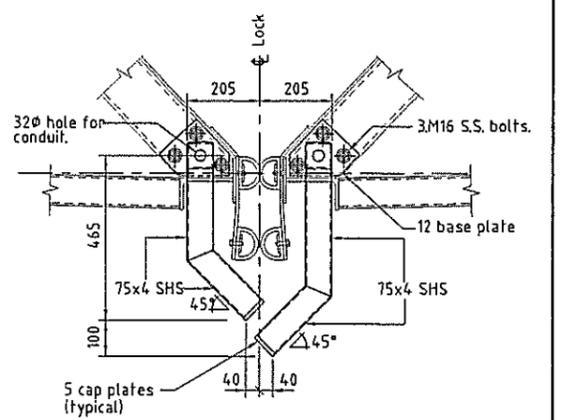
SECTION BV
1:10



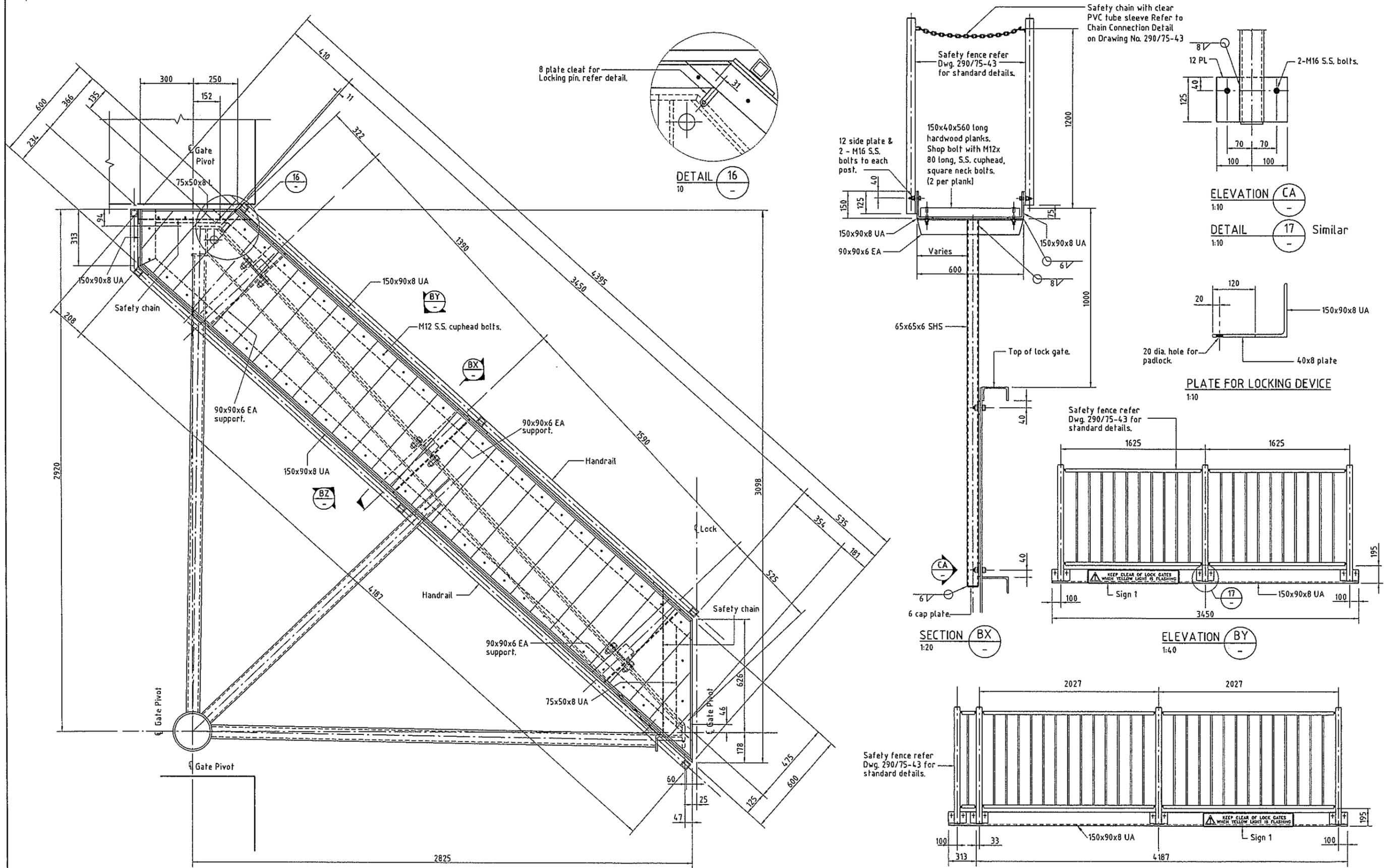
PROTECTION GRILL
1:40



OBSTRUCTION DETECTOR LOWER SUPPORT ARMS
1:20



OBSTRUCTION DETECTOR UPPER SUPPORT ARMS
1:20

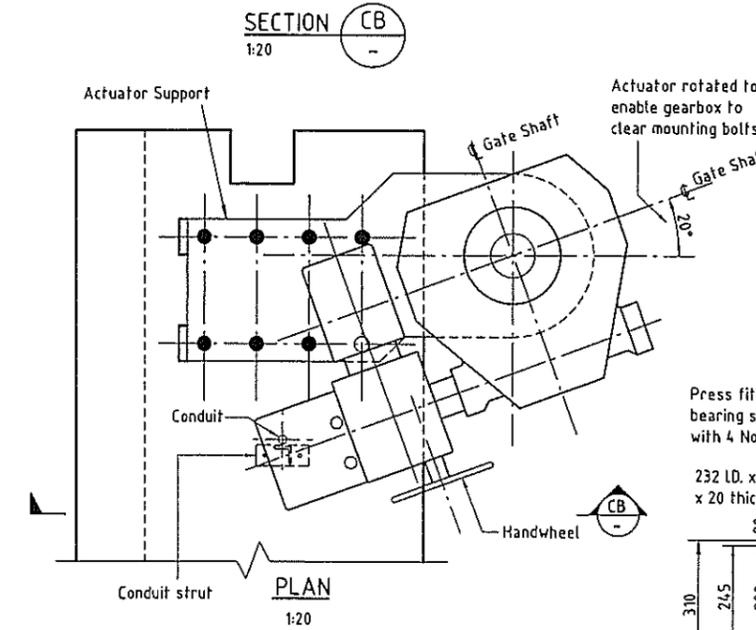
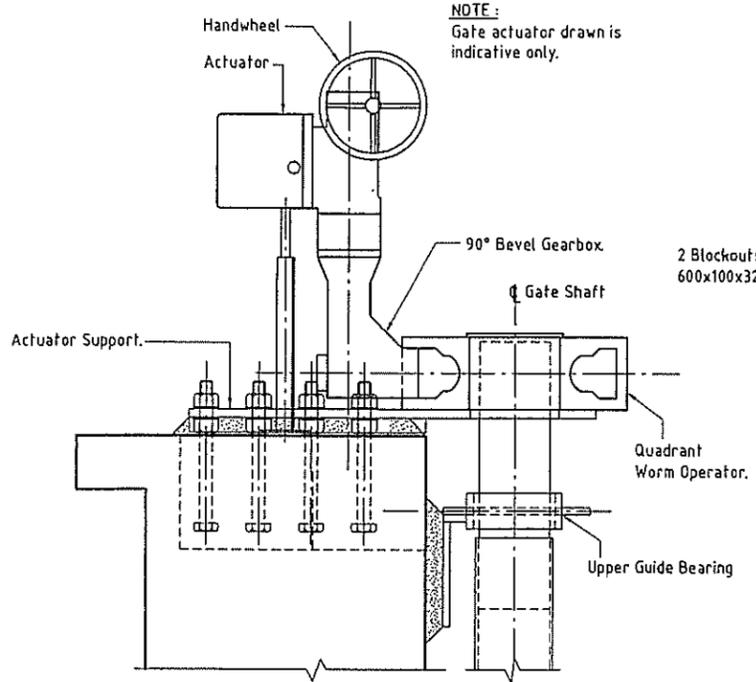


PLAN LOCK GATE WALKWAY
1:20

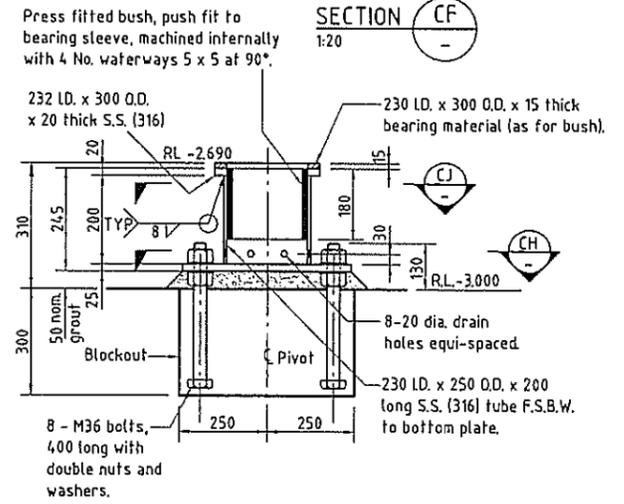
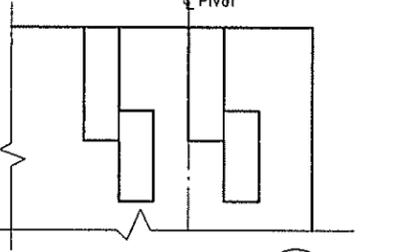
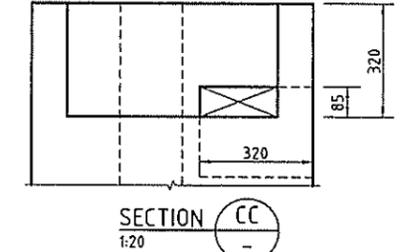
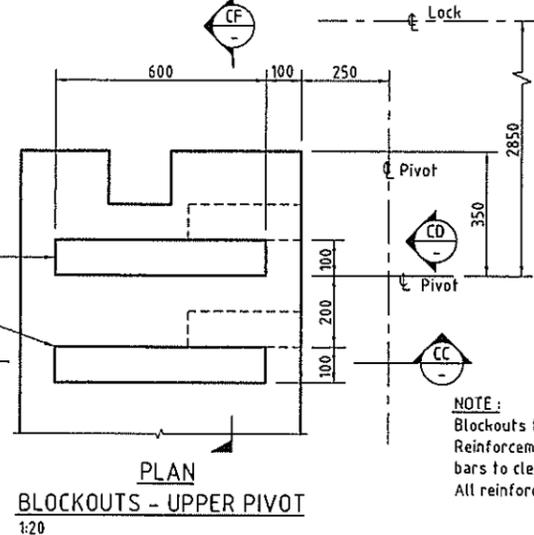
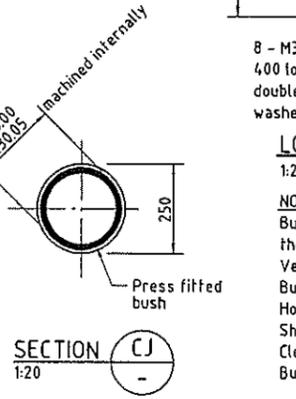
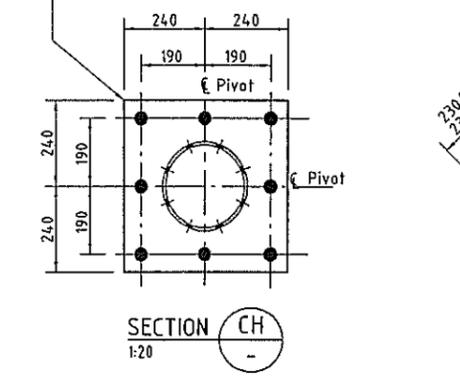
Gate shown in closed position relative to lock centreline.
2 OF AS SHOWN
2 OF OPPOSITE HAND

NOTES:
 1. All bolts shall have double washers.
 2. All nuts, bolts and washers shall be Grade 316 stainless steel.

