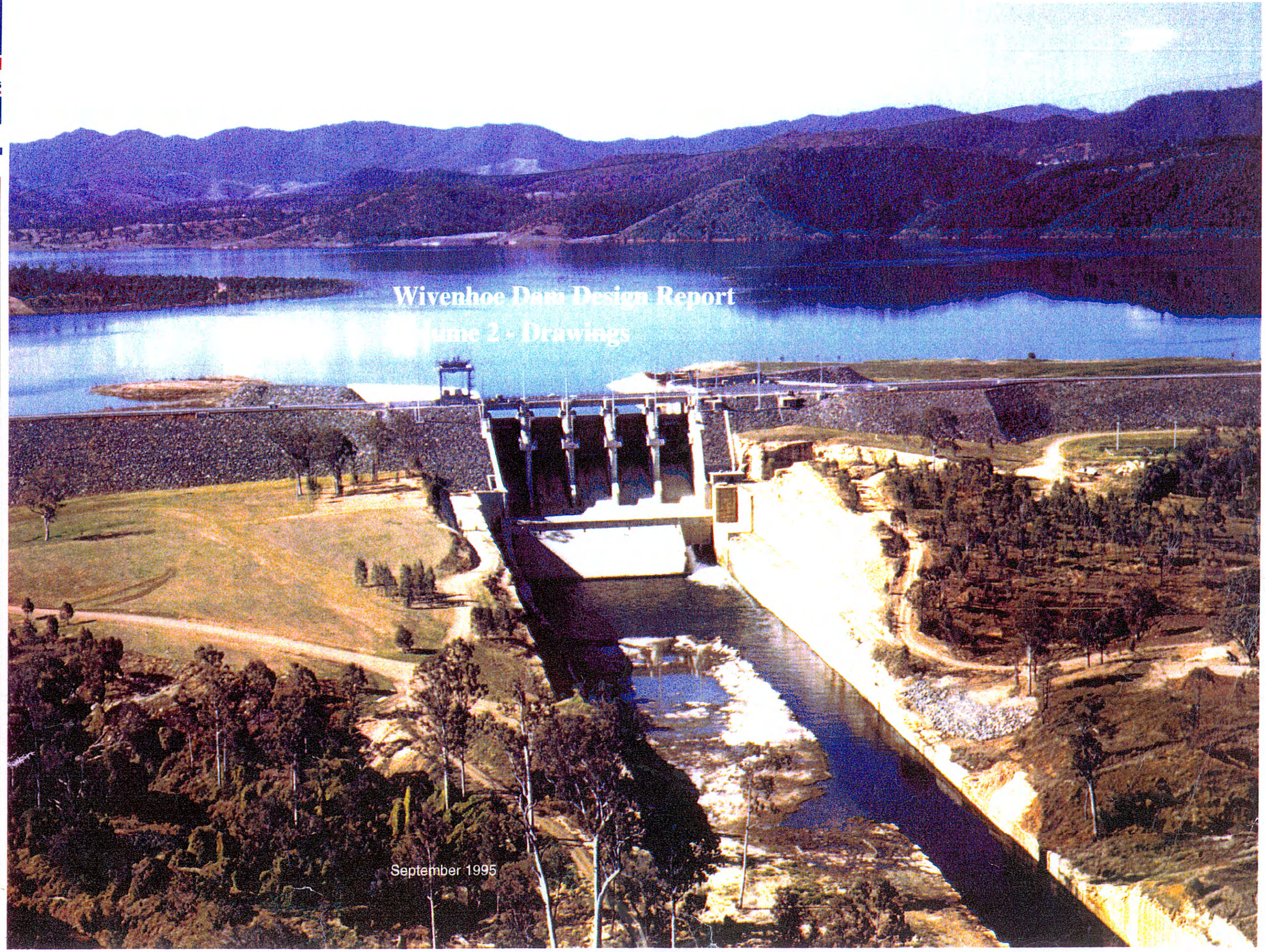
DPI
QUEENSLAND
DEPARTMENT OF PRIMARY INDUSTRIES
WATER COMMERCIAL

Wivenhoe Dam Design Report

Volume 2 - Drawings



September 1995

LIST OF FIGURES

1 Drawing A2-47529F - Location and Detail Locality Maps

2 Drawing A1-50820B - Embankment Area Plan

3 Drawing K1-45754D - Geological Plan (Showing adjustments to Axis C)

4 Drawing DB 1889 - Preliminary Design Proposal 1

5 Drawing DB 1888 - Preliminary Design Proposal 2

6 Drawing DB 1918 - Preliminary Design Proposal 5

7 Drawing A3-500049 RMI - Catchment Areas

8 Hydrographs Derived from Probable Maximum Rainfall. 0.1%, 0.2%, 1% and 2% Exceedence Probabilities for a Typical Catchment (Upper Brisbane River) (1977 Study)

9 Hydrographs for 5% and 10% Exceedence Probabilities at Wivenhoe Dam (1977 Study)

10 Hydrograph for Probable Maximum Flood Derived from Probable Maximum Rainfall - Upper Brisbane River Catchment (1977 Study)

11 Hydrograph for Probable Maximum Flood Derived from Probable Maximum Rainfall - Stanley River above Somerset Dam (1977 Study)

12 Hydrographs for Probable Maximum Flood Derived from Probable Maximum Rainfall - Residual Area to Wivenhoe Dam (1977 Study)

13 Hydrographs for Probable Maximum Flood Derived from Probable Maximum Rainfall Inflow to Wivenhoe Dam and Natural Flow at Wivenhoe Site (1977 Study)

14 Section Through Somerset Dam

15 Brisbane River at Wivenhoe Dam - Probability V Peak Flood Discharge (1983 Study)

16 Drawing A3-45418 - Savages Crossing Distribution of Flood Peaks

17 Drawing A3-49893A - Right Bank Diversion Channel Discharge Capacity Curves

18 Drawing A3-53325 - Discharge Ratings Right Bank Diversion Channel and Initial Spillway Channel

19 River Diversion and Construction Sequence

20 Drawing A3-53372D - Material Sources Locality Plan

21 Drawing A1-56182 - Embankment Foundation 1250m to 2100m Location of Exploratory Boreholes

22 Drawing A1-49868B - Embankment Typical Cross Sections

23 Grading Limits for Zone 1A

24 Grading Limits for Filters Zone 2A

25 Grading Limits for Filters Zone 2B

26 Grading Limits for Filters Zone 2C

27 Grading Limits for Zone 2E

28 Grading Limits for Zone 3A

29 Grading Limits for Zone 3D

30 Drawing A1-45419A - Foundation Excavation and Cofferdams

31 Drawing A1-45420B - Cofferdams - Sections

32 Drawing A1-49869B - Downstream Cofferdam General Arrangement

33 Drawing A1-62303B - Downstream Cofferdam Detail

34 Drawing A1-50779C - Right Bank Axis Distance 1223 m - 1900 m Embankment Arrangement

35 Drawing A1-54666A - Crash Barrier Concrete and Reinforcement

36 Drawing A1-56111E - Left Bank Embankment Typical Sections Adjacent to Spillway

37 Drawing A1-56110E - Left Bank Embankment Typical Sections Adjacent to Spillway

38 Drawing A1-63917 - Main Embankment Foundation Geological Plan - Key to Drawings

39 Drawing A4-109976 - Embankment Slip Failure Surfaces Distance 550 m

40 Drawing A4-109971 - Embankment Slip Failure Surface Distance 1400 m

41 Drawing A4-109972 - Embankment Slip Failure Surface Distance 1600 m

42 Drawing A4-109973 - Embankment Slip Failure Surfaces Distance 1700 m

43 Drawing A4-109974 -Embankment Slip Failure Surface Distance 1800 m Sheet 1 of 2

44 Drawing A4-109975 - Embankment Slip Failure Surfaces Distance 1800 m Sheet 2 of 2

45 Zone 1A p-q Plot

46 Zone 1D p-q Plot

47 Sandstone p-q Plot (Preliminary Investigations)

48 Zones 3B and 3C p-q Plot (Record Testing Stage I and Stage II)

49 Miscellaneous Fill p-q Plot (Assuming SC Materials are Sandstone)

50 Zones 3B and 3C p-q Plot (All Samples Preliminary Investigations, Miscellaneous Fill, and 3B/3C Stages I and II)

51 Drawing A1-53346B - Left Bank Saddle Dam No. 1

52 Drawing A1-53347B - Left Bank Saddle Dam No. 2

53 Drawing A1-45411D - Foundation Grouting Arrangement and Details

54 Drawing A1-57686 - Foundation Grouting - Key Plan of Drawings

55 Drawing DB 1904 - Preliminary Design Proposal 2 Alternative Layout of Spillway

56 Drawing A1-50771C - Spillway General Arrangement

57 Drawing A1-71363 - Spillway Geological Plans and Sections - Key Plan

58 Maximum Probable Inflow Flood Hydrograph to Wivenhoe Dam

59 Drawing A1-50782C - Approach Groynes Arrangement and Details

60 Spillway Approach Velocities for Probable Maximum Flood

61 Spillway Crest Pressures and Flow Profiles

62 Drawing A1-54537C - Spillway Grouted Anchor Bars for Walls

63 Drawing A1-56196A - Drainage Behind Spillway Retaining Walls Monos LH9-LH16

64 Drawing A1-54833A - Spillway Training Walls Monos LH6, LH7 - Concrete and Reinforcement

65 Drawing A1-56265A - Spillway Training Walls LH6, LH7 and LH8 Grouted Anchor Bars

66 Drawing A1-56087A - Spillway Left Bank Excavation Prestressed Rock Anchors

67 Drawing A1-56088A - Spillway Left Bank Excavation Prestressed Rock Anchors (Location)

68 Drawing A1-54815B - Spillway Retaining Walls Monolith RH12 Concrete

69 Drawing A1-54816D - Spillway Retaining Walls Monolith RH12 Concrete

70 Drawing A1-54817C - Spillway Retaining Walls Monolith RH12 Concrete

71 Drawing A1-54818B - Spillway Retaining Walls Monolith RH12 Concrete

72 Drawing A1-54820G - Spillway Retaining Walls Monolith RH12 Concrete

73 Stability Analysis of Spillway Monolith RH12

74 Drawing A1-56240A - Spillway Gantry Crane Beam and Footing - Right Bank Arrangement

75 Drawing A1-56282A - Spillway Retaining Walls Monolith RH12 Prestressing Details

76 Drawing A1-56213A - Spillway Monolith S4 Concrete

77 Drawing A1-56212A - Spillway Monolith S3 Concrete

78 Spillway Foundation Pressure Assumptions

79 Drawing A1-56249A - Spillway Grout Cap Concrete and Reinforcement

80 Drawing A1-56200B - Spillway Monos S2 and S4 Pier Nib Reinforcement

81 Drawing A1-56210B - Spillway Monolith S1 Concrete and Grouting

82 Drawing A1-56221A - Spillway Upper Gallery Mono S2 Drainage and Grout Arrangement

83 Drawing A1-54538C - Spillway Grouted Anchor Bars for Slabs

84 Drawing A1-56216B - Spillway Upper and Lower Galleries Drainage and Grout Arrangement

85 Drawing A1-54547A - Spillway Foundation Drainage Details

86 Drawing A1-74872 - Spillway Upper and Lower Galleries Foundation Drain Holes As Built

87 Drawing A1-56289A - Spillway Piers P1-P4 Concrete

88 Drawing A1-56309B - Spillway Piers P1-P4 Concrete

89 Drawing A3-54791 - Spillway Model Pier Geometry

90 Drawing A3-54812 - Spillway Model Pier Pressures

91 Drawing A3-54796 - Spillway Model Pier Pressures

92 Drawing K1-60160 - Radial Gates Hoists Arrangement

93 Drawing A1-75038 - Radial Gate Winch Inspection Platform Installation

94 Drawing A1-79264 - Spillway Piers P3 and P4 Accidental Cutting of Reinforcement

95 Drawing A1-50767D - Road Bridge Arrangement

96 Drawing A1-50762C - Road Bridge Prestressed Concrete Deck Units Concrete and Reinforcement Details

97 Drawing A1-50829D - Service Bridge General Arrangement

98 Drawing A1-56256A - Service Bridge Deck Slabs - Concrete

99 Drawing A1-56299B - Service Bridge Walkway

100 Drawing K1-60177 - Radial Gate Hoists & River Outlet Penstock Gate Hoist Hydraulic Pipework Arrangement

101 Drawing K1-51418E - Spillway Area Cableway System

102 Drawing A1-84960 - Service Bridge Precast Hollow Box Girder

103 Drawing A1-54750B - Spillway Gantry Crane Rails Installation and Arrangement

104 Drawing A2-50807W - Service Bridge Bracing Details

105 Drawing A1-60888A - Spillway Retaining Walls Monolith LH9 Arrangement

106 Drawing A1-60889A - Spillway Retaining Walls Monolith LH9 Arrangement

107 Drawing A1-59942C - Spillway Retaining Walls Monolith LH9 Concrete Above EL 62.0

108 Drawing A1-54613B - Spillway Retaining Walls Monolith LH9 Concrete to EL 62.0

109 Drawing A1-60903A - Spillway Retaining Walls Monolith LH10 Arrangement

110 Drawing A1-60904B - Spillway Retaining Walls Monolith LH10 Arrangement

111 Drawing A1-56120C - Spillway Retaining Walls Monolith LH10 Concrete above EL 62.0

112 Drawing A1-54614E - Spillway Retaining Walls Monolith LH10 Concrete to EL 62.0

113 Drawing A1-50788D - Grouted Anchor Bars

114 Drawing A1-50774 - Outlet Works Intake Structure M.S. Trashrack

115 Drawing A1-50772 - Outlet Works Intake Structure Trashrack Fishing Gear

116 Drawing A0-70655 - Spillway Area Water Quality Sample Tubes Arrangement and Details

117 Drawing A0-71687 - Spillway Area Water Quality Sampling Pipes Arrangement

118 Drawing A1-50800C - M.S. Selective Baulks Fabrication and Assembly Details

119 Drawing A1-50824E - M.S. Selective Baulks Collapsible Lower Baulk Arrangement

120 Drawing A1-56160D - Penstock and Outlet Pipes Installation Details

121 Drawing A1-54697A - Spillway Diversion Arrangement - Sheet 1 of 2

122 Drawing A1-54698A - Spillway Diversion Arrangement - Sheet 2 of 2

123 Drawing A1-50760E - Penstock Intake Details

124 Drawing A1-56136 - Articulated Fixed Wheel Gate Assembly

125 Drawing A1-54540E - Fixed Wheel Gate Track and Seal Plates General Arrangement

126 Drawing A0-51450A - River Outlet Penstock Gate Hoist Installation Arrangement

127 Drawing A1-62314 - Bulkhead Gate Lifting Frame Arrangement

128 Drawing K1-50201 - 1500 Nom. Cone Dispersion Regulating Valves Hydraulic Pipework Installation Arrangement and Details

129 Drawing K1-69223 - 1500 Discharge Regulator General Arrangement

130 Drawing K1-51408C - Regulator Valves 6 Tonne Monorail Hoist Installation Arrangement

131 Drawing A1-54654 - Dispersion Chamber Liner

132 Drawing K1-56530A - Spillway Area Equipment Location

133 Drawing A1-61555D - Radial Gates Arrangement

134 Finite Element Mesh for Left Half of Radial Gate

135 Radial Gate Horizontal Beam - Skinplate Detail - Prototype and Finite Element Model

136 Drawing A1-60908A - Radial Gate Middle Horizontal Girder

137 Drawing A1-60902A - Radial Gate Radial Girders

138 Drawing A4-56847 - Flow Profiles over Closed Radial Gates

139 Drawing A1-60915C - Radial Gate Trunnion Details

140 Drawing A1-60916B - Radial Gate Trunnion Details

141 Drawing A1-61560D - Radial Gate Trunnion Pin and Pedestal

142 Radial Gate Trunnion Pedestal Model

143 Comparison of Separate Models for Trunnion Pedestals

144 Radial Gate Alternative Bearing Arrangements

145 Drawing A1-61575D - Bulkhead Gate Assembly

146 Drawing A1-62297A - Bulkhead Gate Installation

147 Bulkhead Gate Valve - Approximate Filling Times

148 Bulkhead Gate - Required Tailwaters for Lifting to Ensure Cable Loads < 916 kN

149 Drawing A1-61549 - Radial Gate Seal Arrangement

150 Drawing A1-61576B - Bulkhead Gate Assembly

151 Drawing A0-60000A - 79 Tonne Bulkhead Gate Gantry Crane General Arrangement

152 Drawing A0-60001B - 79 Tonne Bulkhead Gate Gantry Crane Crab General Arrangement

153 Drawing A1-54718B - Left Bank Gantry Track Beams - Concrete and Arrangement

154 Drawing A1-54663B - Left Bank Underground Control Structure Arrangement

155 Drawing A0-62000 - 3 Tonne Inlet Structure Gantry Crane Operating Parameters

156 Drawing A0-62001A - 3 Tonne Inlet Structure Gantry Crane Installation Arrangement

157 Drawing K1-51441 - Water Quality Control Baulk Winches Support Beam Details

158 Drawing A1-53374W - Embankment Instrumentation - Sheet 1 of 2

159 Drawing A1-53375B - Embankment Instrumentation - Sheet 2 of 2

160 Drawing A1-50780D - Right Bank Embankment Details (Diversion Channel Instrumentation)

161 Drawing A1-56230A - Spillway Foundation Instrumentation

162 Extensometer Installed Across Fault Zone Distance 1867 m Approx.

163 Drawing A1-57707 - River Bed Consolidation Grouting

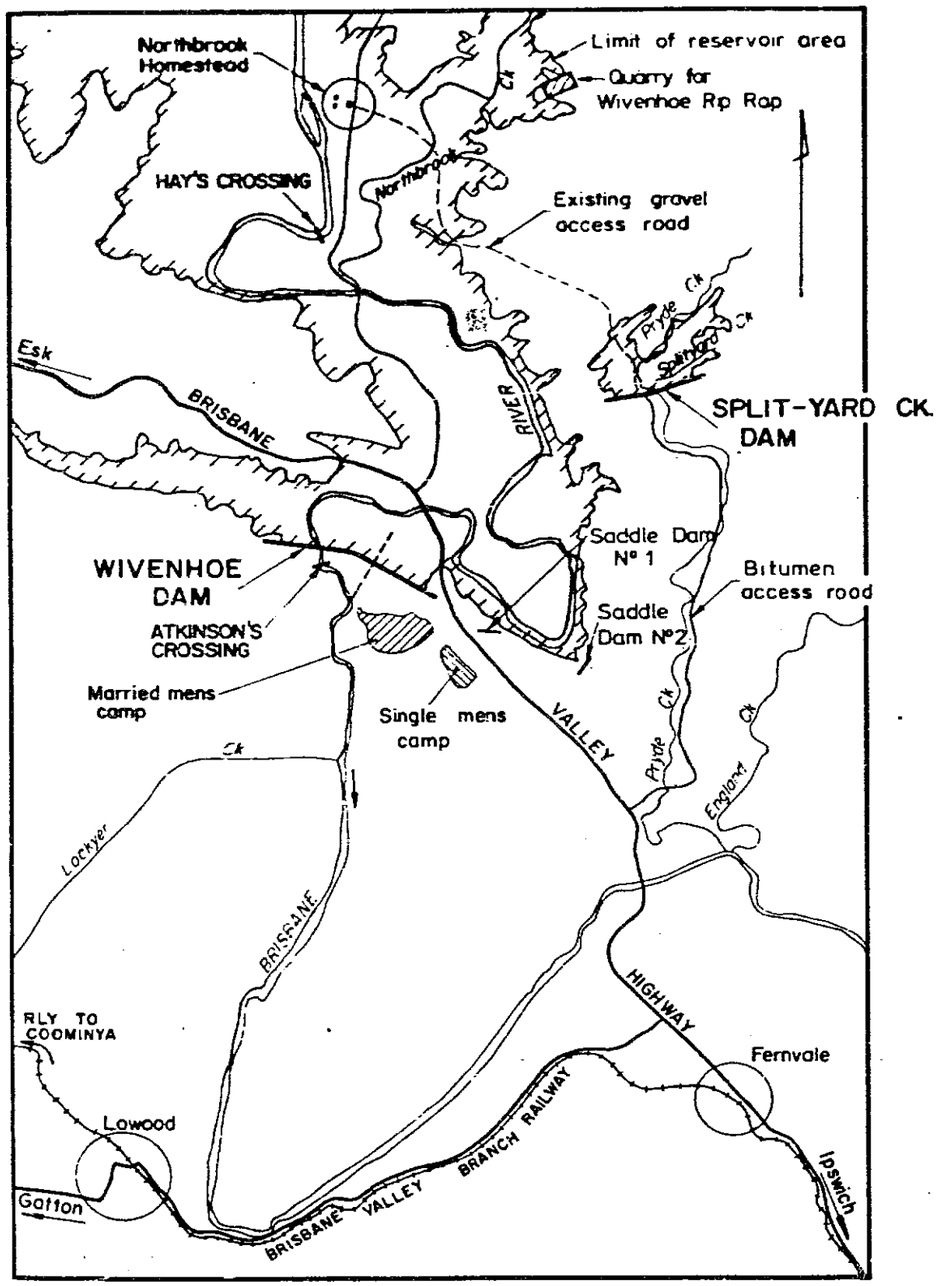
164 Drawing A1-45403C - Foundation Earthworks Axis Distance 00 to 1100 Details

165 Drawing A2-79207 - Dam Embankment Collection Box Details

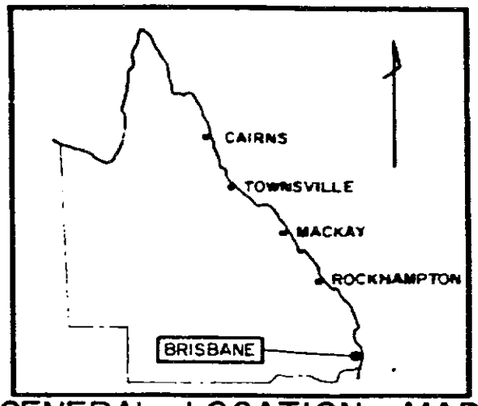
166 Drawing A1-54651B - Foundation Preparation Right Bank Embankment Details

167 Drawing A1-79257 - Downstream Diversion Channel and River Area Drainage and Access Road

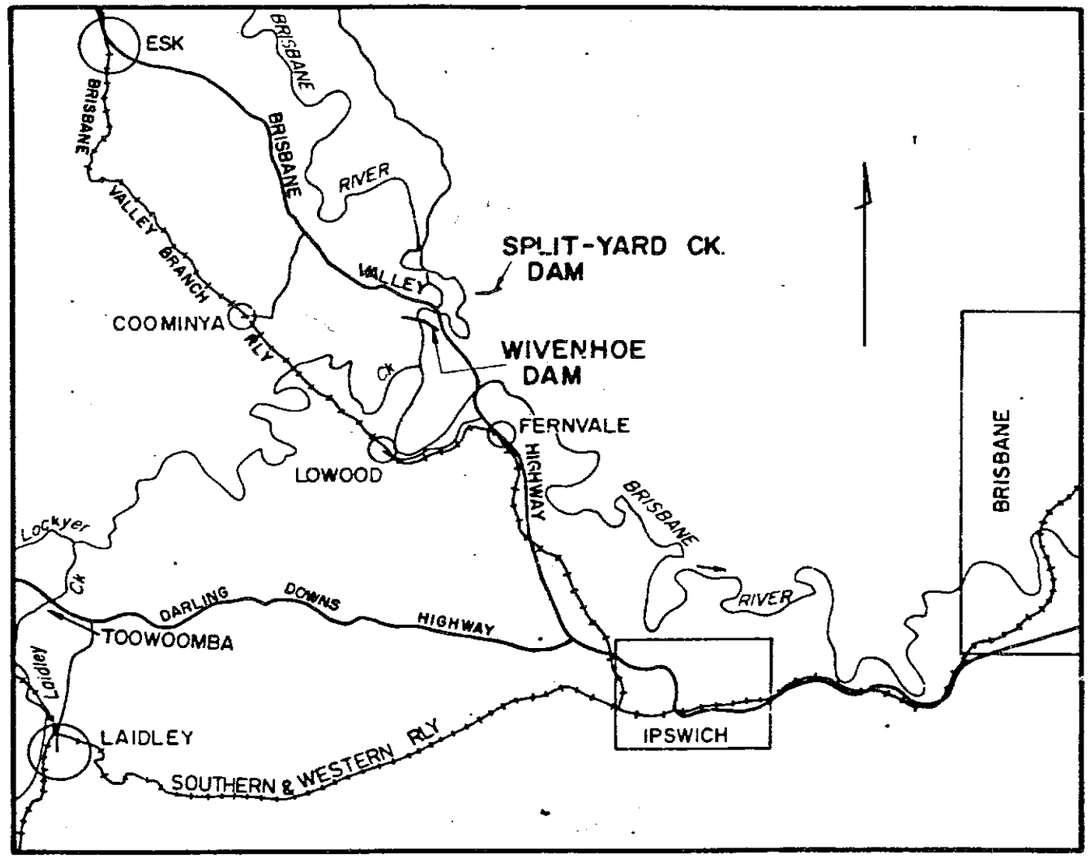
168 Drawing A1-79259 - Downstream Diversion Channel and River Area Cross Sections



LOCALITY MAP
Scale 'a'



GENERAL LOCATION MAP



LOCATION MAP
Scale 'b'

Revision					
19-10-78	D	Stockpile for Wivenhoe Rip Rap altered and Quarry added			
7-6-78	C	Stockpile for Rip Rap and Saddle Dams added	R.D.	B.W.	
19-8-77	B	Crossings added	B.W.		
11-7-77	A	Stockpile for Wivenhoe Rip Rap added.	R.D.	A.R.	
Date		Remarks	Ckd	Psd	

Drawing Schedule				
10-5-79	E	Contract Nº altered	R.D.	M.L.
8-5-80	F	Wivenhoe Rip Rap Stockpile removed		

km 0·5 0 1 2 3 4 5 km
Scale 'a' 1 : 50 000 before reduction.

km 2·5 0 10 20 km
Scale 'b' 1 : 250 000 before reduction.

IRRIGATION AND WATER SUPPLY COMMISSION

Design	Drafting
Prep.	Dr. P.G.H
Ckd.	Ckd.
Supv.	Supv.
Submitted	

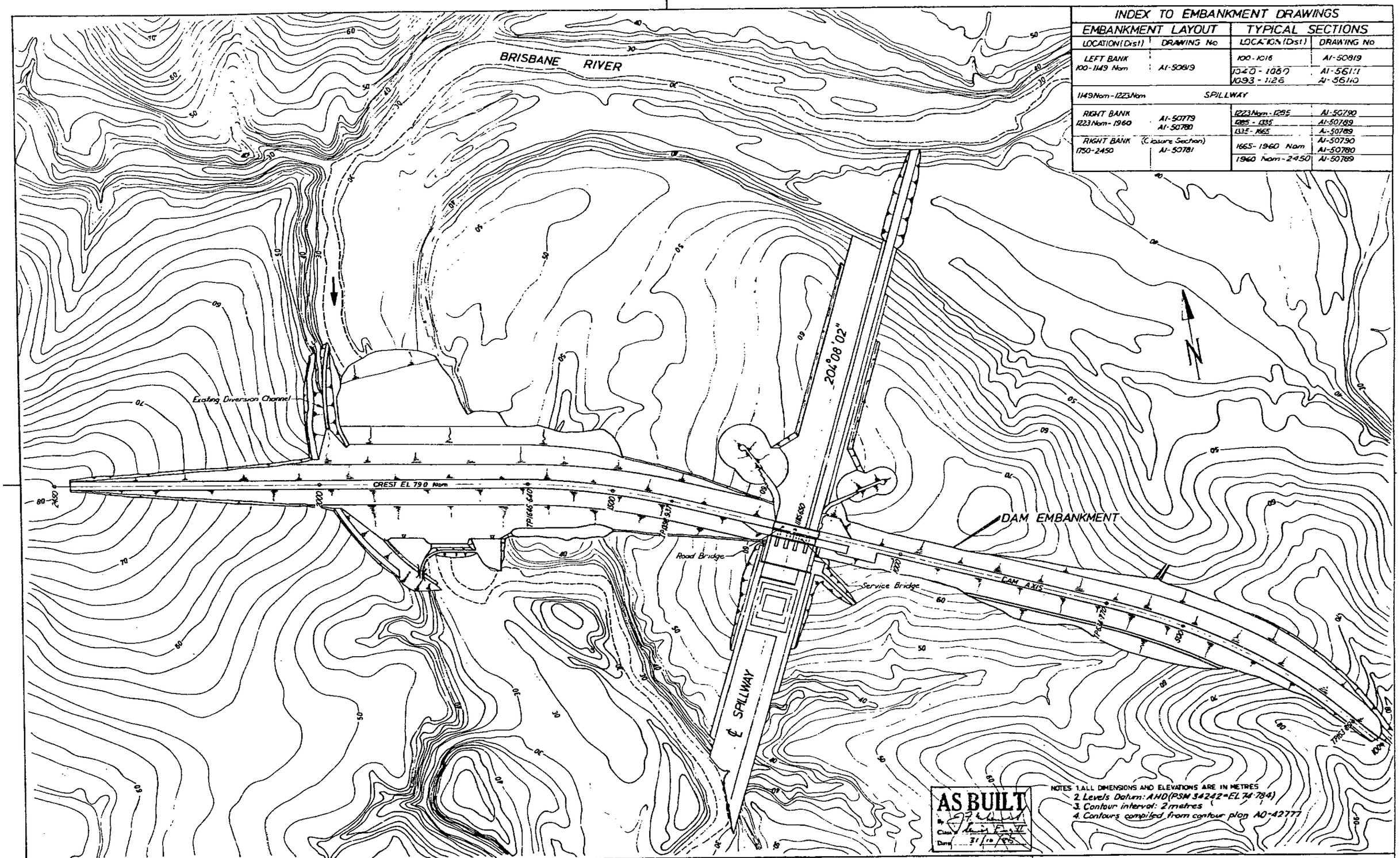
Recommended
Senior Engineer
Approved
Chief Construction Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km — WIVENHOE DAM

LOCATION & DETAIL LOCALITY MAPS

16-6-78 | A2-47529 | A B C D E F



INDEX TO EMBANKMENT DRAWINGS

EMBANKMENT LAYOUT		TYPICAL SECTIONS	
LOCATION (Dist)	DRAWING No	LOCATION (Dist)	DRAWING No
LEFT BANK 100 - 1149 Nom	A1-50819	100 - 1016	A1-50819
		1040 - 1080	A1-56111
		1093 - 1126	A1-56110
1149 Nom - 1223 Nom		SPILLWAY	
RIGHT BANK 1223 Nom - 1960	A1-50779 A1-50780	1223 Nom - 1285	A1-50790
		1285 - 1335	A1-50789
		1335 - 1665	A1-50789
RIGHT BANK (Closure Section) 1750 - 2450	A1-50781	1665 - 1960 Nom	A1-50790 A1-50780
		1960 Nom - 2450	A1-50789

Revision				
Oct '85	B	As Built		
14-9-79	W	Tender drg to working drg	RD	
9-5-79	A	Contract Number Amended	M.J.C.	
Date		Remarks	Ckd	Psd

Drawing Schedule

A1-54666	Crash Barrier - Concrete & Reinforcement
A1-56110	Typical Section Adjacent to S'way Sh 1 of 2
A1-53364	Pipe Culverts - Details
A1-50771	Spillway - General Arrangement

Scale 0 100 200 300m (1:3000 before reduction)

CONTRACT No 2120

IRRIGATION AND WATER SUPPLY COMMISSION

Design	Drafting
Prepd.	Dr A.F.A
Ckd	Ckd M.J.C.
Supv	Supv
Submitted	
Senior Engineer Designs	

Recommended: Chief Designing Engineer

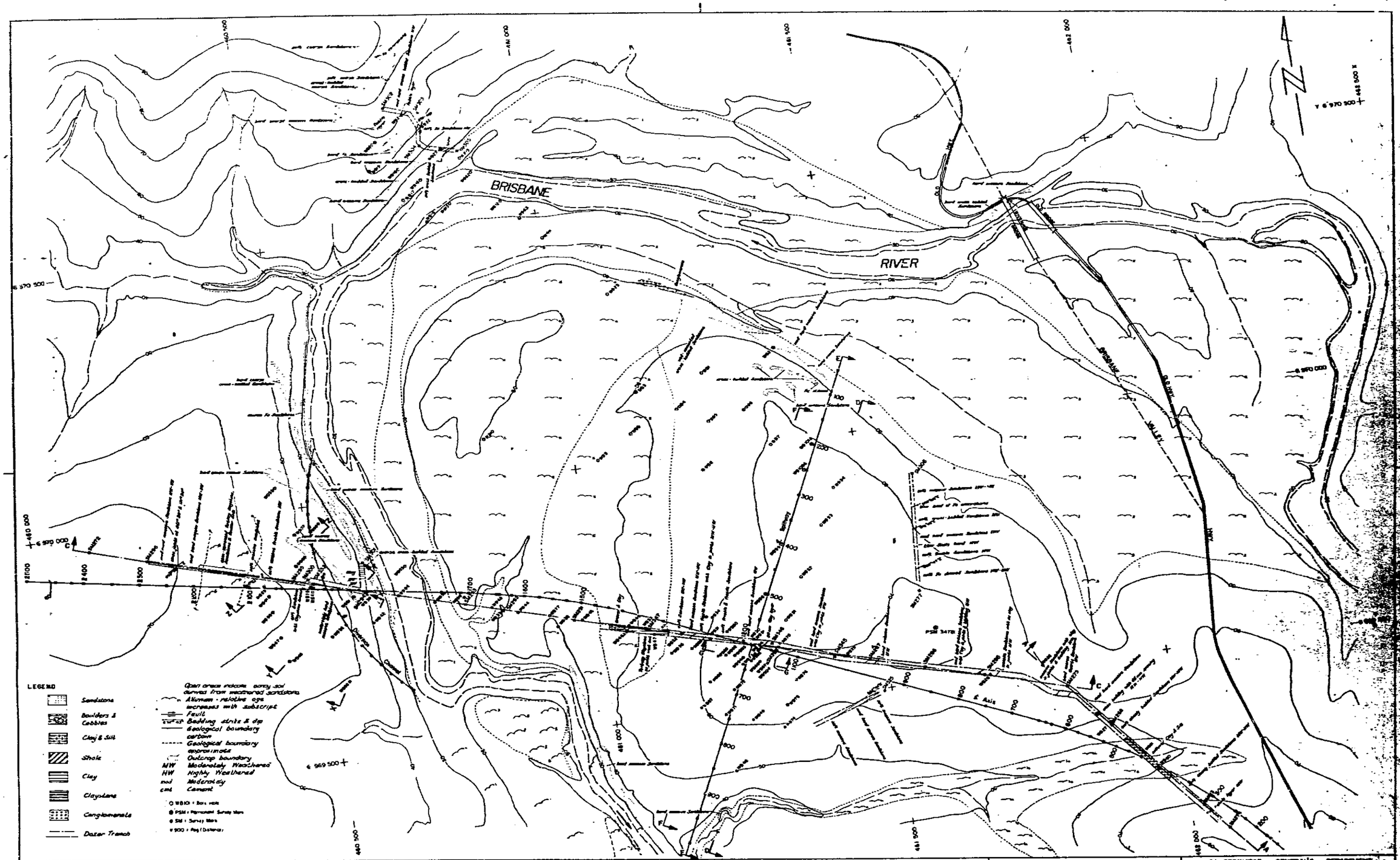
Approved: Commissioner 16.6.78

CO-ORDINATOR GENERAL'S DEPARTMENT

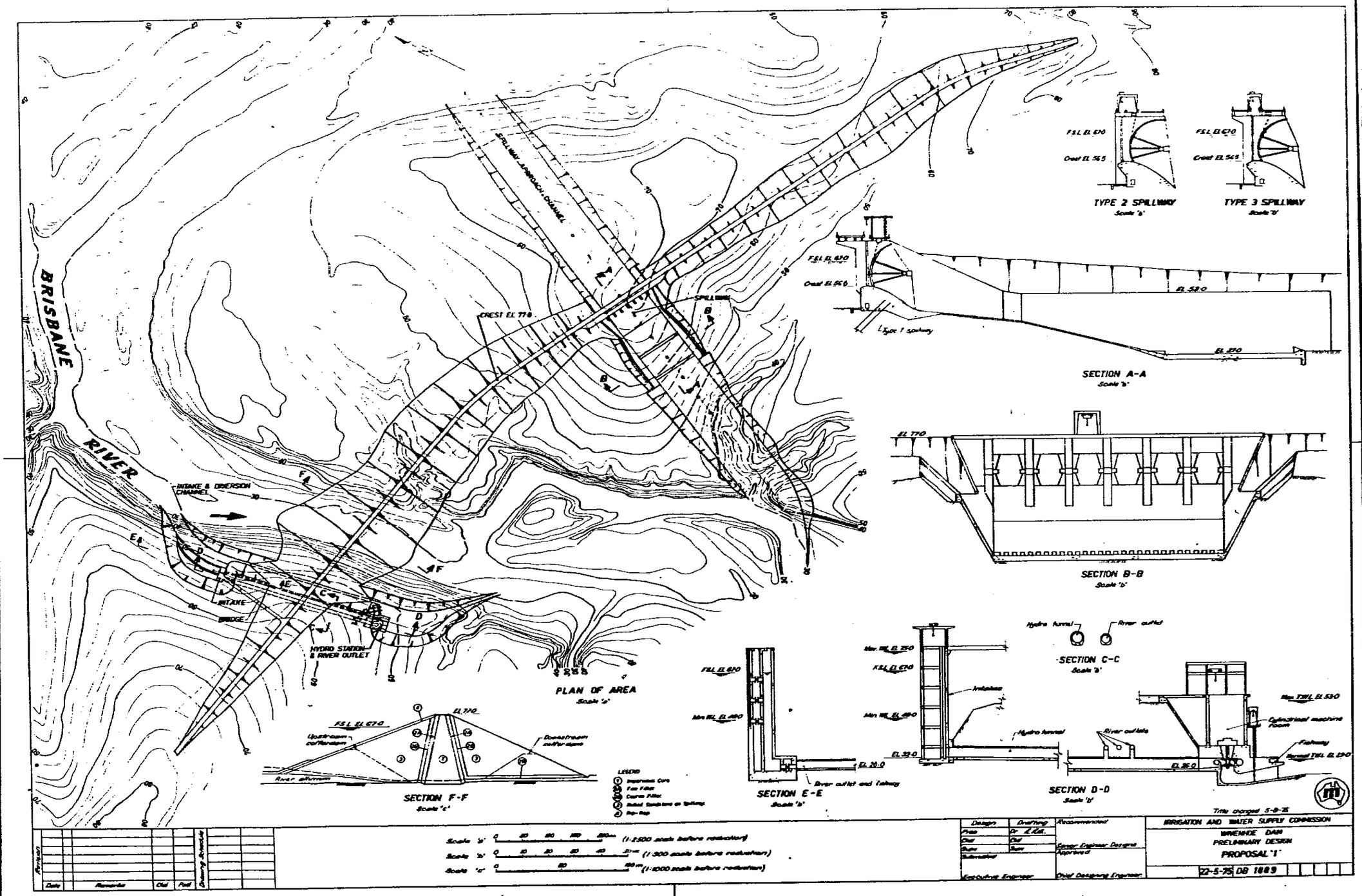
16.6.78 Co-ordinator General

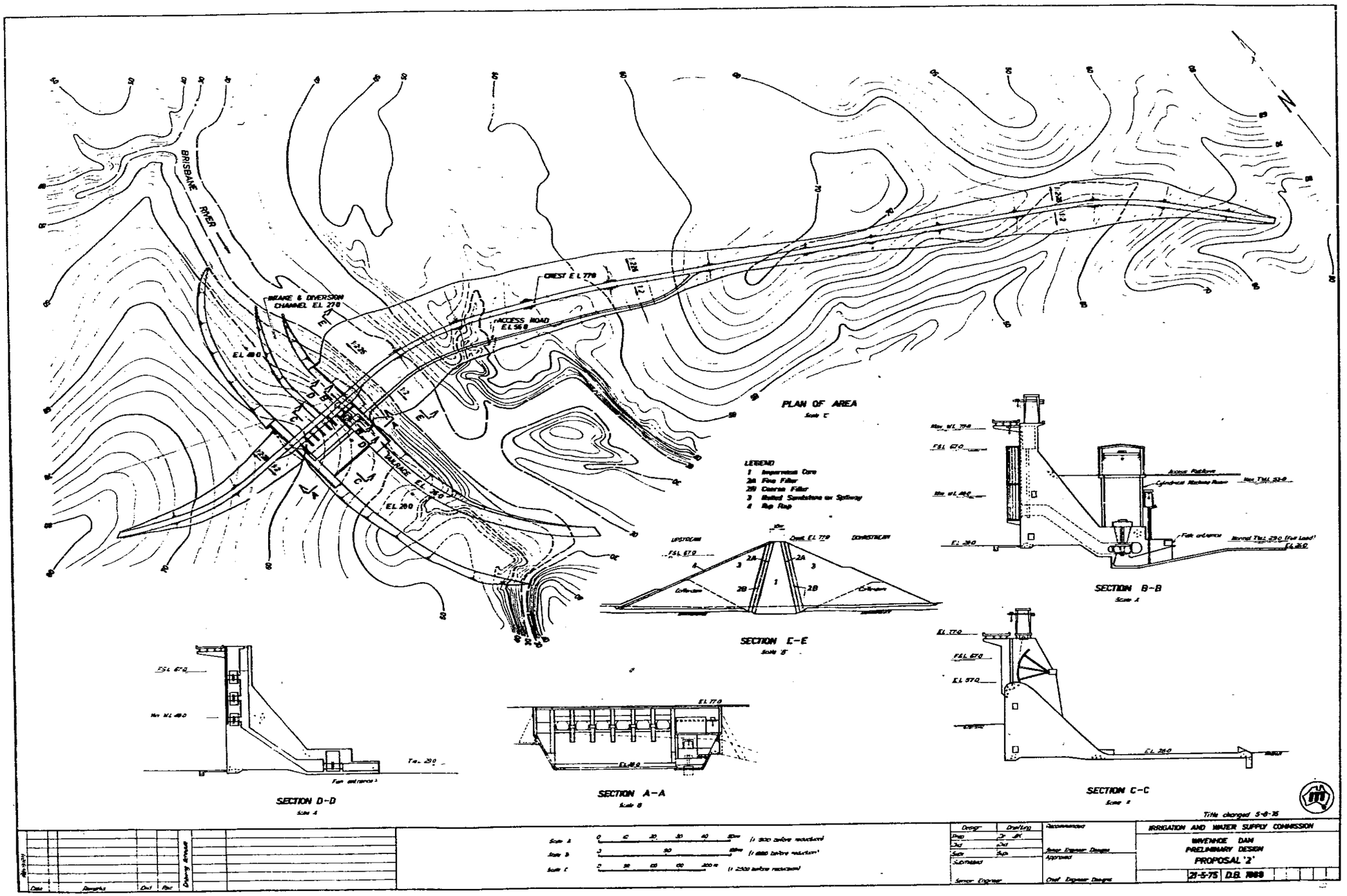
BRISBANE RIVER 150·2 km - WIVENHOE DAM
THIRD STAGE CONSTRUCTION
EMBANKMENT AREA PLAN

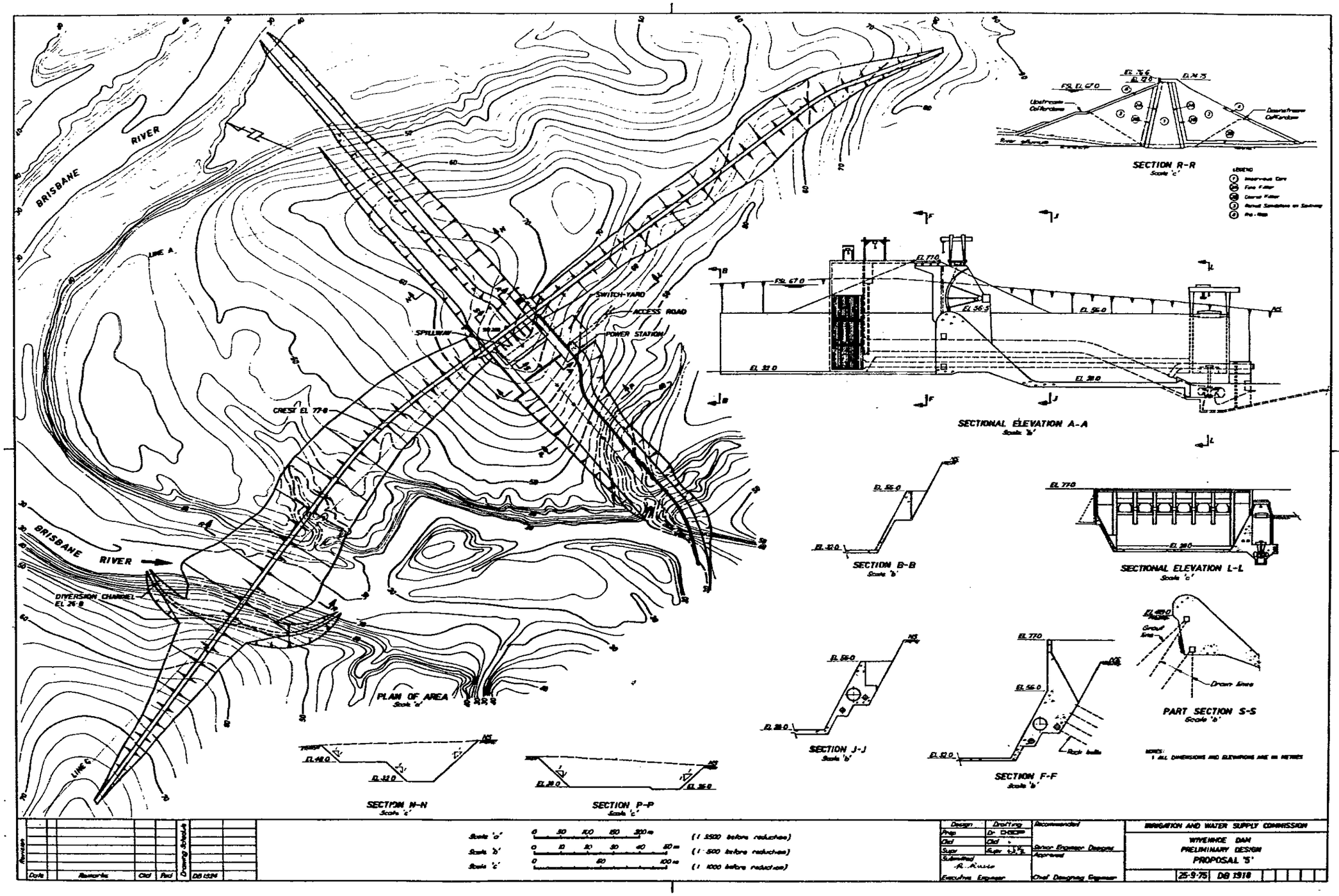
16-6-78 A1-50820 A W B

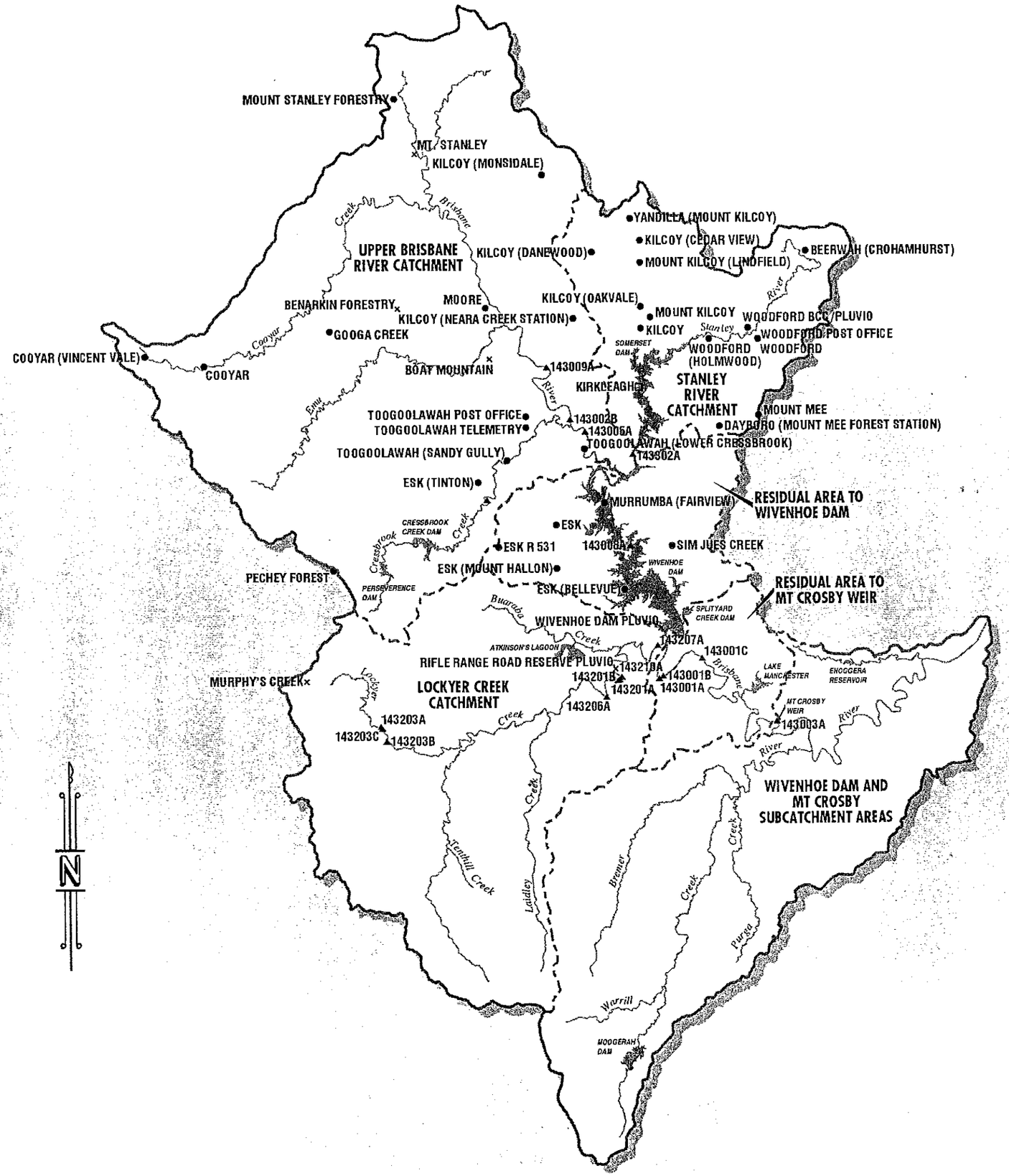

BRISBANE
RIVER
LEGEND
Sandstone
Boulders & Cobbles
Clay & Silt
Shale
Clay
Claystone
Conglomerate
Dozer Trench
Quart areas indicate sandy soil derived from weathered sandstone
Alluvium - relative age increases with subscript
Fault
Bedding strike & dip
Geological boundary certain
Geological boundary approximate
Outcrop boundary
MW Moderately Weathered
HW Highly Weathered
mod Moderately
cmt Cement
WBIO = Bore hole
PSM = Permanent Survey Mark
SM = Survey Mark
900 = Reg (Distance)
COMPILED FROM DRGS — AO-42777, AO-42778 & shows Dwg. Drg No E9C-A-3
For Sections A-A & C-C see Drgs KI-45742 & KI-44997 & AI-48907
For Sections X-X, Y-Y & Z-Z see Drgs AI-48524 & AI-48591
For Section G-G see Drgs AI-46776 & AI-46777
For Section F-F see Drgs AI-4858 & AI-4869
For Section E-E see Drgs AI-46483 & AI-46484
For Section D-D see Drgs AI-4587 & AI-45889
AZIMUTH DATUM — AMG
LEVELS DATUM — AHD - PSM 34242 + EL 74-784
SCALE
0 50 100 150 200 250 metres
IRRIGATION AND WATER SUPPLY COMMISSION
Geology
Drafting
Recommended
Senior Engineer Project Planning
Approved
Chief Investigation Engineer
Submitted
Engineering Geologist
CO-ORDINATOR GENERAL'S DEPARTMENT
BRISBANE RIVER 150-2 km WIVENHOE DAM
GEOLOGICAL PLAN
3·2·76 KI - 45754 D

INS. 0 2 4 6 8 10


BRISBANE RIVER
SPILLWAY APPROACH CHANNEL
CREST EL 770
SPILLWAY
INTAKE & DIVERSION CHANNEL
INTAKE
BRIDGE
HYDRO STATION & RIVER OUTLET
PLAN OF AREA
Scale 'a'
TYPE 2 SPILLWAY
Scale 'b'
TYPE 3 SPILLWAY
Scale 'b'
SECTION A-A
Scale 'b'
SECTION B-B
Scale 'b'
SECTION C-C
Scale 'b'
SECTION D-D
Scale 'b'
SECTION E-E
Scale 'b'
SECTION F-F
Scale 'c'
Upstream cofferdam
Downstream cofferdam
River alignment
Hydro tunnel
River outlet
Cylindrical machine room
Flashing
Scale 'a' (1:2500 scale before reduction)
Scale 'b' (1:500 scale before reduction)
Scale 'c' (1:1000 scale before reduction)
Revision
Date
Remarks
Chd
Appd
Drawing Schedule
Design
Drafting
Recommended
Senior Engineer Designs
Approved
Chief Designing Engineer
Executive Engineer
IRRIGATION AND WATER SUPPLY COMMISSION
WIVENHOE DAM
PRELIMINARY DESIGN
PROPOSAL 'I'
22-5-75
DB 1889


BRISBANE RIVER
BREAKE & DIVERSION CHANNEL EL 270
CREST EL 770
ACCESS ROAD EL 568
EL 480
TAILRACE EL 280
EL 200
PLAN OF AREA
LEGEND
1 Impervious Core
2A Fine Filter
2B Coarse Filter
3 Rolled Sandstone or Spillway
4 Rip Rap
UPSTREAM
DOWNSTREAM
Crest EL 770
FSL 670
Collection
SECTION E-E
Scale 'B'
Max WL 794
FSL 670
Access Platform
Cylindrical Stainless Roller
Min TWL 53.0
Fish ordinance
Normal TWL 29.0 (Full Load)
EL 350
EL 280
SECTION B-B
Scale A
EL 770
FSL 670
EL 570
EL 280
SECTION C-C
Scale A
FSL 670
Min WL 480
TWL 280
Fish ordinance
SECTION D-D
Scale A
EL 770
EL 480
SECTION A-A
Scale B
Scale A 0 10 20 30 40 50m (1:500 before reduction)
Scale B 0 50 100m (1:1000 before reduction)
Scale C 0 50 100 150 200m (1:2500 before reduction)
Drawing Amount
Date
Remarks
Out
Rev
Drawn
Drafting
Prep
Chd
Sch
Submitted
Senior Engineer
Recommended
Senior Engineer Designs
Approved
Chief Engineer Designs
Title changed 5-8-75
IRRIGATION AND WATER SUPPLY COMMISSION
WIVENHOE DAM
PRELIMINARY DESIGN
PROPOSAL '2'
21-5-75
D.B. 1969


BRISBANE RIVER
LINE A
SWITCH-YARD
ACCESS ROAD
SPILLWAY
POWER STATION
CREST EL 77·0
BRISBANE RIVER
DIVERSION CHANNEL EL 26·0
LINE C
PLAN OF AREA
Scale 'a'
SECTION R-R
Scale 'c'
Upstream Cofferdam
Downstream Cofferdam
SECTIONAL ELEVATION A-A
Scale 'b'
SECTION B-B
Scale 'b'
SECTIONAL ELEVATION L-L
Scale 'c'
SECTION J-J
Scale 'b'
SECTION F-F
Scale 'b'
PART SECTION S-S
Scale 'b'
Grout line
Drain lines
Rock bolts
SECTION N-N
Scale 'c'
SECTION P-P
Scale 'c'
Scale 'a' 0 50 100 150 200 m (1:5000 before reduction)
Scale 'b' 0 10 20 30 40 50 m (1:500 before reduction)
Scale 'c' 0 50 100 m (1:1000 before reduction)
Revision
Date
Remarks
Chd
Rvd
Drawing Schedule
DB 1524
Design
Drafting
Prep
Chd
Supr
Submitted
Executive Engineer
Recommended
Senior Engineer Designer
Approved
Chief Designing Engineer
IRRIGATION AND WATER SUPPLY COMMISSION
WIVENHOE DAM
PRELIMINARY DESIGN
PROPOSAL 'S'
25·9·75
DB 1918



143001A	Brisbane River at Lowood
143001B	Brisbane River at Vernor
143001C	Brisbane River at Savages Crossing
143002B	Brisbane River at Fulham Vale
143003A	Brisbane River at Mt Crosby
143005A	Brisbane River at Watts Bridge
143006A	Cressbrook Creek at Tinton
143008A	Brisbane River at Middle Creek
143009A	Brisbane River at Gregors Creek
143201A	Lockyer Creek at Tarampa
143201B	Lockyer Creek at Tarampa
143203A	Lockyer Creek at Helidon
143203B	Lockyer Creek at Helidon No 2
143203C	Lockyer Creek at Helidon
143206A	Lockyer Creek at Brightview Weir
143207A	Lockyer Creek at O'Reillys Weir
143210A	Lockyer Creek at Lyons Bridge
143302A	Stanley River at Silverton

LEGEND

■ KIRKLEAGH	Evaporation Station
× BOAT MOUNTAIN	Pluviograph Station
● KILCOY	Rainfall Station
▲ 143009A	Stream Gauging Station
	Catchment Boundary
	Sub-Catchment Boundary

KILOMETRES

0 20 40 60 75

DPI DEPARTMENT OF PRIMARY INDUSTRIES
QUEENSLAND RESOURCE MANAGEMENT

Wivenhoe Dam and Mt. Crosby

Catchment Areas

18 December 1995

A3-500047 RMI

Printed:- 05 Dec 95 Current Workspace:- /DATAVOL2/WATER SYSTEMS-NEW

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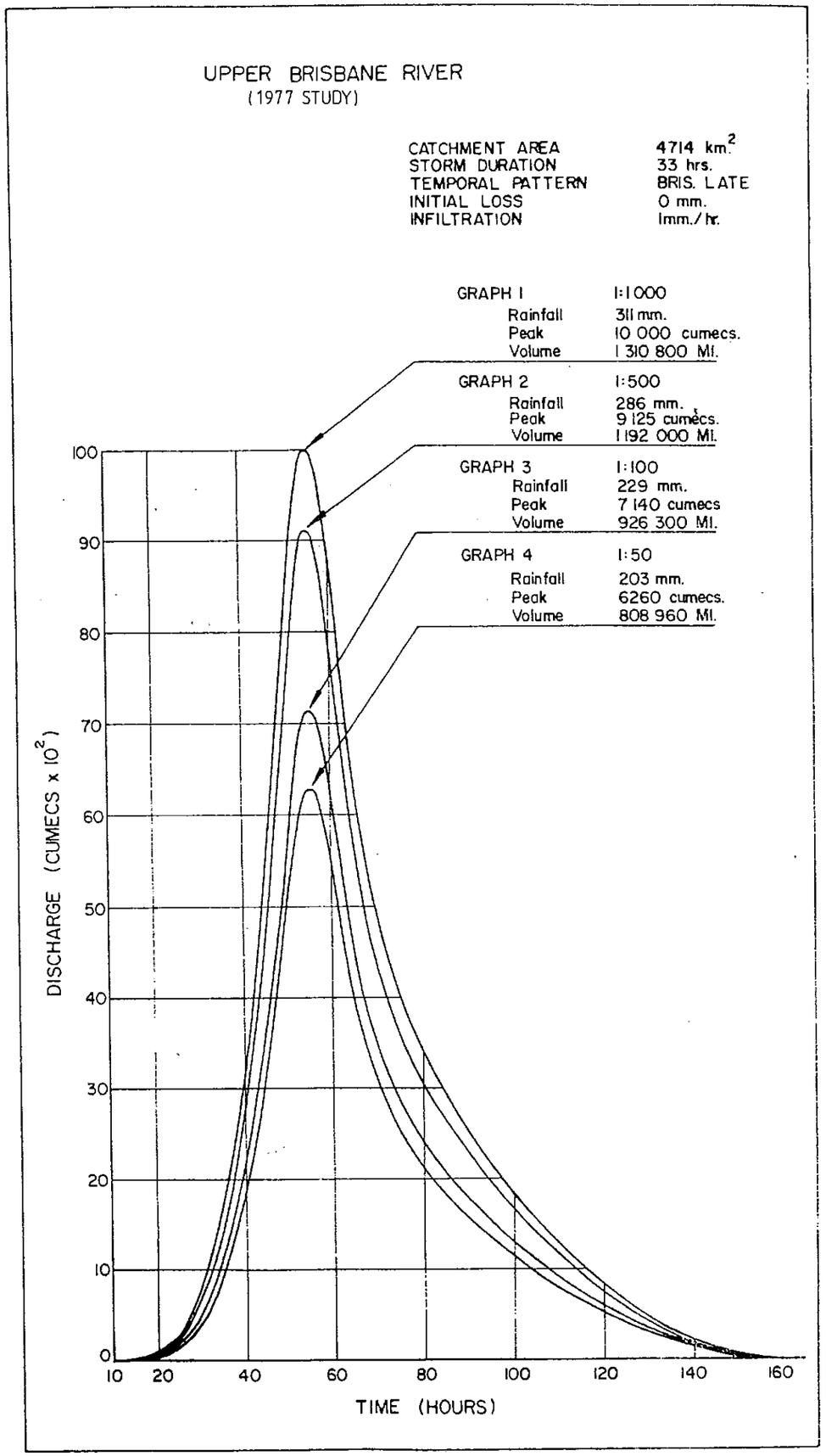
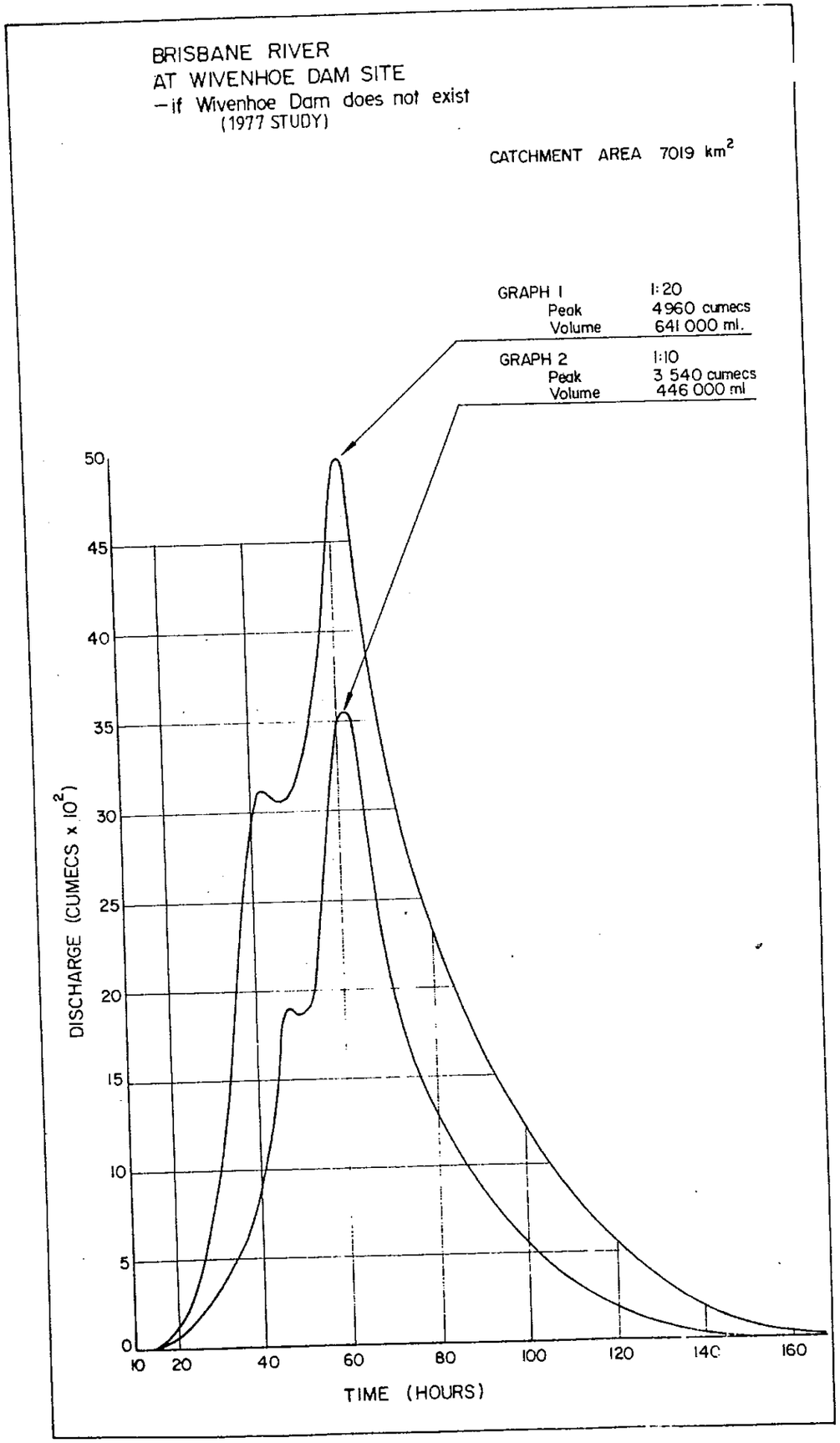
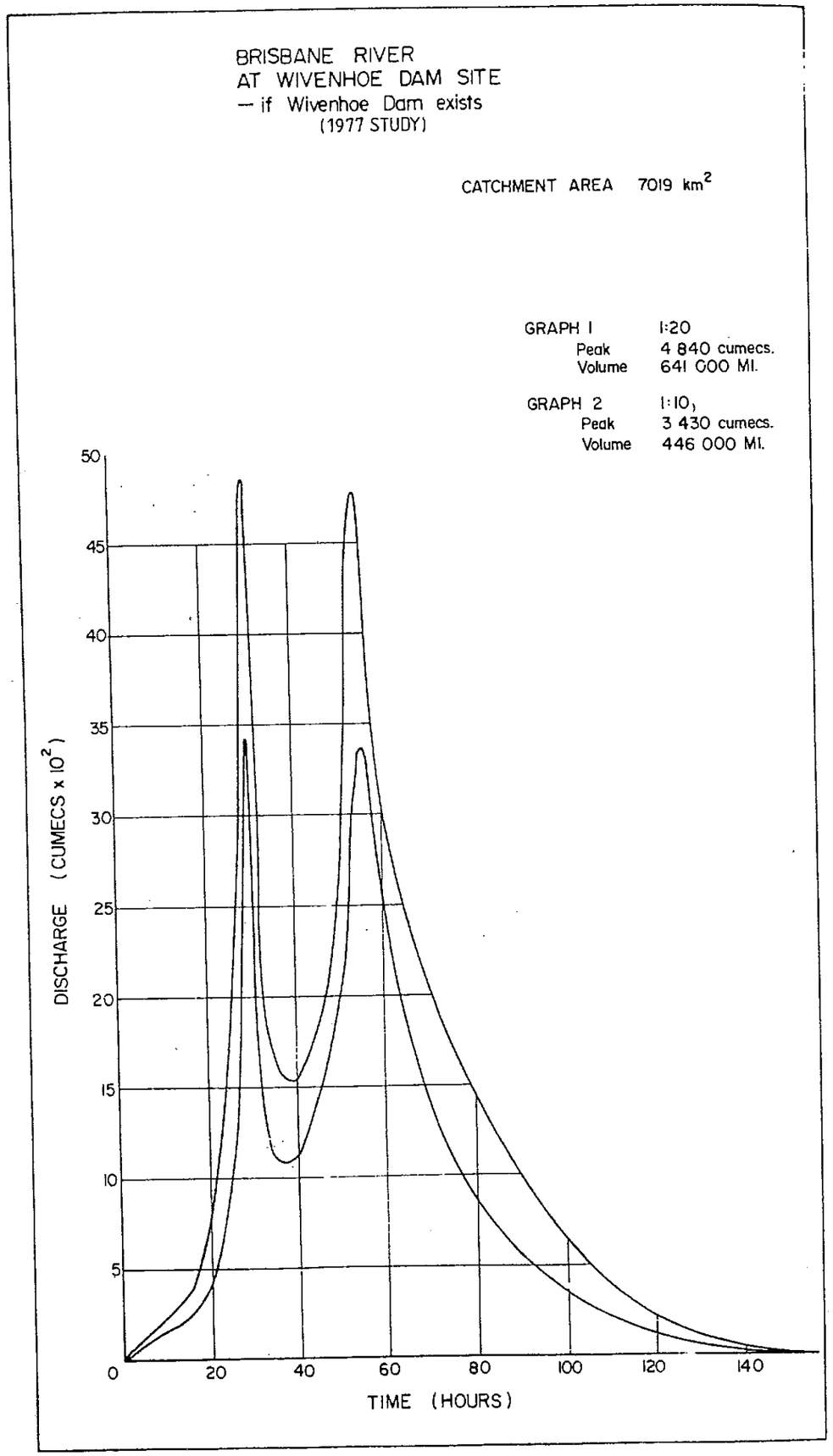

UPPER BRISBANE RIVER
(1977 STUDY)
CATCHMENT AREA 4714 km²
STORM DURATION 33 hrs.
TEMPORAL PATTERN BRIS. LATE
INITIAL LOSS 0 mm.
INFILTRATION 1mm./hr.
GRAPH 1 1:1000
Rainfall 311 mm.
Peak 10 000 cumecs.
Volume 1 310 800 Ml.
GRAPH 2 1:500
Rainfall 286 mm.
Peak 9 125 cumecs.
Volume 1 192 000 Ml.
GRAPH 3 1:100
Rainfall 229 mm.
Peak 7 140 cumecs
Volume 926 300 Ml.
GRAPH 4 1:50
Rainfall 203 mm.
Peak 6260 cumecs.
Volume 808 960 Ml.
DISCHARGE (CUMECS x 10²)
0
10
20
30
40
50
60
70
80
90
100
10
20
40
60
80
100
120
140
160
TIME (HOURS)


BRISBANE RIVER
AT WIVENHOE DAM SITE
– if Wivenhoe Dam does not exist
(1977 STUDY)
CATCHMENT AREA 7019 km²
GRAPH 1 1:20
Peak 4960 cumecs
Volume 641 000 ml.
GRAPH 2 1:10
Peak 3 540 cumecs
Volume 446 000 ml
DISCHARGE (CUMECS x 10²)
0
5
10
15
20
25
30
35
40
45
50
10
20
40
60
80
100
120
140
160
TIME (HOURS)

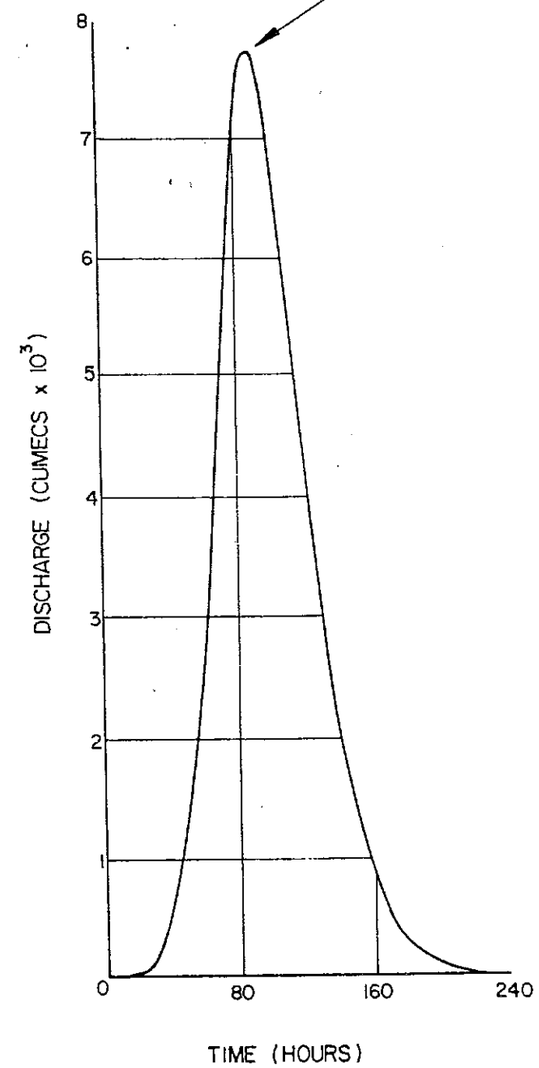

BRISBANE RIVER
AT WIVENHOE DAM SITE
– if Wivenhoe Dam exists
(1977 STUDY)
CATCHMENT AREA 7019 km²
GRAPH 1 1:20
Peak 4 840 cumecs.
Volume 641 000 Ml.
GRAPH 2 1:10,
Peak 3 430 cumecs.
Volume 446 000 Ml.
DISCHARGE (CUMECS x 10²)
0
5
10
15
20
25
30
35
40
45
50
20
40
60
80
100
120
140
TIME (HOURS)

UPPER BRISBANE RIVER
(1977 STUDY)

MAXIMUM PROBABLE FLOOD

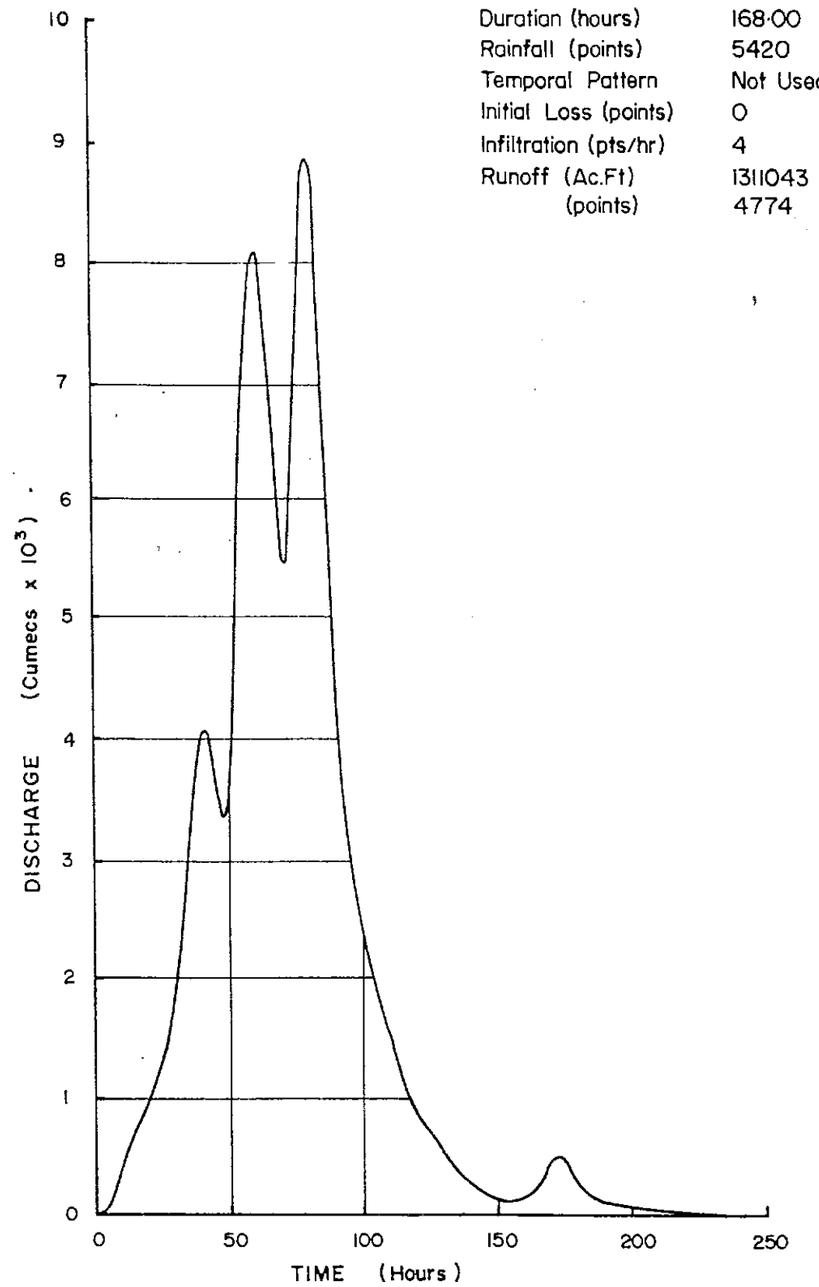
GRAPH 1 1:10 000

Duration	168 hrs.
Rainfall	2041 pts
Temperal Pat.	Not Used
Initial Loss	0 pts.
Infiltration	4 pts/hr.
Runoff	1 457 173 ac.ft.
	1 501 pts.



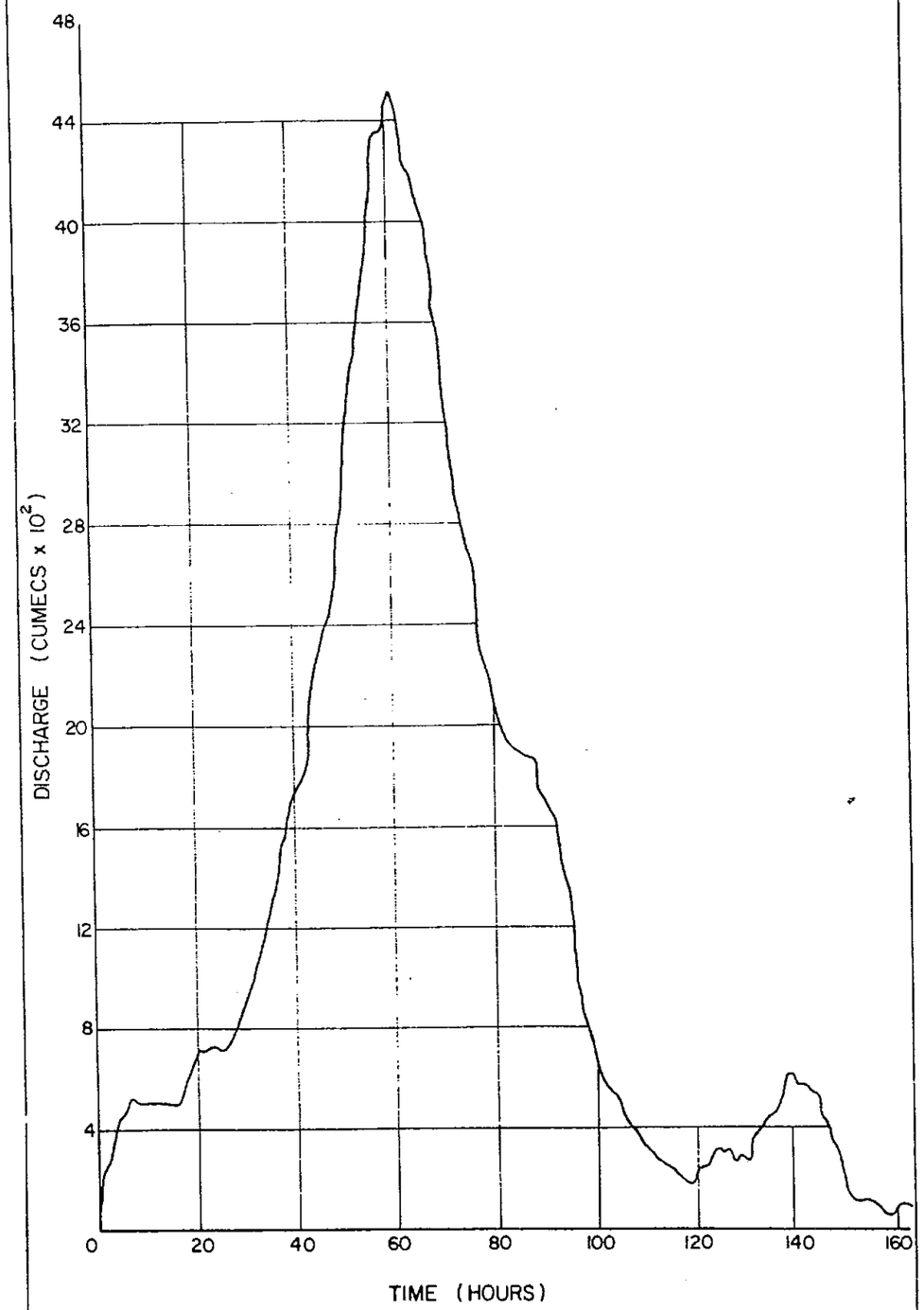
GRAPH 1 1:10 000

Duration (hours)	168·00
Rainfall (points)	5420
Temporal Pattern	Not Used
Initial Loss (points)	0
Infiltration (pts/hr)	4
Runoff (Ac.Ft)	1311043
(points)	4774



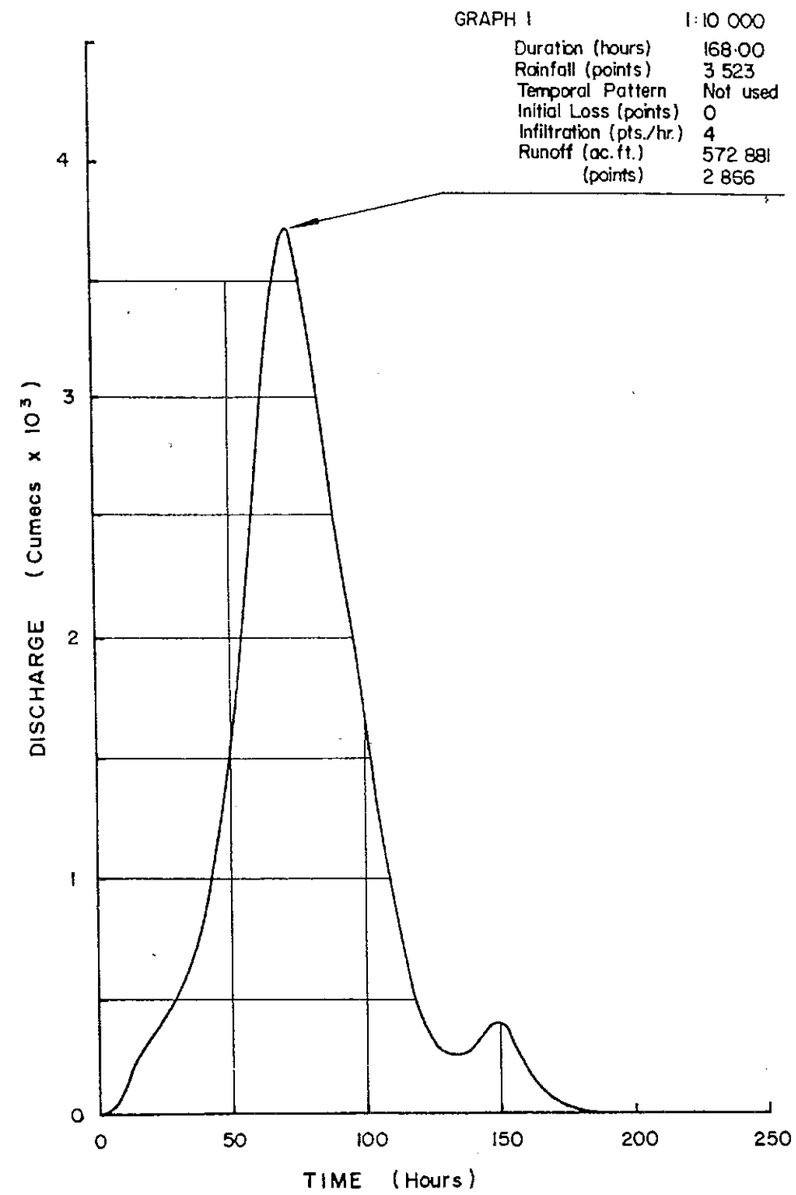
STANLEY RIVER ABOVE SOMERSET DAM
INFLOW INTO THE DAM
MAXIMUM PROBABLE FLOOD (1977 STUDY)

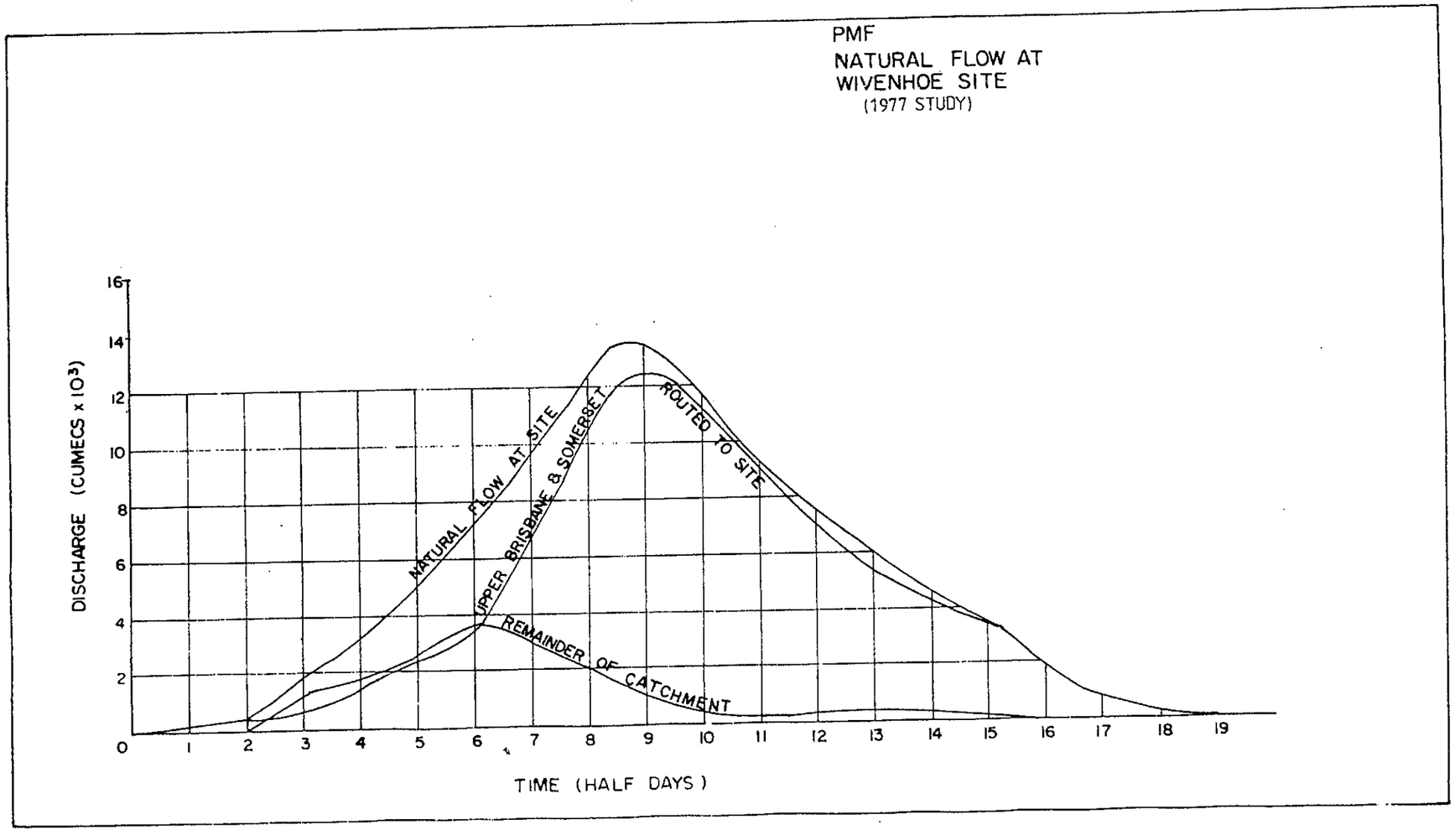
MAXIMUM PROBABLE FLOOD
RESIDUAL AREA TO WIVENHOE DAM
— with Wivenhoe Dam in existence
(1977 STUDY)

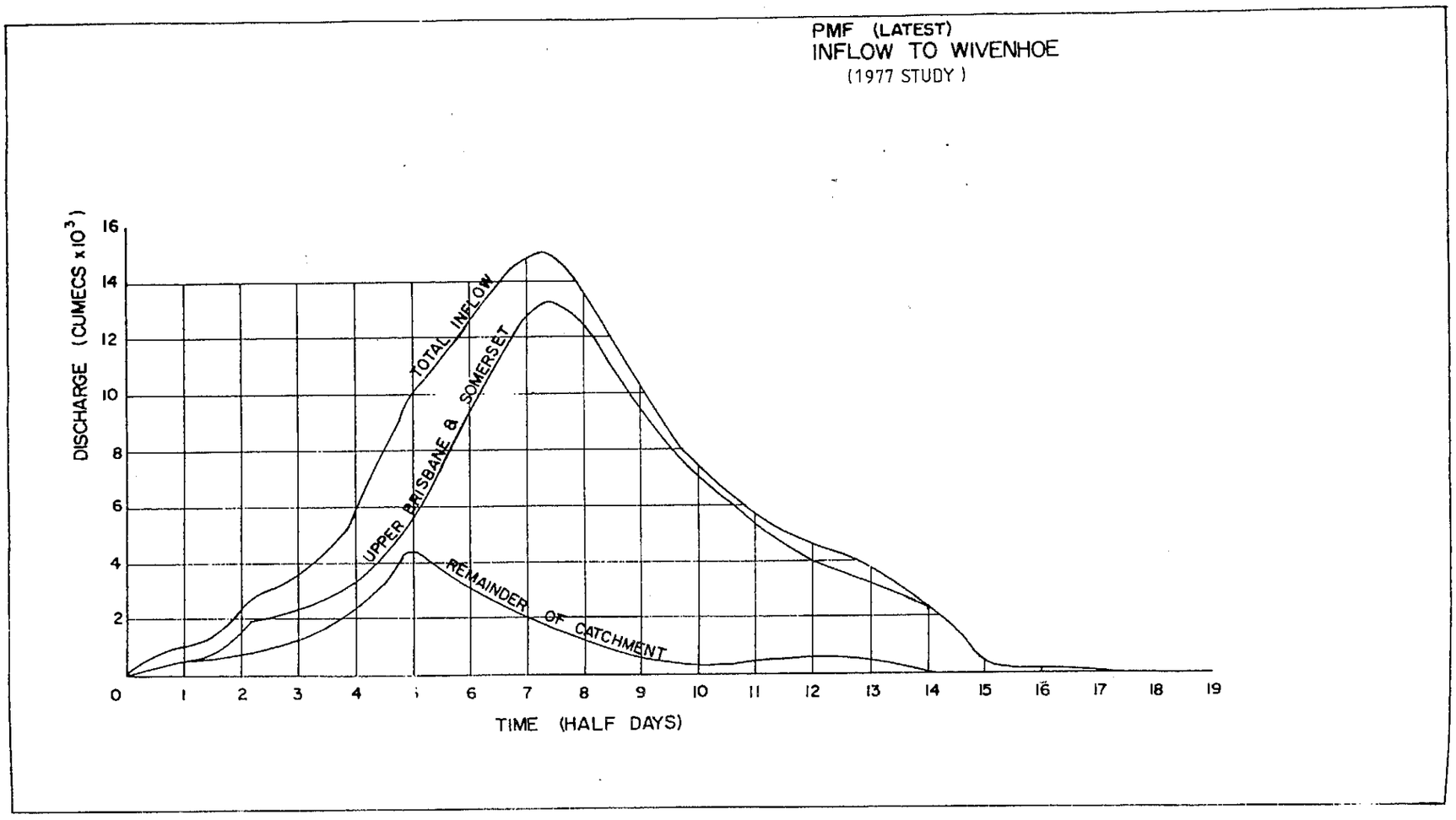


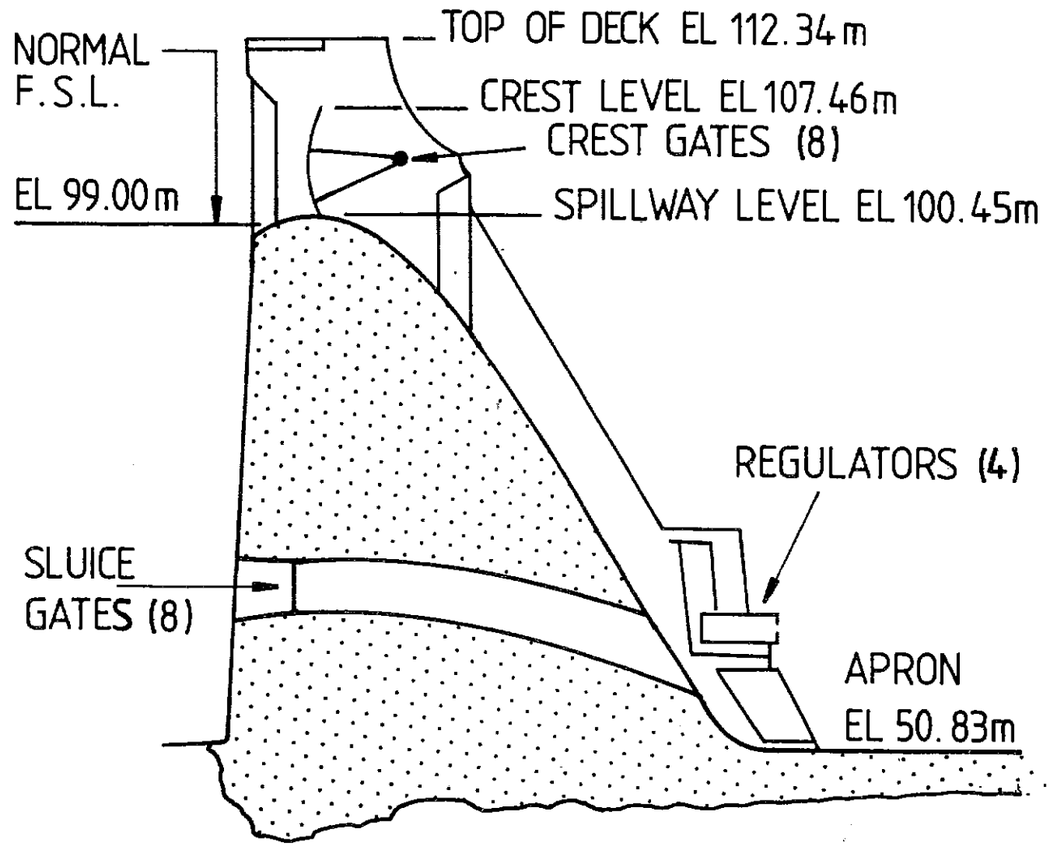
MAXIMUM PROBABLE FLOOD

RESIDUAL AREA TO WIVENHOE DAM
— without Wivenhoe Dam
(1977 STUDY)

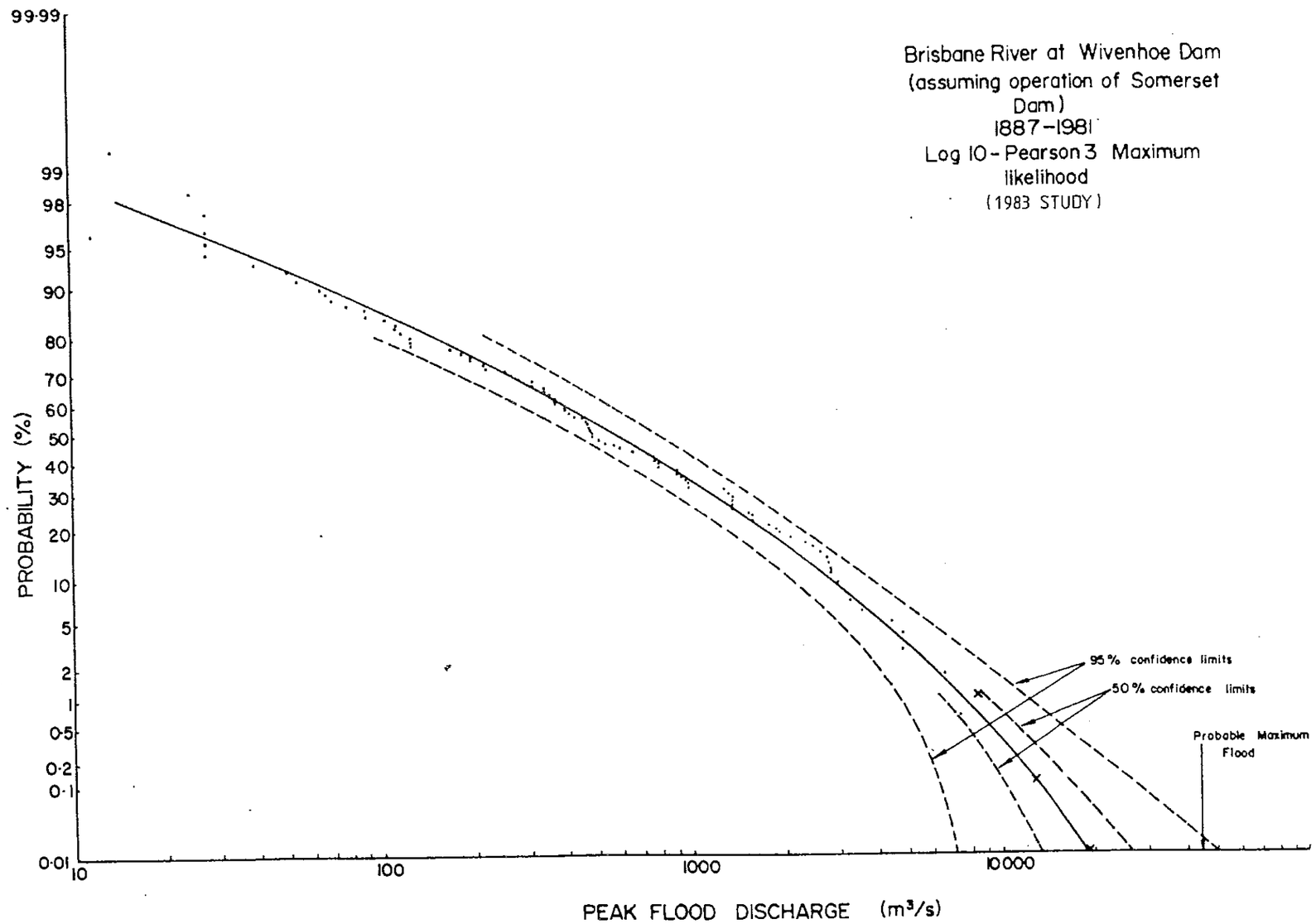


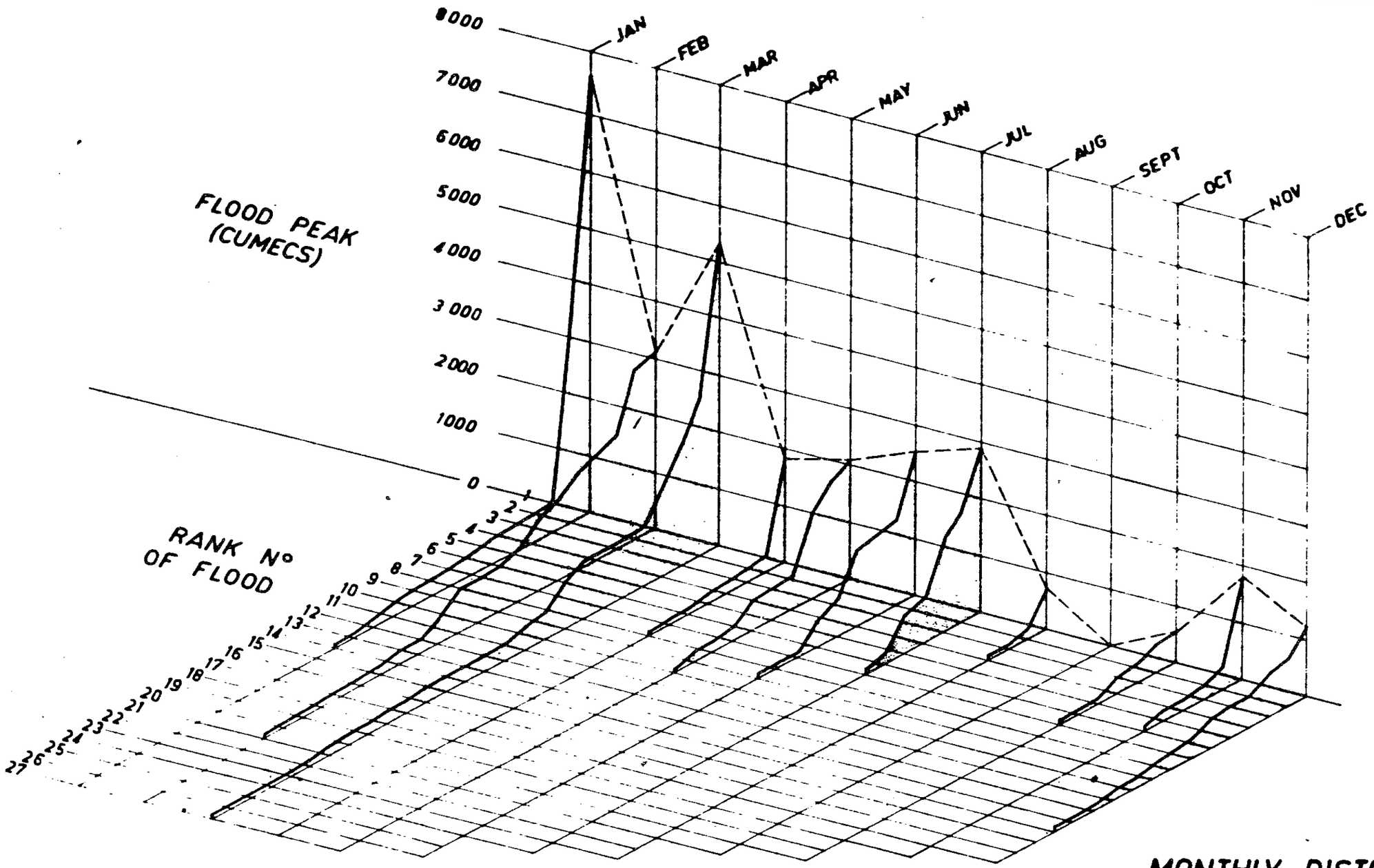

PMF
NATURAL FLOW AT
WIVENHOE SITE
(1977 STUDY)
DISCHARGE (CUMECS x 10³)
TIME (HALF DAYS)
NATURAL FLOW AT SITE
UPPER BRISBANE & SOMERSET
ROUTED TO SITE
REMAINDER OF CATCHMENT


PMF (LATEST)
INFLOW TO WIVENHOE
(1977 STUDY)
DISCHARGE (CUMECS x 10³)
TIME (HALF DAYS)
TOTAL INFLOW
UPPER BRISBANE & SOMERSET
REMAINDER OF CATCHMENT



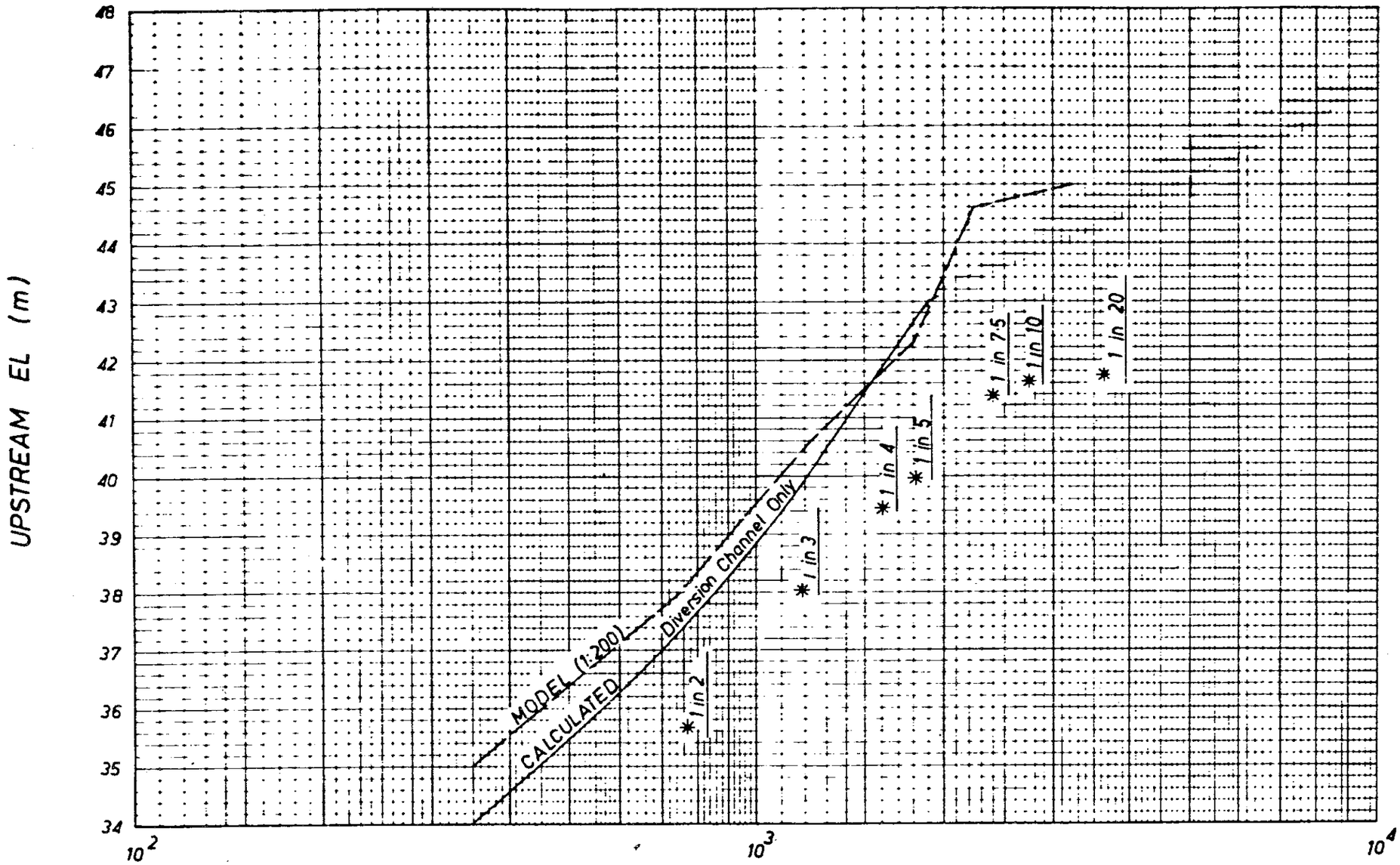
SOMERSET DAM SECTION


Brisbane River at Wivenhoe Dam
(assuming operation of Somerset Dam)
1887-1981
Log 10 - Pearson 3 Maximum likelihood
(1983 STUDY)
PROBABILITY (%)
99·99
99
98
95
90
80
70
60
50
40
30
20
10
5
2
1
0·5
0·2
0·1
0·01
10
100
1000
10000
PEAK FLOOD DISCHARGE (m³/s)
95 % confidence limits
50 % confidence limits
Probable Maximum Flood



MONTHLY DISTRIBUTION OF A
FLOOD PEAKS >50 CUMECS
FOR PERIOD 1942-1974

Revision						Drawing Schedule			Design	Drafting	Recommended	IRRIGATION AND WATER SUPPLY COMMISS
									Prep	Dr	N. Russo	BRISBANE RIVER 150·2 km
									Ckd	Ckd	Senior Eng Designs	WIVENHOE DAM - SAVAGES CROSSING
									Supr	Supr	Approved	DISTRIBUTION OF FLOOD PEAKS
Date		Remarks	Ckd	Psd					Submitted		28-4-77	
									Executive Eng		Chief Designing Eng	28-4-77 A3-45418



DISCHARGE Q (m^3/s)

*Frequencies shown are based on unmitigated river flows (Ref I.W.S. Drg A2-49398)

No.	Date	Remarks	Ckd	Psd
	11-7-78	A Diversion and Overflow above EL 43 Deleted		

Drawing Schedule

IRRIGATION AND WATER SUPPLY COMMISSION

Design	Drafting	Recommended
Prep	Dr	
Ckd	Ckd	Senior Engineer Designs
Supv	Supv	Approved
Submitted		
Executive Engineer		A/Chief Designing Engineer

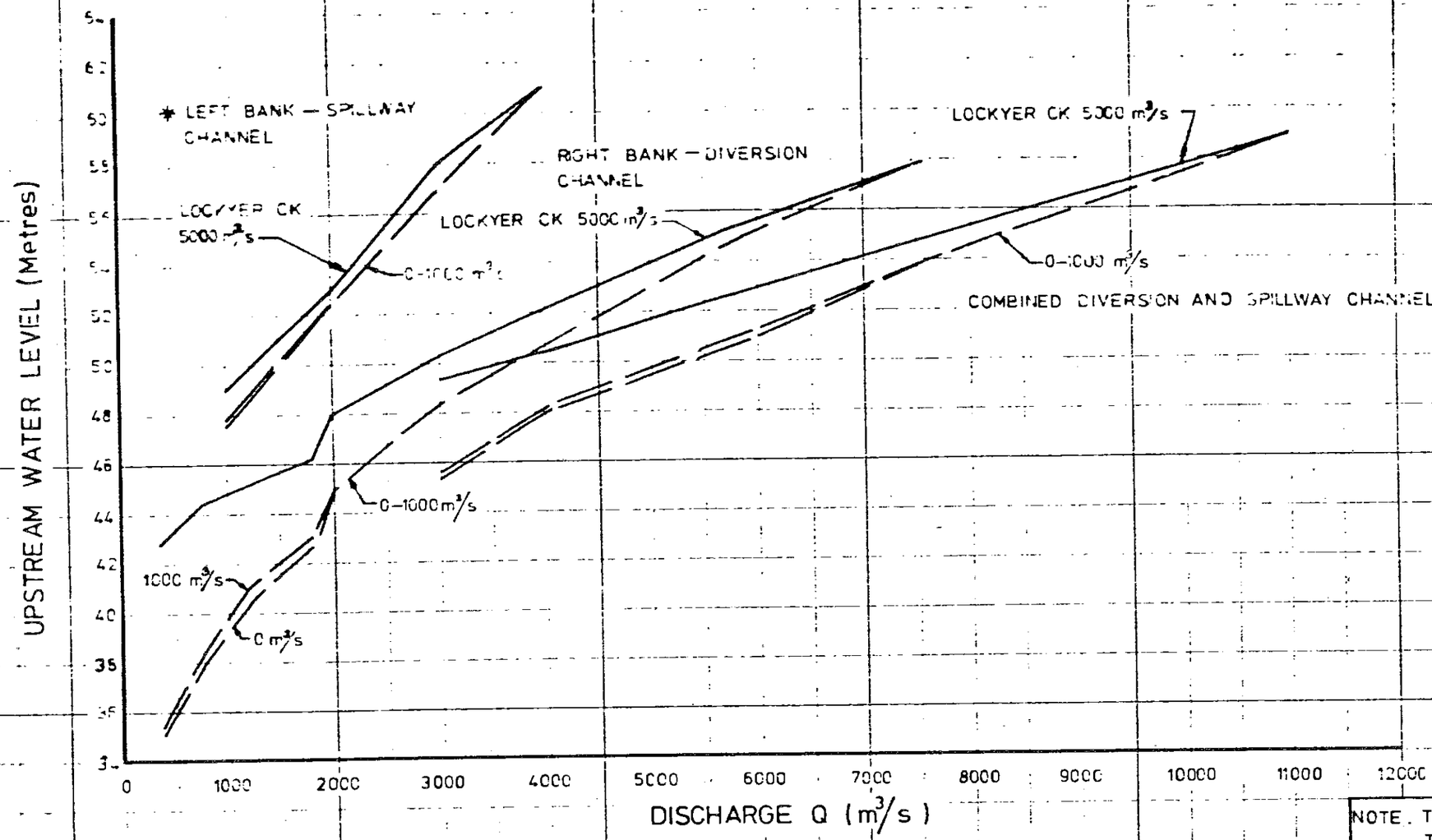
CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km – WIVENHOE D

R/B DIVERSION CHANNEL

DISCHARGE CAPACITY CURVE

3·8·77 | A3-49893 | A



NOTE. THE TAILWATER LEVELS AND DISCHARGES THROUGH THE DIVERSION FACILITIES ARE AFFECTED BY HIGH DISCHARGES IN LOCKYER CK.

FLOWS IN EXCESS OF 5000 m³/s IN LOCKYER CK ARE EXTREMELY RARE.

IN GENERAL FLOWS IN LOCKYER CK. AVERAGE 10% OF FLOWS IN BRISBANE RIVER

* SPILLWAY CHANNEL EXCAVATED TO 15m WIDTH DOWN TO EL 32 ON U/S SIDE OF SPILLWAY.

Revision		Remarks	Ckd	Psd

Drawing Schedule

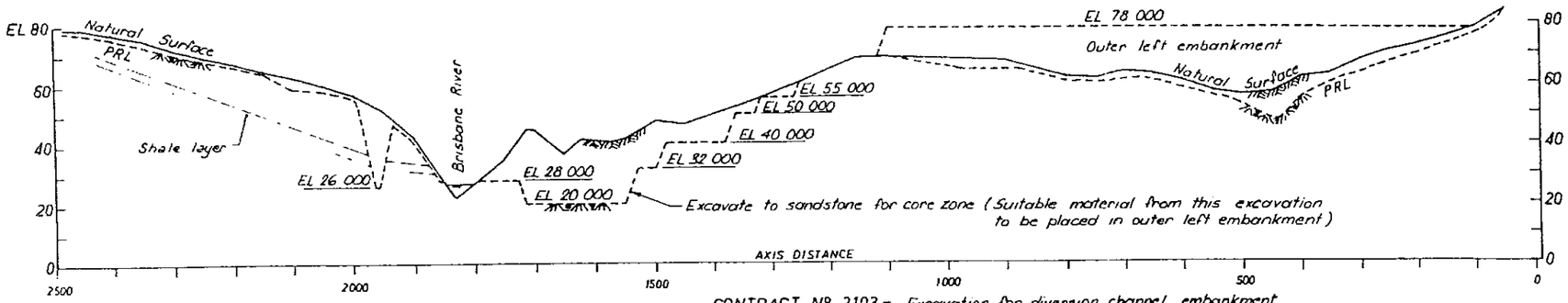
Design	Drafting	Recommended
Prep	Dr PH	
Ckd	Ckd	Sen. Engineer Designs
Supv	Supv	Approved
Submitted		
Executive Engineer		Chief Design Engineer

IRRIGATION AND WATER SUPPLY COMMISSION

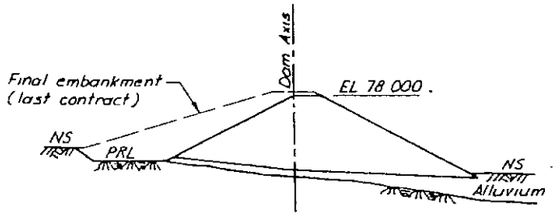
WIVENHOE DAM — DISCHARGE RATINGS

RIGHT BANK DIVERSION CHANNEL AND INITIAL SPILLWAY CHANNEL

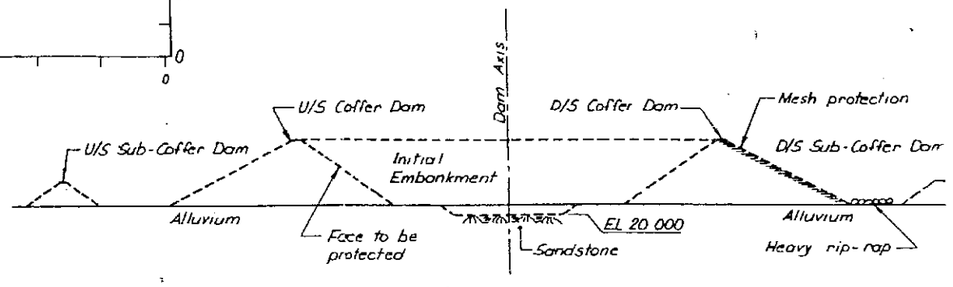
16-6-78 | A3-53325



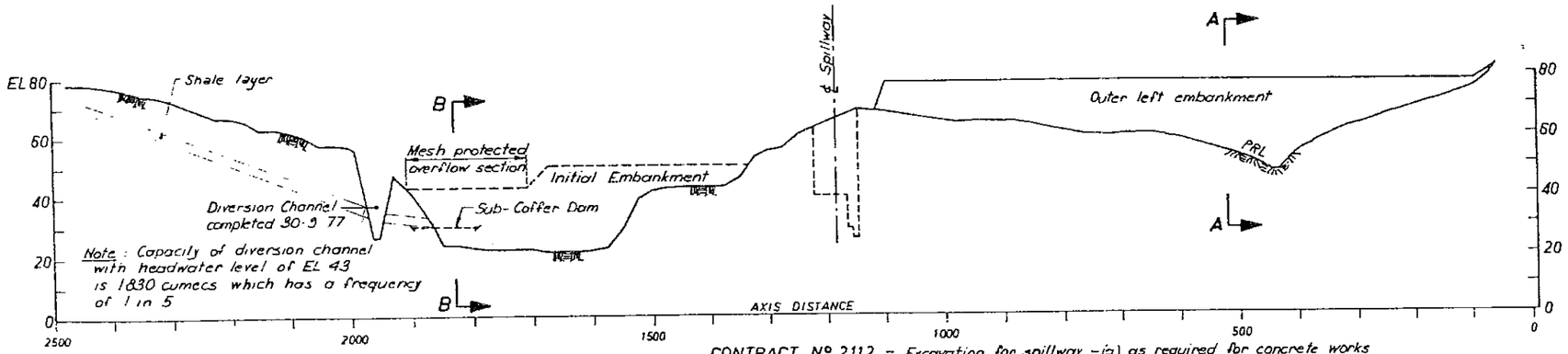
CONTRACT Nº 2103 - Excavation for diversion channel, embankment foundation other than spillway and river sections and construction of miscellaneous fill zone in outer left embankment.
Date for completion 31-10-77



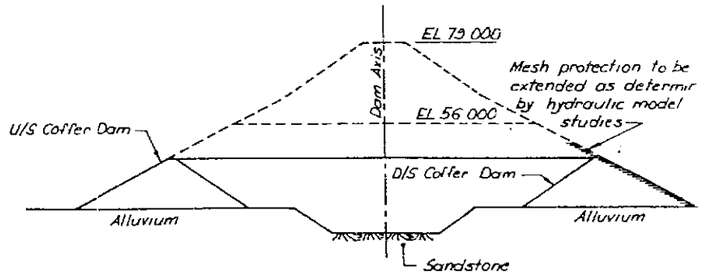
SECTION A-A
Scale 'b'



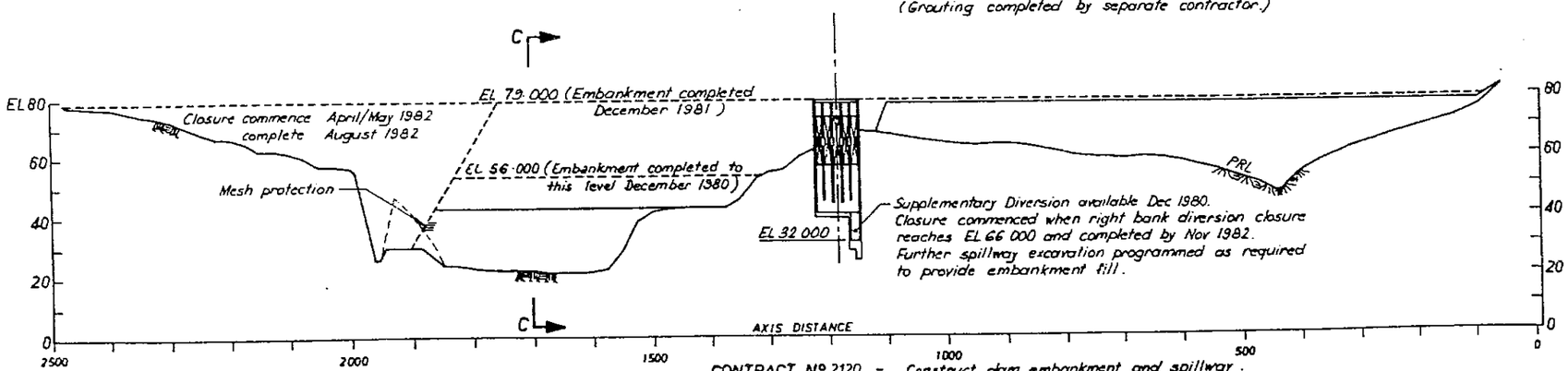
SECTION B-B
Scale 'b'



CONTRACT Nº 2112 - Excavation for spillway - (a) as required for concrete works (b) initial excavation for downstream channel.
Construct sub-coffer dams - direct river through diversion channel. Excavate embankment foundation, construct main coffer dams including protection works. Construct initial embankment inside coffer dams.
(Grouting completed by separate contractor.)



SECTION C-C
Scale 'b'



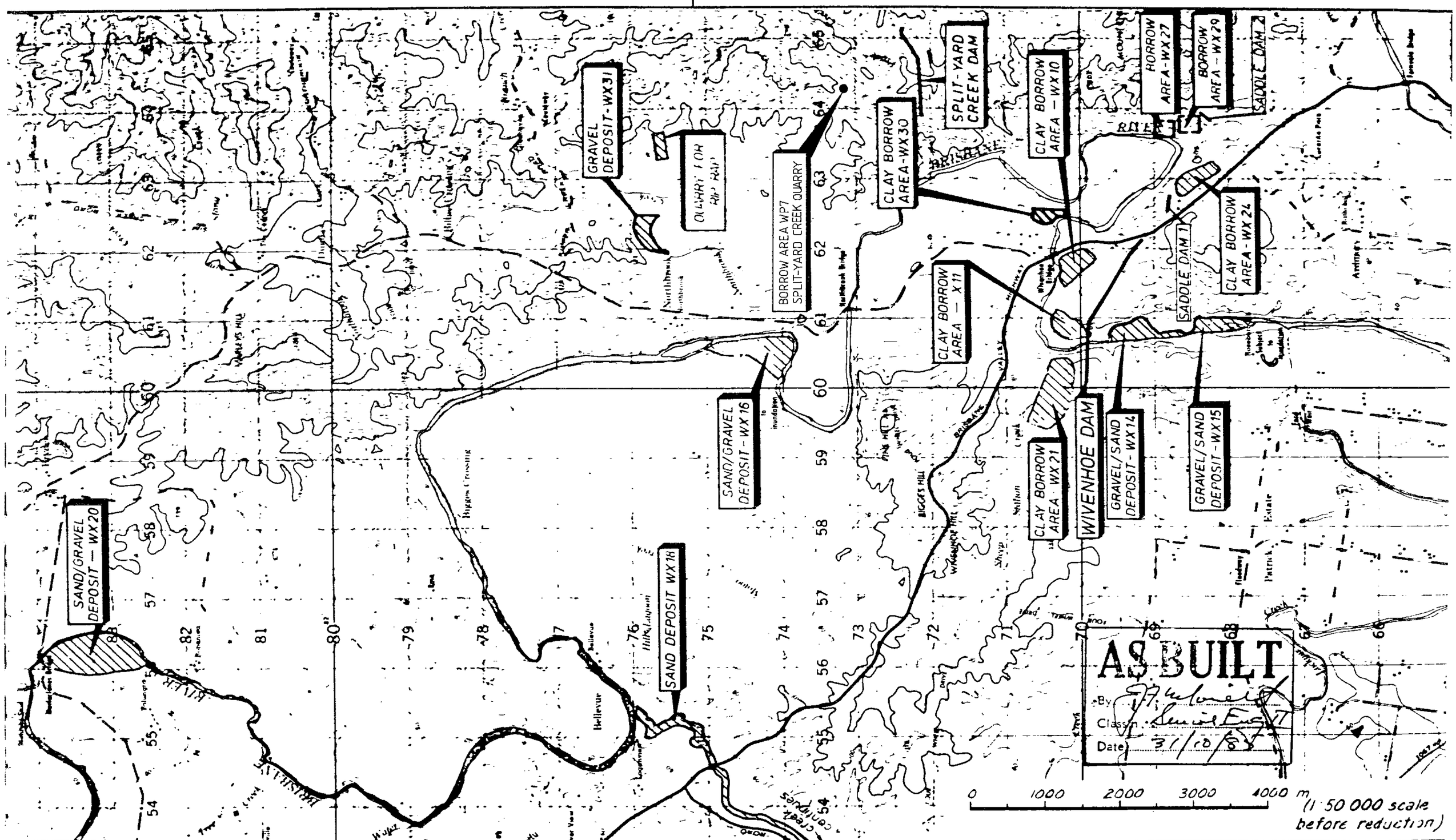
Note: Capacity of right and left bank diversion channels combined with headwater level of EL 54 is 7500 cumecs which with allowance for the reservoir routing effect corresponds to an inflow of about 10 000 cumecs which has a frequency of 1 in 500.
Capacity of right bank diversion channel alone with headwater level of EL 54 is 5400 cumecs which with allowance for the reservoir routing effect corresponds to an inflow peak of about 6 700 cumecs which has a frequency of about 1 in 100

CONTRACT Nº 2120 - Construct dam embankment and spillway.
Specific target dates for stage construction as shown on Longitudinal Section.

LONGITUDINAL SECTIONS
Horizontal - Scale 'a'
Vertical - Scale 'b'

NOTES:
1 ALL DIMENSIONS AND ELEVATIONS ARE IN METRES.
2 Heavy broken lines indicate work to be carried out in the course of the relevant contract
3 PRL means Plan Rock Line.

