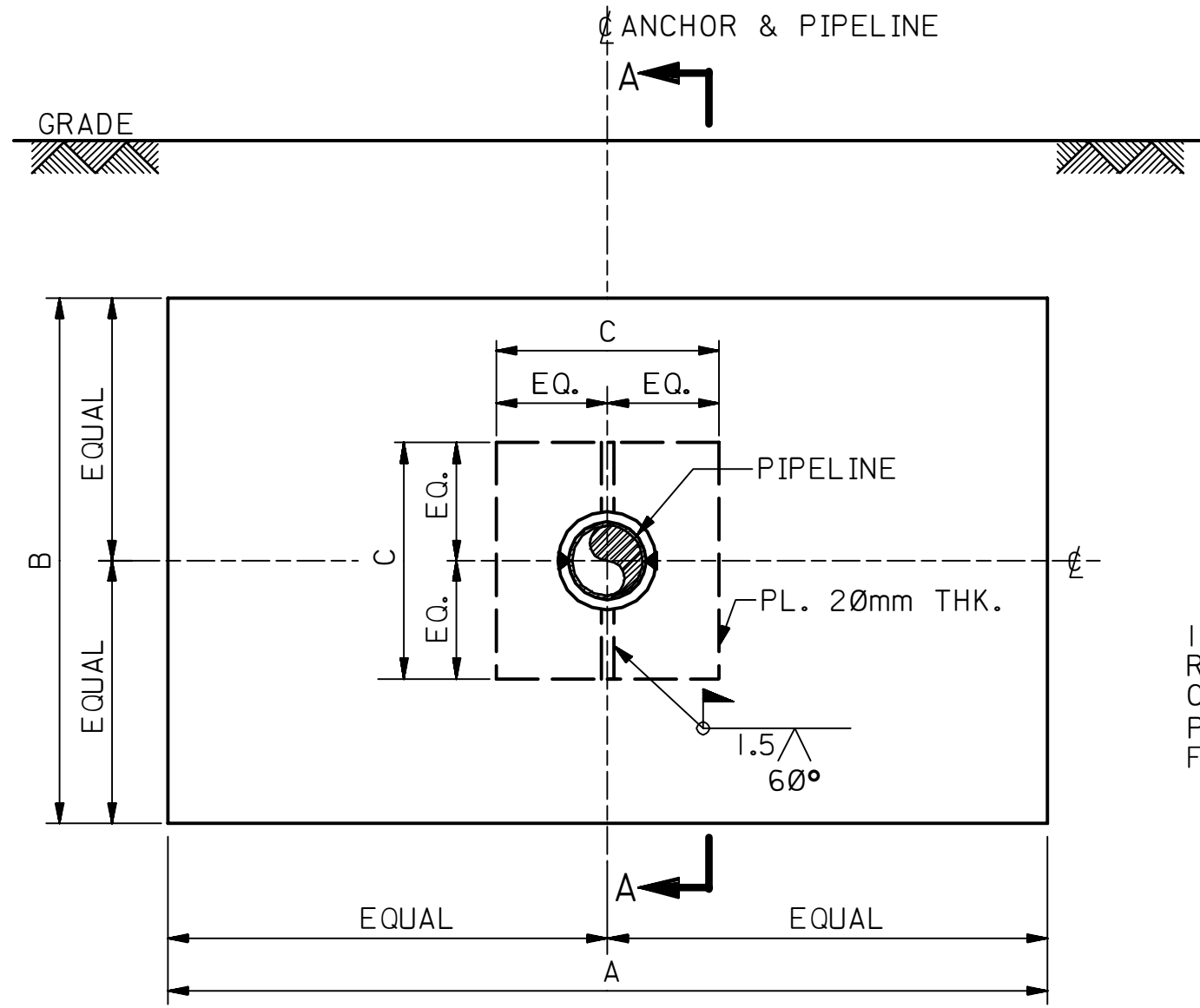
