

N.T.S.

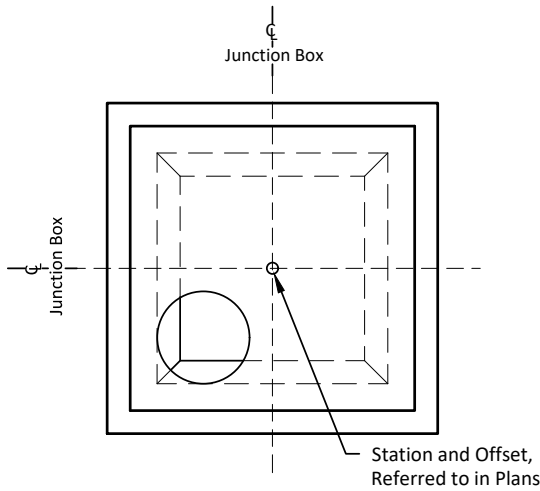
CITY OF RAPID CITY

PUBLIC WORKS DEPARTMENT

PRECAST STORM SEWER MANHOLE

DATE: 8-19-22

Sec. - Sht.
63-1

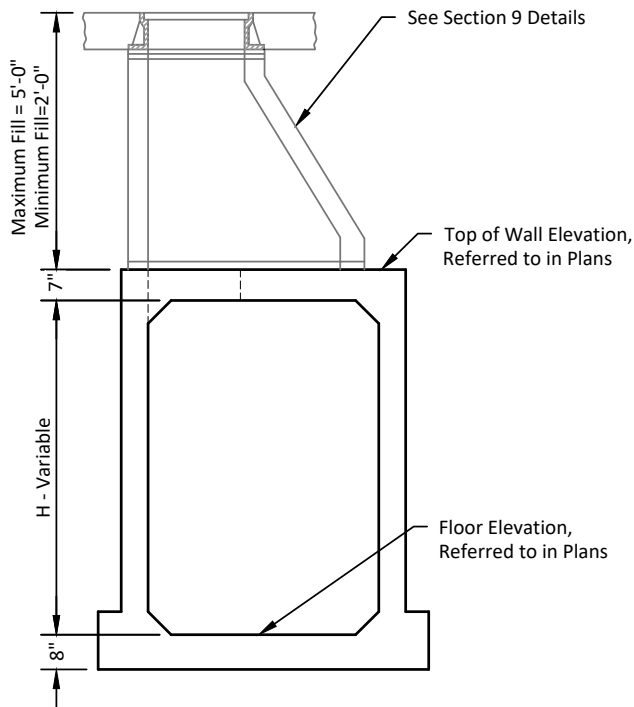


Specifications:

1. Design Specifications: AASHTO LRFD Bridge Design Specifications 2012 Edition.
2. Construction Specifications: City of Rapid City Standard Specifications, Current Edition.

Notes:

1. Design Live Load: HL-93 loading. No construction loading in excess of legal load was considered.
2. The dimension of H is in feet. Maximum H is 8'.
3. The design of the junction box is based on a minimum fill over the junction box of 2' and maximum fill over the junction box of 5'.
4. Junction box may be precast. If precast junction box is used, and details differ from shown, the precast junction box shall receive prior approval by the City. To qualify for alternate design approval, submit: a checked design by a South Dakota Registered Professional Engineer, and shop plans to the City of Rapid City. Design shall be in accordance with the current edition of the AASHTO LRFD Bridge Design Specifications.
5. All pipes entering junction box must fit between the inside face of walls and shall not enter through the corners.
6. Reinforcing steel shall conform to ASTM A615 grade 60. Cut and bend reinforcing steel as required to place pipe(s) through junction box wall.
7. Use 1" clear cover on all reinforcing steel unless otherwise noted.



PIPE DISPLACEMENT REDUCTIONS		
Diameter (Inches)	Wall T (Inches)	Class M6 Concrete (Cu. Yd.)
12	2	0.03
15	2 1/4	0.04
18	2 1/2	0.05
24	3	0.09
30	3 1/2	0.14
36	4	0.20
42	4 1/2	0.26
48	5	0.34
54	5 1/2	0.43

ESTIMATED QUANTITIES		
Item	*Class M6 Concrete	Reinforcing Steel
Unit	Cu. Yd.	Lb.
H = 4' - 0"	4.37	821
H = 4' - 6"	4.61	846
H = 5' - 0"	4.85	908
H = 5' - 6"	5.10	933
H = 6' - 0"	5.34	958
H = 6' - 6"	5.58	1020
H = 7' - 0"	5.82	1045
H = 7' - 6"	6.06	1071
H = 8' - 0"	6.30	1132

*Quantity shown includes reduction for a 24" diameter manhole opening.