RIVER DIVERSION AND CONSTRUCTION SEQUENCE



Revision					Drawing Schedule
DEC '95	D	BORROW AREA WP7 ADDED			
Oct '85	C	As Built			
9-5-79	B	Contract Number Amended	M.J.C.		
19-10-78	A	Quarry for Rip-Rap added	R.D.		
Date		Remarks	Ckd	Psd	

CONTRACT Nº 2120

IRRIGATION AND WATER SUPPLY

Design	Drafting	Recommended
Prep	Dr	
Ckd	Ckd	Senior Eng Designs
Supv	Supv	Approved
Submitted		
Executive Eng		Chief Designing Eng

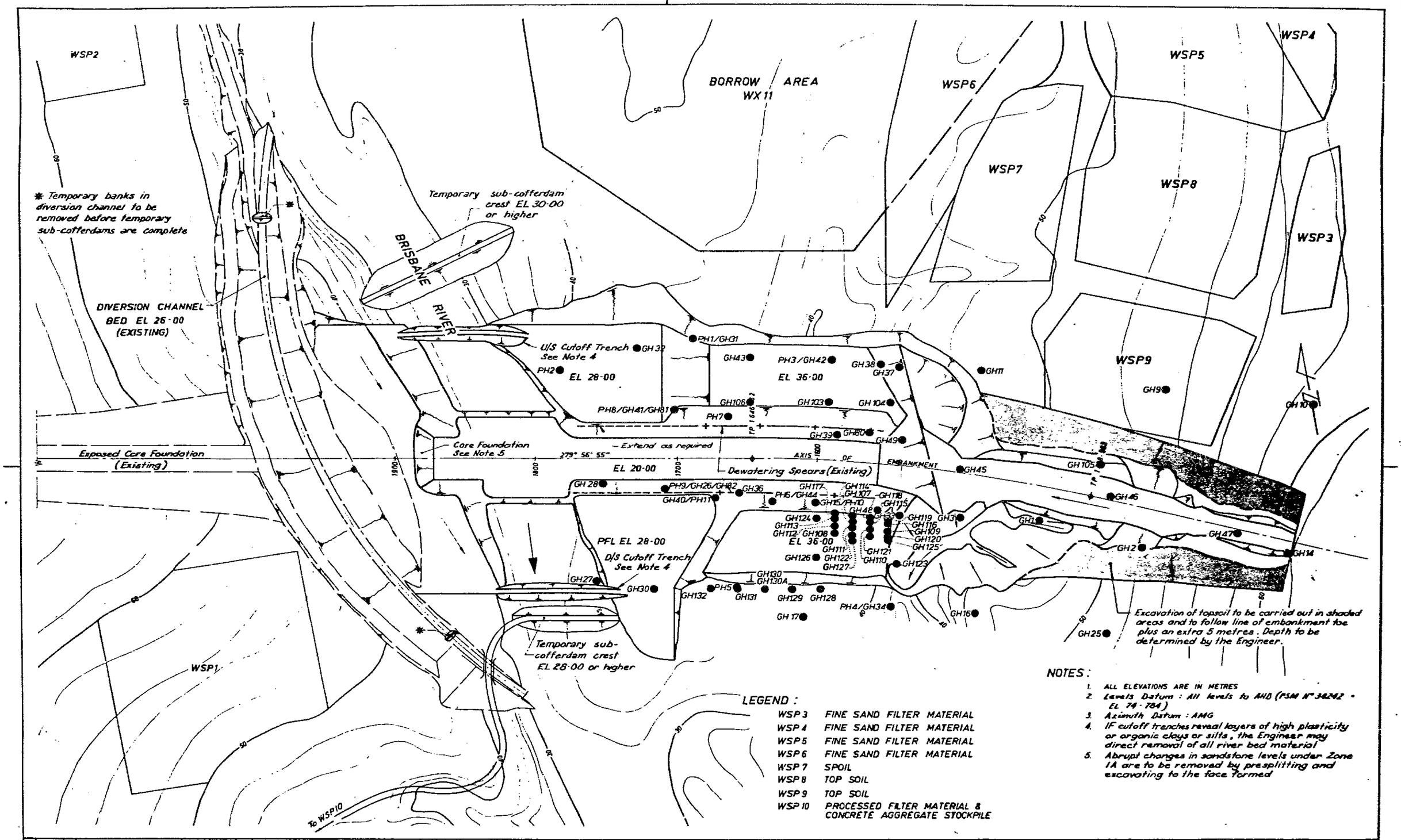
CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km – WIVENHOE DAM

THIRD STAGE CONSTRUCTION

MATERIAL SOURCES – LOCALITY PLAN

16-6-78 | A3-53372 | A B C D



LEGEND :

WSP 3	FINE SAND FILTER MATERIAL
WSP 4	FINE SAND FILTER MATERIAL
WSP 5	FINE SAND FILTER MATERIAL
WSP 6	FINE SAND FILTER MATERIAL
WSP 7	SPOIL
WSP 8	TOP SOIL
WSP 9	TOP SOIL
WSP 10	PROCESSED FILTER MATERIAL & CONCRETE AGGREGATE STOCKPILE

NOTES :

1. ALL ELEVATIONS ARE IN METRES
2. Levels Datum : All levels to AHD (PSM N° 34242 - EL 74·784)
3. Azimuth Datum : AMG
4. IF cutoff trenches reveal layers of high plasticity or organic clays or silts, the Engineer may direct removal of all river bed material
5. Abrupt changes in sandstone levels under Zone 1A are to be removed by presplitting and excavating to the face formed

Revision					Drawing Schedule	
Date	Remarks	Ckd	Psd		A1-49891	Existing Foundation Earthworks - Dist 1270 - 1780

0 50 100 m (1:1250 Scale Before Reduction)

CONTRACT N°

QUEENSLAND WATER RESOURCES COMMISSION

Design	Drafting	Recommended
Prep	Dr JTK	
Ckd	Ckd	Senior Engineer Designs
Supv	Supv	Approved
Submitted		
Executive Engineer		Act. Chief Designing Engineer

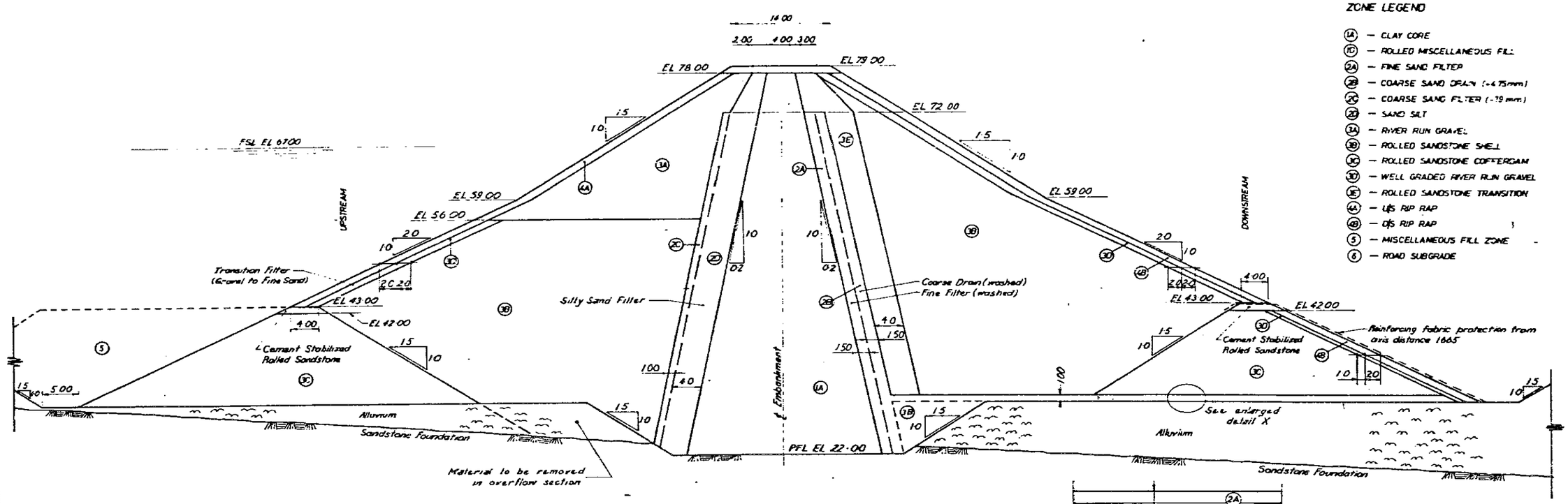
CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km - WIVENHOE DAM

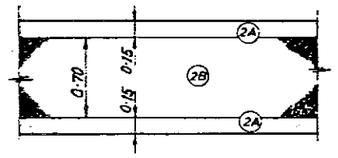
EMBANKMENT FOUNDATION - 1250 m to 2100 m

LOCATIONS OF EXPLORATORY BOREHOLES

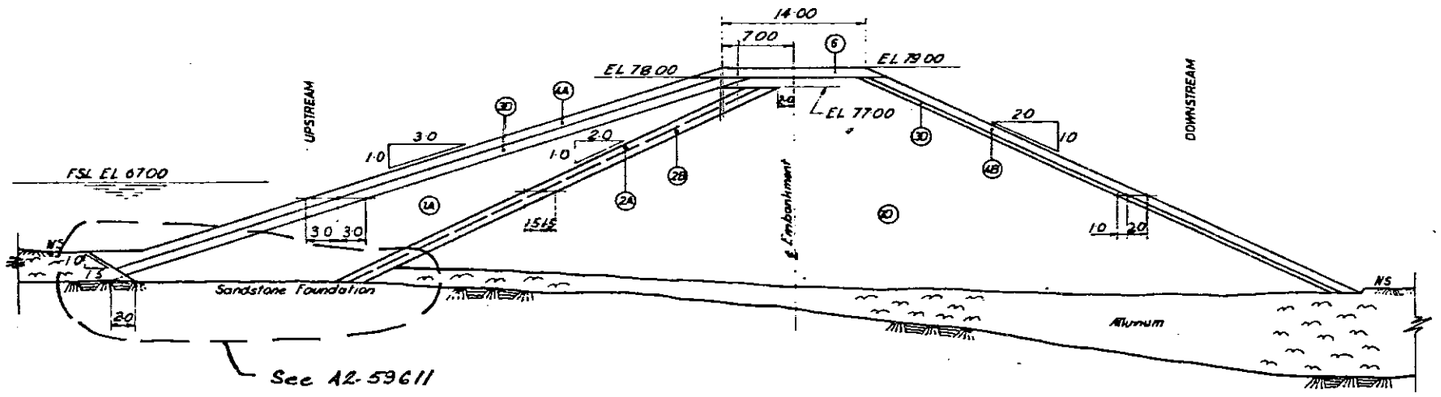
25-7-79 A1-56182



TYPICAL SECTION FROM DISTANCE 1555 to 1800



ENLARGED DETAIL 'X'



TYPICAL SECTION FROM DISTANCE 00 to APPROX 1150

ZONE LEGEND

- (1A) — CLAY CORE
- (1C) — ROLLED MISCELLANEOUS FILL
- (2A) — FINE SAND FILTER
- (2B) — COARSE SAND DRAIN (-4.75mm)
- (2C) — COARSE SAND FILTER (-19 mm)
- (2D) — SAND SILT
- (3A) — RIVER RUN GRAVEL
- (3B) — ROLLED SANDSTONE SHELL
- (3C) — ROLLED SANDSTONE COFFERDAM
- (3D) — WELL GRADED RIVER RUN GRAVEL
- (3E) — ROLLED SANDSTONE TRANSITION
- (4A) — U/S RIP RAP
- (4B) — D/S RIP RAP
- (5) — MISCELLANEOUS FILL ZONE
- (6) — ROAD SUBGRADE

NOTES:-

1. ALL DIMENSIONS AND ELEVATIONS ARE IN METRES
2. Levels Datum. All levels are to AHD (PSM No 34242 = EL 74.784
3. 1 on 1.5 batters in cutoff trench alluvium may have to be flatter depending on material.
4. Cofferdam inside batters to be as steep as possible (with safety) to minimise loading on cutoff trench batters
5. Section A-A on Drg N° A1-43873 - Folio 18 indicates a typical section between approximate distances 1335 and 1555 excepting that:
   i) The limits of downstream and upstream cofferdams are shown on Drg N° A1-43863 - Folio 12 and Drg N° A1-43870 - Folio 13 respectively and
   ii) The limit of the gravel blanket drain - Detail X - is shown on Drg A1-43863 - Folio 12

PART ONLY REQUIRED IN CONTRACT

SEE ALSO ~~A1-78044~~ ~~A1-78045~~ A1-78047

AS BUILT
By
Class'n Surveyor II
Date 1/8/85

Revision					
Oct '85	B	As Built			1/8/85
12·1·78	W	Tender to Working dwg			
18·11·77	A	Note G added			
Date		Remarks	Chd		Psd

Drawing Schedule

CONTRACT Nº 2112

0 5 10 15 20 25 30m (1:300 Scale Before Reduction)

IRRIGATION AND WATER SUPPLY COMMISSION

Design	Drafting
Prep	Dr
Chd	Chd
Supv	Supv
Submitted	
Executive Engineer	

Recommended: Senior Engineer Designs

Approved: Act Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km – WIVENHOE DAM

EMBANKMENT

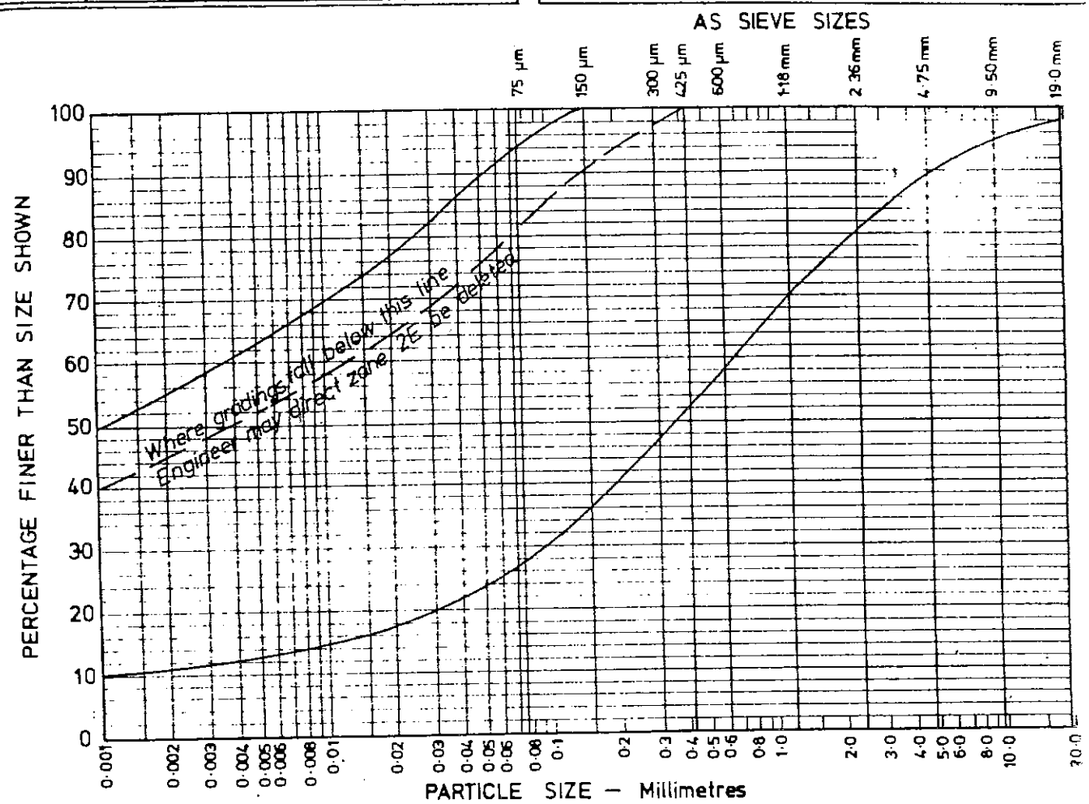
TYPICAL CROSS SECTIONS

3·8·77 | A1-49868 | X | W | B

SOIL CLASSIFICATION

PROJECT	WIVENHOE DAM
FEATURE	GRADING LIMITS FOR
LOCATION	ZONE 1A

SAMPLE N°	
DESCRIPTION	

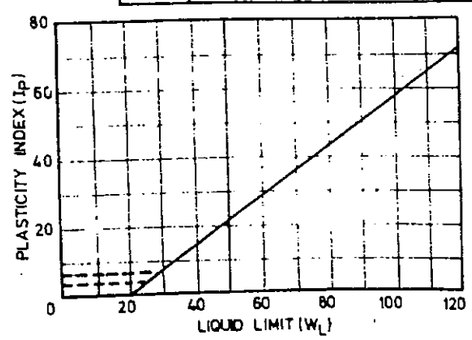


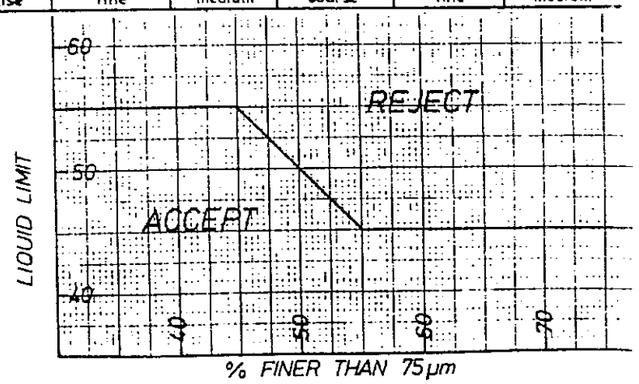
UNIFIED SOILS CLASSIFICATION

CLAY AND SILT	SAND			GRAVEL
	fine	medium	coarse	fine

AS – A89

CLAY	SILT			SAND			GRAVEL	
	fine	medium	coarse	fine	medium	coarse	fine	medium





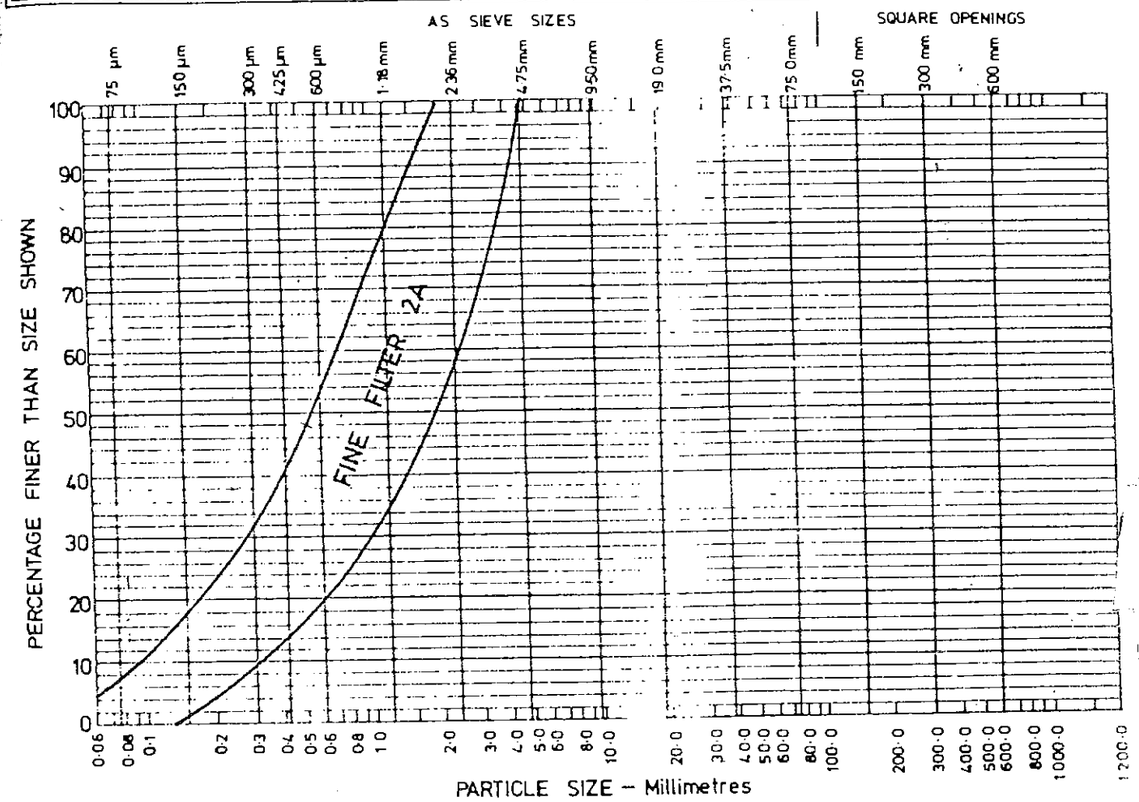
Remarks .....

Prepared by	Checked by K.J. McC.	Sheet 1 of

CLASSIFICATION OF ROCKFILL OR SOIL

PROJECT	WIVENHOE DAM
FEATURE	GRADING LIMITS FOR FILTERS
LOCATION	ZONE 2A

SAMPLE N°	
DESCRIPTION	UNIFORMITY REQUIREMENTS $\frac{D_{60}}{D_{10}} > 6$; $1 < \frac{D_{30}^2}{D_{10} \times D_{60}} < 3$

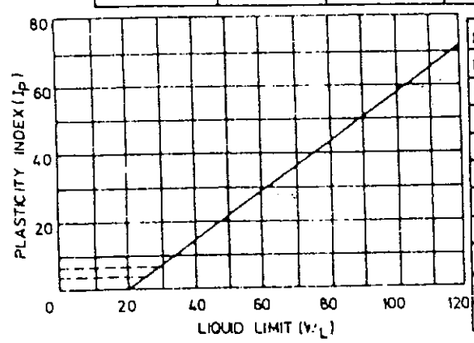


UNIFIED SOILS CLASSIFICATION

SAND			GRAVEL		COBBLES	BOULDERS
fine	medium	coarse	fine	coarse		

AS – A 89

SAND			GRAVEL			COBBLES
fine	medium	coarse	fine	medium	coarse	



PLASTICITY	
Liquid Limit (W_L)	
Plastic Limit (W_P)	
Plasticity Index (Ip)	
GRADATION	
Effect Size D 10	mm
D 30	mm
D 60	mm
Uniformity Coefficient	
Coefficient of Curvature	
LINEAR SHRINKAGE	%

APPARENT SPECIFIC GRAVITY	
Passing 2·36 mm	
Retained 2·36 mm	
Retained mm	
INSITU MOISTURE	%
INSITU DRY DENSITY	kg/m³
DISPERSION	
River Water	
Distilled Water	
PRETREATMENT	
COLOUR	

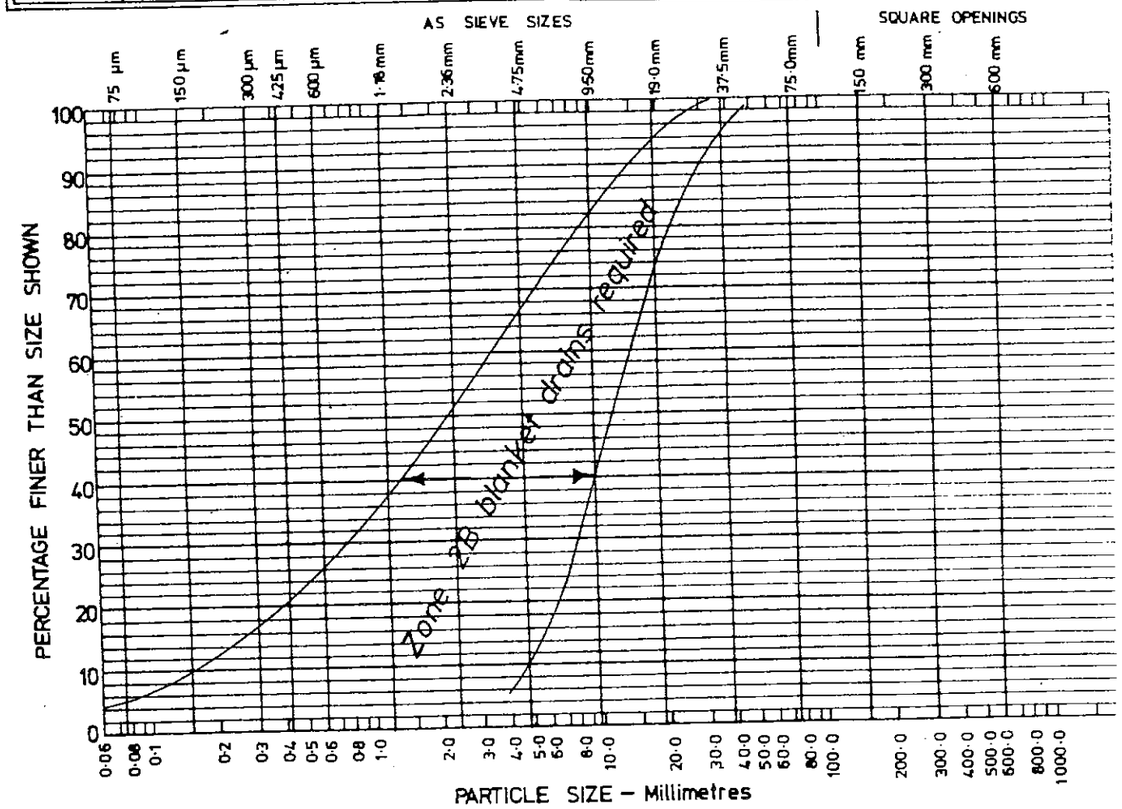
Remarks .....

Prepared by ..... / /	Checked by R. J. M'C ... 8./.8./77	Sheet 1 of
		Job No .....

CLASSIFICATION OF ROCKFILL OR SOIL

PROJECT	WIVENHOE DAM
FEATURE	GRADING LIMITS FOR
LOCATION	ZONE 3A

SAMPLE N°	
DESCRIPTION	

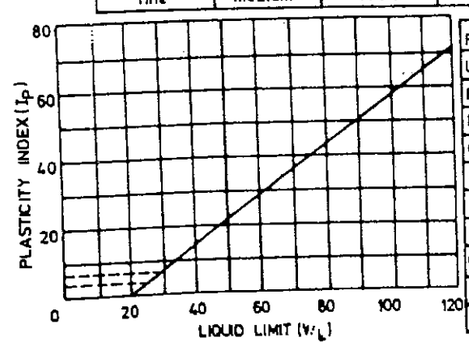


UNIFIED SOILS CLASSIFICATION

SAND			GRAVEL		COBBLES	BOULDERS
fine	medium	coarse	fine	coarse		

AS – A 89

SAND			GRAVEL			COBBLES
fine	medium	coarse	fine	medium	coarse	



PLASTICITY	
Liquid Limit (W_L)	
Plastic Limit (W_P)	
Plasticity Index (I_P)	
GRADATION	
Effect Size D 10 mm	
D 30 mm	
D 60 mm	
Uniformity Coefficient	
Coefficient of Curvature	
LINEAR SHRINKAGE %	

APPARENT SPECIFIC GRAVITY	
Passing 2·36 mm	
Retained 2·36 mm	
Retained mm	
INSITU MOISTURE	
INSITU DRY DENSITY kg/	
DISPERSION	
River Water	
Distilled Water	
PRETREATMENT	
COLOUR	

Remarks .....

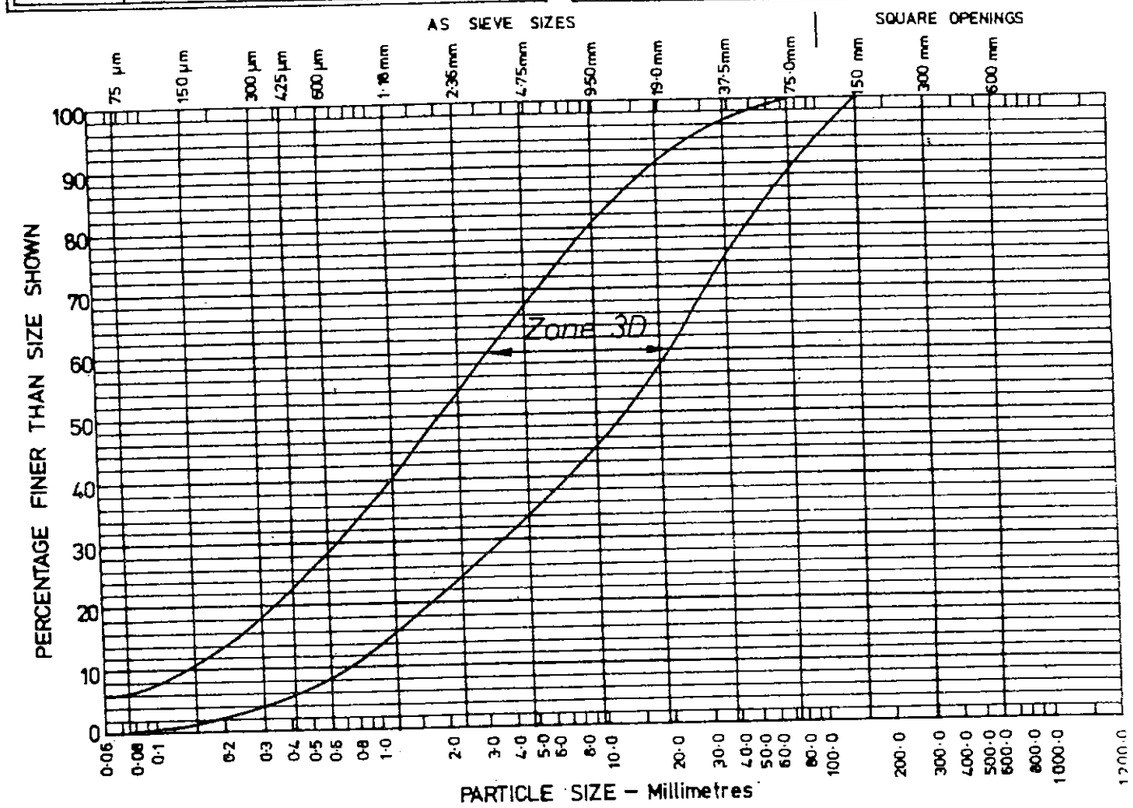
Prepared by	Checked by ..... R.J. M.C.	Sheet 1 of

IRRIGATION AND WATER SUPPLY COMMISSION
QUEENSLAND

CLASSIFICATION OF ROCKFILL OR SOIL

PROJECT	WIVENHOE DAM
FEATURE	GRADING LIMITS FOR
LOCATION	ZONE 3D

SAMPLE N°	
DESCRIPTION	

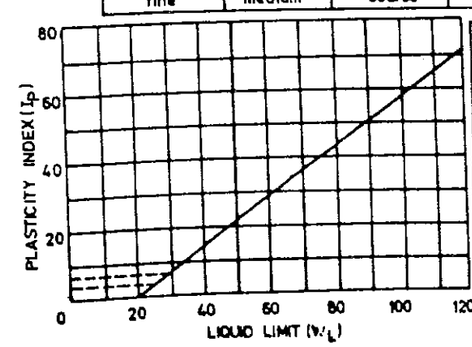


UNIFIED SOILS CLASSIFICATION

SAND			GRAVEL		COBBLES	BOULDERS
fine	medium	coarse	fine	coarse		

AS – A 89

SAND			GRAVEL			COBBLES
fine	medium	coarse	fine	medium	coarse	



PLASTICITY	
Liquid Limit (W_L)	
Plastic Limit (W_P)	
Plasticity Index (I_P)	
GRADATION	
Effect Size D 10	mm
D 30	mm
D 60	mm
Uniformity Coefficient	
Coefficient of Curvature	
LINEAR SHRINKAGE	%

APPARENT SPECIFIC GRAVITY	
Passing 2·36 mm	
Retained 2·36 mm	
Retained mm	
INSITU MOISTURE	%
INSITU DRY DENSITY	kg/m
DISPERSION	
River Water	
Distilled Water	
PRETREATMENT	
COLOUR	

Remarks .....

Prepared by	Checked by	Sheet 1 of

EXISTING WSP2

BRISBANE RIVER

BORROW AREA WX 11

WSP4

WSP5

WSP6

WSP7

WSP8

WSP3

WSP9

Temporary sub-cofferdam Crest EL 30 or higher

* Temporary banks in diversion channel to be removed before temporary sub-cofferdams are complete

Diversion Channel Bed EL 26·00 (Existing)

Slope

(1 on 2)

℄ of Cofferdam Crest EL 43·00

P.F.L. EL 28·00

P.F.L. EL 36·00

(1 on 1.5)

EL 28·00 P.F.L.

Dewatering Spears

A

A

229° 55' 36"

1800

AXIS OF EMBANKMENT

1700

TP 1846·62

1600

Presplit Surface B

PFL EL 20·00

PFL EL 22·00

Dewatering Spears

Gravel blanket drain

PFL EL 28·00

℄ Cofferdam Crest EL 43·00

Piezometer Terminal Structures

Crest elevated to EL 47·00

(1 on 1.5)

(1 on 2)

PFL EL 36·00

EL 26·00

EL 28·00

PFL EL 28·00

Temporary sub-cofferdam Crest EL 28·00

B

EXISTING WSP1

To WSP10

N

LEGEND:

- Cement stabilized rolled sandstone fill
- Polyfabric cover
- Reinforcing mesh

WSP 3,4,5,6 Fine Sand Filter Material

WSP 7 Spoil

WSP 8 & 9 Top Soil

WSP10 Processed Filter Material & Concrete Aggregate Stockpile

NOTES:

1 ALL ELEVATIONS AND DISTANCES ARE IN METRES
2 Levels Datum: All levels to AHD (PSM N° 34242 = EL 74·784)
3 Azimuth Datum: AMG
4 For Sections A-A and B-B see drg A1-45420

AS BUILT
By
Chk'd
Date

Revision				
Oct '85	A	As Built		7/11/85
12·1·78	W	Tender to Working drg	R.D.	
Date		Remarks	Chk'd	Psd

Drawing Schedule	
A1-45870	U/S Cofferdam - General Arrangement
A1-45869	D/S Cofferdam - General Arrangement
A1-45420	Cofferdams - Sections

0 50 100m (1:1250 Scale Before Reduction)

CONTRACT N° 2112

IRRIGATION AND WATER SUPPLY COMMISSION

Design	Drafting	Recommended
Prep	Dr	Senior Engineer Designs
Chd	Chk'd	Approved
Supr	Supr	Act Chief Designing Engineer
Submitted		
Executive Engineer		

CO-ORDINATOR GENERAL'S DEPARTMENT

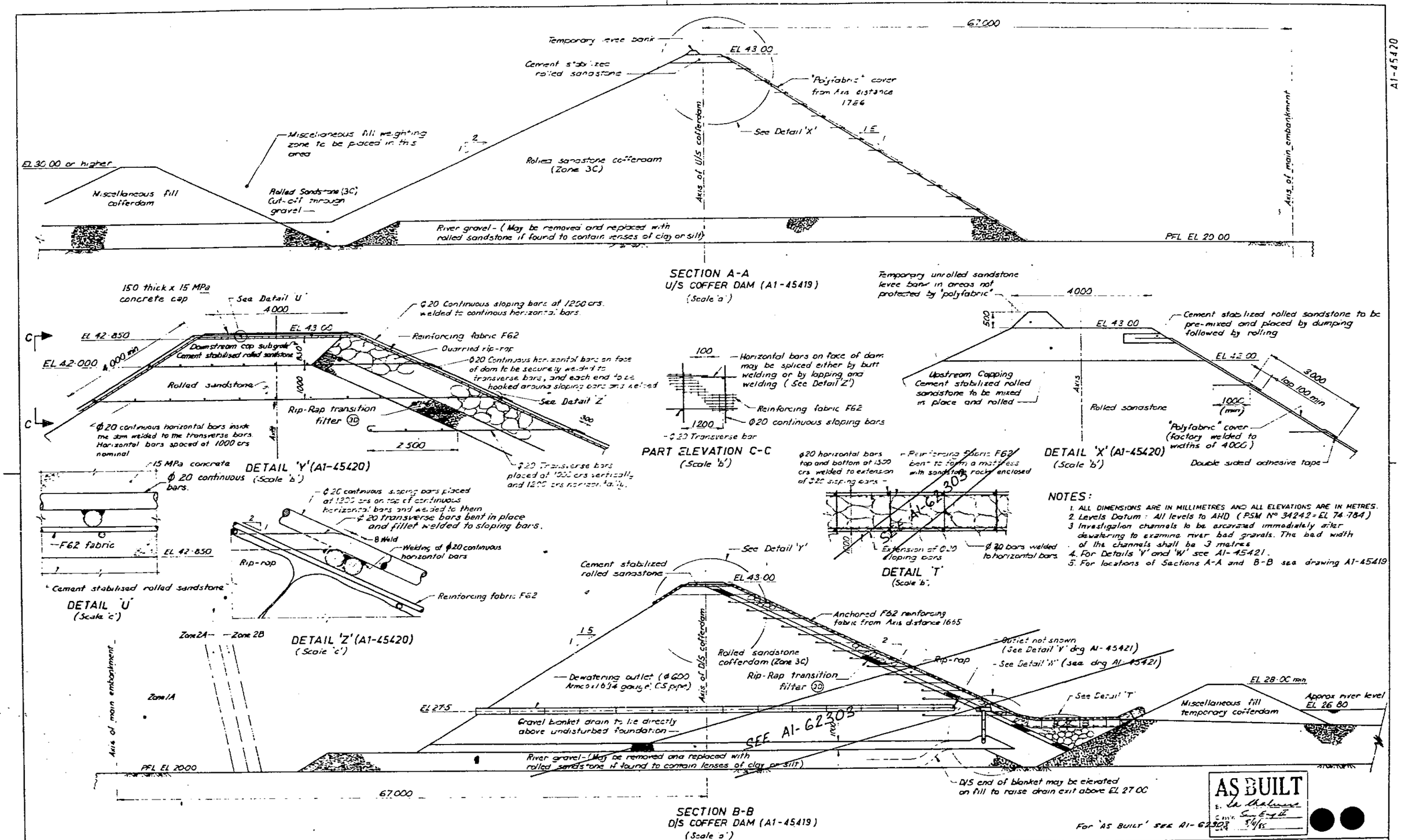
BRISBANE RIVER 150·2 km - WIVENHOE DAM

SECOND STAGE CONSTRUCTION

FOUNDATION EXCAVATION AND COFFERDAMS

3·8·77 A1-45419 W A

A1-45420



NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES AND ALL ELEVATIONS ARE IN METRES.
2. Levels Datum : All levels to AHD (PSM Nº 34242 = EL 74.784)
3. Investigation channels to be excavated immediately after dewatering to examine river bed gravels. The bed width of the channels shall be 3 metres
4. For Details 'Y' and 'W' see A1-45421.
5. For locations of Sections A-A and B-B see drawing A1-45419

Revision					
Oct '85	B	As Built			
12.1.78	W	Tender to Working drg			
18.11.77	A	Catch drains deleted and Note 3 amended			
Date		Remarks	Chd	Psd	

Drawing Schedule

A1-45421	Cofferdams - Details (Sr 2 of 2)
A1-45419	Foundation Excavation and Cofferdams

Scale 'a' 0 5 10 15 20m (1:200 scale before reduction)
Scale 'b' 0 1 2 3 4 5m (1:50 scale before reduction)
Scale 'c' 0 50 100 150 200mm (1:2 scale before reduction)

CONTRACT Nº 2112

IRRIGATION AND WATER SUPPLY COMMISSION

Design	Drafting
Prep	Sr KFP
Chd	Chd
Supv	Supv

Submitted
Executive Engineer

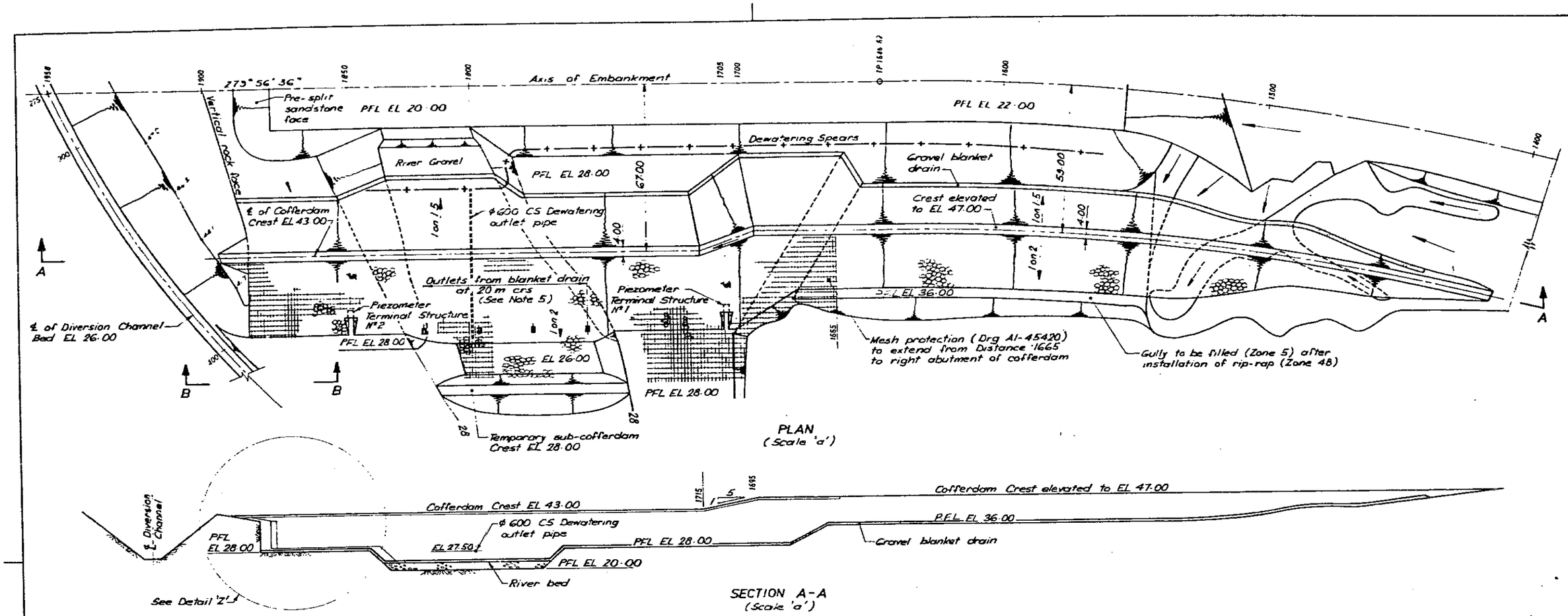
Recommended
Senior Engineer Designs
Approved
Act Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km - WIVENHOE DAM
SECOND STAGE CONSTRUCTION
COFFERDAMS - SECTIONS

3·8·77 | A1-45420 | A | W | B

A1-49869



NOTES:

1. UNLESS OTHERWISE STATED ALL DIMENSIONS AND ELEVATIONS ARE IN METRES.
2. Levels Datum : All levels to AHD (PSM Nº 34242 = EL 74·784)
3. Azimuth Datum : AMG
4. During construction of the cofferdam the section from axis distance 1400 to 1680 (approx) is always to be maintained 4 metres above the remainder of the section.
5. Outlets from blanket drain (Detail 'W' - Drg A1-45421) to be installed where gravel blanket drain is below EL 27·00.
6. Width of cement stabilized sandstone in downstream contact zone backing to be determined by the Engineer.

AS BUILT
By Leatherbarrow
Cas'n Sen Engr II
Date 8/8/78

Revision				
Oct '85	B	As Built	LW	8/8/85
12·1·78	W	Tender drg to working drg		
18·11·77	A	Notes on Detail 'Z' and Elev B-B added		
Date		Remarks	Ckd	Psd

Drawing Schedule
- A1-45419 Foundation Excavation and Cofferdams.
- A1-49889 Piezometer Terminal Structure-Access Details.
- A1-45420 Cofferdams - Sections (Sheet 1 of 2)

Scale 'a' 0 10 20 30 40 50 60 70 m (1:750 scale before reduction)

Scale 'b' 0 5 10 15 20m (1:200 scale before reduction)

CONTRACT Nº 2112

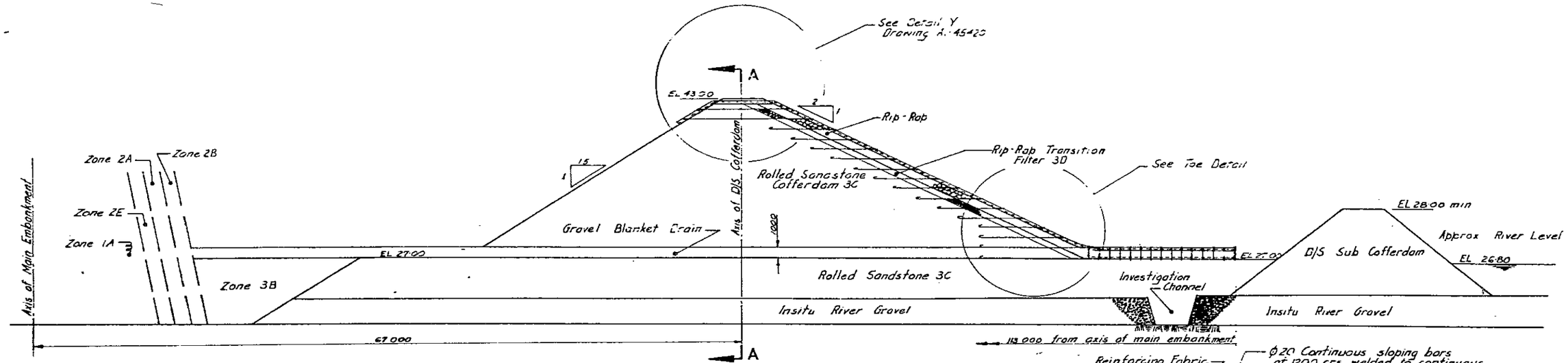
IRRIGATION AND WATER SUPPLY COMMISSION

Design	Drafting	Recommended
Prep R.E. McC.	Dr KFP	Senior Engineer Designs
Ckd	Ckd	Approved
Supv	Supv	Act Chief Designing Engineer
Submitted		
Executive Engineer		

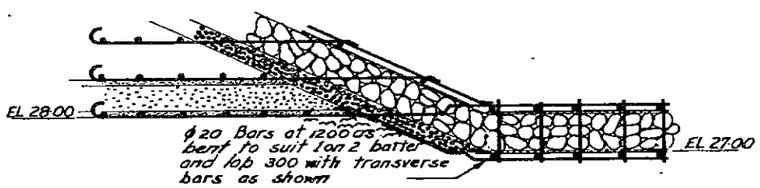
CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km - WIVENHOE DAM
SECOND STAGE CONSTRUCTION
DOWNSTREAM COFFERDAM
GENERAL ARRANGEMENT

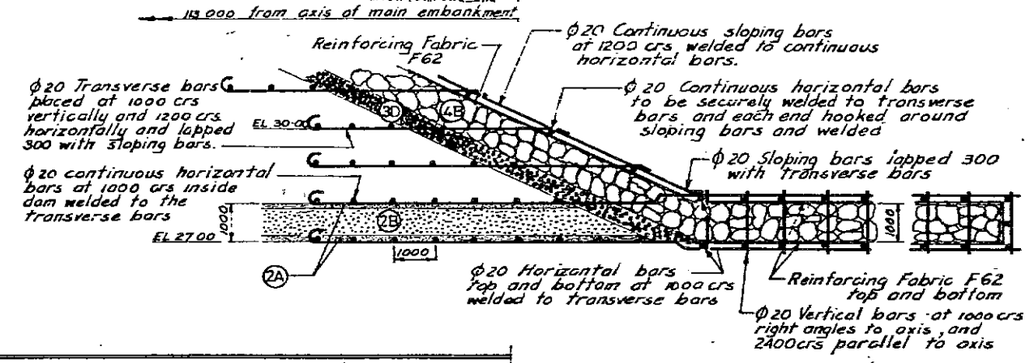
3·8·77 A1-49869 A W B



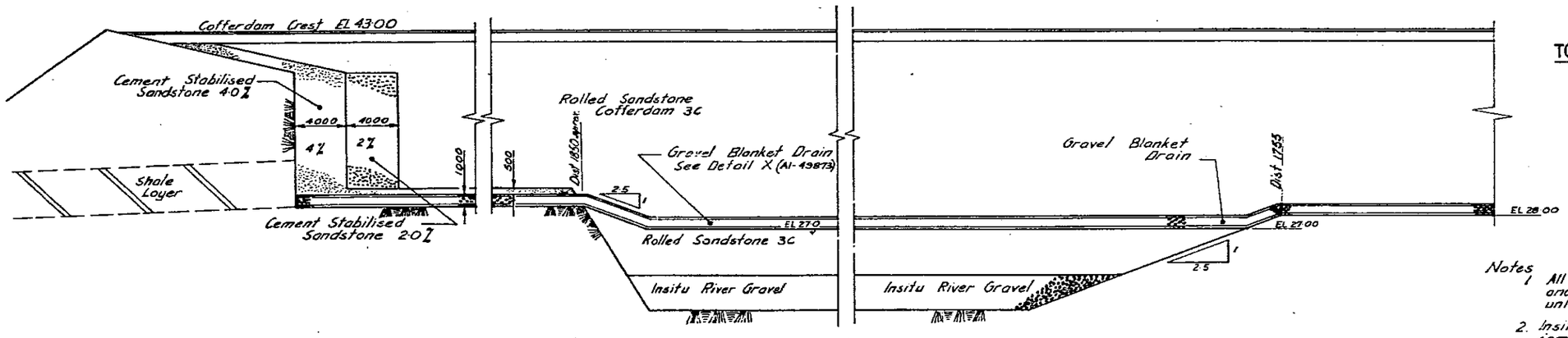
TYPICAL SECTION
(THROUGH RIVER BED)
(Scale 'a')
(Supersedes Section B-B (A1-45420))



TOE DETAIL (BLANKET DRAIN ABOVE EL 27.00)



TOE DETAIL (BLANKET DRAIN AT EL 27.00)
(Scale 'b')
(Supersedes Detail T (A1-45420))



SECTION A-A
(Scale 'a')
(Supersedes Detail Z (A1-49869))

Notes
1. All dimensions in millimetres and elevations in metres unless otherwise noted
2. Insitu river gravel to be compacted by 4 passes of a vibrating roller before placing rolled sandstone.
3. Dewatering outlet (φ600 'Armco' x 1.6 GS Pipe) to be located as directed by Engineer.

AS BUILT

Revision				
30.3.78	B	Contact Zone Amended		
13.3.78	A	Toe Detail Added		
Date		Remarks	Ckd	Psd

Drawing Schedule	
A1-49868	Typical Cross Sections
A1-49869	D/S Cofferdam - General Arrangement
A1-45420	Cofferdams - Sections

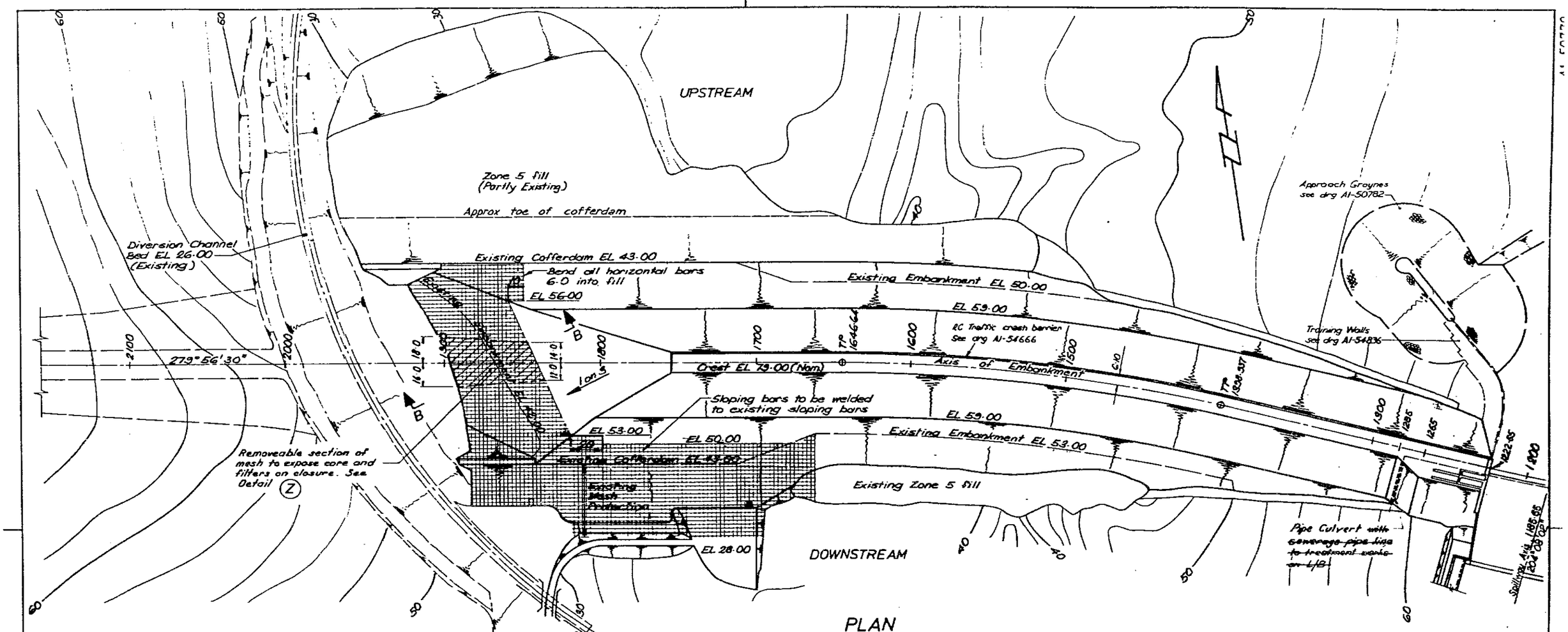
Scale 'a' 0 5 10 15 20 metres (1:200 before reduction)
Scale 'b' 0 10 20 30 40 50 60 70 metres (1:75 before reduction)

Drafting
Dr
Ckd

Approved
Acting Project Engineer

IRRIGATION AND WATER SUPPLY COMMISSION
WIVENHOE DAM
SECOND STAGE CONSTRUCTION
DOWNSTREAM COFFERDAM DETAIL
10.3.78 | A1-62303 | A | B
WD-A1-140

INS. 1 0 2 4 6 8 10
CM. 1 0 2 4 6 8 10 20 30

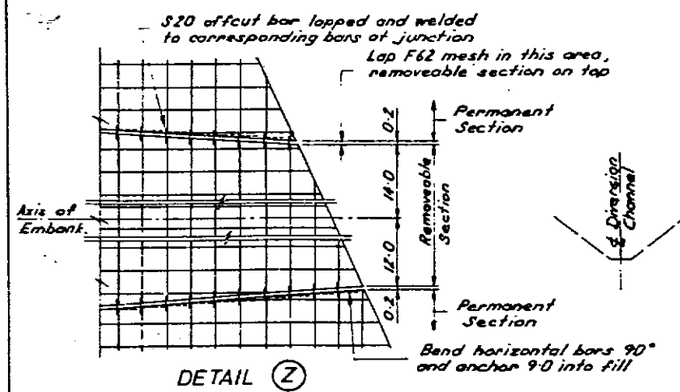


NOTES:

1. Embankment core is displaced from centre line of embankment between axis distances 1223 NOM and 1285, See drg A1-50790.
2. For layout of Guard rails in vicinity of spillway works area see drg A1-53345.

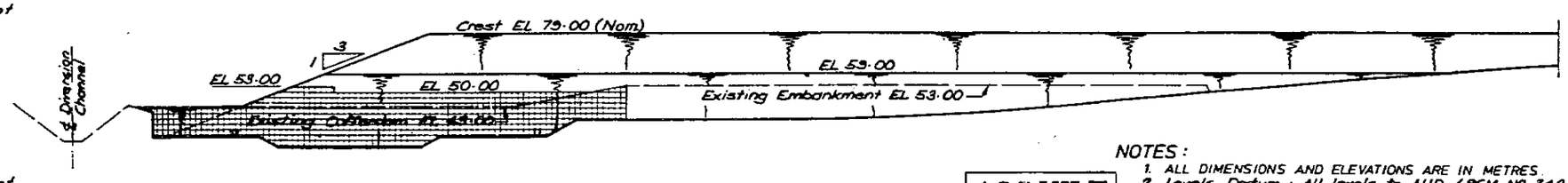
LEGEND :

REINFORCING MESH PROTECTION



DETAIL Z

(Not to scale)



ELEVATION

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS ARE IN METRES.
2. Levels Datum : All levels to AHD (PSM N° 34242 = EL 74·784)
3. Azimuth Datum : AMG.
4. For Section B-B see drg A1-50780.
5. For Typical Section 1223 Nom–1285 & 1665-2020 See drg A1-50790

AS BUILT
By
Class'd
Date 6/11/85

Revision					
Oct '85	C	As Built			
13·3·80	B	Removeable Sect. added	M.J.C.		
19·9·79	W	Tender to Working Drg			
9·5·79	A	Contract N° altered	M.J.C.		
Date		Remarks	Ckd	Pad	

Drawing Schedule	
A1-56305	Right Bank Embankment - Arrgt (Sh 3 of 3)
A1-53357	Spillway Works Area - Guard rail details
A1-54666	Crash Barrier - Concrete & Reinforcement
A1-50781	Right Bank Embankment - Arrangement (Sh 2 of 3)
A1-50783	Right Bank Embankment Details (Sh 1 of 3)
A1-50790	Right Bank Embankment Details (Sh 2 of 3)
A1-50780	Right Bank Embankment Details (Sh 3 of 3)
A1 53345	Spillway Works Area - Crash barrier & Guard rail layout

0 50 100m (1:1250 scale before reduction)

CONTRACT N° 2120

IRRIGATION AND WATER SUPPLY COMMISSION

Design	Drafting	Recommended
Prep & Sup'd	Dr KFP	A. Kinnear
Ckd	Ckd M.J.C.	Senior Engineer Designs
Supv	Supv	Approved
Submitted		
Executive Engineer		Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

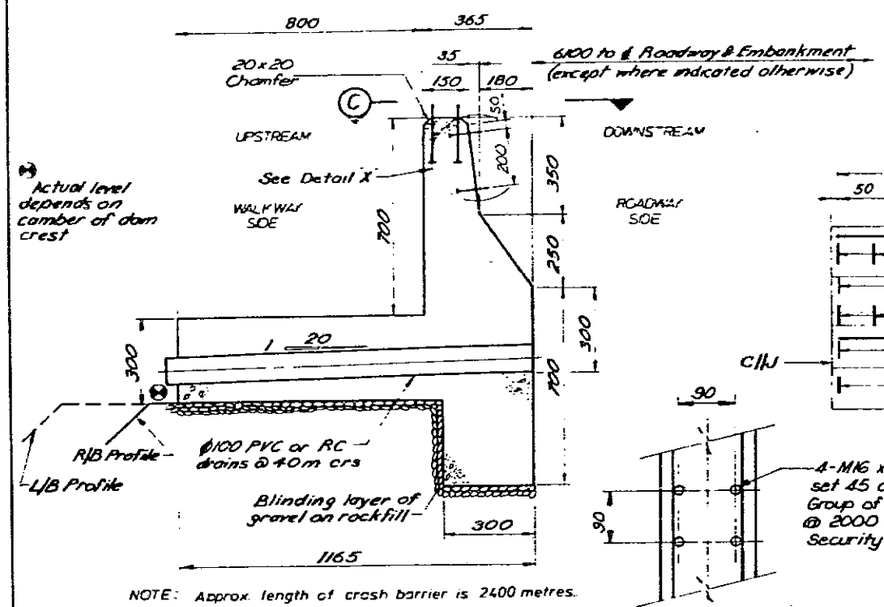
BRISBANE RIVER 150·2 km – WIVENHOE DAM
THIRD STAGE CONSTRUCTION
RIGHT BANK AXIS DISTANCE 1223 Nom – 1900
EMBANKMENT ARRANGEMENT

Sh 1 of 3 | 16·6·78 | A1-50779 | A | W | B | C

ITEM No	LOCATION	DIA	LENGTH	TYPE	THREAD LENGTH	No REQD	NUTS REQD	WASHERS REQD	SETTING DETAILS
1	Axis Dist. 1240·125 + L/B + R/B ends.	10	100	Galv. Hex	35	12	12	12R	35 out of conc.

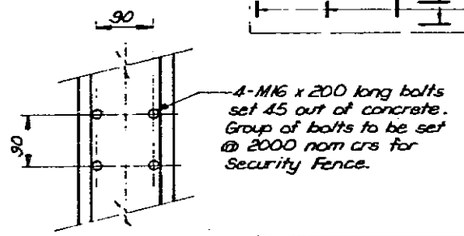
BOLT SCHEDULE

NOTES:- 1. All quantities are net only.
2. 'R' indicates round washers.
3. All items are to be galvanised.

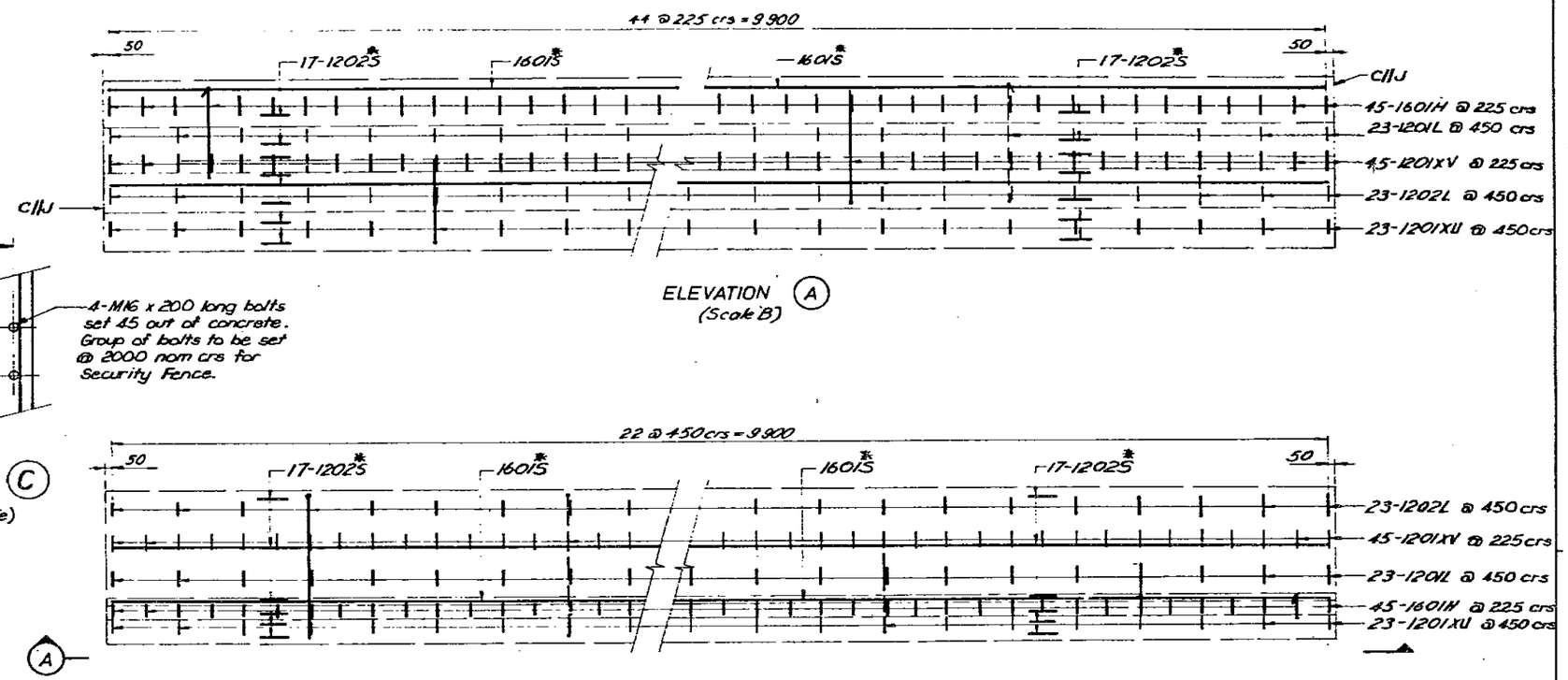


NOTE: Approx. length of crash barrier is 2400 metres.

CONCRETE TYPICAL SECTION (Scale 'A')



PLAN (C)
(Not to scale)

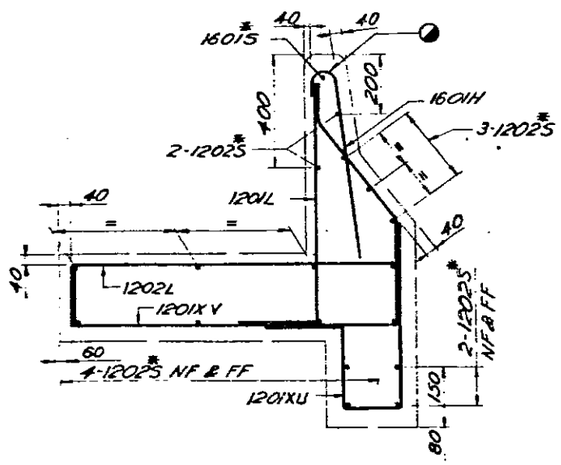


PLAN
(Scale 'B')

TYPICAL 10m SECTION-REINFORCEMENT

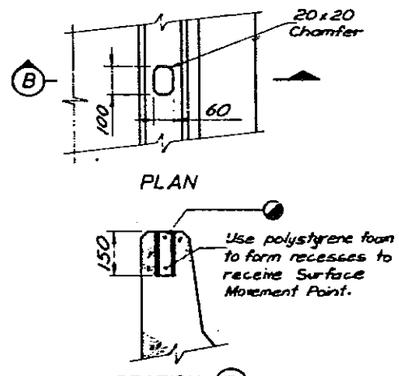
Contraction Joints every 10m with 10mm gap filled with joint filler such as 'Expandite'

* Indicates random lengths. These bars may be supplied in any convenient stock lengths and cut to suit on site. Laps for these bars to be 500



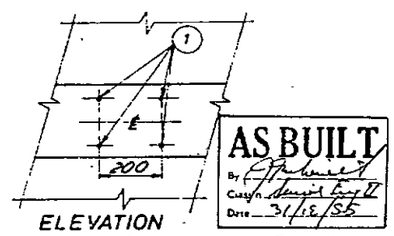
REINFORCEMENT TYPICAL SECTION (Scale 'A')

◐ Reinforcement may be displaced where necessary to clear Blockouts.



BLOCK OUT DETAIL
(Scale 'A')

AXIS DISTANCE LOCATING BLOCKOUTS	
1250	1733
1325	1800
1400	1900
1450	1950
1500	2000
1550	2050
1600	2150
1667	2250



ELEVATION
(Located at axis distance 1240·125 and 500 from L/B and R/B ends of crash barrier.)

DETAIL (X)
(Scale 'A')

NOTES:-
1. All dimensions are in millimetres.
2. All materials and workmanship are to the relevant Australian Standards.
3. Concrete to be Grade 20
4. Maximum size of coarse aggregate to be ϕ20.
5. Clear cover to reinforcement to be 60 min unless shown otherwise.
6. All reinforcement to be cold-worked deformed steel to AS 1302-1977.
7. Legend
   Near Face Reinforcement
   Bar examples shown thus
   Bar positions shown thus
   Far Face Reinforcement
   Bar examples shown thus
   Bar positions shown thus
8. Abbreviations:-
   UF-upper face, LF-lower face
   FF-far face, NF-near face
   C/J means 'Contraction Joint'

Revision				
Oct '85	A	As Built		
Date		Remarks	Chk	Fsd

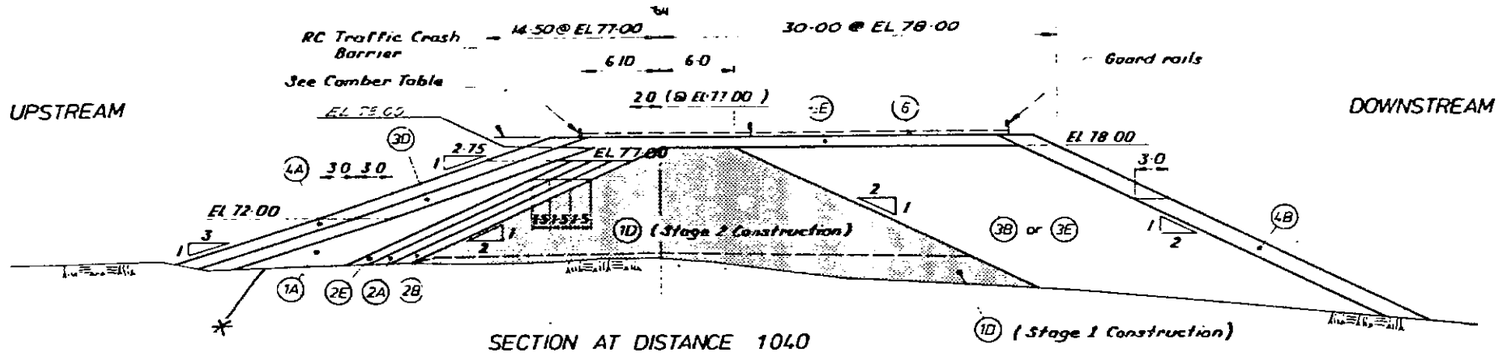
Drawing Schedule	
A3-56223	Reinforcement Schedule
A1-60917	Crash Barrier & Guardrail-Layout & Details Sh 1-3
A1-50781	Right Bank - Embankment Arrangement Sh 2 of 3.
A1-50779	Right Bank - Embankment Arrangement Sh 1 of 3.
A1-50819	Left Bank - Embankment Arrangement & Section

SCALE 'A' 0 500 1000mm (SCALE 1:10)
SCALE 'B' 0 500 1000 1500 2000mm (SCALE 1:20)
(SCALES BEFORE REDUCTION)

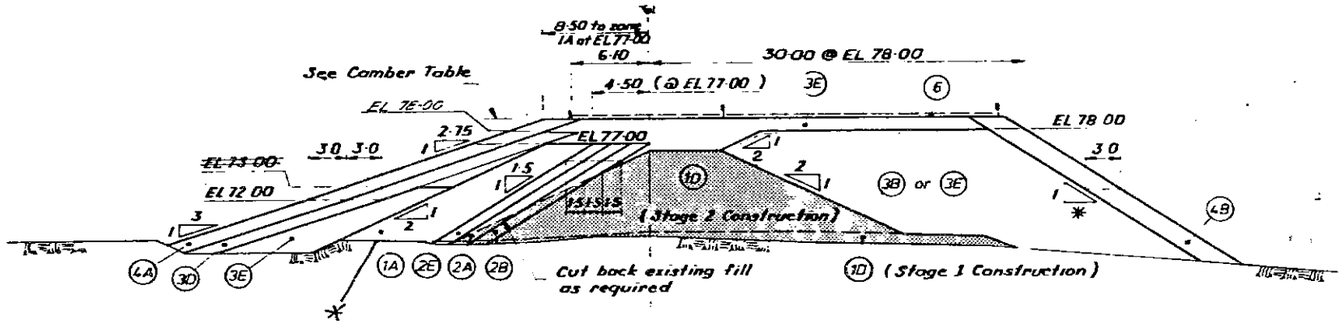
CONTRACT Nº 2120

IRRIGATION AND WATER SUPPLY COMMISSION
Design | Drafting
Prep | Dr AR & GH
Ckd | Ckd
Supv | Supv
Submitted
Executive Engineer
Recommended
Senior Engineer Designs
Approved
Chief Designing Engineer

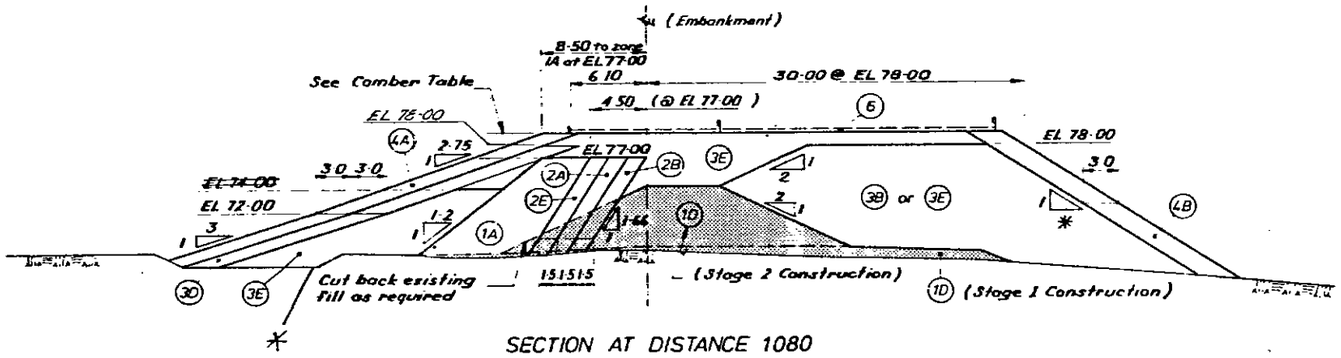
CO-ORDINATOR GENERAL'S DEPARTMENT
BRISBANE RIVER 150·2 km - WIVENHOE DAM
CRASH BARRIER
CONCRETE & REINFORCEMENT
28.9.81 | A1-54666 | A



SECTION AT DISTANCE 1040



SECTION AT DISTANCE 1060



SECTION AT DISTANCE 1080

EMBANKMENT CAMBER TABLE

AXIS DISTANCE	EMBANKMENT EL
0	78·70
200	78·77
400	78·84
500	78·86
600	78·84
800	78·81
1100	78·77

ZONE LEGEND

- (1A) — CLAY CORE
- (1D) — ROLLED MISCELLANEOUS FILL
- (2A) — FINE SAND FILTER
- (2B) — GRAVEL DRAIN (+4·75 mm)
- (2C) — COARSE FILTER (−19 mm)
- (2D) — SANDY SILT
- (2E) — SELECT SANDY SILT
- (3A) — RIVER GRAVEL
- (3B) — ROLLED SANDSTONE SHELL
- (3D) — WELL GRADED RIVER GRAVEL
- (3E) — ROLLED SANDSTONE TRANSITION
- (4A) — U/S RIP RAP
- (4B) — D/S RIP RAP
- (6) — ROAD SUBGRADE (NOT IN CONTRACT)

NOTES:

1. All dimensions and elevations are in metres
2. Levels Datum: All levels to AHD (PSM Nº 34242 = EL 74·784)
3. * Slope varies between 1 on 2 at 1040 and 1 on 1·5 at 1090.

For RC Traffic crash barrier and Guard rail layout, see Drg A1-53345

For RC Traffic crash barrier details, see Drg A1-54666

For Armco Guard Rail details, see Drg A1-53357

For modification in this area see A2-59611

AS BUILT
By
Checked
Date 6/11/84

Revision				
Oct '85	E	As Built		
8·9·81	D	Sect @ 1060 & 1080 amd	MJC	
25·7·81	C	Sect. @ 1060 & 1080 amd	MJC	
24·11·80	B	Section amended	MJC	
23·2·80	A	EL in Camber Table amended	MJC	
17·9·79	W	Tender to Working Drg		
Date		Remarks	Ckd	Psd

Drawing Schedule	
A1-53357	Armco Guard Rail Details
A1-54666	Crash Barrier - Concrete & Reinforcement
A1-53345	Spillway Works Area - Crash barrier & Guard rail layout
A1-56110	Typical Sections Adjacent to Spillway (Sh 1 of 2)

Scale

0 5 10 15 20 m (1:250)

(Scale Before Reduction)

CONTRACT Nº 2120

IRRIGATION AND WATER SUPPLY COMMISSION

Design — Prep — Ckd — Supv — Submitted — Executive Engineer

Drafting — Dr — Ckd — Supv

Recommended — Senior Engineer Designs

Approved — Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

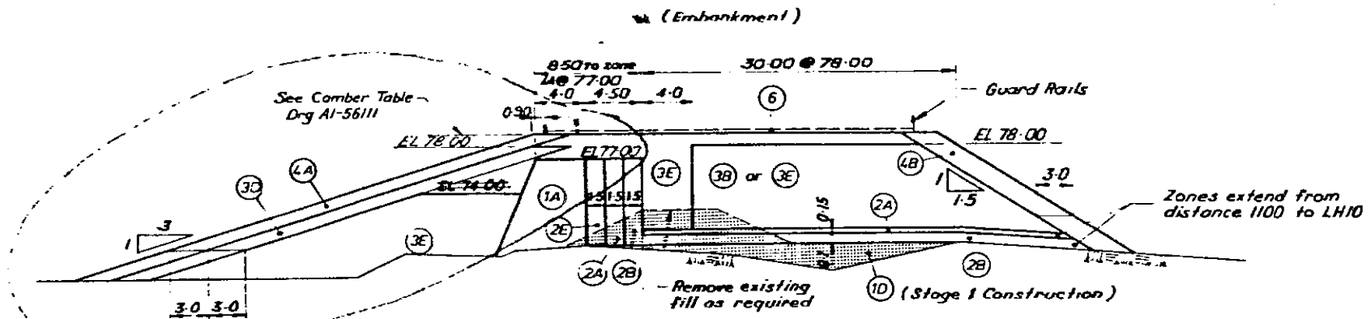
BRISBANE RIVER 150·2 km – WIVENHOE DAM

THIRD STAGE CONSTRUCTION
LEFT BANK EMBANKMENT

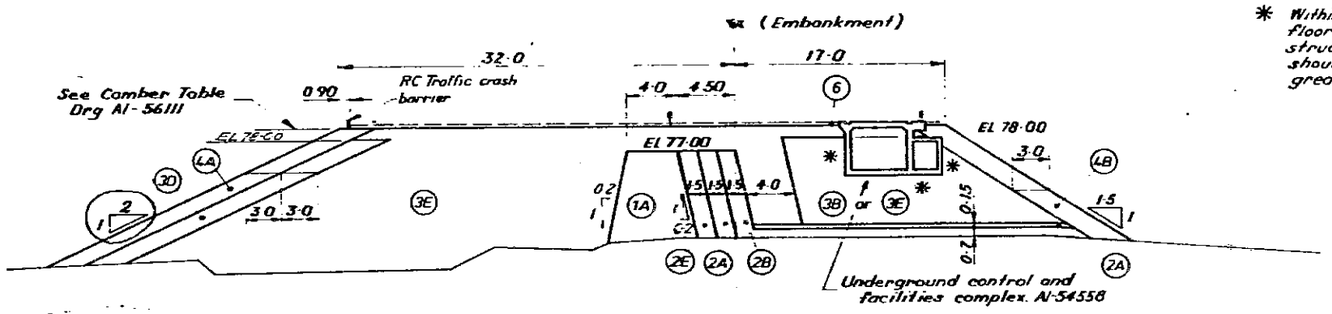
TYPICAL SECTIONS ADJACENT TO SPILLWAY

Sheet 2 of 3 | 9-5-79 | A1-56111 | W A R E R

UPSTREAM

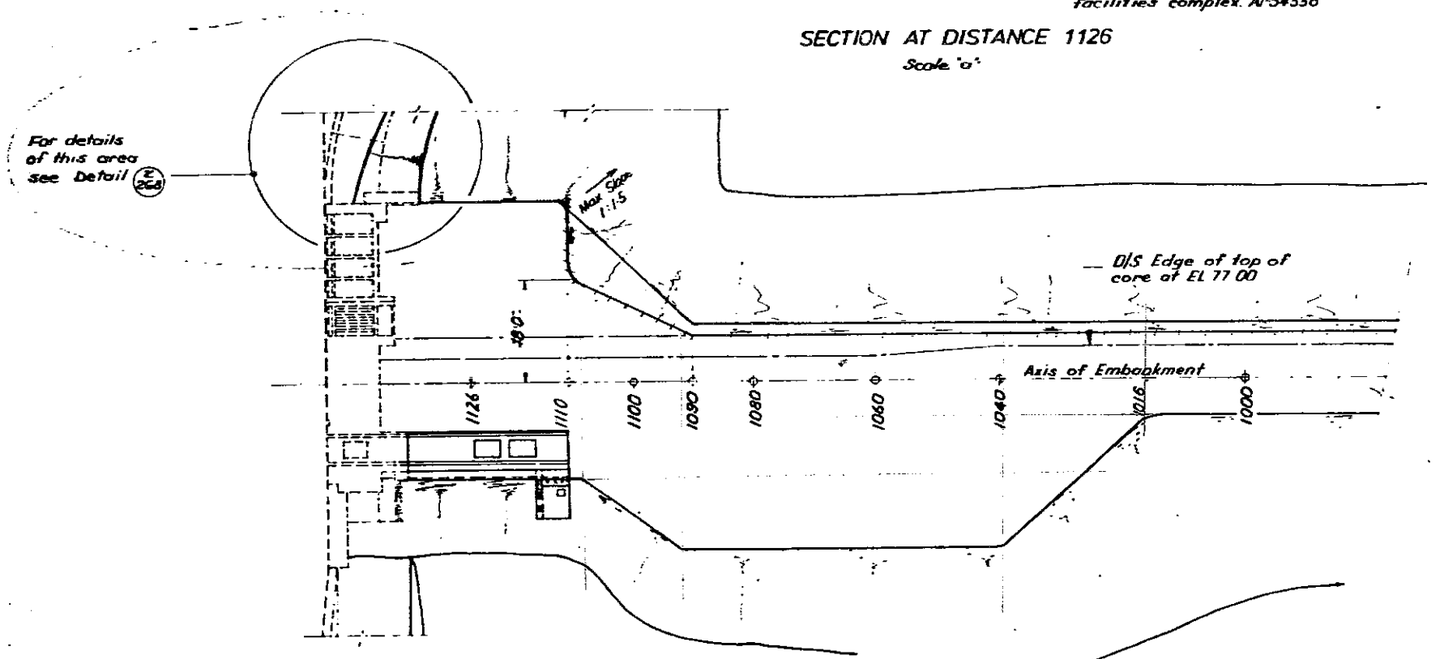


SECTION AT DISTANCE 1090
Scale 'a'



SECTION AT DISTANCE 1126
Scale 'a'

* Within 500 of the underside of the floor and the sidewalls of the control structure, the embankment backfill should not contain hard rock particles greater than 150 in size.



PLAN
Scale 'b'

NOTES:
1. All dimensions and elevations are in metres
2. For general notes and zone legend see Drg A1-56111.

FOR 'AS BUILT' CROSS SECTIONS SEE A3-70231 – A3 70369

AS BUILT

Revision				
Oct '85	E	As Built		
8.5.81	D	U/S adjacent spillway	M.J.C	
26.6.81	C	Sect at 1090 amded	M.J.C.	
9.12.80	B	* Note added	M.J.C.	
24.11.80	A	Sections & Plan amended	M.J.C	
14.11.79	W	Section 1093 & Plan altered Tender to working dwg		
Date		Remarks	Ckd	Psd

Drawings Schedule

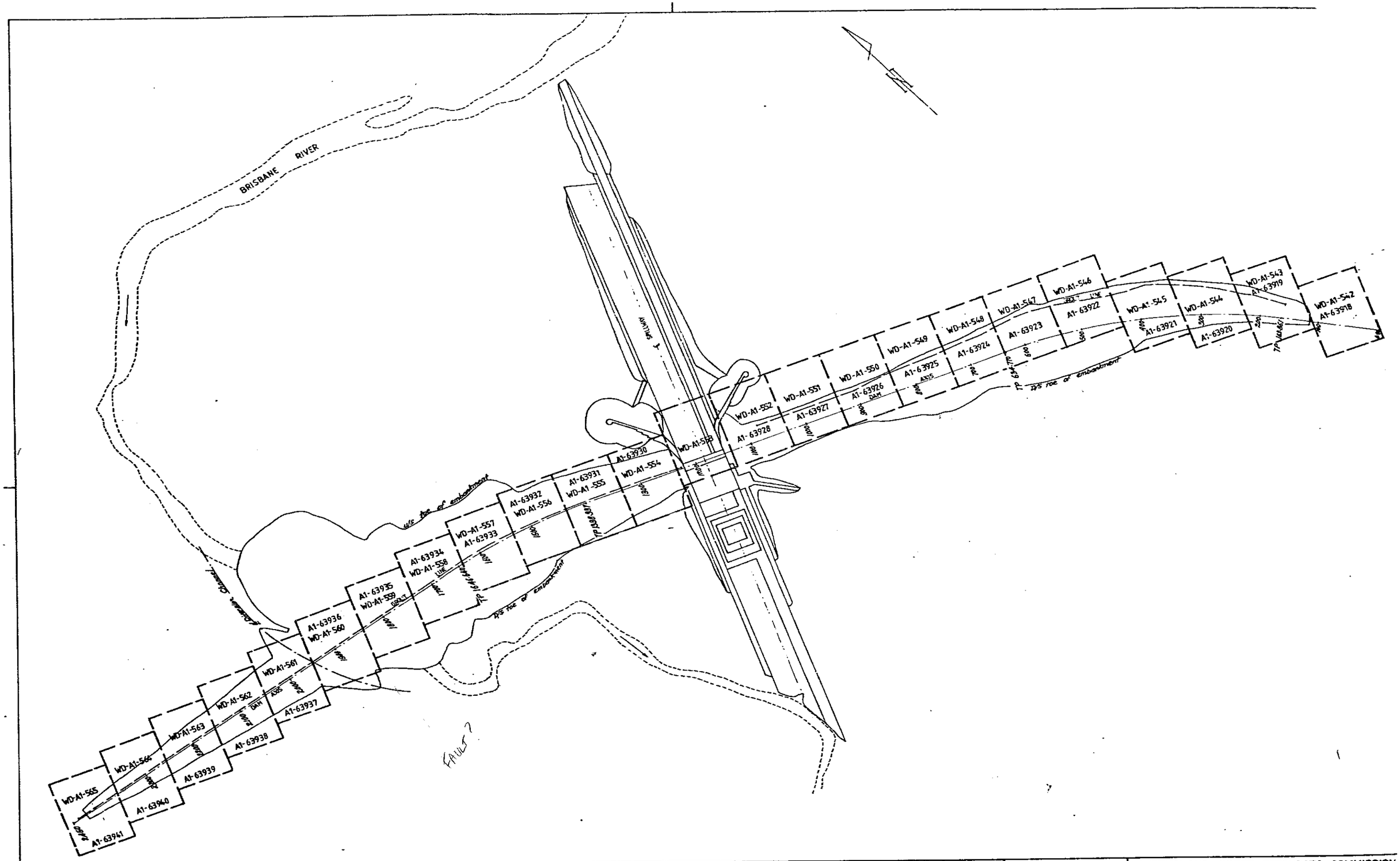
A1-56268	Typical Sections Adjacent to Spillway (Sh 3 of 3)
A1-54558	Underground Control Structure-Concrete Details
A1-56111	Typical Sections Adjacent to Spillway (Sh 2 of 3)

Scale 'a' 0 5 10 15 20 m (1:250)
Scale 'b' 0 10 20 30 40 50 m (1:500)
(Scales Before Reduction)

CONTRACT Nº 2120

IRRIGATION AND WATER SUPPLY COMMISSION
Design | Drafting
Prep | Dr PLX
Ckd | Ckd GLG
Supr | Supr
Submitted
Executive Engineer
Recommended
Senior Engineer Designs
Approved
Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT
BRISBANE RIVER 150·2 km – WIVENHOE DAM
THIRD STAGE CONSTRUCTION
LEFT BANK EMBANKMENT
TYPICAL SECTIONS ADJACENT TO SPILLWAY
Sheet 1 of 3 | 9-5-79 | A1-56110 | W A B C D E



Revision: Date | Remarks | Chd | Plot

Survey Books

Scale 1:3000

Drafting: Dr C.P.P. | Chd | Supv

Submitted

Recommended

Approved J.F. Wilson

QUEENSLAND WATER RESOURCES COMMISSION

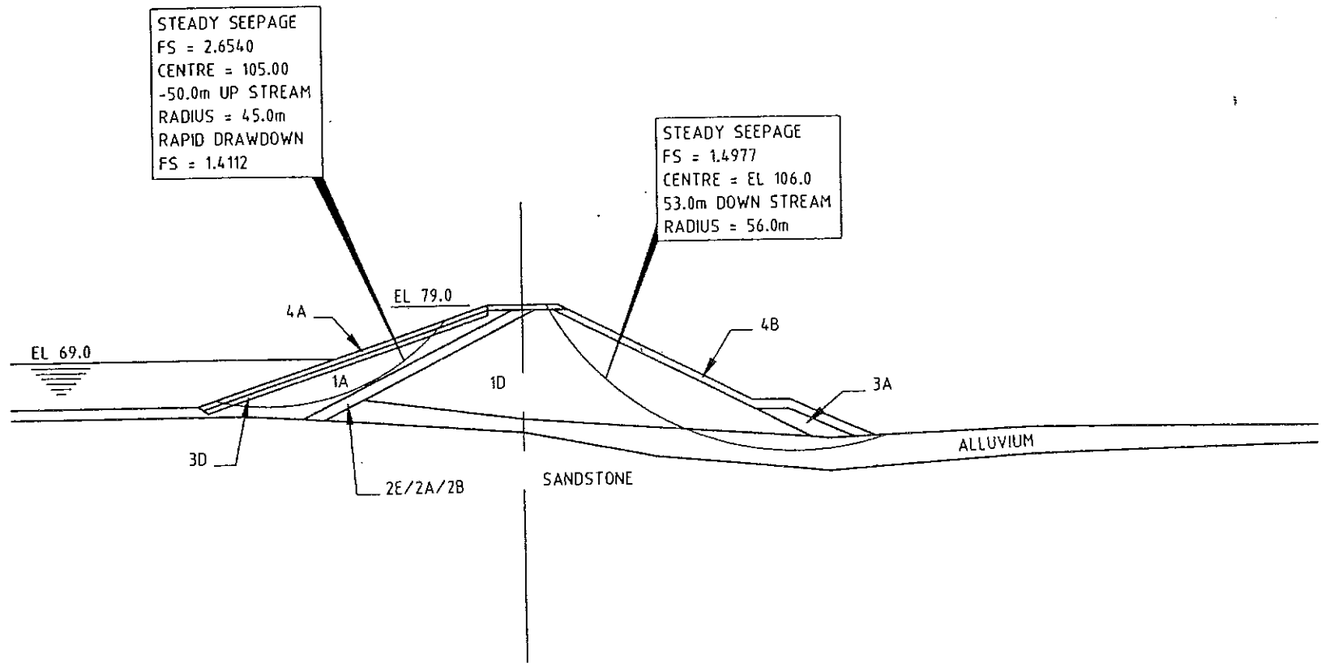
BRISBANE RIVER 150·2km-WIVENHOE DAM
MAIN EMBANKMENT
FOUNDATION GEOLOGICAL PLAN
KEY TO DRAWINGS

12-6-81 | A1-63917

WD-A1-541

INS. 1 0 2 4 6 8 10

CM. 1 0 2 4 6 8 10 20 30



DPI QUEENSLAND DEPARTMENT OF PRIMARY INDUSTRIES WATER RESOURCES

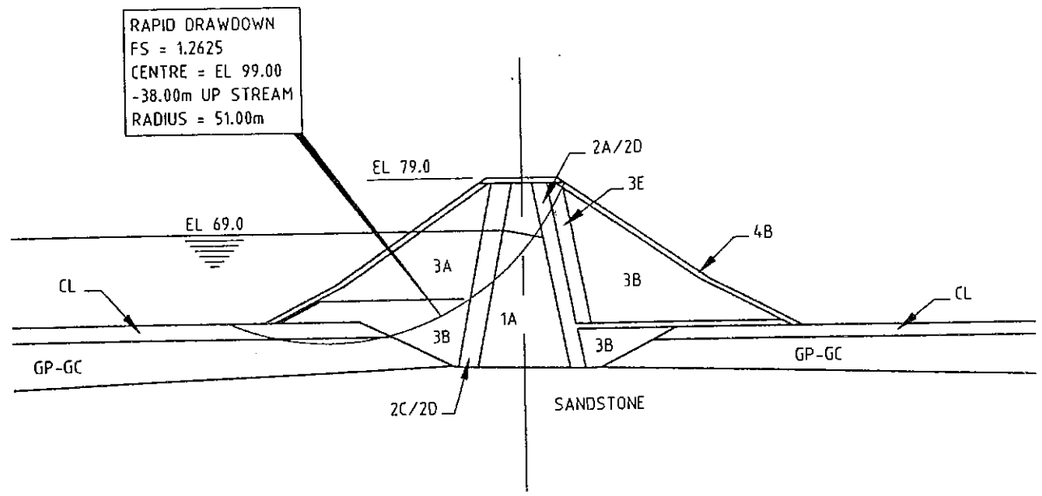
WIVENHOE DAM - DESIGN REPORT

EMBANKMENT SLIP FAILURE SURFACES

DISTANCE 550m

DRAWING NUMBER

A4-109976



DPI QUEENSLAND DEPARTMENT OF PRIMARY INDUSTRIES WATER RESOURCES

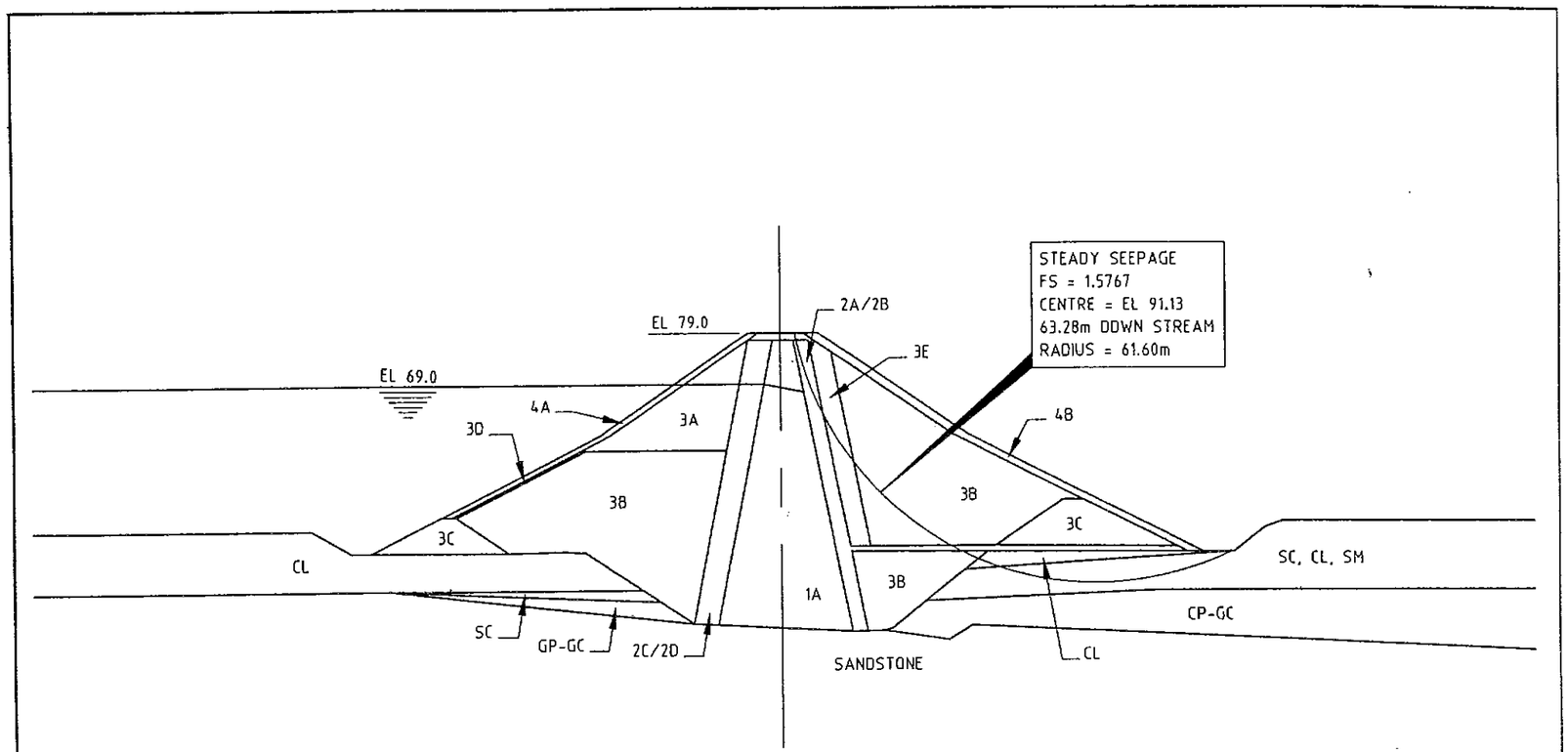
WIVENHOE DAM - DESIGN REPORT

EMBANKMENT SLIP FAILURE SURFACE

DISTANCE 1400m

DRAWING NUMBER

A4-109971



DPI QUEENSLAND DEPARTMENT OF PRIMARY INDUSTRIES WATER RESOURCES

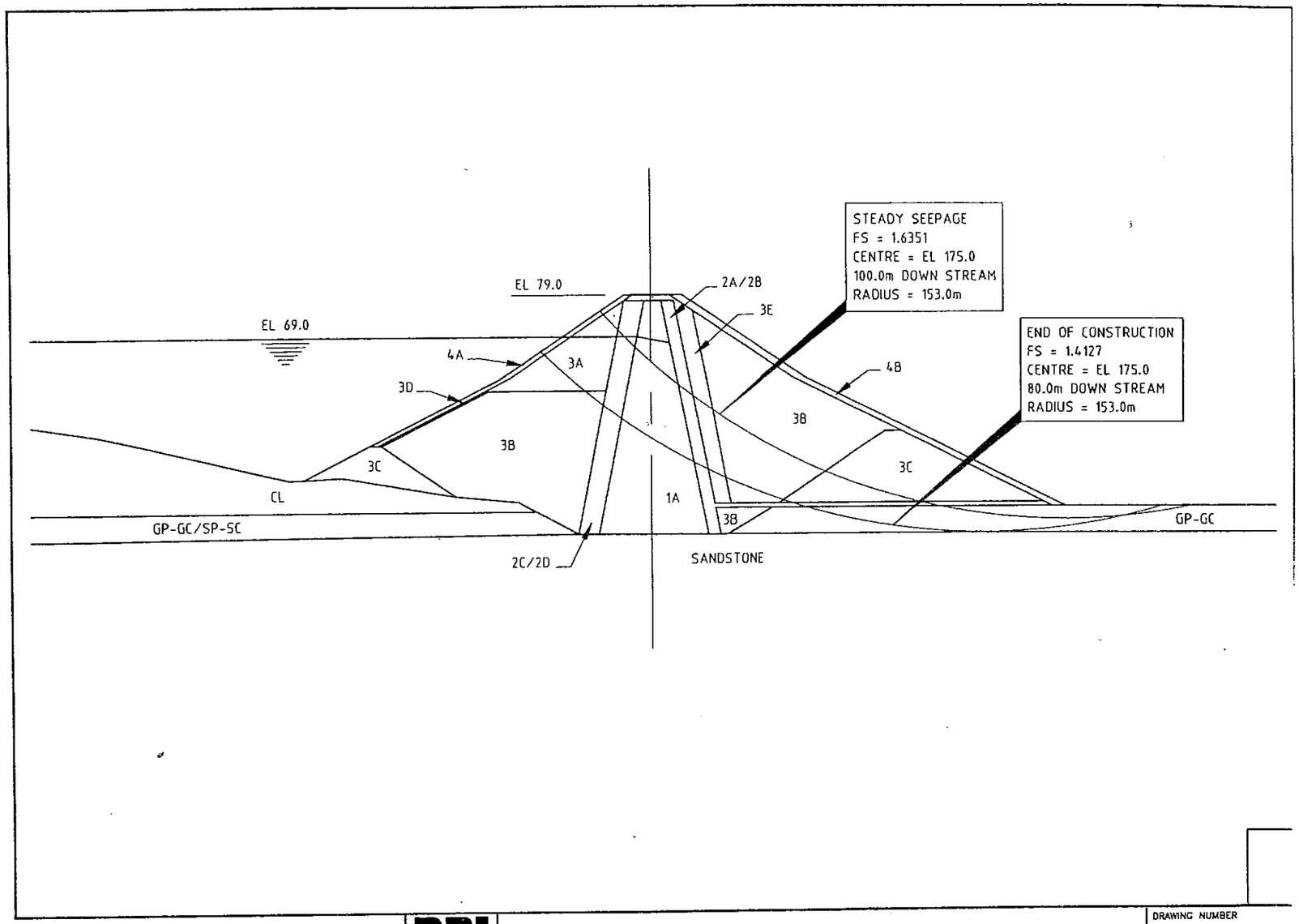
WIVENHOE DAM - DESIGN REPORT

EMBANKMENT SLIP FAILURE SURFACE

DISTANCE 1600m

DRAWING NUMBER

A4-109972



DPI QUEENSLAND DEPARTMENT OF PRIMARY INDUSTRIES WATER RESOURCES

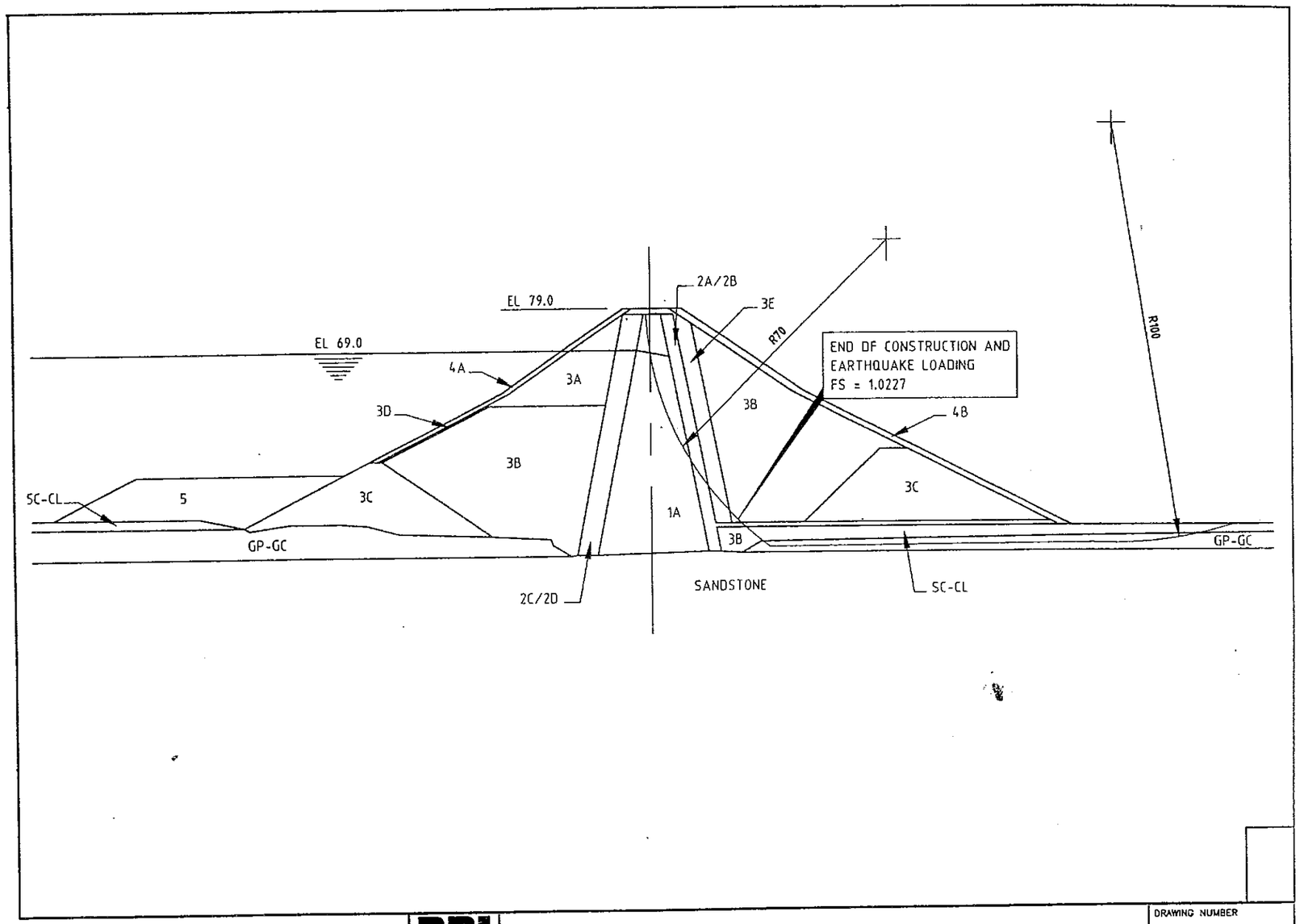
WIVENHOE DAM - DESIGN REPORT

EMBANKMENT SLIP FAILURE SURFACES

DISTANCE 1700m

DRAWING NUMBER

A4-109973



DPI QUEENSLAND DEPARTMENT OF PRIMARY INDUSTRIES WATER RESOURCES

WIVENHOE DAM - DESIGN REPORT

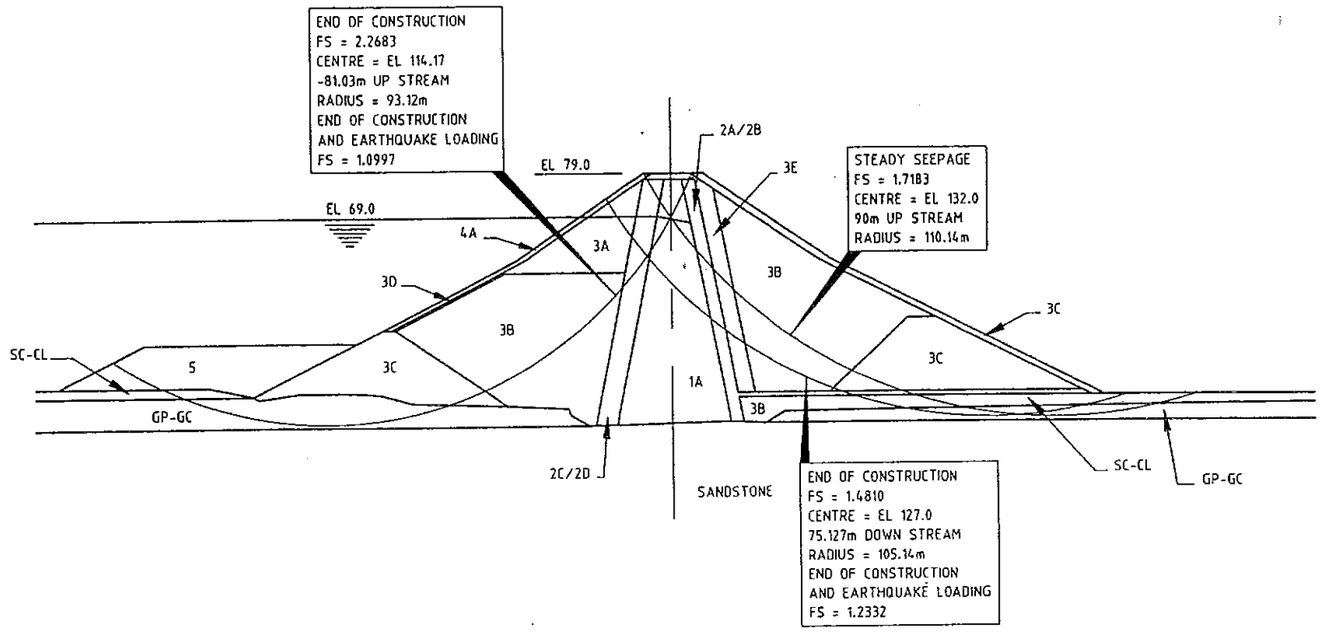
EMBANKMENT SLIP FAILURE SURFACE

DISTANCE 1800m

SH 1 of 2

DRAWING NUMBER

A4-109974



DPI QUEENSLAND DEPARTMENT OF PRIMARY INDUSTRIES WATER RESOURCES

WIVENHOE DAM - DESIGN REPORT

EMBANKMENT SLIP FAILURE SURFACES

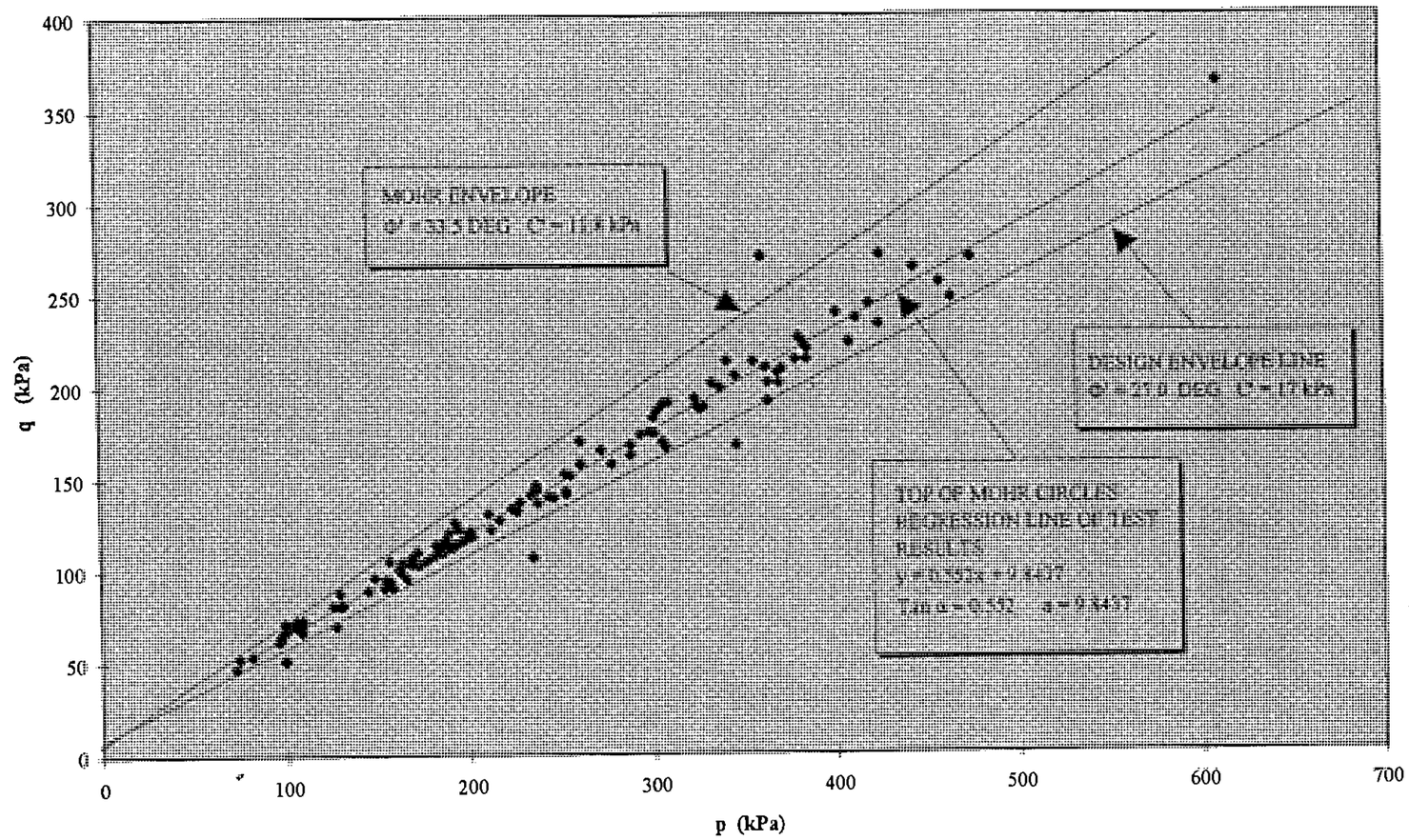
DISTANCE 1800m

SH 2 OF 2

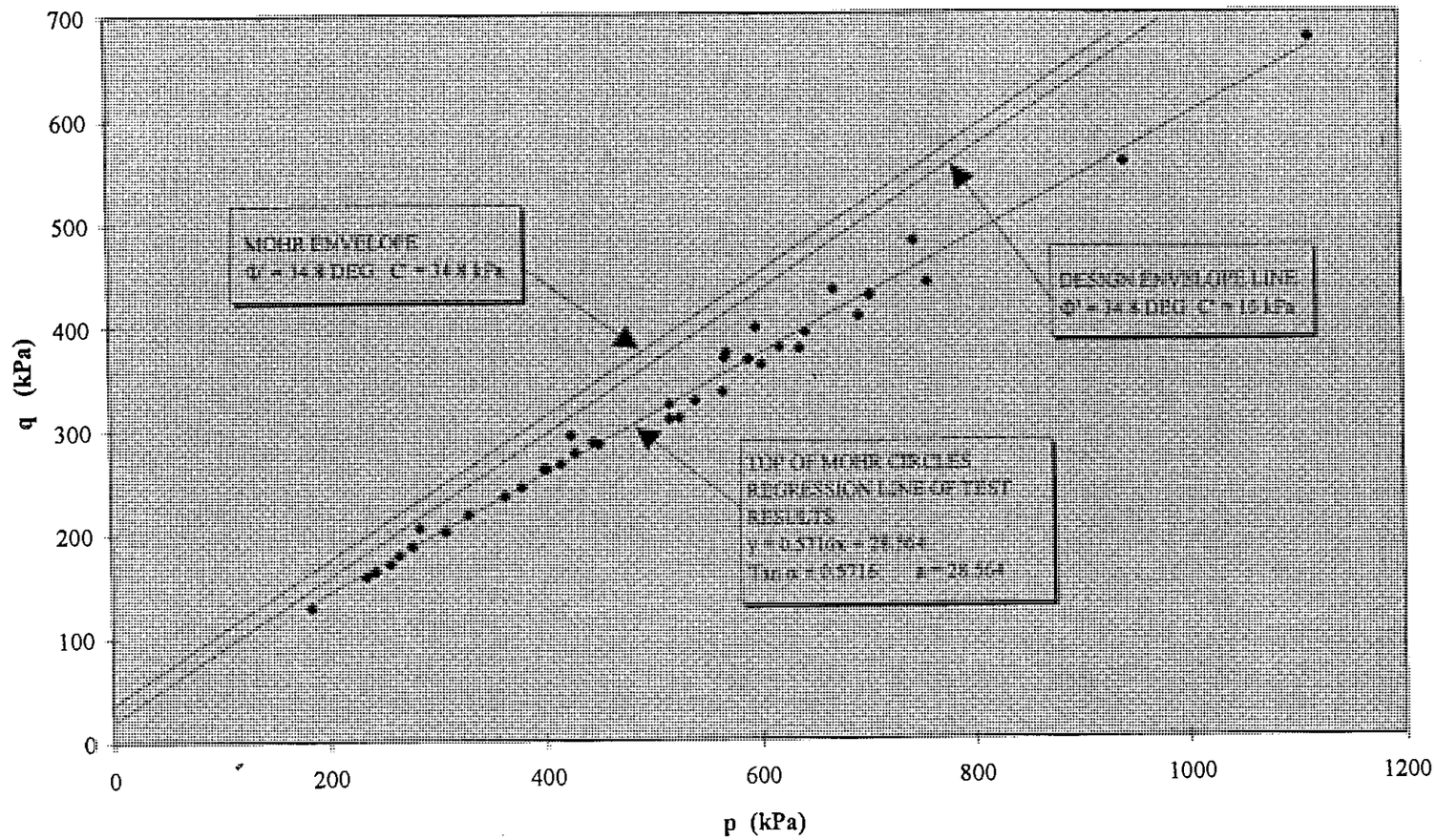
DRAWING NUMBER

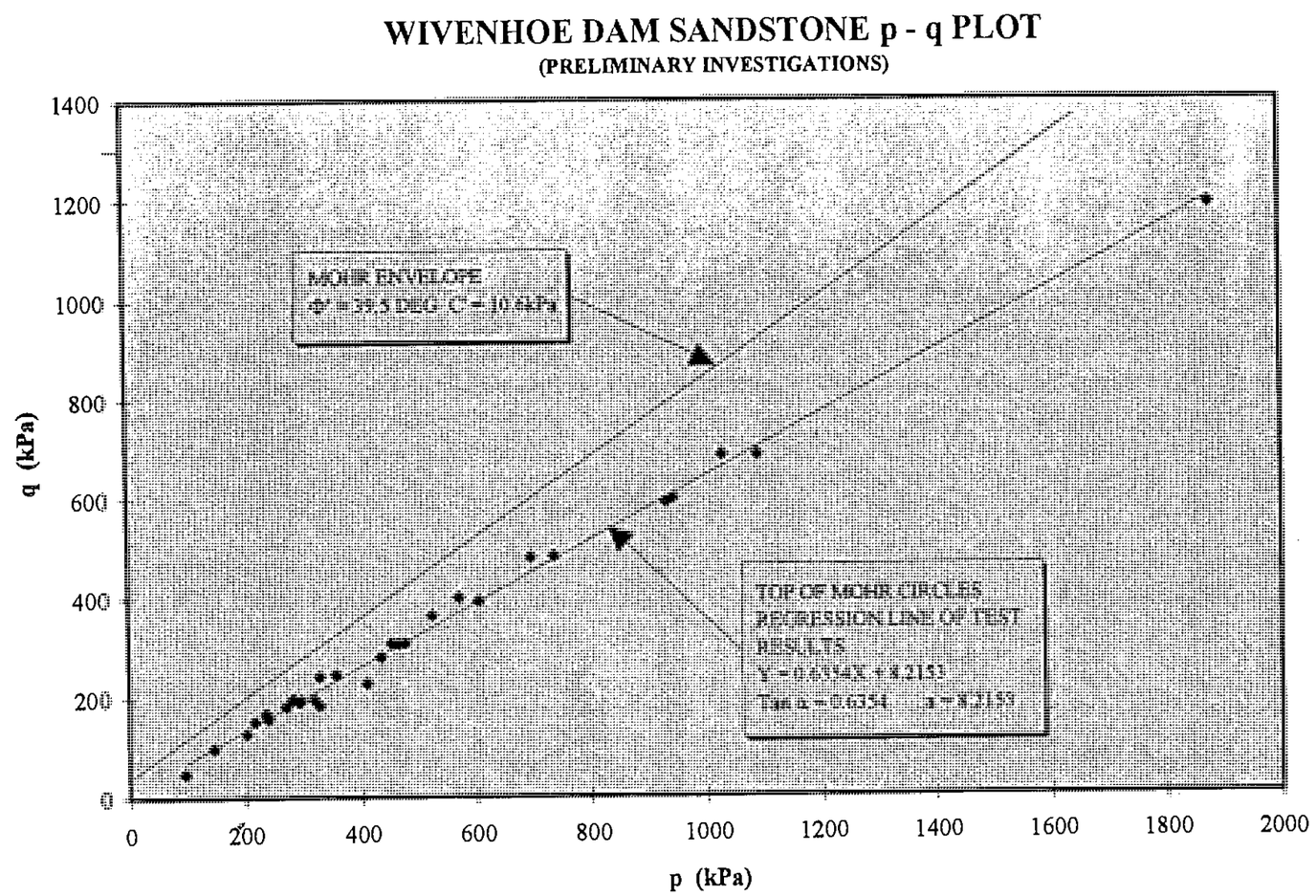
A4-109975

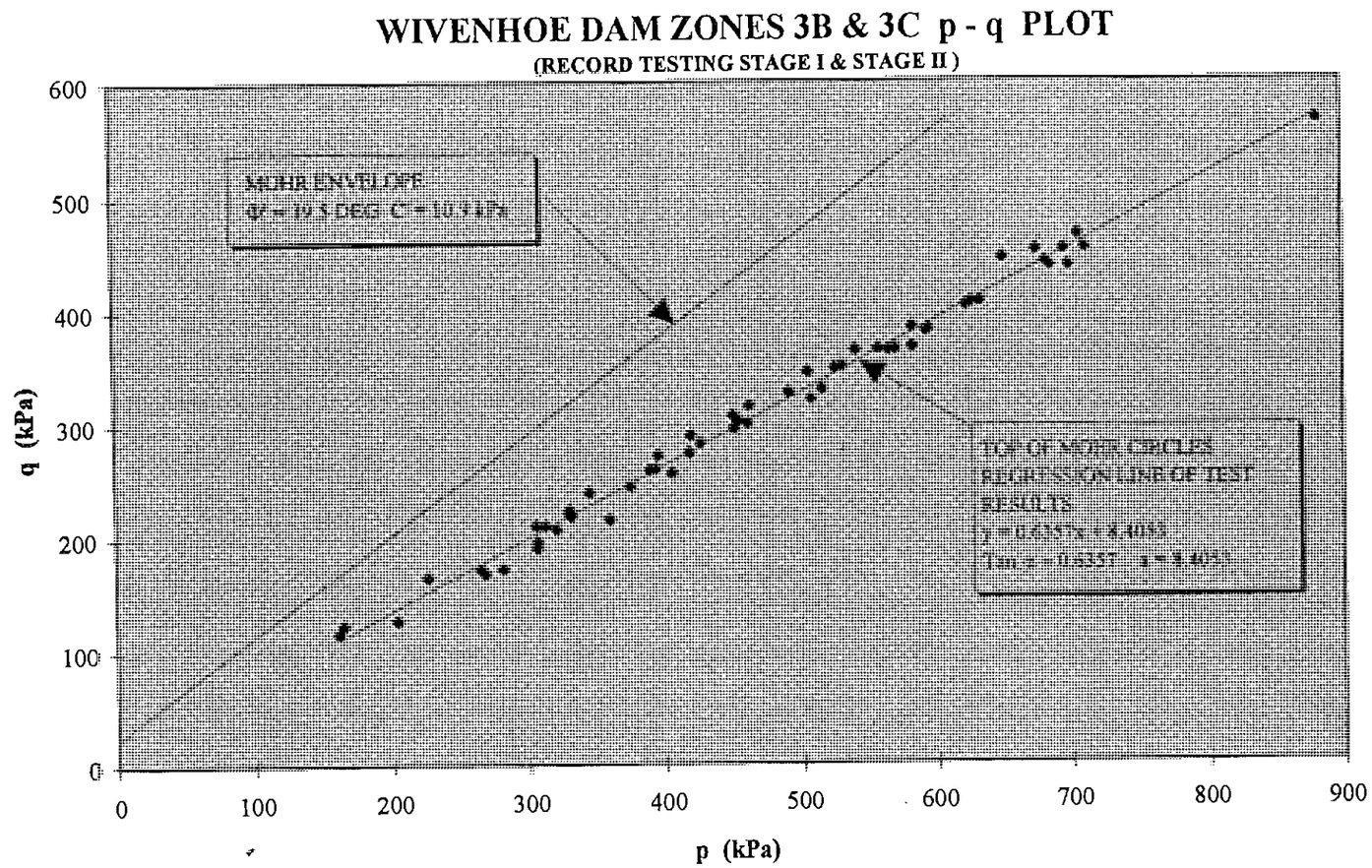
WIVENHOE DAM ZONE 1A p - q PLOT



WIVENHOE DAM ZONE 1D p - q PLOT

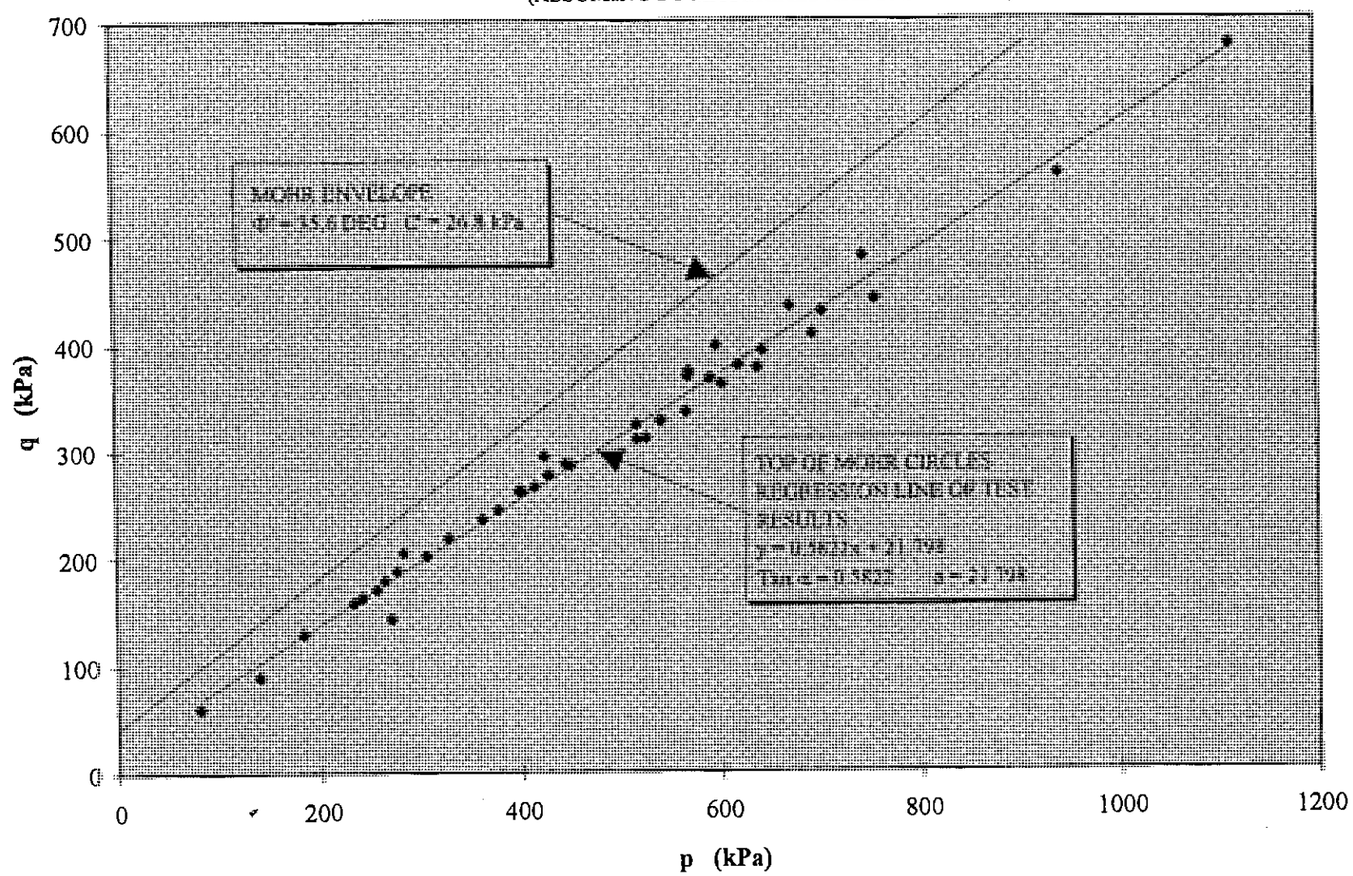


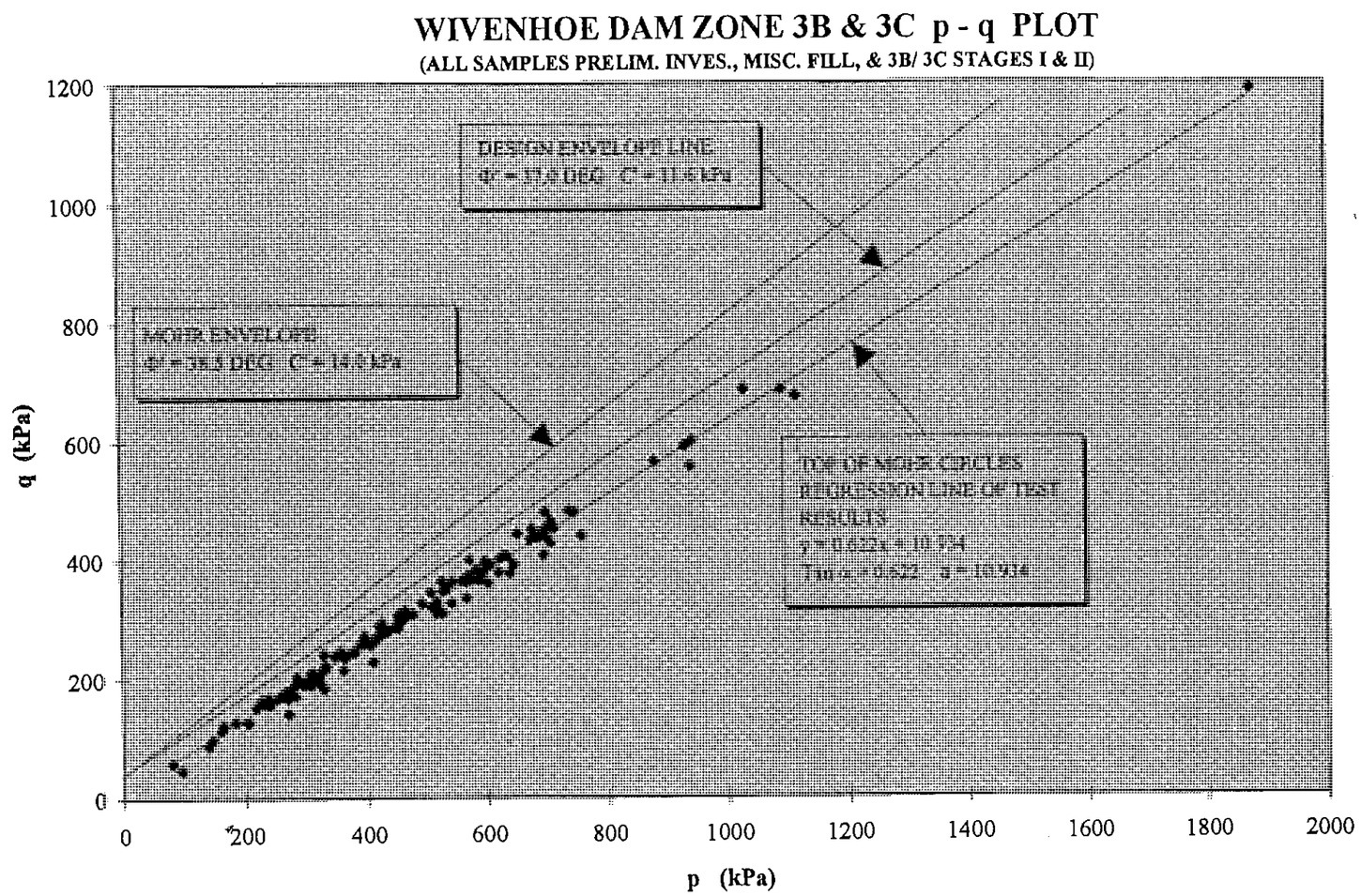

WIVENHOE DAM SANDSTONE p - q PLOT
(PRELIMINARY INVESTIGATIONS)
MOHR ENVELOPE
TOP OF MOHR CIRCLES
REGRESSION LINE OF TEST
RESULTS
q (kPa)
p (kPa)
0
200
400
600
800
1000
1200
1400
1600
1800
2000

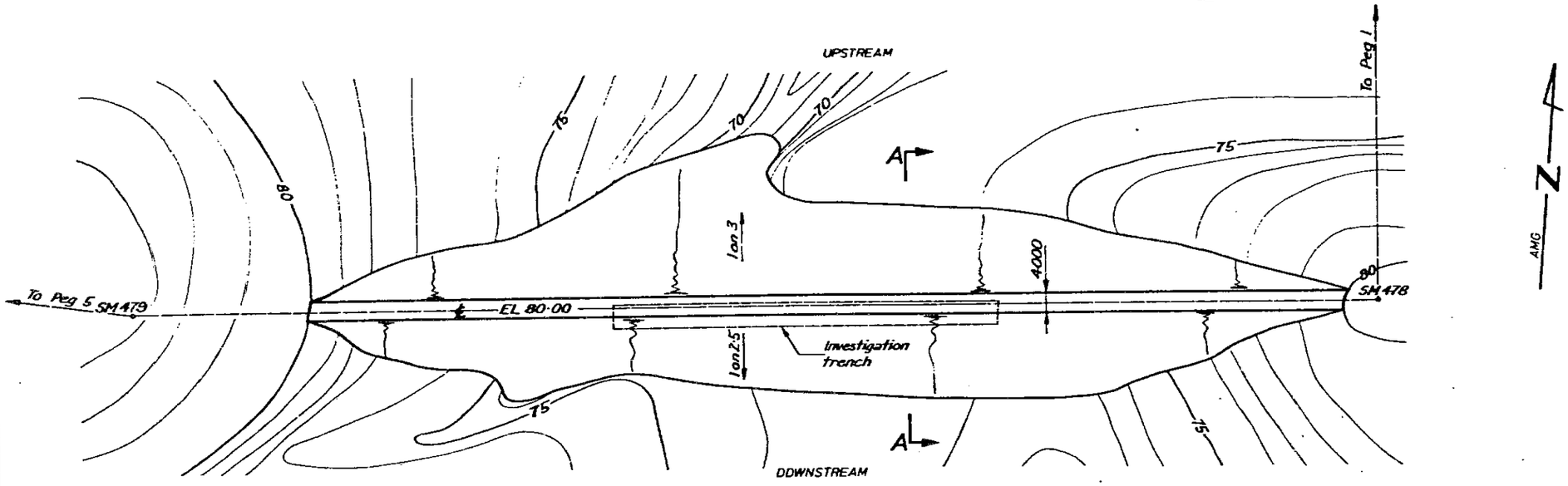

WIVENHOE DAM ZONES 3B & 3C p - q PLOT
(RECORD TESTING STAGE I & STAGE II)
MOHR ENVELOPE
TOP OF MOHR CIRCLES
REGRESSION LINE OF TEST
RESULTS
q (kPa)
p (kPa)
0
100
200
300
400
500
600
700
800
900

WIVENHOE DAM MISC. FILL p - q PLOT

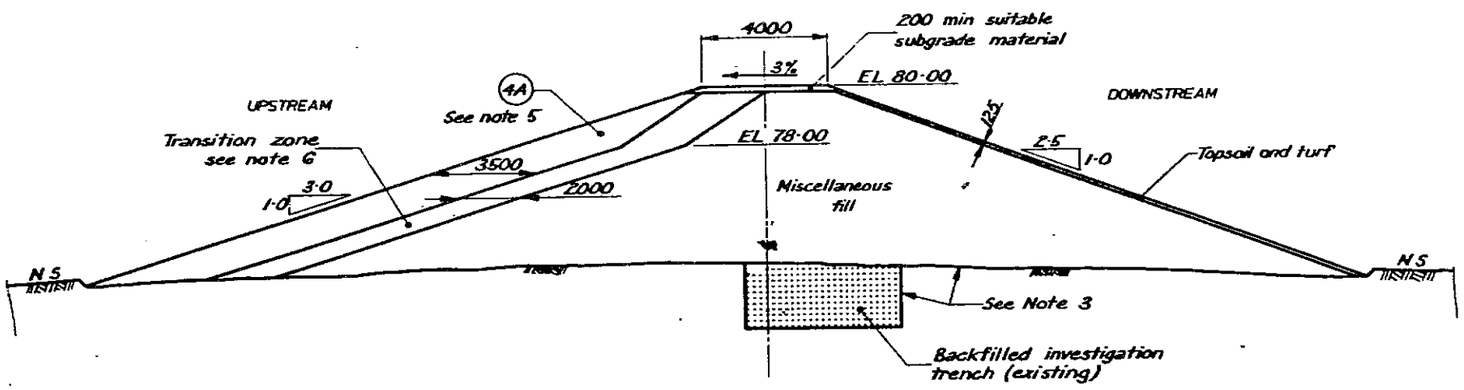
(ASSUMING SC MATERIALS ARE SANDSTONE)




WIVENHOE DAM ZONE 3B & 3C p - q PLOT
(ALL SAMPLES PRELIM. INVES., MISC. FILL, & 3B/ 3C STAGES I & II)
DESIGN ENVELOPE LINE
MOHR ENVELOPE
TOP OF MOHR CIRCLES
REGRESSION LINE OF TEST
RESULTS
q (kPa)
p (kPa)
0
200
400
600
800
1000
1200
1400
1600
1800
2000



PLAN
Scale 'a'



A-A
Scale 'b'

FOR 'AS BUILT' CROSS SECTIONS SEE A3-79166 – A3-79177

NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETRES AND ALL ELEVATIONS ARE IN METRES.
2. Levels Datum :- AHD (PSM 34242 - EL 74·784.)
3. Foundation has been stripped to below root zone.
4. Miscellaneous fill may consist of relatively impermeable low shrinkage material such as CL clays, well graded sandy clays and gravelly clays.
5. (4A) will be the same as rip rap of the main embankment.
6. Transition material shall be selected to be intermediate in grading between the miscellaneous fill and the rip rap.
7. A camber allowance of 1% of the height above foundation level shall be added to the crest EL of 80·00.
8. The downstream face is to be topsoiled and grassed.
9. The crest is to be sloped to aid in drainage.
10. For location of Saddle Dam see drg A2 - 47523

AS BUILT
By
Cust
Date 31/10/85

Revision				
Oct '85	B	As Built		
14-11-78	W	Tender to working drg		
9-5-79	A	Contract Number Amended	N.J.C.	
Date		Remarks	Chd	Psd

Drawing Schedule	
A2-47523	Location & Detail Locality Maps
K1-45989	Saddle Dam Site Nº 1. Contour Plan.

