Tonkin+Taylor

Job No: 1010577.2000
15 June 2021

New Zealand Steel Ltd
Private Bag 92121
Auckland

Attention: Claire Jewell

Dear Claire

NZ Steel - Glenbrook Steel Mill
Structural Inspection of Southside and Northside Outfalls

1 Introduction

NZ Steel Ltd engaged Tonkin & Taylor Ltd (T+T) to undertake a structural inspection of two outfall structures at the NZ Steel Glenbrook site (hereafter referred to as the Southside and Northside Outfalls). The inspection was undertaken to support NZ Steel's application to seek coastal occupation permits for the Southside and Northside Outfalls.

This report summarises the findings of our structural inspection, and includes commentary on the expected structural integrity of the outfalls over the term of the consent (up to 35 years), including the effects of predicted sea level rise.

The inspection was undertaken by a T+T Chartered Structural Engineer on 20 January 2021, at approximately low tide.

Selected photographs from the inspection, together with the available drawings of the outfalls, are attached to this report as Appendix B and Appendix C.

2 Level Survey Results

To confirm the extent that the outfalls will be within the Coastal Marine Area (CMA) over the 35 year term of the consent, a level survey was undertaken by LEH Surveyors in January 2021. Survey results are included in Appendix A, together with current and predicted future Mean High Water Springs (MHWS) levels provided by T+T.

The level survey results indicate the following:

<u>Southside Outfall</u>

- Current MHWS is 2.26 m AVD (Auckland Vertical Datum 1946).
- Predicted MHWS in 2055 is 2.49 m AVD.
- Top of outfall base slab (at its lowest tier) is 2.23 m AVD.

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- The bottom of this slab is estimated at 2.13 m AVD, based on a slab thickness of 200 mm estimated from review of NZ Steel drawing 510/508/002/000/011 rev 0 (see Appendix C).

Therefore, the bottom of the lowest tier of the base slab (downstream of the weir) is currently 230 mm below MHWS, and therefore the Southside Outfall is currently within the CMA.

By 2055, the bottom of the lowest tier of the base slab will be 460 mm below the predicted MHWS.

Northside Outfall

- Current MHWS is 2.26 m AVD (Auckland Vertical Datum 1946).
- Predicted MHWS in 2055 is 2.49 m AVD.
- Top of outfall slab level is 2.34 m AVD.
- The bottom of the outfall slab level is estimated at 2.19 m AVD, based on a slab thickness of 150 mm as indicated on the T+T drawings of the outfall (see Appendix C).

Therefore, while the top of the base slab is currently 80 mm above MHWS, the bottom of the slab is currently 70 mm below MHWS. Therefore, the Northside Outfall is currently within the CMA.

By 2055, the bottom of the base slab will be 300 mm below the predicted MHWS.

3 Observations

3.1 Southside Outfall

A drawing provided by NZ Steel (NZ Steel drawing ref 510/508/002/000/011 rev 0, attached in Appendix C) is dated June 1983, indicating that the outfall is approximately 37 years old. Observations on site indicate that the structure has not been substantively modified since the original design.

The outfall is constructed from a combination of reinforced concrete (headwall, weirs, base slab and adjacent side walls) and reinforced concrete masonry blocks (side walls on the downstream portion of the structure). Access across and around the outfall is provided by a timber pedestrian bridge and stairs. The area downstream of the structure is protected by a layer of riprap (noted as class II riprap on the drawing).

The reinforced concrete and concrete masonry elements were in good condition, with only minor historic shrinkage cracking and efflorescence (indicating localised dampness) visible on the exposed faces. Some evidence of a concrete repair was visible on the downstream face of the concrete wall forming the V-notch weir. Some minor damage was noted at the top of the northern side masonry wall.

The timber access structures were also in good condition, although some areas of corrosion were noted on steel barriers.

No evidence of scour or erosion was observed in the riprap area immediately downstream of the structure.

3.2 Northside Outfall

Drawings provided by NZ Steel (T+T drawing set titled “Woolf Fisher Works Settling Ponds Phase 1”, ref 5384, attached in Appendix C) are dated 1983, indicating that the outfall is approximately 37 years old. A further drawing supplied by NZ Steel, drawing number 061/530/009/000/005 (see Appendix C), indicates that a new steel weir, pipework and a pump station were added to the outfall in 1988.

Observations on site indicate that the structure has not been substantively modified since the original design, other than the 1988 additions noted above.

The drawings indicate that the original design consisted of a reinforced concrete energy dissipator structure, upstream of a dispersal structure consisting of a reinforced concrete slab and reinforced concrete masonry side walls. Observations on site indicate that the dispersal structure side walls were subsequently constructed in reinforced concrete rather than concrete masonry.

A V-notch weir, spanning between the side walls and base slab, is constructed from steel plate, with diagonal steel struts providing additional lateral support. Various timber and steel platform / stair structures provide access over and around the outfall.

The reinforced concrete elements were in good condition, with only minor historic shrinkage cracking and discolouration (indicating localised dampness) visible on the exposed faces. The visible parts of the steel V-notch weir were in good condition. The steel platform above the outlet channel was showing signs of minor corrosion to some structural members.

The timber access structures were in good condition.

No obvious signs of erosion were noted immediately downstream of the outfall structure.

4 Commentary on Structural Integrity

4.1 Southside Outfall

The concrete outfall structure was in good condition, with only minor evidence of concrete repair visible. Over the next 35 years, the condition of the structure can be expected to deteriorate somewhat, and some further concrete repairs could be required, based on our experience of coastal structures of comparable age. However, this deterioration is not expected to affect the structural integrity of the outfall, provided the repairs are undertaken in a timely fashion. The anticipated repairs would typically involve removing loose / cracked concrete, protecting / replacing corroded reinforcing as required, and reinstating using an approved repair mortar.

Sea level rise is predicted to result in more of the slab and side walls downstream of the weir being within the tidal range over the term of the consent (refer Section 2). The affected area may need a greater level of repairs due to the more aggressive tidal environment. However, the structural integrity of the outfall is not anticipated to be affected, provided the structure is maintained and repaired as required.

The timber / steel access structures are likely to need maintenance, and potentially full replacement, within the next 35 years, however this will not affect the structural integrity of the outfall.

The riprap is likely to need regular inspection and potential maintenance over the next 35 years, to ensure that undermining of the outfall structure does not occur due to scour.

4.2 Northside Outfall

The concrete outfall structure was in good condition. Over the next 35 years, the condition of the structure can be expected to deteriorate somewhat, and some further concrete repairs could be anticipated to be required, based on our experience of coastal structures of comparable age. However, this deterioration is not expected to affect the structural integrity of the outfall, provided the repairs are undertaken in a timely fashion. The expected repairs would typically involve removing loose / cracked concrete, protecting / replacing corroded reinforcing as required, and reinstating using an approved repair mortar.

Sea level rise is predicted to result in more of the slab and side walls downstream of the steel V-notch weir being within the tidal range over the term of the consent (refer Section 2). The affected area may need a greater level of repairs due to the more aggressive tidal environment. However, the structural integrity of the outfall is not anticipated to be affected, provided the structure is maintained and repaired as required.

The timber / steel access structures and the steel V-notch weir are likely to need maintenance, and potentially full replacement, within the next 35 years. However this will not affect the structural integrity of the outfall.

The channel immediately downstream of the outfall structure is likely to need regular inspection and potential maintenance over the next 35 years, to ensure that undermining of the outfall structure does not occur due to scour.

5 Applicability

This report has been prepared for the exclusive use of our client New Zealand Steel Ltd, with respect to the particular brief given to us and in accordance with the scope of work set out in our letter of engagement dated 17 June 2019 and associated variations. It may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

We understand and agree that our client will submit this report as part of an application for resource consent and that Auckland Council as the consenting authority will use this report for the purpose of assessing that application.

Tonkin & Taylor Ltd

Environmental and Engineering Consultants

Report prepared by:	Authorised for Tonkin & Taylor Ltd by:
	
.....	.....
Dale Vince Structural Engineer	Jenny Simpson Project Director

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Appendices:

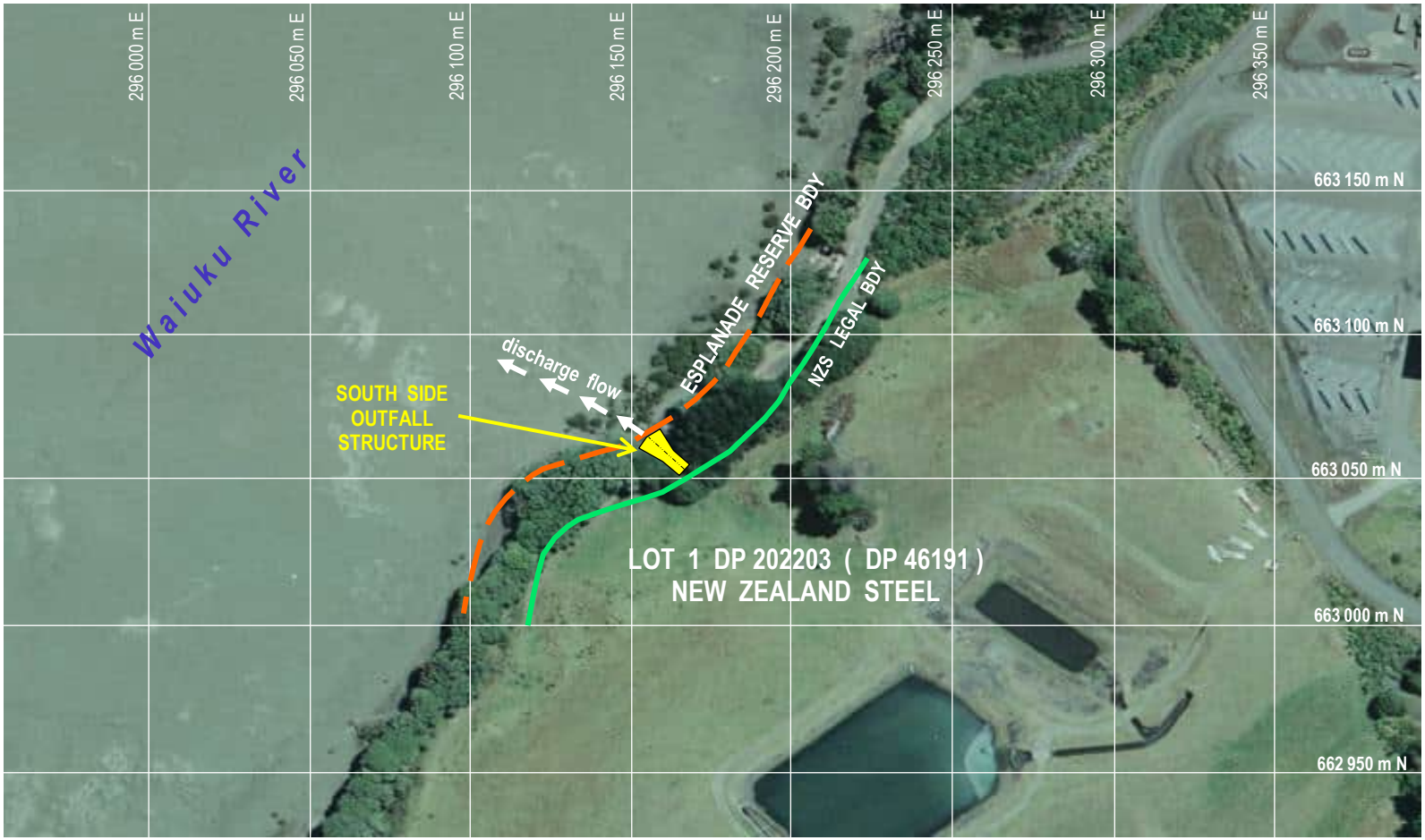
Appendix A: Level Survey Results
Appendix B: Photographs
Appendix C: Drawings

Appendix A: Level Survey Results

PREPARED BY :
L.EH SURVEYORS
Office 09 375 8280
Mobile 021 265 4157

NZS - SOUTH SIDE OUTFALL STRUCTURE MHWS SURVEY
SITE LOCALITY PLAN

REVISION # 3



AERIAL PHOTO - PLAN VIEW

NOTES:
1.- Co.ordinates are in terms with NZ Mount Eden Circuit Geodetic Datum 1949.
2.- Levels are in terms with 'Auckland Vertical Datum 1946 .
3.- NZS Legal Boundary is in terms with DP 46191.
4.- Legal Esplanade Reserve Boundary is in terms with adoptions from SO 17139.

