

1. DESIGN CRITERIA:

- A. SOIL DATA: UNIT WEIGHT = 22 kN/m^3 , $\phi = 35^\circ$
 K_0 (AT REST EARTH PRESSURE COEFFICIENT) = 0.43
- B. CONCRETE * $f'_c = 30 \text{ MPa}$ (PRECAST BOX)

ALL CONCRETE MUST BE PRODUCED WITH CEMENTITIOUS MATERIALS EXHIBITING MODERATE SULFATE RESISTANCE

C. DESIGN: SERVICE LOAD OR LOAD FACTOR DESIGN

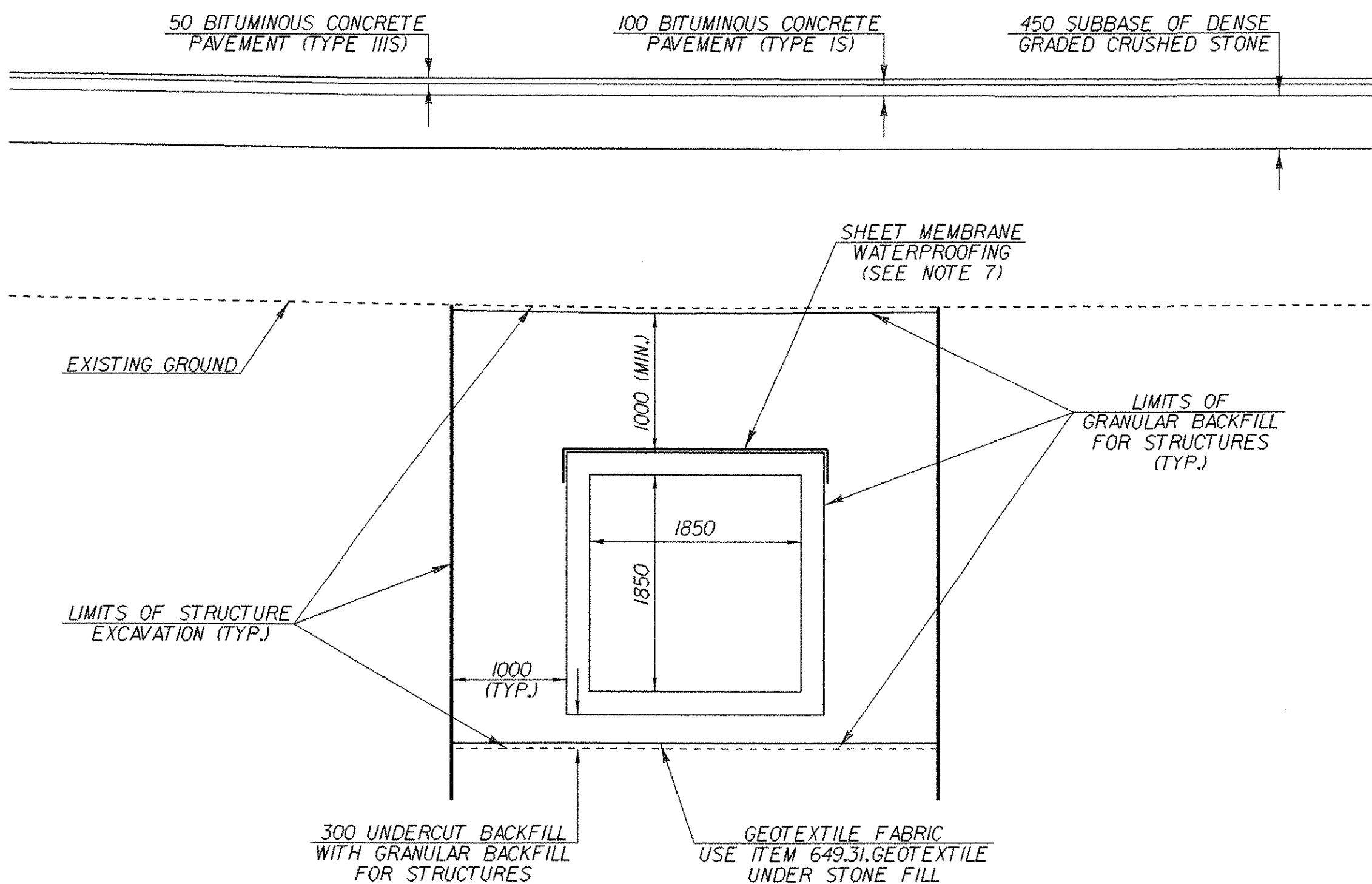
LOAD FACTOR: CAPACITY REDUCTION FACTORS
 SHEAR - $\phi = 0.85$
 BENDING - $\phi = 0.90$