Scale 'a' 0 10 20 30 40 50 m (Scale 1:500 before reduction)

Scale 'b' 0 5000 10 000 mm (Scale 1:100 before reduction)

CONTRACT Nº 2120

IRRIGATION AND WATER SUPPLY COMMISSION

Design	Drafting	Recommended
Prep	Dr P.G.	
Chd	Chd	Senior Engineer Designs
Supv	Supv	Approved
Submitted		
Executive Engineer		Chief Designing Engineer

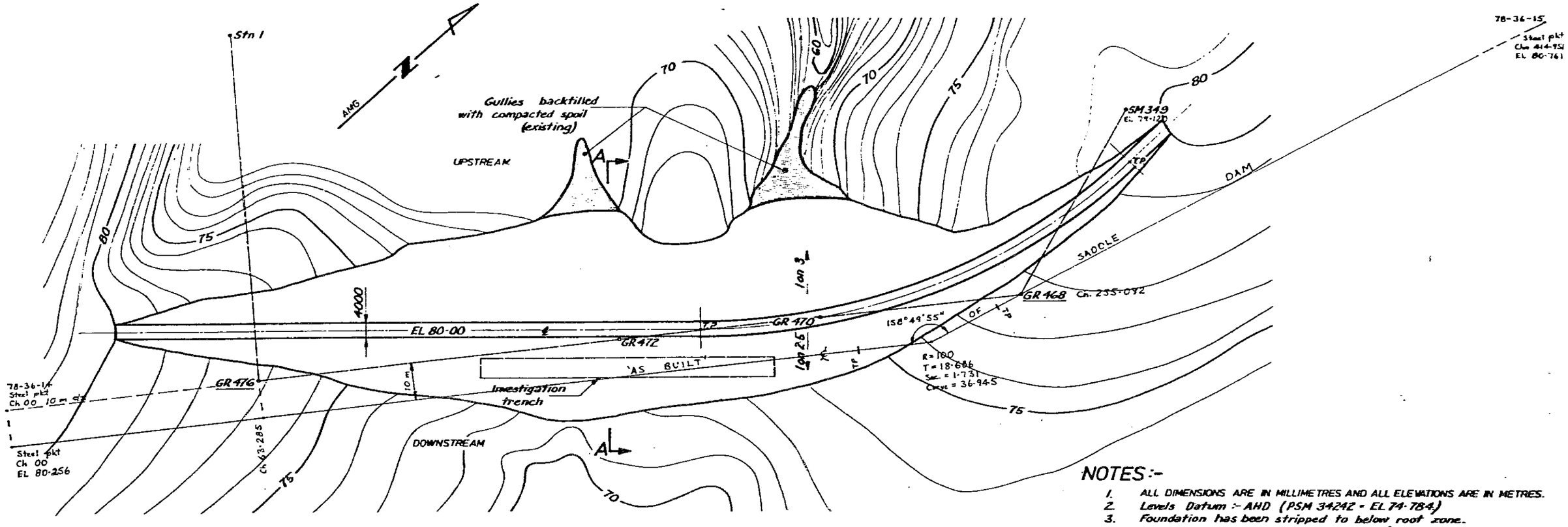
CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km – WIVENHOE DAM

LEFT BANK

SADDLE DAM Nº 1

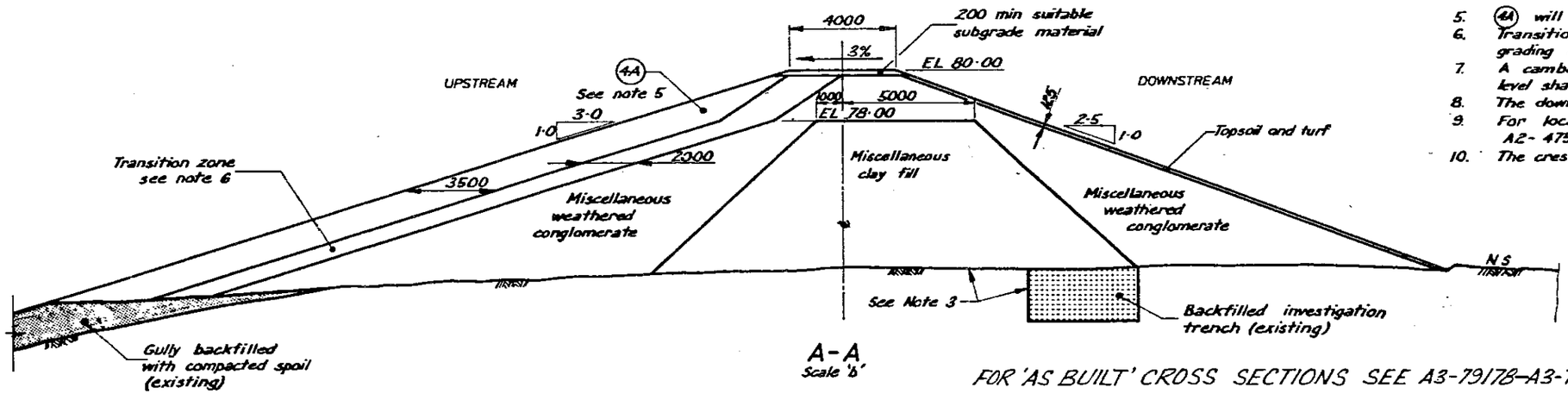
16-6-78 A1-53346 A W B



PLAN
Scale 'a'

NOTES :-

1. ALL DIMENSIONS ARE IN MILLIMETRES AND ALL ELEVATIONS ARE IN METRES.
2. Levels Datum :- AHD (PSM 3424Z - EL 74·784)
3. Foundation has been stripped to below root zone.
4. Miscellaneous fill may consist of relatively impermeable clays and sandy clays and low shrinkage weathered conglomerates.
5. (4A) will be the same as rip rap of the main embankment.
6. Transition material shall be selected to be intermediate in grading between the miscellaneous fill and the rip rap.
7. A camber allowance of 1% of the height above foundation level shall be added to the crest EL of 80·00.
8. The downstream face is to be topsoiled and grassed.
9. For location of Saddle Dam see drawing A2-47529.
10. The crest is to be sloped to aid in drainage.



A-A
Scale 'b'

FOR 'AS BUILT' CROSS SECTIONS SEE A3-79178–A3-79193

AS BUILT
By
Chk'd
Date 31/10/85

Revision				
Oct '85	B	As Built		
4-11-79	W	Tender to working dwg		
9-5-79	A	Contract Number Amended	M.J.C.	
Date		Remarks	Chd	Pad

Drawing Schedule	
A2-47529	Location & Detail Locality Maps
A1-45979	Saddle Dam Site Nº 2. Contour Plan.

Scale 'a' 0 10 20 30 40 50 m (1:500 scale before reduction)

Scale 'b' 0 5000 10 000 mm (1:100 scale before reduction)

CONTRACT Nº 2120

IRRIGATION AND WATER SUPPLY COMMISSION

Design	Drafting	Recommended
Prep'd & M'C.	Dr	
Chd	Chd	Senior Engineer Designs
Supr	Supr	Approved
Submitted		
Executive Engineer		Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km - WIVENHOE DAM

LEFT BANK

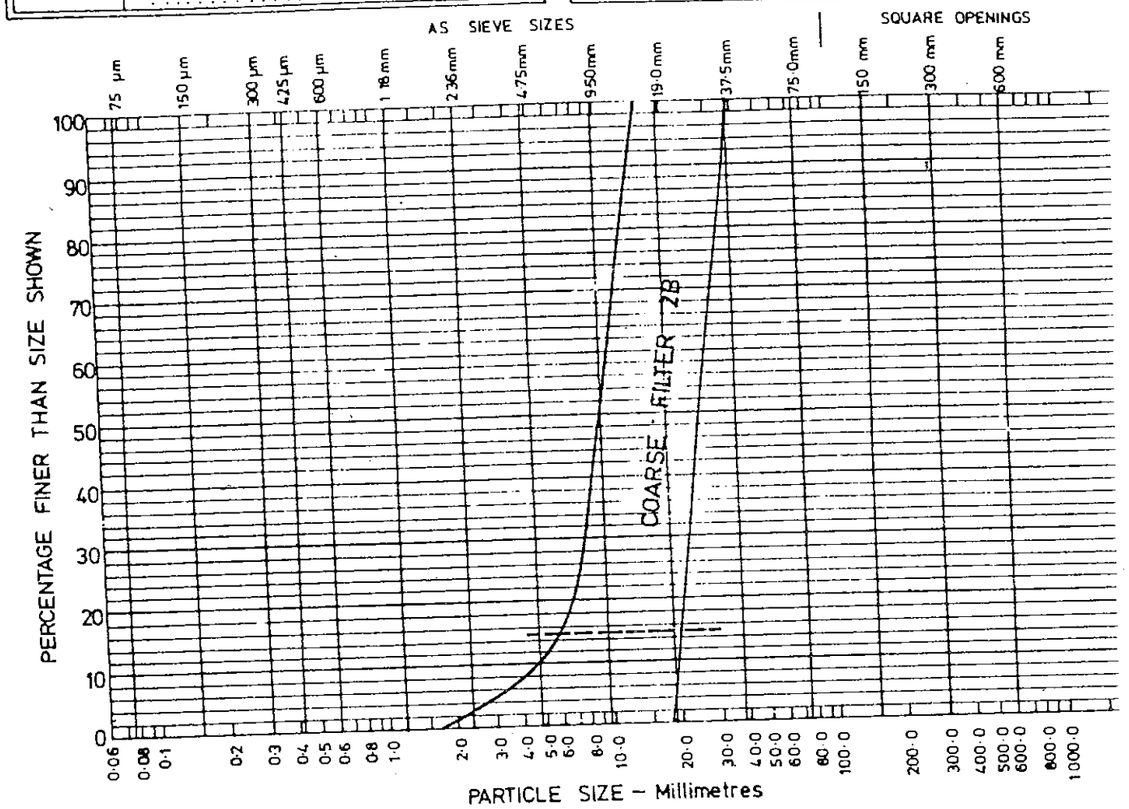
SADDLE DAM Nº 2

16-6-78 A1-53347 A W B

CLASSIFICATION OF ROCKFILL OR SOIL

PROJECT	WIVENHOE DAM
FEATURE	GRADING LIMITS FOR FILTERS
LOCATION	ZONE 2B

SAMPLE N°	
DESCRIPTION	UNIFORMITY REQUIREMENTS $\frac{D_{60}}{D_{10}} < 3$ $D_{15} > 5mm$

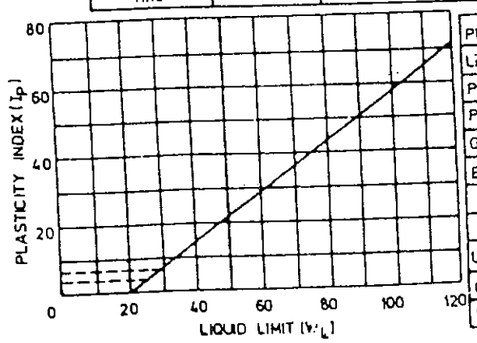


UNIFIED SOILS CLASSIFICATION

SAND			GRAVEL		COBBLES	BOULDERS
fine	medium	coarse	fine	coarse		

AS – A 89

SAND			GRAVEL			COBBLES
fine	medium	coarse	fine	medium	coarse	



PLASTICITY		
Liquid Limit (W_L)		
Plastic Limit (W_P)		
Plasticity Index (Ip)		
GRADATION		
Effect Size D 10	mm	
D 30	mm	
D 60	mm	
Uniformity Coefficient		
Coefficient of Curvature		
LINEAR SHRINKAGE	%	

APPARENT SPECIFIC GRAVITY	
Passing 2·36 mm	
Retained 2·36 mm	
Retained mm	
INSITU MOISTURE	
INSITU DRY DENSITY	kg
DISPERSION	
River Water	
Distilled Water	
PRETREATMENT	
COLOUR	

Remarks .....

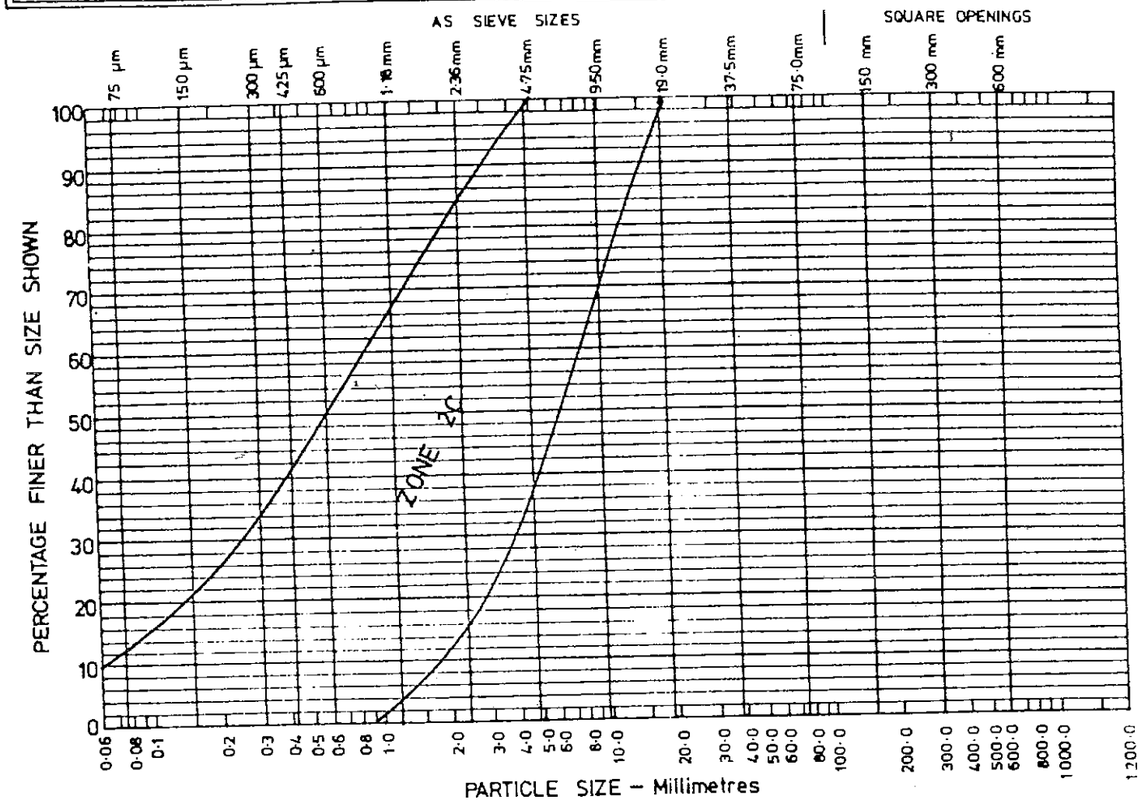
Prepared by ..... / /	Checked by ..... 8 / 8 / 77	Sheet 1 of
		Job No .....

IRRIGATION AND WATER SUPPLY COMMISSION
QUEENSLAND

CLASSIFICATION OF ROCKFILL OR SOIL

PROJECT	WIVENHOE DAM
FEATURE	GRADING LIMITS FOR FILTERS
LOCATION	ZONE 2C

SAMPLE N°	
DESCRIPTION	

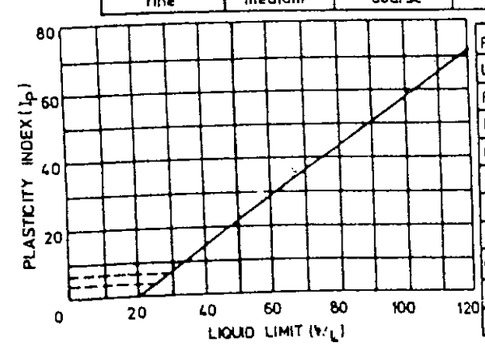


UNIFIED SOILS CLASSIFICATION

SAND			GRAVEL		COBBLES	BOULDERS
fine	medium	coarse	fine	coarse		

AS – A 89

SAND			GRAVEL			COBBLES
fine	medium	coarse	fine	medium	coarse	



PLASTICITY		
Liquid Limit (W_L)		
Plastic Limit (W_P)		
Plasticity Index (I_P)		
GRADATION		
Effect Size D 10	mm	
D 30	mm	
D 60	mm	
Uniformity Coefficient		
Coefficient of Curvature		
LINEAR SHRINKAGE	%	

APPARENT SPECIFIC GRAVITY	
Passing 2·36 mm	
Retained 2·36 mm	
Retained mm	
INSITU MOISTURE	%
INSITU DRY DENSITY	kg/m³
DISPERSION	
River Water	
Distilled Water	
PRETREATMENT	
COLOUR	

Remarks .....

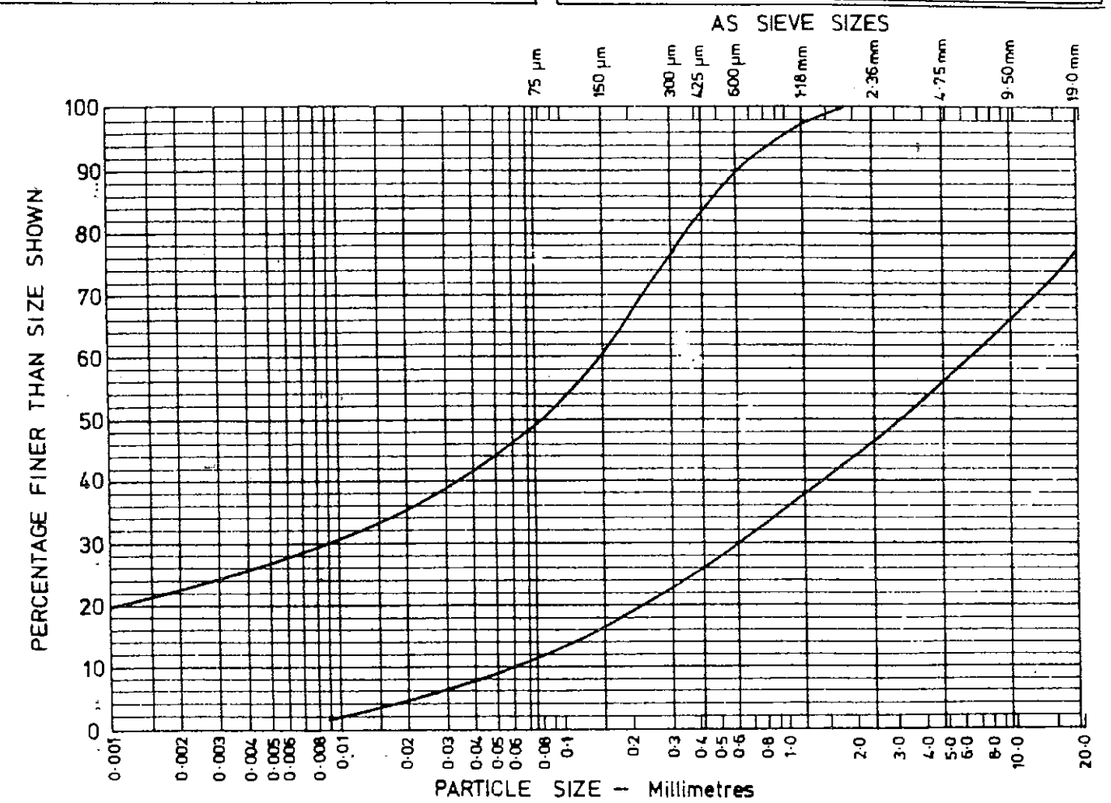
Prepared by	Checked by	Sheet 1 of

IRRIGATION AND WATER SUPPLY COMMISSION
QUEENSLAND

SOIL CLASSIFICATION

PROJECT	WIVENHOE DAM
FEATURE	GRADING LIMITS FOR
LOCATION	ZONE 2E

SAMPLE N°	
DESCRIPTION	

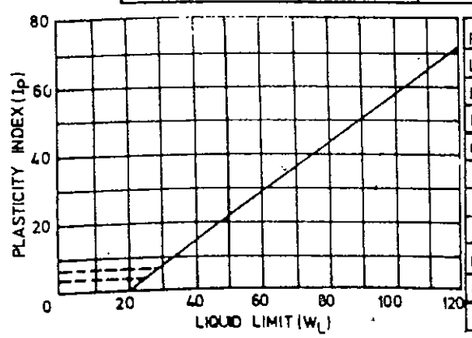


UNIFIED SOILS CLASSIFICATION

CLAY AND SILT	SAND			GRAVEL
	fine	medium	coarse	fine

AS – A89

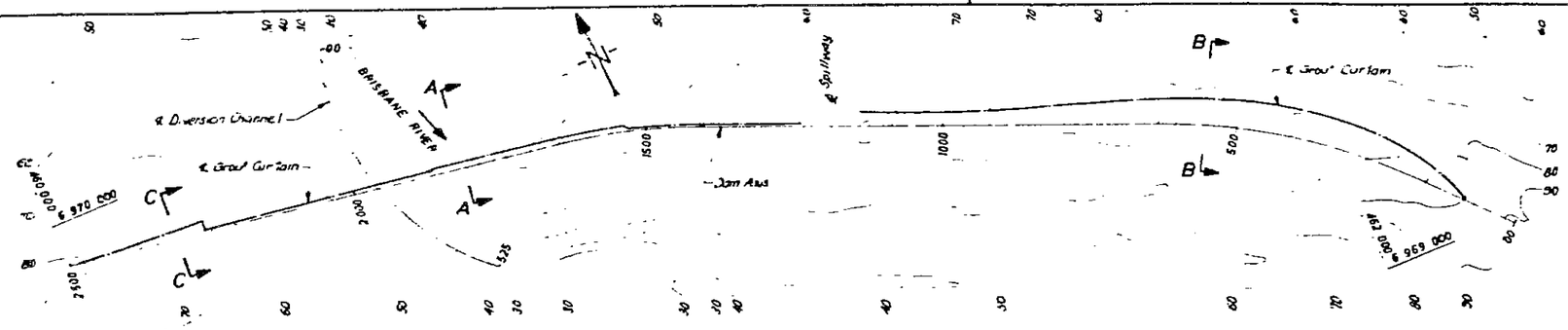
CLAY	SILT			SAND			GRAVEL	
	fine	medium	coarse	fine	medium	coarse	fine	medium



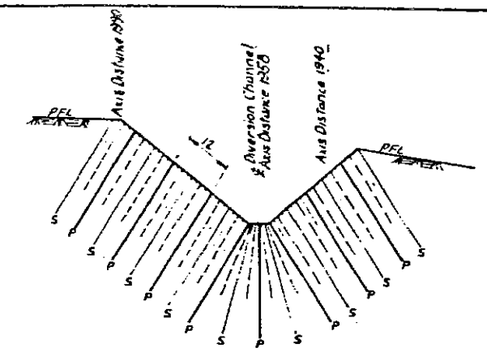
PLASTICITY		APPARENT SPECIFIC GRAVITY	
Liquid Limit (W_L)		Passing 2·36 mm	
Plastic Limit (Wp)		Retained 2·36 mm	
Plasticity Index (Ip)		LINEAR SHRINKAGE	%
GRADATION		INSITU MOISTURE	%
Effect Size D 10	mm	DISPERSION	
D 30	mm	River Water	
D 60	mm	Distilled Water	
Uniformity Coefficient		ACTIVITY	
Coefficient of Curvature		PRETREATMENT	
MAX PARTICLE SIZE	mm	COLOUR	

Remarks .....

Prepared by	Checked by R. J. McC	Sheet 1 of

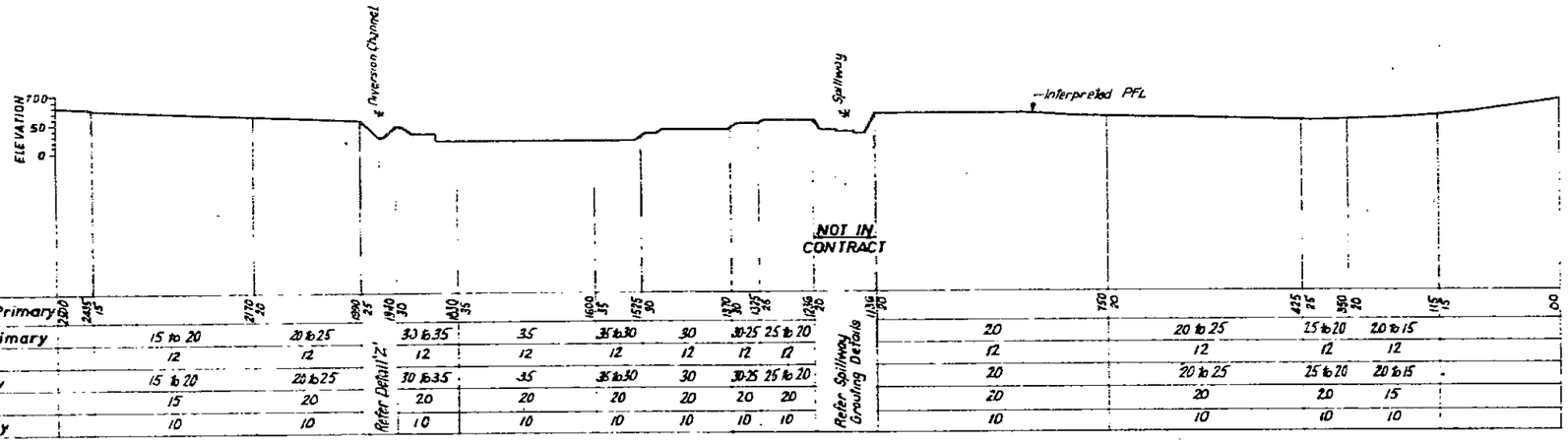


PLAN
Scale 'a'

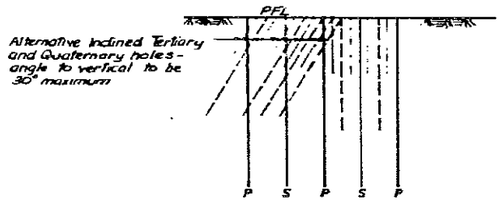


NOTE:-
1. Primary holes at 12 metre spacing.
2. Minimum number of holes in bed of channel is to be 3
3. Primary depth = 30; Secondary depth = 30; Tertiary depth = 20, Quaternary depth = 10.
4. Holes up slope inclined at 30° to the vertical

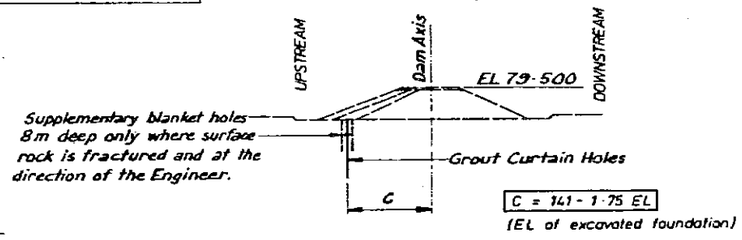
DETAIL Z
(Adjoining vertical holes omitted for convenience).
Scale 'b'



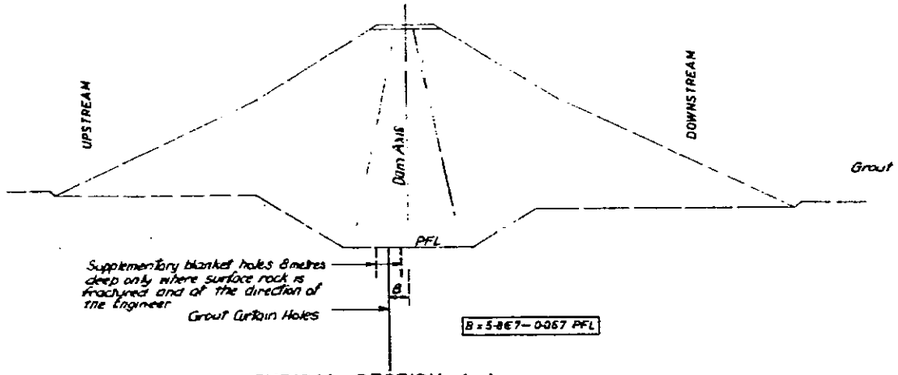
LONGITUDINAL SECTION ON ℄ GROUT CURTAIN
(LOOKING UPSTREAM)
Scale 'a'



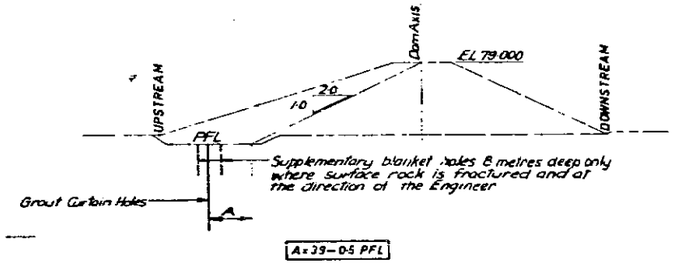
TYPICAL HOLE LAYOUT OF CURTAIN
Not to scale



TYPICAL SECTION C-C
(Distance 2260 to 2435)



TYPICAL SECTION A-A
(Distance 1236 to 2260)
Scale 'b'



TYPICAL SECTION B-B
(Distance 115 to 1136)
Scale 'b'

AS BUILT
By F. Hinchcliffe
Class Senior Eng II
Date 11/11/83

NOTES:-
1. ALL DIMENSIONS AND ELEVATIONS ARE IN METRES.
2. Levels Datum :- AHD (PSM 34242 = EL 74·784)
3. Hole depths shown are nominal and may be varied at the discretion of the Engineer in the light of pressure tests and the requirements of the specification.
4. Cleanup of the foundation before grouting will have been performed by other contractors, but the Grouting Contractors may be required to clean up sections for a distance 3m upstream and 3m downstream by air and water jetting where rock joints have subsequently become obscured.
5. PFL means Plan Foundation Line or Level.

For grouting results see key plan of drawings A1-57686

Revision				
Oct 85	D	As Built		
2-3-78	C	Section C-C added.		
2-3-77	B	Contract No amended	RL	AH
20-2-77	A	Note 5 out, Notes 4 amended		AH
Date		Remarks	Chd	Rsd

Drawing Schedule	
A2-47529	Locality Plan.
A1-45402	Plan of Area.
A1-47502	Centreline Survey of Axis and Spillway

Scale 'a' 0 100 200 300 400 500 m (1:5000 Scale Before Reduction)

Scale 'b' 0 10 20 30 40 50m (1:750 Scale Before Reduction)

CONTRACT No 2108

IRRIGATION AND WATER SUPPLY COMMISSION

Design	Drafting	Recommended
Prep	Dr JCS	R. Russo.
Chd	Chd RL	Senior Engineer Designs
Sup	Supv	Approved
Submitted		
Executive Engineer		Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km - WIVENHOE DAM
FOUNDATION GROUTING
ARRANGEMENT & DETAILS

4-11-76 | A1-45411 | A | B | C | D

BRISBANE RIVER

A1-57706 WD-A1-204
A1-57705 WD-A1-203
A1-57704 WD-A1-202
A1-57703 WD-A1-201
A1-57702 WD-A1-126
A1-57701 WD-A1-150
A1-57700 WD-A1-149
A1-57699 WD-A1-110
A1-57698 WD-A1-144
A1-57697 WD-A1-148
A1-57696 WD-A1-230
A1-57695 WD-A1-229
A1-57694 WD-A1-228
A1-57693 WD-A1-227
A1-57692 WD-A1-226
A1-57691 WD-A1-221
A1-57690 WD-A1-216
A1-57689 WD-A1-211
A1-57688 WD-A1-219
A1-57687 WD-A1-220

Diversion channel

toe of embankment

SPILLWAY

For check grouting of diversion channel see A1-79BC5 – A1-79BC7

REMEDIAL FOUNDATIONS GROUTING approx. chn. 1865 see Drg. A1-57707 WD-A1-208

For spillway see A1-57708, A1-57709 & A1-57710.

For Mono. LH10 & LH11 see A1-79BC8 & A1-79BC9

EMBANKMENT DISTANCES

COINCIDENT POINT

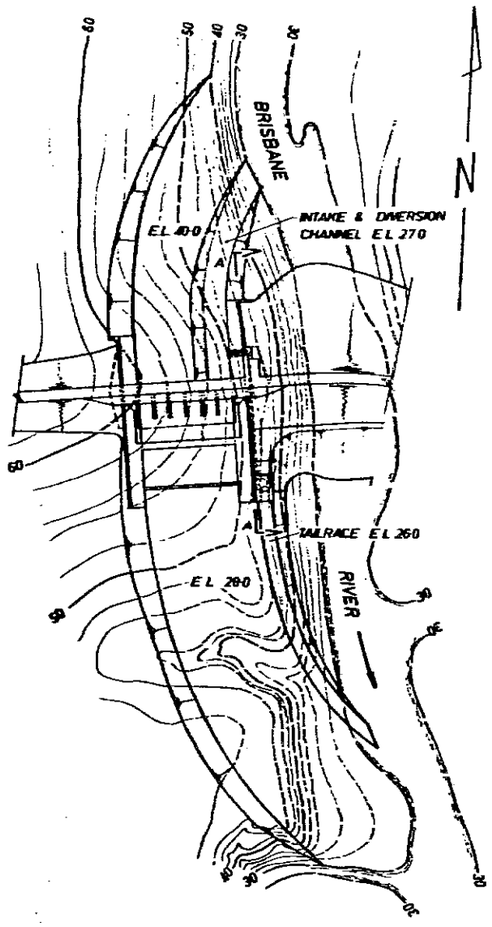
ADOPTED GROUT LINE DISTANCES

AS BUILT
By
Cast
Date 21.4.85

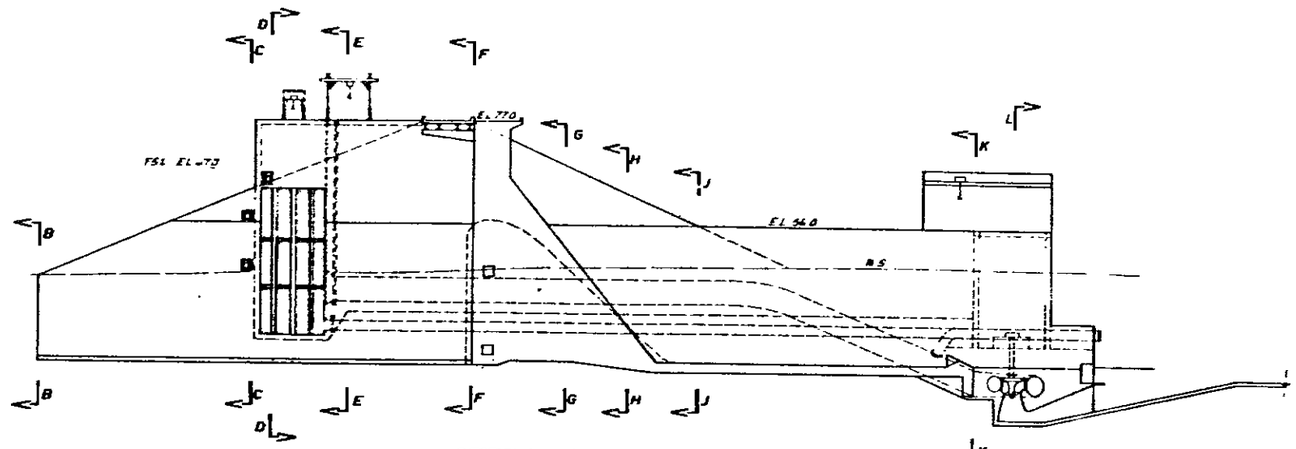
Scale 100 50 0 50 100 150 200 Metres 1:3000	QUEENSLAND WATER RESOURCES COMMISSION			CO-ORDINATOR GENERAL'S DEPARTMENT	
	Design	Drafting	Recommended	WIVENHOE DAM FOUNDATION GROUTING KEY PLAN OF DRAWINGS	
	Prep.	Dr C.P. Page			
	Ckd	Ckd			
	Supv.	Supv	Approved		
	Submitted			3-5-79	A1-57686
					A1-WD-239

INS. 1 0 2 4 6 8 10

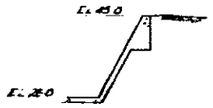
CM. 1 0 2 4 6 8 10 20 30



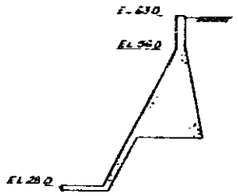
PLAN OF SPILLWAY AREA
Scale 'a'



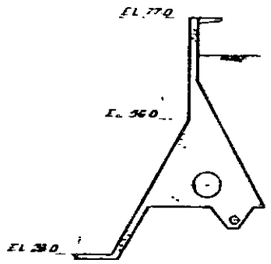
SECTIONAL ELEVATION A-A
Scale 'b'



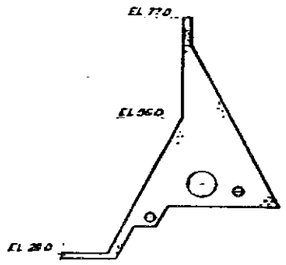
SECTION B-B
Scale 'b'



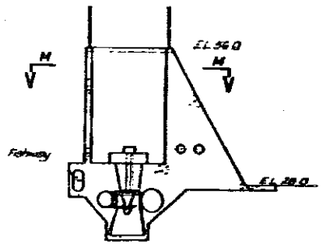
SECTION C-C
Scale 'b'



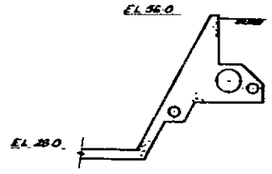
SECTION E-E
Scale 'b'



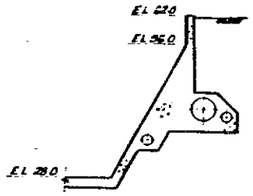
SECTION F-F



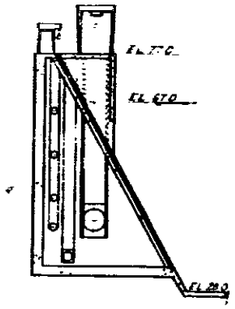
SECTION L-L
Scale 'b'



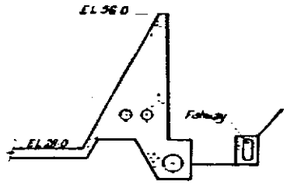
SECTION J-J
Scale 'b'



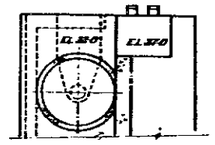
SECTION H-H
Scale 'b'



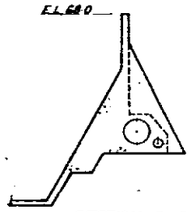
SECTION D-D
Scale 'b'



SECTION K-K
Scale 'b'



SECTION M-M
Scale 'b'



SECTION G-G
Scale 'b'

Title changed 5-8-75

Amendment				Drawing Schedule
Date	Remarks	Chd	Pad	

Scale 'a' 0 50 100 150 200 m (1:2500 before reduction)

Scale 'b' 0 10 20 30 40 50m (1:500 before reduction)

Design	Drawing
Pres	Dr
Chd	Chd
Supv	Serv
Submitted	
Senior Engineer	

Recommended

Senior Engineer Design

Approved

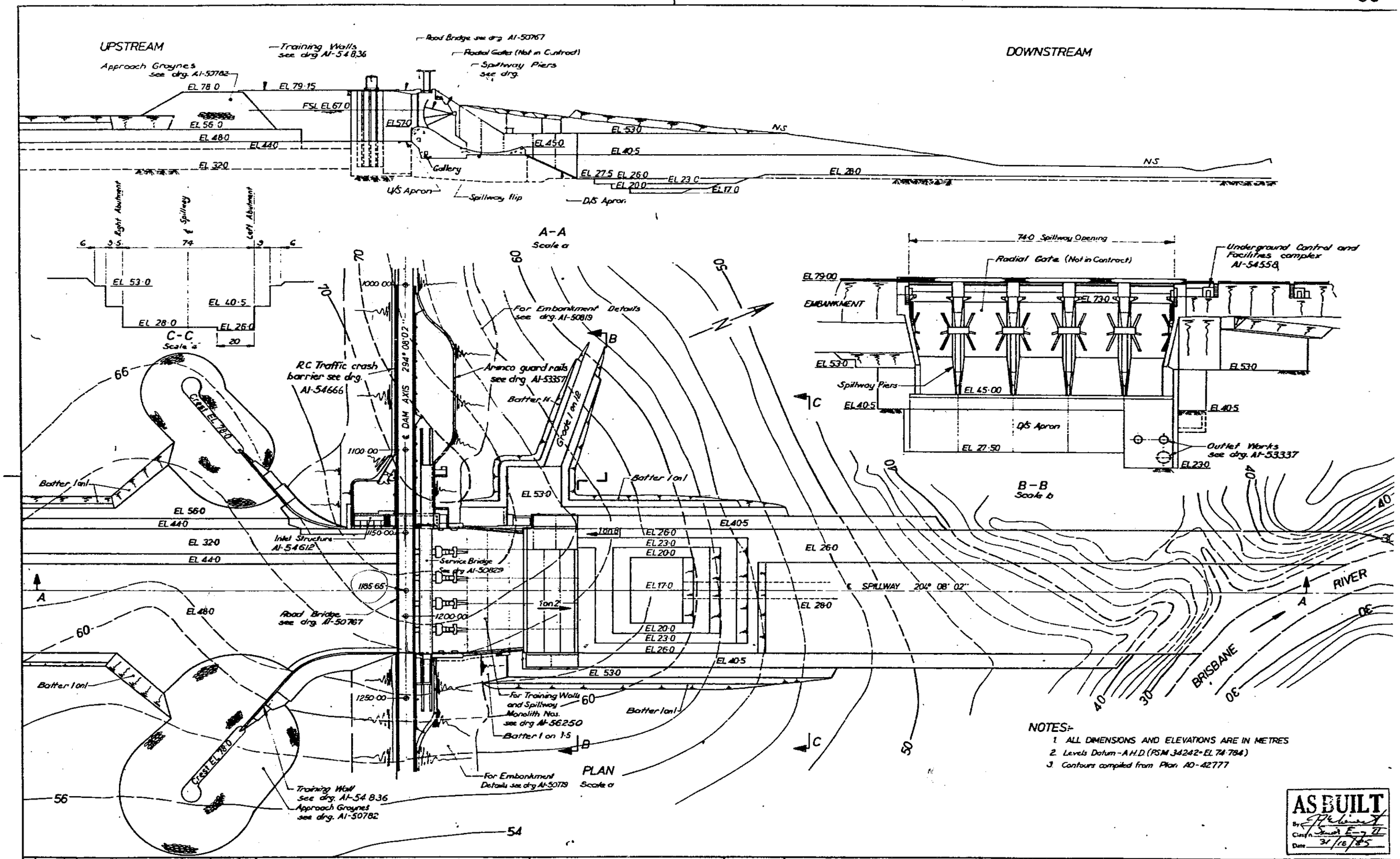
Chief Engineer Design

IRRIGATION AND WATER SUPPLY COMMISSION

WIVENHOE DAM
PRELIMINARY DESIGN PROPOSAL '2'
ALTERNATIVE LAYOUT OF SPILLWAY

DB 1904

FIG 11



Revision				
Oct '85	C	As Built		
20-5-79	W	Tender to Working Drg		
26-2-79	B	Groyne layout amended	M.J.C.	
13-10-78	A	D/S dissipator excavation amended		
Date		Remarks	Ckd	Psd

Drawing Schedule	
A1-54836	Sway Training Walls - Layout & Key to Monos
A1-50782	Approach Groynes - Arrgt & Details
A1-50767	Road Bridge - General Arrangement
A1-50829	Service Bridge - General Arrangement
A1-56250	S'way - Key to Working Drawings
A1-50795	Spillway - Third Stage Construction Excavation Details
A1-50820	Third Stage Const - Embankment Area Plan

Scale a 0 — 50m (1:1000)

Scale b 0 — 10 — 20 — 30 (1 : 500)

(Scales Before Reduction)

CONTRACT Nº 2120

IRRIGATION AND WATER SUPPLY COMMISSION

Design	Drafting
Prep'd	Dr DR
Ckd	Ckd
Supv	Supv
Submitted	

Senior Engineer Designs

Recommended

Act. Chief Designing Engineer

Approved

Commissioner 14.6.78

CO-ORDINATOR GENERAL'S DEPARTMENT

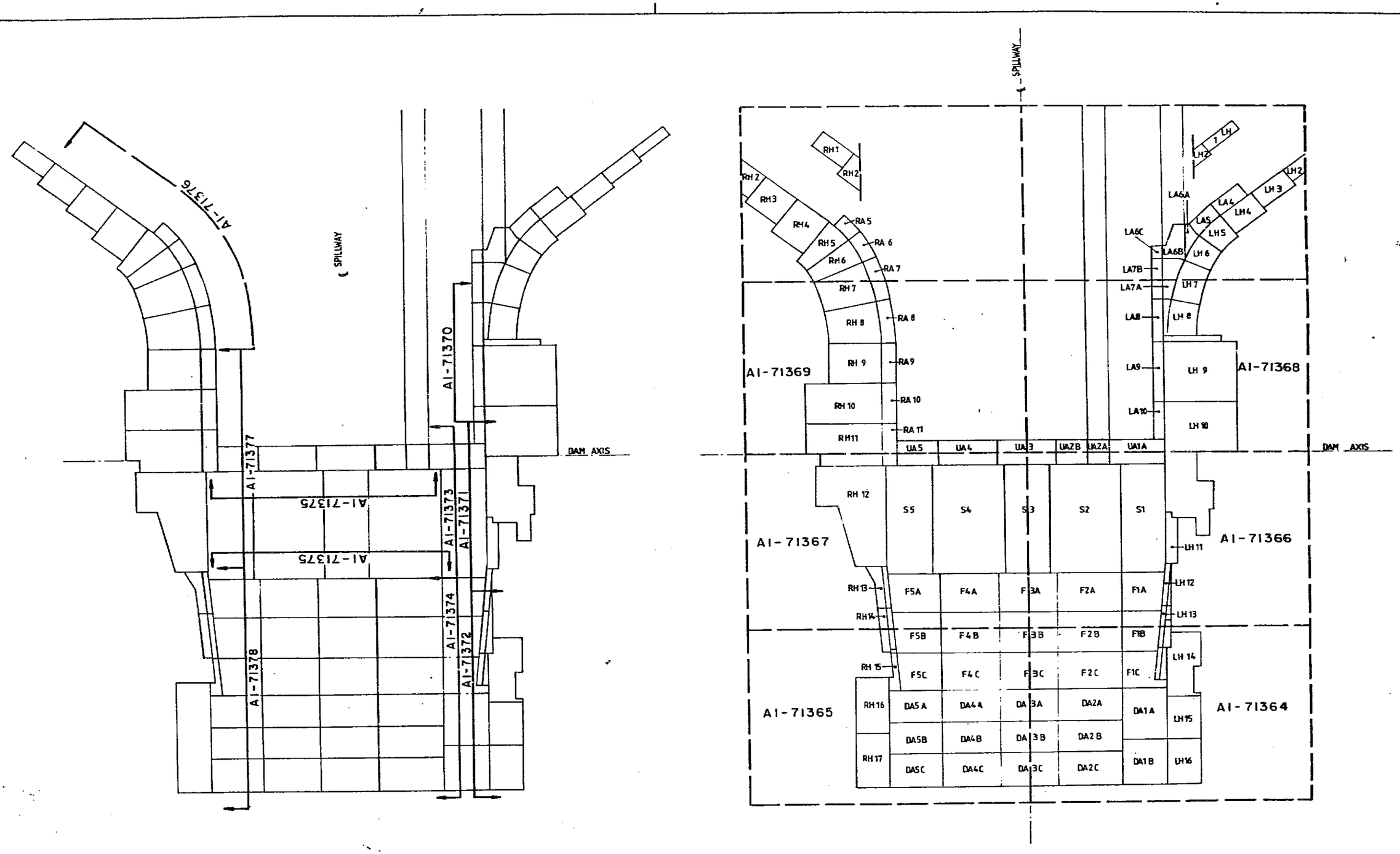
16.6.78 Co-ordinator General

BRISBANE RIVER 150·2 km - WIVENHOE DAM

SPILLWAY

GENERAL ARRANGEMENT

16-6-78 | A1-50771 | A | B | W | C



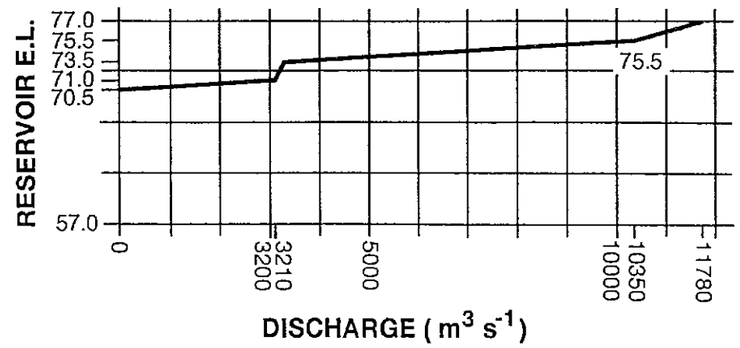
NOTE
1) Azimuth Datum AMG.
2)

Scale
10 5 0 10 20 30 40 50 metres

Revision | Date | Remarks | Chd | Pad | Survey Basis

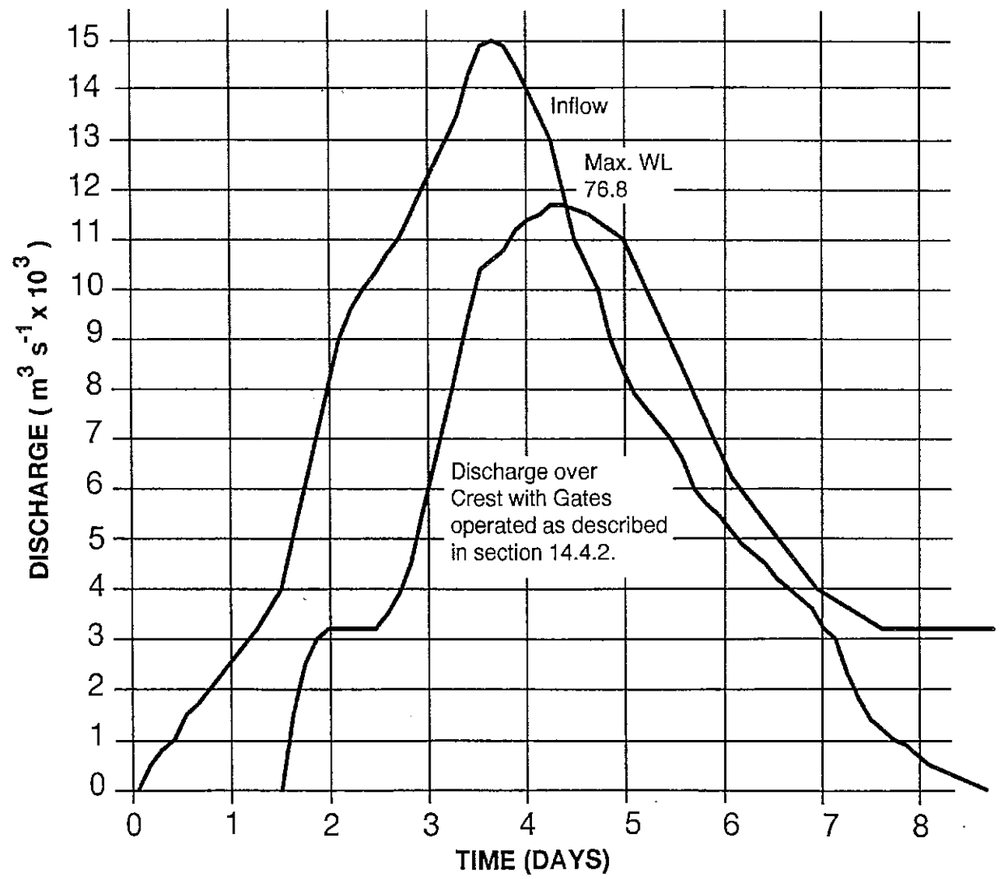
Drafting: Dr, Chd, Supv
Submitted
Recommended
Approved GW Eade 17/7/85

QUEENSLAND WATER RESOURCES COMMISSION
BRISBANE RIVER 150·2km - WIVENHOE DAM
KEY PLAN
GEOLOGICAL PLANS AND SECTIONS
AI-71363

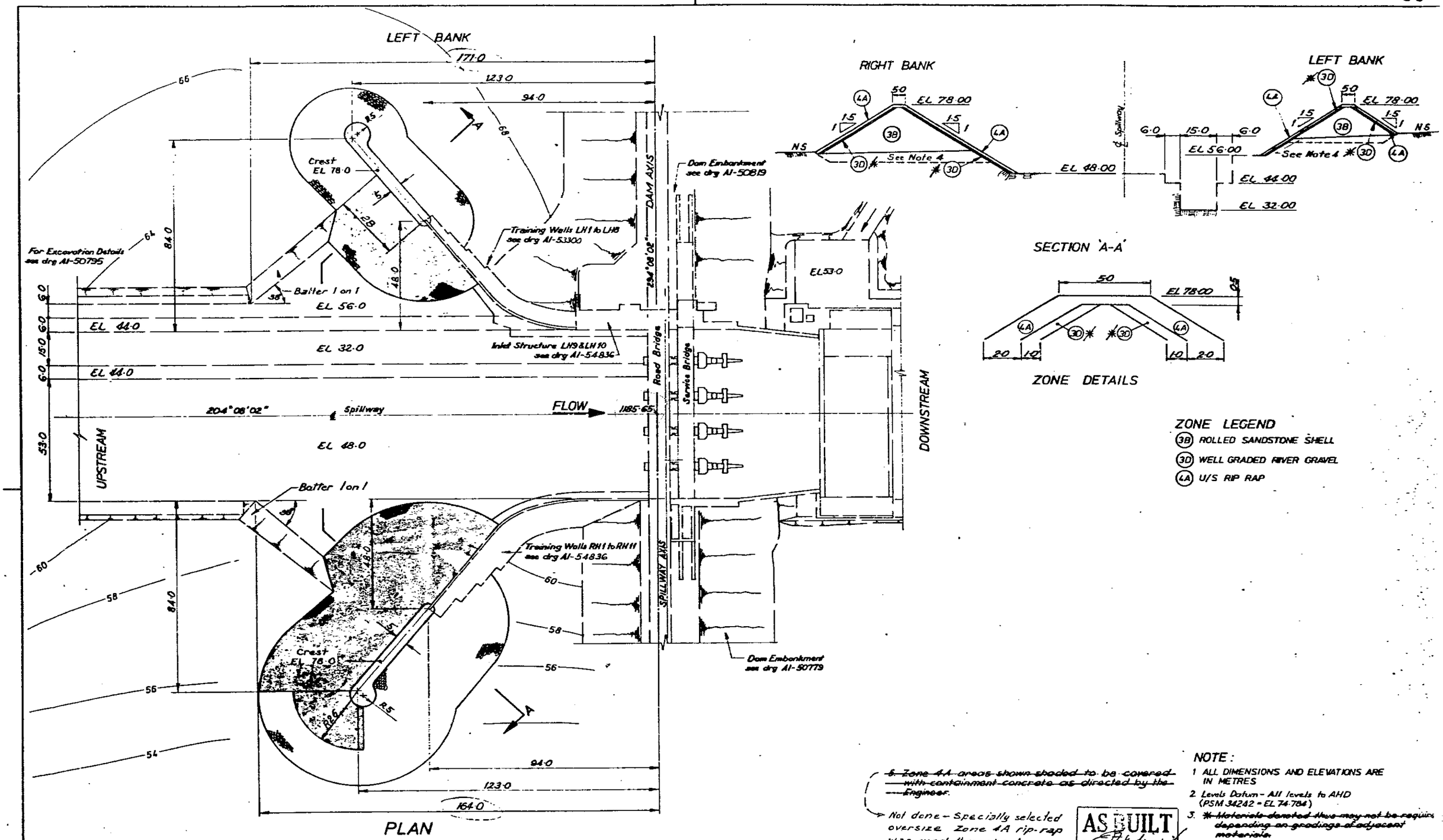


DISCHARGE FROM WIVENHOE DAM FOR PROBABLE MAXIMUM FLOOD UNDER WORST SET OF CONDITIONS.

(i) F.S.L. is 68.5m to allow for possible future expansion to cater for increased demands.
(ii) Complete break in communications between the dam and the control centre.
(iii) 5 gates operative.



Maximum probable inflow flood hydrograph to Wivenhoe Dam



NOTE :

1. ALL DIMENSIONS AND ELEVATIONS ARE IN METRES
2. Levels Datum – All levels to AHD (PSM 34242 = EL 74·784)
3. ~~* Materials denoted thus may not be required depending on gradings of adjacent materials.~~
4. To be excavated to suitable foundation level as determined by the Engineer.

~~5. Zone 4A areas shown shaded to be covered with containment concrete as directed by the Engineer.~~

Not done – Specially selected oversize Zone 4A rip-rap was used throughout.

AS BUILT
By
Class Design Eng II
Date 31/10/85

Revision			
Oct '85	C	As Built	
21·1·80	B	Plan amended	
1·5·79	A	Amended to Working drg	
1·5·79	A	General Amendments	
Date		Remarks	

195	Spillway-Third Stage Construction-Excavation Details
4836	Training Walls - Layout and Key to Monos

Scale 0 40m 80m (1:750 Scale Before Reduction)

CONTRACT Nº 2120

IRRIGATION AND WATER SUPPLY COMMISSION

Design	Drafting
Prep	Dr C.R.L. B.P. C.V.
Civil	Civil M.J.C.
Super	Super M.J.C.
Submitted	
Executive Engineer	

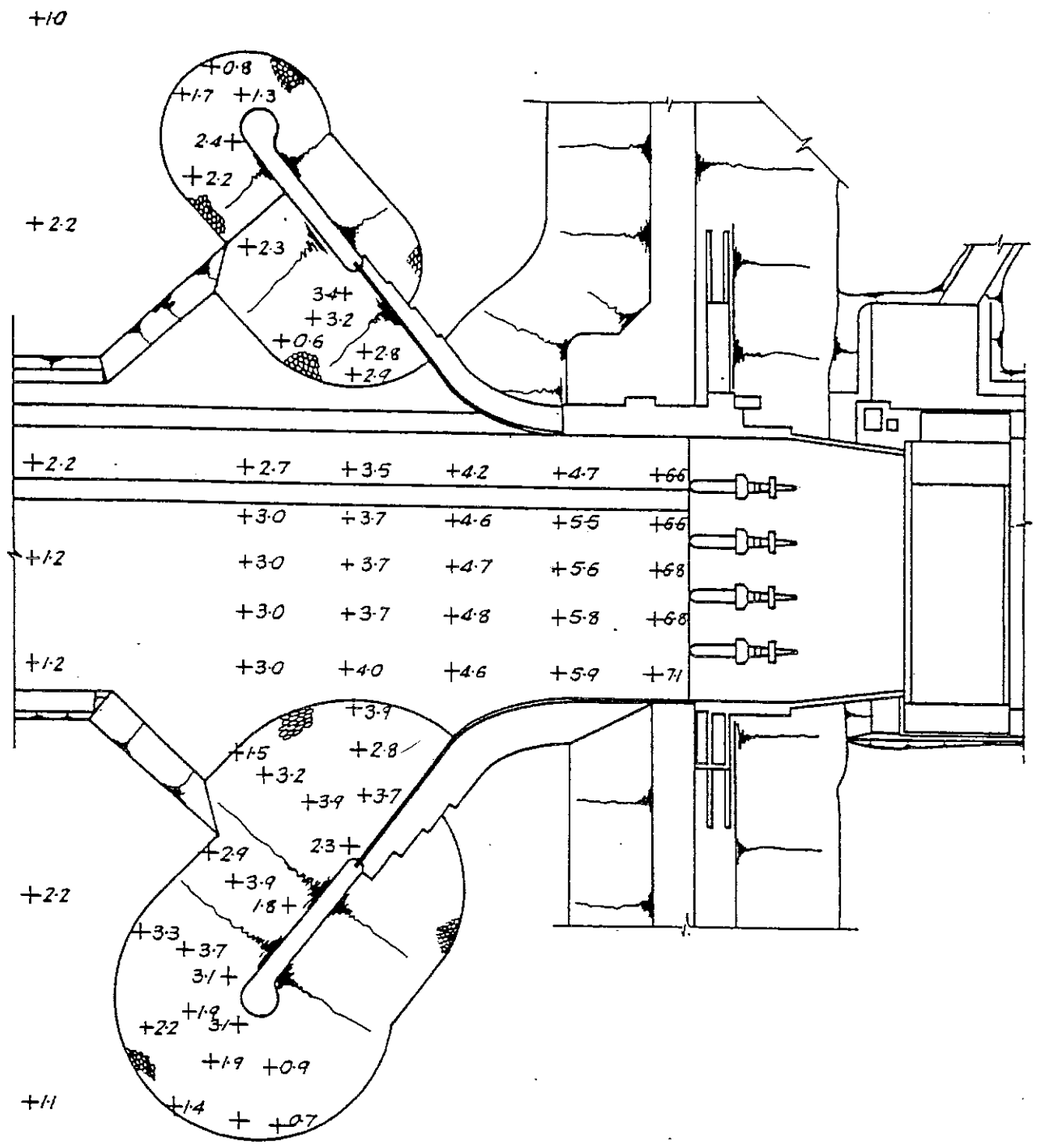
Recommended
Senior Engineer Designs
Approved
Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

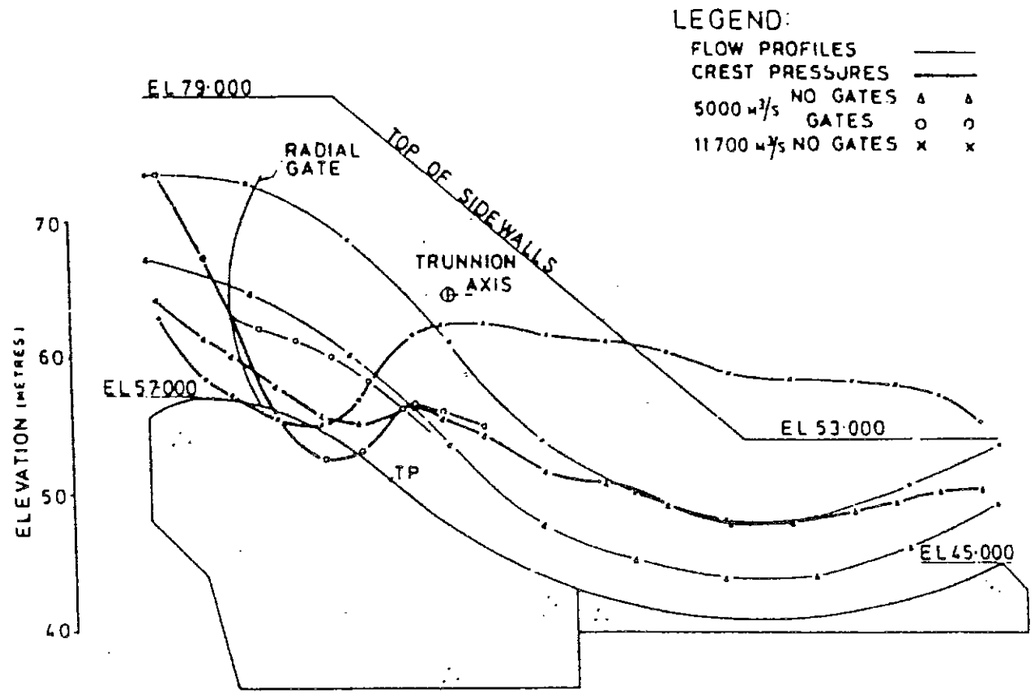
BRISBANE RIVER 150·2 km – WIVENHOE DAM
SPILLWAY WORKS AREA
APPROACH GROYNES

ARRANGEMENT AND DETAILS

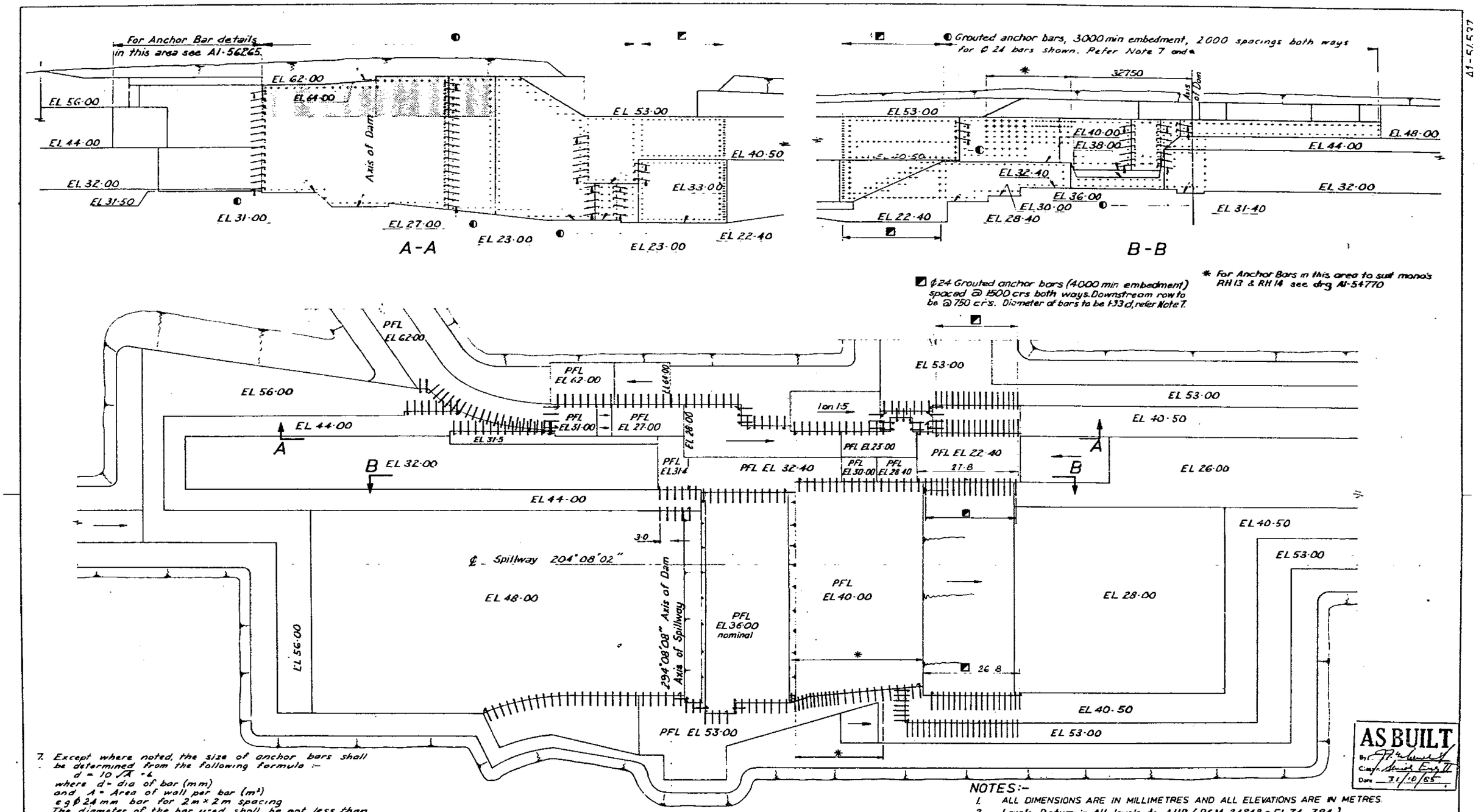
16-6-78 A1-50782 A W B C



SPILLWAY APPROACH VELOCITIES (m/s) FOR PROBABLE MAXIMUM FLOOD



WIVENHOE DAM
SPILLWAY CREST PRESSURES
AND FLOW PROFILES



7. Except where noted, the size of anchor bars shall be determined from the following formula :-
$d = 10\sqrt{A} + 4$
where d = dia of bar (mm)
and A = Area of wall per bar (m^2)
e.g. ϕ 24 mm bar for 2m × 2m spacing
The diameter of the bar used shall be not less than 0·95 times the diameter of the bar required.
The maximum spacing of bars shall be 3 m

AS BUILT
By: [illegible]
Chg: Asst Eng II
Date: 31/10/85

NOTES:-
1. ALL DIMENSIONS ARE IN MILLIMETRES AND ALL ELEVATIONS ARE IN METRES.
2. Levels Datum :- All levels to AHD (PSM 34242 = EL 74·784.)
3. All grouted anchor bars to be Cold-Worked Deformed Bars (410C) to AS 1302-1977.
4. Min. edge distance to all anchor bars to be 1000.
5. Anchor Bars in area shown shaded ▒ to EL 53·00 are existing.
6. For Details of grouted Anchor Bars see Drg A1-50788.

Revision				
Oct '85	C	As Built		
5·11·79	B	Anchor bars LH6, LH7 & LH8 amended	M.J.C.	
3·9·79	W	Tender drg to Working drg	M.J.C.	
8/5/79	A	Qty Sheets of Anchor Bars amended, contract N° amended Anchor Bars * R/B amended		
Date		Remarks	Ckd	Psd

Drawing Schedule	
A1-56265	LH6, 7 & 8 - Grouted Anchor Bars.
A1-54770	Grouted Anchor Bars, slab & walls @ RH13, RH14
A1-54536	Grouted Anchor Bars for Slab
A1-50788	Grouted Anchor Bars
A1-49863	Spillway - Excavation Details-Stage I Sh 1

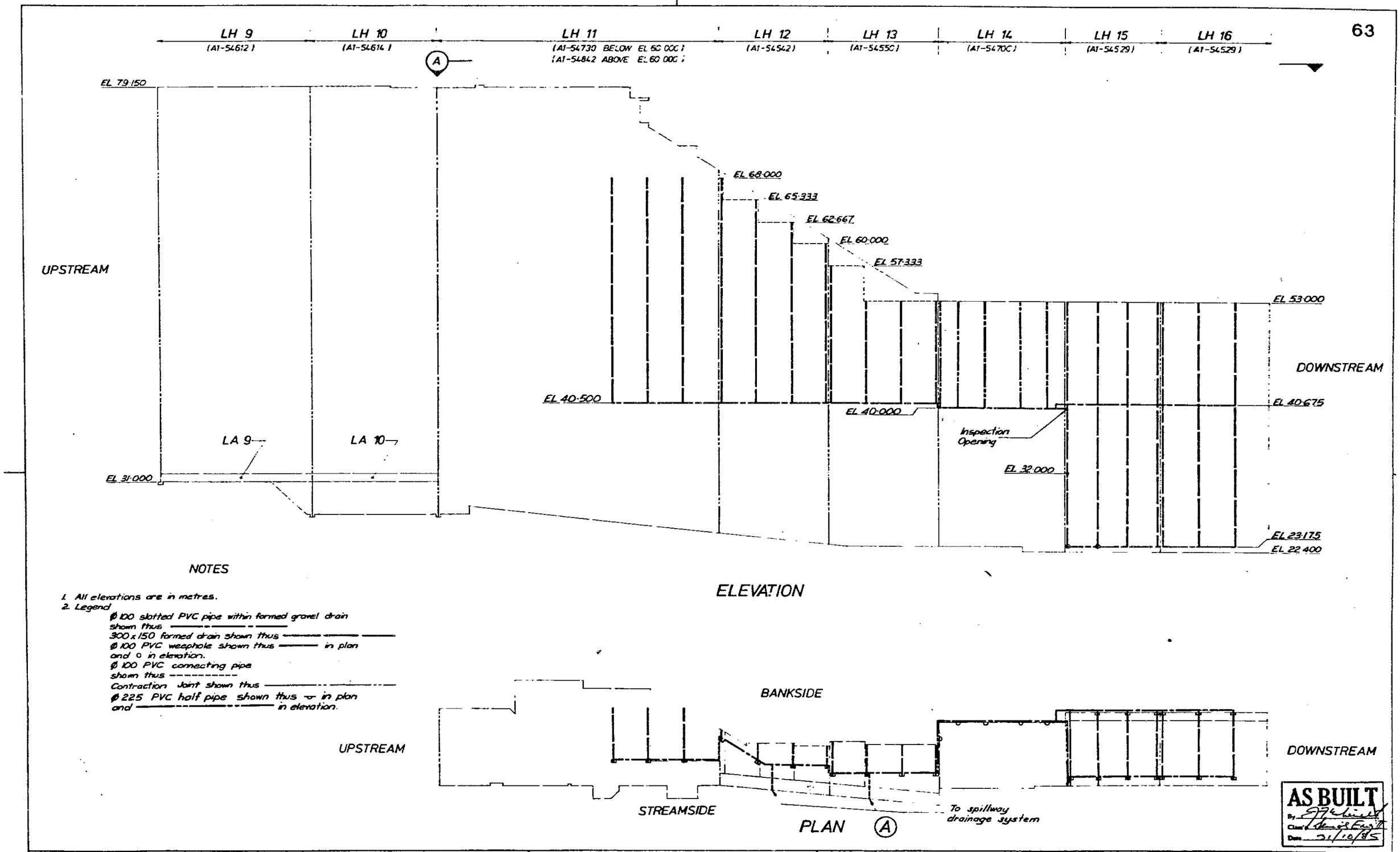
0 10 20 30 40 50 m
(1:500 scale before reduction)

CONTRACT N° 2120

IRRIGATION AND WATER SUPPLY COMMISSION		
Design	Drafting	Recommended
Prep	Dr	
Ckd	Ckd M.J.C.	Senior Engineer Designs
Supv	Supv	
Submitted		
Executive Engineer		A/Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT
BRISBANE RIVER 150·2 km - WIVENHOE DAM
THIRD STAGE CONSTRUCTION
SPILLWAY
GROUTED ANCHOR BARS FOR WALLS
17-10-78 A1-54537 A W B C

INS. 1 0 2 4 6 8 10



NOTES

1. All elevations are in metres.
2. Legend
   - Ø 100 slotted PVC pipe within formed gravel drain shown thus
   - 300 x 150 formed drain shown thus
   - Ø 100 PVC weephole shown thus in plan and o in elevation.
   - Ø 100 PVC connecting pipe shown thus
   - Contraction Joint shown thus
   - Ø 225 PVC half pipe shown thus in plan and in elevation.

AS BUILT
By
Chief
Date 31/10/85

Revision					
Date		Remarks	Ckd	Psd	
Oct '85	A	As Built			

Drawing Schedule: A1-56197 Monos RH9 - RH17 - Drainage

Scale 1:200 0 5 10 15 20 m
(Scale before reduction)

CONTRACT Nº 2120

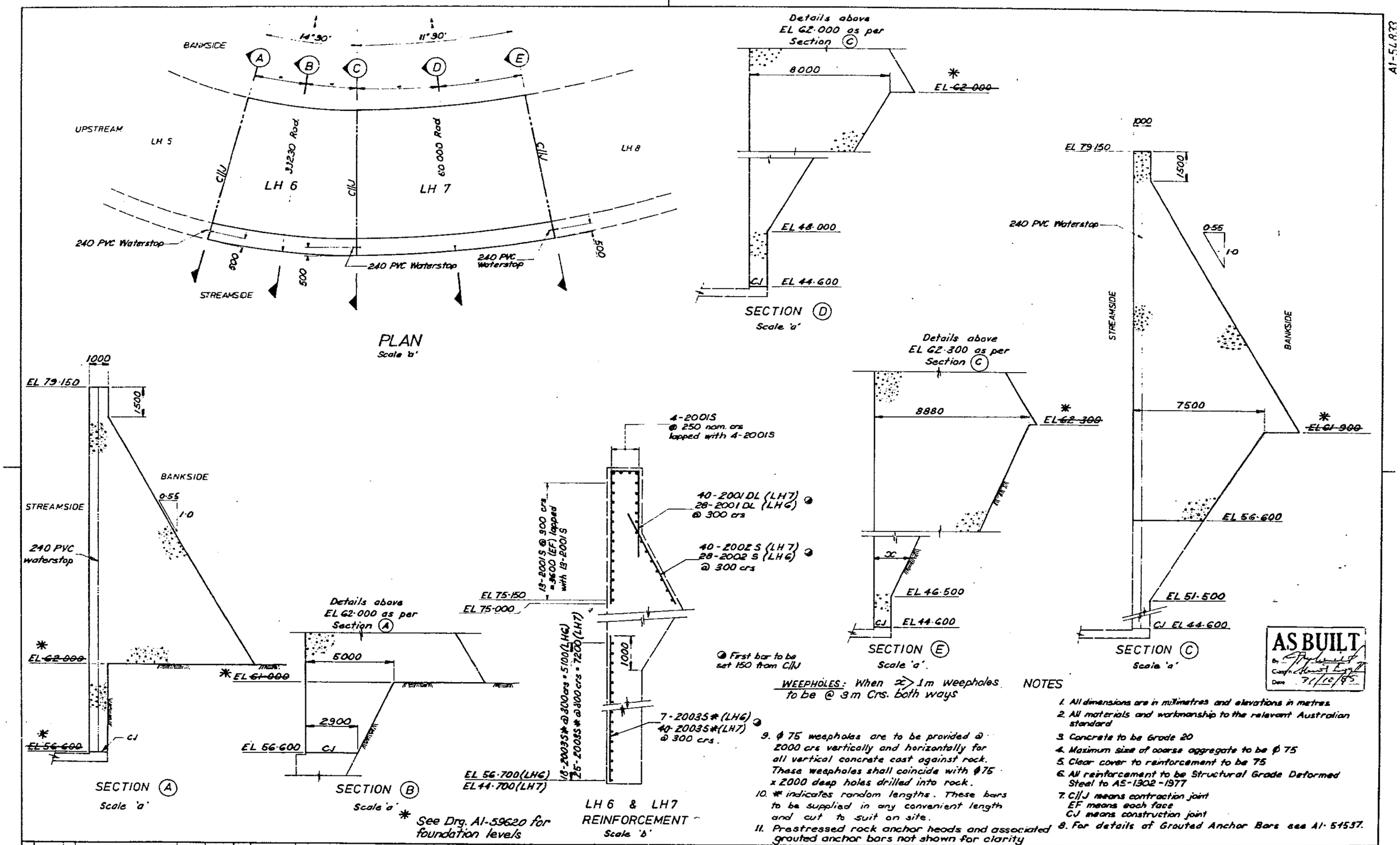
QUEENSLAND WATER RESOURCES COMMISSION

Design	Drafting	Recommended
Prep	Dr G.H.	
Ckd	Ckd GLG	Senior Engineer Designs
Supv	Supv M.J.C	Approved
Submitted		
Executive Engineer		Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km — WIVENHOE DAM
DRAINAGE BEHIND SPILLWAY RETAINING WALLS
MONOS LH9 – LH 16

4·1·80 | A1-56196 | A



NOTES

1. All dimensions are in millimetres and elevations in metres.
2. All materials and workmanship to the relevant Australian standard
3. Concrete to be Grade 20
4. Maximum size of coarse aggregate to be ϕ 75
5. Clear cover to reinforcement to be 75
6. All reinforcement to be Structural Grade Deformed Steel to AS-1302-1977
7. C/J means contraction joint
   EF means each face
   CJ means construction joint
8. For details of Grouted Anchor Bars see A1-54537.
9. ϕ 75 weepholes are to be provided @ 2000 crs vertically and horizontally for all vertical concrete cast against rock. These weepholes shall coincide with ϕ 75 x 2000 deep holes drilled into rock.
10. * indicates random lengths. These bars to be supplied in any convenient length and cut to suit on site.
11. Prestressed rock anchor heads and associated grouted anchor bars not shown for clarity

Revision			
Oct '85	A	As Built	
Date		Remarks	Ckd / Psd

Drawing Schedule	
A1-54836	Training Walls - Layout & Key to Monos
A1-56824	Standard Metric Reinforcing Bars
A3-54835	LH 7 Reinforcement Schedule
A3-54834	LH 6 Reinforcement Schedule

Scale 'b' 0 5 10 m
1:100 (Before Reduction)
Scale 'b' 0 1 2 3 4 5 m
1:50 (Before Reduction)

CONTRACT Nº 2120

IRRIGATION AND WATER SUPPLY COMMISSION

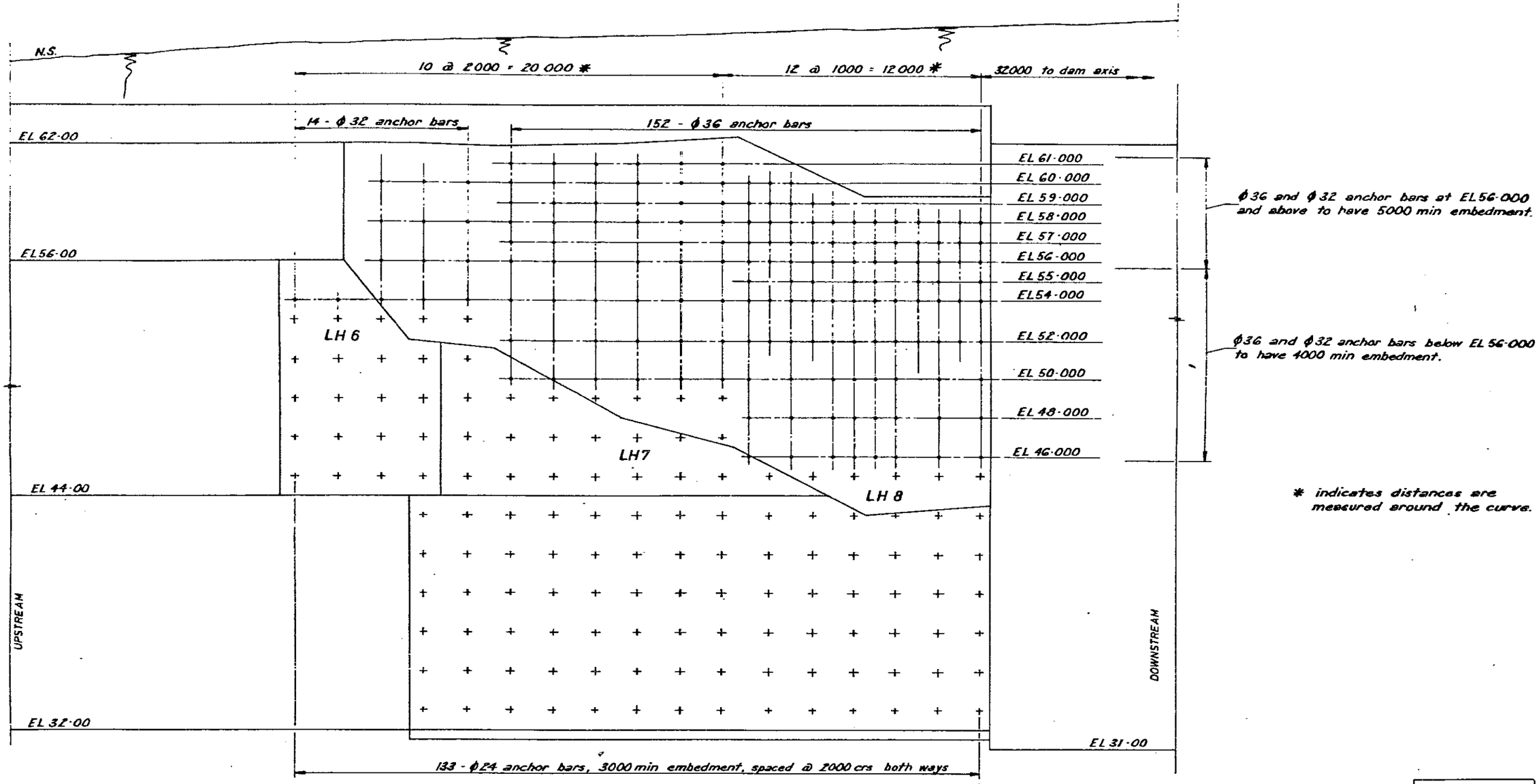
Design	Drafting	Recommended
Prep. P.J.H.	Dr G.H.	
Ckd	Ckd M.J.C.	Sewer Engineer Designs
Supv	Supv M.J.C.	Approved
Submitted		
Executive Engineer		Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km - WIVENHOE DAM
SPILLWAY TRAINING WALLS
MONOS LH 6 LH 7
CONCRETE AND REINFORCEMENT

12·12·79 | A1-54833 | A

INS. 0 2 4 6 8 10



ELEVATION

AS BUILT
By
Class
Date 31/10/85

NOTES:-

1. All dimensions are in millimetres and elevations in metres.
2. All materials and workmanship to the relevant Australian Standard.
3. All grouted anchor bars to be Cold Worked Deformed to AS 1302-1977.
4. ϕ 75 weepholes 2000 deep to be provided for LH6, 7 and 8 @ 2000 crs vertically and horizontally. These to be provided on all rock surfaces other than horizontal surfaces.
5. For locations of Prestressed Rock Anchors see A1-56087.

Revision					Drawing Schedule	
					A1-56087	Prestressed Rock Anchors.
					A1-54826	LH8 - Concrete.
Oct '85	A	As Built			A1-54835	LH6 and LH7-Concrete and Reinf.
Date		Remarks	Ckd	Psd	A1-54537	Grouted Anchor Bars for Walls.

0 5000 10 000 mm
(1 : 100 scale before reduction)

CONTRACT Nº 2120

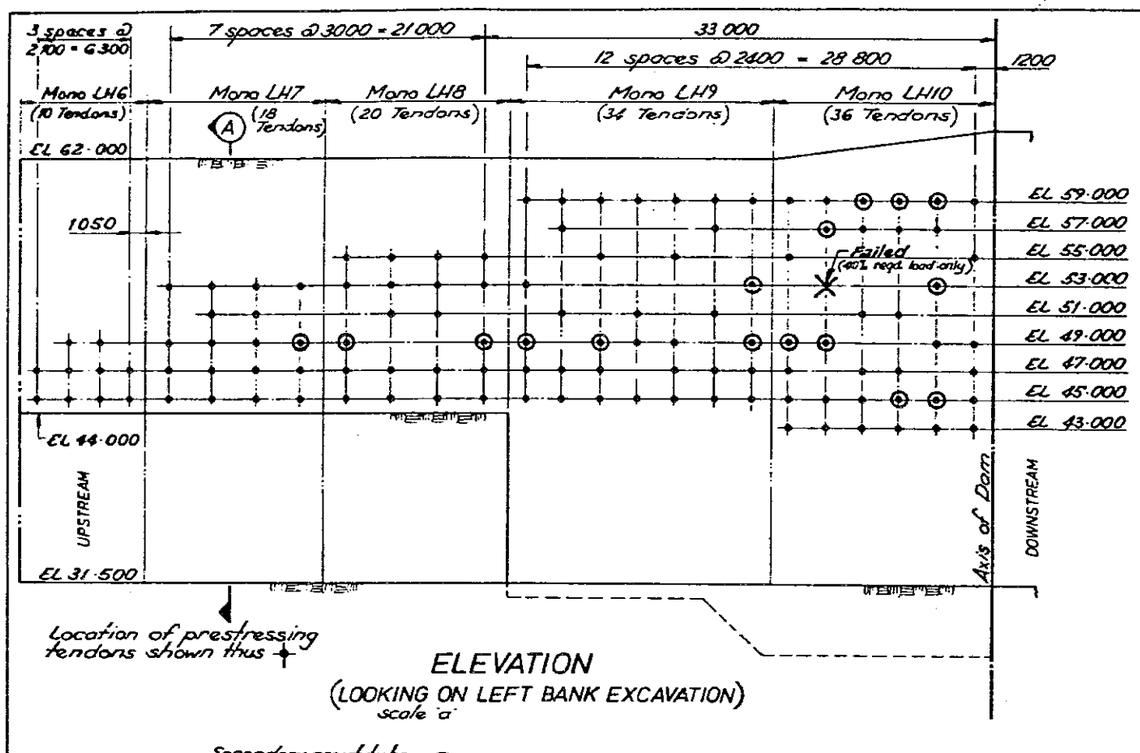
QUEENSLAND WATER RESOURCES COMMISSION

Design	Drafting	Recommended
Prep	Dr	Senior Engineer Designs
Ckd	Ckd M.J.C.	
Supv	Supv M.J.C.	Approved
Submitted		
Executive Engineer		Chief Designing Engineer

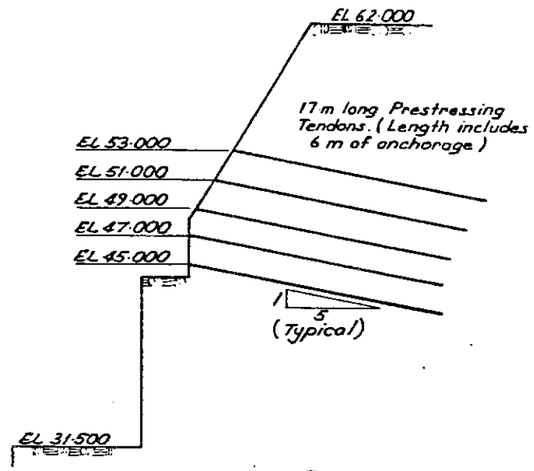
CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km - WIVENHOE DAM
SPILLWAY TRAINING WALLS - LH6, LH7 & LH8
GROUTED ANCHOR BARS

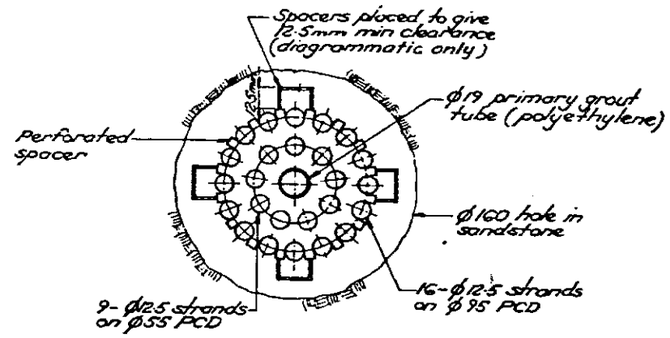
20-11-79 A1- 56265 A



ELEVATION
(LOOKING ON LEFT BANK EXCAVATION)
scale 'a'



SECTION (A)
scale 'a'



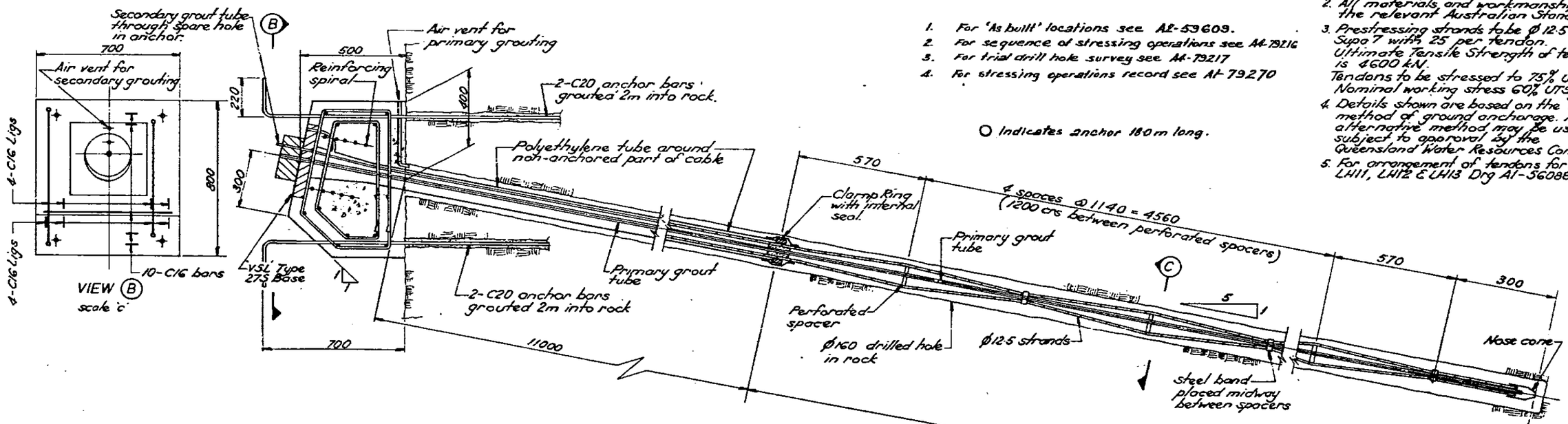
SECTION (C)
scale 'b'

1. For 'As built' locations see A1-59609.
2. For sequence of stressing operations see A1-79216
3. For trial drill hole survey see A1-79217
4. For stressing operations record see A1-79270

O Indicates anchor 180m long.

NOTES:
1. All dimensions are in millimetres and Elevations are in metres.
2. All materials and workmanship to the relevant Australian Standard.
3. Prestressing strands to be Ø12·5 Supa 7 with 25 per tendon. Ultimate Tensile Strength of tendon is 4600 kN. Tendons to be stressed to 75% UTS. Nominal working stress 60% UTS.
4. Details shown are based on the 'VSL' method of ground anchorage. An alternative method may be used subject to approval by the Queensland Water Resources Commn.
5. For arrangement of tendons for Mono's LH11, LH12 & LH13 Drg A1-56088

VIEW (B)
scale 'c'



TYPICAL SECTION THROUGH ROCK ANCHOR
scale 'c'

SEE ALSO 'AUSTRESS Pty Ltd' DRAWING – A1-79263

AS BUILT
By
Class
Date 6/11/85

Revision				
Oct '85	A	As Built		
1·11·79	W	LHG added. Converted to working drawing	RD	AF
Date		Remarks	Ckd	Pcd

Drawing Schedule	
A1-56088	Prestressed Rock Anchors Sh 2 of 2
A1-89863	Excavation details – Stage 1

Scales Before Reduction
Scale 'a' 0 10 000 20 000 mm — Scale 1:200
Scale 'b' 0 100 200 mm — Scale 1:2
Scale 'c' 0 500 1000 mm — Scale 1:10

CONTRACT Nº 2120

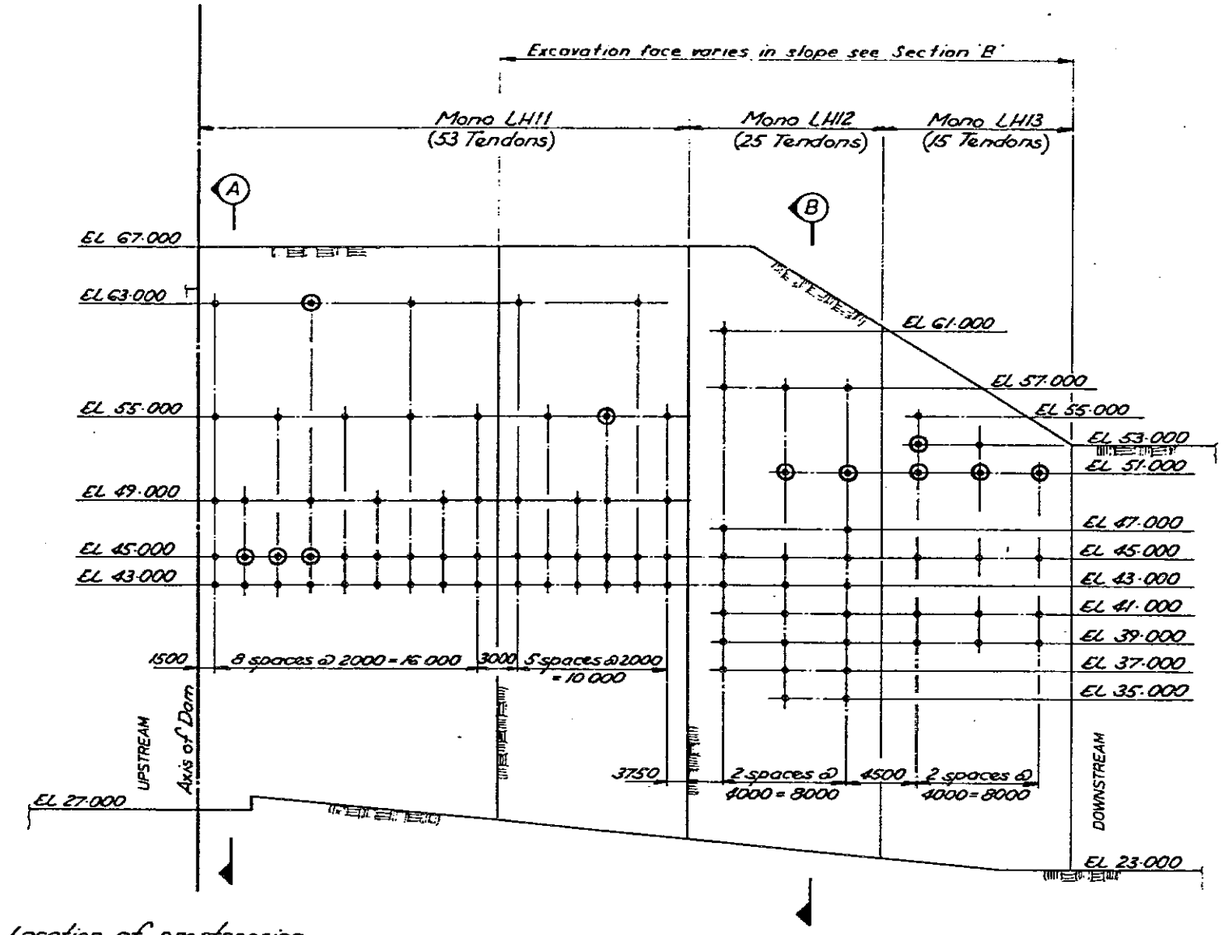
QUEENSLAND WATER RESOURCES COMMISSION

Design	Drafting	Recommended
Prep P. A.	Dr CRC	
Ckd	Ckd	Senior Engineer Designs
Supr	Supr	Approved
Submitted		
Executive Engineer		Act/ Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

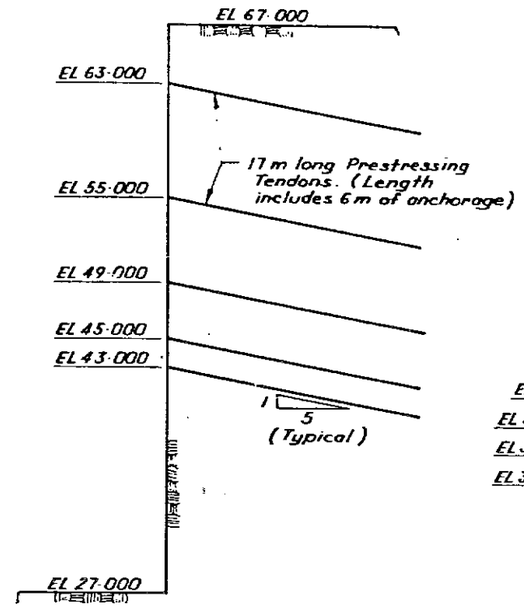
BRISBANE RIVER 150·2 km – WIVENHOE DAM
SPILLWAY
LEFT BANK EXCAVATION
PRESTRESSED ROCK ANCHORS

Sh 1 of 2 | 9-5-79 | A1-56087 | TK | A

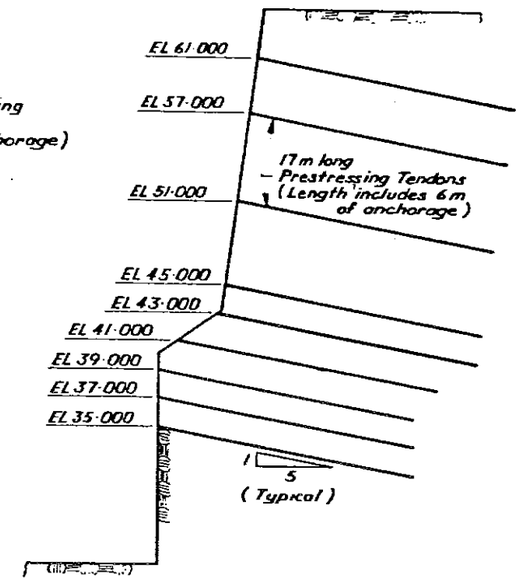


Location of prestressing tendons shown thus ✦
For details of tendons see Drg A1-56087.

ELEVATION
(LOOKING ON LEFT BANK EXCAVATION)



SECTION (A)



SECTION (B)

NOTES :-

1. All dimensions are in millimetres and elevations are in metres.
2. All materials and workmanship to the relevant Australian Standards.
3. For general notes refer to Drg A1-56087.

○ Indicates anchor 18·0m long.

For 'As built' information see A1-56087

AS BUILT
By J.J. Kilcullen
Class Senior Eng II
Date 6/11/84

Revision				
Oct '85	A	As Built		
7·9·79	W	Tender to working Drg	M.J.C.	
Date		Remarks	Ckd	Psd

Drawing Schedule
A1-56087 Prestressed Rock Anchors Sh 1 of 2

Scale 0 10 000 20 000mm
Scale 1:200
(Scale Before Reduction)

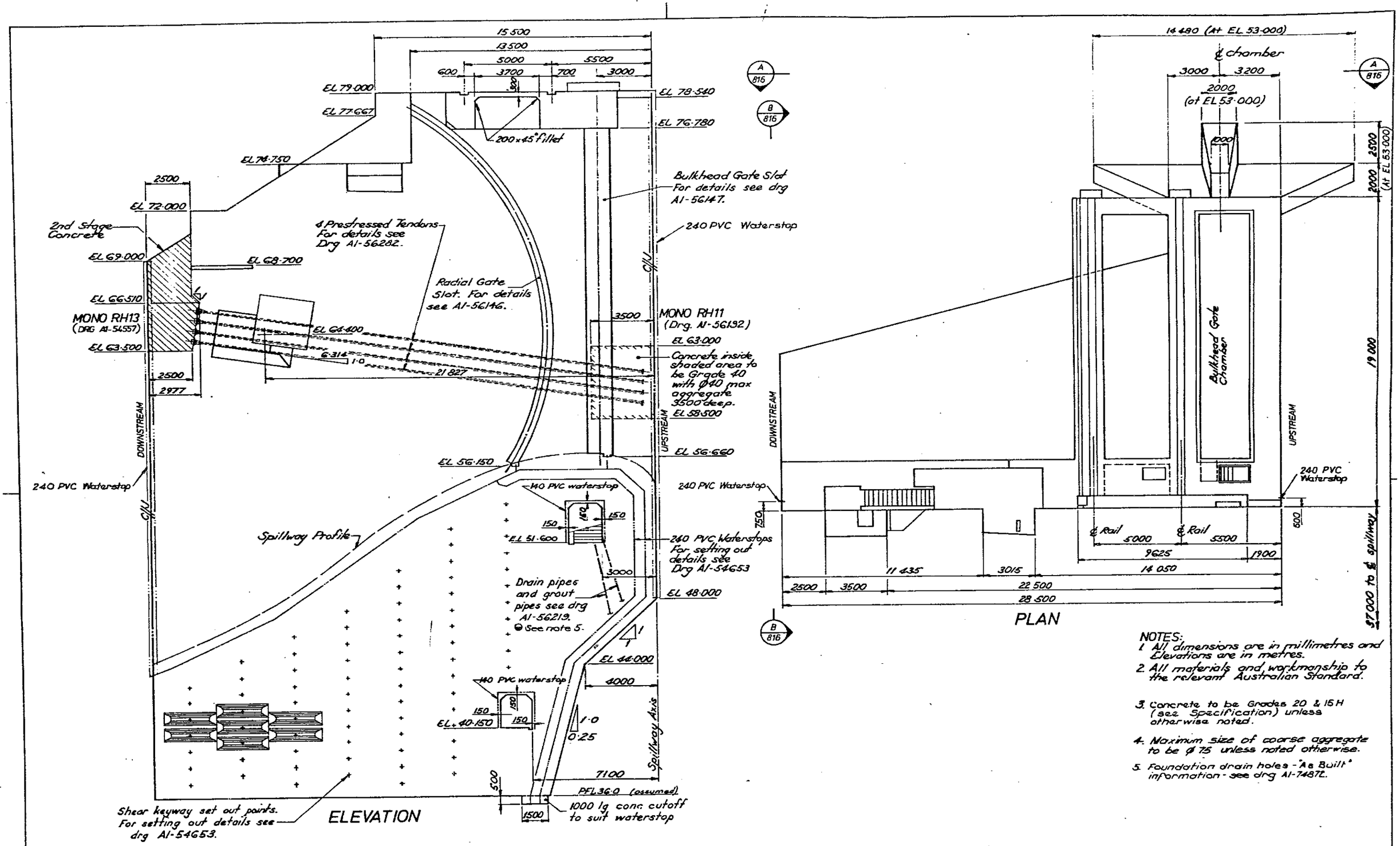
CONTRACT Nº 2120

QUEENSLAND WATER RESOURCES COMMISSION
Design: Prep P.A. Ckd Supv Submitted Executive Engineer
Drafting: Dr CRC Ckd Supv
Recommended Senior Engineer Designs
Approved P. Rune Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT
BRISBANE RIVER 150·2 km - WIVENHOE DAM
SPILLWAY
LEFT BANK EXCAVATION
PRESTRESSED ROCK ANCHORS

Sh 2 of 2 | 9-5-79 | A1-56088 | A

INS. 1 0 2 4 6 8 10



NOTES:
1. All dimensions are in millimetres and Elevations are in metres.
2. All materials and workmanship to the relevant Australian Standard.
3. Concrete to be Grades 20 & 15H (see Specification) unless otherwise noted.
4. Maximum size of coarse aggregate to be Ø 75 unless noted otherwise.
5. Foundation drain holes - "As Built" information - see drg A1-74872.

Drawing Schedule			
A1-54750	Spillway Gantry Crane Rails - Installation and Arrgt.		
A1-54816	Monolith RH12 Concrete		Sh 2 of 8
A1-54817	" " "		Sh 3 of 8
A1-54818	" " "		Sh 4 of 8
A1-54819	" " "		Sh 5 of 8
A1-54820	" " "		Sh 6 of 8
A1-54821	" " "		Sh 7 of 8
A1-54822	" " "		Sh 8 of 8

Revision				
12-9-84	B	'As built' info. added	RD	RD
23-1-81	A	General amendments		
Date		Remarks	Ckd	Psd

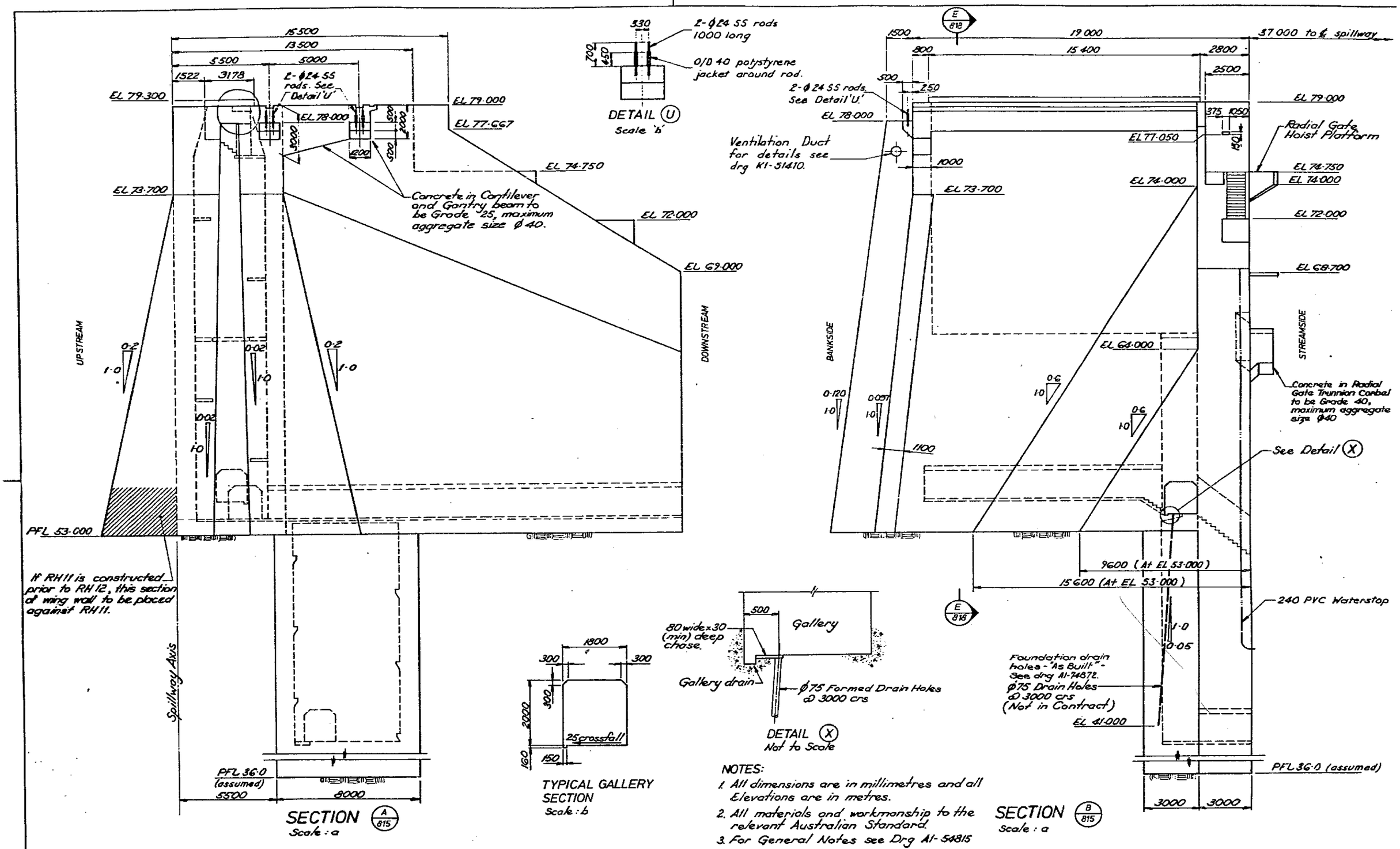
Scale 0 5000 10 000 mm
Scale 1:100 Before Reduction

CONTRACT No 2120

IRRIGATION AND WATER SUPPLY COMMISSION
Design — Prep
Drafting — Dr CRC
Ckd — Ckd
Supv — Supv M.J.C.
Submitted — Executive Engineer
Recommended — Senior Engineer Designs
Approved — Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT
BRISBANE RIVER 150·2 km - WIVENHOE DAM
SPILLWAY RETAINING WALLS
MONOLITH RH12—CONCRETE
Sh 1 of 8 | 4-9-79 | A1-54815 | A | B

INS. 0 2 4 6 8 10
CM 1 0 2 4 6 8 10 20 30



NOTES:

1. All dimensions are in millimetres and all Elevations are in metres.
2. All materials and workmanship to the relevant Australian Standard.
3. For General Notes see Drg A1-54815

Revision					
12-8-84	D	As built info added.			RD
18-8-81	C	Section A/815 amended			
4-7-81	B	Sections 'A/815' & 'B/815' amended.	M.J.C.		
23-1-81	A	General amendments			
Date		Remarks	Ckd		Tsd

Drawing Schedule	
A1-56331	Monolith RH12 - Arrangement
A1-54815	Monolith RH12 - Concrete. Sh 1 of 8

Scale: a 0 5000 10 000 mm — Scale 1:100 Before Reduction

Scale: b 0 5000 mm — Scale 1:50 Before Reduction

CONTRACT Nº 2120

IRRIGATION AND WATER SUPPLY COMMISSION

Design		Drafting	
Prep		Dr	C.R.C.
Ckd	C.M.	Ckd	
Supr		Supr	M.J.C.

Submitted

Executive Engineer

Recommended

Senior Engineer Designs

Approved

Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km - WIVENHOE DAM

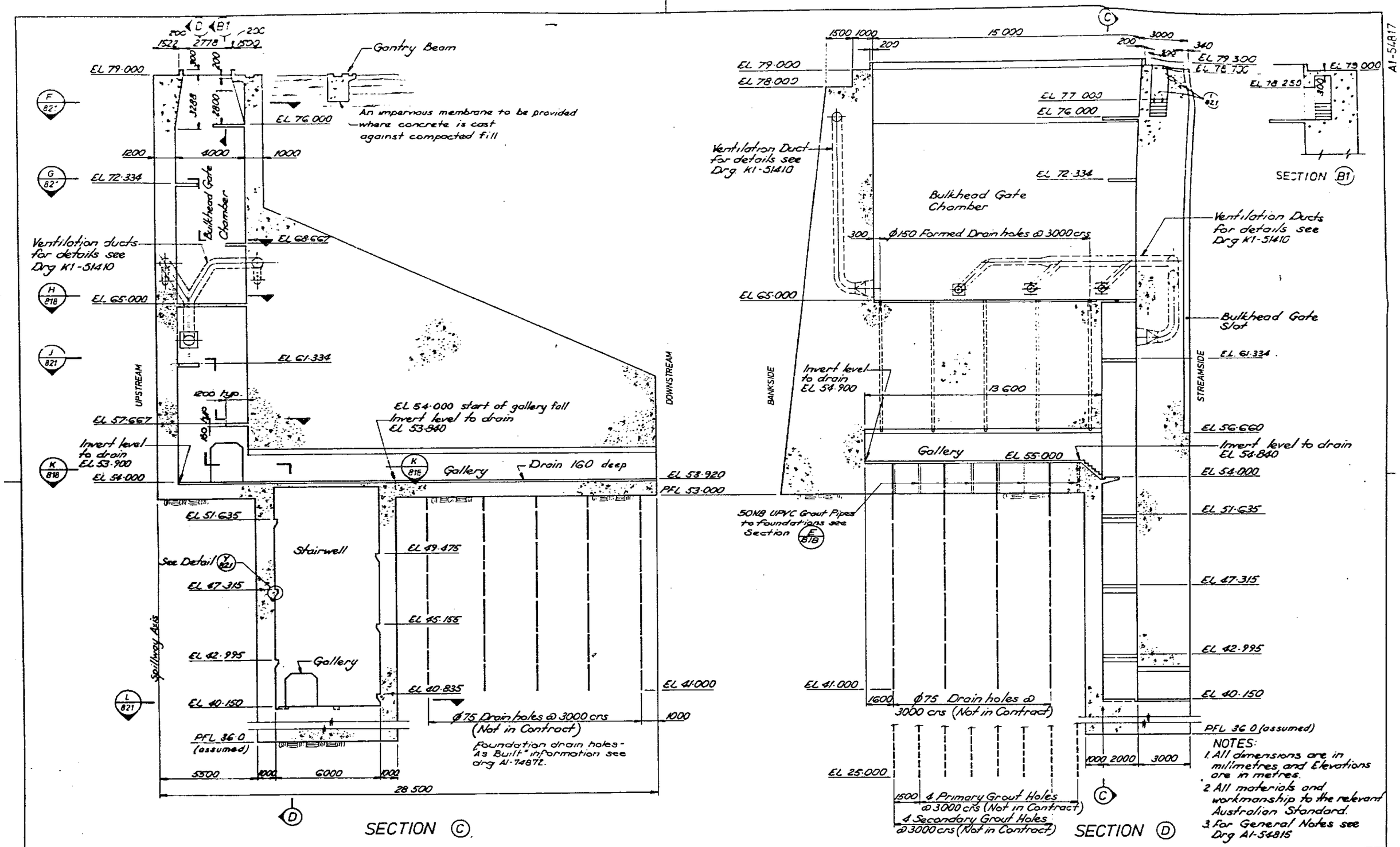
SPILLWAY RETAINING WALLS

MONOLITH RH12 - CONCRETE

Sh 2 of 8 | 4-9-79 | A1-54816 | A B C D

INS. 1 0 2 4 6 8 10

CM. 1 0 2 4 6 8 10 20 30



Revision			
23·8·84	C	As built info added.	RD
18·8·81	B	Section B1 added	
23·1·81	A	General amendments	
Date		Remarks	Ckd / Psd

Drawing Schedule: A1-54815 Monolith RH 12 - Concrete. Sh 1 of 8

Scale 0 5000 10 000 mm
Scale 1 100 Before Reduction

CONTRACT Nº 2120

IRRIGATION AND WATER SUPPLY COMMISSION

Design	Drafting	Recommended
Prep	Dr CRC	
Ckd	Ckd	Senior Engineer Designs
Supv	Supv M.J.C.	Approved
Submitted		
Executive Engineer		Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km - WIVENHOE DAM

SPILLWAY RETAINING WALLS

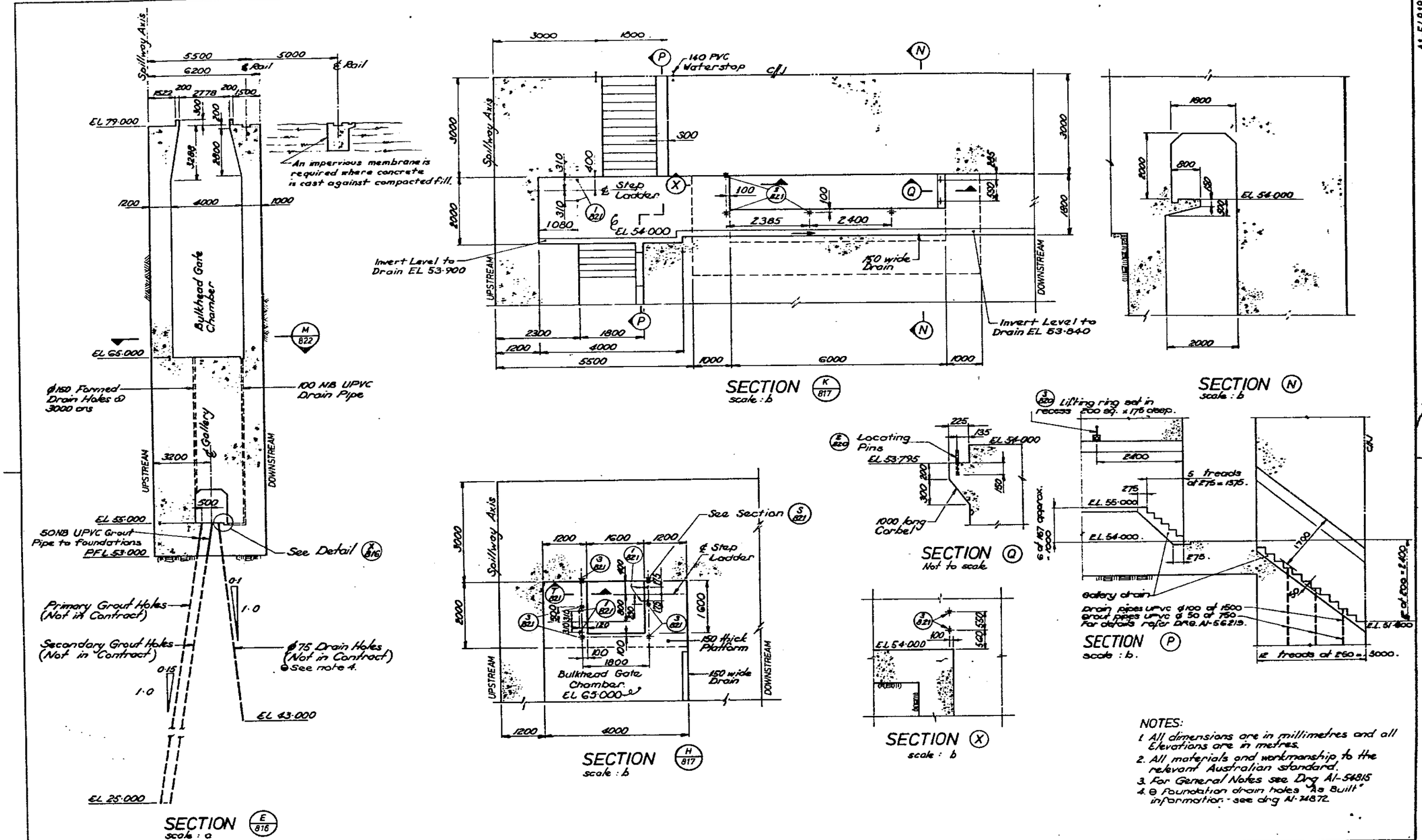
MONOLITH RH 12 - CONCRETE

Sh 3 of 8 | 4-9-79 | A1-54817 | A B C

A1-54817

INS. 0 2 4 6 8 10
CM. 0 2 4 6 8 10 20 30

A1-54818



NOTES:

1. All dimensions are in millimetres and all Elevations are in metres.
2. All materials and workmanship to the relevant Australian standard.
3. For General Notes see Drg A1-54815
4. ⊖ Foundation drain holes "As Built" information - see drg A1-24872.

Revision				
8384	3	As built info added		
23·1·8	A	General amendments		
Date		Remarks	Ckd	Chd

Drawing Schedule: A1-54815 Monolith RH12 - Concrete. Sh 1 of 8.

Scale a 0 — 5000 — 10 000 mm Scale 1:100

Scale b 0 — 5000 mm Scale 1:50

Scales Before Reduction

CONTRACT Nº 2120

IRRIGATION AND WATER SUPPLY COMMISSION

Design	Drafting
Prep	Dr CRC
Ckd	Ckd
Supr	Supr M.J.C.
Submitted	
Executive Engineer	

Recommended: Sewer Engineer Designs
Approved: Chief Designing Engineer

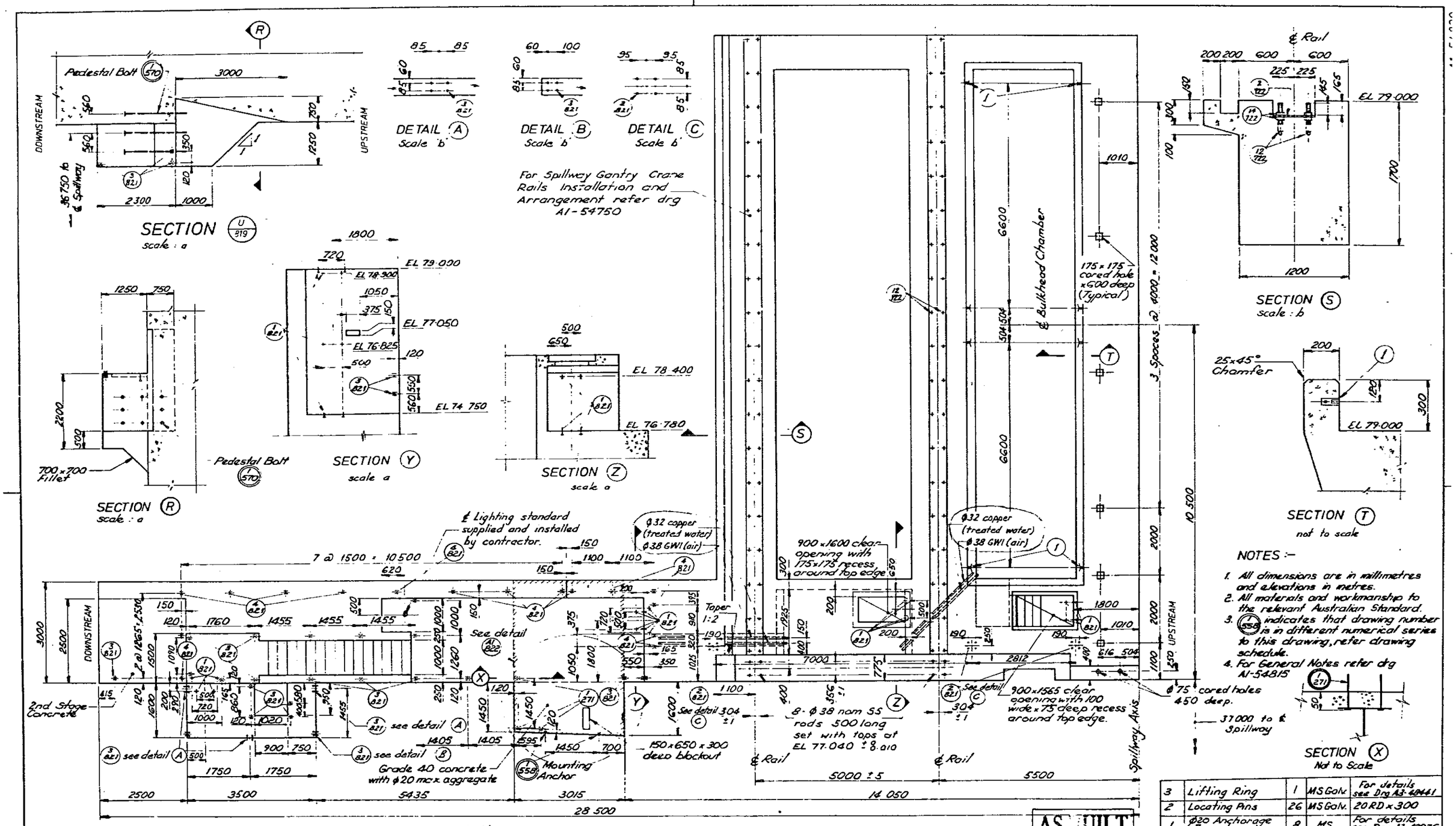
CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km - WIVENHOE DAM
SPILLWAY RETAINING WALLS

MONOLITH RH 12 - CONCRETE

Sh 4 of 8 | 4-9-79 | A1-54818 | A | B

INS. 1 0 2 4 6 8 10



ITEM No	DESCRIPTION	No OFF	MATERIAL	REMARKS
3	Lifting Ring	1	MS Galv.	For details see Drg A3-69441
2	Locating Pins	26	MS Galv.	20 RD x 300
1	Φ20 Anchorage Ferrule	8	MS	For details see Drg A3-82936

ITEM SCHEDULE

NOTES :-

1. All dimensions are in millimetres and elevations in metres.
2. All materials and workmanship to the relevant Australian Standard.
3. (1/558) indicates that drawing number is in different numerical series to this drawing, refer drawing schedule.
4. For General Notes refer drg A1-54815

Revision				
Oct '85	G	As Built		
13-1-82	F	Pipes - air & treated water		
15-7-81	E	Φ38 SS rods amended		
30-6-81	D	Plan & Sect. Y amded	MJC	
30-4-81	C	Section R amended	MJC	MJC
6-3-81	B	Plan amded	MJC	
23-1-81	A	General amendments		
Date		Remarks	Ckd	Tsd

Drawing Schedule	
A3-62271	Spillway - Piers 1-4, LH 11 & RH 12 Handrail Anchor Plates Fabrication.
A3-61570	Radial Gates - Pedestal Bolt
A3-61558	Radial Gates - Hoist Platforms - Mounting Anchor
A1-54815	Monolith RH 12 - Concrete Sh 1 of 8.

Scales Before Reduction
Scale a 0 — 5000 mm — Scale 1:50
Scale b 0 — 1000 — 2000 mm — Scale 1:20

CONTRACT No 2120

IRRIGATION AND WATER SUPPLY COMMISSION

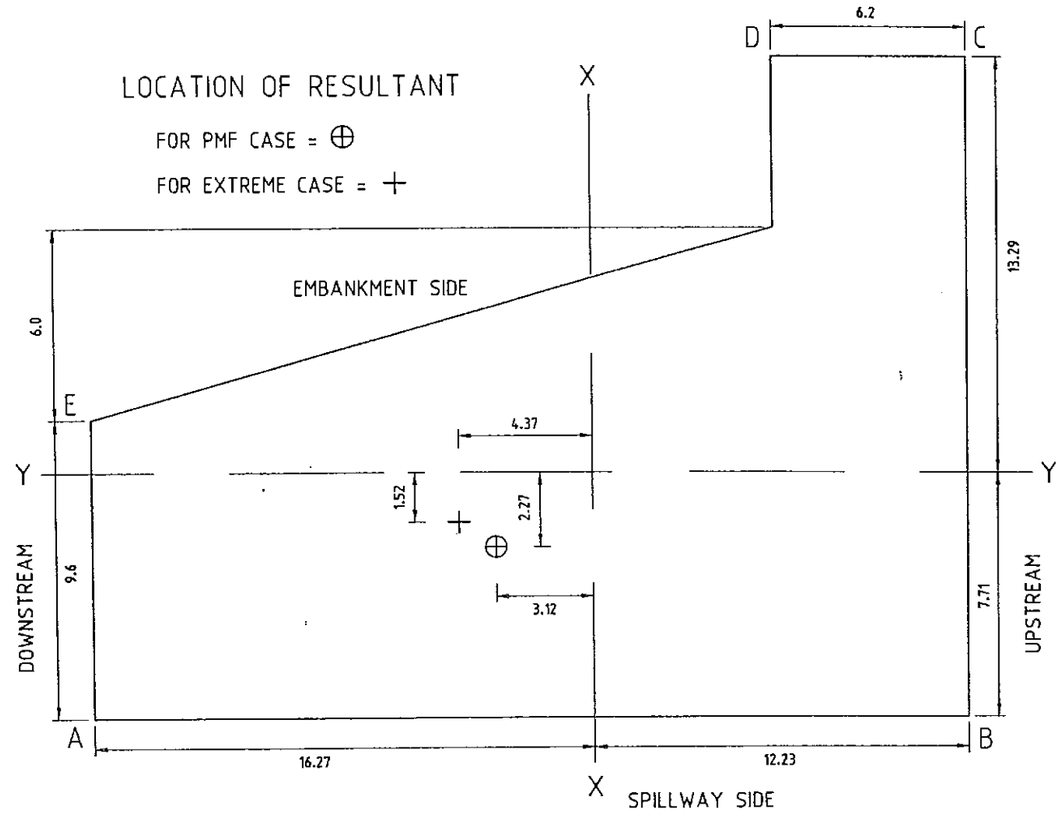
Design	Drafting	Recommended
Prep	Dr CRC	
Ckd	Ckd	Senior Engineer Designs
Supv	Supv M.J.C.	Approved
Submitted		
Executive Engineer		Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km - WIVENHOE DAM
SPILLWAY RETAINING WALLS

MONOLITH RH12 - CONCRETE

Sh 6 of 8 | 4-9-79 | A1-54820 | K B G D E | 6



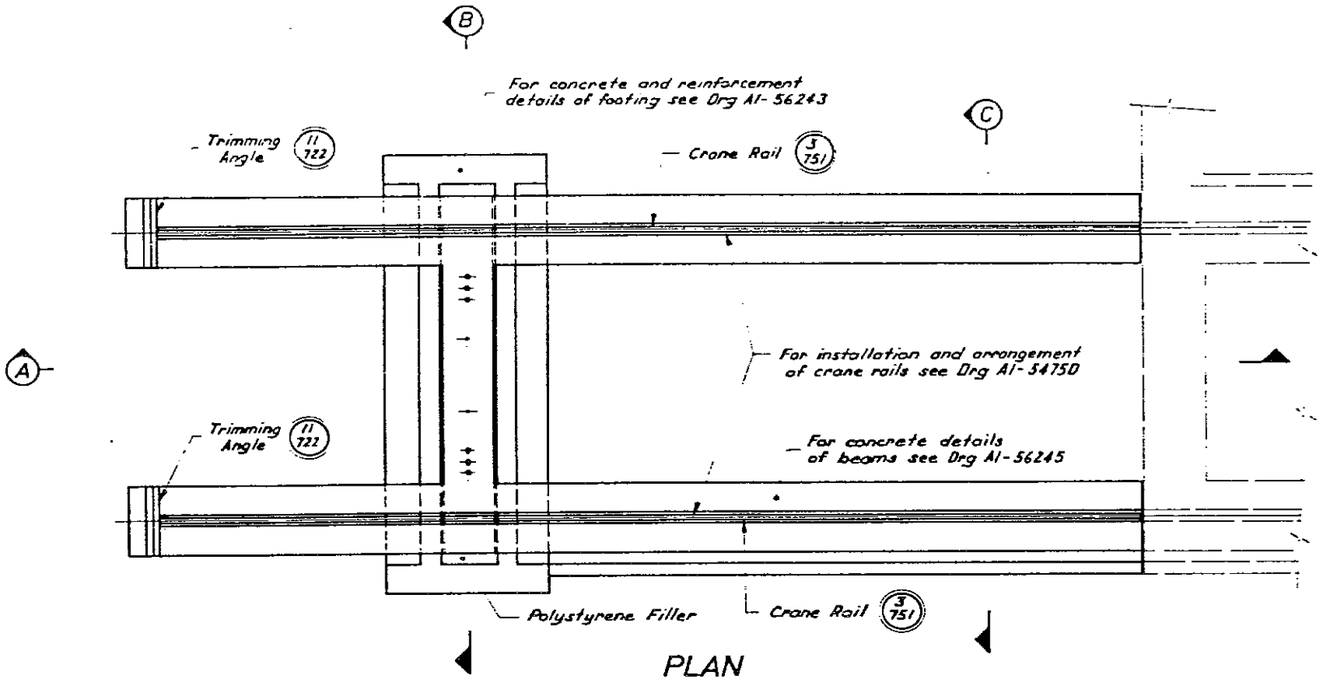
MONOLITH RH12 - PLAN OF FOUNDATION SECTION AT EL 53

POINT	VERTICAL STRESS (MpA)	
	PMF CASE	EXTREME CASE
A	0.992	0.988
B	0.350	0.263
C	-0.322	-0.249
D	-0.203	-0.092
E	0.640	0.754

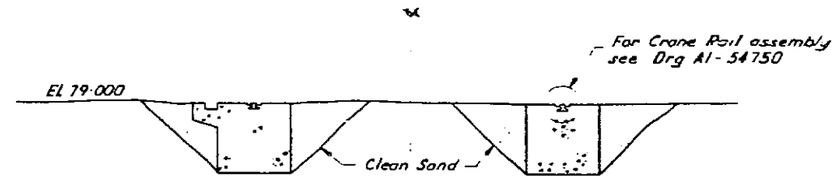
SLIDING FACTOR:	PMF CASE	EXTREME CASE
	0.322	0.385

OVERTURNING F.S.:	PMF CASE	EXTREME CASE
	2.35	2.69

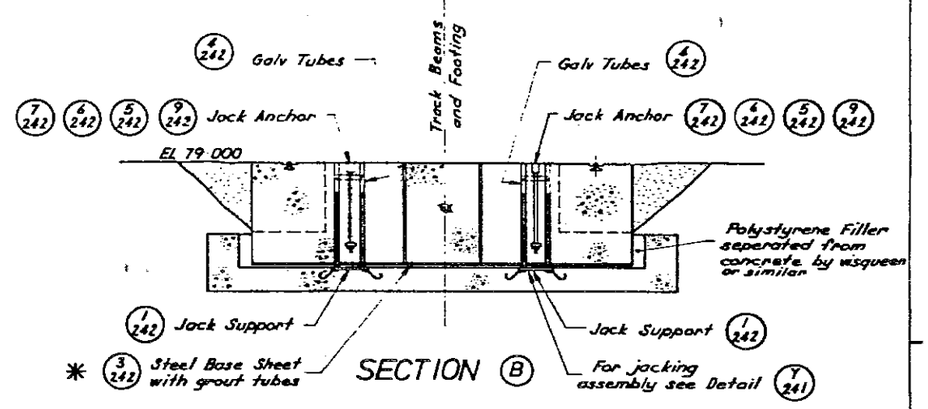
STABILITY ANALYSIS OF SPILLWAY MONOLITH RH12



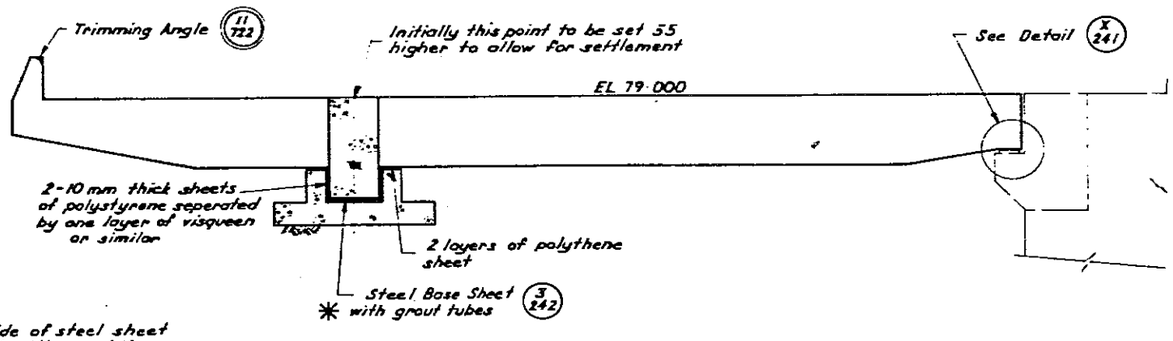
PLAN



SECTION (C)



SECTION (B)



* Note : Underside of steel sheet painted with graphite grease

SECTION (A)

NOTES :

1. All dimensions are in millimetres and all elevations are in metres.
2. All materials and workmanship to the relevant Australian Standards.
3. Levels Datum : All levels to AHD (PSM N° 34242 = EL 74·784)
4. 11/722 Indicates drawing number is in different numerical series to this drawing. Refer to drawing schedule.