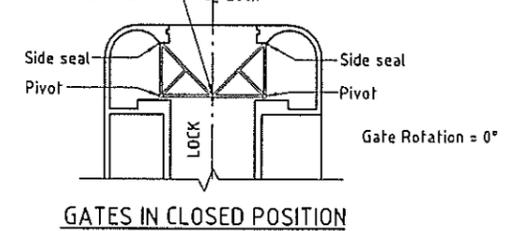
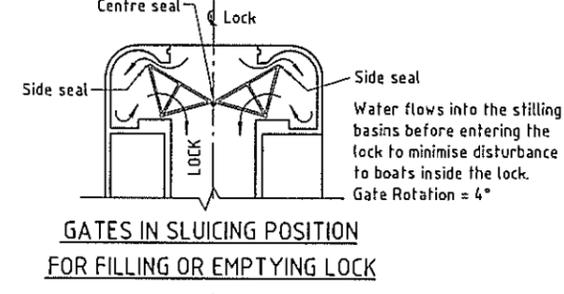
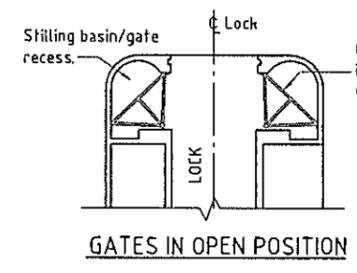
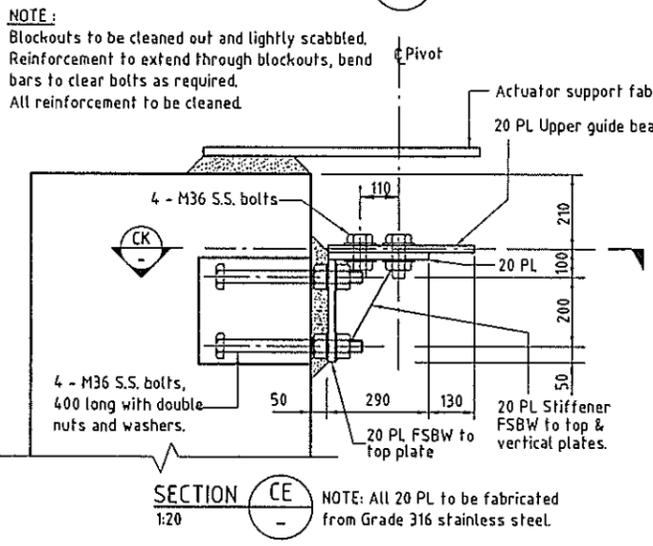
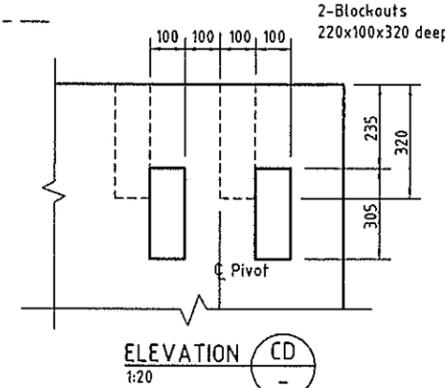
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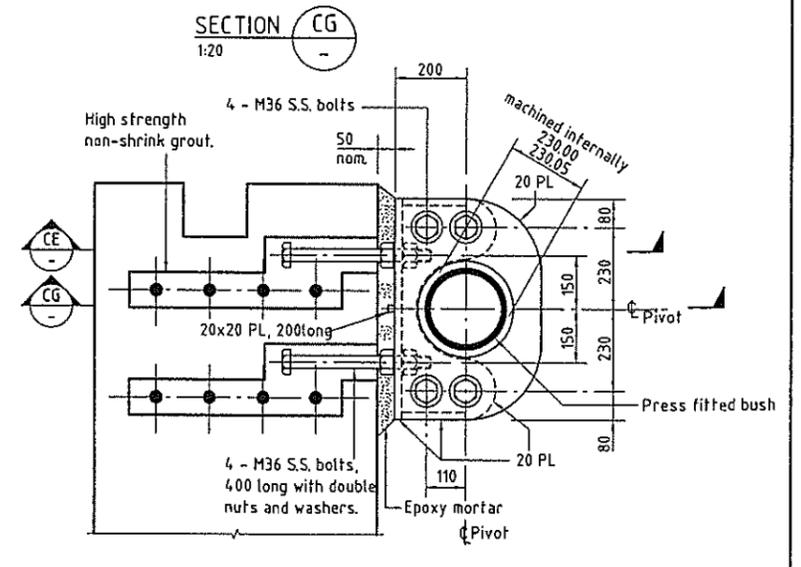
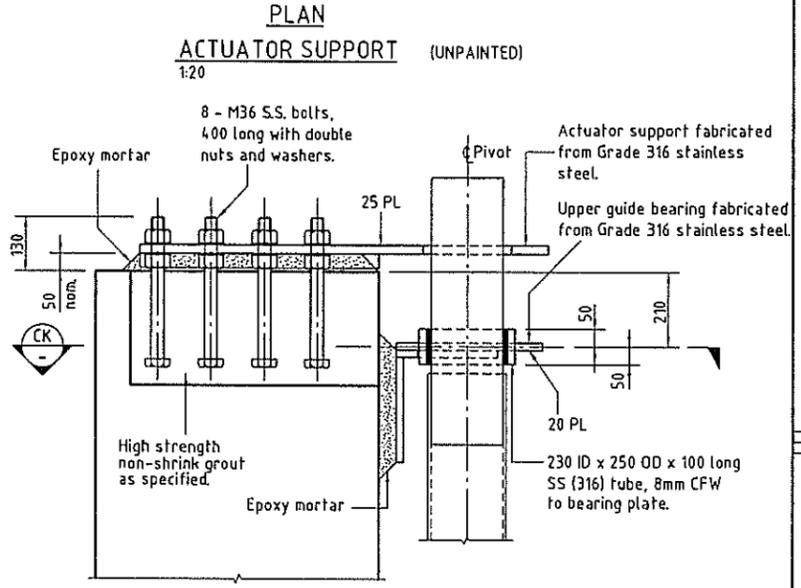
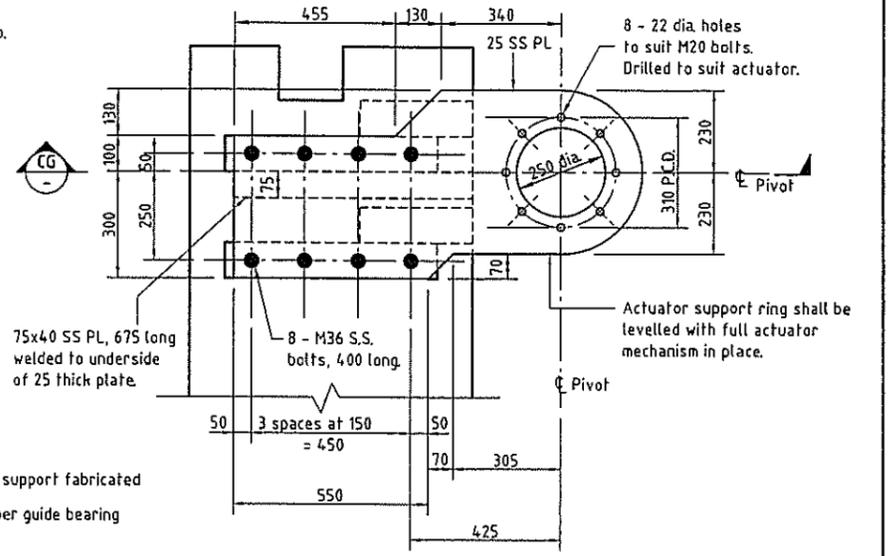
GATE ACTUATOR DETAILS
 NOTE:
 Gate actuator details are indicative only and will depend on type of actuator accepted by the superintendent.



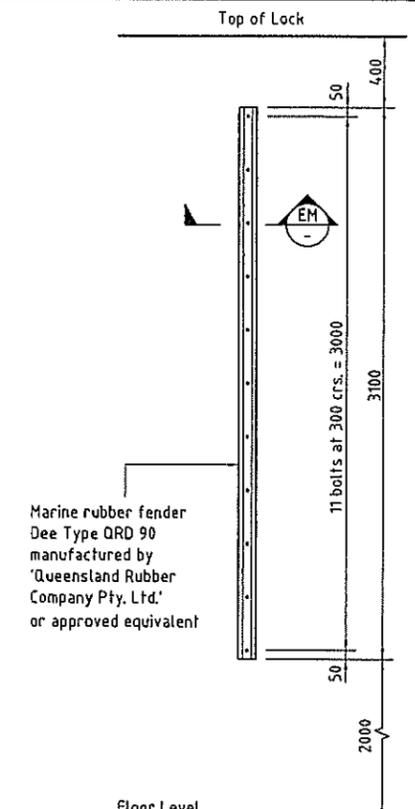
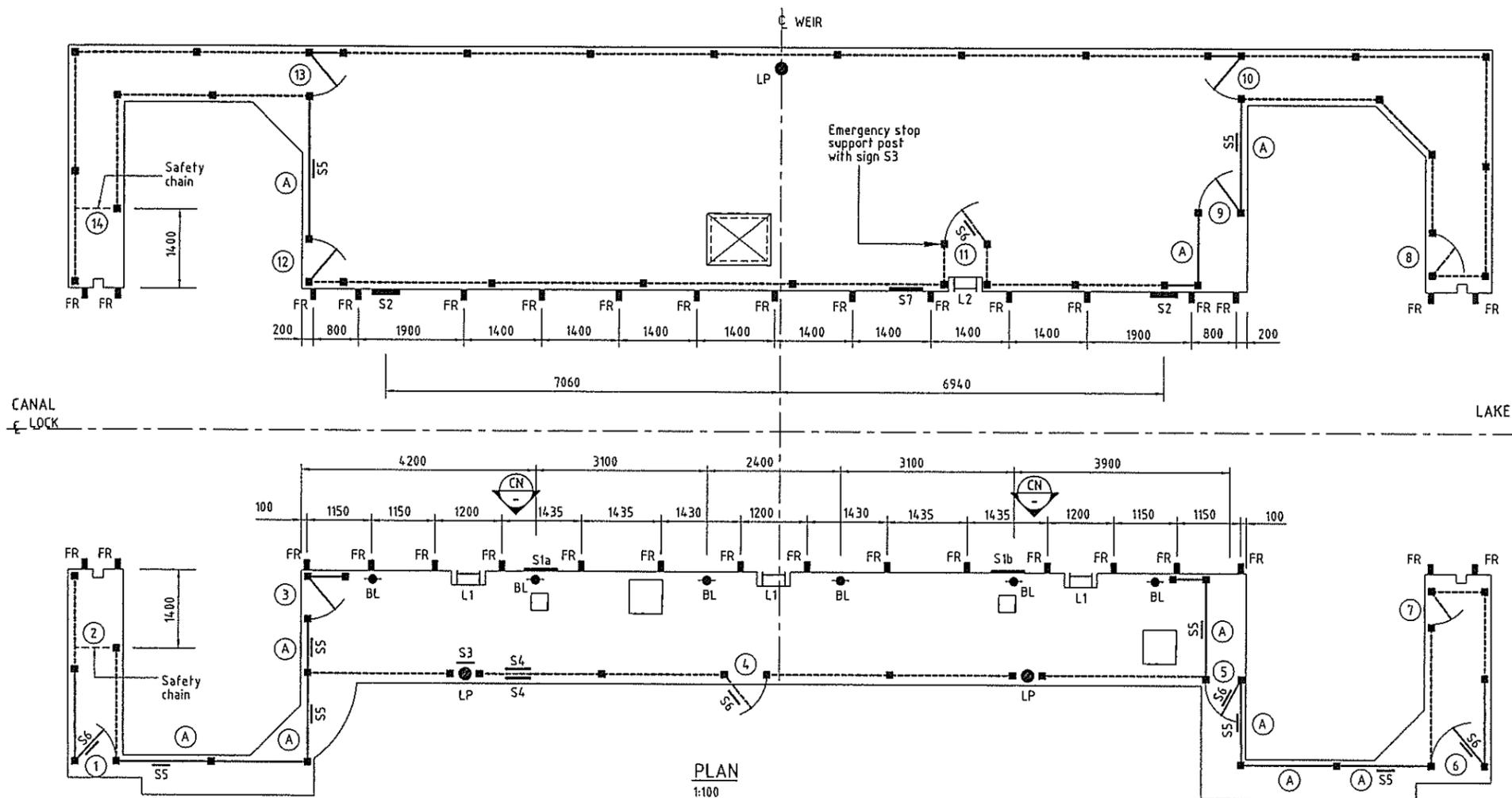
LOWER GUIDE AND THRUST BEARING (UNPAINTED)
 1:20
 NOTE:
 Bush material shall be machined from a non-swelling thermoplastic polymer, Unasco Tultlad 'Moly', Vesco Plastics 'Vesconite' or equivalent.
 Bush machined dimensions :-
 Housing 230.00 dia.
 Shaft 200.00 dia.
 Clearance 0.10 - 0.20
 Bush OD 230.10 - 230.20
 ID 200.20 - 200.30



GATE OPERATION
 NOT TO SCALE

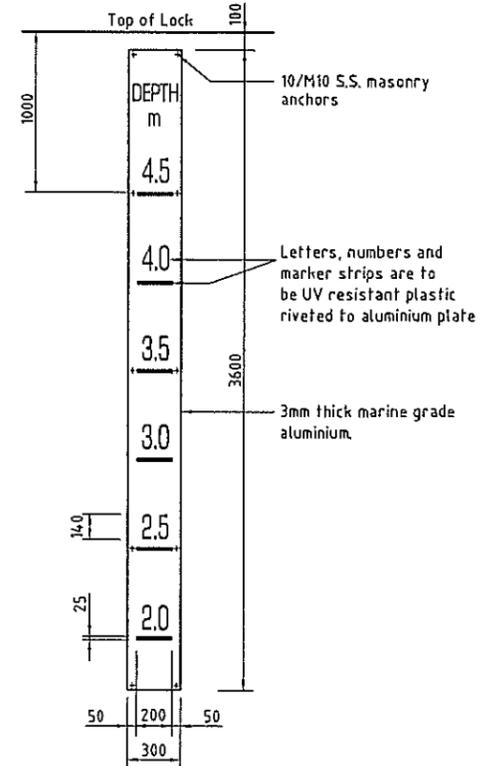
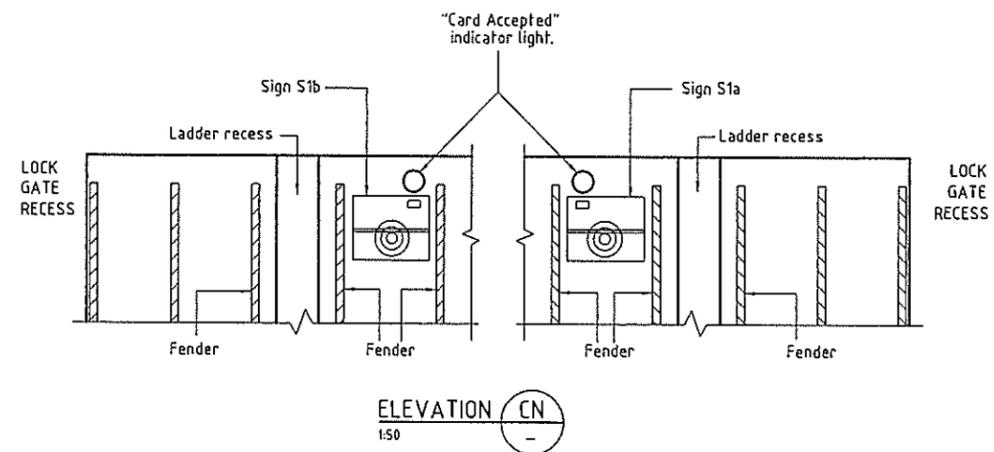
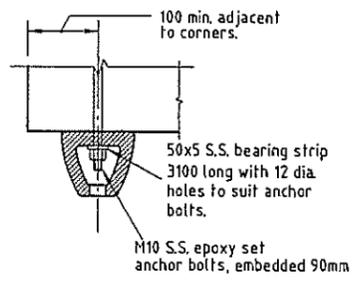