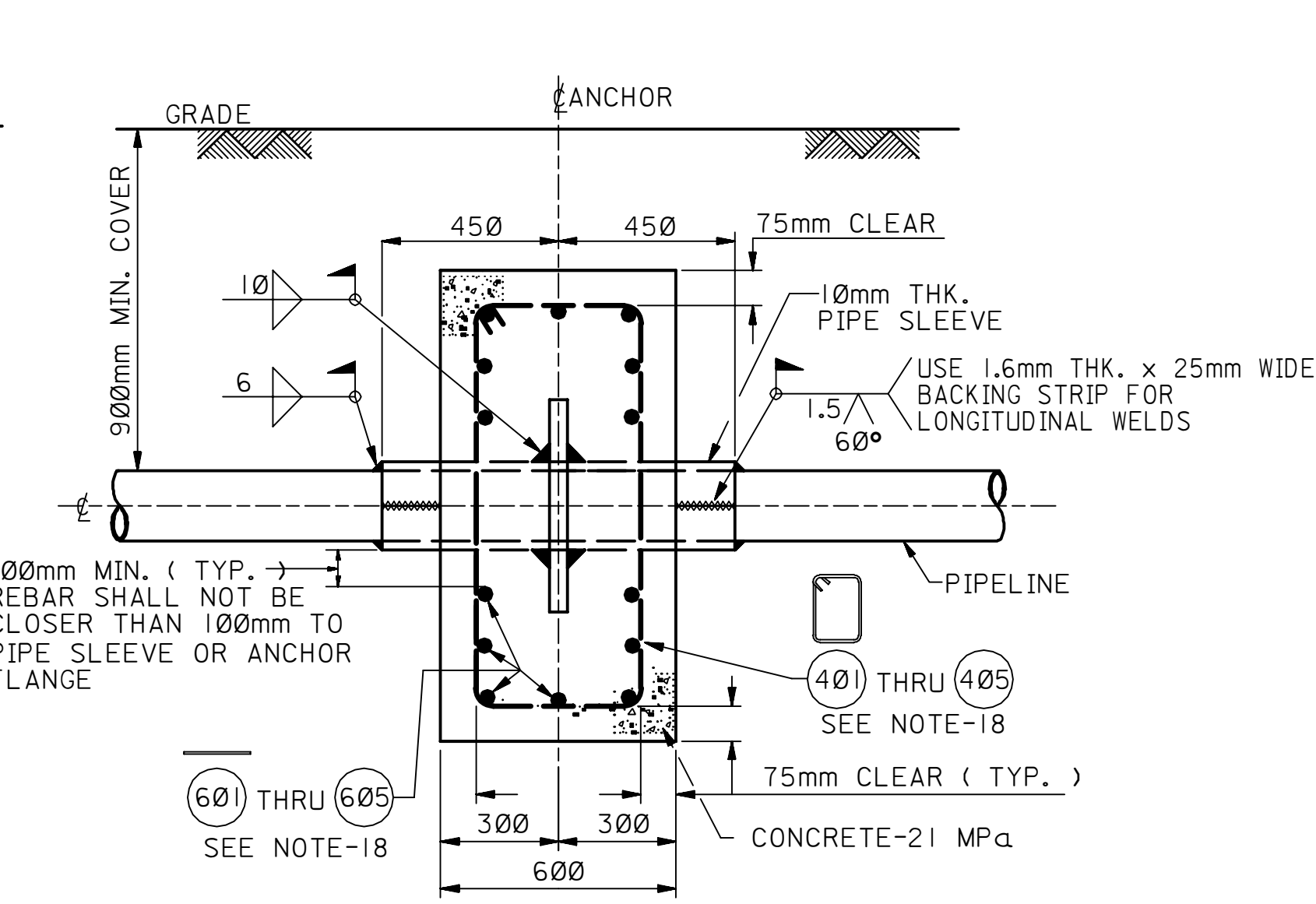