AS BUILT
By
Chkd
Date 31/10/85

Revision				
Oct '85	A	'As Built'		
Date		Remarks	Chkd	Psd

Drawing Schedule	
A1-56243	Spillway Gantry Crane Beam Footing - Conc & Reinf
A1-56245	Spillway Gantry Crane Beam - Conc
A1-54750	Spillway Gantry Crane Rails - Installation & Arr
A1-54722	Gantry Track - Fabricated Metal Items Sh 1 of 2
A1-54751	Gantry Track - Fabricated Metal Items Sh 2 of 2
A1-56242	Spillway Gantry Crane (B & F) - Fabricated Items
A1-56261	Spillway Gantry Crane Beam & Footing - Gen Arr. Sh 2

Scale

0 1000 2000 3000 4000 5000 mm (1-50)

(Scale Before Reduction)

CONTRACT N° 2120

QUEENSLAND WATER RESOURCES COMMISSION

Design	Drafting	Recommended
Prep	Dr	
Ckd J.E.R.	Ckd	Senior Engineer Designs
Supv	Supv M.J.C.	Approved
Submitted		
Executive Engineer		Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

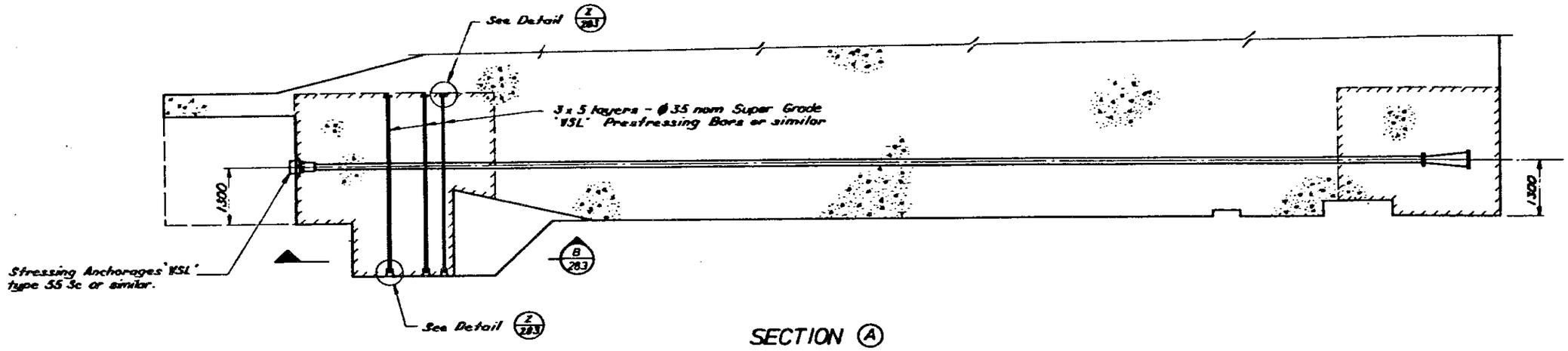
BRISBANE RIVER 150·2 km - WIVENHOE DAM

SPILLWAY GANTRY CRANE BEAM AND FOOTING - R/B

ARRANGEMENT

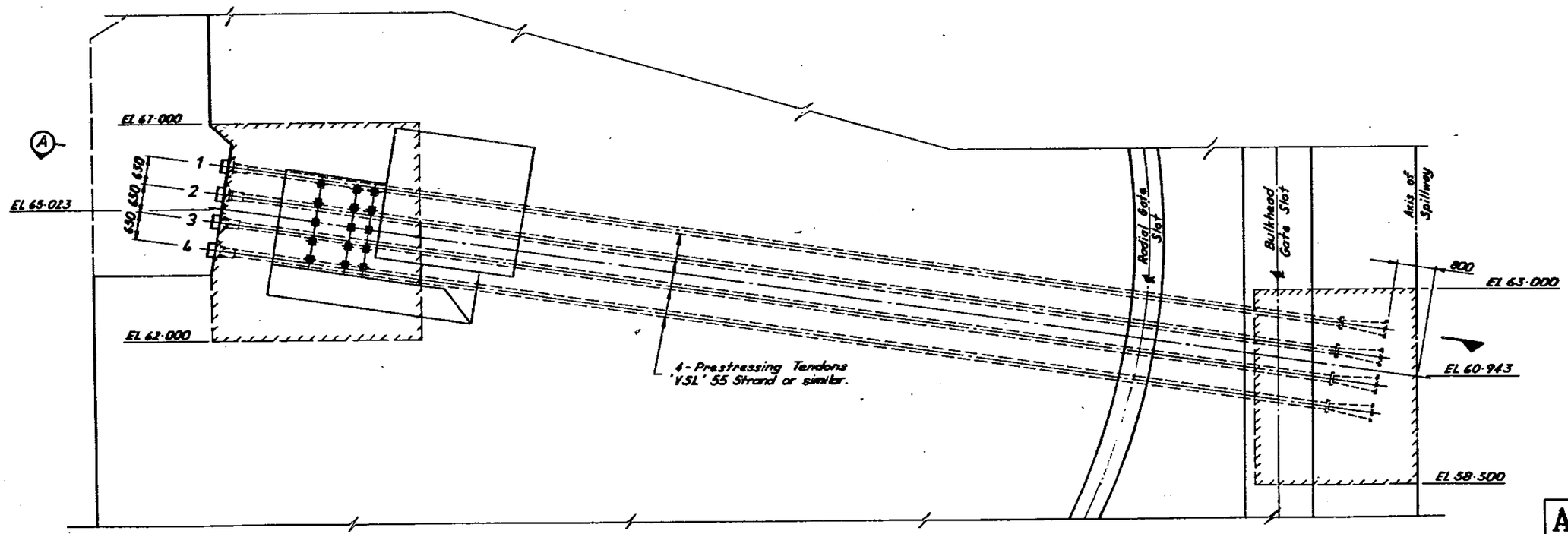
Sh 1 of 2 | 28·3·80 | A1-56240 | A

A1-56282



SECTION (A)

NOTES :
1. All dimensions are in millimetres and elevations in metres.
2. All materials and workmanship to the relevant Australian Standards.
3. For General Notes refer to Drg A1-56283.



ELEVATION

AS BUILT
By
Checked
Date 31/12/85

Revision					Drawing Schedule	
Oct '85	A	As Built			A1-54815	Mono RH12 - Concrete
Date		Remarks	Chd	Psd	A1-56283	Mono RH12 - Prestressing Details Sh2of2

0 1000 2000 3000 4000 5000 mm

(1:50 Scale Before Reduction)

CONTRACT Nº 2120

QUEENSLAND WATER RESOURCES COMMISSION

Design	Drafting	Recommended
Proj T.R.	Dr	Senior Engineer Designs
Chd	Chd	Approved
Supv	Supv M.J.C.	Chief Designing Engineer
Submitted		
Executive Engineer		

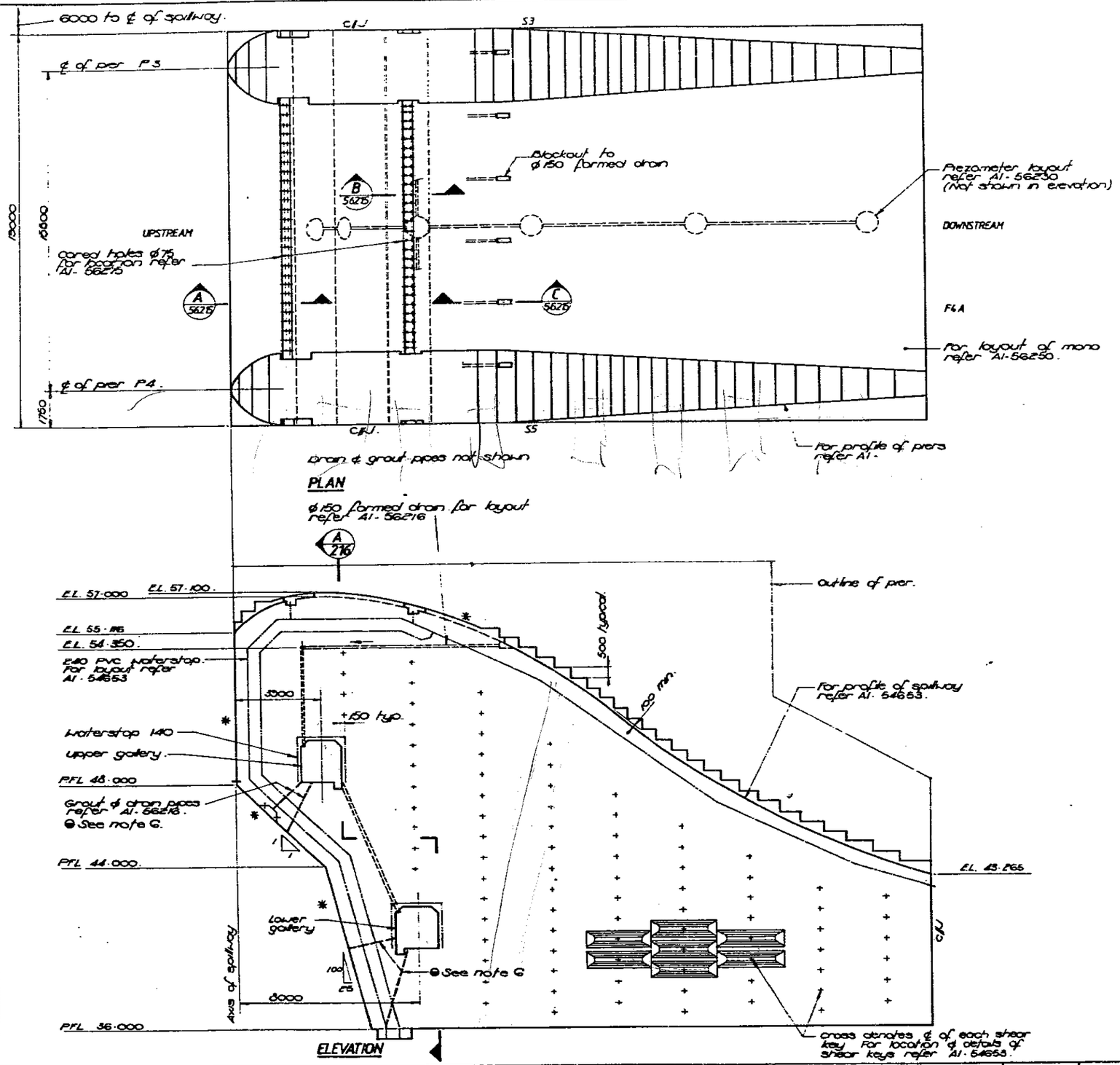
CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km —WIVENHOE DAM
SPILLWAY RETAINING WALLS
MONOLITH RH12

PRESTRESSING DETAILS

Sh 1 of 2 | 3.11.80 | A1-56282 | A

A1-56213



NOTES

1. All dimensions are in millimetres & all elevations are in metres.
2. All material & workmanship to the relevant Australian standards.
3. All concrete to be Grade 15H EXCEPT for the 1200 mm zone of perimeter faces marked thus ·// to be Grade 20.
4. Maximum size of coarse aggregate to be ø 75.
5. C/J denotes contraction joint.
6. Foundation drain holes "AS BUILT" information - see drg. A1-74872.

Revision				
12-3-84	A	As built info added	RD	
Date		Remarks	Ckd	Psd

Drawing Schedule	
A1-56215	Spillway Mono Cored Holes.
A1-56201	Mono S2-S5 Gallery Reinforcement.
A1-56195	Mono S2-S5 Reinforcement.
A1-56250	Spillway - Key to Monolith.
A1-56230	Foundation Instrumentation.
A1-56216	Upper & Lower Galleries Drain. & Grout Arr'gt.
A1-54653	Spillway - concrete profile.

SCALE 1:100 0 5000 10000 mm
BEFORE REDUCTION

CONTRACT N° 2120

QUEENSLAND WATER RESOURCES COMMISSION

Design	Drafting	Recommended
Prep. B.J.S.	Dr. M.G.S.	
Ckd	Ckd	Senior Engineer Designs
Supv	Supv. M.J.C.	Approved
Submitted		
Executive Engineer		Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km - WIVENHOE DAM

SPILLWAY

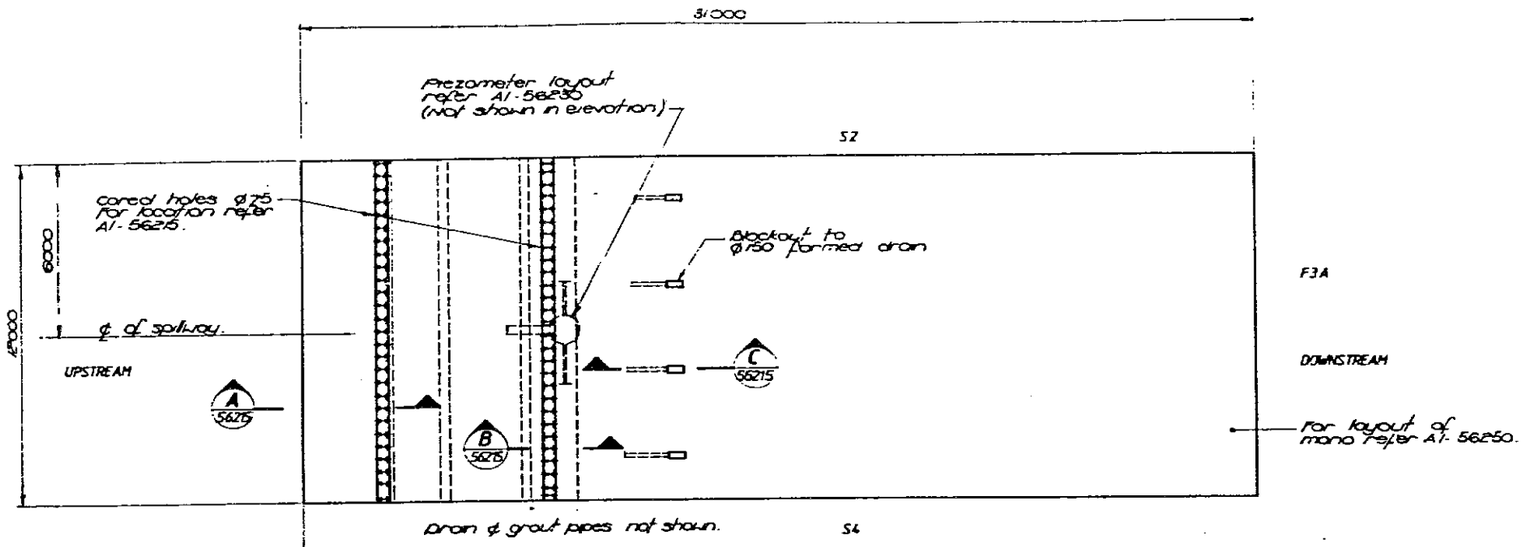
MONOLITH S4 CONCRETE

3·3·80 | A1-56213 | A

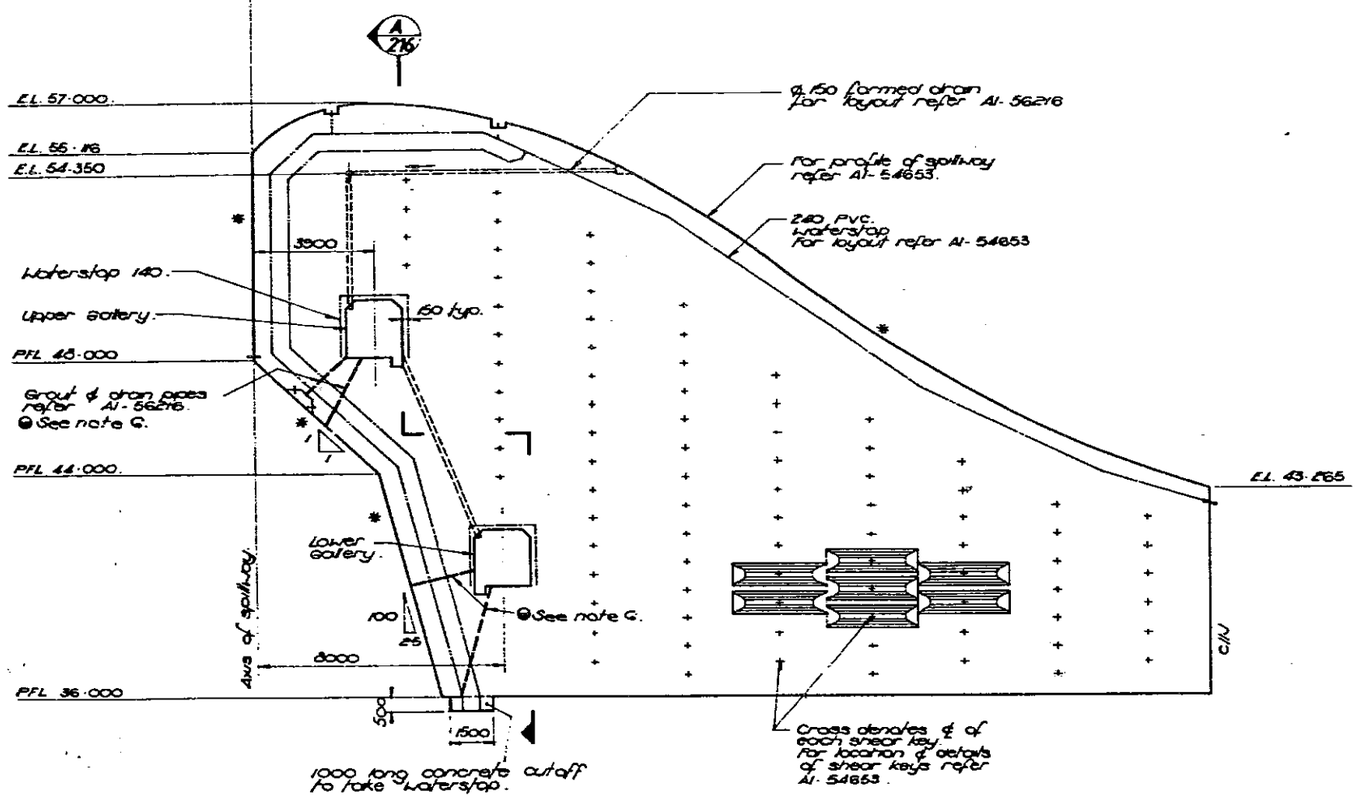
INS. 1 0 2 4 6 8 10

CM. 1 0 2 4 6 8 10 20 30

A1-56212



PLAN



ELEVATION

NOTES.
1. All dimensions are in millimetres & all elevations are in metres.
2. All materials & workmanship to the relevant Australian standards.
3. All concrete to be Grade 15H EXCEPT for the 1200 mm zone of perimeter faces marked thus - * to be Grade 20
4. Maximum size of coarse aggregate to be ø75
5. C/J denotes contraction joint.
6. ● Foundation drain holes "As Built" information - see drg A1-74872.

Revision				
12-4-84	A	As Built info. added		RO
Date		Remarks	Ckd	Psd

Drawing Schedule	
A1-56215	Spillway Mono Cored Holes.
A1-56201	Mono S2-S5 Gallery Reinforcement.
A1-56155	Mono S2-S5 Pier Nib Reinforcement.
A1-56250	Spillway - Key to monolith.
A1-56230	Foundation Instrumentation.
A1-56216	Upper & Lower Galleries Drain. & Grout Arng.
A1-54653	Spillway - concrete profile.

SCALE 1:100 BEFORE REDUCTION — 0 5000 10000

CONTRACT Nº 2120

QUEENSLAND WATER RESOURCES COMMISSION

Design	Drafting	Recommended
Prep B.T.S.	Dr MGS	
Ckd	Ckd	Senior Engineer Designs
Supv	Supv M.J.C.	Approved
Submitted		
Executive Engineer		Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km — WIVENHOE DAM

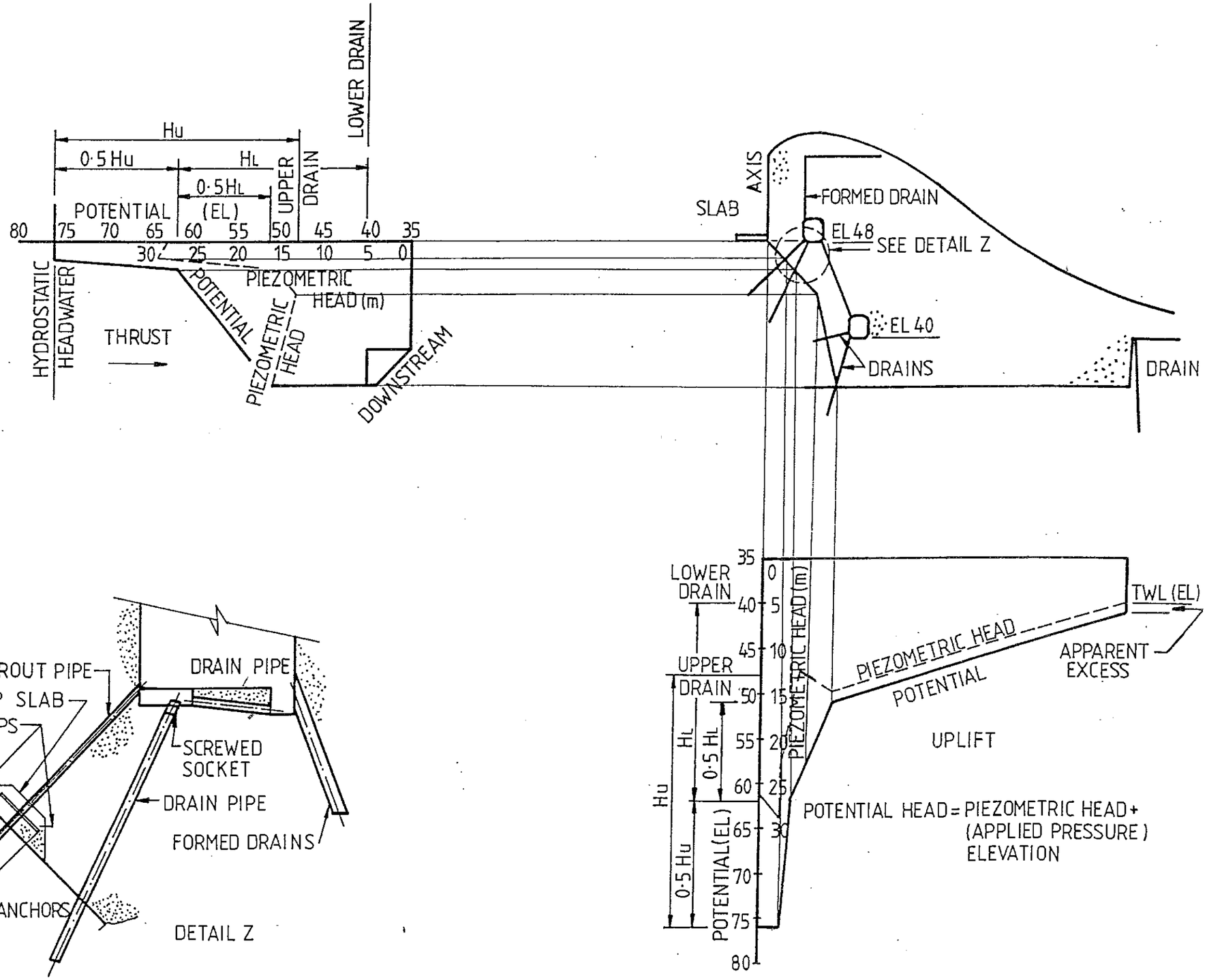
SPILLWAY

MONOLITH S3 CONCRETE

3·3·80 | A1-56212 | A

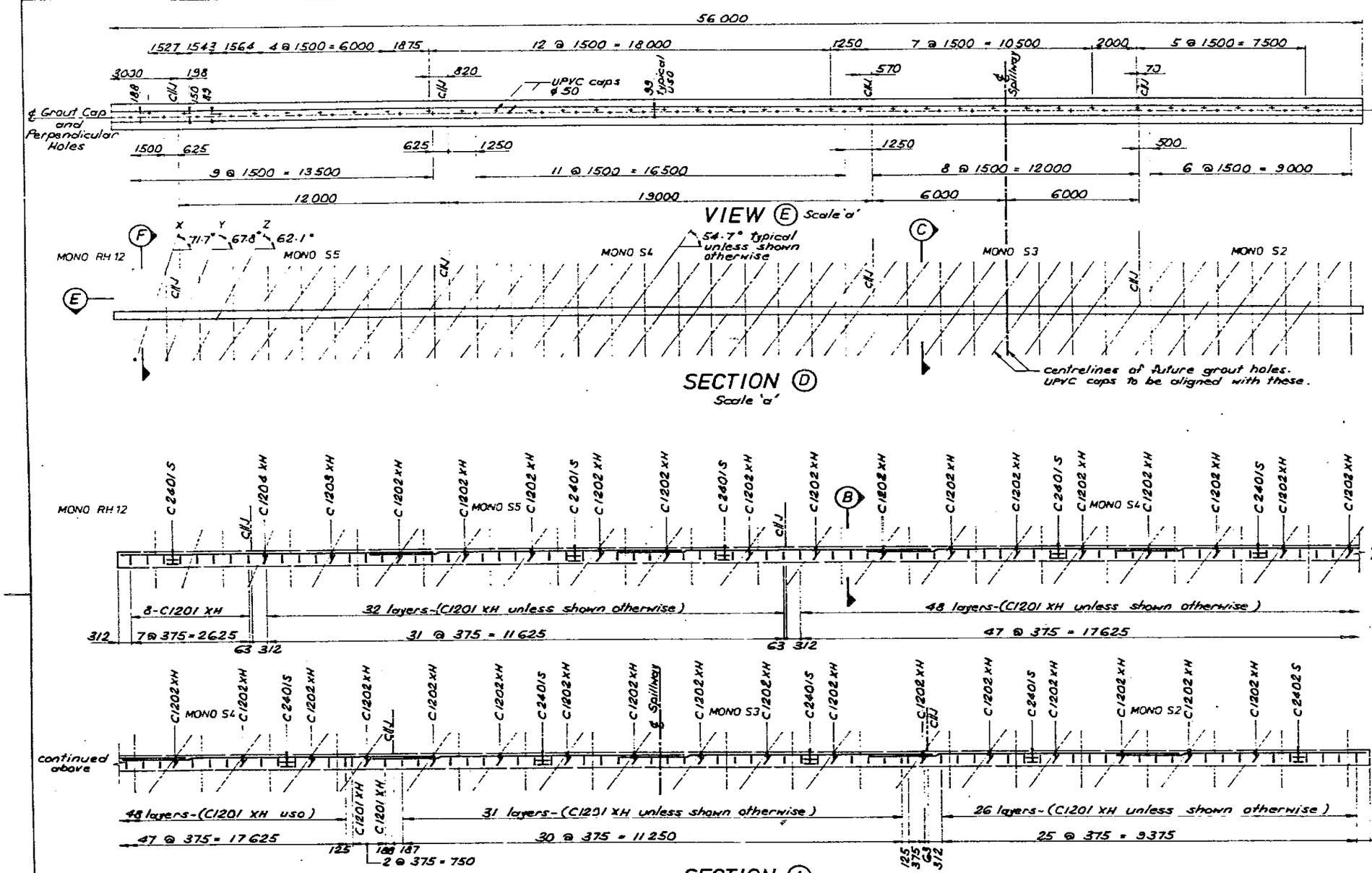
INS. 1 0 2 4 6 8 10

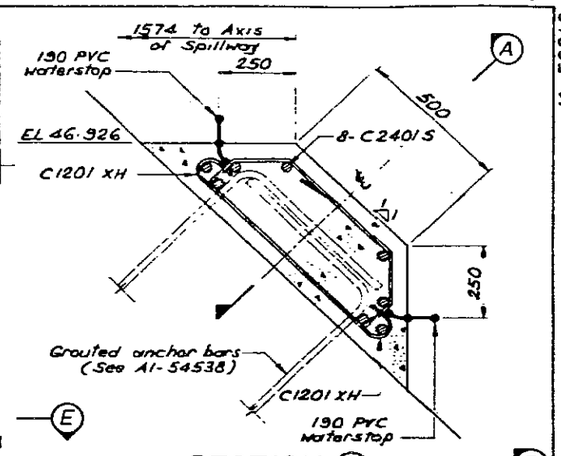
CM 1 0 2 4 6 8 10 20 30

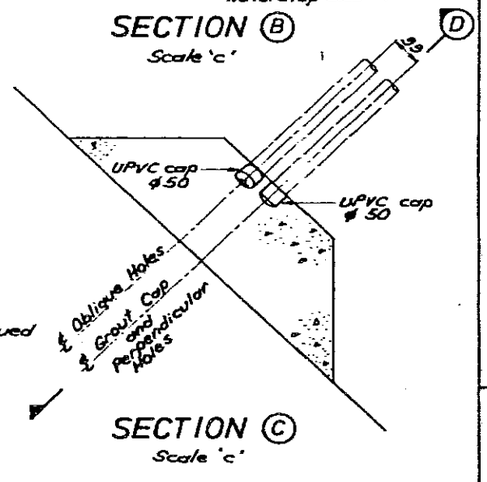


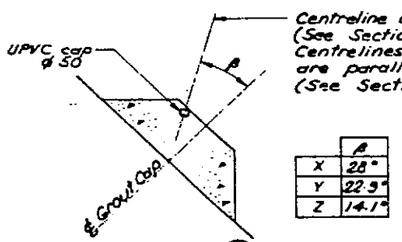
WIVENHOE DAM
SPILLWAY FOUNDATION PRESSURE ASSUMPTIONS

A1-56249









	β
X	28°
Y	22·9°
Z	14·1°

NOTES:

1. All dimensions are in millimetres and all elevations are in metres.
2. All materials and workmanship to the relevant Australian Standards.
3. Concrete to be Grade 20.
4. Maximum size of coarse aggregate to be ϕ75.
5. Clear cover to reinforcement to be 50 min.
6. All reinforcement to be cold worked deformed steel to AS 1302-1977.
7. Abbreviations:
   C/J means Contraction Joint
   uso means unless shown otherwise
8. Laps in horizontal reinforcement to be 1425 min.
9. C/J's where shown are in spillway monos only. No joints in grout cap.

AS BUILT
By
Chief Engineer
Date 31/12/85

Revision				
Oct '85	A	'As Built'		
Date		Remarks	Ckd	Psd

Drawing Schedule	
A1-54538	Spillway - Grouted Anchor Bars for Slabs
A1-56216	Drainage and Grout Arrangement
A3-56254	Reinforcement Schedule
A1-56251	Concrete and Reinforcement (Sh 2 of 2)

Scale 'a' 0 5 10 m (1:100)
Scale 'b' 0 1 2 3 4 5 m (1:50)
Scale 'c' 0 500 1000 mm (1:10)
(Scales before reduction)

CONTRACT Nº 2120

QUEENSLAND WATER RESOURCES COMMISSION

Design	Drafting	Recommended
Prep B.J.S	Dr KFP	
Ckd	Ckd RL	Senior Engineer Designs
Supv	Supv M.J.C.	Approved
Submitted		
Executive Engineer		Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

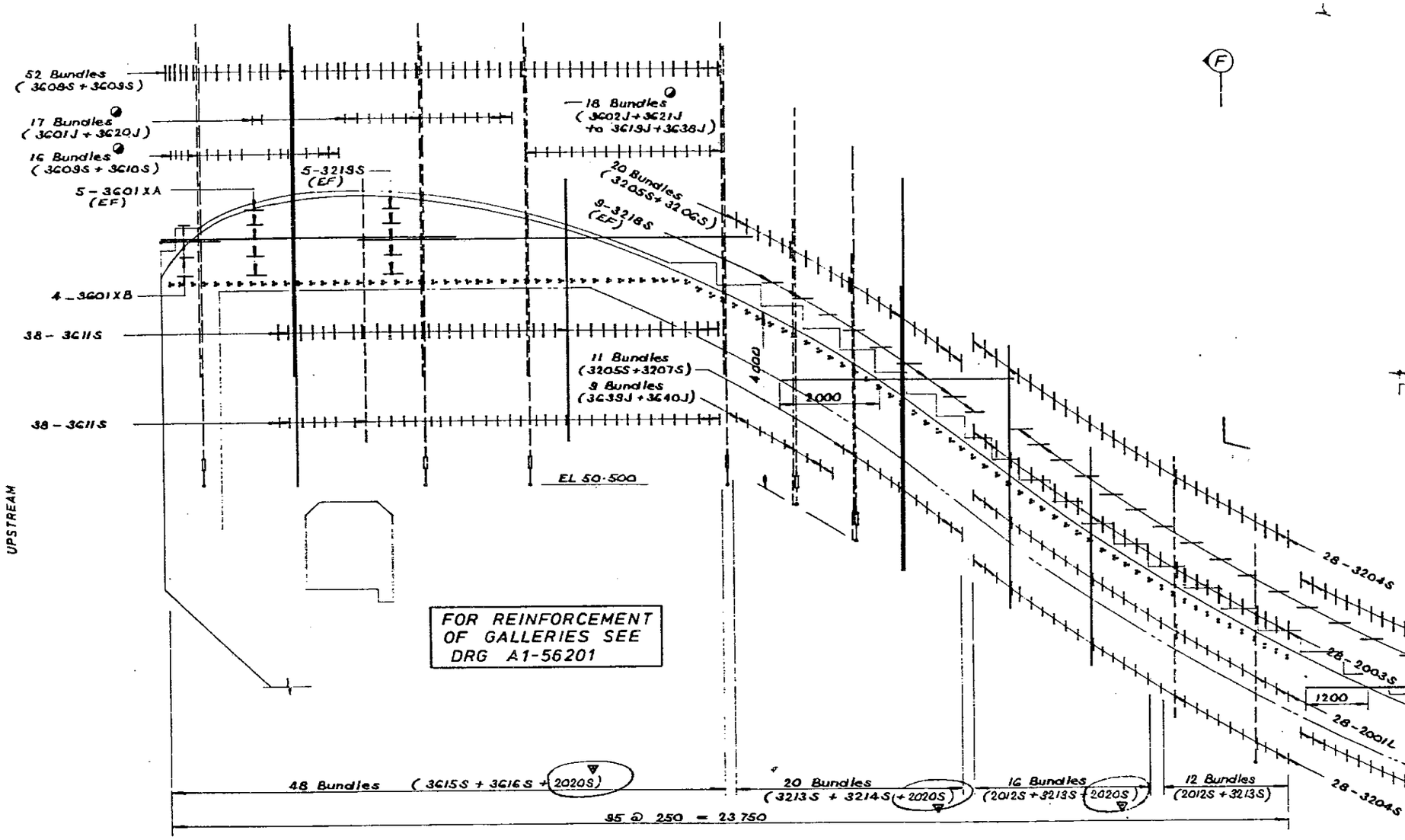
BRISBANE RIVER 150·2 km — WIVENHOE DAM

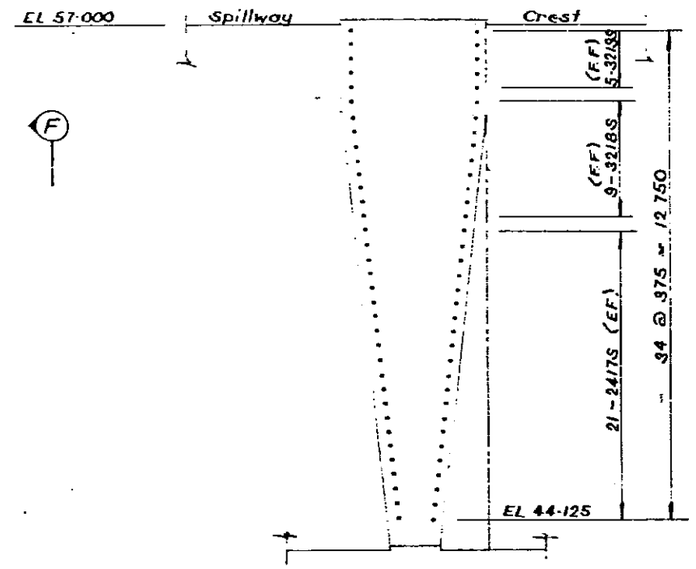
SPILLWAY - GROUT CAP
CONCRETE AND REINFORCEMENT

Sh 1 of 2 | 21·12·79 | A1-56249 | A

A1-56200

3610S, 3601J, 3602J to 3619J and 3639J bars are mechanically coupled to 3603L bars





SECTION (F)

(Scale b)

Vertical Reinforcement omitted for clarity

NOTES

1. All dimensions are in millimetres and elevations in metres
2. All materials and workmanship to the relevant Australian Standards
3. All reinforcement to be Cold-worked Deformed Steel to AS 1302 – 1977
4. CJ indicates Construction Joint
5. Pressed steel mechanical couplers may be used on C32 & C36 steel at Contractors option in lieu of using lap splices

SECTION (E/199)

(Scale a)

▽ 2020S bars shown apply to Mono S2 only

LEGEND

Near Face Reinforcement
- Bar examples shown thus
- Bar positions shown thus

Far Face Reinforcement
- Bar examples shown thus
- Bar positions shown thus

AS BUILT
By
Chk
Date 31/10/83

Revision				
Oct '85	B	As Built		
18·3·82	A	2020S bars added	M.J.C.	
Date		Remarks	Ckd	Psd

Drawing Schedule: A1-56199 Pier Nib Reinforcement (Sh 1 of 2)

Scale a: 0 1 2 3 4 5 m (1:50 before reduction)

Scale b: 0 2500 5000 7500 (1:75 before reduction)

CONTRACT Nº 2120

QUEENSLAND WATER RESOURCES COMMISSION

Design	Drafting	Recommended
Preq	Dr AJN	
Ckd	Ckd CJG	Senior Engineer Designs
Supv	Supv M.J.C.	Approved
Submitted		
Executive Engineer		Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

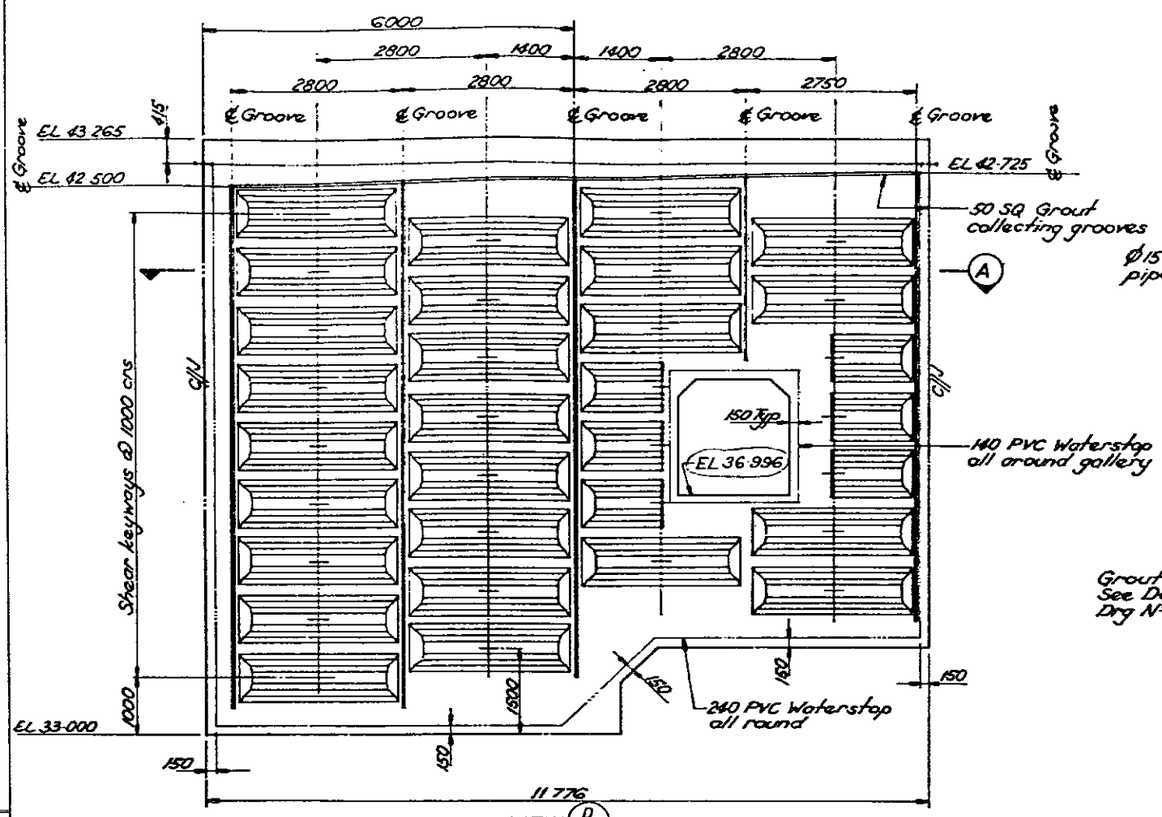
BRISBANE RIVER 150·2 km – WIVENHOE DAM

SPILLWAY MONOS S2 & S4

PIER NIB REINFORCEMENT

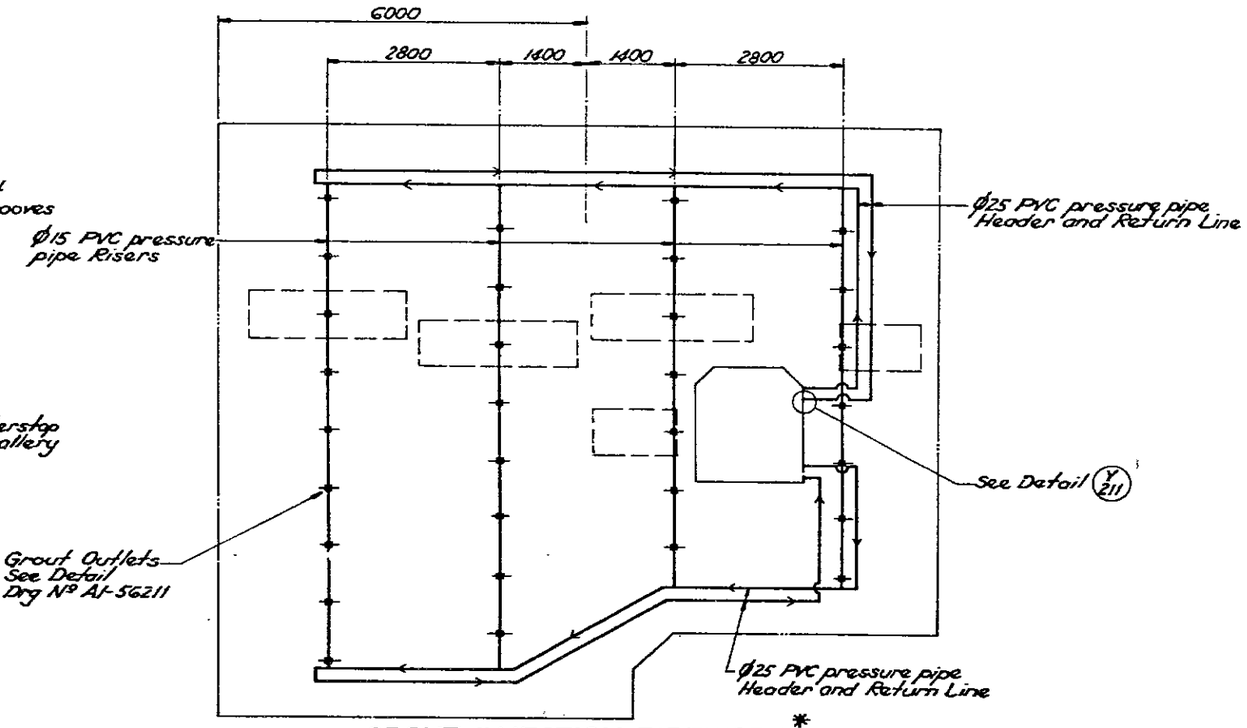
Sh 2 of 2 | 2·6·80 | A1-56200 | A | B

A1-56210

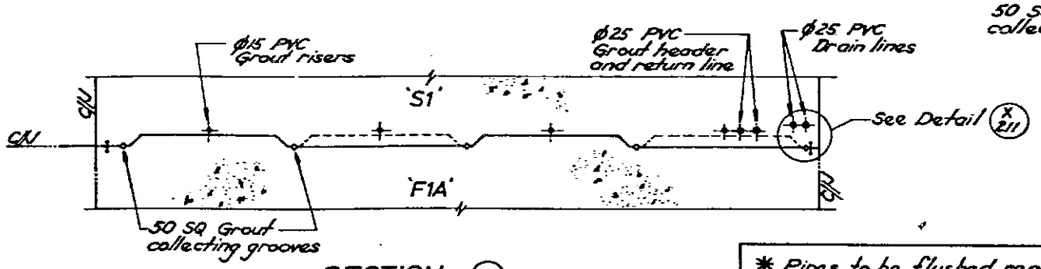


VIEW (D/208)

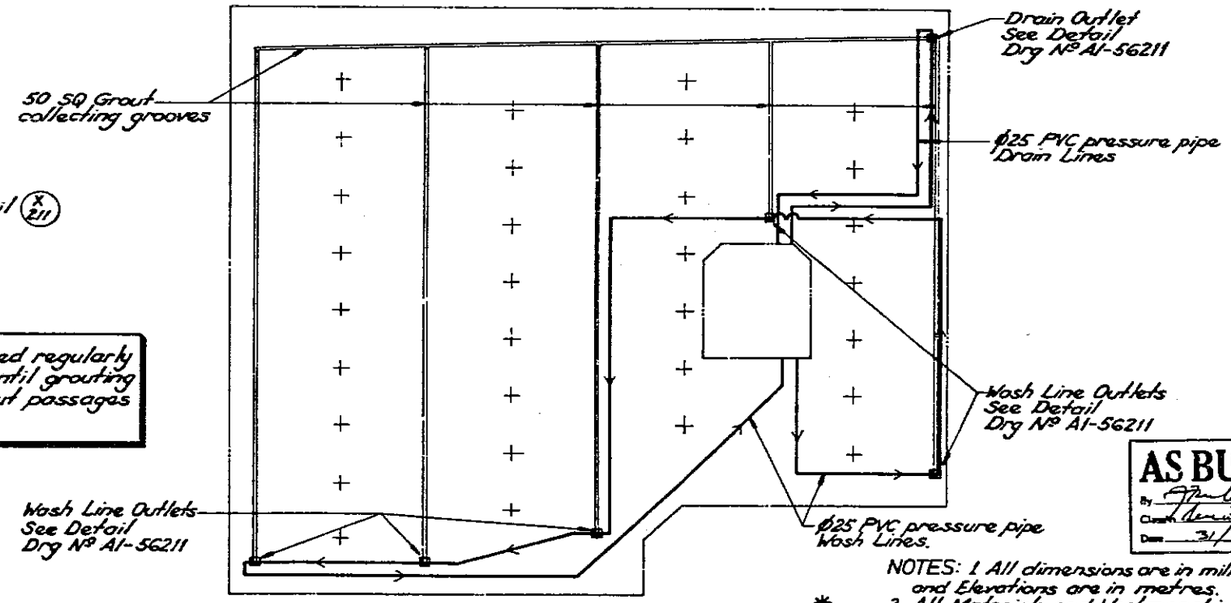
CONTRACTION JOINT BETWEEN 'S1' & 'F1A'
scale : a



GROUT INJECTION PIPEWORK *
scale : a

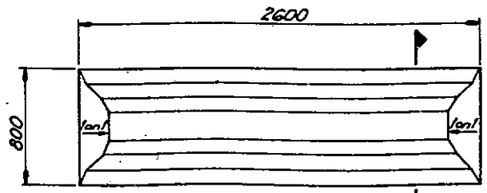


SECTION (A)
scale : a

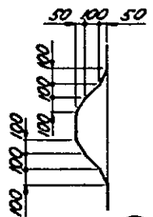


COLLECTOR PIPEWORK *
scale : a

* Pipes to be flushed regularly after installation until grouting begins so that grout passages remain clear.



SHEAR KEYWAY DETAILS (B)
scale : b



SECTION (B)

AS BUILT
By
Check
Date 31/18/85

NOTES: 1 All dimensions are in millimetres and Elevations are in metres.
2. All Materials and Workmanship to the relevant Australian Standard.
3 For General Notes See Drg A1-56208

Revision					Drawing Schedule	
Oct '85	B	As Built				
28-8-80	A	View D-208 amended	M.J.C		A1-54566	Flip Slabs - Concrete
Date		Remarks	Ckd	Psd	A1-56208	Mono S1 - Concrete Sh 1 of 3

Scales Before Reduction
Scale 'a' 0 — 5000 mm — Scale 1:50
Scale 'b' 0 — 1000 — 2000 mm — Scale 1:20

CONTRACT Nº 2120

QUEENSLAND WATER RESOURCES COMMISSION

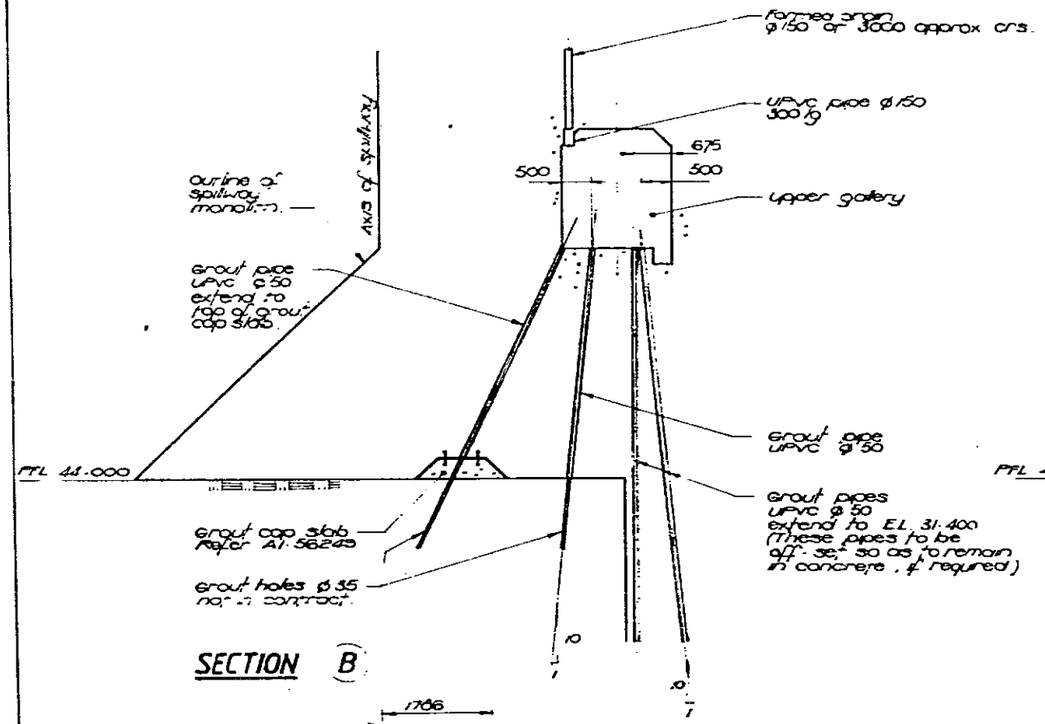
Design	Drafting	
Prep B.J.S	Dr G.R.C	Recommended
Ckd N.A	Ckd	Senior Engineer Designs
Supv N.L	Supv M.J.C	Approved
Submitted		
Executive Engineer		Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

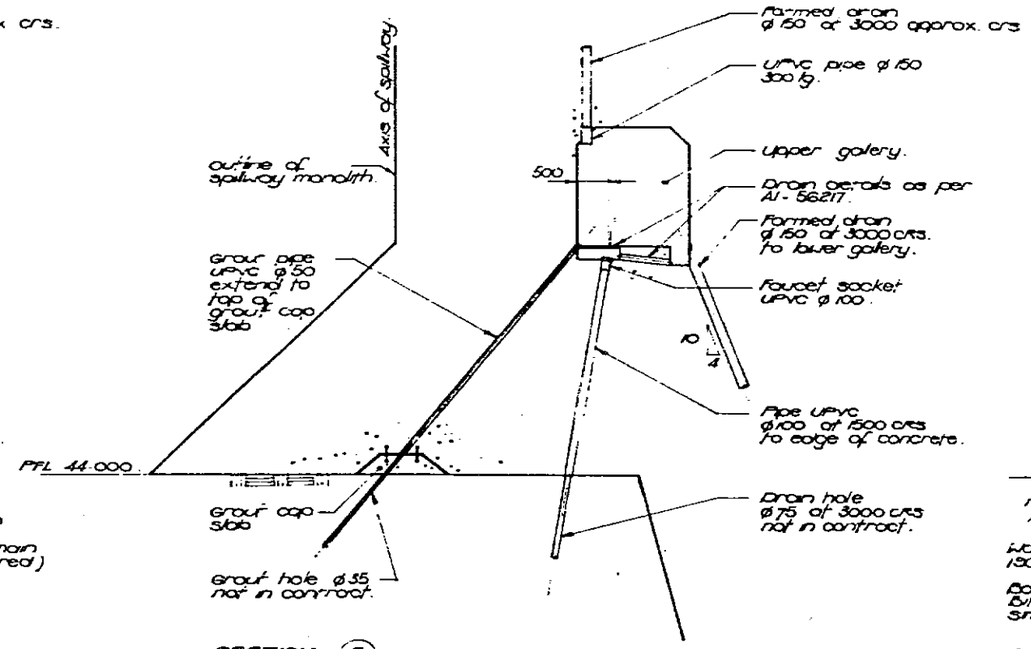
BRISBANE RIVER 150·2 km — WIVENHOE DAM
SPILLWAY
MONOLITH S1 CONCRETE & GROUTING

Sh 2 of 3 | 12·3·80 | A1-56210 | A | B

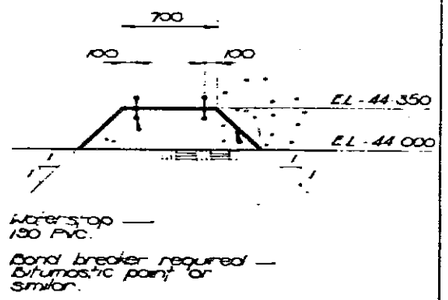
A1-56221



SECTION B

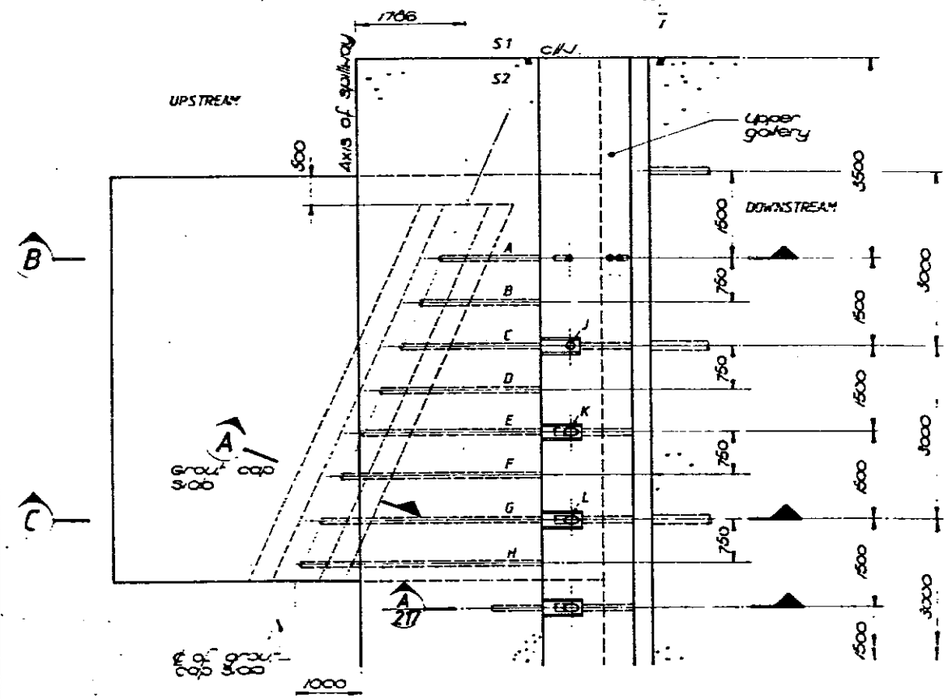


SECTION C



SECTION A

Enlarged Detail.



SECTION F 216

SLOPE OF GROUT & DRAIN PIPES

Grout Pipes	Slope Dimension x - 1/1000
A	450
B	535
C	626
D	714
E	802
F	850
G	978
H	1067
Drain Pipes	
J	Vertical
K	167
L	333

Notes

1 All dimensions are in millimetres & all elevation are in metres

2 All materials & workmanship to the relevant Australian standards

3 All uPVC pipes to be heavy duty (AS 1260) or class 6 (AS 1477)

For drainage details see also A1-74872

AS BUILT
By
Class Senior Engr
Date 31/12/85

Revision				
Oct '85	A	As Built		
Date		Remarks	Chd	Psd

Drawing Schedule	
A1-56248	Grout Cap - Concrete & reinforcement
A1-56217	Upper Galery Drainage & Grout Arrg't.
A1-56216	Upper & Lower Galleries Drainage & Grout Arrg't

SCALE 1:50 0 1000 2000 3000 4000 5000 mm
BEFORE REDUCTION

CONTRACT Nº 2120

QUEENSLAND WATER RESOURCES COMMISSION

Design	Drafting
Prep BJS	Dr MGS
Chd	Chd
Supv	Supv M.J.C.

Submitted
Executive Engineer

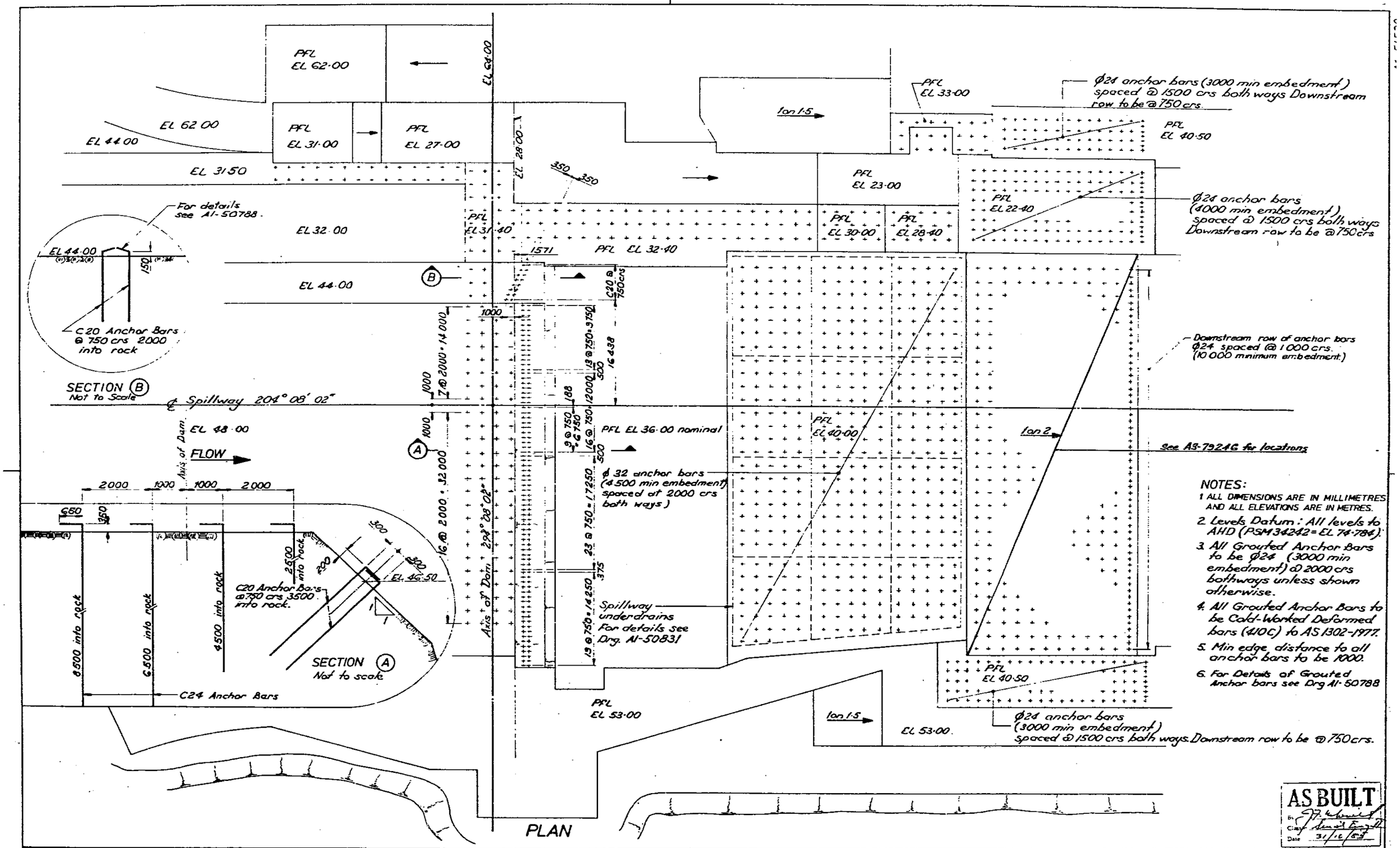
Recommended
Senior Engineer Designs

Approved
Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150.2 km - WIVENHOE DAM
SPILLWAY
UPPER GALLERY MONO S2
DRAINAGE & GROUT ARRANGEMENT

5 2 80 | A1-56221 | A



NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES AND ALL ELEVATIONS ARE IN METRES.
2. Levels Datum: All levels to AHD (PSM 34242 = EL 74·784).
3. All Grouted Anchor Bars to be Ø24 (3000 min embedment) @ 2000 crs bothways unless shown otherwise.
4. All Grouted Anchor Bars to be Cold-Worked Deformed bars (410C) to AS 1302-1977.
5. Min edge distance to all anchor bars to be 1000.
6. For Details of Grouted Anchor bars see Drg A1-50788

AS BUILT
By: J. Schmidt
Chief Asst's Engr
Date 31/12/85

Revision				
17/10/85	C	As Built		
27-3-79	B	Apron slab bars added	M.J.C.	
3-9-79	U	Tender drg to Working drg	M.J.C.	
		Sect (A) added, and contract No amended Excavation D/S & D/Stream		M.J.C.
4/5/79	A	anchor bars amended	R.D.	
Date		Remarks	Ckd	Psd

Drawing Schedule	
A1-50788	Grouted Anchor Bars
A1-49963	Spillway excavation Details - Stage 1
A1-54537	Grouted Anchor Bars For Walls

Scale 0 — 250m
Scale 1:250 Before Reduction

CONTRACT Nº 2120

IRRIGATION AND WATER SUPPLY COMMISSION

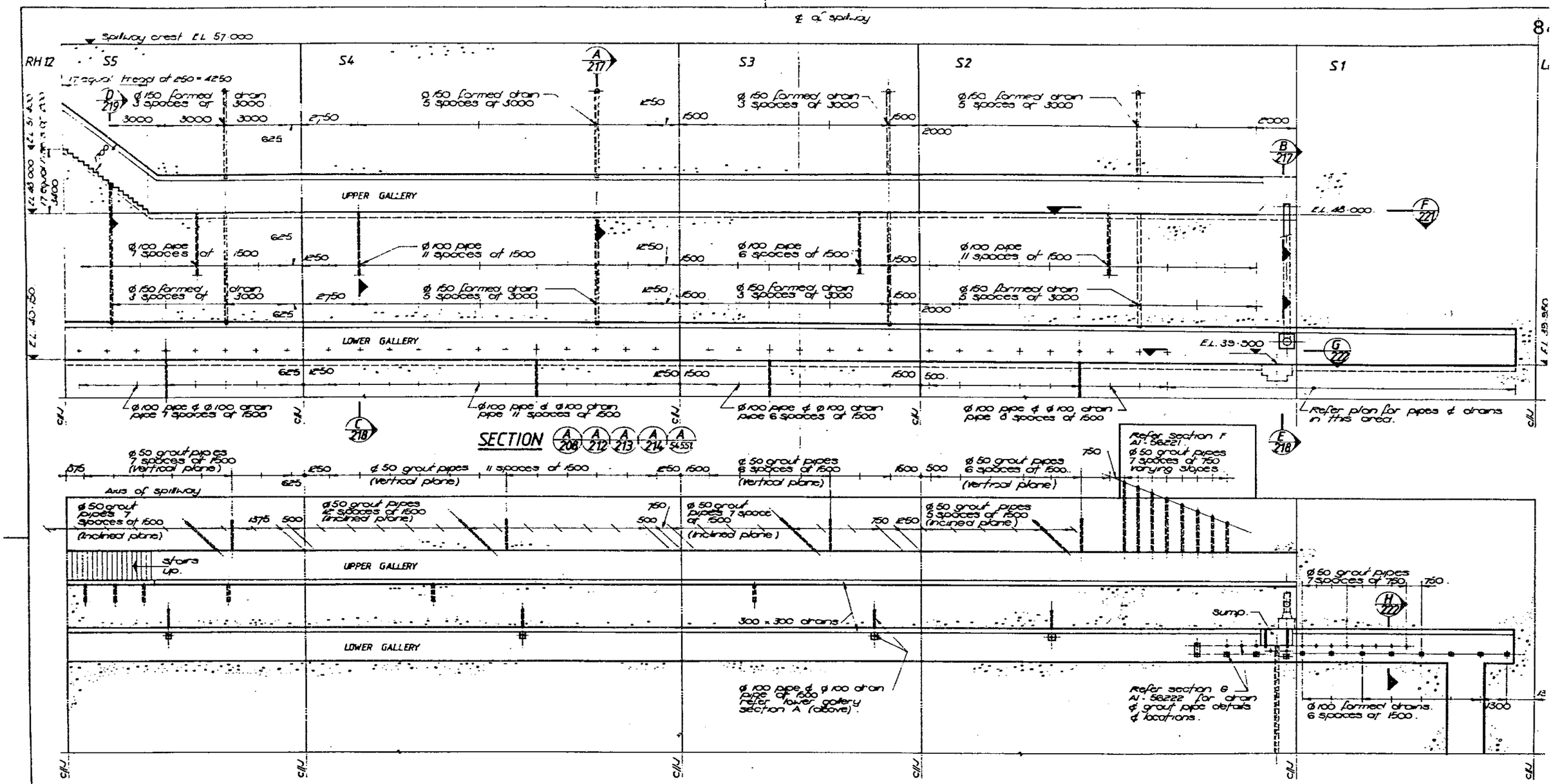
Design	Drafting	Recommended
Prep	Dr CRC	K. Russo
Ckd	Ckd M.J.C.	Senior Engineer Designs
Supv	Supv	Approved
Submitted B.J. Menzies		K. Walsh
Executive Engineer		Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km - WIVENHOE DAM
THIRD STAGE CONSTRUCTION
SPILLWAY
GROUTED ANCHOR BARS FOR SLABS

17-10-78 | A1-54538 | A | W | B | C

INS. 0 2 4 6 8 10



SECTIONAL PLAN ON GALLERIES

For drainage details see also A1-74E72

AS BUILT
By
Class
Date 31/12/85

Notes.
1. All dimensions are in millimetres & all elevations are in metres.
2. All materials & workmanship to the relevant Australian standard.
3. Each embedded pipe shall be set & maintained in position so that a clear opening of diameter not less than (a) 45 mm for ø50 pipe or (b) 65 mm for ø100 pipe is maintained over its entire length.

Revision				
Oct '85	B	As Built		
10-6-80	A	1700 to s/fors - S5	M.J.C.	
Date		Remarks	Ckd	Psd

Drawing Schedule	
A1-56222	Lower Gallery Mono 32 Drain. & Grout Arrg't.
A1-56221	Upper Gallery Mono 32 Drain. & Grout Arrg't.
A1-56215	Upper Gallery Stair Drain. & Grout Arrg't.
A1-56218	Lower Gallery Drain. & Grout Arrangement.
A1-56217	Upper Gallery Drain & Grout Arrangement.

SCALE 1:100 — 0 — 5000 — 10000 mm
BEFORE REDUCTION

CONTRACT Nº 2120

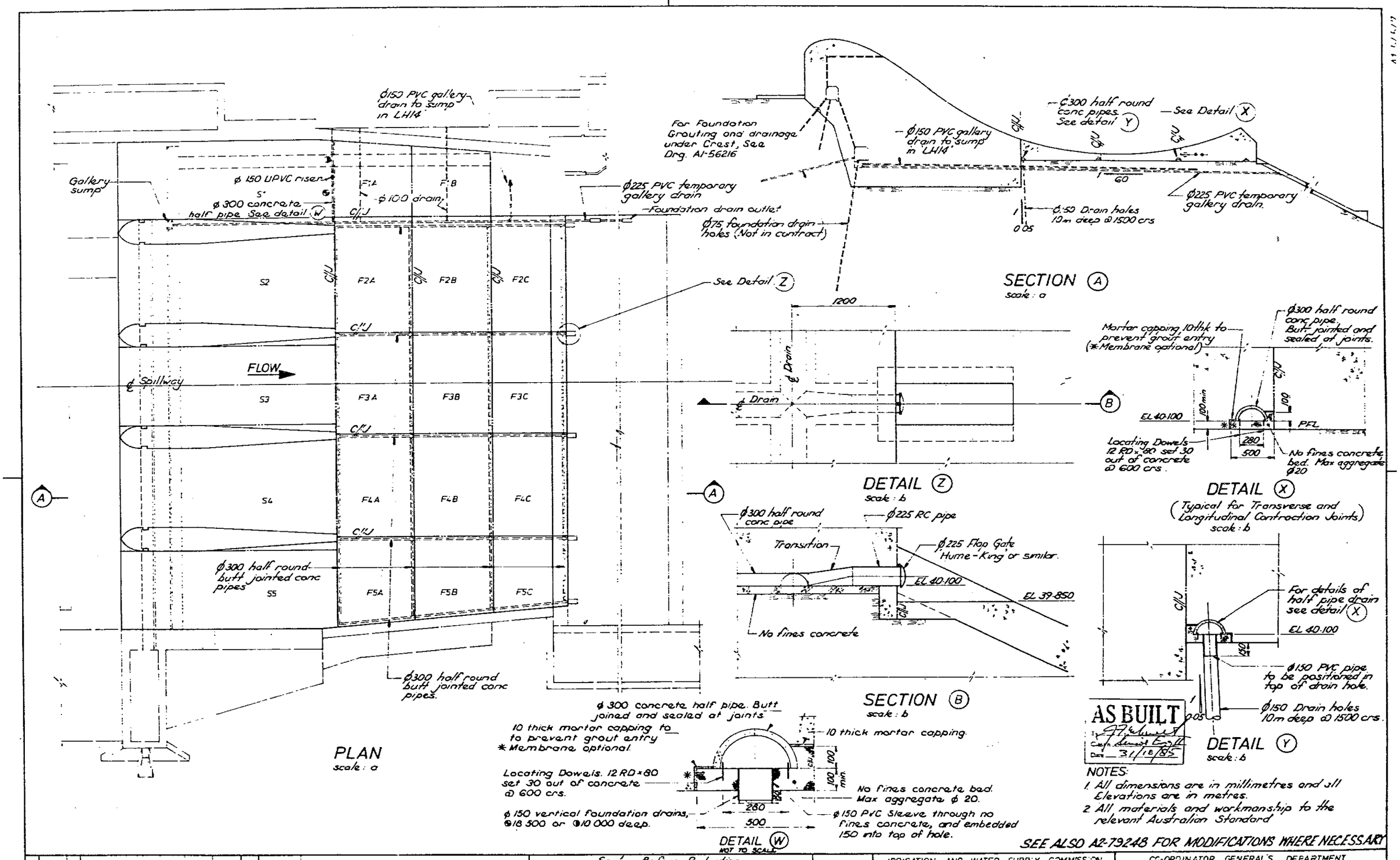
QUEENSLAND WATER RESOURCES COMMISSION

Design	Drafting	Recommended
Prep BJS	Dr MGS	
Ckd	Ckd	Senior Engineer Designs
Supv	Supv M.J.C.	Approved
Submitted Executive Engineer		Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 159·2 km — WIVENHOE DAM
SPILLWAY
UPPER & LOWER GALLERIES
DRAINAGE & GROUT ARRANGEMENT

5·2·80 | A1-56216 | A | B



NOTES:

1. All dimensions are in millimetres and all Elevations are in metres.
2. All materials and workmanship to the relevant Australian Standard

SEE ALSO A2-79248 FOR MODIFICATIONS WHERE NECESSARY

Revision				
Oct '85	A	As Built		
Date		Remarks	Ckd	Psd

Drawing Schedule

Scales Before Reduction
Scale : a 0 1000 2000 2500 mm — Scale 1:250
Scale : b 0 1000 2000 mm — Scale 1:20

CONTRACT № 2120

IRRIGATION AND WATER SUPPLY COMMISSION

Design	Drafting	Recommended
Prep B.J.S.	Dr CRC	
Ckd	Ckd	Senior Engineer Designs
Supv	Supv M.J.C.	Approved
Submitted B.J. Shannon Executive Engineer		Actg Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

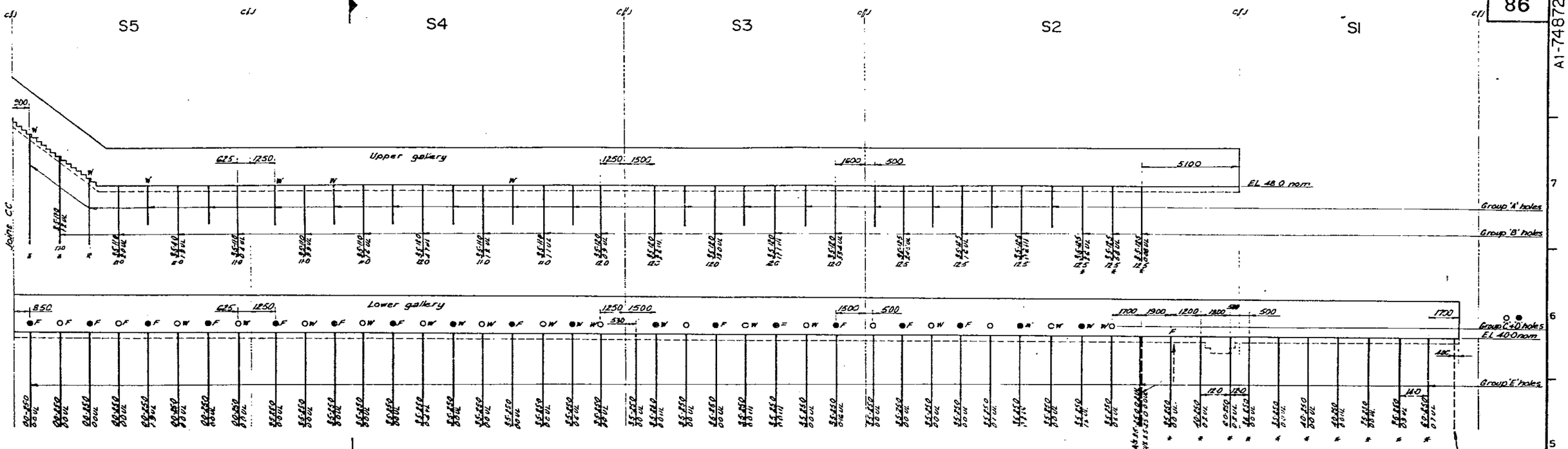
BRISBANE RIVER 150.2 km WIVENHOE DAM SPILLWAY

FOUNDATION DRAINAGE DETAILS

14-9-79 | A1-54547 | A

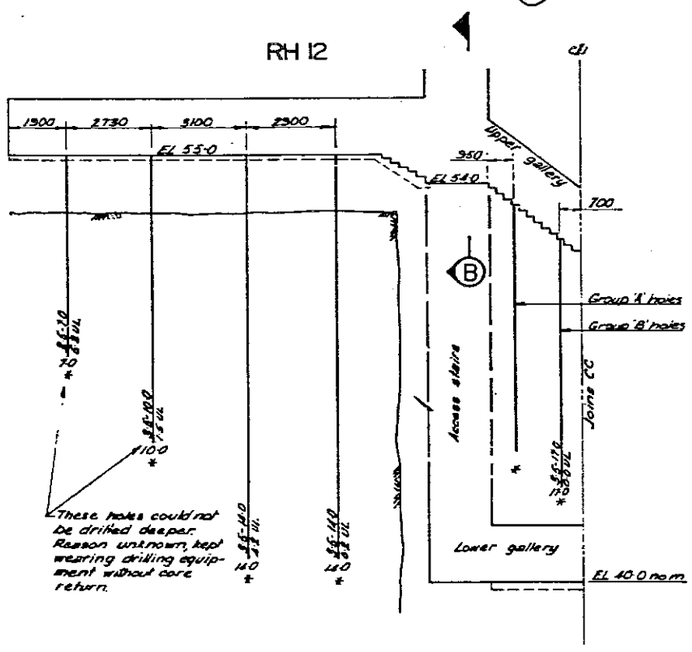
86

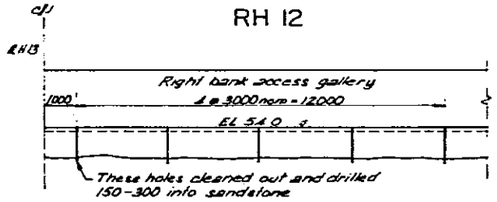
A1-74872



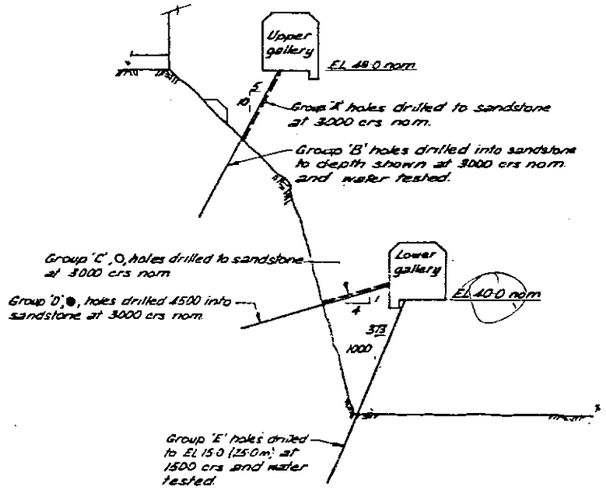
LONGITUDINAL SECTION OF GALLERIES

Note:- Depth of holes not shown to scale.





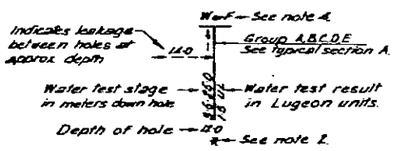
SECTION (B)



TYPICAL SECTION (A)

Note:- Depth of holes not shown to scale.

HOLE LEGEND



NOTES

1. This plan to be read in conjunction with A1-56216 to A1-56222.
2. A indicates these holes are drilled with slopes different to those shown in typical section A, for approximate slopes refer plans in note 1.
3. All holes were drilled with a 60 dia diamond drill core bit.
4. F indicates a small, only noticeable flow from drain hole.
   W indicates a damp water stain at drain hole.
5. The observations in 4 above were made on the 4-9-84 with reservoir level at EL 55.1.

AS BUILT

REVISION					DRAWING SCHEDULE		
DATE	REMARKS	ZONE	CKD	PSD	A1-56216	Drainage and grout arrangement	SURVEY BOOKS

SCALES: 0 — 5 — 10 metres (1:100)

DESIGN	DRAFTING
PREP	DR
CKD	CKD
SUPV	SUPV
SUBMITTED	

Queensland Water Resources Commission

RECOMMENDED

APPROVED 5.9.84.

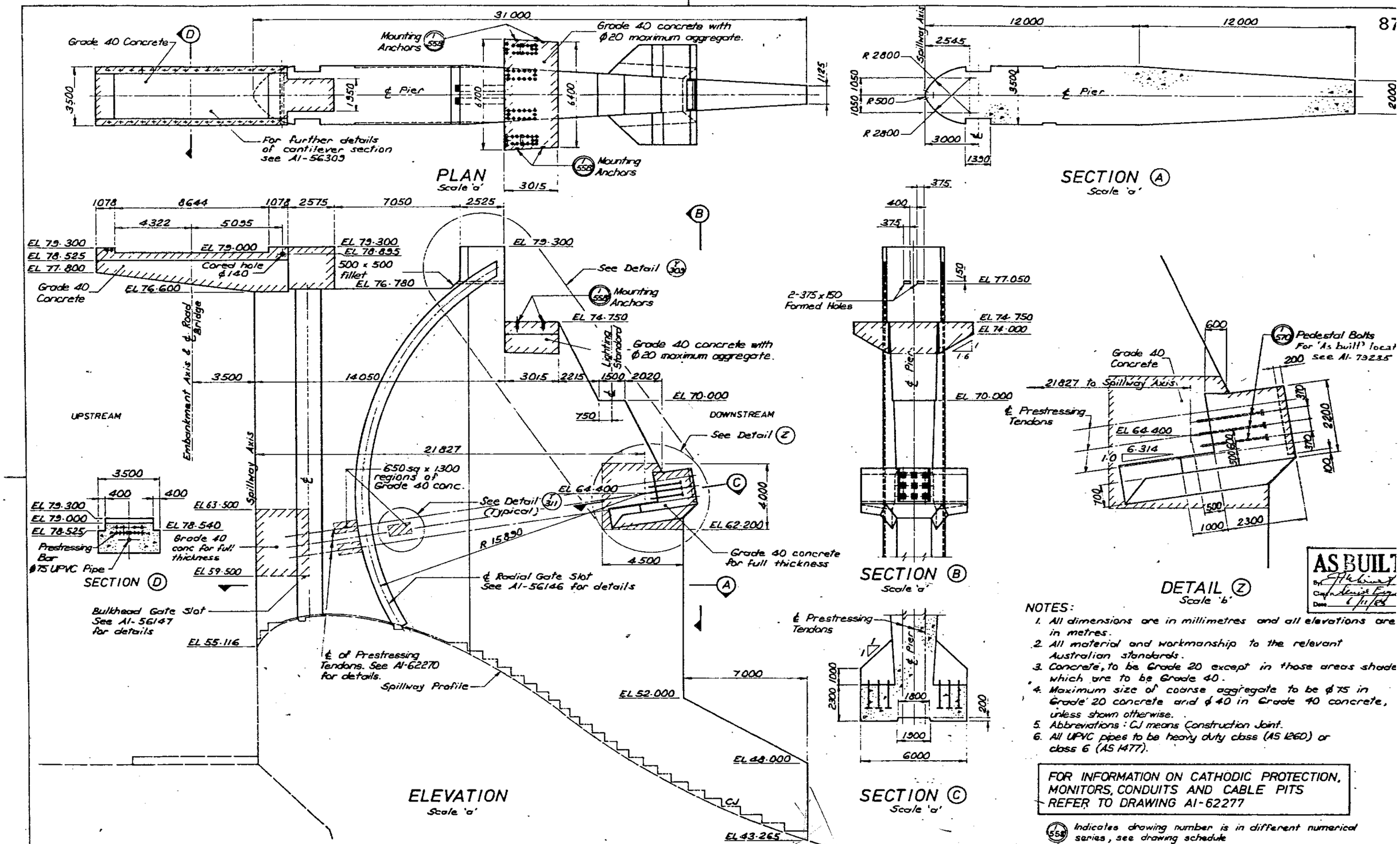
BRISBANE RIVER 150·2 km – WIVENHOE DAM
SPILLWAY
UPPER AND LOWER GALLERIES
FOUNDATION DRAIN HOLES
AS BUILT

CONTRACT NUMBER

DRAWING NUMBER A1-74872

DATE 4-9-84

WD-A1-867



AS BUILT

NOTES:

1. All dimensions are in millimetres and all elevations are in metres.
2. All material and workmanship to the relevant Australian standards.
3. Concrete, to be Grade 20 except in those areas shade which are to be Grade 40.
4. Maximum size of coarse aggregate to be ϕ75 in Grade 20 concrete and ϕ40 in Grade 40 concrete, unless shown otherwise.
5. Abbreviations: CJ means Construction Joint.
6. All UPVC pipes to be heavy duty class (AS 1260) or class 6 (AS 1477).

FOR INFORMATION ON CATHODIC PROTECTION, MONITORS, CONDUITS AND CABLE PITS REFER TO DRAWING A1-62277

(558) Indicates drawing number is in different numerical series, see drawing schedule

Revision			
Oct '85	A	As Built	
Date		Remarks	Chd / Psd

Drawing Schedule

A3-G1570	Radial Gates - Pedestal Bolts
A3-G1558	Radial Gates - Hoist Platforms - Mounting Anchors
A1-62270	Piers P1-P4 - Concrete (Sh 4 of 4)
A1-56315	Piers P1-P4 - Reinforcement (Sh 1 of)
A1-56147	Bulkhead Gate Slots - First Stage Conc.
A1-56146	Radial Gate Slots - First Stage Conc.
A1-56311	Piers P1-P4 - Concrete (Sh 3 of 4)
A1-56309	Piers P1-P4 - Concrete (Sh 2 of 4)

Scale 'a' 0 5 10 m (1:100)

Scale 'b' 0 1 2 3 4 5 m (1:50)

(Scales before reduction)

CONTRACT Nº 2120

QUEENSLAND WATER RESOURCES COMMISSION

Design	Drafting	Recommended
Prep	Dr RFP	
Chd	Chd	Senior Engineer Designs
Supv	Supv M.J.C.	Approved
Submitted		
Executive Engineer		Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

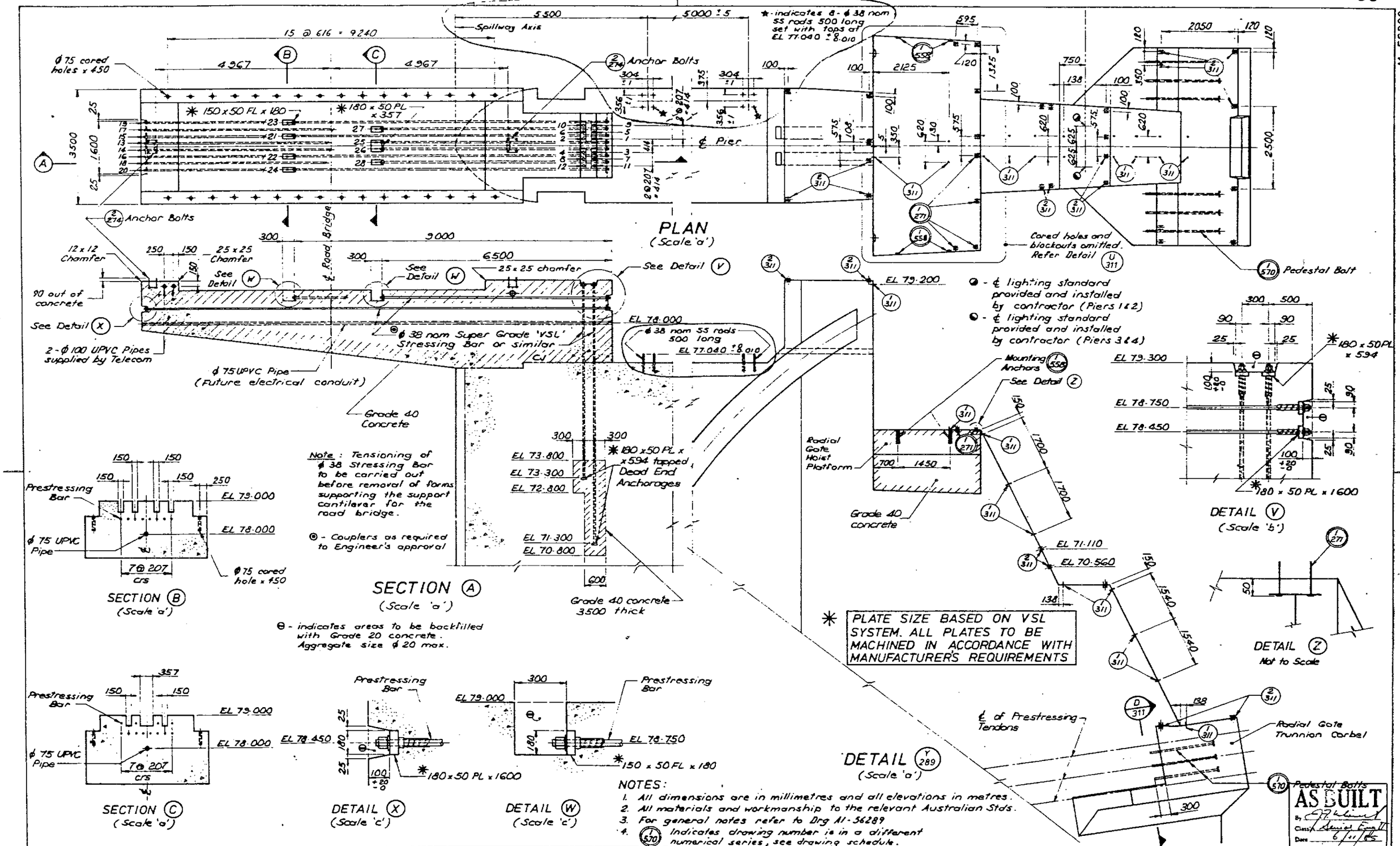
BRISBANE RIVER 150·2 km — WIVENHOE DAM

SPILLWAY

PIERS P1-P4 - CONCRETE

Sh 1 of 4	30·6·81	A1-56289	A

A1-56309



✱ PLATE SIZE BASED ON VSL SYSTEM. ALL PLATES TO BE MACHINED IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS

NOTES:

1. All dimensions are in millimetres and all elevations in metres.
2. All materials and workmanship to the relevant Australian Std's.
3. For general notes refer to Drg A1-56289
4. (1/570) Indicates drawing number is in a different numerical series, see drawing schedule.

Revision			
Oct 75	B	As Built	
16.7.81	A	ϕ 38 SS rods added	
Date		Remarks	Ckd / Psd

Drawing Schedule	
A3-62271	Spillway - Piers 1-4, LH11 & RH12 Handrail Anchor Plates Fabrication.
A1-62270	Piers P1 - P4 - Concrete (Sh 4 of 4)
A3-61558	Radial Gates - Hoist Platforms - Mounting Anchor
A3-61570	Radial Gates - Pedestal Bolts
A1-56311	Piers P1 - P4 - Concrete (Sh 3 of 4)
A1-56289	Piers P1 - P4 - Concrete (Sh 1 of 4)

Scale 'a' 0 1 2 3 4 5m (1:50)
Scale 'b' 0 500 1000 1500 2000 mm (1:20)
Scale 'c' 0 500 1000 mm (1:10)
(Scales before reduction)

CONTRACT Nº 2120

QUEENSLAND WATER RESOURCES COMMISSION

Design	Drafting	Recommended
Prep	Dr KFP	Senior Engineer Designs
Ckd	Chd	
Supv	Supv M.J.C	Approved
Submitted		Chief Designing Engineer
Executive Engineer		

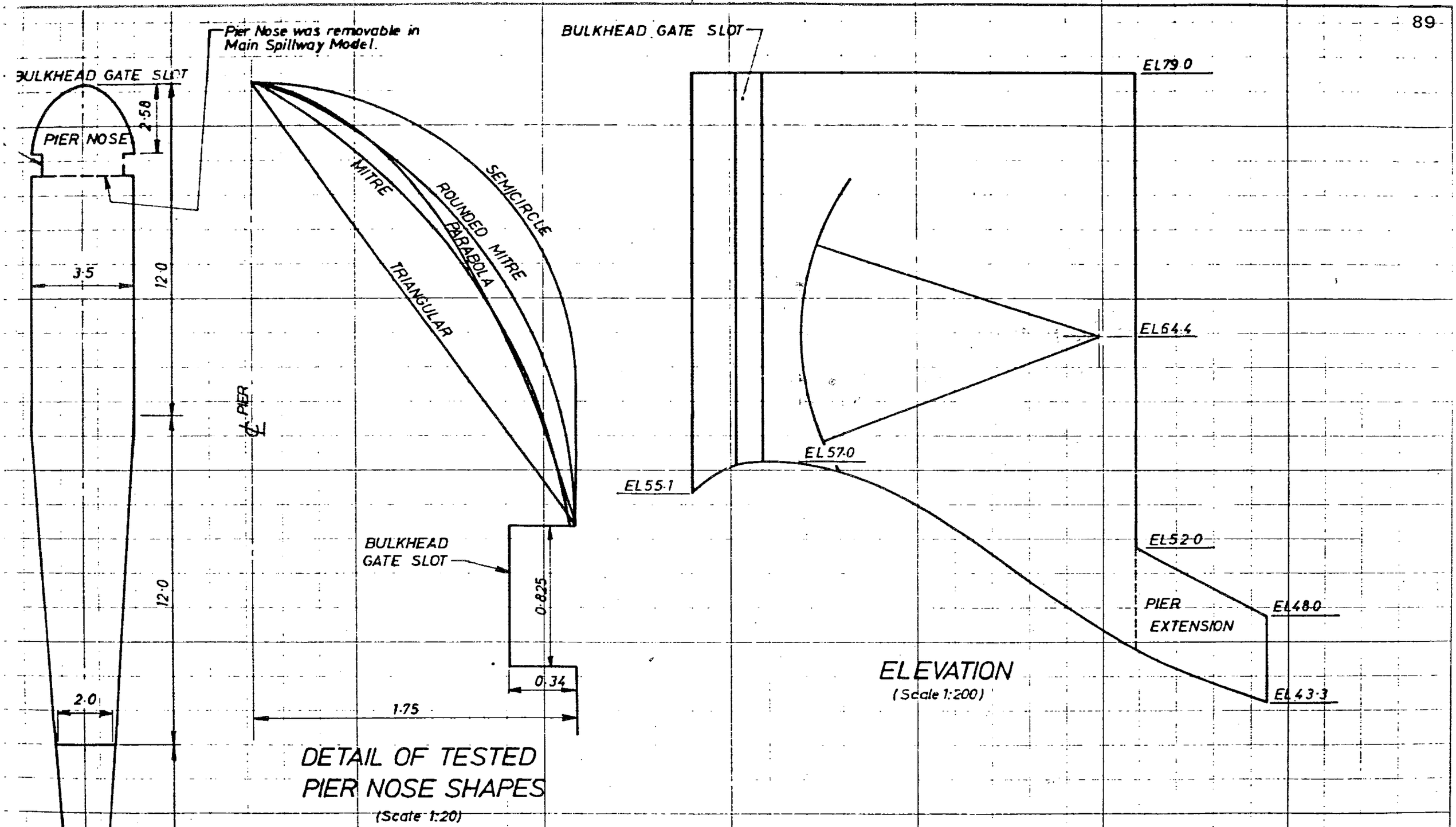
CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km — WIVENHOE DAM

SPILLWAY

PIERS P1 - P4 - CONCRETE

Sh 2 of 4 | 30.6.81 | A1-56309 | A | B



Design	Drafting	Recommended
Prep	Dr	
Ckd	Ckd	Senior Eng Designs
Supv	Supv	Approved
Submitted		
E/C Hydraulics Lab.		Chief Designing Eng

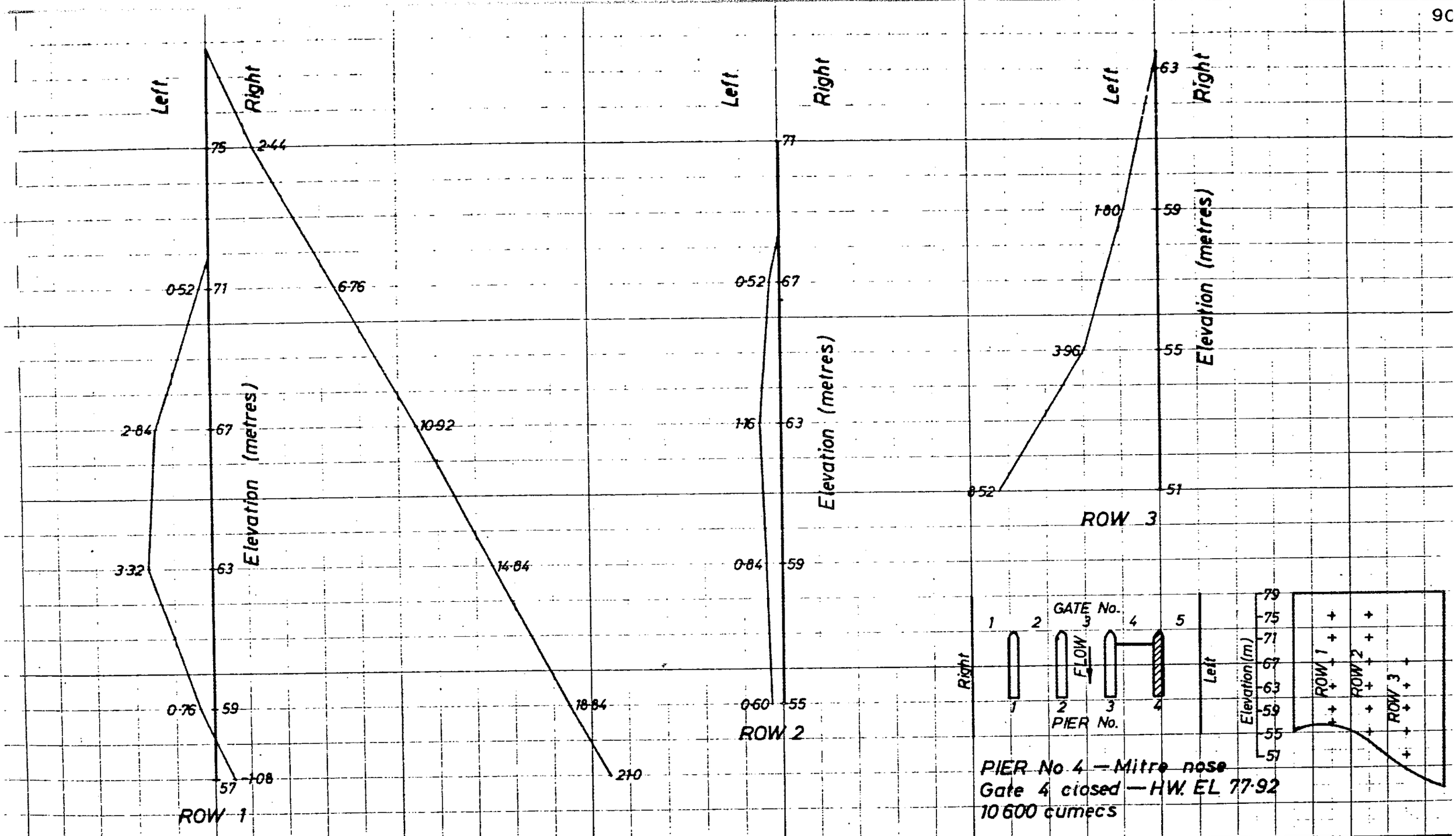
QUEENSLAND WATER RESOURCES COMMISSION

WIVENHOE DAM

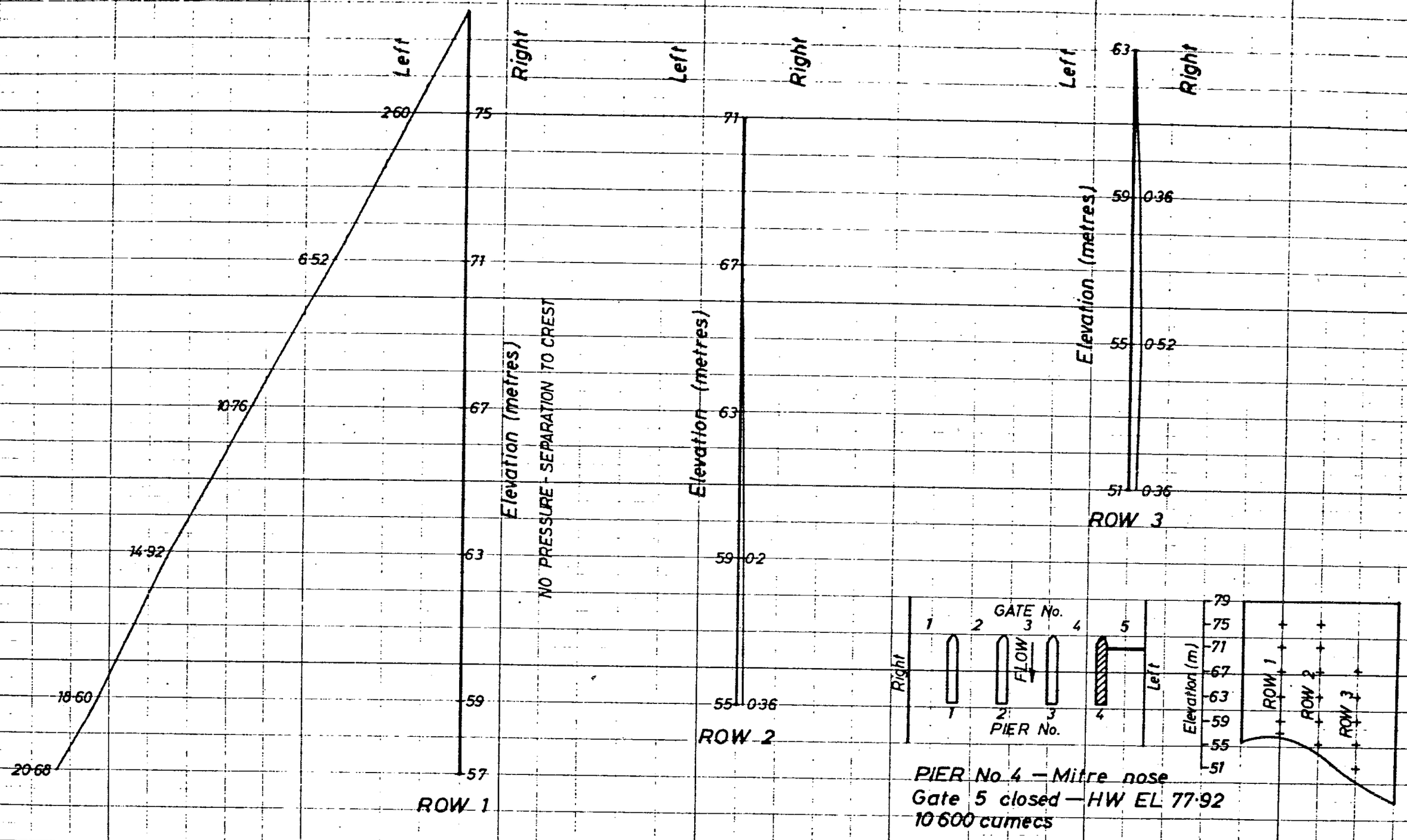
SPILLWAY MODEL

PIER GEOMETRY

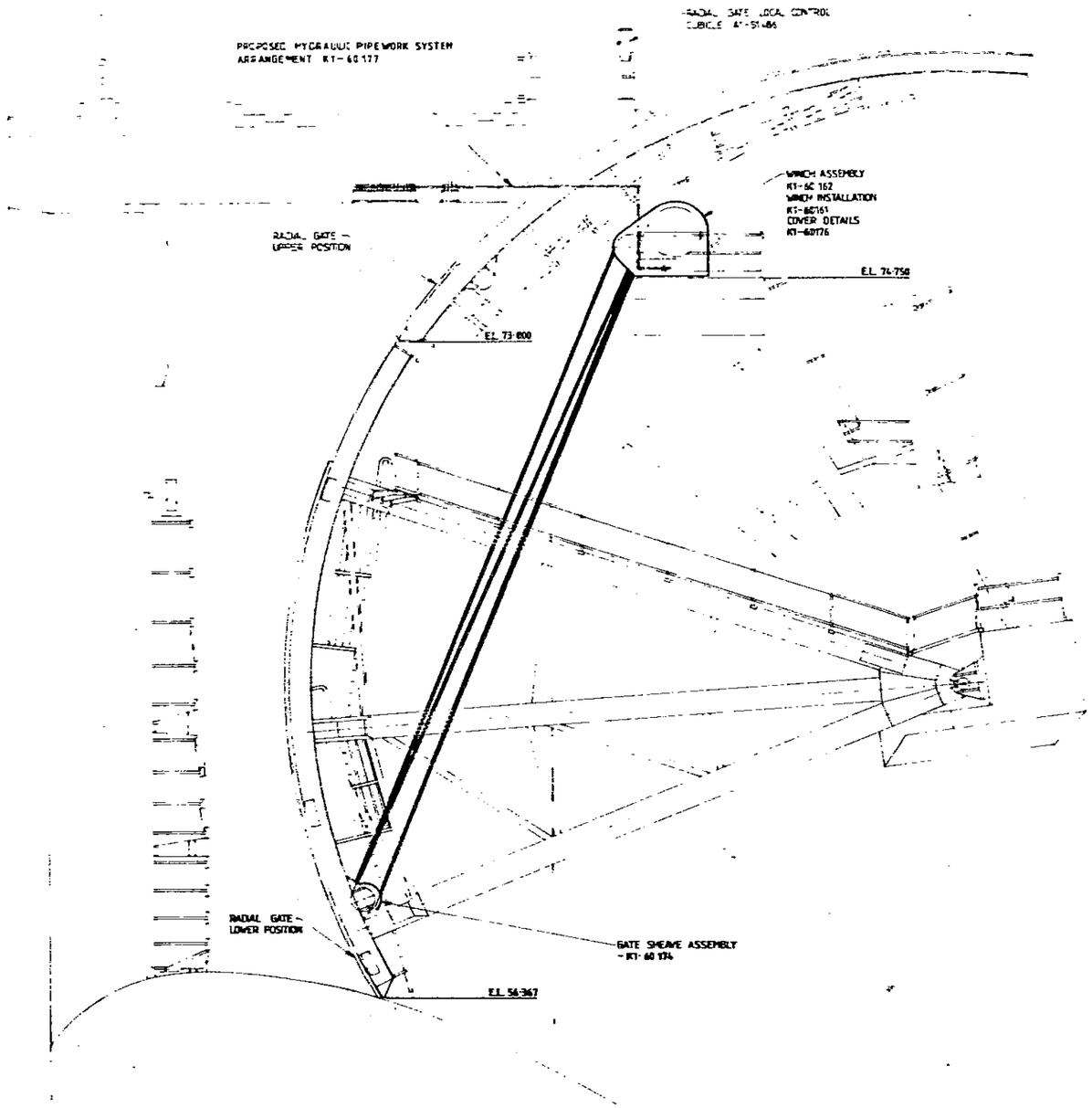
9-3-79 A3-54791



Design	Drafting	Recommended	QUEENSLAND WATER RESOURCES COMMISSION
Prep. P.A.	Dr. M.L.		WIVENHOE DAM SPILLWAY MODEL
Ckd. ✓	Ckd. ✓	Senior Eng. Designs	PIER PRESSURES
Supv. ✓	Supv. ✓	Approved	
Submitted			9-3-79 A3-54812
E/C Hydraulics Lab		Chief Designing Eng.	



Design	Drafting	Recommended	QUEENSLAND WATER RESOURCES COMMISSION
Prep. P.A.	Dr. M.J.L.		WIVENHOE DAM SPILLWAY MODEL
Ckd.	Ckd.	Senior Eng. Designs	PIER PRESSURES
Supv.	Supv.	Approved.	
Submitted			
E/C Hydraulics Lab		Chief Designing Eng.	9-3-79 A3-54796



ELEVATION

(LEFT HAND WINCH UNIT SHOWN
TYPICAL 10 LOCATIONS)

DRAWING SCHEDULE	
K1-60177	PROPOSED HYDRAULIC PIPEWORK SYSTEM-ARRANGEMENT
K1-60176	COVER DETAILS
K1-60174	GATE SHEAVE ASSEMBLY
K1-60162	WINCH ASSEMBLY
K1-60161	WINCH INSTALLATION DETAILS

REVISION					
DATE		REMARKS	ZONE	CKD	PSD

SCALE: 1 100 200 300 400 500
(1:50)
(BEFORE REDUCTION)
(OTHERS AS NOTED)

CONTRACT No. 2123

QUEENSLAND WATER RESOURCES COMMISSION

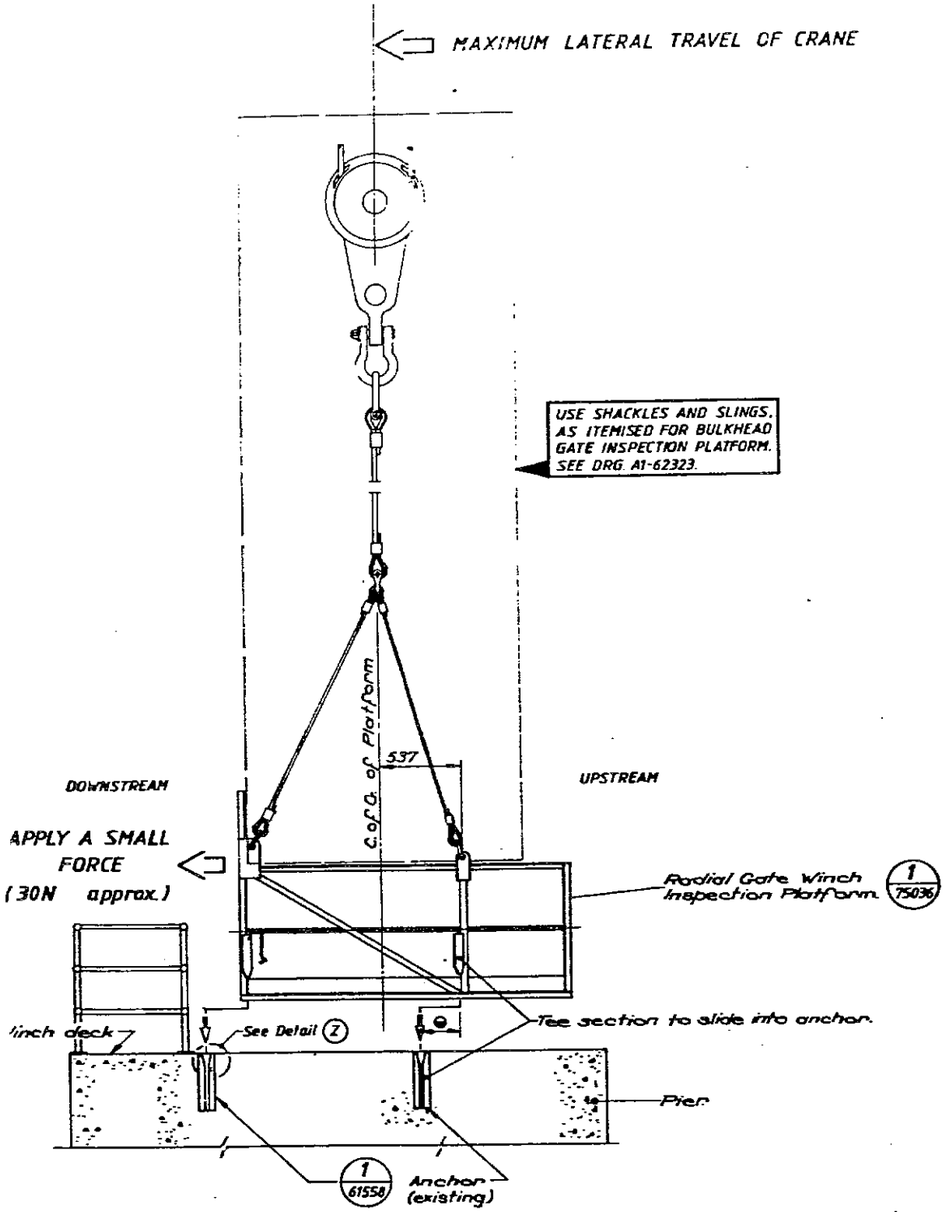
DESIGN: PREPARED 6.6.82 — CHD. — SUPV.
DRAFTING: CKD — SUPV.
RECOMMENDED: 6.6.82 — SENIOR CIVIL ENGINEER
SUBMITTED: F. Tsimanis 16.6.82 — ENGINEER
APPROVED: 23.6.82 — SENIOR ENGINEER MECH. & ELEC.

CO-ORDINATOR GENERAL'S DEPARTMENT

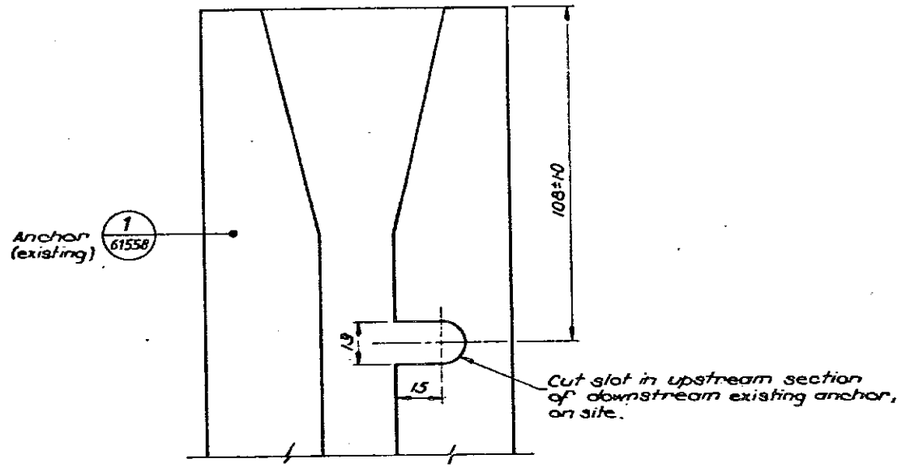
BRISBANE RIVER 150·2km-WIVENHOE DAM
RADIAL GATE HOISTS
ARRANGEMENT

K1-60 160

A1-75038



INSTALLATION DETAIL
(Not to Scale)



DETAIL Z
(Scale - Full Size)

DATE	REMARKS	ZONE	CKD	PSD

REVISIONS

DRAWING SCHEDULE: A1-75039 Inspection Platform Fabrication.

SCALE

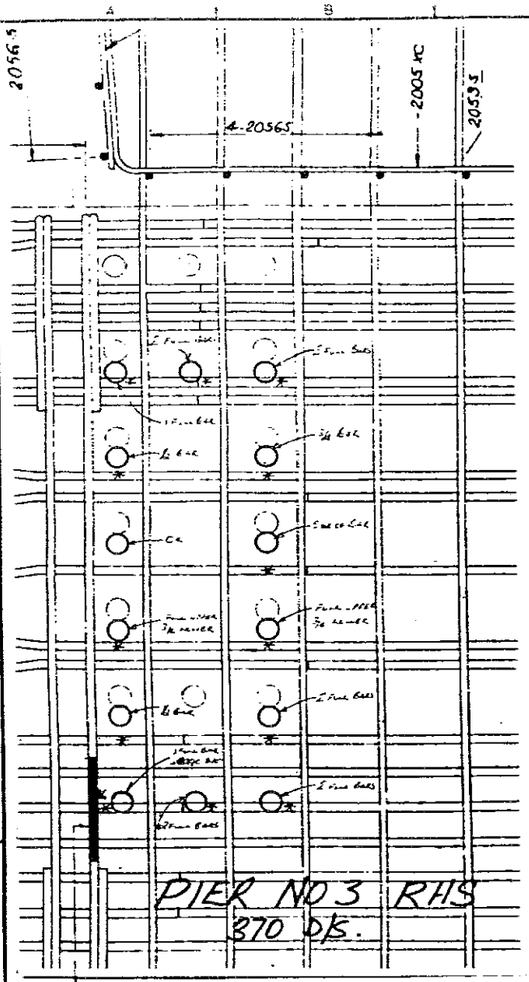
DESIGN: PREP; CKD; SUPV; SUBMITTED; EXEC ENGINEER
DRAFTING: DR; CKD; SUPV; SUBMITTED; SUPV D'MAN
RECOMMENDED: SENIOR ENGINEER DESIGNS
APPROVED: CHIEF DESIGNING ENGINEER

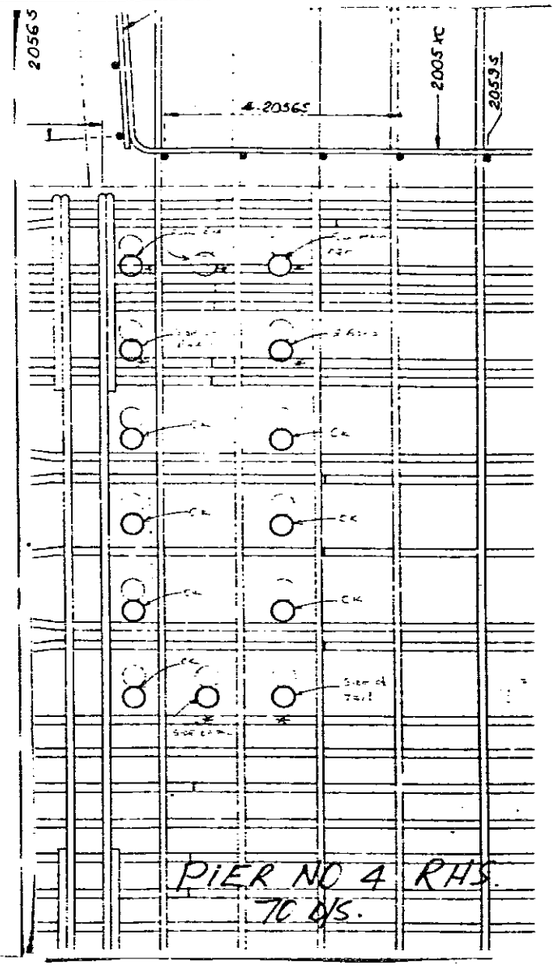
Queensland Water Resources Commission

BRISBANE RIVER 150·2km - WIVENHOE DAM
RADIAL GATE WINCH
INSPECTION PLATFORM
INSTALLATION

CONTRACT NUMBER
DRAWING NUMBER A1-75038
DATE 27-11-84.

INS. 0 2 4 6 8 10
CM. 0 2 4 6 8 10 20 30





Approximate position of splice

* Indicates bar most likely cut.

FOR REINFORCEMENT DETAILS SEE AI-62272

QUEENSLAND WATER RESOURCES COMMISSION—OFFICE MEMO. 9650

To: CHIEF DESIGN ENGINEER.

From: CHIEF DESIGN ENGINEER. Date: 8/9/83 File: 85/

Copies to: PROJECT ENGINEER, TULLIBIGEAL. F. Allen 224.8255

Subject: PIERS 3, 4 AND 5 NO. 4 WINCH PLATFORM DETAILS

Reference: 9650.10

It was originally envisaged that the winch pedestal would be placed in cored holes in the winch platforms.

However the Contractor opted to place the concrete and drill out the pedestal bolt holes at a later date. While some care was taken to ensure that the reinforcement locations did not conflict with the "cored hole" locations less care was taken with the hole locations when they were drilled.

As shown on the attached figures, the result was that on the right hand sides of piers no. 3 and 4 on the inner winch pedestal, the bolt groups were:-

Pier No. 3 370 mm downstream of "true".
Pier No. 4 70 mm downstream of "true".

The result of such errors in such a heavily reinforced structure inevitably lead to the cutting of bars during the drilling process with the effective loss of 6 off C32 bars and a C20 closed tie in pier no. 3 and 2.66 off C32 bars in pier no. 4.

Details of these severed bars, as supplied to us from Wivenhoe Dam, are attached for your reference.

It is hard to understand how the Contractor cut through so many bars before the alarm was raised by our inspectors.

The correct location of the winch platform pedestals is critical to the proper lifting of the radial gates so at the very least the holes will have to be redrilled in their correct locations.

To determine what other remedial measures are required a design check has been carried out on these platforms.

Fortunately the severed bars are outside the regions of critical shear loadings so that the resulting reduction in the design load factors, while regrettable, is not catastrophic and that with reinstatement of the cut "2041 DL" bar in pier 3 to complete the closed tie the resulting reduced design load factors will remain acceptable.

Subsequent Noting: Eng. Instruction PGR
N.C. informed over letter of 15/9/83

94

.2.

While it is desirable that the other bars that were cut in the exercise also be reinstated, it is probable that more damage than benefit would result and it has been decided to leave these bars as is.

The repair of the 2041 DL bar should proceed by first digging out the surrounding concrete and then either -

(i) lapping another C20 bar to the cut bar with a full development length either side of the cut; or

(ii) weld in a joining piece of C20 bar using a full lap splice or a suitable prequalified butt splice in accordance with AS 1554, Part 3 - 1983. The heat input into the bar is to be restricted to prevent spalling of the adjacent concrete.

After the bar is reinstated the removed concrete should be replaced with a high strength, non shrink grout such as Nonslith with care being taken to ensure a good bonding between the grout and the concrete.

R. Russo for
CHIEF DESIGN ENGINEER.

AS BUILT
By: S.P. Schmidt
Checked: Senior Engineer
Date: 7/11/85

REVISION						DRAWING SCHEDULE		
DATE	REMARKS	ZONE	CKD	PSD				SURVEY BOOKS

SCALES

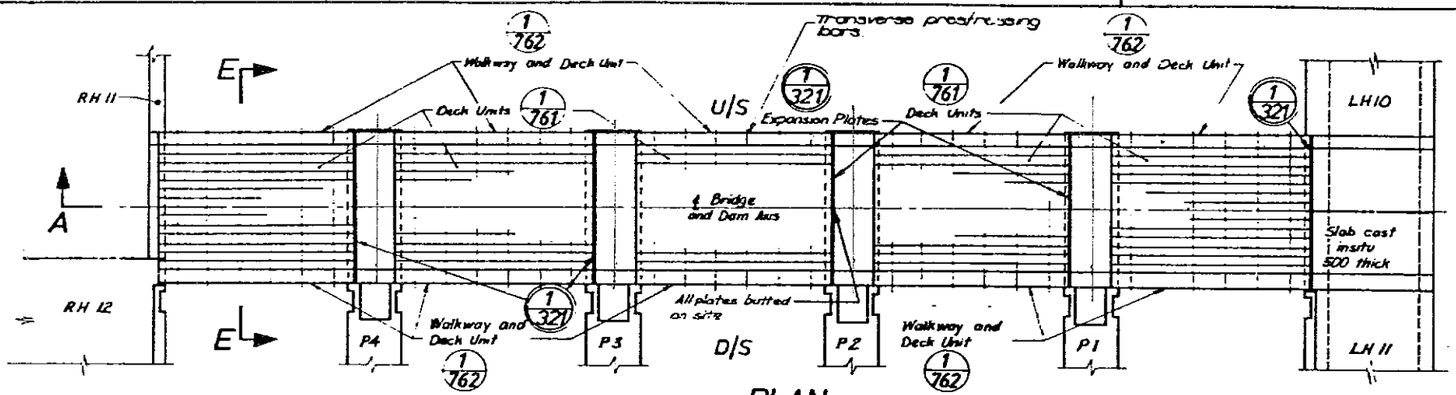
DESIGN	DRAFTING
PREP	DR
CKD	CKD
SUPV	SUPV
SUBMITTED	

Queensland Water Resources Commission

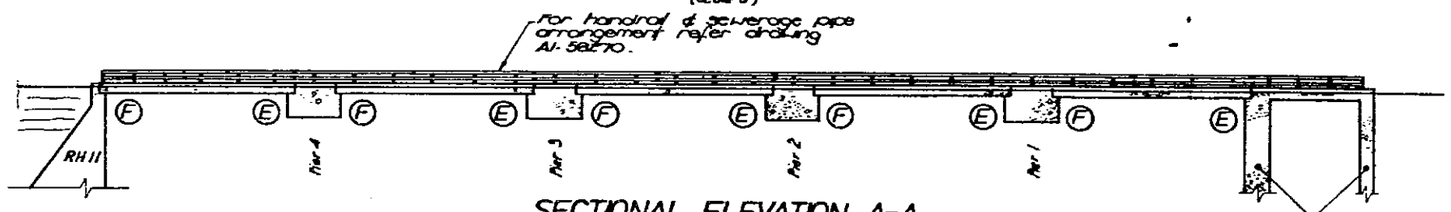
RECOMMENDED | APPROVED

BRISBANE RIVER 150.2 km - WIVENHOE DAM
SPILLWAY
PIERS P3 AND P4
ACCIDENTAL CUTTING OF REINFORCEMENT

CONTRACT NUMBER
DRAWING NUMBER AI-79264
DATE 4-11-85



PLAN (Guardrails omitted for clarity)
(Scale 'a')

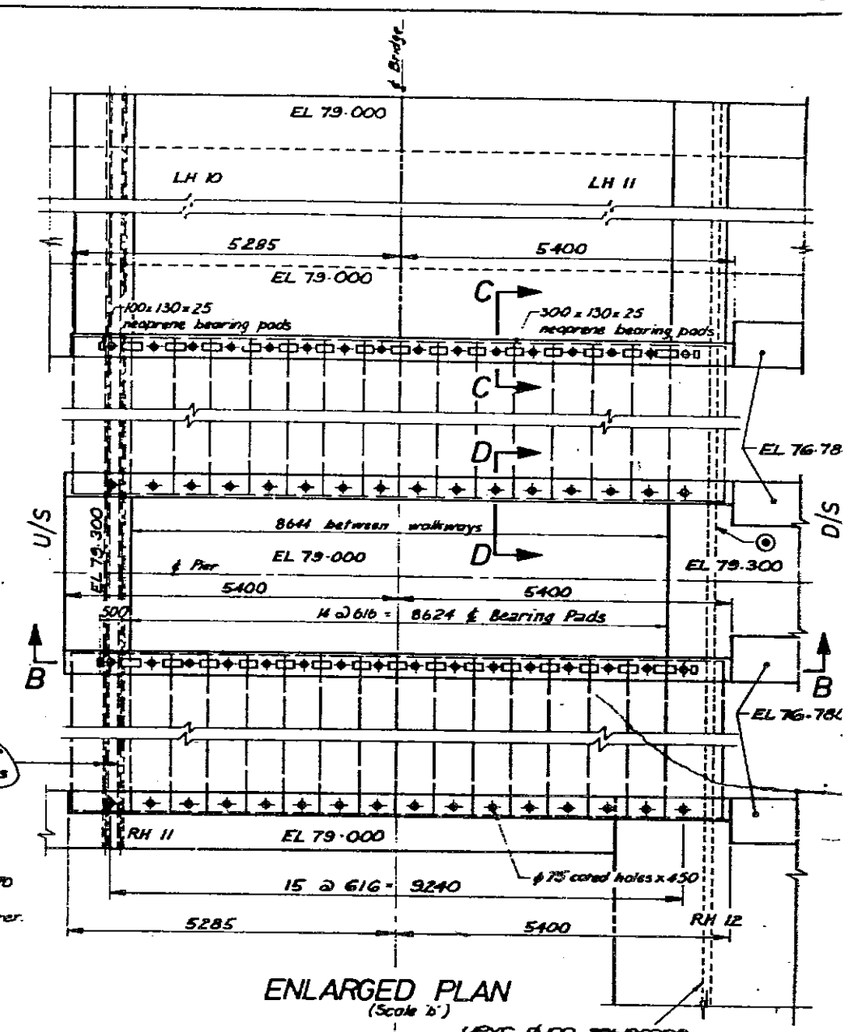


SECTIONAL ELEVATION A-A
(Scale 'a')

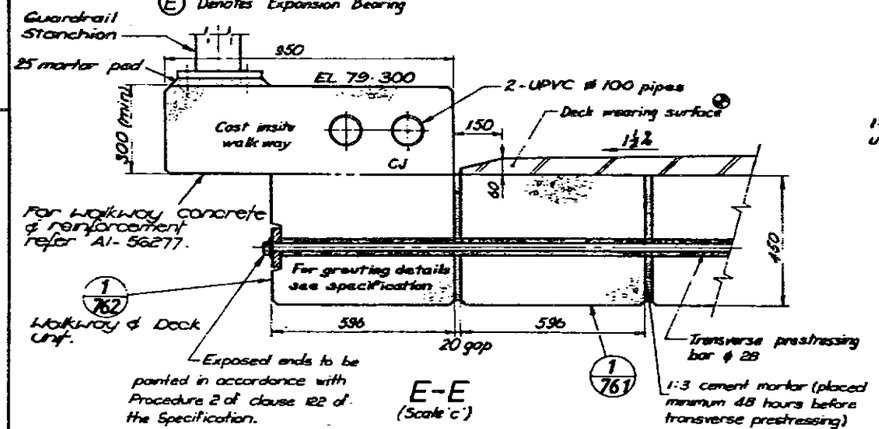
NOTE:-

(F) Denotes 'Fixed' Bearing

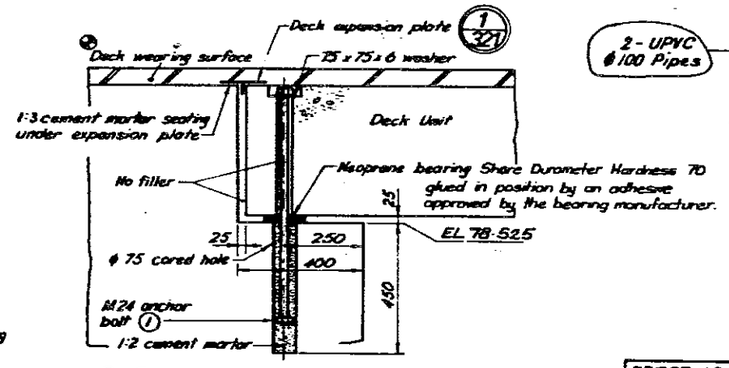
(E) Denotes 'Expansion' Bearing



ENLARGED PLAN
(Scale 'b')

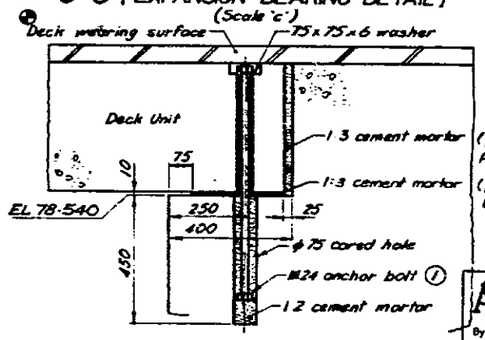


E-E
(Scale 'c')



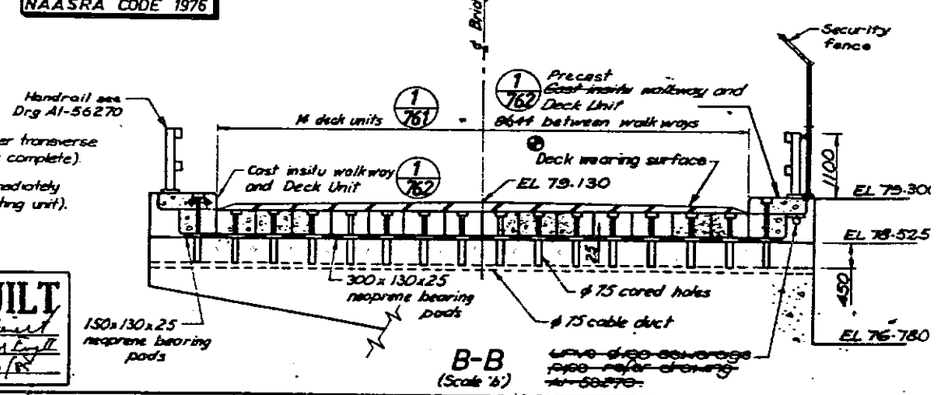
C-C (EXPANSION BEARING DETAIL)
(Scale 'c')

BRIDGE LOADING T44
NAASRA CODE 1976



D-D (FIXED BEARING DETAIL)
(Scale 'c')

AS BUILT
By
Chk'd
Date 31/10/85



B-B
(Scale 'b')

NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETRES AND ALL ELEVATIONS ARE IN METRES
2. ALL MATERIALS AND WORKMANSHIP TO THE RELEVANT AUSTRALIAN STANDARDS
3. Denotes Deck wearing surface NOT IN CONTRACT.
4. Load in ϕ 28 transverse prestressing bar to be 350 kN at lock off
5. (1/321) Indicates drawing number is in different numerical series to the drawing. Refer drawing schedule

ITEM No	LOCATION	DIA	LENGTH	TYPE	THREAD LENGTH	No REQD	NUTS REQD	WASHERS REQD	SETTING DETAILS
4	Security Fence	M16	56	Galv	33	68	68	136 R	
3	Security Fence	M8	90x60	U Bolt Galv Hex	25	34	68	68 R	
2	Deck Unit item 1 Anchor Bolts	M24	1125	Galv Hex	73	20	20	20	
1	Deck Unit item 2 Anchor Bolts	M24	825	Galv Hex	73	140	140	140	

BOLT SCHEDULE NOTE:- 1. Quantities are net only. 2. 'R' indicates round washers.