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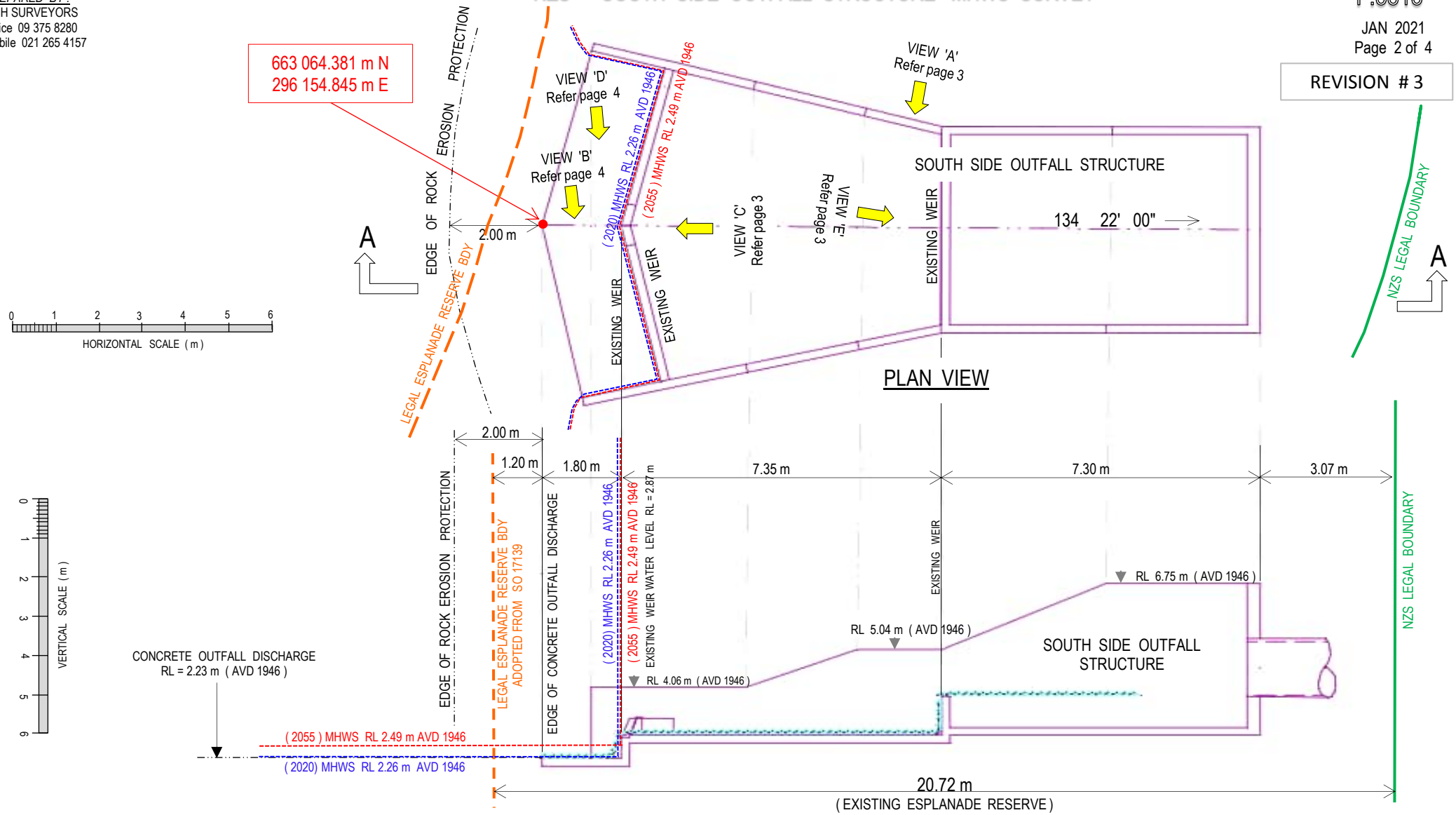
NZS - SOUTH SIDE OUTFALL STRUCTURE MHWS SURVEY

F.3815
JAN 2021

REVISION # 3



LONGITUDINAL SECTION THROUGH SOUTH SIDE OUTFALL STRUCTURE
ELEVATION 'A - A'

Future projected MHWS levels (supplied by Tonkin & Taylor)

PERIOD	Year	MHWS (m AVD - 46)
Present	2020	2.26 m
25 Years	2045	2.41 m
35 Years	2055	2.49 m
100 Years	2120	3.23 m

NOTES:
1.- Co.ordinates are in terms with NZ Mount Eden Circuit Geodetic Datum 1949.
2.- Levels are in terms with 'Auckland Vertical Datum 1946 .
3.- NZS Legal Boundary is in terms with DP 46191.
4.- Legal Esplande Reserve Boundary is in terms with adoptions from SO 17139.

- DENOTES REFERENCE DITIGAL PHOTO DIRECTION (REFER PAGES 3 & 4)

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NZS - SOUTH SIDE OUTFALL STRUCTURE MHWS SURVEY

REVISION # 3

VIEW 'A'

VIEW 'C'

VIEW 'E'

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NZS - SOUTH SIDE OUTFALL STRUCTURE MHWS SURVEY

REVISION # 3

VIEW 'B'

VIEW 'D'

PREPARED BY :
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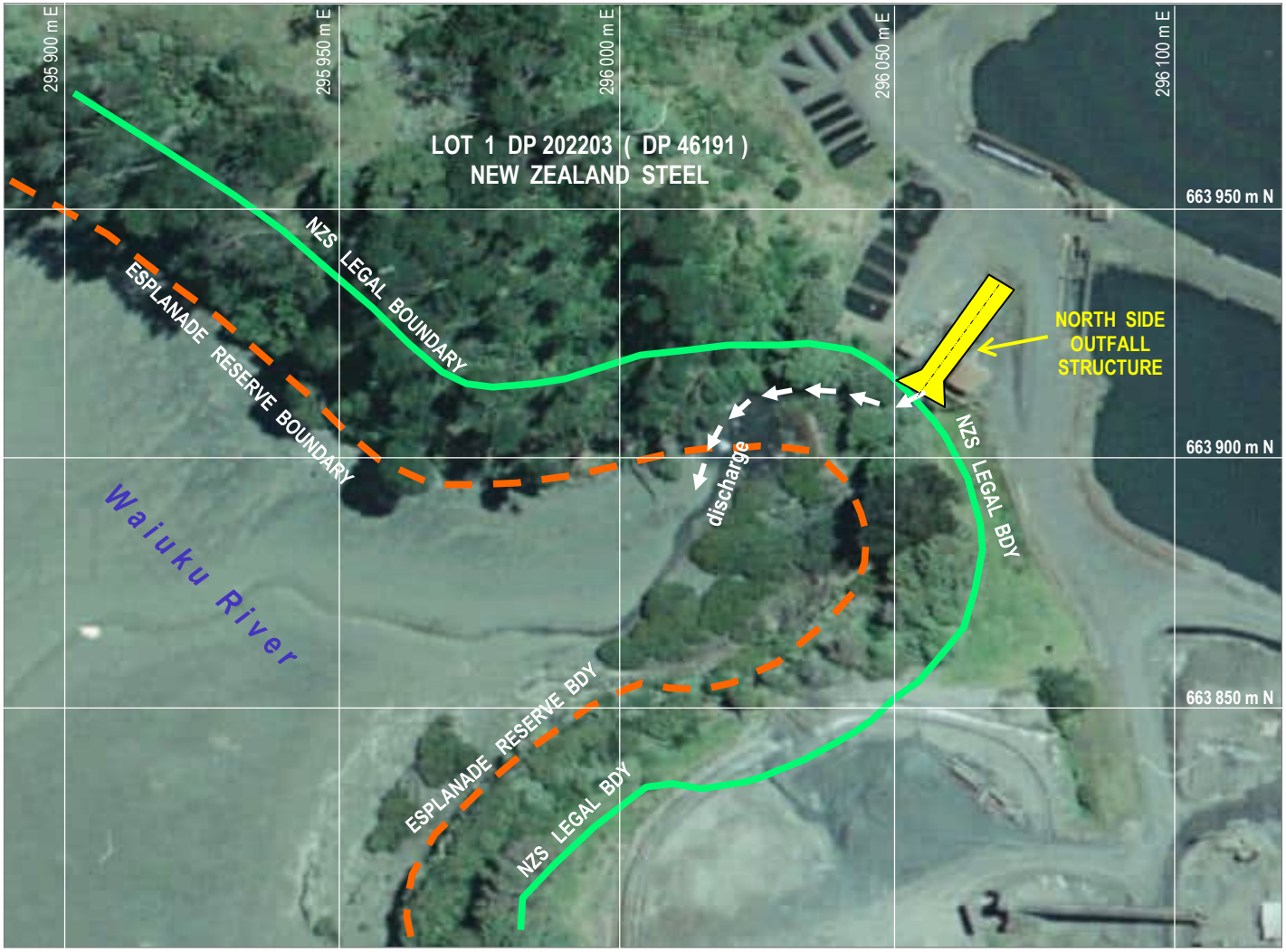
Mobile 021 265 4157

NZS - NORTH SIDE OUTFALL STRUCTURE MHWS SURVEY
SITE LOCALITY PLAN

REVISION # 3



AERIAL PHOTO - PLAN VIEW

NOTES:
1.- Co.ordinates are in terms with NZ Mount Eden Circuit Geodetic Datum 1949.
2.- Levels are in terms with 'Auckland Vertical Datum 1946 .
3.- NZS Legal Boundary is in terms with DP 46191.
4.- Legal Esplanade Reserve Boundary is in terms with adoptions from DP 20738.