ELEVATION

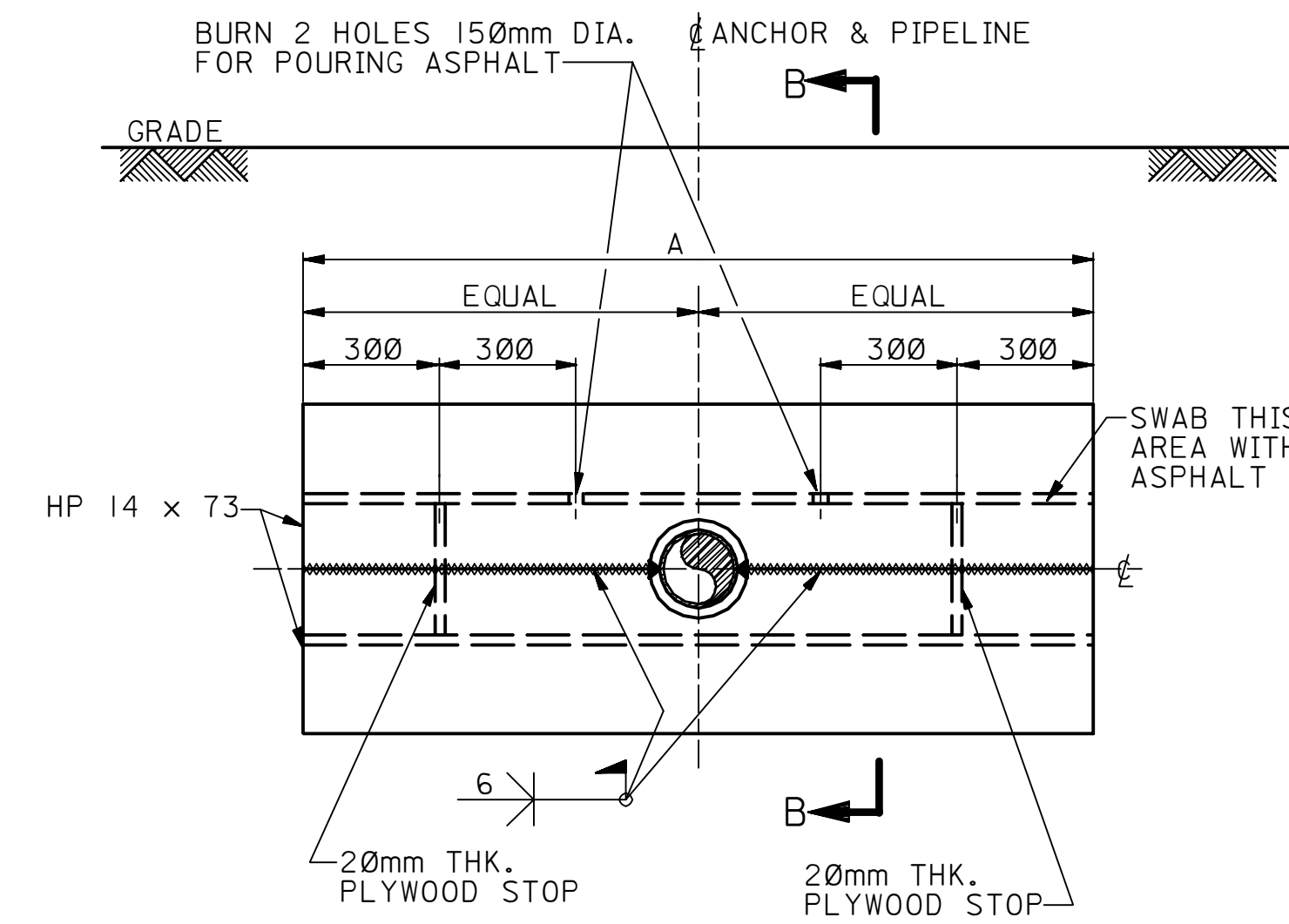


SECTION A-A

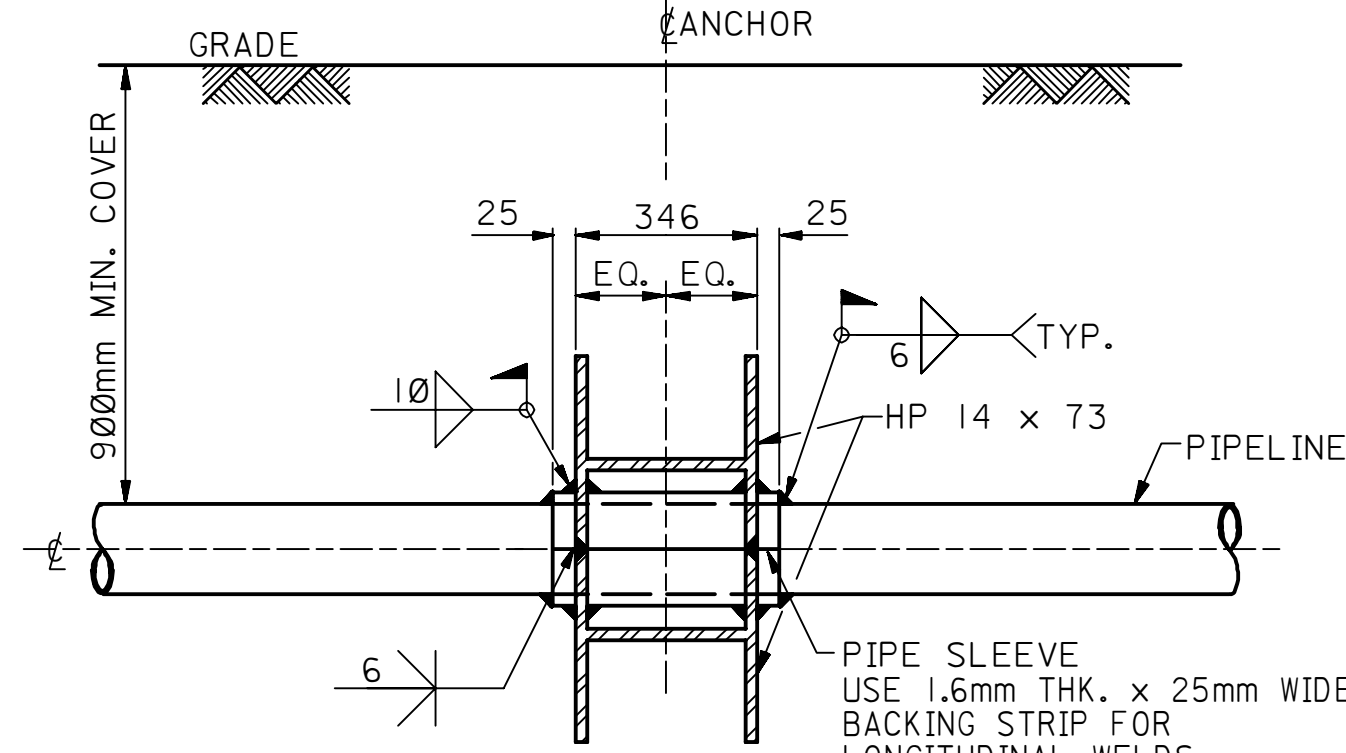
TABLE FOR ANCHOR TYPE-I						
SUB TYPE	SIZE OF PIPELINE INCH	DIMENSION MILLIMETERS			20mm PLATE SQ. M.	CONCRETE VOLUME CU. M.
		A	B	C		
a	6"	2100	1200	500	0.26	1.61
b	8"	2100	1500	600	0.37	2.0
c	10"	2700	1500	600	0.37	2.52
d	12"	3400	1500	600	0.37	3.10
e	14"	4000	1500	700	0.51	3.70

