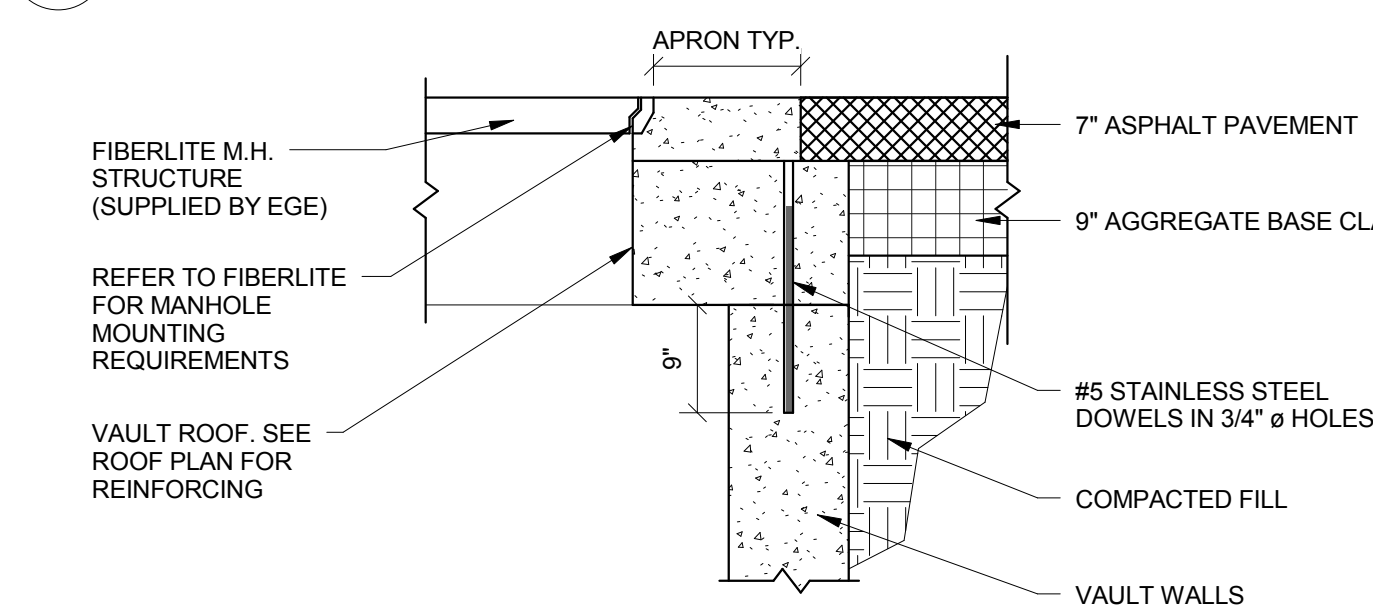


1 WEST WASHINGTON AND 1ST ALLEY PLAN VIEW
3/8" = 1'-0"



4 MANHOLE APRON AND ROAD WAY REPAIR DETAIL
3/4" = 1'-0"

DEMOLITION QUANTITIES		
ITEM	UNIT	EST. QTY.
SAWCUT AND REMOVE ROADWAY SURFACE OVER NEW VAULT	SQ. FT	104
SAWCUT AND REMOVE CURB AND GUTTER OVER NEW VAULT	SQ. FT	26
EXCAVATE FOR NEW VAULT	LS	1

CONSTRUCTION QUANTITIES		
ITEM	UNIT	EST. QTY.
MOBILIZATION	LS	1
SUPPLY AND INSTALL STAINLESS STEEL DOWELS FOR ROOF CONNECTION	EA	12
SUPPLY AND INSTALL VAULT ROOF INCLUDING STAINLESS STEEL REINFORCING *	C.Y.	1.3
INSTALL MANHOLE RINGS COVERS AND APRONS	EA	1
FORM AND CAST FLOOR	C.Y.	1.9
REBUILD ROADWAY TO MATCH EXISTING	SQ. FT.	84
FORM AND CAST WALLS (FINAL HEIGHT TO BE DETERMINED IN FIELD)*	C.Y.	4.6
FORM WALLS AND FLOOR AROUND EXISTING THRUST BLOCK	LS	1
PROVIDE AND INSTALL PIPE SLEEVES FOR STEAM PIPE	EA	2
PROVIDE AND PLACE / COMPACT GRANULAR FILL	C.Y.	11
CLEAN AND SANDBLAST (E) VAULT WALL	LS	1

