



TRANSNET SOC LTD
**DCT BERTHS 203 TO 205 – RECONSTRUCTION, DEEPENING AND
LENGTHENING**
PORT OF DURBAN
LOT 10 ASSESSMENT

ZAA 1785 | RPT | 069 REV T-02
16 OCTOBER 2023

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| REVISIONS | | | | | |
|-----------|-----------------|---------------------|-------------|------------|-------------|
| REV | DATE | DESCRIPTION | DESIGNED BY | CHECKED BY | APPROVED BY |
| T-00 | 30 June 2016 | Issue for Tender | CJE/MB | MC | JZ |
| T-01 | 06 August 2019 | Issue for Re-Tender | JW | WVW | JZ |
| T-02 | 16 October 2023 | Issue for Tender | DM | JW/JZ | JZ |

| AUTHORISATION | | | |
|---------------|-------------------|-----------|-----------------|
| AUTHORISED BY | NAME | SIGNATURE | DATE |
| DIRECTOR | J ZIETSMAN Pr Eng | | 16 October 2023 |

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1.0 EXECUTIVE SUMMARY

1.1 Preamble

This report has been prepared for the DCT Berths 203 to 205 Reconstruction, Deepening and Lengthening Project in the Port of Durban.

The Port of Durban Container Terminal at Pier No 2, Berths 203 to 205, is being deepened and refurbished to accommodate Post Panamax container vessels up to 9,000 to 12,000 TEU (fully laden) and 14,000 TEU (partially laden).

The Project requires precast concrete caissons to be cast, launched and towed to the site where they will be ballasted down onto a prepared foundation bed. Caissons have previously been produced at Lot 10 in the Bayhead area of the port of Durban for the Berths D – G project (2002 -2003).

This report provides information on the Lot 10 Site at present day, provides summary information on the present occupancy and current use of the site and its current state.

An inventory of items that must be removed from the site, in preparation for its use as a caisson fabrication and other precast items for this Berth Deepening Project, is provided. The information provided herein is to be confirmed and clarified by Bidders during the tender stage. The *Contractor* is responsible for confirming all measurements and quantities with the *Supervisor* prior to the removal of the materials.

1.2 Summary

The conclusions of the assessment are summarised as follows:

- a) The caissons required for this project have been designed within the constraints of the existing launching dock at Lot 10.
- b) Lot 10 yard can be utilised for casting the new caissons and the other precast concrete items required for this project, subject to some refurbishment and stabilisation of the civil works.
- c) The launching dock will need to be deepened and stabilised.
- d) Maintenance dredging is required from the existing launching dock to the Maydon Wharf Channel, a distance of approximately 200 m.
- e) An inventory of items that must be removed from the site, in preparation for its use as a caisson fabrication site and other items precast casting yard for this Berth Deepening Project, is included in this report. The information provided herein is to be confirmed and clarified by Bidders during the tender stage. The *Contractor* is responsible for confirming all measurements and quantities with the *Supervisor* prior to the removal of the materials.
- f) Hamburg Road itself, which provides the only vehicular and truck access to Lot 10, will have to be inspected and repaired before construction starts and be maintained over the period of construction activity at Lot 10.
- g) Similarly, Clydebank Road, which feeds into Hamburg Road, in the middle, from the West and East, requires inspection and repair and to be maintained over the period of construction activity at Lot 10.

1.3 Aerial View of Lot 10



Figure 1.1: Google Earth View of Lot 10, December 2022

2.0 LOT 10 CASTING YARD – CURRENT STATE

2.1 Overview

The purpose of this report is to provide information on the suitability of the Lot 10 casting yard for caisson and other precast item manufacture.

2.2 Current State

The Lot 10 Casting Yard is an existing facility located at the Bayhead in the Port of Durban which was developed some years ago for the purpose of caisson construction for the extension of the Point area quay (Berths D-G). It has not been used for this purpose for several years and will require significant clearing, refurbishment, and re-equipping to refit it for its purpose.



Figure 2.1: Zoomed in Current State of Casting Yard, Google Earth Aerial Photo, December 2022

The current condition of the facility may be summarised as follows:

- a) The access road (Hamburg Road) is showing signs of wear and tear.
- b) All concrete structures including all six caisson casting platforms show signs of cracking. There has been some work done over the years on the sealing of the cracks.
- c) The sheet pile walls of the launching dock have some corrosion above the intertidal zone. The subsurface condition of the sheet pile walls is not known.
- d) No mechanical components of any sort are on site, nor the synchrolift launching platform. Handrail stanchions on the synchrolift support structure have corroded away completely.
- e) The 120 mm x 120 mm x 8 mm steel angles cast into the top of the casting platforms to form wedged slide resisters in the underside of the caissons are in poor condition. These have the incorrect orientation for the new caissons and need to be replaced.
- f) The launching dock is silted up and will require localized dredging, extending some 200 m towards the Maydon Wharf Channel. The sheet-piling in this area will also require stabilization.
- g) No other facilities are available on site, although the South West casting platform was used by a local civil contractor for its office and stores. To facilitate this, the angle wedge formers have been filled in with concrete on this base only.
- h) Items identified to be removed from the site are summarized in Annexure 1.
- i) There is currently a Container Handling Operator who is occupying the entire site south of the casting yard concrete bases.
- j) The remaining northern section of the site from the last row of containers to the load out dock, including the casting yard, has a vegetation problem. An attempt has been made to cut down the vegetation but unfortunately all the stumps and roots were left in the ground and all the cut vegetation has been left behind in the same position they were cut.

2.3 Previous Operations

The Lot 10 Casting Yard was purpose built in 2002 by the Grinaker-LTA/Interbeton/BCW Joint Venture and was designed by ARQ Specialist Engineers. Drawings of the concrete works are available and general arrangement drawings are provided in Annexure 3.

3.0 LOT 10 – AS-BUILT DETAILS

3.1 Lot 10 Casting Yard Layout

The basic layout of the old Lot 10 Casting Yard is shown on the drawings included in Annexure 3 and consists of:

- Six concrete casting platforms, each accommodating a caisson base under construction. These have two transverse slots 2 m wide in each to accommodate the jacking and moving equipment.
- Six sets of transverse ground level beams for lateral movement of the cast bases.
- Six sets of transverse beams on to which the bases will be lowered to continue the construction by sliding shutter techniques and curing of the caissons.
- A set of longitudinal launching beams running down the whole site and forming a central spine. The caissons are sequentially moved onto and then along this beam to the launching dock.
- A launching dock and synchrolift platform. This consists of two substantial upstand beams onto which eight sets of strand jacks are mounted. These in turn support, raise and lower a structural steel synchrolift platform to launch the caissons.



Figure 3.1: View of Lot 10 Casting Yard - 2002



Figure 3.2: Lot 10 Yard during Operations – 2003 (photo courtesy Transnet)

3.2 Launching Dock Size

The caissons will be produced in the existing Lot 10 Casting Yard and launched through the modified existing launching dock.

This dock is shown in basic outline on drawings 4B-901-001-01, 4B-901-002-01 and 4B-901-005-01 in Annexure 3, and has the following physical constraints:

- The dock design dredge depth was -11 m CDP, with the access channel outside the launching dock being originally dredged to -10,5 m CDP. From the bathymetric surveys conducted, it is known that siltation has occurred and some dredging will be required to regain the design depths.
- The width between the jacking beams is 18,374 m and the original design width of the caissons was 17 m, giving a clearance of 0,687 m each side. This width has been maintained in the ZAA design.
- The design length of the original caissons was 23,94 m, providing a 0,405 m clearance between the sheet pile wall and the base of the caisson when loaded centrally on the launching platform.
- The length of the jacking beams is 17,64 m. Each beam has place for four hydraulically operated jacking strands at 5,04 m spacing.
- The overall dimensions of the launching dock are:
 - Length 25,83 m from the rear face of the sheet pile wall to the NW return point.
 - Width 18.90 m. This determines the maximum width of the steel synchrolift platform.

4.0 TOWAGE ROUTES AND DREDGING

4.1 Launching Dock

The launching dock was originally dredged to -11 m CDP and the access channel beyond it was dredged to -10,5 m CDP. From the bathymetric surveys conducted it is known that siltation has occurred and dredging will be required. The depth of the required channel is at -12.2 m CDP some 200 m from the dock and this decreases steadily all the way into the dock, where the sea bed level in 2019 was about -8 m CDP.

