Catherine Hill Bay Jetty

Prepared for The Department of Planning and Environment

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Report No. 2 – Materials Engineering & Durability

OPPORTUNITIES THROUGH EXCELLENCE

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BG&E

Contents

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1. Introduction

BG&E have been engaged by the Department of Planning and Environment (hereafter referred to as DPE) to conduct a thorough condition assessment of the Catherine Hill Bay jetty located at Catherine Hill Bay, NSW.

1.1 Background Information

For the history of Catherine Hill Bay jetty please refer to N23028-REP-M-0001 – History and Background.

BG&E have been engaged to conduct a thorough structural condition assessment of Catherine Hill Bay jetty. This work is necessary to establish adaptive reuse opportunities for the jetty and if any residual life of the jetty remains.

BG&E completed a brief condition assessment and provided recommendations in 2017 for Lake Coal.

The jetty, since Lake Coal's liquidation, is now the responsibility of Crown Lands, National Parks, and Mining, Exploration, and Geoscience.

The following key findings relating to the condition of the jetty were delivered as part of BG&E's 2017 report:

- The concrete elements, particularly the concrete deck, were modelled, based on chloride ion content within the concrete, to not be subject to chloride inducted corrosion within the next 100 years.
- Smaller elements such as knee-braces bolted to the primary beams, steel walkways, and suspended gantries were generally more corroded than the main structural steel framing and would need to be removed and/or replaced.
- The main 760 CHS support piles have patches of localised corrosion blistering, where the coating has failed.
- Moderate blistering and lamination were observed in primary, secondary, and tertiary beams, and was typically more severe on the lower flange.
- Generally, the loss of section appears to be relatively minor (less than say 10%).
- The precast deck panels were found to be in generally good condition, with a small number of minor spalls that in some cases were causing minor corrosion of embedded reinforcement.
- Corrosion was generally more severe for steelwork within the tidal and splash zone, which included all the columns between Bents 18 and 27. This could be caused by abrasion of the steel's coating by suspended sand within the turbulent water leaving the steel unprotected, as well as abrasion of the steel itself. The column in this area generally exhibits widespread corrosion pitting and flange lamination, causing significant section loss. No columns are exhibiting structural failure as would be evidenced by wall buckling or deformation of the member or its elements (web/flanges).
- The pairs of back-to-back channels near the top of Bents 19 to 26 were generally heavily corroded, particularly where they connect to the columns. It appears that these were previously part of a cantilever supporting a side platform.

2. Visual Condition Assessment

BG&E conducted a visual condition assessment of the jetty and provide the following information relating to concrete, steel, and miscellaneous items. The items identified below are typical examples of defects and the extent of such items are provided in the photographic appendices.

2.1 Concrete Elements

2.1.1 Precast Concrete Deck

Description and Comment	Photo
Exposed reinforcement in the soffit. Several instances of spalled concrete because of corroding/expanding reinforcement were observed. It is likely the chloride ions have penetrated to the depth of reinforcement and initiated corrosion.	
Minor edge spalling. Most of the panels exhibited some form of corner or edge spalling. This is likely a result of general wear and tear over time.	

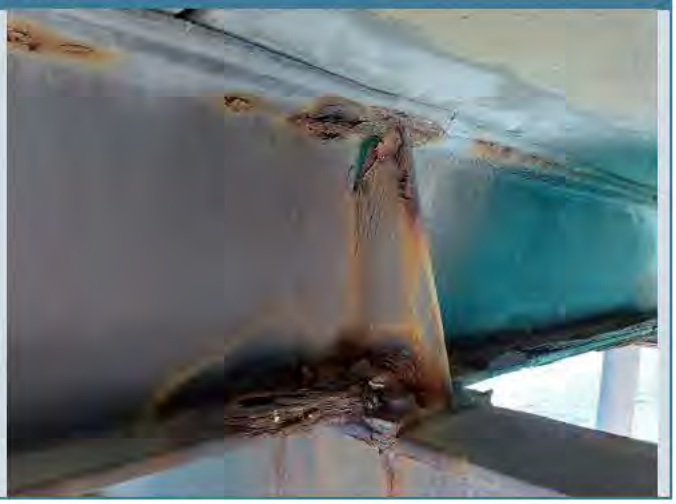
2.1.2 Concrete Footing/Encasements for Vertical Steel Elements

Description and Comment	Photo

The concrete encasements are no longer fit for purpose. Large cracks, voids, and significant spalls were observed.	

2.2 Steel Elements

2.2.1 Primary Beams

Description and Comment	Photo
The primary beams along their extent, away from connections, are generally in good condition.	

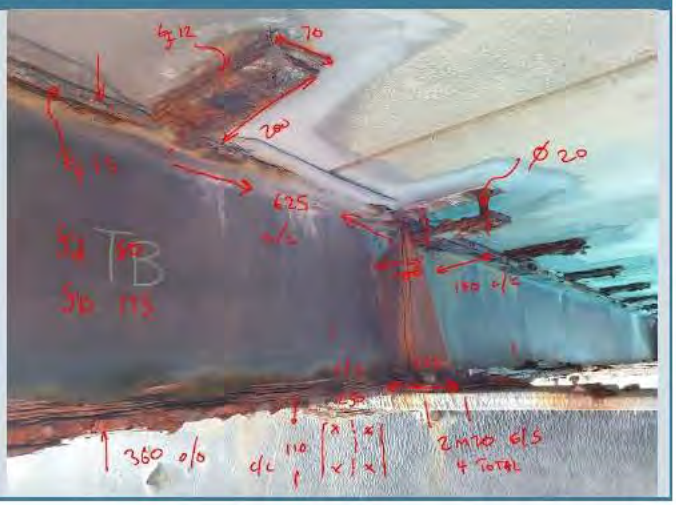
	
Typically, nut and bolt connections are no longer fit for purpose with significant corrosion and section loss observed.	
Splice connections were observed to be corroding between primary beams. Coating deterioration was also observed.	

2.2.2 Secondary Beams

Description and Comment	Photo

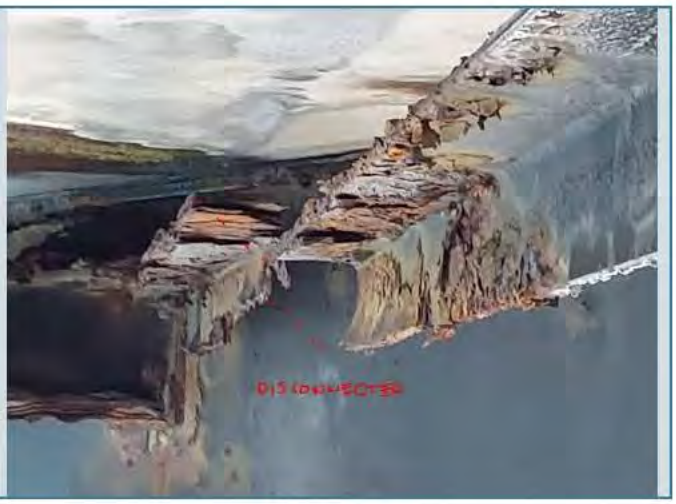
	

2.2.3 Ternary Beams

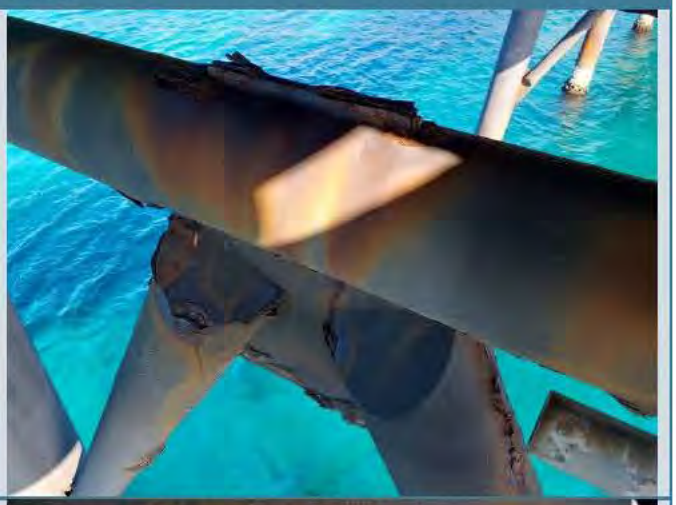
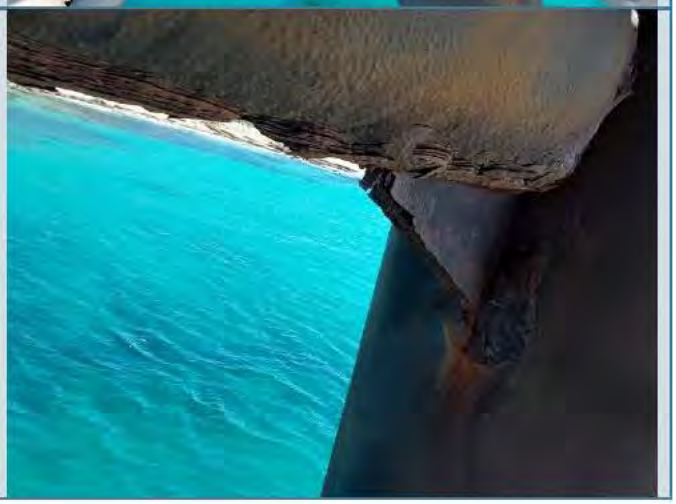
Description and Comment	Photo
Ternary beams are exhibiting corrosion and lamination of the bottom flange. Connection points are also heavily corroded.	

2.2.4 Diagonal Bracing

Description and Comment	Photo

In most instances the diagonal bracing had completed corroded, failed, or fallen from the structure.	

2.2.5 Circular Hollow Section Bracing

Description and Comment	Photo
Typically, the external surface of the CHS bracing exhibited coating loss, blistering, corrosion initiation. and deterioration at the connections.	
The bottom of the CHS bracing elements exhibited lamination and stiffener plates were also corroded with notable section loss.	

The splice connections between CHS braces exhibited corrosion between the circular plates, at stiffeners, and on the nuts.	

2.2.6 Circular Hollow Section Piling

Description and Comment	Photo
Large bearing plates and platforms are welded to the top of the CHS piles to support primary beams. These exhibited significant corrosion and lamination.	

Piles below the water level had extensive marine growth.	
Once cleaned, the pile outer surface showed evidence of local blistering and coating deterioriation.	

2.2.7 Universal Columns

Description and Comment	Photo

	
Connections of CHS bracing to UC's were also heavily corroded. Stiffener plates were showing section loss and CHS braces also had visible section loss.	

2.3 Miscellaneous Items

Please refer to BG&E's first deliverable, N23028-LTR-M-0002 – High Risk Items, which describes the current condition of handrails, catwalks, and miscellaneous items.

2.3.1 Buildings

Description and Comment	Photo
Buildings are heavily deteriorated and structural not fit for purpose.	

3. Testing, Sampling, and Results

BG&E completed a variety of non-invasive and invasive testing to ascertain the condition of the jetty. This testing has been described and summarised below.

3.1 Concrete

3.1.1 Scanning

Electromagnetic cover meter scanning identified embedded reinforcement depths and spacing in the concrete precast panels. All reinforcement cover and bar spacing measurements were undertaken at each concrete core sampling location. Results are summarised in Table 1 below.

Table 1: Reinforcement cover measurements

Bent Region	Slab #	Measured Concrete Cover (mm)		Bar Spacing (mm)	
		N S	E W	N S	E W
TA3.2	21-22	40-55	40-80	200-220	300
TA2	13-14	45-55	55-70	200-220	300
TA1	3-4	40-55	60-70	220	330

3.1.2 Breakouts

The reinforcement bars were exposed via breakout to confirm the bar presence and condition to ensure no corrosion products or section loss were observed on bar surfaces. The breakout was completed by drilling into the space where reinforcement was located. Care was taken to avoid damage to the reinforcing bars.

In all breakouts, the reinforcement bars were in good condition and did not have any signs of corrosion, as observed in Figure 1. In addition, we note that reinforcement bars that were exposed from atmospheric condition or concrete deterioration were also measured, with the condition of the bars being moderately corroded, as observed in Figure 2. The reinforcement bar diameter was measured between 19-20mm.

Figure 1: Reinforcement breakout

Figure 2: Exposed reinforcement

3.1.3 Coring

Concrete core samples were retrieved from the proposed locations using a concrete cutting subcontractor. Core samples were retrieved where possible having a diameter of 75mm with a length of 180mm in accordance with the requirements of AS 1012.14:2018. Where element thickness and reinforcement congestion do not allow for a concrete core of 180mm, a reduced core length of at least 1:1 (75mm) were retrieved.

All retrieved concrete core samples were visually identified to be sound without significant voids present.

A photographic log of each core is available in Appendix D.35

3.1.4 Carbonation Testing

Carbon dioxide gas in the atmosphere reacts with the calcium hydroxide in the concrete resulting in a reduction in the concrete's alkalinity. When the carbonation depths reach that of embedded steel, depassivation of the steel occurs and results in corrosion. Depth of carbonation (DoC) has been undertaken at each chloride and compressive strength locations, resulting in a total of 12 measurements taken (samples taken for chloride can be tested for carbonation on site). A phenolphthalein indictor solution was sprayed onto the cored concrete samples to determine the carbonation depth. This testing calculated the remaining life before carbonation ingress reaches the embedded reinforcement through a carbonation model.

Based on the results of the site investigation, a predictive carbonation modelling has been undertaken to assess if ground slabs are at risk of carbonation induced corrosion over its required additional life.

Carbonation modelling has been undertaken using the formula:

$$X = k\sqrt{t} \tag{3.1}$$

Where:

- X = Measured depth of carbonation;
- k = A constant for each particular material in a particular environment; and
- t = time.

3.1.5 Hardness Assessment with Silver Schmidt Hammer

Rebound Hammer testing was performed using a Proceq Silver Schmidt Hammer which measures the rebound of a single-loaded mass impacting against a concrete surface. Twelve readings were taken with the device held perpendicular to the surface, to measure the hardness of the concrete. This is required to obtain an average and a standard deviation calculation. Prior to testing, the rebound hammer was calibrated.

Schmidt hammer readings were completed to calculate compressive strength of concrete slabs where coring was not conducted. At each slab along the jetty, 2-3 Schmidt Hammer tests were performed at different locations across the slab surface. Q readings from the Schmidt Hammer testing on the slabs are shown in Table 2 below.

Table 2: Schmidt Hammer Results

Slab	Location on slab	Schmidt Hammer Q value	Average Schmidt Hammer Q value	Standard Deviation
1	1A	40.9	44.1	4.5
	1B	47.3		
2	2A	41.6	42.8	1.6
	2B	43.9		
3	3A	50.9	49.5	2.1

Slab	Location on slab	Schmidt Hammer Q value	Average Schmidt Hammer Q value	Standard Deviation
	3B	48.0		
4	4A	44.4	39.5	7.0
	4B	34.5		
5	5A	36.4	39.9	4.9
	5B	43.3		
6	6A	37.9	35.7	3.2
	6B	33.4		
7	7A	38.8	42.0	4.5
	7B	45.2		
8	8A	44.0	45.5	2.1
	8B	47.0		
9	9A	43.5	40.3	4.6
	9B	37.0		
10	10A	45.3	45.4	0.1
	10B	45.5		
11	11A	46.4	42.9	4.9
	11B	39.4		
12	12A	49.3	44.6	6.7
	12B	39.8		
13	13A	37.8	40.0	3.6
	13B	44.1		
	13C	38.0		
14	14A	39.3	39.7	2.0
	14B	37.9		
	14C	41.8		
15	15A	35.5	35.9	0.4
	15B	36.3		
	15C	35.8		
16	16A	36.8	40.2	2.9
	16B	41.9		
	16C	41.8		
17	17A	32.7	28.6	4.4
	17B	24.0		
	17C	29.2		

Slab	Location on slab	Schmidt Hammer Q value	Average Schmidt Hammer Q value	Standard Deviation
18	18A	17.3	25.9	7.5
	18B	29.9		
	18C	30.6		
19	19A	40.5	34.6	5.2
	19B	30.6		
	19C	32.6		
20	20A	32.7	32.3	0.5
	20B	32.5		
	20C	31.8		
21	21A	30.3	38.1	9.6
	21B	48.8		
	21C	35.2		
22	22A	27.7	34	7.8
	22B	36.6		
	22C	27.8		
	22D	43.8		
23	23A	31.5	31.3	3.3
	23B	34.5		
	23C	28		
24	24A	35.6	29.9	5.5
	24B	24.6		
	24C	29.4		
25	25A	38.1	34.9	4.5
	25B	31.7		

These results were correlated to the compressive strength results where coring was completed to estimate the compressive strength of slabs which did not have a compressive strength testing performed on them. Rebound surface testing must only be performed on concrete identical to that of compression tested core samples to obtain an accurate correlation; no render or other material must be present.

3.1.6 Ultrasonic Pulse Velocity (UPV) Testing

UPV testing was completed on all concrete slabs where Schmidt Hammer testing was performed to assess the integrity of the in-situ concrete. This test was completed to calculate compressive strength of concrete slabs where coring was not completed. At each slab along the jetty, 2-3 UPV tests were performed at different locations across the slab surface. The readings from the UPV testing on the slabs are shown in Table 3 below.

Table 3: UPV readings for ground slabs

Slab Location	UPV reading
1	40.3
2	37.9
3	38.7
4	39.5
5	40.4
6	38.5
7	39.9
8	41.0
9	42.3
10	42.5
11	41.4
12	42.4
13	41.3
14	40.5
15	42.1
16	39.2
17	38.5
18	40.3
19	40.5
20	40.9
21	42.1
22	40.0
23	38.4
24	39.4
25	40.8

3.1.7 Compressive Strength Testing

Concrete core samples were tested for compressive strength and density at Boral Materials Testing Laboratory, a NATA accredited laboratory. All cores were wet conditioned for 3 days prior to testing as per AS1012.4:2018. Concrete compressive testing was performed by direct measurement of the force required for failure on the concrete

cores. 2 cores were taken at each proposed concrete testing locations, resulting in a total of 6 core samples used for compressive strength testing, as per AS 3600:2018. Cores were secured from the concrete by using a core drill to a 2:1 length to diameter ratio where possible with a diameter of 75mm, in accordance with AS 1012.14:2018. Where cores of these dimensions are unable to be achieved, correction factors were applied.

The compressive strength testing results were utilized in the structural engineering assessments. Additionally, it provided an overview of the current condition of the concrete's binding matrix and would feed into durability models to determine the remaining life of the concrete elements.

Concrete cores were obtained from test locations found in Appendix A and a photographic log of all cores before being tested at Boral Materials Technology Laboratory is found in Appendix D. The concrete compressive strength results have been summarized in Table 4 below and the relevant test certificate can be found in Appendix B.

Table 4: Compressive Strength Results

Bent Region	Core ID	Compressive Strength (MPa)	Average Compressive Strength (MPa)	Compressive Strength, AS3600 Correction[1] (MPa)	Density (kg/m^3)
TA3.1 (22-23)	C1	35	42	48.3	2360
	C2	49			2360
TA2 (13-14)	C1	49	51.3	58.9	2360
	C4	53.5			2350
TA1 (3-4)	C1	46.5	44.3	50.9	2370
	C4	42			2340

1. A 1.15 correction factor has been applied to the retrieved core samples in accordance with AS3600:2018.

Concrete density was tested on the retrieved core samples with the results per element tabulated below in Table 5. Visual inspection of the concrete core samples noted that river gravel aggregate was present in all sample. River gravel has a slightly lower density than the aggregates currently used, and the measured densities are consistent to be consistent with normal weight concrete of the 1980's.

Table 5: Density Testing Results

Element	Minimum	Maximum	Average
Ground slab	2340	2370	2357

A correlation between Schmidt Hammer readings to the compressive strength of the extracted cores were made in attempt to extrapolate the compressive strength of the concrete slabs where coring was not completed, as observed in Figure 3. Taking into consideration of the R-squared value (0.0917) being less than 0.5 illustrates that the correlation is not statistically significant. As a result, a correlation between Schmidt Hammer readings to the compressive strength of the extracted cores cannot be made.

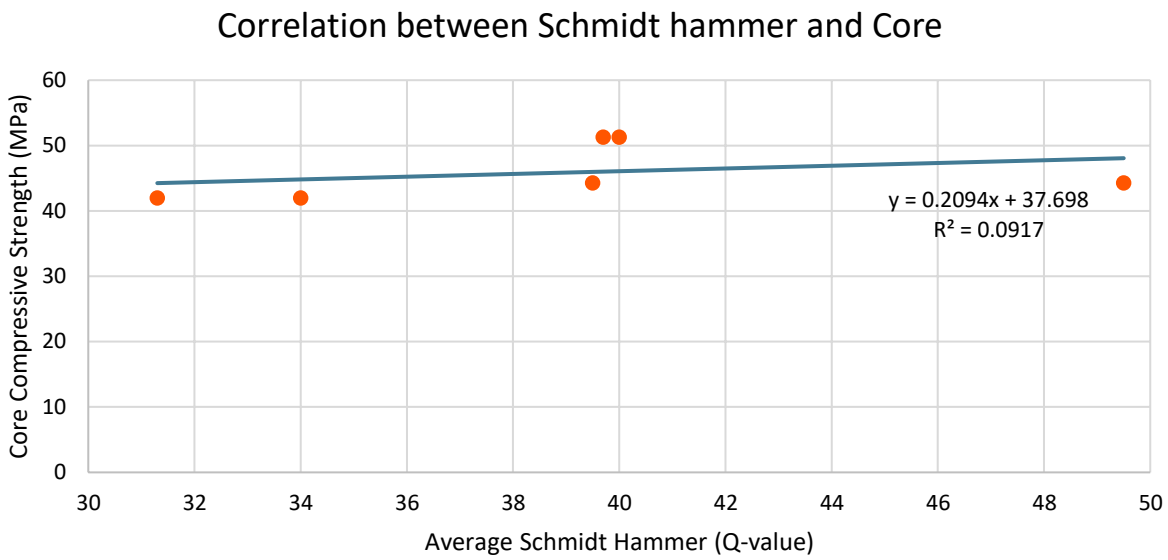


Figure 3: Correlation between Schmidt hammer and core compressive strength

In addition, a correlation between UPV readings to the compressive strength of the extracted cores were made in attempt to extrapolate the compressive strength of the concrete slabs where coring was not completed, as observed in Figure 3. Taking into consideration of the R-squared value (0.6254) being more than 0.5 illustrates that the correlation is statistically significant. As a result, a correlation between UPV readings to the compressive strength of the extracted cores can be made.

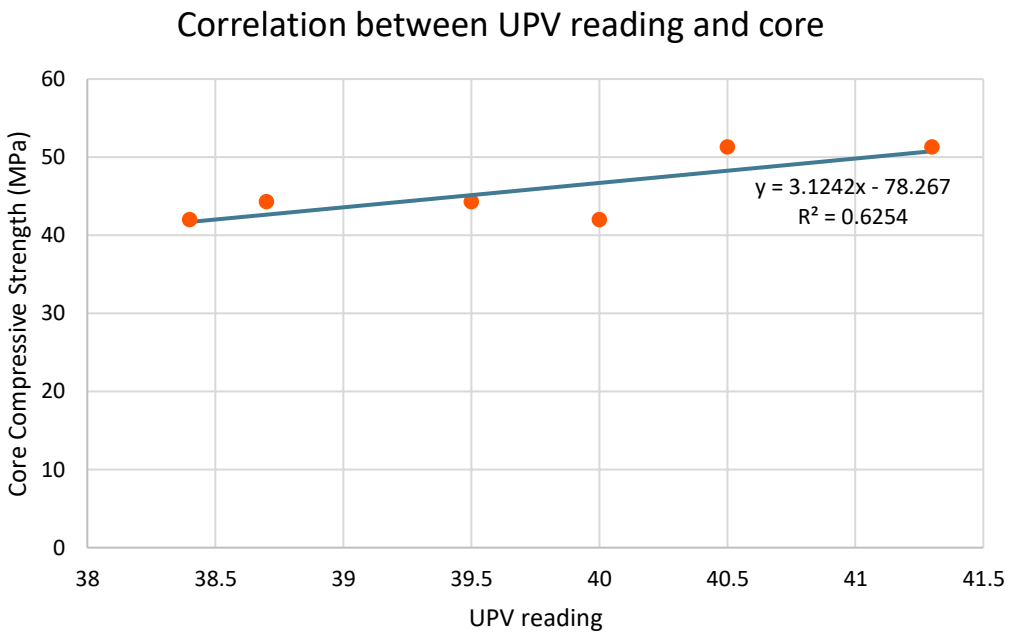


Figure 4: Correlation between UPV reading and core compressive strength

Using the derived correlation equation factor, an estimate of the approximate compressive strength values found at each ground slab can be determined. The calculated values are summarised in Table 6.

Table 6: Estimation of the compressive strength of slab location based on UPV-Core correlation equation

Slab location	UPV reading	Average Compressive Strength, based on correlation equation (MPa)
1	40.3	47.6
2	37.9	40.1
3	38.7	42.6
4	39.5	45.1
5	40.4	48.0
6	38.5	42.0
7	39.9	46.4
8	41.0	49.8
9	42.3	53.9
10	42.5	54.5
11	41.4	51.1
12	42.4	54.2
13	41.3	50.8
14	40.5	48.3
15	42.1	53.3
16	39.2	44.2
17	38.5	42.0
18	40.3	47.6
19	40.5	48.3
20	40.9	49.5
21	42.1	53.3
22	40.0	46.7
23	38.4	41.7
24	39.4	44.8
25	40.8	49.2

The in-situ characteristic compressive strength values have been derived using the method outlined in BS EN 13791:2019, and the relationship developed between the UPV reading and core compressive strength data shown in Figure 4. The in-situ characteristic compressive strength of the ground slabs was calculated to be 40 MPa. A comparison to the in-situ characteristic compressive strength of the ground slabs to the respective average compressive strength was graphed in Figure 5.

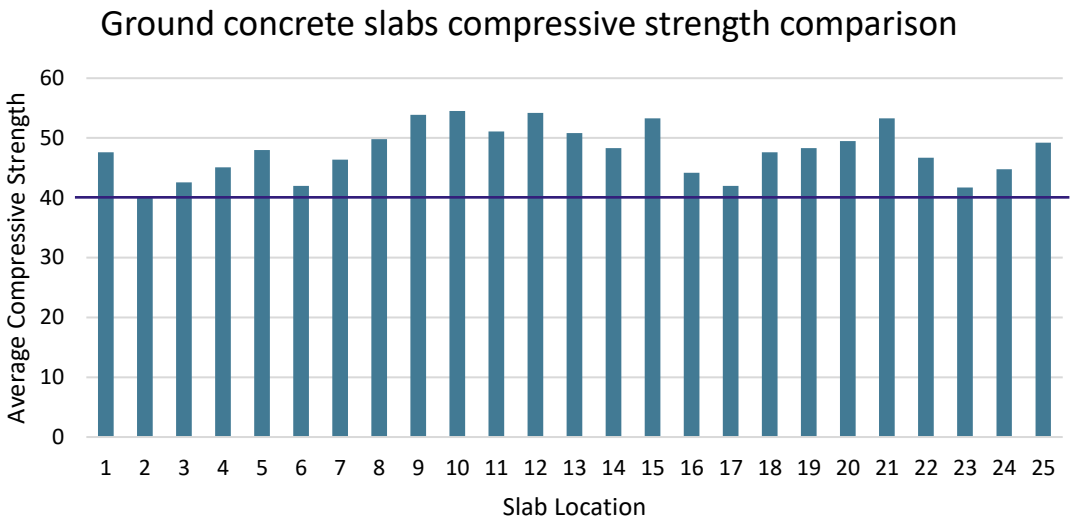


Figure 5: Comparison between compressive strength of ground slabs to in-situ characteristic strength

3.1.8 Chloride Ion Penetration Testing

Acid soluble chloride contents was measured on exposed concrete elements to confirm their ingress into the concrete. 2 core samples were taken at each proposed concrete testing locations, resulting in a total of 6 core samples used for chloride testing. Concrete cores were extracted at up to 180mm depth. Chloride testing were tested at eight depth increments (0-20mm, 20-40mm, 40-60mm, 60-80mm, 80-100mm, 100-120mm, 120-140mm, 140-160mm, and 160-180mm) at Watertest Pty Ltd, a NATA accredited laboratory, in accordance with AS1012.20, to determine the acid soluble chloride content.

The results of this assessment can be found in Section 4.

3.2 Steel

3.2.1 Cleaning of Corrosion

The cleaning of corrosion off piles were completed by an underwater diving team (Diving co.). During the cleaning process, high pressurised water was shot onto the piles to remove the barnacles and corrosion products off the piles' surface. This process was completed on 3 piles prior to testing.

A complete photographic log can be found in Diving co. report in Appendix B.

3.2.2 Steel Thickness Measurements

Both ultrasonic thickness testing and underwater visual inspections were completed to assess the existing conditions of the steel framing and connection points.

3.2.2.1 Above Water

Ultrasonic thickness testing was completed to determine whether significant section loss had occurred across the steel framing and connection points, to evaluate the maximum loading capacities at localised regions. The thickness was undertaken, at the jetty soffit to assess the condition of the steel beams under the concrete slabs.
All measurements were taken at structural testing locations, where scaffold was completed under the jetty. The measurements are recorded in Table 7 below.

It was noted certain measurements of structural elements were found to be difficult due to the build-up of corrosion products on or around the surface of the structural elements. No surfaces were angle grided prior to the measurements being taken. In addition, the severity of section loss due to corrosion cannot be estimated, due to missing measurements in the original drawings.

Table 7: Thickness measurements of steel structural elements (above water)

Test Location	Slab location	Element	Steel Measurements (mm)				
			Top Flange Thickness	Web Thickness	Bottom Flange Thickness	Element Width	Total Height of Element
ST6	21	Primary Beam	-	-	10	-	610
ST6	21	Secondary Beam	-	-	10	-	200
ST4	13	Ternary Beam	18	15	-	170	360
ST4	13	Secondary Beam	18	15	-	195	460
ST4	13	Primary Beam	18	-	-	230	610
ST3	8	Ternary Beam	15	15	-	170	360
ST3	8	Secondary Beam	15	15	-	195	460
ST1	3	Primary Beam	18	26.2	33	270	760
ST1	3	Secondary Beam	18	15	18	225	600
ST1	3	Ternary Beam	-	-	-	-	410

3.2.2.2 Below Water

The measurements of the steel frame under water level were completed by an underwater diving team. The process involved the cleaning of 3 piles prior to scanning and testing the thickness of the circular hollow section annulus. The measurements recorded on the 3 piles can be found in Table 8 below. No conclusions of section loss of piles can be made, due to missing measurements from the original drawings.

Observations were made per pile ID which are as follows:

- Plastic type of wrap was identified at the base of pile 1, where the wrap goes below the seabed and rises 1m above the seabed. The base of pile 1 sits in a concrete annulus of approximately 200mm.
- One large anode is fitted to tabs and welded at the base of both pile 2 and 3.

The complete report including a photographic log can be found in Appendix B.

Table 8: Thickness measurements of steel structural elements (below water)

Pile ID	Bent Location	Direction	Pile Depth Location (mm)			
			Above High Water	Tidal Zone	Below Low Tide	1m Below Low Tide
1	Bent 1	North	19.4	19.4	19.1	19.3
		East	19.5	19.5	18.9	19.3
		South	19.6	19.6	19.1	19.4
		West	19.5	19.7	19.0	19.4
2	Bent 5	North	19.1	19.5	19.4	19.4
		East	19.3	19.7	19.6	19.5
		South	19.4	19.9	19.7	19.5
		West	18.9	19.3	19.2	19.2
3	Bent 11	North	14.4	14.5	14.4	14.4
		East	14.4	14.5	14.3	14.1
		South	14.3	14.5	14.3	14.4
		West	14.1	14.4	14.5	14.4

4. Durability Assessment

4.1 Residual Life of Concrete Elements

4.1.1 Chloride Ion Penetration Modelling

A chloride propagation model was created by assessing the measured chloride content by percent of weight of concrete at various depths to predict when a certain threshold of chloride will meet the reinforcements. This can be represented as a time in years. All testing were performed at Watertest Pty Ltd, a NATA accredited laboratory, to determine the acid soluble chloride content. Eight depth increments (0-20mm, 20-40mm, 40-60mm, 60-80mm, 80-100mm, 100-120mm, 120-140mm, 140-160mm, and 160-180mm) were taken for the assessment. The depth increments were split to capture the chloride progression from the top-middle (0-100mm) and soffit-middle (180-100mm). A baseline of 0.06% by weight of concrete of chlorides indicates that chloride induced corrosion is highly likely. The chloride ion penetration testing can be seen in Table 9 below.