STEEL BENDING DETAILS (FOR ANCHOR TYPE-I ONLY)									
TYPE-1					TYPE-2				
SUB TYPE	ITEM NO.	TYPE	REBAR SIZE DIA. mm	NO. REQ'D.	DIMENSION MILLIMETERS		CUTTING LENGTH mm	TOTAL LENGTH IN METERS	
a	401	2	12	6	425	1025	3070	18.5	
	601	1	20	14	2000		2000	28.0	
b	402	2	12	6	425	1325	3670	22.1	
	602	1	20	18	2000		2000	36.0	
c	403	2	12	8	425	1325	3670	29.4	
	603	1	20	18	2600		2600	46.8	
d	404	2	12	10	425	1325	3670	36.7	
	604	1	20	18	3300		3300	59.4	
e	405	2	12	12	425	1325	3670	44.1	
	605	1	20	18	3900		3900	70.2	

ANCHOR TYPE-I
(SEE NOTE-2 THRU 7)



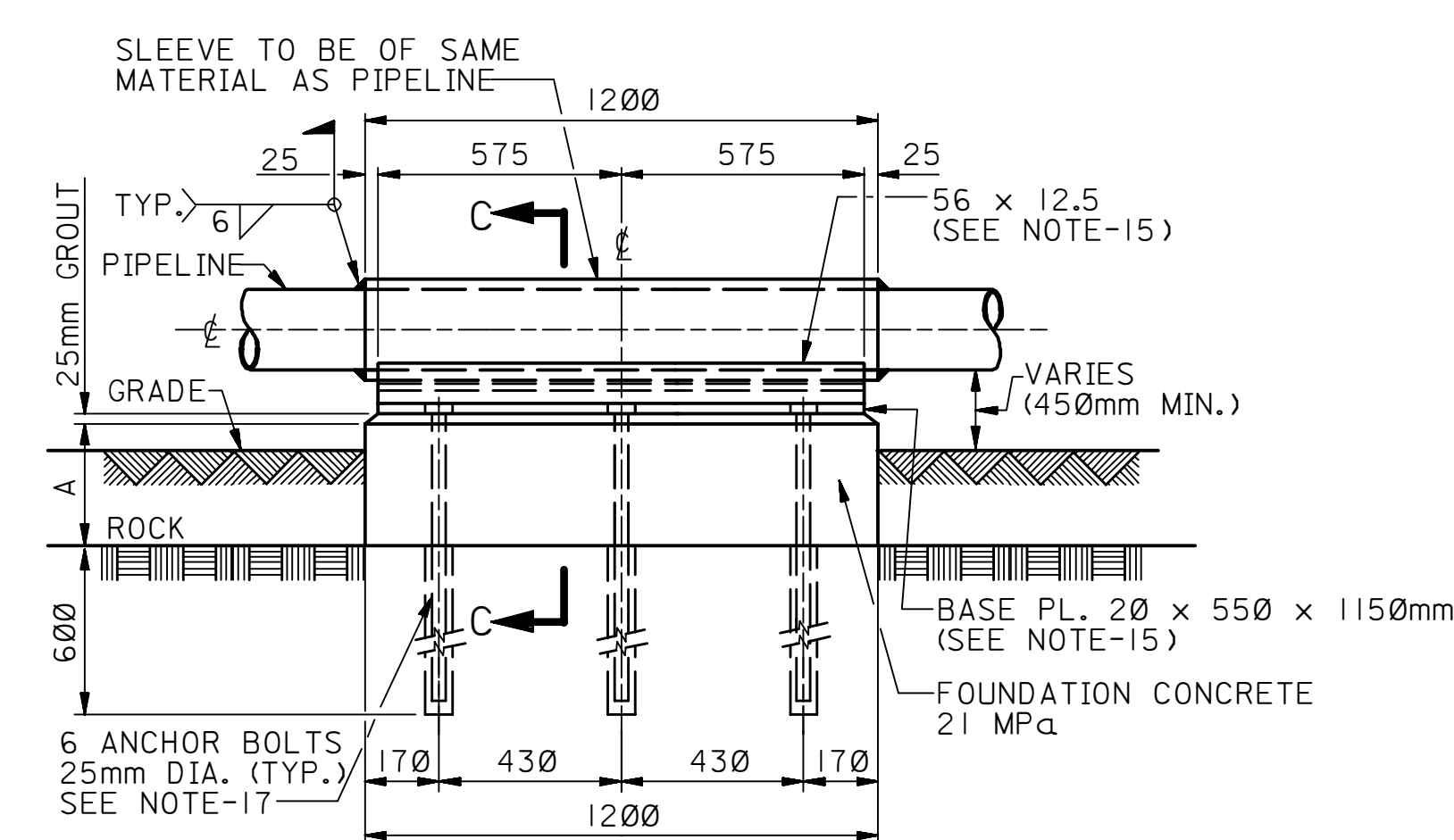
ELEVATION



SECTION B-B

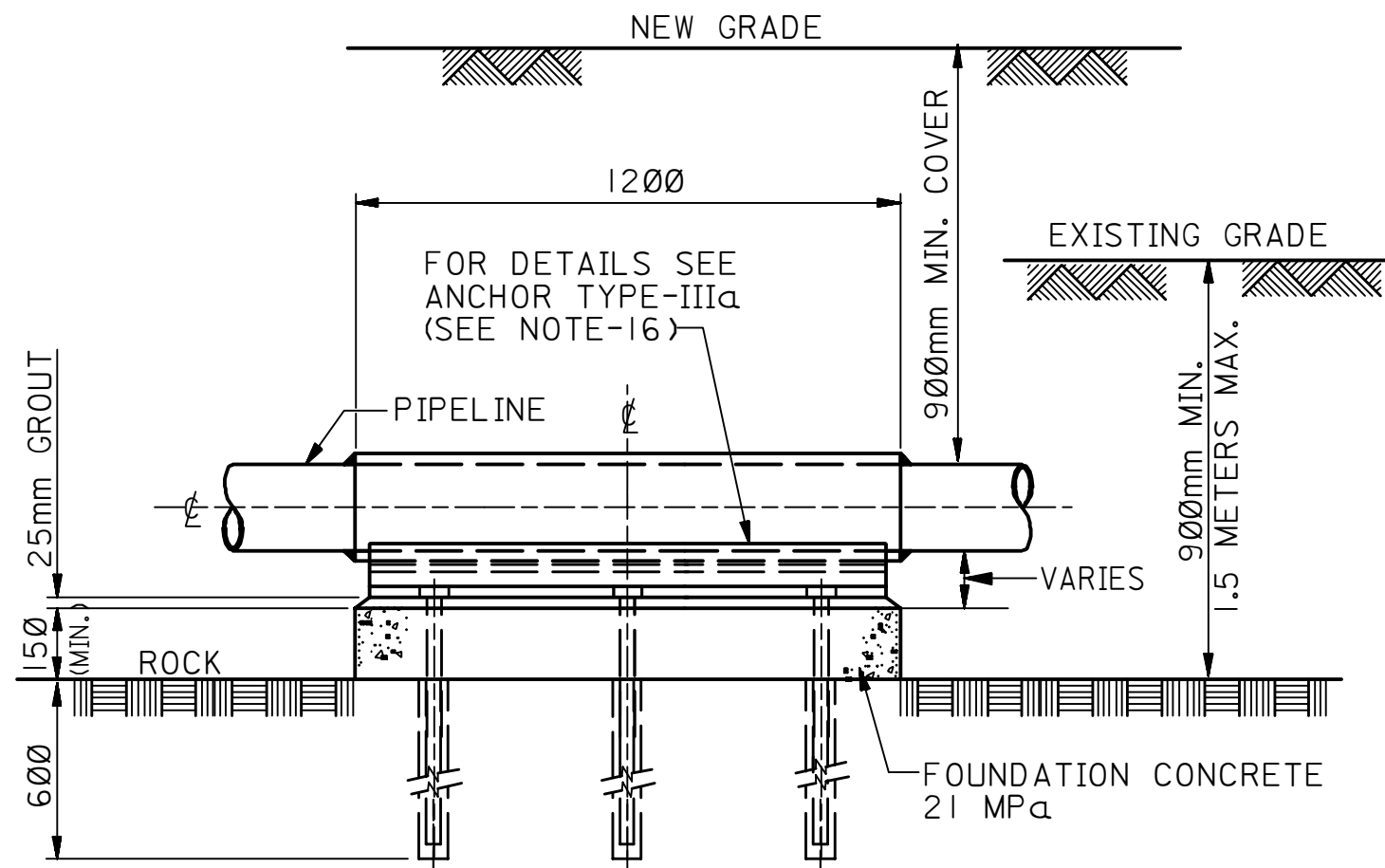
TABLE FOR ANCHOR TYPE-II		
SUB TYPE	SIZE OF PIPELINE INCH	DIMENSION MILLIMETERS
		A
a	6"	1800
b	8"	2100
c	10"	2400
d	12"	2700
e	14"	3000

ANCHOR TYPE-II
(SEE NOTE-8 THRU 10)