4.2 Channels to Site

The route that will be used to tow the caissons from the launching dock can be summarised as follows: down the Maydon Wharf Channel, along the Esplanade Channel and around to Pier 2. This route has a length to the furthest end of Pier 205 of about 5.5 km.



Figure 4.1: Indirect Route 5.5 km

5.0 REHABILITATION AND USE OF SITE

Rehabilitation and use of the site will be as described in the Works Information for the Berth Deepening Project.



ANNEXURE 1: INVENTORY OF ITEMS ON SITE

LOT 10 Site Inspection – Inventory

| Area | Photo Ref. | Description | QTY |
|--|---------------|---|-------|
| <u>Jetty & Jetty Access Area</u> | | | |
| A | A 007 / A 013 | Steel Winch Column 3500 x 1300 x 1500mm | 1 No |
| A | A 016 | Steel Winch Column 3500 x 1300 x 1500mm | 1 No |
| A | A 014 / 015 | Steel Pipe 10000 x 200 dia | 1 No |
| A | A 014 / 015 | Steel Pipe - Various 6000 x 50 -100mm Diameter | 4 No |
| A | A 014 / 015 | Steel Plate - 3000 x 2000 x 12mm | 1 No |
| A | A 014 / 015 | Rusted Steel Frame - 3000 x 3000 x 100mm | 1 No |
| A | A 010 | Spill Tech Waste Wheelie Bins | 3 No |
| A | A 005 / A 025 | Concrete Slab 5000 x 2300 x 1400 (In 2 Section) | 1 No |
| A | A 005 | Tyre Fenders | 2 No |
| A | A 022 | Timber Beams - Various 3000 x 200 x 200 | 5 No |
| A | A 011 | Wooden sleepers 4500 x 300 x 150 | 4 No |
| A | A 001 / A 018 | Wooden Floating Fender - 4000 x 800 x 250 | 1 No |
| A | A 021 | Barge legs 30 m long x 800 dia | 2 No |
| A | A 012 | Tyres Fenders | 3 No |
| A | A 020 | Tyre Fenders | 2 No |
| A | A 006 | Steel I-Beam on Plate | 1 No |
| A | A 024 | Rubble / General Waste / Dirt, Sand , Vegetation | |
| <u>Jetty Access Route</u> | | | |
| B | B 001 | Collapsed Wendy House | 1 No |
| B | B 002 | Anchor block 600 x 1200 x 1200 | 1 No |
| B | B 003 | Tyre - 1500mm Diameter | 1 No |
| B | B 004 / B005 | Concrete Sleepers / Beams - 1500 x 200 x 300mm | 12 No |
| <u>Access Route - Guard House to NW Corner</u> | | | |
| C | C 001 | HDPE pipes - 6000 x 200 dia | 2 No |
| C | C 002 / C 003 | Rubble / General & Garden Waste - West Perimeter Fence Line | 300m2 |
| C | C 004 / C 005 | Road Crash Barrier - 12000mm | 2 No |
| C | C 006 | Ironwood Railway Sleeper with cut rail tracks | 20 No |
| C | C 008 | Guard House - Prefabricated | 1 No |
| C | C 007 | Portable Toilet | 1 No |
| C | C 007 | Rubble / General & Garden Waste - 5000 x 4000 x 1500mm | 30m3 |
| C | C 010 | Pile of Gravel - 12000 x 4000 x 1500mm | 72m3 |
| C | C 009 | New Jersey concrete road barriers | 17 No |
| C | C008 | Rubble /General & Garden Waste - 7000 x 4000 x 1500mm | 42m3 |
| C | C 011 | Concrete Anchor Block 3000 x 3000 x 1200 | 1 No |
| C | C 010 | Tyre - 1500mm | 1 No |
| C | C 008 | Collapsed Fencing - 3000 x 2000mm | 1 No |
| C | C 008 | Guard House - Collapsed Wendy House | 1 No |
| <u>Access Route - Current Entrance to Guard House</u> | | | |
| D | D 006 | Wooden Cable Drum - Empty | 1 No |
| D | D 009 - 010 | Scrap 40ft Shipping Container | 1 No |
| D | D 007 | New Jersey concrete road barriers | 5 No |
| D | D 004 | Wooden Cabinet - 2500 x 600 x 900 | 1 No |
| D | D 011 - 012 | Half Built Toilet Block 4300 x 5300 x 2200 | 1 No |



| Area | Photo Ref. | Description | QTY |
|------|-------------|---|--------|
| D | D 010 | Scrap Materials inside Container | 1 No |
| D | D 001 | Pile of sand & garden waste - 8000 x 4000 x 1500 | 1 No |
| | D 005 - 007 | Rubble / General & Garden Waste - West Perimeter Fence Line | |
| | | <u>North-West Casting Base</u> | |
| E | E 001 | Jacking Corridor 1 - Trees & General & Garden Waste - 10000 x 2000 x 1500mm | 30m3 |
| E | E 001 | Jacking Corridor 1 - Concrete filled casing - 500 x 900mm diameter | 1 No |
| E | E 002 | Jacking Corridor 2 - General & Garden Waste / Stump Removal | 44m2 |
| | E 012 - 014 | Wooden Beams 6000 x 300 x 300 | 62 No |
| | | <u>Clearing between NW & W Casting Base</u> | |
| E | E 003 - 008 | Concrete piles 15000 x 300 x 300 | 32 No |
| E | E 003 - 008 | Concrete piles 15000 x 300 x 300 | 28 No |
| E | E 009 - 011 | Concrete Beams - 2500 x 0.3 x 0.25mm | 70 No |
| E | E 009 - 011 | Concrete Sleepers - 2100 x 0.3 x 0.25mm | 20 No |
| | | <u>West Casting Base</u> | |
| E | E 020 - 021 | Jacking Corridor 3 - Steel T-Bollard - 1200 x 1000 x 750mm | 5 No |
| E | E 020 - 021 | Jacking Corridor 3 - Cylindrical Bollard - 700 x 600mm Diameter | 3 No |
| E | E 017 - 019 | Jacking Corridor 3 - Flexible Piping Various | 50m3 |
| E | E 020 - 021 | Jacking Corridor 3 - Tubular Fender - 6000 x 900mm Diameter | 1 No |
| E | E 020 - 021 | Jacking Corridor 3 - Steel MH covers | 15 |
| E | E 022 | Steel Tube - 3600 x 710mm Diameter on 1000 x 1000mm base plate | 1 No |
| E | E 023 | Jacking Corridor 4 - Vegetation Clearing | 44m2 |
| | | <u>Clearing between W & SW Casting Bases</u> | |
| E | E 024 - 025 | Clearing - Rubble / Garden Waste / Levelling - 22000 x 10000mm | 220m2 |
| | | <u>South-West Casting Base</u> | |
| E | E 026 | Jacking Corridor 5 - Steel box - 900 x 900 x 500 x 25mm / Vegetation Clearing | 1 No |
| E | E 026 | Jacking Corridor 5 - Vegetation Clearing | 44m2 |
| E | E 027 | Jacking Corridor 6 - Vegetation Clearing | 44m2 |
| | | <u>South End Corridor between Casting Bases and Current line of Containers</u> | |
| F | F 005 - 007 | Polystyrene/ Fibre Glass Floats - 1800 x 2300 x 800 | 6 No |
| F | F 008 | Steel T-Bollard - 1200 x 1000 x 750mm | 1 No |
| F | F 009 - 010 | Concrete Blocks - 1300 x 1200 x 1200 | 4 No |
| F | F 013 | Concrete Block - 1500 x 1500 x 1500 | 1 No |
| F | F 014 | Concrete - Mixed pile of scrap sleepers | |
| F | F 012 | Asphalt / Rubble - 3000 x 5000 x 1000mm | 15m3 |
| F | F 003 | Clearing - Vegetation - Along line of current South Perimeter formed by containers | 2600m2 |
| | | <u>Access Route - East Perimeter</u> | |
| G | G 002 | Concrete Slabs - 2000 x 3000 x 300 | 3 No |
| G | G 001 | SE Base - Rubble mound - 18000 x 3000 x 3000 | 180m3 |
| G | G 005 - 006 | SE Base - Rubble mound (Tar) - 3000 x 3000 x 1000 | 9m3 |
| G | G 002 | Steel Frame - 2000 x 3000 x 100 | 1 No |
| G | G 006 | Tyres - Various | 6 No |
| | | <u>South - East Casting Base</u> | |
| H | H 001 - 004 | Jacking Corridor 6 - Rubble, General Waste - 5000x2200x2000 | 22m3 |
| H | H 006 - 007 | Jacking Corridor 5 - Rubble, General Waste - 5000x2200x2000 | 22m3 |