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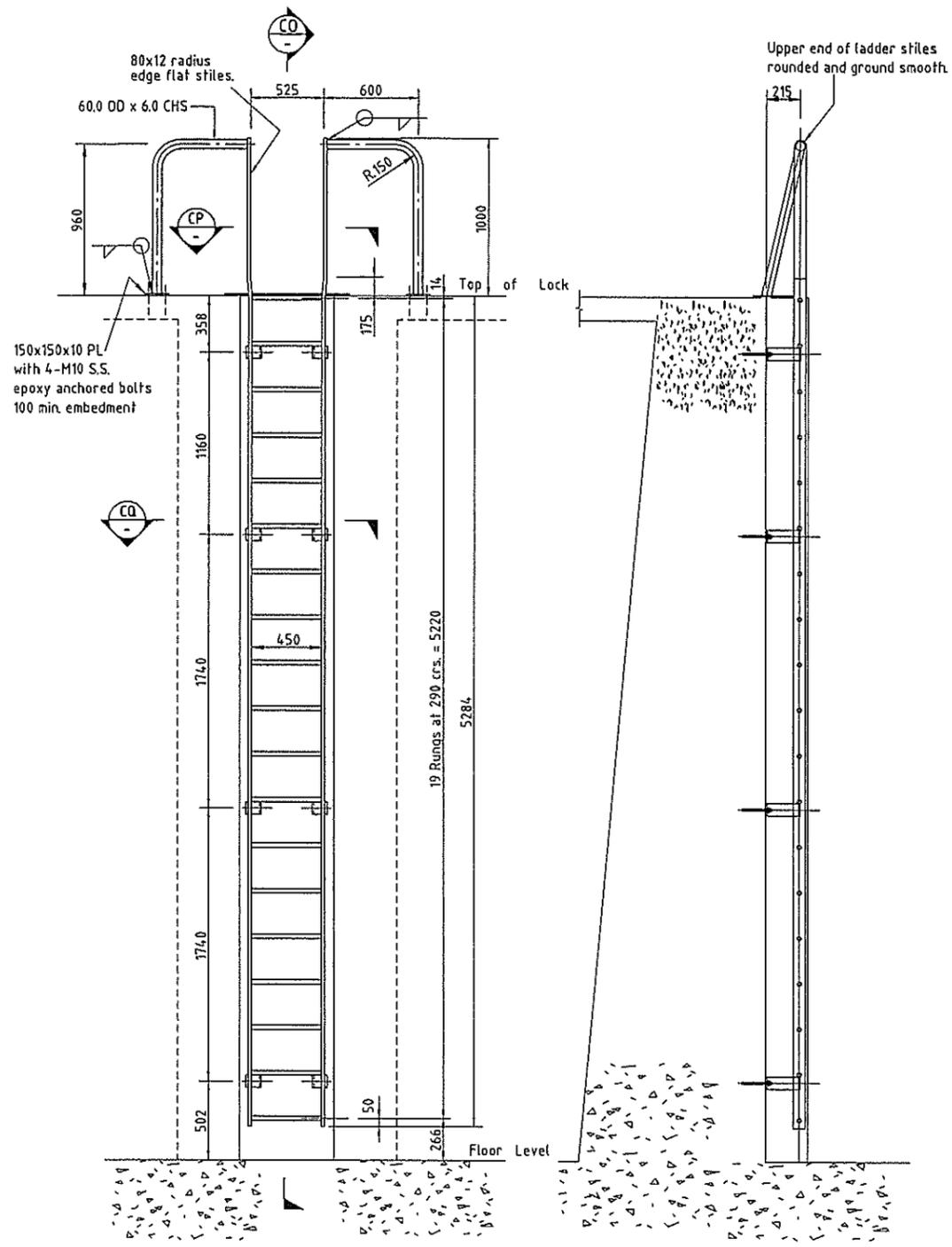


- LEGEND :**
- 1200 high security fence, refer Dwg. 290/75-43 for details
 - 2200 high security fence, refer Dwg. 290/75-43 for details
 - LP ● Light Pole, refer Dwg. 290/75-34 for details
 - BL ● Mooring Bollards, refer Dwg. 290/75-41 for details
 - FR Fender Rubbers, refer detail
 - L1 Ladder Type 1, refer Dwg. 290/75-41 for details
 - L2 Ladder Type 1, refer Dwg. 290/75-41 for details
 - S1a & S1b Active Card Detector sign, refer Dwg. 290/75-44 for details
 - S2 Depth Gauge sign, refer detail
 - S3 Emergency Stop sign 1, refer Dwg. 290/75-44 for details
 - S4 Emergency Phone sign, refer Dwg. 290/75-44 for details
 - S5 Automatic Machinery sign, refer Dwg. 290/75-44 for details
 - S6 No Public Access sign, refer Dwg. 290/75-44 for details
 - S7 Emergency Stop sign 2, refer Dwg. 290/75-44 for details

- NOTES:**
1. Gates 1, 3, 4, 5, 6, 9, 10, 12 & 13 shall be locked with padlocks to prevent public access.
 2. Fence panels marked A & gates 3, 5, 9 & 12 shall have an additional bottom rail and vertical bars at 75mm crs.
 4. Ladders Type L1 and Type L2 as detailed, for base plate and bolt setout refer Dwg. 290/75-41
 5. Gates 1, 3, 5, 6, 9, 10, 12 & 13 are to be 2200 high.
 6. Refer Dwg. 290/75-42 for base plate setout for fence and poles



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Rv. DATE REVISIONS REC. APPR.							Rv.

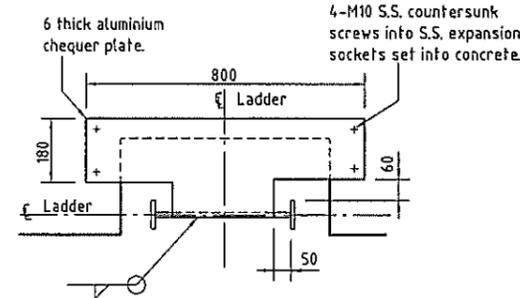


ELEVATION LADDER TYPE (L1)
1:40

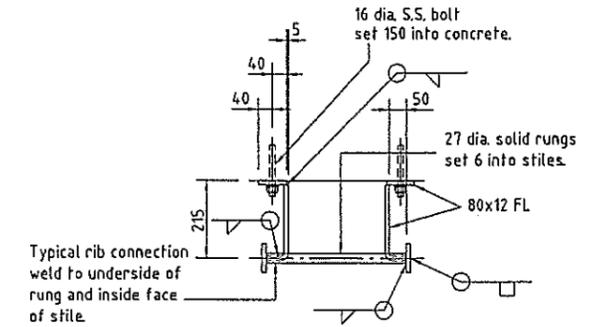
Ladder Type (L2) similar, refer Elevation CR for variation.

LADDER DETAILS

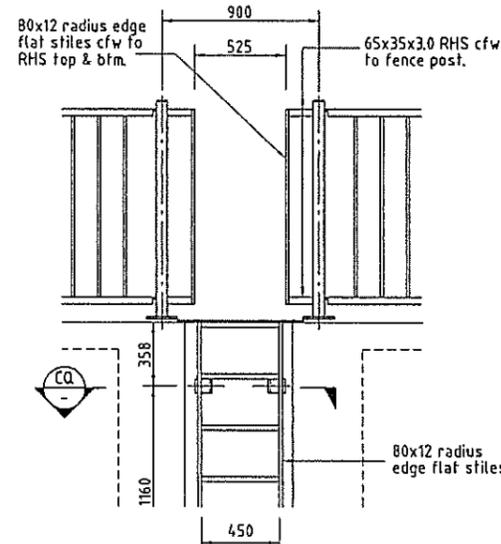
SECTION CO
1:40



SECTION CP
1:20



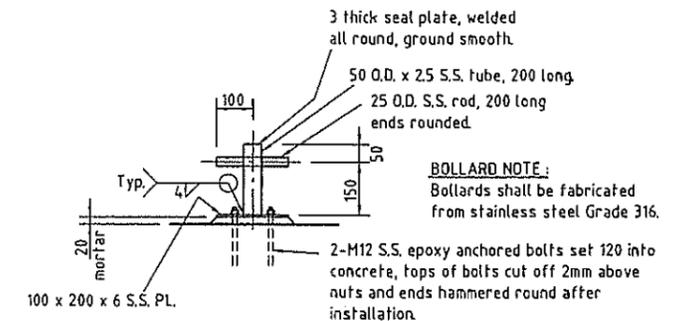
SECTION CQ
1:20



ELEVATION CR Ladder Type L2
1:40

LADDER NOTES:

1. Ladders and brackets shall be fabricated from aluminium alloy 6061 to Temper T6
2. All welds shall be 6mm continuous fillet using filler alloy 5356.
3. Welding shall be in accordance A.S. 1665
4. Bolts, nuts and washers shall be stainless steel type 316.
5. Washers shall be used under all bolt heads and nuts
6. Apply a slip resistant coating to all ladder rungs.
7. Provide approved neoprene washer and collars at all stainless steel/aluminium interfaces.



BOLLARD NOTE:

Bollards shall be fabricated from stainless steel Grade 316.

DETAIL OF BOLLARD (BL)
1:20

DESIGNED: <i>[Signature]</i>	A3 DATUM. A.H.D.
DRAWN: <i>[Signature]</i>	
CHECKED: <i>[Signature]</i>	
RECOMMENDED: PROJ. MAN.	APPROVED: PROJ. DIR.
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SUNSHINE COAST OFFICE: 66 Duporth Avenue Maroochydore, Qld 4558
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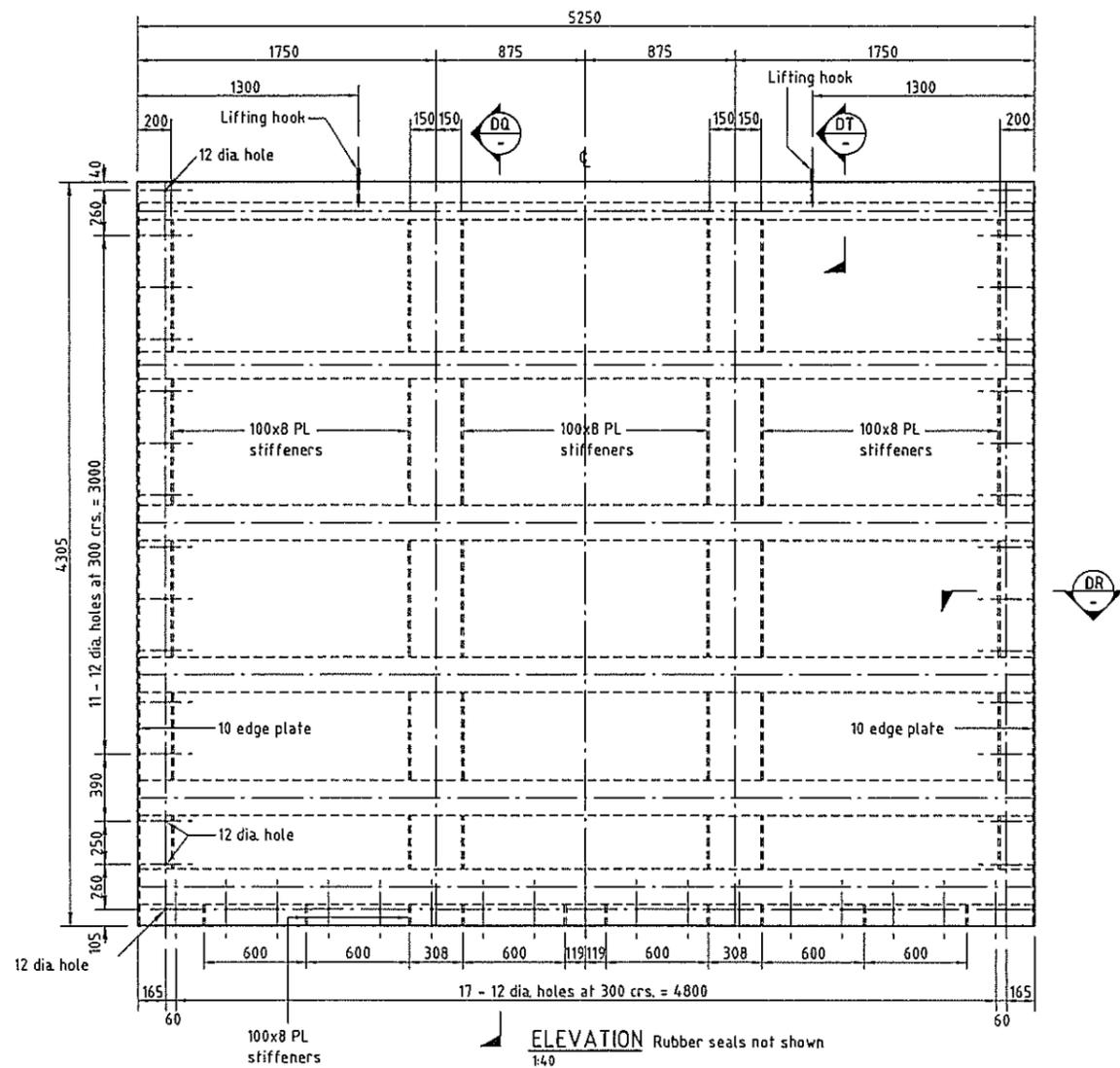
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FAX: (07) 3309 0722, (02) 9410 0520, (07) 5530 4547, (07) 5443 2642, (07) 4721 5508, (07) 4124 5155, (07) 4121 5710, (02) 4324 3251, (0011675) 325 0951, (0011632) 910 5140

QVIEW PTY. LTD.
PELICAN WATERS DEVELOPMENT - STAGE 5
NORTH LAKE LOCK AND WEIR
LOCK STRUCTURE
LADDER DETAILS

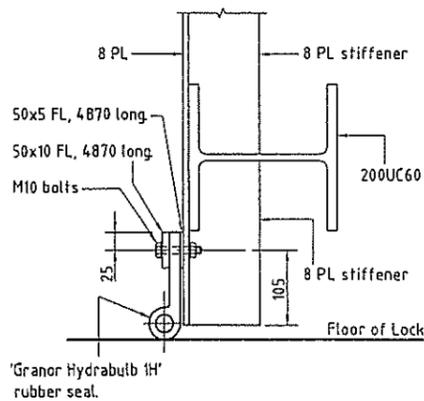
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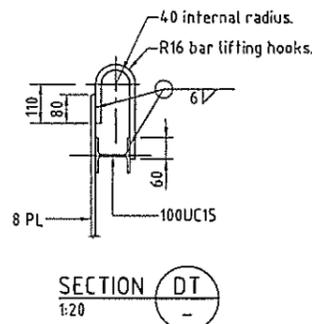
ELEVATION Rubber seals not shown
1:40

BULKHEAD GATE (2 OF)

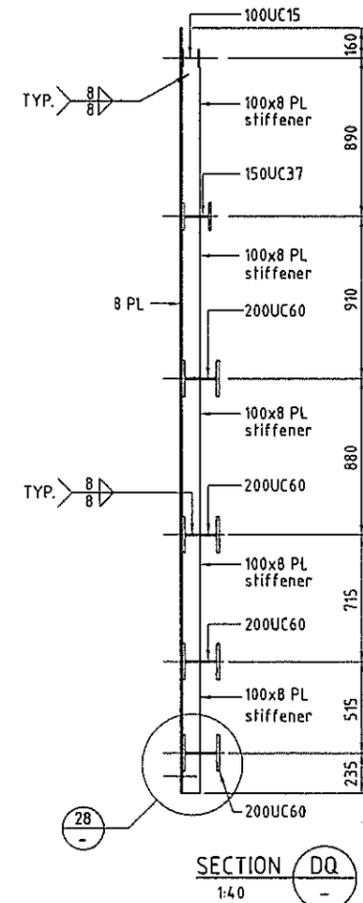
NOTE:
Cathodic protection system similar to Lock gates shall be installed on bulkheads (not shown on drawing).