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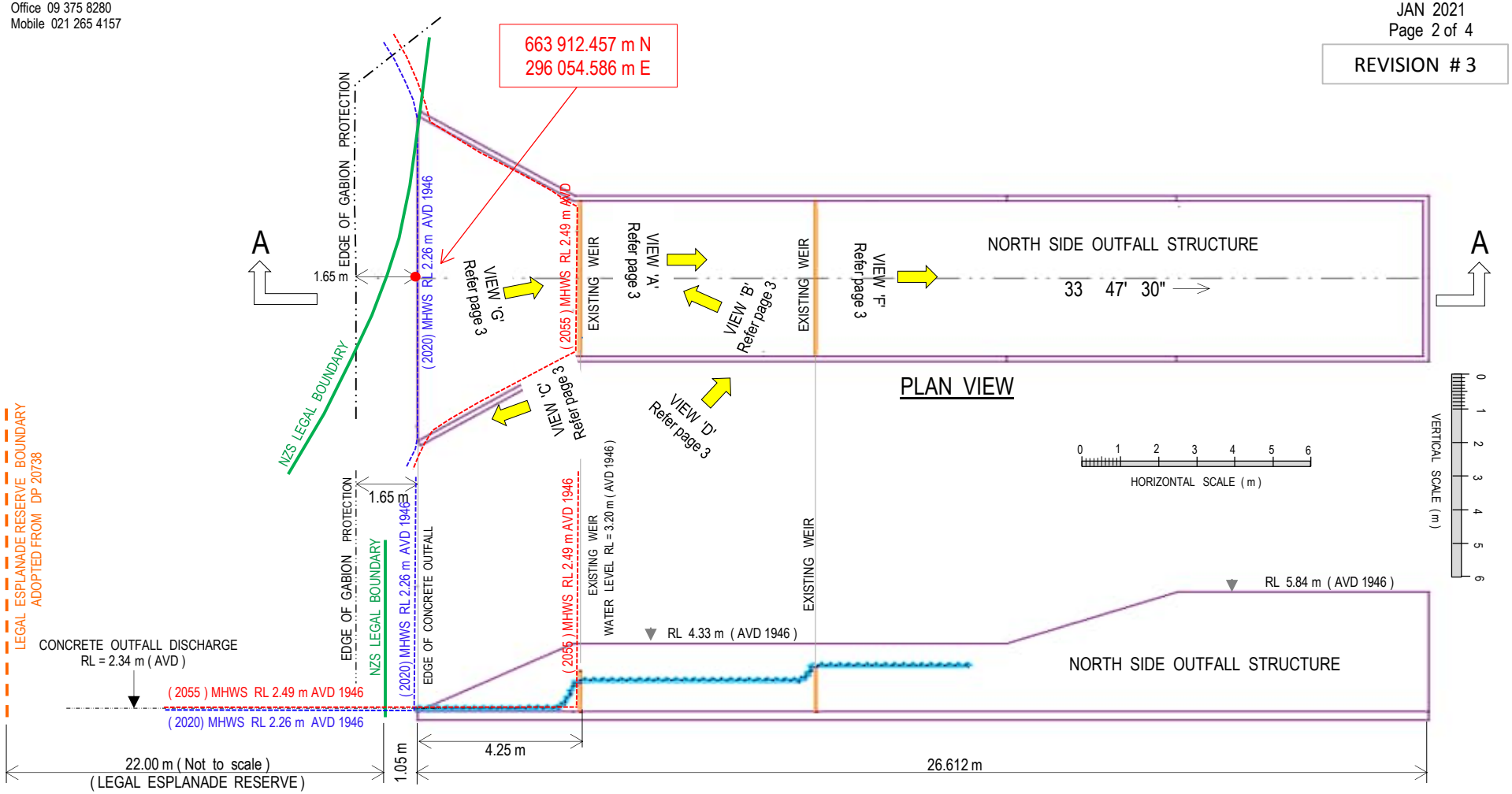
NZS - NORTH SIDE OUTFALL STRUCTURE MHWS SURVEY

F.3815
JAN 2021

REVISION # 3



LONGITUDINAL SECTION THROUGH NORTH SIDE OUTFALL STRUCTURE
ELEVATION 'A - A'

Future projected MHWS levels (supplied by Tonkin & Taylor)

PERIOD	Year	MHWS (m AVD - 46)
Present	2020	2.26 m
25 Years	2045	2.41 m
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➡ - DENOTES REFERENCE DITIGAL PHOTO DIRECTION (REFER PAGES 3 & 4)

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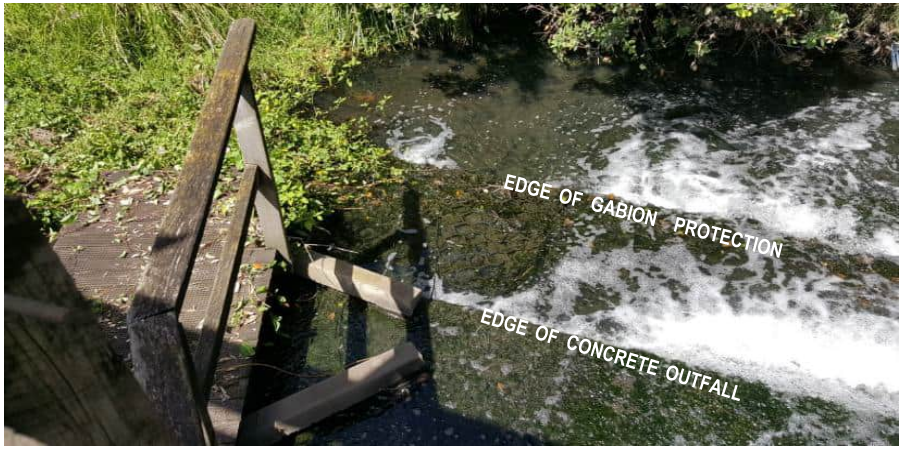
NEW ZEALAND STEEL - NORTH SIDE OUTFALL STRUCTURE MHWS SURVEY
REFERENCE DIGITAL PHOTOS

VIEW 'A'

VIEW 'G'

VIEW 'F'



VIEW 'C'

PREPARED BY :
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Mobile 021 265 4157

NEW ZEALAND STEEL - NORTH SIDE OUTFALL STRUCTURE MHWS SURVEY
REFERENCE DIGITAL PHOTOS

REVISION # 3

VIEW 'D'

VIEW 'B'

Appendix B Photographs

NZ Steel Outfall - Northside Outfall Photos

N1.JPG

N2.JPG

NZ Steel Outfall - Northside Outfall Photos

N3.JPG

N4.JPG

N5.JPG

N6.JPG

N7.JPG

N8.JPG

N9.JPG

N10.JPG

NZ Steel Outfall - Northside Outfall Photos

N11.JPG

N12.JPG

NZ Steel Outfall - Northside Outfall Photos

N13.JPG

N14.JPG

N15.JPG

N16.JPG

N17.JPG

N18.JPG

NZ Steel Outfall - Northside Outfall Photos

N19.JPG

N20.JPG

NZ Steel Outfall - Northside Outfall Photos

N21.JPG

N22.JPG

NZ Steel Outfall - Northside Outfall Photos

N23.JPG

N24.JPG

NZ Steel Outfall - Northside Outfall Photos

N25.JPG

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NZ Steel Outfall - Northside Outfall Photos