| Area | Photo Ref. | Description | QTY |
|------|---------------|---|----------|
| H | H 008 - 010 | Rubble - Top of SE Bases | |
| | | <u>Clearing between SE & East Casting Bases</u> | |
| H | H 011 - 012 | Opening between SE & E Bases completely filled with Rubble | Note |
| H | H 011 - 013 | Rubble, General and Garden Waste - 21000 x 10000 x 2200mm | 462m3 |
| | | <u>East Casting Base</u> | |
| H | H 013 | Jacking Corridor 4 - Rubble, General Waste - Clearing | |
| H | H 014 | Rubble, General Waste, Concrete - Volume ??? | 25m3 |
| H | H 015 | Jacking Corridor 3 - Rubble, General Waste - 3000 x 2000 x 1500mm | 9m3 |
| | | <u>Clearing between E & NE Casting Bases</u> | |
| H | H 016 | General clearing / Stump removal / Levelling | 220m2 |
| | | <u>North - East Casting Base</u> | |
| H | H 017 - 018 | Jacking Corridor 2 - Rubble, General Waste, Tyres - 22000 x 2000 x 1200mm | 50m3 |
| H | H 020 - 036 | Jacking Corridor 1 - Rubble, General Waste, Tree, Tyres, Steel Rope | 50m3 |
| H | H 020 - 036 | Tyres - Various Sizes (R51 - R57 / R26 - R33/ Truck Tyres | 50+ |
| H | H 020 - 037 | Numerous tyres of different sizes stacked on top | 30+ |
| H | H 020 / H 036 | Tree- Established Tree to be removed | |
| H | H 036 | Steel Rope - approx 80mm diameter / unkown quantity | |
| | | <u>North - East Corner</u> | |
| I | I 001 - 002 | Monopile Donut Fenders - Marine Guard - 3000 x 3000 Diameter | 4 No |
| I | I 005 - 006 | Large concrete piles - 6000 x 500 x 500 | 4 No |
| I | I 005 - 006 | Tubular Fender - 6000 x 900mm Diamter | 1 No |
| I | I 007 - 008 | Ex-Loading Ramp Platform - 5500 x 6600 x 500 | 1 No |
| I | I 003 | Timber beams - 3000 x 200 x 200mm | 4 No |
| I | I 004 | Concrete - Vibracrete fencing - Various | 10 No |
| I | I 004 | Rubble / General & Garden Waste - 5000 x 5000 x 1300mm | 32m3 |
| | | <u>Cassion Fabrication Yard - Area between the East and West Casting Bases</u> | |
| J | J 001 | Concrete Block | 1 No |
| J | J 002 | IBC Bin Liner - 1200 x 1000 x 1000mm | 1 No |
| J | J 004 | Wooden Cable Drum - 1500mm Diameter | 1 No |
| J | J 011 | Concrete - Anchor Blocks - 600 x 600 x 800mm | 3 No |
| | | Note: Below items pertain to the entire Area | |
| J | J 001 - 021 | Tyres - Various discarded throughout | |
| J | J 001 - 021 | Concrete - Various Blocks discarded throughout | |
| J | J 001 - 021 | Rubble - Mixed Sand & Stone | |
| J | J 001 - 021 | Rubble - Mixed Sand & Stone | |
| J | J 001 - 021 | Vegetation Clearing - Entire Area | 10 000m2 |



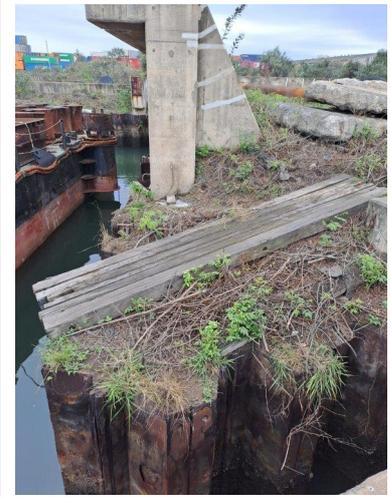
ANNEXURE 2: PHOTOGRAPHS OF ITEMS ON SITE

Index to areas (A to J) for photographic record



Selected photographs (areas A to J)

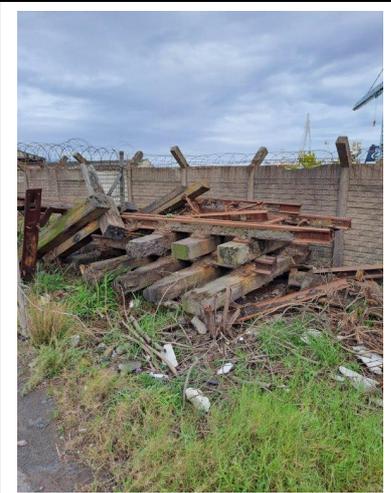
Area A

| | | |
|---|---|---|
|  |  |  |
| <p>Wooden Floating Fender</p> | <p>Steel Winch Column</p> | <p>Spill Tech Waste Wheelie Bins</p> |

Area B

| | | |
|--|--|--|
|  |  |  |
| <p>Concrete Sleepers / Beams</p> | <p>Collapsed Wendy House</p> | <p>Anchor Block</p> |

Area C

| | | |
|---|---|---|
|  |  |  |
| <p>Ironwood Railway Sleeper / Tracks</p> | <p>Rubble / General Waste</p> | <p>Concrete Road Barriers</p> |

Area D

| | | |
|--|---------------------------------------|---|
| | | |
| <p>Container with Scrap Materials</p> | <p>Half Built Toilet Block</p> | <p>Rubble / General Garden Waste</p> |

Area E

| | | |
|------------------------------|---------------------------------------|--------------------------|
| | | |
| <p>Concrete Piles</p> | <p>Flexible Piping Various</p> | <p>Steel Tube</p> |

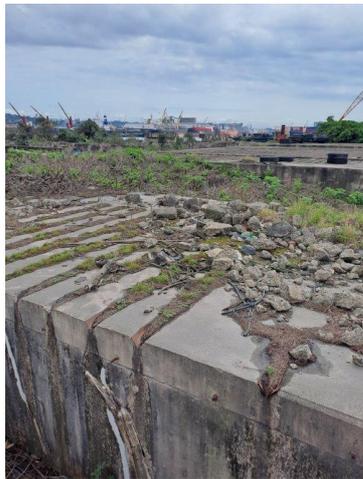
Area F

| | | |
|--|-------------------------------|-------------------------------|
| | | |
| <p>Polystyrene / Glass Fibre Floats</p> | <p>Steel T-Bollard</p> | <p>Concrete Blocks</p> |

Area G

| | | |
|---|---|---|
|  |  |  |
| Concrete Slabs | Rubble Mound (Tar) | Rubble Mound |

Area H

| | | |
|--|--|--|
|  |  |  |
| Rubble | Rubble / General Waste / Tyres | Steel Rope |

Area I

| | | |
|---|---|---|
|  |  |  |
| Monopile Donut Fenders | Ex-Loading Ramp Platform | Concrete – Vibracrete Fencing |

Area J

| | | |
|---|---|---|
|  |  |  |
| Wooden Cable Drum | Concrete | Rubble – Mixed Sand and Stone |