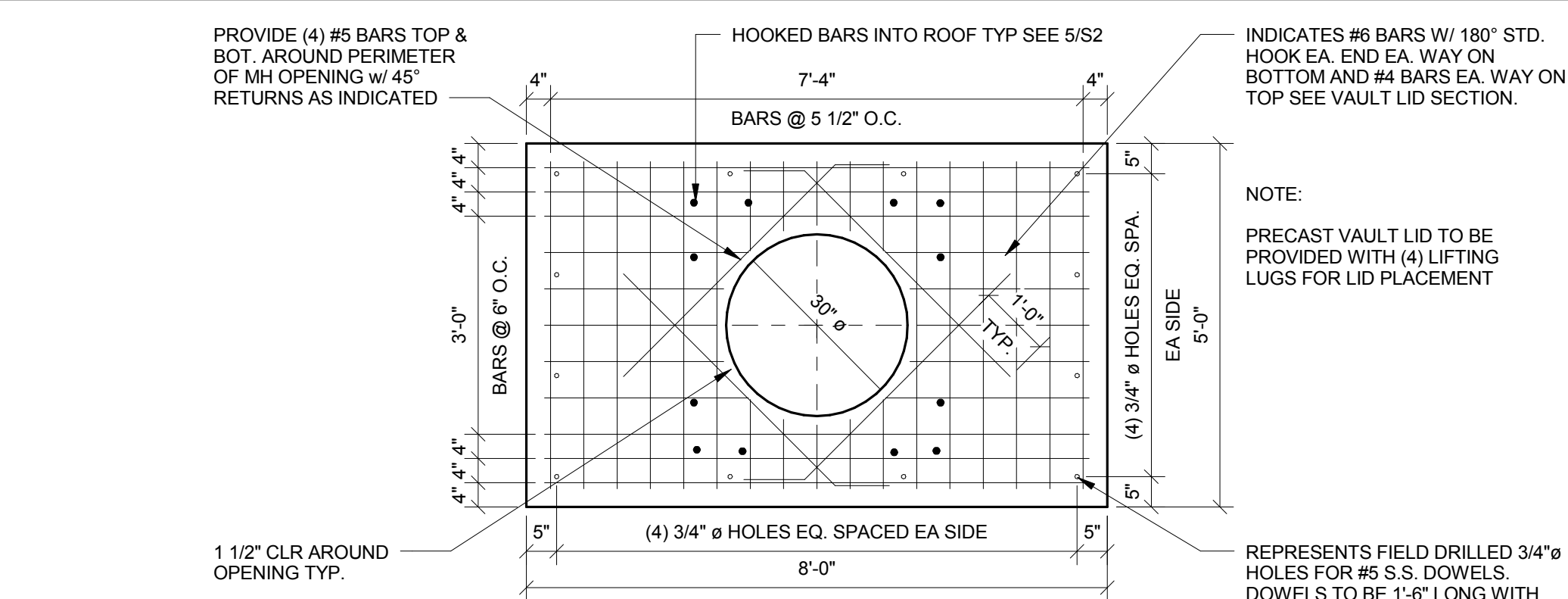
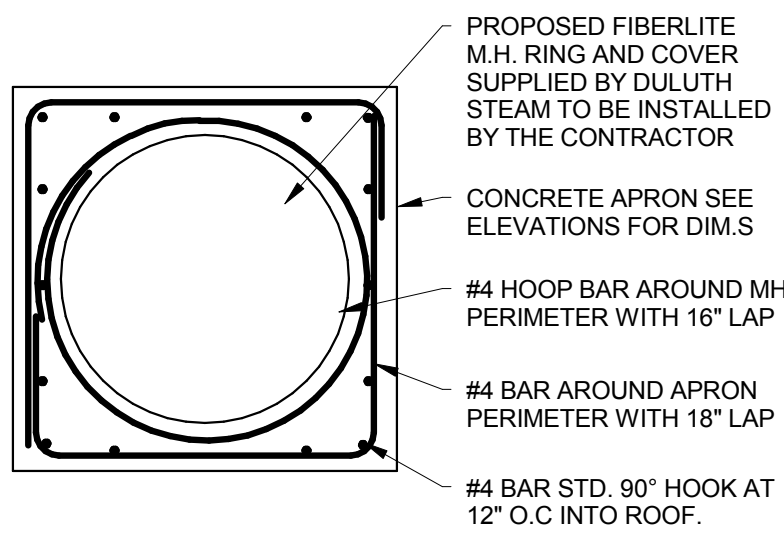
* USE APPROVED ARROWHEAD CONCRETE MIX FOR HIGH TEMPERATURE APPLICATIONS