Revision				
Oct '85	D	As Built	MJC	
23/2/81	C	Enlarged Plan & Sect B-B amended	M.J.C	M.J.C
11-1-80	B	Updated to a working drawing	M.J.C.	
9-5-79	A	Contract No amended	M.J.C.	
Date		Remarks	Chk	Psd

Drawing Schedule	
A1-56321	Deck Expansion Plates
A2-59752	Sh.2 of 2 Road Bridge Arrangement
A1-56270	Handrail & Sewerage Arrangement.
A1-56277	Walkway. Concrete & Reinforcement.
A1-50764	Road Bridge - Cast Insitu Walkway - Conc & Reinf Details
A1-50762	Deck Units - Concrete and Reinforcement Details Sh.2
A1-50761	Deck Units - Concrete and Reinforcement Details

Scale 'a' 0 5 10 15 20m (1:200)

Scale 'b' 0 1 2 3 4 5m (1:50)

Scale 'c' 0 500 1000mm (1:10)

Scales before reduction

CONTRACT Nº 2120

IRRIGATION AND WATER SUPPLY COMMISSION

Design | Drafting
Prog | Dr
Chd | Chd M.J.C.
Supv | Supv
Submitted
Executive Engineer

Recommended
Senior Engineer Designs
Approved
Chief Designing Engineer

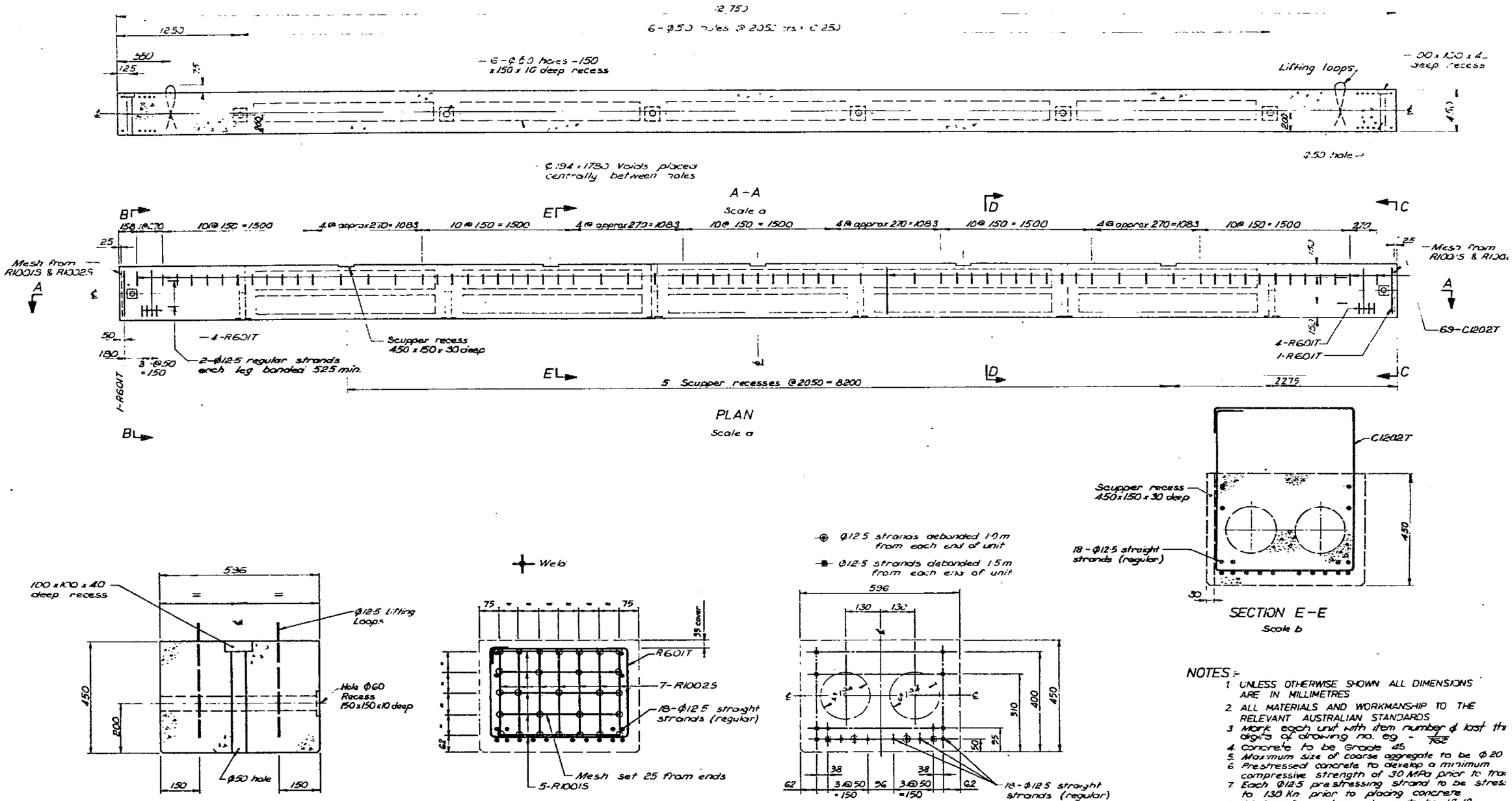
CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km - WIVENHOE DAM

ROAD BRIDGE ARRANGEMENT

Sh 1 of 2 | 16-6-78 | A1-50767 | A B C D

INS. CM.



DECK UNIT

ITEM 1

NOTES :-

1. UNLESS OTHERWISE SHOWN ALL DIMENSIONS ARE IN MILLIMETRES
2. ALL MATERIALS AND WORKMANSHIP TO THE RELEVANT AUSTRALIAN STANDARDS
3. Mark each unit with item number & last thr digits of drawing no. eg - 762
4. Concrete to be Grade 45
5. Maximum size of coarse aggregate to be Ø 20
6. Prestressed concrete to develop a minimum compressive strength of 30 MPa prior to tra
7. Each Ø12.5 prestressing strand to be stress to 130 Kn prior to placing concrete
8. All Chamfers where shown to be 12x12
9. Tendon ends to be coated with tar epoxy - 3 co minimum - each 0.3 min. thickness
10. Cover to reinforcement - 40mm unless noted otherwis
11. Reinforcement :- Bar examples shown thus ——— Bar position shown thus —|—|
12. Reinforcing bars to be displaced where necessary clear openings and to maintain cover.

ITEM	DESCRIPTION	NO.	MATERIAL	REMARKS
1	Deck Unit	10	concrete	

ITEM SCHEDULE

Revision				
26-1-82	C	Scupper recess location		
1-12-81	B	Strand & reinf. location	KFP	
21-10-79	W	4R7 deleted, unit now item 1	M.J.C.	
9-5-79	A	Contract No. amended	M.J.C.	
Date		Remarks	Chd	Psd

Drawing Schedule

A1-36824	Standard Metric Reinforcing Bars
A3-50763	Reinforcement Schedule
A1-50761	Road Bridge - Deck Units Sh 1 of 2
A1-50767	Road Bridge - General Arrangement
A1-56277	Road Bridge - Cast Insitu Walkway - Conc & Reinf Details

Scale a 0 1000 2000 mm 1:20

Scale b 0 10 20 30 40 50 mm 1:5

(scales before reduction)

CONTRACT Nº 2120

IRRIGATION AND WATER SUPPLY COMMISSION

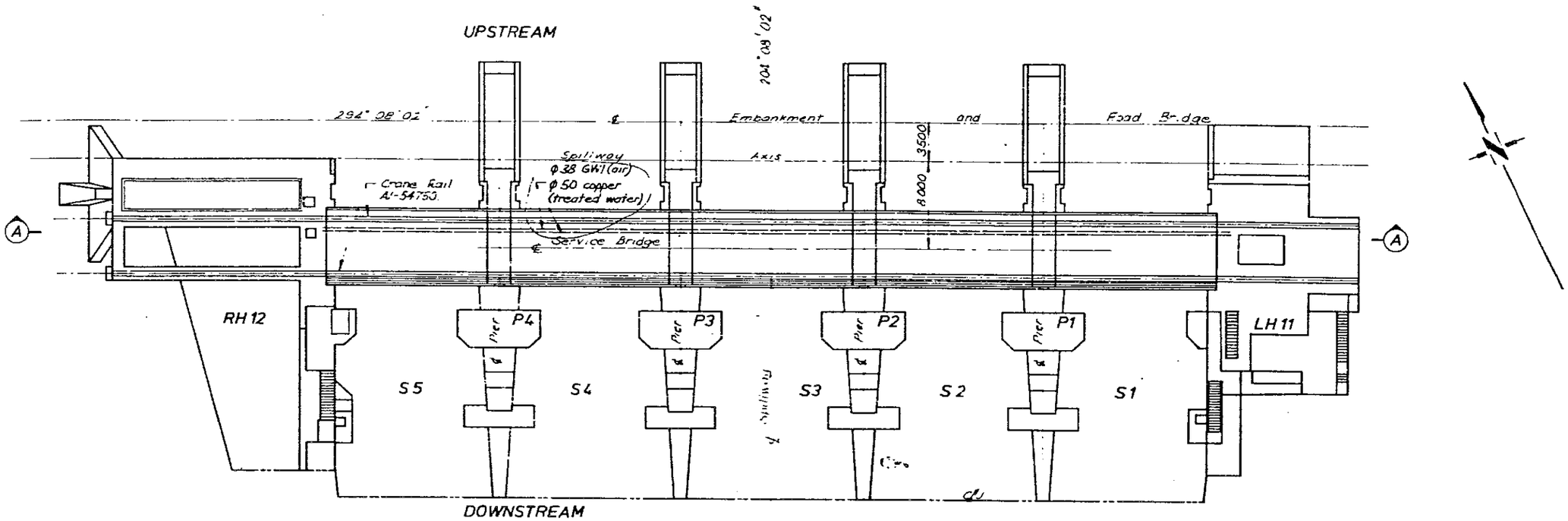
Design | Drafting | Recommended
Prep | Dr JTR
Chd | Chd M.J.C. | Senior Engineer Designs
Supv | Supv | Approved
Submitted
Executive Engineer | Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

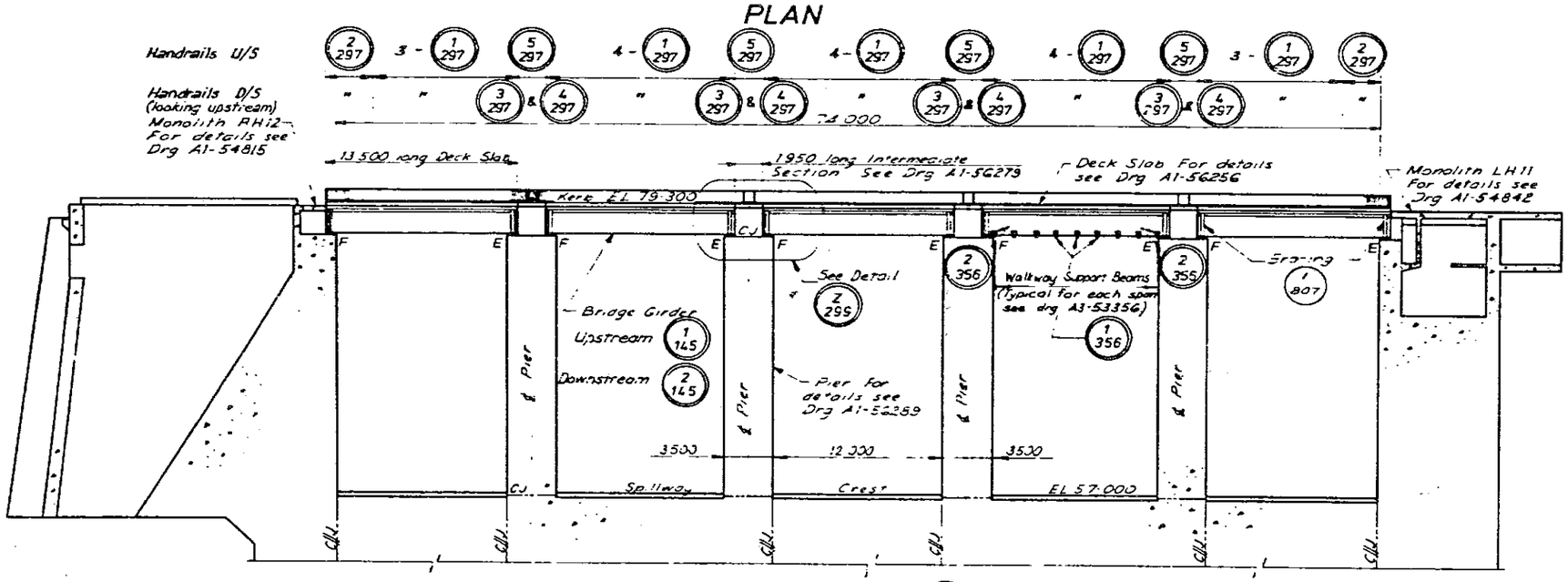
BRISBANE RIVER 150·2 km - WIVENHOE DA
ROAD BRIDGE
PRESTRESSED CONCRETE DECK UNITS
CONCRETE & REINFORCEMENT DETAI

Sheet 2 of 2 | 16-6-78 | A1-50762 | A | K | B

INS. 1 0 2 4 6 8 10 20 30



PLAN



SECTION (A)

NOTES:

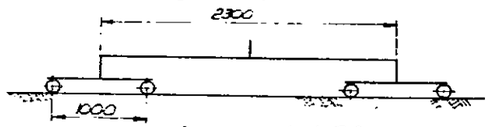
1. ALL DIMENSIONS ARE IN MILLIMETRES AND ALL ELEVATIONS ARE IN METRES
2. ALL MATERIALS AND WORKMANSHIP TO THE RELEVANT AUSTRALIAN STANDARDS
3. Levels Datum: All levels to AHD (PSM Nº 34242 = EL 74·784)
4. Azimuth Datum : AMG
5. Abbreviations:
   - CJ means Contraction Joint
   - CJ means Construction Joint
   - E expansion end
   - F fixed end
6. (2/297) Indicates drawing number is in different numerical series to this drawing. Refer drawing schedule.

AS BUILT
By
Check
Date 31/10/85

Design Loadings

Deck - NAASRA Specification T44 Vehicle. Single lane with 30 % impact factor OR Two lane without impact.

Girder - Gantry Crane Loading per leg of 1660 kN with bogies arranged as follows :-



Legs spaced at 10·2 m crs.

Revision				
Oct '85	D	As Built		
13·1·82	C	Pipes air & treated water		
30 4 81	B	Section A. Handrails		
13·11·80	W	Amended to working drg		
9·5·79	A	Contract Nº amend.	M.J.C	
Date		Remarks	Ckd	Psd

Drawing Schedule	
A3-53356	Walkway Support Beam
A1-56289	Spillway - Piers - Concrete
A1-56297	Service Bridge - Handrails
A1-56299	Service Bridge - General Arrangement Sh 2 of 2
A1-54842	Monolith LH11 - Conc Above EL 60 000 Sh 1 of 7
A1-54815	Monolith RH12 - Concrete. Sh 1 of 8
A1-56279	Intermediate Sections - Concrete
A2-50807	Service Bridge - Bracing Details
A1-56256	Deck Slabs - Concrete
A1 56145	Service Bridge - Girders - Concrete

0 5 000 10 000 15 000 20 000 mm
(1:200 Scale Before Reduction)

CONTRACT Nº 2120

IRRIGATION AND WATER SUPPLY COMMISSION

Design	Drafting
Prep RGH	Dr NGA
Ckd PA	Ckd MJC
Supv	Supv

Submitted
Executive Engineer

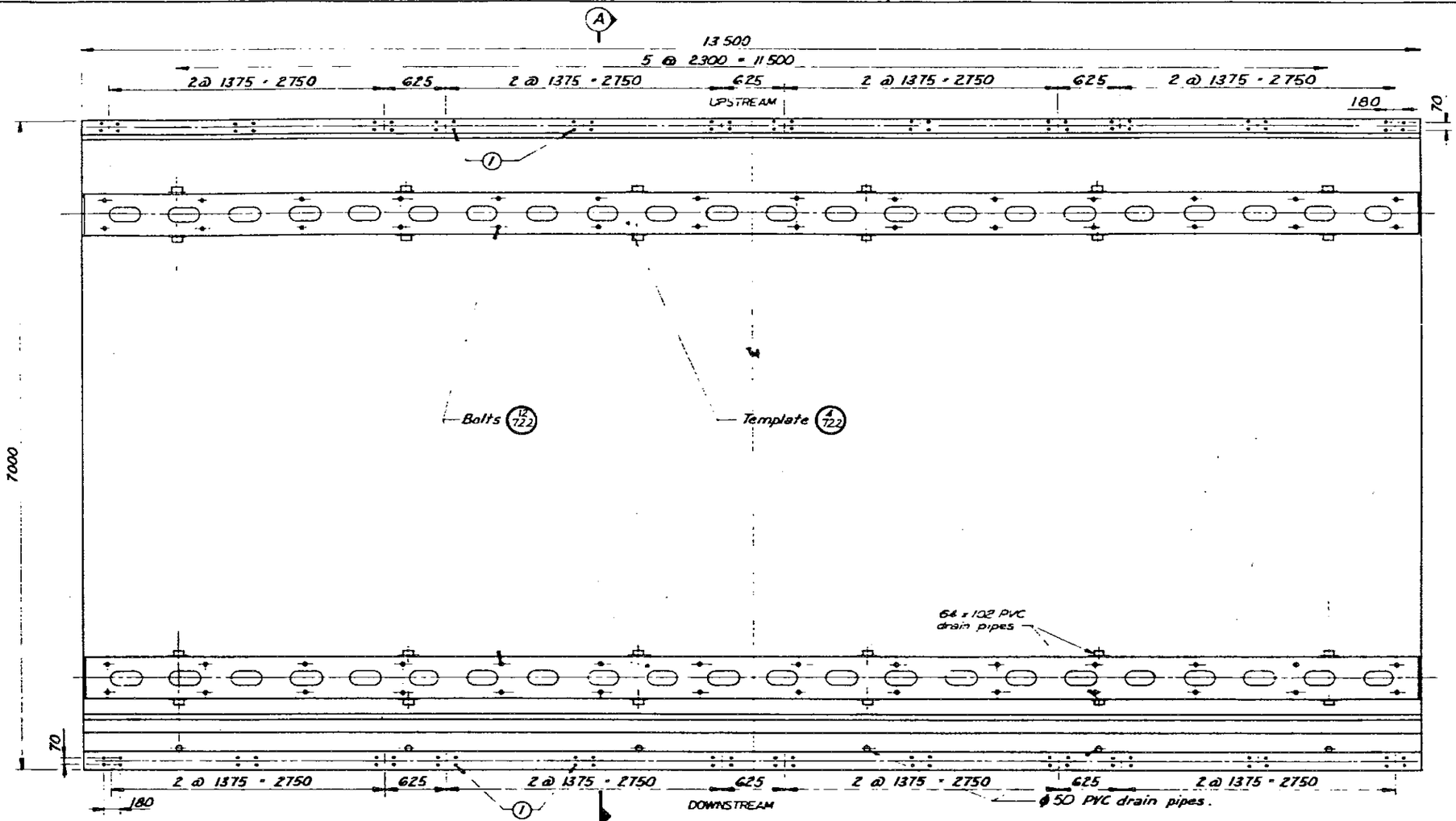
Recommended
Senior Engineer Designs

Approved
Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km - WIVENHOE DAM
SPILLWAY - SERVICE BRIDGE
GENERAL ARRANGEMENT

Sheet 1 of 2 | 15-6-76 | A1-50829 | A W B C



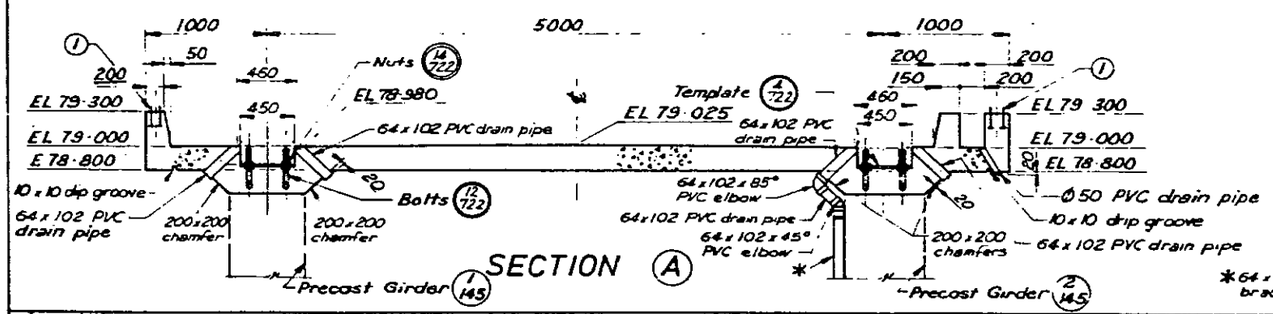
PLAN

DECK SLAB-5 REQD

NOTES :-

1. All dimensions are in millimetres and elevations in metres.
2. All materials and workmanship to the relevant Australian Standard.
3. Concrete to be Grade 25.
4. Maximum size of coarse aggregate to be ϕ20.

(4/722) Indicates drawing number is in a different numerical series to this drawing. The first two digits of the drawing number are 54. e.g. A1-54722.



SECTION (A)

AS BUILT
By
Chkd
Date

ITEM Nº	LOCATION	DIA	LENGTH	TYPE	THREAD LENGTH	Nº REQD	NUTS REQD	WASHERS REQD	SETTING DETAILS
1	Handrails	M16	175	Galv hex	std	480	480	480R	50 out of co

BOLT SCHEDULE

Revision				
Oct '85	A	As Built		
Date		Remarks	Ckd	Psd

Drawing Schedule	
A1-56297	Service Bridge - Handrails.
A1-54722	Gantry Tracks - Fabricated Metal Items
A1-54750	Gantry Crane Rails - Install and Arrgt. Sh 1 of 2
A1-50829	Service Bridge - Arrangement.
A1-56257	Service Bridge - Deck Slabs - Reinforcement Sh 1-2

0 500 1000 1500 2000 mm
(Scale 1:25 before reduction.)

CONTRACT Nº 2120

QUEENSLAND WATER RESOURCES COMMISSION

Design	Drafting	Recommended
Prep	Dr	
Ckd	Ckd	Senior Engineer Designs
Supv BJS	Supv M.J.C.	Approved
Submitted		
Executive Engineer		Chief Designing Engineer

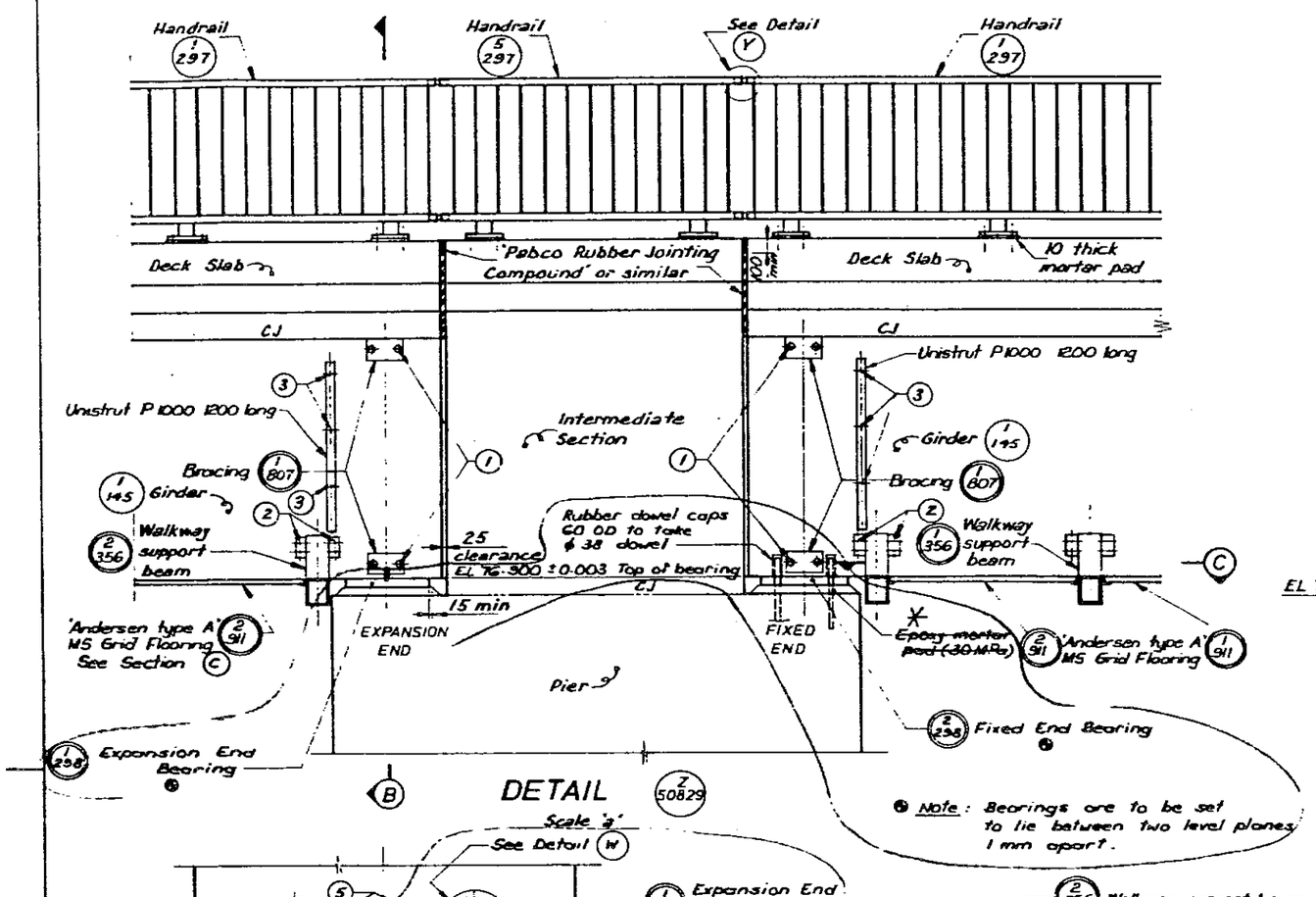
CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km - WIVENHOE DAM

SPILLWAY - SERVICE BRIDGE

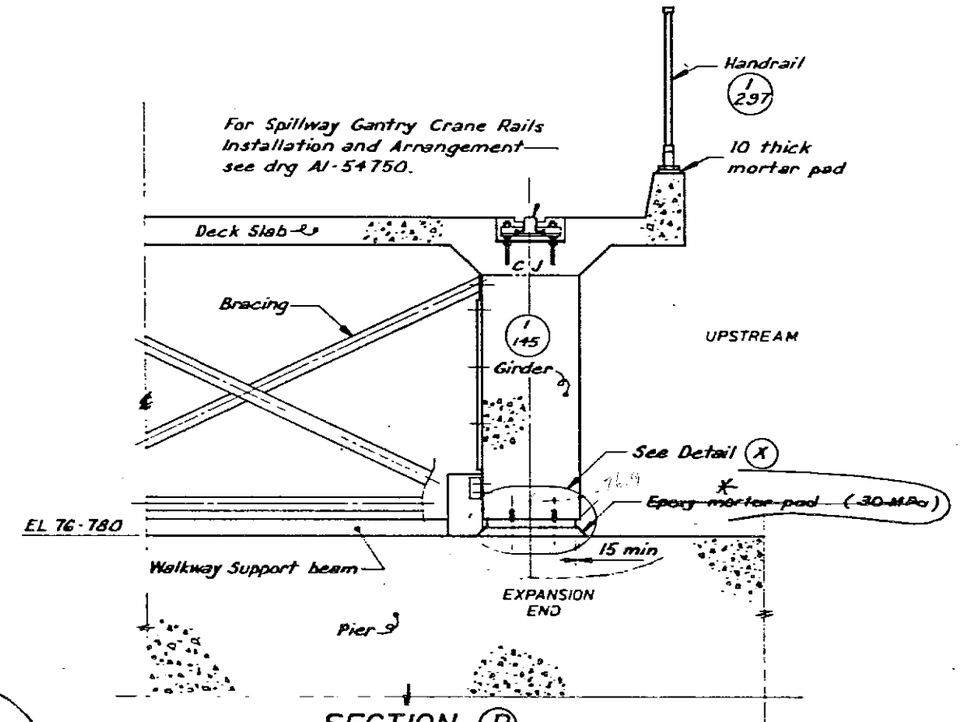
DECK SLABS - CONCRETE

19·1·81 | A1-56256 | A



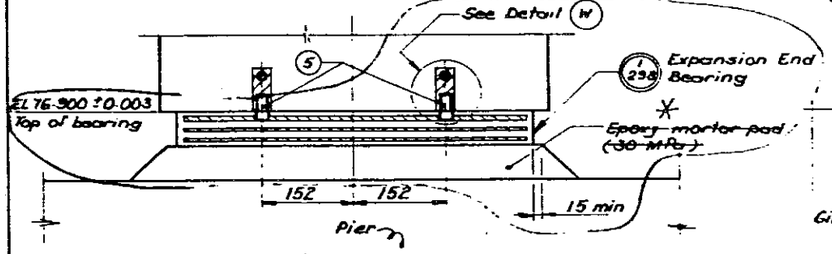
DETAIL B
Scale 'a'
2/50829

● Note: Bearings are to be set to lie between two level planes, 1 mm apart.

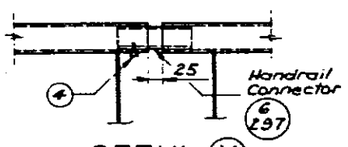


SECTION B
Scale 'a'

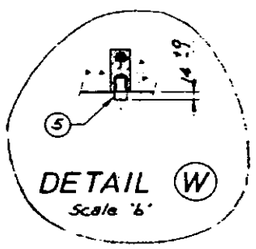
✱ Monolith non shrink grout.



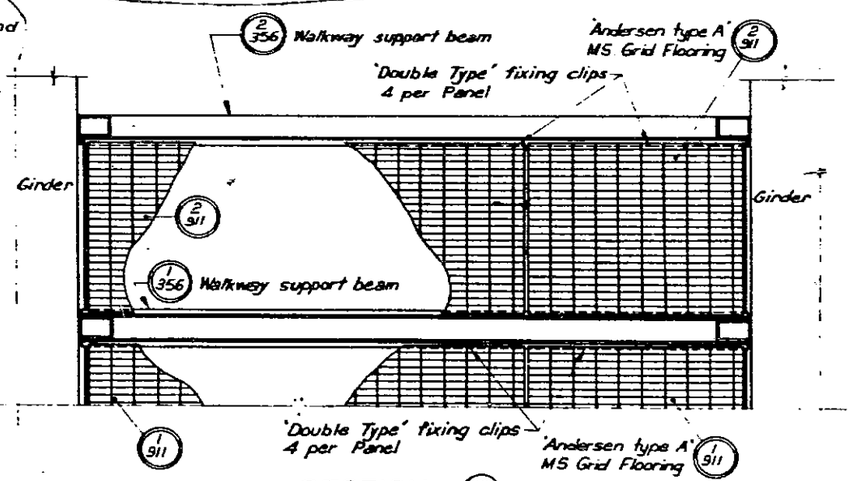
DETAIL X
Scale 'b'



DETAIL Y
Scale 'b'



DETAIL W
Scale 'b'



SECTION C
Scale 'a'

NOTES :-

1. ALL DIMENSIONS ARE IN MILLIMETRES AND ELEVATIONS IN METRES
2. ALL MATERIALS AND WORKMANSHIP TO THE RELEVANT AUSTRALIAN STANDARD.
3. (2/911) Indicates drawing number is in different numerical series to this drawing. Refer drawing schedule.
4. For General Notes refer drawing A1-50829

ITEM Nº	LOCATION	DIA	LENGTH	TYPE	THREAD LENGTH	Nº REQD	NUTS REQD	WASHERS REQD
5	Expansion end bearing	20	(42)	Galv stud	30	20	–	–
4	Handrail connector	10	25	Galv hex set screw	std	92	–	92R
3	'Unistrut' P 1000	12	25	"	std	150	–	100R
2	Walkway support beam	20	30	"	std	360	–	360R
1	Bracing	24	35	Galv hex set screw	std	80	–	80 R

BOLT SCHEDULE
Notes :- 1. All quantities are net only.
2. 'R' indicates round.

AS BUILT
By: [illegible]
Check: Senior Engr
Date: 6/11/85

Revision				
Oct '85	B	'As Built'	[illegible]	[illegible]
14·7·81	A	Bearings revised	[illegible]	[illegible]
Date		Remarks	Ckd	Psd

Drawing Schedule	
A1-62298	Service Bridge - Elastomeric Bridge Bearings
A2-50807	Spillway - Service Bridge Bracing Details
A3-53356	Spillway - Service Bridge Walkway Support Beam
A3-60911	Spillway - Service Bridge MS Grid Floors
A1-54750	Gantry Crane Rail - Installation and Arrgt.
A1-50829	Service Bridge - General Arrangement. Sh 1 of 2.

Scale 'a' 0 500 1000 1500 2000 mm (1:20)
Scale 'b' 0 100 200 300 400 500 mm (1:5)
(Scales before reduction)

CONTRACT Nº 2120

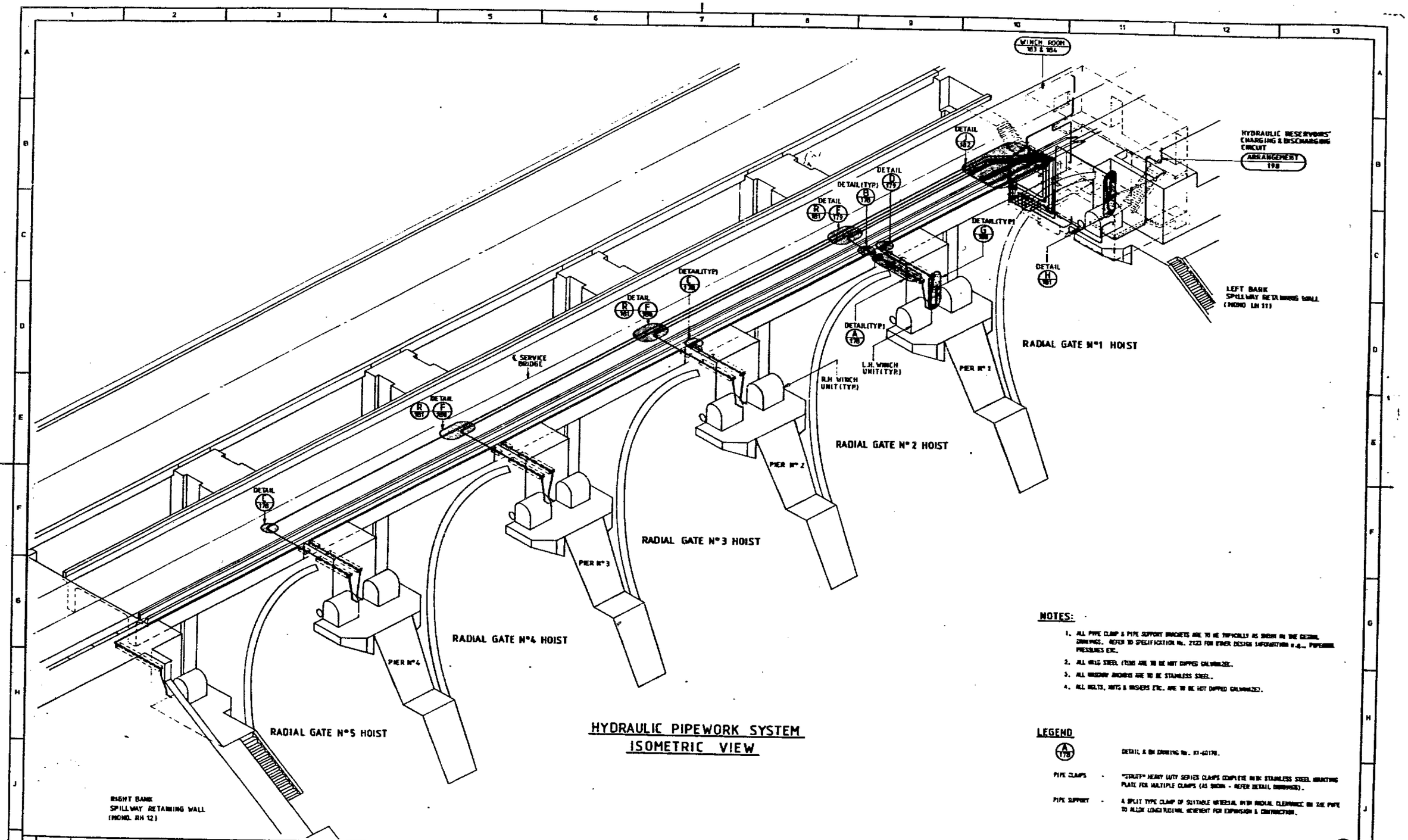
QUEENSLAND WATER RESOURCES COMMISSION

Design	Drafting	Recommended
Prog RGH/PA	Dr P.G.	
Ckd PA/BJS	Ckd	Senior Engineer Designs
Supv [illegible]	Supv M.J.C.	Approved
Submitted		
Executive Engineer		Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km - WIVENHOE DAM
SPILLWAY SERVICE BRIDGE
GENERAL ARRANGEMENT

Sheet 2 of 2 | 19·11·80 | A1-56299 | A | B



HYDRAULIC PIPEWORK SYSTEM
ISOMETRIC VIEW

NOTES:

1. ALL PIPE CLAMP & PIPE SUPPORT BRACKETS ARE TO BE TYPICALLY AS SHOWN ON THE GENERAL DRAWINGS. REFER TO SPECIFICATION No. 2123 FOR OTHER DESIGN INFORMATION e.g. PIPEWORK PRESSURES ETC.
2. ALL MILD STEEL ITEMS ARE TO BE HOT DIPPED GALVANIZED.
3. ALL MASONRY ANCHORS ARE TO BE STAINLESS STEEL.
4. ALL BOLTS, NUTS & WASHERS ETC. ARE TO BE HOT DIPPED GALVANIZED.

LEGEND

(A 178) DETAIL A ON DRAWING No. K1-60178.

PIPE CLAMPS - "STAUFF" HEAVY DUTY SERIES CLAMPS COMPLETE WITH STAINLESS STEEL MOUNTING PLATE FOR MULTIPLE CLAMPS (AS SHOWN - REFER DETAIL DRAWINGS).

PIPE SUPPORT - A SPLIT TYPE CLAMP OF SUITABLE MATERIAL WITH RADIAL CLEARANCE ON THE PIPE TO ALLOW LONGITUDINAL MOVEMENT FOR EXPANSION & CONTRACTION.

DRAWING SCHEDULE

K1-60198	CHARGING/DISCHARGING CIRCUIT-PROPOSED ARRANGEMENT
K1-60187	HYD CIRCUIT DIAG - (SHT 2)
K1-60186	HYD CIRCUIT DIAG - (SHT 1)
A2-60185	PIPEWORK SCHEDULE

DRAWING SCHEDULE

K1-60184
K1-60183
K1-60182
K1-60181
K1-60180
K1-60179
K1-60178

REVISION

DATE	REMARKS	ZONE	CKD	PSD

SCALE: 0 5 10m (1:100) (BEFORE REDUCTION) (OTHERS AS NOTED)

CONTRACT No. 2123

QUEENSLAND WATER RESOURCES COMMISSION

DESIGN: PREP, CHD, SUPV — DRAFTING: CHD, SUPV

RECOMMENDED — EXECUTIVE ENGINEER

APPROVED — SENIOR ENGINEER (WORKS & D.O.)

SUBMITTED — ENGINEER

CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2km-WIVENHOE DAM

RADIAL GATE HOISTS & RIVER OUTLET PENSTOCK GATE HOIST

PROPOSED HYDRAULIC PIPEWORK SYSTEM - ARRANGEMENT

K1-60 177

INLET STRUCTURE

LEFT BANK UNDERGROUND CONTROL COMPLEX

INSET — H.V. SUB STATION CABLEWAYS

OUTLET WORKS

RIGHT BANK

NOTES:
1. REFER DRG K1-51421 FOR STD ELECTRICAL PIT DETAILS.
2. FOR CABLEWAY SCHEDULE REFER DRG A2-51416.
3. FOR CONTINUATION OF THIS DRG REFER DRG A1-51417.
4. THIS DRG INDICATES PRIMARY CABLEWAY ROUTES ONLY.

LEGEND

◆	ELECTRICAL PIT
—·—·—	CABLEWAY ROUTE
C.W.7	CABLEWAY Nº 7
J.B. 3	JUNCTION BOX Nº 3
W.L.I.	WATER LEVEL INDICATOR

LEGEND (CONT'D)

R.G.3	RADIAL GATE CONTROL STATION Nº 3
M.B.	MARSHALLING BOX
D.B.	DISTRIBUTION SWITCHBOARD

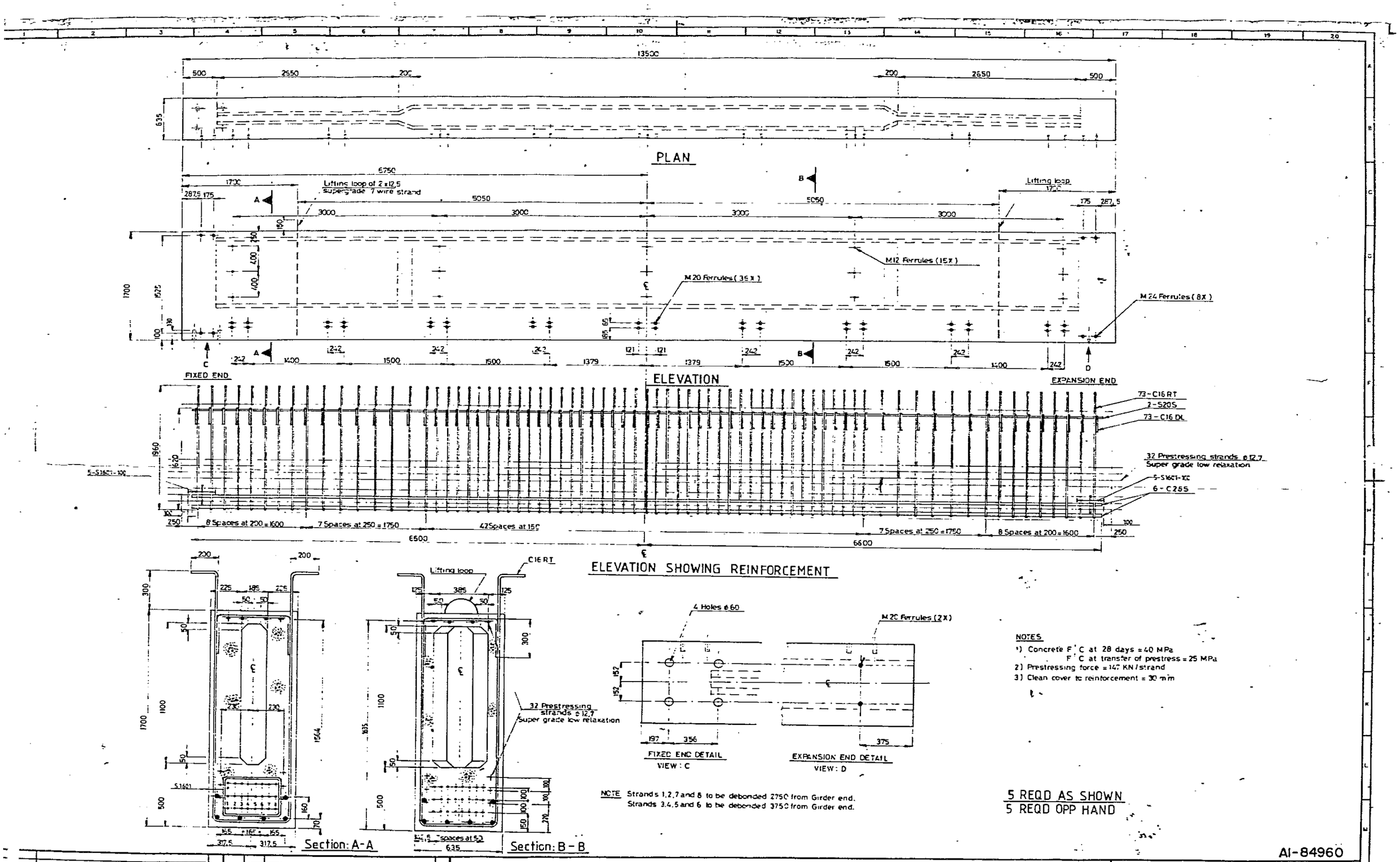
SCALE 0 5 10 15 20 METRES (1:200)

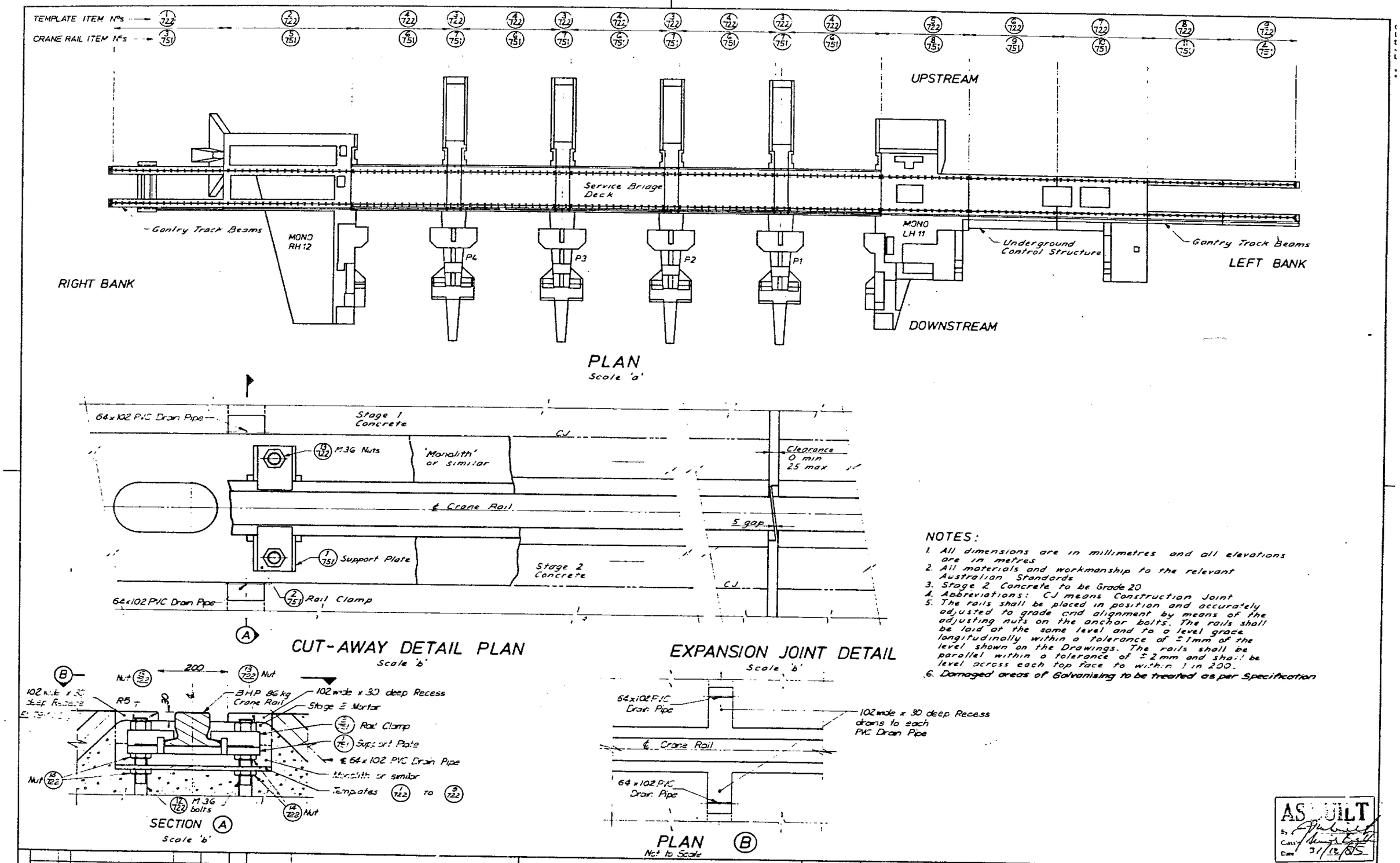
5-3-82	E	REVISED
14.9.81	D	[illegible]
8-8-81	C	SPILLWAY CW'S REVISED REVISED CW ARRNGT. OUTLET [illegible] STATION CW 76 ADDED.
9-12-80		

IRRIGATION AND WATER SUPPLY COMMISSION
MECHANICAL BRANCH

CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150 2km-W. VENHOE DAM
SPILLWAY AREA
CABLEWAY SYSTEM


PLAN
Lifting loop of 2 x 12.5 Supergrade 7 wire strand
Lifting loop
M12 Ferrules (15 X)
M20 Ferrules (35 X)
M24 Ferrules (8 X)
FIXED END
EXPANSION END
ELEVATION
73 - C16 RT
2 - S20S
73 - C16 DL
32 Prestressing strands ø 12.7 Super grade low relaxation
6 - C25S
8 Spaces at 200 = 1600
7 Spaces at 250 = 1750
42 Spaces at 150
ELEVATION SHOWING REINFORCEMENT
Lifting loop
C16 RT
32 Prestressing strands ø 12.7 Super grade low relaxation
Section: A-A
Section: B-B
4 Holes ø 60
M20 Ferrules (2 X)
FIXED END DETAIL
VIEW : C
EXPANSION END DETAIL
VIEW : D
NOTES
1) Concrete F'C at 28 days = 40 MPa
F'C at transfer of prestress = 25 MPa
2) Prestressing force = 147 KN/strand
3) Clean cover to reinforcement = 30 mm
NOTE Strands 1,2,7 and 8 to be debonded 2750 from Girder end.
Strands 3,4,5 and 6 to be debonded 3750 from Girder end.
5 REQD AS SHOWN
5 REQD OPP HAND
AI-84960
PRECAST HOLLOW BOX GIRDER FOR BRISBANE
RIVER 150·2 Km WIVENHOE DAM SPILLWAY SERVICE BRIDGE
DOWSTRESS
DOWSTRESS (QUEENSLAND) PTY LTD 20 ARY ST WACOL QLD 4076 PHONE 372 2233
SCALE
DATE
W/O NO.
P-827
DESIGNED
DRAWN
CHECKED
DWG NO.
78-141-
ISSUE
REVISION
REF
ISSUE
DATE
REVISION
REF



NOTES:

1. All dimensions are in millimetres and all elevations are in metres
2. All materials and workmanship to the relevant Australian Standards
3. Stage 2 Concrete to be Grade 20
4. Abbreviations: CJ means Construction Joint
5. The rails shall be placed in position and accurately adjusted to grade and alignment by means of the adjusting nuts on the anchor bolts. The rails shall be laid at the same level and to a level grade longitudinally within a tolerance of ±1mm of the level shown on the Drawings. The rails shall be parallel within a tolerance of ±2mm and shall be level across each top face to within 1 in 200.
6. Damaged areas of Galvanising to be treated as per Specification

AS BUILT
Sy
Cary
Date 31/12/85

Revision				
Oct '85	B	As Built		
10-12-80	A	Drainage details added	MJC	BJS
Date		Remarks	Ckd	Psd

Drawing Schedule: A1-54722 Fabricated Metal Items (Sh 1 of 2)

Scale 'a' 0 5000 10000 15000 20000mm (1:250)
Scale 'b' 0 100 200 300 400 500mm (1:5)
(Scales Before Reduction)

CONTRACT Nº 2120

IRRIGATION AND WATER SUPPLY COMMISSION

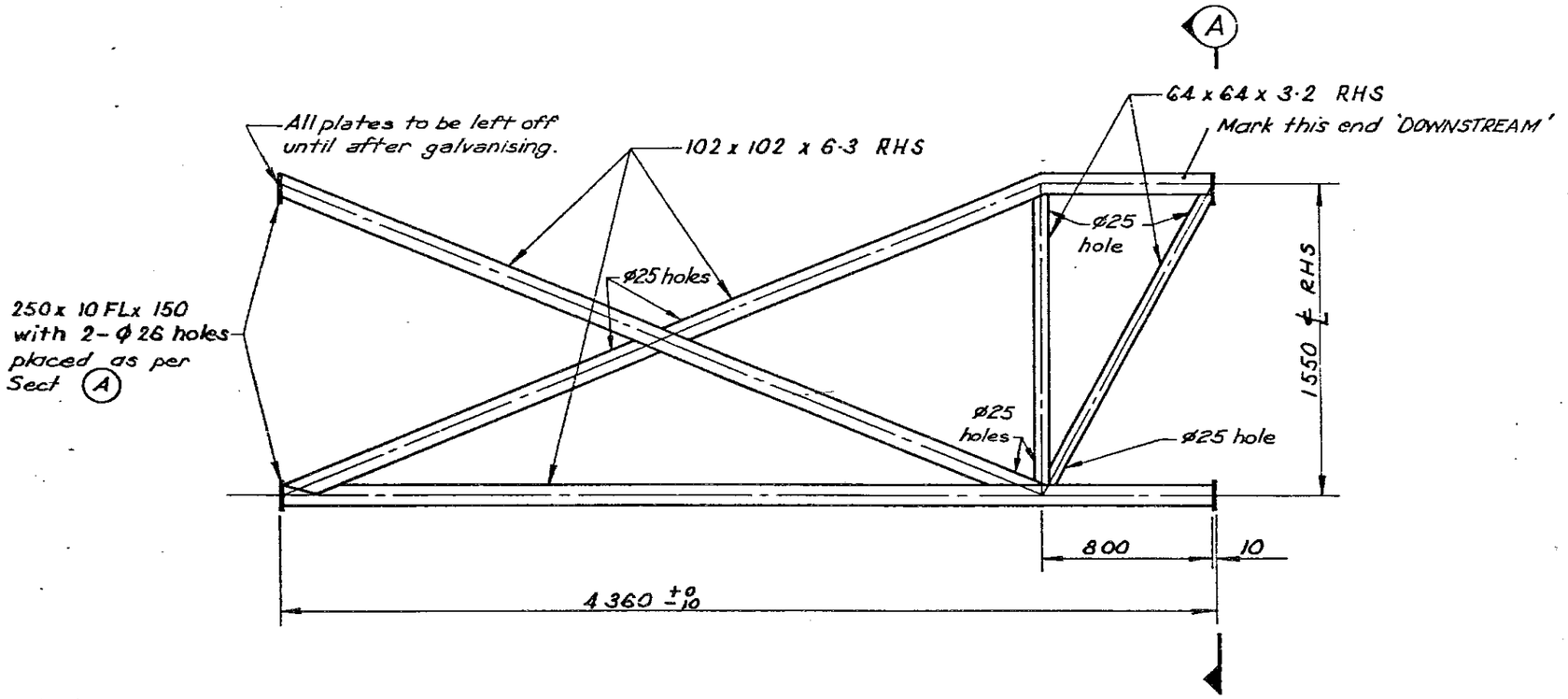
Design		Drafting	
Prep		Dr	NGA
Ckd	BJS	Ckd	
Supv		Supv	MJC

Submitted: Executive Engineer
Recommended: Senior Engineer Designs
Approved: Chief Designing Engineer

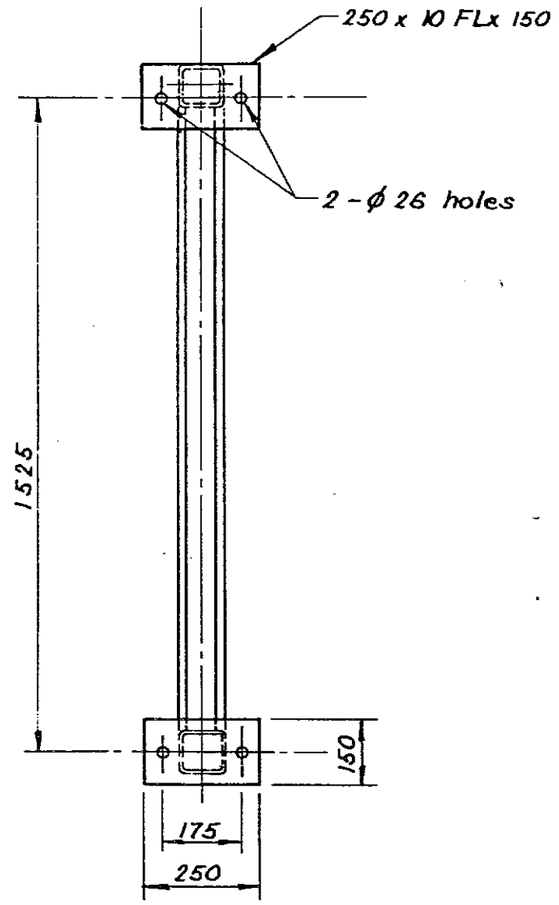
CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2km – WIVENHOE DAM
SPILLWAY GANTRY CRANE RAILS
INSTALLATION AND ARRANGEMENT

28·3·80 | A1-54750 | A | B



ITEM 1
(Scale a)



SECTION A
(Scale b)

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. ALL MATERIALS AND WORKMANSHIP TO THE RELEVANT AUSTRALIAN STANDARDS.
3. Items to be of an all welded construction. Welds to be full penetration butt welds or 5mm fillet welds all around as applicable.
4. After fabrication items to be cleaned, galvanised and patch painted in accordance with specification.
5. ø25 holes to be tapped and plugged after galvanising.
6. Vent and drain holes for galvanising are provided for dipping frame vertically.

ITEM Nº	DESCRIPTION	Nº OFF	MATERIAL	REMARKS
1	Bracing	10	MS	to be galvan

ITEM SCHEDULE

Revision					
22-2-80	W	Amended to working drg.	AH		
9-5-79	A	Contract Number Amended	M.J.C.		
Date		Remarks	Ckd	Psd	

Drawing Schedule: A1-50829

Scale a 0 500 1000 1500 mm (1:20 before reduction)

Scale b 0 500 1000 mm (1:10 before reduction)

CONTRACT Nº 2120

IRRIGATION AND WATER SUPPLY COMMISSION

Design	Drafting	Recommended
Prep RGH	Dr AJN	R. Russo.
Ckd	Ckd M.J.C.	Senior Engineer Designs
Supv	Supv	Approved
Submitted Executive Engineer		Chief Designing Engineer

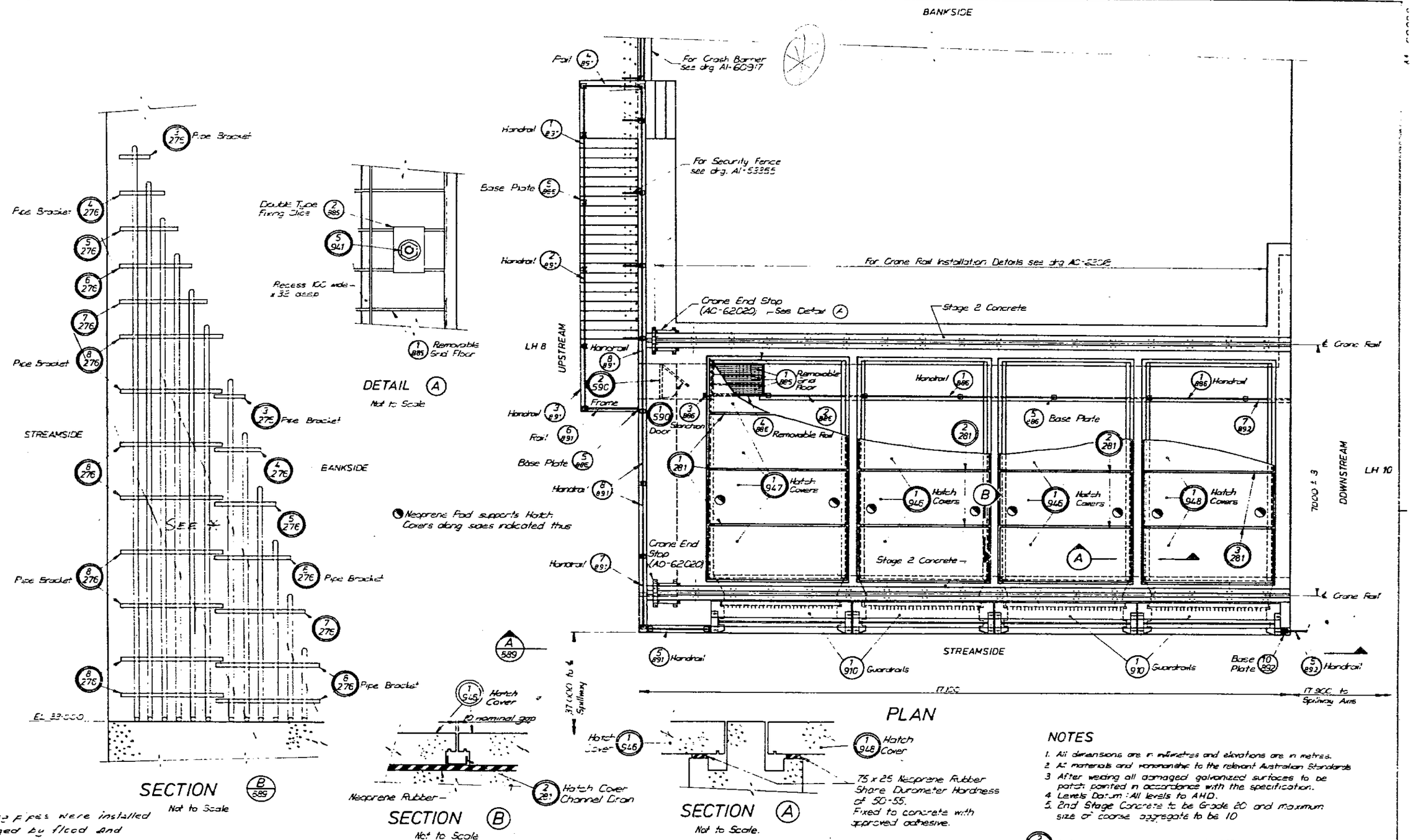
CO-ORDINATOR GENERAL'S DEPARTMEN

BRISBANE RIVER 150·2 km – WIVENHOE D

SPILLWAY — SERVICE BRIDGE

BRACING DETAILS

16-6-78 | A2-50807 | A | W



* Water sampling pipes were installed later damaged by flood and subsequently removed. For new arrangement see AC-70655

NOTES

1. All dimensions are in millimetres and elevations are in metres.
2. All materials and workmanship to the relevant Australian Standards
3. After welding all damaged galvanized surfaces to be patch painted in accordance with the specification.
4. Levels Datum: All levels to AHD.
5. 2nd Stage Concrete to be Grade 20 and maximum size of coarse aggregate to be 10

(2/276) indicates drawing number is in different numerical series to this drawing, refer drawing schedule.

Drawing Schedule	
A3-62287	Monolith LH9 - Hatch Cover Drains
A1-60894	Monolith LH9 - Reinforcement above EL 62.000 (Sh 1 of 10)
A1-54764	Monolith LH9 - Reinforcement to EL 62.000 (Sh 1 of 2)
A1-60910	Monolith LH9 Guardrail Fabrication
A1-56276	Monoliths LH9 & LH10 Metal Items
A1-54590	Monolith LH9 Door & Frame
A1-59948	Monolith LH9 R.C. Hatch Cover Conc. & Reinf. (Sh 3 of 3)
A1-59947	" " " " " " " (Sh 2 of 3)
A1-59946	" " " " " " " (Sh 1 of 3)
A1-59944	Monolith LH9 Concrete above EL 62.000 (Sh 1 of 5)
A1-54618	" " Concrete to EL 62.000 (Sh 1 of 2)
A1-60890	Monolith LH9 - Arrangement (Sh 3 of 3)
A1-60893	" " " (Sh 2 of 3)

ITEM Nº	LOCATION	DIA	LENGTH	TYPE	THREAD LENGTH	Nº REQD	NUTS REQD	WASHER REQD
1	Removable Rails 4,886 M.S.		55	Galv Hex	Std	2	2	4

BOLT SCHEDULE

REQUIRED 52m OF 75 x 25 NEOPRENE RUBBER WITH A SHORE DUROMETER HARDNESS OF 50-55

Revision				
Oct '85	4	As Built		
Date		Remarks	Ckd	Psd

0 1000 2000 3000 4000 5000 mm (1:50)
(Scale before reduction)

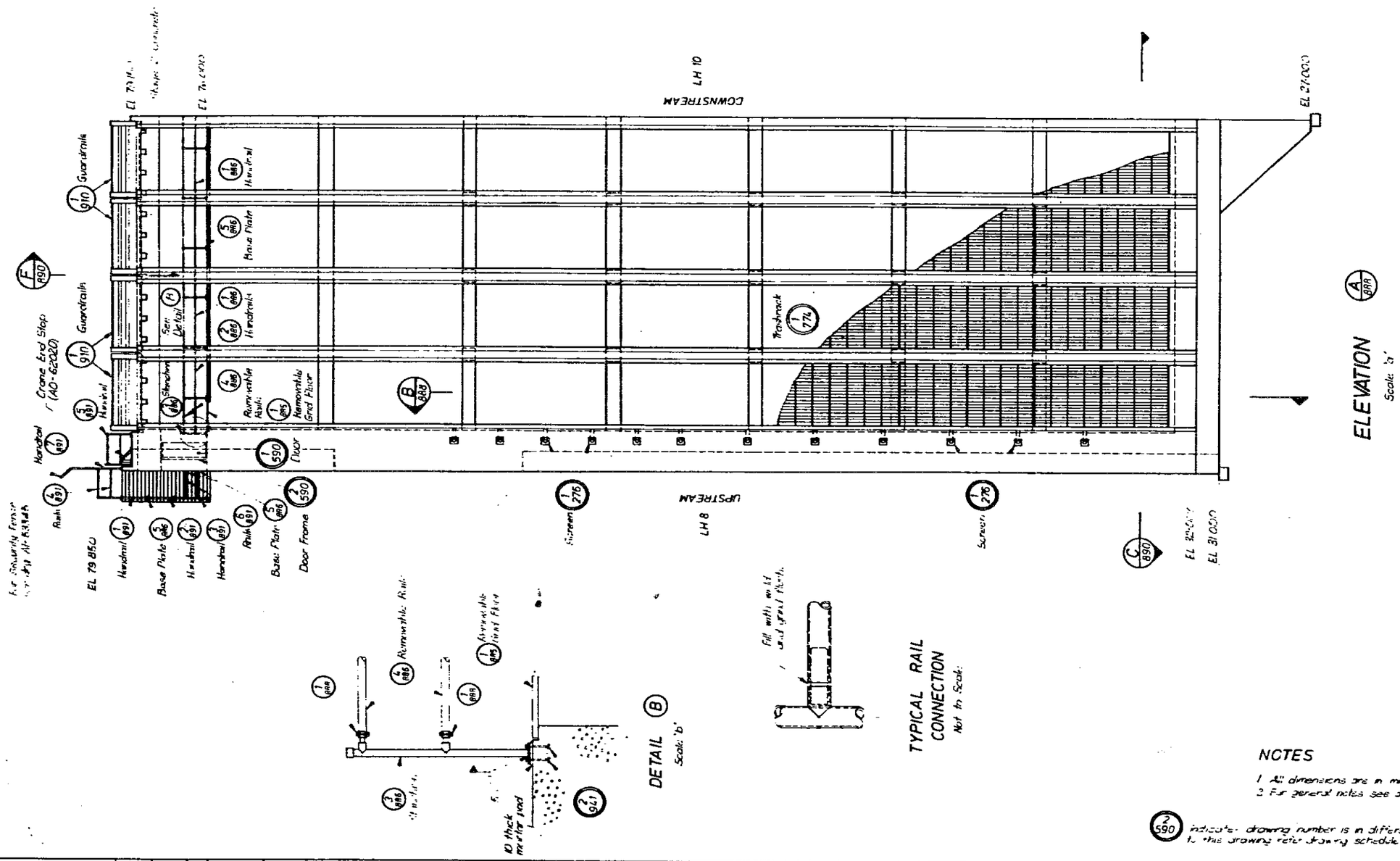
CONTRACT Nº 2120

QUEENSLAND WATER RESOURCES COMMISSION
Design: Prep. P.J.M. — Ckd — Supv — Submitted — Executive Engineer
Drafting: Dr. GH — Ckd GTG — Supv M.J.C.
Recommended — Senior Engineer Designs
Approved — Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT
BRISBANE RIVER 150·2 km - WIVENHOE DAM
SPILLWAY RETAINING WALLS
MONOLITH LH 9 - ARRANGEMENT
Sh 1 of 3 | 21-4-81 | A1-60888 | A

AS BUILT
By
Class
Date 6/11/85

INS. 0 2 4 6 8 10
CM. 0 10 20 30



AS BUILT
By
Chkd
Date 6/12/85

NOTES

1 All dimensions are in millimetres and elevations are in metres
2 For general notes see drawing A1-60858

(2/590) indicates drawing number is in different numerical series to the drawing refer drawing schedule.

Revision				
Oct '85	A	As Built		
Date		Remarks	Ckd	Psd

Drawing Schedule	
A1-59941	Monolith LH9 Concrete above EL 62 000 (Sh 1 of 3)
A1-50774	Outlet Works - MS Trash Racks
A1-60910	Monolith LH9 Guardrail Fabrication
A1-54530	Monolith LH9 Door & Frame
A1-50276	Monolith LH9 & LH10 Metal Items
A1-60858	Monolith LH9 - Arrangement (Sh 1 of 3)

Scale 'a' 0 5000 10000 mm 1:100
Scale 'b' 0 500 1000 1500 mm 1:15
Scales before reduction

CONTRACT Nº 2120

QUEENSLAND WATER RESOURCES COMMISSION		
Design	Drafting	Recommended
Prep	Dr GH	
Ckd	Ckd CTC	Senior Engineer Designs
Supv	Supv MJC	Approved
Submitted		
Executive Engineer		Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

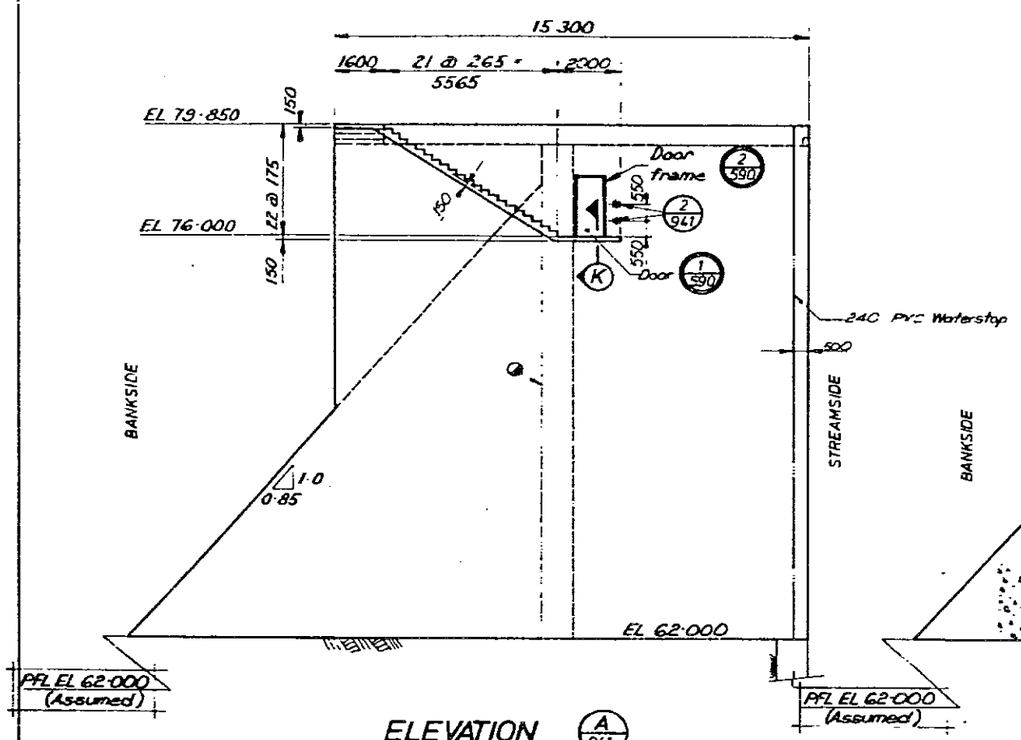
BRISBANE RIVER 150·2 km – WIVENHOE DAM

SPILLWAY RETAINING WALLS

MONOLITH LH 9 – ARRANGEMENT

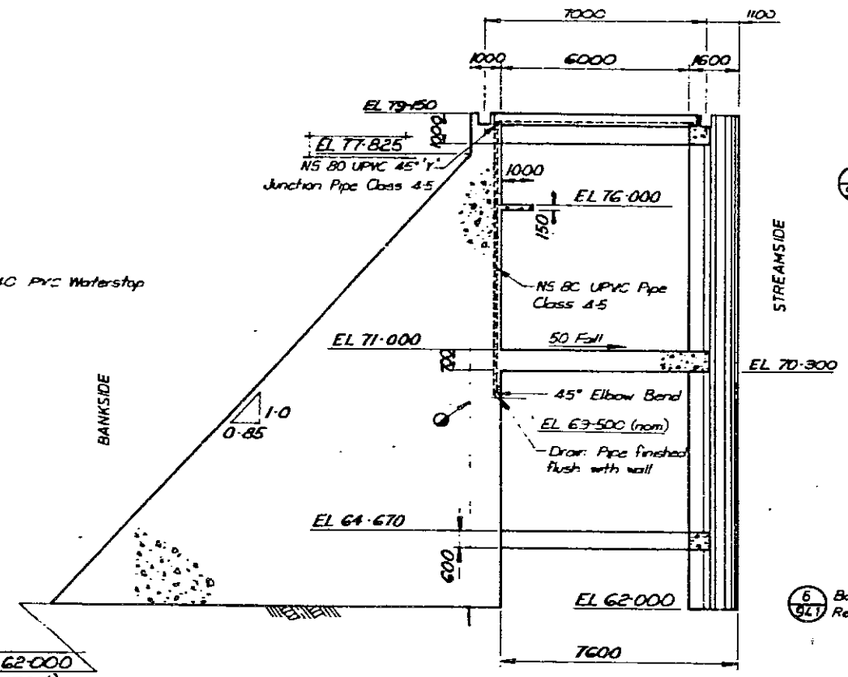
Sh 2 of 3 | 21-4-81 | A1-60889 | A

A1-59942

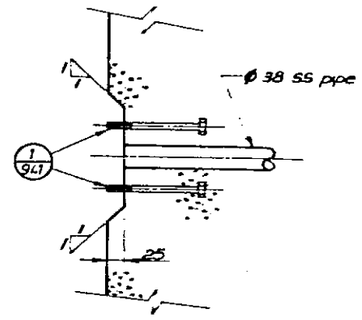


ELEVATION (A/941)
Scale 'a'

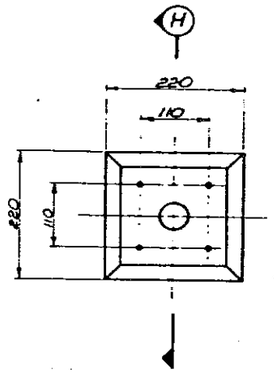
● Denotes demarcation plane between reinforced concrete LH 9 and mass concrete in retaining wall.



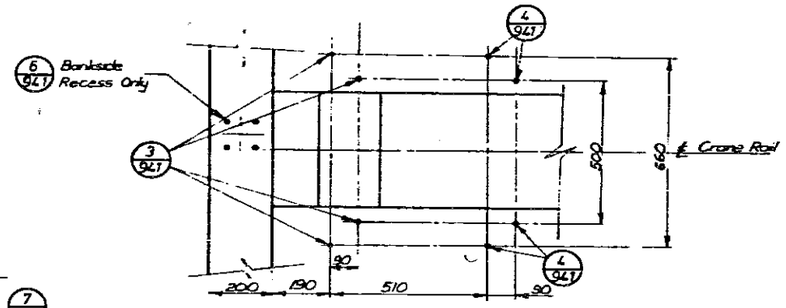
SECTION (B/941)
Scale 'a'



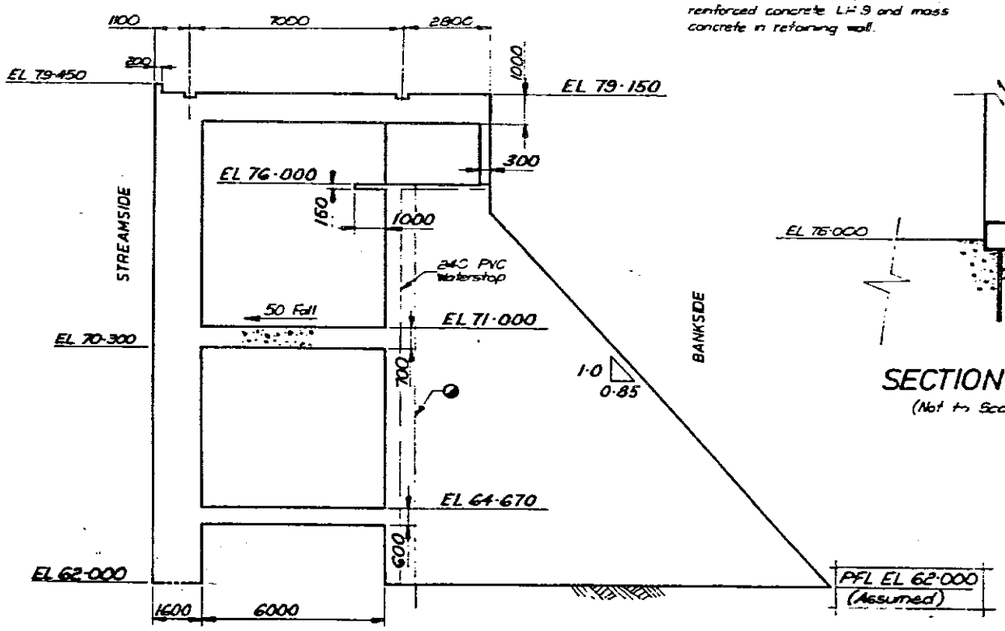
SECTION (H)
Scale 'b'



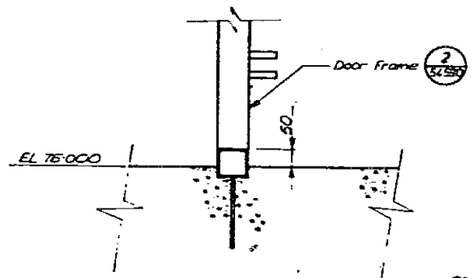
DETAIL (Z/941)
Scale 'b'



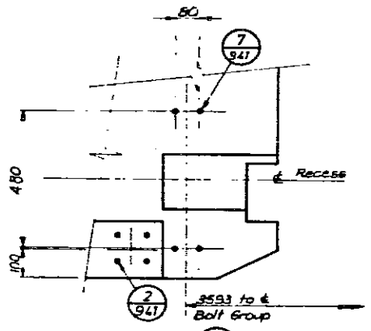
DETAIL (X/941)
Scale 'c'



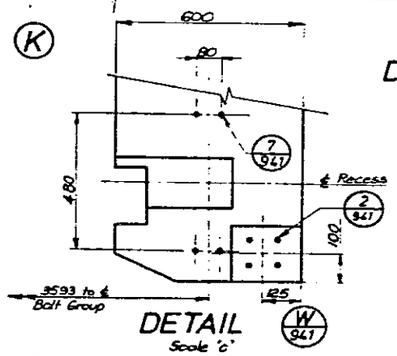
ELEVATION (C/941)
Scale 'a'



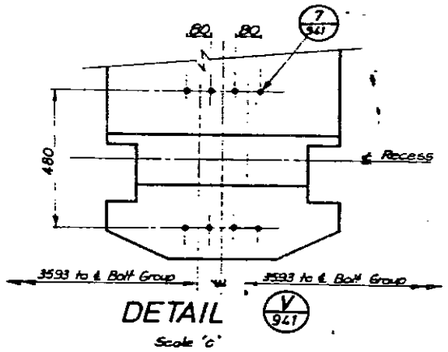
SECTION (K)
(Not to Scale)



DETAIL (Y/941)
Scale 'c'



DETAIL (W/941)
Scale 'c'



DETAIL (V/941)
Scale 'c'

AS BUILT
By
Checked
Date 6/11/85

NOTES

1. All dimensions are in millimetres and elevations are in metres.
2. 2/590 indicates drawing number is in different numerical series to this drawing. Refer drawing schedule
3. For general notes see drawing A1-59941

Revision					Drawing Schedule	
Dec '85	C	As Built				
29·7·81	B	Retaining Wall				
14·4·81	A	Sections B & C amended	M.J.C		N-54590	Monolith LH9 Door & Frame Fabrication
Date		Remarks	Ckd	Psd	N-59941	Concrete above EL 62·000 (Sh 1 of 3)

Scale 'a' 0 — 5000 — 10 000 mm (1:100)
Scale 'b' 0 — 100 — 200 — 300 — 400 — 500 mm (1:5)
Scale 'c' 0 — 500 — 1000 mm (1:10)
(Scales before reduction)

CONTRACT No 2120

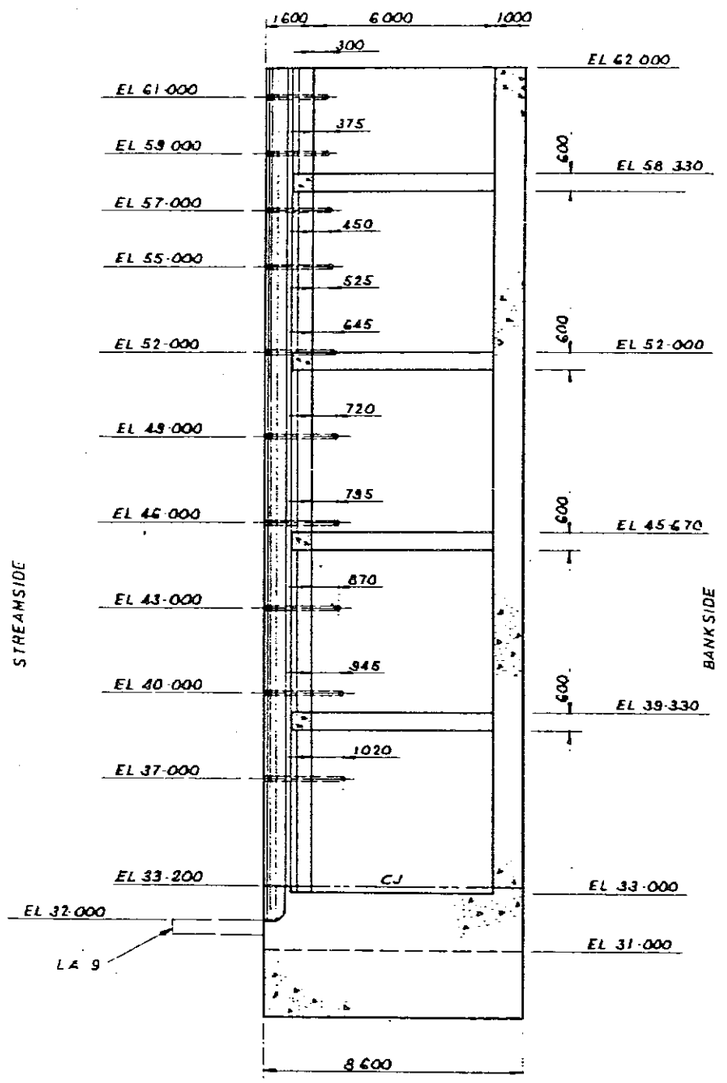
QUEENSLAND WATER RESOURCES COMMISSION

Design	Drafting	Recommended
Prep P.J.M.	Dr P.L. GH	Senior Engineer Designs
Ckd	Ckd	Approved
Supv	Supv N.J.C.	
Submitted		
Executive Engineer		Chief Designing Engineer

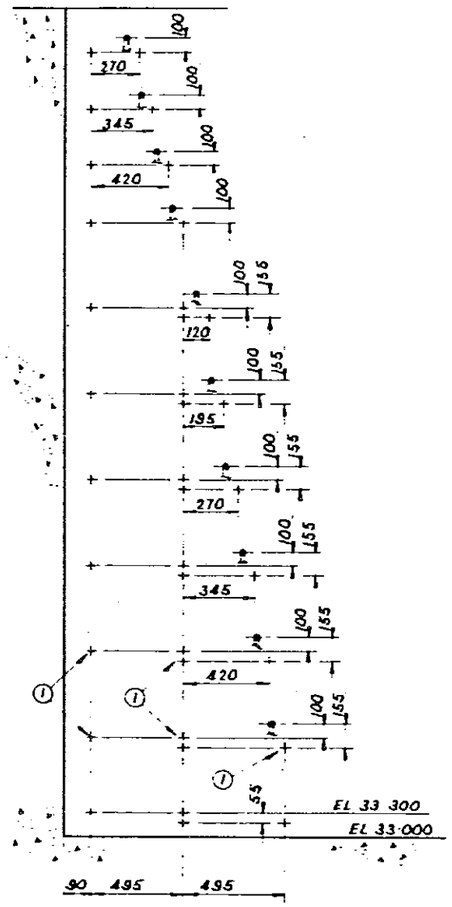
CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km – WIVENHOE DAM
SPILLWAY RETAINING WALLS - MONOLITH LH 9
CONCRETE ABOVE EL 62·000

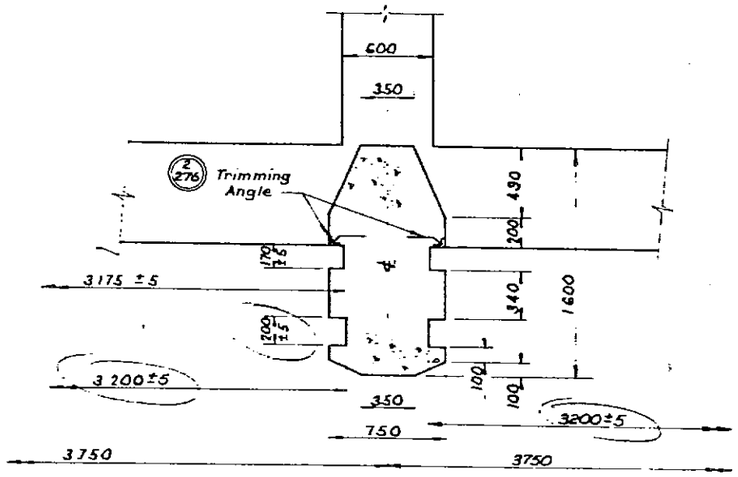
SH 2 of 3 | 12·11·80 | A1-59942 | A B C



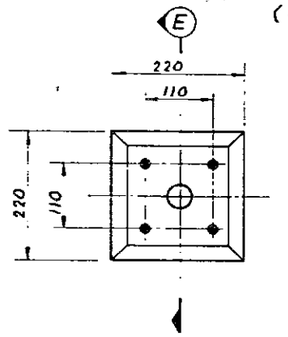
SECTION (A/612)
(Scale a)



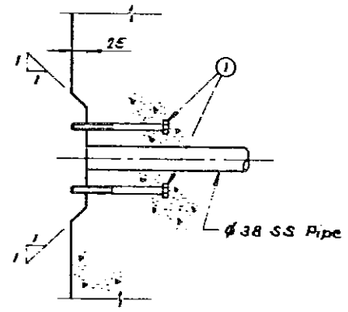
SECTION (B/612)
(Not to Scale)



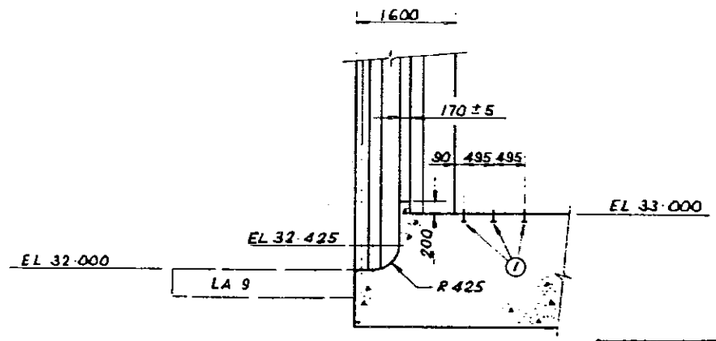
SECTION (C/612)
(Scale b)



DETAIL (Z/612)
(Not to Scale)



SECTION (E)
(Not to Scale)
Bolts shown for clarity



SECTION (D/612)
(Scale c)

NOTES

1. All dimensions are in millimetres and elevations in metres
2. For general notes see drawing A1-54612
3. (2/276) Indicates drawing number is in different numerical series to this drawing. Refer drawing shedule

ITEM N°	LOCATION	DIA	LENGTH	TYPE	THREAD LENGTH	N° REQD	NUTS REQD	WASHERS REQD	SETTING DETAILS
1	SS Pipes	12	150	SS Hex	36	96	96	96 round	25 out of concrete

BOLT SCHEDULE

All quantities are net only
All items to be Stainless Steel

AS BUILT
By
Chk'd
Date 31/12/82

Revision				
Oct '85	B	As Built		
7-10-80	A	Section C amended; Note 3 added; Aad to Draw Schd	MJC	
Date		Remarks	Ckd	Psd

Drawing Schedule	
A1-56276	Monos LH9 & LH10 MS Items
A1-54612	Concrete to EL 62·000 (Sheet 1 of 2)

Scale a: 0 5000 10 000 mm (1:100 before reduction)
Scale b: 0 500 1000 1500 2000 mm (1:20 before reduction)
Scale c: 0 1000 2000 3000 4000 5000 mm (1:50 before reduction)

CONTRACT N° 2120

IRRIGATION AND WATER SUPPLY COMMISSION

Design	Drafting	Recommended
Prep P.J.M	Dr A.J.N	Senior Engineer Designs
Ckd	Ckd	Approved
Supv	Supv M.J.C.	Chief Designing Engineer
Submitted		
Executive Engineer		

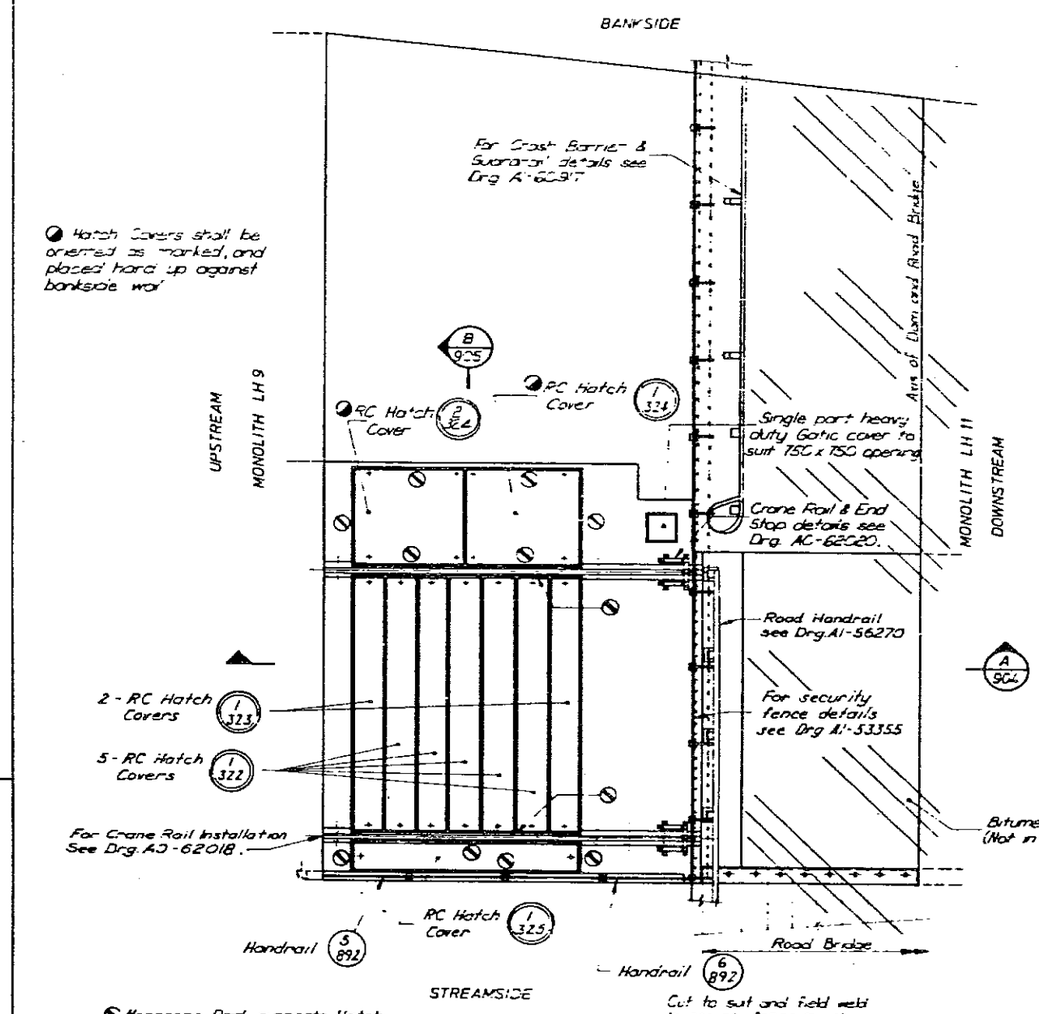
CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km - WIVENHOE DAM

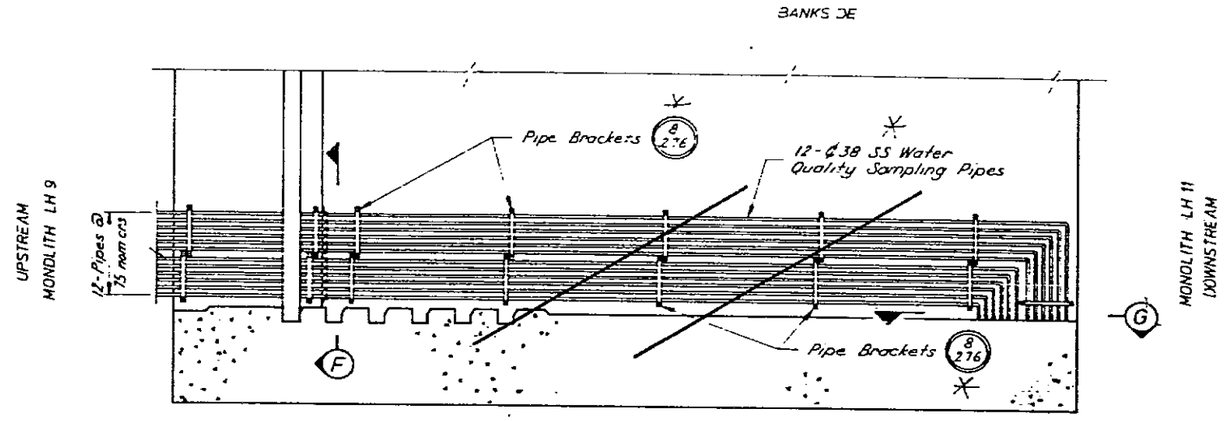
SPILLWAY RETAINING WALLS

MONO LH9 CONC. TO EL 62·000

Sh 2 of 2 | 19·12·79 | A1-54613 | A | B

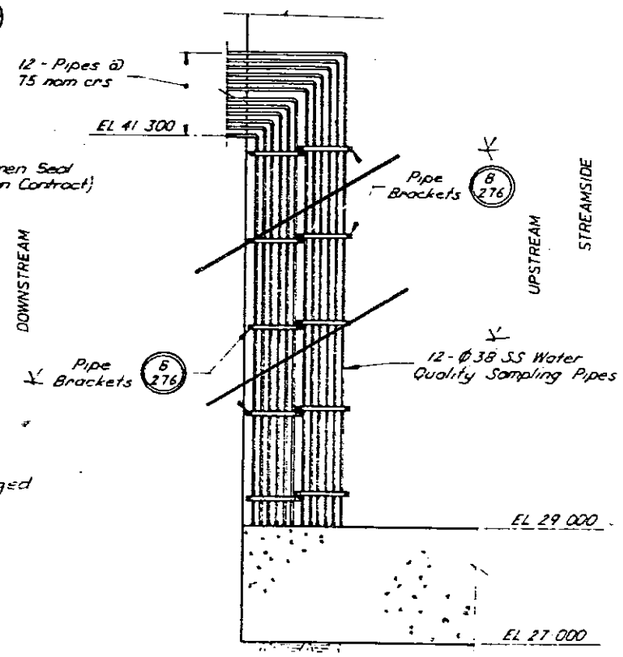


PLAN



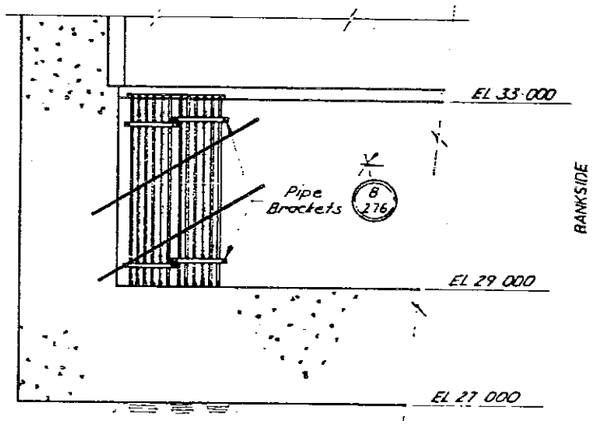
SECTION C 904

Not to Scale



SECTION G

Not to Scale



SECTION F

Not to Scale

* Water sampling pipes were installed and damaged flood waters and subsequently removed.

REQUIRED 34 m OF 75 x 30 NEOPRENE RUBBER WITH A SHORE DUROMETER HARDNESS OF 50-55

AS BUILT
By
Class
Date 6/4/85

NOTES :—

1. All dimensions are in millimetres and elevations in metres.
2. All materials and workmanship to the relevant Australian Standards.
3. For general notes refer to Drg A1-60904

(B 276) Indicates drawing number is in a different numerical series to this drawing.

Drawing Schedule	
A1-56149	Monolith LH10 - Reinforcement above EL 62.000 (Sh 1 of 2)
A1-56097	Monolith LH10 - Reinforcement to EL 62.000 (Sh 1 of 7)
A3-61574	Monolith LH 10 - Hatch Cover Drains
A1-60904	Spillway Retaining Walls - Mono LH10 Arrgt Sh 2 of 3
A1-60905	Spillway Retaining Walls - Mono LH10 Arrgt Sh 3 of 3
A1-56322	Mono LH10 - RC Hatch Covers - Conc & Reinf Sh 1 of 4
A1-54614	Mono LH10 Concrete below EL 62.000 Sh 1 of 2
A1-56120	Mono LH 10 Concrete above EL 62.00 Sh 1 of 3
A2-60914	Mono LH 10 - Handrail Details (Sh 2 of 2)
A1-60892	Mono LH10 - Handrail Details (Sh 1 of 2)
A1-53355	Spillway Works Area - Security Fence Details
A1-56276	Monos LH9 & LH10 - Metal Items

Revision			
Oct '85	4	As Built	
Date		Remarks	Ckd / Psd

Scale Before Reduction

0 2500 5000 7500 mm (1:75)

CONTRACT Nº 2120

QUEENSLAND WATER RESOURCES COMMISSION

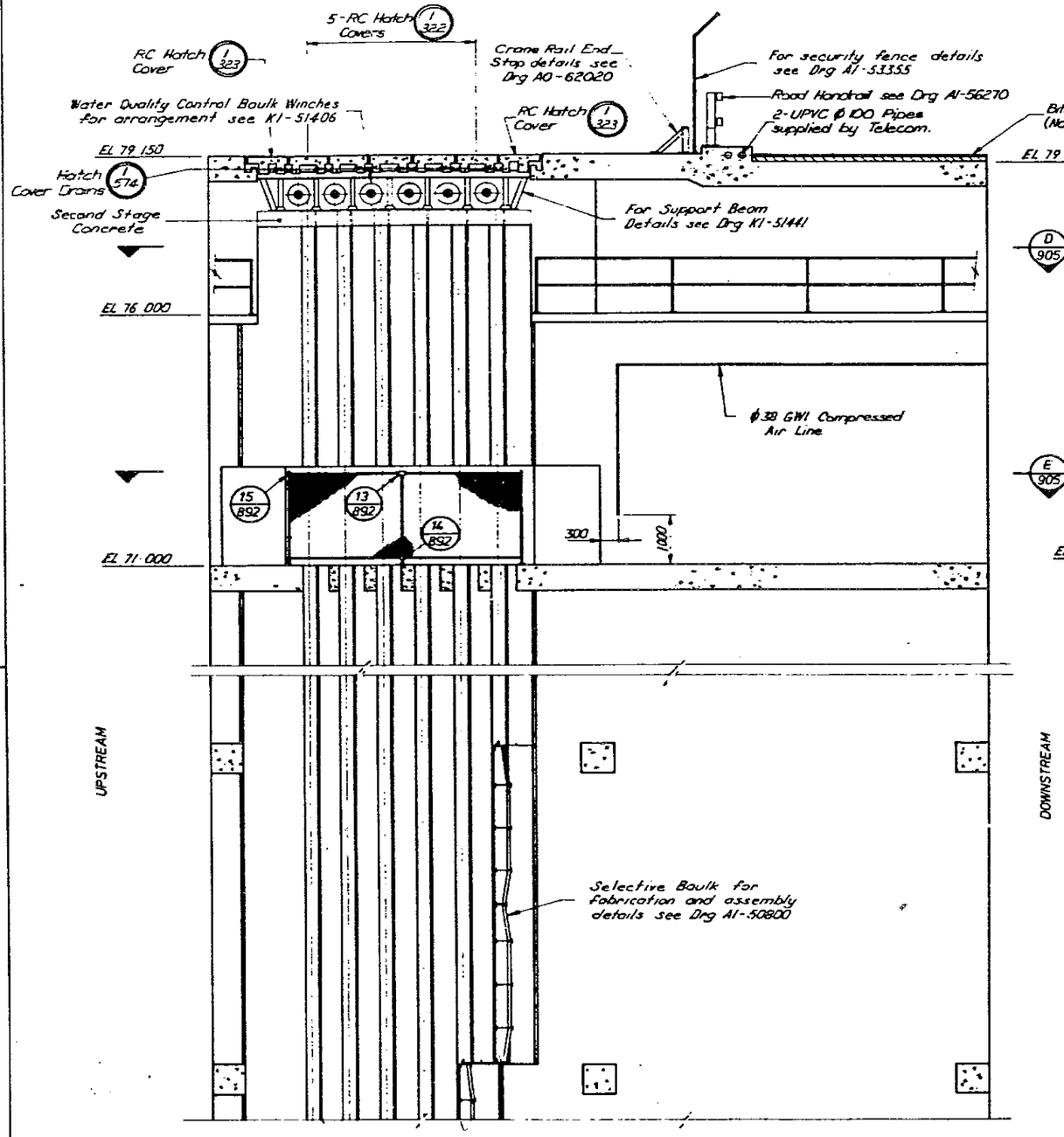
Design	Drafting	Recommended
Prep P J M	Dr	Senior Engineer Designs
Ckd	Ckd	Approved
Supv	Supv M J C	Chief Designing Engineer
Submitted		
Executive Engineer		

CO-ORDINATOR GENERAL'S DEPARTMENT

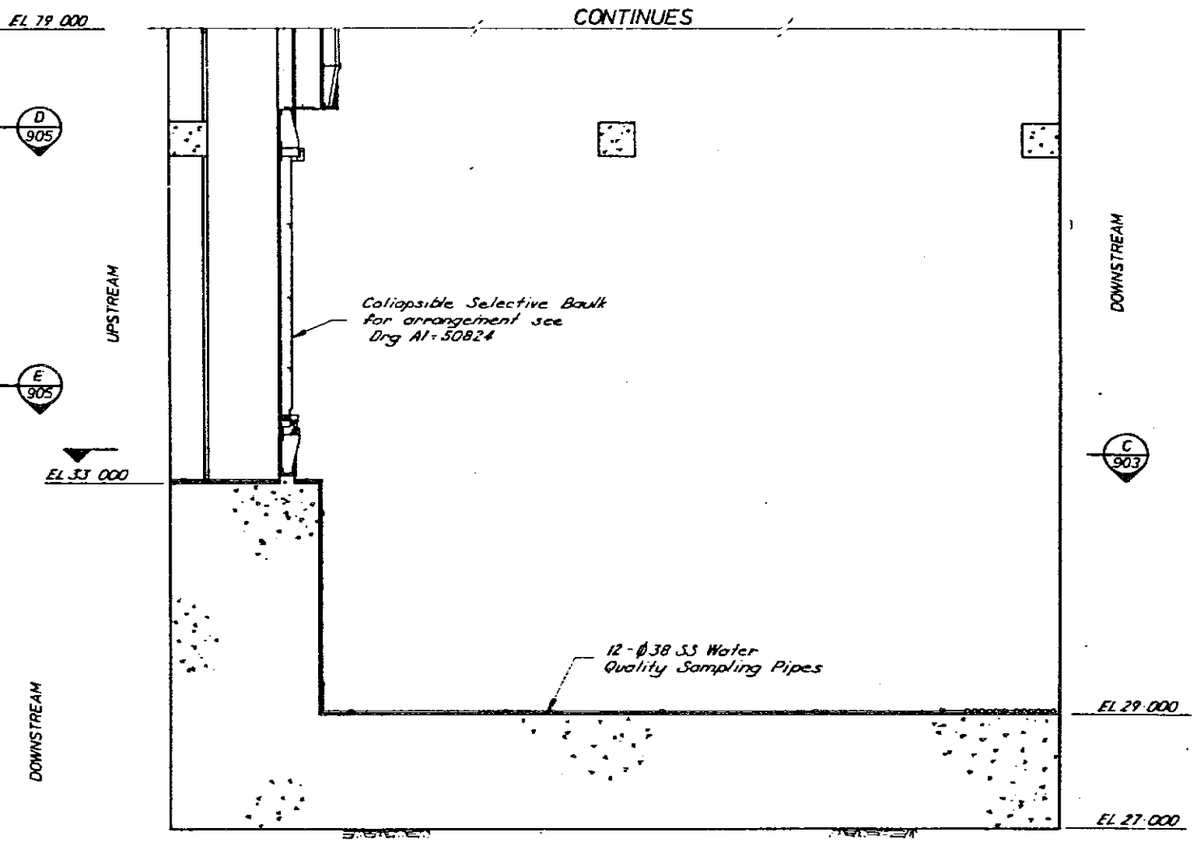
BRISBANE RIVER 150·2 km - WIVENHOE DAM
SPILLWAY RETAINING WALLS

MONOLITH LH10 - ARRANGEMENT

Sh 1 of 3 | 15.5.81 | A1-60903 | A



SECTION (A/903) CONTINUED



SECTION (A/903)

AS BUILT
By
Class
Date 6/11/85

NOTES :—

1. All dimensions are in millimetres and elevations in metres.
2. All materials and workmanship to the relevant Australian Standards.
3. 2nd Stage Concrete to be Grade 20 and maximum size of aggregate to be 10.
4. After welding all damaged galvanized surfaces to be patch painted in accordance with the specification.

(1/574) Indicates drawing number is in a different numerical series to this drawing. Refer to drawing schedule.

Revision				
Oct '85	B	As Built		
12.1.82	A	Ø38 Comp Air Line added	GTG	
Date		Remarks	Ckd	Psd

Drawing Schedule	
A3-61574	Monolith LH10 - Hatch Cover Drains
K1-51441	Water Quality Control Boulk Winches - Support Beam Details
K1-51406	Water Quality Control Boulk Winches - Installation & Arrgt
A1-50800	MS Selective Boulks - Fabrication & Assembly Details
A1-50824	Collapsible Selective Boulk - Arrangement
A1-60903	Spillway Retaining Walls - Mono LH10 Arrgt Sh 1 of 3

Scale Before Reduction

0 1000 2000 3000 4000 5000 mm (1:50)

CONTRACT Nº 2120

QUEENSLAND WATER RESOURCES COMMISSION

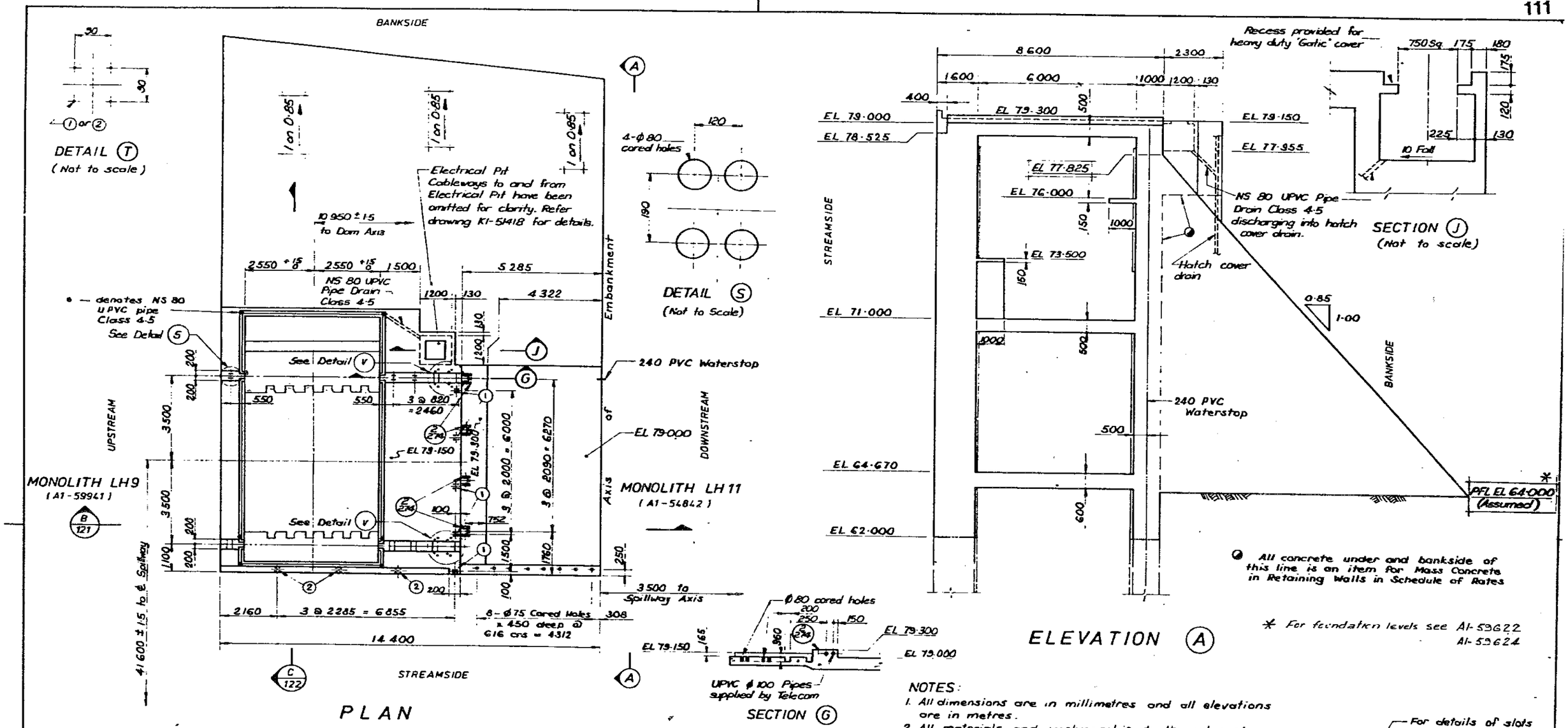
Design	Drafting	Recommended
Prep P.J.M.	Dr PKT	
Ckd	Ckd GTG	Senior Engineer Designs
Supv	Supv M.J.C.	Approved
Submitted		
Executive Engineer		Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2km - WIVENHOE DAM
SPILLWAY RETAINING WALLS

MONOLITH LH10 — ARRANGEMENT

Sh 2 of 3 | 15.5.81 | A1-60904 | A | B



NOTES:

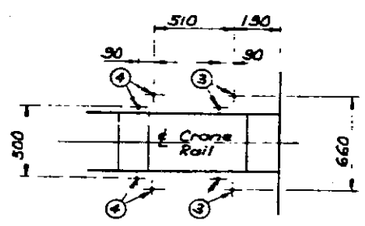
1. All dimensions are in millimetres and all elevations are in metres.
2. All materials and workmanship to the relevant Australian Standards.
3. For general notes see drg A1-56121.

ITEM N°	LOCATION	DIA	LENGTH	TYPE	THREAD LENGTH	N° REQD	NUTS REQD	WASHERS REQD	MASONRY ANCHORS	SETTING DETAILS
4	Crane Buffer	M24	380	Galv Hex	80	8	8	8 R	Not Suitable	80 out of conc
3	Crane Buffer	M20	320	Galv Hex	70	8	8	8 R	Not Suitable	70 out of conc
2	Handrails	M12	150	Galv Hex	Std	92	92	92	*	45 out of conc as per Detail (T)
1	Security Fence	M16	200	Galv Hex	Std	20	20	20	Not Suitable	45 out of conc as per Detail (T)

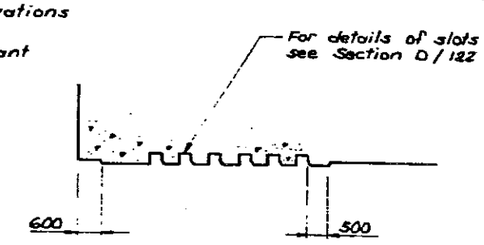
BOLT SCHEDULE

* Masonry Anchors approved by the Engineer may be substituted

All quantities are net only. All items to be galvanised



DETAIL (V) (Not to scale)



SECTION (H/121)

AS BUILT
By
Checked
Date 31/10/86

Revision			
Oct '85	C	As Built	
29.7.81	B	Retaining Wall	
14.4.91	A	Elevation A amended	MJC
Date		Remarks	Crd / Pstd

Drawing Schedule	
KI-51441	Boulk Winches – Support Beam Details
KI-51406	Boulk Winches – Installation
A1-54614	LH10 Concrete to EL 62.000 (Sh 1 of 2)
A1-56097	LH10 Reinforcement below EL 62.000
A1-56122	LH10 Concrete above EL 62.000 (Sh 3 of 3)
A1-56121	LH10 Concrete above EL 62.000 (Sh 2 of 3)

0 2500 5000 7500 mm

(1:75 Scale before reduction)

CONTRACT N° 2120

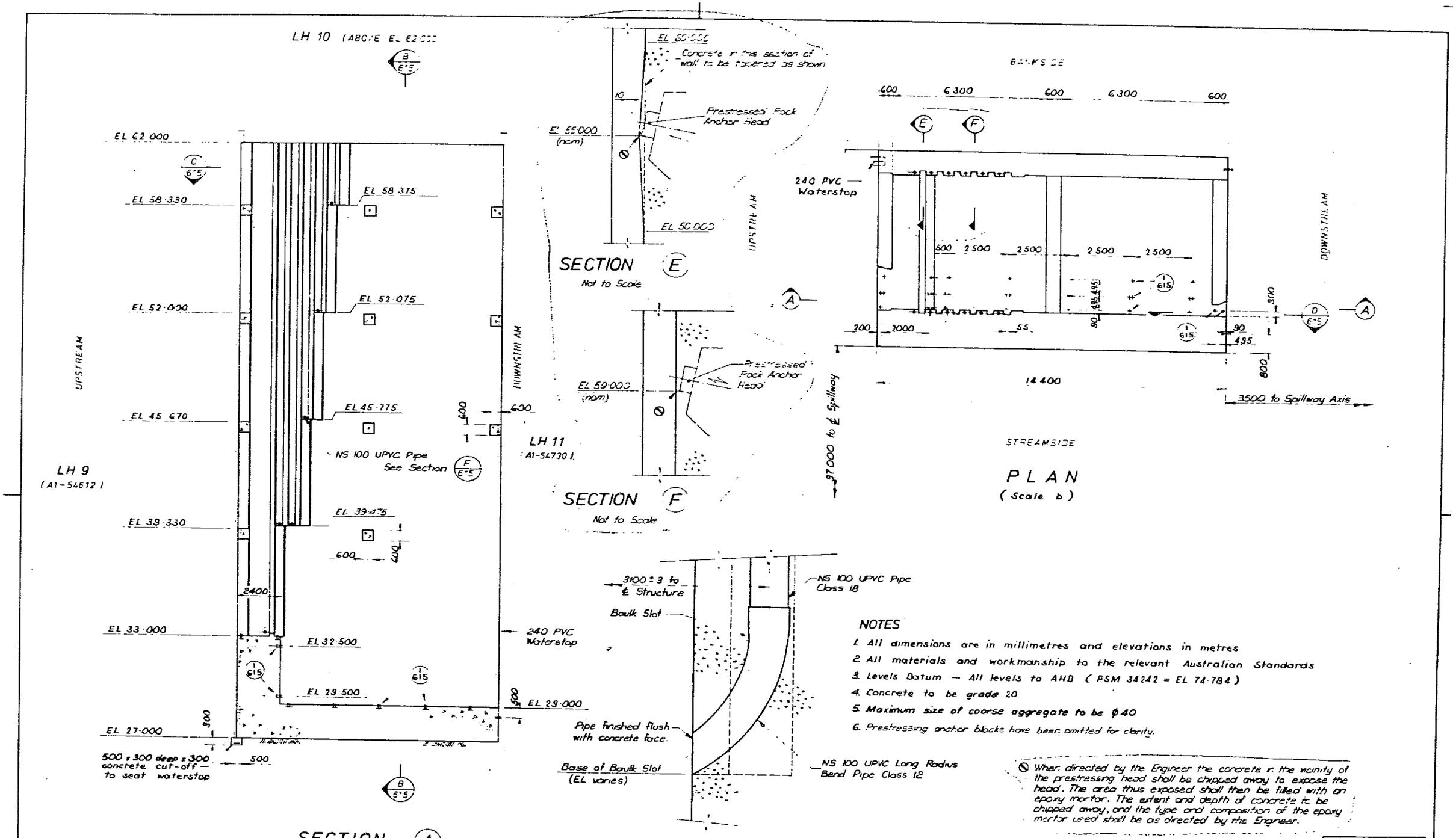
IRRIGATION AND WATER SUPPLY COMMISSION

Design: Pres D J M
Drafting: Dr A.J.N.
Recommended: Senior Engineer Designs
Approved

CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km – WIVENHOE DAM
SPILLWAY RETAINING WALLS
MONOLITH LH 10
CONCRETE ABOVE EL 62·000

Sh 1 of 3 | 6 1:80 | A1-56120 | A | B | C



NOTES

1. All dimensions are in millimetres and elevations in metres
2. All materials and workmanship to the relevant Australian Standards
3. Levels Datum — All levels to AHD (PSM 34242 = EL 74.784)
4. Concrete to be grade 20
5. Maximum size of coarse aggregate to be ϕ40
6. Prestressing anchor blocks have been omitted for clarity.

⊘ When directed by the Engineer the concrete in the vicinity of the prestressing head shall be chipped away to expose the head. The area thus exposed shall then be filled with an epoxy mortar. The extent and depth of concrete to be chipped away, and the type and composition of the epoxy mortar used shall be as directed by the Engineer.

AS BUILT
By
Chk'd
Date 31/12/85

Revision			
Oct '85	E	As Built	
1-5-81	D	Sections E & F added	MJC
27-9-80	C	Plan & Sect. A amded,	MJC
		Sect F/615 added	
16-5-80	B	Conc around baulks amend	MJC
24-1-80	A	General amendments.	MJC PJM
Date		Remarks	Ckd Psd

Drawing Schedule	
A1-56097	Reinforcement to EL 62.000 (Sheet 1 of 7)
A1-54615	Concrete to EL 62.000 (Sheet 2 of 2)

Scale a: 0 — 5000 — 10000 mm (1:100 before reduction)

Scale b: 0 — 2500 — 5000 — 7500 mm (1:75 before reduction)

CONTRACT Nº 2120

IRRIGATION AND WATER SUPPLY COMMISSION

Design	Drafting	Recommended
Prep PJM	Dr AJN	
Ckd	Ckd	Senior Engineer Designs
Supv	Supv M.J.C.	Approved
Submitted		
Executive Engineer		Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

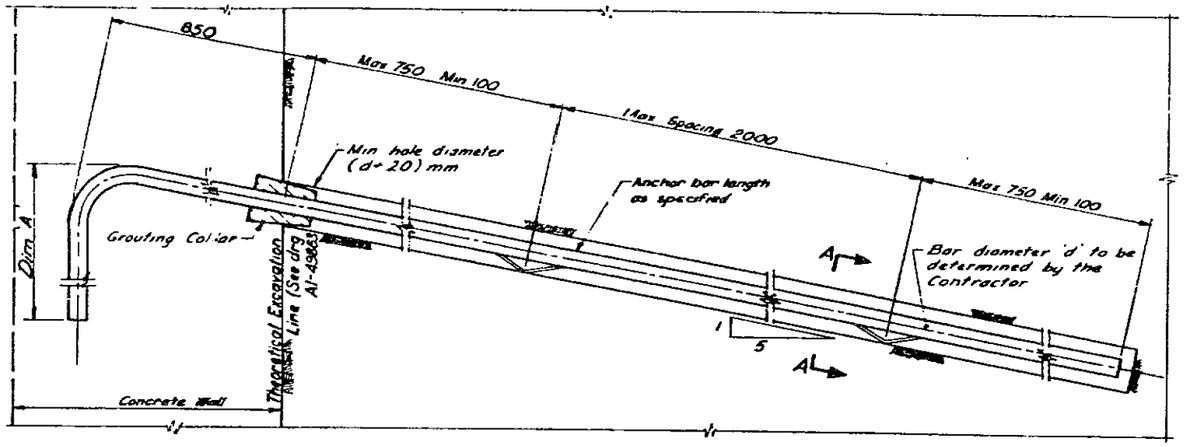
BRISBANE RIVER 150·2 km - WIVENHOE DAM

SPILLWAY RETAINING WALLS

MONO LH10 CONC. TO EL 62·000

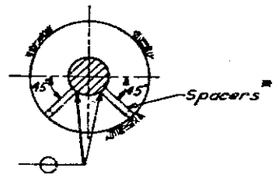
Sh 1 of 2 | 4.1.80 | A1-54614 | A B C D E

INS. 1 0 2 4 6 8 10



Scale 'b'

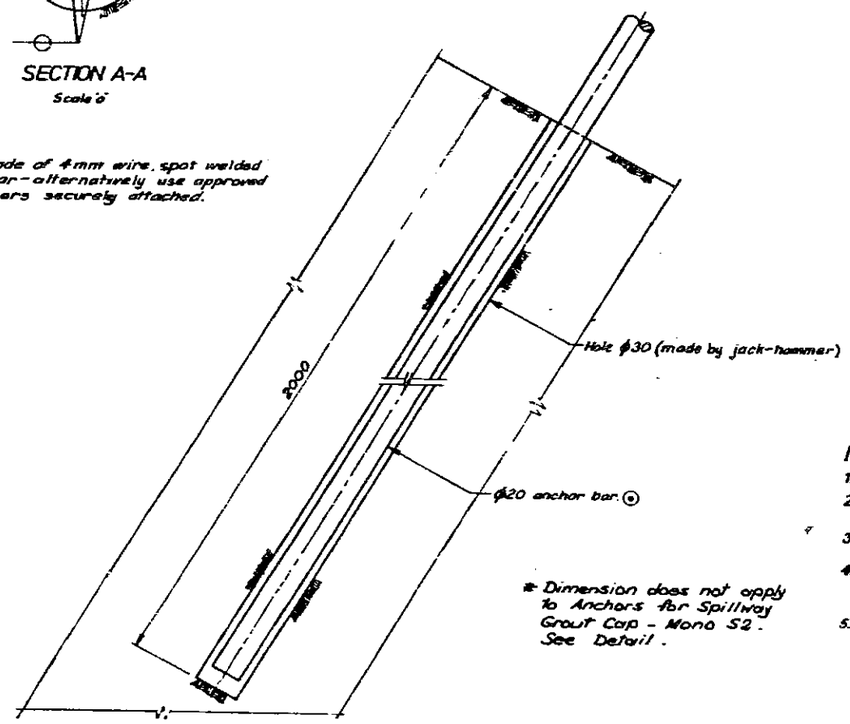
ANCHORS FOR SPILLWAY WALLS



SECTION A-A

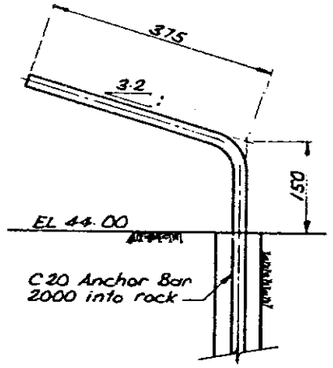
Scale 'a'

* Spacers made of 4mm wire, spot welded to anchor bar - alternatively use approved plastic spacers securely attached.



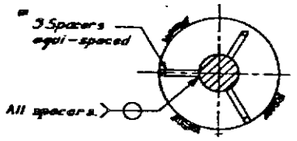
Scale 'a'

ANCHORAGE FOR EMBANKMENT MESH PROTECTION



ANCHORS FOR SPILLWAY GROUT CAP - MONO S2

Scale 'b'



SECTION B-B

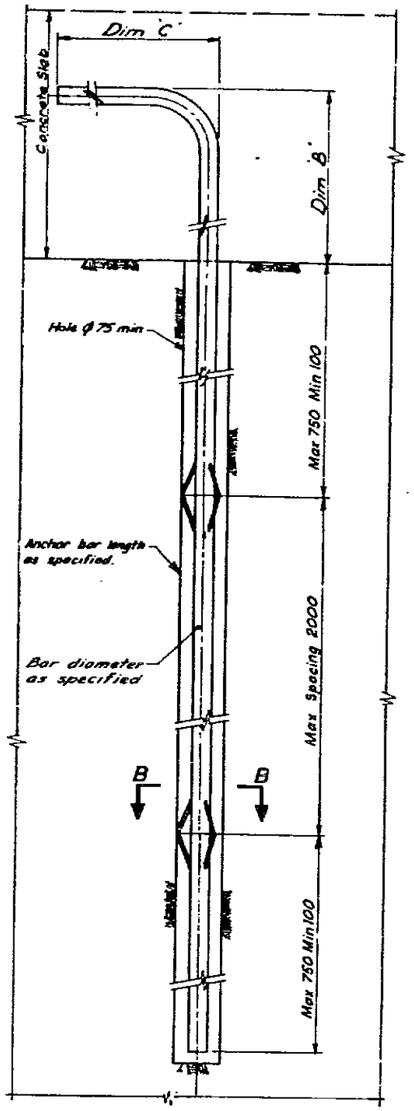
Scale 'a'

Bar Size	Dim 'A'	Dim 'B'	Dim 'C'
C36	1200		
C32	800	850	750
C28	300		
C24	250	350	650
C20		200 *	600 *

* Dimension does not apply to Anchors for Spillway Grout Cap - Mono S2. See Detail.