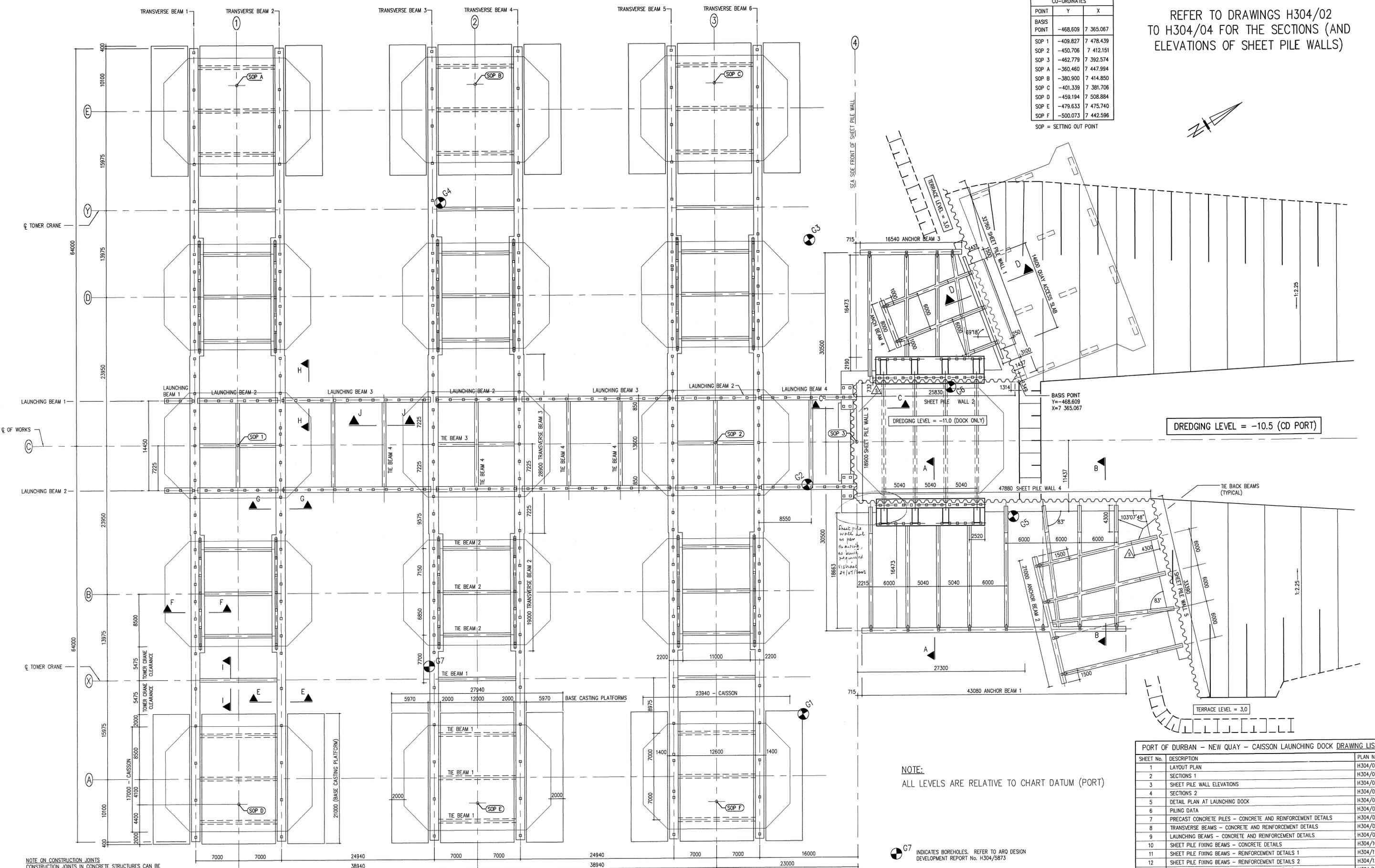


ANNEXURE 3: AS-BUILT DRAWINGS

| CO-ORDINATES | | |
|--------------|----------|-----------|
| POINT | Y | X |
| BASIS POINT | -468.609 | 7 365.067 |
| SOP 1 | -408.827 | 7 478.439 |
| SOP 2 | -450.706 | 7 412.151 |
| SOP 3 | -462.779 | 7 392.574 |
| SOP A | -360.460 | 7 447.994 |
| SOP B | -380.900 | 7 414.850 |
| SOP C | -401.339 | 7 381.706 |
| SOP D | -459.194 | 7 508.884 |
| SOP E | -479.633 | 7 475.740 |
| SOP F | -500.073 | 7 442.596 |

SOP = SETTING OUT POINT

REFER TO DRAWINGS H304/02 TO H304/04 FOR THE SECTIONS (AND ELEVATIONS OF SHEET PILE WALLS)



PLAN OF WORKS AREA
SCALE 1:200

NOTE ON CONSTRUCTION JOINTS
CONSTRUCTION JOINTS IN CONCRETE STRUCTURES CAN BE POSITIONED TO SUITE CONTRACTOR UNLESS SPECIFICALLY SHOWN OTHERWISE. HOWEVER, THESE SHOULD BE POSITIONED NOT CLOSER THAN 500mm (HORIZ.) TO THE PILES.

NOTE:
ALL LEVELS ARE RELATIVE TO CHART DATUM (PORT)

G7 INDICATES BOREHOLES. REFER TO ARO DESIGN DEVELOPMENT REPORT No. H304/5873

| PORT OF DURBAN - NEW QUAY - CAISSON LAUNCHING DOCK DRAWING LIST | | |
|---|--|----------|
| SHEET No. | DESCRIPTION | PLAN No. |
| 1 | LAYOUT PLAN | H304/01 |
| 2 | SECTIONS 1 | H304/02 |
| 3 | SHEET PILE WALL ELEVATIONS | H304/03 |
| 4 | SECTIONS 2 | H304/04 |
| 5 | DETAIL PLAN AT LAUNCHING DOCK | H304/05 |
| 6 | PIILING DATA | H304/06 |
| 7 | PRECAST CONCRETE PILES - CONCRETE AND REINFORCEMENT DETAILS | H304/07 |
| 8 | TRANSVERSE BEAMS - CONCRETE AND REINFORCEMENT DETAILS | H304/08 |
| 9 | LAUNCHING BEAMS - CONCRETE AND REINFORCEMENT DETAILS | H304/09 |
| 10 | SHEET PILE FIXING BEAMS - CONCRETE DETAILS | H304/10 |
| 11 | SHEET PILE FIXING BEAMS - REINFORCEMENT DETAILS 1 | H304/11 |
| 12 | SHEET PILE FIXING BEAMS - REINFORCEMENT DETAILS 2 | H304/12 |
| 13 | CAISSON LOWERING STRUCTURE - CONCRETE DETAILS | H304/13 |
| 14 | CAISSON LOWERING STRUCTURE - REINFORCEMENT DETAILS | H304/14 |
| 15 | ACCESS SLAB TO EXISTING QUAY - CONCRETE AND REINFORCEMENT DETAILS | H304/15 |
| 16 | CAISSON BASE CASTING PLATFORM - CONCRETE AND REINFORCEMENT DETAILS | H304/16 |

| No. | DATE | REVISION | APPROVED |
|-----|------------|---|-----------|
| 5 | 16/07/2002 | DRAWING UPDATED AS SHOWN | RG MILLER |
| 4 | 19/06/2002 | LOWERING STRUCTURE MOVED, SHEET PILE WALLS 3 & 4 MODIFIED SHEET PILE WALL 5 ROTATED AND LENGTHENED | RG MILLER |
| 3 | 21/05/2002 | UPDATED FOR CONSTRUCTION | RG MILLER |
| 2 | 24/04/2002 | DRAWING UPDATED. RE-ISSUED FOR CONSTRUCTION APPROVAL | RG MILLER |
| 1 | 02/04/2002 | ISSUED FOR CONSTRUCTION APPROVAL | RG MILLER |
| 0 | 04/03/2002 | ISSUED FOR PRELIMINARY APPROVAL | RG MILLER |