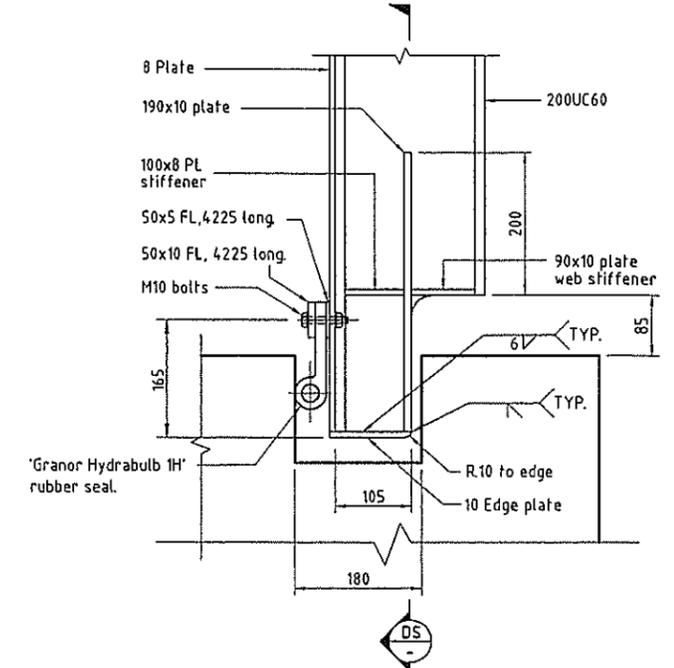
DETAIL 28
1:10



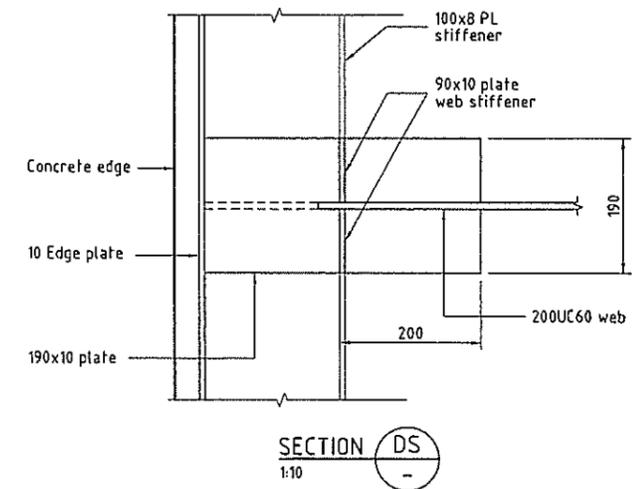
SECTION DT
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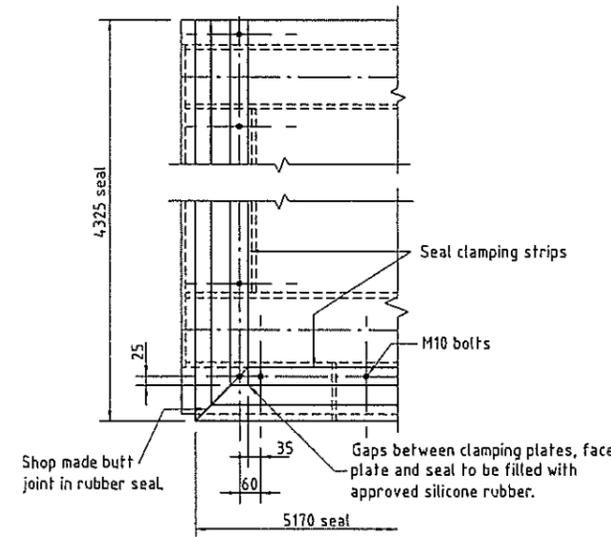
SECTION DQ
1:40



SECTION DR SIMILAR FOR 150UC37
1:10



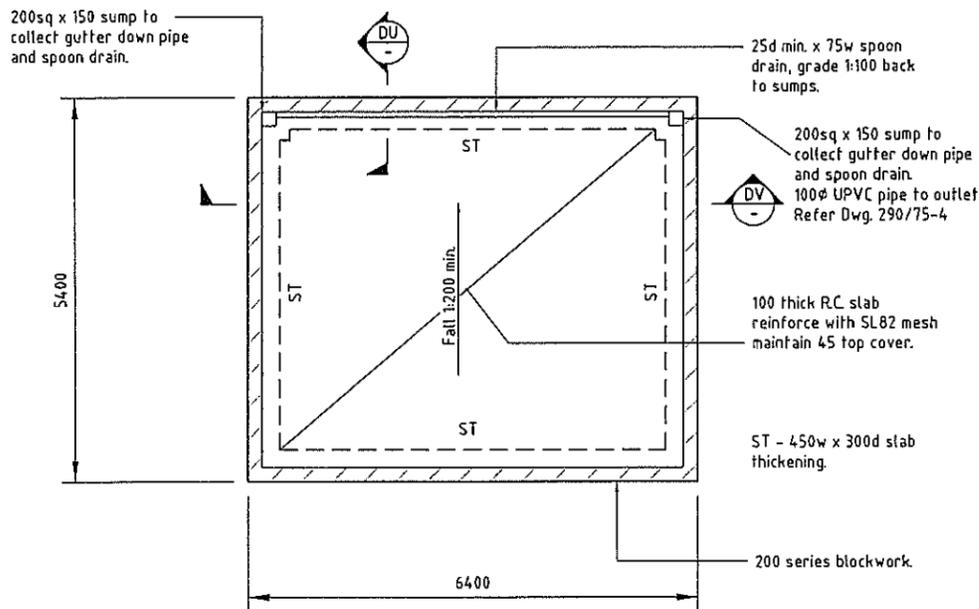
SECTION DS
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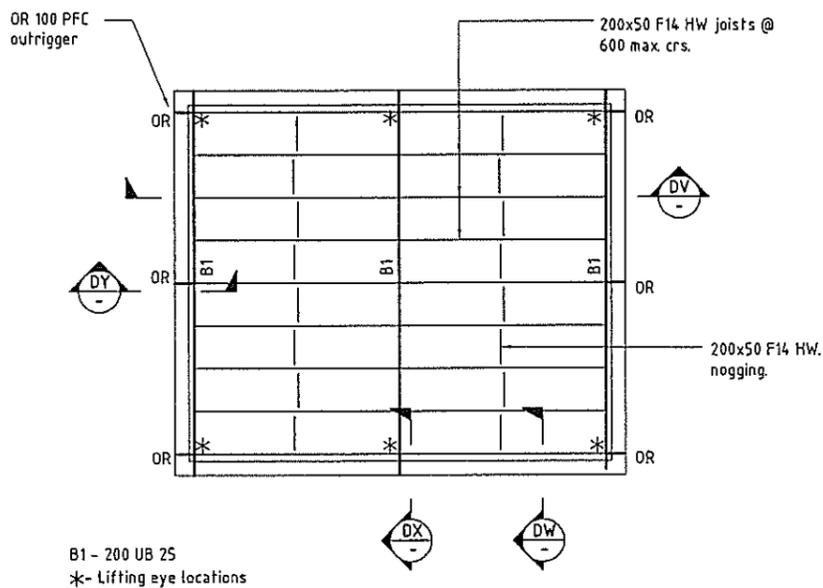
ELEVATION
1:20
TOP AND CORNER SEAL DETAIL

NOTE:
Rubber seal shall be continuous around bulkhead gate with shop made butt welded 90° joints at corners.

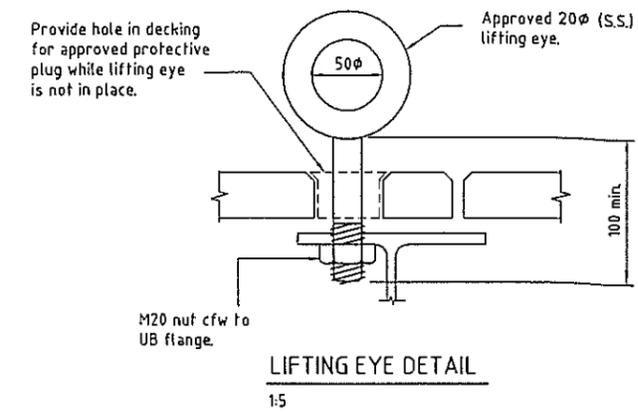
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REV.	DATE	REVISIONS	REC.	APPR.		



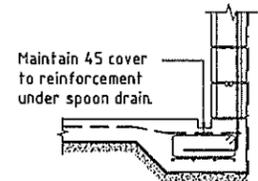
SLAB & FOOTING LAYOUT
1:100



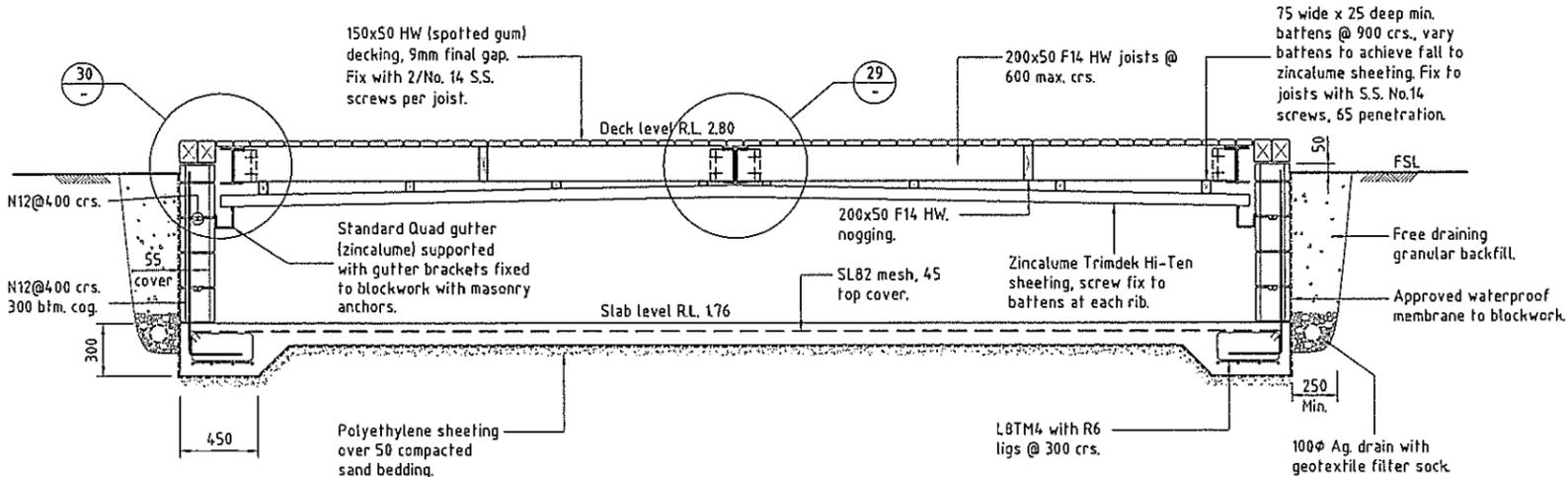
FRAMING LAYOUT
1:100



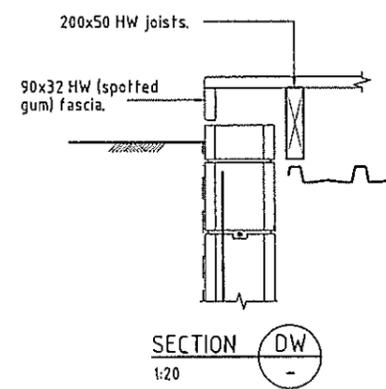
LIFTING EYE DETAIL
1:5



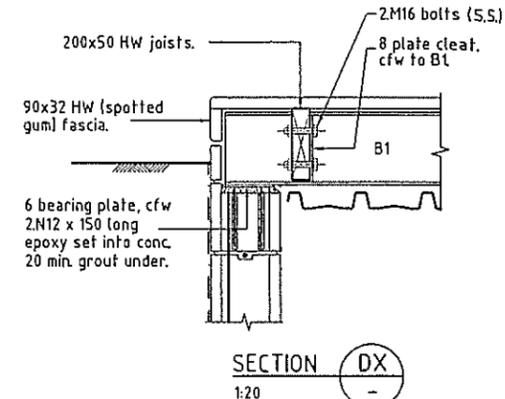
SECTION DU
1:20



SECTION DV
1:40

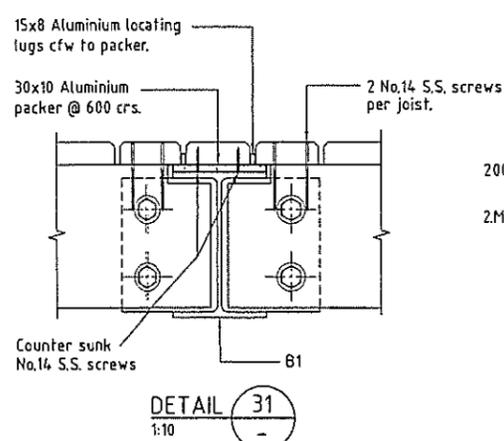


SECTION DW
1:20

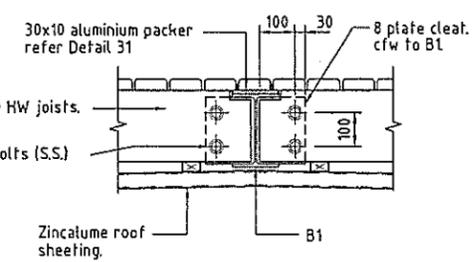


SECTION DX
1:20

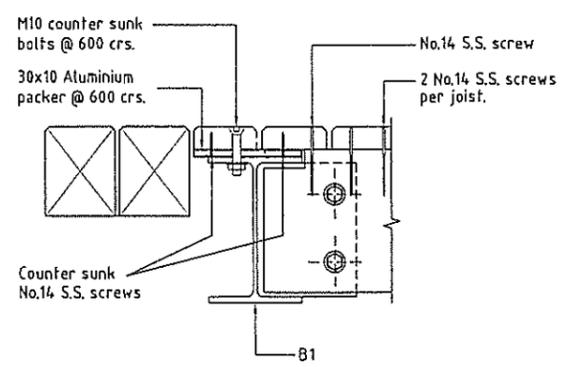
- NOTES:**
1. All steelwork to be hot dipped galvanised after fabrication.
 2. All bolts and screws to be stainless steel.
 3. After removal, timber platform is to be supported by blocks placed under outriggers & B1.