γ AND β FACTORS: (GROUP I LOADING)
 DEAD LOAD $\gamma = 1.3$ $\beta_e = 1.3$ VERT.
 &
 LIVE LOAD $\gamma = 1.3$ $\beta = 1.67$ LATER.

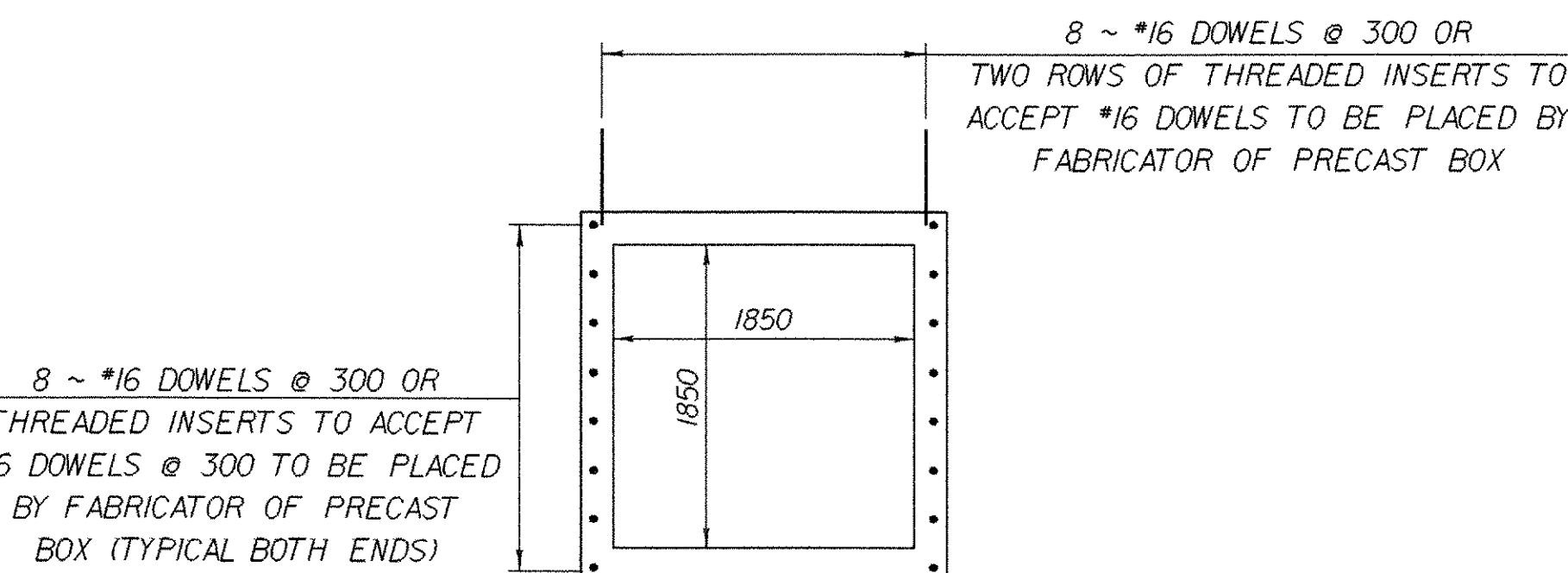
IMPACT - REFER TO AASHTO SECTIONS 3.8 AND 6.4

SERVICE LOAD AND FACTORS: (GROUP I LOADING)
 DEAD LOAD $\gamma = 1.0$ $\beta_e = 1.3$ VERT.
 &
 LIVE LOAD $\gamma = 1.0$ $\beta = 1.0$ LATER.