N27.JPG

N28.JPG

NZ Steel Outfall - Northside Outfall Photos

N29.JPG

N30.JPG

NZ Steel Outfall - Southside Outfall Photos

S1.JPG

S2.JPG

NZ Steel Outfall - Southside Outfall Photos

S3.JPG

S4.JPG

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S6.JPG

NZ Steel Outfall - Southside Outfall Photos

S7.JPG

S8.JPG

NZ Steel Outfall - Southside Outfall Photos

S9.JPG

S10.JPG

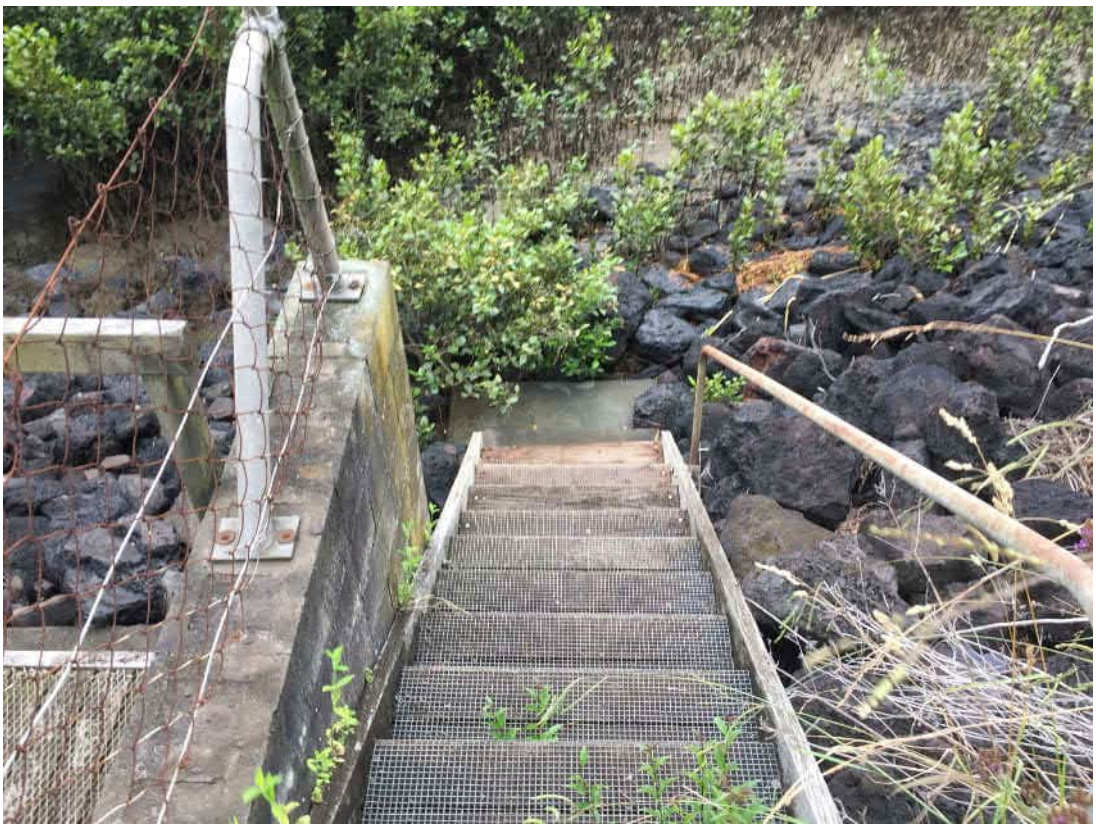
S11.JPG

S12.JPG

NZ Steel Outfall - Southside Outfall Photos

S13.JPG

S14.JPG



S15.JPG

S16.JPG

S17.JPG

S18.JPG

NZ Steel Outfall - Southside Outfall Photos

S19.JPG

S20.JPG

NZ Steel Outfall - Southside Outfall Photos

S21.JPG

S22.JPG

NZ Steel Outfall - Southside Outfall Photos

S23.JPG

S24.JPG

NZ Steel Outfall - Southside Outfall Photos

S25.JPG

S26.JPG

NZ Steel Outfall - Southside Outfall Photos

S27.JPG

S28.JPG

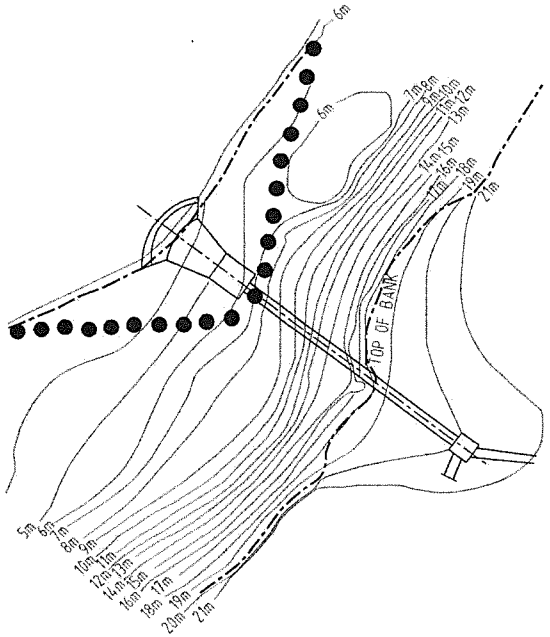
S29.JPG

S30.JPG

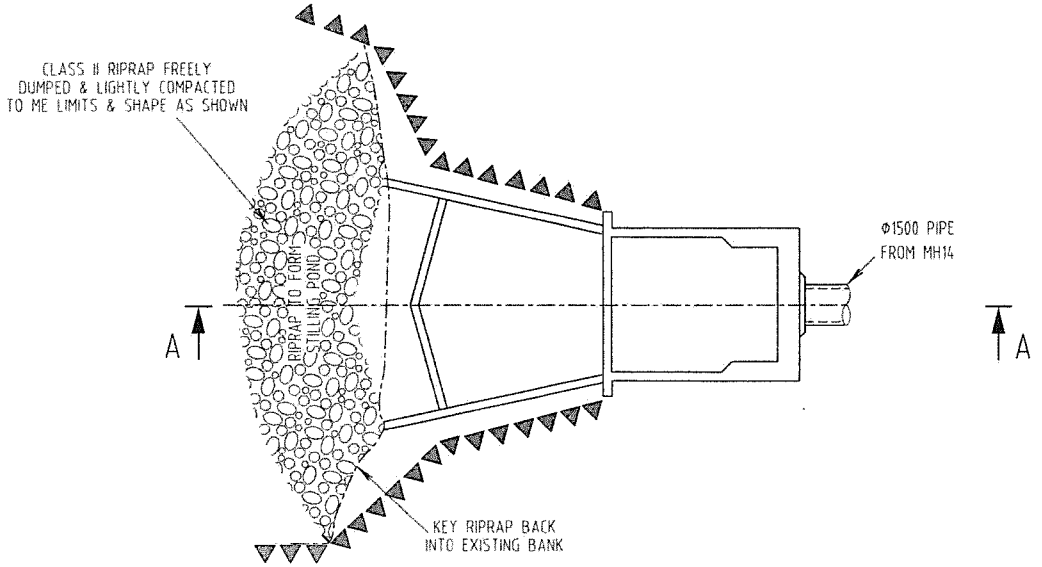
S31.JPG

Appendix C: Drawings

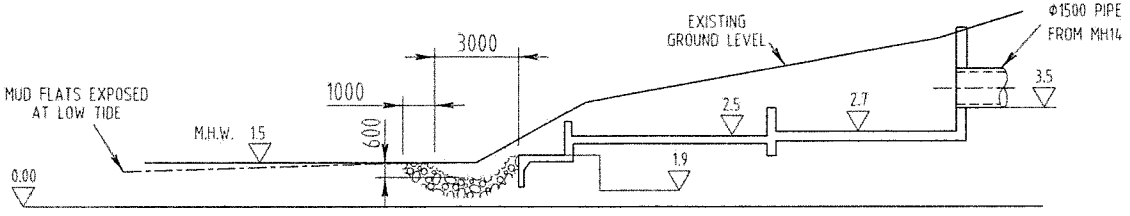
PROJECTION	USED ON	ARRANGEMENT/ASSY DRG. No.	DRAWN TO NZS/AS 1100 (TECHNICAL DRAWING PRACTICE)	CAD DRAWING. NO MANUAL REVISIONS PERMITTED.	TOLERANCES (UNLESS STATED OTHERWISE)
			DIMENSIONS IN MILLIMETRES (mm)	DO NOT SCALE	MACHINING ±0.2mm & NON-MACHINING ±1mm



LOCALITY PLAN
1:1000



PLAN
1:200



MINIMUM DEPTH OF RIPRAP 500mm
INCREASE AT EDGE OF CONCRETE
STRUCTURE TO 1000mm - SHAPE RIPRAP
TO PROVIDE STILLING POND AT OUTLET

SECTION A-A
1:200

LEGEND:

▼▼▼ APPROXIMATE LINE OF FENCE

●●● POSSIBLE ACCESS AROUND OUTFALL

SOUTHSIDE OUTFALL STRUCTURE & RIPRAP DETAIL

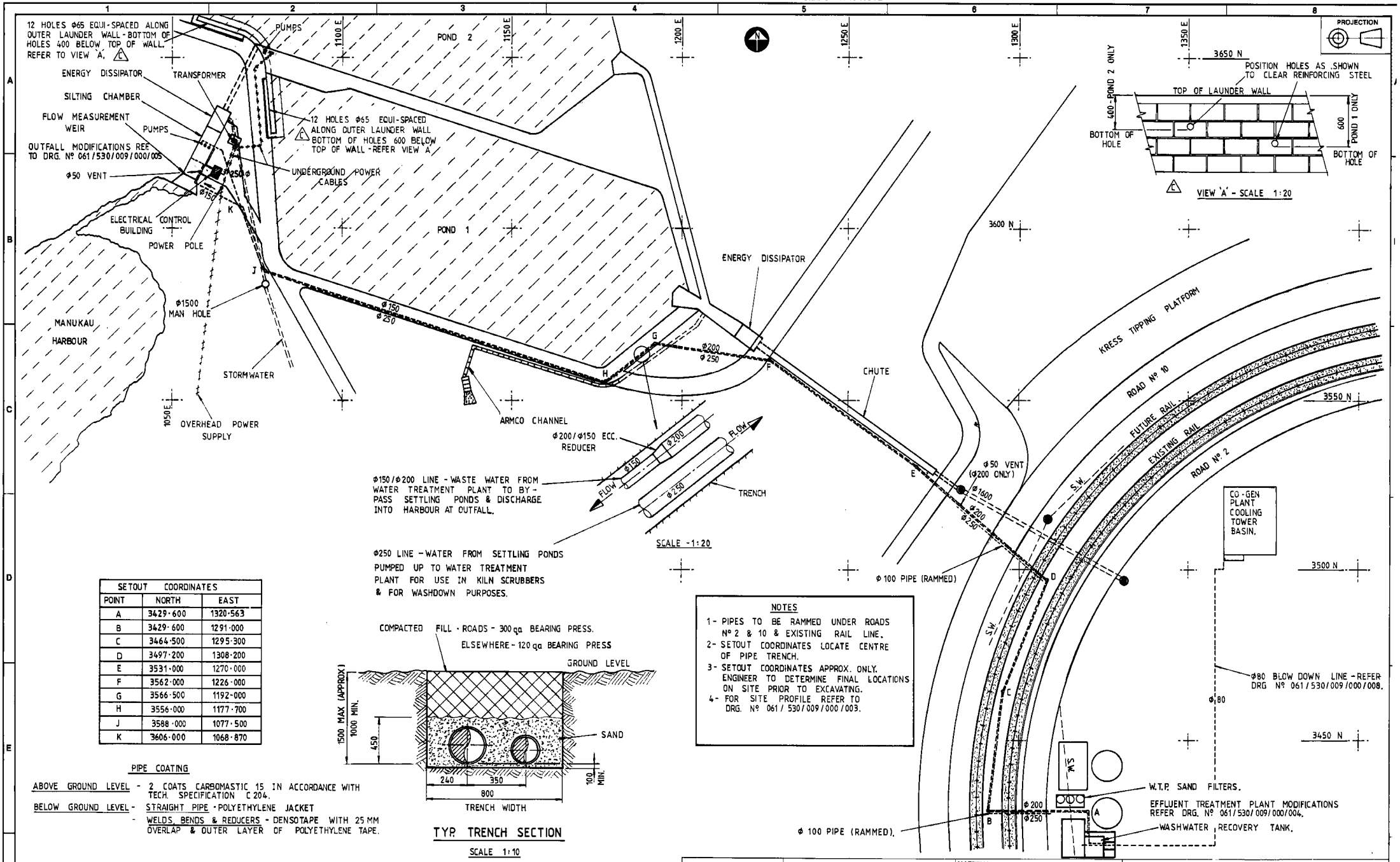
BHP NZS DRG No 510/508/002/000/011
(THIS DRAWING)

REV	DRN	CKD	MATERIAL:	PROJECT NAME/No: N/A	NEW ZEALAND STEEL	DESIGNED:	PLANT AREA: WORKS SERVICES & UTILITIES GENERAL
	APD	DATE		CONTRACTOR: BCHF / BABBAGE	New Zealand Steel Ltd Private Bag 92121 Auckland, New Zealand	DRAWN: S.G.	TITLE: SOUTHSIDE OUTFALL STRUCTURE & RIPRAP DETAIL
AMD:			SURFACE TEXTURE (µm): (UNLESS STATED OTHERWISE)	CONTRACTOR REF No: C60		DATE: 02-06-83	
REV	DRN	CKD	FINISH:	CONTRACTOR CAD SYSTEM: N/A		CHECKED:	
	APD	DATE				APPROVED:	
AMD:			ORIGINAL SCALE: AS SHOWN			CAD FILE: 510SLC07.DGN	
						STORES CODE No: N/A	
						BENTLEY MICROSTATION (VER. 5.50)	

DRG No 6 3 510/508/002/000/011 | SHEET | OF | REV Ø

DATE: 25-Jun-98 10:49

FILE: k:\user\becawork\archive\dwg\wd014833\510slc07.dgn



SETOUT COORDINATES		
POINT	NORTH	EAST
A	3429·600	1320·563
B	3429·600	1291·000
C	3464·500	1295·300
D	3497·200	1308·200
E	3531·000	1270·000
F	3562·000	1226·000
G	3566·500	1192·000
H	3556·000	1177·700
J	3588·000	1077·500
K	3606·000	1068·870

NOTES

1- PIPES TO BE RAMMED UNDER ROADS Nº 2 & 10 & EXISTING RAIL LINE.
2- SETOUT COORDINATES LOCATE CENTRE OF PIPE TRENCH.
3- SETOUT COORDINATES APPROX. ONLY. ENGINEER TO DETERMINE FINAL LOCATIONS ON SITE PRIOR TO EXCAVATING.
4- FOR SITE PROFILE REFER TO DRG. Nº 061/530/009/000/003.

TYP. TRENCH SECTION

SCALE 1:10

PIPE COATING

ABOVE GROUND LEVEL - 2 COATS CARBOMASTIC 15 IN ACCORDANCE WITH TECH. SPECIFICATION C 204.

BELOW GROUND LEVEL - STRAIGHT PIPE - POLYETHYLENE JACKET
- WELDS, BENDS & REDUCERS - DENSOTAPE WITH 25 MM OVERLAP & OUTER LAYER OF POLYETHYLENE TAPE.

REV No.	REVISION	REV BY	DATE
C	HOLES IN LAUNDER WALL ADDED	G.F.	18-10-88
B	AS BUILT	G.F.	20-9-88
A	FOR MANUFACTURE	G.F.	23-5-88

PART	USED ON	ASSEMBLY DRAWING No.