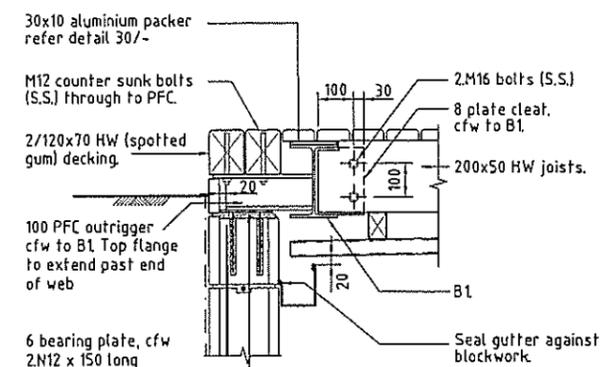
DETAIL 31
1:10



DETAIL 29
1:20



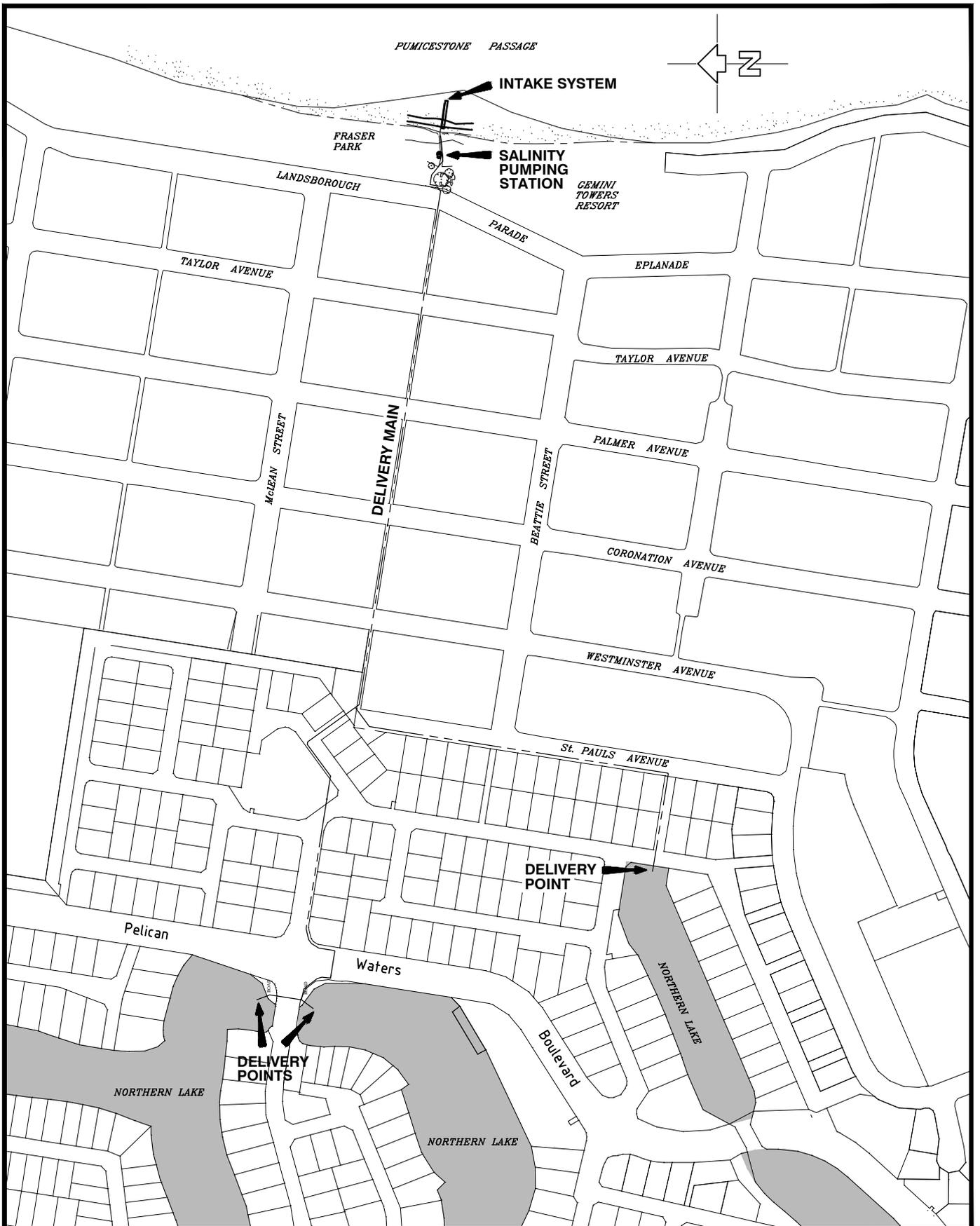
DETAIL 30
1:20



SECTION DY
1:20

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Appendix B: Salinity exchange overview plan

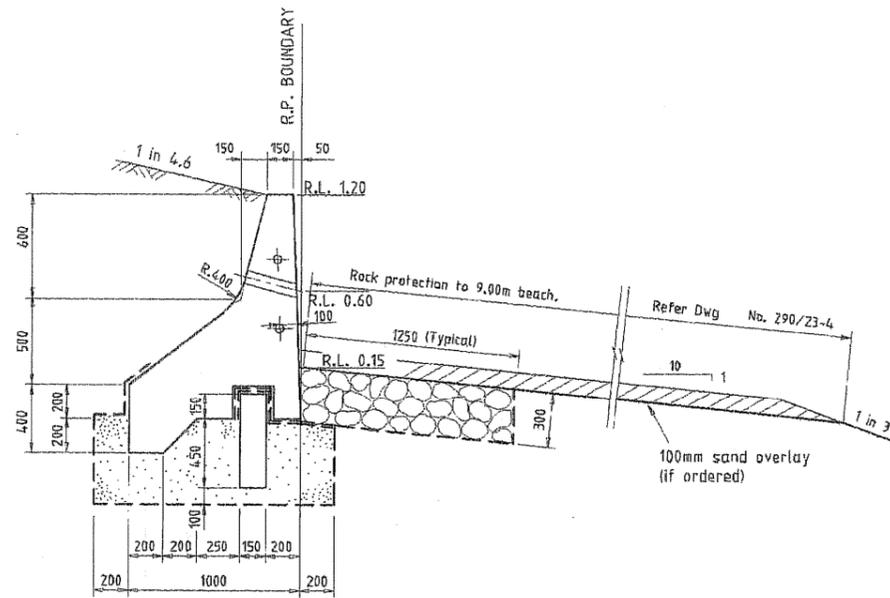


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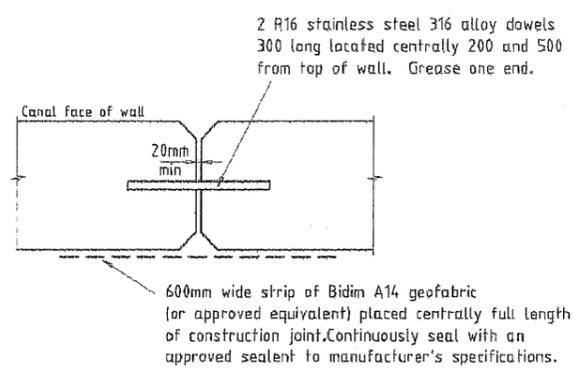
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PUMICESTONE PASSAGE DEVELOPMENTS NORTHERN LAKES PRECINCT SALINITY PUMPING SYSTEM

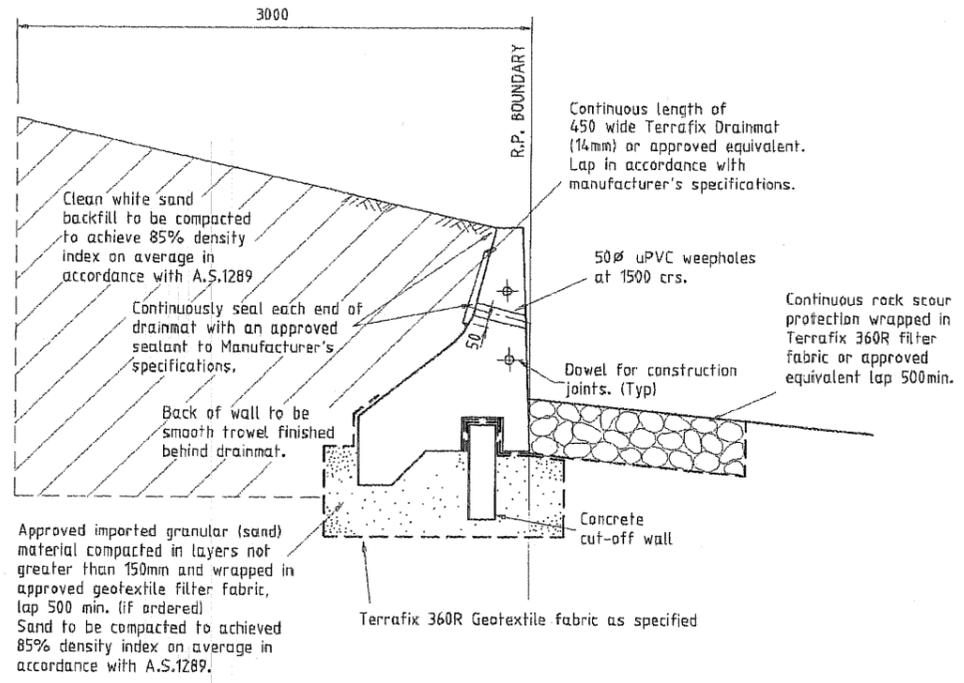
Appendix C: Typical revetment wall section



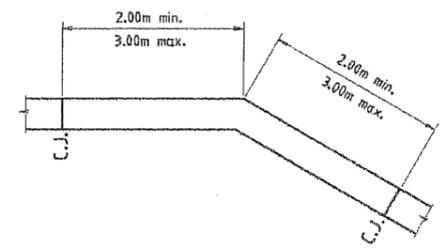
WALL PROFILE



CONSTRUCTION JOINT (C.J.)
N.T.S.



COMPACTION REQUIREMENTS AND DETAILS
REVETMENT WALL



CORNER DETAIL
N.T.S.

NOTES:

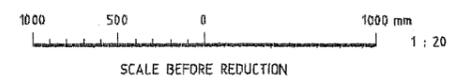
- All concrete quality and construction procedures shall be in accordance with A.S.3600-1990.
- Concrete shall be N40 MPa/20 at 28 days, Type FA, Slump 80mm (max.). Minimum cement content 390 kg/m³, flyash 100 kg/m³, W/C ratio 0.45.
- Concrete to be sprayed with approved curing membrane. Application rate 1 litre per 6 m². Apply within 1 hour of concrete pour.
- All exposed edges shall be chamfered 25mm.
- Construction joints for the revetment wall shall be at 10.00m centres, with contraction joints (saw cut) at 5.00m centres.
- All geotextile fabric shall be 'Terrafix' 360R or approved equivalent unless noted otherwise.
- Rock protection shall comply with the following specifications:

(i) Grading

Rock Mass(kg.)	Nom. Sieve Size (mm)	Target % of sample (by mass) of Rock less than specified mass	% Limit on Target Passing
37.5	300	-	-
22	250	-	-
11	200	87	75-100
7	175	68	58-75
2.7	125	25	21-29
1.2	95	7	5-10
0.2	53	-	-
0.1	37.5	-	-

(Rock mass based on S.G. of 2.65)

- Shape
The ratio of the maximum to minimum dimensions of any rock shall not exceed three.
 - Abrasion Resistance
The suitability of rock shall be assessed by the Los Angeles Value specified in Part 23 of A.S. 1141-1980. The maximum permissible loss for each rock fraction shall be 20%.
 - Soundness
The soundness of rock shall be assessed in accordance with Part 24 of A.S.1141-1974, (by use of Sodium Sulphate Solution.)
The maximum permissible loss for each fraction shall be 6%.
8. Rock of larger size maybe substituted if approved by the Superintendent. If larger rock is used specified layer thicknesses must be increased whilst maintaining nominated finished levels and profiles.



AUTOCAD NAME: P13-7.DWG
DATE: 24-1-1994 TIME: 3:29 PM

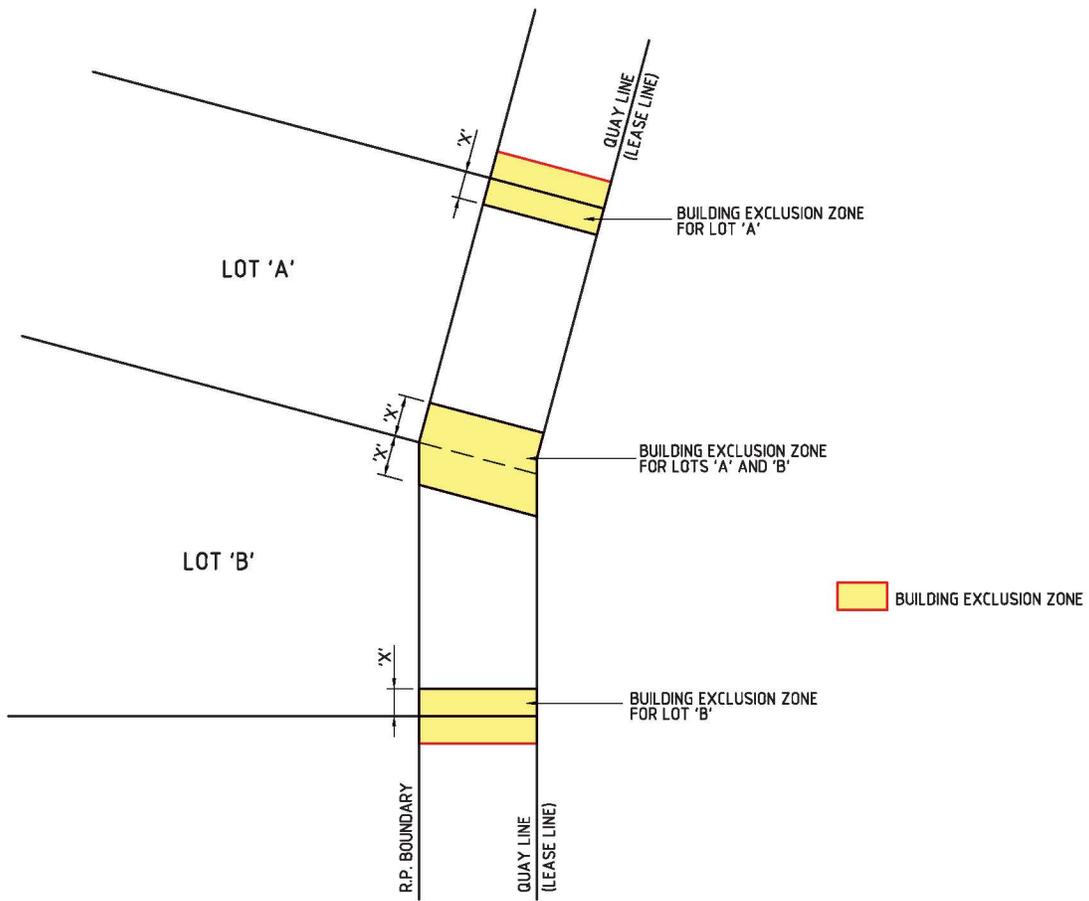
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DATE: 24-1-1994	DATE: 24-1-1994	DATE: 24-1-1994	DATE: 24-1-1994	DATE: 24-1-1994	DATE: 24-1-1994

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Consulting Engineers & Planners

QVIEW PTY LTD
PELICAN WATERS ESTATE - PHASE 2
SUBDIVISIONAL ROADWORKS AND DRAINAGE

DATE: 24-1-1994
DRAWING No: 290/23-7

Appendix D: Approved design standards for pontoons, decks/stairs, jetties and boat ramps



PLAN (TYPICAL)

N.T.S.