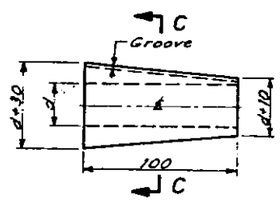
NOTES:-

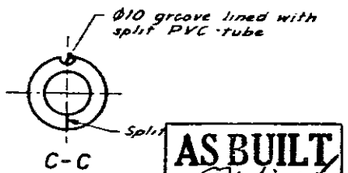
1. ALL DIMENSIONS ARE IN MILLIMETRES
2. ALL MATERIALS AND WORKMANSHIP TO THE RELEVANT AUSTRALIAN STANDARDS
3. All anchor bars to be Cold Worked Deformed Bars (410 C) to AS1302-1977 or structural grade deformed bars if marked thus ⊙
4. Drilling of holes for anchor bars and grouting of anchor bars in place, to be in accordance with the specification.
5. Grouting Collar to be fitted to the anchor bar to coincide with the rock face before inserting the bar to its final depth in a grout filled hole. Grout must flow from the return groove before the collar is finally wedged in place and left for the grout to set



Scale 'b'

ANCHORS FOR SPILLWAY SLABS





SOFT RUBBER GROUTING COLLAR

Scale 'a'

AS BUILT
By
Date 31/10/86

Revision					
Oct '85	D	As Built			
13-11-79	C	C20 anchors added	M.J.C		
4-9-79	W	Tender to Working Drg	M.J.C.		
24-4-79	B	Contract Number Amended & Bar Size Table Added			
13-10-78	A	Notes & Collar added	M.J.C.		
Date		Remarks	Ckd	Psd	

Drawing Schedule

SCALES

Scale 'a' 0 50 100 150 200 mm (1·2 before reduction)

Scale 'b' 0 100 200 300 400 500 mm (1·5 before reduction)

CONTRACT Nº 2120

IRRIGATION AND WATER SUPPLY COMMISSION

Design	Drafting	Recommended
Prep	Dr	
Ckd	Ckd	Senior Engineer Designs
Supr	Supr	Approved
Submitted		
Executive Engineer		Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

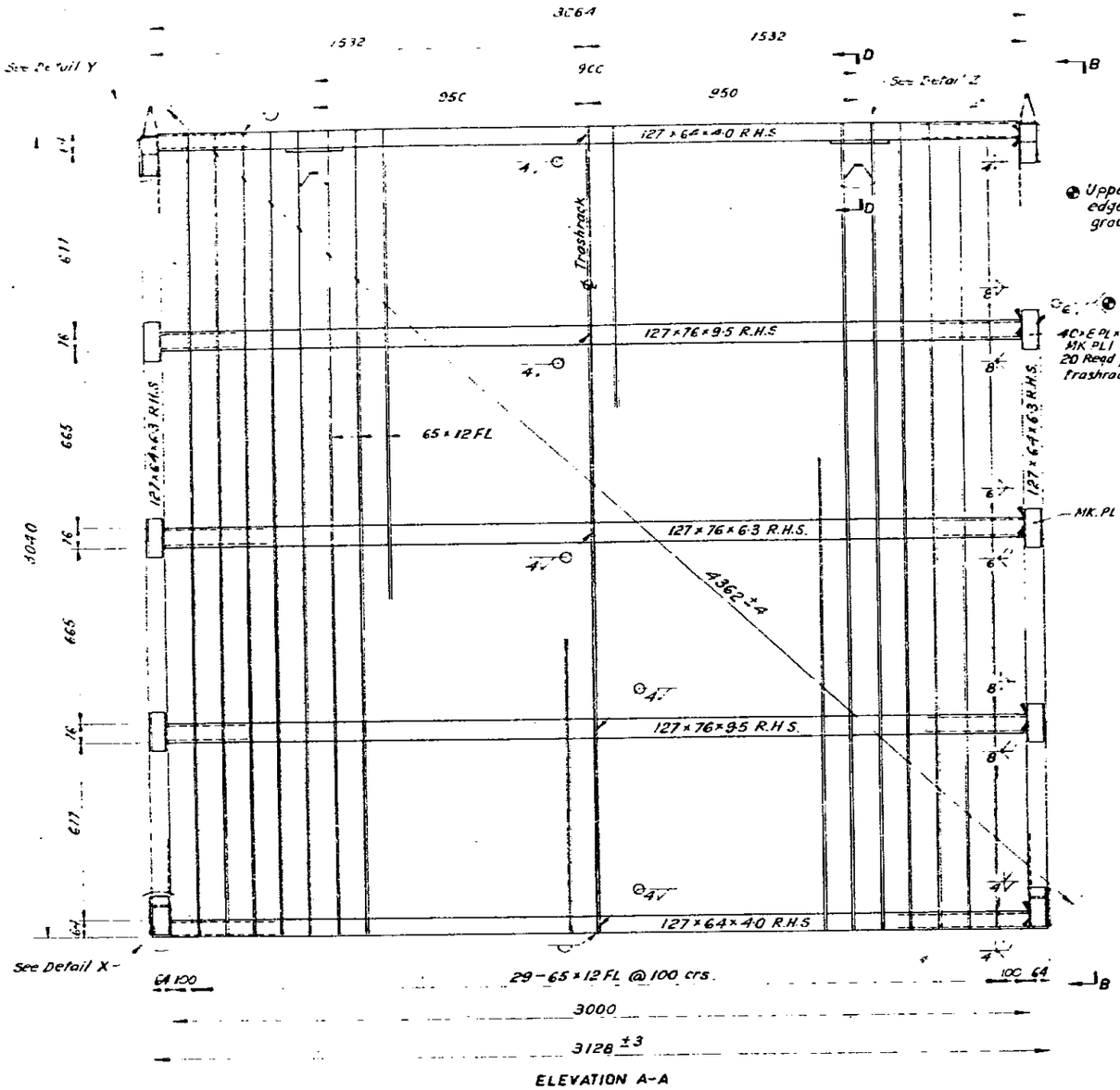
BRISBANE RIVER 150·2 km - WIVENHOE DAM

THIRD STAGE CONSTRUCTION

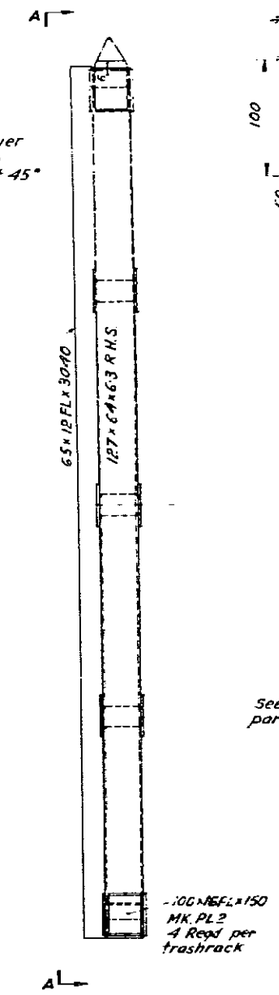
GROUTED ANCHOR BARS

16-6-78 A1-50788 A B W C D

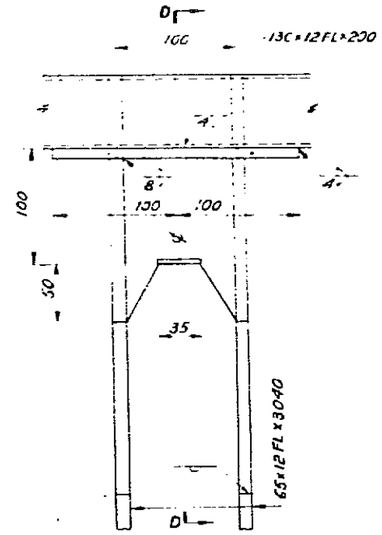
A1-50774



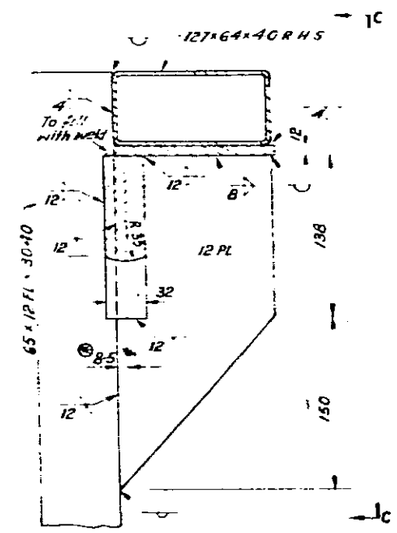
ELEVATION A-A



ELEVATION B-B



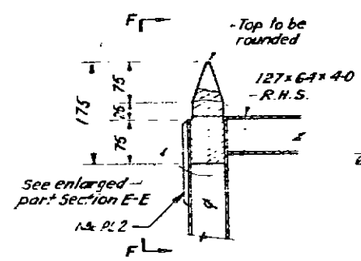
ELEVATION C-C



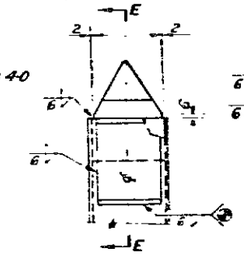
SECTION D-D

Denotes - critical dimension

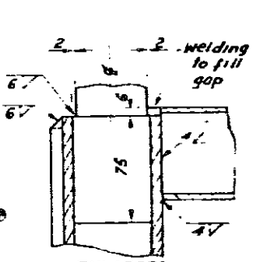
DETAIL Z
(Scale 'a')



SECTION E-E
Scale 'b'

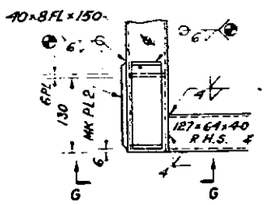


ELEVATION F-F
Scale 'a'

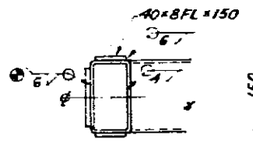


ENLARGED PART SECTION E-E

DETAIL Y

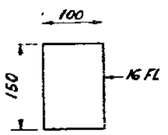


DETAIL X
(Scale 'b')

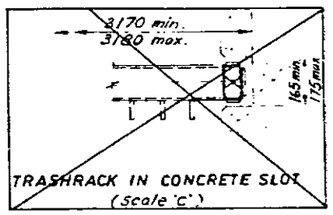


Upper & Lower edges to be ground of 45°.

ELEVATION G-G



MK. PL.2
244 REQD.



TRASHRACK IN CONCRETE SLOT
(Scale 'c')

TRASHRACK ARRANGEMENT
61 REQD. (Scale 'c')

4. PAINTING:
After cleaning all surfaces to be painted with a minimum of two (2) applications of an approved two pack epoxy resin based coal tar paint to to give a minimum dry thickness of 400 µm Paint to be applied in accordance with manufacturers instruction.

NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES
2. ALL MATERIALS AND WORKMANSHIP TO THE RELEVANT AUSTRALIAN STANDARDS
3. After fabrication all M.S. Items to be cleaned to base metal by sand blasting or approved grit blasting.
5. All joints to be sealed by welding.
6. All Flame-cut edges to be ground smooth.
7. Each Trashrack Section to lie wholly between two parallel planes not more than 203mm apart.

Revision				Drawing Schedule	
Date	Remarks	Ckd	Psd	A1-50773	Trashrack Fishing Gear (Sh. 2 of 2)
				A1-50772	Trashrack Fishing Gear (Sh. 1 of 2)

0 50 100 150 200 250 mm (Scale 1:25 Before Reduction. (Scale 'a'))
0 100 200 300 400 500 mm (Scale 1:5 Before Reduction. (Scale 'b'))
0 500 1000 mm (Scale 1:10 Before Reduction. (Scale 'c'))

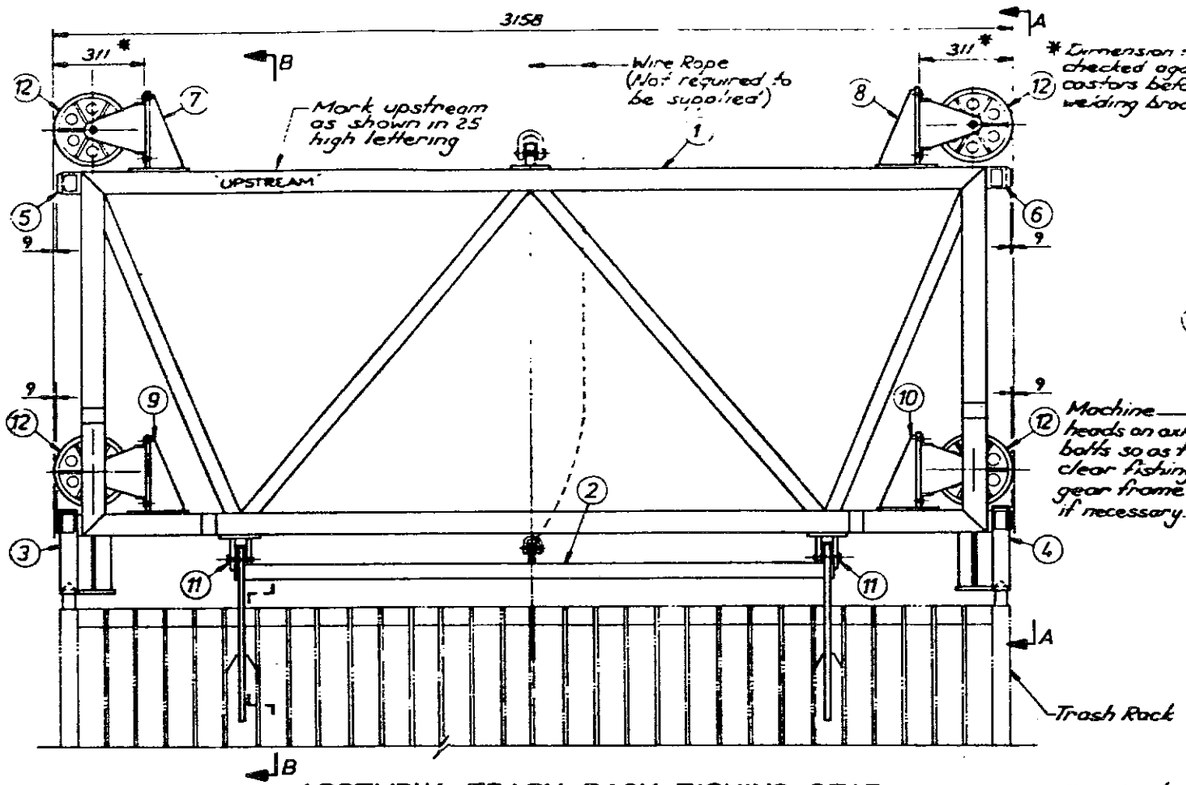
NOT IN CONTRACT

Design		Drafting	
Prep		Dr	
Ckd		Ckd.	N J C
Supr.		Supr.	
Submitted			
Executive Engineer			

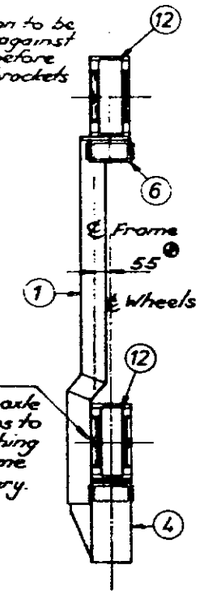
Recommended — Senior Engineer Designs
Approved — Act. Chief Designing Engineer

IRRIGATION AND WATER SUPPLY COMMISSION
BRISBANE RIVER 150.2km - WIVENHOE DAM
OUTLET WORKS - INTAKE STRUCTURE
M.S. TRASHRACK
7-4-78 | A1-50774

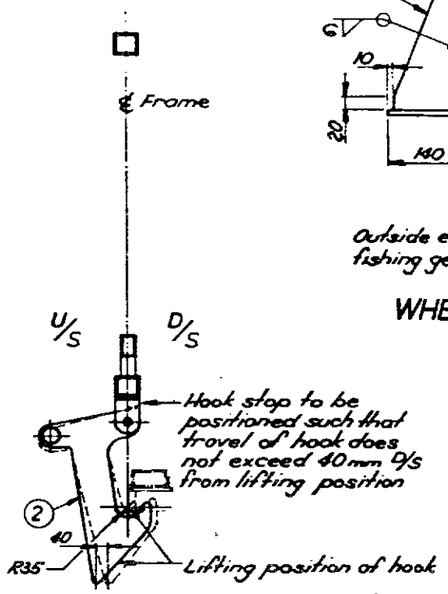
A1-50772



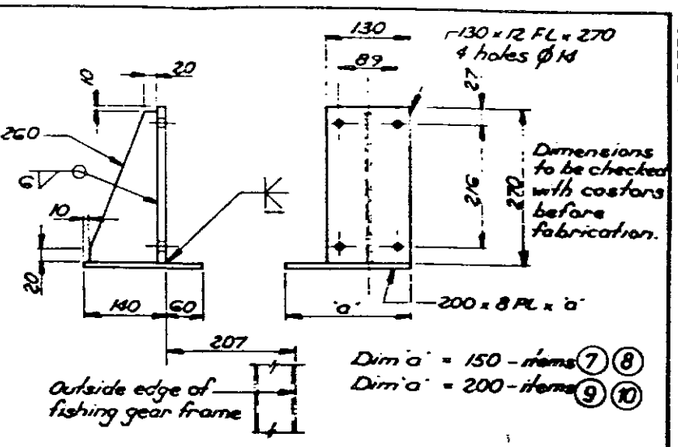
ASSEMBLY—TRASH RACK FISHING GEAR
Scale : a



VIEW 'A-A'
Scale : a



SECTION 'B-B'
Scale : a

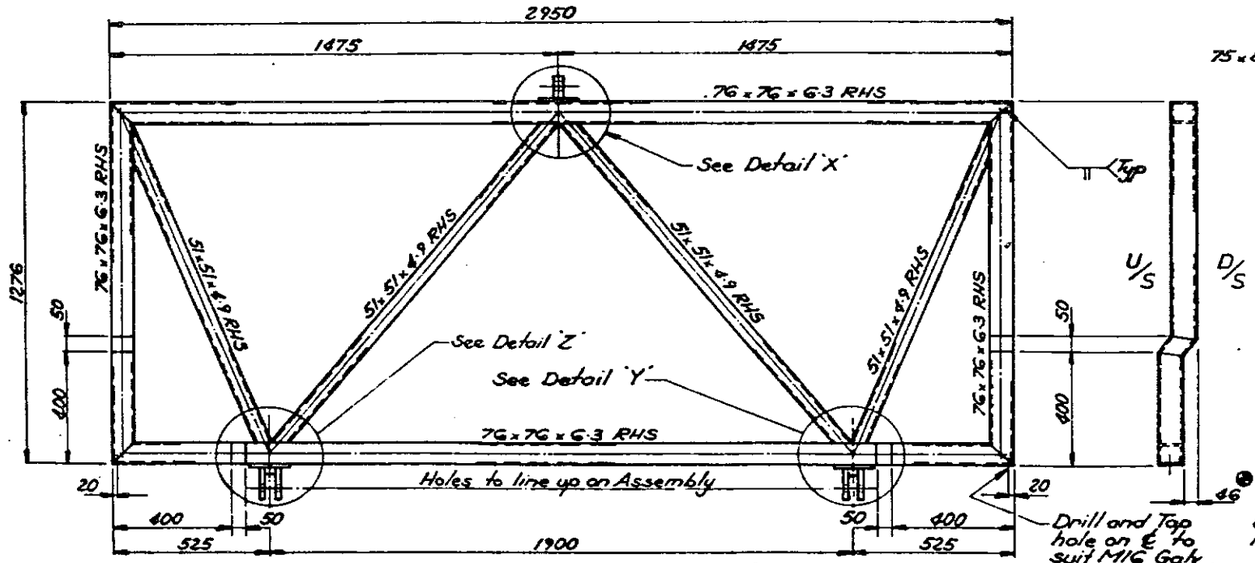


WHEEL BRACKET DETAIL Scale 'b'

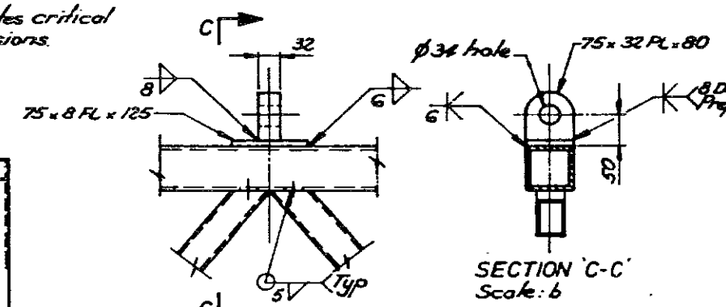
1-REQD AS SHOWN ITEM 8
1-REQD OPP HAND ITEM 7
1-REQD AS SHOWN ITEM 10
1-REQD OPP HAND ITEM 9

Note : Weld wheel brackets to frame and guides with 6mm continuous fillet where possible. Remaining edges to have full penetration butt welds and these welds are to be ground flush.

● Indicates critical dimensions.

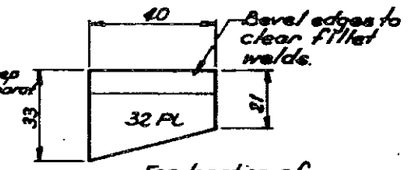


FISHING GEAR FRAME (1) 1-REQD
Scale : a



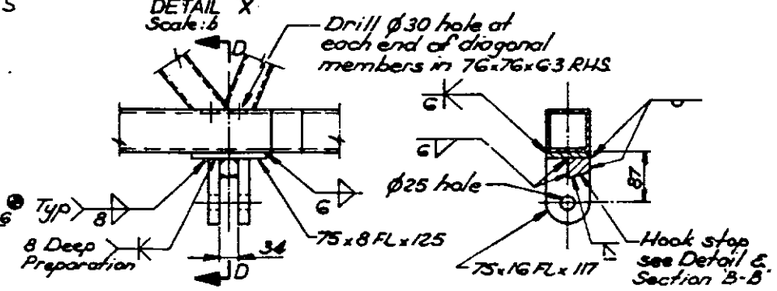
SECTION 'C-C'
Scale : b

DETAIL 'X'
Scale : b



For location of stop see Section 'D-D' & 'B-B'

HOOK STOP DETAIL
Scale : c



DETAIL 'Y' AS SHOWN
DETAIL 'Z' OPP HAND

SECTION 'D-D'
Scale : b

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. ALL MATERIALS AND WORKMANSHIP TO THE RELEVANT AUSTRALIAN STANDARDS
3. After fabrication, all MS items to be cleaned to base metal by sand blasting or approved chemical descaling process.
4. After cleaning all items to be immediately hot dip galvanised.
5. All welds to be 6 continuous Fillet unless otherwise noted.

See Drg A1-50773 for notes 6 to 9

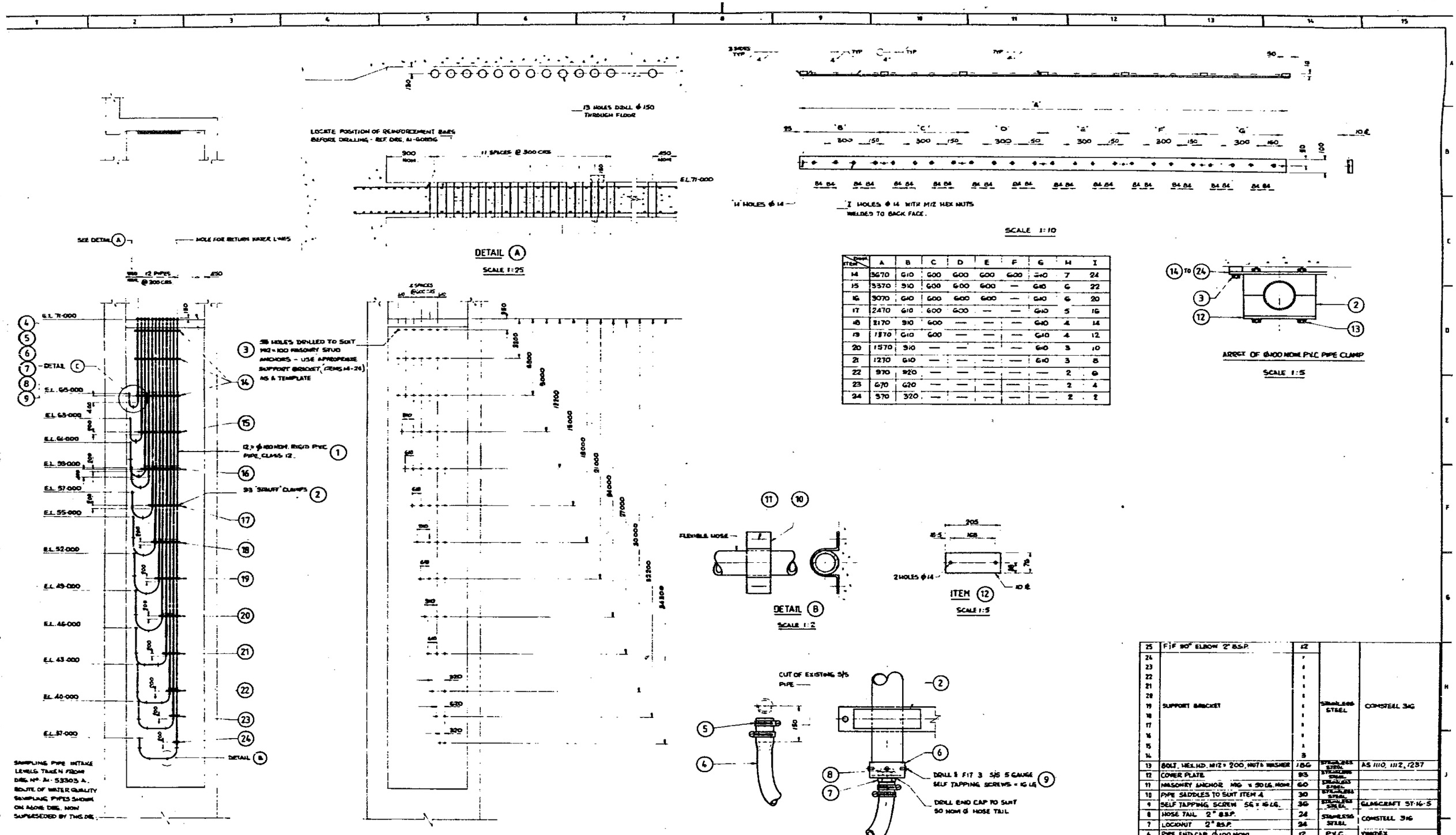
Revision				Drawing Schedule	
Date	Remarks	Chd	Psd	A1-50774	Trash Racks
				A1-50773	Trash Rock Fishing Gear Sh 2 of 2

Scale a 0 — 500 — 1000 mm (Scale 1:10 Before Reduction)
Scale b 0 — 250 — 500 mm (Scale 1:5 Before Reduction)
Scale c 0 — 50 — 100 mm (Scale 1:1 Before Reduction)

NOT IN CONTRACT

IRRIGATION AND WATER SUPPLY COMMISSION
Design — Drafting Dr CRC — Chd MJC — Supv — Submitted — Executive Engineer
Recommended — Senior Engineer Designs
Approved — Act/ Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT
BRISBANE RIVER 150·2 km - WIVENHOE DAM
OUTLET WORKS — INTAKE STRUCTURE
TRASH RACK FISHING GEAR
SH 1 of 2 | 6/4/79 | A1-50772



Item	A	B	C	D	E	F	G	H	I
14	3670	610	600	600	600	600	610	7	24
15	3370	910	600	600	600	—	610	6	22
16	3070	610	600	600	600	—	610	6	20
17	2470	610	600	600	—	—	610	5	16
18	2170	910	600	—	—	—	610	4	14
19	1870	610	600	—	—	—	610	4	12
20	1570	910	—	—	—	—	610	3	10
21	1270	610	—	—	—	—	610	3	8
22	970	920	—	—	—	—	—	2	6
23	670	620	—	—	—	—	—	2	4
24	370	320	—	—	—	—	—	2	2

ITEM	DESCRIPTION	QTY	MATERIAL	SPECIFICATION
25	F/F 90° ELBOW 2" B.S.P.	12		
24	SUPPORT BRACKET	1	STAINLESS STEEL	COMSTEEL 316
23		1		
22		1		
21		1		
20		1		
19		1		
18		1		
17		1		
16		1		
15		1		
14		3		
13	BOLT, HEX. HD. M12 x 200, NUT & WASHER	18G	STAINLESS STEEL	AS 1110, 1112, 1237
12	COVER PLATE	93	STAINLESS STEEL	
11	MASONRY ANCHOR M12 x 50 LG. NOM.	60	STAINLESS STEEL	
10	PIPE SADDLES TO SUIT ITEM 4	30	STAINLESS STEEL	
9	SELF TAPPING SCREW 5G x 16 LG.	3G	STAINLESS STEEL	GLASCRAFT ST-16-S
8	HOSE TAIL 2" B.S.P.	24	STAINLESS STEEL	COMSTEEL 316
7	LOCKNUT 2" B.S.P.	24		
6	PIPE END CAP ϕ100 NOM.	12	P.V.C.	YANDEX
5	HOSE CLIP ϕ50 NOM.	4B	STAINLESS STEEL	UTILUX 1X H4049
4	FLEXIBLE WATER SUCTION HOSE ϕ50 x 8	60 M	PLASTIC	HELIFLEX
3	MASONRY ANCHOR M12	58	STAINLESS STEEL	
2	PIPE CLAMP SHELL	93		SIMUFF 8116
1	ϕ100 NOM 2 RIGID PVC. PRESSURE PIPE	48 x 6m LENGTHS	P.V.C.	CLASS 12 'YANDEX'

MATERIAL LIST

DRAWING SCHEDULE	REVISION	DATE	REMARKS	ZONE	CKD	PSD	SME

SCALE: 0 1 2 3 4 5 6 7 8 9 10m (1:100) (DENOTE REDUCTION) (OTHERS AS NOTED)

STANDARD TOLERANCES
> 1000 ±1.0
< 1000 ±1.5
✓ SURFACES ±0.50
XXX.0 ±0.50
XX.00 ±0.10
UNLESS OTHERWISE INDICATED

Queensland Water Resources Commission

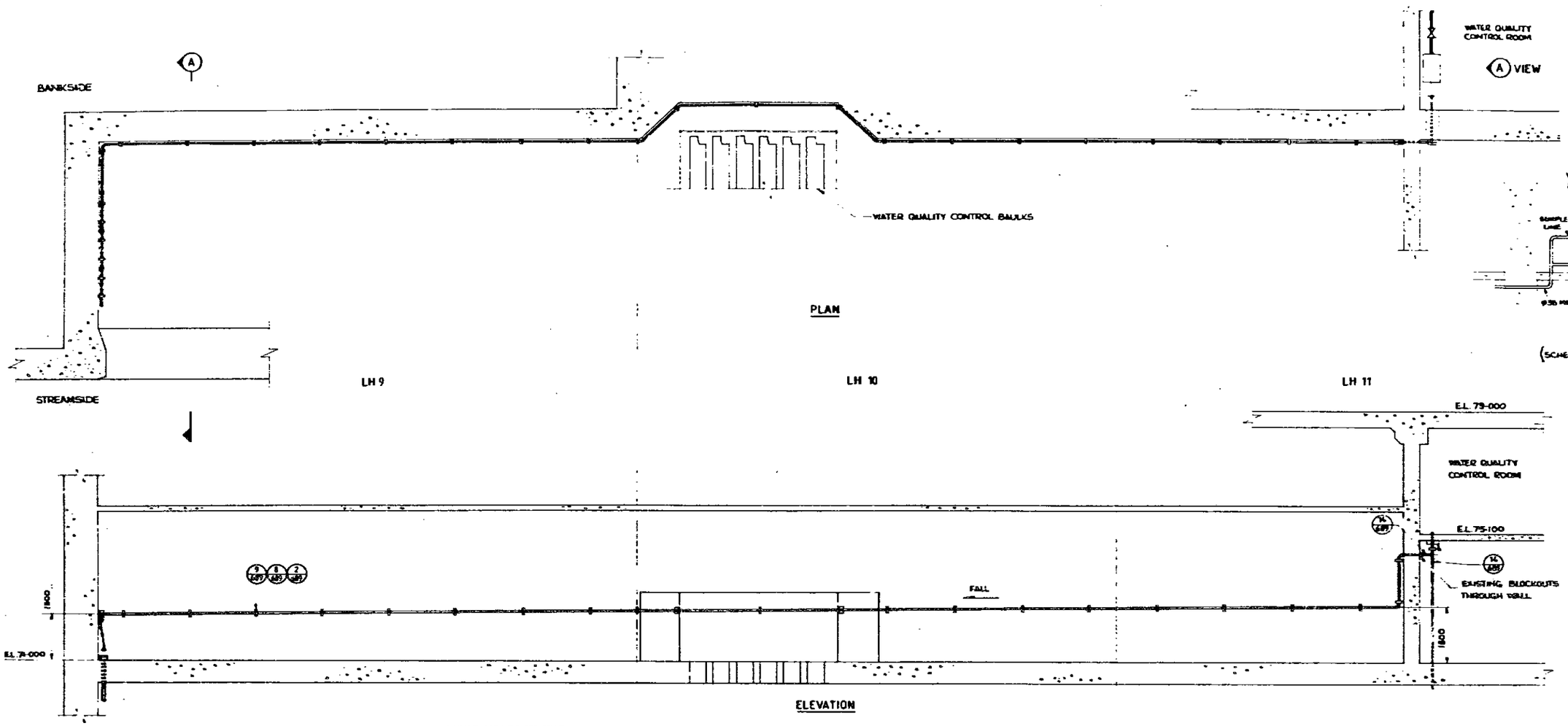
BRISBANE RIVER 150·2 km – WIVENHOE DAM

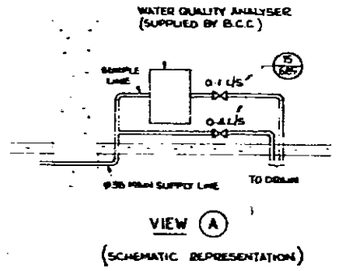
SPILLWAY AREA

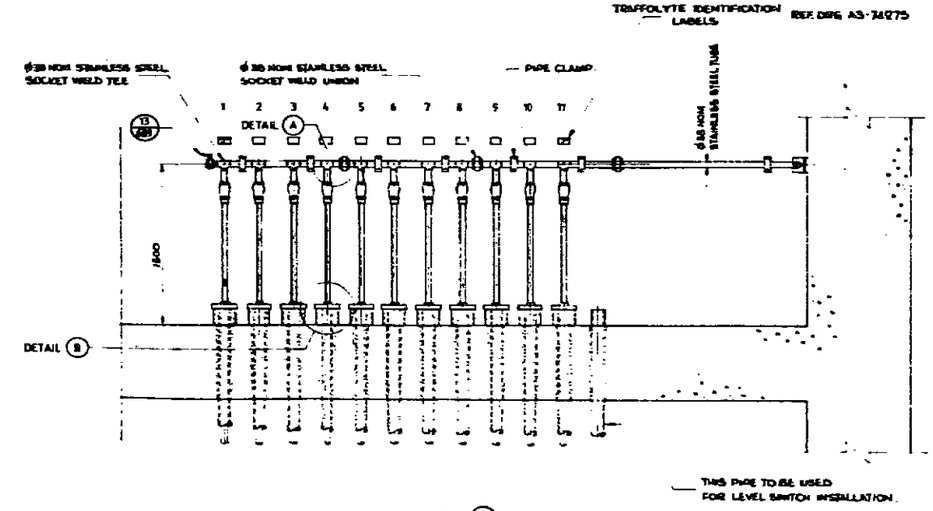
WATER QUALITY SAMPLE TUBES

ARRANGEMENT & DETAILS

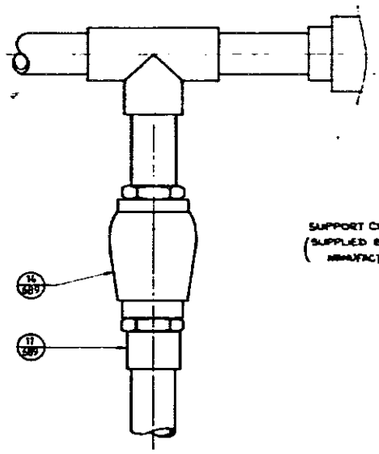
DRAWING NUMBER AQ-70655



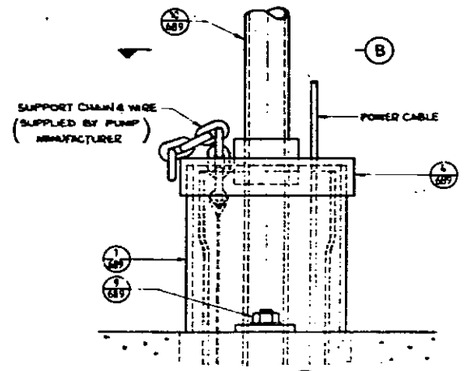




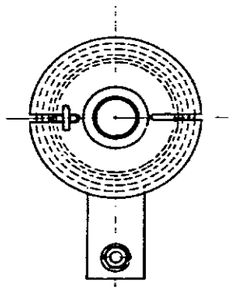
SECTION A SCALE 1:20



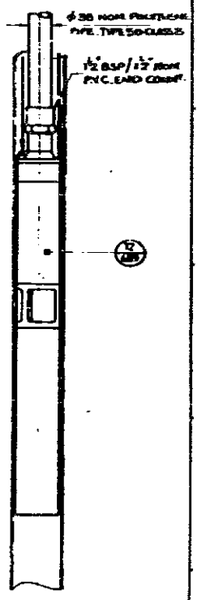
DETAIL A
SCALE 1:2



DETAIL B
SCALE 1:2



SECTION B
SCALE 1:2



PUMP CONNECTION DETAIL
SCALE 1:5

DRAWING SCHEDULE	DRAWING SCHEDULE	REVISION	DATE	REMARKS	ZONE	CKD	PSD	SME

SCALE:

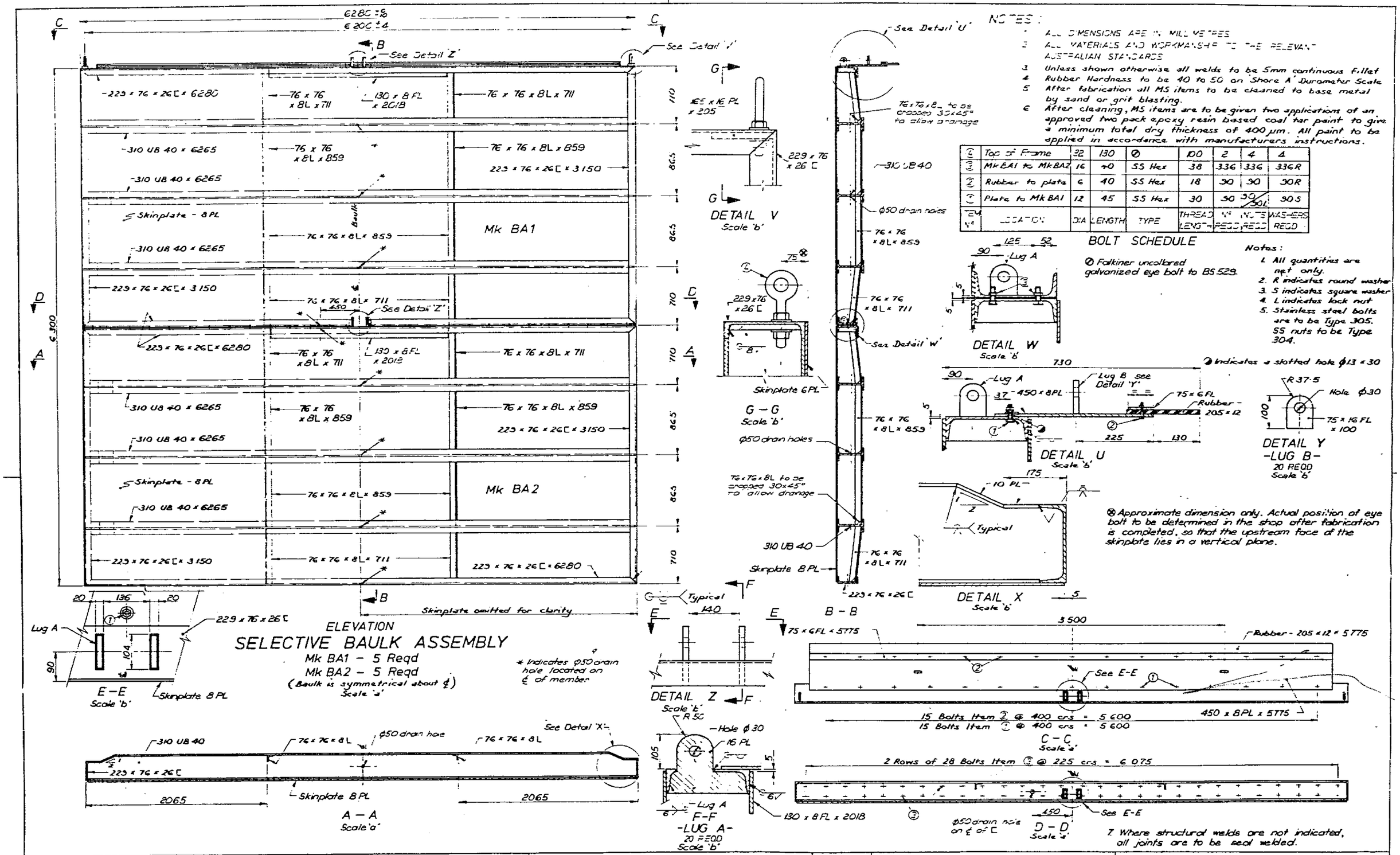
STANDARD TOLERANCES

Queensland Water Resources Commission

BRISBANE RIVER 150.2 km - WIVENHOE DAM
SPILLWAY AREA
WATER QUALITY SAMPLING PIPES
ARRANGEMENT

A0-71687

QLD. WATER RESOURCES



NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES
2. ALL MATERIALS AND WORKMANSHIP TO THE RELEVANT AUSTRALIAN STANDARDS
3. Unless shown otherwise all welds to be 5mm continuous fillet
4. Rubber Hardness to be 40 to 50 on 'Shore A' Durometer Scale
5. After fabrication all MS items to be cleaned to base metal by sand or grit blasting.
6. After cleaning, MS items are to be given two applications of an approved two pack epoxy resin based coal tar paint to give a minimum total dry thickness of 400 μm. All paint to be applied in accordance with manufacturers instructions.

Item No	LOCATION	DIA	LENGTH	TYPE	THREAD LENGTH	NUTS REQD	WASHERS REQD
1	Top of Frame	32	130	⊘	100	2	4
3	Mk BA1 to Mk BA2	16	40	SS Hex	38	3 S	3 S R
2	Rubber to plate	6	40	SS Hex	18	3 S	3 S R
3	Plate to Mk BA1	12	45	SS Hex	30	3 S/3 L	3 S

BOLT SCHEDULE

⊘ Falkiner uncalibrated galvanized eye bolt to BS 529.

Notes:

1. All quantities are net only.
2. R indicates round washer
3. S indicates square washer
4. L indicates lock nut
5. Stainless steel bolts are to be Type 305. SS nuts to be Type 304.

◑ Indicates a slotted hole ϕ13 x 30

⊗ Approximate dimension only. Actual position of eye bolt to be determined in the shop after fabrication is completed, so that the upstream face of the skinplate lies in a vertical plane.

7. Where structural welds are not indicated, all joints are to be seal welded.

Revision	Date	Remarks	Cxd	Psd
	18·11·81	C ϕ50 drain holes added	MJC	
	24·12·80	B Amd to Working Drg	MJC	
	9·5·79	A Contract Number Amended	M.J.C.	

Drawing Schedule

CONTRACT Nº 2120

QUEENSLAND WATER RESOURCES COMMISSION

Design — Drafting — Recommended
Prep — Dr T.S.
Ckd — Ckd R.L. — Senior Engineer Designs
Supv — Supv — Approved
Submitted
Executive Engineer — Senior Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

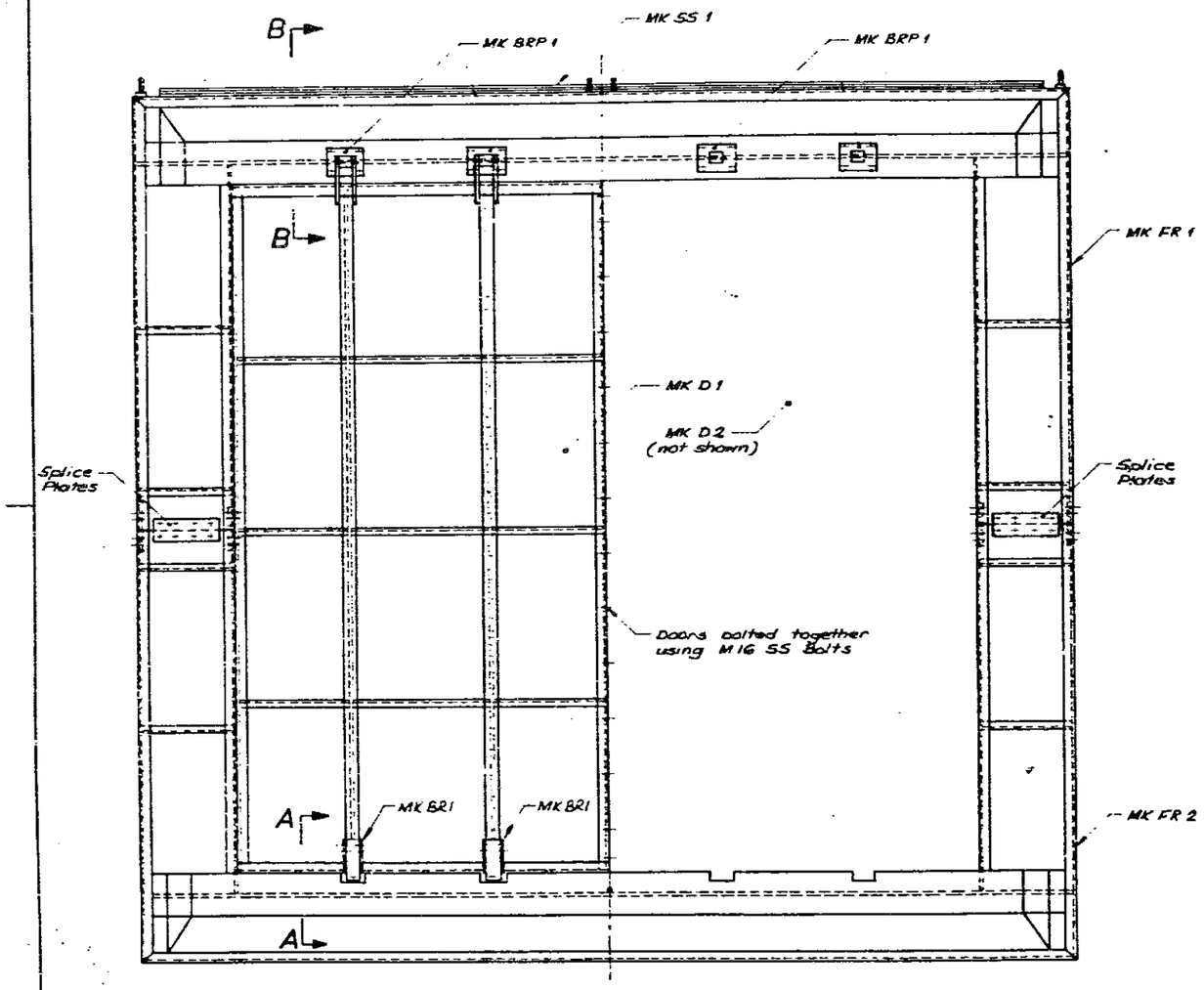
BRISBANE RIVER 150·2 km – WIVENHOE DAM
INLET STRUCTURE-VS SELECTIVE BAULKS

FABRICATION AND ASSEMBLY DETAILS

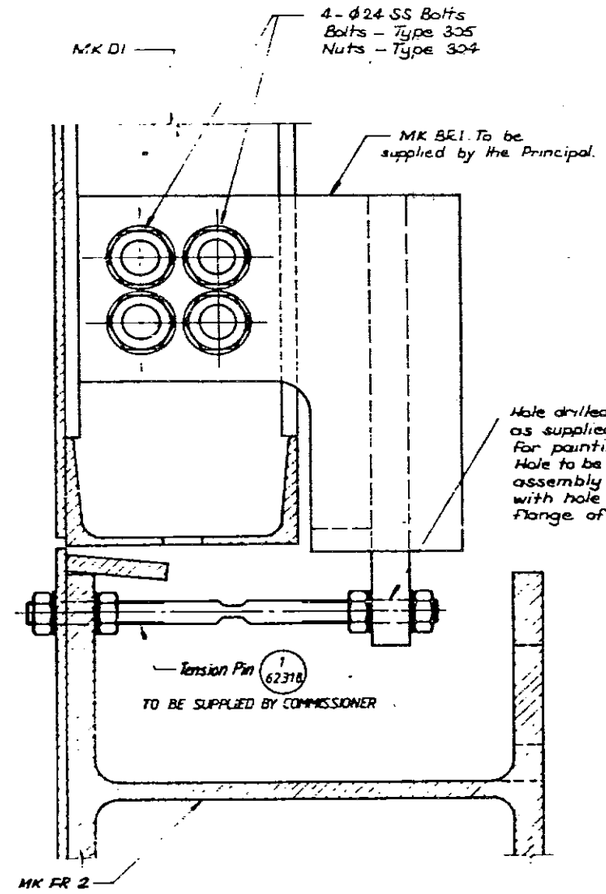
16-5-78 | A1-50800 | A | B | C

INS. 0 2 4 6 8 10
CM. 0 2 4 6 8 10 20 30

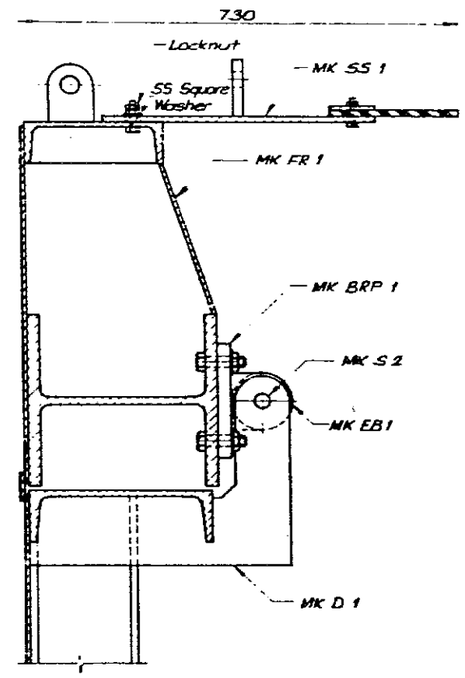
A1-50824



ELEVATION
Scale 'a'



SECTION A-A
Scale 'c'



SECTION B-B
Scale 'b'

NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. ALL MATERIALS AND WORKMANSHIP TO THE RELEVANT AUSTRALIAN STANDARDS.
3. All painted surfaces damaged during assembly to be patch painted with 2 applications of an approved 2 pack epoxy resin based coal tar paint to give minimum total dry thickness of 400 μm. Paint to be applied in accordance with manufacturer's instructions.
4. All bolts nuts and washers to be stainless steel.
5. Paint is to be removed from faces of the bolted joint of bracket MK BR1 to door MK D1 prior to bolting together. After bolting together, any unpainted surfaces are to be painted in accordance with Procedure 4 (sub-clause 122.24.) The joint shall also be sealed by painting.

Revision				
1.6.83	E	Item 1 added to Section A-A	MJC	
1.4.82	C	Rollers removed Bracket Mk B1 added	MJC	
19.11.81	C	Drawings added	MJC	
24.12.80	B	Amd to Working Drg	MJC	
5.5.79	A	Contract Number Amended	MJC	
Date		Remarks	Ckd	Ppd

Drawing Schedule	
A1-62318	Inlet Structure Collapsible Lower Baulk Tension Pin
A3-23.3C	Bracket Mk BR1
A1-50823	Miscellaneous Details
A1-50822	Doors - Fabrication Details
A1-50821	Frame - Fabrication & Assembly Details

Scale 'a' 0 500 1000 1500 2000 mm (1:20)
Scale 'b' 0 100 200 300 400 500 mm (1:5)
Scale 'c' 0 50 100 150 200 mm (1:2)
(Scales before reduction)

CONTRACT Nº 2120

IRRIGATION AND WATER SUPPLY COMMISSION

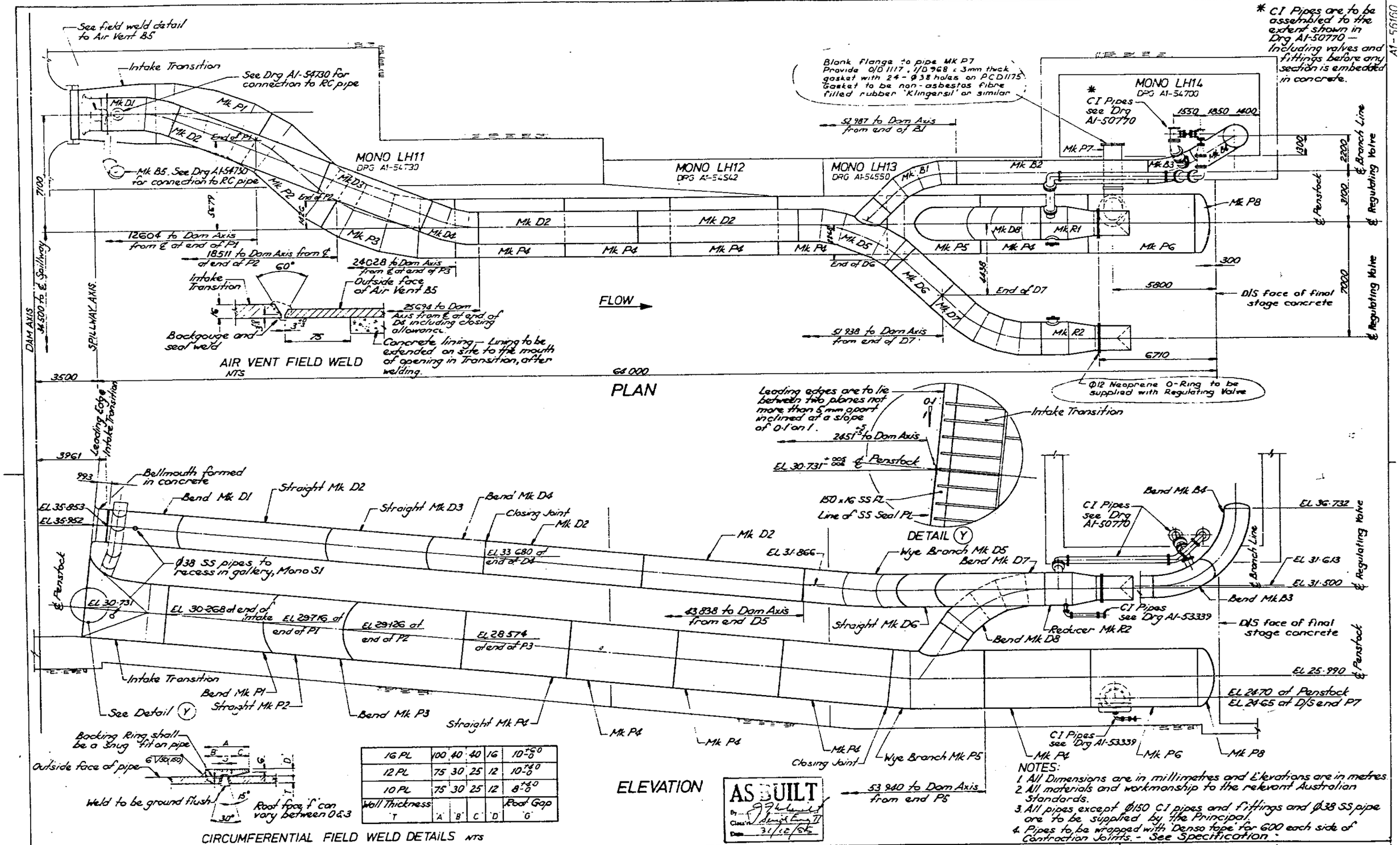
Design	Drafting	Recommended
Prep	Dr KFP	
Ckd	Ckd	Senior Engineer Designs
Supr	Supr	Approved
Submitted		
Executive Engineer		Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km - WIVENHOE DAM
INLET STRUCTURE - MS SELECTIVE BAULKS
COLLAPSIBLE LOWER BAULK
ARRANGEMENT

16-5-78 | A1-50824 | A B C D E

INS. 0 2 4 6 8 10
CM. 0 2 4 6 8 10 20 30



16 PL	100	40	40	16	10 +6 0 -0
12 PL	75	30	25	12	10 +4 0 -0
10 PL	75	30	25	12	8 +4 0 -0
Wall Thickness 'T'	'A'	'B'	'C'	'D'	Root Gap 'G'

NOTES:
1. All Dimensions are in millimetres and Elevations are in metres.
2. All materials and workmanship to the relevant Australian Standards.
3. All pipes except Ø150 CI pipes and fittings and Ø38 SS pipe are to be supplied by the Principal.
4. Pipes to be wrapped with Denso tape for 600 each side of Contraction Joints. - See Specification.

Revision					
Oct '85	D	As Built			
25 8 83	C	Gasket & O-Ring added			
13-6-80	B	Dimensions & El's amended	M.J.C		
27.3.80	A	Additional information	M.J.C		
Date		Remarks	Drd	Psd	

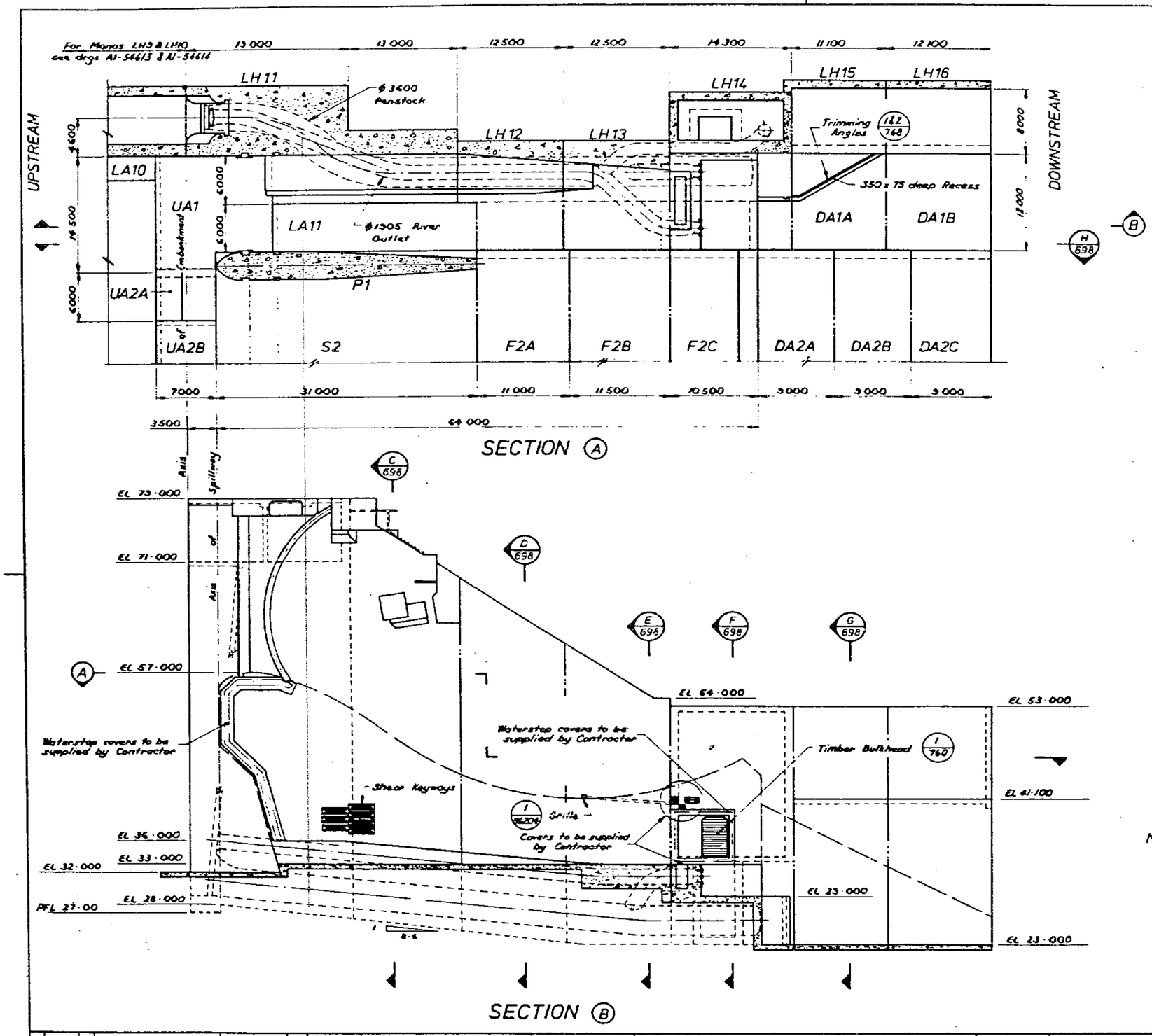
Drawing Schedule

Scale 0 5000 10000mm
Scale 1:100 Before Reduction

CONTRACT Nº 2120

QUEENSLAND WATER RESOURCES COMMISSION
Design | Drafting
Prep | Dr CRC
Ckd | Ckd M.J.C.
Supv | Supv M.J.C.
Submitted
Executive Engineer
Recommended
Senior Engineer Designs
Approved
Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT
BRISBANE RIVER 150·2 km — WIVENHOE DAM
PENSTOCK AND OUTLET PIPES
INSTALLATION DETAILS
10-8-79 | A1-56160 | A B C D



NOTES :

1. All dimensions are in millimetres and elevations are in metres
2. All materials and workmanship to the relevant Australian Standards
3. Levels Datum : A.H.D. (PSM 34242 · EL 74·784)

AS BUILT
By
Chief Engr
Date 31/12/85

Revision				
Oct '85	A	As Built		
Date		Remarks	Ckd	Psd

Drawing Schedule	
A1-54614	Monos LH10 Concrete Sh 1 of 2
A1-54730	Monos LH11 Concrete Sh 1 of 2
A1-54542	Monos LH12 Concrete
A1-54550	Monos LH13 Concrete
A1-54700	Monos LH14 - Diversion Stage Concrete Sh 1 of 6
A1-53310	Monos LH15, LH16, DA1A, DA1B - Conc & Reinf
A1-54698	Spillway Diversion - Arrangement (Sh 2 of 2)

0 10 000 20 000 mm
(1:250 Scale Before Reduction)

CONTRACT Nº 2120

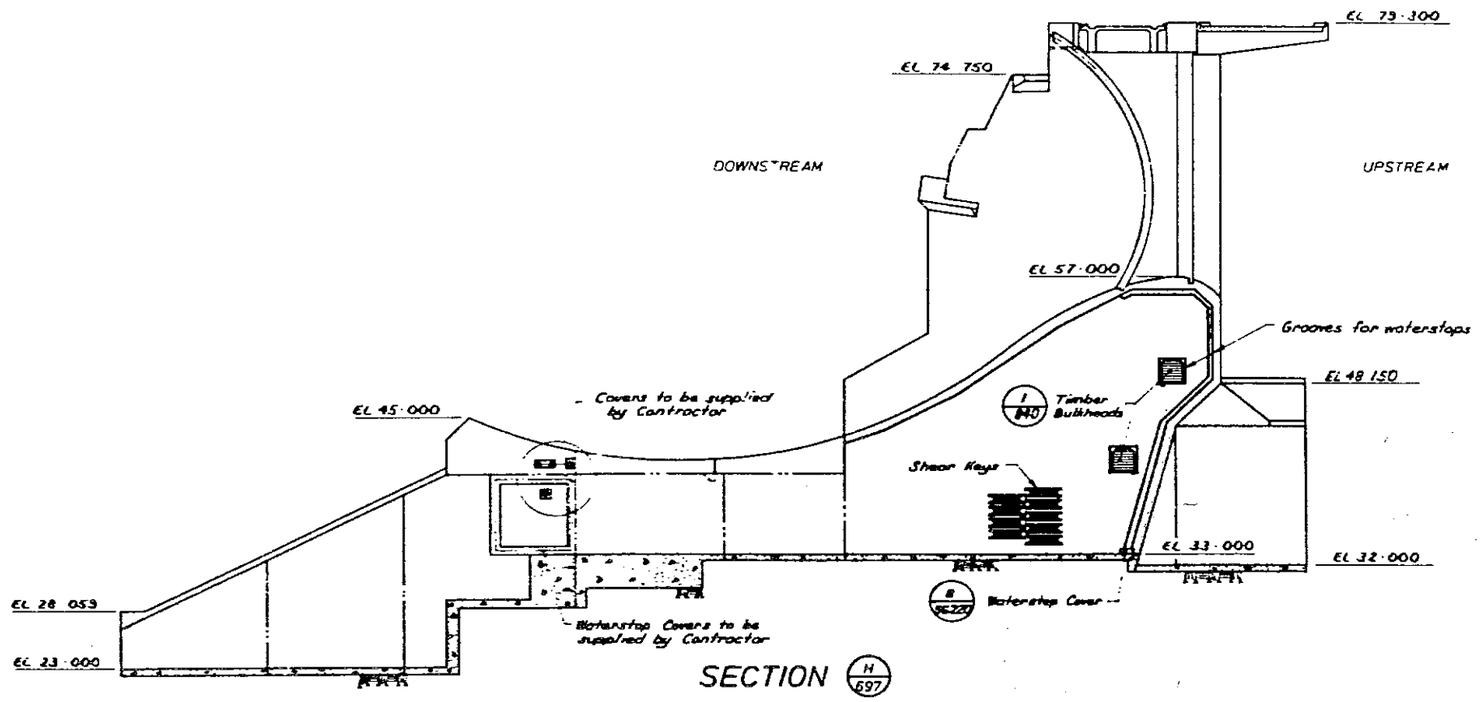
IRRIGATION AND WATER SUPPLY COMMISSION

Design	Drafting	Recommended
Prep	Dr T.S.	
Ckd	Ckd RL	Senior Engineer Designs
Supv	Supv N.J.C.	Approved
Submitted		
Executive Engineer		Chief Designing Engineer

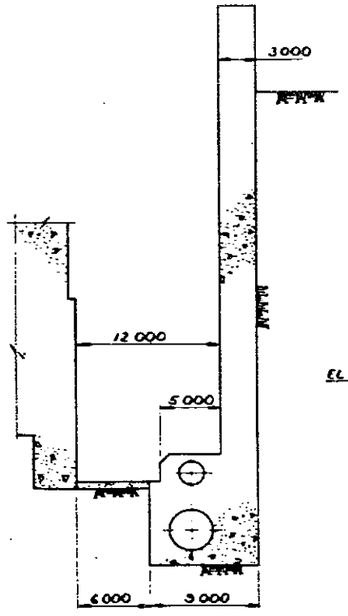
CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km - WIVENHOE DAM
SPILLWAY DIVERSION ARRANGEMENT

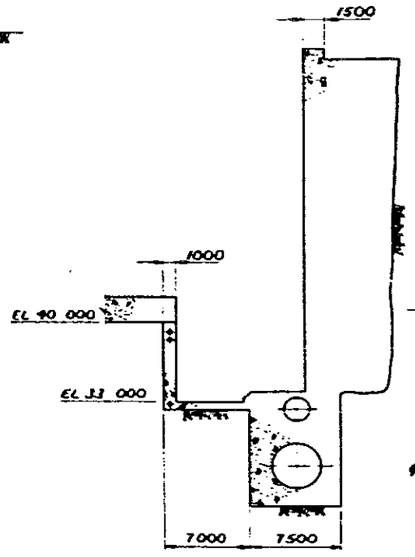
Sh 1 of 2 | 6·5·80 | A1-54697 | A



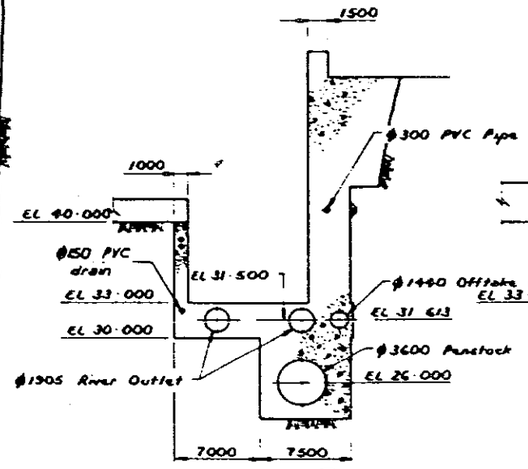
SECTION H/697



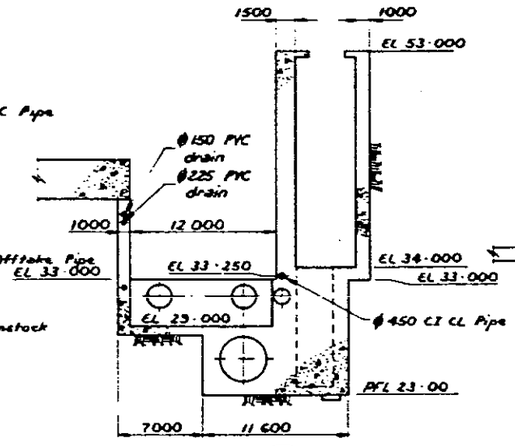
SECTION C/697



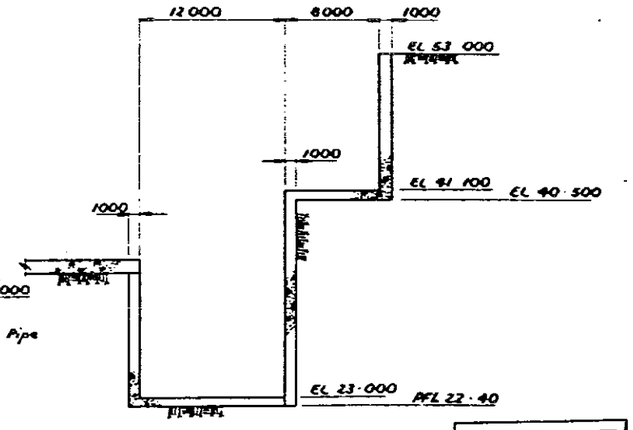
SECTION D/697



SECTION E/697



SECTION F/697



SECTION G/697

AS BUILT
By
Class
Date 31/10/85

NOTES :

1. All dimensions are in millimetres and elevations are in metres.
2. For general notes see drg A1-54637

Revision				
Oct '85	A	As Built		
Date		Remarks	Ckd	Psd

Drawing Schedule	
A1-54628	D/S Aprons - Concrete
A1-54566	Flip Slabs - Concrete Sh 1 of 2
A1-54676	Apron Slabs UA5 - UA2A - Conc & Reinf
A1-54674	Apron Slab UA1 - Conc & Reinf
A1-56161	Apron Slab LA11 - Conc & Reinf
A1-54551	Mono S2 - Concrete Sh 1 of 2
A1-54637	Spillway Diversion - Arrangement (Sh 1 of 2)

0 10 000 20 000 mm
(1·450 Scale Before Reduction)

CONTRACT Nº 2120

IRRIGATION AND WATER SUPPLY COMMISSION

Design	Drafting	Recommended
Prep	Dr T.S.	Senior Engineer Designs
Ckd	Ckd R.L.	Approved
Supr	Supr M.J.C.	Chief Designing Engineer
Submitted		
Executive Engineer		

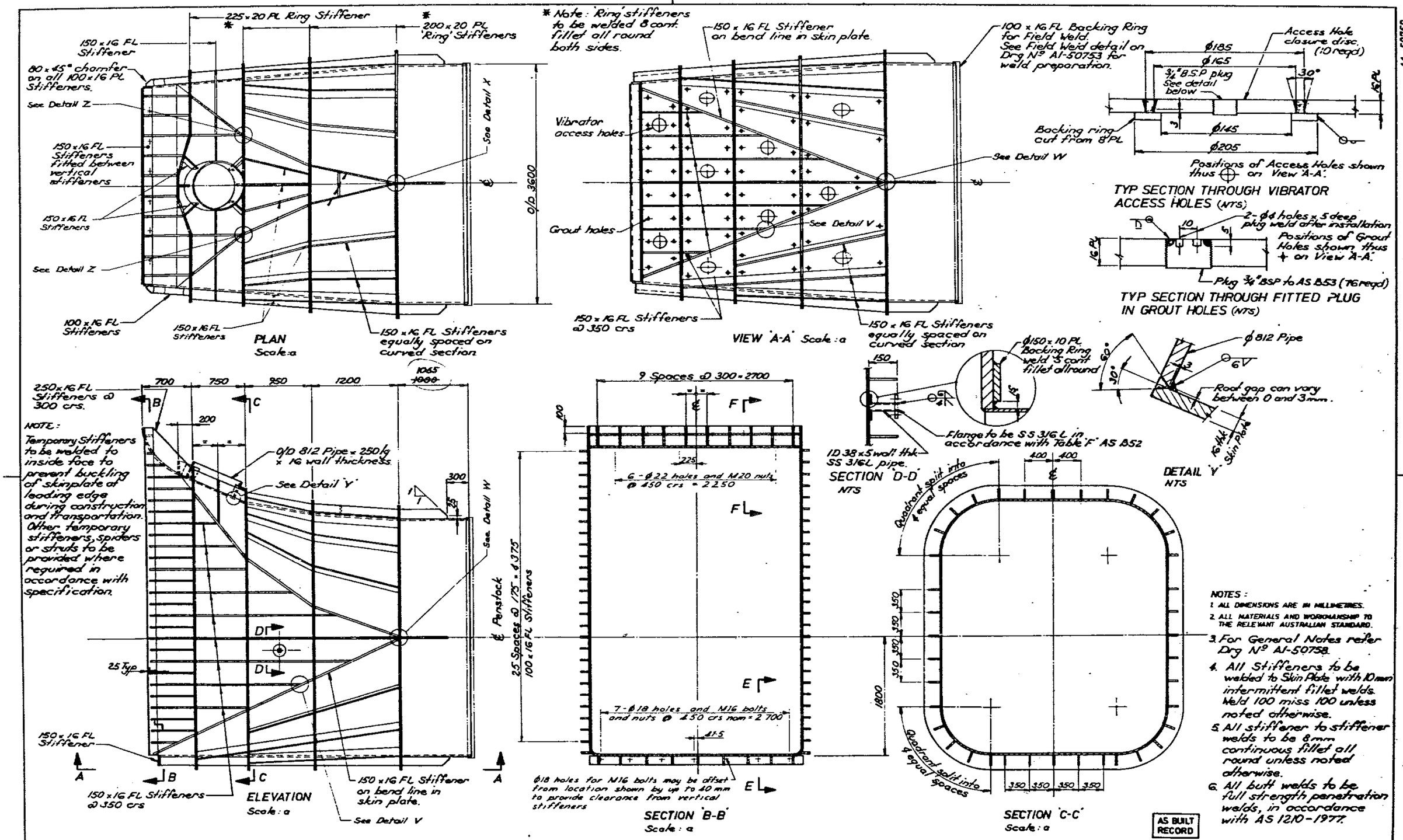
CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km - WIVENHOE DAM
SPILLWAY DIVERSION ARRANGEMENT

Sh 2 of 2 | 6·5·80 | A1-54698 | A

INS. 1 0 2 4 6 8 10

A1-50760



NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. ALL MATERIALS AND WORKMANSHIP TO THE RELEVANT AUSTRALIAN STANDARD.
3. For General Notes refer Drg Nº A1-50758.
4. All Stiffeners to be welded to Skin Plate with 10mm intermittent fillet welds. Weld 100 miss 100 unless noted otherwise.
5. All stiffener to stiffener welds to be 8mm continuous fillet all round unless noted otherwise.
6. All butt welds to be full strength penetration welds, in accordance with AS 1210-1977.

FOR DETAILS V, W, X & Z & SECTIONS E-E & F-F SEE DRG A2-50783

Revision					
Date		Remarks	Chd	Psd	
6 4 84	E	Design checked	J.R.R.	[illegible]	
15-6-80	D	As built dimensions amended	M.J.C.	[illegible]	
14-11-78	C	Holes, bolts & nuts added	M.J.C.	[illegible]	
7-6-78	B	Vibrator holes, grout holes, stiffeners & 38mm outlet added	M.J.C.	[illegible]	
13-1-78	A	Stiffeners added, Winds amended, O/D 818 pipe to ϕ812	M.J.C.	[illegible]	

Drawing Schedule	
A2-50783	Penstock Intake Details (Sh 3 of 3)
A1-50758	Penstock Intake Details (Sh 1 of 3)

Scale 'a' 0 — 2500 mm (Scale 1:25 Before Reduction)

CONTRACT Nº 2116

IRRIGATION AND WATER SUPPLY COMMISSION

Design: Prep J.R.R. Chd J.R.R. Supv — Drafting: Dr C.R.C. Chd M.J.C. Supv M.J.C. — Submitted — Executive Engineer — Recommended — Senior Engineer Designs — Approved — Act. Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

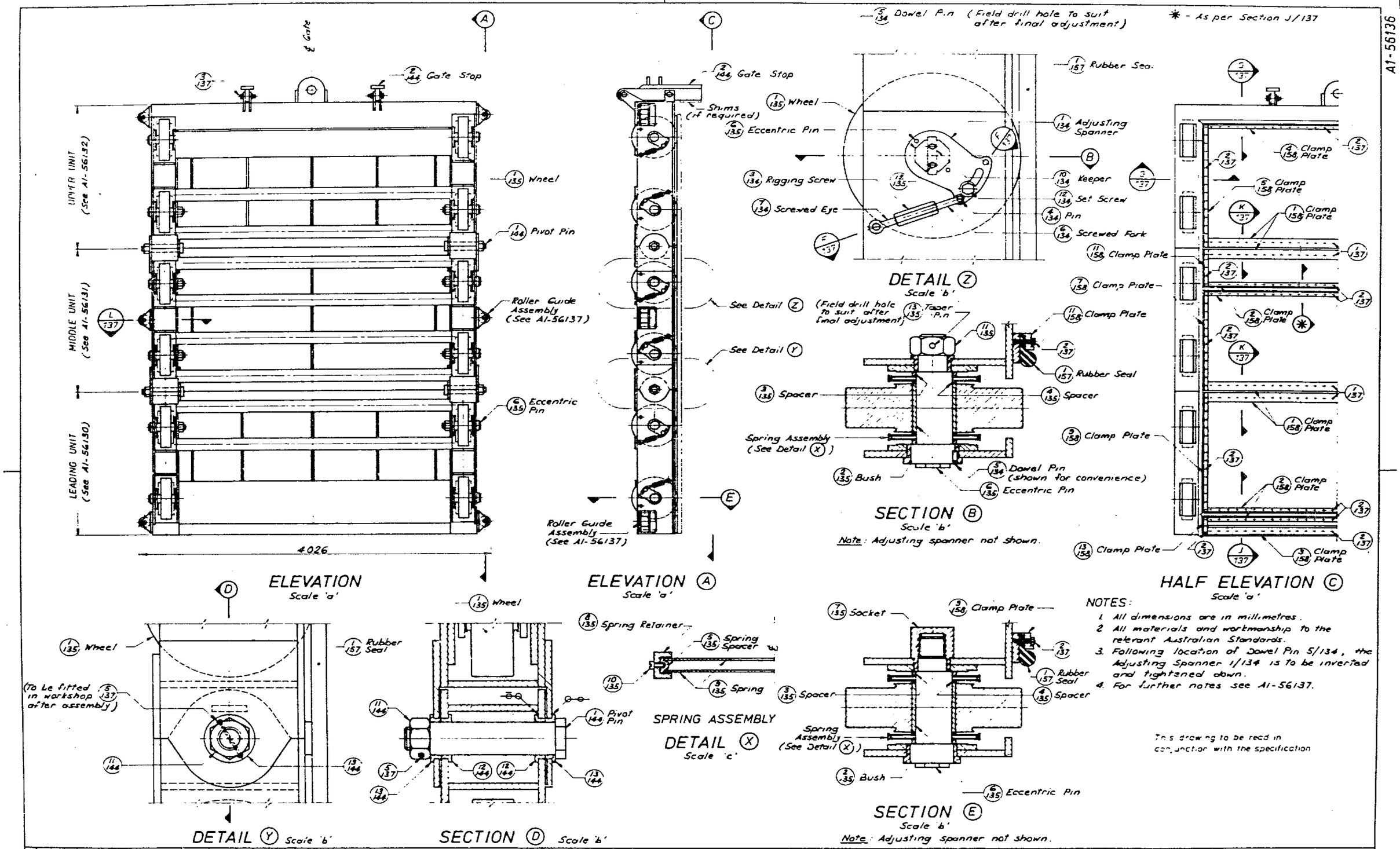
BRISBANE RIVER 150·2 km – WIVENHOE DAM
SPILLWAY OUTLET WORKS

PENSTOCK INTAKE DETAILS

SH 2 of 3 | 2-11-77 | A1-50760 | X | B | C | D | E

INS.

A1-56136



NOTES:

1. All dimensions are in millimetres.
2. All materials and workmanship to the relevant Australian Standards.
3. Following location of Dowel Pin 5/134, the Adjusting Spanner 1/134 is to be inverted and tightened down.
4. For further notes see A1-56137.

This drawing to be read in conjunction with the specification

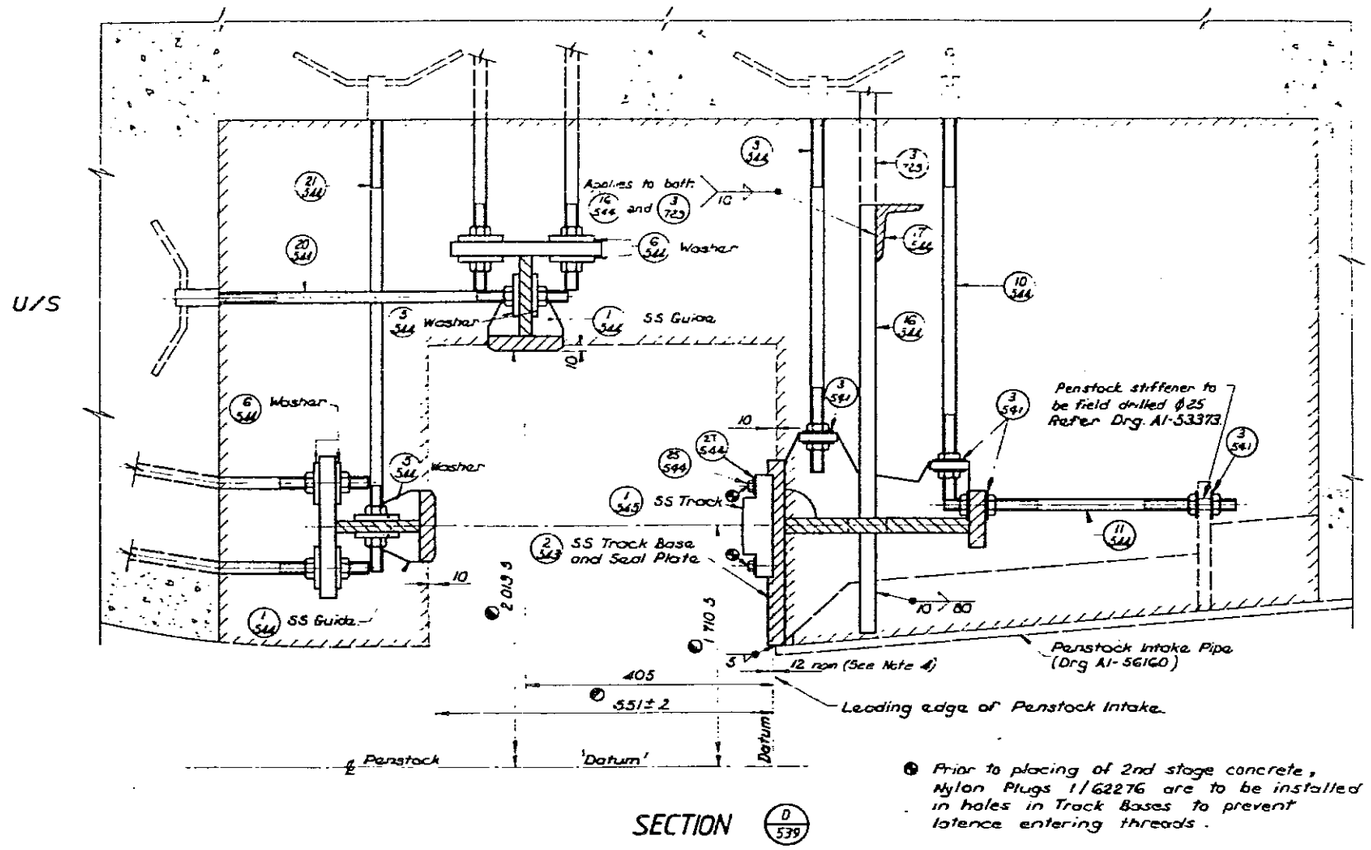
Revision			
Date	Remarks	Ckd	Psd

Drawing Schedule	
A1-56135	Wheel Components
A1-56134	Adjusting Spanner Components
A1-56133	Leading Edge Piece
A1-56132	Upper Unit - Fabrication
A1-56131	Middle Unit - Fabrication
A1-56130	Leading Unit - Fabrication
A1-56137	Assembly (Sh 2 of 2)

Scale 'a' 0 500 1000 1500 2000 mm (1:20)
Scale 'b' 0 100 200 300 400 500 mm (1:5)
Scale 'c' 0 50 100 150 200 mm (1:2)
(Scales before reduction)

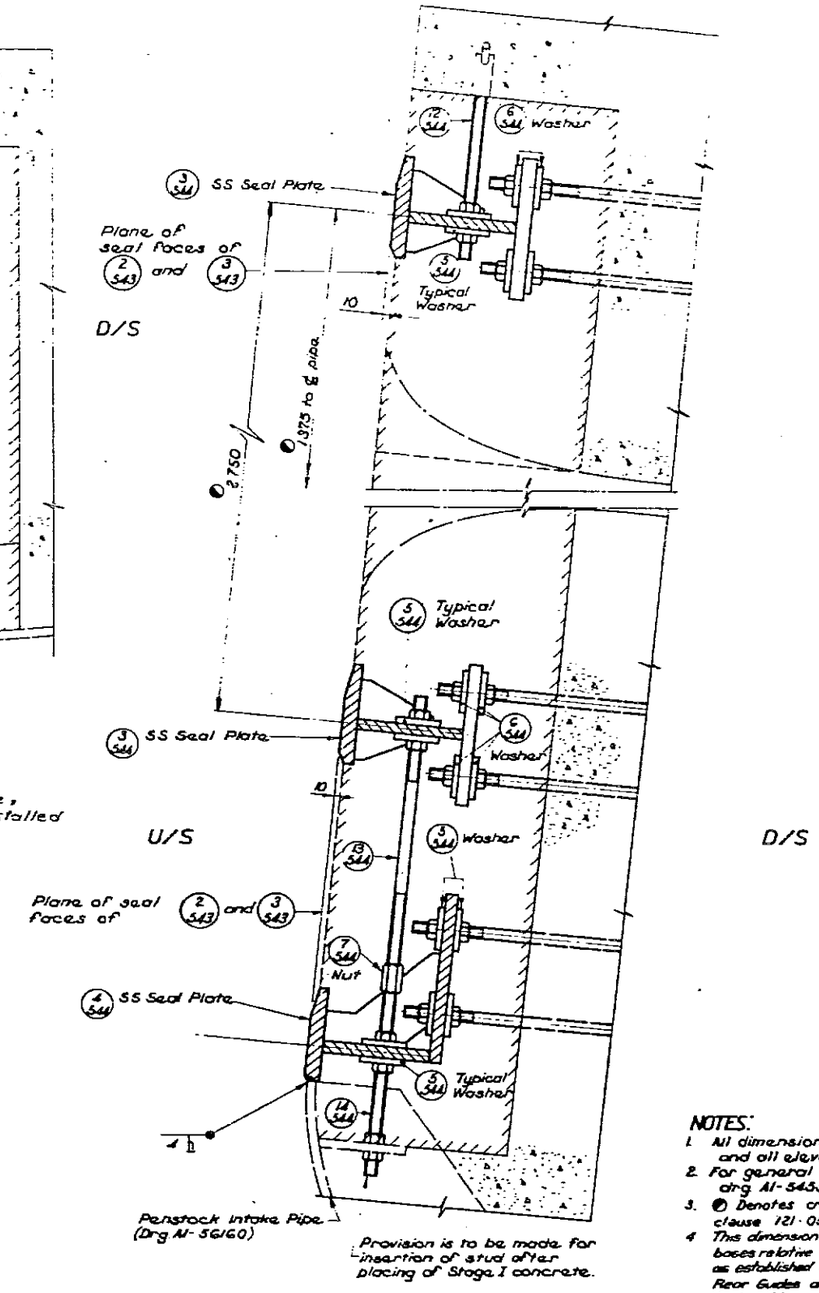
QUEENSLAND WATER RESOURCES COMMISSION			CO-ORDINATOR GENERAL'S DEPARTMENT
Design	Drafting	Recommended	WIVENHOE DAM - PENSTOCK INLET
Prep Kelly	Dr KFP		ARTICULATED FIXED WHEEL GATE
Ckd	Ckd	Senior Engineer Designs	ASSEMBLY
Supv	Supv M.C.	Approved	
Submitted			
Executive Engineer		Chief Designing Engineer	Sh 1 of 2 | 31 1 80 | A1-56136

A1-54540



SECTION (0/539)

● Prior to placing of 2nd stage concrete, Nylon Plugs 1/62276 are to be installed in holes in Track Bases to prevent latence entering threads.



SECTION (J/539)

STUD LOCATION TABLE

STUD	Nº OFF	Nº SUPPLIED	LOCATION	DIST ALONG TRACK OR GUIDE FROM UNDERSIDE OF PENSTOCK	ITEM/S FIXED
8/544	16	16	Penstock Lower Seal Plate.	——	1/543
9/544	38	38	Track Bases	186 - 9 450	2/543; 3/543
10/544	38		Track Bases	186 - 9 450	2/543; 3/543
10/544	28		Track Bases	10 266 - 13 266	4/543; 5/543
10/544	98		Track Bases	13 566 - 38 866	4/545; 5/545
10/544	96	240	Upstream Guide	9 340 - 31 440	1/544; 2/544
11/544	18	18	Track Bases	46 - 4 771	2/543; 3/543
12/544	6		River Outlet-Upper Seal	——	3/544
12/544	36	42	Side Guide	32 500 - 42 000	1/544; 2/544
13/544	6	6	River Outlet-Lower Seal.	——	3/544
14/544	6	6	Penstock-Upper Seal.	——	4/544
20/544	110	110	Side Guides	500 - 32 000	1/544
21/544	34	34	Upstream Guides.	420 - 9 420	1/544

NOTE: This table to be used as a guide only. Actual position of stud is fixed by ferrule 3/729. See drg A1-54664.

NOTES:
1. All dimensions are in millimetres and all elevations are in metres.
2. For general notes refer to drg A1-54539.
3. ● Denotes critical dimension. Refer clause 121·05 of Specification.
4. This dimension is used to locate track bases relative to position of penstock as established on drg A1-56160. Side and Rear Guides are then located relative to trackbases.

Revision					
Oct. 85	E	As Built	L.L.R.	J.F.W.
6.4.84	D	Design checked	JKR	
5.1.82	C	Tolerance added	MGS	J.H.
16.4.81	B	'Nylon Plugs' note added	M.J.C.	J.H.
1.5.80	A	Note 4 added	M.J.C.	J.H.
Date		Remarks	Ckd	Psd

Drawing Schedule	
A1-62276	Track Base - Nylon Plugs
A1-53373	Details of Anchor Bars on Penstock Intake.
A1-54539	Track and Seal Plates - General Arrgt. Sh 1 of 4

0 100 200 300 400 500 mm
(1:5 before reduction.)

CONTRACT Nº 2120

QUEENSLAND WATER RESOURCES COMMISSION

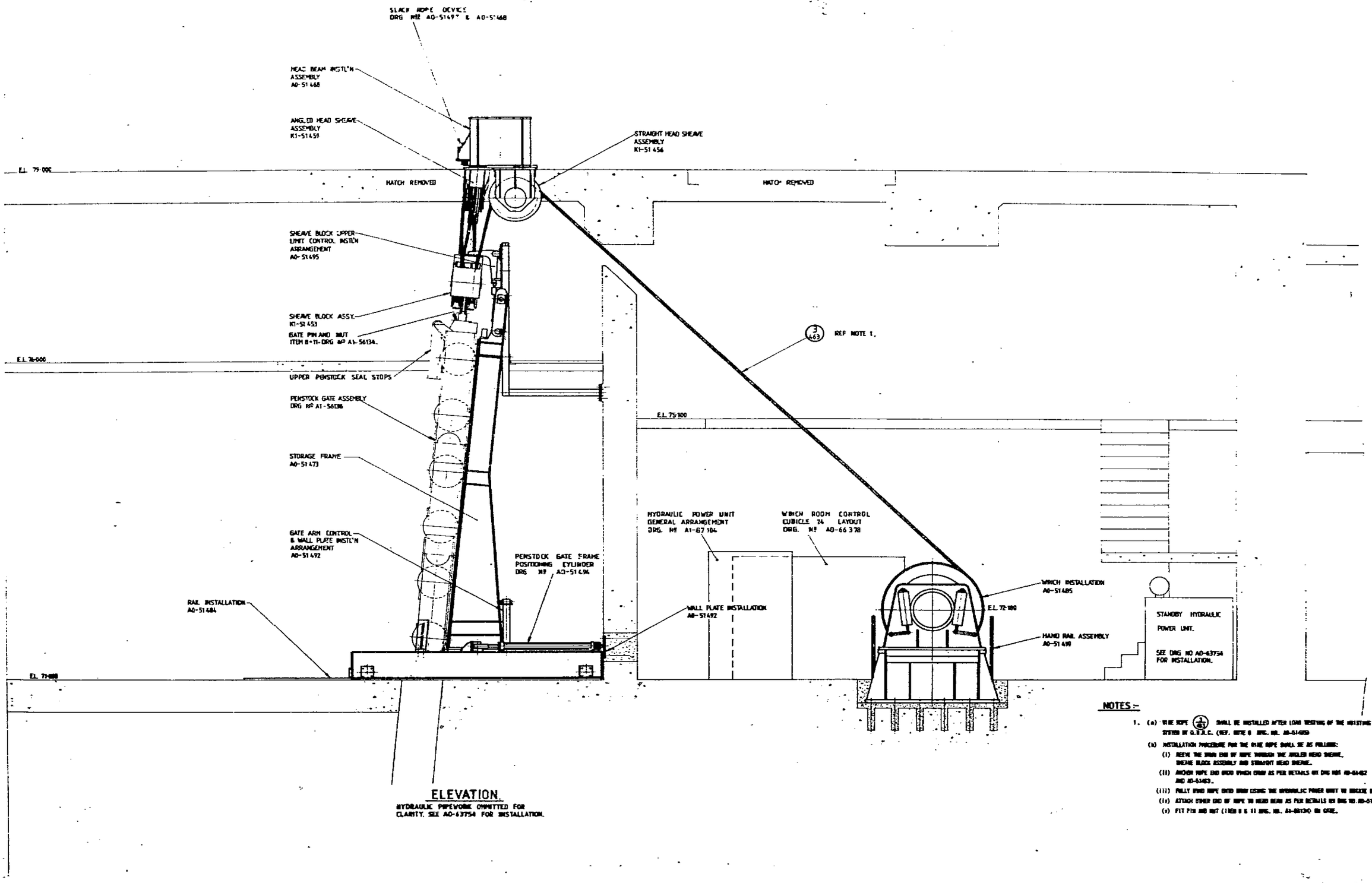
Design	Drafting	Recommended
Prep. J.H.	Dr.	
Ckd. J.K.R.	Ckd.	Senior Engineer Designs
Supv.	Supv. M.J.C.	Approved
Submitted		
Executive Engineer		Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km - WIVENHOE DAM
SPILLWAY RETAINING WALLS - MONOLITH LH 11
FIXED WHEEL GATE - TRACK AND SEAL PLATES
GENERAL ARRANGEMENT

Sheet 2 of 4 | 4.1.80 | A1-54540 | A B C D E

INS. 1 0 2 4 6 8 10
CM. 1 0 2 4 6 8 10 20 30



ELEVATION.

HYDRAULIC PIPEWORK OMMITTED FOR CLARITY. SEE A0-63754 FOR INSTALLATION.

NOTES:-

1. (a) WIRE ROPE (1/463) SHALL BE INSTALLED AFTER LOAD TESTING OF THE HOISTING SYSTEM BY Q.W.R.C. (REF. NOTE 6 DRG. NO. A0-61459)

   (b) INSTALLATION PROCEDURE FOR THE WIRE ROPE SHALL BE AS FOLLOWS:

   (i) REEVE THE DRUM END OF ROPE THROUGH THE ANGLED HEAD SHEAVE, SHEAVE BLOCK ASSEMBLY AND STRAIGHT HEAD SHEAVE.

   (ii) ANCHOR ROPE END INTO WINCH DRUM AS PER DETAILS ON DRG NOS A0-61452 AND A0-61453.

   (iii) FULLY WIND ROPE ONTO DRUM USING THE HYDRAULIC POWER UNIT TO BREAKE DRUM.

   (iv) ATTACH OTHER END OF ROPE TO HEAD BEAM AS PER DETAILS ON DRG NO A0-61488.

   (v) FIT PIN AND NUT (ITEM 8 & 11 DRG. NO. A1-56130) ON GATE.

DRAWING SCHEDULE	DRAWING SCHEDULE	REVISION					
			A	BLACK GATE REMOVED, UPPER SHEAVE BLOCK, SEAL STOPS & PENSTOCK GATE FRAME POSITIONING CYLINDER DISMANTLED. STORAGE FRAME, HYDRAULIC POWER UNIT & WINCH ROOM CONTROL CUBICLE REMOVED.	F.E.		

SCALE:

STANDARD TOLERANCES

Queensland Water Resources Commission

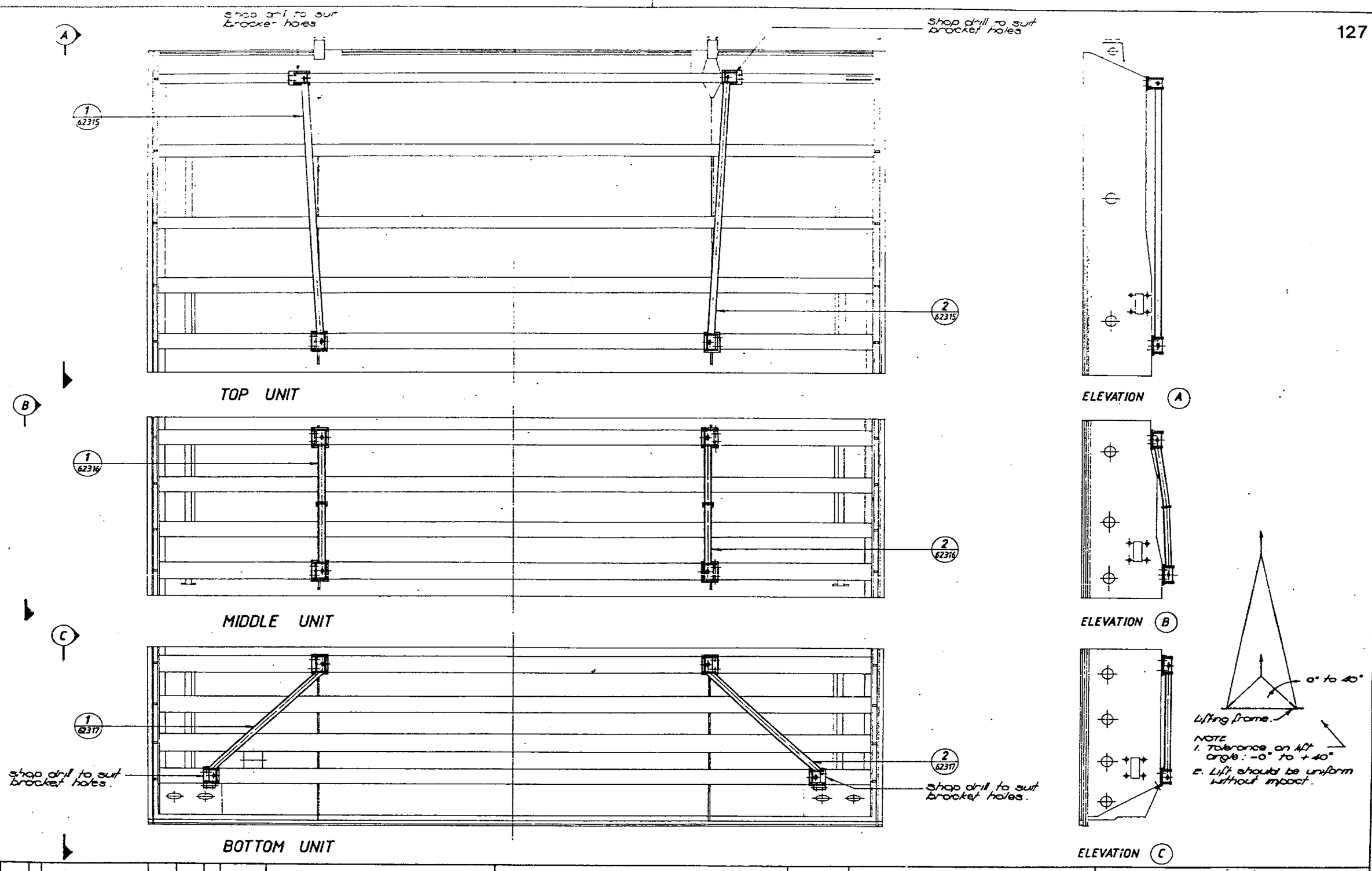
CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150-2[illegible] UNIVERSITY RIVER OUTLET SPENSTOCK [illegible]

INS. 1 0 2 4 6 8 10

CM. 1 0 2 4 6 8 10 20 30

A1 - 62314



Revision				
Date	Remarks	Ckd	Psd	

Drawing Schedule	
A1-62314	Bulkhead Gate. Main Units Fabrication.
A1-62315/7	Bulkhead Gate. Bottom Lifting Frame.
A1-62316	" " Middle " "
A1-62315/5	" " Top " "

Scale 1:30 0 1000 2000 3000 mm.
Before reduction.

CONTRACT Nº 2123

QUEENSLAND WATER RESOURCES COMMISSION

Design	Drafting	Recommended
Prep	Dr M.G.B.	R. Musso
Ckd	Ckd M.J.C.	Senior Engineer Designs
Supr	Supr M.J.C.	Approved
Submitted		
Executive Engineer		Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

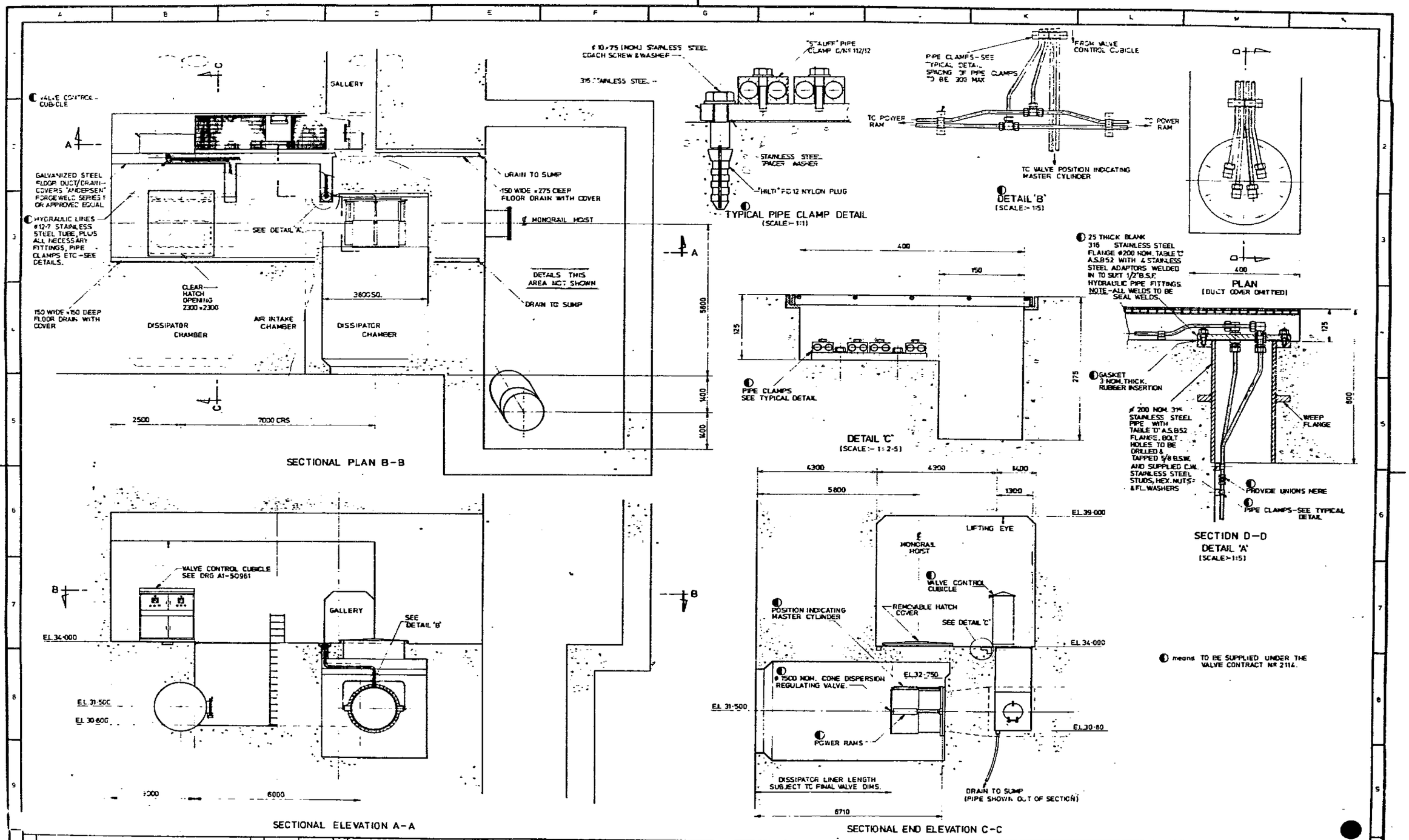
BRISBANE RIVER 150·2 km - WIVENHOE DAM

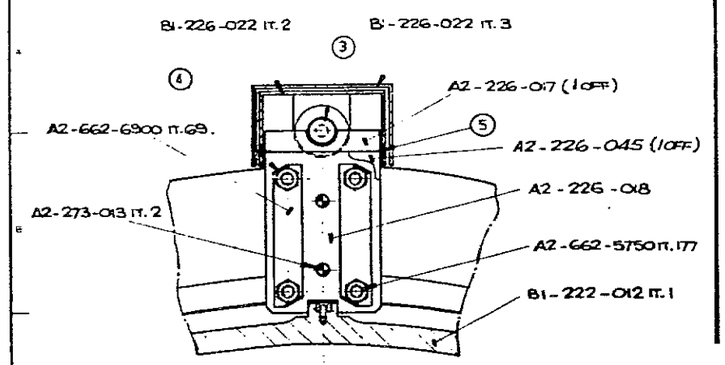
BULKHEAD GATE

LIFTING FRAME - ARRANGEMENT

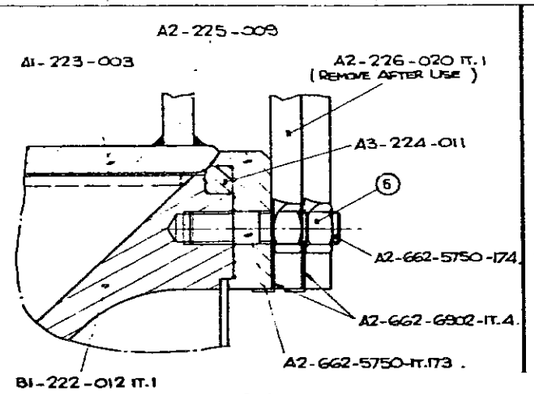
2·3·83 A1-62314

INS. 1 0 2 4 6 8 10
1 0 2 4 6 8 10 20 30

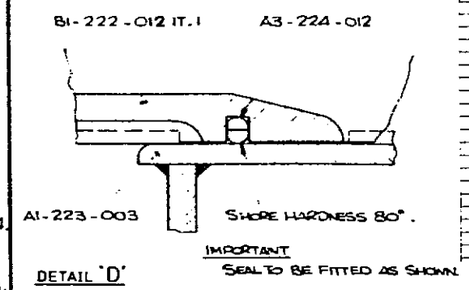

SECTIONAL PLAN B-B
VALVE CONTROL CUBICLE
GALLERY
GALVANIZED STEEL FLOOR DUCT/DRAIN COVERS "ANDERSEN" FORGEWELD SERIES T OR APPROVED EQUAL
HYDRAULIC LINES #12-7 STAINLESS STEEL TUBE PLUS ALL NECESSARY FITTINGS, PIPE CLAMPS ETC - SEE DETAILS.
SEE DETAIL 'A'
CLEAR HATCH OPENING 2300 x 2300
150 WIDE x 150 DEEP FLOOR DRAIN WITH COVER
DISSIPATOR CHAMBER
AIR INTAKE CHAMBER
DISSIPATOR CHAMBER
DRAIN TO SUMP
150 WIDE x 275 DEEP FLOOR DRAIN WITH COVER
MONORAIL HOIST
DETAILS THIS AREA NOT SHOWN
DRAIN TO SUMP
3800 SQ.
2500
7000 CRS
5800
1400
1400
TYPICAL PIPE CLAMP DETAIL
(SCALE:- 1:1)
STAINLESS STEEL SPACER WASHER
"HILTI" FID 12 NYLON PLUG
PIPE CLAMPS - SEE TYPICAL DETAIL
SPACING OF PIPE CLAMPS TO BE 300 MAX
FROM VALVE CONTROL CUBICLE
TO POWER RAM
TO POWER RAM
TO VALVE POSITION INDICATING MASTER CYLINDER
DETAIL 'B'
(SCALE:- 1:5)
PLAN
(DUCT COVER OMITTED)
400
25 THICK BLANK 316 STAINLESS STEEL FLANGE #200 NOM. TABLE 'E' A.S.B.52 WITH 4 STAINLESS STEEL ADAPTORS WELDED IN TO SUIT 1/2" B.S.F. HYDRAULIC PIPE FITTINGS. NOTE - ALL WELDS TO BE SEAL WELDS.
GASKET 3 NOM. THICK. RUBBER INSERTION
#200 NOM. 316 STAINLESS STEEL PIPE WITH TABLE 'D' A.S.B.52 FLANGES, BOLT HOLES TO BE DRILLED & TAPPED 5/8 B.S.W. AND SUPPLIED C/W. STAINLESS STEEL STUDS, HEX. NUTS & FL. WASHERS
WEEP FLANGE
PROVIDE UNIONS HERE
PIPE CLAMPS - SEE TYPICAL DETAIL
SECTION D-D
DETAIL 'A'
(SCALE:- 1:5)
400
150
125
275
PIPE CLAMPS SEE TYPICAL DETAIL
DETAIL 'C'
(SCALE:- 1:2.5)
4300
4300
400
5800
1300
EL 39.000
LIFTING EYE
MONORAIL HOIST
VALVE CONTROL CUBICLE
POSITION INDICATING MASTER CYLINDER
REMOVABLE HATCH COVER
SEE DETAIL 'C'
EL 34.000
#1500 NOM. CONE DISPERSION REGULATING VALVE.
EL 32.750
EL 31.500
EL 30.80
POWER RAMS
DISSIPATOR LINER LENGTH SUBJECT TO FINAL VALVE DIMS.
DRAIN TO SUMP (PIPE SHOWN OUT OF SECTION)
6710
SECTIONAL END ELEVATION C-C
VALVE CONTROL CUBICLE SEE DRG A1-50961
GALLERY
SEE DETAIL 'B'
EL 34.000
EL 31.500
EL 30.600
6000
SECTIONAL ELEVATION A-A
means TO BE SUPPLIED UNDER THE VALVE CONTRACT No 2114.
K1-50962 ELECTRICAL CIRCUIT DIAGRAM
A1-50961 HYDRAULIC CIRCUIT AND CONTROL CUBICLE
SCALE 1 2 3 4 5m
1:50
IRRIGATION & WATER SUPPLY COMMISSION
MECHANICAL BRANCH
CONTRACT No 2114
CO-ORDINATOR GENERAL'S DEPARTMENT
BRISBANE RIVER 150·2km-WIVENHOE DAM
OUTLET WORKS
#1500 NOM CONE DISPERSION REGULATING VALVES
HYDRAULIC PIPEWORK — INSTALLATION ARRGT & DETAILS
20-2-78 K1-50201



DETAIL 'A'



DETAIL 'B'

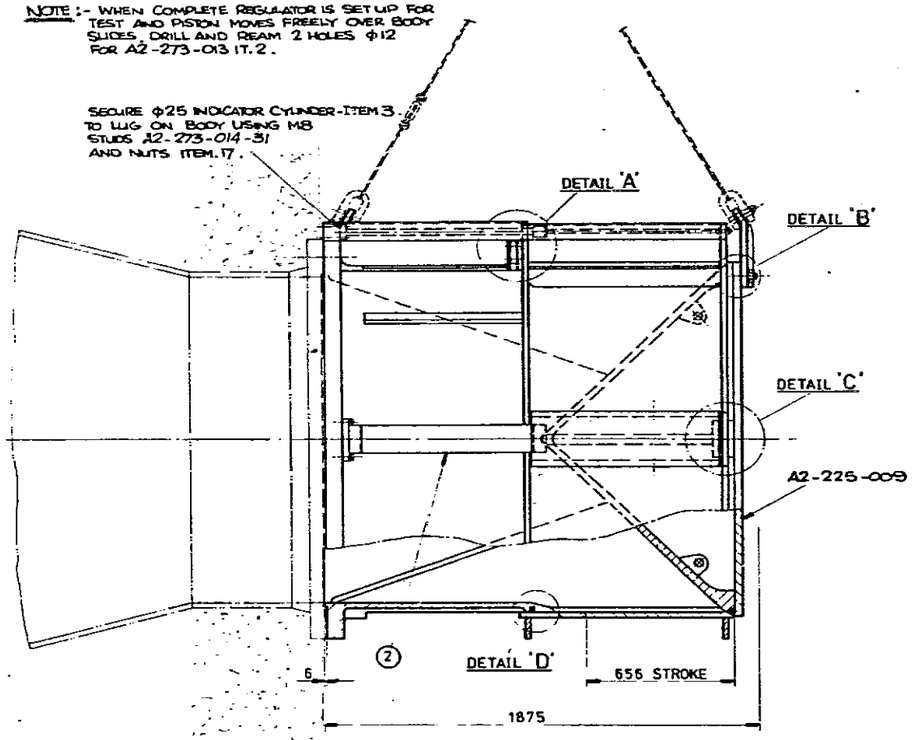


DETAIL 'D'

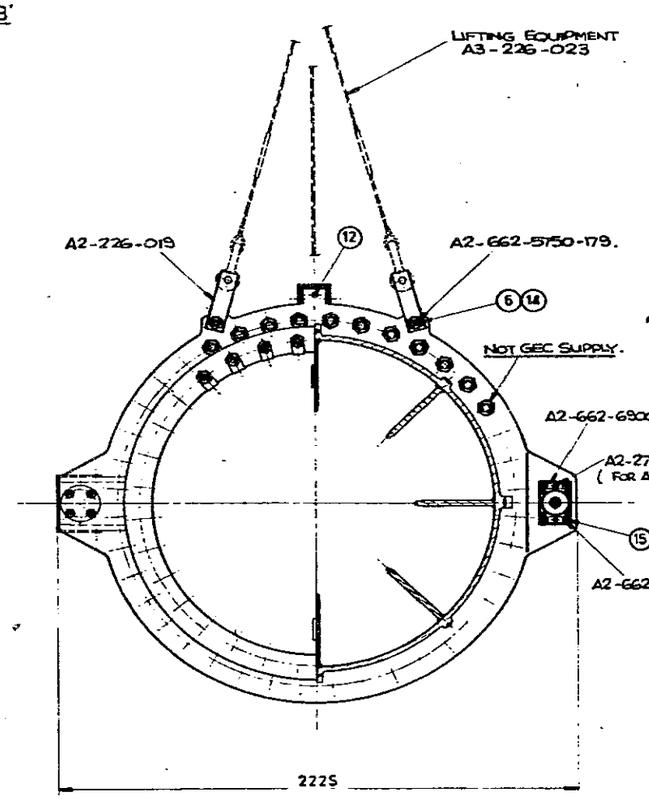
IMPORTANT
SEAL TO BE FITTED AS SHOWN.

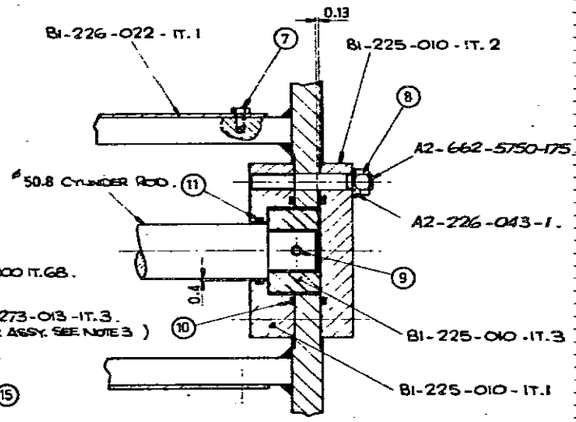
1	GEN. ARRANGEMENT	1	ASSY. OF ALL ITEMS.	
2	CYLINDER	2	PONGRASS φ102 BORE × 50.8 ROD × 670 STR. - 2F	
1	INDICATOR CYLINDER	3	PONGRASS φ12 ROD × 670 STROKE -	
4	HEX. HD NUT	4	S.S. 316 M12	
6	C'SUNK HD. SCREW	5	S.S. 316	M5 × 15 LONG.
36	HEX. HD. NUT	6	S.S. 316 M30	
20	HEX. HD SCREW	7	S.S. 316	M8 × 15 LONG.
8	HEX. HD. NUT	8	S.S. 316 M16	
2	TENSION PIN	9	S.S. 316	φ8 × 75 LONG.
4	'O' RING	10	BS 239	92 I.D. × 98.4 O.D.
2	'O' RING	11	BS 329	50.8 I.D. × 60.3 O.D.
2	HEX. HD NUT	12	S.S. 316 M10	
2	PLAIN WASHER	14	S.S. 316 M30	
8	HEX. HD. NUT	15	S.S. 316 M16	
8	CHEESE HD SCREW	16	S.S. 302	M4 × 12 LONG.
3	HEX. HD. NUT	17	S.S. 316 M8	

NOTE :- WHEN COMPLETE REGULATOR IS SET UP FOR TEST AND PISTON MOVES FREELY OVER BODY SLIDES, DRILL AND REAM 2 HOLES φ12 FOR A2-273-013 IT.2.



① ASSEMBLY.





DETAIL 'C' (FOR ASSY. SEE NOTE 1 & 2)

NOTES

1. CAVITY BETWEEN CLAMPING RINGS TO BE PACKED WITH GREASE BEFORE FINAL ASSEMBLY.
2. BEFORE TIGHTENING NUTS ENSURE CLAMPING RING B1-225-010 IT.1 HAS 0.4 CLEARANCE WITH CYLINDER ROD.
3. CYLINDERS ITEM 2, 3 TO BE SET UP WITH ℄ OF REGULATOR AND PISTON - PISTON IN 'OPEN' POSITION. THEN DRILL AND REAM FOR DOWELS.
4. COAT ALL S.S. NUTS, BOLTS & STUDS WITH DOW CORNING SILICON COMPOUND, EXCEPT WHERE 'NOTE 5' APPLIES.
5. ALL STUDS & NUTS NOT SECURED WITH LOCKING STRIPS TO BE COATED WITH A SUITABLE GRADE LOCTITE COMPOUND.
6. MATCH MARK.

SPECIFICATION

1. INSPECTION AND TESTING IN ACCORDANCE WITH I & W.S. COMMISSION SPEC. No. 2114 CLAUSE 309.
2. TEST PRESSURE - 1800 kPa FOR 15 MINUTES, THEN 1300 kPa UNTIL WELDS ARE CHECKED.
3. LEAK PRESSURE - 1300 kPa.
4. WORKING PRESSURE - 730 kPa.
5. PASSIVATE ALL S.S. SURFACES PRIOR TO FINAL ASSY. ACC. TO I & W.S. COMM. SPEC. No. 2114 CLAUSE 305-9.

ESTIMATED TOTAL WEIGHT - 4.9 TONNES.

K1-69223

A	B	C	
12.7.80	20.9.79	8.10.80	
Rev.	TITLE WAS AS NO.	B1-222-017-IT.1 WAS A1-222-017-IT.1 (1H)	A2-226-045-1 WAS A2-662-6900-67 (4A)
			A2-273-014-31 WAS A2-662-5750-178 (2D)

1978

TITLE: WIVENHOE DAM
φ1500 DISCHARGE REGULATOR
GENERAL ARRANGEMENT.