Table 9: Chloride Concentration Test Results

Slab location	Core ID	Depth Increment (mm)	Chloride concentration (wt% concrete)	Cover (mm)	Time to Corrosion (years)
21-22	C3	0-20	0.065	40-50	≥ 50
		20-40	0.012		
		40-60	0.010		
		60-80	0.010		
		80-100	0.011		
21-22	C3*	180-160	0.074	40-50	≥ 50
		160-140	0.009		
		140-120	0.011		
		120-100	0.012		
21-22	C4	0-20	0.089	40-50	≥ 50
		20-40	0.029		
		40-60	0.012		
		60-80	0.011		
		80-100	0.010		
21-22	C4*	180-160	0.340	40-50	34
		160-140	0.190		
		140-120	0.012		
		120-100	0.010		
13-14	C2	0-20	0.160	40-50	≥ 50
		20-40	0.033		
		40-60	0.006		
		60-80	0.006		
		80-100	0.004		

Slab location	Core ID	Depth Increment (mm)	Chloride concentration (wt% concrete)	Cover (mm)	Time to Corrosion (years)
13-14	C2*	180-160	0.062	40-50	≥ 50
		160-140	0.016		
		140-120	0.005		
		120-100	0.005		
13-14	C3	0-20	0.110	40-50	≥ 50
		20-40	0.025		
		40-60	0.006		
		60-80	0.004		
		80-100	0.004		
13-14	C3*	180-160	0.060	40-50	≥ 50
		160-140	0.018		
		140-120	0.007		
		120-100	0.006		
3-4	C2	0-20	0.110	40-50	≥ 50
		20-40	0.020		
		40-60	0.008		
		60-80	0.013		
		80-100	0.019		
3-4	C2*	160-140	0.079	40-50	≥ 50
		140-120	0.045		
		120-100	0.020		
3-4	C3	0-20	0.054	40-50	≥ 50
		20-40	0.009		
		40-60	0.009		
		60-80	0.008		
		80-100	0.008		
3-4	C3*	180-160	0.160	40-50	≥ 50
		160-140	0.051		
		140-120	0.010		
		120-100	0.008		

* Chloride Ion Penetration Testing was completed on cores from bottom to top surface

Predictive modelling has concluded that chloride induced corrosion is likely to occur in 34 years within slab 21-22. It should be noted that the test was completed from bottom of the core to the middle, where the bottom of the core was near the ocean shoreline. For the other predictive models, chloride induced corrosion is not likely to occur within the slabs over the next 50 years. The test certificate is attached in Appendix B.

4.1.2 Carbonation Modelling

The carbonation testing results and photos of each core are available in Appendix D. Observed carbonation depths were identified to vary between 0 – 5mm, significantly below the cover depth to the embedded steel of the concrete slabs. Predictive carbonation modelling has been undertaken to determine the approximate time to corrosion based on carbonation. Based on the predictive modelling, corrosion due to carbonation is not considered likely to occur within the next 50 years on the ground slabs. The carbonation results can be found in Table 10 below.

Table 10: Carbonation results of ground slabs

Bent Region	Core ID	Cover (mm)	Depth of Carbonation (mm)	Time to Corrosion (Years)
TA3.1 (22-23)	C1	50	0	-
	C2	50	0	-
TA3.2 (21-22)	C3	50	2	≥ 50
	C4	50	5	≥ 50
TA2 (13-14)	C1	50	0	-
	C2	50	0	-
	C3	50	0	-
	C4	50	0	-
	C5	50	0	-
TA1 (3-4)	C1	50	0	-
	C2	50	0	-
	C3	50	0	-
	C4	50	0	-

4.2 Residual Life of Steel Elements

Please refer to our Structural Engineering report and attached spreadsheet denoting elements to retain/maintain and refurbish, or replace.

5. Discussion

5.1 Visual Assessment

A visual assessment was undertaken at each test location, of each retrieved cores and, of all structural elements on the jetty footpath and under.

A visual condition assessment was performed prior to durability and structural testing of the jetty. For the concrete elements, it was noted many concrete slabs had concrete spalling and exposed reinforcement on the underside of the precast decking. For the steel elements, it was observed many steel elements along the edge or surface of the precast decking and on the underside of the precast decking were corroded and deteriorated at varying severity. The steel elements include primary and secondary beams, diagonal braces, circular columns, retaining wall, handrails, cat walks, and steel plates.

Visual examination of the retrieved core locations at the ground slabs did not identify any signs of significant deterioration. It is noted that are some core locations, remnants of previous superstructure elements were present, such as drilled holes for track placement at TA2. This did not affect the visual assessment, not the coring works for any retrieved cores. All core samples were visually identified to be of sound, well compacted concrete and not showing any signs of significant voiding or internal cracking.

All core samples had presence of river gravel aggregates present in all retrieved core samples. River gravel has a slightly lower density than aggregates currently used, and the measured densities are consistent with normal weight concrete from the 1970's.

5.2 Concrete Reinforcement Cover, Element Dimensions and Reinforcement Breakouts

Localised cover testing of the ground slabs was found to be consistent on all slabs spread along the length of the jetty. The concrete reinforcement cover differed against direction, where vertical beams (N-S) had cover of 50mm, whilst horizontal beams (E-W) had cover of 60mm, on average. In addition, reinforcement bar spacing was found to be consistent on all ground slabs spread along the length of the jetty. The reinforcement bar was placed at 210mm vertically, whilst 310mm horizontally, on average. It was noted the reinforcement bar diameter was observed to be on average of 19mm, which is comparable to reinforcement bar diameter of 0.75 inches used in 1970's. All measurements of concrete cover and bar dimensions are not comparable, as no original design values were provided.

In all reinforcement breakouts, the reinforcement bars were in good condition and did not show any signs of corrosion. Only exposed reinforcement bars (missing concrete covers) appear to have moderate surface corrosion and some observed section loss.

5.3 Compressive Strength

Slab cores have been taken from 6 select locations from 3 test areas to get an indicative idea of the strength of the concrete slabs along the jetty length. AS3600 corrected strengths range between 42.0 – 51.3 MPa.

Relationships between Schmidt Hammer and core data were found to not be significant and as such the calculated strengths are not recommended to be used in design. The design strength of the concrete slabs was further calculated using the relationship between UPV reading and core data. The correlation was found to be significant and as such the calculated strengths are recommended to be used in design. As a result, design strengths for the concrete slabs were calculated using the method outlined in BS EN 13791:2019.

The characteristic in-situ compressive strength was calculated as 40 MPa. With reference to Figure 5, all slab locations are above the characteristic in-situ strength. As a result, it is recommended the characteristic in-situ strength can be adopted in designs for structural analysis and testing.

5.4 Durability Modelling

Durability of the ground slabs were assessed through carbonation testing and chloride testing, as well as durability modelling. Carbonation depths were measured to vary between 2-5mm, which are below the measured cover depths at all locations. The predicative modelling has indicated the carbonation induced corrosion will not occur at any locations within the next 50 years.

Chloride content testing has indicated that there are low amounts of chlorides present within the content element (up to 0.34). The chloride ion progression between each tested increment is still considered significantly below the threshold to induce corrosion. The chloride laboratory results were used to undertake predictive chloride diffusion modelling to predict the time to corrosion. Predictive modelling has concluded that chloride induced corrosion is not likely to occur within all ground slabs over the next 50 years, except at slab 21-22, where one model showed that chloride induced corrosion will occur at 34 years. It should be noted for this test model, that the first tested increment surface was near the ocean shoreline.

6. Recommendations

Please refer to our Construction Engineering and Structural Engineering reports for further details on these recommendations.

6.1 Partial Demolition

Regarding concrete precast deck elements, some retained panels would need to be replaced. These include one exhibiting reinforcement section loss. For panels exhibiting surface corrosion of exposed reinforcement, a simple clean, coat, and patch repair could be specified.

6.2 Full Demolition

As the majority of the concrete precast deck elements are in good condition and with residual life, they could be repurposed as a sustainability initiative.

This is also true of the primary and secondary steel elements. These could be cleaned, grouped by surface hardness, laboratory assessed for their structural properties and repurposed.

6.3 Full Rectification

As previously stated, concrete precast deck elements exhibiting surface corrosion on exposed reinforcement bars can be repaired. We would also recommend patching spalls at corners and joints as these are trip hazards.

Regarding steel elements, significant work needs to be completed to clean the corroded materials, ascertain section loss, and recoat these elements. Whilst it can be specified and executed this would be a costly exercise and likely need to be maintained via recoating and maintenance every 10-15 years.

6.3.1 Protecting Coatings

The protective coatings have been separated into two categories.

- Jetty piles in tidal immersed and splash zone. Epoxy coating system
  - Tidal immersion
- Jetty piles above tidal/ splash zone in atmosphere. UV stable polyurethane coating system.
  - AS/NZS 4312:2019 Category C5-M (very high marine corrosivity)

6.3.1.1 Jetty pylons in tidal immersed and splash zone. Epoxy coating system

Remove grease, oil, dirt, and all other contaminants in accordance with AS1627.1. If an alkaline detergent is required, Gamlen CA 1 is a suitable cleaning agent. Check for chlorides, sulphates, and nitrates using an appropriate testing kit per the test kit manufacturer's instructions. The acceptable levels for these salts are as follows:

- Chlorides – 10 µg/cm2, Sulphates – 5 µg/cm2, Nitrates - 5 µg/cm2.

If the levels are found to be greater than the acceptable levels, use an appropriate agent to remove the salts from the surface such as Clhor*Rid or Hold Tite 102. Follow the manufacturer's instructions, including neutralisation of the surface and recheck. Repeat as needed to achieve the required maximum (or less) levels. Fully abrasive blast clean all surfaces in accordance with AS1627.4 Class Sa 2.1/2 with a visual reference to ISO 8501-1 Sa 2.1/2. Immediately prior to the application of the coating, the surface extract shall not contain more than 10 µg/cm2 (environment dependent for level) of the specific contaminant (e.g., chloride, nitrate, sulfate) when tested with a specified method (e.g., Brestle Patch, Chlor*Test).

Remove all spent abrasive and residual dust by dry compressed air, vacuum or sweeping with a clean brush. Avoid handling the prepared bare steel areas. The surface must be inspected prior to coating application to ensure there are no surface defects or contamination, otherwise rectification is required before any coating is applied.

Apply the initial coating within 2 hours of completing the surface preparation or sooner if required to avoid any visible deterioration of the surface. All edges, bolts, nuts and difficult to coat areas require extra brushing in and stripe coating to achieve adequate coating thickness. All surfaces must be clean and dry prior to coating.

Coating System										
	Material	Product	Catalyst	Data Sheet	Thinner	Application	% Vol Solid Spread Rate	Film Build	WFT**	DFT*
1st Coat	DUREMAX GFX	775-Line	976-H0096	PC256	CR REDUCER	B, R, CS or AS	84% 1.68 m²/l @ 500µm	REC	600µm	500µm
Min recoat time = 14 HOURS Max recoat time = 72 Hours										

AAS = Air Assisted Spray, AS = Airless Spray, B = Brush, CS = Conventional Spray, HVLP = High-Volume, Low-Pressure Spray, R = Roller, T = Trowel

* If application is by brush or roller, further coats may be necessary to achieve the recommended DFT and full opacity.

** WFT is thickness of wet paint required to achieve the specified 'Dry Film Thickness' assuming no thinner is added. # %Vol Solids is of untinted White or Light Base

Dry times apply to a single coat at 25ºC and 50% Relative Humidity. Dry times are longer at lower temperatures and/or higher humidity.

6.3.1.2 Specific Recommendations and Comments

- To achieve the specified DFT air or airless spray is recommended, however care must be taken to contain the DFT to the recommended thickness.
- Care MUST be taken to ensure that the coating applied to the surface is protected from contamination such as dirt, grit etc. and is not exposed to the weather. If applying coatings on site, unfavorable climatic conditions during application will compromise coating adhesion, curing times, aesthetics, and performance. Do not apply coatings unless climatic conditions are good. Wash off air borne salt deposits and dry surface immediately before painting. Repeat surface wash and dry between coats to prevent salt entrapment.
- All products must be applied strictly in accordance with this specification and relevant Product Data Sheets and SDS (available from www.duluxprotectivecoatings.com.au) by experienced applicators. The applicator must ensure that all colours supplied match the approved standard prior to commencement. Specification details (such as hardener choice) depend on climatic conditions at application time and should be reviewed with your Dulux Representative prior to application. The asset manager is responsible for verifying the presence of lead and determining whether to remove or encapsulate; if lead is present, a customised specification must be obtained from Dulux Australia, and the work done in strict accordance with AS 4361 Parts 1 and 2 and Worksafe Australia guidelines.

6.3.1.3 Jetty pylons above tidal/ splash zone in atmosphere. UV stable polyurethane coating system

Remove grease, oil, dirt, and all other contaminants in accordance with AS1627.1. If an alkaline detergent is required, Gamlen CA 1 is a suitable cleaning agent. Check for chlorides, sulphates, and nitrates using an appropriate testing kit per the test kit manufacturer's instructions. The acceptable levels for these salts are as follows: Chlorides – 10 µg/cm2, Sulphates – 5 µg/cm2, Nitrates - 5 µg/cm2. If the levels are found to be greater than the acceptable levels, use an appropriate agent to remove the salts from the surface such as Clhor*Rid or Hold Tite 102. Follow the manufacturer's instructions, including neutralisation of the surface and recheck. Repeat as needed to achieve the required maximum (or less) levels.

Fully abrasive blast clean all surfaces in accordance with AS1627.4 Class Sa 2.1/2 with a visual reference to ISO 8501-1 Sa 2.1/2. Immediately prior to the application of the coating, the surface extract shall not contain more than 10 µg/cm2 (environment dependent for level) of the specific contaminant (e.g., chloride, nitrate, sulphate) when tested with a specified method (e.g., Brestle Patch, Chlor*Test).

Remove all spent abrasive and residual dust by dry compressed air, vacuum or sweeping with a clean brush. Avoid handling the prepared bare steel areas. The surface must be inspected prior to coating application to ensure there are no surface defects or contamination, otherwise rectification is required before any coating is applied.

Apply the initial coating within 2 hours of completing the surface preparation or sooner if required to avoid any visible deterioration of the surface. All edges, bolts, nuts and difficult to coat areas require extra brushing in and stripe coating to achieve adequate coating thickness. All surfaces must be clean and dry prior to coating.

Coating System										
	Material	Product	Catalyst	Data Sheet	Thinner	Application	% Vol Solid Spread Rate	Film Build	WFT**	DFT*
1st Coat	DUREMAX GFX	775-Line	976-H0096	PC 256	CR REDUCER	B, R, CS or AS	84% 1.68 m²/l @ 500µm	REC	600µm	500µm
Min recoat time = 14 HOURS					Max recoat time = 48 Hours					
2nd Coat	WEATHERMAX HBR	770-Line	976-84593	PC 405	DURHIN 040 965 42166	B, R, CS or AS	70% 7.0 m²/l @ 100µm	REC	145µm	100µm
Min recoat time = 10 HOURS					Max recoat time = EXTENDED					

AAS = Air Assisted Spray, AS = Airless Spray, B = Brush, CS = Conventional Spray, HVLP = High-Volume, Low-Pressure Spray, R = Roller, T = Trowel

* If application is by brush or roller, further coats may be necessary to achieve the recommended DFT and full opacity.

** WFT is thickness of wet paint required to achieve the specified 'Dry Film Thickness' assuming no thinner is added. # %Vol Solids is of untinted White or Light Base

Dry times apply to a single coat at 25ºC and 50% Relative Humidity. Dry times are longer at lower temperatures and/or higher humidity.

6.3.1.4 Specific Recommendations and Comments

- To achieve the specified DFT air or airless spray is recommended, however care must be taken to contain the DFT to the recommended thickness.
- Care MUST be taken to ensure that the coating applied to the surface is protected from contamination such as dirt, grit etc. and is not exposed to the weather. If applying coatings on site, unfavorable climatic conditions during application will compromise coating adhesion, curing times, aesthetics, and performance. Do not apply coatings unless climatic conditions are good. Wash off air borne salt deposits and dry surface immediately before painting. Repeat surface wash and dry between coats to prevent salt entrapment.
- All products must be applied strictly in accordance with this specification and relevant Product Data Sheets and SDS (available from www.duluxprotectivecoatings.com.au) by experienced applicators. The applicator must ensure that all colours supplied match the approved standard prior to commencement. Specification details (such as hardener choice) depend on climatic conditions at application time and should be reviewed with your Dulux Representative prior to application. The asset manager is responsible for verifying the presence of lead and determining whether to remove or encapsulate; if lead is present, a customised specification must be

obtained from Dulux Australia, and the work done in strict accordance with AS 4361 Parts 1 and 2 and Worksafe Australia guidelines.

Appendices

Appendix A – **Test Locations**

4. Testing Brief for Site Works

The testing brief has changed from the initial scope of works. This change is due to site constraints, availability, and timing.

4.1 Test Locations

The following test areas have been selected based on accessibility, coverage for structural engineering investigation, and materials investigation.

- Point 1 – ST1 – Open
- Point 2 – ST2 – Closed, cannot be opened.
- Point 3 – ST3 – Open
- Point 4 – ST4 – Open
- Point 5 – ST5 – Open
- Point 6 – ST6 – Open
- Point 7 – ST7 – Closed, cannot be opened.
- Point 8 – ST8 – Closed, cannot be opened.

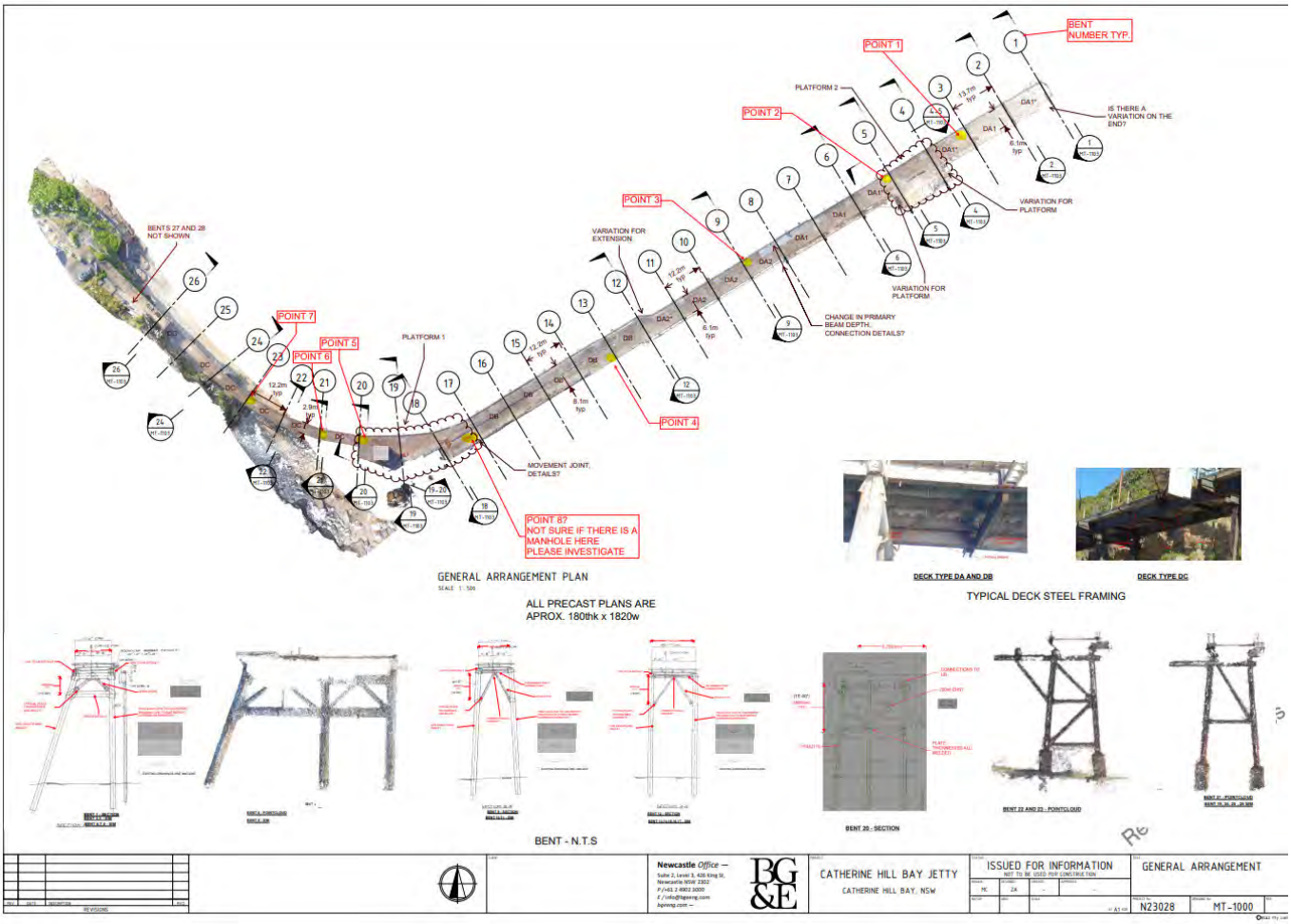


Figure 1 Locations for Inspection, Testing, and Sampling

Appendix B – Laboratory Test Certificates

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Materials Technical Services

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PO Box 400, Winston Hills NSW 2153

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www.boral.com.au

CONCRETE CORE STRENGTH TEST REPORT

CLIENT: **BG & E PTY LTD**

Client No: **482 / 23**
Request No: **106294**

PROJECT: **Catherine Hill Bay Wharf**
DESCRIPTION: **Testing of Concrete Core**
DATE OF SECURING: **13.06.2023**
LOCATION: **Concrete slab along the wharf**

TEST METHODS: AS1012.14. Method for securing and testing cores from hardened concrete for compressive strength
AS1012.12.1. - Mass per unit volume of hardened concrete – Rapid measuring method

Lab sample No.	Core Identity	Test Date	Defects *Note 1	Uncapped Height (mm)	Average Diam. (mm)	Age	Test Condition	Core density (kg/m³)	Uncorrected Compressive Strength (MPa)	Corrected Compressive Strength (MPa)
285421	TA3.1 C1	17.06.2023	2+3+4+6	116	81.8	N/A	wet	**2360**	35.0	**33.0**

*** Note 1**

1. Diam. less than 75mm	**3. Diam. Uneven**	5. Steel Reinforcements	7. Cracks
2. L/D < 2/1	**4. Both Ends Ground**	**6. Voids**	8. Other

Remarks: Concrete core was delivered by the client on 14.06.2023 in moist condition. Core was trimmed and preconditioned in water bath at temperature 23 ±5°C for three days. Compressive strength and density were determined in accordance with AS1012.14 and AS1012.12.1, respectively.

[redacted] **Clayton. Feng, File 8326, Ref: 106294SD**

Simon Dong

Approved Signatory

Date 20.06.2023 Serial No. CON106294.SD.1

NATA
ACCREDITED FOR TECHNICAL COMPETENCE

NATA Accredited Laboratory
Number: 547

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CONCRETE CORE STRENGTH TEST REPORT

CLIENT: **BG & E PTY LTD**

Client No: **482 / 23**
Request No: **106294**

PROJECT: **Catherine Hill Bay Wharf**
DESCRIPTION: **Testing of Concrete Core**
DATE OF SECURING: **13.06.2023**
LOCATION: **Concrete slab along the wharf**

TEST METHODS: AS1012.14. Method for securing and testing cores from hardened concrete for compressive strength
AS1012.12.1. - Mass per unit volume of hardened concrete – Rapid measuring method

Lab sample No.	Core Identity	Test Date	Defects *Note 1	Uncapped Height (mm)	Average Diam. (mm)	Age	Test Condition	Core density (kg/m³)	Uncorrected Compressive Strength (MPa)	Corrected Compressive Strength (MPa)
285422	TA3.1 C2	17.06.2023	2+3+4	118	81.6	N/A	wet	**2360**	49.0	**46.5**

*** Note 1**

1. Diam. less than 75mm	**3. Diam. Uneven**	5. Steel Reinforcements	7. Cracks
2. L/D < 2/1	**4. Both Ends Ground**	6. Voids	8. Other

Remarks: Concrete core was delivered by the client on 14.06.2023 in moist condition. Core was trimmed and preconditioned in water bath at temperature 23 ±5°C for three days. Compressive strength and density were determined in accordance with AS1012.14 and AS1012.12.1, respectively.

[redacted] **Clayton. Feng, File 8326, Ref: 106294SD**

Simon Dong

Approved Signatory _____

Date 20.06.2023 Serial No. CON106294.SD.2

NATA Accredited Laboratory
Number: 547

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CONCRETE CORE STRENGTH TEST REPORT

CLIENT: **BG & E PTY LTD**

Client No: **482 / 23**
Request No: **106294**

PROJECT: **Catherine Hill Bay Wharf**
DESCRIPTION: **Testing of Concrete Core**
DATE OF SECURING: **13.06.2023**
LOCATION: **Concrete slab along the wharf**

TEST METHODS: AS1012.14. Method for securing and testing cores from hardened concrete for compressive strength
AS1012.12.1. - Mass per unit volume of hardened concrete – Rapid measuring method

Lab sample No.	Core Identity	Test Date	Defects *Note 1	Uncapped Height (mm)	Average Diam. (mm)	Age	Test Condition	Core density (kg/m^3)	Uncorrected Compressive Strength (MPa)	Corrected Compressive Strength (MPa)
285423	TA2 C1	17.06.2023	2+3+4	153	82.4	N/A	wet	**2360**	49.0	**48.5**

*** Note 1**

1. Diam. less than 75mm	**3. Diam. Uneven**	5. Steel Reinforcements	7. Cracks
2. L/D < 2/1	**4. Both Ends Ground**	6. Voids	8. Other

Remarks: Concrete core was delivered by the client on 14.06.2023 in moist condition. Core was trimmed and preconditioned in water bath at temperature 23 ±5°C for three days. Compressive strength and density were determined in accordance with AS1012.14 and AS1012.12.1, respectively.

[redacted] **Clayton. Feng, File 8326, Ref: 106294SD**

Approved Signatory Simon Dong

Date 20.06.2023 Serial No. CON106294.SD.3

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CONCRETE CORE STRENGTH TEST REPORT

CLIENT: **BG & E PTY LTD**

Client No: **482 / 23**
Request No: **106294**

PROJECT: **Catherine Hill Bay Wharf**
DESCRIPTION: **Testing of Concrete Core**
DATE OF SECURING: **13.06.2023**
LOCATION: **Concrete slab along the wharf**

TEST METHODS: AS1012.14. Method for securing and testing cores from hardened concrete for compressive strength
AS1012.12.1. - Mass per unit volume of hardened concrete – Rapid measuring method

Lab sample No.	Core Identity	Test Date	Defects *Note 1	Uncapped Height (mm)	Average Diam. (mm)	Age	Test Condition	Core density (kg/m³)	Uncorrected Compressive Strength (MPa)	Corrected Compressive Strength (MPa)
285424	TA2 C4	17.06.2023	2+3+4	149	82.4	N/A	wet	**2350**	53.5	**53.0**

*** Note 1**

1. Diam. less than 75mm	**3. Diam. Uneven**	5. Steel Reinforcements	7. Cracks
2. L/D < 2/1	**4. Both Ends Ground**	6. Voids	8. Other

Remarks: Concrete core was delivered by the client on 14.06.2023 in moist condition. Core was trimmed and preconditioned in water bath at temperature 23 ±5°C for three days. Compressive strength and density were determined in accordance with AS1012.14 and AS1012.12.1, respectively.

[redacted] **Clayton. Feng, File 8326, Ref: 106294SD**

Simon Dong

Approved Signatory _____

Date 20.06.2023 Serial No. CON106294.SD.4

NATA Accredited Laboratory
Number: 547

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CONCRETE CORE STRENGTH TEST REPORT

CLIENT: **BG & E PTY LTD**

Client No: **482 / 23**
Request No: **106294**

PROJECT: **Catherine Hill Bay Wharf**
DESCRIPTION: **Testing of Concrete Core**
DATE OF SECURING: **13.06.2023**
LOCATION: **Concrete slab along the wharf**

TEST METHODS: AS1012.14. Method for securing and testing cores from hardened concrete for compressive strength
AS1012.12.1. - Mass per unit volume of hardened concrete – Rapid measuring method

Lab sample No.	Core Identity	Test Date	Defects *Note 1	Uncapped Height (mm)	Average Diam. (mm)	Age	Test Condition	Core density (kg/m³)	Uncorrected Compressive Strength (MPa)	Corrected Compressive Strength (MPa)
285425	TA1 C1	17.06.2023	2+3+4	123	82.2	N/A	wet	**2370**	46.5	**44.5**

*** Note 1**

1. Diam. less than 75mm	**3. Diam. Uneven**	5. Steel Reinforcements	7. Cracks
2. L/D < 2/1	**4. Both Ends Ground**	6. Voids	8. Other

Remarks: Concrete core was delivered by the client on 14.06.2023 in moist condition. Core was trimmed and preconditioned in water bath at temperature 23 ±5°C for three days. Compressive strength and density were determined in accordance with AS1012.14 and AS1012.12.1, respectively.

[redacted] **Clayton. Feng, File 8326, Ref: 106294SD**

Simon Dong

Approved Signatory

Date 20.06.2023 Serial No. CON106294.SD.5

NATA Accredited Laboratory
Number: 547

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CONCRETE CORE STRENGTH TEST REPORT

CLIENT: **BG & E PTY LTD**

Client No: **482 / 23**
Request No: **106294**

PROJECT: **Catherine Hill Bay Wharf**
DESCRIPTION: **Testing of Concrete Core**
DATE OF SECURING: **13.06.2023**
LOCATION: **Concrete slab along the wharf**

TEST METHODS: AS1012.14. Method for securing and testing cores from hardened concrete for compressive strength
AS1012.12.1. - Mass per unit volume of hardened concrete – Rapid measuring method

Lab sample No.	Core Identity	Test Date	Defects *Note 1	Uncapped Height (mm)	Average Diam. (mm)	Age	Test Condition	Core density (kg/m^3)	Uncorrected Compressive Strength (MPa)	Corrected Compressive Strength (MPa)
285426	TA1 C4	17.06.2023	2+3+4	138	82.4	N/A	wet	**2340**	42.0	**41.0**

*** Note 1**

1. Diam. less than 75mm	**3. Diam. Uneven**	5. Steel Reinforcements	7. Cracks
2. L/D < 2/1	**4. Both Ends Ground**	6. Voids	8. Other

Remarks: Concrete core was delivered by the client on 14.06.2023 in moist condition. Core was trimmed and preconditioned in water bath at temperature 23 ±5°C for three days. Compressive strength and density were determined in accordance with AS1012.14 and AS1012.12.1, respectively.