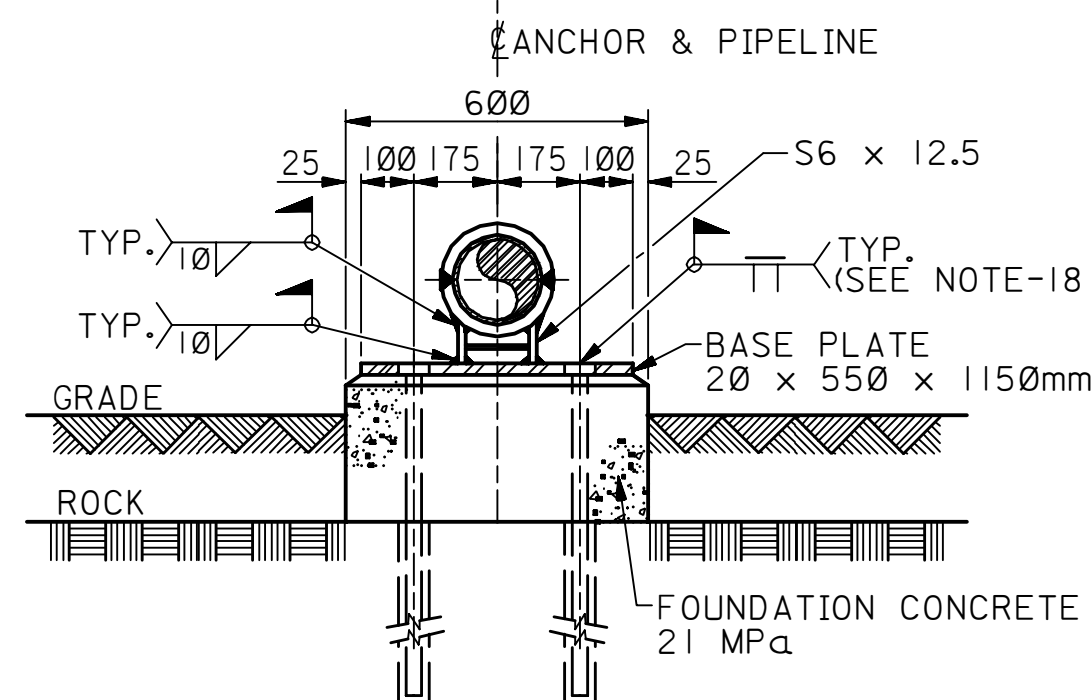
ELEVATION

ANCHOR TYPE-IIIa
(SEE NOTE-11, 13, 15, 16 & 17)

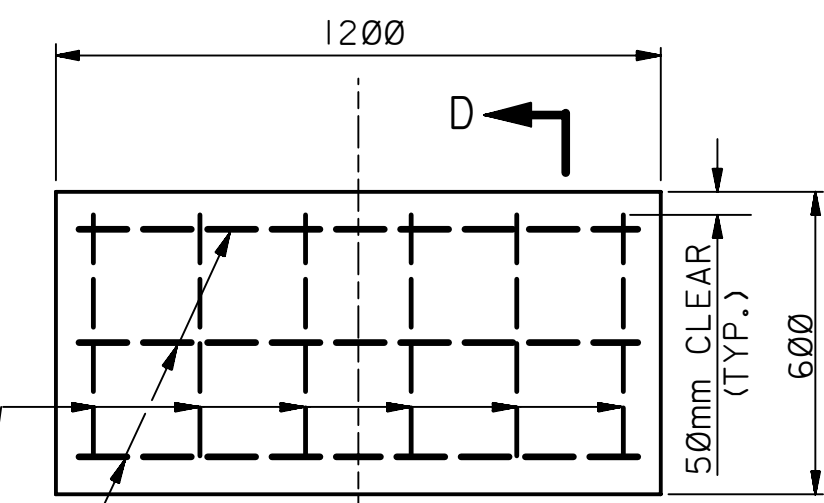


ELEVATION

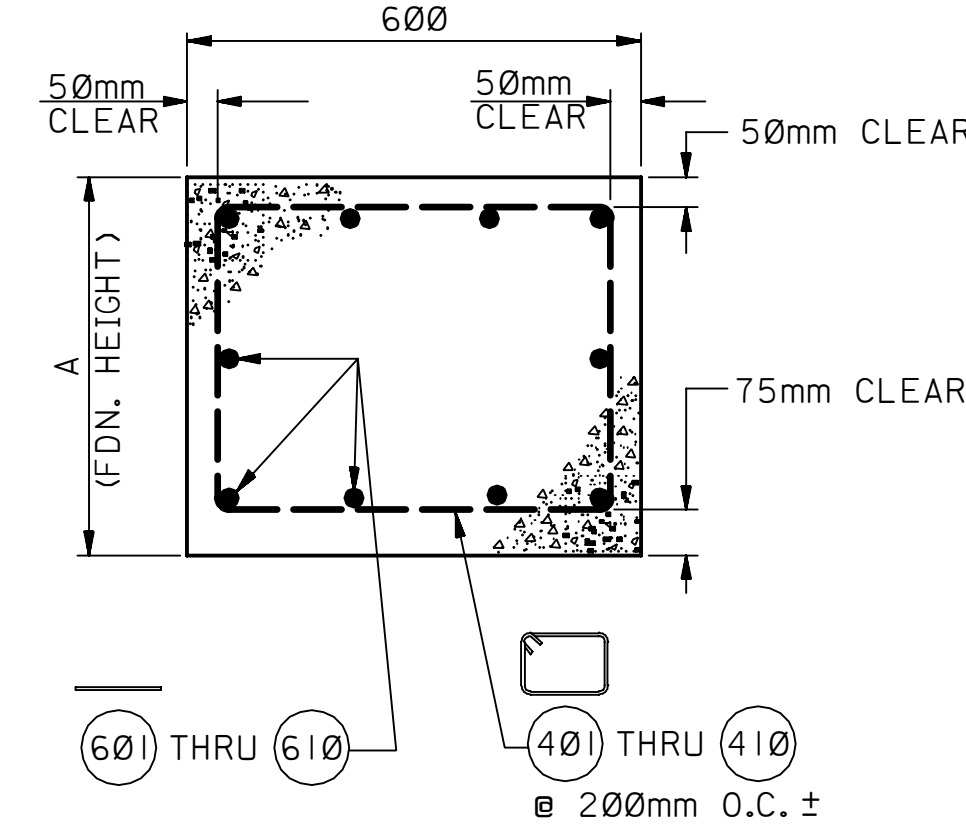
ANCHOR TYPE-IIIb
(SEE NOTE-12, 14, 16 & 17)