DESIGNED: **AL PARROCK**

DRAWN: **RG MILLER**

CHECKED: **RG MILLER**

APPROVED: **AL PARROCK**

SIGNED: _____ DATE: _____ PR. ENG: _____



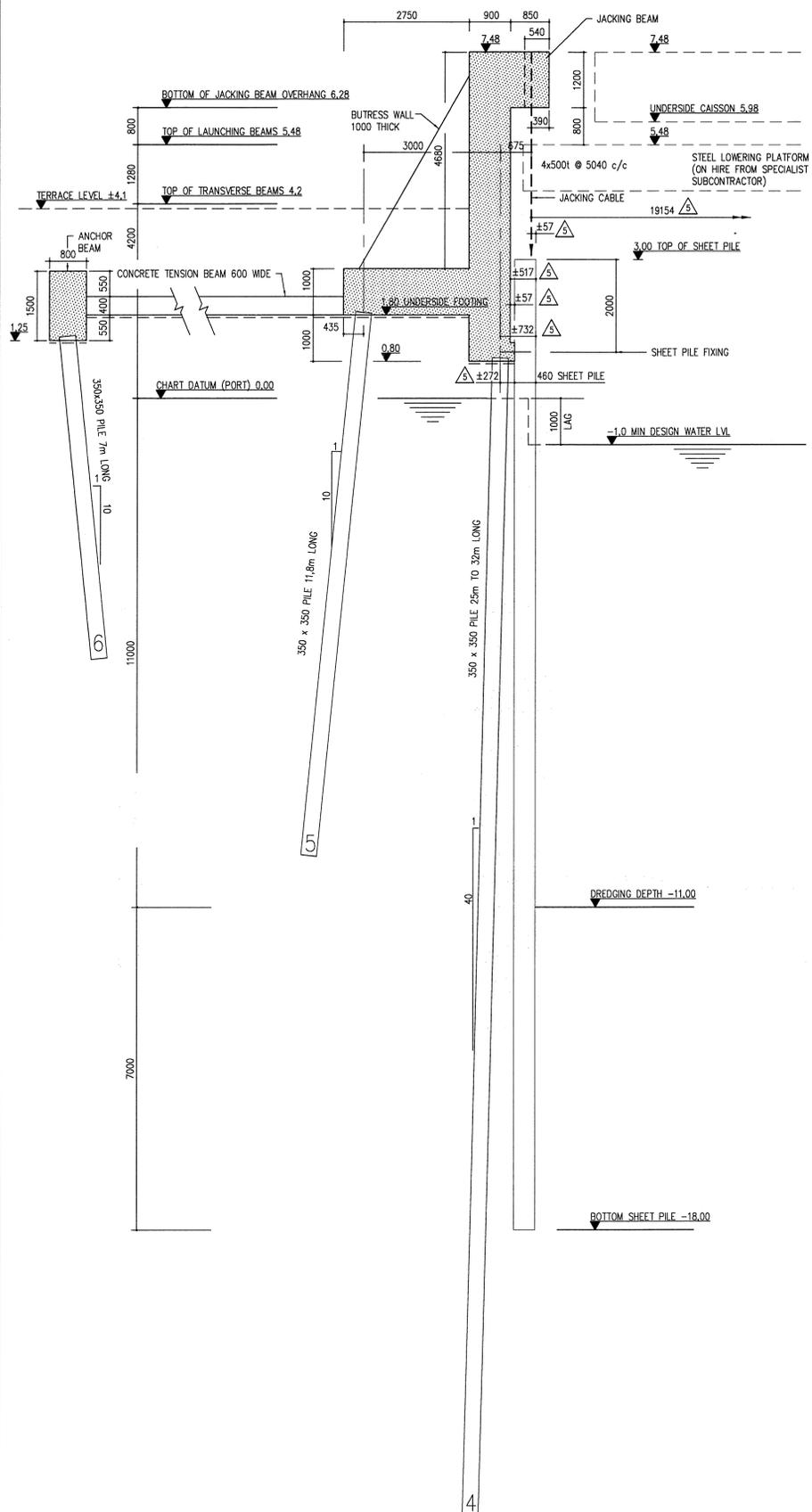
ARQ (PTY) LTD
66 INGERSON ROAD
LYNNWOOD GLEN
0081 RSA
TEL : 012 348 6668
FAX : 012 348 6669
EMAIL : arq@arq.co.za