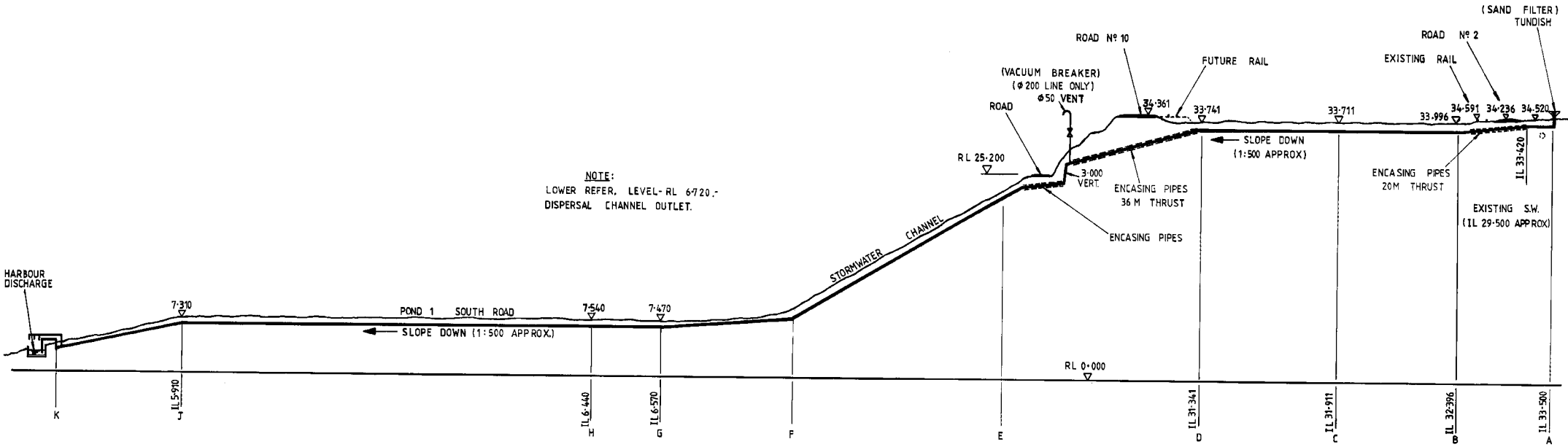
DESIGNED	DRAWN ACCORDING TO NZS 5901 (BS 308 ENGINEERING DRAWING PRACTICE)	MATERIAL N/A	New Zealand Steel Limited, WOOLF FISHER WORKS GLENBROOK AUCKLAND NEW ZEALAND
DRAWN G. FAUSETT			
TRACED	TOLERANCES (UNLESS OTHERWISE STATED)	SURFACE TEXTURE (VALUES IN µm)	TITLE: MODIFICATIONS TO WASTE WATER SYSTEM. NORTH SIDE - (STAGE 1) SITE PLAN.
DATE 30 - 3 - 88	MACHINING ± 0.2 mm DIMENSIONAL ± 0.1° ANGULAR		
CHECKED	NON-MACHINING ± 1 mm DIMENSIONAL ± 1° ANGULAR	FINISH N/A	DRG No. / 1 061/530/009/000/002 C SHEET OF
APPROVED			
DO NOT SCALE	DIMENSIONS IN MILLIMETRES (mm)	SCALE 1:500	STORES CODE No. SEPARATE PARTS LIST
			ORIGINAL TO BE KEPT DESTROYED

FOR MICROFILMING PURPOSES LETTERING MUST BE AT LEAST THE SIZE OF THIS NOTE

PROJECTION

NOTE
BEFORE EXCAVATING LOCATE ALL BURIED SERVICE
TO ENSURE NO DAMAGE OCCURS.

NOTE
UPPER REFERENCE LEVEL - RL 34·670 -
TOP OF SAND FILTER CONC. PLINTH.



NOTE:
LOWER REFER, LEVEL - RL 6·720 -
DISPERSAL CHANNEL OUTLET.

PROFILE - SAND FILTER TO HARBOUR DISCHARGE.

SCALE - HORIZONTAL - 1:500 - VERTICAL - 1: 250.

NOTE - REFER TO DRG. Nº 061/530/009/000/002
FOR SITE PLAN.

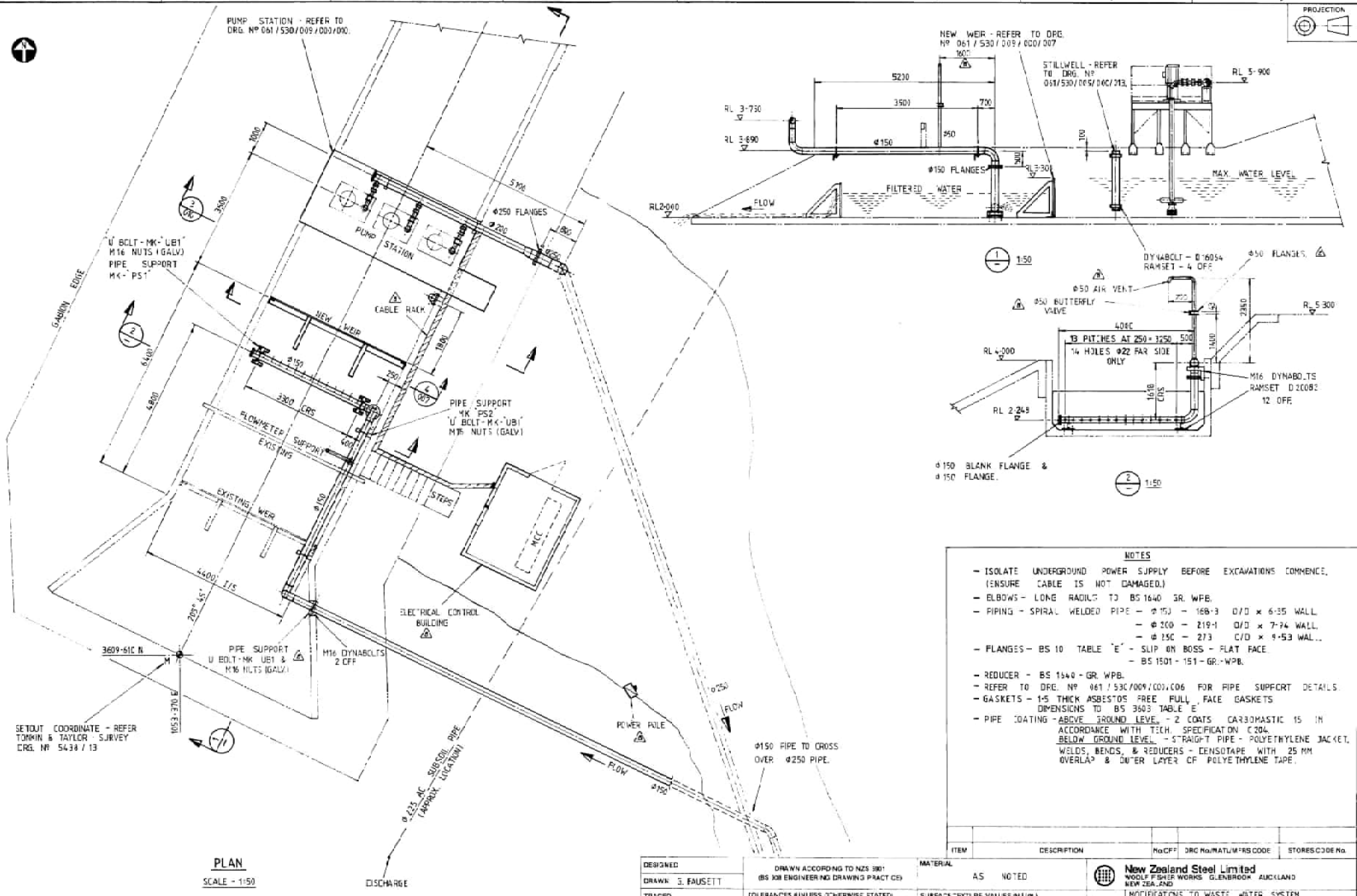
ITEM	DESCRIPTION	No.OFF	DRG No./MATL/MFRS CODE	STORES CODE No.

DESIGNED		MATERIAL N.A.	New Zealand Steel Limited, WOOLF FISHER WORKS GLENBROOK AUCKLAND NEW ZEALAND
DRAWN G FAUSETT	DRAWN ACCORDING TO NZS 5901 (BS 308 ENGINEERING DRAWING PRACTICE)		
TRACED	TOLERANCES (UNLESS OTHERWISE STATED)	SURFACE TEXTURE (VALUES IN µm)	TITLE: MODIFICATIONS TO WASTE WATER SYSTEM NORTH SIDE - PROFILE
DATE 31 - 3 - 88	MACHINING ± 0.2 mm DIMENSIONAL ± 0.1° ANGULAR		
CHECKED	NON-MACHINING ± 1 mm DIMENSIONAL ± 1° ANGULAR	FINISH N.A.	DRG No. / 1 061/530/009/000/003 B; SHEET OF
APPROVED			
DO NOT SCALE	DIMENSIONS IN MILLIMETRES (mm)	SCALE 1:500, - 1:250.	STORES CODE No. / SEPARATE PARTS LIST
			ORIGINAL TO BE KEPT / DESTROYED

REV No.	REVISION	REV BY	DATE
B	AS BUILT	G.F.	20-9-88
A	FOR MANUFACTURE	G.F.	24-5-88

PART	USED ON	ASSEMBLY DRAWING No.
	SITE PLAN	061/530/009/000/002

FOR MICROFILMING PURPOSES LETTERING MUST BE AT LEAST THE SIZE OF THIS NOTE



PLAN

SCALE - 1:50

PROJECTION

NOTES

- ISOLATE UNDERGROUND POWER SUPPLY BEFORE EXCAVATIONS COMMENCE. (ENSURE CABLE IS NOT DAMAGED.)
- ELBOWS - LONG RADIUS TO BS 1640 GR. WPB.
- PIPING - SPIRAL WELDED PIPE - Φ150 - 168·3 O/D x 6·35 WALL.
  - Φ200 - 219·1 O/D x 7·94 WALL.
  - Φ250 - 273 O/D x 9·53 WALL.
- FLANGES - BS 10 TABLE 'E' - SLIP ON BOSS - FLAT FACE.
  - BS 1501 - 151 - GR. WPB.
- REDUCER - BS 1640 - GR. WPB.
- REFER TO DRG. Nº 061/530/009/C03, C06 FOR PIPE SUPPORT DETAILS.
- GASKETS - 1·5 THICK ASBESTOS FREE FULL FACE GASKETS DIMENSIONS TO BS 3603 TABLE 'E'
- PIPE COATING - ABOVE GROUND LEVEL - 2 COATS CARBOMASTIC 15 IN ACCORDANCE WITH TECH. SPECIFICATION C204.
  BELOW GROUND LEVEL - STRAIGHT PIPE - POLYETHYLENE JACKET, WELDS, BENDS, & REDUCERS - DENSOTAPE WITH 25 MM OVERLAP & OUTER LAYER OF POLYETHYLENE TAPE.

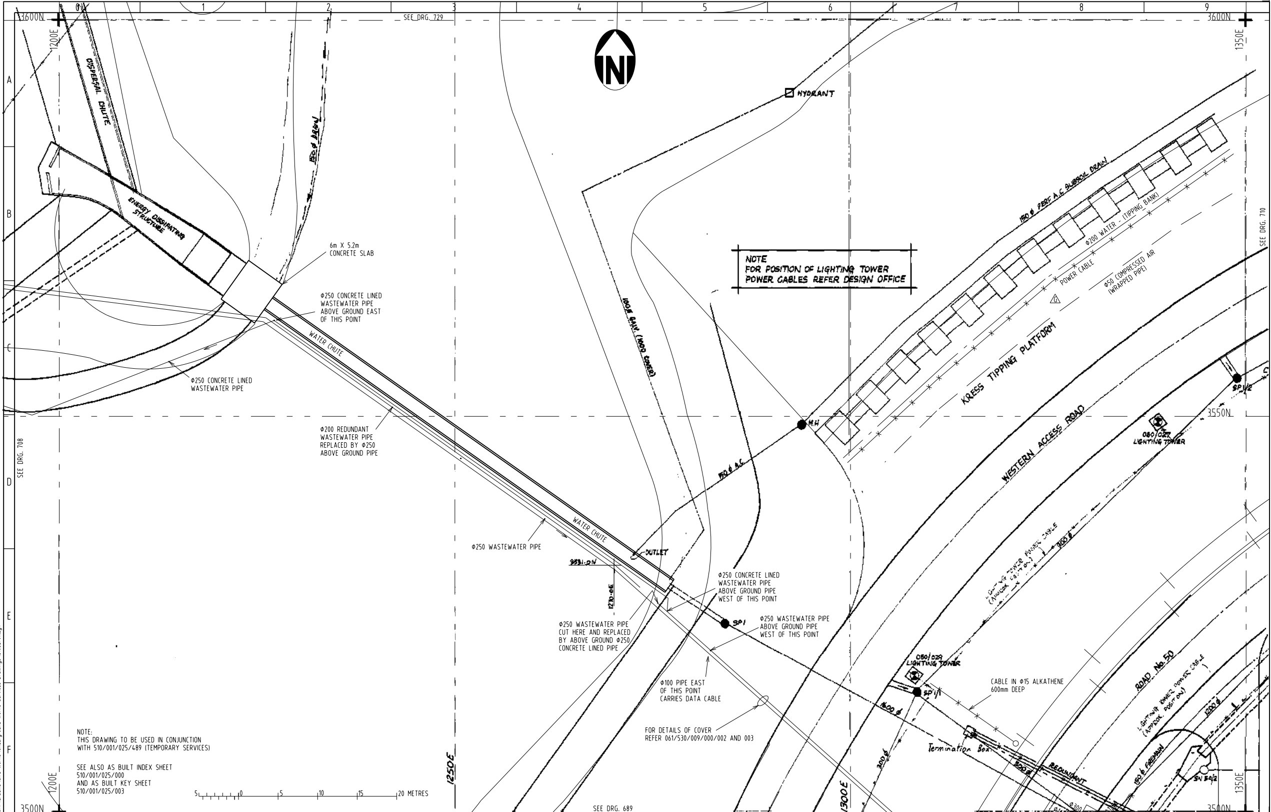
ITEM	DESCRIPTION	No OFF	DRG No/MATL/MFRS CODE	STORES CODE No.