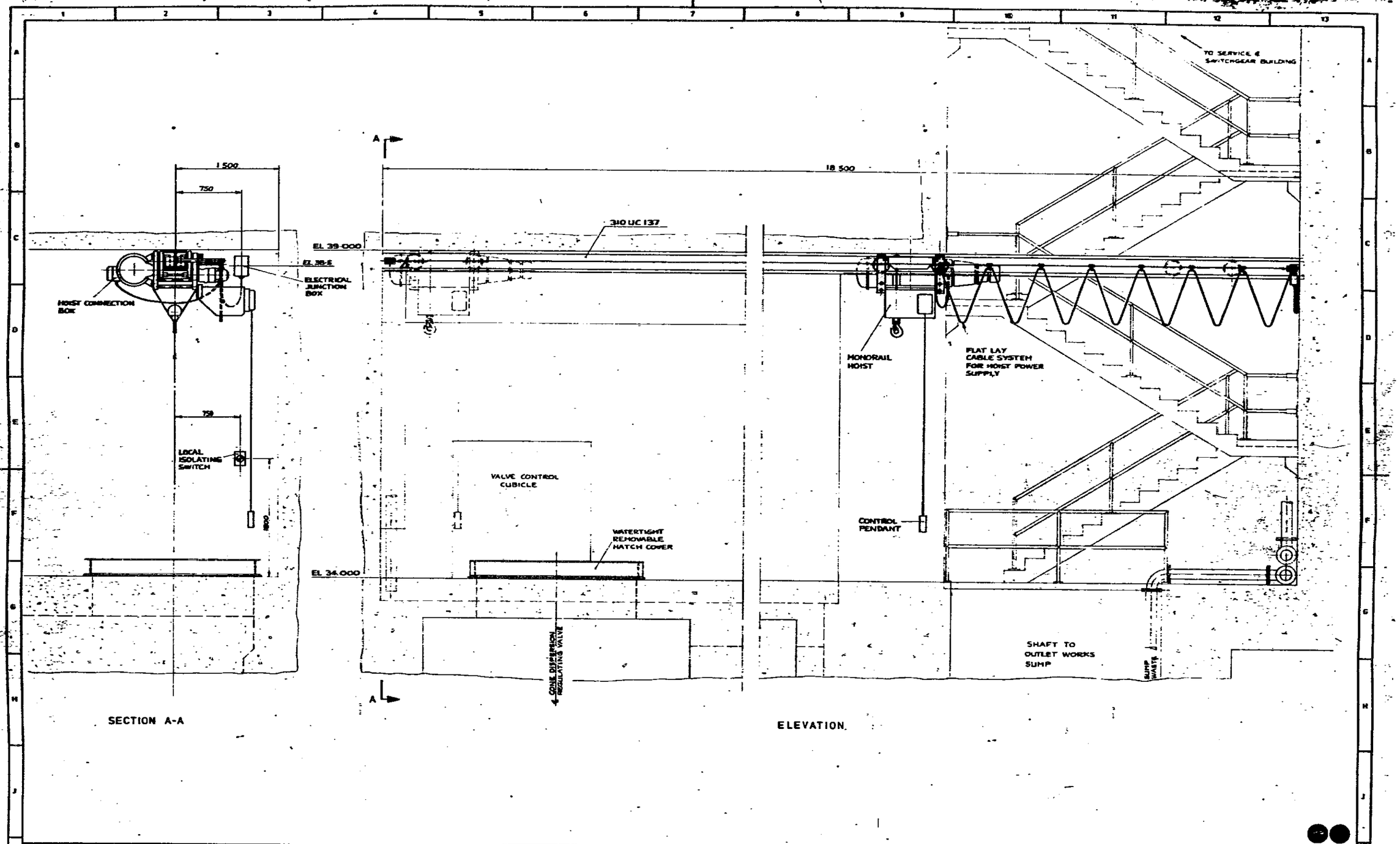
DEPT: G.E.D.G. | SCALE 1:10 1:2 | D. No. 21 K 206 | I & W.S.C. (D.D.)
DRAWN: | CHECKED: | APPROVED:

GEC AUSTRALIA LIMITED
HEAVY ENGINEERING DIVISION
ROCKLEA WORKS BRISBANE

DRG. No. B1-220-006

UNLESS OTHERWISE STATED DIMENSIONS IN MILLIMETRES — DO NOT SCALE

INS. 0 2 4 6 8 10
CM. 0 2 4 6 8 10 20 30



REVISION			
20.12.95	C	TITLE CHANGE	
12.6.86	B	JUNCTION BOX & SWITCH LOCATED	E3, E3
10-5-79	A	GENERAL REVISION	
DATE		REMARKS	ZONE / CKD / PSD

SCALE: 0 500 1000 1500 2000 mm (1:20) (BEFORE REDUCTION) (UNLESS AS NOTED)

CONTRACT No. 2120

IRRIGATION AND WATER SUPPLY COMMISSION
MECHANICAL BRANCH

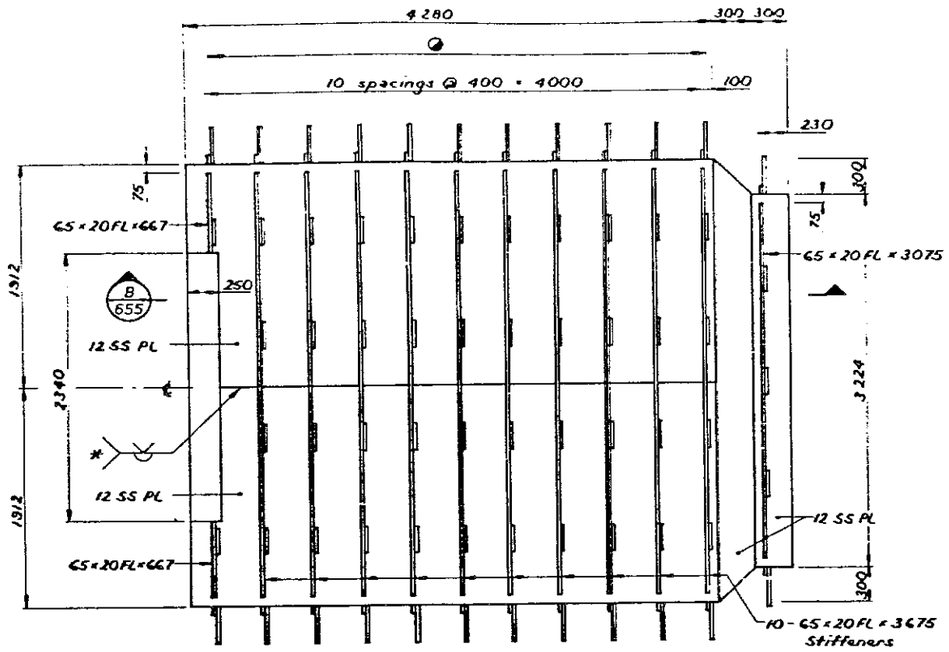
DESIGN / DRAFTING / RECOMMENDED / EXECUTIVE ENGINEER / APPROVED / SUBMITTED / ENGINEER / SENIOR MECHANICAL ENGINEER

CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2km-WIVENHOE DAM

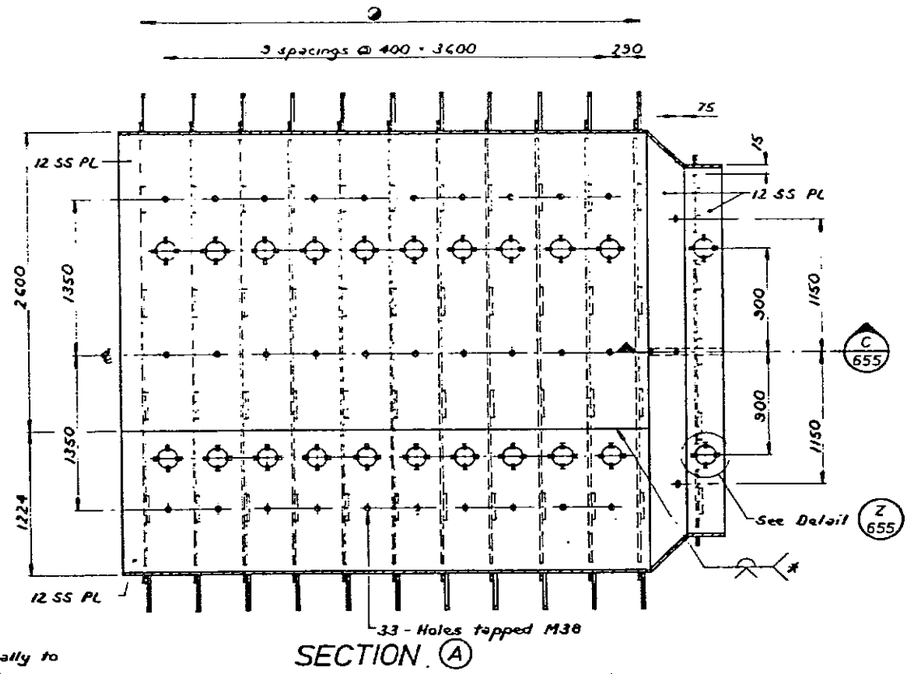
OUTLET WORKS REGULATOR VALVES
6 TONNE MONORAIL HOIST
INSTALLATION ARRANGEMENT

16-6-78 K1- 51408 A B C

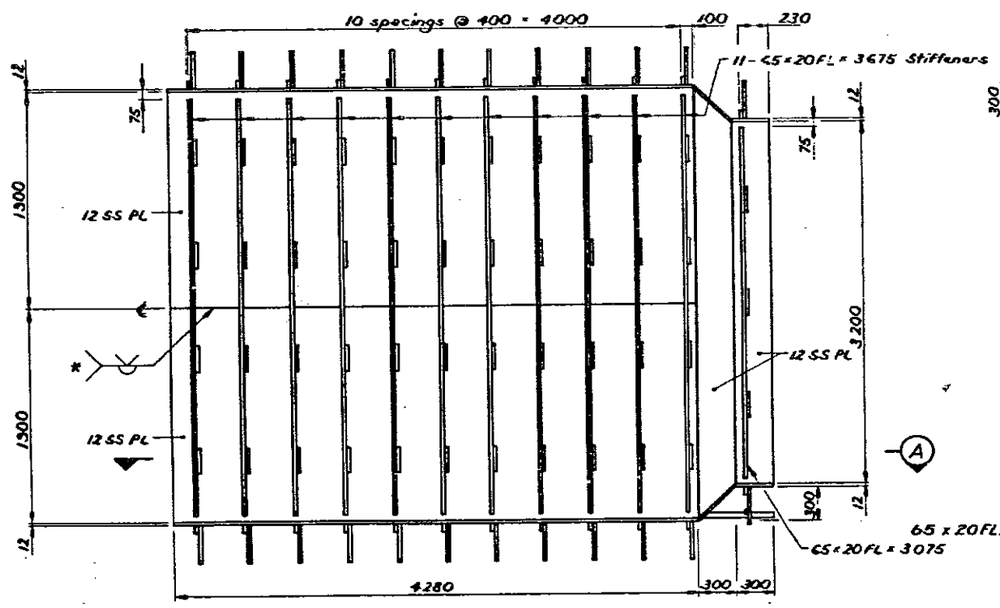


PLAN

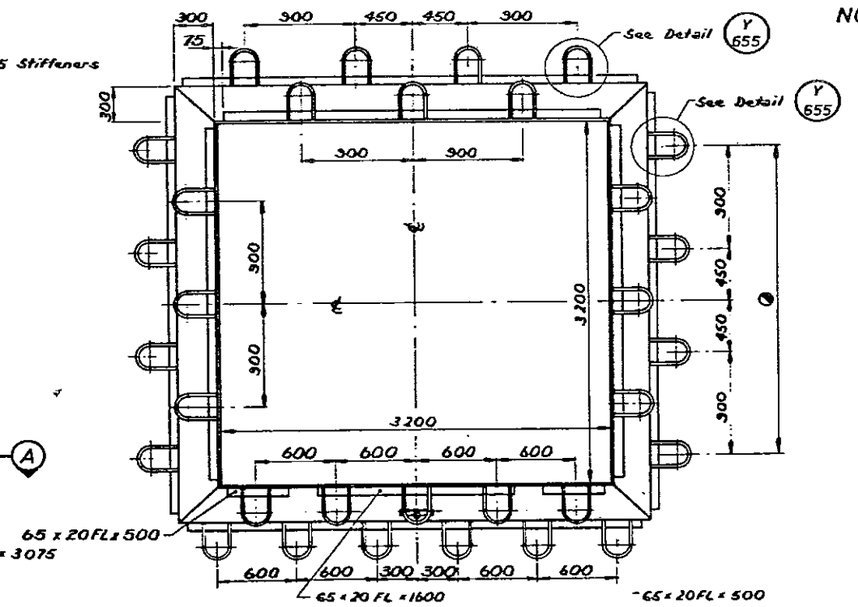
* Grind flush locally to clear stiffeners



SECTION (A)



ELEVATION



END ELEVATION

NOTES :

1. All dimensions are in millimetres
2. All materials and workmanship to the relevant Australian or British Standards
3. Liner to be stainless steel - Type 316L Stiffeners and anchors to be mild steel
4. Electrodes for welding stainless steel to be 18/8 stainless steel containing a stabilizer e.g. Stainweld C-Cb
5. When assembled, the liner shall comply with the following requirements :
   i) Allowable variation in overall height or width of liner ± 12 mm
   ii) Allowable variation in internal surface of liner from a straight line parallel to liner ℄ measured over total length of walls, floor or roof ± 6mm
   iii) Allowable variation in diagonal of end of liner ± 12 mm
6. All items to be marked with Item Number and last three digits of drawing number e.g. 1 654

ITEM N°	DESCRIPTION	N° OFF	MATERIAL	REMARKS
2	Dispersion chamber liner	1	SS & MS	To have shorter anchors - indicated @ (Note 5 - A1-54655)
1	Dispersion chamber liner	1	SS & MS	As drawn

ITEM SCHEDULE

Revision				
Date	Remarks	Ckd	Psd	

Drawing Schedule: A1-54655 Dispersion chamber liner (Sh 2 of 2)

0 500 1000 1500 2000 mm
(1:. scale Before Reduction)

CONTRACT N° 2120

IRRIGATION AND WATER SUPPLY COMMISSION

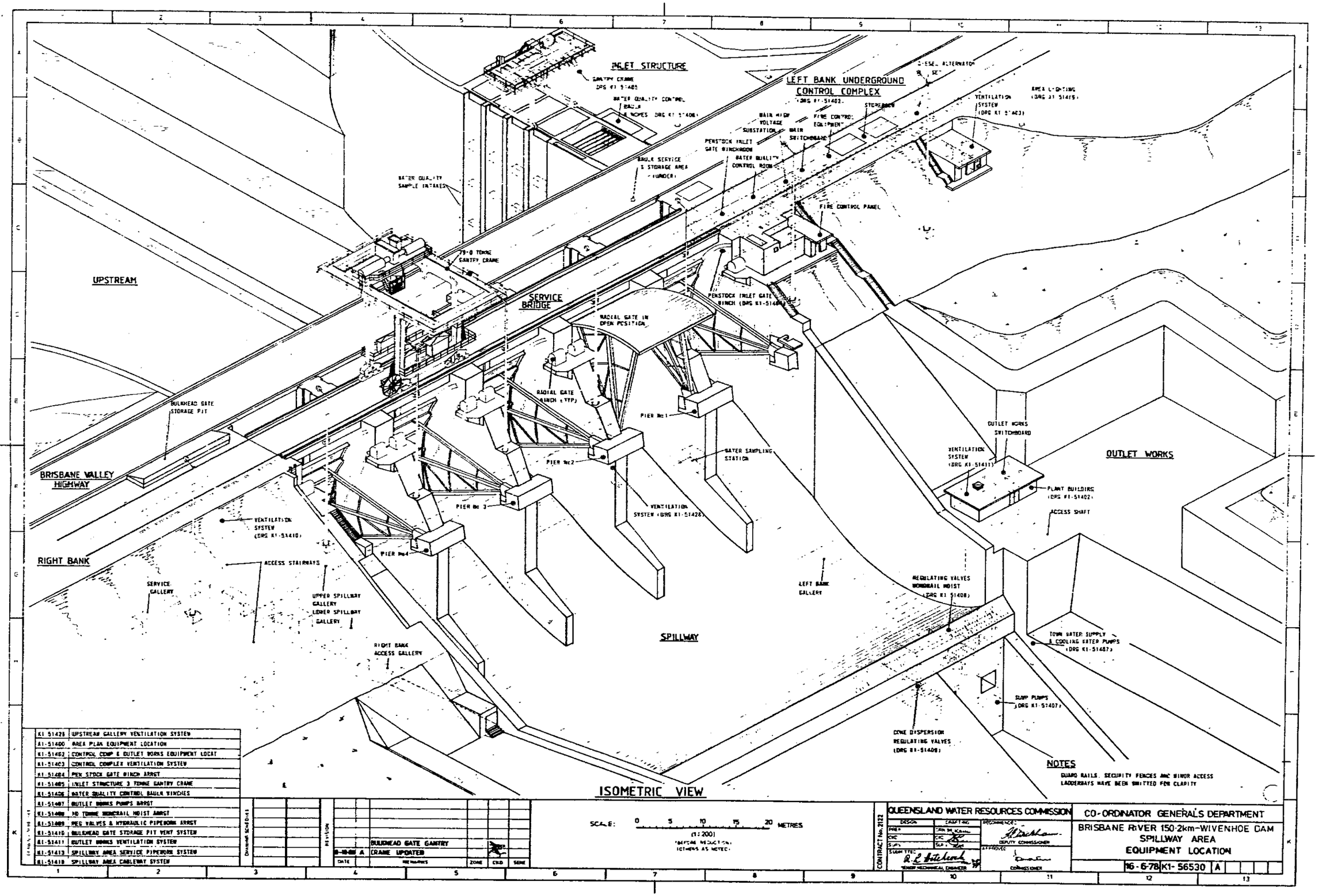
Design	Drafting	Recommended
Prep	Dr T.S.	Senior Engineer Designs
Ckd	Ckd RL	Approved
Supv	Supv	Act/ Chief Designing Engineer
Submitted		
Executive Engineer		

CO-ORDINATOR GENERAL'S DEPARTMENT

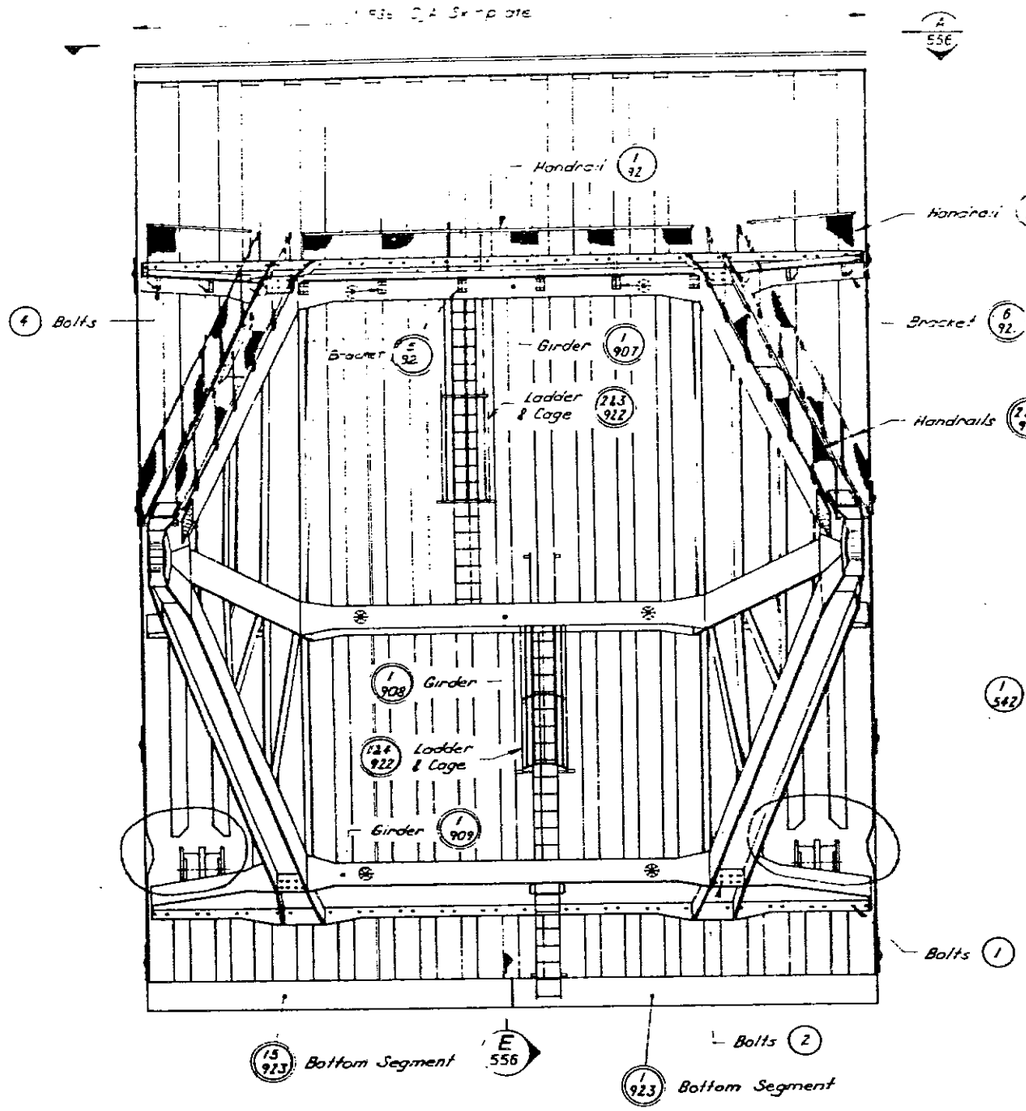
BRISBANE RIVER 150·2 km - WIVENHOE DAM
SPILLWAY RETAINING WALLS

MONO LH14 - DISPERSION CHAMBER LINER

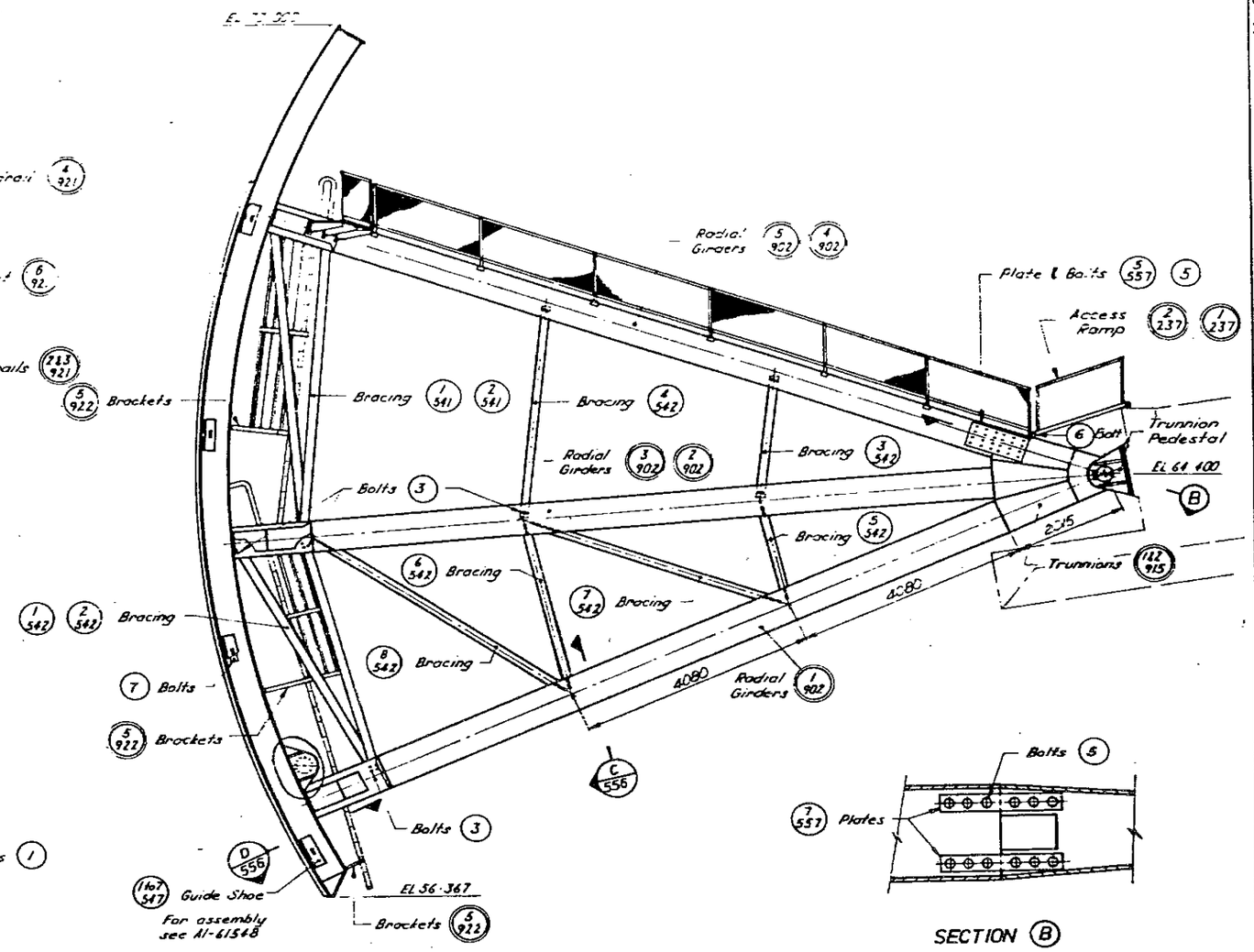
Sh 1 of 2 | 31-8-79 | A1- 54654


INLET STRUCTURE
LEFT BANK UNDERGROUND CONTROL COMPLEX
UPSTREAM
SERVICE BRIDGE
BRISBANE VALLEY HIGHWAY
RIGHT BANK
SPILLWAY
OUTLET WORKS
BULKHEAD GATE STORAGE PIT
RADIAL GATE IN OPEN POSITION
RADIAL GATE WINCH (TYP)
PIER No 1
PIER No 2
PIER No 3
PIER No 4
WATER SAMPLING STATION
VENTILATION SYSTEM (DRG K1-51428)
VENTILATION SYSTEM (DRG K1-51410)
ACCESS STAIRWAYS
SERVICE GALLERY
UPPER SPILLWAY GALLERY
LOWER SPILLWAY GALLERY
RIGHT BANK ACCESS GALLERY
LEFT BANK GALLERY
REGULATING VALVES WORKRAIL HOIST (DRG K1 51408)
CONE DISPERSION REGULATING VALVES (DRG K1-51408)
SUMP PUMPS (DRG K1-51407)
TOWN WATER SUPPLY & COOLING WATER PUMPS (DRG K1-51487)
PLANT BUILDING (DRG K1-51402)
ACCESS SHAFT
OUTLET WORKS SWITCHBOARD
VENTILATION SYSTEM (DRG K1-51411)
FIRE CONTROL PANEL
PENSTOCK INLET GATE WINCHROOM
WATER QUALITY CONTROL ROOM
MAIN HIGH VOLTAGE SUBSTATION
MAIN SWITCHBOARD
FIRE CONTROL EQUIPMENT
STORE ROOM
DIESEL ALTERNATOR SET
VENTILATION SYSTEM (DRG K1 51403)
AREA LIGHTING (DRG K1 51475)
BAULK SERVICE & STORAGE AREA (UNDER)
WATER QUALITY SAMPLE INTAKES
PENSTOCK INLET GATE WINCH (DRG K1-51484)
ISOMETRIC VIEW
NOTES
GUARD RAILS, SECURITY FENCES AND MINOR ACCESS LADDERWAYS HAVE BEEN OMITTED FOR CLARITY
K1 51428 UPSTREAM GALLERY VENTILATION SYSTEM
K1-51400 AREA PLAN EQUIPMENT LOCATION
K1-51402 CONTROL COMP & OUTLET WORKS EQUIPMENT LOCAT
K1-51403 CONTROL COMPLEX VENTILATION SYSTEM
K1-51404 PEN STOCK GATE WINCH ARRGT
K1-51405 INLET STRUCTURE 3 TONNE GANTRY CRANE
K1-51406 WATER QUALITY CONTROL BAULK WINCHES
K1-51407 OUTLET WORKS PUMPS ARRGT
K1-51408 40 TONNE WORKRAIL HOIST ARRGT
K1-51409 REG VALVES & HYDRAULIC PIPEWORK ARRGT
K1-51410 BULKHEAD GATE STORAGE PIT VENT SYSTEM
K1-51411 OUTLET WORKS VENTILATION SYSTEM
K1-51413 SPILLWAY AREA SERVICE PIPEWORK SYSTEM
K1-51418 SPILLWAY AREA CABLEWAY SYSTEM
DRAWING SCHEDULE
REVISION
BULKHEAD GATE GANTRY
CRANE UPDATED
SCALE: 0 5 10 15 20 METRES
(1:200)
QUEENSLAND WATER RESOURCES COMMISSION
CO-ORDINATOR GENERAL'S DEPARTMENT
BRISBANE RIVER 150·2km-WIVENHOE DAM
SPILLWAY AREA
EQUIPMENT LOCATION
16-6-78 K1-56530 A

A1-61555



ELEVATION



END ELEVATION

SECTION (B)

Not to Scale

● With approval of the Engineer. Temporary bracing may be bolted to the outer girder flanges at the positions marked ❋. After field erections holes to be filled and ground flush.

NOTES:

1. All dimensions are in millimetres and elevations in metres.
2. All materials and workmanship shall be in accordance with the specification.
3. (5/922) Indicates drawing number is in a different numerical series to this drawing. See drawing schedule.

BOLT SCHEDULE - QUANTITY FOR 5 GATES

ITEM Nº	GRADE	LOCATION	DIA	LENGTH	TYPE	THREAD LENGTH	Nº REQD	NUTS REQD	WASHERS REQD
7	4.6	Guide Shoe	20	65	Galv Hex	46	80	80	80
6		Lug to Walkway	20	55	Galv Hex	22	20	20	20
5		Girder to Trunnion	30		NSFG				
4	4.6	Brackets to Girder	12	50	Galv Hex	30	240	240	240
3	4.6	Bracing	24	65	Galv Hex	54	560	540	540
2	8.8	Radial Girders	20	75	Galv Hex	46	480	480	480
1	4.6	Bot, Top & Mid Girders	16	55	Galv Hex	38	1080	1080	1080

Drawing Schedule	
A1-62237	Radial Gates - Access Ramp
A1-61557	Radial Gates - Grid Floor & Splice Plates
A1-61556	Radial Gates - Arrangement Sh 2 of 2
A1-61547	Radial Gates - Guide Shoe Fabrication
A1-61548	Radial Gates - Guide Shoe Assembly
A1-61541	Radial Gates - Girder Bracing
A1-61542	Radial Gates - Girder Bracing
A1-60902	Radial Gates - Radial Girders
A1-60921	Radial Gates - Handrails
A1-60907	Radial Gates - Top Horiz Girder
A1-60908	Radial Gates - Middle Horiz Girder
A1-60909	Radial Gates - Bottom Horiz Girder
A1-60923	Radial Gates - Bottom Segment & Seal Clamps
A1-60922	Radial Gates - Ladders

Revision				
16.9.83	D	Sheave block shifted	M.J.C.	
13.12.82	C	Section E added	M.J.C.	
20.10.82	B	Bracket item number amended.	M.J.C.	
22.6.82	A	Guide Shoe & C/L Skinplate Dim added	M.J.C.	
Date		Remarks	Ckd	Psd

Scale Before Reduction

0 1000 2000 3000 4000 5000 mm (1:50)

CONTRACT Nº 2123

QUEENSLAND WATER RESOURCES COMMISSION

Design: Prep. Ckd. Supv. Engr. Submitted Executive Engineer

Drafting: Dr. Ckd. M.J.C. Supv. M.J.C.

Recommended Senior Engineer Designs

Approved Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km - WIVENHOE DAM

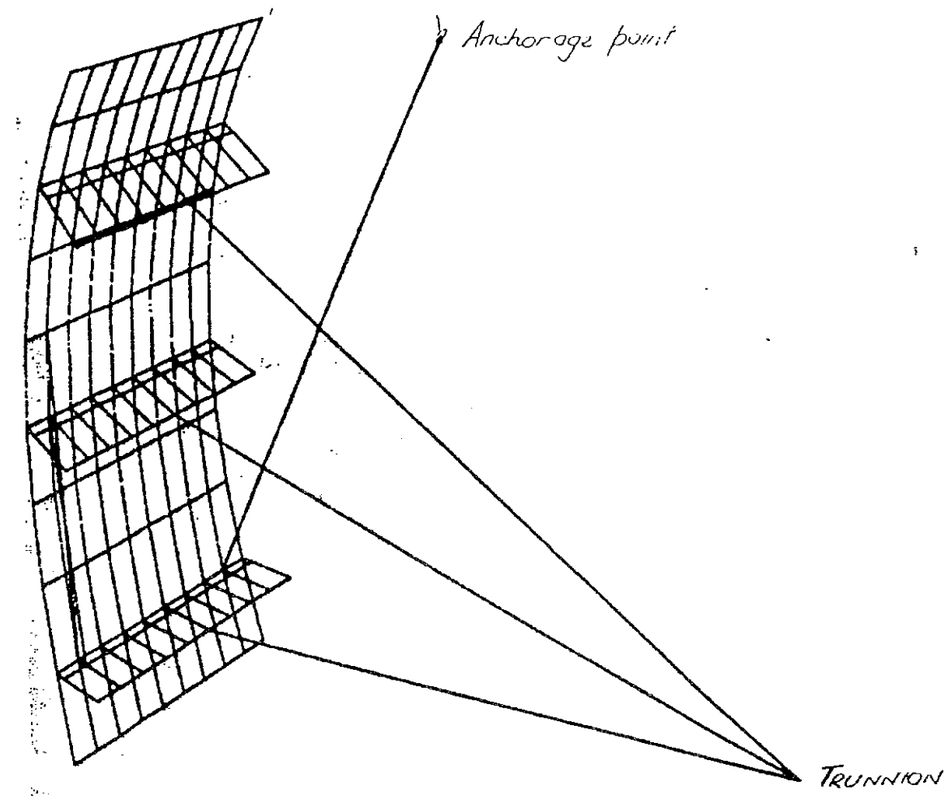
RADIAL GATES

ARRANGEMENT

Sh 1 of 2 | A1-61555 | A B C D

INS. 1 0 2 4 6 8 10

CM. 1 0 2 4 6 8 10 20 30



Finite Element Mesh for Left Half of Gate.

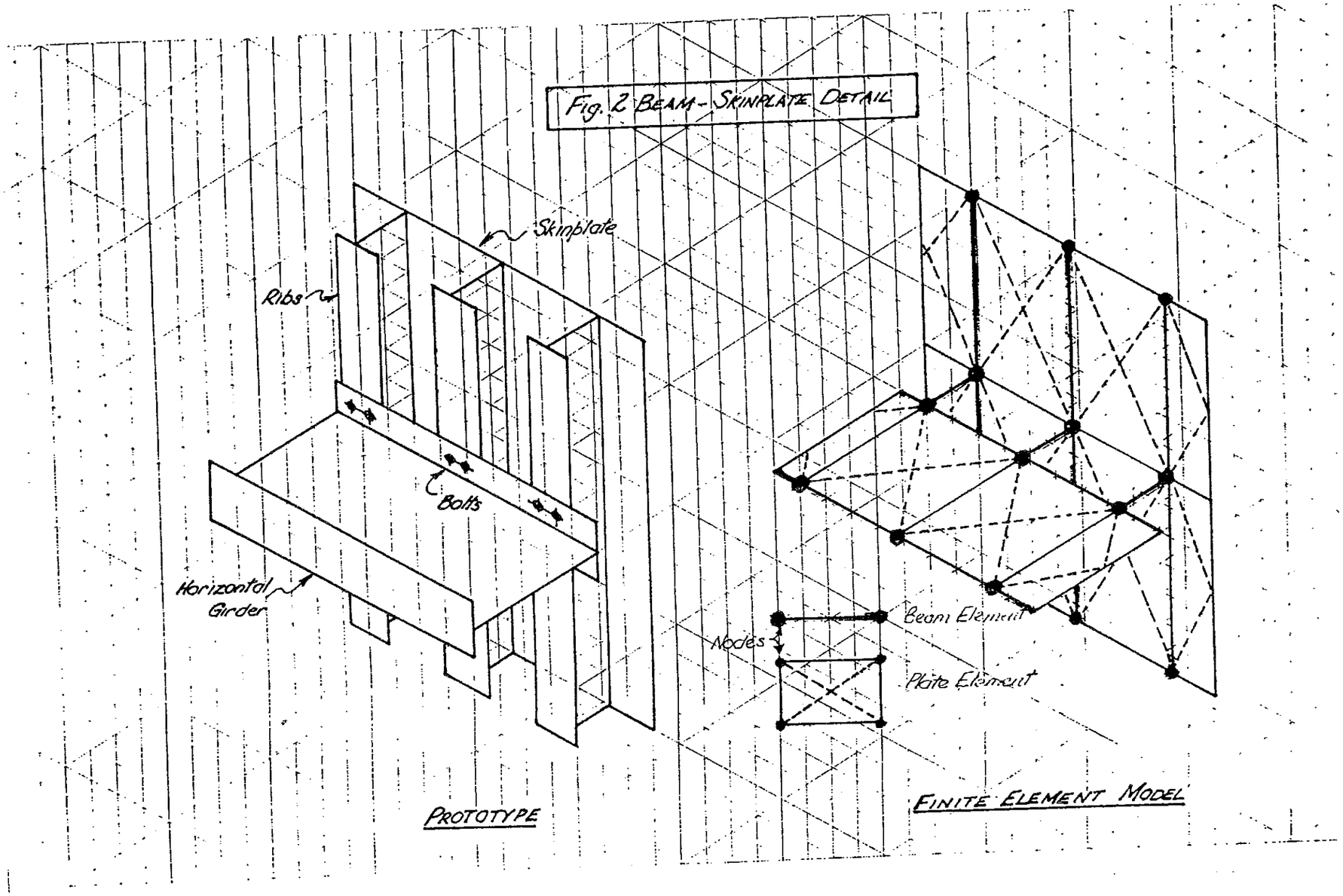
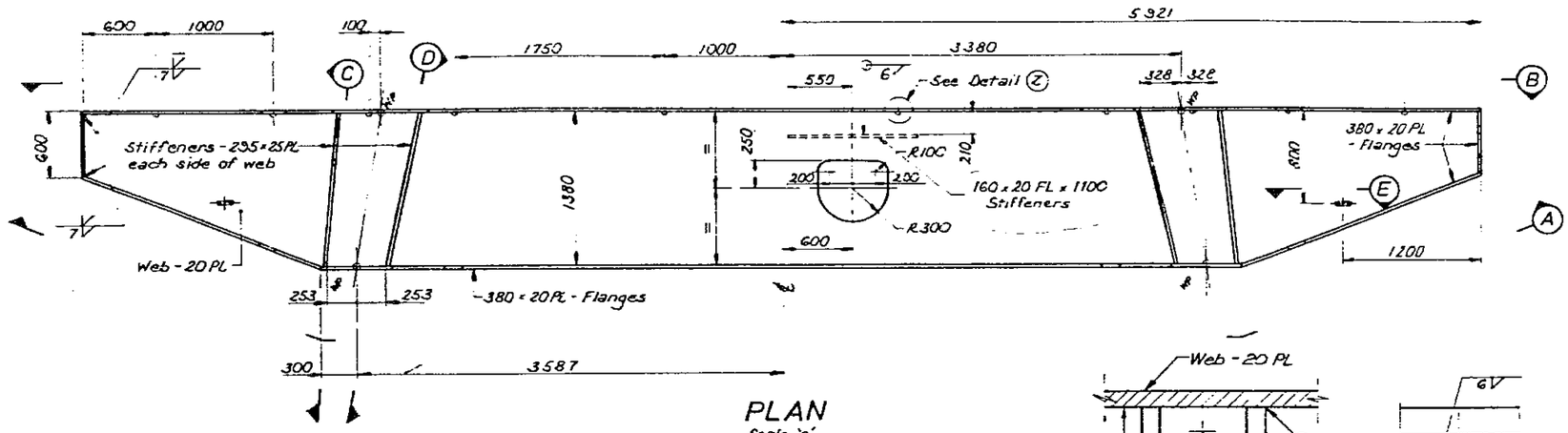


Fig. 2 BEAM-SKINPLATE DETAIL

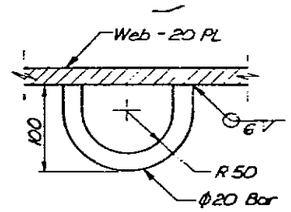
A1-60908



PLAN

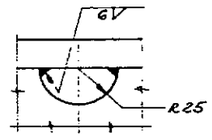
Scale 'a'

Girder is symmetrical about ℄ except for ladder opening.



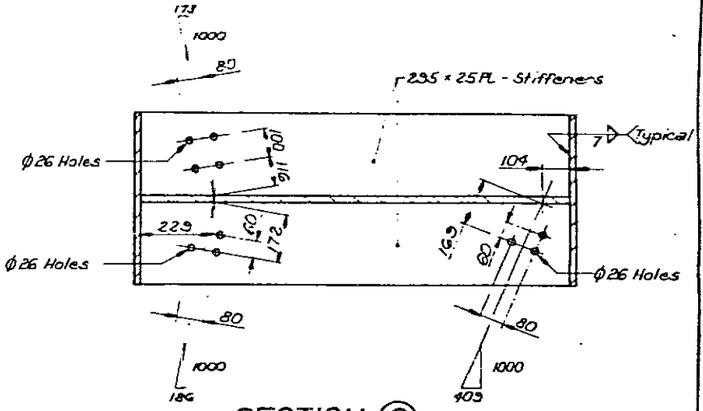
SECTION (E)

Not to Scale



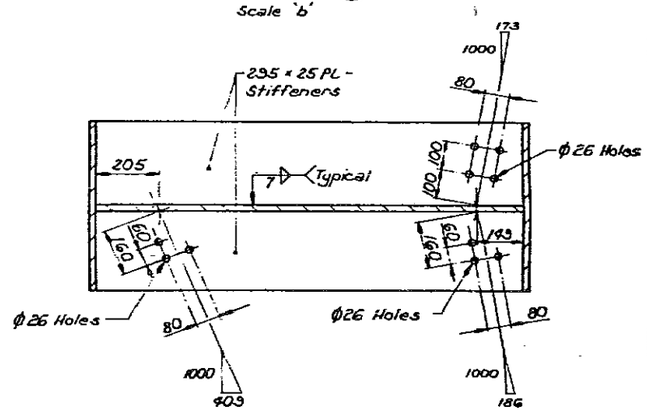
DETAIL (Z)

Not to scale



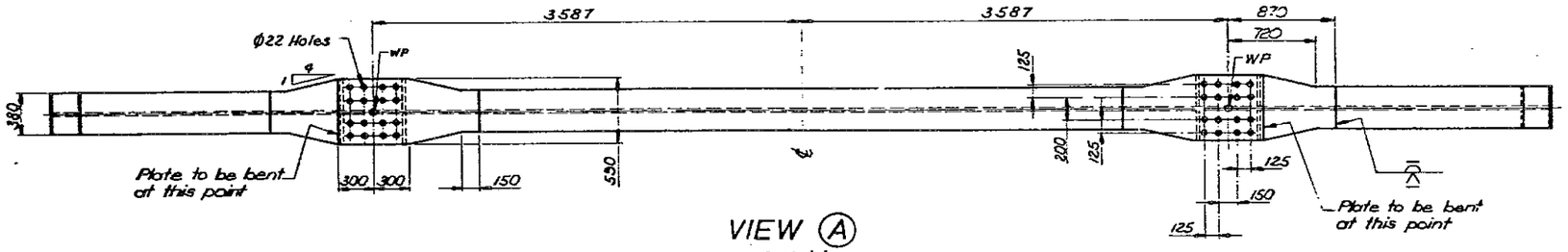
SECTION (C)

Scale 'b'



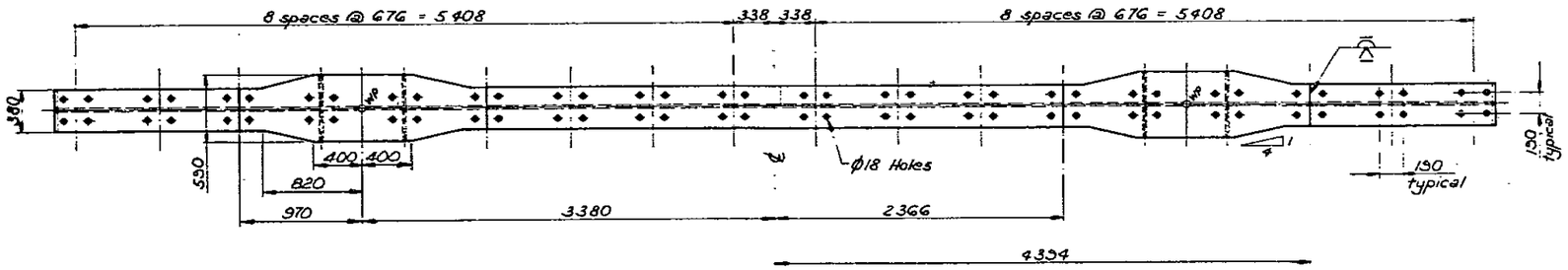
SECTION (D)

Scale 'b'



VIEW (A)

Scale 'a'



VIEW (B)

Scale 'a'

NOTES:

1. All dimensions are in millimetres.
2. For dimensional tolerances refer to the specification.
3. All materials and workmanship shall be in accordance with the specification.
4. All welds to be 7mm continuous fillet unless otherwise stated.
5. For surface preparation and painting requirements refer to the relevant clauses in the specification.
6. All Items to be marked with Item Number and last three digits of Drawing Number. e.g. (608)
7. 'WP' denotes working point.
8. All full web stiffeners shall fit tightly against the adjacent flanges before welding.

WELDING SEQUENCE

1. Weld flanges to web.
2. Force in stiffeners and weld to girder flange.
3. Weld stiffeners to web.

ITEM No	DESCRIPTION	No OFF	MATERIAL	REMARKS
1	Middle Horizontal Girder	5	M.S.	Grade 250 AS 1204 - 1972

ITEM SCHEDULE

Revision				
Date		Remarks	Ckd	Psd
19.10.82	A	Stiffener added	M.J.C.	

Drawing Schedule		
A1-61555	Radial Gate Arrangement	Sh 1 of 2

Scales Before Reduction

Scale 'a' 0 500 1000 1500 2000 2500 mm 1:25

Scale 'b' 0 500 1000 mm 1:10

CONTRACT No 2123

QUEENSLAND WATER RESOURCES COMMISSION

Design	Drafting	
Prep R	Dr T.S.	Recommended R. Kirkby Senior Engineer Designs
Ckd G.F.	Ckd M.J.C.	
Supv K.J.W.C.	Supv M.J.C.	Approved T.K. Lehn Chief Designing Engineer
Submitted H.J.M. Cowell Executive Engineer		

CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km - WIVENHOE DAM

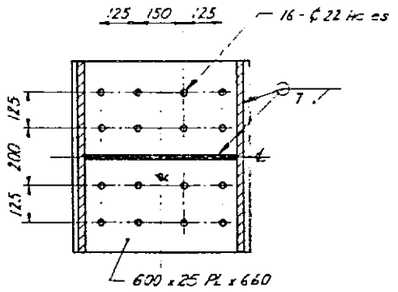
RADIAL GATES

MIDDLE HORIZONTAL GIRDER

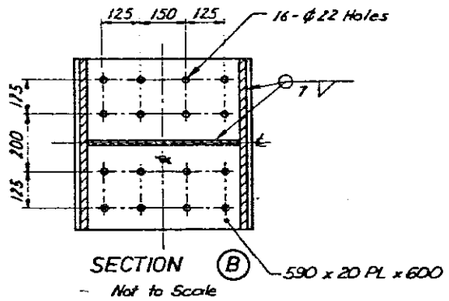
18.8.81 | A1-60908 | A

INS. 1 0 2 4 6 8 10 20 30

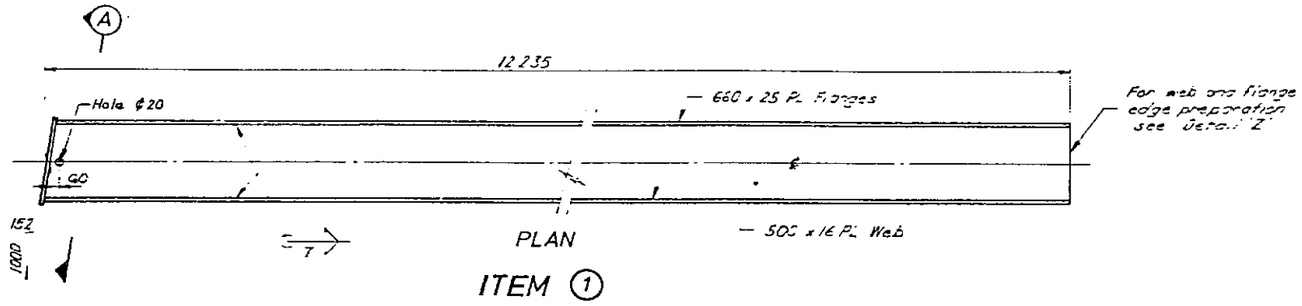
A1-60902



SECTION (A)
Not to Scale

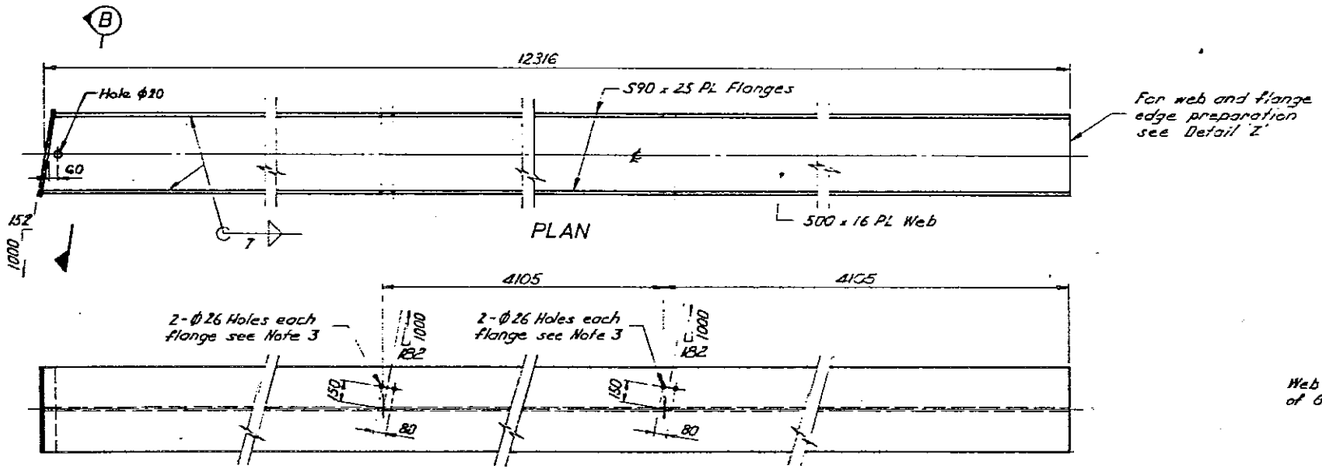


SECTION (B)
Not to Scale



PLAN

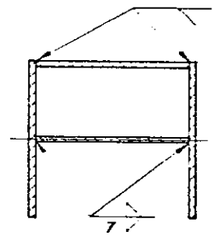
ITEM (1)



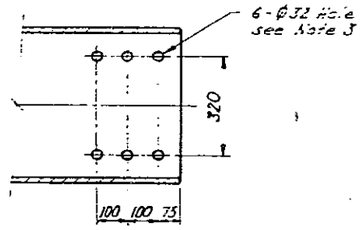
PLAN

ELEVATION

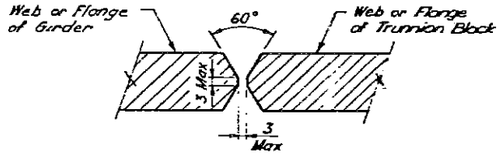
ITEM (2) (AS DRAWN)
ITEM (3) (OPPOSITE HAND)



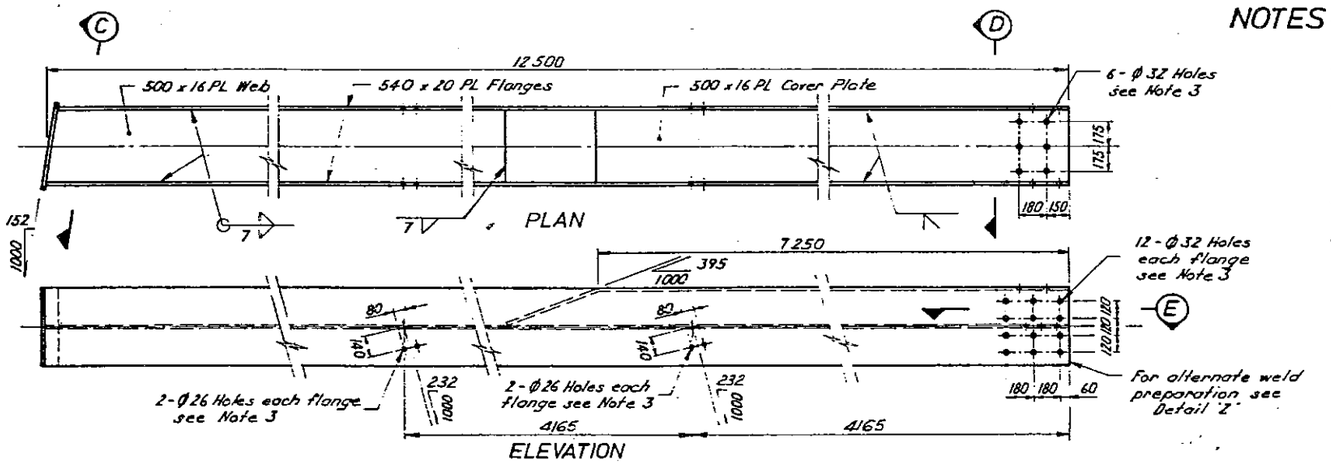
SECTION (D)
Not to Scale



SECTION (E)
Not to Scale

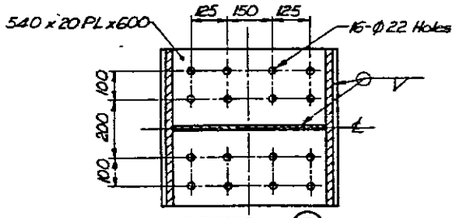


DETAIL (Z)
Not to Scale



ELEVATION

ITEM (4) (AS DRAWN)
ITEM (5) (OPPOSITE HAND)



SECTION (C)
Not to Scale

NOTES :-

1. All dimensions are in millimetres.
2. All materials and workmanship shall be in accordance with the specification.
3. Bolt holes are for an alternate method of connection, refer to the relevant clauses in the specification.
4. For surface preparation and painting requirements refer to the relevant clauses in the specification.
5. All items to be marked with item number and last three digits of drawing number eg. (3/902)
6. All steel to be grade 250 to AS 1204 - 1972.

ITEM N°	DESCRIPTION	N° OFF	MATERIAL	REMARKS
5	Top Radial Girder	5	MS	See Note 6
4	" " "	5	MS	"
3	Middle Radial Girder	5	MS	"
2	" " "	5	MS	"
1	Bottom Radial Girder	10	MS	"

ITEM SCHEDULE

Revision				
Date		Remarks	Ckd	Psd
30·8·84	A	Hole ϕ20 Items 1,2 & 3		

Drawing Schedule	
A1-61555	Radial Gates - Arrgt Sh 1 of 2

Scale Before Reduction

0 500 1000 1500 2000 mm (1/20)

CONTRACT N° 2123

QUEENSLAND WATER RESOURCES COMMISSION

Design	Drafting	Recommended
Prep	Dr	R. Russo
Ckd	Ckd M.J.C.	Senior Engineer Designs
Supv	Supv M.J.C.	Approved
Submitted		
Executive Engineer		Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

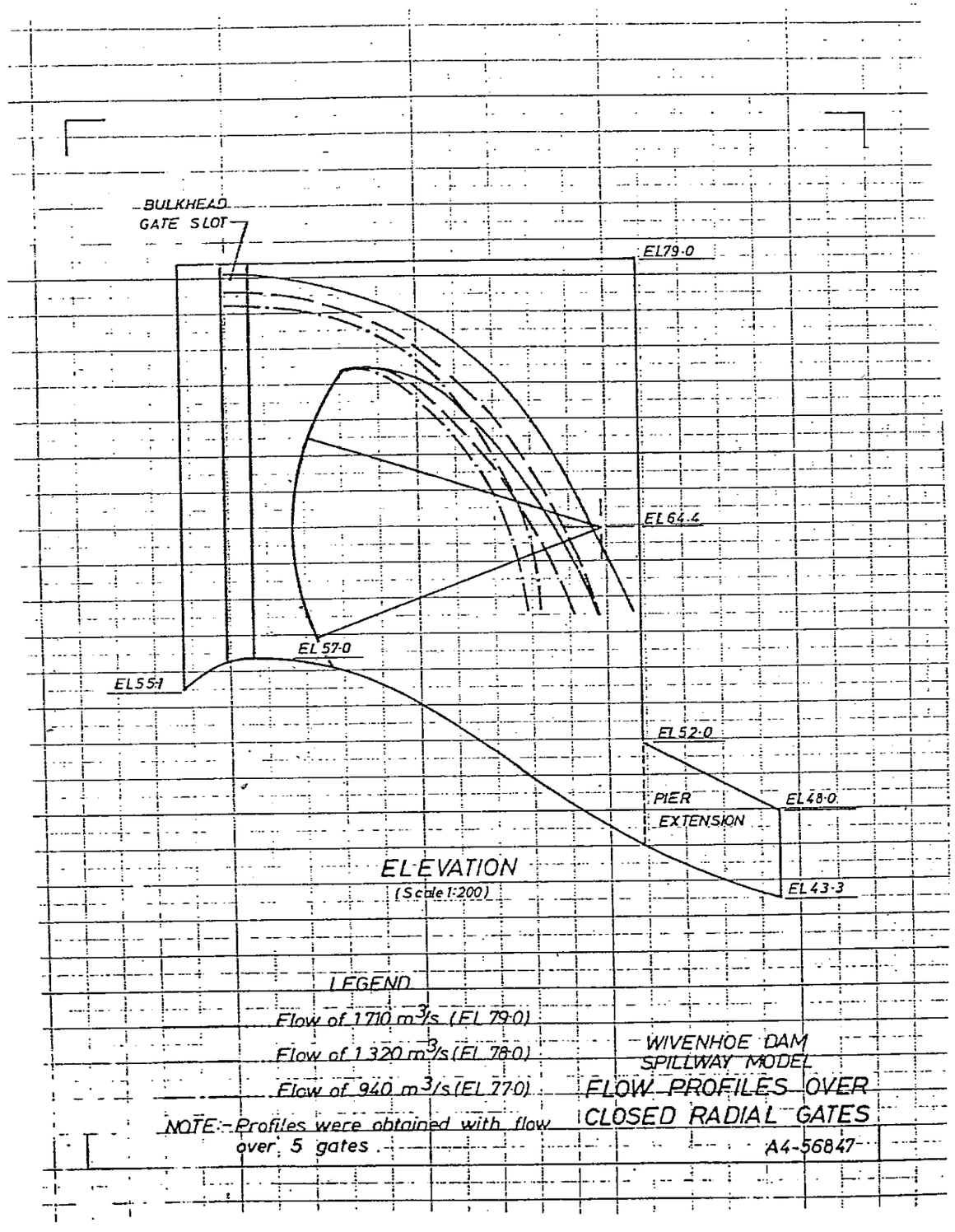
BRISBANE RIVER 150·2 km — WIVENHOE DAM
RADIAL GATE

RADIAL GIRDERS

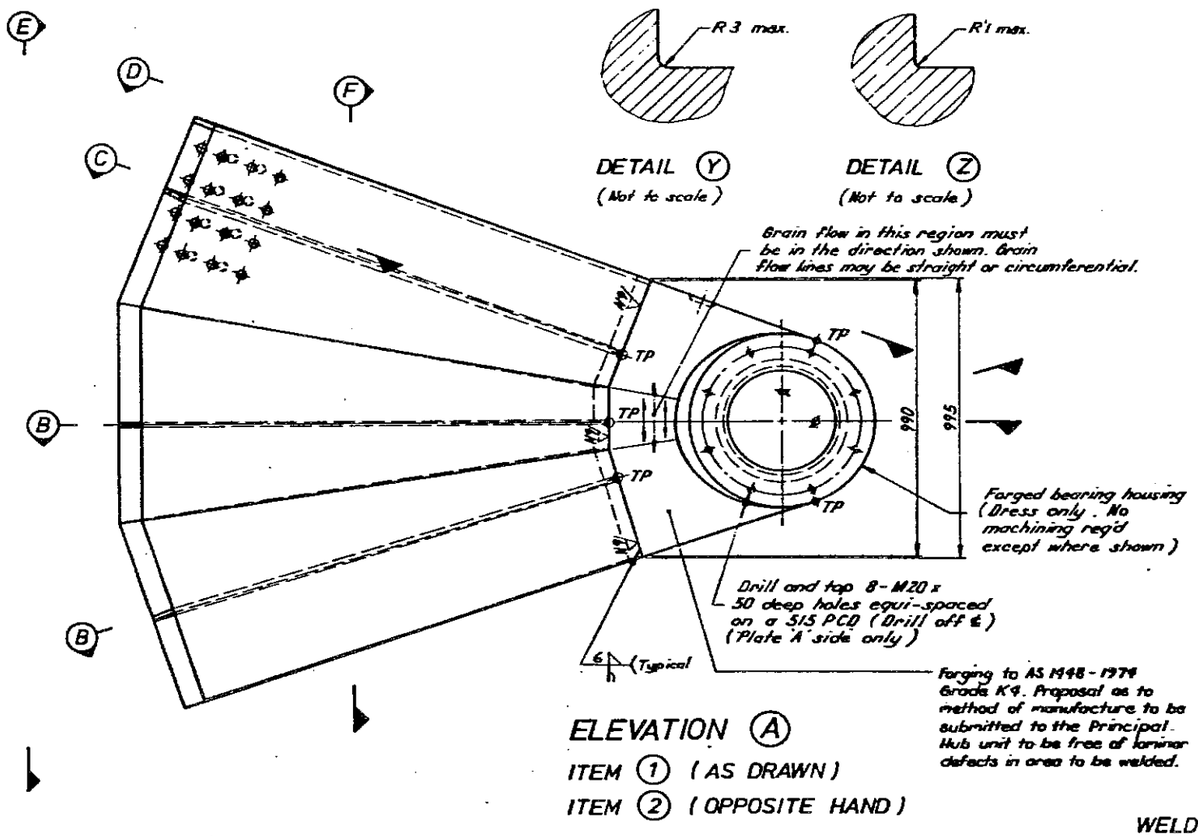
30.7.81 | A1-60902 | A

INS. 0 2 4 6 8 10

CM. 0 2 4 6 8 10 20 30


BULKHEAD
GATE SLOT
EL79·0
EL64·4
EL57·0
EL55·1
EL52·0
PIER
EXTENSION
EL48·0
EL43·3
ELEVATION
(Scale 1:200)
LEGEND
Flow of 1710 m³/s (EL 79·0)
Flow of 1320 m³/s (EL 78·0)
Flow of 940 m³/s (EL 77·0)
NOTE:- Profiles were obtained with flow over 5 gates.
WIVENHOE DAM
SPILLWAY MODEL
FLOW PROFILES OVER
CLOSED RADIAL GATES
A4-56847

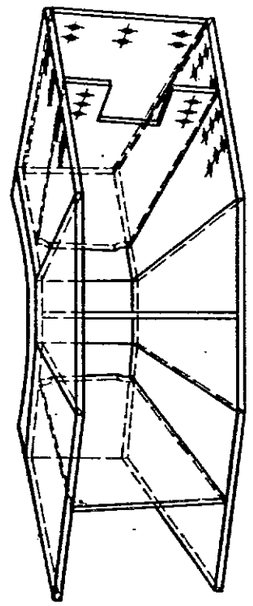
A1-60915



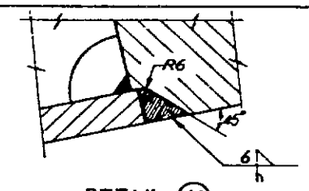
ELEVATION (A)

ITEM (1) (AS DRAWN)

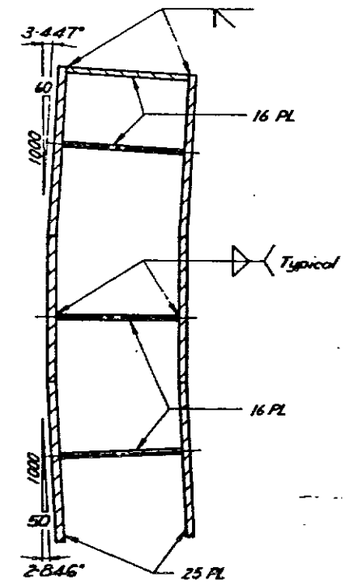
ITEM (2) (OPPOSITE HAND)



VIEW (E)



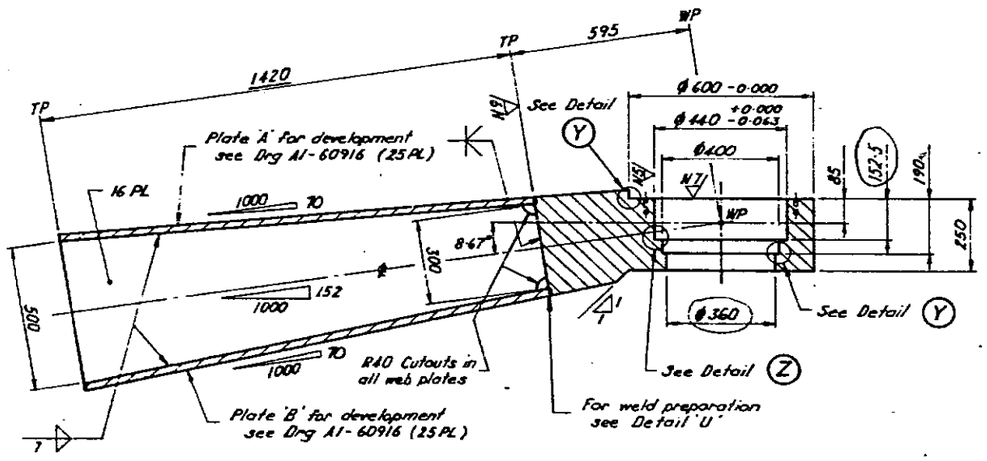
DETAIL (U)
(Not to Scale)



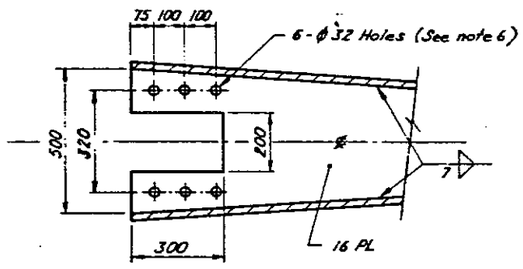
SECTION (F)

WELDING SEQUENCE FOR TRUNNION PLATES

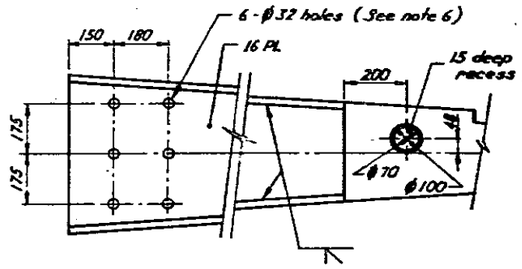
1. Weld web plates to forging
2. Weld web plates to cover plates



SECTION (B)



SECTION (C)



SECTION (D)

NOTES:

1. All dimensions are in millimetres.
2. All materials and workmanship shall be in accordance with the specification.
3. For general notes refer to drg A1-60916

ITEM N°	DESCRIPTION	N° OFF	MATERIAL	REMARKS
2	Trunnion Hub Plates	5	MS	Grade 250-AS1204-1982
1	Trunnion Hub Plates	5	MS	" " "

ITEM SCHEDULE

Revision				
Date		Remarks	Ckd	Psd
18·4·83	C	Section B amended		
3·1·83	B	Detail (U) amended	M.J.C.	
5·1·82	A	Items 1 & 2 - forging grade		

Drawing Schedule	
A1-61555	Radial Gates - Arrgt Sh 1 of 2
A1-60916	Radial Gates - Trunnion Details Sh 2 of 2

Scales Before Reduction

0 500 1000 mm (1:10)

CONTRACT N° 2123

QUEENSLAND WATER RESOURCES COMMISSION

Design	Drafting	Recommended
Prep	Dr	Senior Engineer Designs
Ckd	Ckd M.J.C.	
Supv	Supv M.J.C.	Approved
Submitted		
Executive Engineer		Chief Designing Engineer

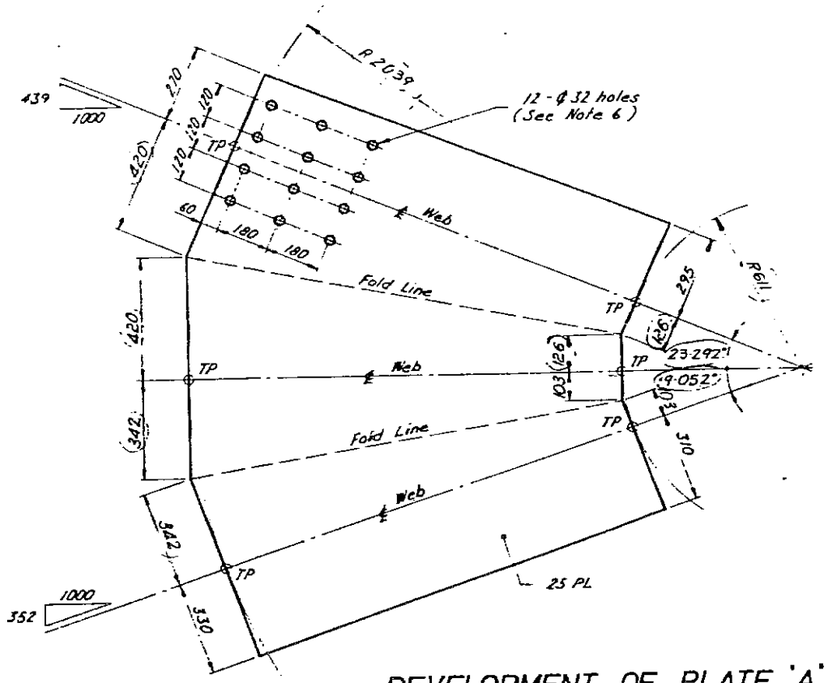
CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km - WIVENHOE DAM
RADIAL GATE

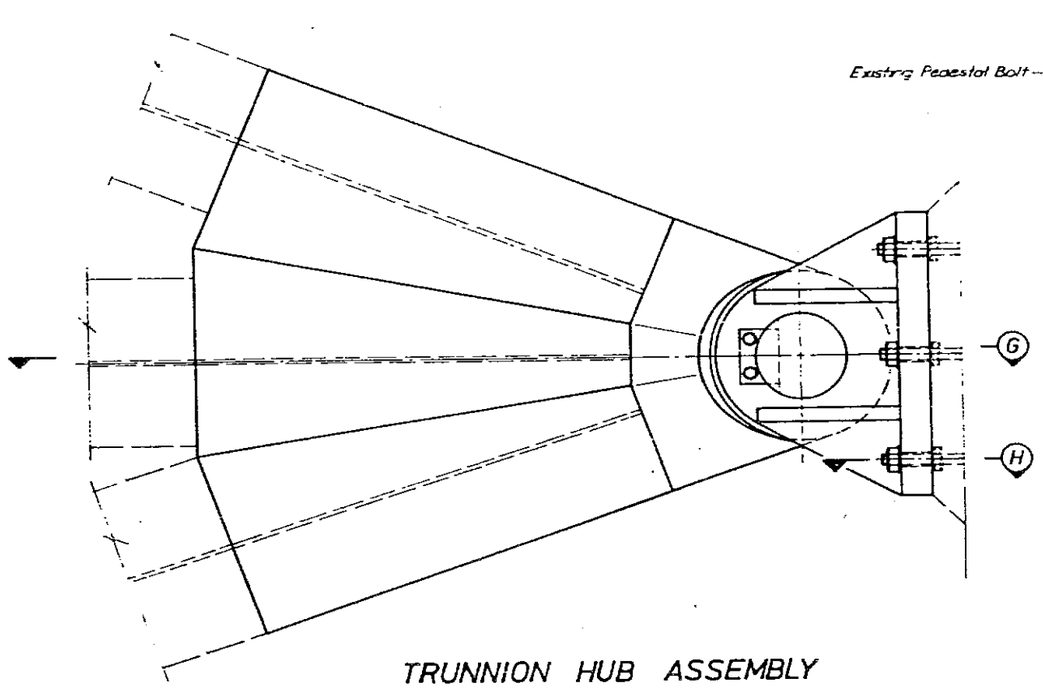
TRUNNION DETAILS

Sh 1 of 2 | 19·8·81 | A1-60915 | A | B | C

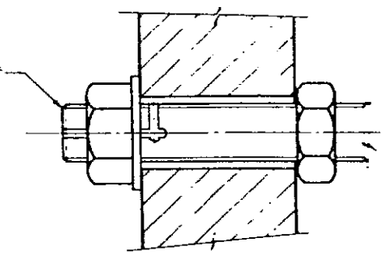
A1-60916



DEVELOPMENT OF PLATE 'A'

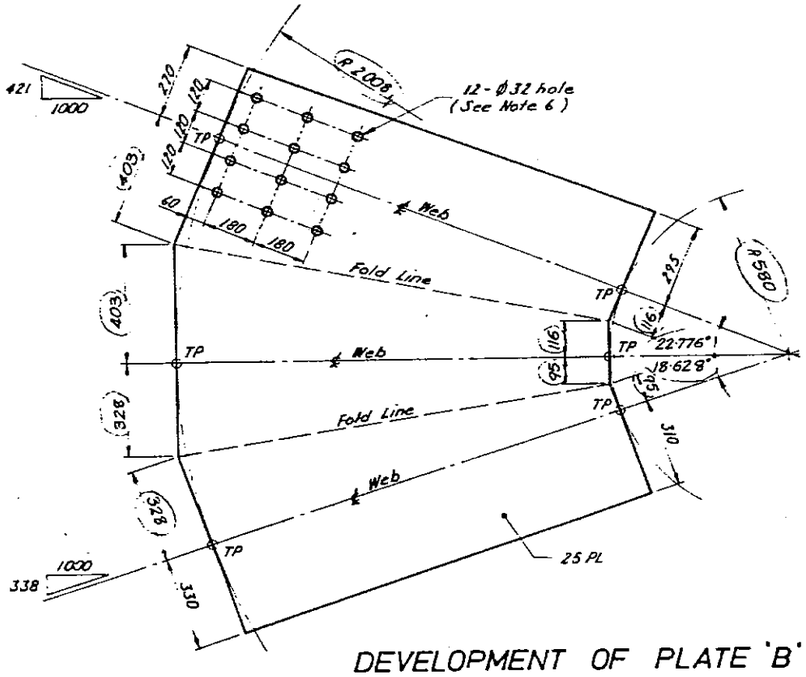


TRUNNION HUB ASSEMBLY

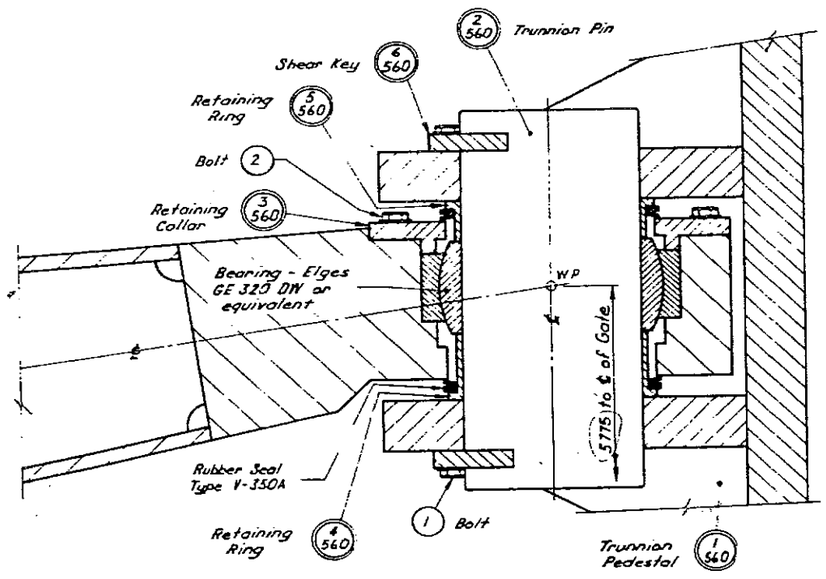


SECTION (H)

Not to scale



DEVELOPMENT OF PLATE 'B'



SECTION (G)

Not to scale

NOTES:

1. All dimensions are in millimetres.
2. All materials and workmanship shall be in accordance with the specification.
3. For surface preparation and painting requirements refer to the relevant clauses in the specification.
4. All Items to be marked with Item Number and last three digits of Drawing Number eg. (1/915)
5. (4/560) Indicates drawing number is in a different numerical series to this drawing. See drawing schedule.
6. Bolt holes are for an alternate method of connection, refer to the relevant clauses in the specification. (Plate A and Plate B)

BOLT SCHEDULE

ITEM Nº	LOCATION	DIA	LENGTH	TYPE	THREAD LENGTH	Nº REQD	NUTS REQD	WASHERS REQD
2	Retaining Collar	20	80	Galv Hex	50	80	–	80 R
1	Shear Key	16	70	Galv Hex	40	40	–	40 R

Revision				
5/6.83	B	De. Plan dimensions		
2/7/82	A	Sect 'G' amended	M.J.C.	
Date		Remarks	Ckd	Psd

Drawing Schedule	
A1-61560	Radial Gates - Trunnion Pedestal
A1-60915	Radial Gates - Trunnion Details Sh 1 of 2

Scale Before Reduction

0 500 1000 mm (1:10)

CONTRACT Nº 2123

QUEENSLAND WATER RESOURCES COMMISSION

Design	Drafting
Prep	Dr
Ckd	Ckd M.J.C.
Supv	Supv M.J.C.

Submitted: Executive Engineer

Recommended: Senior Engineer Designs

Approved: Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

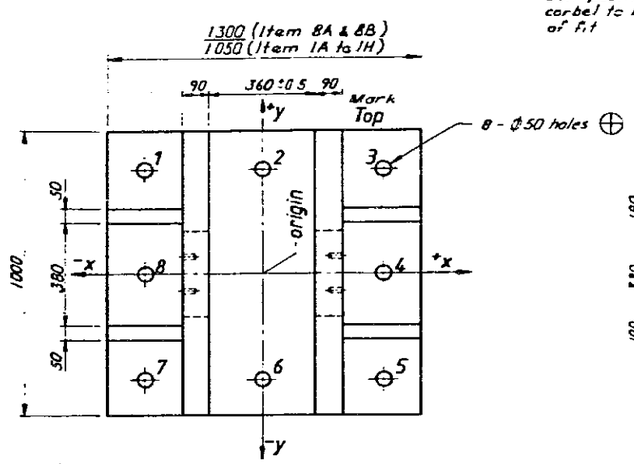
BRISBANE RIVER 150·2 km - WIVENHOE DAM
RADIAL GATES

TRUNNION DETAILS

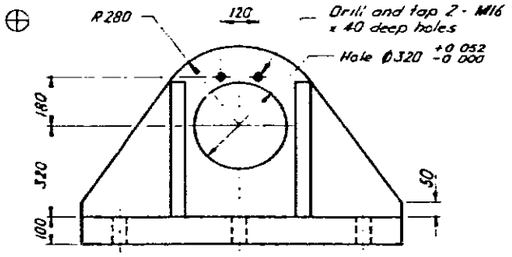
Sh 2 of 2 | 19·8·81 | A1-60916 | A | B

A1-61560

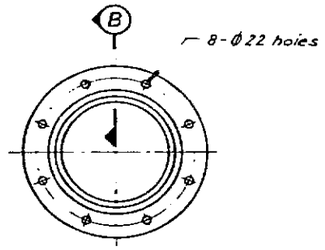
Prior to drilling Ø50 holes, bolt positions on each trunnion corbel to be checked for accuracy of fit



PLAN

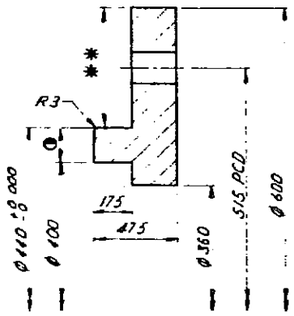


END ELEVATION



ITEM 3

Scale 'a'

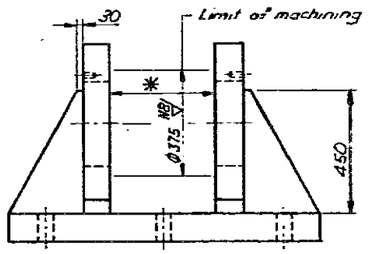


SECTION B

Scale 'b'

** This face is to be machined so that on assembly there shall be no gaps between the face marked ⊖ and the bearing and a maximum gap of 0.5mm between the face marked ** and the trunnion.

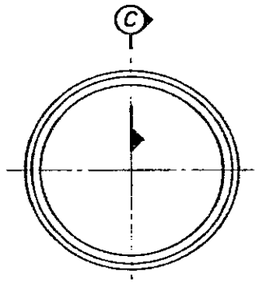
* This critical dimension shall permit the passage of the bearing and retaining rings during construction



ELEVATION

ITEMS 1 & 8

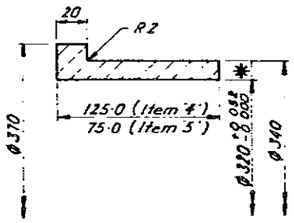
Scale 'a'



ITEM 4

ITEM 5

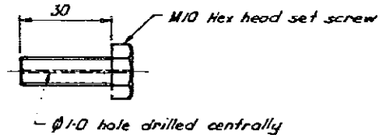
Scale 'c'



* This face to be machined to produce a maximum gap of 0.5mm on assembly between the retaining rings and the trunnion pedestal

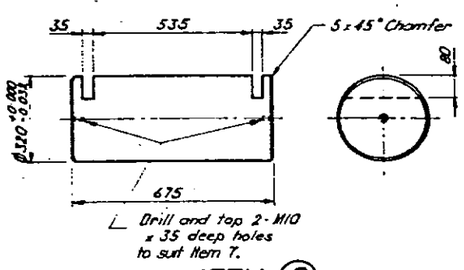
SECTION C

Scale 'b'



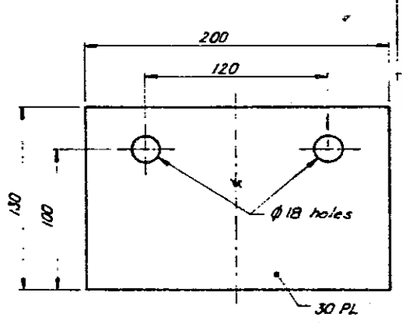
ITEM 7

(Scale full size)



ITEM 2

Scale 'a'



ITEM 6

Scale 'b'

LOCATION (LOOKING DOWNSTREAM)	ITEM Nº	AXIS (SEE ITEMS 1 & 8.)	POSITION OF HOLES — HOLE NUMBERS (SEE ITEMS 1 & 8.) 1	2	3	4	5	6	7	8
MONO LH 11	8A	X	-552	+8	+570	+567	+569	+8	-554	-553
		Y	+365	+361	+363	-12	-382	-378	-379	-5
PIER 1 LH SIDE	1A	X	-398	+4	+404	+405	+404	+3	-398	-395
		Y	+352	+358	+359	-7	-380	-386	-385	-16
PIER 1 RH SIDE	1B	X	-397	+5	+407	+405	+404	+4	-396	-395
		Y	+347	+354	+351	-30	-385	-391	-386	-20
PIER 2 LH SIDE	1C	X	-398	+2	+401	+402	+401	+1	-396	-398
		Y	+359	+361	+360	-10	-381	-349	-360	-10
PIER 2 RH SIDE	1D	X	-406	-7	+391	+398	+398	0	-402	-406
		Y	+361	+358	+359	-11	-380	-381	-381	-12
PIER 3 LH SIDE	1E	X	-402	0	+399	+400	+400	0	-400	-400
		Y	+364	+361	+363	-9	-382	-382	-378	-10
PIER 3 RH SIDE	1F	X	-416	-17	+384	+388	+390	-10	-410	-412
		Y	+359	+363	+360	-7	-377	-375	-380	-9
PIER 4 LH SIDE	1G	X	-391	+7	+407	+404	+399	+1	-398	-395
		Y	+352	+355	+353	-17	-390	-383	-386	-15
PIER 4 RH SIDE	1H	X	-399	+1	+400	+401	+401	+1	-399	-399
		Y	+358	+360	+356	-14	-384	-378	-378	-10
MONO RH 12	8B	X	-574	-14	+553	+553	+552	-13	-562	-569
		Y	+353	+351	+363	-10	-380	-383	-400	-28

TABLE

NOTES :-

1. All dimensions are in millimetres.
2. All materials and workmanship shall be in accordance with the specification.
3. For surface preparation and painting requirements refer to the relevant clauses in the specification
4. All items to be marked with item number and last three digits of drawing number eg. (4 560) (1A 560)
5. All welds to be full penetration butt welds
6. For hole positions for Items 1A to 1H and 8A and 8B see Table

ITEM Nº	DESCRIPTION	Nº OFF	MATERIAL	REMARKS
8A + 8B	Abutment Trunnion Pedestal	2	MS	Grade 250 - AS 1204 - 1972
7	Set Screw	20	SS	Grade 316 to AS M45-1978
6	Shear Key	20	MS	Grade 250 to AS 1204 1972
5	Retaining Ring	10	SS	Grade 316L - AS M45 - 1978
4	Retaining Ring	10	SS	" " " " "
3	Retaining Collar	10	SS	" " " " "
2	Trunnion Pin	10	SS	AISI - Grade 431
1(A-H)	Pier Trunnion Pedestal	8	MS	Grade 250 - AS 1204 - 1972

ITEM SCHEDULE

Revision	Date		Remarks	Ckd	Psd
	23.11.83	D	Hole Table amended		
	26-7-83	C	Hole Table added		
	18-4-83	B	Items 3,4 & 5 amended		
			Item 8 added Machine Symbol for Items 1 & 8 amended.		
	14.7.82	A		M.J.C.	

Drawing Schedule: A1-61555 Radial Gates - Arrgt Sh 1 of 2

Scales Before Reduction

'a' 0 500 1000 mm (1:10)

'b' 0 50 100 150 200 mm (1:2)

'c' 0 100 200 300 400 500 mm (1:5)

CONTRACT Nº 2123

QUEENSLAND WATER RESOURCES COMMISSION

Design: Prep. — Ckd — Supv — Submitted — Executive Engineer

Drafting: Dr. — Ckd M.J.C. — Supv M.J.C.

Recommended — Senior Engineer Designs

Approved — Chief Designing Engineer

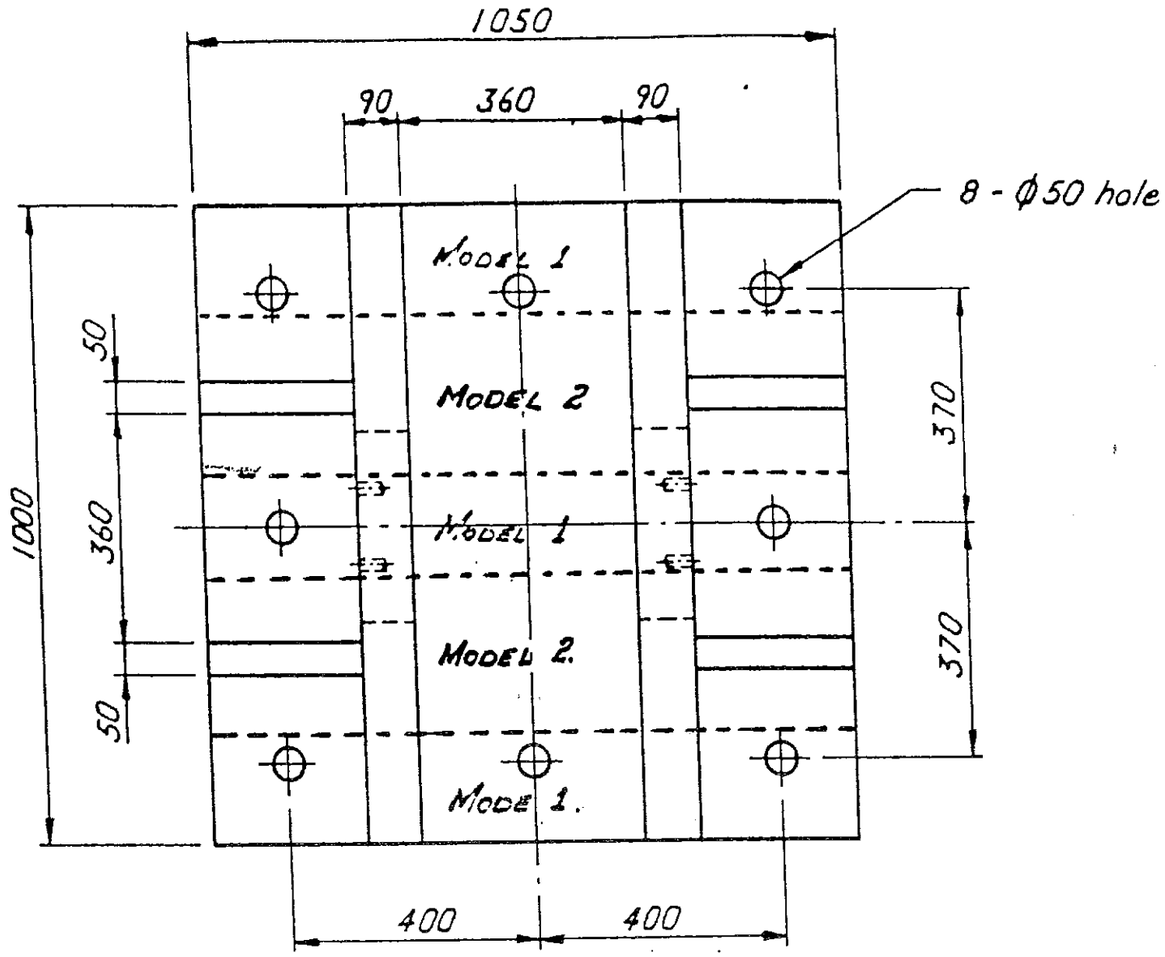
CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km - WIVENHOE DAM

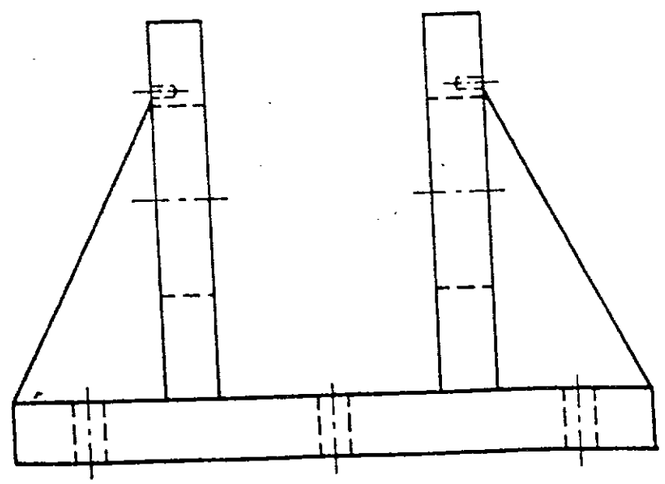
RADIAL GATES

TRUNNION PIN AND PEDESTAL

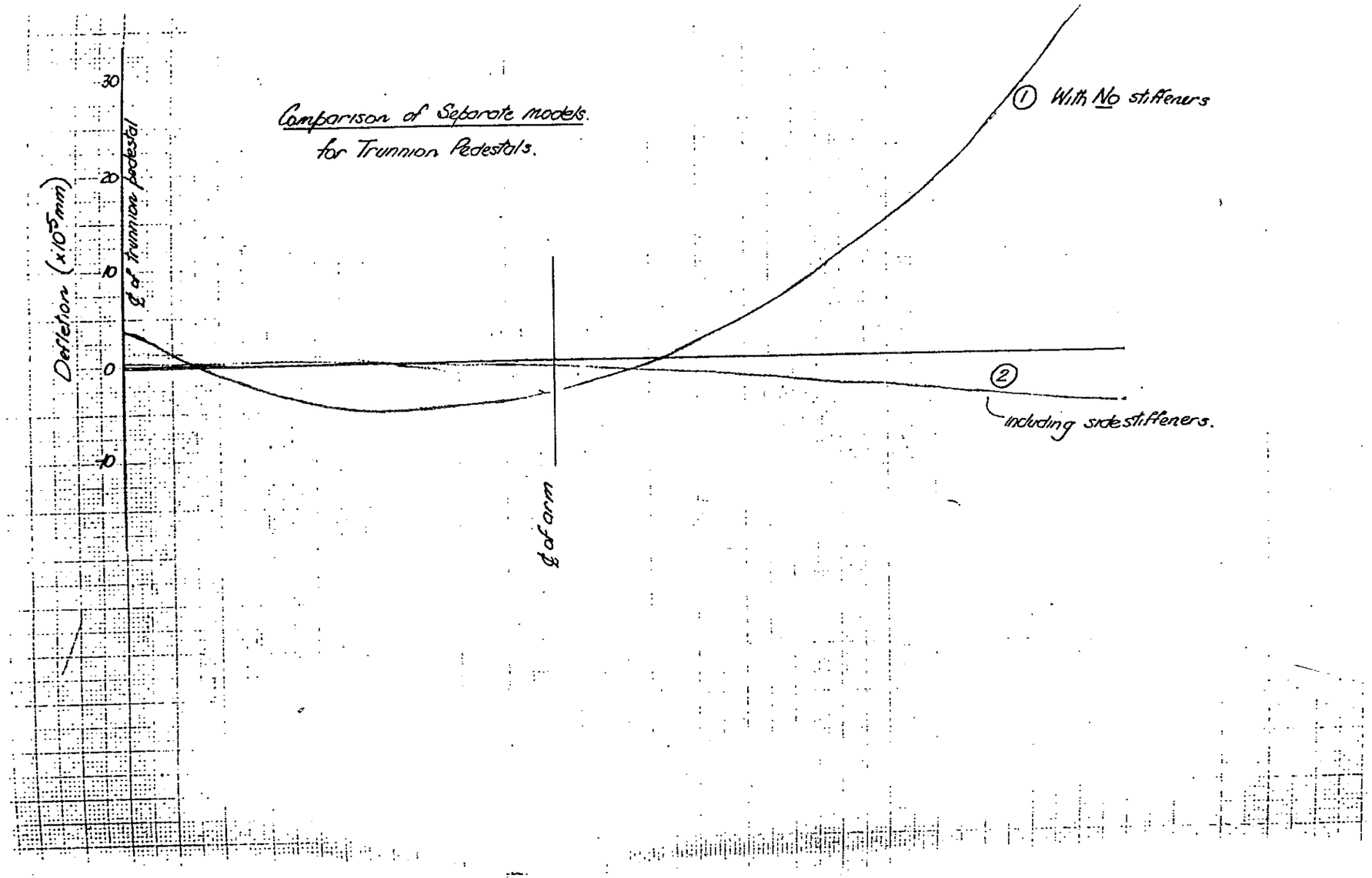
30.7.81 A1-61560 A B C D

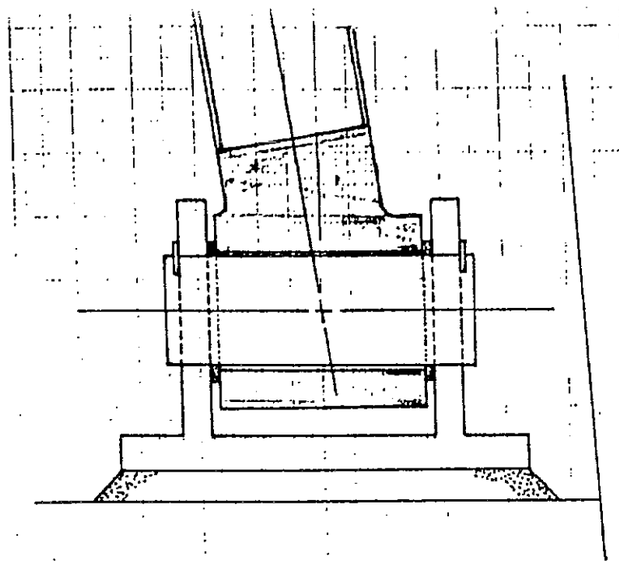


PLAN



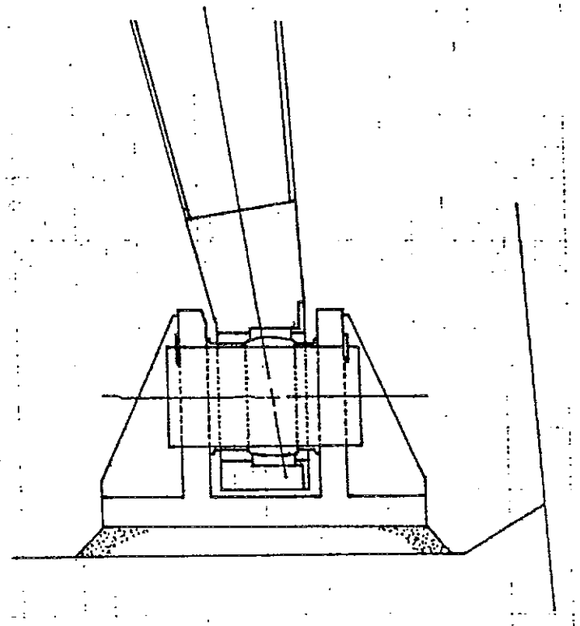
RADIAL GATE TRUNNION PEDESTAL MODEL


Comparison of Separate models.
for Trunnion Pedestals.
Deflection (x10⁻⁵mm)
30
20
10
0
-10
℄ of trunnion pedestal
℄ of arm
① With No stiffeners
②
including sidestiffeners.



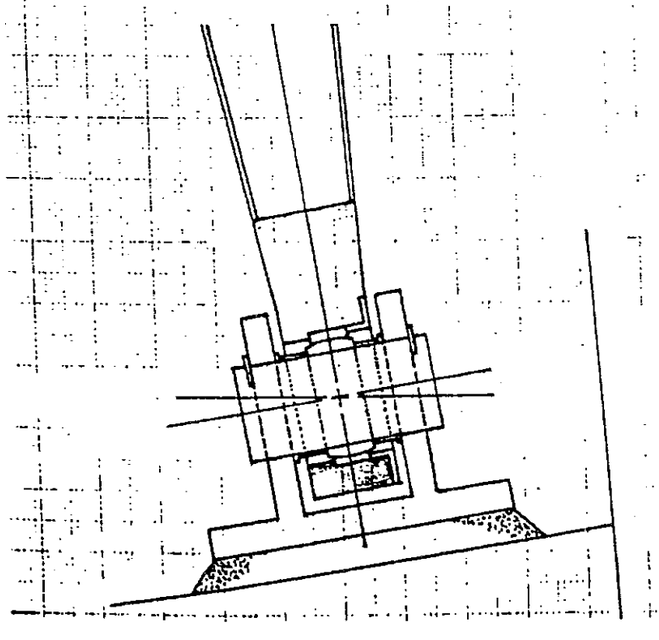
Arrangement No. 1

Cylindrical Sleeve bearing 365 mm dia x 680 mm long.



Arrangement No 2

320 mm spherical plain bearing with the trunnion axis aligned with the axis of rotation.



Arrangement No. 3

300 mm spherical plain bearing with the trunnion pin axis at 8.5 degrees to the axis of rotation.

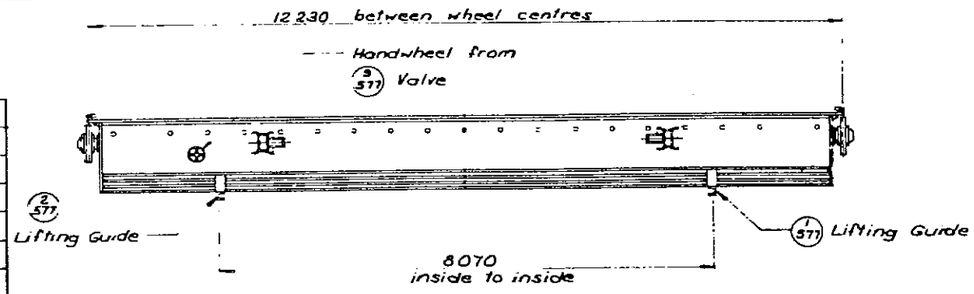
Alternative Bearing Arrangements.

A1-61575

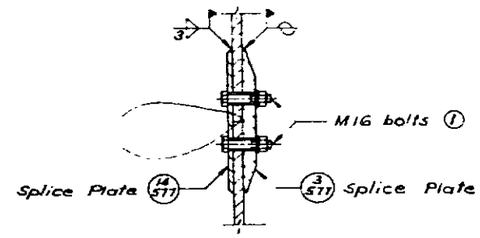
ITEM No	LOCATION	DIA	LENGTH	TYPE	THREAD LENGTH	No REQD	NUTS REQD	WASHERS REQD
8	Splice PL,10,11/577	M20	70	Galv Hex	46	32	32	32R
7	Corner of Seals	M12	60	SS Hex	30	2	2	2 R
6	Crest Seal	M12	55	SS Hex	30	81	81	81 R
5	Side Seals	M12	45	SS Hex	30	166	166	166 R
4	Side Rollers	M20	75	Galv Hex	46	24	24	24 R
3	Splice Plates 10,11,13 / 577	M20	100	Galv Hex	46	48	48	48R
2	Straps 6, 7 / 577	M20	55	Galv Hex	46	64	64	64 R
1	Splice Plates 3-5, 14-16/577	M16	70	Galv Hex	38	240	240	240 R

BOLT SCHEDULE

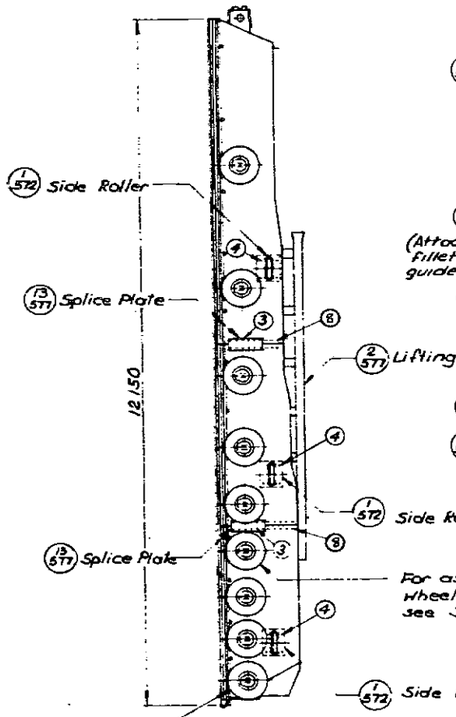
Notes:
1. All quantities are net only.
2. 'R' indicates Round Washers
3. All items are to be galvanised.
4. Item 1 - Grade 8.8 to AS 1252
   Items 2,3 & 8 - Grade 8.8 to AS 1110 - 1972
   Item 4 - Grade 4.6 to AS 1111 - 1972
   Items 5-7 - Grade 304



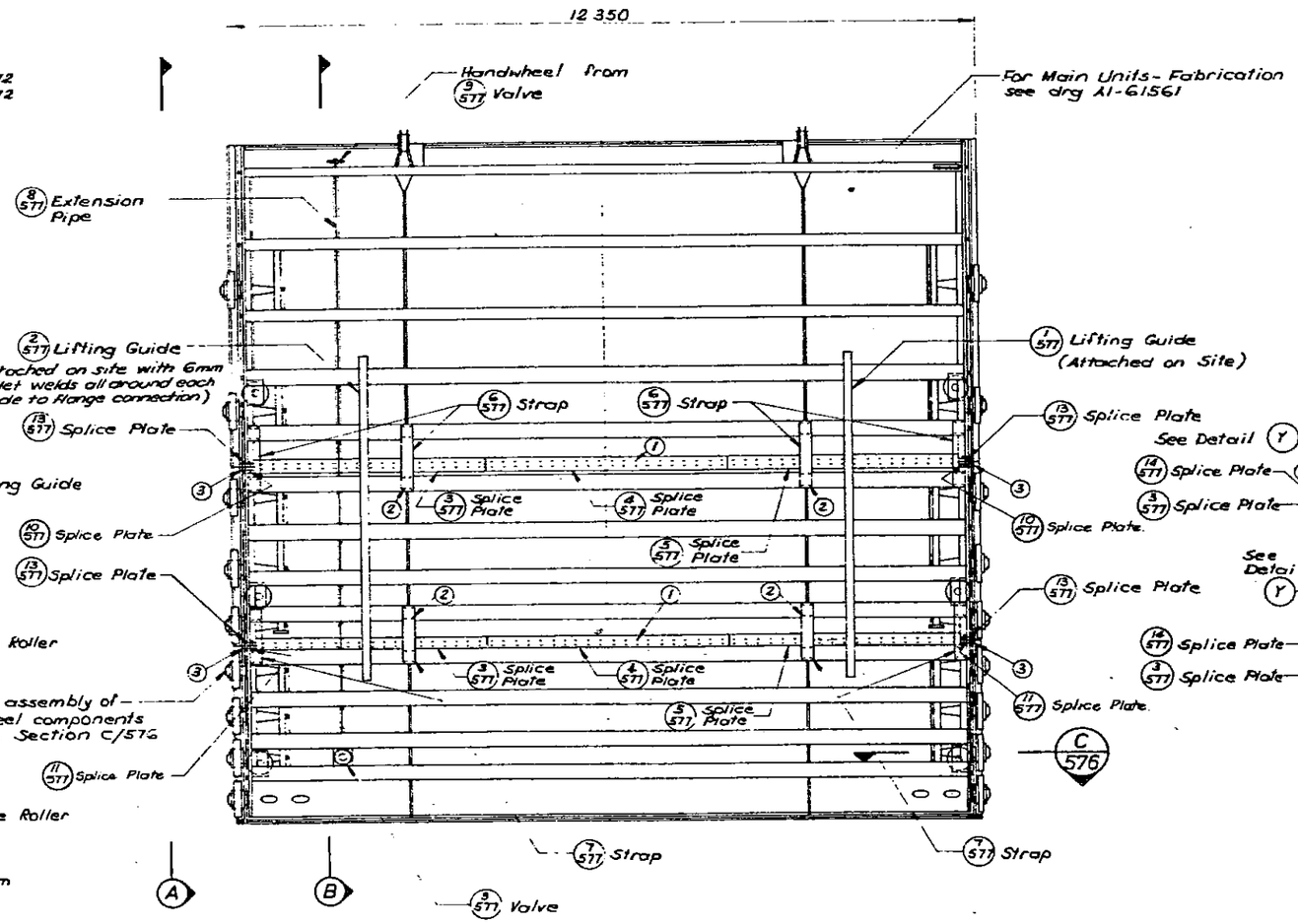
PLAN



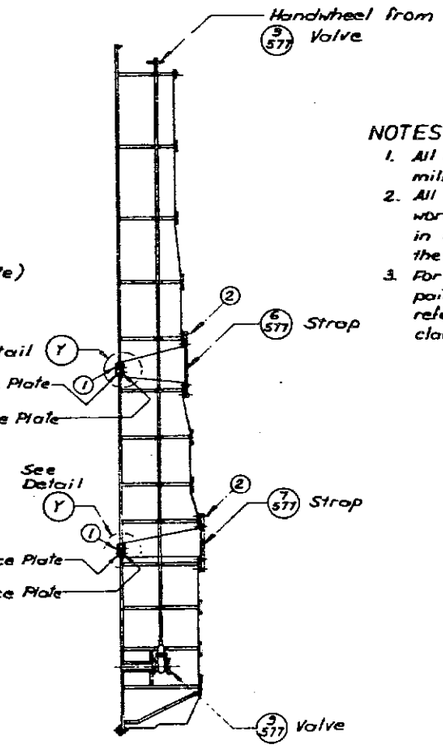
DETAIL (Y)
(Not to scale)



ELEVATION (A)



ELEVATION



SECTION (B)

Note: Lifting Guides and Lifting Points omitted for clarity.

NOTES:
1. All dimensions are in millimetres.
2. All materials and workmanship to be in accordance with the Specification
3. For surface preparation and painting requirements refer to the relevant clauses in the Specification.

Revision			
5.4.84	D	Weld deleted Detail Y	
27.3.84	C	Rear splice plates added	
22.2.84	B	Splice Plate Altered	
14.7.81	A	Weld note added to Elev.	M.J.C.
Date		Remarks	Ckd / Psd

Drawing Schedule	
A1-61578	Rubber Seals
A1-61577	Miscellaneous Items - Fabrication
A1-61573	Clamp Plates - Fabrication
A1-61572	Side Rollers - Fabrication
A1-61568	Wheel Components - Fabrication (Sh 1 of 2)
A1-61561	Main Units - Fabrication (Sh 1 of 5)
A1-61576	Assembly (Sh 2 of 2)

0 1 2 3 4 5m
(1:50)
(Scale before reduction)

CONTRACT No 2123

QUEENSLAND WATER RESOURCES COMMISSION

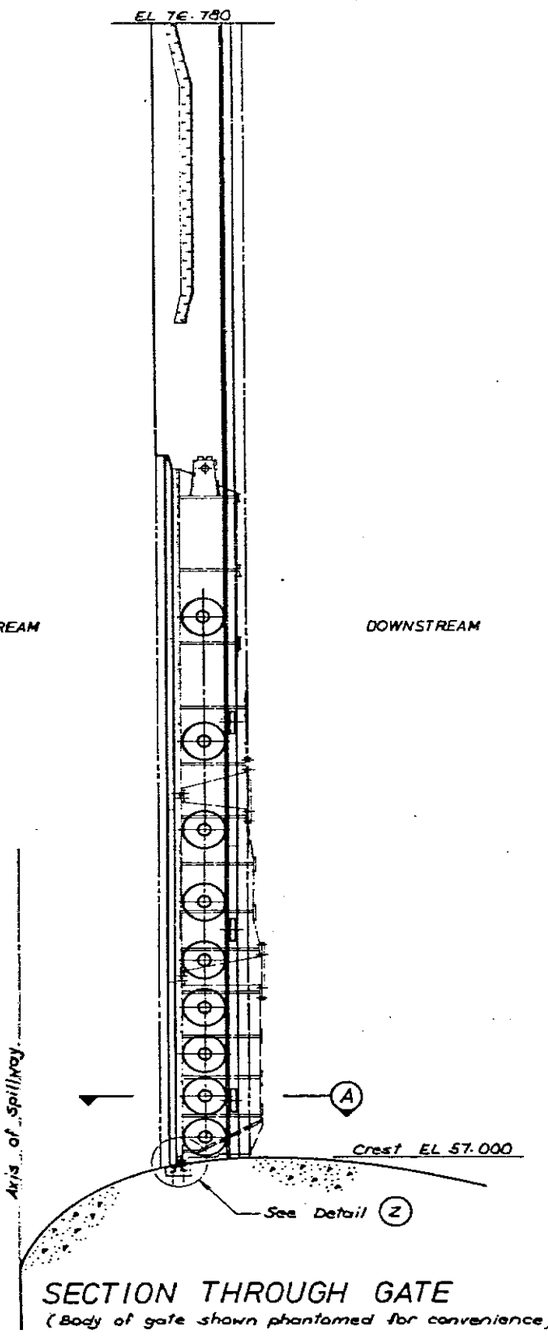
Design	Drafting	Recommended
Prep	Dr KFP	
Ckd	Ckd T.S.	Senior Engineer Designs
Supv	Supv M.J.C.	Approved
Submitted		
Executive Engineer		Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

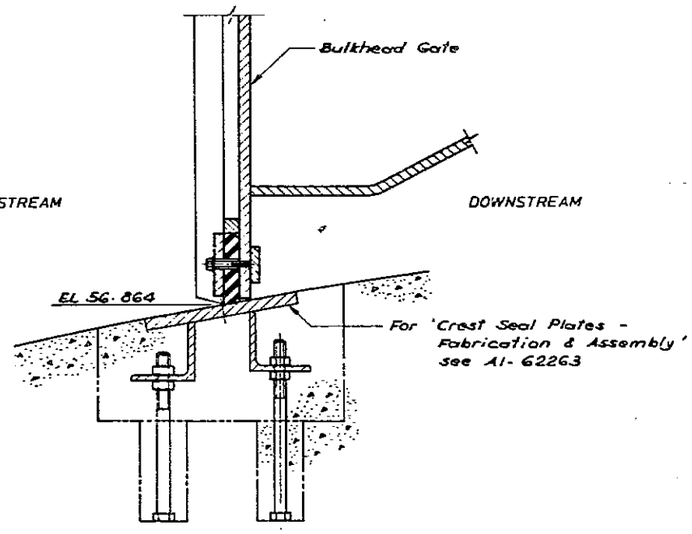
BRISBANE RIVER 150·2 km - WIVENHOE DAM

BULKHEAD GATE - ASSEMBLY

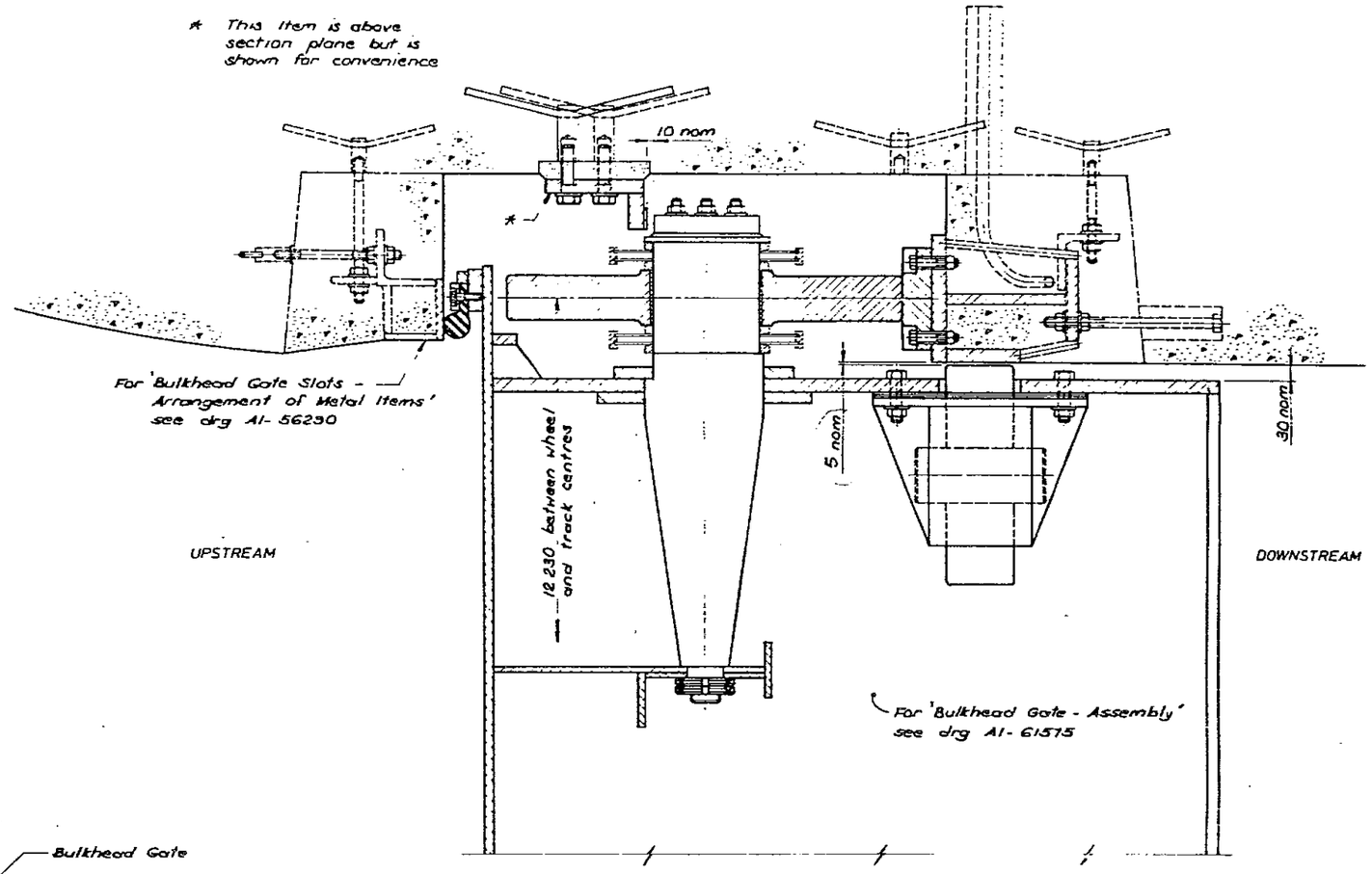
Sh 1 of 2 | 30·7·81 | A1-61575 | A B C D



SECTION THROUGH GATE
(Body of gate shown phantomed for convenience)
(Scale 'a')



DETAIL Z
Scale 'b'



SECTION A
Scale 'b'

NOTES:
1. All dimensions are in millimetres and all elevations are in metres.
2. All materials and workmanship to be in accordance with the Specification.

Revision				
16.2.84	A	Section A - Clearance		
Date		Remarks	Ckd	Psd

Drawing Schedule	
A1-56290	Bulkhead Gate Slots - Arrgt of Metal Items
A1-61575	Bulkhead Gate - Assembly (Sh 1 of 2)

Scale 'a' 0 1 2 3 4 5m (1:50)
Scale 'b' 0 100 200 300 400 500 mm (1:5)
(Scales before reduction)

CONTRACT Nº 2123

QUEENSLAND WATER RESOURCES COMMISSION

Design	Drafting
Prep	Dr. KFP
Ckd	Ckd M.J.C.
Supv	Supv M.J.C

Submitted
Executive Engineer.

Recommended
Senior Engineer Designs

Approved
Chief Designing Engineer

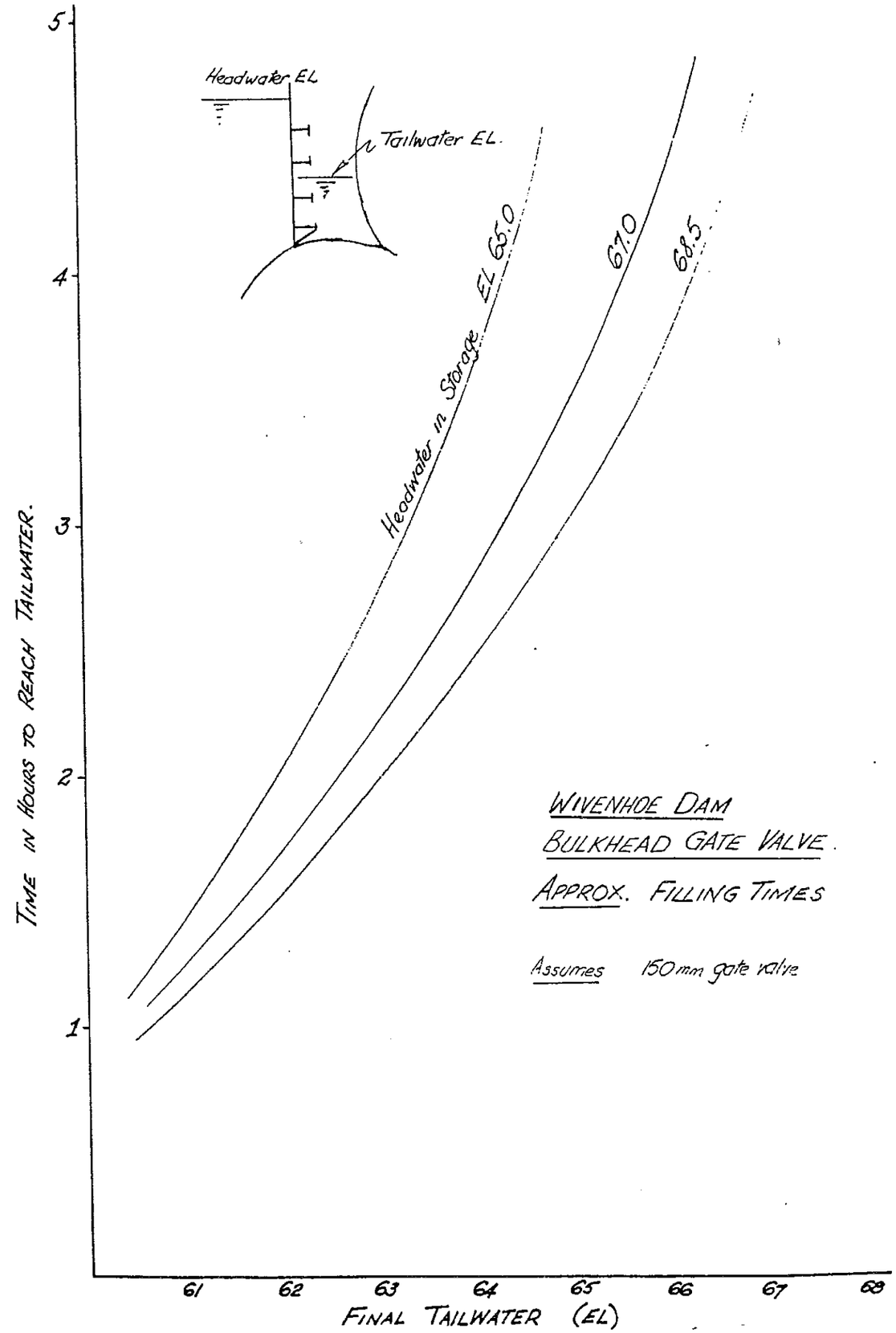
CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km - WIVENHOE DAM

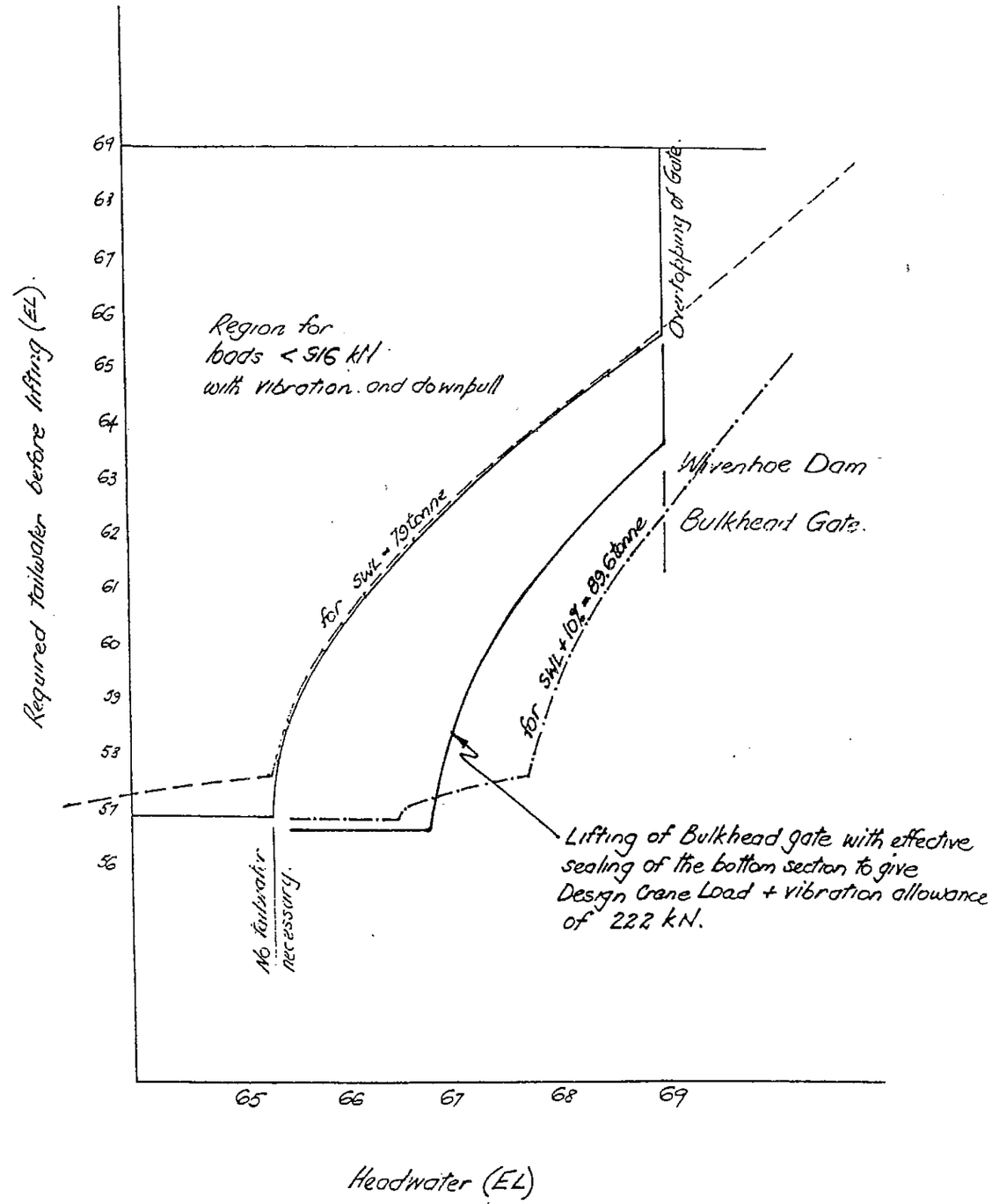
BULKHEAD GATE - INSTALLATION

19.8.81 | A1-62297 | A

INS. 1 0 2 4 6 8 10


Headwater EL
Tailwater EL.
Headwater in Storage EL 65.0
67.0
68.5
WIVENHOE DAM
BULKHEAD GATE VALVE.
APPROX. FILLING TIMES
Assumes 150mm gate valve
TIME IN HOURS TO REACH TAILWATER.
1
2
3
4
5
61
62
63
64
65
66
67
68
FINAL TAILWATER (EL)

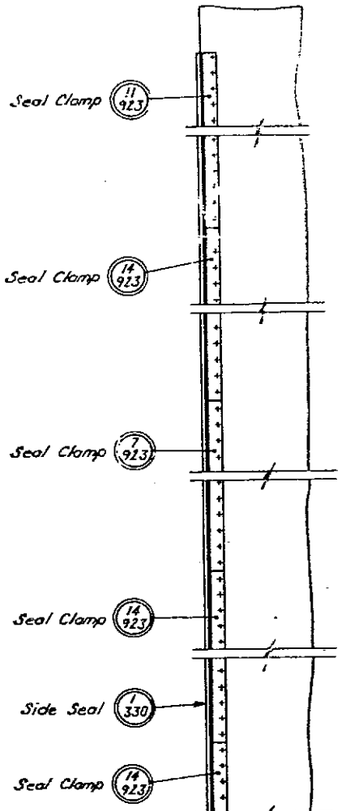
NOTE: SWL Crane = 774 kN. (79.0 tonne
SWL + 10% = 852 kN (86.9 tonne = Test Load)
— based on a gate mass 59.5 tonne (design)

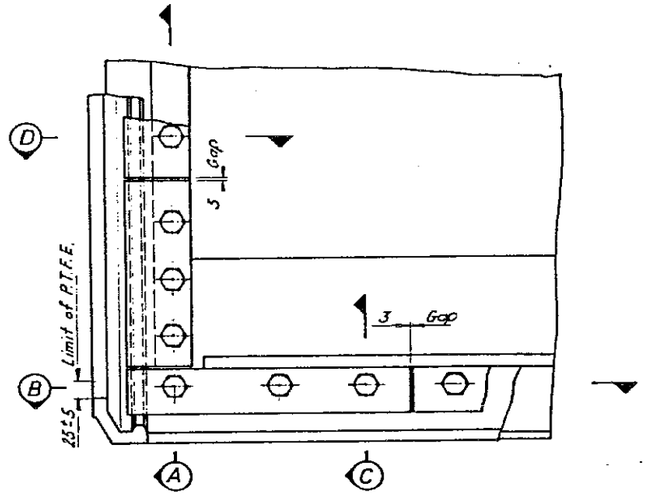


NOTE: If the hydraulic forces are eliminated i.e. there are no tailwaters
A lift with Headwater to EL 67.04 will require SWL
" " " " " EL 69.15 will require SWL + 10%
(150 mm of over-topping)

REQUIRED TAILWATERS FOR LIFTING TO ENSURE CABLE LOADS < 916 KN

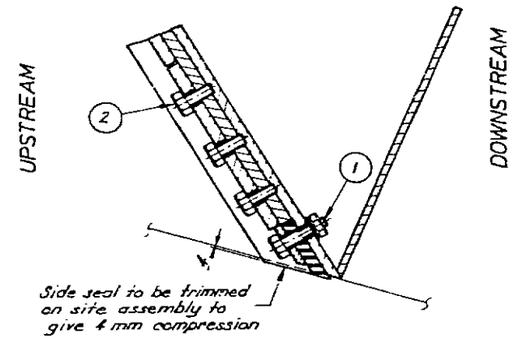
A1-61549





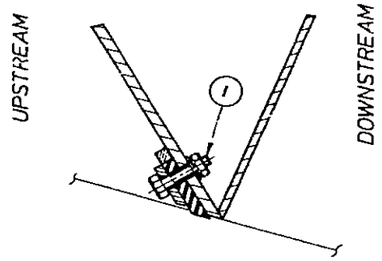
DETAIL Z

Scale 'b'



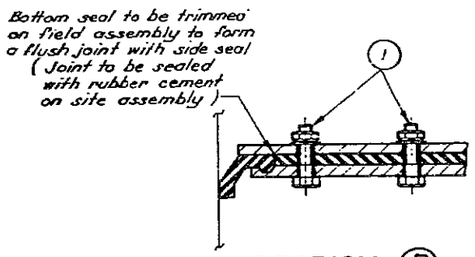
SECTION A

Scale 'b'



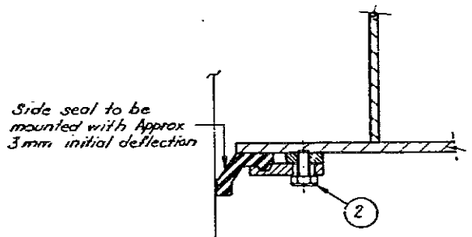
SECTION C

Scale 'b'



SECTION B

Scale 'b'

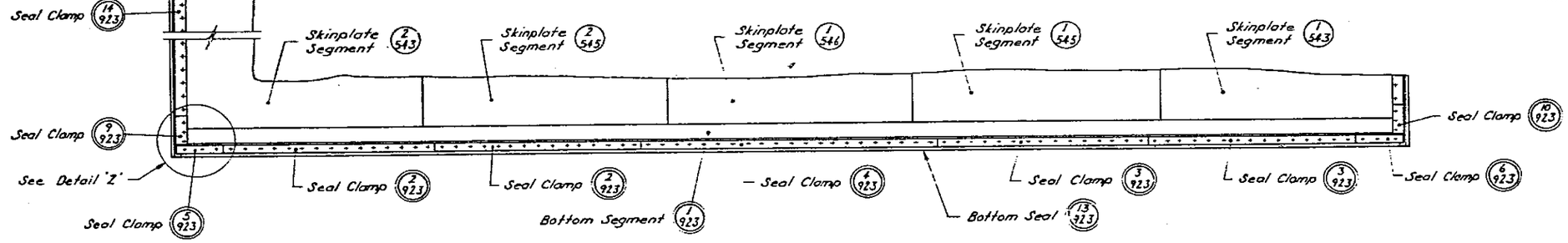


SECTION D

Scale 'b'

NOTES:

1. All dimensions are in millimetres.
2. All materials and workmanship shall be in accordance with the specification.
3. (7/923) Indicates drawing number is in a different numerical series to this drawing. See drawing schedule.
4. Joints in seals not to coincide with joints in seal clamps.
5. All joints between rubber seals to be filled with rubber cement on field assembly.
6. At joints of side sealing strips there is to be a gap of 3-6 mm. Refer to the Specification.
7. P.T.F.E. to stop 20-30 mm short of crest. Refer to the Specification.
8. Surrounds of Bolts (Item 1) to be filled with an approved caulking compound on assembly.



ELEVATION — LOOKING DOWNSTREAM

Scale 'a'

* SS bolts to be Grade 304-AS 1449-1978

BOLT SCHEDULE

ITEM Nº	LOCATION	DIA	LENGTH	TYPE	THREAD LENGTH	Nº REQD	NUTS REQD	WASHERS REQD
* 2	Side seal clamp	20	40	SS Hex Set Screw	40	950	950	950
* 1	Bottom seal clamp	20	85	" " " "	Std	435	435	435

Revision			
Date	Remarks	Ckd	Psd

Drawing Schedule	
A1-61555	Radial Gates - Arrgt Sh 1 of 2
A1-61543	Radial Gates - Skinplate Segments
A1-61546	Radial Gates - Skinplate Segments
A4-56330	Radial Gates - Side Seal
A1-60923	Radial Gates - Bottom Segment & Seal Clamps
A1-61545	Radial Gates - Skinplate Segments

Scales Before Reduction

'a' 0 500 1000 1500 2000 2500 mm (1:25)

'b' 0 100 200 300 400 500 mm (1:5)

CONTRACT Nº 2123

QUEENSLAND WATER RESOURCES COMMISSION

Design: Prep. Ckd. Supv. Submitted — Executive Engineer

Drafting: Dr. Ckd. M.J.C. Supv. M.J.C.

Recommended — Senior Engineer Designs

Approved — Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km — WIVENHOE DAM

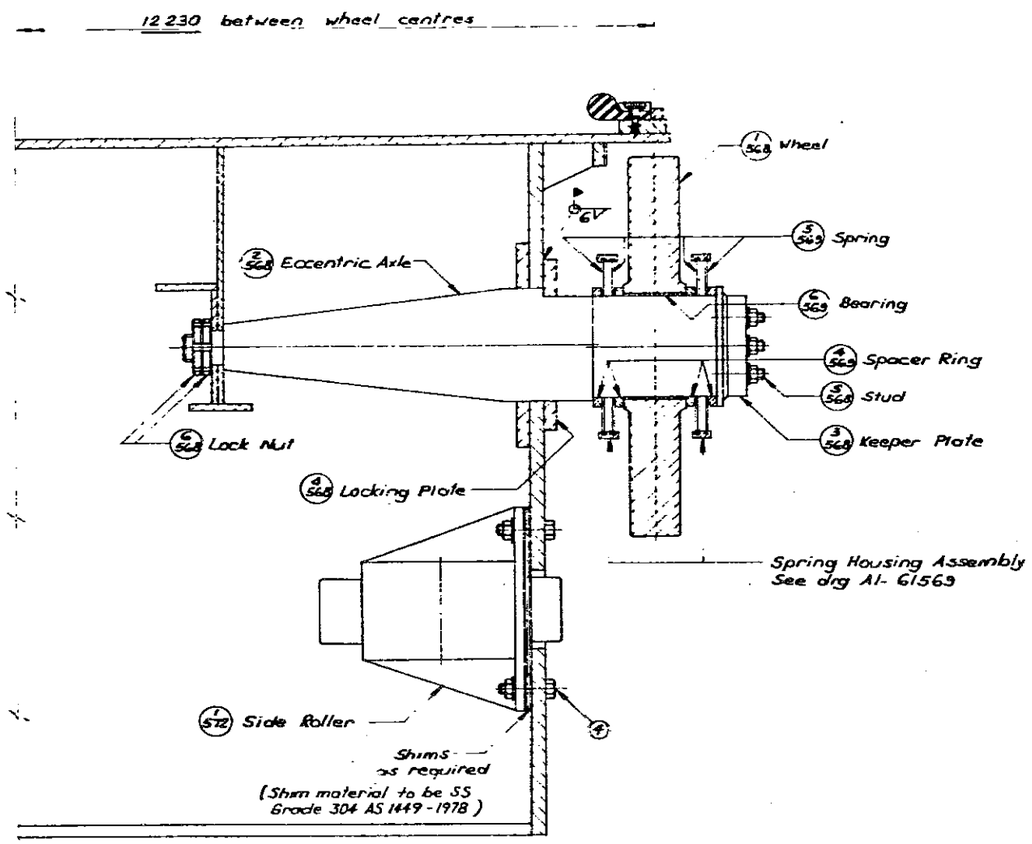
RADIAL GATE

SEAL ARRANGEMENT

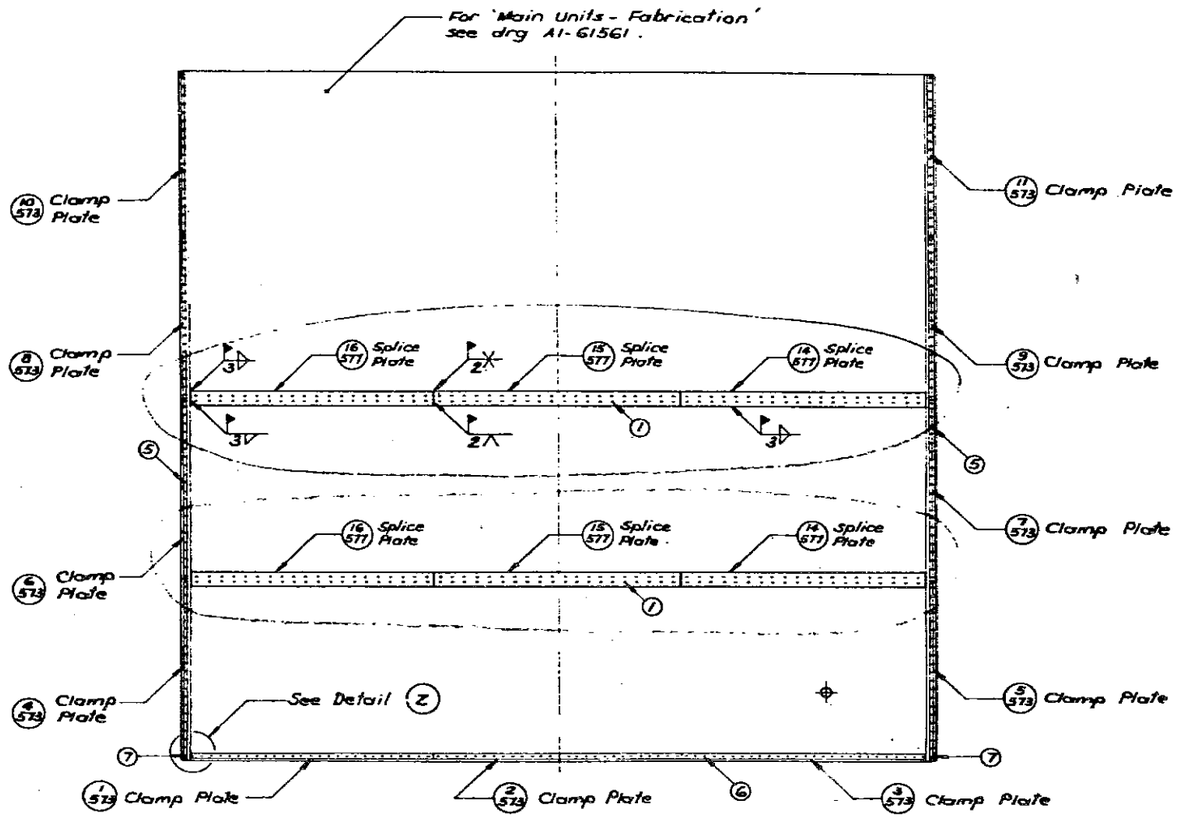
18.8.81 A1-61549

INS. 1 0 2 4 6 8 10

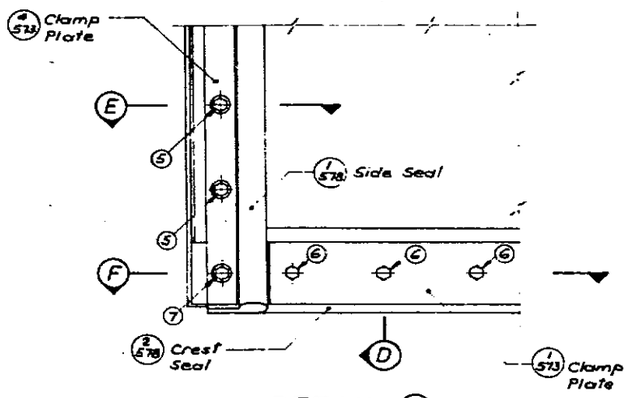
A1-61576



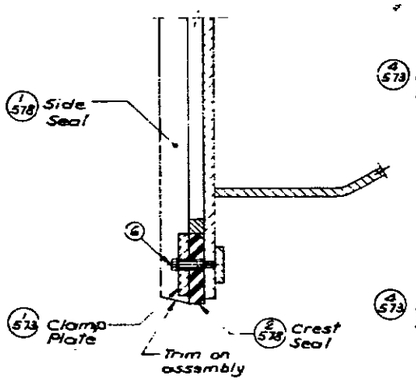
SECTION C/575
Scale 'b'



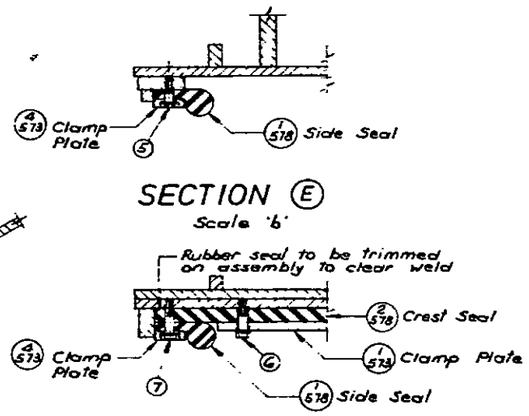
REAR ELEVATION
Scale 'a'



DETAIL Z
Scale 'b'



SECTION D
Scale 'b'



SECTION E
Scale 'b'

SECTION F
Scale 'b'

NOTES:
1. All dimensions are in millimetres.
2. All materials and workmanship shall be in accordance with the Specification.
3. For general notes see A1-61575.