N.T.S.

CITY OF RAPID CITY

PUBLIC WORKS DEPARTMENT

5' x 5' JUNCTION BOX

DATE: 8-19-22

Sec. - Sht.
63-2a

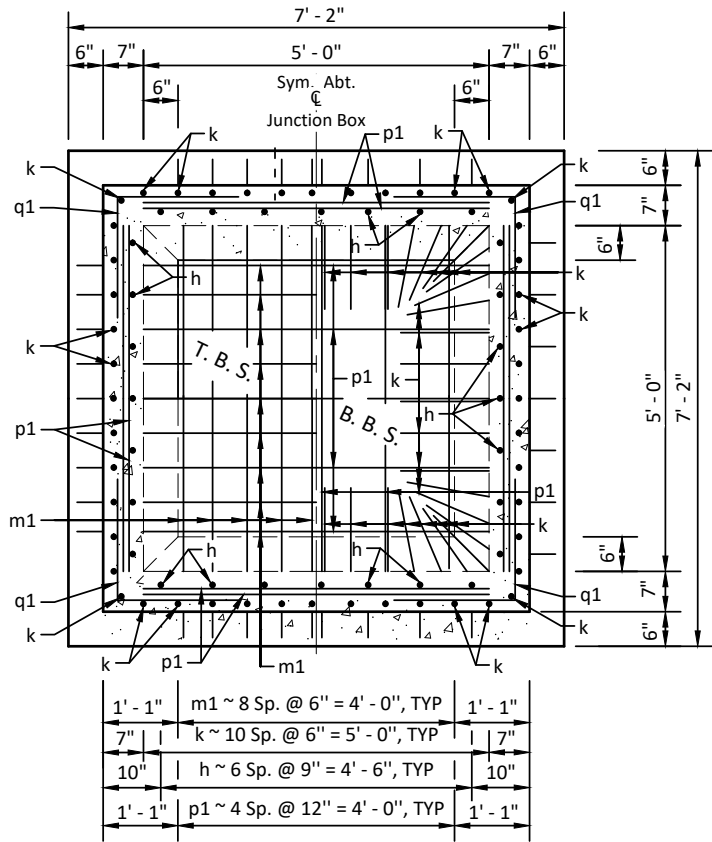
REINFORCING SCHEDULE

						Bending Details										
Mk.	No.	Size	Length	Type		Mk.	No.	Size	Length	Type	Mk.	No.	Size	Length	Type	
H = 4'-0"	a1	1	6	9'-0"	T3		a1	1	6	9'-0"	T3	a1	1	6	9'-0"	T3
	h3	28	4	5'-9"	17A		h10	28	4	9'-3"	17A	h11	28	4	9'-9"	17A
	k3	48	4	8'-6"	17		k10	48	4	12'-0"	17	k11	48	4	12'-6"	17
	m1	18	5	6'-9"	Str.		m1	18	5	6'-9"	Str.	m1	18	5	6'-9"	Str.
	n1	18	5	5'-9"	Str.		n1	18	5	5'-9"	Str.	n1	18	5	5'-9"	Str.
	p1	52	4	5'-0"	Str.		p1	68	4	5'-0"	Str.	p1	76	4	5'-0"	Str.
q1	8	4	3'-6"	17A	q1		16	4	3'-6"	17A	q1	20	4	3'-6"	17A	
H = 4'-6"	a1	1	6	9'-0"	T3											
	h4	28	4	6'-3"	17A											
	k4	48	4	9'-0"	17											
	m1	18	5	6'-9"	Str.											
	n1	18	5	5'-9"	Str.											
	p1	52	4	5'-0"	Str.											
q1	8	4	3'-6"	17A												
H = 5'-0"	a1	1	6	9'-0"	T3											
	h5	28	4	6'-9"	17A											
	k5	48	4	9'-6"	17											
	m1	18	5	6'-9"	Str.											
	n1	18	5	5'-9"	Str.											
	p1	52	4	5'-0"	Str.											
q1	8	4	3'-6"	17A												
H = 5'-6"	a1	1	6	9'-0"	T3											
	h6	28	4	7'-3"	17A											
	k6	48	4	10'-0"	17											
	m1	18	5	6'-9"	Str.											
	n1	18	5	5'-9"	Str.											
	p1	60	4	5'-0"	Str.											
q1	12	4	3'-6"	17A												
H = 6'-0"	a1	1	6	9'-0"	T3											
	h7	28	4	7'-9"	17A											
	k7	48	4	10'-6"	17											
	m1	18	5	6'-9"	Str.											
	n1	18	5	5'-9"	Str.											
	p1	60	4	5'-0"	Str.											
q1	12	4	3'-6"	17A												
H = 6'-6"	a1	1	6	9'-0"	T3											
	h8	28	4	8'-3"	17A											
	k8	48	4	11'-0"	17											
	m1	18	5	6'-9"	Str.											
	n1	18	5	5'-9"	Str.											
	p1	68	4	5'-0"	Str.											
q1	16	4	3'-6"	17A												
H = 7'-0"	a1	1	6	9'-0"	T3											
	h9	28	4	8'-9"	17A											
	k9	48	4	11'-6"	17											
	m1	18	5	6'-9"	Str.											
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LEGEND FOR PLACING RE-STEEL