B	AS BUILT	G.F.	23-9-88
A	FOR MANUFACTURE	G.F.	24-5-88
REV No.	REVISION	REV BY	DATE

	SITE PLAN	061/530/009/010/002
PART	USE ON	ASSEMBLY DRAWING No.

DESIGNED	DRAWN ACCORDING TO NZS 8001 (BS 308 ENGINEERING DRAWING PRACTICE)	MATERIAL AS NOTED	New Zealand Steel Limited, WOOLF FISHER WORKS GLENBROOK AUCKLAND NEW ZEALAND
DRAWN S. FAUSETT			
TRACED	TOLERANCES (UNLESS OTHERWISE STATED)	SURFACE TEXTURE VALUES IN (μm)	TITLE: MODIFICATIONS TO WASTE WATER SYSTEM. NORTH SIDE (STAGE 1). MODIFICATIONS TO OUTFALL.
DATE 12-4-88	MACHINING ± 0.2 mm DIMENSIONAL, ± 0.1° ANGULAR		
CHECKED	NON MACHINING ± 1 mm DIMENSIONAL, ± 1° ANGULAR	FINISH AS NOTED	DRG No. / 1 061/530/009/000/305 B
APPROVED			SHEET OF
DO NOT SCALE	DIMENSIONS IN MILLIMETRES (mm)	SCALE 1:50	STORES CODE No. / SEPARATE PARTS LIST

DRG NO. TO BE KEPT / DESTROYED



SEE DRG. 729
HYDRANT
DISPERSAL CHUTE
ENERGY DISSIPATING STRUCTURE
150 ø BRAIN
6m X 5.2m CONCRETE SLAB
Φ250 CONCRETE LINED WASTEWATER PIPE ABOVE GROUND EAST OF THIS POINT
WATER CHUTE
Φ250 CONCRETE LINED WASTEWATER PIPE
Φ200 REDUNDANT WASTEWATER PIPE REPLACED BY Φ250 ABOVE GROUND PIPE
NOTE
FOR POSITION OF LIGHTING TOWER POWER CABLES REFER DESIGN OFFICE
150 ø PERF A.C SUBSOIL DRAIN
Φ200 WATER - (TIPPING BANK)
POWER CABLE
Φ50 COMPRESSED AIR (WRAPPED PIPE)
KRESS TIPPING PLATFORM
WESTERN ACCESS ROAD
SP1/2
080/027 LIGHTING TOWER
M.H
150 ø A.C
150 ø GALV (1000 COVER)
SEE DRG. 710
SEE DRG. 708
Φ250 WASTEWATER PIPE
OUTLET
Φ250 CONCRETE LINED WASTEWATER PIPE ABOVE GROUND PIPE WEST OF THIS POINT
Φ250 WASTEWATER PIPE ABOVE GROUND PIPE WEST OF THIS POINT
SP1
Φ250 WASTEWATER PIPE CUT HERE AND REPLACED BY ABOVE GROUND Φ250 CONCRETE LINED PIPE
Φ100 PIPE EAST OF THIS POINT CARRIES DATA CABLE
FOR DETAILS OF COVER REFER 061/530/009/000/002 AND 003
080/029 LIGHTING TOWER
SP1/1
CABLE IN Φ15 ALKATHENE 600mm DEEP
Termination Box
REDUNDANT
ROAD No. 50
SW 5A/2
NOTE:
THIS DRAWING TO BE USED IN CONJUNCTION WITH 510/001/025/489 (TEMPORARY SERVICES)
SEE ALSO AS BUILT INDEX SHEET 510/001/025/000
AND AS BUILT KEY SHEET 510/001/025/003
5 0 5 10 15 20 METRES
3600N
3550N
3500N
1200E
1250E
1300E
1350E
SEE DRG. 689

REV	DRN		CKD			AMD
D	L.G.BRYANT	APD		DATE 31-5-01	XD018230	PART OF Φ250 WASTEWATER PIPE REPLACED BY NEW Φ250 CONCRETE LINED PIPE
E	L.G.BRYANT	APD		DATE 29-4-03	XD020260	CONCRETE SLAB ADDED AT DRG REF.C1
F	G.M. ORAM	APD A. BEER	CKD ROGER WYLIE	DATE 06-09-06	NZM.00527	ADDED NEW STORMWATER PIPE TO ENERGY DISSIPATING STRUCTURE
G	G. FAUSETT	APD A.A.BEER	CKD K. WHITEHEAD	DATE 26-04-11	NZM.01688	POWER CABLE, COMPRESSED AIR PIPE & WATER PIPE ADDED TO TIPPING BANK AREA. (UNCOVERED DURING EXCAVATIONS IN THE AREA)

NOTES:
POWER
PHONE & DATA CABLES
WATER
STORMWATER SEWER
DOMESTIC SEWER
EFFLUENT SEWER
FIRE WATER MAIN
STEAM
COMP. AIR
OXYGEN
PROPANE
NITROGEN
FUEL OIL
NAT. GAS

0000 NZS CO-ORDINATE GPS RECORDED POINT. REF 510/001/025/001 FOR TABLE OF POINTS.

D ADDITIONAL HIDDEN DIMNS AVAILABLE SEE ENG. SERVICES CAD OFFICE

CAD DRAWING. NO MANUAL REVISIONS PERMITTED

USED ON
ARRANGEMENT/ASSY DRG. No.

PROJECT NAME/No. -
CONTRACTOR: N/A
CONTRACTOR REF. No. N/A
CONTRACTOR CAD SYSTEM: N/A

NEW ZEALAND STEEL
New Zealand Steel Ltd
Private Bag 92121
Auckland, New Zealand

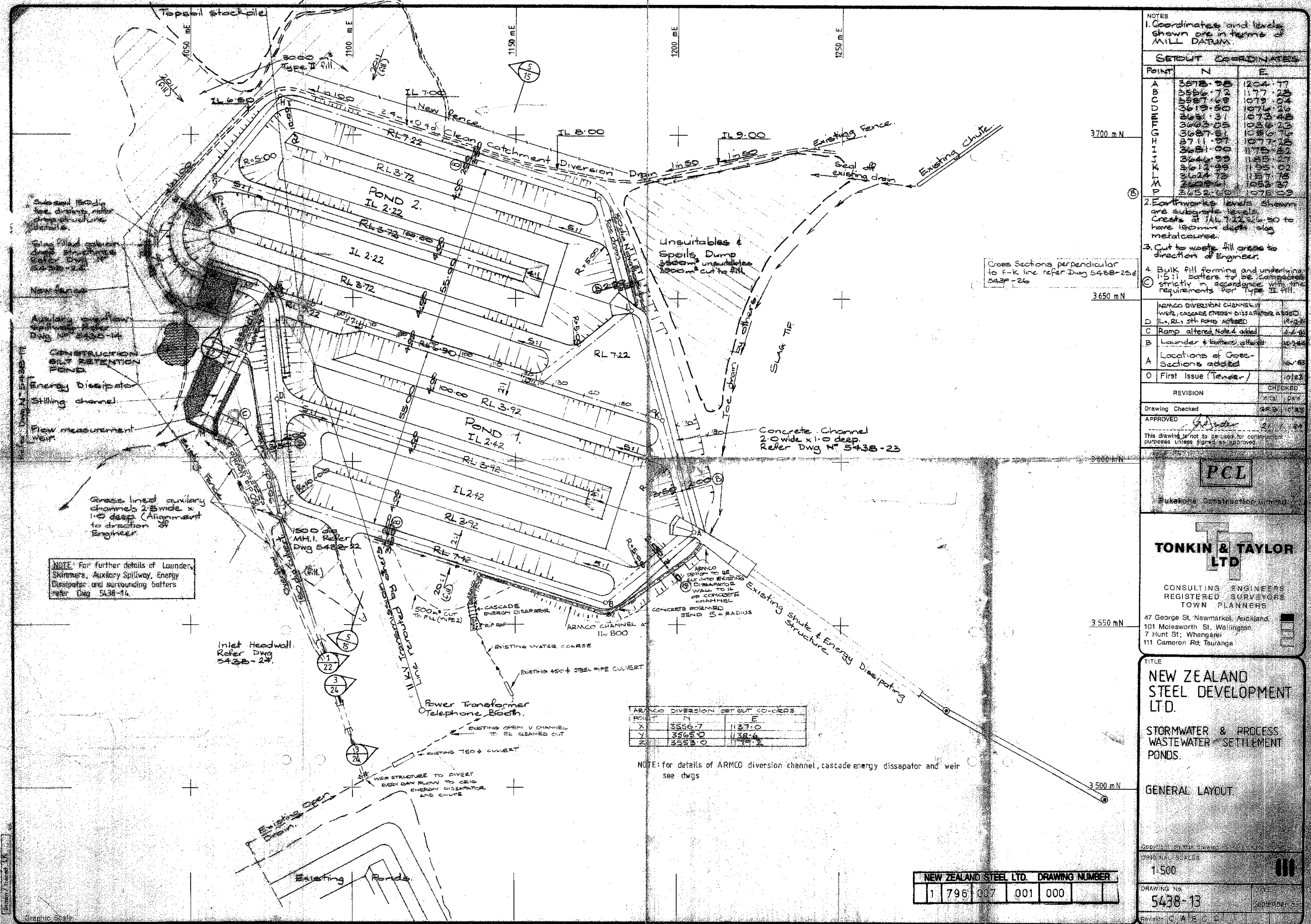
DESIGNED:
DRAWN: S.KNOTT
DATE: 15-7-88
CHECKED:
APPROVED:
CAD FILE: 510SU709.DGN
STORES CODE No.
BENTLEY MICROSTATION (VER 5.50)