2. THE PRECAST SECTION SHOWN IS APPROXIMATE. THE ACTUAL SHAPE WILL BE DEPENDENT UPON THE FABRICATOR. MINOR DIFFERENCES FROM THE SHAPE SHOWN ARE ACCEPTABLE. ALL OF THE UNITS SHALL HAVE THE SAME SHAPE. INDIVIDUAL UNIT LENGTHS DEPICTED ON DRAWINGS ARE 2400mm OR 1550mm. OTHER UNIT LENGTHS MAY BE USED BUT A MIN. LENGTH OF 1200mm MUST BE ADHERED TO.
3. THE HEADWALLS AND WINGWALLS SHALL BE CAST IN PLACE WITH CONCRETE HIGH PERFORMANCE, CLASS B.
4. SEE SPECIAL PROVISIONS FOR ADDITIONAL SPECIFICATIONS ON THE PRECAST UNITS.
5. THE EXTERIOR (TOP & SIDES) AND INTERIOR (SIDES & BOTTOM) OF ALL CONCRETE BOX JOINTS ALONG WITH ALL LIFTING HOLES SHALL BE FILLED WITH MORTAR, TYPE IV, AFTER BEING SET IN THEIR FINAL POSITION. ALL MORTAR SHALL BE WET CURED A MIN. OF 24 HRS. PRIOR TO THE WATERPROOFING DESCRIBED IN NOTE NO. 7.
6. THE SIDES AND TOP OF THE INLET AND OUTLET END SECTIONS SHALL BE PROVIDED WITH INSERTS FOR THE INSTALLATION OF DOWEL BARS. DOWELS OR INSERTS SHALL BE PROVIDED BY THE FABRICATOR OF THE PRECAST UNITS AND COSTS WILL BE INCIDENTAL TO THE CONTRACT ITEM 540.10, PRECAST CONCRETE BOX. SEE DETAILS ON THIS SHEET.
7. A 600mm WIDE STRIP OF SHEET MEMBRANE WATERPROOFING SHALL BE APPLIED AT EACH SIDE JOINT. THE MEMBRANE SHALL BE CENTERED ON THE JOINT AND COVER THE FULL HEIGHT OF SIDE JOINTS. THE ENTIRE TOP SHALL THEN BE COVERED WITH MEMBRANE. THE SHEETS SHALL OVERLAP THE EDGES BY 300mm ON EACH SIDE. AFTER MEMBRANE PLACEMENT THE REMAINDER OF THE EXPOSED SIDES SHALL BE COATED WITH TAR EMULSION APPLIED AS PER SECTION 404.06 (a). PAYMENT FOR THE MEMBRANE AND EMULSION WORK SHALL BE BY THEIR RESPECTIVE ITEMS.
8. COSTS FOR ALL MORTAR, TYPE IV USED WILL BE INCIDENTAL TO THE CONTRACT ITEM 540.10, PRECAST CONCRETE BOX.
9. THE GEOTEXTILE FABRIC SHALL BE WRAPPED AROUND THE 300mm UNDERCUT AS SHOWN IN THE TYPICAL BOX SECTION DETAIL ON THIS SHEET.
10. OMIT WEEPHOLES IN ALL PRECAST BOX SECTIONS.
11. 1000mm OF GRANULAR BACKFILL FOR STRUCTURES SHALL BE PROVIDED OVER THE TOP OF THE PRECAST CONCRETE BOXES. IN ACCORDANCE WITH SECTION 601.08 THE PIPES SHALL HAVE A MINIMUM OF 600mm OF GRANULAR BACKFILL FOR STRUCTURES.