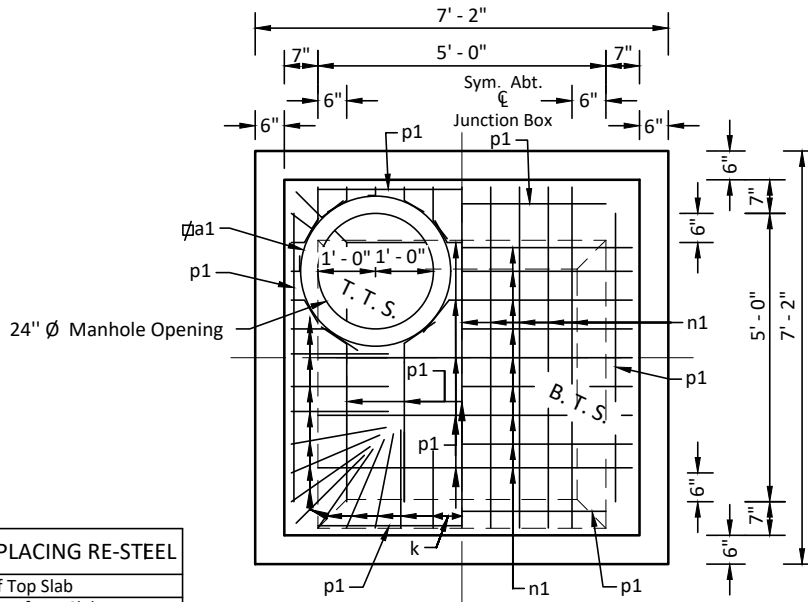
T. B. S. - Top of Bottom Slab
 B. B. S. - Bottom of Bottom Slab

Locate in center of top slab with 3" clearance at manhole opening.
 All dimensions are out to out of bars.