PLANT AREA: WORKS SERVICES & UTILITIES GENERAL

TITLE: "AS BUILT" RECORD SHEET

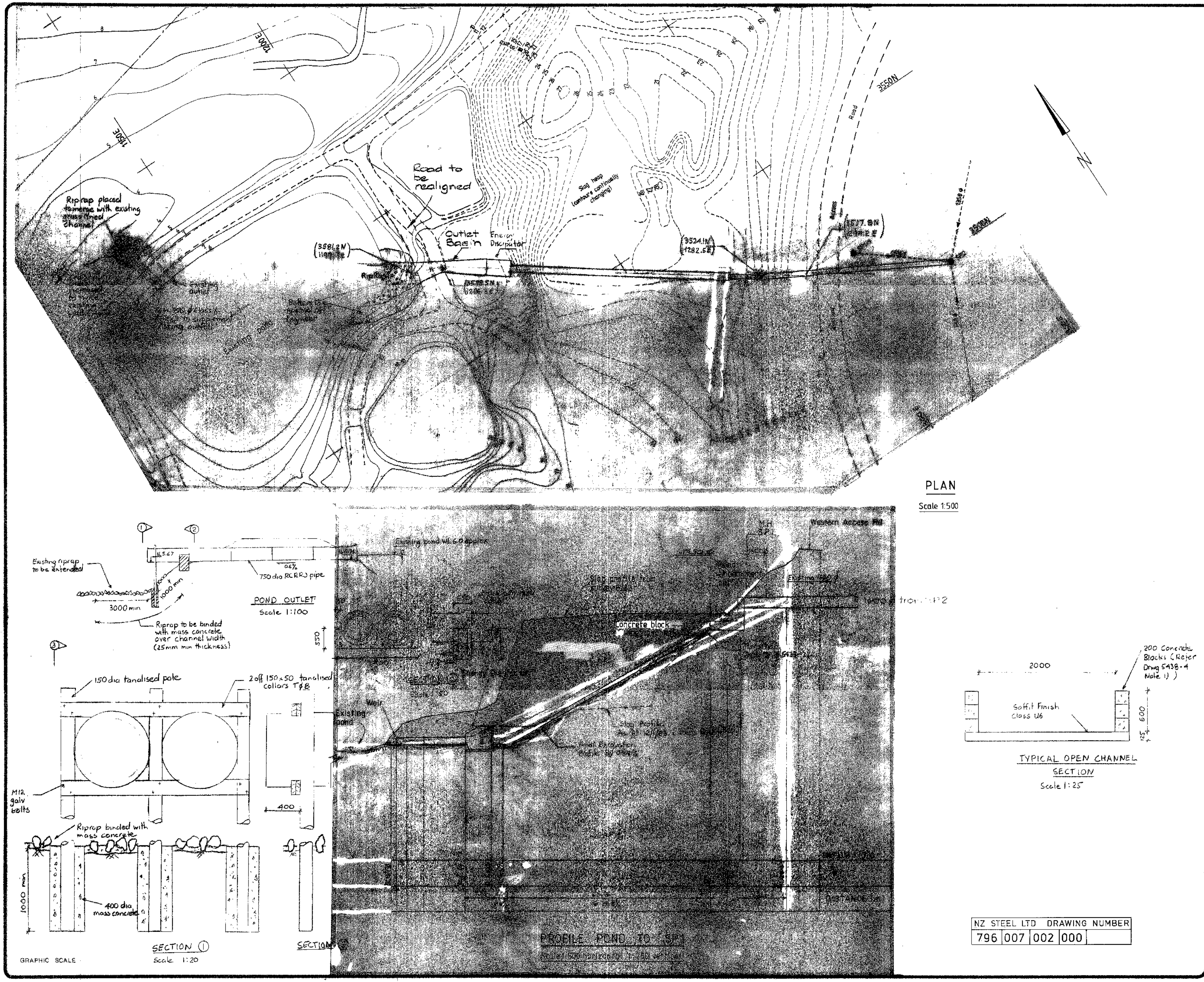
DRG. No. 1 1 510/001/025/709 SHEET OF REV G

DATE: 16-May-11 15:35 FILE: L:\Work\Graeme\Site Works\Underground Works Services Drawings\510su709.dgn



Re-Order Filemaster "D"
SELF-ADHESIVE PLAN HANGER

796-007-001-000



PLAN
Scale 1:500
Road to be realigned
Outlet Basin
Energy Dissipator
Riprap placed to merge with existing grass lined Channel
Slag heap (contours continually changing)
Road
3550N
3500N
1200E
1150E
(3581.2N)
(3524.1N 1282.5E)
(3517.8N)
Existing pond
POND OUTLET
Scale 1:100
Existing riprap to be extended
750 dia RCRRJ pipe
0.6%
1000 min
3000 min
Riprap to be binded with mass concrete over channel width (25mm min thickness)
150 dia tanalised pole
2 off 150 x 50 tanalised collars T&B
M12 galv bolts
400
Riprap binded with mass concrete
1000 min
400 dia mass concrete
SECTION 1
Scale 1:20
SECTION
GRAPHIC SCALE
ORIGINAL SCALE
Western Access Rd
Existing pond W.L.
Slag profile from
Concrete block
Weir
Existing pond
DISTANCE
PROFILE POND TO SP1
2000
200 Concrete Blocks (Refer Drwg 5438-4 Note 1)
Soffit Finish Class U6
600
TYPICAL OPEN CHANNEL SECTION
Scale 1:25

NZ STEEL LTD	DRAWING NUMBER		
796	007	002	000

CKD	REVISION	DATE
AWM C	Outlet works added	7/2/83
AWM B	Title Block Altered; 1200 ø Amended To 1350 ø; Transition Altered; Track Over Pipe Realigned	13/1/83
AWM A	Open channel added; outlet amended; SP1 relocated	22/11/82
AWM	Drawing checked	

APPROVED 28/1/83

This drawing is not to be used for construction purposes unless signed as approved

REFERENCES: Drg no 5118 – 5 and 6 (drains and M.H. details)

TONKIN & TAYLOR LTD

CONSULTING ENGINEERS
REGISTERED SURVEYORS
TOWN PLANNERS
47 George St. Newmarket, Auckland
101 Molesworth St. Wellington
ORIGINATING OFFICE Auckland

TITLE

NEW ZEALAND STEEL DEVELOPMENT LTD.

WASTEWATER SETTLING PONDS

PHASE 1 WORK

PLAN AND PROFILE

ORIGINAL SCALES: As shown

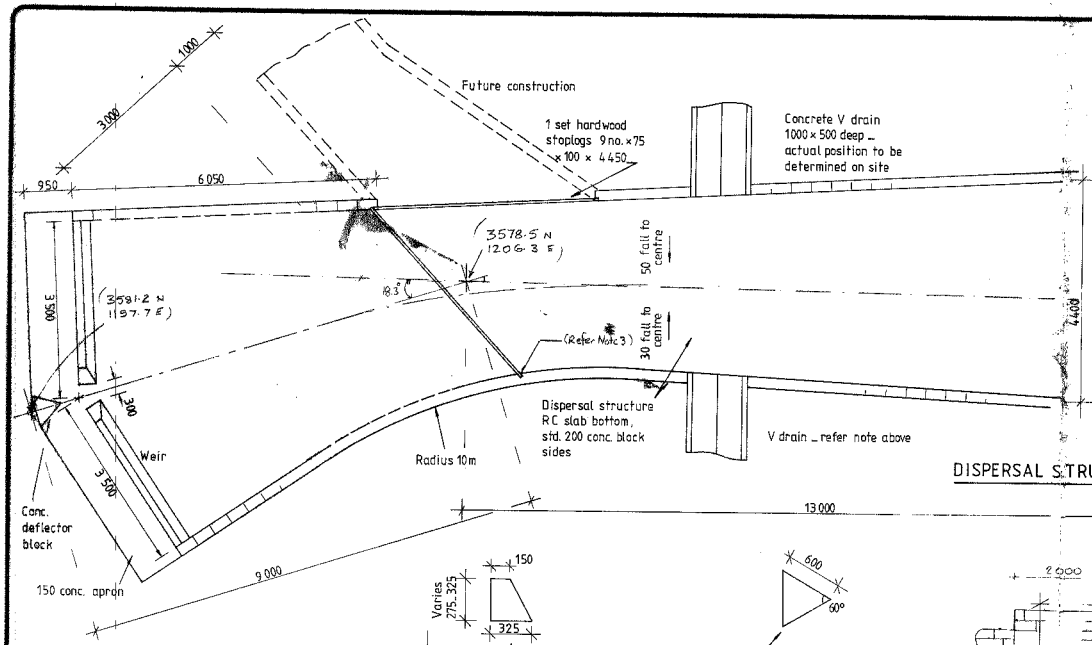
metric design

DRAWING No: 5438_6

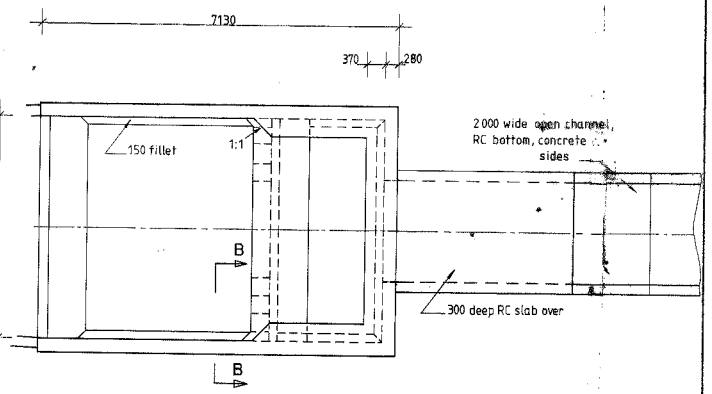
DATE: October 1982

0 A B C

796-007-002-000



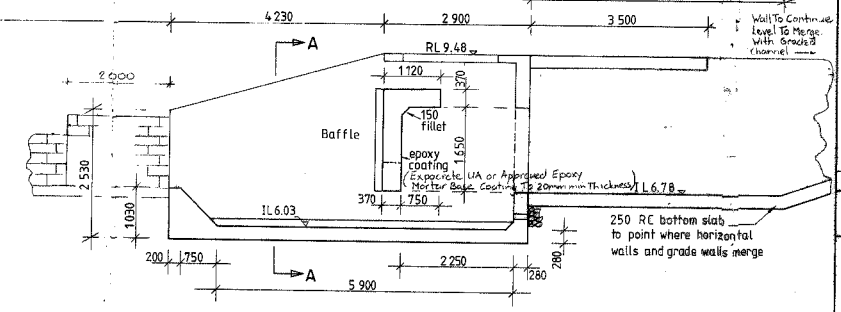
DISPERSAL STRUCTURE AND ENERGY DISSIPATOR – PLAN



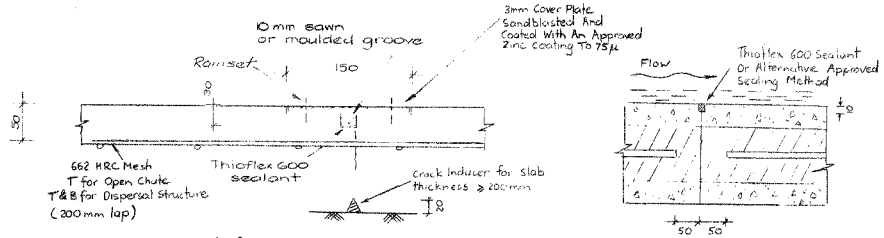
END ELEVATION

SECTION ON ℄

DISPERSAL STRUCTURE



ENERGY DISSIPATOR – SECTION ON ℄

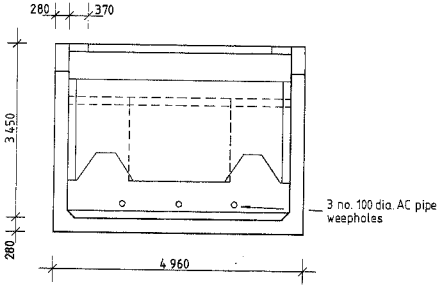


SLAB JOINTS AT 4.8m SPACING

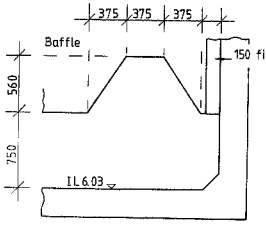
WALL JOINTS AT 4.8m SPACING

SLAB JOINT AT MIDPOINT OF OPEN CHANNEL

JOINT DETAILS
NTS



SECTION A–A



SECTION B–B Scale 1:25

NZ STEEL LTD DRAWING NUMBER
796 007 003 000

NOTES
1) All blockwork cavities to be pump grouted completely full using a mix approved by the Engineer.
2) Slab soffits shall be finished to Class U6 (NZS 3114 : 1980)
3) Stoplogs shall be provided with RSC guides with an approved coating. The Contractor shall ensure that sufficient clearance between stoplog and guide is maintained to allow removal of stoplog after timber swelling