[redacted] **Clayton. Feng, File 8326, Ref: 106294SD**

Simon Dong

Approved Signatory

Date 20.06.2023 Serial No. CON106294.SD.6

WATERTEST

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SEVEN HILLS NSW 2147

Laboratory:
1/4 ABBOTT ROAD
SEVEN HILLS NSW 2147
Telephone: (02) 9838 8294
Fax: (02) 9838 8919
A.C.N. 098 982 140
A.B.N. 76 098 982 140
NATA No: 1884

ANALYTICAL REPORT for:

BG&E PTY LIMITED

LEVEL 24, 12 CREEK ST
BRISBANE QLD 4000

ATTN: CLAYTON FENG

JOB NO: WI0626

CLIENT ORDER: NTL2023014

DATE RECEIVED: 14/06/23

DATE COMPLETED: 27/06/23

TYPE OF SAMPLES: CONCRETE

NO OF SAMPLES: 53

NATA Accredited for compliance with ISO/IEC 17025 Testing

[redacted]
Issued [redacted]

ANALYTICAL REPORT

JOB NO: WI0626
CLIENT ORDER: NTL2023014

	SAMPLES	Cl- %
1	TA3-2 C3 0-20	0.065
2	TA3-2 C3 20-40	0.012
3	TA3-2 C3 40-60	0.010
4	TA3-2 C3 60-80	0.010
5	TA3-2 C3 80-100	0.011
6	TA3-2 C3 100-120	0.012
7	TA3-2 C3 120-140	0.011
8	TA3-2 C3 140-160	0.009
9	TA3-2 C3 160-180	0.074
10	TA3-2 C4 0-20	0.089
11	TA3-2 C4 20-40	0.029
12	TA3-2 C4 40-60	0.012
13	TA3-2 C4 60-80	0.011
14	TA3-2 C4 80-100	0.010
15	TA3-2 C4 100-120	0.010
16	TA3-2 C4 120-140	0.012
17	TA3-2 C4 140-160	0.19
18	TA3-2 C4 160-180	0.34
19	TA2 C2 0-20	0.16
20	TA2 C2 20-40	0.033
21	TA2 C2 40-60	0.006
22	TA2 C2 60-80	0.006
23	TA2 C2 80-100	0.004
24	TA2 C2 100-120	0.005
25	TA2 C2 120-140	0.005
26	TA2 C2 140-160	0.016
27	TA2 C2 160-180	0.062
28	TA2 C3 0-20	0.11
29	TA2 C3 20-40	0.025
30	TA2 C3 40-60	0.006
31	TA2 C3 60-80	0.004
32	TA2 C3 80-100	0.004
33	TA2 C3 100-120	0.006
34	TA2 C3 120-140	0.007
35	TA2 C3 140-160	0.018
36	TA2 C3 160-180	0.060
MDL		0.001
Method Code		10.13
Preparation		P1

ANALYTICAL REPORT

JOB NO: WI0626
CLIENT ORDER: NTL2023014

	SAMPLES		Cl- %
37	TA1 C2	0-20	0.11
38	TA1 C2	20-40	0.020
39	TA1 C2	40-60	0.008
40	TA1 C2	60-80	0.013
41	TA1 C2	80-100	0.019
42	TA1 C2	100-120	0.020
43	TA1 C2	120-140	0.045
44	TA1 C2	140-160	0.079
45	TA1 C3	0-20	0.054
46	TA1 C3	20-40	0.009
47	TA1 C3	40-60	0.009
48	TA1 C3	60-80	0.008
49	TA1 C3	80-100	0.008
50	TA1 C3	100-120	0.008
51	TA1 C3	120-140	0.010
52	TA1 C3	140-160	0.051
53	TA1 C3	160-180	0.16
MDL			0.001
Method Code			10.13
Preparation			P1

ANALYTICAL REPORT

JOB NO: WI0626
CLIENT ORDER: NTL2023014

METHODS OF PREPARATION AND ANALYSIS

The tests contained in this report have been carried out on the samples as received by the laboratory. In the case where an analyte or group of analytes are received outside of recommended holding times, the analysis will proceed and the report annotated. Analysis is carried out within analyte holding times where possible.

P1	Analysis performed on sample as received
10.13	Chloride in Concrete - AS1012.20.1 Determined by Potentiometric Titration

Appendix C – Coating Specification

Dulux PROTECTIVE COATINGS

Dulux Protective Coating System Specifications for

CATHERINE HILL BAY JETTY

Prepared for:

Name: [redacted]
Company: BG&E
Phone: [redacted]
Email: [redacted]
Project Address: 93 Flowers Dr, Catherine Hill Bay NSW 2281
Specification No: PCQ-480-0923
Version Number: 1

Prepared by:

Name: [redacted]
Company: Dulux Protective Coatings
Phone: [redacted]
Email: [redacted]
Reviewed by: [redacted]
Date of Issue: 6/09/2023

Doc Version: 09.05.2023

Protection you can count on.

CATHERINE HILL BAY JETTY

Table of Contents

CATHERINE HILL BAY JETTY

Schedule of Coating Systems

Item	Substrate	Specification No.	Colour
Jetty pylons in tidal immersed and splash zone. Epoxy coating system	Mild Steel	**PCQ-480-0923 /A**	To approved standard
Jetty pylons above tidal/ splash zone in atmoshpere. UV stable polyurethane coating system	Mild Steel	**PCQ-480-0923 /B**	To approved standard

Specification Document No. PCQ-480-0923 /A

SITE	**93 Flowers Dr, Catherine Hill Bay NSW 2281**
EXPOSURE	Tidal immersion
SUBSTRATE	Mild Steel
ITEM	Jetty pylons in tidal immersed and splash zone. Epoxy coating system
SCOPE	To provide a specification for the onsite preparation and application of a Dulux Protective Coatings Specification

Surface Preparation

Remove grease, oil, dirt and all other contaminants in accordance with AS1627.1. If an alkaline detergent is required, Gamlen CA 1 is a suitable cleaning agent. Check for chlorides, sulphates, and nitrates using an appropriate testing kit per the test kit manufacturer's instructions. The acceptable levels for these salts are as follows: Chlorides – 10 µg/cm2, Sulphates – 5 µg/cm2, Nitrates - 5 µg/cm2. If the levels are found to be greater than the acceptable levels, use an appropriate agent to remove the salts from the surface such as Clhor*Rid or Hold Tite 102. Follow the manufacturer's instructions, including neutralisation of the surface and recheck. Repeat as needed to achieve the required maximum (or less) levels.
Fully abrasive blast clean all surfaces in accordance with AS1627.4 Class Sa 2.1/2 with a visual reference to ISO 8501-1 Sa 2.1/2 . Immediately prior to the application of the coating, the surface extract shall not contain more than 10 µg/cm2 (environment dependent for level) of the specific contaminant (e.g., chloride, nitrate, sulfate) when tested with a specified method (e.g. Brestle Patch, Chlor*Test).

Remove all spent abrasive and residual dust by dry compressed air, vacuum or sweeping with a clean brush. Avoid handling the prepared bare steel areas. The surface must be inspected prior to coating application to ensure there are no surface defects or contamination, otherwise rectification is required before any coating is applied.

Apply the initial coating within 2 hours of completing the surface preparation or sooner if required to avoid any visible deterioration of the surface. All edges, bolts, nuts and difficult to coat areas require extra brushing in and stripe coating to achieve adequate coating thickness. All surfaces must be clean and dry prior to coating.

PROFILE: Uniform angular profile depth ranging from 40 microns minimum to 70 microns maximum

Coating System

	Material	Product	Catalyst	Data Sheet	Thinner	Application	% Vol Solids# Spread Rate	Film Build	WFT**	DFT*
1st Coat	**DUREMAX GFX**	**775-LINE**	**976-H0096**	**PC256**	**CR REDUCER**	**B, R, CS or AS**	84% **1.68 m²/l @ 500µm**	REC	600µm	**500µm**
					Min recoat time = 14 HOURS			**Max recoat time = 3 DAYS**		

AAS = Air Assisted Spray, AS = Airless Spray, B = Brush, CS = Conventional Spray, HVLP = High Volume, Low Pressure Spray, R = Roller, T = Trowel
* If application is by brush or roller, further coats may be necessary to achieve the recommended DFT and full opacity.
** WFT is thickness of wet paint required to achieve the specified 'Dry Film Thickness' assuming no thinner is added. # %Vol Solids is of untinted White or Light Base
Dry times apply to a single coat at 25ºC and 50% Relative Humidity. Dry times are longer at lower temperatures and/or higher humidity.

Specific Recommendations and Comments

To achieve the specified DFT air or airless spray is recommended, however care must be taken to contain the DFT to the recommended thickness.

Care MUST be taken to ensure that the coating applied to the surface is protected from contamination such as dirt, grit etc. and is not exposed to the weather. If applying coatings on site, unfavourable climatic conditions during application will compromise coating adhesion, curing times, aesthetics and performance. Do not apply coatings unless climatic conditions are good. Wash off air borne salt deposits and dry surface immediately before painting. Repeat surface wash and dry between coats to prevent salt entrapment.

All products must be applied strictly in accordance with this specification and relevant Product Data Sheets and SDS (available from www.duluxprotectivecoatings.com.au) by experienced applicators. The applicator must ensure that all colours supplied match the approved standard prior to commencement. Specification details (such as hardener choice) depend on climatic conditions at application time and should be reviewed with your Dulux Representative prior to application. The asset manager is responsible for verifying the presence of lead and determining whether to remove or encapsulate; if lead is present, a customised specification must be obtained from Dulux Australia, and the work done in strict accordance with AS 4361 Parts 1 and 2 and Worksafe Australia guidelines.

Dulux Contacts

PREPARED BY:	[redacted]	PHONE:	**0457 643 910**
REVIEWED BY:	[redacted]	DATE:	06-Sep-23

Disclaimer

Please ensure you have read and understood the Disclaimer and all Explanatory Notes within this specification. Refer to the Explanatory Notes Page.

Specification Document No. PCQ-480-0923 /B

PROJECT: CATHERINE HILL BAY JETTY	
SITE	**93 Flowers Dr, Catherine Hill Bay NSW 2281**
EXPOSURE	AS/NZS 4312:2019 Category C5-M (very high marine corrosivity)
SUBSTRATE	Mild Steel
ITEM	Jetty pylons above tidal/ splash zone in atmoshpere. UV stable polyurethane coating system
SCOPE	To provide a specification for the onsite preparation and application of a Dulux Protective Coatings Specification

Surface Preparation

Remove grease, oil, dirt and all other contaminants in accordance with AS1627.1. If an alkaline detergent is required, Gamlen CA 1 is a suitable cleaning agent. Check for chlorides, sulphates, and nitrates using an appropriate testing kit per the test kit manufacturer's instructions. The acceptable levels for these salts are as follows: Chlorides – 10 µg/cm2, Sulphates – 5 µg/cm2, Nitrates - 5 µg/cm2. If the levels are found to be greater than the acceptable levels, use an appropriate agent to remove the salts from the surface such as Clhor*Rid or Hold Tite 102. Follow the manufacturer's instructions, including neutralisation of the surface and recheck. Repeat as needed to achieve the required maximum (or less) levels.
Fully abrasive blast clean all surfaces in accordance with AS1627.4 Class Sa 2.1/2 with a visual reference to ISO 8501-1 Sa 2.1/2 . Immediately prior to the application of the coating, the surface extract shall not contain more than 10 µg/cm2 (environment dependent for level) of the specific contaminant (e.g., chloride, nitrate, sulfate) when tested with a specified method (e.g. Brestle Patch, Chlor*Test).

Remove all spent abrasive and residual dust by dry compressed air, vacuum or sweeping with a clean brush. Avoid handling the prepared bare steel areas. The surface must be inspected prior to coating application to ensure there are no surface defects or contamination, otherwise rectification is required before any coating is applied.

Apply the initial coating within 2 hours of completing the surface preparation or sooner if required to avoid any visible deterioration of the surface. All edges, bolts, nuts and difficult to coat areas require extra brushing in and stripe coating to achieve adequate coating thickness. All surfaces must be clean and dry prior to coating.

PROFILE: Uniform angular profile depth ranging from 40 microns minimum to 70 microns maximum

Coating System

	Material	Product	Catalyst	Data Sheet	Thinner	Application	% Vol Solids# / Spread Rate	Film Build	WFT**	DFT*
1st Coat	**DUREMAX GFX**	**775-LINE**	**976-H0096**	**PC256**	**CR REDUCER**	**B, R, CS or AS**	84%	REC	600µm	**500µm**
							1.68 m²/l @ 500µm			
				Min recoat time = 14 HOURS			**Max recoat time = 48 HOURS**			
2nd Coat	**WEATHERMAX HBR**	**770-Line**	**976-84593**	**PC 405**	**DUTHIN 040**	**B, R, CS or AS**	70%	REC	145µm	**100µm**
					965 42166		**7.0 m²/l @ 100µm**			
				Min recoat time = 10 HOURS			**Max recoat time = EXTENDED**			

AAS = Air Assisted Spray, AS = Airless Spray, B = Brush, CS = Conventional Spray, HVLP = High Volume, Low Pressure Spray, R = Roller, T = Trowel
* If application is by brush or roller, further coats may be necessary to achieve the recommended DFT and full opacity.
** WFT is thickness of wet paint required to achieve the specified 'Dry Film Thickness' assuming no thinner is added. # %Vol Solids is of untinted White or Light Base
Dry times apply to a single coat at 25ºC and 50% Relative Humidity. Dry times are longer at lower temperatures and/or higher humidity.

Specific Recommendations and Comments

To achieve the specified DFT air or airless spray is recommended, however care must be taken to contain the DFT to the recommended thickness.

Care MUST be taken to ensure that the coating applied to the surface is protected from contamination such as dirt, grit etc. and is not exposed to the weather. If applying coatings on site, unfavourable climatic conditions during application will compromise coating adhesion, curing times, aesthetics and performance. Do not apply coatings unless climatic conditions are good. Wash off air borne salt deposits and dry surface immediately before painting. Repeat surface wash and dry between coats to prevent salt entrapment.

All products must be applied strictly in accordance with this specification and relevant Product Data Sheets and SDS (available from www.duluxprotectivecoatings.com.au) by experienced applicators. The applicator must ensure that all colours supplied match the approved standard prior to commencement. Specification details (such as hardener choice) depend on climatic conditions at application time and should be reviewed with your Dulux Representative prior to application. The asset manager is responsible for verifying the presence of lead and determining whether to remove or encapsulate; if lead is present, a customised specification must be obtained from Dulux Australia, and the work done in strict accordance with AS 4361 Parts 1 and 2 and Worksafe Australia guidelines.

Dulux Contacts

PREPARED BY:	[redacted]	PHONE:	**0457 643 910**
REVIEWED BY:	[redacted]	DATE:	06-Sep-23

Disclaimer

Please ensure you have read and understood the Disclaimer and all Explanatory Notes within this specification. Refer to the Explanatory Notes Page.

DULUX PROTECTIVE COATINGS SPECIFICATION

Project:	CATHERINE HILL BAY JETTY

SPECIFICATION NO.	PCQ-480-0923

Explanatory Notes

1 This specification should only be carried out by applicators experienced in applying these products.

2 This is an abridged specification and must be read and carried out according to the relevant product data sheets, detailed application instructions, Conditions of Specification, safety data sheets and relevant Australian Standards whether attached to this document or not.

3 All products must be applied strictly in accordance with the specification and relevant Product Data Sheets and SDS available from www.duluxprotectivecoatings.com.au.

4 The applicator must ensure that all colours supplied match the approved standard prior to commencement.

5 The use of a thinner other than that nominated herein must not be used without the written consent of your Dulux Protective Coatings Representative.

6 The coating should be protected from the elements and contamination during coating cure to achieve optimum performance and aesthetics.

7 System service life is dependent upon conditions.

8 Pay particular attention to edges to prevent edge corrosion. Sharp edges must be mechanically ground off to a minimum of 2mm radius. Edges must be stripe coated to achieve recommended DFT for optimum service life.

9 Practical spreading rates will vary from quoted theoretical figures depending on substrate roughness and porosity, overspray losses, application methods and environmental conditions (e.g. wind, temperature, humidity, etc).

10 Application techniques should be adjusted, or additional coats applied, in order to achieve the specified DFT. Thus if application is by brush or roller, additional coats are usually required to achieve the specified DFT.

11 Dry times apply to a single coat at 25ºC and 50% Relative Humidity. Dry times are generally longer at lower temperatures and/or higher humidity.

12 Do not apply paint if Relative Humidity is above 85% or if the surface temperature exceeds the maximum quoted on the technical data sheet or is within 3ºC of Dew Point.

13 Do not apply paint if the surface temperature is below 10ºC or likely to fall below 10ºC during the curing period unless otherwise stated, either in the data sheet or by your Dulux Protective Coatings Representative.

14 The specification(s) in this document have been selected by Dulux as being suitable for this project based upon the information given to Dulux by the customer or customer's authorised agent at the time of issue. Changes to the exposure environment and conditions, or changes to chemicals or their concentration in contact with the coating(s) may also change the expected performance of the coatings specified.

15 Specification details (such as choice of hardener) depend on several assumptions (such as climatic conditions at time of application). Dulux suggests that you review this specification with your Dulux Representative prior to application.

16 The asset manager is responsible for verifying the presence of lead and determining if removal or encapsulation is justified. If lead is present, the work shall be carried out in strict accordance with AS 4361 Parts 1 and 2 and Worksafe Australia guidelines.

17 Prior to a Project commencing, a Dulux representative must be notified in advance that a Dulux Coating System will be applied to the Project and a Warranty will be required. No Warranty will be issued if Dulux is notified after the commencement or completion of a Project

18 This specification is not a warranty document. A draft warranty document should be obtained from Dulux along with the specification prior to the work commencing.

Additional Notes common to all Specifications for this Project

The Applicator shall maintain records in accordance with AS3894 Parts 10, 11, 12, 13 & 14 or as required by the Project Manager. These records shall be made available for inspection at any time by the Project Manager or authorised Representative and submitted to the Principal Contractor upon completion of work.

Specification conformance requires the dry film thickness targets to be met, NOT the number of coats applied. If the nominated dry film thickness for each coat in above table is not achieved in a single application, additional coats MUST be applied to ensure that the specified film thickness for each coat is achieved. Inadequate film thickness of one coat in the system cannot be rectified by increasing the thickness of successive coats in the system.

Please Note: This coating specification has been prepared by Dulux in good faith using information offered by the project manager but without a site inspection. Dulux recommends a site inspection prior to the commencement of work to confirm the suitability of the Specification.

Dulux Contacts

PREPARED BY:	[redacted]	PHONE:	**0457 643 910**
REVIEWED BY:		DATE:	**06-September-2023**

Disclaimer

DULUX is a Quality Endorsed Company - International Standards ISO9001, ISO9002 & Australian Standards AS3901, AS3902.

DuluxGroup Australia Pty Ltd. A.B.N. 67000049427

INSPECTION REPORT 10 DAILY SURFACE AND AMBIENT CONDITIONS

PROJECT: #REF! Date:

ITEM ID No.:

APPLICATOR: SUPERVISOR: Phone:

WEATHER CONDITIONS [✓]

TIME	CLEAR/ SUNNY	CLOUDY	FOG	DEW	RAIN				WIND		
					LIGHT	MOD.	HEAVY	SHOWERS	LIGHT	MOD.	STRONG
6.00 am or start											
9.00 am											
12 noon											
3.00 pm											
6.00 pm or finish											
Other											

AMBIENT / SURFACE CONDITIONS

TIME	AIR/DRY BULB °C	WET BULB °C	HUMIDITY %	SUBSTRATE TEMP. °C	DEW POINT °C	SUBSTRATE TEMP. (minus) Dewpoint	OK TO PAINT [✓]
6.00 am or start							
9.00 am							
12 noon							
3.00 pm							
6.00 pm or finish							
Other							

SURFACE PREPARATION (AS 1627) [✓]

ABRASIVE BLAST CLEANING (AS 1627.4) CHAMBER ☐ COVERED ☐ OPEN ☐ INTERNAL ☐

GRADE OF SURFACE RUST [✓]	A	B	C	D	COMMENTS	TIME PAINTED	OK TO PAINT [✓]
Sa 1 Light blast							
Sa 2 Commercial (68% clean)							
Sa 2.5 Near white (95% clean)							
Sa 3 White metal (100% clean)							

TYPE OF ABRASIVE GRADE DRY STORAGE ☐

SURFACE PROFILE/ANCHOR PATTERN [✓]

12 µm ☐ 25 µm ☐ 38 µm ☐ 50 µm ☐ 62 µm ☐ >75 µm ☐

OTHER SURFACE PREPARATION METHODS OK TO PAINT ☐

SURFACE CONDITION AT TIME OF APPLICATION AS/NZS 3894.6 [✓]

FREE OF DUST AND SPENT ABRASIVE ☐ FREE OF WELD SLAG ☐ FREE OF SHARP EDGES ☐

FREE OF OIL AND CONTAMINANTS ☐ FREE OF WELD POROSITY ☐ FREE OF LAMINATIONS ☐

FREE OF FLASH RUSTING ☐ FREE OF WELD SPATTER ☐ FREE OF BURRS ☐

REMARKS

Signed

On behalf of

Date

INSPECTION REPORT 11 EQUIPMENT REPORT

PROJECT: #REF! Date:

APPLICATOR: SUPERVISOR: Phone:

SITE CONDITIONS ☑

WORK AREA:	Totally enclosed ☐	Roofed ☐	Fully exposed ☐
Clean ☐	Dusty ☐	Sealed floor ☐	Well ventilated ☐
Cramped access ☐	Clear access ☐	Marine, on-shore ☐	Marine, offshore ☐
Ground level ☐	Height (m) ☐ metres	Scaffold required ☐	Hazardous ☐

TEST EQUIPMENT

TEST REQUIREMENT	TYPE / MODEL	DATE STANDARD CALIBRATED AGAINST REFERENCE STANDARD
ABRASIVE BLAST STANDARD—AS 1627.4		
PROFILE—AS 3894.5		
WET FILM THICKNESS—AS 3894.3		
DRY FILM THICKNESS—AS 3894.3		
DEWPOINT/HUMIDITY—AS 3894.7		
ADHESION TESTING—AS 3894.9		
HARDNESS—AS 3894.4		
CONTINUITY TESTING—AS 3894.1		
OTHER		

METHOD OF APPLICATION ☑

Brush ☐ Roller ☐ Conventional spray ☐ Airless spray ☐ Plural Spray ☐

SPRAY EQUIPMENT

Airless pump ☐ Pressure pot ☐ Continuous agitator ☐ Water trap ☐

Model:

Gun Tip Size Needle Aircap

AIR SUPPLY	ABRASIVE BLAST CLEANING	SPRAY APPLICATION
COMPRESSOR BRAND/MODEL		
CAPACITY		
AIR PRESSURE	Singe pot	Pressure pot
	Double pot	Airless pump
	Blast nozzle	Gun

Water trap fitted ☐ Condensor fitted ☐ Filter fitted ☐

REMARKS

Signed

On behalf of

Date

INSPECTION REPORT 12 COATING

PROJECT: #REF! Date:

ITEM NAME ID NUMBER

SKETCH/LOCATION/DESCRIPTION

COATING IDENTIFICATION	1ST COAT	2ND COAT	3RD COAT	4TH COAT
Generic Type				
Brand Name				
Batch Number Base				
Batch Number Hardener				
Colour				
Thinner Used (Reference Number)				
% Thinner Used				
Date of Application				

METHOD OF APPLICATION ☑

Brush ☐ ☐ ☐ ☐

Roller ☐ ☐ ☐ ☐

Spray Conventional ☐ Airless ☐ Plural ☐ ☐ ☐ ☐ ☐

Wet Film Thickness (µm)				
Dry Film Thickness (µm)				
Specified (µm)				
Average (µm)				
Maximum (µm)				
Minimum (µm)				
Number of Readings Taken				

ADHESION ☑ Full cure/Dry ☐ ☐ ☐ ☐

Method AS/NZS 3894.9 ☐

HARDNESS ☑ Full cure/Dry ☐ ☐ ☐ ☐

Method AS/NZS 3894.4 ☐

CURE/FULL DRY ☑ PASS ☐ FAIL ☐

Method AS/NZS 3894.4 ☐

CURE/FULL DRY ☑ PASS ☐ FAIL ☐ VOLTAGE:

Method AS/NZS 3894.4 ☐

REMARKS

Signed PASSED ☐

On behalf of REJECTED ☐

Date REWORK ☐

Appendix D – Photo Reports

www.divingco.com.au

WORK AS EXECUTED REPORT

Project: Cathrine Hill Bay Wharf Pile Inspecion

Client: BG&E Newcastle

Date: 13 June 2023

CONTENTS

1. INTRODUCTION

The Diving Company mobilised to Cathrine Hill Bay Wharf on 13 June 23, to clean and test the thickness of three piles, identified by the client.

Thickness testing was carried out at 4 depths. Results are in **millimetres**

- Above high water
- Tidal zone
- Below low tide
- 1 meter, below low tide

Each depth had 4 tests, North/South/East/West

2. PILE 1

Test Results for Pile 1

	Above High Water	Tidal Zone	Below Low Tide	1m Below Low Tide
North	19.4	19.4	19.1	19.3
East	19.5	19.5	18.9	19.3
South	19.6	19.6	19.1	19.4
West	19.5	19.7	19.0	19.4

- A plastic type of wrap was identified around the base of pile 1. This wrap goes below the seabed and rises 1m above the seabed. The base of pile 1 also seemed to sit in a concrete annulus of approximately 200mm.

3. PILE 2

Test results for Pile 2

	Above High Water	Tidal Zone	Below Low Tide	1m Below Low Tide
North	19.1	19.5	19.4	19.4
East	19.3	19.7	19.6	19.5
South	19.4	19.9	19.7	19.5
West	18.9	19.3	19.2	19.2

- At the base of the pile, one large anode is fitted to tabs, welded on the pile. See **Photo 13**

PILE 3

Test results for Pile 3

	Above High Water	Tidal Zone	Below Low Tide	1m Below Low Tide
North	14.4	14.5	14.4	14.4
East	14.4	14.5	14.3	14.1
South	14.3	14.5	14.3	14.4
West	14.1	14.4	14.5	14.4

- At the base of the pile, one large anode is fitted to tabs, welded on the pile. See **Photo 18**

3. IMAGES

Photo 1: Pile 1. Before Cleaning. High-Water Mark

Photo 2: Pile 1. After Cleaning.

Photo 3: Pile 1. High Water Mark Testing.

Photo 4: Pile 1. 1m Below Low Tide Mark

Photo 5: Pile 1 Plastic Wrap

Photo 5: Pile 1 Plastic Wrap

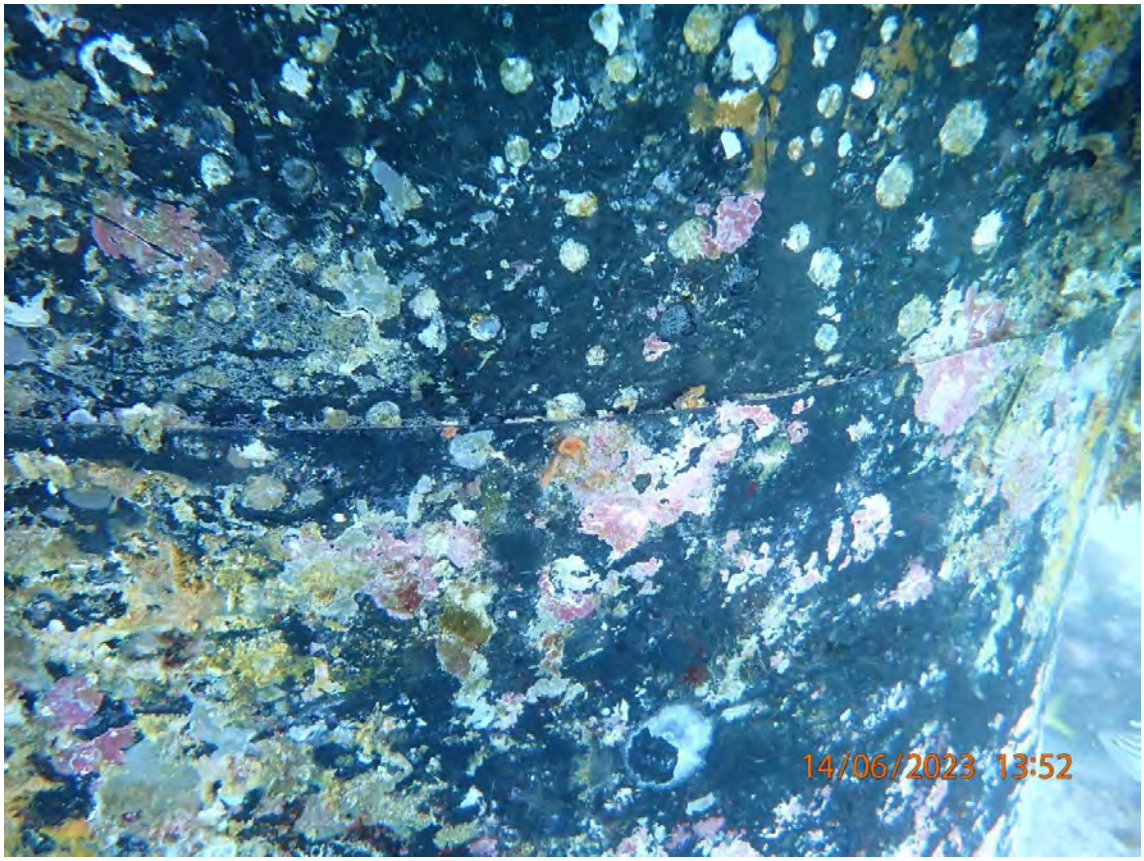


Photo 6: Pile 1 Concrete Annulus

Photo 7: Pile 2. Before Cleaning. High Water Mark

Photo 8: Pile 2. Before Cleaning. Underwater.

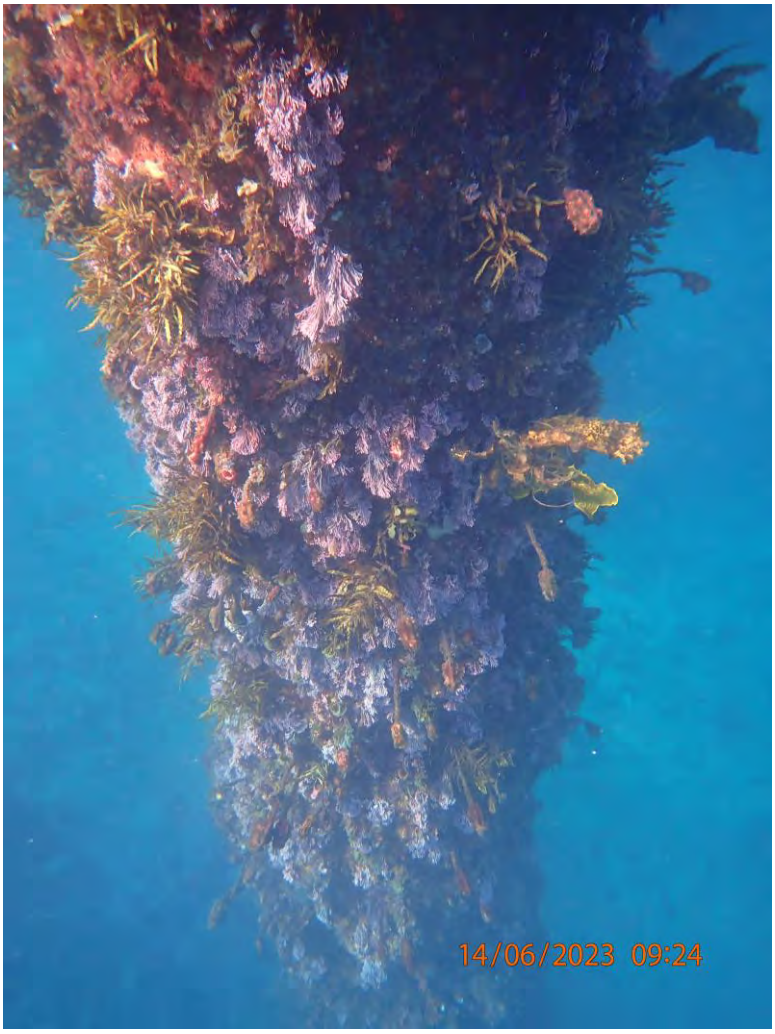


Photo 9: Pile 2. After Cleaning. High Water Mark.

Photo 10: Pile 2. After Cleaning. Underwater.

Photo 11: Pile 2. Testing High Water Mark.