TABLE OF DIMENSIONS

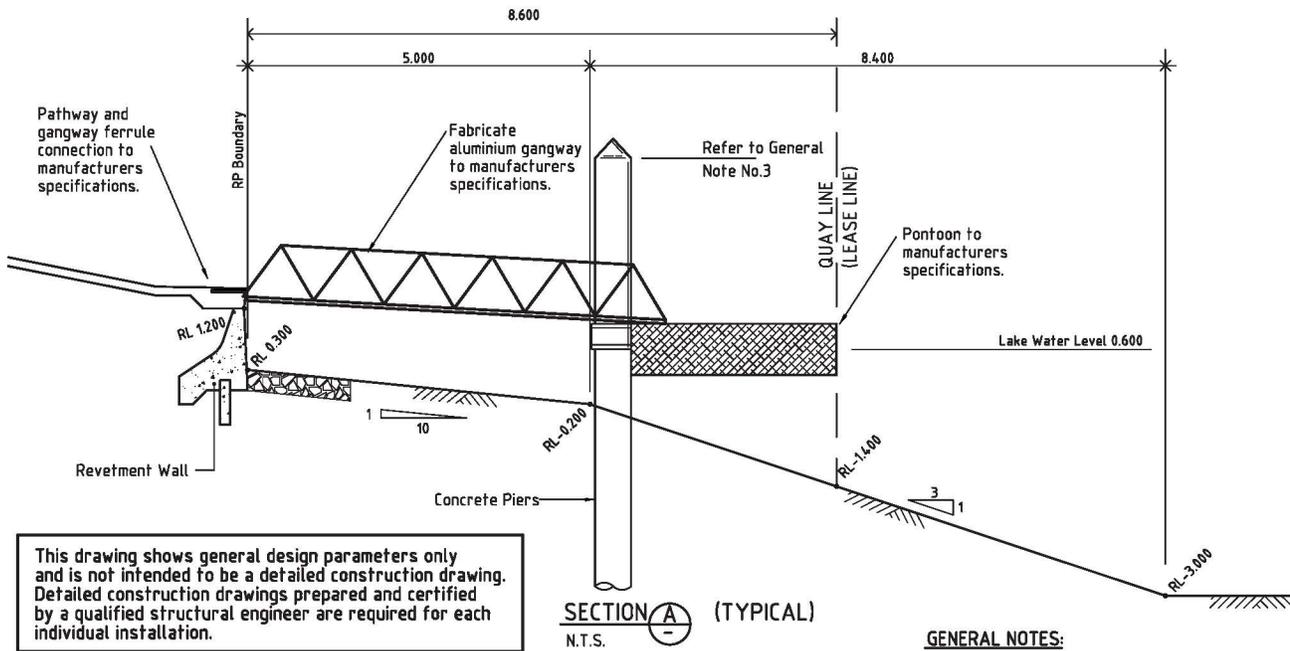
STRUCTURE (BUILDING) TYPE	DIMENSION 'X'	REFER FIGURE
PONTOON	1.5	2.1
JETTY	1.5	2.2
DECK	3.0	2.3
RAMP	1.0	2.4



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**PUMICESTONE PASSAGE DEVELOPMENTS
NORTHERN LAKES PRECINCT
QUAY LINE AND BUILDING
EXCLUSION ZONE
FIGURE 2.0**

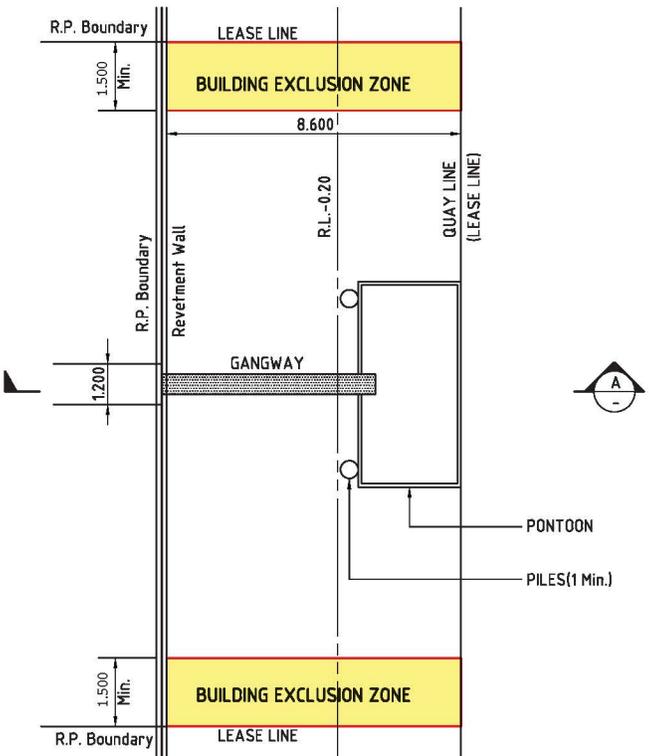


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SECTION A (TYPICAL)
N.T.S.

GENERAL NOTES:

- Design live loads for gangways and pontoons (Private use only):
 - single user residential site 2.0kPa
 - multi user residential site 3.0kPa
- All structures shall be designed to withstand berthing impact and hydraulic loadings for a channel velocity of 0.75m/s.
- Top Level of pontoon piles to be sufficient to provide adequate extension above pontoon rollers for a maximum Q100 Flood Level of R.L. 2.30m AHD.
- Pontoons must be stable at all times. When the specified live load is distributed over half the width of the pontoon and over the walkway, there shall be not less than 75 mm of reserve buoyancy; the bottom corner shall not emerge from the water and the angle of tilt shall not exceed 15°.
- Pontoons must be constructed of materials suitable for the purpose. Thin walled steel oil drums shall not be permitted for pontoon floats. Pontoons must be protected against corrosion, attack by marine organisms and deterioration of the materials by abrasion or immersion in sea water.
- All pontoons to be restrained by at least one driven pile, stay wires are not permitted.
- Pontoons are not to extend beyond quay line or closer than 1.5m to the projection of the side boundary of the quay line.
- The pontoon must contain fixed lighting sufficient to indicate the presence of the pontoon. The lighting must be adequately shielded as to not cause a risk to the safe navigation of other vessels or a nuisance to surrounding properties.
- All piles are to be fitted with retro-reflective tape or a similar material, sufficient to be clearly visible from approaching vessels.
- The length of the pontoon must extend to the outer edge of the Quay Line.
- Both pontoons and walkway shall be fully carpeted, fitted with mooring cleats and fender rubber to three sides.



PLAN (Typical)
N.T.S.

MOORING ARRANGEMENTS:

Any vessel berthed at the the pontoon must not at any time :-

- Extended into that area within 1.5m of the side boundaries of the designated Quay Line.
- Exceed the design limitations of the pontoon.

- Impede the safe navigation of vessels that utilise the waterway.
- Compromise the safe ingress and egress of vessels to and from neighbouring structures.

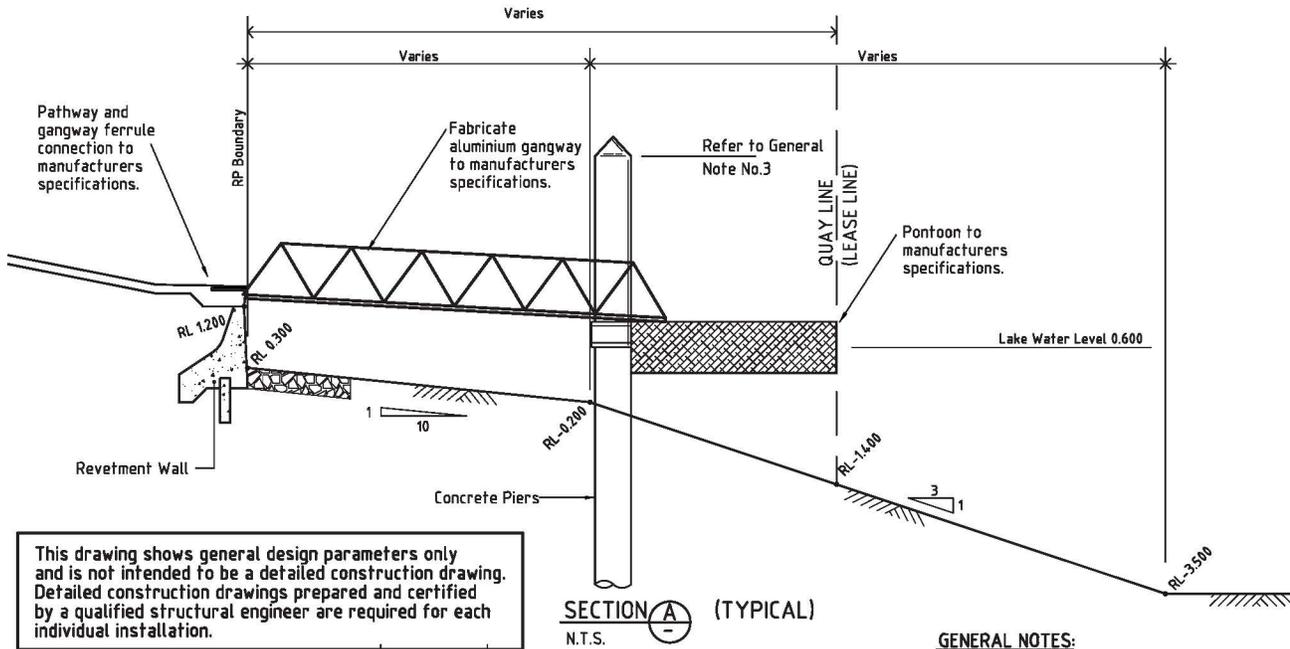


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**PUMICESTONE PASSAGE DEVELOPMENTS
NORTHERN LAKES PRECINCT**

**TYPICAL PONTOON
FIGURE 2.1**

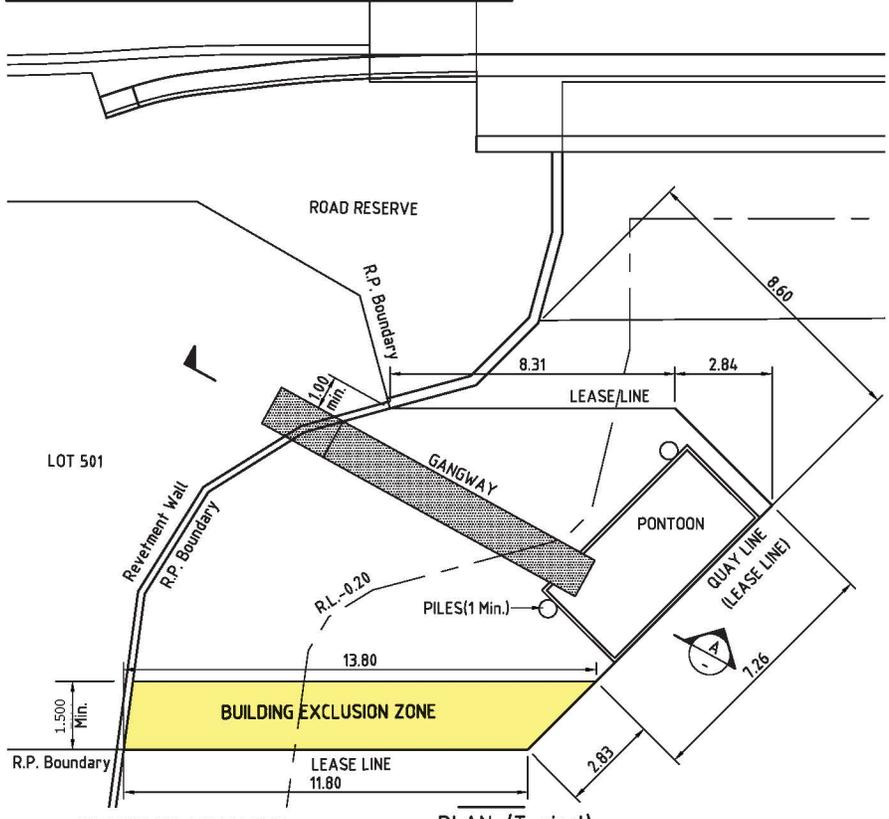
Rev. A. 05 - 06 - 2006



SECTION A (TYPICAL)
N.T.S.

GENERAL NOTES:

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 - multi user residential site 3.0kPa
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8. The pontoon must contain fixed lighting sufficient to indicate the presence of the pontoon. The lighting must be adequately shielded as to not cause a risk to the safe navigation of other vessels or a nuisance to surrounding properties.
9. All piles are to be fitted with retro-reflective tape or a similar material, sufficient to be clearly visible from approaching vessels.
10. The length of the pontoon must extend to the outer edge of the Quay Line.
11. Both pontoons and walkway shall be fully carpeted, fitted with mooring cleats and fender rubber to three sides.



PLAN (Typical)
N.T.S.

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4. Compromise the safe ingress and egress of vessels to and from neighbouring structures.