	REVISION	DATE
A	Piped chute replaced by open channel, dispersal structure amended.	14/12/82

CKD
APPROVED
This drawing is not to be used for construction purposes unless signed as approved

REFERENCES

TONKIN & TAYLOR LTD
CONSULTING ENGINEERS
REGISTERED SURVEYORS
TOWN PLANNERS
47 George St, Newmarket, Auckland.
101 Molesworth St, Wellington.
ORIGINATING OFFICE Auckland

TITLE
NEW ZEALAND STEEL DEVELOPMENT LTD.
WOOLF FISHER WORKS
SETTLING PONDS PHASE I
General Arrangement
Energy Dissipator & Dispersal Structure

ORIGINAL SCALES
1 : 50
and as shown

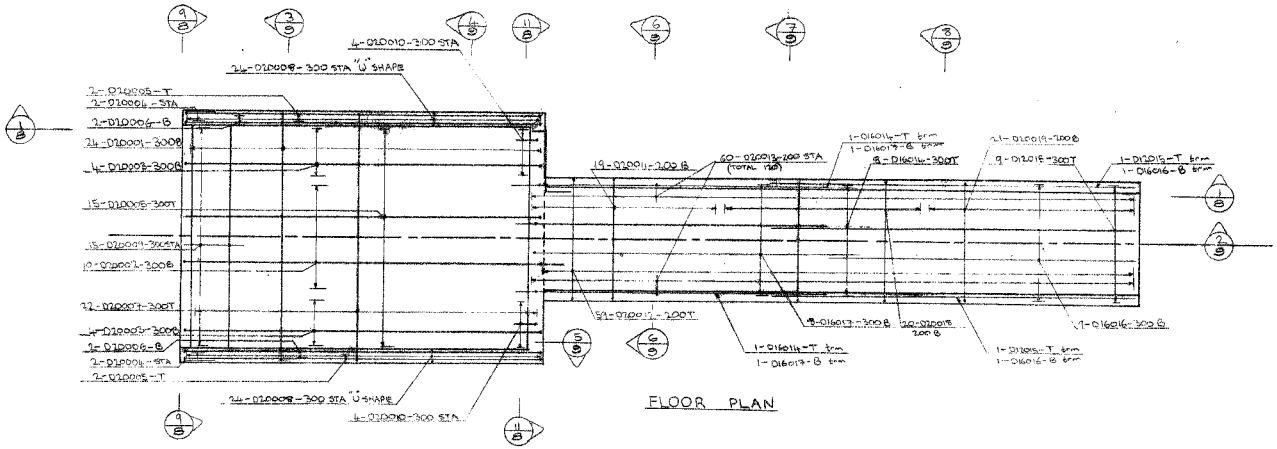
DRAWING No.
5438 – 4

DATE
JUNE 1982

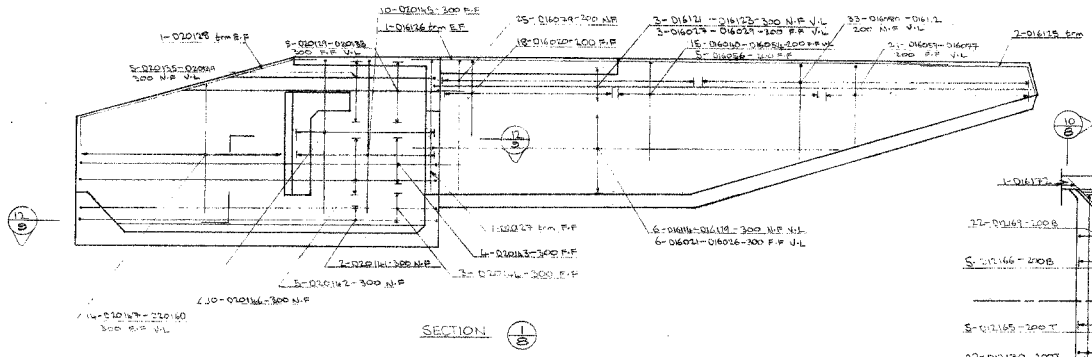
A

ORIGINAL SCALE

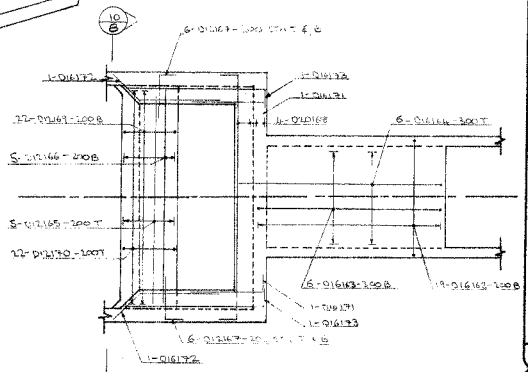
GRAPHIC SCALE



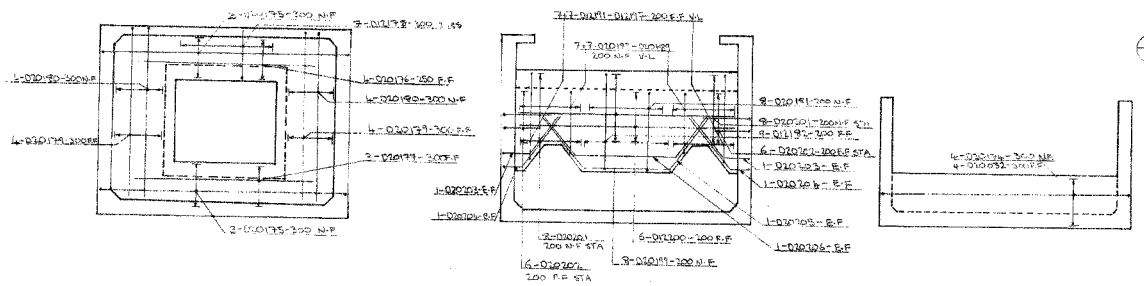
FLOOR PLAN



SECTION 1/8



TOP SLAB PLAN



SECTION 11/8 SECTION 10/8 SECTION 9/8

GRAPHIC SCALE

ORIGINAL SCALE

NOTES

0 Issued
Drawing Checked

CKD	REVISION	DATE

APPROVED

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REFERENCES

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CONSULTING ENGINEERS
REGISTERED SURVEYORS
TOWN PLANNERS

47 George St, Newmarket, Auckland.
101 Molesworth St, Wellington.

ORIGINATING OFFICE

TITLE

NEW ZEALAND STEEL DEVELOPMENT LTD

WOOLF FISHER WORKS
SETTLING PONDS
PHASE I

Dissipator
Reinforcing Details

ORIGINAL SCALES

1:50

DRAWING No.

5438-8

DATE

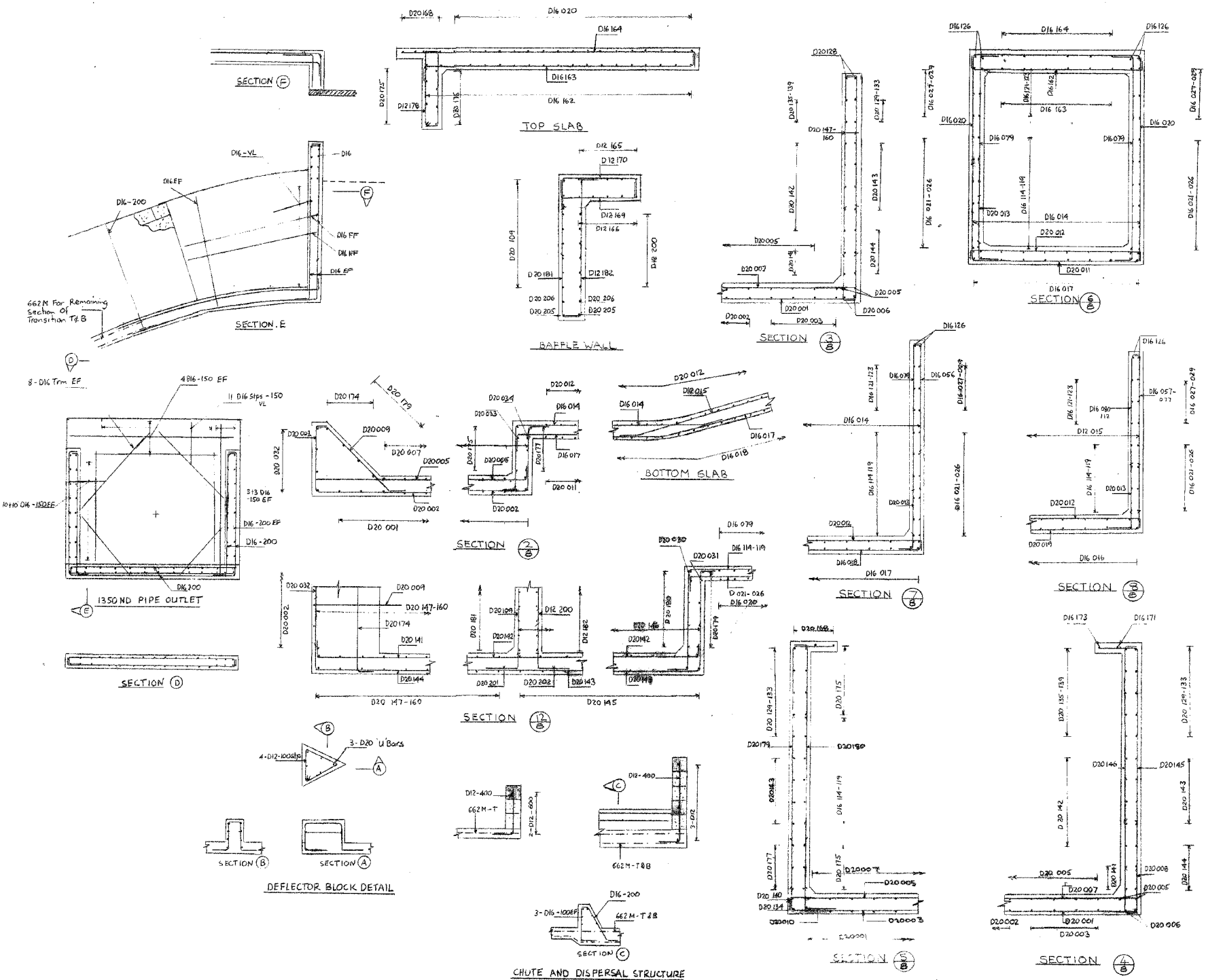
28/1/83

0

NZ STEEL LTD DRAWING NUMBER

796	007	003	001	

Re-Order Filemaster "D"
SELF-ADHESIVE PLAN HANGER



NOTES

CKD	REVISION	DATE
	0 Issued for Drawing Checked	

APPROVED (TJT) under 28/1/83

This drawing is not to be used for construction purposes unless signed as approved

REFERENCES

TONKIN & TAYLOR LTD

CONSULTING ENGINEERS
REGISTERED SURVEYORS
TOWN PLANNERS

47 George St. Newmarket, Auckland.
101 Molesworth St. Wellington.

ORIGINATING OFFICE .....

TITLE

NEW ZEALAND STEEL DEVELOPMENT LTD

WOOLF FISHER WORKS
SETTLING PONDS
PHASE I

Reinforcing Sections, Details

ORIGINAL SCALES 1:25

DRAWING No. S4384-9

DATE 28/1/83

NZ STEEL LTD DRAWING NUMBER 796 | 007 | 003 | 002