Photo 12: Pile 2. Testing Tidal Zone

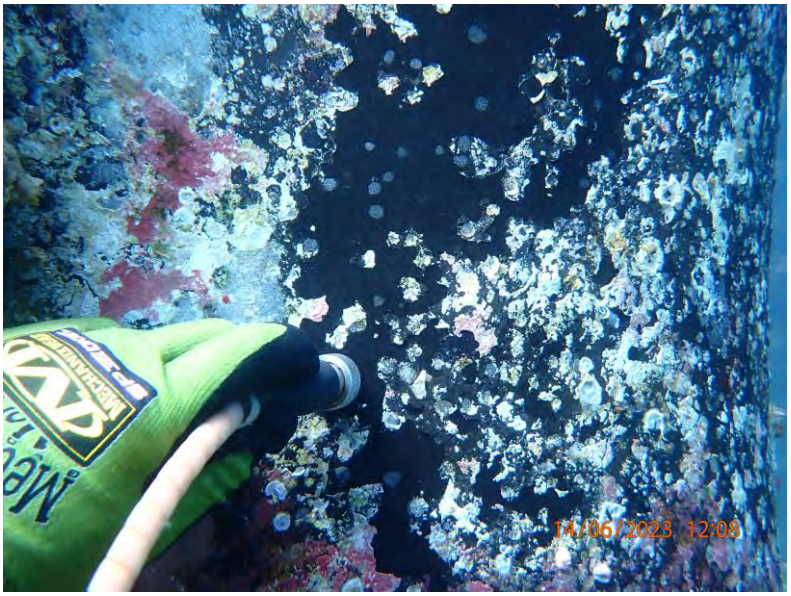


Photo 13: Pile 2 Anode

Photo 14: Pile 3. High Water Mark. Before Clean

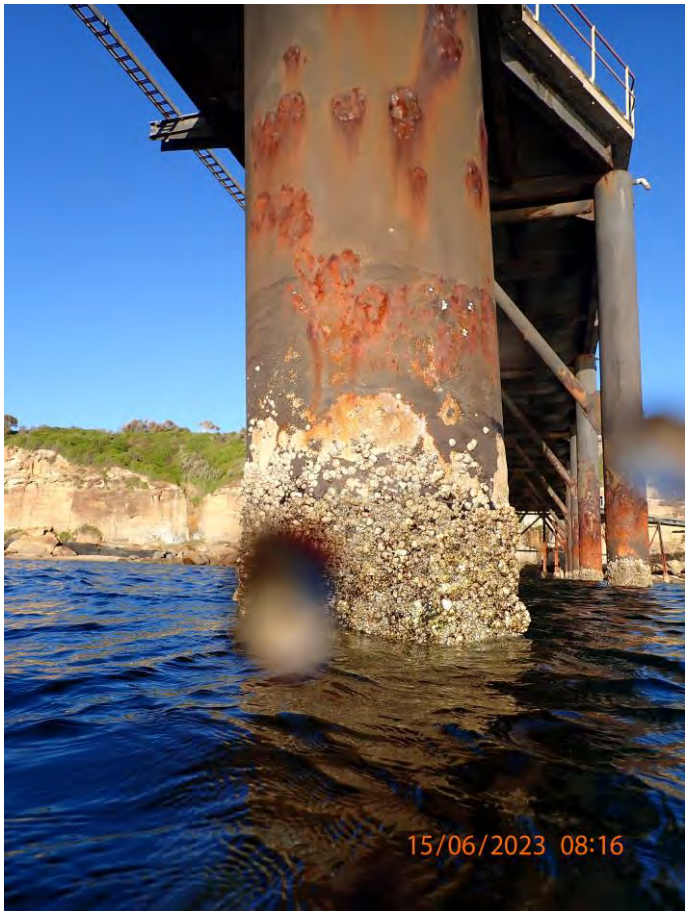


Photo 15: Pile 3. Before Clean. Underwater

Photo 16: Pile 3. Testing High Water Mark.

Photo 17: Pile 3. Testing Tidal Zone

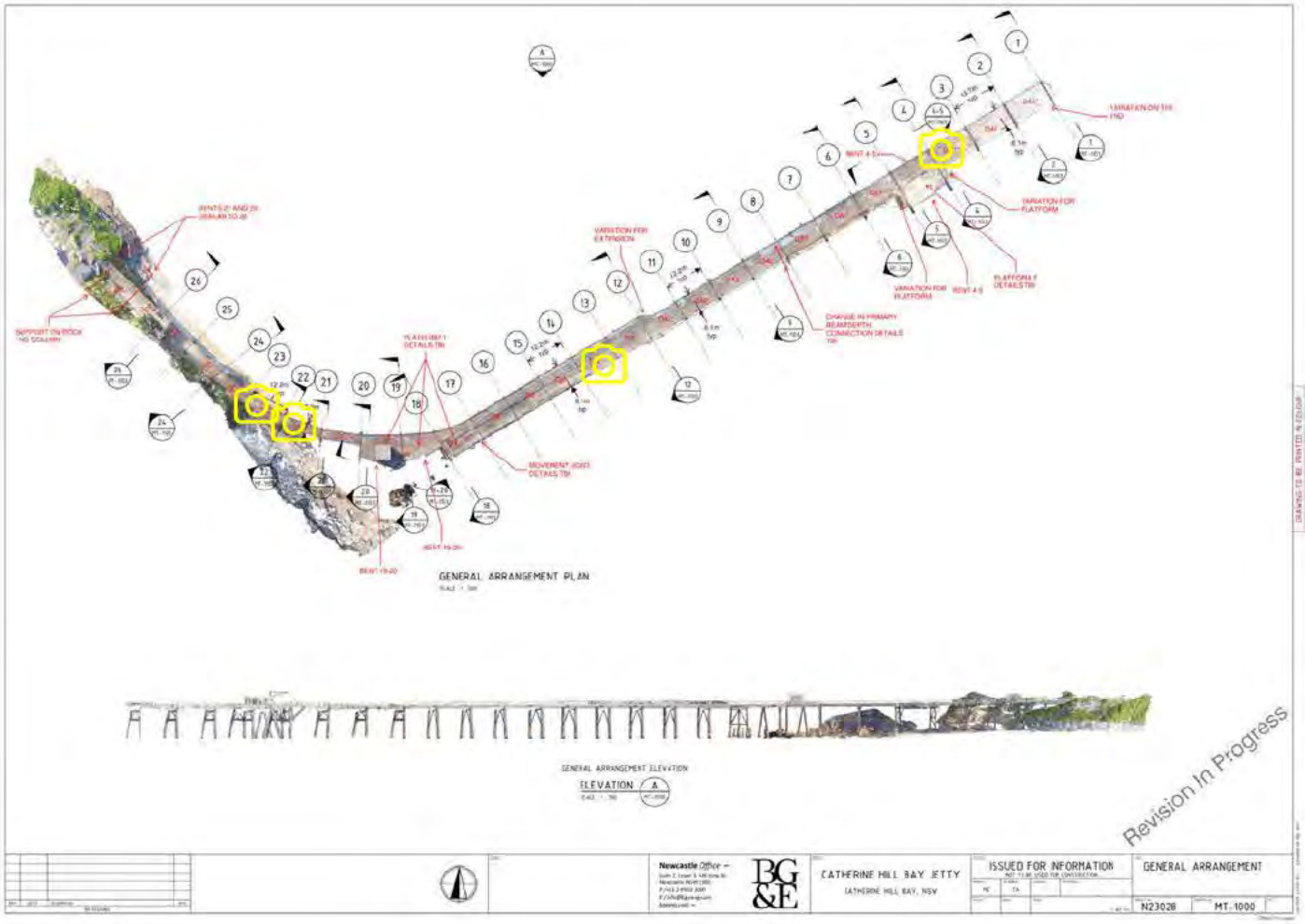
Photo 18. Pile 3. Anode

Document No:	Catherine Hill Bay Wharf 13 June 23	Revision: 1	Date: 15.6.23
Author:	J Darcey		
Authorised:	S. Guthrie		

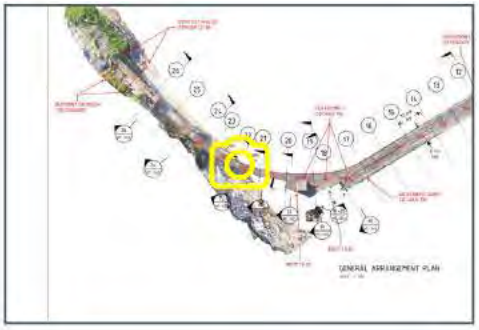
Concrete Testing - Photo Report - June 13, 2023

Prepared by : [redacted]

13 June 2023


GENERAL ARRANGEMENT PLAN
GENERAL ARRANGEMENT ELEVATION
ELEVATION A
Revision In Progress
Newcastle Office –
CATHERINE HILL BAY JETTY
CATHERINE HILL BAY, NSW
ISSUED FOR INFORMATION
GENERAL ARRANGEMENT
N23028
MT-1000

MT3.2



Last Updated:
[redacted]
13 June 2023 4:30 pm

20230613_022454_photo

Taken on:
13 June 2023 12:24 pm

Added on:
13 June 2023 12:25 pm

Added by:
[redacted]

20230613_022505_photo

Taken on:
13 June 2023 12:25 pm

Added on:
13 June 2023 12:25 pm

Added by:
[redacted]

20230613_022515_photo

Taken on:
13 June 2023 12:25 pm

Added on:
13 June 2023 12:25 pm

Added by:
[redacted]

20230613_022524_photo

Taken on:
13 June 2023 12:25 pm

Added on:
13 June 2023 12:25 pm

Added by:
[redacted]

20230613_022619_photo

Taken on:
13 June 2023 12:26 pm

Added on:
13 June 2023 12:26 pm

Added by:
[redacted]

MT3.1

Last Updated:
[redacted]
13 June 2023 4:30 pm

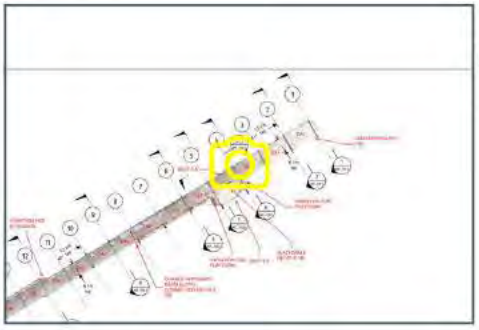
20230613_022708_photo

Taken on:
13 June 2023 12:27 pm

Added on:
13 June 2023 12:27 pm

Added by:
[redacted]

MT1



Created:
[redacted]
13 June 2023 4:30 pm

Last Updated:
[redacted]
13 June 2023 4:30 pm

20230613_024835_photo

Taken on:
13 June 2023 12:48 pm

Added on:
13 June 2023 12:48 pm

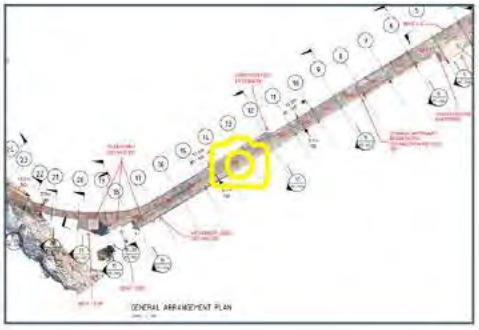
Added by:
[redacted]

20230613_024848_photo

Taken on:
13 June 2023 12:48 pm

Added on:
13 June 2023 12:48 pm

Added by:
[redacted]



[redacted]
13 June 2023 4:32 pm

Last Updated:
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13 June 2023 4:32 pm

20230613_031237_photo

Taken on:
13 June 2023 1:12 pm

Added on:
13 June 2023 1:12 pm

Added by:
[redacted]

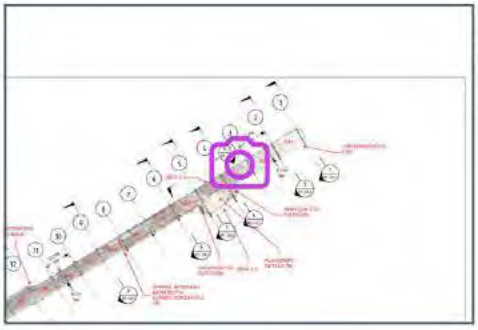
Structural Info - Photo Report - June 13, 2023

Prepared by : [redacted]

13 June 2023


GENERAL ARRANGEMENT PLAN
GENERAL ARRANGEMENT ELEVATION
ELEVATION A
Revision In Progress
Newcastle Office –
CATHERINE HILL BAY JETTY
CATHERINE HILL BAY, NSW
ISSUED FOR INFORMATION
GENERAL ARRANGEMENT
N23028
MT-1000

ST1



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13 June 2023 4:29 pm

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13 June 2023 4:32 pm

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Taken on:
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Added on:
13 June 2023 12:47 pm

Added by:
[redacted]

20230613_024723_photo

Taken on:
13 June 2023 12:47 pm

Added on:
13 June 2023 12:47 pm

Added by:
[redacted]

20230613_025714_photo

Taken on:
13 June 2023 12:57 pm

Added on:
13 June 2023 12:58 pm

Added by:
[redacted]

20230613_025858_photo

Taken on:
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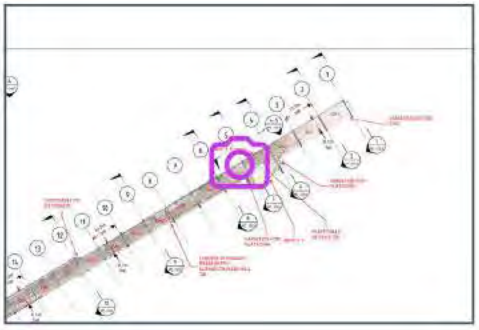
Added on:
13 June 2023 12:59 pm

Added by:
[redacted]

ST2



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13 June 2023 4:41 pm

20230613_024931_photo

Taken on:
13 June 2023 12:49 pm

Added on:
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Added by:
[redacted]

20230613_024941_photo

Taken on:
13 June 2023 12:49 pm

Added on:
13 June 2023 12:49 pm

Added by:
[redacted]

20230613_030002_photo

Taken on:
13 June 2023 1:00 pm

Added on:
13 June 2023 1:01 pm

Added by:
[redacted]

20230613_040800_photo

Taken on:
13 June 2023 2:08 pm

Added on:
13 June 2023 2:08 pm

Added by:
[redacted]

20230613_040812_photo

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13 June 2023 2:08 pm

Added on:
13 June 2023 2:08 pm

Added by:
[redacted]

20230613_040829_photo

Taken on:
13 June 2023 2:08 pm

Added on:
13 June 2023 2:08 pm

Added by:
[redacted]

20230613_040839_photo

Taken on:
13 June 2023 2:08 pm

Added on:
13 June 2023 2:08 pm

Added by:
[redacted]

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Taken on:
13 June 2023 2:12 pm

Added on:
13 June 2023 2:12 pm

Added by:
[redacted]

20230613_041240_photo

Taken on:
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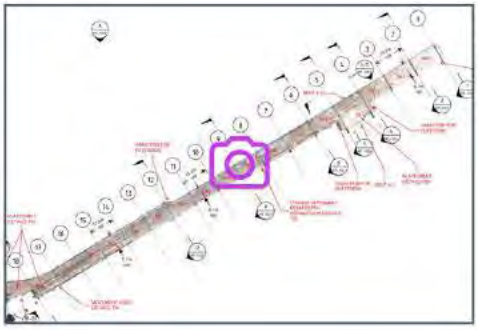
Added on:
13 June 2023 2:12 pm

Added by:
[redacted]

ST3



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13 June 2023 4:31 pm

Last Updated:
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13 June 2023 4:31 pm

20230613_025416_photo

Taken on:
13 June 2023 12:54 pm

Added on:
13 June 2023 12:54 pm

Added by:
[redacted]

20230613_025424_photo

Taken on:
13 June 2023 12:54 pm

Added on:
13 June 2023 12:54 pm

Added by:
[redacted]

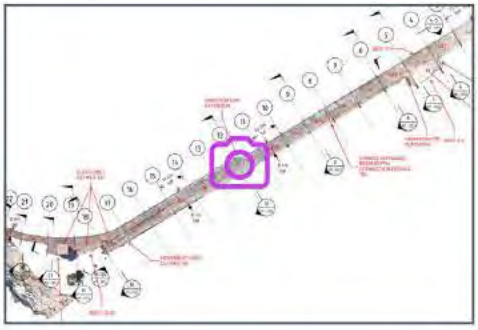
20230613_025439_photo

Taken on:
13 June 2023 12:54 pm

Added on:
13 June 2023 12:56 pm

Added by:
[redacted]

Bent 12 Info



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13 June 2023 4:32 pm

Last Updated:
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13 June 2023 4:32 pm

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Taken on:
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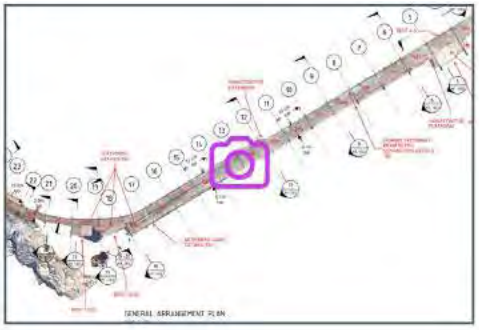
Added on:
13 June 2023 1:11 pm

Added by:
[redacted]



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Last Updated:
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13 June 2023 4:32 pm

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Taken on:
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Added on:
13 June 2023 1:12 pm

Added by:
[redacted]

Last Updated:
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13 June 2023 4:32 pm

20230613_031402_photo

Taken on:
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Added on:
13 June 2023 1:14 pm

Added by:
[redacted]

Last Updated:
[redacted]
13 June 2023 4:35 pm

20230613_031430_photo

Taken on:
13 June 2023 1:14 pm

Added on:
13 June 2023 1:14 pm

Added by:
[redacted]

20230613_034422_photo

Taken on:
13 June 2023 1:44 pm

Added on:
13 June 2023 1:45 pm

Added by:
[redacted]

ST7

Last Updated:
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13 June 2023 4:33 pm

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Taken on:
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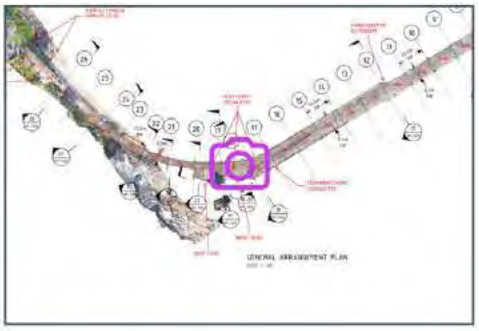
Added on:
13 June 2023 1:15 pm

Added by:
[redacted]



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13 June 2023 4:33 pm

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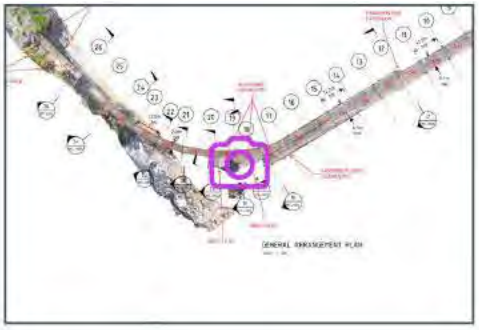
Added on:
13 June 2023 1:31 pm

Added by:
[redacted]



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13 June 2023 4:33 pm

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Added on:
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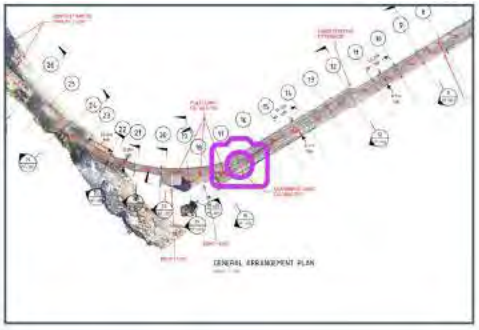
Added by:
[redacted]



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13 June 2023 4:42 pm

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Taken on:
13 June 2023 1:34 pm

Added on:
13 June 2023 1:34 pm

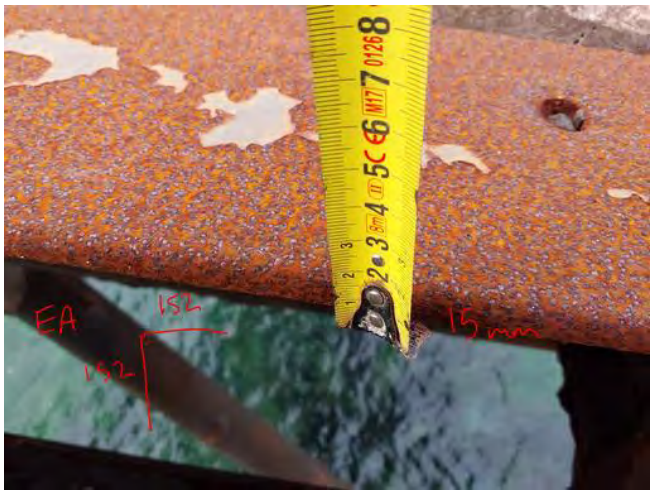
Added by:
[redacted]

20230613_033415_photo

Taken on:
13 June 2023 1:34 pm

Added on:
13 June 2023 1:34 pm

Added by:
[redacted]



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13 June 2023 1:34 pm

Added on:
13 June 2023 1:36 pm

Added by:
[redacted]

20230613_033610_photo

Taken on:
13 June 2023 1:36 pm

Added on:
13 June 2023 1:36 pm

Added by:
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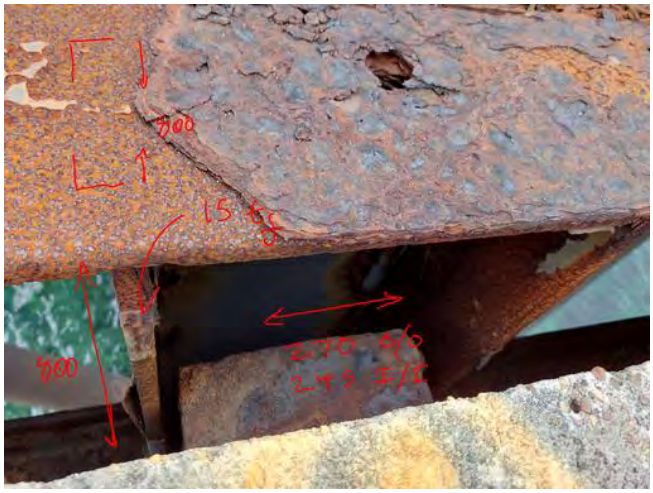

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Taken on:
13 June 2023 1:36 pm

Added on:
13 June 2023 1:38 pm

Added by:
[redacted]

20230613_033833_photo

Taken on:
13 June 2023 1:38 pm

Added on:
13 June 2023 1:38 pm

Added by:
[redacted]

20230613_033856_photo

Taken on:
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Added on:
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Added by:
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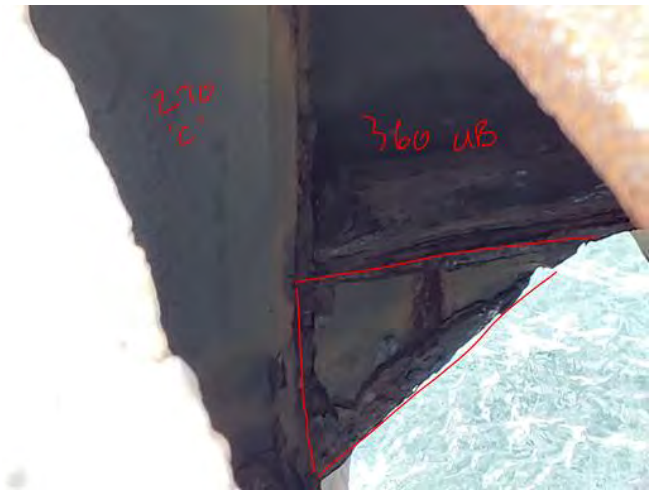

20230613_034057_photo

Taken on:
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Added on:
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Added by:
[redacted]

20230613_034227_photo

Taken on:
13 June 2023 1:42 pm

Added on:
13 June 2023 1:42 pm

Added by:
[redacted]

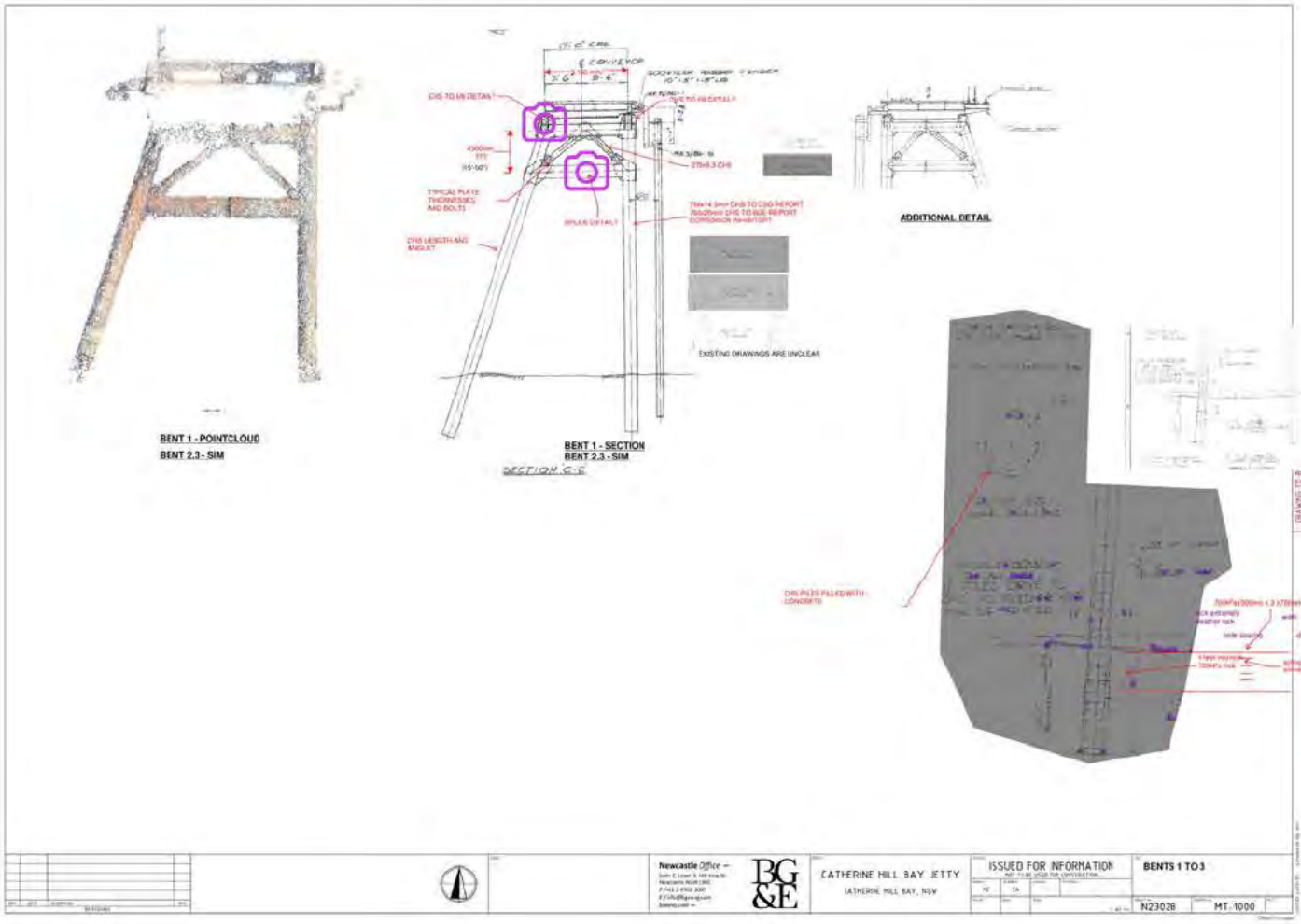
Bent 1-3 - Photo Report - June 30, 2023

Prepared by : [redacted]

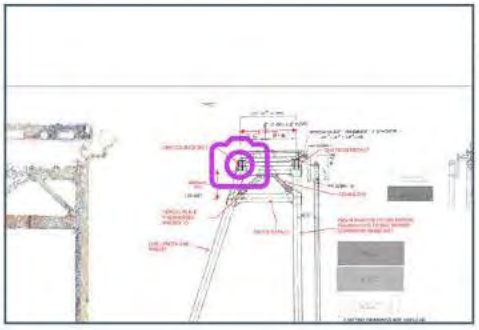
30 June 2023

Description

Geometry


BENT 1 - POINTCLOUD
BENT 2.3 - SIM
BENT 1 - SECTION
BENT 2.3 - SIM
SECTION C-C
ADDITIONAL DETAIL
EXISTING DRAWINGS ARE UNCLEAR
CATHERINE HILL BAY JETTY
CATHERINE HILL BAY, NSW
ISSUED FOR INFORMATION
BENTS 1 TO 3
N23028
MT-1000

CHS UB Detail



Created:
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Last Updated:
[redacted]
30 June 2023 10:38 am

20230630_243141_photo

Taken on:
30 June 2023 10:31 am

Added on:
30 June 2023 10:35 am

Added by:
[redacted]

20230630_243536_photo

Taken on:
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Added on:
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Added by:
[redacted]

20230630_243548_photo

Taken on:
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Added on:
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Added by:
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20230630_243609_photo

Taken on:
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Added on:
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Added by:
[redacted]

20230630_243624_photo

Taken on:
30 June 2023 10:36 am

Added on:
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Added by:
[redacted]

20230630_243638_photo

Taken on:
30 June 2023 10:36 am

Added on:
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Added by:
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20230630_243652_photo

Taken on:
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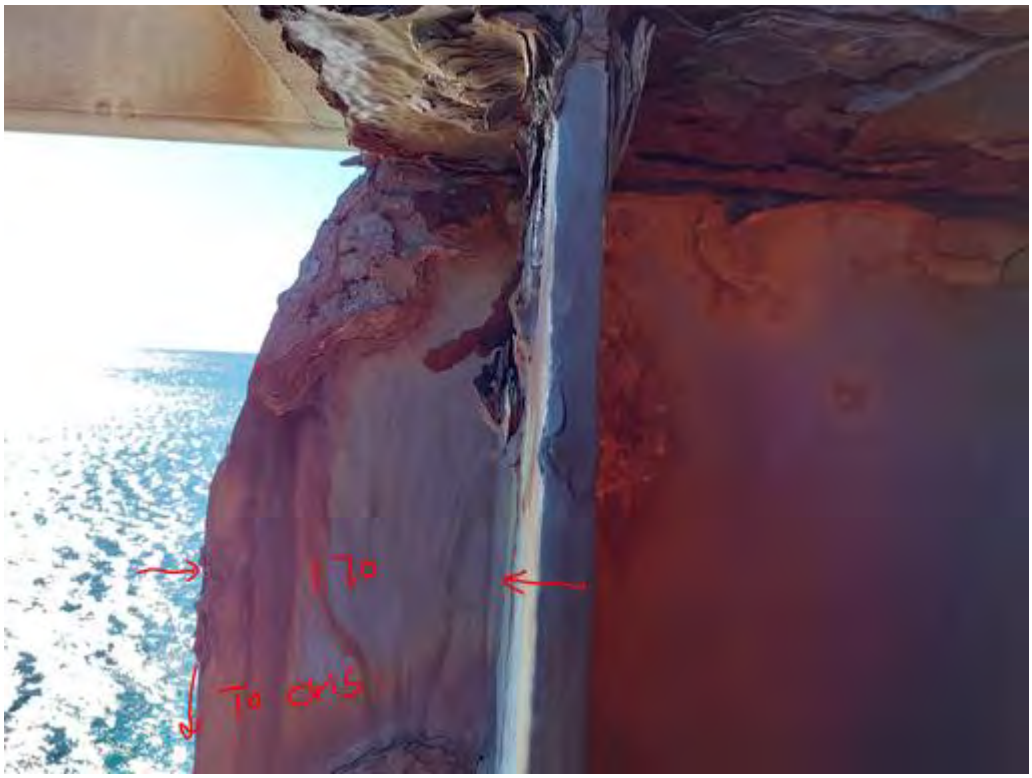
Added on:
30 June 2023 10:36 am

Added by:
[redacted]



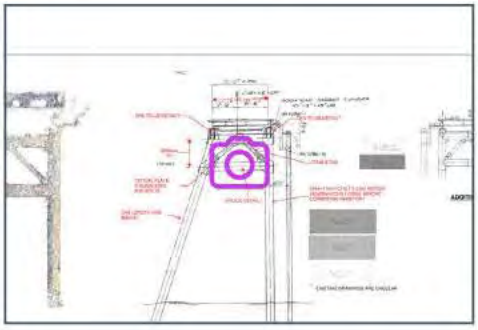
20230630_243707_photo

Taken on:
30 June 2023 10:37 am

Added on:
30 June 2023 10:38 am

Added by:
[redacted]