CONTRACTOR:
GRINAKER-LTA / INTERBETON / BCW JOINT VENTURE

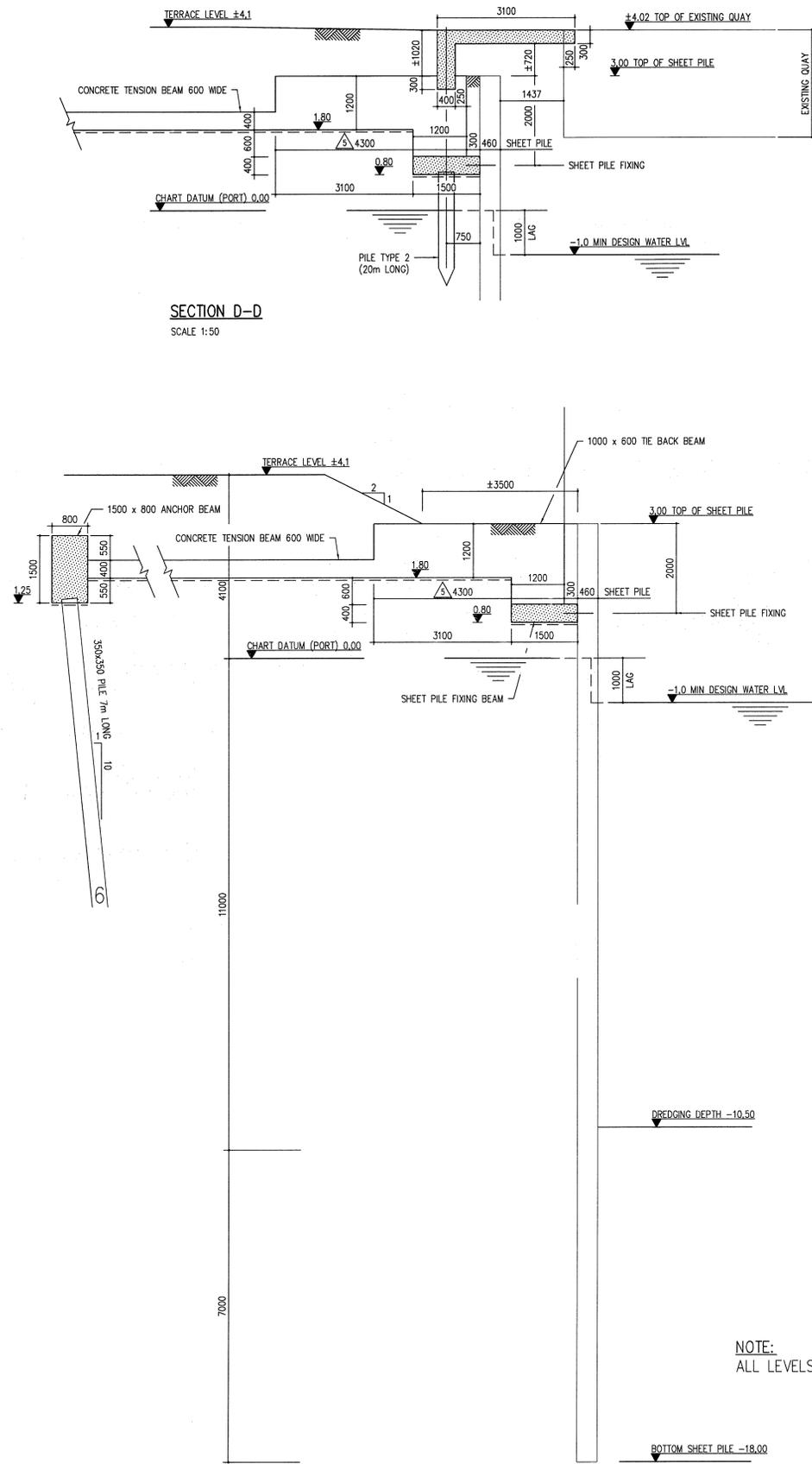
CLIENT:
**NATIONAL PORTS AUTHORITY OF SA
PORT ENGINEER DURBAN**

PROJECT:
**PORT OF DURBAN - NEW QUAY
CAISSON LAUNCHING DOCK LAYOUT PLAN**

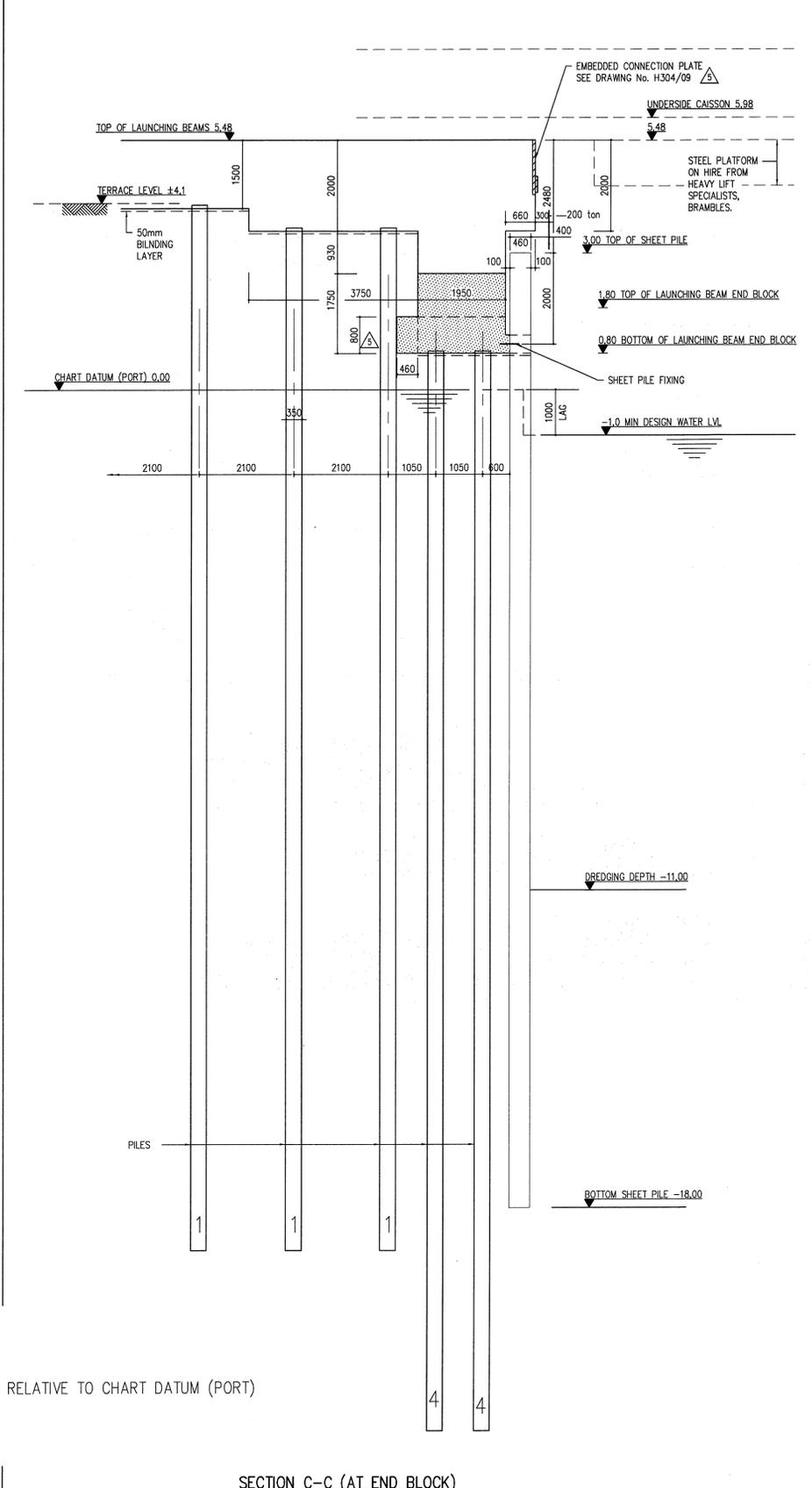
DRAWING NUMBERS
NPA Drawing No. 4B0901-001-01
ARQ DWG.
H304/01



SECTION A-A (AT CAISSON LOWERING STRUCTURE)
SCALE 1:50



SECTION B-B (THROUGH SHEET PILING)
SCALE 1:50



SECTION C-C (AT END BLOCK)
SCALE 1:50

NOTE:
ALL LEVELS ARE RELATIVE TO CHART DATUM (PORT)

REFER TO DRAWING H304/01 FOR SECTION POSITIONS

| No. | DATE | REVISION | APPROVED |
|-----|------------|--|-----------|
| 5 | 16/07/2002 | DRAWING UPDATED AS SHOWN | RG MILLER |
| 4 | 19/06/2002 | SECTION C-C MODIFIED | RG MILLER |
| 3 | 21/05/2002 | UPDATED FOR CONSTRUCTION | RG MILLER |
| 2 | 24/04/2002 | DRAWING UPDATED. RE-ISSUED FOR CONSTRUCTION APPROVAL | RG MILLER |
| 1 | 02/04/2002 | ISSUED FOR CONSTRUCTION APPROVAL | RG MILLER |
| 0 | 04/03/2002 | ISSUED FOR PRELIMINARY APPROVAL | RG MILLER |

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DRAWN: RG MILLER
CHECKED: RG MILLER
APPROVED: AL PARROCK

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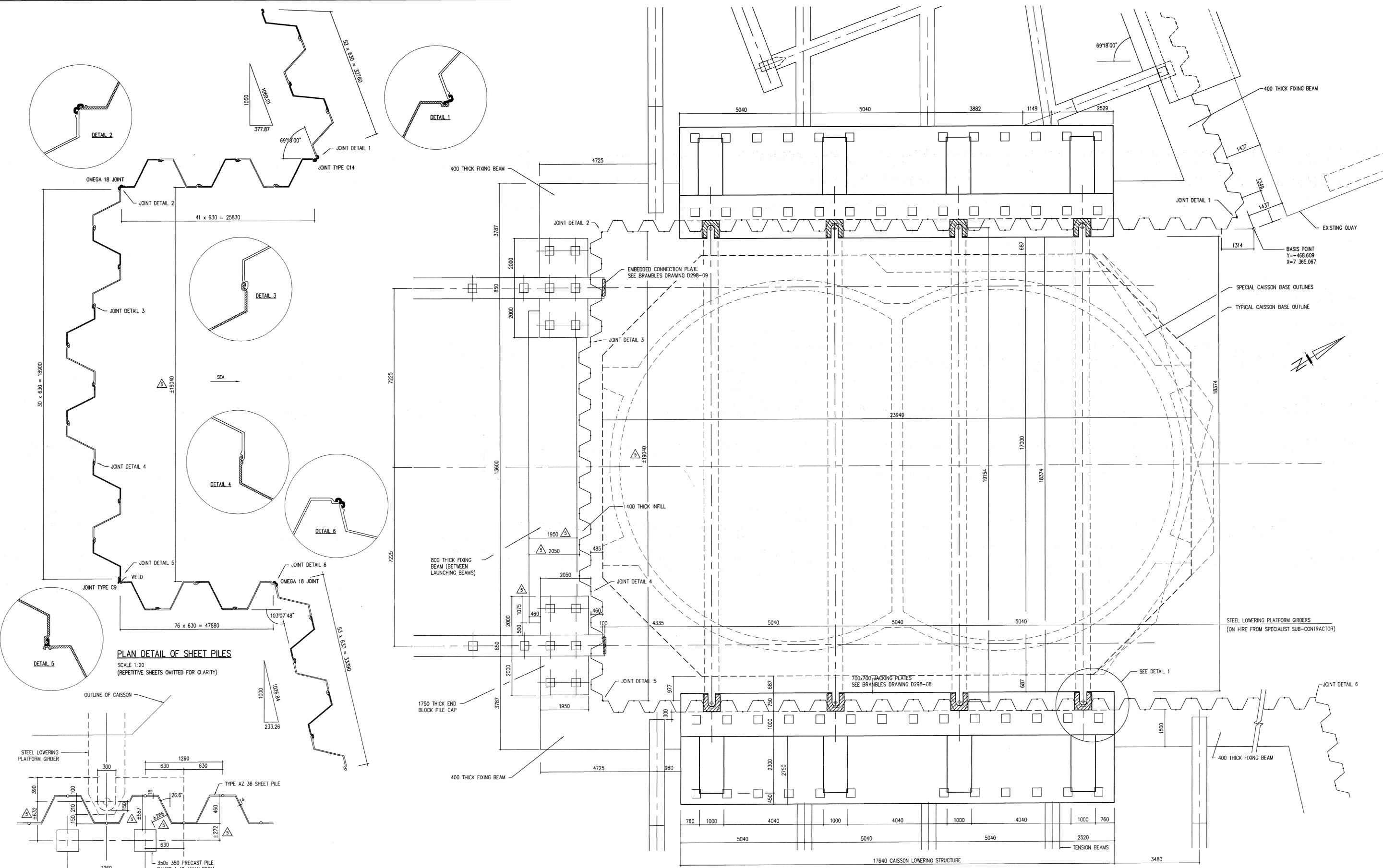
SIGNED: _____ DATE: _____ PR ENG: _____