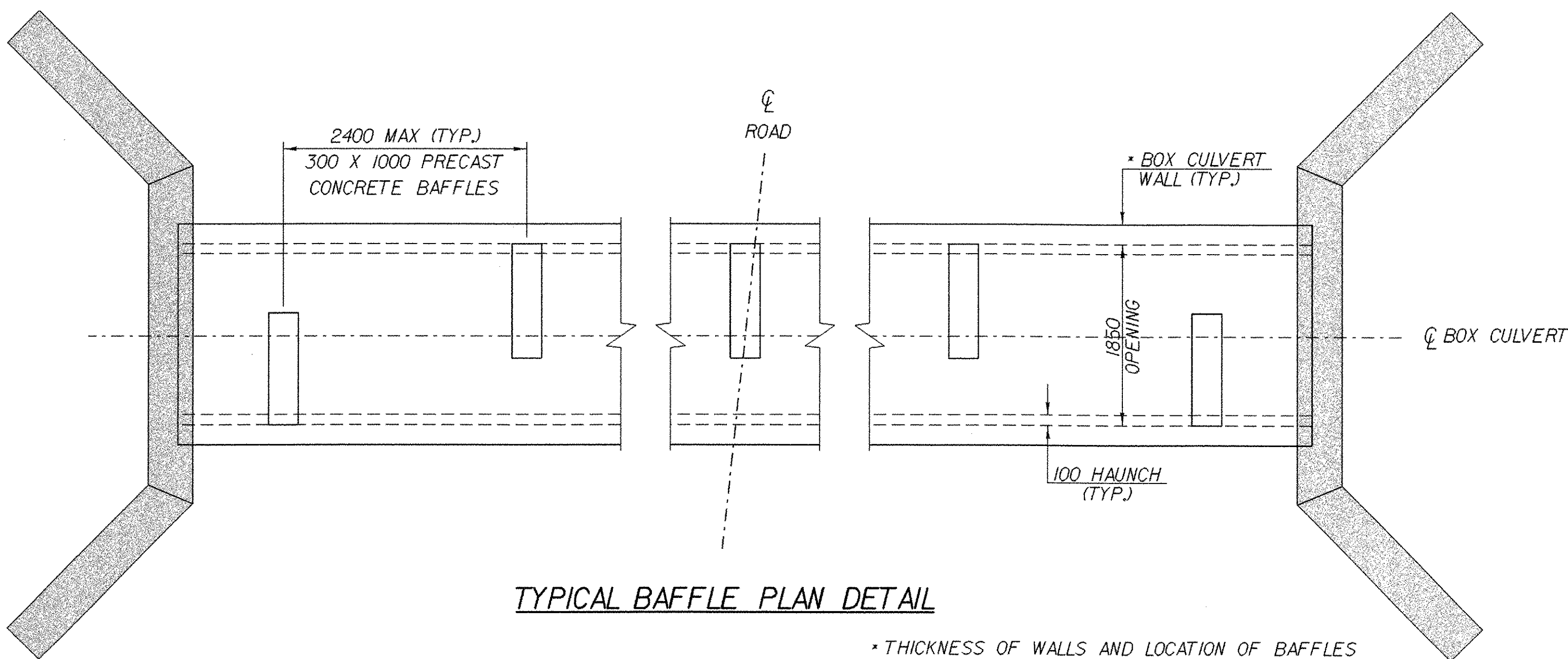


PRECAST BOX SECTION



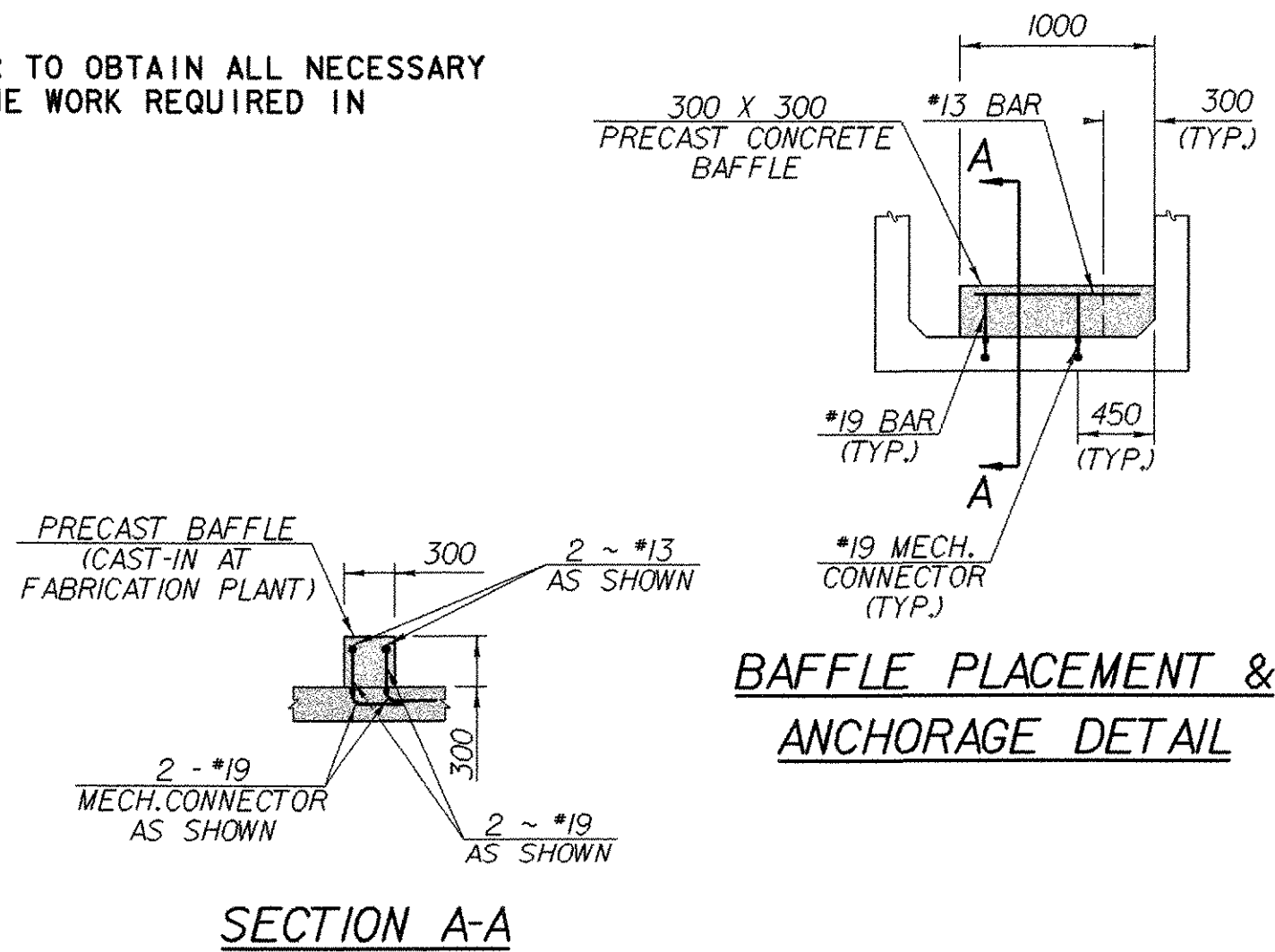
PRECAST BOX DETAIL (END SECTIONS ONLY)

NOTE:
 IT IS THE RESPONSIBILITY OF THE CONTRATOR TO OBTAIN ALL NECESSARY PERMITS AND CLEARANCES ASSOCIATED WITH THE WORK REQUIRED IN THE TEMPORARY RELOCATION OF THE STREAM

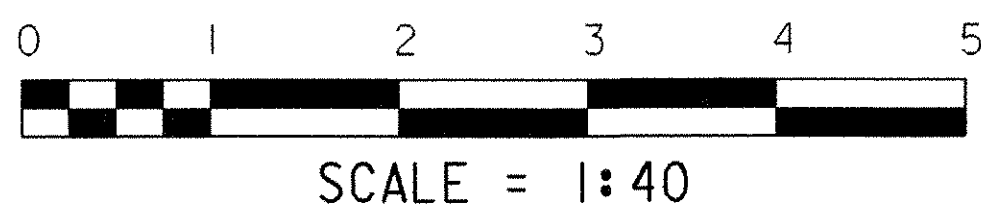


TYPICAL BAFFLE PLAN DETAIL

* THICKNESS OF WALLS AND LOCATION OF BAFFLES TO BE DETERMINED BY THE FABRICATOR.