Splice Detail



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30 June 2023 10:38 am

Last Updated:
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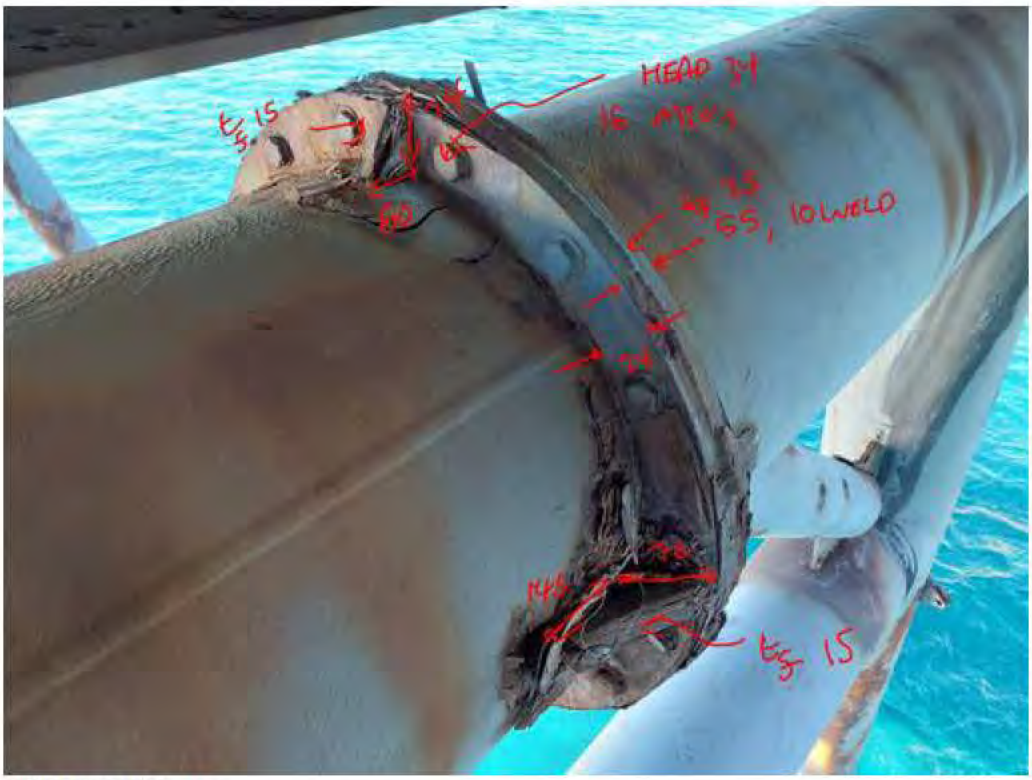

20230630_244552_photo

Taken on:
30 June 2023 10:45 am

Added on:
30 June 2023 10:52 am

Added by:
[redacted]

20230630_245305_photo

Taken on:
30 June 2023 10:53 am

Added on:
30 June 2023 10:53 am

Added by:
[redacted]

20230630_245315_photo

Taken on:
30 June 2023 10:53 am

Added on:
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Added by:
[redacted]

20230630_245325_photo

Taken on:
30 June 2023 10:53 am

Added on:
30 June 2023 10:53 am

Added by:
[redacted]

20230630_245337_photo

Taken on:
30 June 2023 10:53 am

Added on:
30 June 2023 10:53 am

Added by:
[redacted]

Bent 9-11 - Photo Report - June 30, 2023

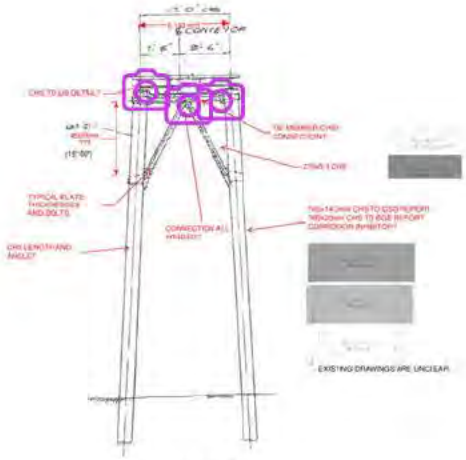
Prepared by : [redacted]

30 June 2023

Description

Geometry

BENT 9 - POINTCLOUD
BENT 10,11 - SIM



SECTION B-B
BENT 9 - SECTION

Newcastle Office –

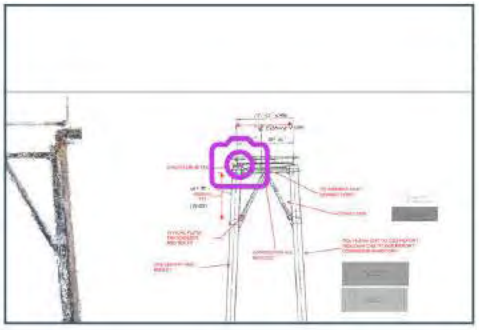
CATHERINE HILL BAY JETTY
CATHERINE HILL BAY, NSW

ISSUED FOR INFORMATION

BENTS 9 TO 11

N23028 MT-1000

CHS UB



Created:
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Last Updated:
[redacted]
30 June 2023 11:48 am

20230630_014626_photo

Taken on:
30 June 2023 11:46 am

Added on:
30 June 2023 11:46 am

Added by:
[redacted]

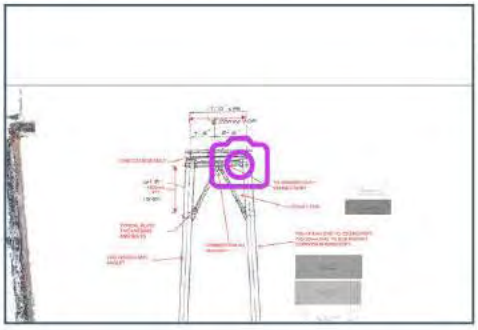
20230630_014654_photo

Taken on:
30 June 2023 11:46 am

Added on:
30 June 2023 11:46 am

Added by:
[redacted]

Tie CHS Connection



Created:
[redacted]
1:48 am

Last Updated:
[redacted]
30 June 2023 11:51 am

20230630_014736_photo
Taken on:
30 June 2023 11:47 am
Added on:
30 June 2023 11:49 am
Added by:
[redacted]

20230630_014931_photo

Taken on:
30 June 2023 11:49 am

Added on:
30 June 2023 11:49 am

Added by:
[redacted]

20230630_014942_photo

Taken on:
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Added on:
30 June 2023 11:49 am

Added by:
[redacted]

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Taken on:
30 June 2023 11:49 am

Added on:
30 June 2023 11:50 am

Added by:
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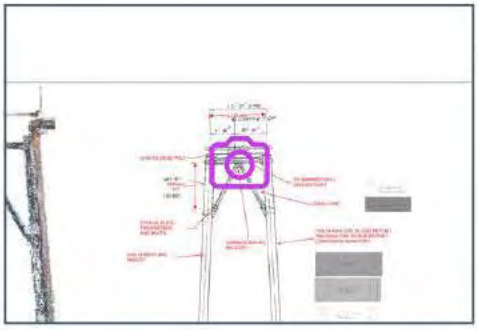
Connection Welded



Created:
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1:51 am

Last Updated:
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30 June 2023 11:52 am

20230630_015116_photo

Taken on:
30 June 2023 11:51 am

Added on:
30 June 2023 11:51 am

Added by:
[redacted]

20230630_015125_photo

Taken on:
30 June 2023 11:51 am

Added on:
30 June 2023 11:51 am

Added by:
[redacted]

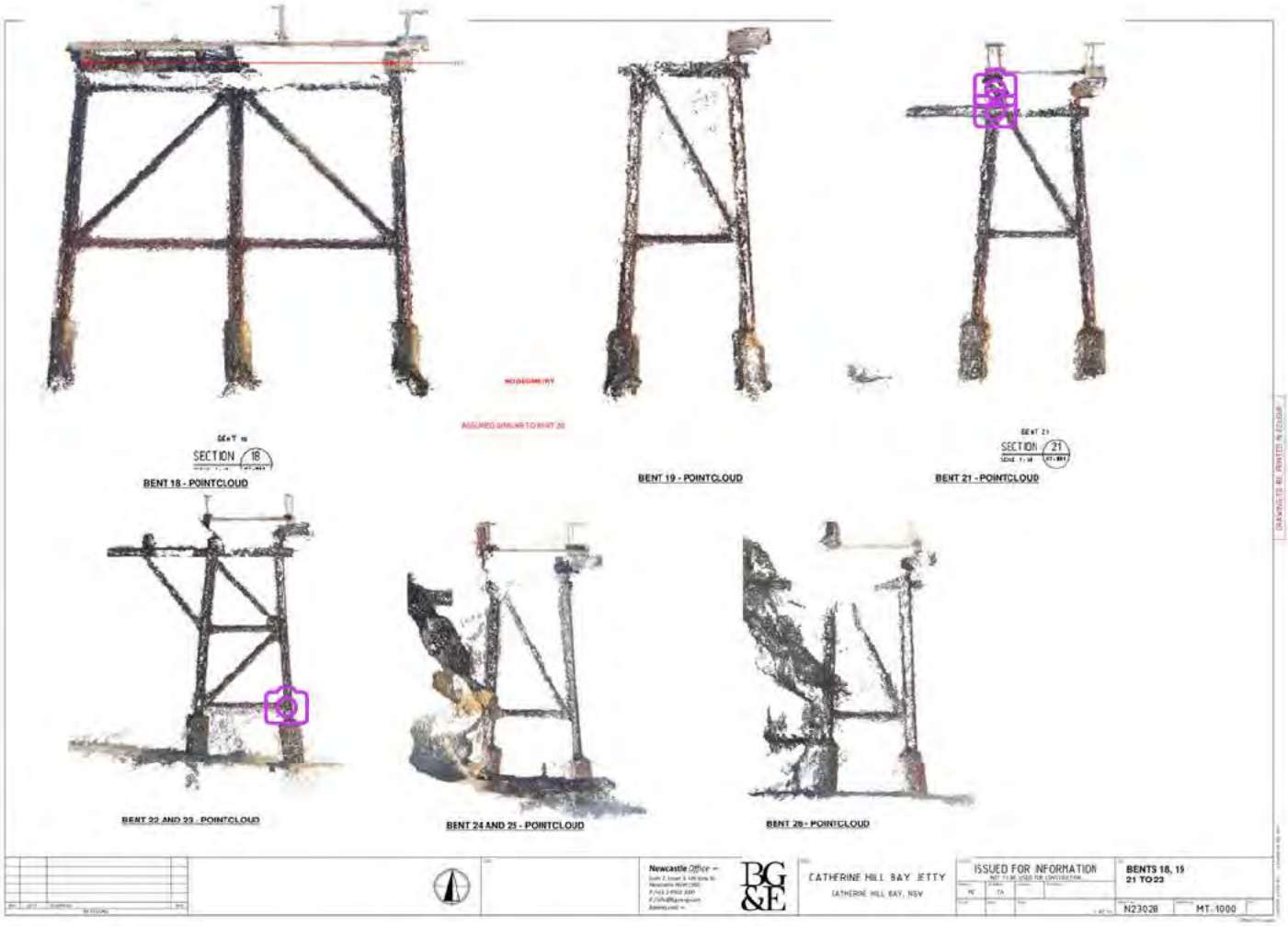
Bent 21 - Photo report - July 4, 2023

Prepared by : [redacted]

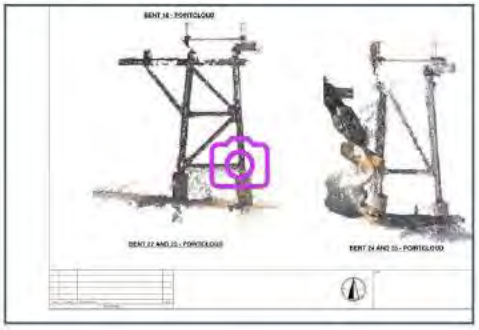
4 July 2023

Description

Geometry


SECTION 18
BENT 18 - POINTCLOUD
BENT 19 - POINTCLOUD
SECTION 21
BENT 21 - POINTCLOUD
BENT 22 AND 23 - POINTCLOUD
BENT 24 AND 25 - POINTCLOUD
BENT 26 - POINTCLOUD
CATHERINE HILL BAY JETTY
CATHERINE HILL BAY, NSW
ISSUED FOR INFORMATION
BENTS 18, 19
21 TO 23
N23028
MT-1000

Measurements



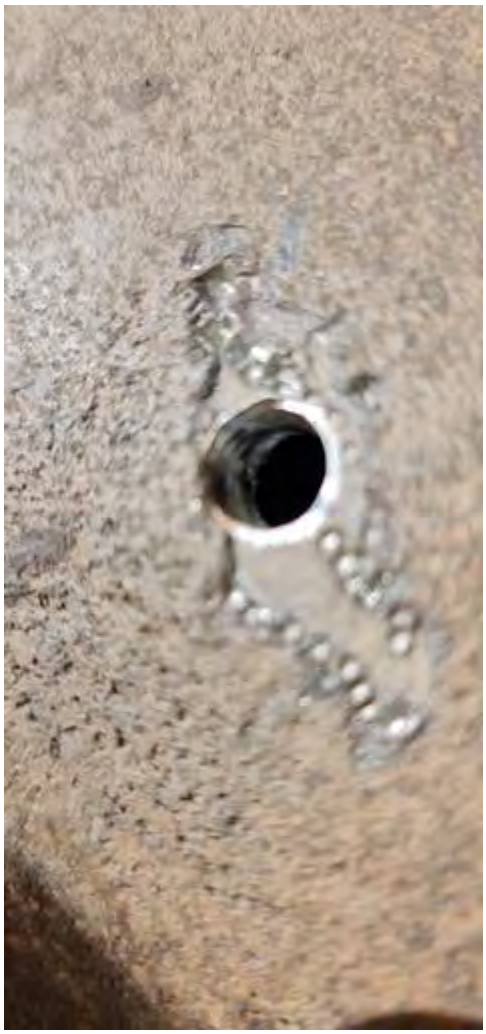
Last Updated:
[redacted]
14 June 2023 4:07 pm

20230614_243132_photo

Taken on:
14 June 2023 10:31 am

Added on:
14 June 2023 10:37 am

Added by:
[redacted]



20230614_120818.jpg

Taken on:
14 June 2023 12:08 pm

Added on:
14 June 2023 4:06 pm

Added by:
[redacted]

33° 9′ 34.36920″ S
151° 37′ 51.70080″ E

20230614_120825.jpg

Taken on:
14 June 2023 12:08 pm

Added on:
14 June 2023 4:06 pm

Added by:
[redacted]

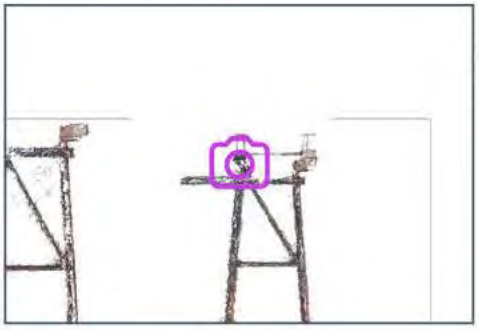
33° 9′ 34.65000″ S
151° 37′ 51.22920″ E

MicrosoftTeams-image (2)

Added on:
14 June 2023 3:40 pm

Added by:
[redacted]

Bent 21 CHS



Created:
[redacted]
4 July 2023 6:16 pm

Last Updated:
[redacted]
4 July 2023 6:28 pm

20230704_051445_photo

Taken on:
4 July 2023 3:14 pm

Added on:
4 July 2023 3:14 pm

Added by:
[redacted]

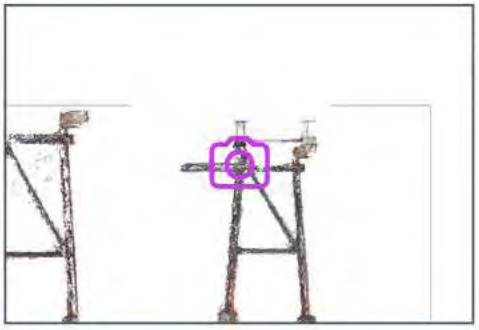
20230704_051457_photo

Taken on:
4 July 2023 3:14 pm

Added on:
4 July 2023 3:15 pm

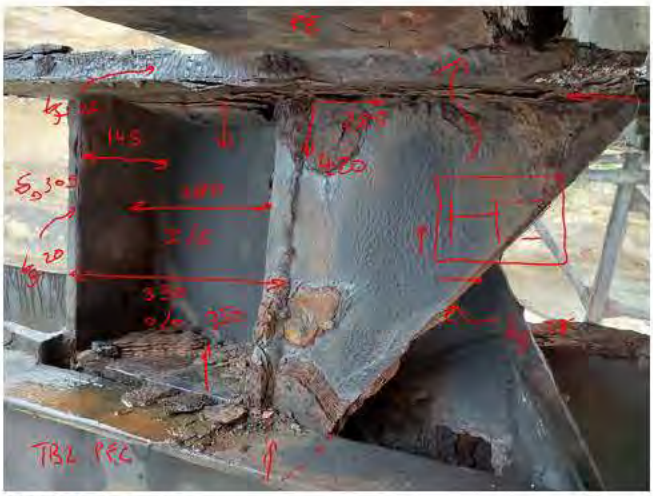
Added by:
[redacted]

UC



Created:
[redacted]
4 July 2023 6:17 pm

Last Updated:
[redacted]
4 July 2023 6:28 pm



20230704_051540_photo

Taken on:
4 July 2023 3:15 pm

Added on:
4 July 2023 3:20 pm

Added by:
[redacted]

20230704_052012_photo

Taken on:
4 July 2023 3:20 pm

Added on:
4 July 2023 3:20 pm

Added by:
[redacted]

20230704_052021_photo

Taken on:
4 July 2023 3:20 pm

Added on:
4 July 2023 3:20 pm

Added by:
[redacted]

20230704_052021_photo_edited

Taken on:
4 July 2023 3:20 pm

Added on:
4 July 2023 3:21 pm

Added by:
[redacted]

20230704_052032_photo

Taken on:
4 July 2023 3:20 pm

Added on:
4 July 2023 3:20 pm

Added by:
[redacted]

20230704_052046_photo

Taken on:
4 July 2023 3:20 pm

Added on:
4 July 2023 3:20 pm

Added by:
[redacted]

20230704_052058_photo

Taken on:
4 July 2023 3:20 pm

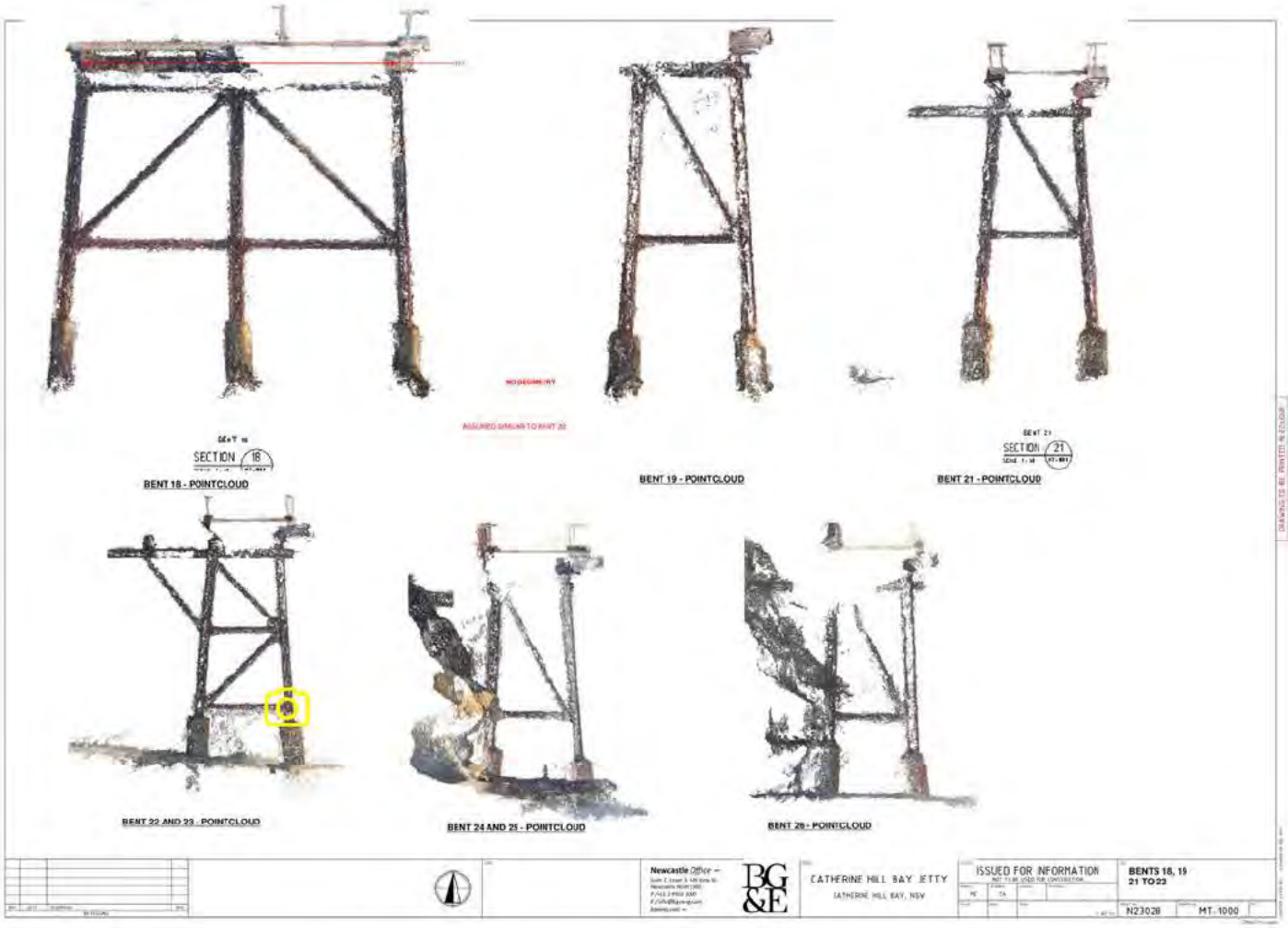
Added on:
4 July 2023 3:21 pm

Added by:
[redacted]

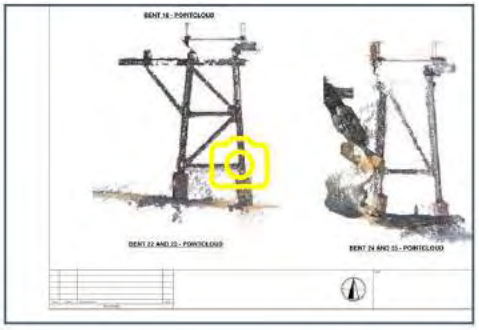
Bent 22 - Photo Report - June 14, 2023

Prepared by : [redacted]

14 June 2023


SECTION 18
BENT 18 - POINTCLOUD
BENT 19 - POINTCLOUD
SECTION 21
BENT 21 - POINTCLOUD
BENT 22 AND 23 - POINTCLOUD
BENT 24 AND 25 - POINTCLOUD
BENT 26 - POINTCLOUD
CATHERINE HILL BAY JETTY
CATHERINE HILL BAY, NSW
ISSUED FOR INFORMATION
BENTS 18, 19
21 TO 23
N23028
MT-1000

Measurements



Last Updated:
[redacted]
14 June 2023 2:26 pm

20230614_243132_photo
Taken on:
14 June 2023 10:31 am
Added on:
14 June 2023 10:37 am
Added by:
[redacted]

MicrosoftTeams-image (2)
Added on:
14 June 2023 3:40 pm
Added by:
[redacted]

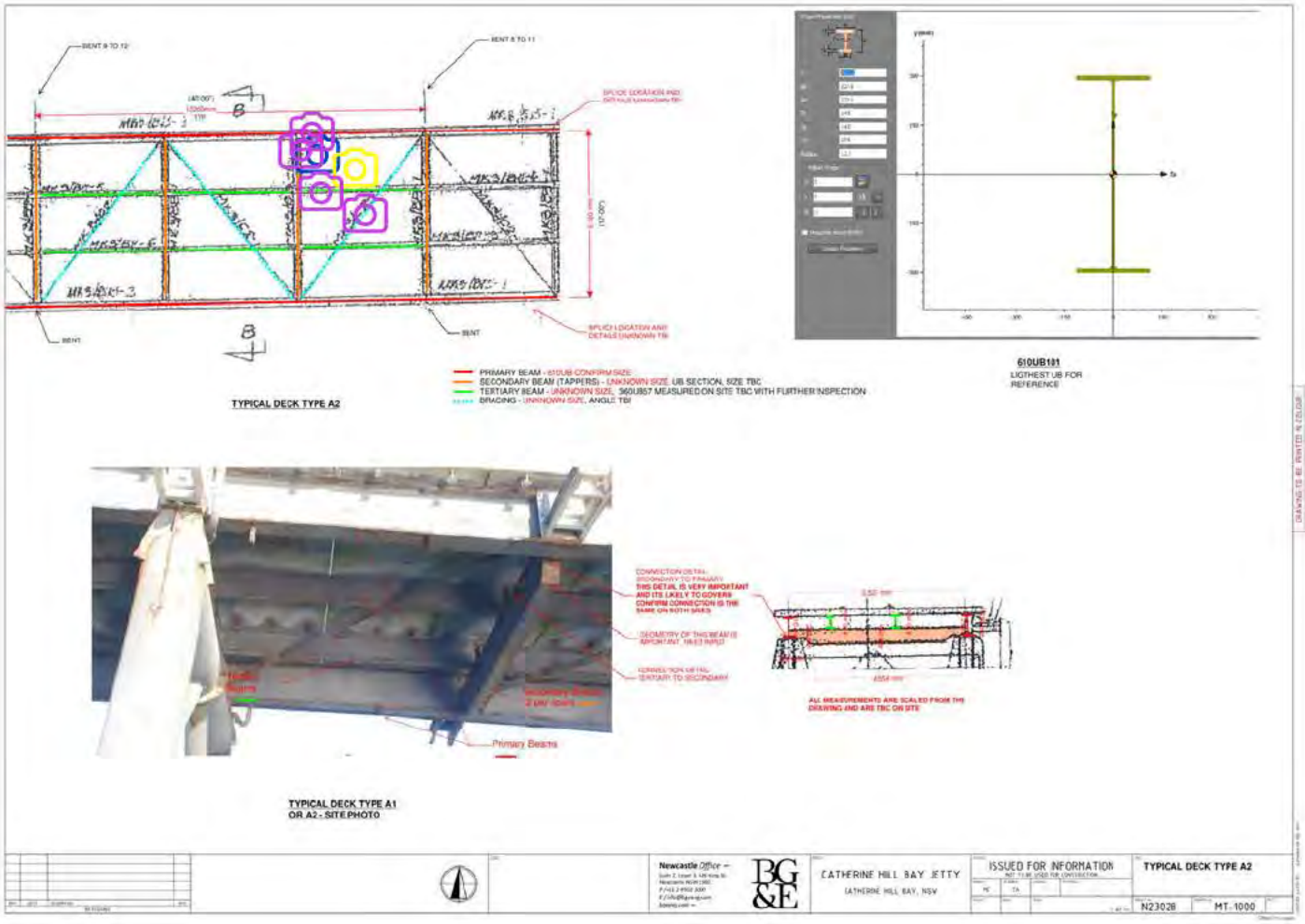
Deck A2 - Photo Report - June 30, 2023

Prepared by : [redacted]

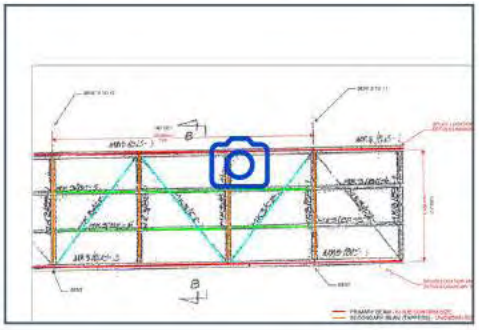
30 June 2023

Description

Geometry

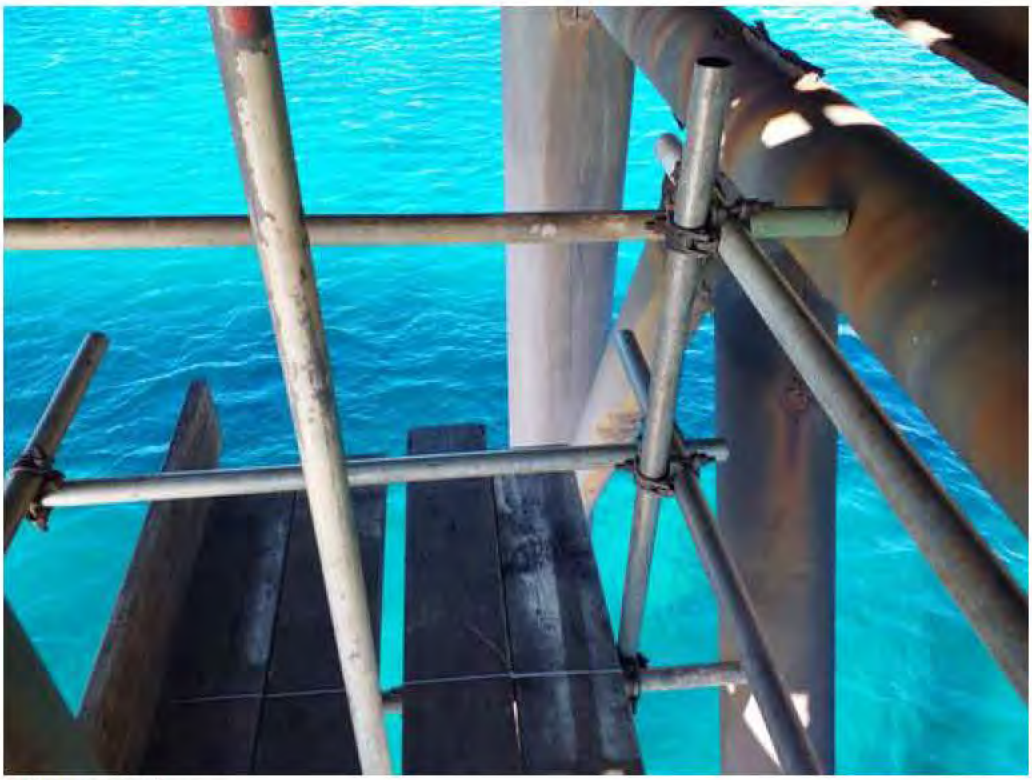

BENT 9 TO 12
BENT 8 TO 11
SPLICE LOCATION AND DETAILS UNKNOWN TBI
BENT
SPLICE LOCATION AND DETAILS UNKNOWN TBI
PRIMARY BEAM - 610UB CONFIRM SIZE
SECONDARY BEAM (TAPPERS) - UNKNOWN SIZE, UB SECTION, SIZE TBC
TERTIARY BEAM - UNKNOWN SIZE, 360UB57 MEASURED ON SITE TBC WITH FURTHER INSPECTION
BRACING - UNKNOWN SIZE, ANGLE TBI
TYPICAL DECK TYPE A2
610UB101
LIGTHEST UB FOR REFERENCE
CONNECTION DETAIL SECONDARY TO PRIMARY
THIS DETAIL IS VERY IMPORTANT AND ITS LIKELY TO GOVERN CONFIRM CONNECTION IS THE SAME ON BOTH SIDES
GEOMETRY OF THIS BEAM IS IMPORTANT VALUES INPUT
CONNECTION DETAIL TERTIARY TO SECONDARY
Primary Beams
ALL MEASUREMENTS ARE SCALED FROM THIS DRAWING AND ARE TBC ON SITE
TYPICAL DECK TYPE A1
OR A2 - SITE PHOTO
Newcastle Office
CATHERINE HILL BAY JETTY
CATHERINE HILL BAY, NSW
ISSUED FOR INFORMATION
TYPICAL DECK TYPE A2
N23028
MT-1000

Scaffold Location



Created:
[redacted]