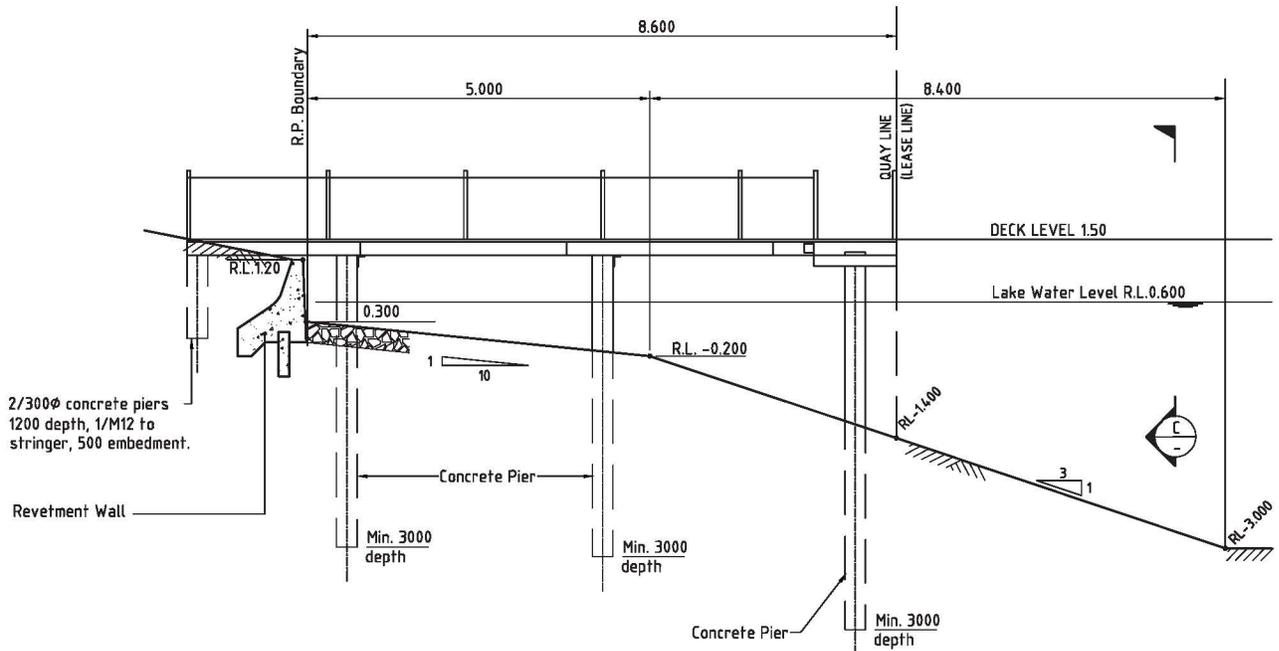


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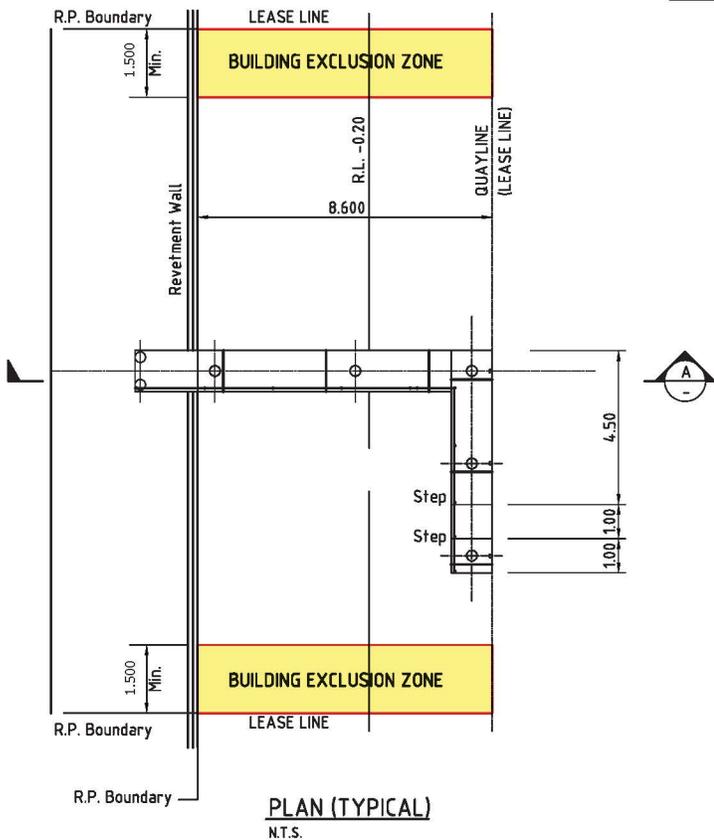
**PUMICESTONE PASSAGE DEVELOPMENTS
NORTHERN LAKES PRECINCT**

**LOT 501 PONTOON
FIGURE 2.1A**

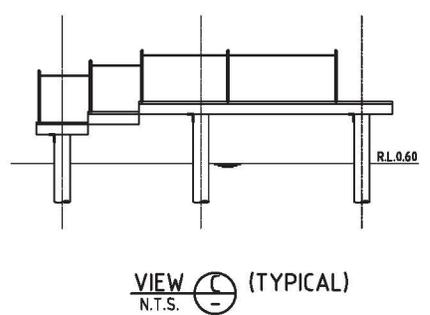


SECTION A (TYPICAL)
N.T.S.

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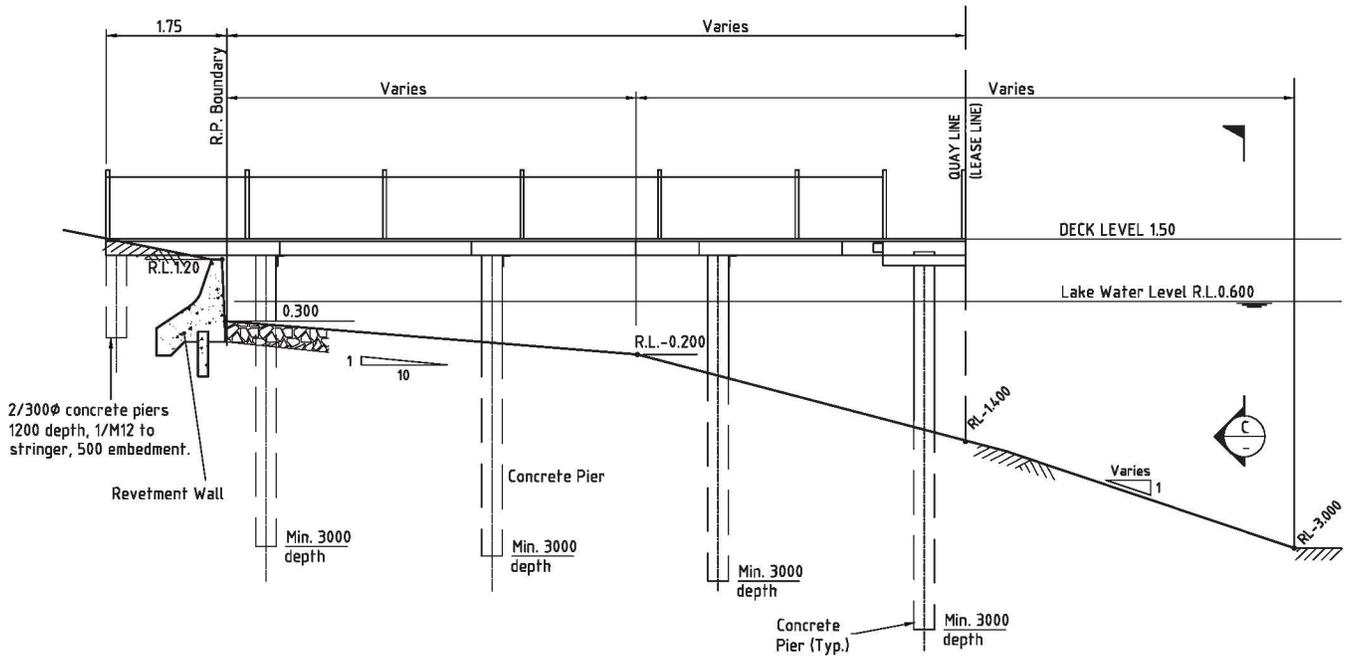
PLAN (TYPICAL)
N.T.S.



VIEW C (TYPICAL)
N.T.S.

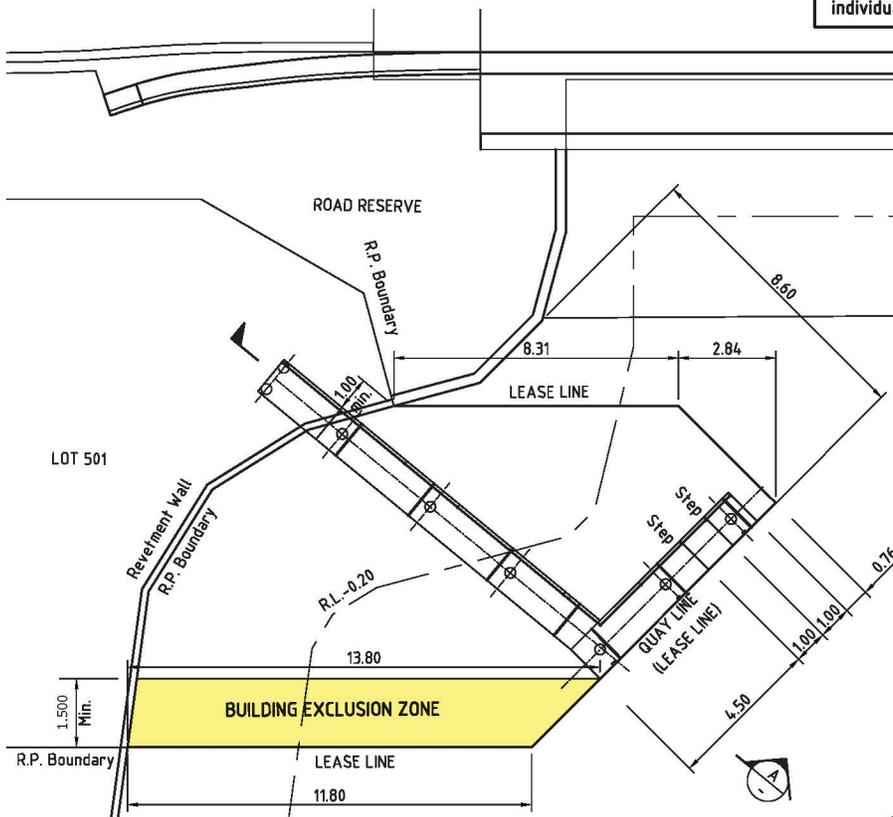
GENERAL NOTES:

- Design live loads for jetties (Private use only):
- single user residential site 2.0kPa
- multi user residential site 3.0kPa
- All structures shall be designed to withstand berthing impact and hydraulic loadings for a channel velocity of .075m/s. No loads are to be imposed on revetment wall by jetty.
- The jetty deck shall be not less than 900mm in width on any part of the deck area.
- All concrete quality and construction procedures shall be in accordance with AS 3600.
- Concrete shall be suitable for durability exposure Classification C.
- Where piles are to be driven through rock protection, the rock shall be removed and the geotextile cut for the pile penetration. The geotextile shall be repaired to provide a neat fit around the pile and the rock replaced.



SECTION A (TYPICAL)
N.T.S.

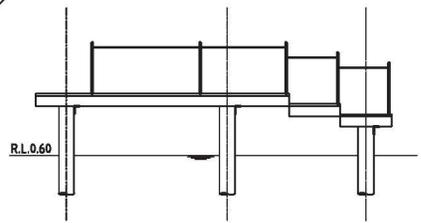
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PLAN (TYPICAL)
N.T.S.

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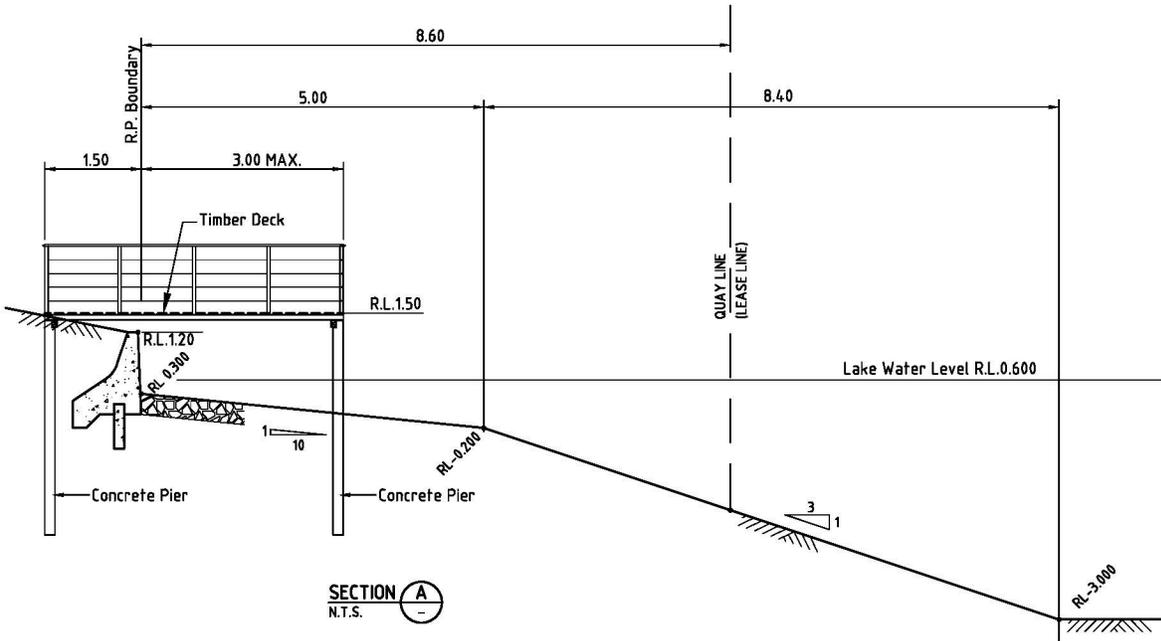
VIEW C (TYPICAL)
N.T.S.



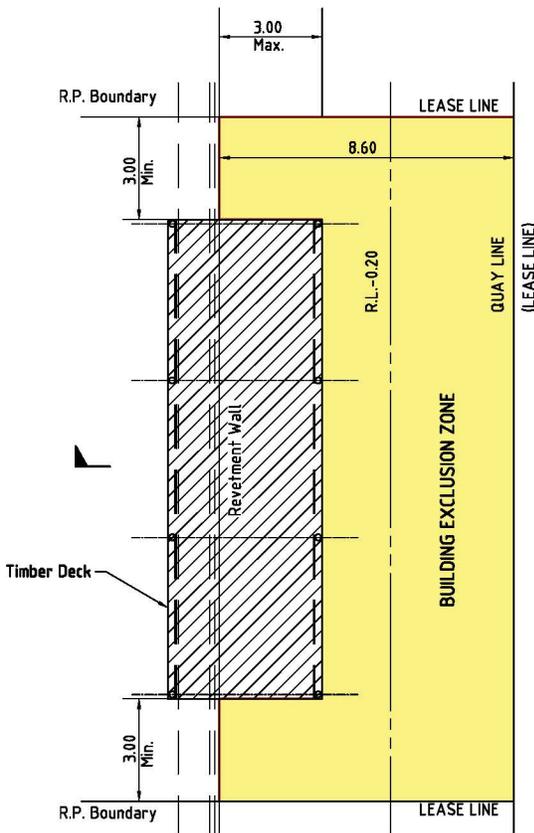
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**PUMICESTONE PASSAGE DEVELOPMENTS
NORTHERN LAKES PRECINCT
LOT 501 JETTY
FIGURE 2.2A**



SECTION A
N.T.S.



PLAN
N.T.S.

GENERAL NOTES:

1. All structures shall be designed to withstand berthing impact and hydraulic loadings for a channel velocity of 0.75m/s. No loads are to be imposed on revetment wall by deck.
2. Design live loads for decks (Private use only):
 - single user residential site 2.0kPa
 - multi user residential site 3.0kPa
3. No fixing or deck support shall be made onto the existing revetment wall.
4. Maximum deck level of R.L. 1.50.