NOTE: BIDDERS SHALL INCLUDE UNIT PRICES FOR THE BID ITEMS ABOVE. CONTRACTOR WILL BE PAID AT THE UNIT BID PRICE ONLY FOR THOSE QUANTITIES ABOVE THE ESTIMATED QUANTITIES SHOWN

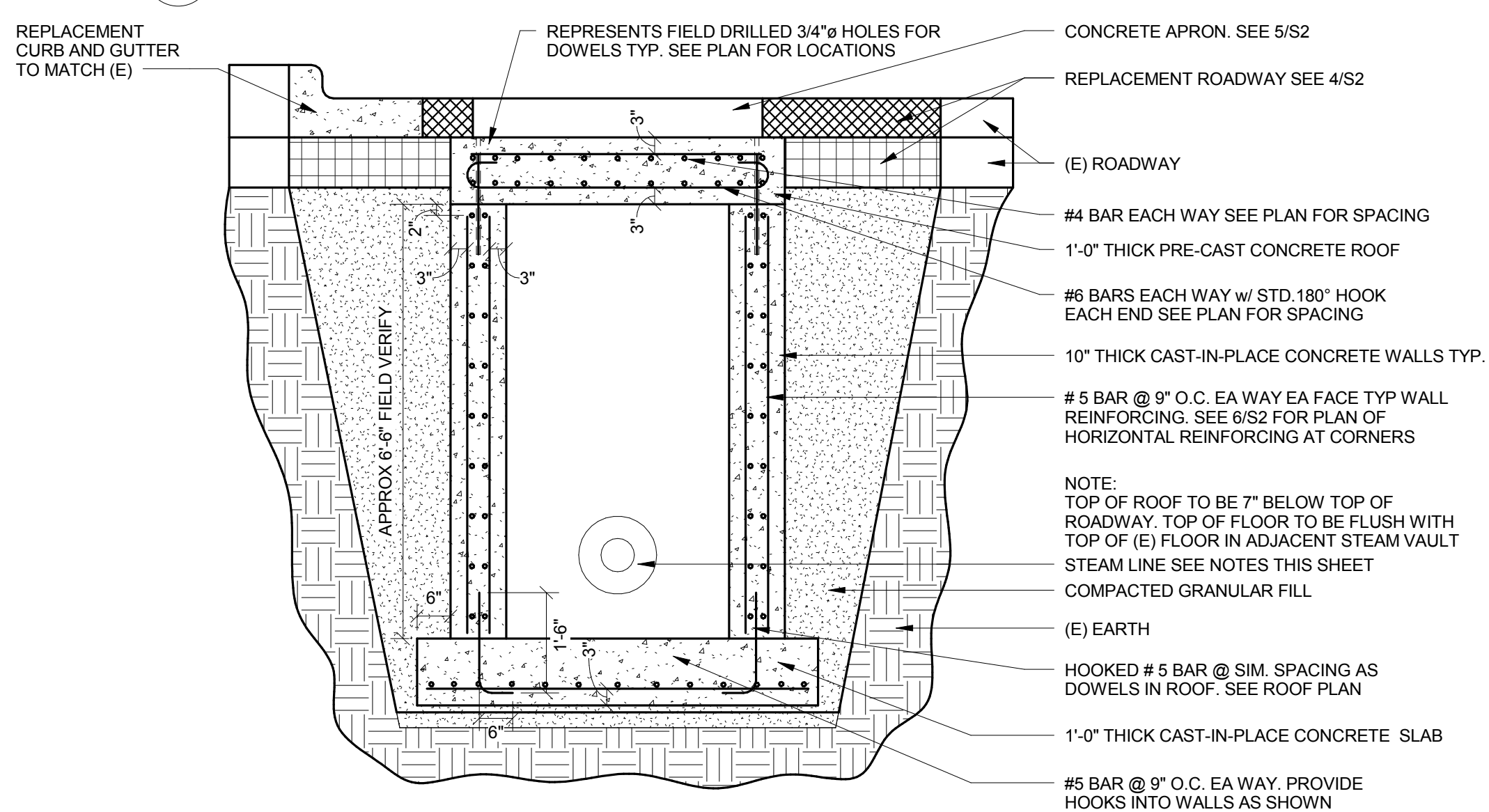
NOTES:

- SEE S1 FOR GENERAL NOTES AND SPECIFICATIONS
- DO NOT SCALE DRAWINGS. SCALE IS FOR DESIGN REFERENCE ONLY
- CONTRACTOR IS RESPONSIBLE SHORING AND BRACING
- NOTIFY ENGINEER OF DISCREPANCIES OR DAMAGE PRIOR TO PROCEEDING WITH WORK
- SUBSTITUTIONS FOR FASTENERS OR MATERIALS SHALL BE DONE IN WRITING
- THE WORK COVERED BY THESE PLANS INCLUDES THE EXCAVATION AND PREPARATION FOR AND CONSTRUCTION OF A VAULT AROUND A NEW STEAM PIPE JOINT.
- SEE MECHANICAL DRAWING M1 BY FJJ FOR STEAM PIPE AND PIPE COMPONENTS WORK DESCRIPTION
- PROVIDE PIPE SLEEVES AROUND STEAM PIPE
- FORM EAST WALL AND FLOOR AROUND EXISTING CONCRETE THRUST BLOCK LOCATED JUST OUTSIDE OF EXISTING STEAM VAULT. EXACT SIZE AND LOCATION UNKNOWN. NOTIFY ENGINEER OF POURING PLAN ONCE EXPOSED.
- POUR EAST WALL OF JOINT VAULT AGAINST WEST WALL OF EXISTING STEAM VAULT. PREP. SURFACE OF EXISTING VAULT WALL BY REMOVING DIRT AND LOOSE MATERIAL AND SANDBLASTING. WET EXISTING WALL TO A "SATURATED-SURFACE DRY" CONDITION PRIOR TO POURING NEW WALL

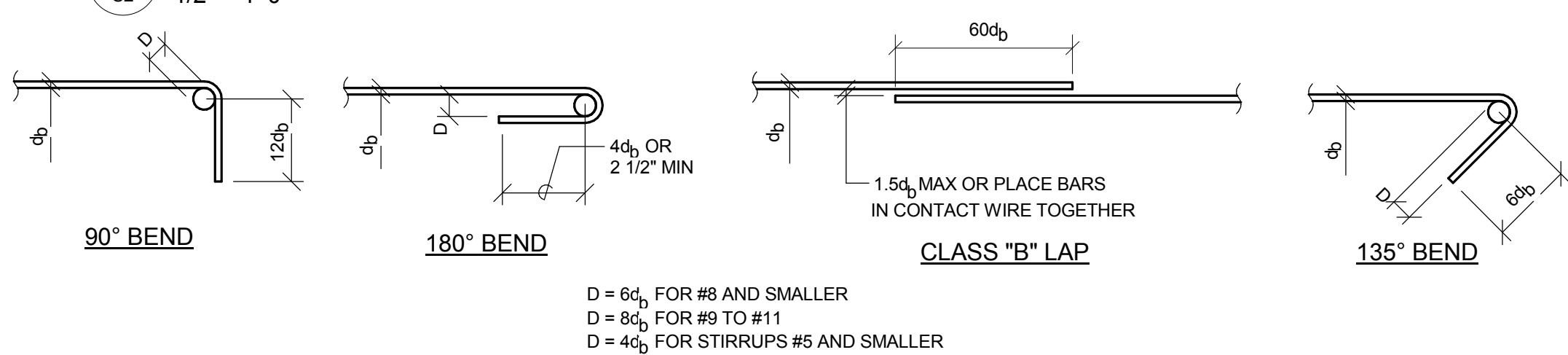
5 TYPICAL MANHOLE APRON REINFORCING PLAN
1/2" = 1'-0"