Last Updated:
[redacted]
30 June 2023 11:20 am

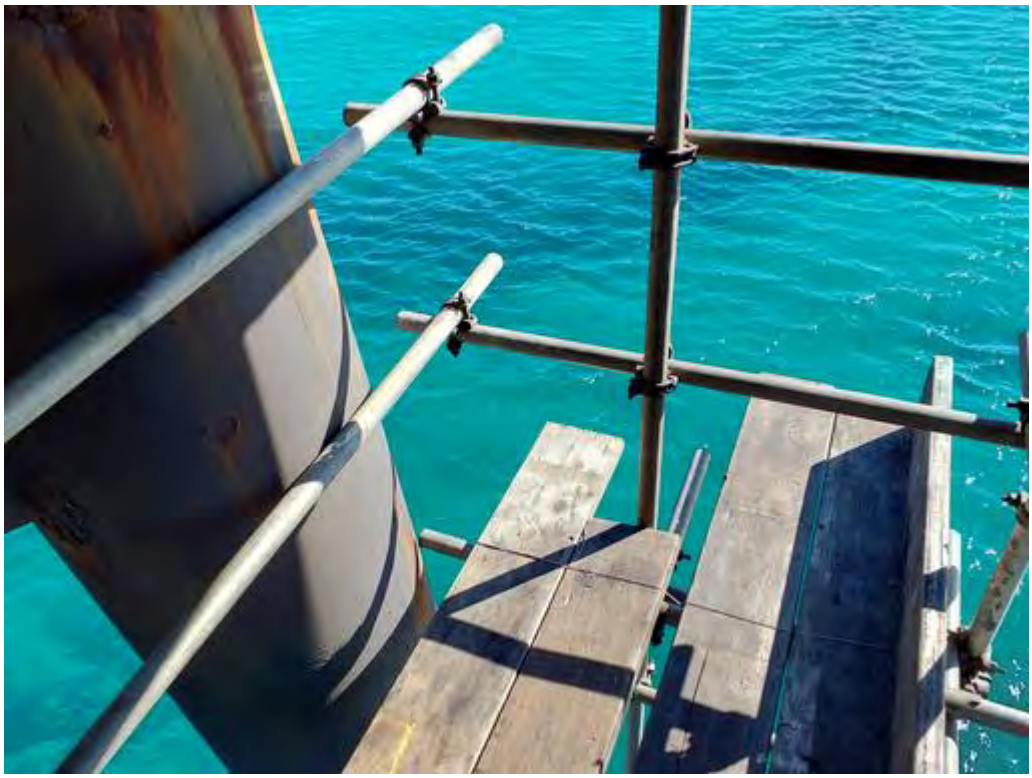


20230630_011731_photo

Taken on:
30 June 2023 11:17 am

Added on:
30 June 2023 11:17 am

Added by:
[redacted]



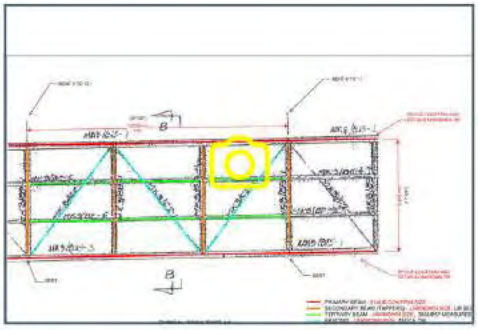
20230630_011742_photo

Taken on:
30 June 2023 11:17 am

Added on:
30 June 2023 11:17 am

Added by:
[redacted]

Concrete



Created:

Last Updated:
[redacted]
30 June 2023 11:20 am

20230630_011825_photo

Taken on:
30 June 2023 11:18 am

Added on:
30 June 2023 11:18 am

Added by:
[redacted]

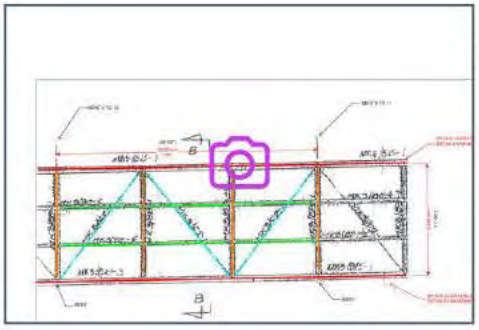
20230630_011840_photo

Taken on:
30 June 2023 11:18 am

Added on:
30 June 2023 11:18 am

Added by:
[redacted]

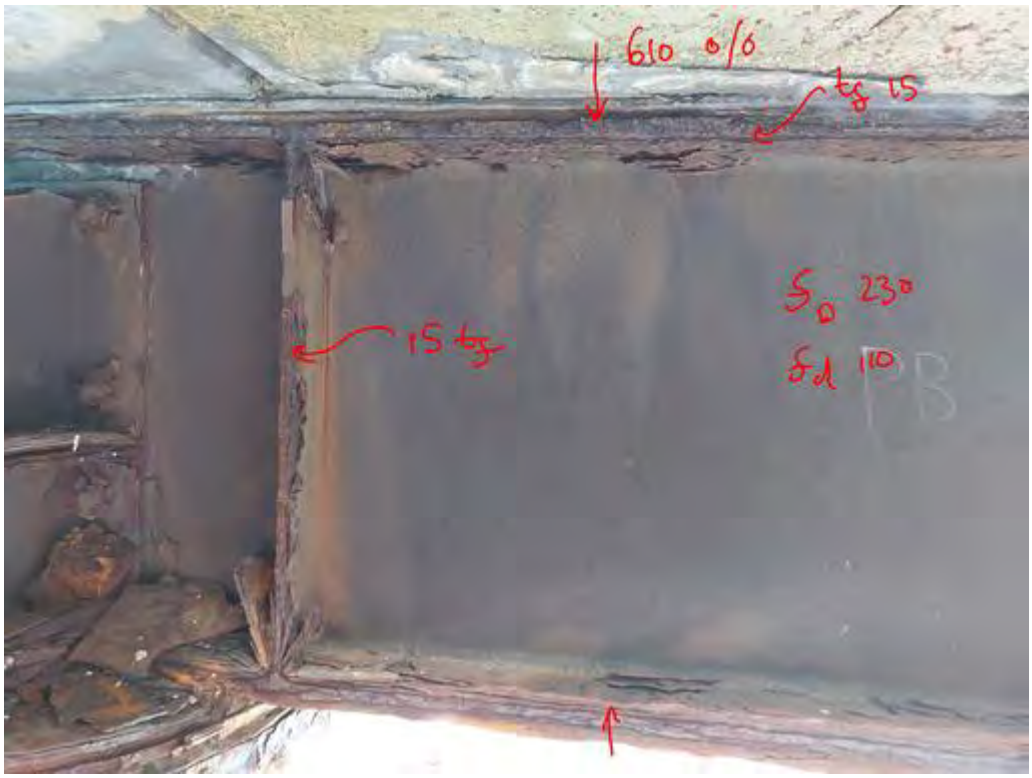
PB



Created:
[redacted]

Last Updated:
[redacted]
30 June 2023 11:23 am

20230630_012002_photo
Taken on:
30 June 2023 11:20 am
Added on:
30 June 2023 11:20 am
Added by:
[redacted]



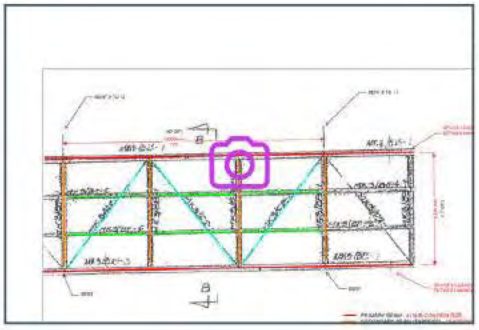
20230630_012002_photo_edited

Taken on:
30 June 2023 11:20 am

Added on:
30 June 2023 11:23 am

Added by:
[redacted]

SB



Created:
[redacted]

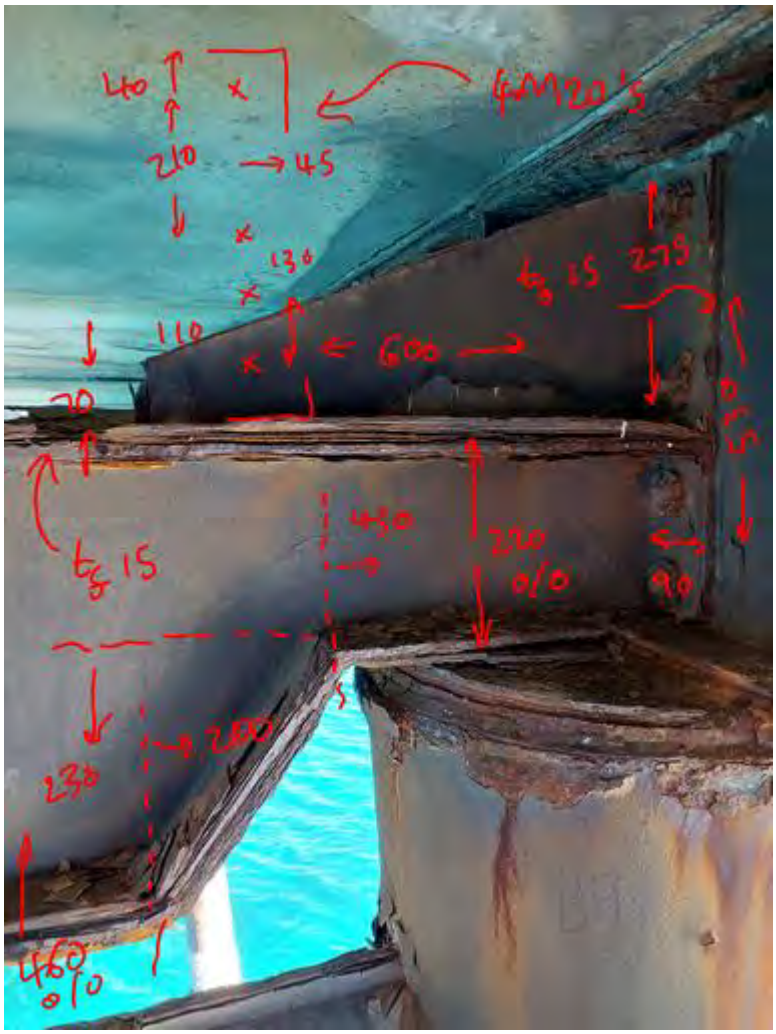
Last Updated:
[redacted]
30 June 2023 11:37 am

20230630_012418_photo

Taken on:
30 June 2023 11:24 am

Added on:
30 June 2023 11:24 am

Added by:
[redacted]



20230630_012704_photo

Taken on:
30 June 2023 11:27 am

Added on:
30 June 2023 11:33 am

Added by:
[redacted]

20230630_013346_photo

Taken on:
30 June 2023 11:33 am

Added on:
30 June 2023 11:33 am

Added by:
[redacted]

20230630_013355_photo

Taken on:
30 June 2023 11:33 am

Added on:
30 June 2023 11:33 am

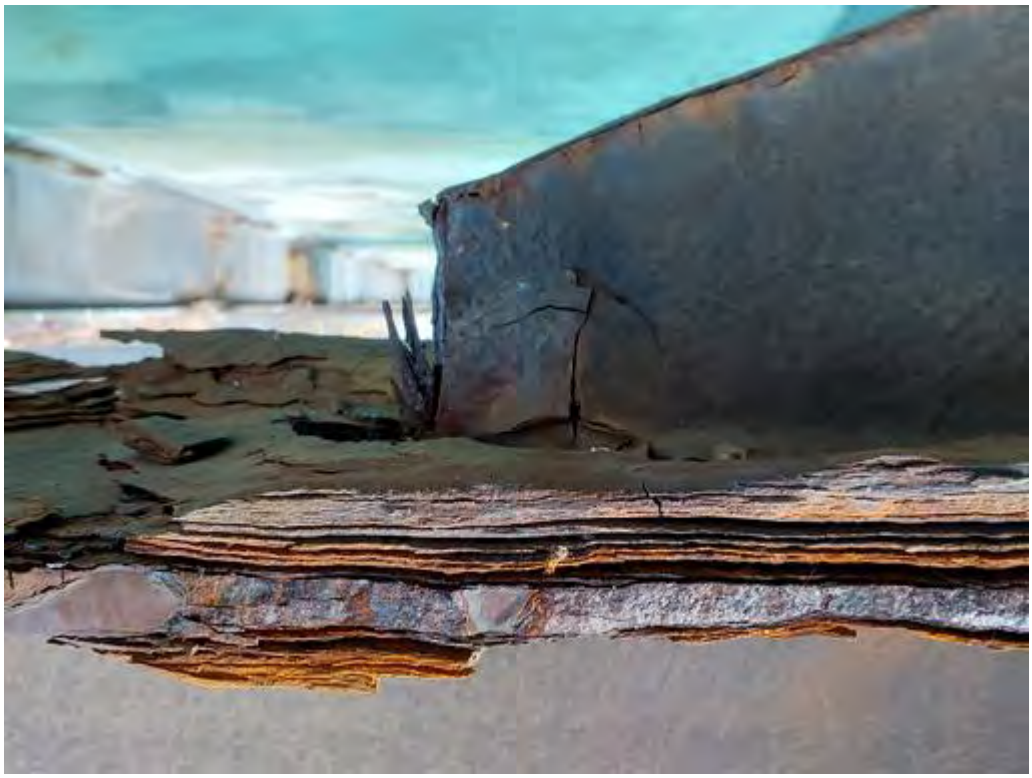
Added by:
[redacted]

20230630_013405_photo

Taken on:
30 June 2023 11:34 am

Added on:
30 June 2023 11:34 am

Added by:
[redacted]



20230630_013413_photo

Taken on:
30 June 2023 11:34 am

Added on:
30 June 2023 11:34 am

Added by:
[redacted]

20230630_013425_photo

Taken on:
30 June 2023 11:34 am

Added on:
30 June 2023 11:34 am

Added by:
[redacted]

20230630_013435_photo

Taken on:
30 June 2023 11:34 am

Added on:
30 June 2023 11:34 am

Added by:
[redacted]

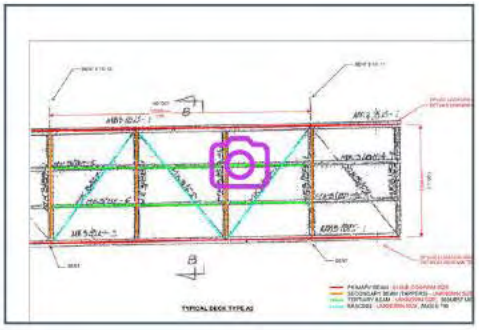
20230630_013443_photo

Taken on:
30 June 2023 11:34 am

Added on:
30 June 2023 11:34 am

Added by:
[redacted]

TB



Created:

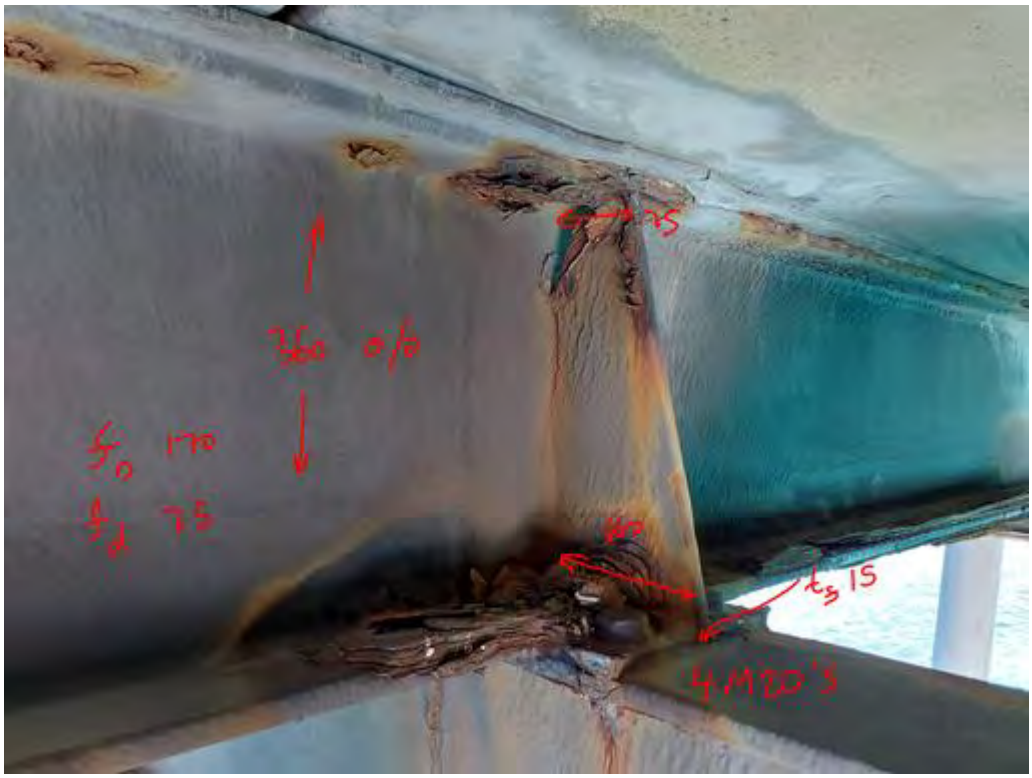
Last Updated:
[redacted]
30 June 2023 11:42 am

20230630_013509_photo

Taken on:
30 June 2023 11:35 am

Added on:
30 June 2023 11:35 am

Added by:
[redacted]



20230630_013509_photo_edited

Taken on:
30 June 2023 11:35 am

Added on:
30 June 2023 11:38 am

Added by:
[redacted]

20230630_013833_photo

Taken on:
30 June 2023 11:38 am

Added on:
30 June 2023 11:38 am

Added by:
[redacted]

20230630_013844_photo

Taken on:
30 June 2023 11:38 am

Added on:
30 June 2023 11:38 am

Added by:
[redacted]

20230630_013851_photo

Taken on:
30 June 2023 11:38 am

Added on:
30 June 2023 11:38 am

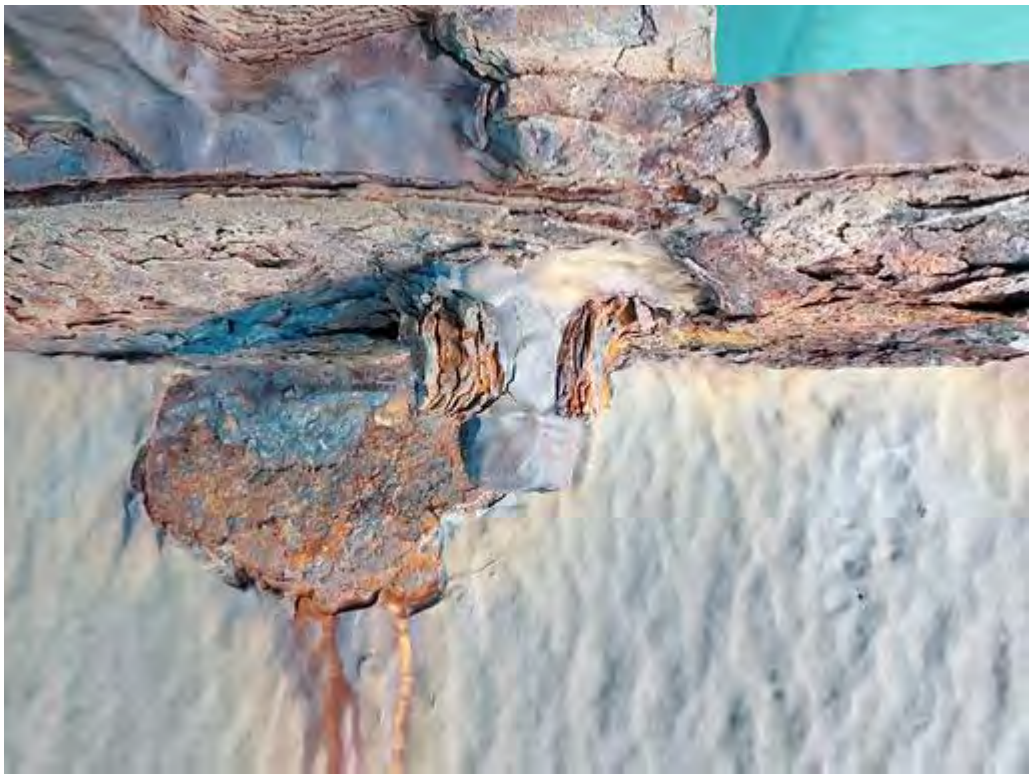
Added by:
[redacted]

20230630_013901_photo

Taken on:
30 June 2023 11:39 am

Added on:
30 June 2023 11:39 am

Added by:
[redacted]



20230630_013907_photo

Taken on:
30 June 2023 11:39 am

Added on:
30 June 2023 11:39 am

Added by:
[redacted]

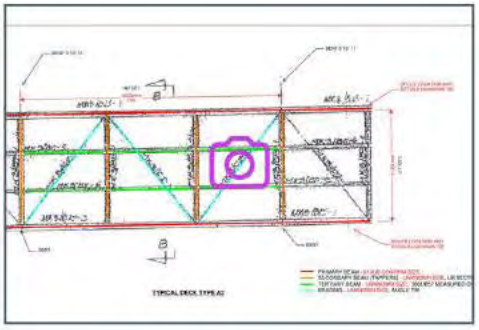
20230630_013919_photo

Taken on:
30 June 2023 11:39 am

Added on:
30 June 2023 11:39 am

Added by:
[redacted]

DB



Created:

Last Updated:
[redacted]
30 June 2023 11:44 am

20230630_013946_photo

Taken on:
30 June 2023 11:39 am

Added on:
30 June 2023 11:39 am

Added by:
[redacted]

20230630_013956_photo

Taken on:
30 June 2023 11:39 am

Added on:
30 June 2023 11:40 am

Added by:
[redacted]

20230630_014006_photo

Taken on:
30 June 2023 11:40 am

Added on:
30 June 2023 11:40 am

Added by:
[redacted]

20230630_014006_photo_edited

Taken on:
30 June 2023 11:40 am

Added on:
30 June 2023 11:41 am

Added by:
[redacted]

20230630_014022_photo

Taken on:
30 June 2023 11:40 am

Added on:
30 June 2023 11:40 am

Added by:
[redacted]

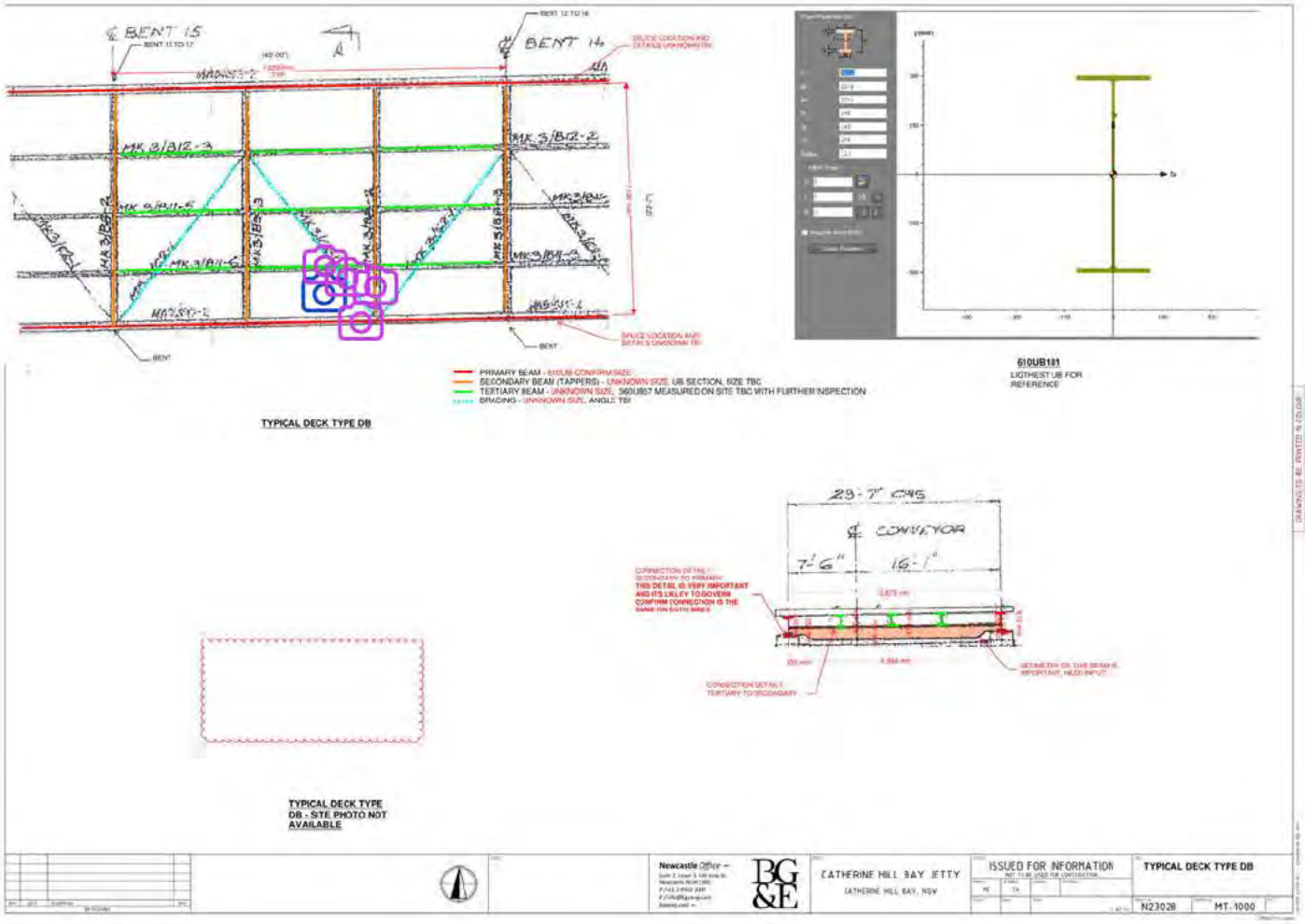
Deck Type DB - Photo Report - June 30, 2023

Prepared by : [redacted]

30 June 2023

Description

Geometry


BENT 15
BENT 14
PRIMARY BEAM - 610UB CONFIRM SIZE
SECONDARY BEAM (TAPPERS) - UNKNOWN SIZE, UB SECTION, SIZE TBC
TERTIARY BEAM - UNKNOWN SIZE, 360UB57 MEASURED ON SITE TBC WITH FURTHER INSPECTION
BRACING - UNKNOWN SIZE, ANGLE TBI
TYPICAL DECK TYPE DB
610UB101
LIGTHEST UB FOR REFERENCE
29'-7" C/C
℄ CONVEYOR
7'-6"
16'-1"
THIS DETAIL IS VERY IMPORTANT AND ITS LIKLEY TO GOVERN CONFIRM CONNECTION IS THE
TYPICAL DECK TYPE DB - STE PHOTO NOT AVAILABLE
Newcastle Office –
CATHERINE HILL BAY JETTY
CATHERINE HILL BAY, NSW
ISSUED FOR INFORMATION
TYPICAL DECK TYPE DB
N23028
MT-1000

Scaffold Location

Last Updated:
[redacted]
30 June 2023 6:11 pm

20230630_034055_photo
Taken on:
30 June 2023 1:40 pm
Added on:
30 June 2023 1:40 pm
Added by:
[redacted]

20230630_034106_photo

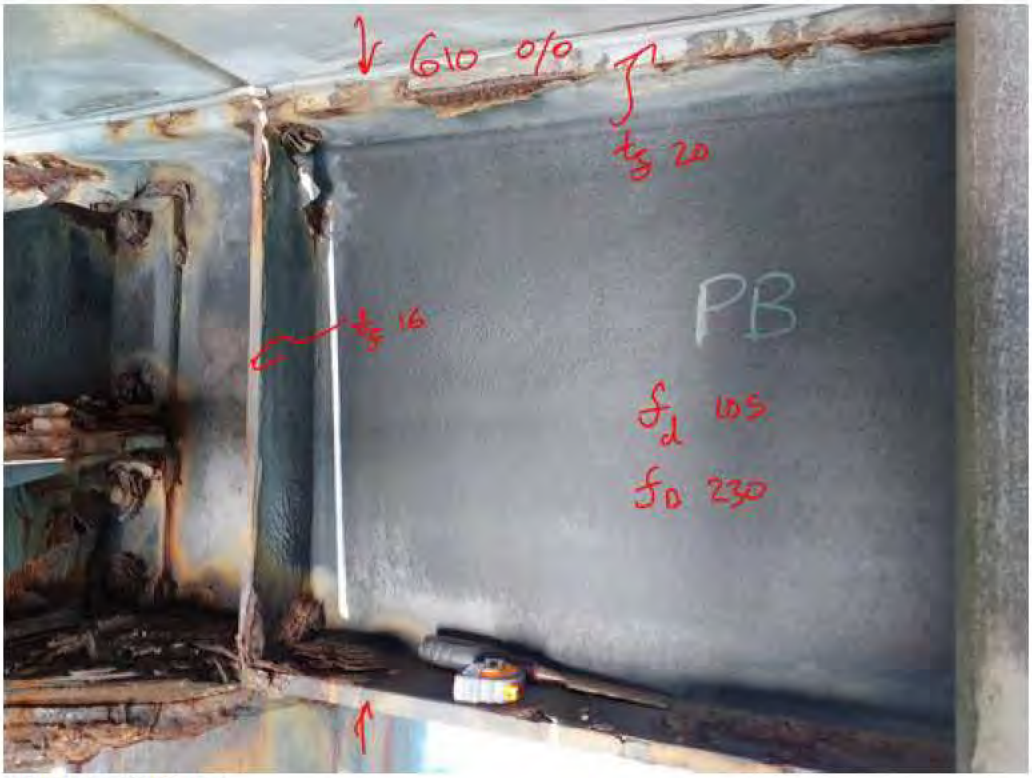
Taken on:
30 June 2023 1:41 pm

Added on:
30 June 2023 1:41 pm

Added by:
[redacted]

PB

Last Updated:
[redacted]
30 June 2023 6:12 pm



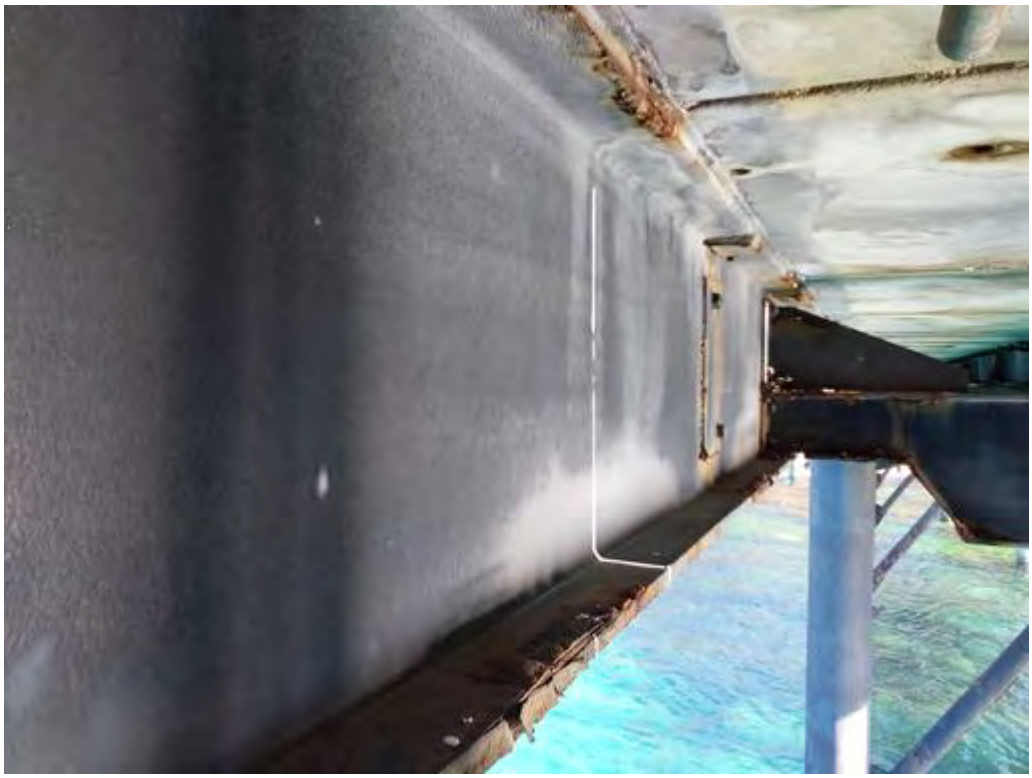
20230630_034346_photo
Taken on:
30 June 2023 1:43 pm
Added on:
30 June 2023 1:45 pm
Added by:
[redacted]

20230630_034539_photo

Taken on:
30 June 2023 1:45 pm

Added on:
30 June 2023 1:45 pm

Added by:
[redacted]



20230630_034550_photo

Taken on:
30 June 2023 1:45 pm

Added on:
30 June 2023 1:45 pm

Added by:
[redacted]

20230630_034607_photo

Taken on:
30 June 2023 1:46 pm

Added on:
30 June 2023 1:46 pm

Added by:
[redacted]

20230630_034624_photo

Taken on:
30 June 2023 1:46 pm

Added on:
30 June 2023 1:46 pm

Added by:
[redacted]