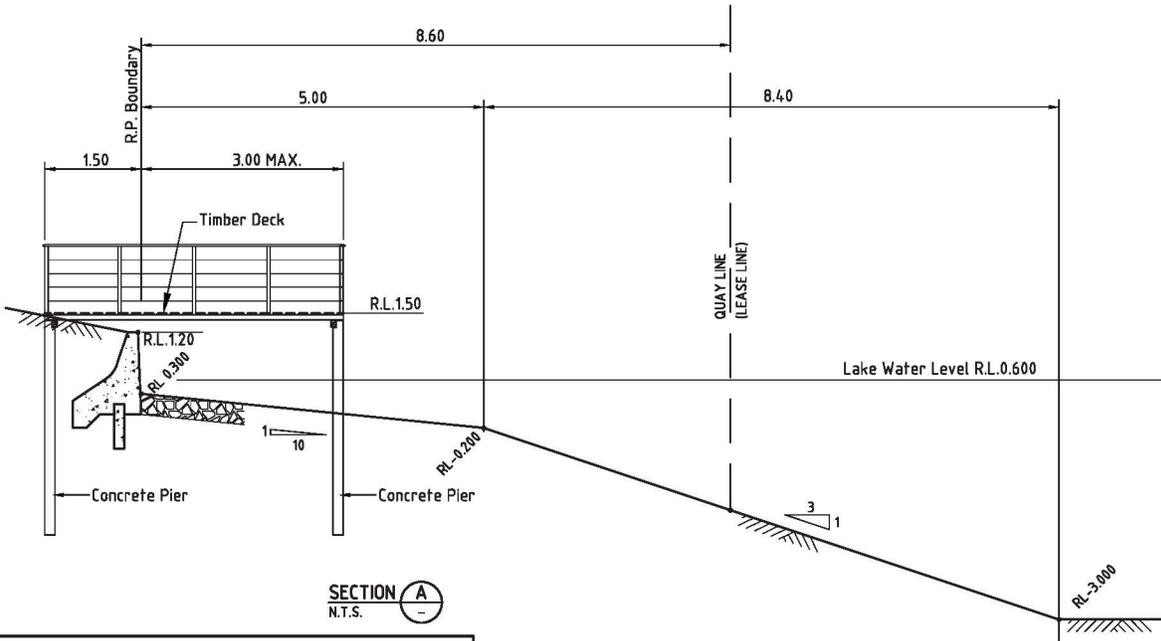


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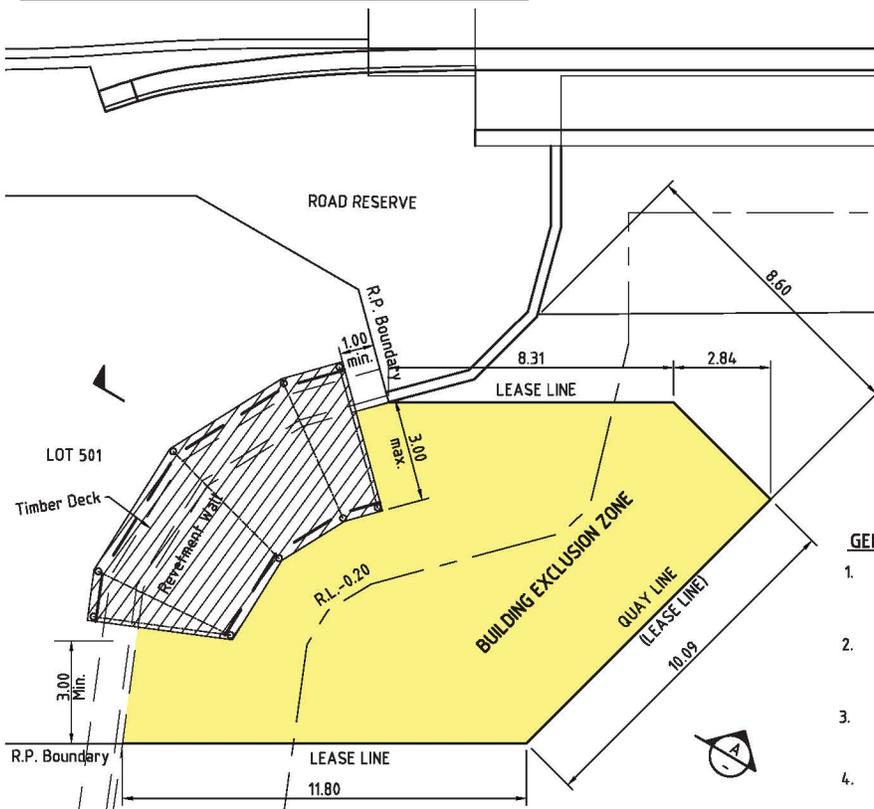
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**PUMICESTONE PASSAGE DEVELOPMENTS
 NORTHERN LAKES PRECINCT
 TYPICAL DECK
 FIGURE 2.3**



SECTION A
N.T.S.

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PLAN
N.T.S.

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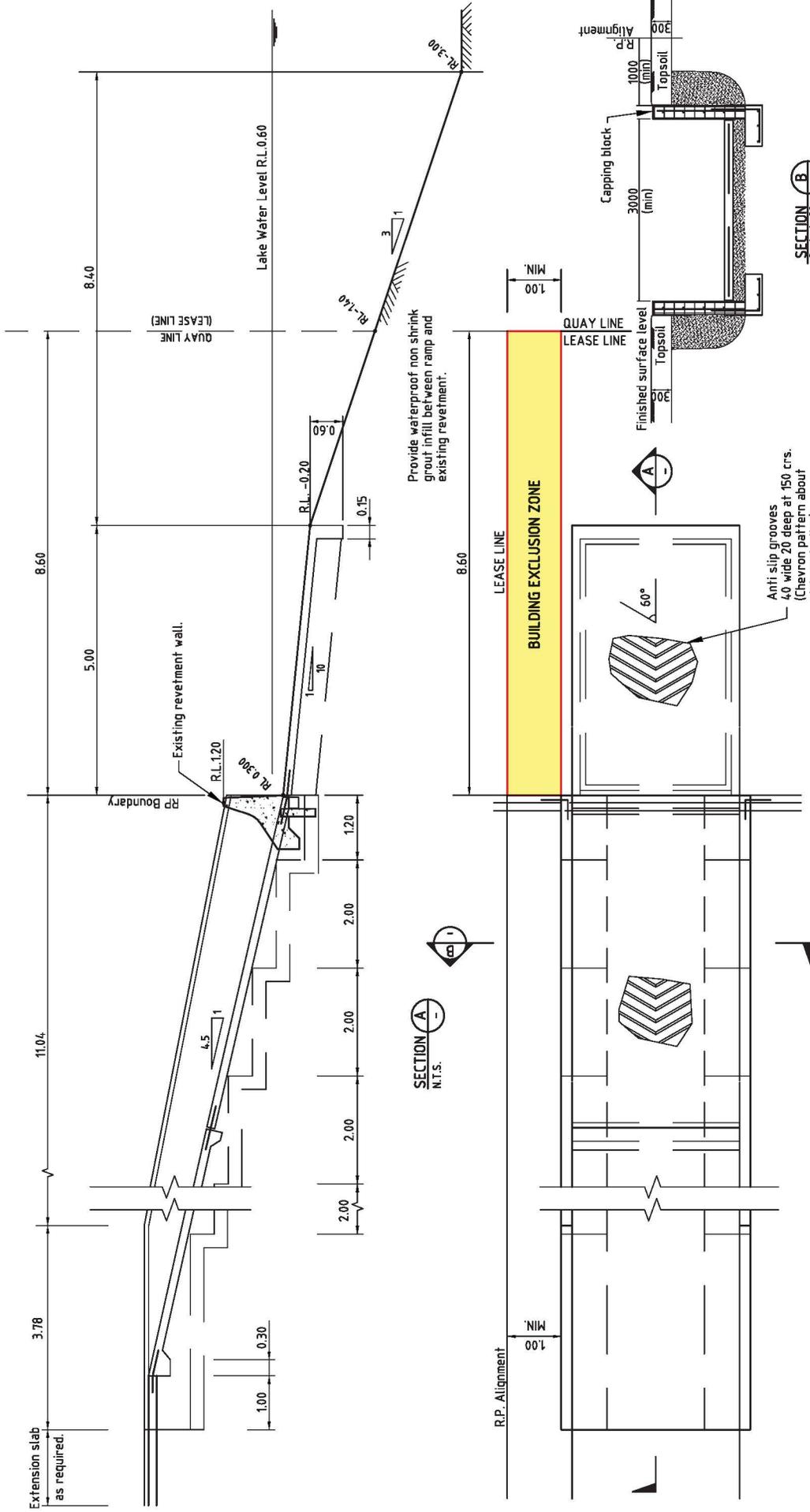


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**PUMICESTONE PASSAGE DEVELOPMENTS
NORTHERN LAKES PRECINCT**

**LOT 501 DECK
FIGURE 2.3A**



**PUMICESTONE PASSAGE DEVELOPMENTS
NORTHERN LAKES PRECINCT
TYPICAL RAMP
FIGURE 2.4**

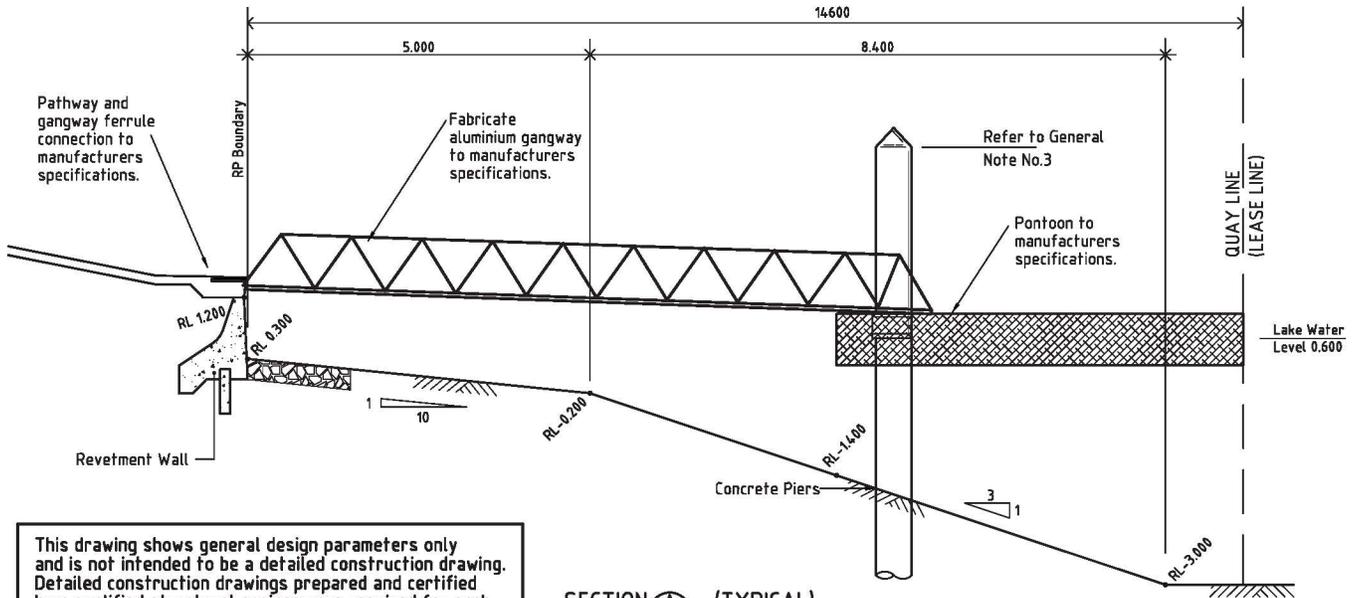
PLAN (TYPICAL)
N.T.S.

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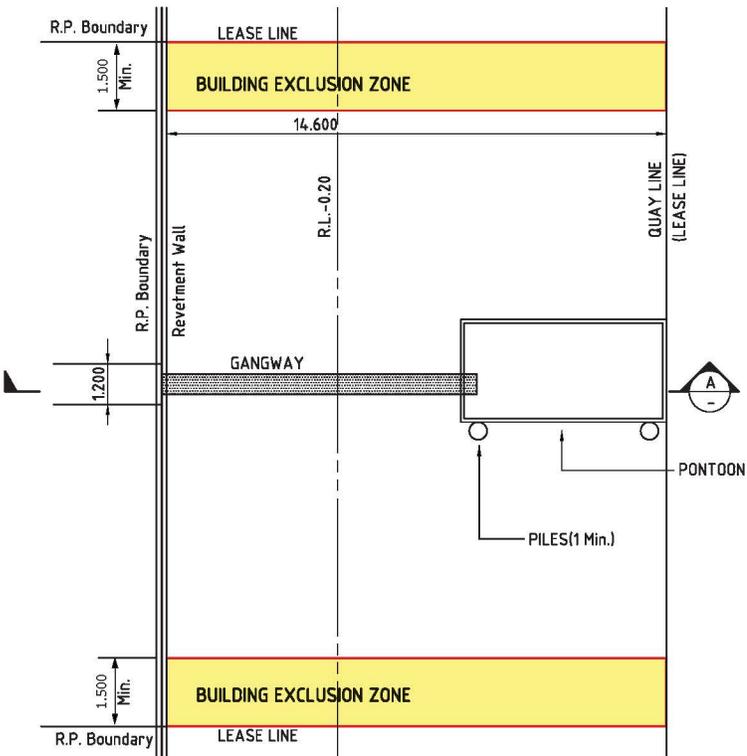


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SECTION A (TYPICAL)
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- Pontoons must be stable at all times. When the specified live load is distributed over half the width of the pontoon and over the walkway, there shall be not less than 75 mm of reserve buoyancy; the bottom corner shall not emerge from the water and the angle of tilt shall not exceed 15°.
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- All piles are to be fitted with retro-reflective tape or a similar material, sufficient to be clearly visible from approaching vessels.
- The length of the pontoon must extend to the outer edge of the Quay Line.
- Both pontoons and walkway shall be fully carpeted, fitted with mooring cleats and fender rubber to three sides.



PLAN (Typical)
N.T.S.

MOORING ARRANGEMENTS:

Any vessel berthed at the the pontoon must not at any time :-

- Extended into that area within 1.5m of the side boundaries of the designated Quay Line.
- Exceed the design limitations of the pontoon.
- Impede the safe navigation of vessels that utilise the waterway.
- Compromise the safe ingress and egress of vessels to and from neighbouring structures.



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**PUMICESTONE PASSAGE DEVELOPMENTS
NORTHERN LAKES PRECINCT**

**TYPICAL PONTOON
FIGURE 2.5**



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