SECTION C-C



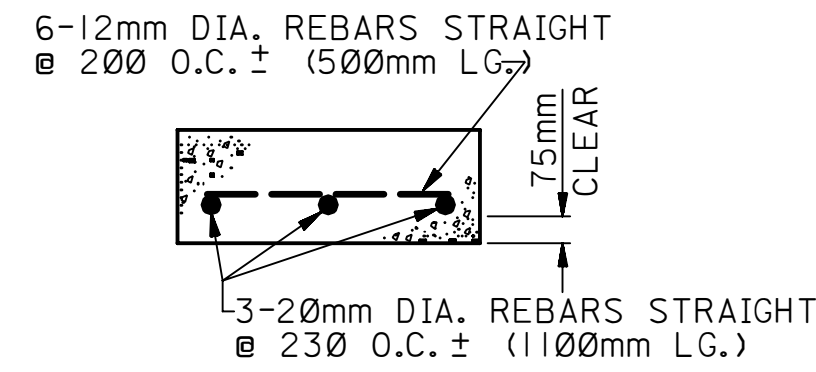
PLAN
DETAIL-2



DETAIL-1

SCHEDULE FOR DETAIL-1		
SCH. NO.	A FOUNDATION HEIGHT mm	CONCRETE VOLUME CU. M.
1	230	0.18
2	305	0.23
3	380	0.28
4	460	0.34
5	535	0.40
6	610	0.46
7	685	0.51
8	760	0.57
9	840	0.63
10	915	0.68

STEEL BENDING DETAILS							
TYPE-1				TYPE-2			
SUB TYPE	ITEM NO.	TYPE	REBAR SIZE DIA. mm	NO. REQ'D.	DIMENSION MILLIMETERS		TOTAL LENGTH IN METERS
1	401	2	12	6	475	125	8.3
	601	1	20	8	1100		8.8
2	402	2	12	6	475	200	9.2
	602	1	20	8	1100		8.8
3	403	2	12	6	475	230	9.5
	603	1	20	8	1100		8.8
4	404	2	12	6	475	310	10.5
	604	1	20	10	1100		11.0
5	405	2	12	6	475	385	11.4
	605	1	20	10	1100		11.0
6	406	2	12	6	475	460	12.3
	606	1	20	10	1100		11.0
7	407	2	12	6	475	535	13.2
	607	1	20	12	1100		13.2
8	408	2	12	6	475	610	14.1
	608	1	20	12	1100		13.2
9	409	2	12	6	475	690	15.0
	609	1	20	12	1100		13.2
10	410	2	12	6	475	765	15.9
	610	1	20	14	1100		15.4



SECTION D-D

ANCHOR TYPE-III
(FOR ROCK AREA)