CONTRACTOR: GRINAKER-LTA / INTERBETON / BCW JOINT VENTURE

CLIENT: NATIONAL PORTS AUTHORITY OF SA
PORT ENGINEER DURBAN

PROJECT: PORT OF DURBAN - NEW QUAY
TITLE: CAISSON LAUNCHING DOCK SECTIONS 1

DRAWING NUMBERS: NPA Drawing No. 4B0901-002-01
ARQ DWG. H304/02



PLAN DETAIL OF SHEET PILES
SCALE 1:20
(REPETITIVE SHEETS OMITTED FOR CLARITY)

PLAN OF LAUNCHING DOCK
SCALE 1:50

| No. | DATE | REVISION | APPROVED |
|-----|------------|--|-----------|
| 5 | 16/07/2002 | DRAWING UPDATED AS SHOWN | RG MILLER |
| 4 | 19/06/2002 | LOWERING STRUCTURE MOVED, SHEET PILE DETAILS ADDED | RG MILLER |
| 3 | 21/05/2002 | UPDATED FOR CONSTRUCTION | RG MILLER |
| 2 | 24/04/2002 | DRAWING UPDATED, RE-ISSUED FOR CONSTRUCTION APPROVAL | RG MILLER |
| 1 | 02/04/2002 | ISSUED FOR CONSTRUCTION APPROVAL | RG MILLER |
| 0 | 04/03/2002 | ISSUED FOR PRELIMINARY APPROVAL | RG MILLER |

DESIGNED
RG MILLER

DRAWN
RG MILLER

CHECKED
RG MILLER

APPROVED
AL PARROCK

SIGNED: _____ **DATE:** _____ **PR. ENG:** _____

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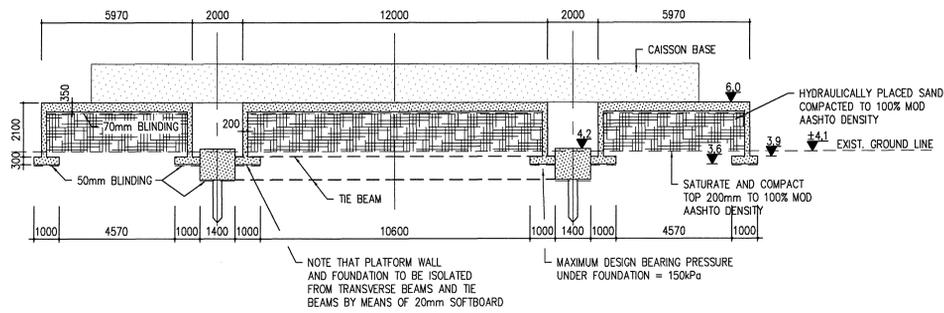
CONTRACTOR:
GRINAKE-LTA / INTERBETON / BCW JOINT VENTURE

CLIENT:
NATIONAL PORTS AUTHORITY OF SA
PORT ENGINEER DURBAN

PROJECT:
PORT OF DURBAN - NEW QUAY

TITLE:
CAISSON LAUNCHING DOCK
DETAIL PLAN AT LAUNCHING DOCK

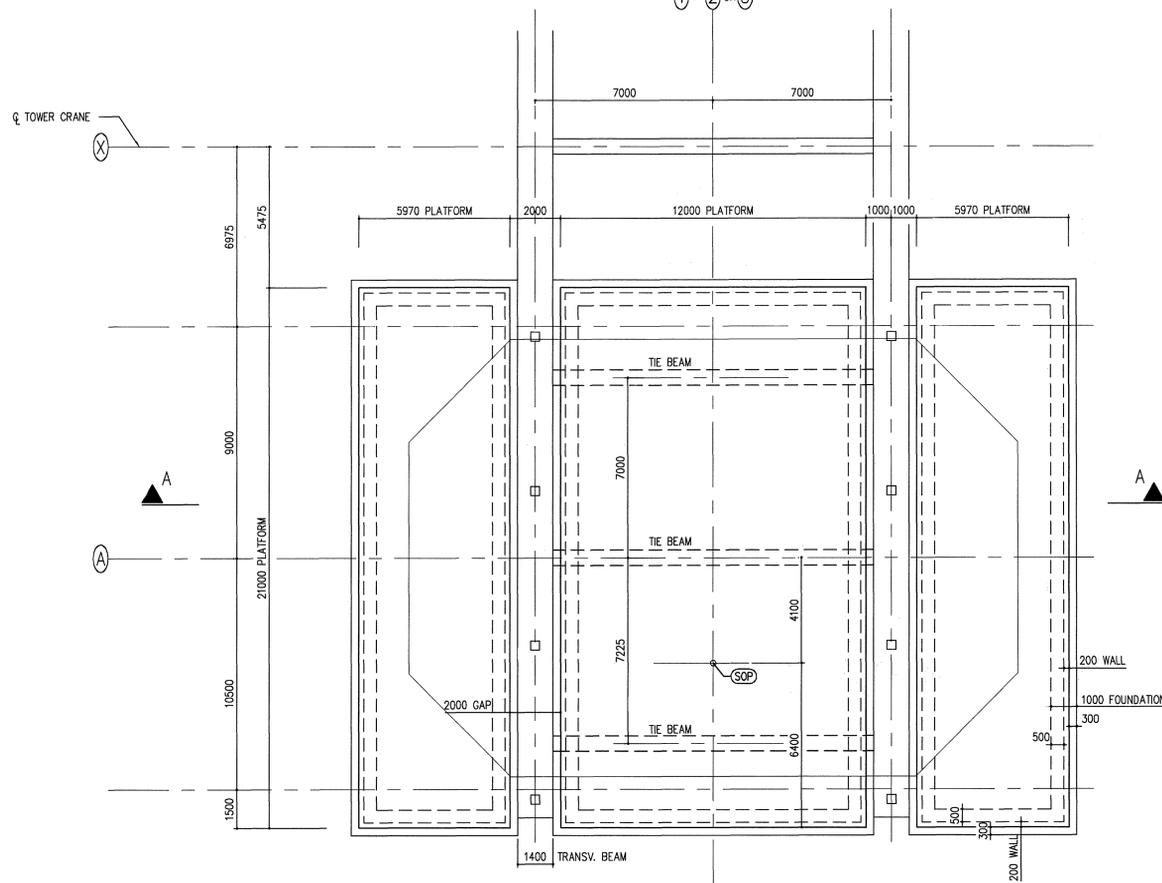
DRAWING NUMBERS
NPA Drawing No. 4B0901-005-01
ARO DWG.
H304/05