20230630_034632_photo

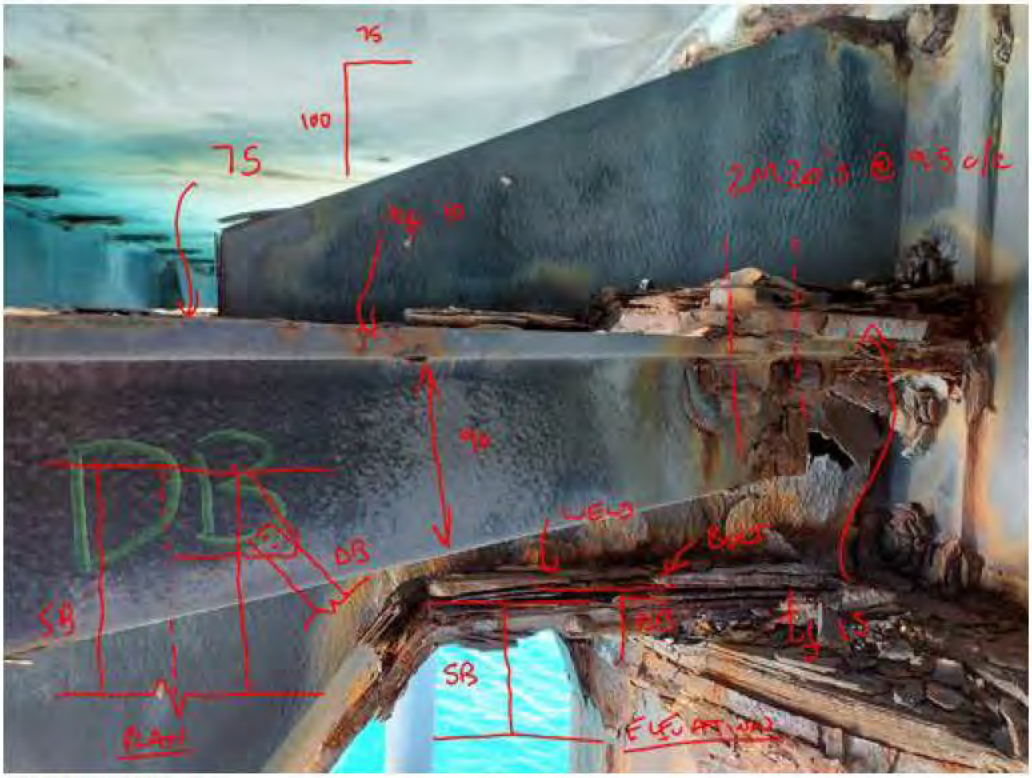
Taken on:
30 June 2023 1:46 pm

Added on:
30 June 2023 1:46 pm

Added by:
[redacted]

DB

Last Updated:
[redacted]
30 June 2023 6:13 pm



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Taken on:
30 June 2023 1:47 pm
Added on:
30 June 2023 1:52 pm
Added by:
[redacted]

20230630_035221_photo

Taken on:
30 June 2023 1:52 pm

Added on:
30 June 2023 1:52 pm

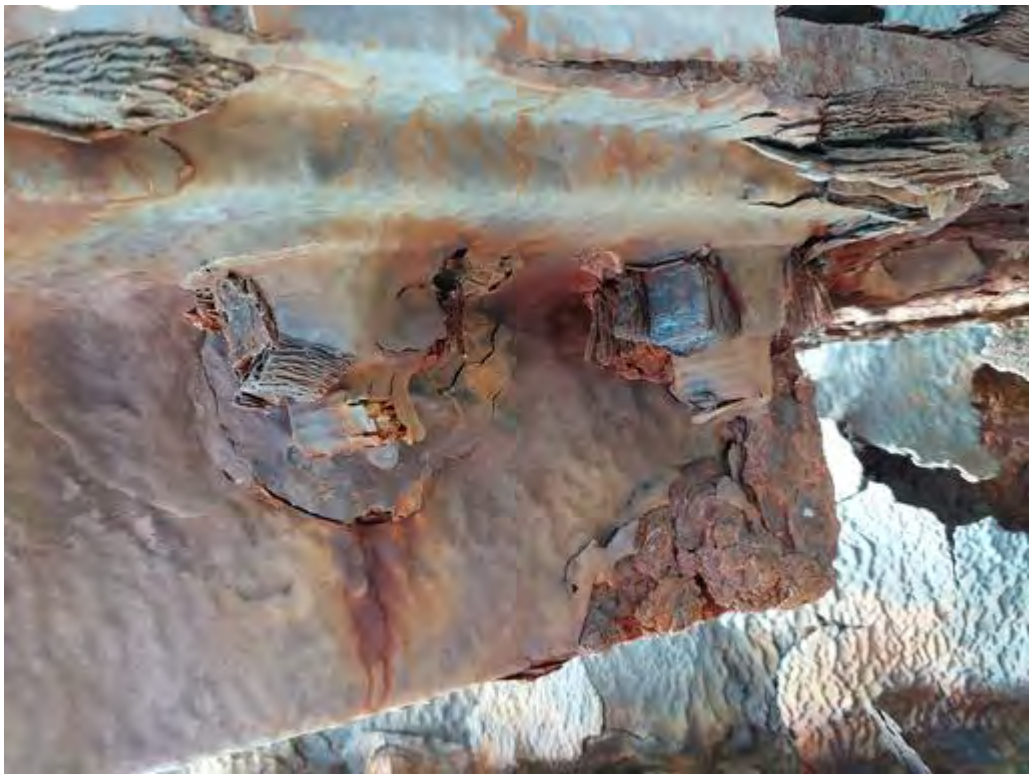
Added by:
[redacted]

20230630_035507_photo

Taken on:
30 June 2023 1:55 pm

Added on:
30 June 2023 1:56 pm

Added by:
[redacted]



20230630_035637_photo

Taken on:
30 June 2023 1:56 pm

Added on:
30 June 2023 1:56 pm

Added by:
[redacted]

20230630_035651_photo

Taken on:
30 June 2023 1:56 pm

Added on:
30 June 2023 1:56 pm

Added by:
[redacted]

SB

Last Updated:
[redacted]
30 June 2023 6:14 pm

20230630_040550_photo
Taken on:
30 June 2023 2:05 pm
Added on:
30 June 2023 2:05 pm
Added by:
[redacted]

20230630_040558_photo

Taken on:
30 June 2023 2:05 pm

Added on:
30 June 2023 2:06 pm

Added by:
[redacted]

20230630_040608_photo

Taken on:
30 June 2023 2:06 pm

Added on:
30 June 2023 2:06 pm

Added by:
[redacted]

20230630_040655_photo

Taken on:
30 June 2023 2:06 pm

Added on:
30 June 2023 2:06 pm

Added by:
[redacted]

20230630_040703_photo

Taken on:
30 June 2023 2:07 pm

Added on:
30 June 2023 2:07 pm

Added by:
[redacted]

20230630_040718_photo

Taken on:
30 June 2023 2:07 pm

Added on:
30 June 2023 2:07 pm

Added by:
[redacted]

20230630_040732_photo

Taken on:
30 June 2023 2:07 pm

Added on:
30 June 2023 2:07 pm

Added by:
[redacted]

TB

Last Updated:
[redacted]
30 June 2023 6:15 pm

20230630_040825_photo
Taken on:
30 June 2023 2:08 pm
Added on:
30 June 2023 2:16 pm
Added by:
[redacted]

20230630_041633_photo

Taken on:
30 June 2023 2:16 pm

Added on:
30 June 2023 2:16 pm

Added by:
[redacted]

20230630_041642_photo

Taken on:
30 June 2023 2:16 pm

Added on:
30 June 2023 2:16 pm

Added by:
[redacted]

20230630_041651_photo

Taken on:
30 June 2023 2:16 pm

Added on:
30 June 2023 2:16 pm

Added by:
[redacted]

20230630_041651_photo_edited

Taken on:
30 June 2023 2:16 pm

Added on:
30 June 2023 2:18 pm

Added by:
[redacted]

20230630_041704_photo

Taken on:
30 June 2023 2:17 pm

Added on:
30 June 2023 2:17 pm

Added by:
[redacted]

20230630_041716_photo

Taken on:
30 June 2023 2:17 pm

Added on:
30 June 2023 2:17 pm

Added by:
[redacted]

20230630_041723_photo

Taken on:
30 June 2023 2:17 pm

Added on:
30 June 2023 2:17 pm

Added by:
[redacted]

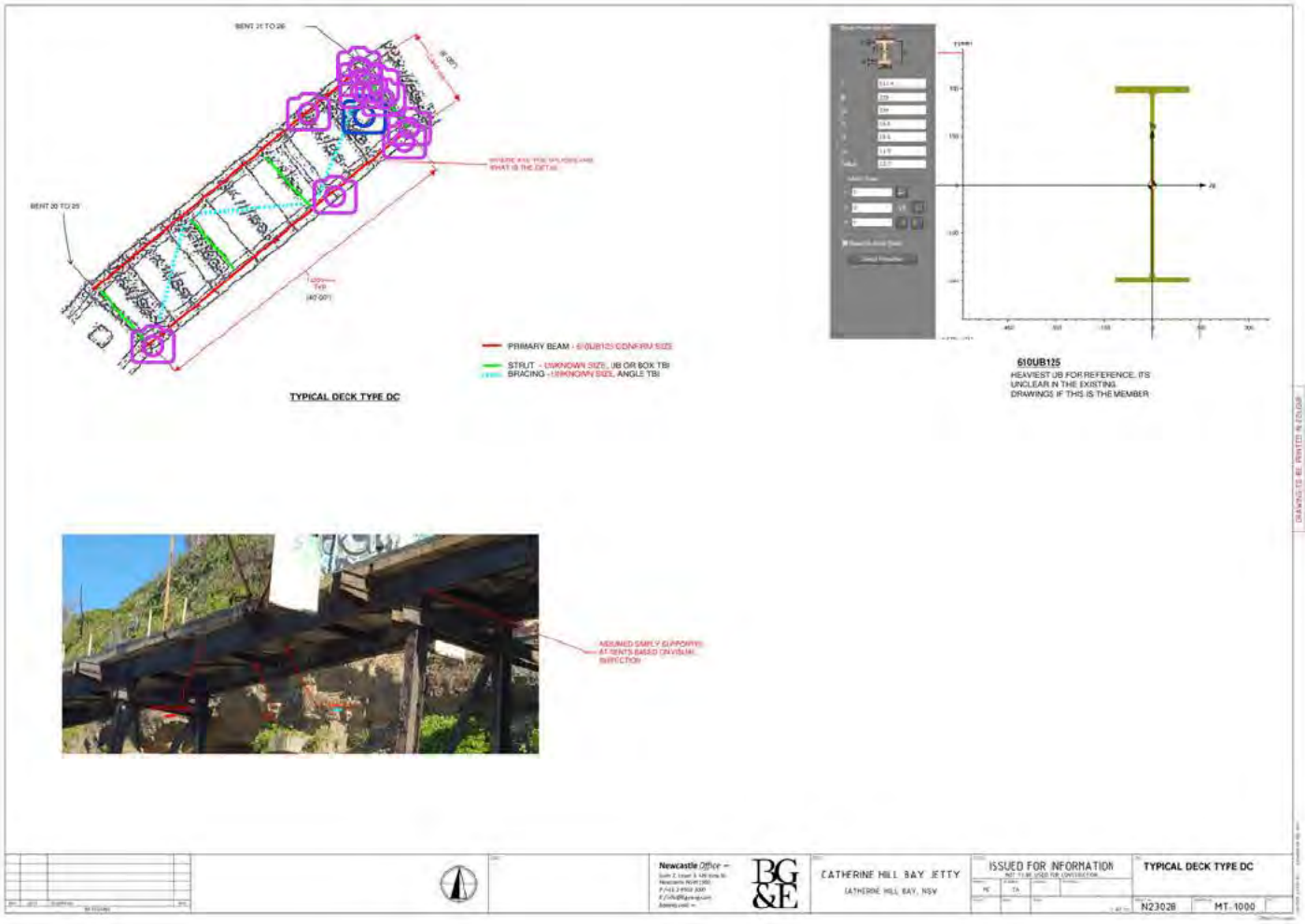
Deck Type DC - Photo report - July 4, 2023

Prepared by : [redacted]

4 July 2023

Description

Geometry


BENT 21 TO 26
BENT 20 TO 25
PRIMARY BEAM - 610UB125 CONFIRM SIZE
STRUT - UNKNOWN SIZE, UB OR BOX TBI
BRACING - UNKNOWN SIZE, ANGLE TBI
TYPICAL DECK TYPE DC
610UB125
HEAVIEST UB FOR REFERENCE. IT'S UNCLEAR IN THE EXISTING DRAWINGS IF THIS IS THE MEMBER
ASSUMED SIMPLY SUPPORTED AT TENTS BASED ON VISUAL INSPECTION
Newcastle Office
CATHERINE HILL BAY JETTY
CATHERINE HILL BAY, NSW
ISSUED FOR INFORMATION
TYPICAL DECK TYPE DC
N23028
MT-1000

Typical Bent 26 Details

Created:
[redacted]

Last Updated:
[redacted]
14 June 2023 4:08 pm

20230614_245727_photo

Taken on:
14 June 2023 10:57 am

Added on:
14 June 2023 10:57 am

Added by:
[redacted]

20230614_245738_photo

Taken on:
14 June 2023 10:57 am

Added on:
14 June 2023 10:57 am

Added by:
[redacted]

20230614_245757_photo

Taken on:
14 June 2023 10:57 am

Added on:
14 June 2023 11:02 am

Added by:
[redacted]

20230614_110058.jpg

Taken on:
14 June 2023 11:00 am

Added on:
14 June 2023 4:07 pm

Added by:
[redacted]

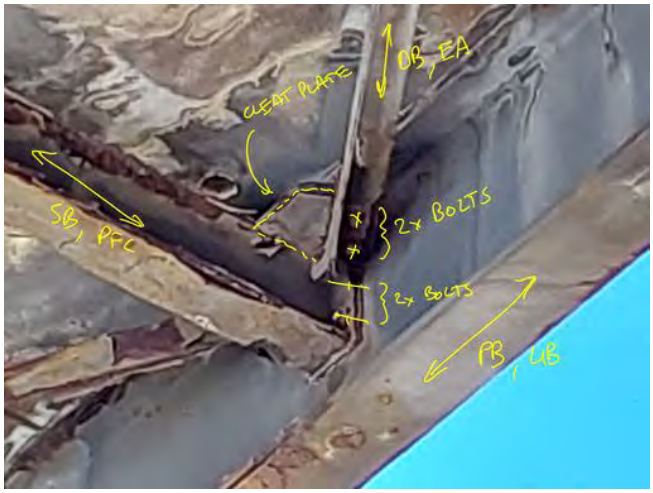
33° 9′ 33.37920″ S
151° 37′ 50.77920″ E

20230614_010301_photo

Taken on:
14 June 2023 11:03 am

Added on:
14 June 2023 11:04 am

Added by:
[redacted]



20230614_012348_photo

Taken on:
14 June 2023 11:23 am

Added on:
14 June 2023 11:25 am

Added by:
[redacted]

20230614_110355.jpg

Taken on:
14 June 2023 11:03 am

Added on:
14 June 2023 4:07 pm

Added by:
[redacted]

33° 17′ 35.85840″ S
151° 28′ 3.98280″ E

Not every PB connection has a stiffener

Created:

Last Updated:
[redacted]

14 June 2023 3:44 pm

20230614_011207_photo

Taken on:
14 June 2023 11:12 am

Added on:
14 June 2023 11:12 am

Added by:
[redacted]

Simply Supported

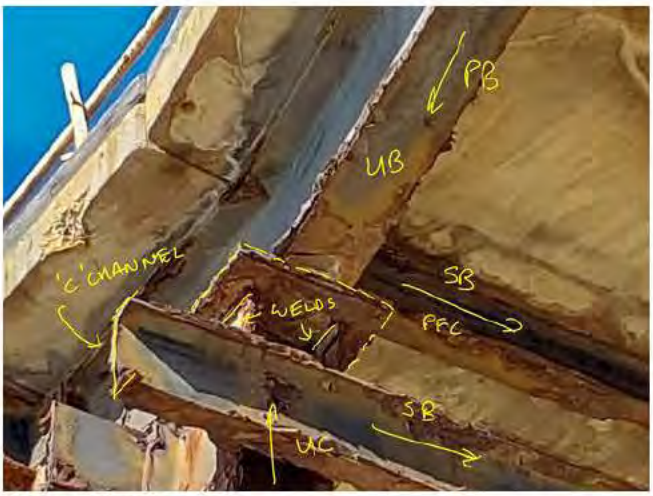
Last Updated:
[redacted]
14 June 2023 3:44 pm

20230614_011436_photo

Taken on:
14 June 2023 11:14 am

Added on:
14 June 2023 11:16 am

Added by:
[redacted]



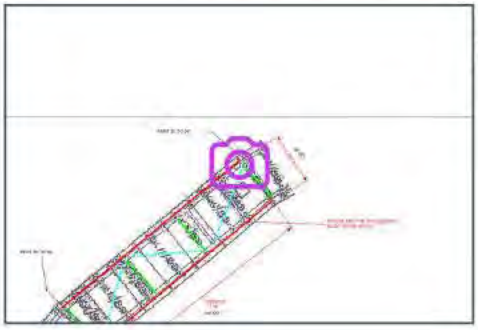
20230614_012117_photo

Taken on:
14 June 2023 11:21 am

Added on:
14 June 2023 11:22 am

Added by:
[redacted]

Bracing Connection



Created:
[redacted]
14 June 2023 2:27 pm

Last Updated:
[redacted]
14 June 2023 4:07 pm

20230614_111304.jpg

Taken on:
14 June 2023 11:13 am

Added on:
14 June 2023 4:07 pm

Added by:
[redacted]

33° 9′ 33.51960″ S
151° 37′ 50.49840″ E

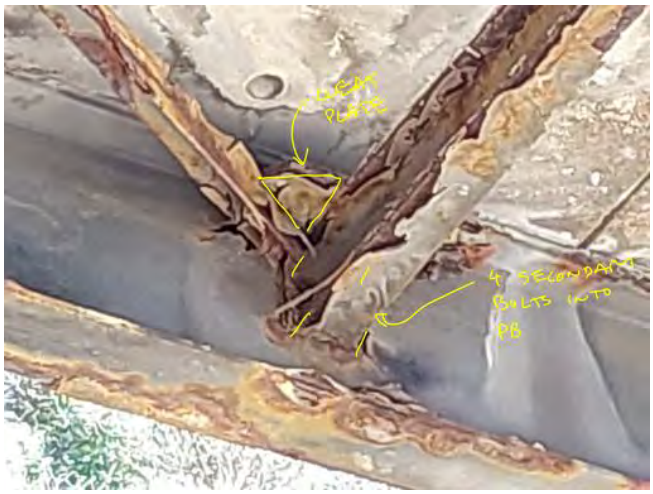
20230614_111337.jpg

Taken on:
14 June 2023 11:13 am

Added on:
14 June 2023 4:07 pm

Added by:
[redacted]

33° 9′ 34.05960″ S
151° 37′ 51.13920″ E



20230614_011643_photo

Taken on:
14 June 2023 11:16 am

Added on:
14 June 2023 11:19 am

Added by:
[redacted]

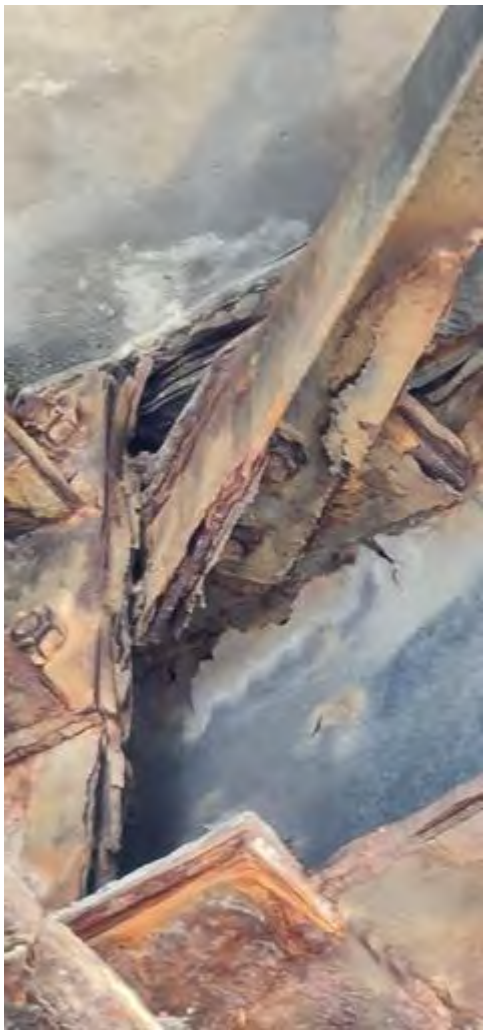
20230614_111836.jpg

Taken on:
14 June 2023 11:18 am

Added on:
14 June 2023 4:07 pm

Added by:
[redacted]

33° 9′ 33.86160″ S
151° 37′ 50.76840″ E



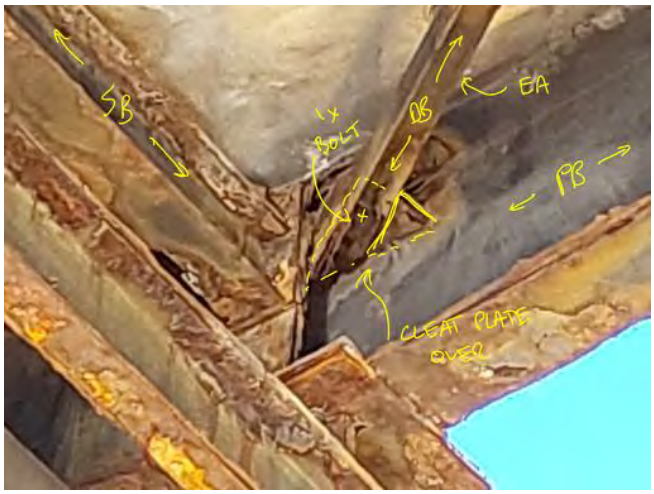
20230614_111913.jpg

Taken on:
14 June 2023 11:19 am

Added on:
14 June 2023 4:07 pm

Added by:
[redacted]

33° 9′ 34.22880″ S
151° 37′ 50.86920″ E



20230614_011938_photo

Taken on:
14 June 2023 11:19 am

Added on:
14 June 2023 11:20 am

Added by:
[redacted]

20230614_112323.jpg

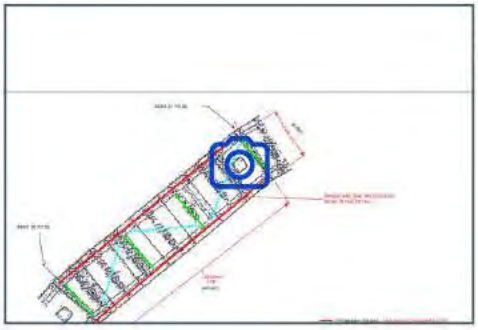
Taken on:
14 June 2023 11:23 am

Added on:
14 June 2023 4:07 pm

Added by:
[redacted]

33° 9′ 34.75080″ S
151° 37′ 51.45960″ E

Scaffold Location



Created:
[redacted]

Last Updated:
[redacted]
4 July 2023 6:28 pm

20230704_044158_photo

Taken on:
4 July 2023 2:41 pm

Added on:
4 July 2023 2:42 pm

Added by:
[redacted]

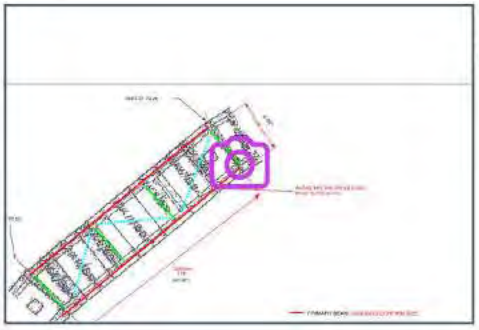
20230704_044211_photo

Taken on:
4 July 2023 2:42 pm

Added on:
4 July 2023 2:42 pm

Added by:
[redacted]

UC



Created:
[redacted]

Last Updated:
[redacted]
4 July 2023 6:28 pm

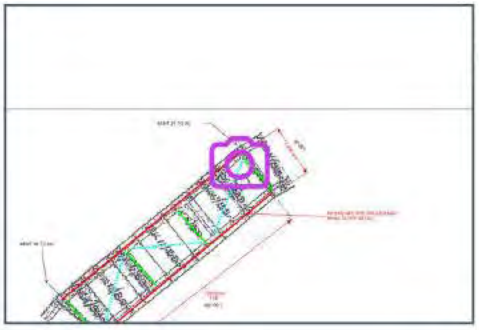
20230704_052702_photo

Taken on:
4 July 2023 3:27 pm

Added on:
4 July 2023 3:27 pm

Added by:
[redacted]

DB



Created:
[redacted]

Last Updated:
[redacted]
4 July 2023 6:28 pm

20230704_052221_photo

Taken on:
4 July 2023 3:22 pm

Added on:
4 July 2023 3:24 pm

Added by:
[redacted]

20230704_052421_photo

Taken on:
4 July 2023 3:24 pm

Added on:
4 July 2023 3:26 pm

Added by:
[redacted]

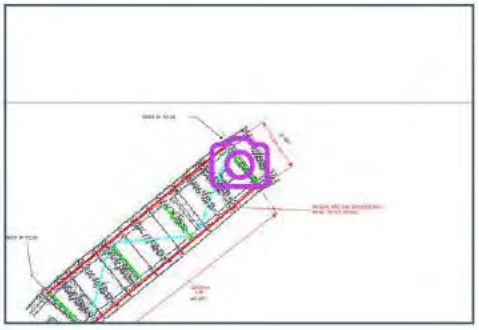
20230704_052619_photo

Taken on:
4 July 2023 3:26 pm

Added on:
4 July 2023 3:26 pm

Added by:
[redacted]

TB1



Created:
[redacted]

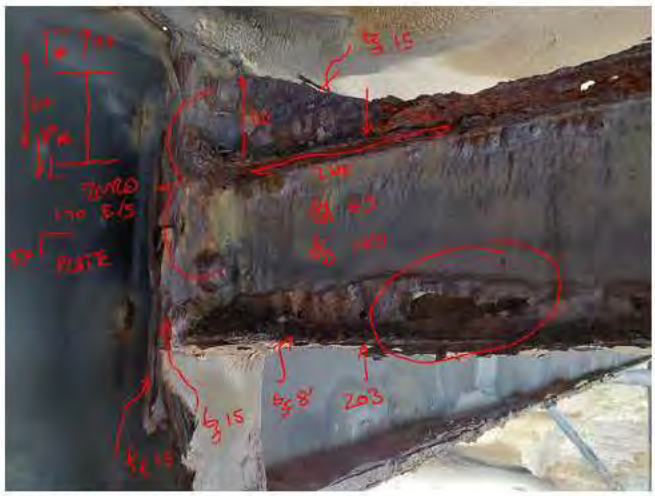
Last Updated:
[redacted]
4 July 2023 6:28 pm

20230704_045652_photo

Taken on:
4 July 2023 2:56 pm

Added on:
4 July 2023 2:57 pm

Added by:
[redacted]



20230704_045733_photo

Taken on:
4 July 2023 2:57 pm

Added on:
4 July 2023 3:04 pm

Added by:
[redacted]

20230704_050518_photo

Taken on:
4 July 2023 3:05 pm

Added on:
4 July 2023 3:05 pm

Added by:
[redacted]

20230704_050527_photo

Taken on:
4 July 2023 3:05 pm

Added on:
4 July 2023 3:05 pm

Added by:
[redacted]

20230704_050535_photo

Taken on:
4 July 2023 3:05 pm

Added on:
4 July 2023 3:05 pm

Added by:
[redacted]

20230704_050549_photo

Taken on:
4 July 2023 3:05 pm

Added on:
4 July 2023 3:05 pm

Added by:
[redacted]

20230704_050600_photo

Taken on:
4 July 2023 3:06 pm

Added on:
4 July 2023 3:06 pm

Added by:
[redacted]

20230704_050610_photo

Taken on:
4 July 2023 3:06 pm

Added on:
4 July 2023 3:06 pm

Added by:
[redacted]

20230704_050619_photo

Taken on:
4 July 2023 3:06 pm

Added on:
4 July 2023 3:06 pm

Added by:
[redacted]

20230704_050630_photo

Taken on:
4 July 2023 3:06 pm

Added on:
4 July 2023 3:06 pm

Added by:
[redacted]

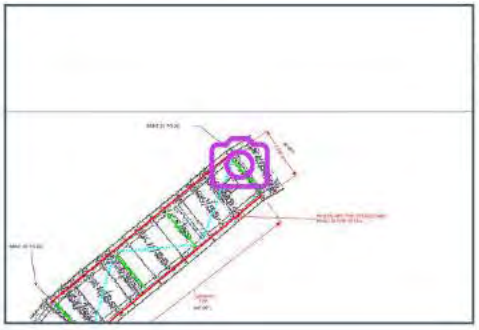
20230704_050639_photo

Taken on:
4 July 2023 3:06 pm

Added on:
4 July 2023 3:06 pm

Added by:
[redacted]

TB2, PFC



Created:
[redacted]
4 July 2023 6:25 pm

Last Updated:
[redacted]
4 July 2023 6:28 pm

20230704_050739_photo

Taken on:
4 July 2023 3:07 pm

Added on:
4 July 2023 3:10 pm

Added by:
[redacted]

20230704_051051_photo

Taken on:
4 July 2023 3:10 pm

Added on:
4 July 2023 3:10 pm

Added by:
[redacted]

20230704_051057_photo

Taken on:
4 July 2023 3:10 pm

Added on:
4 July 2023 3:11 pm

Added by:
[redacted]

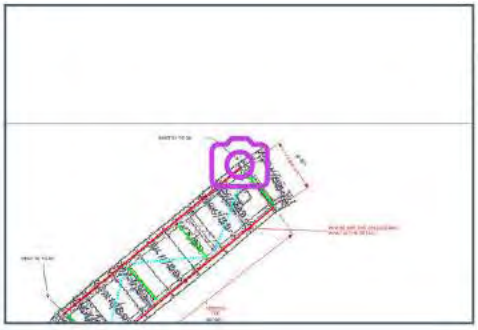
20230704_051112_photo

Taken on:
4 July 2023 3:11 pm

Added on:
4 July 2023 3:12 pm

Added by:
[redacted]

PB



Created:
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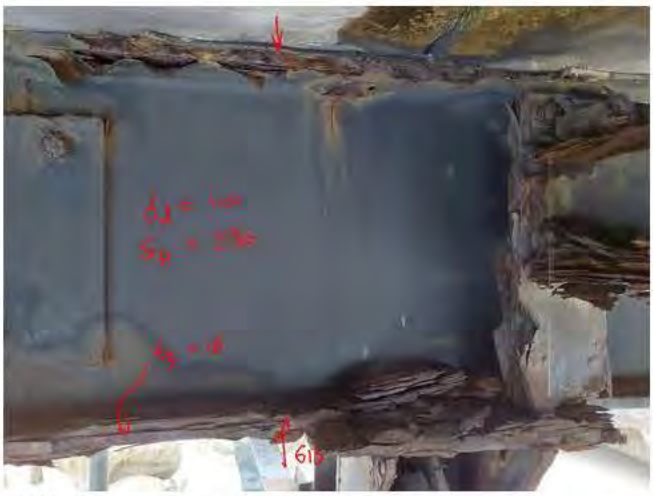
4 July 2023 6:26 pm

Last Updated:
[redacted]
4 July 2023 6:28 pm



20230704_044245_photo

Taken on:
4 July 2023 2:42 pm

Added on:
4 July 2023 2:44 pm

Added by:
[redacted]

20230704_044446_photo

Taken on:
4 July 2023 2:44 pm

Added on:
4 July 2023 2:44 pm

Added by:
[redacted]

20230704_044454_photo

Taken on:
4 July 2023 2:44 pm

Added on:
4 July 2023 2:45 pm

Added by:
[redacted]

20230704_044616_photo

Taken on:
4 July 2023 2:46 pm

Added on:
4 July 2023 2:46 pm

Added by:
[redacted]

20230704_044628_photo

Taken on:
4 July 2023 2:46 pm

Added on:
4 July 2023 2:46 pm

Added by:
[redacted]