FOR BOLT SCHEDULE SEE A1-61575

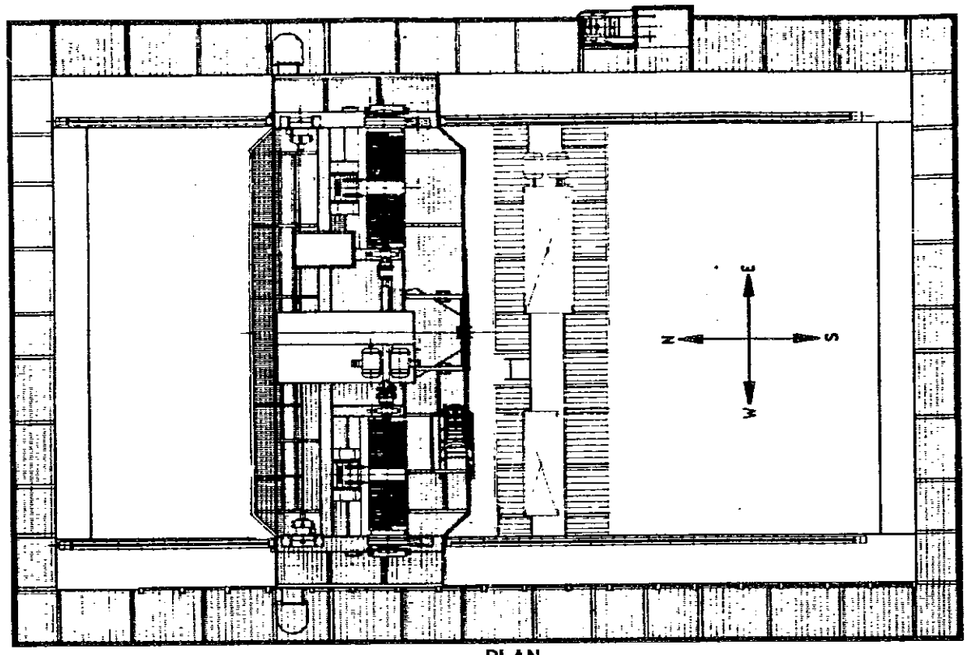
Revision					Drawing Schedule	
27.3.84	B	Rear splice plates added			A1-61559	Bulkhead and Radial Gate Arrangement
22/7/82	A	Shim noted added Sect C	M.J.C.		A1-62287	Installation
Date		Remarks	Ckd	Psd	A1-61575	Assembly (Sh 1 of 2)

Scale 'a' 0 1 2 3 4 5 m (1:50)
Scale 'b' 0 100 200 300 400 500 mm (1:5)
(Scales before reduction)

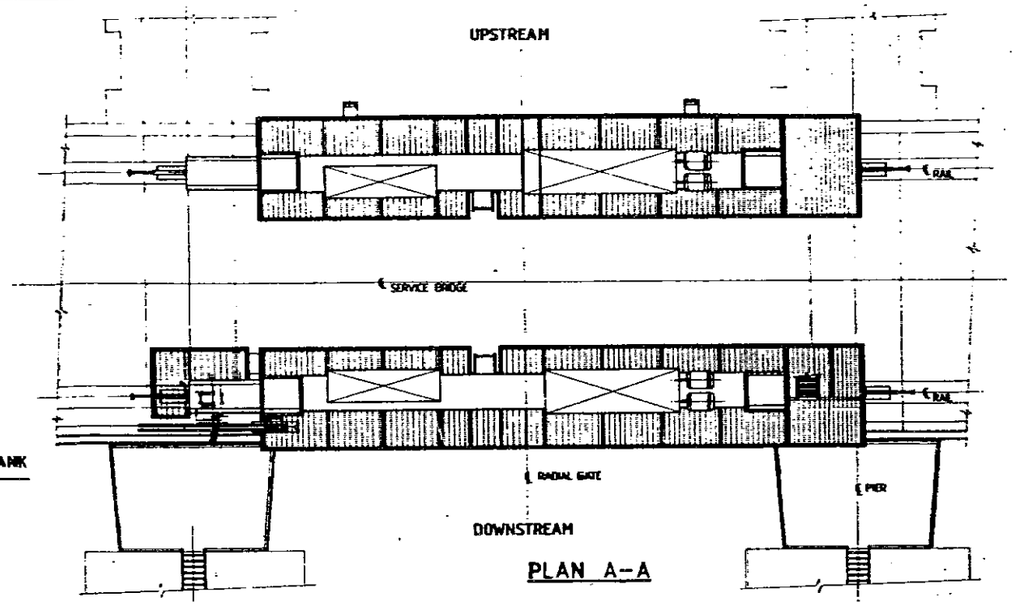
CONTRACT Nº 2123

QUEENSLAND WATER RESOURCES COMMISSION
Design: Prep. Ckd. Supv. Submitted: Executive Engineer
Drafting: Dr KFP; Ckd T.S.; Supv M.J.C.
Recommended: Senior Engineer Designs
Approved: Chief Designing Engineer

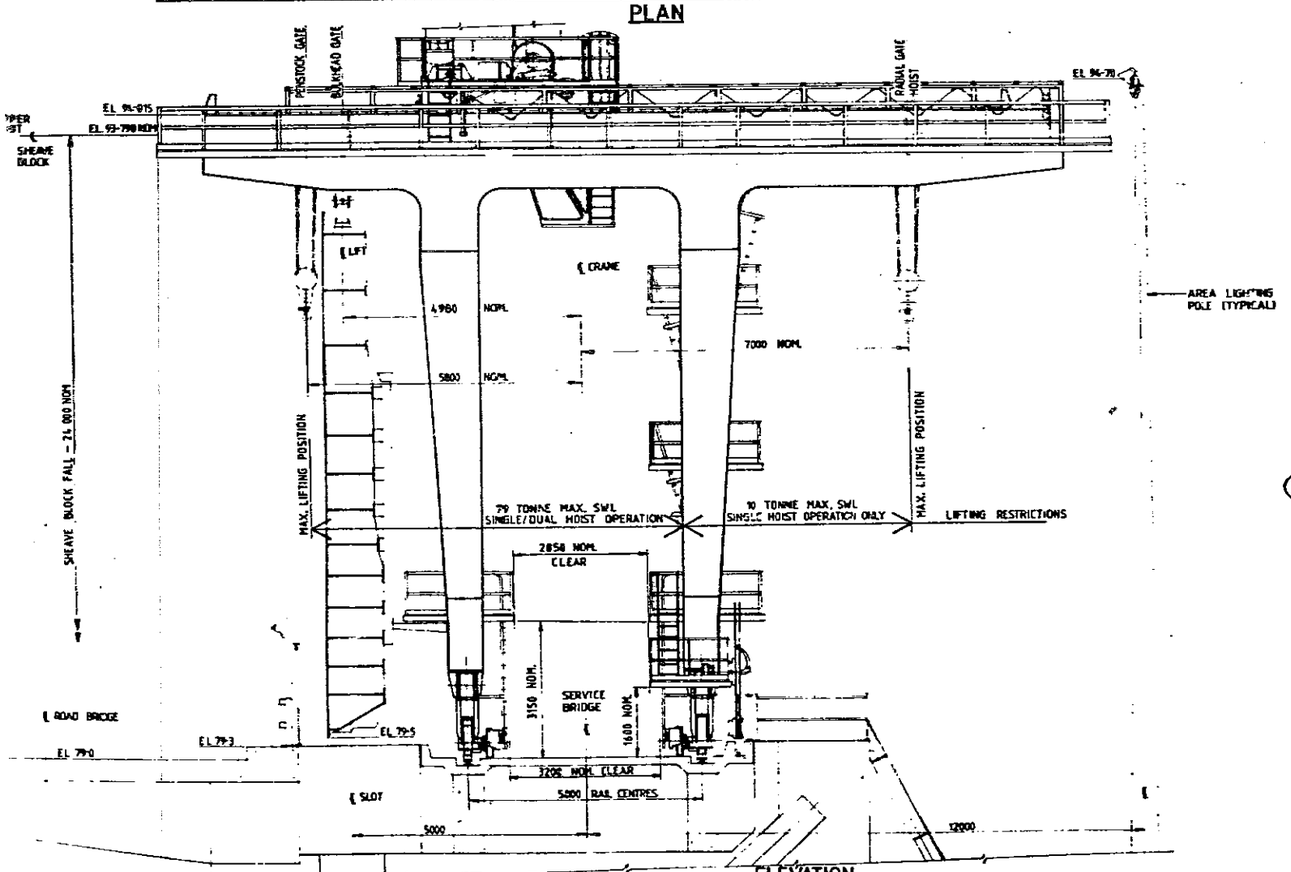
CO-ORDINATOR GENERAL'S DEPARTMENT
BRISBANE RIVER 150·2 km - WIVENHOE DAM
BULKHEAD GATE - ASSEMBLY
Sh 2 of 2 | 30·7·81 | A1-61576 | A | B



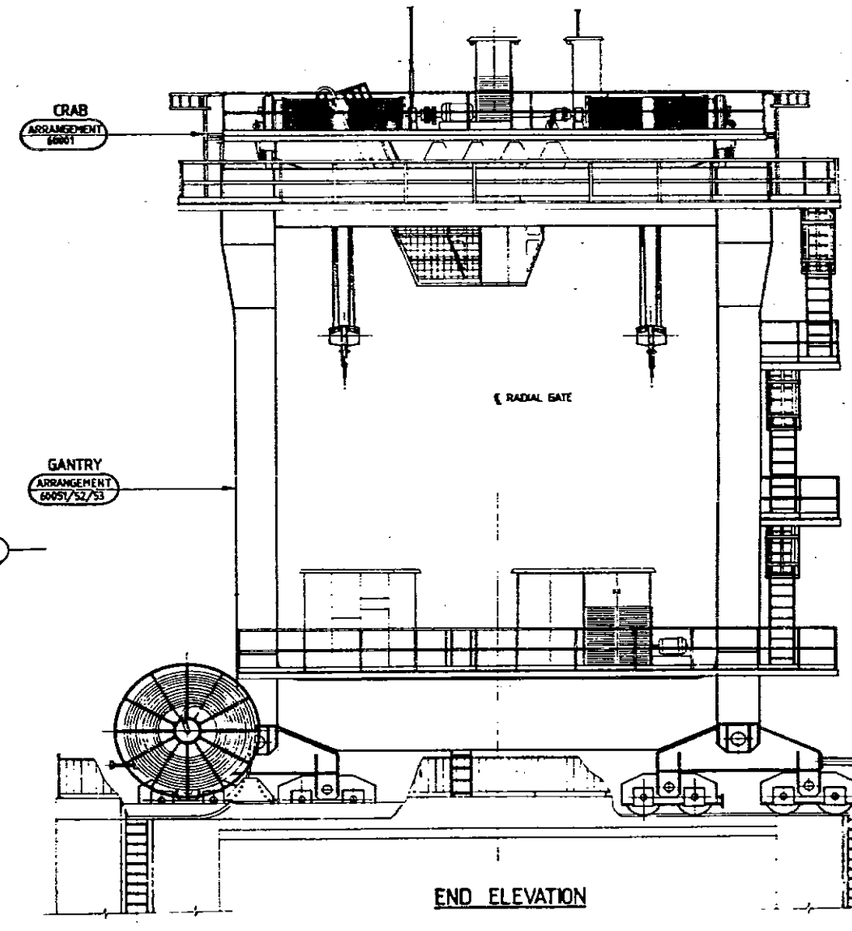
PLAN



PLAN A–A



ELEVATION



END ELEVATION

OPERATING PARAMETERS	
FUNCTION	CAPACITY
LONG TRAVEL (BRIDGE CLEARANCE wrt ℄ SPILLWAY)	L.B. 94·6 METRES R.B. 67 METRES
LONG TRAVEL SPEED	CREEP 1 METRE/min LOW 15 METRES/min HIGH 30 METRES/min
CROSS TRAVEL (BRIDGE CLEARANCE wrt ℄ SERVICE BRIDGE)	U/S 5·000 METRES D/S 7·000 METRES
CROSS TRAVEL SPEED	LOW 2 METRES/min HIGH 4 METRES/min
LIFTING RANGE (℄ SHEAVE BLOCK)	24 METRES (NOM.) (EL. 93·790 – EL. 69·790)
LIFTING SPEED DUAL HOIST	LOW 1·5 METRES/min HIGH 3 METRES/min
SINGLE HOIST	LOW 3 METRES/min MED 6 METRES/min HIGH 12 METRES/min
LIFTING CAPACITY (SWL)	
DUAL HOIST	39·5 TONNES/HOIST
SINGLE HOIST	39·5 TONNES U/S & SERVICE BRG.
SINGLE HOIST	10 TONNES D/S CANTILEVER

NOTES:

1. ELECTRICAL CABLING, HYDRAULIC PIPEWORK, COVERS, AND MINOR MECHANISMS NOT SHOWN.

DRAWING SCHEDULE	
60053	GANTRY – GENERAL ARRANGEMENT SHEET 3
60052	GANTRY – GENERAL ARRANGEMENT SHEET 2
60051	GANTRY – GENERAL ARRANGEMENT SHEET 1
60001	CRAB – GENERAL ARRANGEMENT

REVISION						
25·1·82	A	CRAB WALKWAY EXTENDED	C.E.·S			
DATE		REMARKS	ZONE	CHD	PSO	SME

SCALE: 0 1000 2000 3000 4000 5000 (1:50)
(DRAWING REDUCTION FACTORS AS NOTED)

STANDARD TOLERANCES	
> 1000	± 3.0
< 1000	± 1.5
< SURFACES	± 0.50
0.0	± 0.50
0.00	± 0.10

UNLESS OTHERWISE INDICATED

CONTRACT Nº 2132

QUEENSLAND WATER RESOURCES COMMISSION
MECHANICAL & ELECTRICAL BRANCH

DESIGN	DRAFTING	RECOMMENDED
PREP / MANAGER	DR P CLARKSON	EXECUTIVE ENGINEER I
CHD	CHD	APPROVED
SUPV	SUPV	
SUBMITTED: EXECUTIVE ENGINEER II		SENIOR ENGINEER MECH. & ELEC.

CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2Km – WIVENHOE
79 TONNE BULKHEAD GATE GANTRY CRANE
INSTALLATION – GANTRY CRANE
GENERAL ARRANGEMENT

15·8·80 | A0-60000 | A

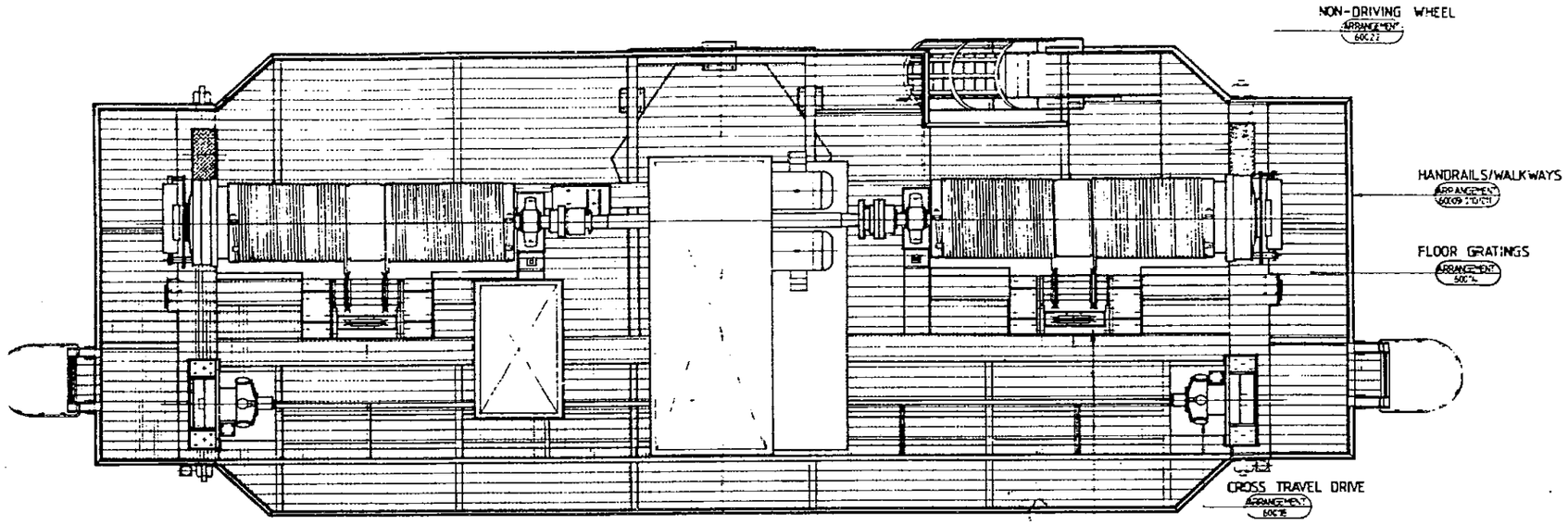
NOTES

1. ELECTRICAL CABLING, HYDRAULIC PIPEWORK, EQUIPMENT COVERS AND MINOR MECHANISMS NOT SHOWN.

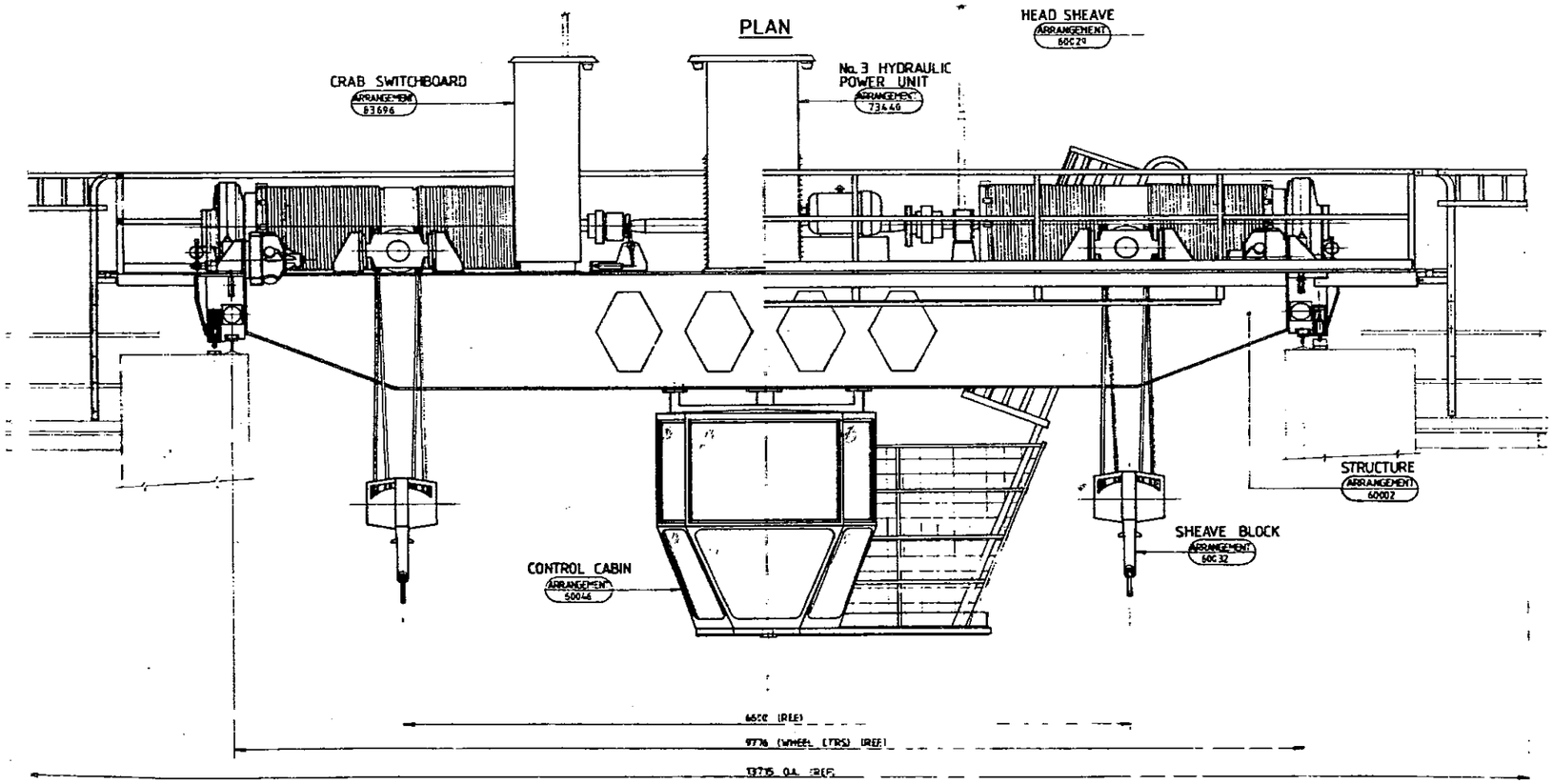
ELECTRICAL INSTALLATION — ARRANGEMENT 60104

HYDRAULIC SYSTEM INSTALLATION — ARRANGEMENT 73441

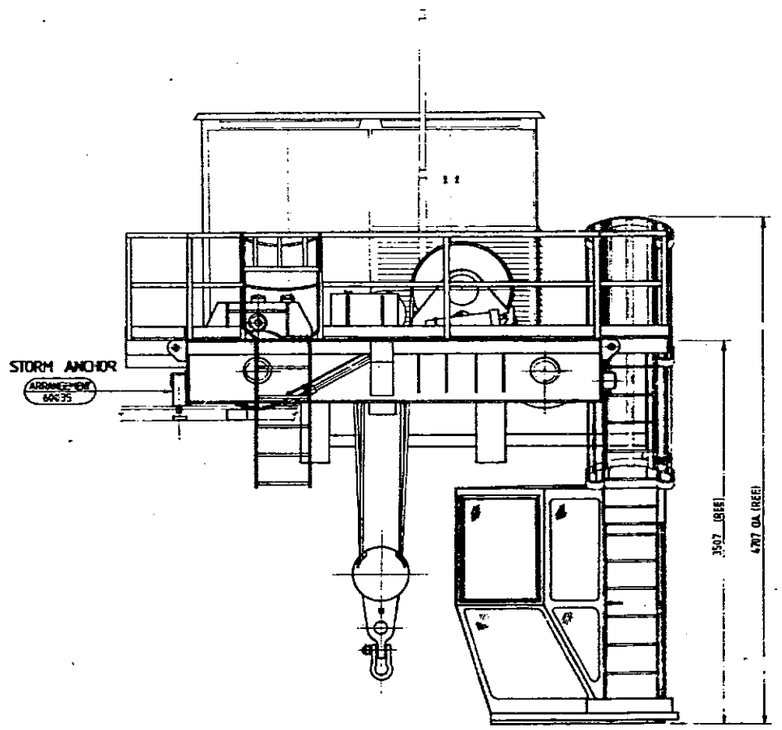
EQUIPMENT COVERS — ARRANGEMENT 60039



PLAN



ELEVATION



END ELEVATION

60032	SHEAVE BLOCK-ARRANGEMENT	
60029	HEAD SHEAVE - ARRANGEMENT	
60022	NON-DRIVING WHEEL - ARRANGEMENT	
60018	CROSS TRAVEL DRIVE - ARRANGEMENT	
60014	FLOOR GRATINGS - ARRANGEMENT	
60011	HANDRAILS/WALKWAYS - ARRANGEMENT (SHEET 3)	
60010	HANDRAILS/WALKWAYS - ARRANGEMENT (SHEET 2)	
60009	HANDRAILS/WALKWAYS - ARRANGEMENT (SHEET 1)	

DRAWING SCHEDULE

A0-60002	STRUCTURAL ARRANGEMENT
A1-83696	CRAB SWITCHBOARD - EQUIPMENT LAYOUT
A0-60104	ELECTRICAL INSTALLATION - ARRANGEMENT
A0-73440	No. 3 HYDRAULIC POWER UNIT - ARRANGEMENT
A0-73441	HYDRAULIC SYSTEM INSTALLATION - ARRANGEMENT
A0-60046	CONTROL CABIN - ARRANGEMENT
A0-60039	EQUIPMENT COVERS - ARRANGEMENT
A0-60035	STORM ANCHOR - ARRANGEMENT

REVISION				
6.12.88	B	REF DRAWINGS AMENDED	GW	
8.1.82	A	HANDRAIL EXTENDED	D.2-9	
DATE		REMARKS	ZONE	PSO / SME

SCALE: 0 500 1000 1500 2000 (1:20)

STANDARD TOLERANCES

[illegible]	± 1.0
[illegible]	± 0.5
SURFACES	± 0.50
[illegible]	± 0.10
[illegible]	± 0.10

UNLESS OTHERWISE INDICATED

CONTRACT No 2122

QUEENSLAND WATER RESOURCES COMMISSION
MECHANICAL & ELECTRICAL BRANCH

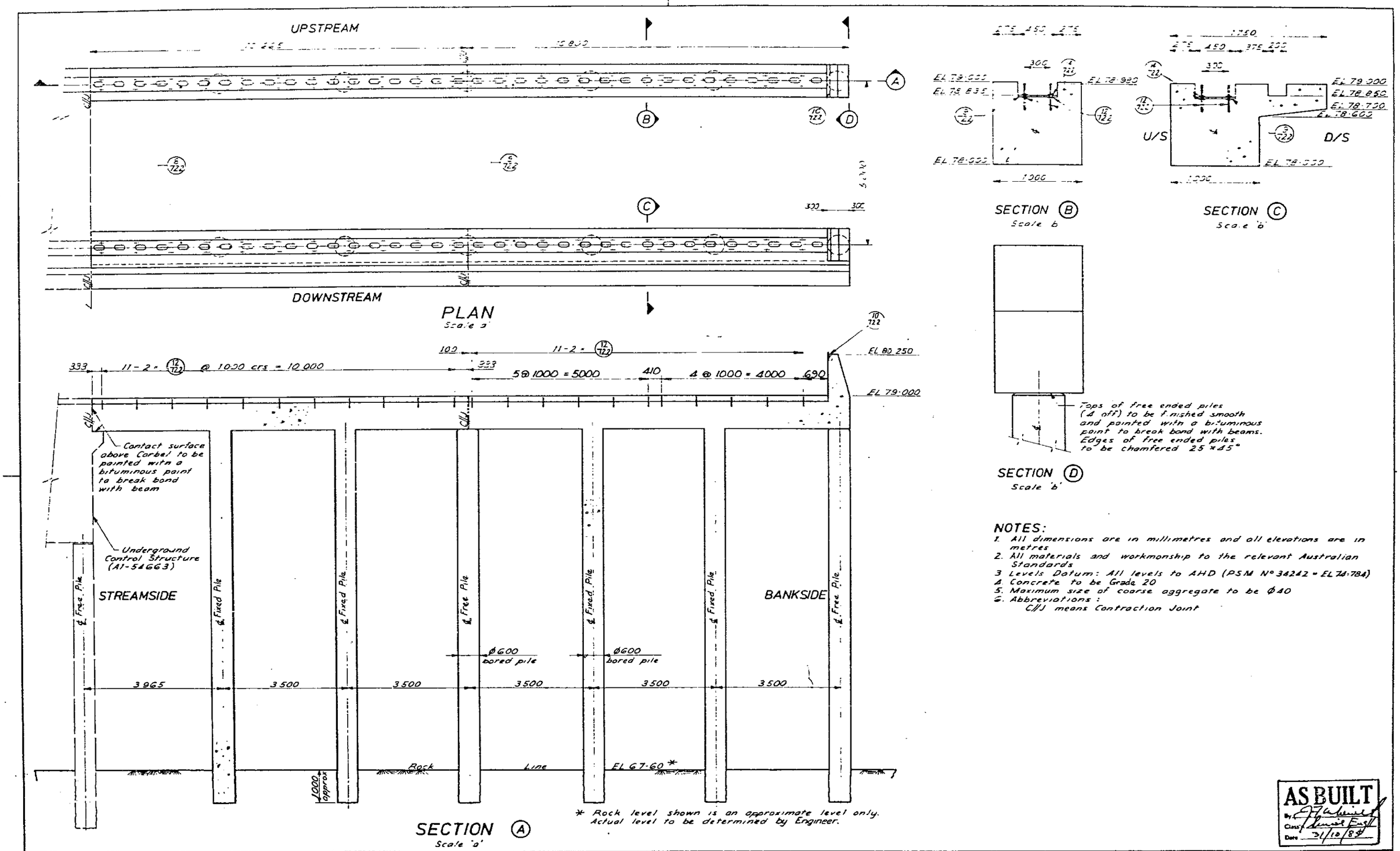
DESIGN: PREP J BRANNY
DRAFTING: DR J CLARKSON
RECOMMENDED: EXECUTIVE ENGINEER
SUBMITTED: 30/4/80 — EXECUTIVE ENGINEER
APPROVED: SENIOR ENGINEER MECHANICAL

CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2Km — WIVENHOE DAM

79 TONNE CAPACITY BULKHEAD GATE GANTRY CRANE
CRAB
GENERAL ARRANGEMENT

11-11-80 A0-60001 A B



NOTES:
1. All dimensions are in millimetres and all elevations are in metres
2. All materials and workmanship to the relevant Australian Standards
3. Levels Datum: All levels to AHD (PSM N° 34242 = EL 74·784)
4. Concrete to be Grade 20
5. Maximum size of coarse aggregate to be Ø40
6. Abbreviations:
   C/J means Contraction Joint

AS BUILT
By
Class Senior Engr
Date 31/10/85

Revision					Drawing Schedule	
Oct '85	B	'As Built				
14.10.81	A	Sect. A & Plan amded.	MJC		A1-54722	Gantry Track Beams - Metal Items
Date		Remarks	Ckd	Psd	A1-54719	Reinforcement Sheet 1 of 2

Scale 'a' 0 1000 2000 3000 4000 5000 mm (1:50)
Scale 'b' 0 500 1000 1500 2000 mm (1:20)
(Scales before reduction)

CONTRACT N° 2120

IRRIGATION AND WATER SUPPLY COMMISSION

Design	Drafting	Recommended
Prep	Dr NGA	
Ckd	Ckd GIG	Senior Engineer Designs
Supv	Supv M.J.C.	Approved
Submitted		
Executive Engineer		Chief Designing Engineer

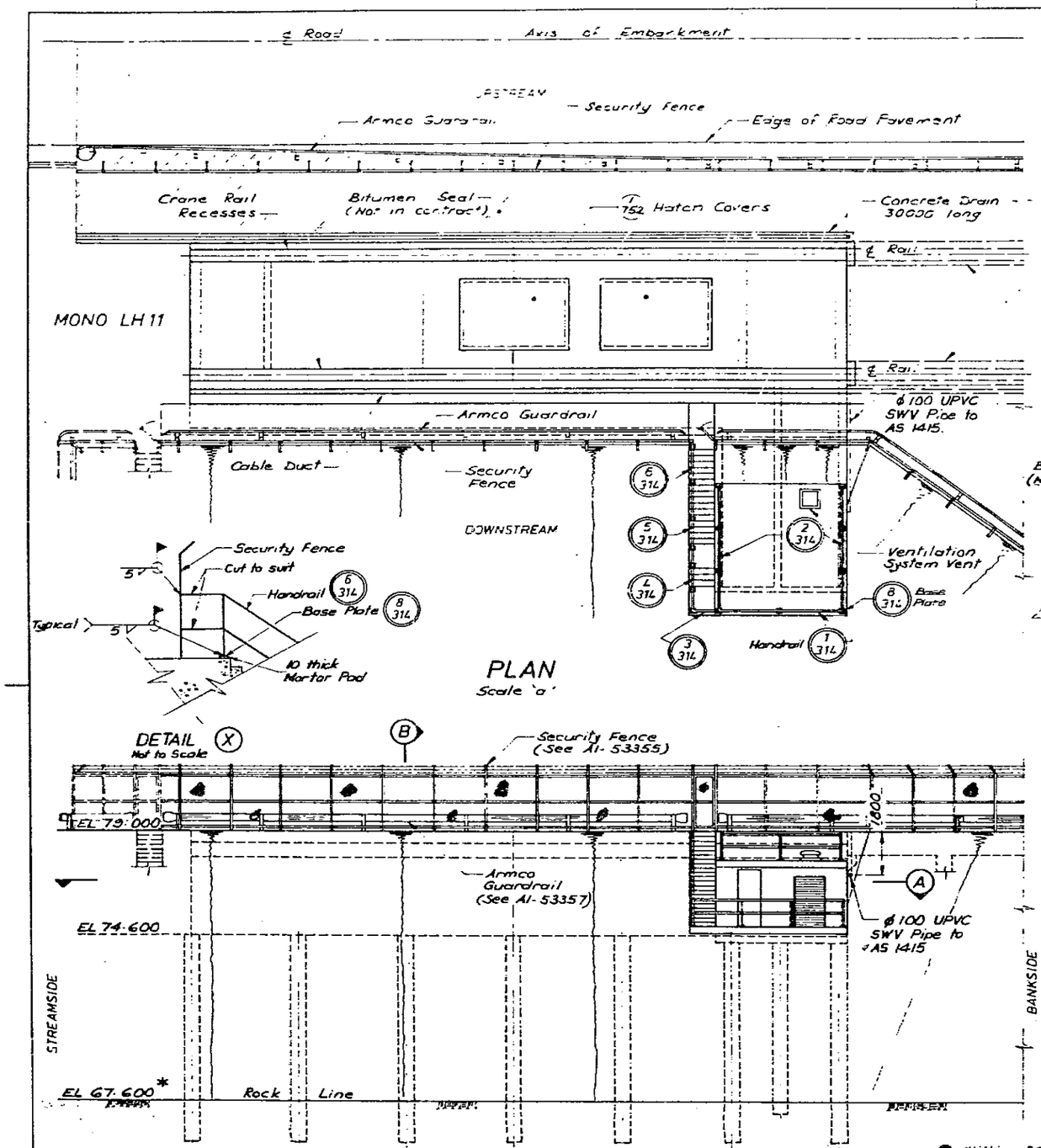
CO-ORDINATOR GENERAL'S DEPARTMENT

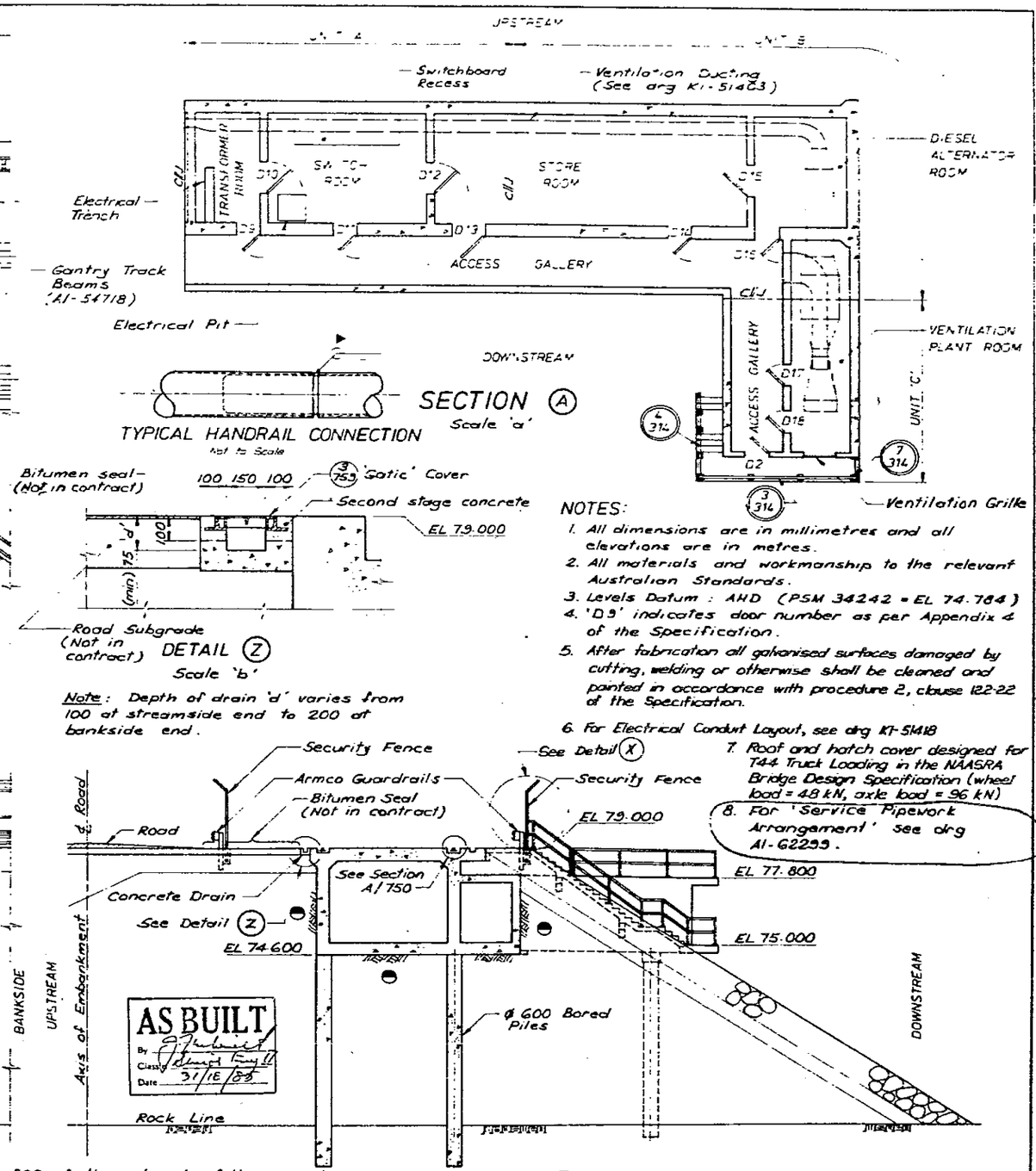
BRISBANE RIVER 150·2 km - WIVENHOE DAM
LEFT BANK — GANTRY TRACK BEAMS
CONCRETE AND ARRANGEMENT

9.12.80 A1-54718 A B

INS. 0 2 4 6 8 10
CM. 0 2 4 6 8 10 20 30

A1-54663





AS BUILT
By
Class
Date 31/12/88

NOTES:

1. All dimensions are in millimetres and all elevations are in metres.
2. All materials and workmanship to the relevant Australian Standards.
3. Levels Datum : AHD (PSM 34242 = EL 74.784)
4. 'D9' indicates door number as per Appendix 4 of the Specification.
5. After fabrication all galvanised surfaces damaged by cutting, welding or otherwise shall be cleaned and painted in accordance with procedure 2, clause 122-22 of the Specification.
6. For Electrical Conduit Layout, see drg K1-51418
7. Roof and hatch cover designed for T44 Truck Loading in the NAASRA Bridge Design Specification (wheel load = 48 kN, axle load = 96 kN)
8. For 'Service Pipework Arrangement' see drg A1-62299.

Note: Depth of drain 'd' varies from 100 at streamside end to 200 at bankside end.

* Rock level shown is an approximate level only. Actual level to be determined by Engineer.

● Within 500 of the underside of the floor and the sidewalls of the control structure, the embankment backfill should not contain hard rock particles greater than 150 in size

(2/314) indicates drawing number is in different numerical series to this drawing, refer drawing schedule.

Revision				
Oct '85	B	As Built		
12.1.82	A	Note 8 added		
Date		Remarks	Chd	Psd

Drawing Schedule

A1-62299	Left Bank Monos - Service Pipework Arrgt.
A1-56314	Left Bk Uground Control Struct. Handrail Details
A1-54750	Spillway Gantry Crane Rails - Installation & Arrgt
A1-54759	Metal Items
A1-54752	Precast RC Hatch Covers - Conc. & Reinf.
K1-51403	Ventilation System
K1-51402	Mechanical & Electrical Plant Layout
A1-54558	Concrete (Sheet 1 of 3)

Scale 'a' 0 5 10 m (1:100)

Scale 'b' 0 500 1000 mm (1:10)

(Scales before reduction)

CONTRACT Nº 2120

IRRIGATION AND WATER SUPPLY COMMISSION

Design	Drafting	Recommended
Prep	Dr KEP	
Ckd	Ckd	Senior Engineer Designs
Supv	Supv N.J.C.	Approved
Submitted		
Executive Engineer		Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km - WIVENHOE DAM

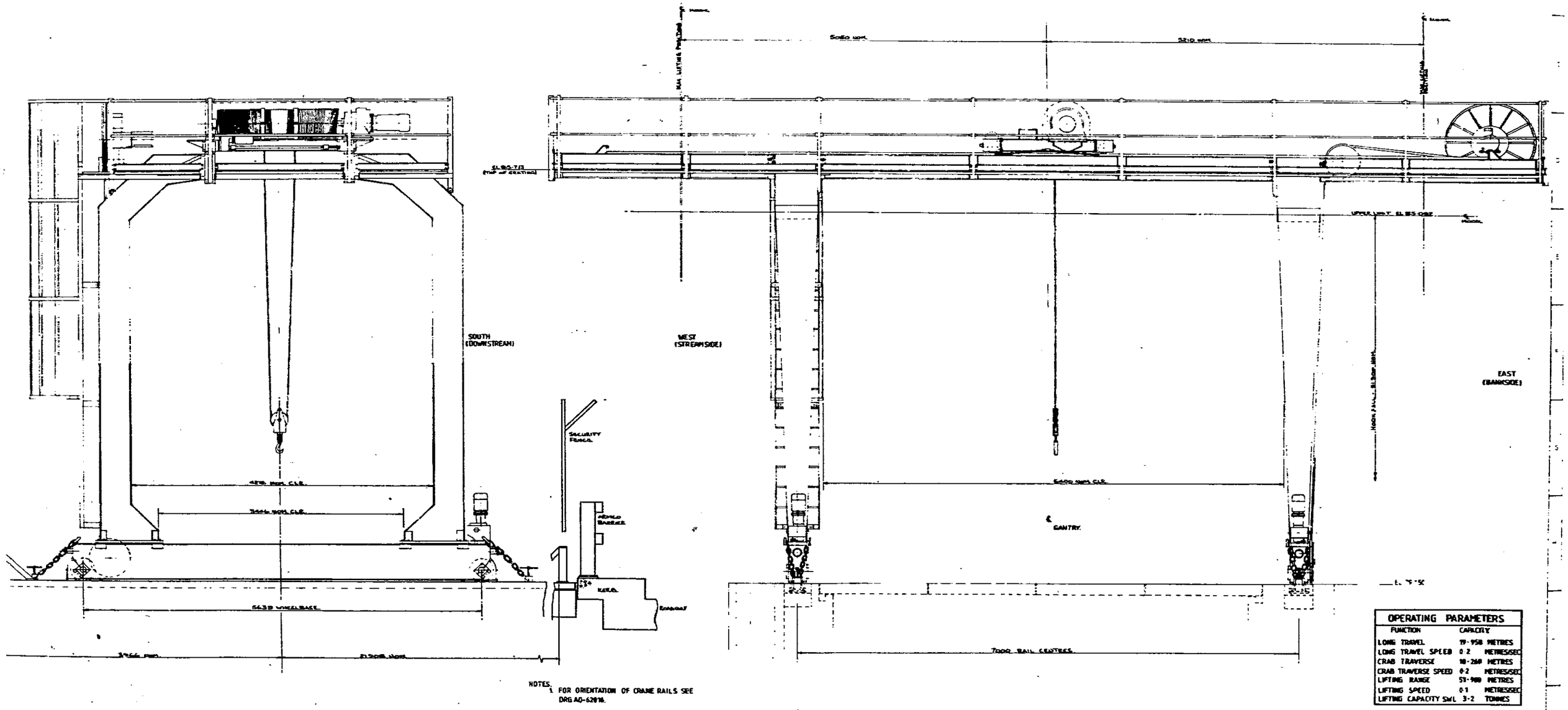
LEFT BANK - UNDERGROUND CONTROL STRUCTURE

ARRANGEMENT

9.12.80 A1-54663 A B

INS. 1 0 2 4 6 8 10

CM. 1 0 2 4 6 8 10 20 30



OPERATING PARAMETERS		
FUNCTION	CAPACITY	
LONG TRAVEL	19-958	METRES
LONG TRAVEL SPEED	0·2	METRES/SEC
CRAB TRAVERSE	18-268	METRES
CRAB TRAVERSE SPEED	0·2	METRES/SEC
LIFTING RANGE	51-900	METRES
LIFTING SPEED	0·1	METRES/SEC
LIFTING CAPACITY SWL	3·2	TONNES

GENERAL ARRANGEMENT

DRAWING SCHEDULE

REVISION

DATE	REMARKS	ZONE	CRD	PSD	SME

SCALE: 1:20

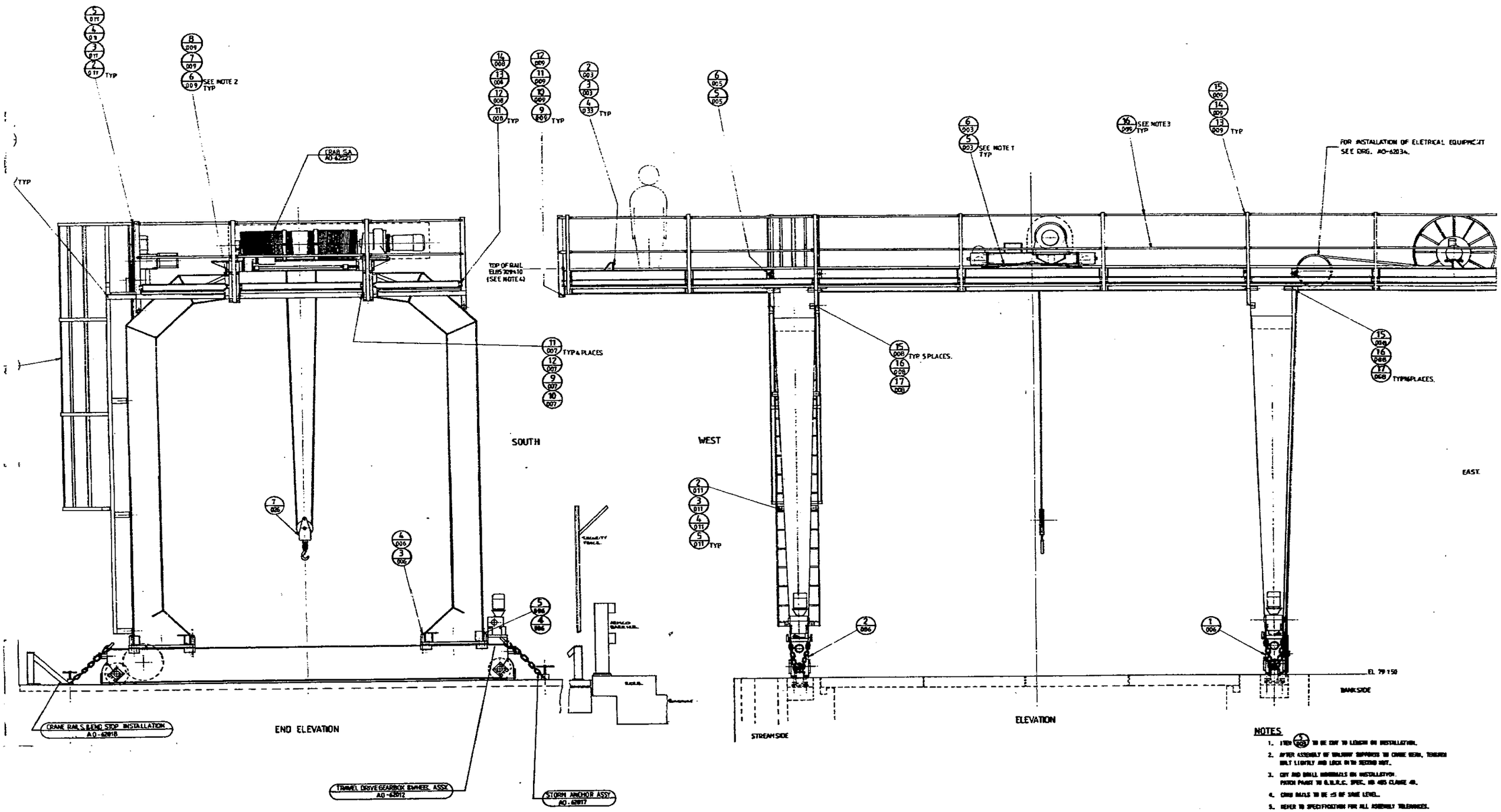
QUEENSLAND WATER RESOURCES COMMISSION
MECHANICAL BRANCH

CONTRACT No.

CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2Km—WIVENHOE DAM
3 TONNE INLET STRUCTURE GANTRY CRANE
OPERATING PARAMETERS

AO-62000



NOTES

1. ITEM (5/006) TO BE CUT TO LENGTH ON INSTALLATION.
2. AFTER ASSEMBLY OF RAILWAY SUPPORTS TO CRANE BEAM, TENSION BOLT LIGHTLY AND LOCK WITH SECOND NUT.
3. CUT AND DRILL HANDRAILS ON INSTALLATION. PATCH PAINT TO Q.W.R.C. SPEC. NO 485 CLAUSE 49.
4. CRAN RAILS TO BE ±5 OF SAME LEVEL.
5. REFER TO SPECIFICATION FOR ALL ASSEMBLY TOLERANCES.

DRAWING SCHEDULE	
A0-62004	RAILWAY DETAILS (SHEET 2)
A0-62007	RAILWAY DETAILS (SHEET 1)
A0-62008	WHEEL BEAM DETAILS
A0-62015	CRANE LINK DETAILS
A0-62024	CRANE BEAM DETAILS (SHEET 2)
A0-62033	CRANE BEAM DETAILS (SHEET 1)
A0-62001	INSTALLATION ARRANGEMENT (SHEET 2)
A0-62034	CABLE REEL & CONDUCTOR RAIL ARRANGEMENT & DETAILS
A0-62016	CRANE RAIL & END STOP DETAILS
A0-62017	STORM ANCHOR ASSEMBLY AND DETAILS
A0-62012	TRAVEL DRIVE GEARBOX & WHEEL ASSEMBLY
A0-62011	ACCESS LADDER DETAILS
A0-62010	CONTROL ARRANGEMENT DETAILS
A0-62009	RAILWAY SUPPORT DETAILS

REVISION	DATE	REMARKS	ZONE	CKD	PSD	SME
B	31-1-84	ITEM 7 ADDED	G-6			
A	30-5-83	Lengthened beam chain removed. Long travel drive altered.	H2-H6			

SCALE: 0 500 1000 1500 2000 (1:20) (DRAWING DIMENSIONS ARE IN METRES AS NOTED)

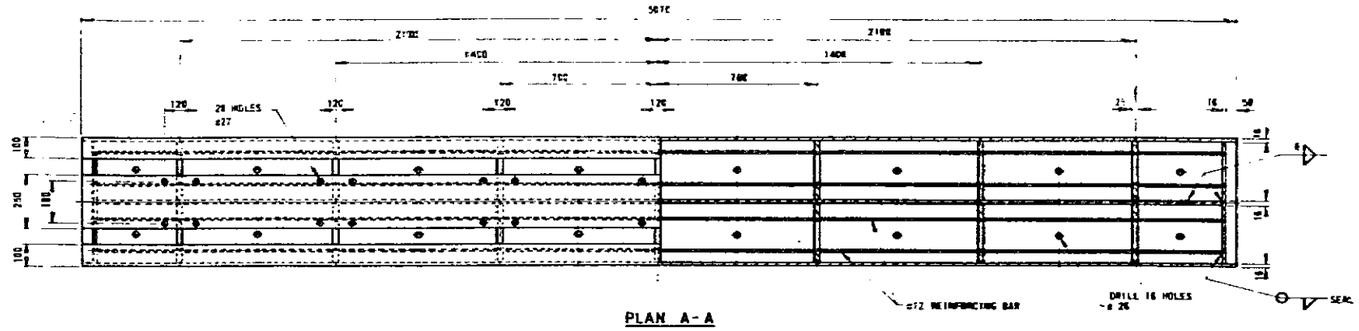
CONTRACT No

QUEENSLAND WATER RESOURCES COMMISSION

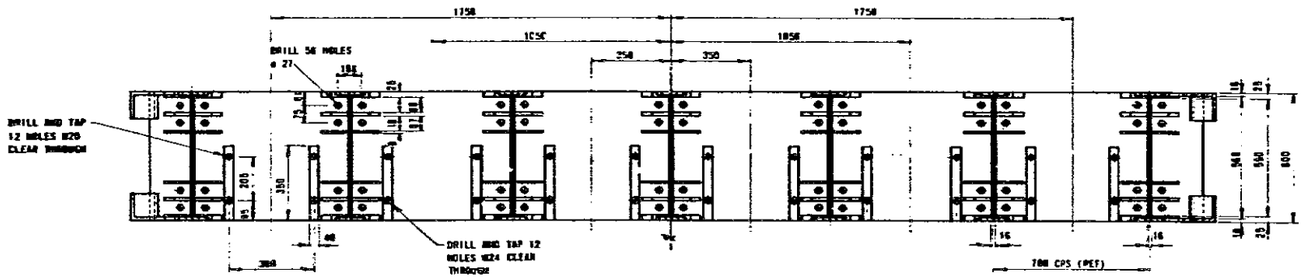
CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150-2Km-WIVENHOE DA
3 TONNE INLET STRUCTURE GANTRY CRANE
INSTALLATION ARRANGEMENT (SHEET 1

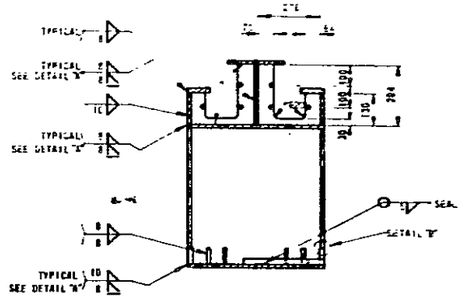
A0-62001 | A | B



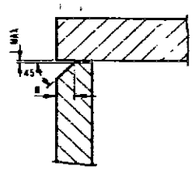
PLAN A-A



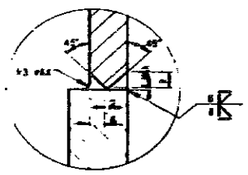
PLAN B-B



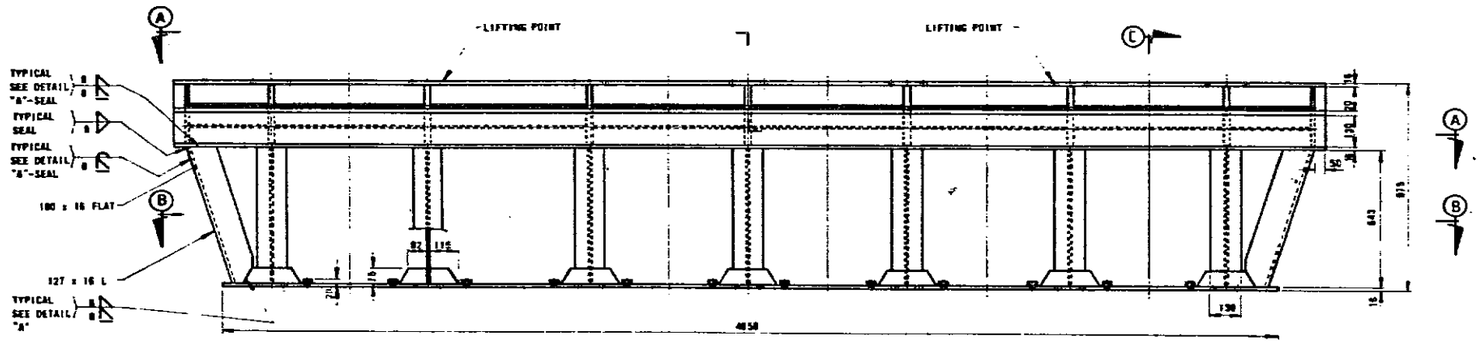
SECTION C-C



TYPICAL DETAIL "A"
SCALE :- FULL SIZE



DETAIL "B"
SCALE :- FULL SIZE



ELEVATION
ITEM 1
(APPROX SHIPPING WEIGHT - 2 TONNES)

NOTES:-

1 FOR FABRICATION NOTES SEE SPECIFICATION FOR:- MANUFACTURE, SUPPLY AND DELIVERY OF SAULE DINCH SUPPORT BEAMS FOR RIVERVIEW DAM Nº 482 (WELD IN MECHANICAL BRANCH).

2 ALL HOLES SHALL BE DRILLED AND ALL BURRS AND SHARP EDGES REMOVED. AFTER WELDING OPERATIONS ARE COMPLETE, SHARP IRREGULARITIES ON THE WELDS AND ALL WELD SLAG AND SPATTER SHALL BE GROUND OFF TO GIVE A SMOOTH, NEAT AND REGULAR APPEARANCE.

3 TOLERANCES - DIMENSIONS SHOWN SHALL HAVE A MAXIMUM TOLERANCE AS FOLLOWS:-
(a) DIMENSIONS UP TO AND INCLUDING 300mm ± 1.5
(b) DIMENSIONS OVER 300mm ± 3
(c) MBC ±½
(d) LATERAL BOW ± 5
WHERE TOLERANCES ON CENTRE LINE DIMENSIONS ARE CUMULATIVE, THE TOTAL TOLERANCE SHALL NOT EXCEED ±3

4 LIFTING POINTS - FOUR (4) EYEBOLTS COMPLETE WITH NUTS AND WASHERS ARE TO BE PROVIDED FOR LIFTING PURPOSES AND ARE TO BE INSTALLED IN HOLES AS INDICATED ON THIS DRAWING

ITEM	DESCRIPTION	QTY	MATERIAL	SPECIFICATION
1	SUPPORT BEAM	2	GALV STEEL	AS 1294 GRADE 250

MATERIAL LIST

DRAWING SCHEDULE | DRAWING SCHEDULE | REVISION | DATE | REMARKS | ZONE | CKD | PSD

SCALE: 1:10 (BEFORE REDUCTION) (OTHERS AS NOTED)

CONTRACT No.

QUEENSLAND WATER RESOURCES COMMISSION
MECHANICAL BRANCH

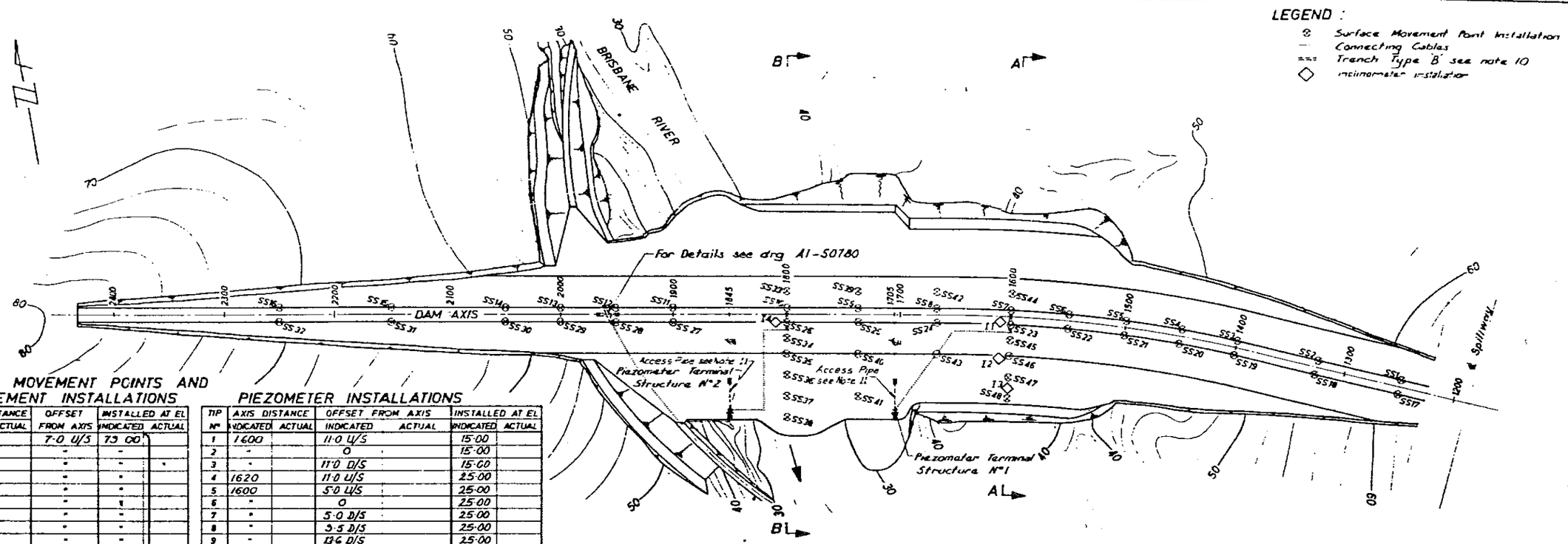
DESIGN: PREP C.G.B. CHD P.L. SUPV L.J.C.
DRAFTING: DRN G.R. CKD SUPV
SUBMITTED: ENGINEER I
RECOMMENDED: EXECUTIVE ENGINEER
APPROVED: SENIOR MECHANICAL ENGINEER

CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150-2km-WIVENHOE DAM
INLET STRUCTURE
WATER QUALITY CONTROL BALLK WINCHES
SUPPORT BEAM - DETAILS

23-11-79 | K1-51441

A1-53374



SURFACE MOVEMENT POINTS AND SETTLEMENT INSTALLATIONS

N°	AXIS DISTANCE INDICATED	AXIS DISTANCE ACTUAL	OFFSET FROM AXIS	INSTALLED AT EL INDICATED	INSTALLED AT EL ACTUAL	
SS1	1250		7·0 U/S	73·00		
SS2	1325		"	"		
SS3	1400		"	"		
SS4	1450		"	"		
SS5	1500		"	"		
SS6	1550		"	"		
SS7	1600		"	"		
SS8	1667		"	"		
SS9	1733		"	"		
SS10	1800		"	"		
SS11	1900		"	"		
SS12	1950		"	"		
SS13	2000		"	"		
SS14	2050		"	"		
SS15	2150		"	"		
SS16	2250		"	"		
SS17	1250		7·0 D/S	"		
SS18	1325		"	"		*
SS19	1400		"	"		
SS20	1450		"	"		
SS21	1500		"	"		
SS22	1550		"	"		
SS23	1600		"	"		
SS24	1667		"	"		
SS25	1733		"	"		
SS26	1800		"	"		
SS27	1900		"	"		
SS28	1950		"	"		
SS29	2000		"	"		
SS30	2050		"	"		
SS31	2150		"	"		
SS32	2250		"	"		
SS33	1800		22·0 U/S	63·00		
SS34	1800		22·0 D/S	63·00		
SS35	"		37·0 D/S	53·00		
SS36	"		57·0 D/S	43·00		
SS37	"		77·0 D/S	33·00		
SS38	"		97·0 D/S	23·00		
SS39	1733		22·0 U/S	63·00		
SS40	1733		37·0 D/S	53·00		*
SS41	1733		77·0 D/S	33·00		
SS42	1667		22·0 U/S	63·00		
SS43	1667		37·0 D/S	53·00		
SS44	1600		22·0 U/S	63·00		*
SS45	"		22·0 D/S	63·00		
SS46	"		37·0 D/S	53·00		
SS47	"		57·0 D/S	43·00		
SS48	"		77·0 D/S	33·00		

Note: Surface movement points to be as shown on drg A2-43361

PIEZOMETER INSTALLATIONS

TIP N°	AXIS DISTANCE INDICATED	AXIS DISTANCE ACTUAL	OFFSET FROM AXIS INDICATED	OFFSET FROM AXIS ACTUAL	INSTALLED AT EL INDICATED	INSTALLED AT EL ACTUAL	
1	1600		11·0 U/S		15·00		
2	"		0		15·00		
3	"		11·0 D/S		15·00		
4	1620		11·0 U/S		25·00		
5	1600		5·0 U/S		25·00		
6	"		0		25·00		
7	"		5·0 D/S		25·00		
8	"		3·5 D/S		25·00		
9	"		13·6 D/S		25·00		
10	"		8·0 U/S		35·00		
11	"		3·0 U/S		35·00		
12	"		3·0 D/S		35·00		
13	"		8·0 D/S		35·00		
14	1620		7·5 U/S		45·00		
15	1600		2·5 U/S		45·00		
16	"		2·5 D/S		45·00		
17	"		6·0 D/S		45·00		
18	"		4·0 U/S		55·00		
19	"		0		55·00		
20	"		4·0 D/S		55·00		*
21	"		3·0 U/S		65·00		
22	"		0		65·00		
23	"		42·0 U/S		32·00		
24	"		42·0 D/S		32·00		
25	1800		11·0 U/S		15·00		
26	"		0		15·00		
27	"		11·0 D/S		15·00		
28	1820		11·0 U/S		25·00		
29	1800		5·0 U/S		25·00		
30	"		0		25·00		
31	"		5·0 D/S		25·00		
32	"		3·5 D/S		25·00		
33	"		13·6 D/S		25·00		
34	"		8·0 U/S		35·00		
35	"		3·0 U/S		35·00		
36	"		3·0 D/S		35·00		
37	"		8·0 D/S		35·00		
38	1820		7·5 U/S		45·00		
39	1800		2·5 U/S		45·00		
40	"		2·5 D/S		45·00		
41	"		6·0 D/S		45·00		
42	"		4·0 U/S		55·00		*
43	"		0		55·00		
44	"		4·0 D/S		55·00		
45	"		3·0 U/S		65·00		
46	"		0		65·00		
47	1970		10·5 U/S		28·00		
48	1965		0		28·00		
49	1960		10·5 D/S		28·00		
50	●		0		●		
51	●		0		●		

TOTAL PRESSURE CELL INSTALLATIONS

N°	ORIENTATION	AXIS DISTANCE INDICATED	AXIS DISTANCE ACTUAL	OFFSET FROM AXIS INDICATED	OFFSET FROM AXIS ACTUAL	INSTALLED AT EL INDICATED	INSTALLED AT EL ACTUAL	
TP1		1620		14·5 U/S		25·00		
TP2		"		11·0 U/S		25·00		
TP3		1600		0		25·00		
TP4		"		3·5 D/S		25·00		
TP5		"		13·5 D/S		25·00		
TP6		1620		10·5 U/S		45·00		
TP7		"		7·5 U/S		45·00		
TP8		1600		0		45·00		
TP9		"		6·0 D/S		45·00		
TP10		"		9·5 D/S		45·00		
TP11		"		0		65·00		*
TP12		1820		14·5 U/S		25·00		
TP13		"		11·0 U/S		25·00		
TP14		1800		0		25·00		
TP15		"		3·5 D/S		25·00		
TP16		"		13·5 D/S		25·00		
TP17		1820		10·5 U/S		45·00		
TP18		"		7·5 U/S		45·00		
TP19		1800		0		45·00		
TP20		"		6·0 D/S		45·00		*
TP21		"		9·5		45·00		
TP22		"		0		65·00		
TP23		1960		0		28·00		
TP24		●		0		●		
TP25		●		0		●		

* REQUIRED THIS CONTRACT

Note: For definition of existing embankment see drg A1-53375

● See drg A1-50780

INCLINOMETER INSTALLATIONS

N°	AXIS DISTANCE INDICATED	AXIS DISTANCE ACTUAL	OFFSET FROM AXIS INDICATED	OFFSET FROM AXIS ACTUAL	EL ACTUAL	
I1	1600		6·5 D/S			*
I2	"		40·0 D/S			*
I3	"		68·0 D/S			
I4	1800		6·5 D/S			*

NOTES :

1. ALL DIMENSIONS AND ELEVATIONS ARE IN METRES
2. Levels Datum : All levels to AHD (PSM N° 34242 - EL 74·784)
3. Azimuth Datum : AMG
4. All installations to be carried out as per specification
5. Piezometers, Total Pressure Cells and associated tubes and wiring to be furnished and installed by the Principal but the associated protective surrounds shall be provided by the Contractor
6. Embankment Settlement and Inclinometer Installations to be furnished and installed by the Principal but the associated trenches and drilled holes and subsequent backfilling shall be provided by the Contractor
7. Surface Movement Points to be supplied and installed by the Contractor
8. Location of all embedded instruments and settlement installations to be recorded to the nearest two millimetres at the time of installation by the Engineer
9. Actual locations of instruments may vary depending on site conditions and will be determined by the Engineer
10. Trench Type 'B' (refer drg A1-50780) to be excavated to enable placement of connecting cables After placement of cables is completed trench to be backfilled with 15 MPa concrete
11. For details of Piezometer Terminal Structure access pipes refer to drg A1-56232.

FOR SECTIONS A-A AND B-B AND LOCATION OF INSTRUMENT INSTALLATIONS SEE DRG A1-53375

Revision				
13-11-79	W	Tender drg to working drg		
9-5-79	B	Contract No amended	M.J.C.	
27-7-78	A	Piezometres 47-50 TP's 23-25 added		
Date		Remarks	Ckd	Psd

Drawing Schedule	
A1-53377	Hydraulic & Electric Piezometer Tips Installation Details.
A1-50780	Right bank embankment details Sh 3 of 3
A2-43361	Measurement of Crest & Surface movement points
A1-56232	Access Pipe Arrangement
A1-43535	Inclinometer Installations
~~A1-49875~~	~~Piezometer Tip Installation Details~~
A1-53375	Left Bank - Embankment Instrumentation Sh 2 of 2

Scale 0 50 100 150 200m (1:2000 Scale Before Reduction)

CONTRACT N° 2120

IRRIGATION AND WATER SUPPLY COMMISSION

Design: Prep & Ckd. Ckd. Supv. Submitted. Executive Engineer

Drafting: Dr. Ckd. Supv.

Recommended: Senior Engineer Designs

Approved: Act Chief Designing Engineer

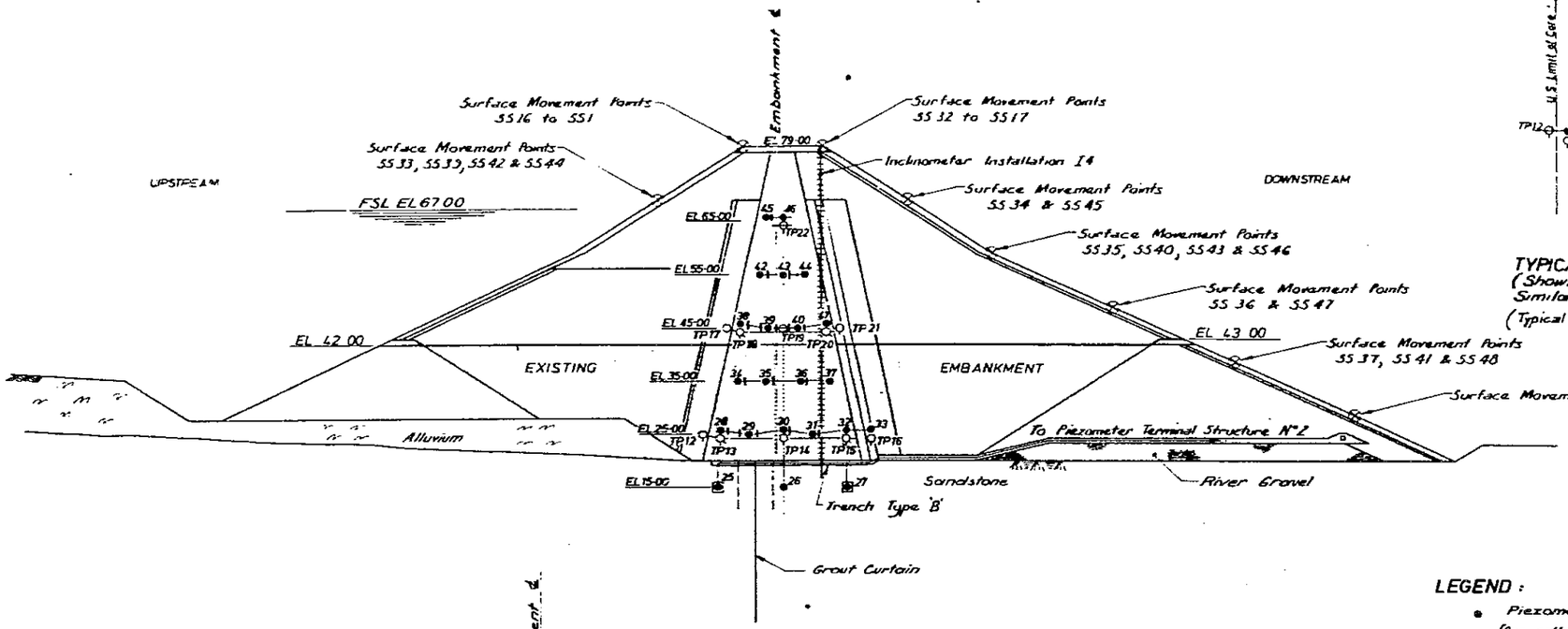
CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km - WIVENHOE DAM

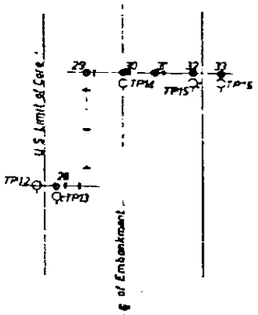
THIRD STAGE CONSTRUCTION

EMBANKMENT INSTRUMENTATION

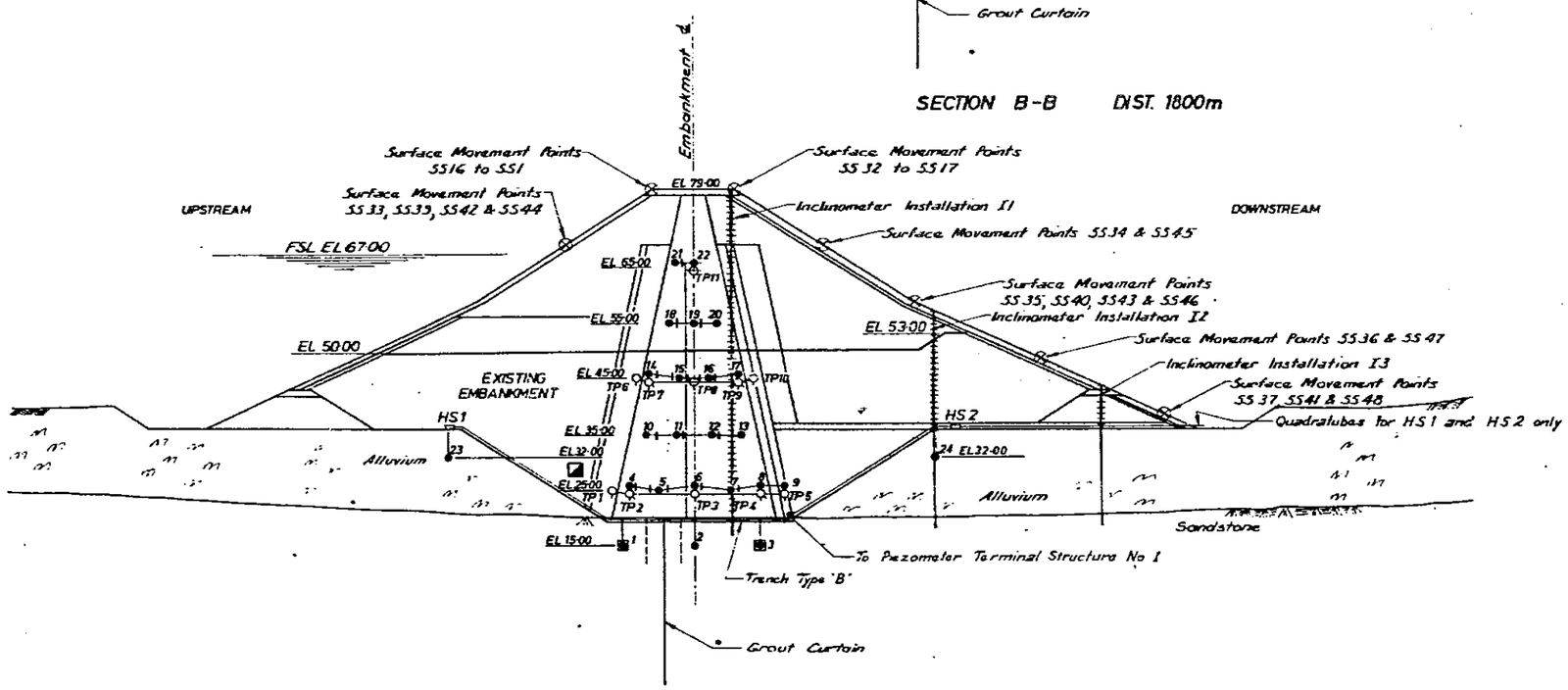
Sheet 1 of 2 | 16-6-78 | A1-53374 | A | B | W



SECTION B-B DIST. 1800m



TYPICAL SECTIONAL PLAN - DIST 1800 m
(Showing instruments @ EL 25.00
Similar arrangement @ EL 45.00)
(Typical Sectional Plan Dist 1600 m similar)



SECTION A-A DIST. 1600m

LEGEND :

- Piezometer
- (One cell installation) Total Pressure Cell
- (Two cell installation) Total Pressure Cell
- (Three cell installation) Total Pressure Cell
- Hydrostatic Settlement Gauge
- Surface Movement Point Installation
- Electric Piezometer
- Bentonite seepage Cutoff Plug (Maximum 2000 downstream from piezometer location or as directed by the Engineer)
- All electric cables to be introduced to riser at EL 25.00

NOTES:

1. ALL DIMENSIONS AND ELEVATIONS ARE IN METRES
2. For general notes see drg A1-53374

AS BUILT
By
Chk
Date 21/10/83

FOR TABULATION OF INSTRUMENT INSTALLATIONS SEE DRG A1-53374

Revision				
Oct '85	B	As Built		
2-9-75	W	Tender drg to working drg		
7-5-79	A	Contract Number Amended	M.J.C.	
Date		Remarks	Chd	Psd

Drawing Schedule

A1-50780	Right Bank Embankment Details Sh 3 of 3
A1-50789	Right Bank Embankment Details. Sh 1 of 3.
A1-53374	Left Bank - Embankment Instrumentation (Sh 1 of 2)

Scale 0 10 20 30 40 50 m (1:500 scale before reduction)

CONTRACT N° 2120

IRRIGATION AND WATER SUPPLY COMMISSION

Design	Drafting
Prep A.E.W.C.	Dr JTK
Chd	Chd
Supv	Supv

Submitted
Executive Engineer

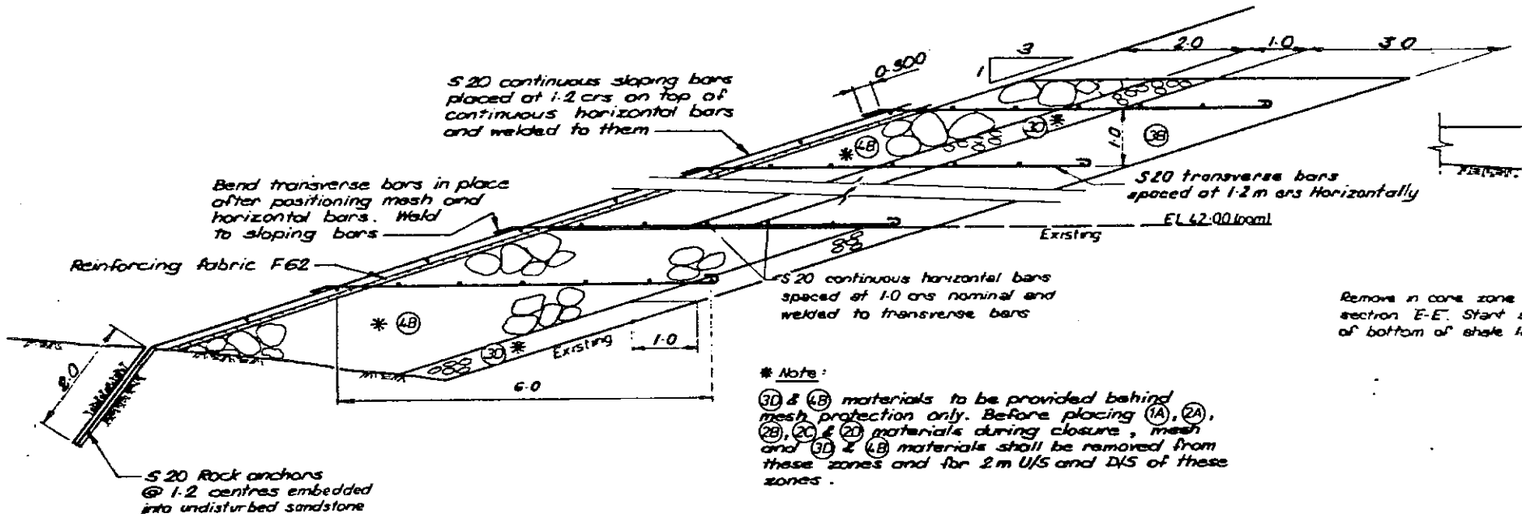
Recommended
Senior Engineer Designs
Approved
Act Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150.2 km - WIVENHOE DAM
THIRD STAGE CONSTRUCTION
EMBANKMENT INSTRUMENTATION

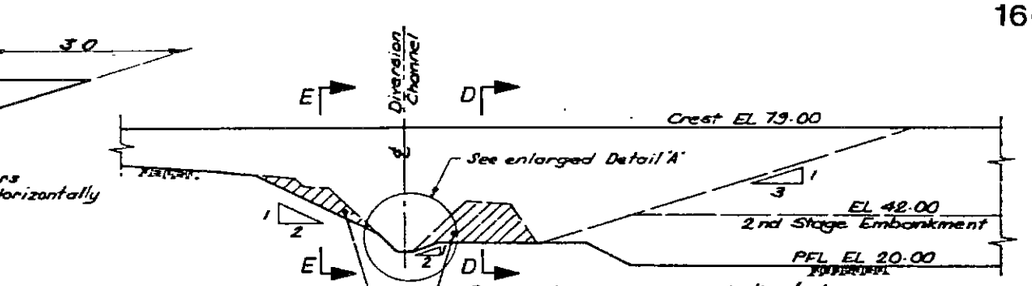
Sheet 2 of 2 | 16-6-78 | A1-53375 | A | W | B

INS. 0 2 4 6 8 10

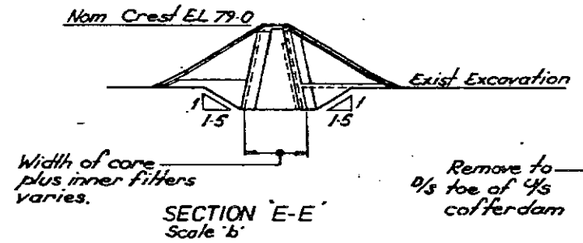


* Note:
(3D) & (4B) materials to be provided behind mesh protection only. Before placing (1A), (2A), (2B), (2C) & (2D) materials during closure, mesh and (3D) & (4B) materials shall be removed from these zones and for 2 m U/S and D/S of these zones.

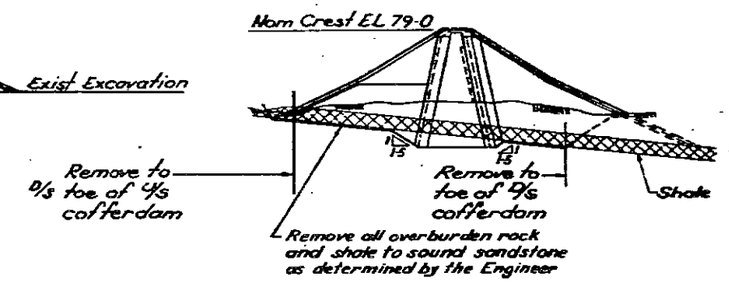
SECTION B-B (AI-50779)
Scale 'a'
(See also drg AI-56108)



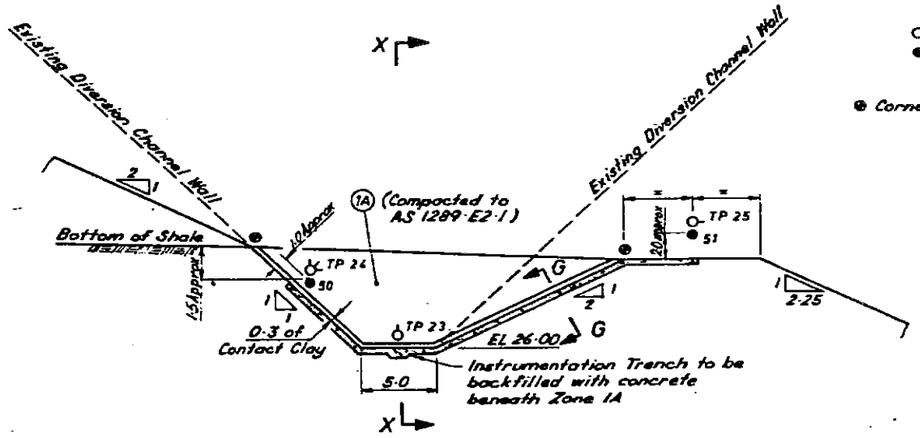
SECTION C-C (AI-50781)
Scale 'b'



SECTION 'E-E'
Scale 'b'

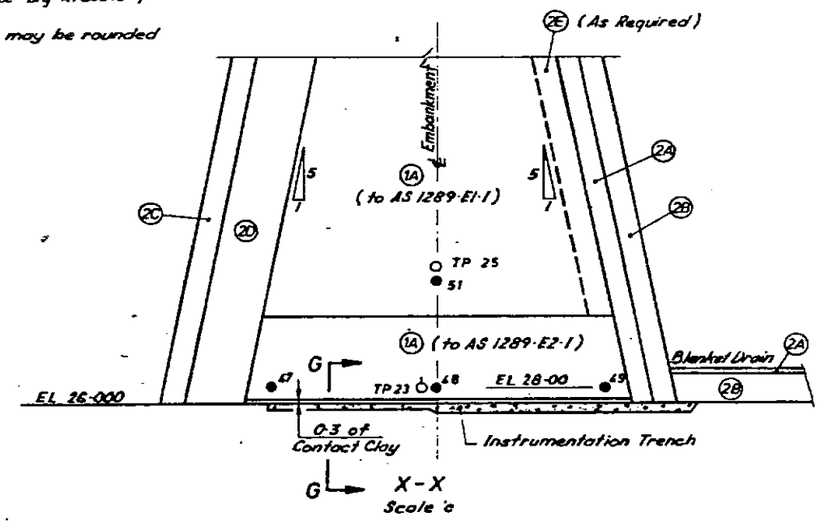


SECTION 'D-D'
Scale 'b'



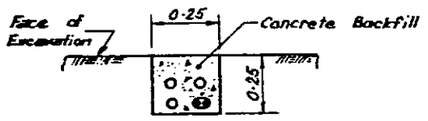
DETAIL 'A'
Scale 'c'

○ Total Pressure Cell
● Piezometer (See Drg AI-53375)
⊛ Corners may be rounded



NOTES:
1. ALL DIMENSIONS AND ELEVATIONS ARE IN METRES.
2. ALL MATERIALS AND WORKMANSHIP TO THE RELEVENT AUSTRALIAN STANDARDS.
3. For General Notes see Drg AI-50789.

SEE ALSO AZ-78048



TYPICAL SECTION G-G
(Not to Scale)

AS BUILT
By
Checked
Date 31/10/85

Revision	Date		Remarks	Chd	Ptd
	Oct '85	D	As Built		
	3-9-80	C	Section D-D' amended	M.J.C.	
	13-3-80	W	amended to working drg (3B) added to Section B-B		
	6-5-79	B	Contract Nº altered		
	27-7-78	A	Instrumentation added to Detail A & X-X		

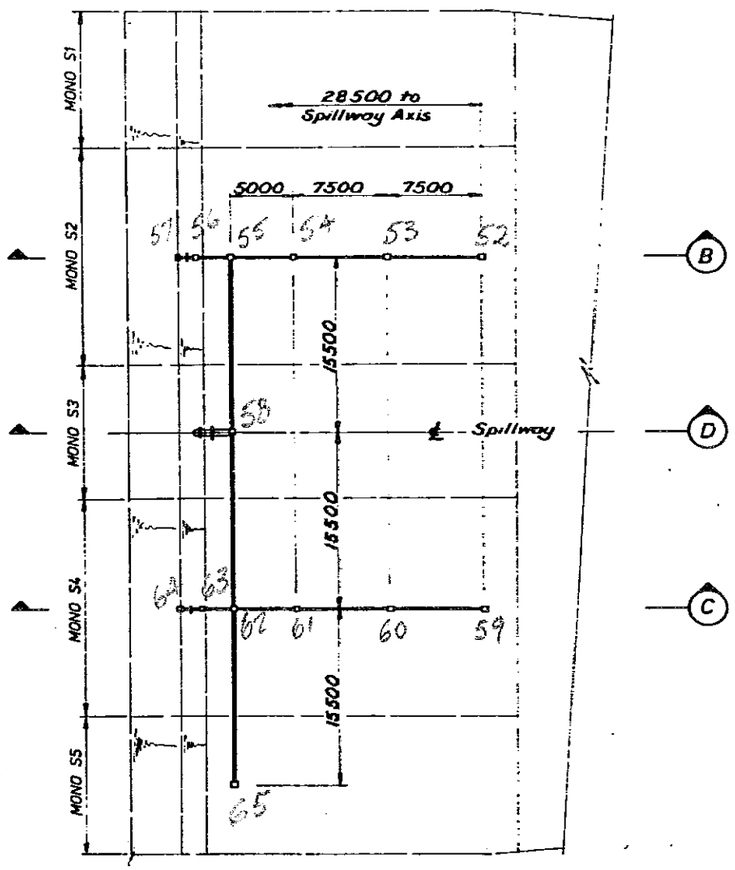
Drawing Schedule	
AI-56108	Third Stage Constr. Embank. Protection Details
AI-53375	Third Stage Constr Embank Instrumentation (Sh 2 of 2)
AI-50789	Right Bank Embankment Details (Sh 1 of 3)
AI-50781	Axis Distance 1750-1850-Embankment Arrgt (Sh 2 of 3)
AI-50779	Axis Distance 1250-1900-Embankment Arrgt (Sh 1 of 3)

Scales
Scale 'a' 0 1 2 3 4 5 m (1:60)
Scale 'b' 0 50 100 m (1:1250)
Scale 'c' 0 5 10 15 20 m (1:200)
(Scales Before Reduction)

CONTRACT Nº 2120

IRRIGATION AND WATER SUPPLY COMMISSION
Design | Drafting | Recommended
Prep K.S.M.C. | Dr KFP
Chd | Chd M.J.C.
Supr | Supr
Submitted
Executive Engineer | Senior Engineer Designs | Approved | Chief Designing Engineer

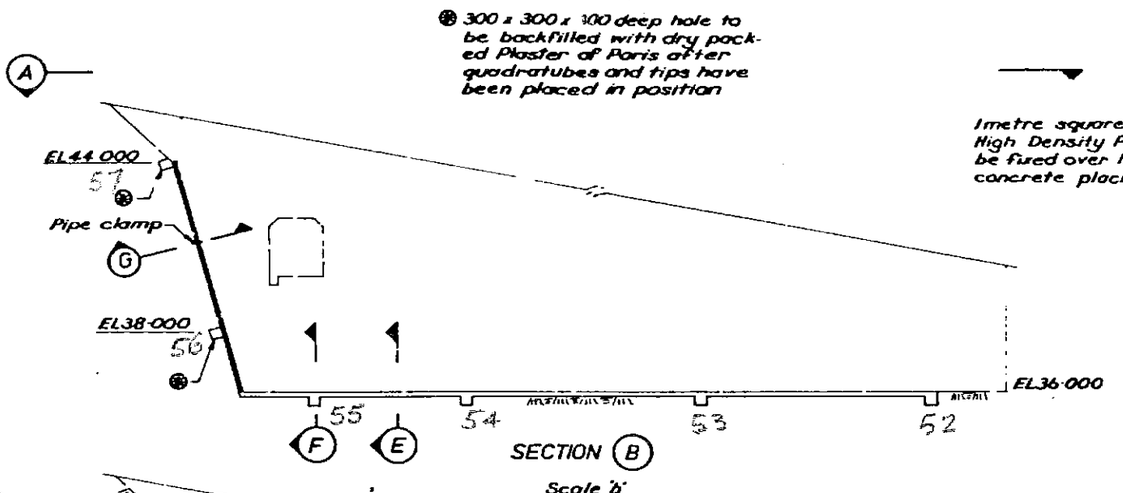
CO-ORDINATOR GENERAL'S DEPARTMENT
BRISBANE RIVER 150·2 km - WIVENHOE DAM
THIRD STAGE CONSTRUCTION
RIGHT BANK · EMBANKMENT DETAILS
Sh 3 of 3 | 16-6-78 | A1-50780 | A B W C D



Gallery omitted for clarity

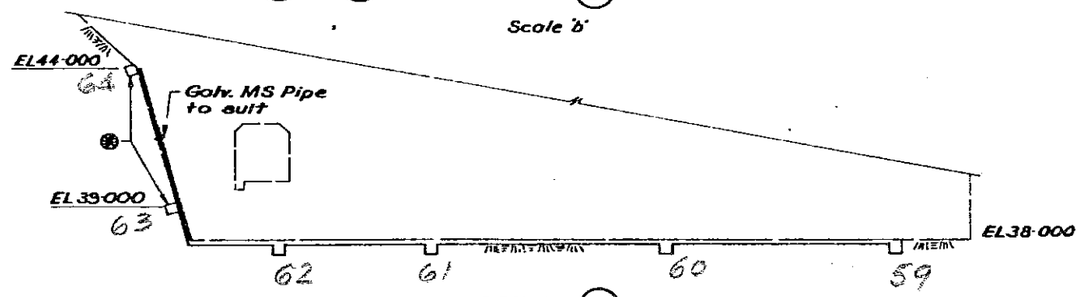
SECTIONAL PLAN (A)

Scale 'a'



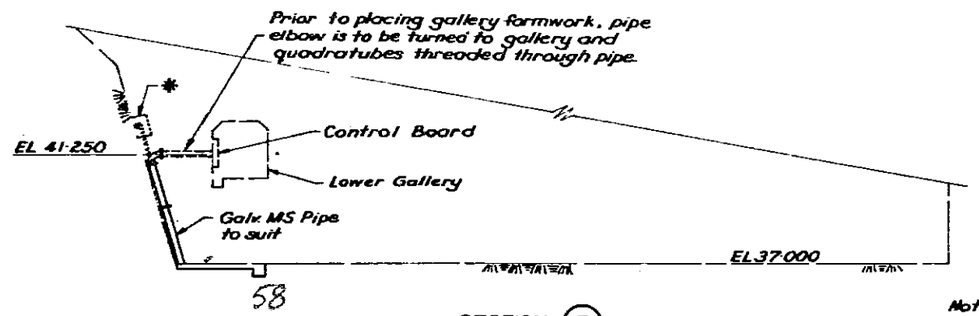
SECTION (B)

Scale 'b'



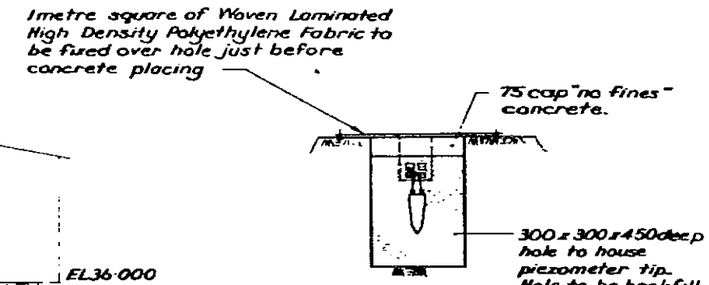
SECTION (C)

Scale 'b'



SECTION (D)

Scale 'b'



SECTION (F)

Not to Scale

SECTION (G)

Not to Scale

SECTION (E)

Not to Scale

* Following setting of piezometer tips the pipe elbow in section (D) is to be set parallel with rock face. Quadratubes to be carefully coiled and suitably secured to rock face above EL 42·000. These quadratubes are to be adequately protected from damage by construction equipment during concreting operations below EL 41·00

Notes:

1. All dimensions are in millimetres and all elevations are in metres.
2. All materials and workmanship to the relevant Australian Standards.

AS BUILT
By
Class
Date 31/10/85

Revision					Drawing Schedule
Date		Remarks	Chd	Psd	
1.10.85	A	As Built			

Scale 'a' (1:250) 0 5 10 15 20m

Scale 'b' (1:100) 0 5 10m

Scales Before Reduction

QUEENSLAND WATER RESOURCES COMMISSION

Design	Drafting	Recommended
Prep	Dr	Senior Engineer Designs
Chd	Chd	Approved
Supv	Supv	Chief Designing Engineer
Submitted		
Executive Engineer		

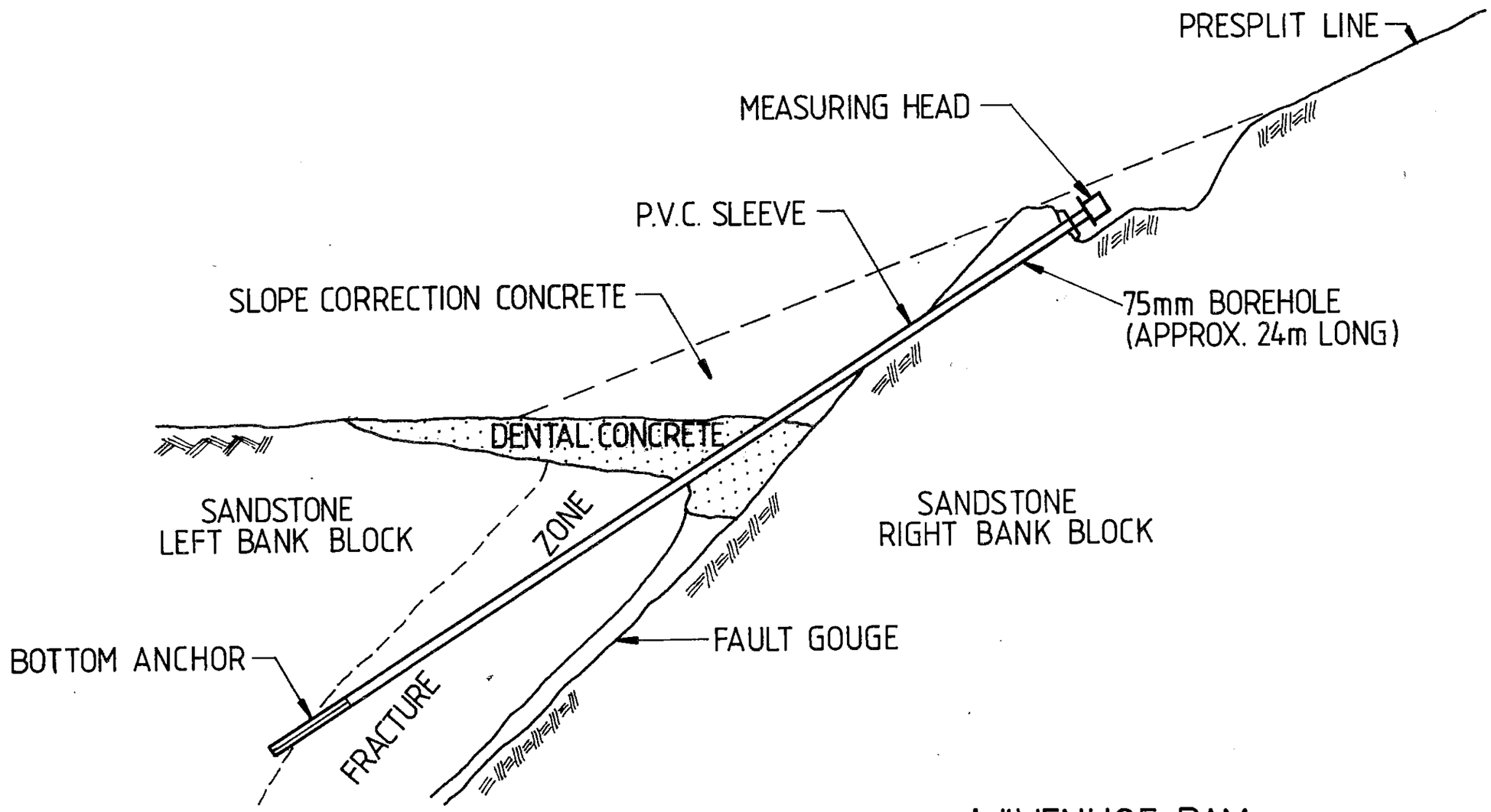
CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km — WIVENHOE DAM

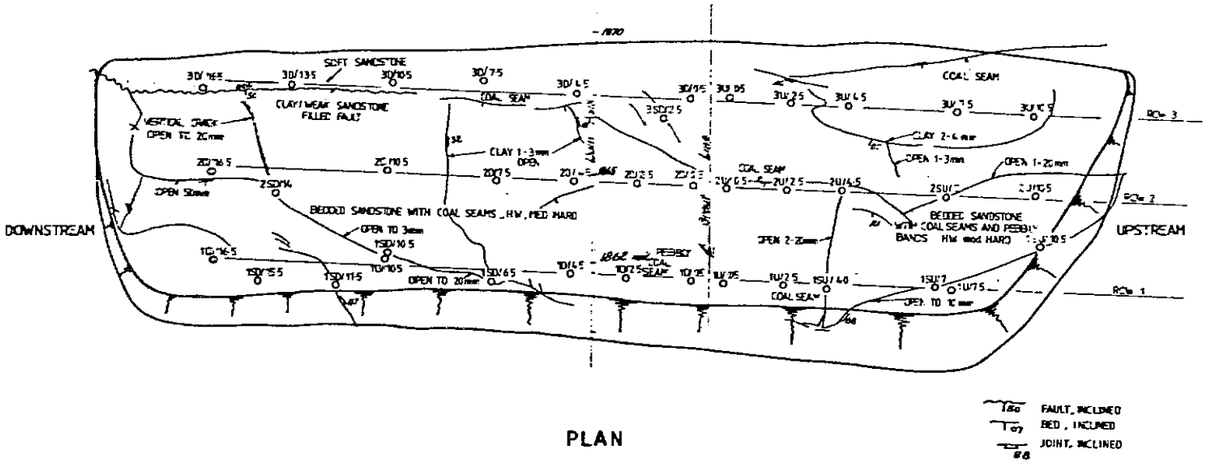
SPILLWAY

FOUNDATION INSTRUMENTATION

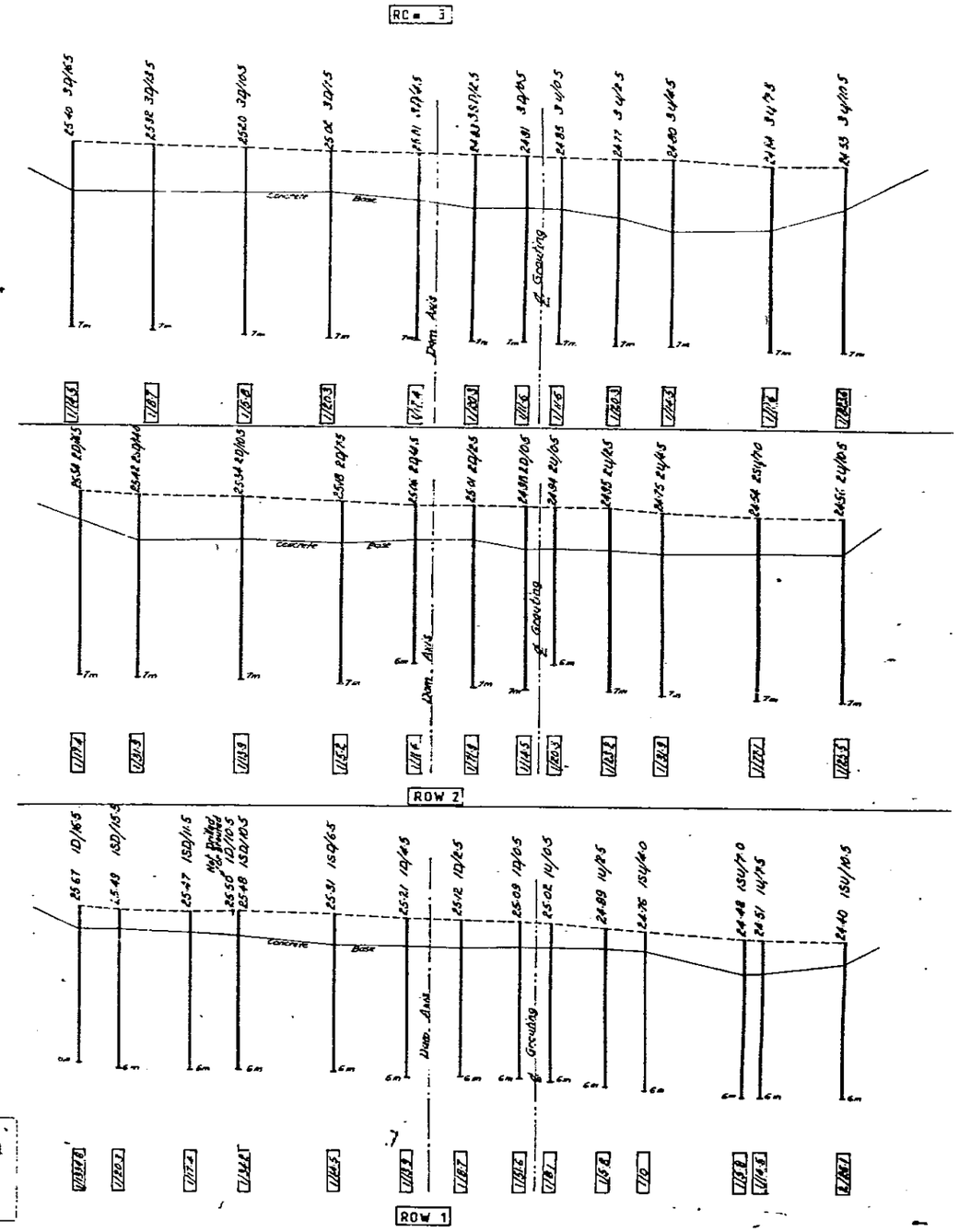
12-10-79 A1-56230 A



WIVENHOE DAM
EXTENSOMETER INSTALLED
ACROSS FAULT ZONE
DISTANCE 1867m APPROX.



PLAN



NOTES

1. All dimensions and elevations are in metres.
2. Levels Datum : AHD
3. Levels and depth of holes are measured at top of standpipes
4. All drill holes are vertical
5. Hookups and cement taken are shown thus:

Row N°	Percussion Drilling (Metre)	Standpipes (Metre)	Hookups (Number)	Cement (Kilograms)
1	73·5	11·25	15	1555·7
2	73·0	9·0	12	344·4
3	75·0	9·0	12	980·2
Backfill				650·7
TOTALS	221·5	29·25	39	3531·0

AS BUILT
By
Checked
Date

Revision			
Date	Remarks	Ckd.	Psd.

Scale 5 4 3 2 1 0 5 10 metres

Design	Drafting
Prep.	Dr C.P.P.
Ckd.	Ckd.
Supr.	Supr.
Submitted	

Recommended 30/10/78

Approved

IRRIGATION AND WATER SUPPLY COMMISSION

WIVENHOE DAM

FOUNDATION GROUTING

RIVER BED CONSOLIDATION GROUTING

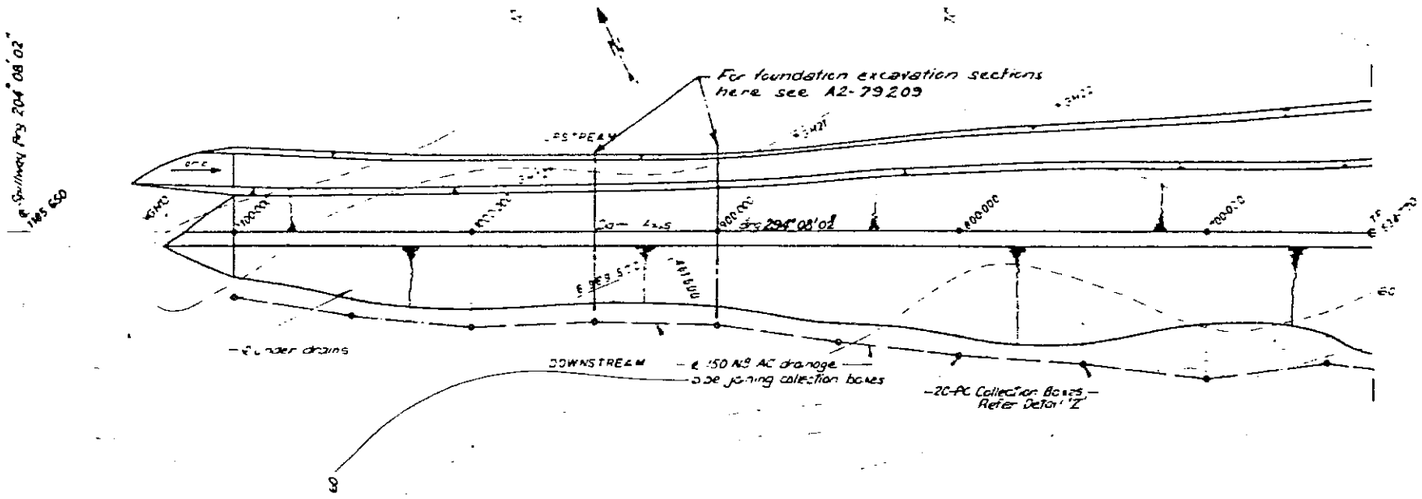
31-10-78 | A1-57707

WD-A1-208

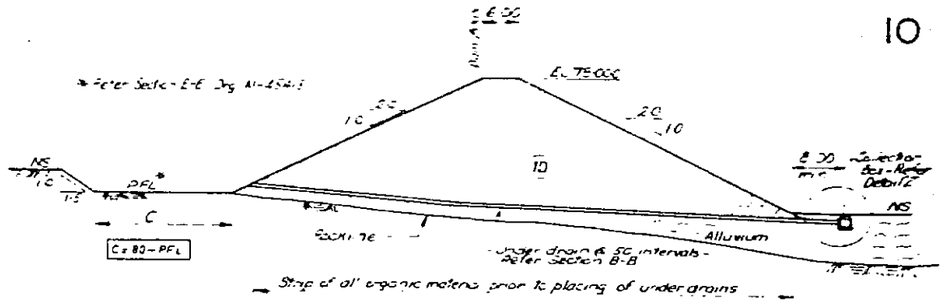
INS. 0 2 4 6 8 10

CM. 0 2 4 6 8 10 20 30

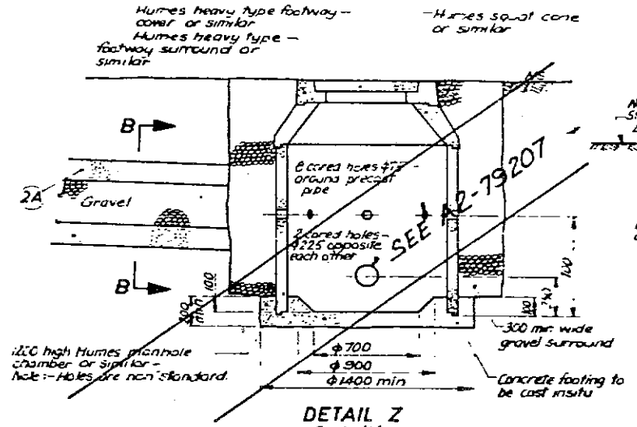
10



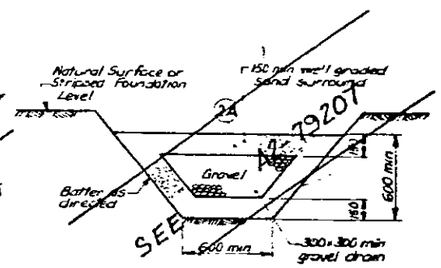
PLAN (Axis Distance 634 to 1100)
Scale 'a'



TYPICAL SECTION A-A
Scale 'c'



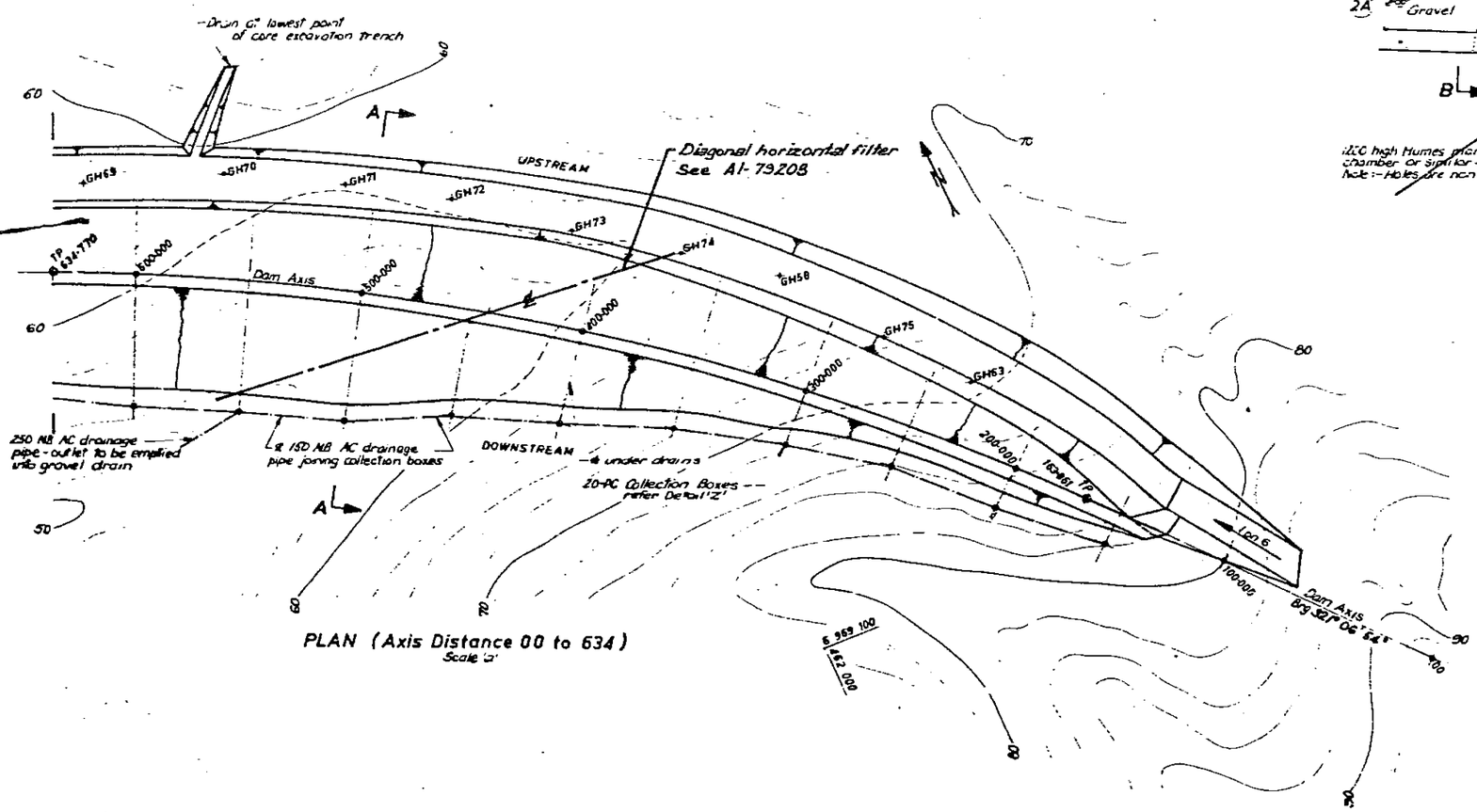
DETAIL Z
Scale 'b'



SECTION B-B
Scale 'b'

NOTE:-
DIMENSIONS ON DETAIL Z & SECTION B-B ARE EXPRESSED IN MILLIMETRES.

ZONE LEGEND:-
10 — Miscellaneous Fill
2A — Sand Filter



PLAN (Axis Distance 00 to 634)
Scale 'a'

NOTES:-
1. UNLESS OTHERWISE SHOWN ALL DIMENSIONS AND ELEVATIONS ARE IN METRES
2. ALL MATERIALS AND WORKMANSHIP TO THE RELEVANT AUSTRALIAN STANDARD
3. Levels Datum: All levels to AHD (PSM 34242 = EL 74·784)
4. Under drains to maintain a downwards slope to collection boxes.
5. 150 NB AC pipes to maintain a downwards slope to outlet.
6. PFL means Plan Foundation Line.
7. Test holes shown thus → GH75.

AS BUILT
By
Class'n Sur Eng 17
Date

Revision				
Oct '85	C	As Built		
7-6-78	B	Embankment bearings to 'AS BUILT' record		
28-3-77	A	Crest width reduced	MJC	
Date		Remarks	Chkd	Psd

Drawing Schedule	
A1-45411	Topography - Location of Exploratory Bore Holes
A1-45413	Exploratory Bore Holes - Upper Left Bank Cross Sections.
A1-47502	Centreline Survey of Axis and Spillway.
A1-45902	Foundation Earthworks - Plan of Area.

Scale 'a' 0 50 100m (1:1250 Scale before reduction)
Scale 'b' 0 0·5 1·0 1·5 2·0m (1:20 Scale before reduction)
Scale 'c' 0 10 20 30 40 50m (1:500 Scale before reduction)

CONTRACT No 2103

IRRIGATION AND WATER SUPPLY COMMISSION

Design	Drafting
Prep A.J.	Dr. J.C.S.
Chkd	Chkd R.L.
Supv	Supv

Submitted
Executive Engineer

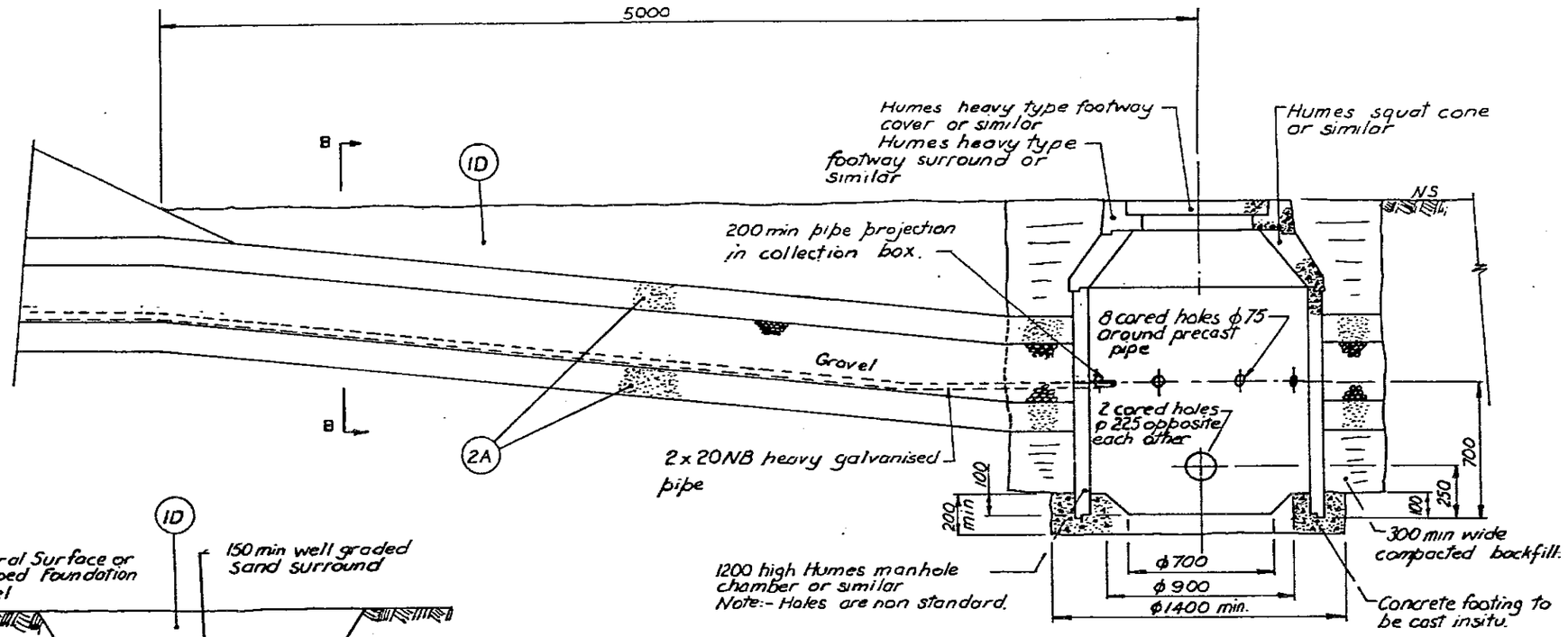
Recommended
Senior Engineer Designs
Approved
Chief Designing Engineer

CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km - WIVENHOE DAM
FOUNDATION EARTHWORKS
AXIS DISTANCE 00 TO 1100 - DETAILS

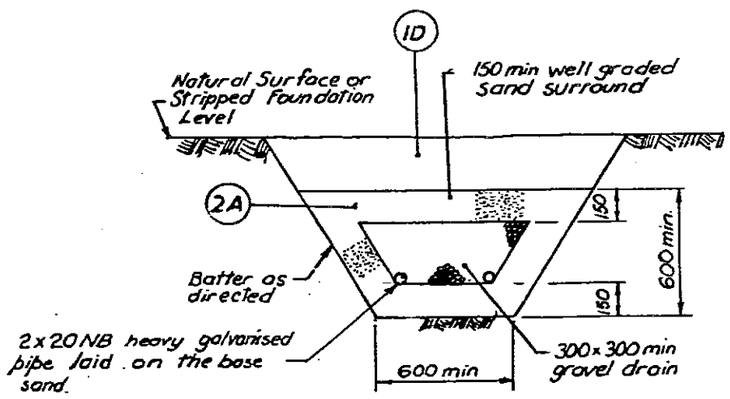
4-11-76 | A1-45403 | A | B | C | 1

INS. 1 0 2 4 6 8 10
CM. 1 0 2 4 6 8 10 20 30



SECTIONAL ELEVATION

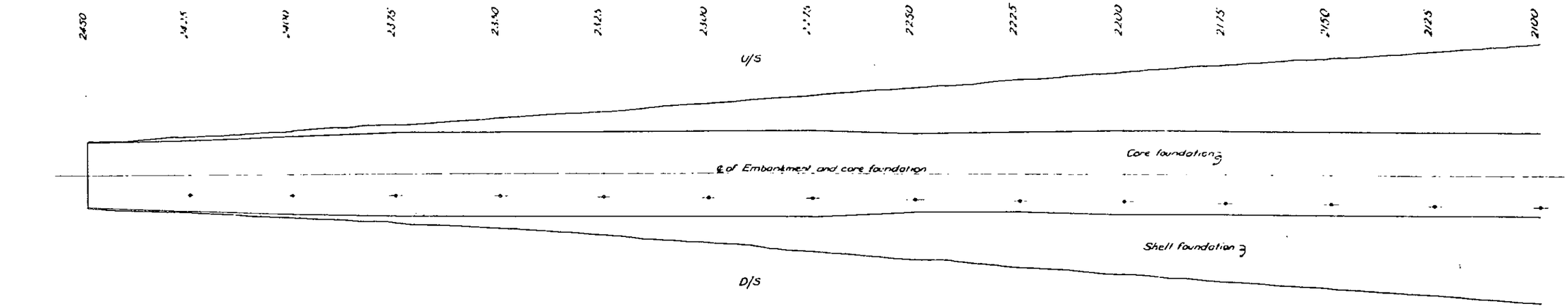
(SUPERSEDES DETAIL Z ON DRG. AI-45403)



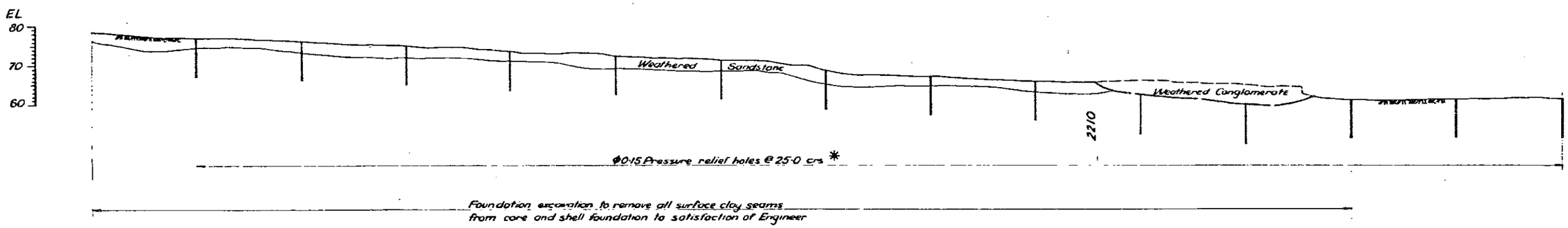
SECTION B-B

Note:-
Demensions on Detail Z & Section B-B are expressed in millimetres.
(1D) Miscellaneous Fill
(2A) Sand Filter

AS BUILT
By J.A. Chalmers
Class'n Sen Eng II
Date 8/11/85



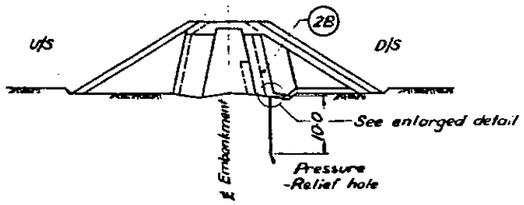
PLAN



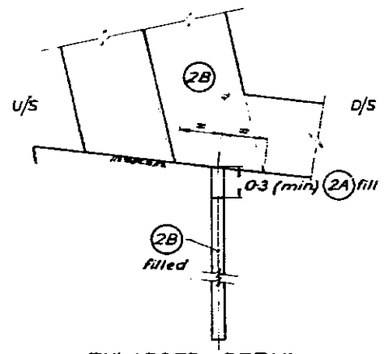
SECTION

*If holes reveal excessive clay seams Engineer may close up the spacing

Excavate all clay bound weathered conglomerate to satisfaction of Engineer



TYPICAL SECTION
(For details of embankment zoning See drg A1-50789)



ENLARGED DETAIL
(Not to Scale)

NOTES:
1. All dimensions and elevations are in metres
2. Levels Datum: All levels are to A.H.D. (PSM N° 34242 = EL 74·784)

AS BUILT
By
Chkd
Date 31/10/85

Revision					Drawing Schedule	
Oct '85	B	As Built				
17·6·81	W	Amded to Working Drg	M.J.C			
10·5·79	A	Contract N° amended	M.J.C		A1-50789	Right bank embankment details (Sh 1 of 3)
Date		Remarks	Ckd	Psd		

Scale 0 10 20 30 40 50m
(1:500 Before Reduction)

CONTRACT N° 2120

IRRIGATION AND WATER SUPPLY COMMISSION

Design	Drafting	Recommended
Prep	Dr	Senior Engineer Designs
Ckd	Ckd	Approved
Supv	Supv	Acting Chief Designing Engineer
Submitted: Executive Engineer		

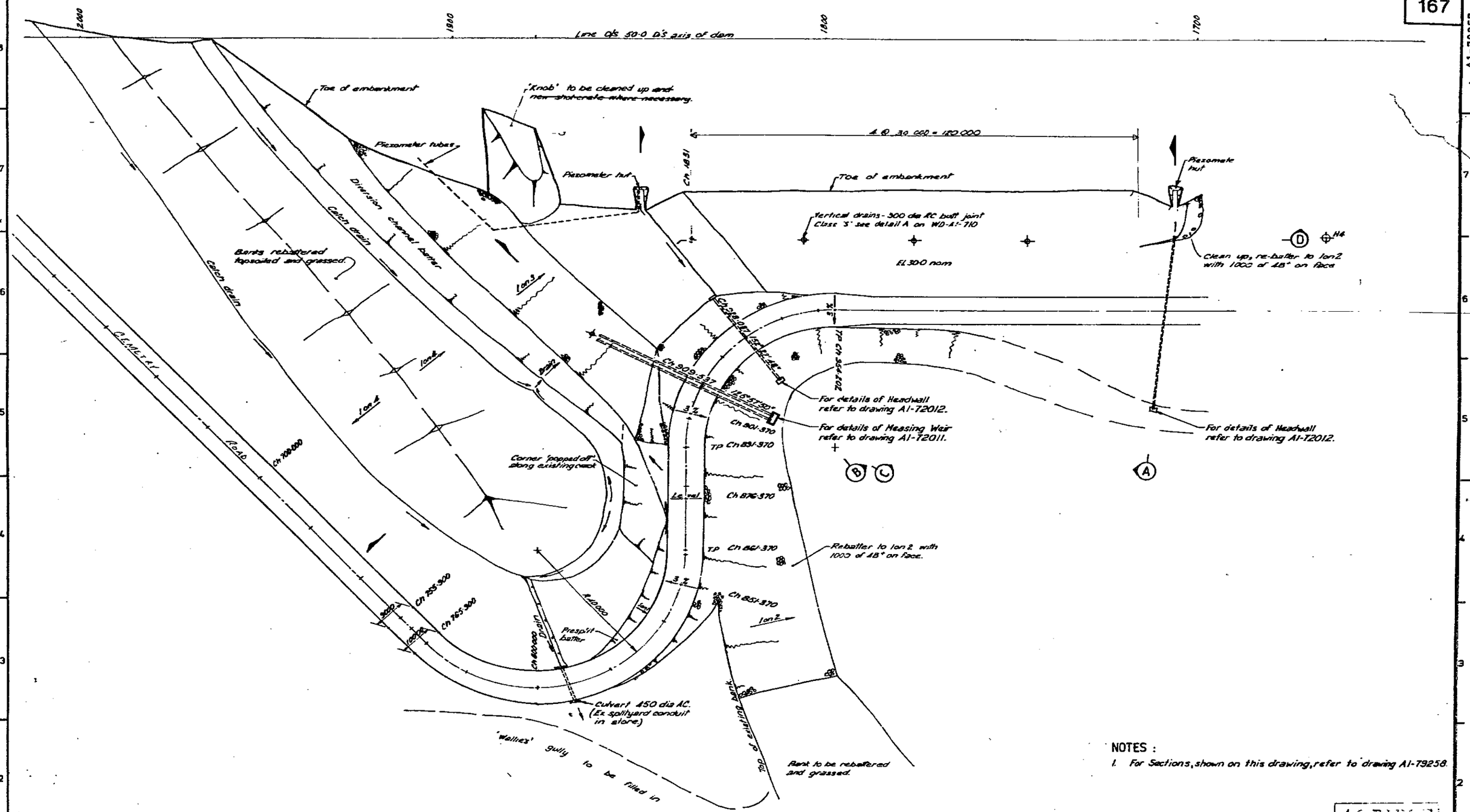
CO-ORDINATOR GENERAL'S DEPARTMENT

BRISBANE RIVER 150·2 km - WIVENHOE DAM
THIRD STAGE CONSTRUCTION
FOUNDATION PREPARATION
RIGHT BANK EMBANKMENT DETAILS

20-10-78 A1-54651 A W B

INS. 1 0 2 4 6 8 10
CM. 1 0 2 4 6 8 10 20 30

A1-79257



NOTES :

1. For Sections, shown on this drawing, refer to drawing A1-79258.

AS BUILT

REVISION						DRAWING SCHEDULE		
DATE	REMARKS	ZONE	CKD	PSD		A1-79259	Cross Sections Sh 2 of 2	
						A1-79258	Dir. Chnl & Riv. Area - Cross Sections	SURVEY BOOKS

SCALE 1:500

DESIGN	DRAFTING
PREP	DR
CKD	CKD
SUPV	SUPV
SUBMITTED	

Queensland Water Resources Commission

RECOMMENDED

APPROVED/DATE

BRISBANE RIVER 150·2 km WIVENHOE DAM
DOWNSTREAM DIVERSION CHANNEL
AND RIVER AREA
DRAINAGE AND ACCESS ROAD

CONTRACT NUMBER

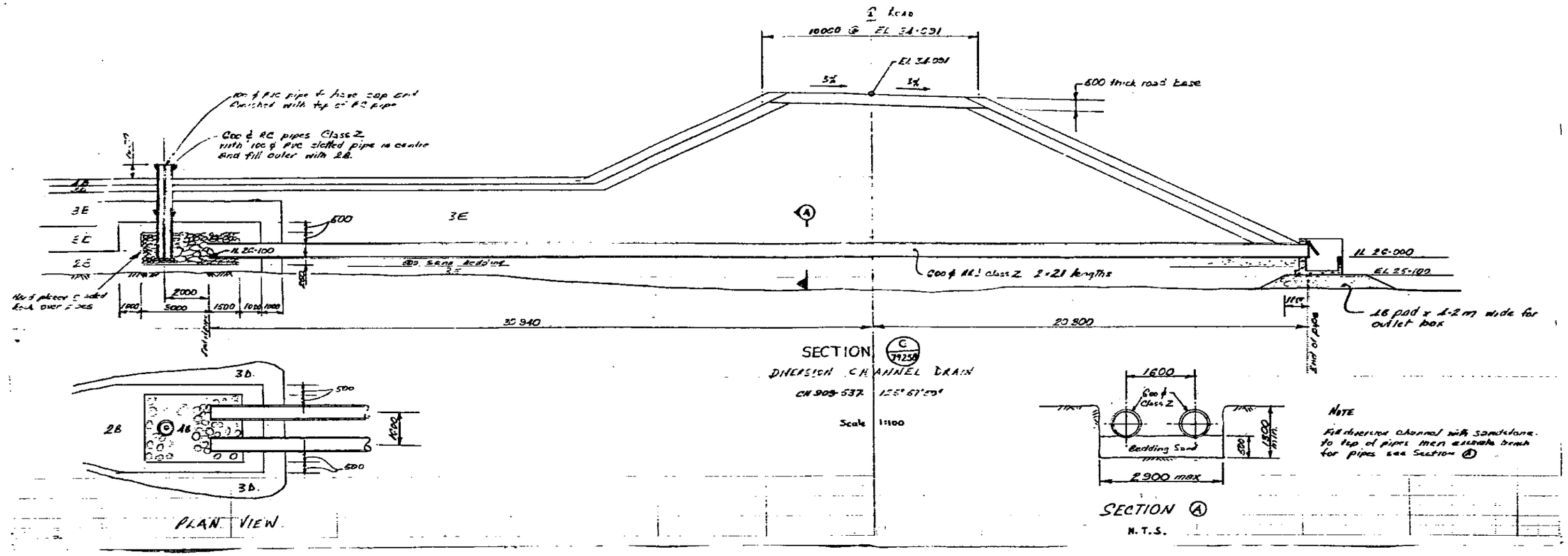
DRAWING NUMBER A1-79257

WD-A1-709

INS. 0 2 4 6 8 10

CM. 0 2 4 6 8 10 20 30

A1-79259



NOTES :

1. Refer to drawing A1-79258 for additional information on Sections.

AS BUILT
By G.J. Cubbins
Chief Engineer
Date 6/11/85

REVISION						DRAWING SCHEDULE			
DATE	REMARKS	ZONE	CKD	PSD		A1-79258	Div. Chnl & Riv. Area - Cross Sections Sh 1/2		
						A1-79257	" " " " - Drainage & Acc. Rd.		SURVEY BOOKS

SCALES

DESIGN	DRAFTING
PREP	DR
CKD	CKD
SUPV	SUPV
SUBMITTED	

Queensland Water Resources Commission

RECOMMENDED | APPROVED

BRISBANE RIVER 150·2 km - WIVENHOE DAM
DOWNSTREAM DIVERSION CHANNEL
AND RIVER AREA
CROSS SECTIONS
Sh 2 of 2

CONTRACT NUMBER
DRAWING NUMBER A1-79259
DATE