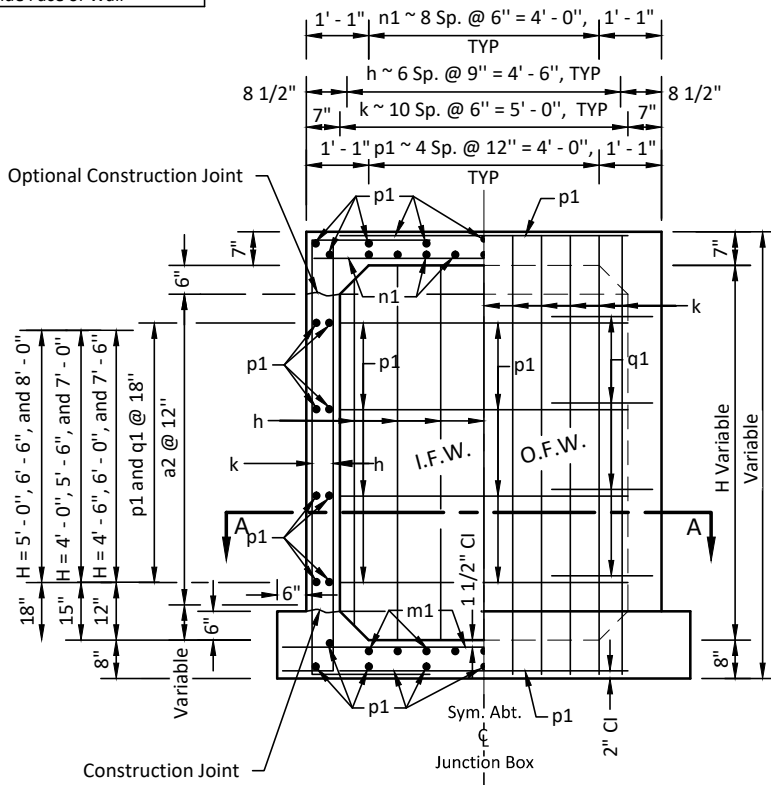


SEC. A - A

N.T.S.

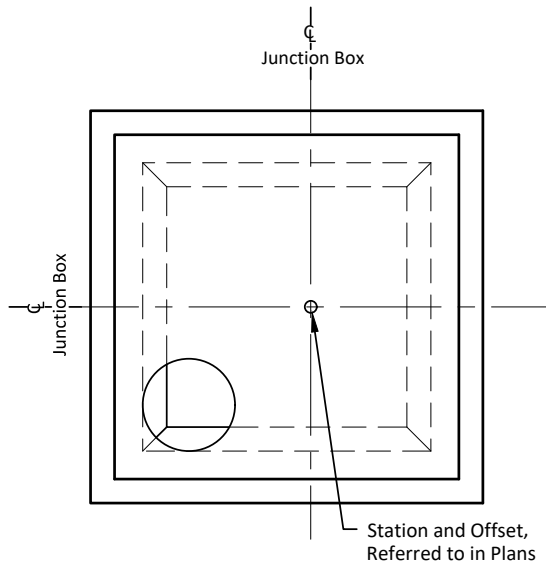


LEGEND FOR PLACING RE-STEEL	
T. T. S.	- Top of Top Slab
B. T. S.	- Bottom of Top Slab
O. F. W.	- Outside Face of Wall
I. F. W.	- Inside Face of Wall



N.T.S.

5' x 5' JUNCTION BOX

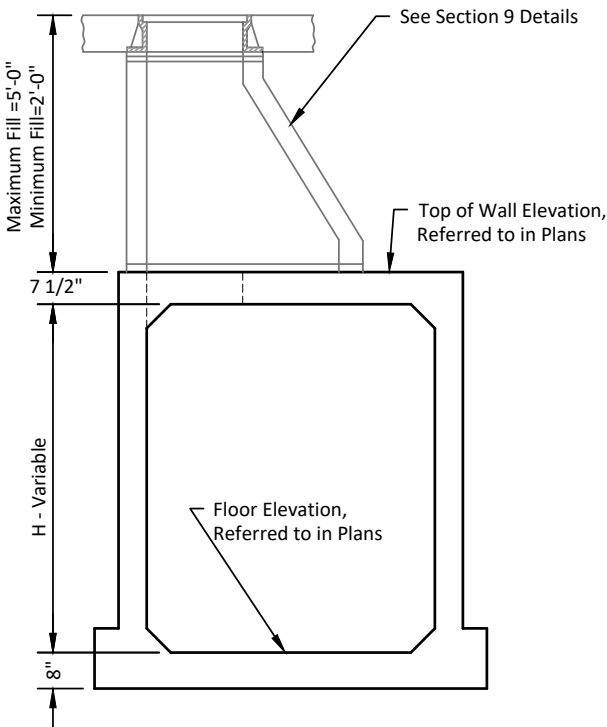


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ESTIMATED QUANTITIES		
Item	*Class M6 Concrete	Reinforcing Steel
UNIT	Cu. Yd.	Lb.
H = 4' - 0"	5.53	1186
H = 4' - 6"	5.82	1215
H = 5' - 0"	6.10	1286
H = 5' - 6"	6.39	1316
H = 6' - 0"	6.67	1345
H = 6' - 6"	6.96	1416
H = 7' - 0"	7.24	1445
H = 7' - 6"	7.52	1475
H = 8' - 0"	7.81	1545

* Quantity shown includes reduction for a 24" diameter manhole opening.