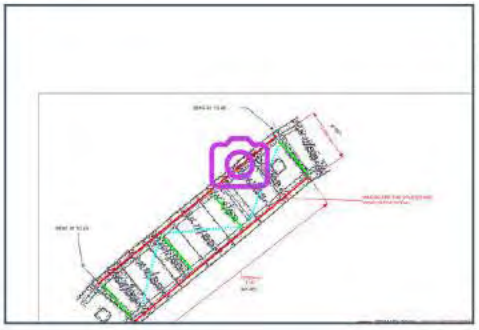
20230704_044640_photo

Taken on:
4 July 2023 2:46 pm

Added on:
4 July 2023 2:46 pm

Added by:
[redacted]

Splice



Created:
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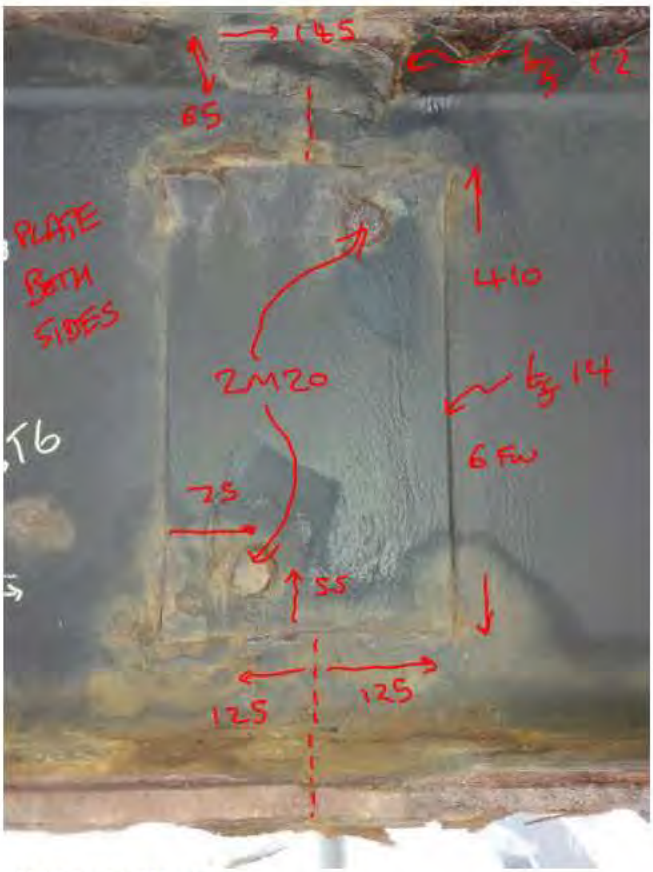
Last Updated:
[redacted]
4 July 2023 6:28 pm



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Taken on:
4 July 2023 2:47 pm
Added on:
4 July 2023 2:51 pm
Added by:
[redacted]

20230704_045129_photo
Taken on:
4 July 2023 2:51 pm
Added on:
4 July 2023 2:52 pm
Added by:
[redacted]

20230704_045353_photo

Taken on:
4 July 2023 2:53 pm

Added on:
4 July 2023 2:53 pm

Added by:
[redacted]

20230704_045401_photo

Taken on:
4 July 2023 2:54 pm

Added on:
4 July 2023 2:54 pm

Added by:
[redacted]

20230704_045417_photo

Taken on:
4 July 2023 2:54 pm

Added on:
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Added by:
[redacted]

20230704_045430_photo

Taken on:
4 July 2023 2:54 pm

Added on:
4 July 2023 2:54 pm

Added by:
[redacted]

20230704_045445_photo

Taken on:
4 July 2023 2:54 pm

Added on:
4 July 2023 2:54 pm

Added by:
[redacted]

20230704_045507_photo

Taken on:
4 July 2023 2:55 pm

Added on:
4 July 2023 2:55 pm

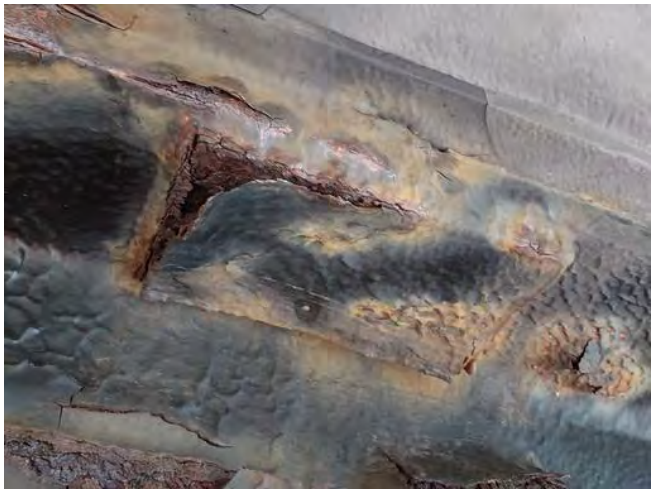
Added by:
[redacted]

20230704_045516_photo

Taken on:
4 July 2023 2:55 pm

Added on:
4 July 2023 2:55 pm

Added by:
[redacted]



20230704_045530_photo

Taken on:
4 July 2023 2:55 pm

Added on:
4 July 2023 2:55 pm

Added by:
[redacted]

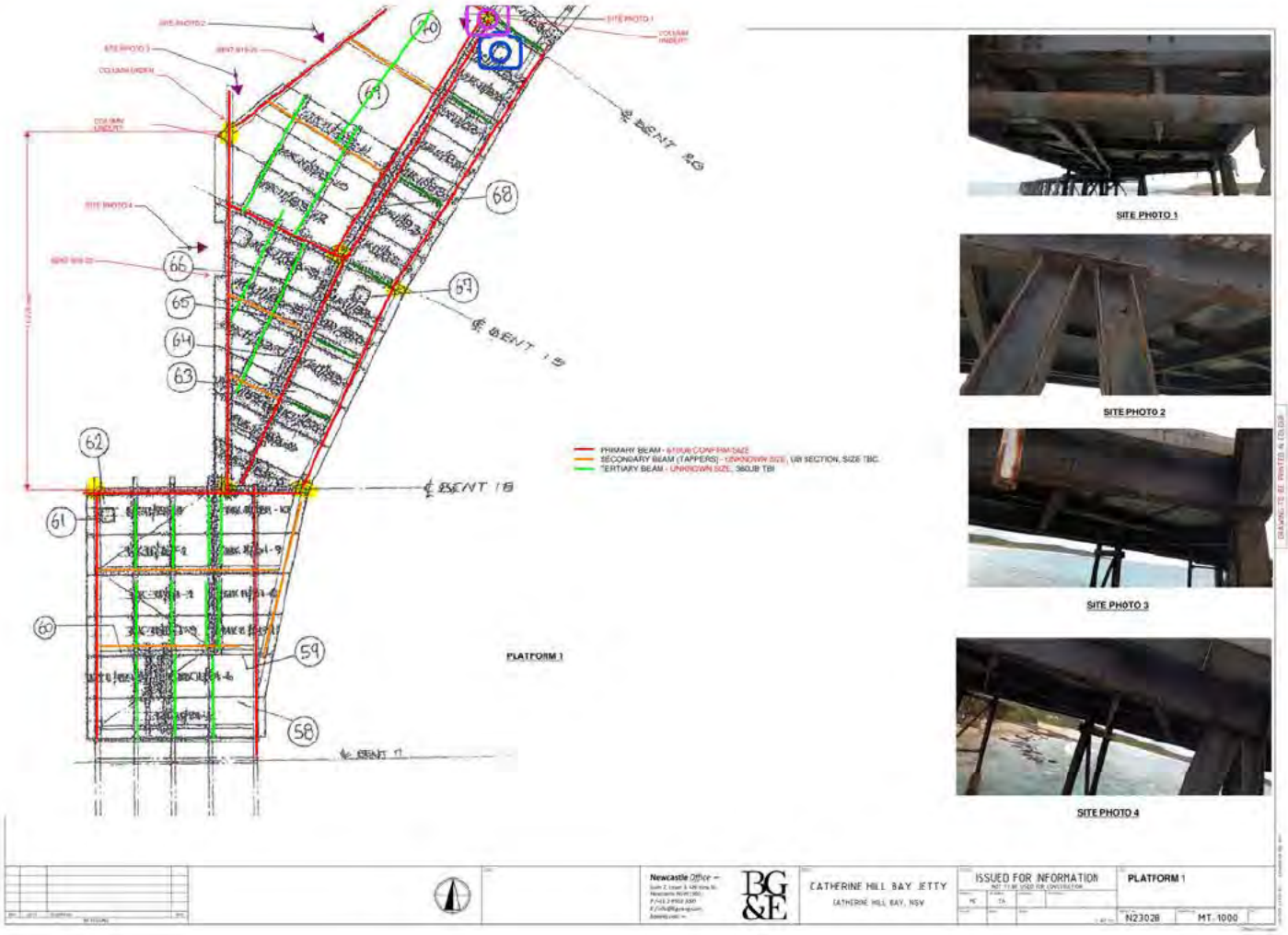
Platform 1 - Photo report - July 4, 2023

Prepared by : [redacted]

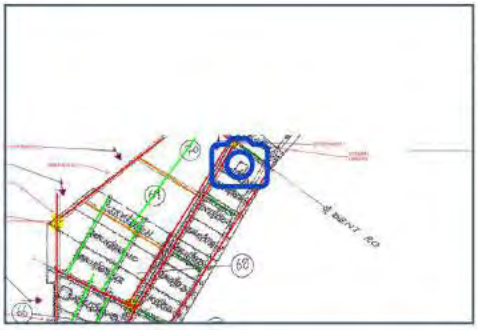
4 July 2023

Description

Geometry


SITE PHOTO 1
SITE PHOTO 2
SITE PHOTO 3
SITE PHOTO 4
PLATFORM 1
CATHERINE HILL BAY JETTY
CATHERINE HILL BAY, NSW
ISSUED FOR INFORMATION
PLATFORM 1
N23028
MT- 1000

Scaffold Location



Created:
[redacted]
4 July 2023 6:19 pm

Last Updated:
[redacted]
4 July 2023 6:28 pm

20230704_053356_photo

Taken on:
4 July 2023 3:33 pm

Added on:
4 July 2023 3:34 pm

Added by:
[redacted]

20230704_053405_photo

Taken on:
4 July 2023 3:34 pm

Added on:
4 July 2023 3:34 pm

Added by:
[redacted]

UC/CHS Mid

Created:
[redacted]
4 July 2023 6:19 pm

Last Updated:
[redacted]
4 July 2023 6:28 pm

20230704_053512_photo

Taken on:
4 July 2023 3:35 pm

Added on:
4 July 2023 3:35 pm

Added by:
[redacted]

20230704_053524_photo

Taken on:
4 July 2023 3:35 pm

Added on:
4 July 2023 3:35 pm

Added by:
[redacted]

20230704_053533_photo

Taken on:
4 July 2023 3:35 pm

Added on:
4 July 2023 3:35 pm

Added by:
[redacted]

20230704_053542_photo

Taken on:
4 July 2023 3:35 pm

Added on:
4 July 2023 3:35 pm

Added by:
[redacted]

20230704_053626_photo

Taken on:
4 July 2023 3:36 pm

Added on:
4 July 2023 3:36 pm

Added by:
[redacted]

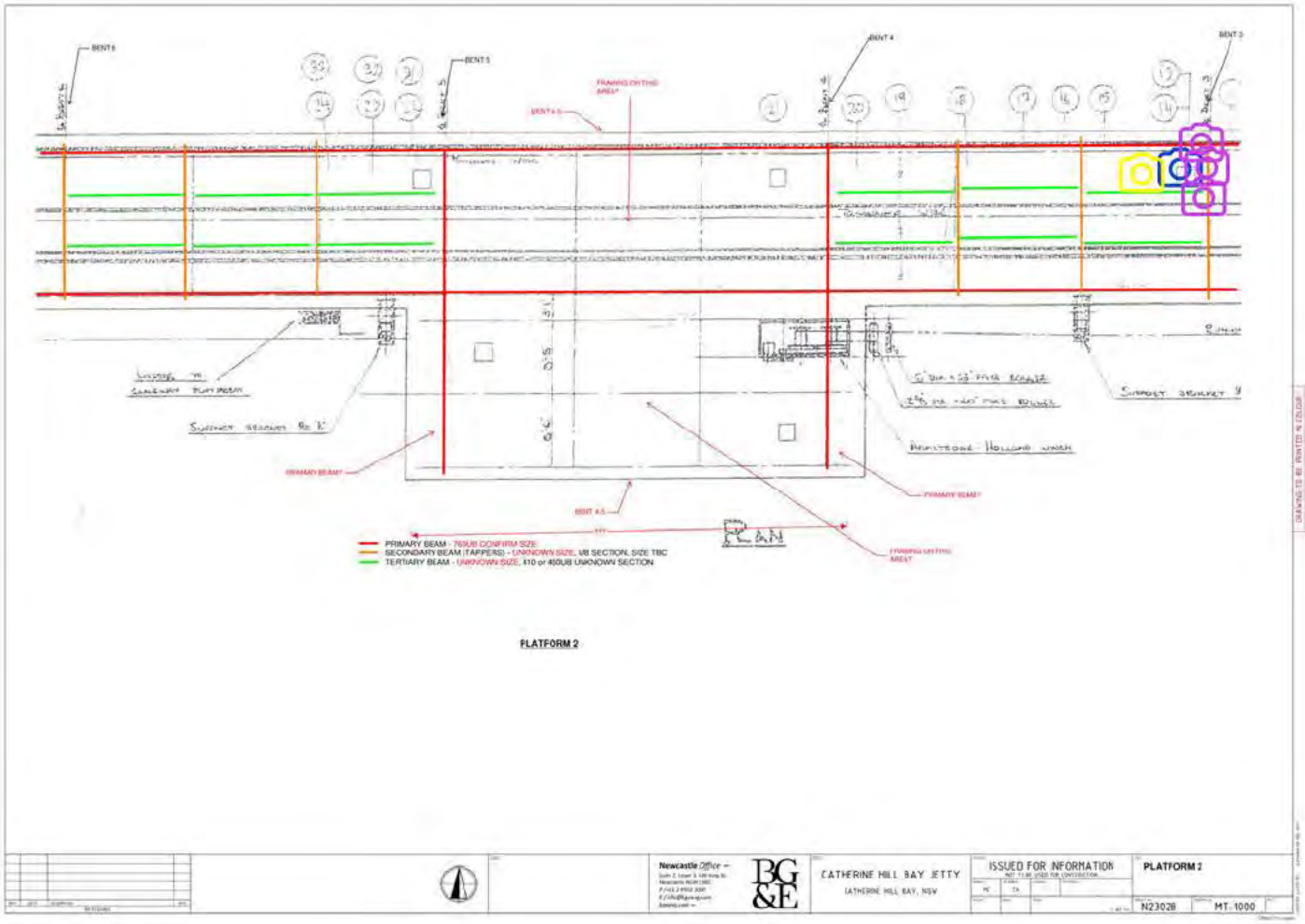
Platform 2 - Photo Report - June 30, 2023

Prepared by : [redacted]

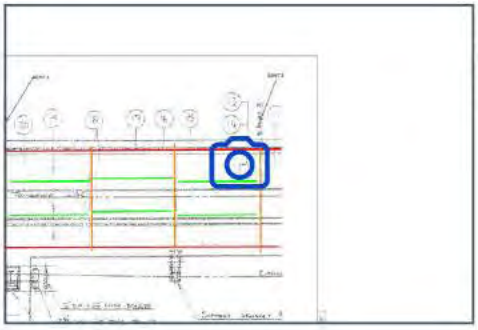
30 June 2023

Description

Geometry


BENT 6
BENT 5
BENT 4
BENT 3
PRIMARY BEAM - 760UB CONFIRM SIZE
SECONDARY BEAM (TAPERED) - UNKNOWN SIZE, UB SECTION, SIZE TBC
TERTIARY BEAM - UNKNOWN SIZE, 410 or 460UB UNKNOWN SECTION
PLATFORM 2
Newcastle Office
CATHERINE HILL BAY JETTY
CATHERINE HILL BAY, NSW
ISSUED FOR INFORMATION
PLATFORM 2
N23028
MT-1000

ST1



Created:
[redacted]
30 June 2023 9:56 am

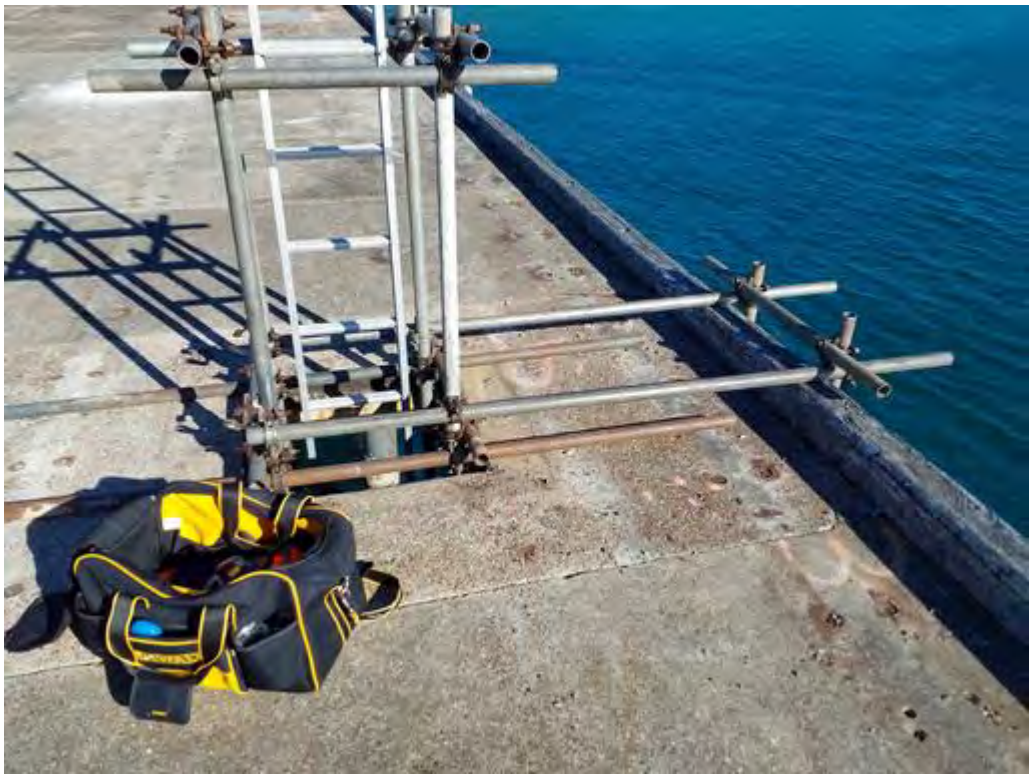
Last Updated:
[redacted]
30 June 2023 11:03 am

20230629_235703_photo

Taken on:
30 June 2023 9:57 am

Added on:
30 June 2023 9:57 am

Added by:
[redacted]

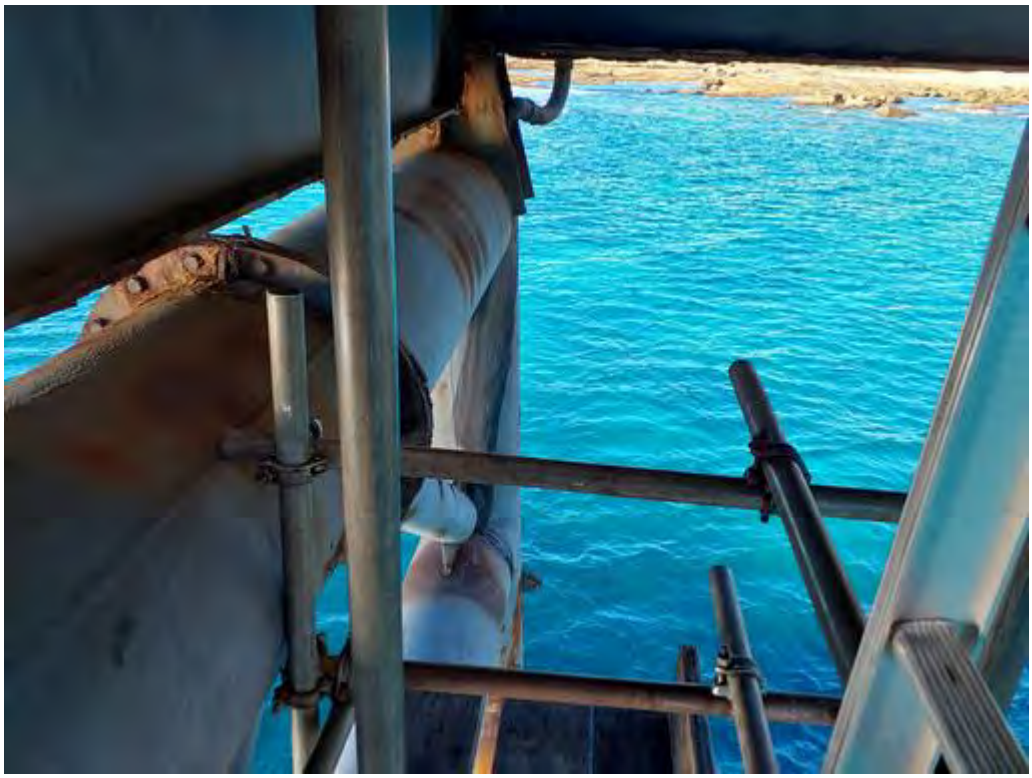


20230629_235716_photo

Taken on:
30 June 2023 9:57 am

Added on:
30 June 2023 9:59 am

Added by:
[redacted]



20230629_235923_photo

Taken on:
30 June 2023 9:59 am

Added on:
30 June 2023 9:59 am

Added by:
[redacted]

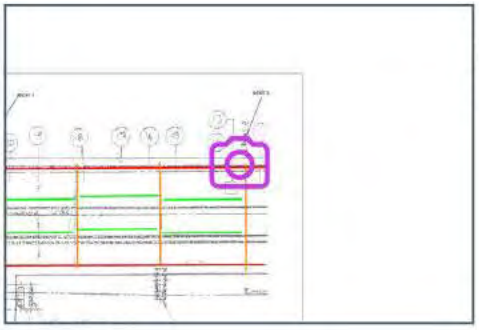
20230629_235938_photo

Taken on:
30 June 2023 9:59 am

Added on:
30 June 2023 9:59 am

Added by:
[redacted]

PB



Created:
[redacted]
30 June 2023 10:02 am

Last Updated:
[redacted]
30 June 2023 11:03 am

20230630_240256_photo

Taken on:
30 June 2023 10:02 am

Added on:
30 June 2023 10:06 am

Added by:
[redacted]

20230630_242755_photo

Taken on:
30 June 2023 10:27 am

Added on:
30 June 2023 10:27 am

Added by:
[redacted]

20230630_242806_photo

Taken on:
30 June 2023 10:28 am

Added on:
30 June 2023 10:28 am

Added by:
[redacted]

20230630_242818_photo

Taken on:
30 June 2023 10:28 am

Added on:
30 June 2023 10:28 am

Added by:
[redacted]

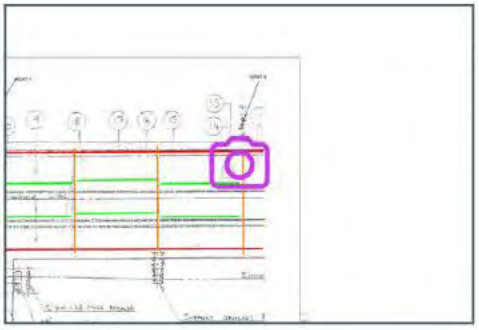
20230630_242829_photo

Taken on:
30 June 2023 10:28 am

Added on:
30 June 2023 10:28 am

Added by:
[redacted]

SB (tappered)



Created:
[redacted]
30 June 2023 10:07 am

Last Updated:
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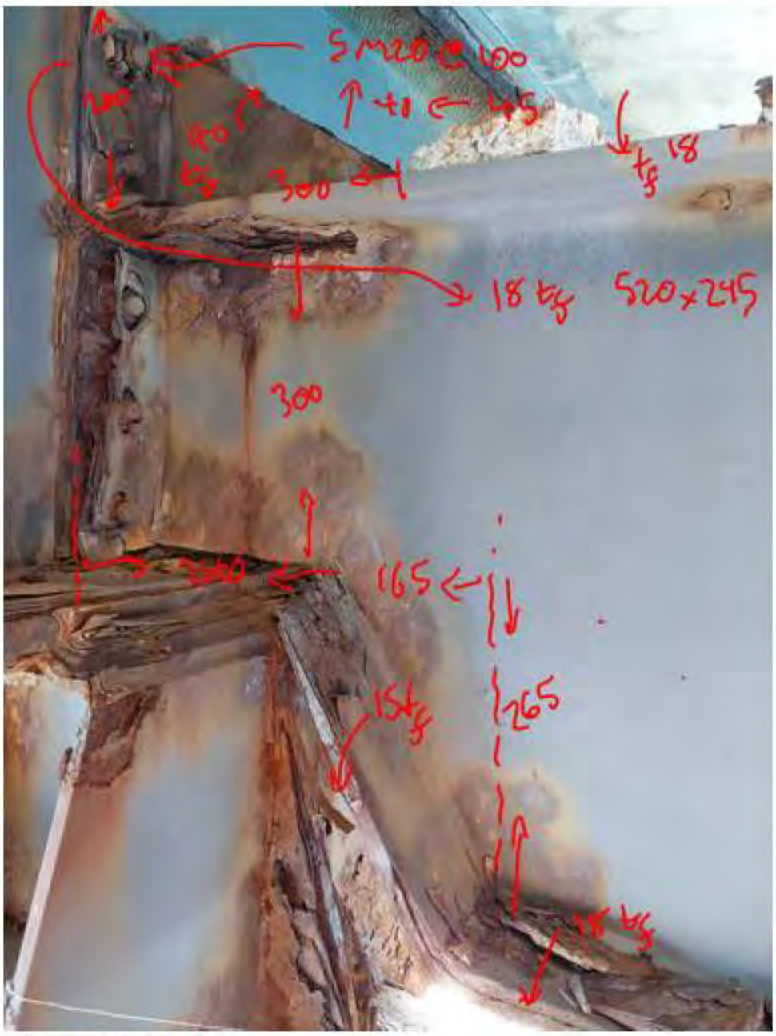
30 June 2023 11:03 am



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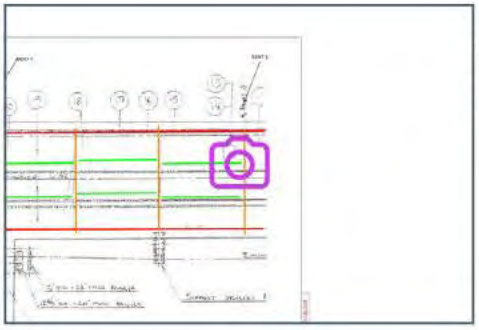

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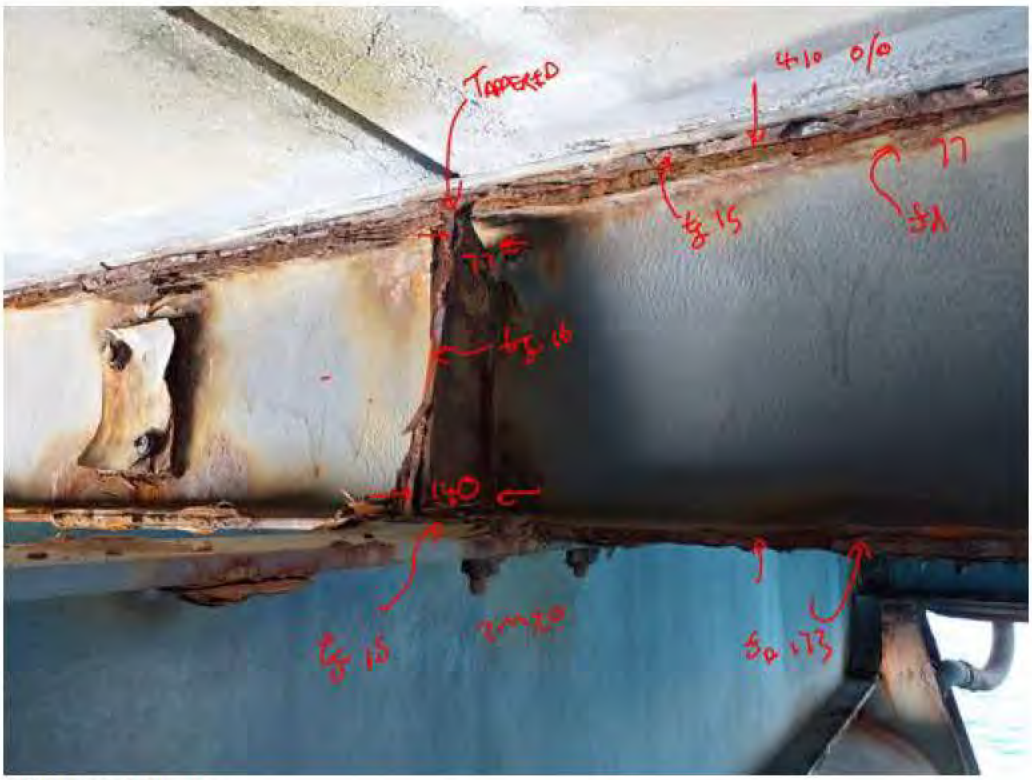

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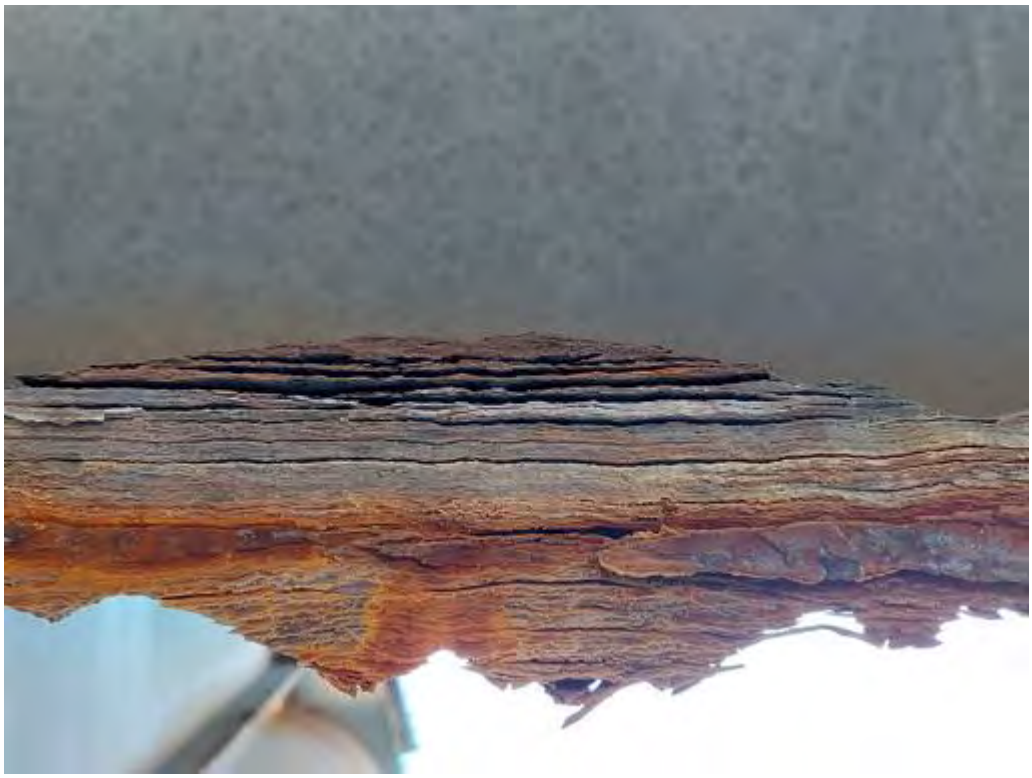

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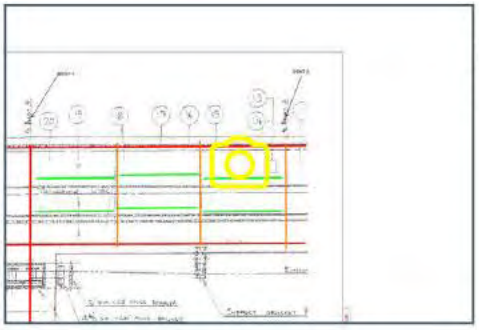
Concrete



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Added by:
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Our teams in Australia, New Zealand, South East Asia, the United Kingdom and the Middle East, design and deliver engineering solutions for clients in the Property, Transport, Ports and Marine, Water, Defence, Renewables and Resources sectors.

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