2 VAULT ROOF PLAN
1/2" = 1'-0"



3 TYP. VAULT SECTION LOOKING WEST
1/2" = 1'-0"

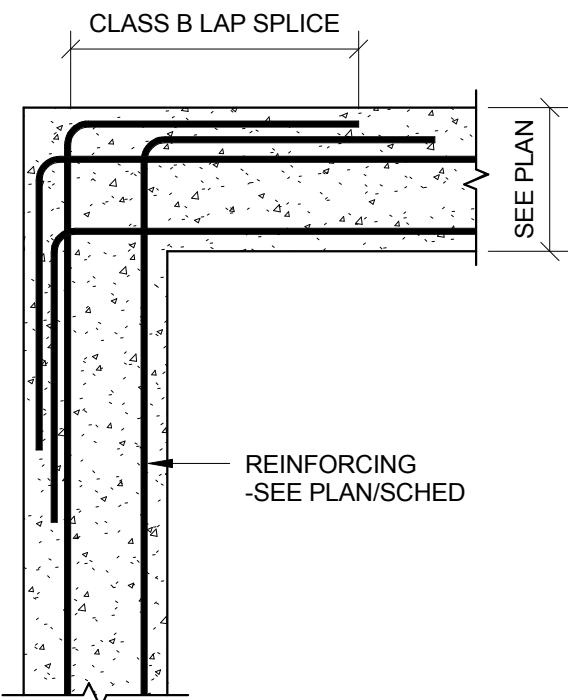


7 TYPICAL CONCRETE REINFORCING DETAILS
3/4" = 1'-0"

MINIMUM SPLICE AND EMBEDMENT LENGTHS					
CONCRETE STRENGTH = 4000 PSI BAR STRENGTH = 60,000 PSI					
Type	Lap Splice		Embedment		
Bar Size	Vertical Bar or Bottom Bar	Horizontal Bar	Vertical Bar or Bottom Bar	Horizontal Bar	Standard Hook
3	19	24	15	19	6
4	25	32	19	25	7
5	31	40	24	31	9
6	37	48	29	37	10
7	54	70	42	54	12
8	62	80	48	62	14
9	70	91	54	70	15

- TABULATED VALUES ARE BASED ON GRADE 60 REINFORCING BARS AND NORMAL-WEIGHT CONCRETE. THEY ARE TYPICAL MINIMUM VALUES TO BE USED UNLESS NOTED OTHERWISE WITHIN THE PLANS. LENGTHS ARE IN INCHES.
- BOTTOM HORIZONTAL BARS MUST BE CAST WITHIN THE BOTTOM 12" OF THE CONCRETE POUR
- LENGTHS ARE FOR CENTER TO CENTER BAR SPACING GREATER THAN OR EQUAL TO 2 BAR DIAMETERS AND CLEAR COVER GREATER THAN OR EQUAL TO ONE BAR DIAMETER. INCREASE THE TABULATED VALUES BY 50% FOR ALL OTHER CASES.
- ALL LAP SPLICES ARE ASSUMED TO BE CLASS B TYPE. TABULATED VALUES MAY BE REDUCED BY 25% FOR ALL CLASS A SPLICES AS APPROVED AS A REQUEST ON SHOP DRAWINGS
- FOR EPOXY COATED BARS, INCREASE THE TABULATED VALUES BY 20%
- LENGTHS SHOWN ARE FOR SIDE CONCRETE COVER GREATER THAN OR EQUAL TO 2 1/2" AND END CONCRETE COVER GREATER THAN OR EQUAL TO 2"

6 TYPICAL CONCRETE CORNER REINFORCING DETAIL (PLAN)
3/4" = 1'-0"



I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY CLOSE PERSONAL SUPERVISION AND THAT I AM A LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA
NAME: LEE C. M. WATERS
SIGNATURE: [Signature]
DATE: 9/24/13
LIC. NO. 50862

Revision Schedule		Description		By	
#	Date	Description	Issued For Construction	Graphical Revisions Only	
1	9/24/13	GRAPHICAL REVISIONS ONLY			

STEAM LINE INSTALLATION -
DULUTH STEAM
1ST ALLEY & 7TH AVE. E.
DULUTH, MN
STRUCTURAL PLAN AND DETAILS

JOB No: 131164
DATE: 9/11/13
DRAWN BY:
CHECKED BY: LCMW

SHEET:
S2