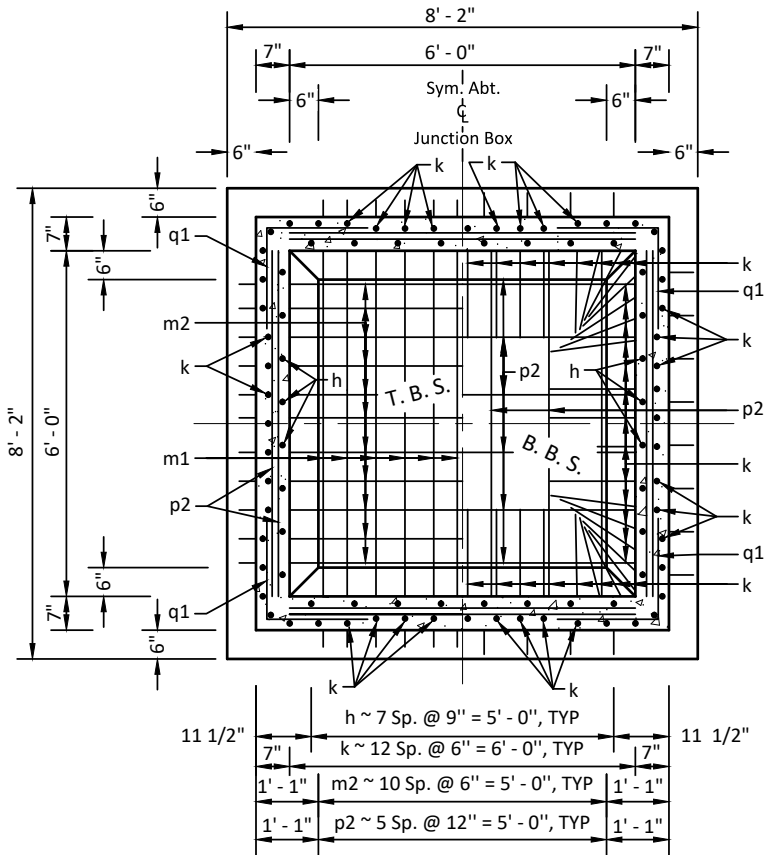
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REINFORCING SCHEDULE

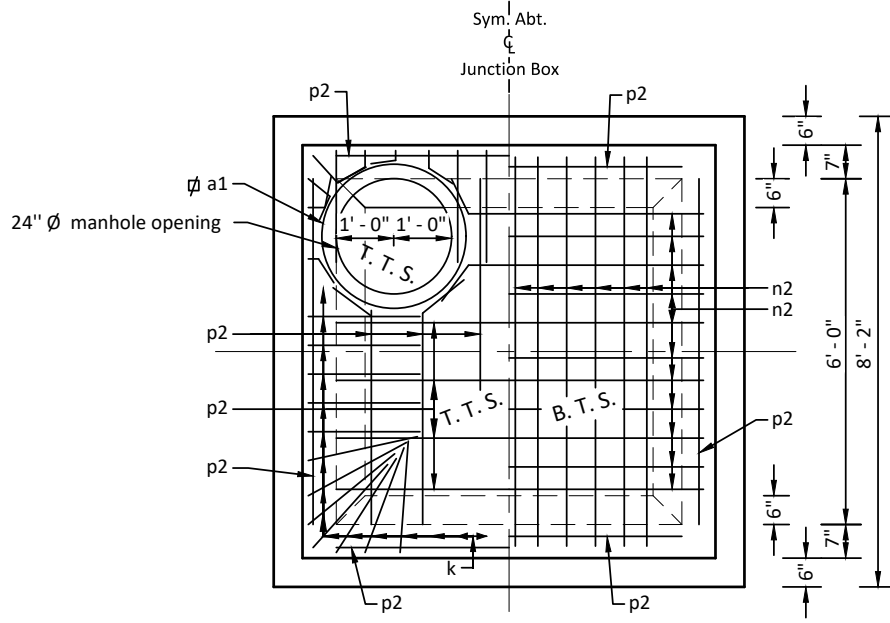
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h24	32	4	9'-9"	17A																																																																						
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LEGEND FOR PLACING RE-STEEL
 T. B. S. - Top of Bottom Slab
 B. B. S. - Bottom of Bottom Slab