BAFFLE PLACEMENT & ANCHORAGE DETAIL



FINAL HYDRAULICS REPORT

BOX CULVERT - STA. 2+483.00

DRAINAGE AREA=		313 HA	
02.33=	1.6 cms	HEADWATER ELEVATION=	0.7M
010=	3.4 cms	"	" = 1.2M
025=	4.2 cms	"	" = 1.4M
050=	5.1 cms	"	" = 1.6M
0100=	6.0 cms	"	" = 1.8M

TAILWATER ELEVATION @ 050 = N/A
 OUTLET VELOCITY @ 025 = 2.8 mps
 AT WHAT FREQUENCY IS THE ROADWAY OVERTOPPED? Greater than 0100
 DISCHARGE OVER ROAD @ 0100: N/A
 REQUIRED CHANNEL PROTECTION: Stone Fill Type II

PERMIT INFORMATION

AVERAGE DAILY FLOW:	0.07 cms	DEPTH:	0.1 m
ORDINARY LOW WATER:	0.03 cms	DEPTH:	0.9 m
ORDINARY HIGH WATER:	0.7 cms	DEPTH:	0.9 m

- DESIGN CRITERIA:
- DESIGN LIVE LOAD AASHTO MS 22.5
 - DESIGN SPAN 1850 X 1850 PRECAST BOX CULVERT
 - ALLOWABLE LOAD FOR SPREAD FOOTINGS ON SOIL 190 kPa ON LEDGE N/A
 - ALLOWABLE LOAD FOR PILING N/A TYPE N/A ESTIMATED LENGTH N/A
 - STRUCTURAL STEEL AASHTO GRADE N/A
 - REINFORCING STEEL GRADE 420
 - CONCRETE HIGH PERFORMANCE, CLASS B $f'_c = 25 \text{ MPa}$

TRAFFIC MAINTENANCE:
 1. IS TRAFFIC TO BE MAINTAINED? YES

BOX CULVERT - STA. 3+627.50

DRAINAGE AREA=		270 HA	
02.33=	1.4 cms	HEADWATER ELEVATION= 0.7M	
010=	3.3 cms	"	" = 1.2M
025=	4.1 cms	"	" = 1.3M
050=	4.8 cms	"	" = 1.5M
0100=	5.8 cms	"	" = 1.7M

TAILWATER ELEVATION @ 050 = N/A
 OUTLET VELOCITY @ 025 = 2.8 mps
 AT WHAT FREQUENCY IS THE ROADWAY OVERTOPPED? Greater than 0100
 DISCHARGE OVER ROAD @ 0100: N/A
 REQUIRED CHANNEL PROTECTION: Stone Fill Type II

PERMIT INFORMATION

AVERAGE DAILY FLOW:	0.06 cms	DEPTH:	0.1 m
ORDINARY LOW WATER:	0.03 cms	DEPTH:	0.9 m
ORDINARY HIGH WATER:	0.6 cms	DEPTH:	0.9 m

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TRAFFIC MAINTENANCE:
 1. IS TRAFFIC TO BE MAINTAINED? YES

BOX CULVERT DETAIL SHEET

PROJECT NAME: HIGHGATE-FRANKLIN
 PROJECT NUMBER: STP RS 030(K)SA

FILE NAME: /85c060/str/s85c060ww.dgn PLOT DATE: 09-MAY-2005
 PROJECT LEADER: S. FARNSWORTH DRAWN BY: R. PELLETT
 DESIGNED BY: M. FOWLER CHECKED BY: G. SPILAK
 sc060box.i SHEET 232 OF 450