SECTION B-B

SCALE 1:5

① OR ② OR ③



PLAN OF CAISSON BASE CASTING PLATFORM

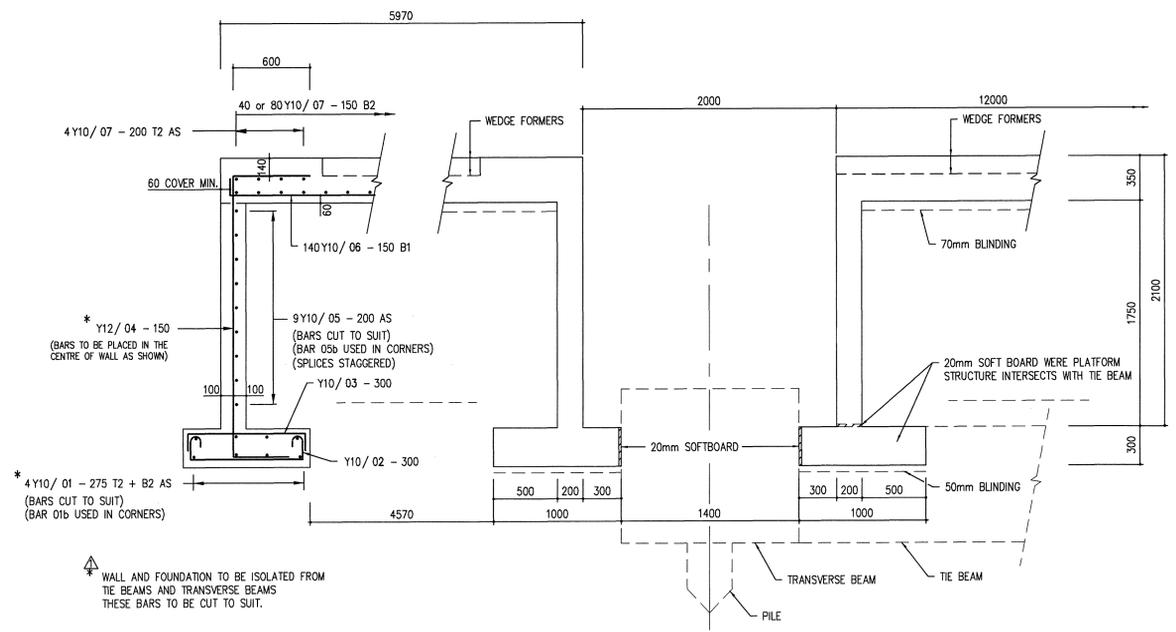
SCALE 1:100

NOTES

1. CONCRETE CLASS: 40 MPa
2. CONCRETE COVER 60mm MINIMUM
3. CONCRETE FINISH:
HIDDEN F1, U1
EXPOSED F2, U2
TOP OF PLATFORM U3
4. ALL EXPOSED CORNERS TO HAVE 25x25 CHAMFERS
5. MIN. SPLICE LENGTH = 43φ
6. ABBREVIATIONS :-
T1 = FIRST LAYER FROM TOP
T2 = SECOND LAYER FROM TOP
B1 = FIRST LAYER FROM BOTTOM
B2 = SECOND LAYER FROM BOTTOM
AS = AS SHOWN
BS = BOTH SIDES
EW = EACH WAY
IF = INSIDE FACE
OF = OUTSIDE FACE
ALT = ALTERNATIVE
TW = TOGETHER WITH
EF = EACH FACE

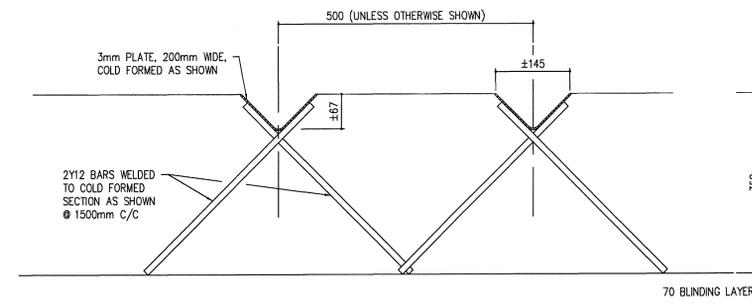
| BENDING SCHEDULE | | | | | | | | | | | | |
|-------------------------------|----------|-------|---------|-------|--------|------|-------|------|---|---|---|---|
| MARK | TYPE & # | UNITS | NO/UNIT | TOTAL | LENGTH | CODE | A | B | C | D | E | R |
| CAISSON BASE CASTING PLATFORM | | | | | | | | | | | | |
| 01a | Y10 | 6 | 88 | 528 | 13000 | 20 | | | | | | |
| 01b | Y10 | 72 | 8 | 576 | 1150 | 37 | 600 | | | | | |
| 02 | Y10 | 6 | 452 | 2712 | 1550 | 72 | 180 | 880 | | | | |
| 03 | Y10 | 6 | 452 | 2712 | 1150 | 35 | 880 | | | | | |
| 04 | Y12 | 6 | 904 | 5424 | 3100 | 38 | 400 | 2140 | | | | |
| 05a | Y10 | 6 | 99 | 594 | 13000 | 20 | | | | | | |
| 05b | Y10 | 72 | 9 | 648 | 1150 | 37 | 600 | | | | | |
| 06a | Y10 | 12 | 140 | 1680 | 6150 | 35 | 5850 | | | | | |
| 06b | Y10 | 6 | 140 | 840 | 12150 | 35 | 11880 | | | | | |
| 07 | Y10 | 6 | 368 | 2208 | 10900 | 34 | 10750 | | | | | |

| SUMMARY OF REINFORCEMENT QUANTITIES | | | | | | | |
|-------------------------------------|-----|--------|--------|------|------|------|------|
| HIGH TENSILE STEEL | | | | | | | |
| DIAMETER | 8mm | 10mm | 12mm | 16mm | 20mm | 25mm | 32mm |
| TOTAL LENGTH THIS SCHEDULE | m | 57 589 | 16 814 | | | | |
| MASS | kg | 35 533 | 14 931 | | | | |
| TOTAL MASS THIS SCHEDULE | kg | 50 464 | | | | | |



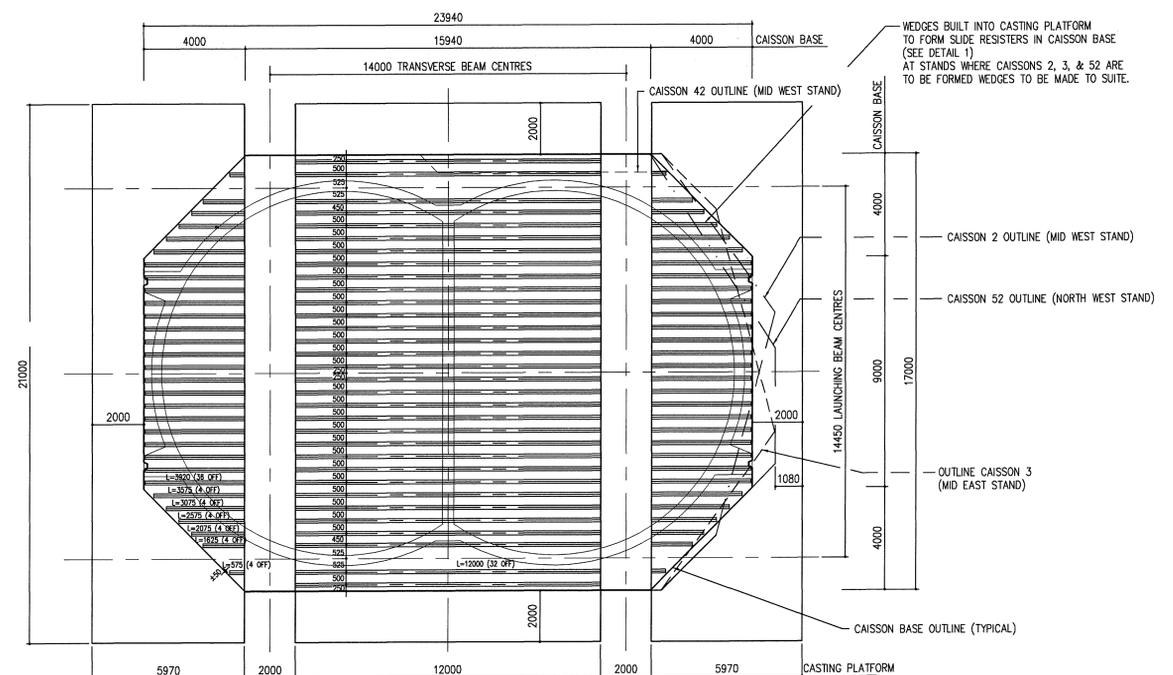
SECTION A-A SHOWING REINFORCEMENT

SCALE 1:20



DETAIL 1

SCALE 1:5



PLAN OF CASTING PLATFORM SHOWING WEDGES AND CAISSON OUTLINES

SCALE 1:100

NOTE: ALL LEVELS ARE RELATIVE TO CHART DATUM PORT

| No. | DATE | REVISION | APPROVED |
|-----|------------|---|-----------|
| 2 | 16/07/2002 | DETAIL 1 REVISED | RG MILLER |
| 1 | 19/06/2002 | OUTLINE CAISSON 3 ROTATED, REINFORCEMENT NOTE ADDED | RG MILLER |
| 0 | 21/05/2002 | NEW DRAWING - ISSUED FOR CONSTRUCTION | RG MILLER |

| DESIGNED | DRAWN | CHECKED | APPROVED |
|-----------|-----------|-----------|------------|
| RG MILLER | RG MILLER | RG MILLER | AL PARROCK |



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| CONTRACTOR: | CLIENT: |
|---|--------------------------------|
| GRINAKEE-LTA / INTERBETON / BCW JOINT VENTURE | NATIONAL PORTS AUTHORITY OF SA |

| PROJECT: | TITLE: |
|---------------------------|------------------------------------|
| PORT OF DURBAN - NEW QUAY | CAISSON LAUNCHING DOCK |
| | CONCRETE AND REINFORCEMENT DETAILS |

| DRAWING NUMBERS |
|-------------------------------|
| NPA Drawing No. 4B0901-016-01 |
| ARQ DWG. H304/16 |