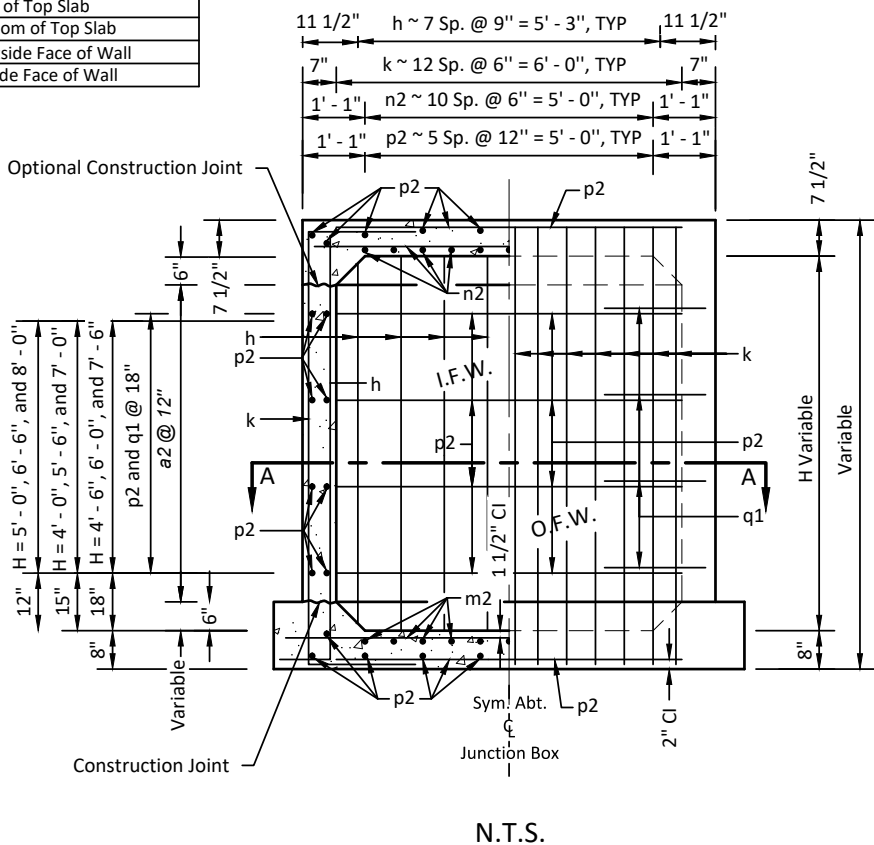
∅ a1 Locate in center of top slab with 3" clearance at manhole opening.
 All dimensions are out to out of bars.



N.T.S.

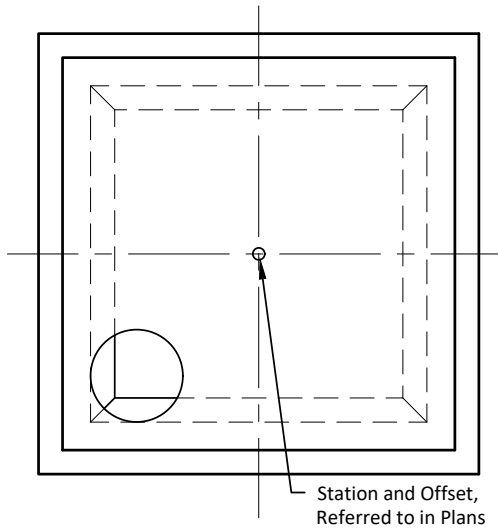


LEGEND FOR PLACING RE-STEEL	
T. T. S. -	Top of Top Slab
B. T. S. -	Bottom of Top Slab
O. F. W. -	Outside Face of Wall
I. F. W. -	Inside Face of Wall



N.T.S.