GENERAL NOTES

- FOR FULLY RESTRAINED PIPELINES SEE PROJECT DRAWING OR SPECIFICATIONS.
- ANCHOR TYPE-I
- COAT ALL EXTERNAL SURFACES OF THE SLEEVE INSIDE THE CONCRETE ANCHOR WITH APCS-113 OR APCS-19B OR 09-612-345 OR APCS-104 (SHOP APPLIED FBE). THE COATING SHALL EXTEND AT LEAST 150mm BEYOND THE FORMS. THE COATING SHALL BE CURED PRIOR TO POURING CONCRETE.
- CONCRETE TO BE MIXED, PLACED AND CURED FOR A MINIMUM COMPRESSIVE STRENGTH OF 21.0 MPa AFTER 28 DAYS OF CURE PER SAES-0-001. CONCRETE SHALL BE PLACED ON TOP OF POLYETHYLENE PLASTIC SHEETING AT LEAST 0.25mm THICK. THE CONCRETE REBAR SHALL BE FBE COATED PER 09-SAMSS-106.
- REMOVE FORMS AND COVER ANCHOR WITH MASTING COATING (APCS-10 OR APCS-23) BEFORE BACK-FILLING. ANY PORTION OF THE LINE OR SLEEVE NOT COMPLETELY WRAPPED SHALL BE COVERED WITH MASTING COATING (APCS-10 OR APCS-23) ANCHOR AND PIPE MUST BE COMPLETELY INSULATED FROM SAND.
- BACKFILL AROUND ANCHOR IN 300mm MAXIMUM LIFTS, MOISTEN WITH WATER AND COMPACT.
- THIS ANCHOR IS DESIGNED TO WITHSTAND THE THRUST OF 150 METERS OF PIPELINE WITH 900mm COVER. USE OF FULL THRUST ANCHOR SHALL BE THOROUGHLY EVALUATED.
- IF SOLID ROCK IS ENCOUNTERED AT 1.5 METERS OR LESS BELOW GRADE USE ANCHOR TYPE-III.
- ANCHOR TYPE-II
- COAT THE BURIED PIPE, SLEEVE, AND STEEL ANCHOR WITH APCS-113 OR APCS-19B OR 09-612-345 OR APCS-104 (SHOP APPLIED FBE).
- THIS ANCHOR IS DESIGNED TO WITHSTAND THE THRUST OF 60 METERS OF PIPELINE WITH 900mm COVER. FOR LONGER BURIED SECTIONS ADJACENT TO WELLHEAD USE ANCHOR TYPE-I.
- IF SOLID ROCK IS ENCOUNTERED AT 1.5 METERS OR LESS BELOW GRADE USE ANCHOR TYPE-III.
- ANCHOR TYPE-III
- IF SOLID ROCK IS LESS THAN 900mm BELOW GRADE. USE ANCHOR TYPE-IIIa.
 - REMOVE SOIL TO SOLID ROCK.
 - DRILL HOLES IN ROCK FOR EXTRA 600mm.
 - GROUT ANCHOR BOLTS IN HOLES.
 - POUR CONCRETE ANCHOR UP TO GRADE.
 - GROUT 25mm.
- ANCHOR TYPE-IIIb
- IF SOLID ROCK IS MORE THAN 900mm BUT LESS THAN 1.5 METERS BELOW GRADE USE ANCHOR TYPE-IIIb.
 - REMOVE SOIL TO SOLID ROCK.
 - DRILL HOLES IN ROCK FOR EXTRA 600mm.
 - USING COMPRESSED AIR, BLOWOUT ROCK DUST CHIPS FROM DRILLED HOLES.
 - GROUT ANCHOR BOLTS IN PLACE.
 - POUR CONCRETE FOUNDATION ANCHOR.
 - SET BASEPLATE TO GRADE AND LEVEL.
 - POUR GROUT, MINIMUM OF 25mm UNDER BASEPLATE.
 - PROVIDE MINIMUM 900mm COVER OVER PIPELINE.
- FOUNDATION
- (TYPE-IIIa) A=FOUNDATION HEIGHT.
 - IF A IS 0-75mm NO REINFORCEMENT REQUIRED.
 - IF A IS 75-230mm REINFORCEMENT REQUIRED AS PER DETAIL-2.
 - IF A IS 230-915mm REINFORCEMENT REQUIRED AS PER DETAIL-1.
- (TYPE-IIIb) FOUNDATION HEIGHT.
 - IF "A" IS 150-230mm REINFORCEMENT REQUIRED AS PER DETAIL-2.
 - IF "A" IS GREATER THAN 230mm REINFORCEMENT REQUIRED AS PER DETAIL-1.
- PAIN TWO COATS OF PRIMER ZINC CHROMATE AND TWO COATS OF ALUMINUM PAINT IN ACCORDANCE WITH ARAMCO MANUAL AES-H-101 SYSTEM APCS-4 (ABOVE GROUND ONLY).
- CONCRETE TO BE MIXED, PLACED AND CURED FOR A MINIMUM COMPRESSIVE STRENGTH OF 27.6 MPa AFTER 28 DAYS OF CURE PER SAES-0-001. REBAR SHALL BE FBE COATED PER 09-SAMSS-106. CONCRETE COVER OF REBARS
 - 50mm AT TOP, BOTTOM AND ON SIDES FOR REBAR.
 - 75mm AT BOTTOM FOR REBAR.
- ANCHOR BOLTS (FROM 25mm DIA. BAR STEEL ROUND) GROUT ANCHOR BOLTS IN 40mm DIA. HOLES DRILLED IN ROCK. PLUG WELD ANCHOR BOLT TO 20mm PLATE AND CUT BOLT FLUSH WITH PLATE.
- ANCHOR BOLTS SHALL BE FBE COATED (OR EQUIVALENT) OR SHALL BE EXTERNALLY COATED WITH APCS-26 AFTER BEING GROUTED IN PLACE. ALL SURFACES OF THE BASE PLATE, IN CONTACT WITH THE CONCRETE FOUNDATION SHALL BE EXTERNALLY COATED WITH APCS-26, APCS-22, OR EQUIVALENT. THE INTENT IS TO ELECTRICALLY INSULATE THE PIPE ANCHOR FROM THE CONCRETE FOUNDATION.
- SPREAD REBARS AT CENTER TO CLEAR PIPE SLEEVE BY AT LEAST 100mm. EQUALLY SPACE REBARS ON EITHER SIDE OF SLEEVE.
- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.

TYPICAL INSTALLATION DRAWING

03	06-21-94	CAB	REVISED NOTES.			
02	07-28-88	RLO	REDRAWN, CONSOLIDATED SHT-1A2 TO SHT-1. ADDED TYP. INSTALL. NOTE.	ORIGINAL SIGNED	ORIGINAL SIGNED	ORIGINAL SIGNED
REV. NO.	DATE	BY	DESCRIPTION	CHKD	CERT.	APPD.
FOR ARABIAN AMERICAN OIL COMPANY						
DRAWN BY N.J. FERNANDEZ CHECKED BY NAK 9/9/73 SCALE: NONE						
DATE STARTED DATE COMPLETED 08-30-73						
OPRG. DEPT. ENG. DEPT. ORIGINAL SIGNED						
APPD. FOR CONST. 09-18-73						
THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION OR FOR ORDERING MATERIAL UNLESS CERTIFIED AND DATED						
CERTIFIED ORIGINAL CERTIFIED DATE 09-24-73						
ANCHORS						
UNRESTRAINED PIPELINES						
STD. DWG. METRIC						
PLANT NO.	INDEX	DRAWING NUMBER		SHT. NO.	REV. NO.	
990	L	AA-036531		001	03	