6' x 6' JUNCTION BOX

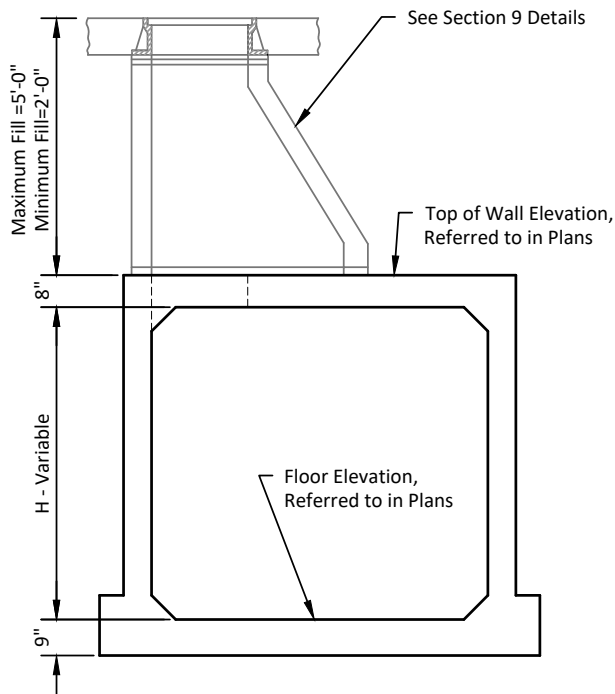


Specifications:

1. Design Specifications: AASHTO LRFD Bridge Design Specifications 2012 Edition.
2. Construction Specifications: City of Rapid City Standard Specifications, Current Edition.

Notes:

1. Design Live Load: HL-93 loading. No construction loading in excess of legal load was considered.
2. The dimension of H is in feet. Maximum H is 8'.
3. The design of the junction box is based on a minimum fill over the junction box of 2' and maximum fill over the junction box of 5'.
4. Junction box may be precast. If precast junction box is used, and details differ from shown, the precast junction box shall receive prior approval by the City. To qualify for alternate design approval, submit: a checked design by a South Dakota Registered Professional Engineer, and shop plans to the City of Rapid City. Design shall be in accordance with the current edition of the AASHTO LRFD Bridge Design Specifications.
5. All pipes entering junction box must fit between the inside face of walls and shall not enter through the corners.
6. Reinforcing steel shall conform to ASTM A615 grade 60. Cut and bend reinforcing steel as required to place pipe(s) through junction box wall.
7. Use 1" clear cover on all reinforcing steel unless otherwise noted.



PIPE DISPLACEMENT REDUCTIONS

	Diameter (Inches)	Wall T (Inches)	Class M6 Concrete (Cu. Yd.)
R.C.P.	12	2	0.03
	15	2 1/4	0.04
	18	2 1/2	0.05
	24	3	0.09
	30	3 1/2	0.14
	36	4	0.20
	42	4 1/2	0.26
	48	5	0.34
	54	5 1/2	0.43

ESTIMATED QUANTITIES

Item	*Class M6 Concrete	Reinforcing Steel
	UNIT	UNIT
	Cu. Yd.	Lb.
H = 4' - 0"	7.09	1506
H = 4' - 6"	7.42	1541
H = 5' - 0"	7.75	1622
H = 5' - 6"	8.08	1657
H = 6' - 0"	8.40	1692
H = 6' - 6"	8.73	1773
H = 7' - 0"	9.06	1808
H = 7' - 6"	9.39	1843
H = 8' - 0"	9.71	1924

*Quantity shown includes reduction for a 24-inch diameter manhole opening.

N.T.S.

CITY OF RAPID CITY

PUBLIC WORKS DEPARTMENT

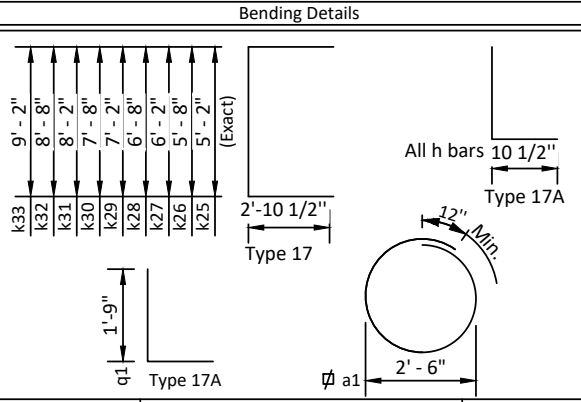
7' x 7' JUNCTION BOX

DATE: 8-19-22

Sec. - Sht.
63-4a

REINFORCING SCHEDULE

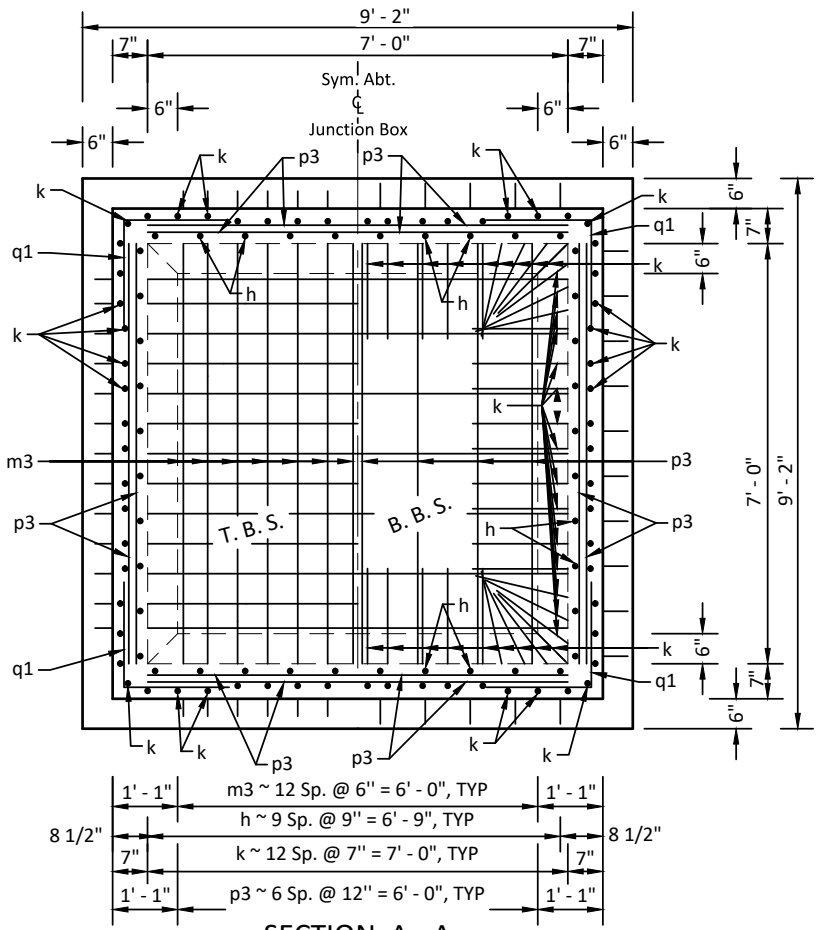
Mk.	No.	Size	Length	Type
H = 4'-0"				
∅ a1	1	6	9'-0"	T3
h25	40	4	5'-9"	17A
k25	64	4	9'-3"	17
m3	26	6	8'-9"	Str.
n3	26	6	7'-9"	Str.
p3	60	4	7'-0"	Str.
q3	8	4	3'-6"	17A
H = 4'-6"				
∅ a1	1	6	9'-0"	T3
h26	40	4	6'-3"	17A
k26	64	4	9'-9"	17
m3	26	6	8'-9"	Str.
n3	26	6	7'-9"	Str.
p3	60	4	7'-0"	Str.
q1	8	4	3'-6"	17A
H = 5'-0"				
∅ a1	1	6	9'-0"	T3
h27	40	4	6'-9"	17A
k27	64	4	10'-3"	17
m3	26	6	8'-9"	Str.
n3	26	6	7'-9"	Str.
p3	68	4	7'-0"	Str.
q1	12	4	3'-6"	17A
H = 5'-6"				
∅ a1	1	6	9'-0"	T3
h28	40	4	7'-3"	17A
k28	64	4	10'-9 3/4"	17
m3	26	6	8'-9"	Str.
n3	26	6	7'-9"	Str.
p3	68	4	7'-0"	Str.
q1	12	4	3'-6"	17A
H = 6'-0"				
∅ a1	1	6	9'-0"	T3
h29	40	4	7'-9"	17A
k29	64	4	11'-3"	17
m3	26	6	8'-9"	Str.
n3	26	6	7'-9"	Str.
p3	68	4	7'-0"	Str.
q1	12	4	3'-6"	17A
H = 6'-6"				
∅ a1	1	6	9'-0"	T3
h30	40	4	8'-3"	17A
k30	64	4	11'-9"	17
m3	26	6	8'-9"	Str.
n3	26	6	7'-9"	Str.
p3	76	4	7'-0"	Str.
q1	16	4	3'-6"	17A
H = 7'-0"				
∅ a1	1	6	9'-0"	T3
h31	40	4	8'-9"	17A
k31	64	4	12'-3"	17
m3	26	6	8'-9"	Str.
n3	26	6	7'-9"	Str.
p3	76	4	7'-0"	Str.
q1	16	4	3'-6"	17A



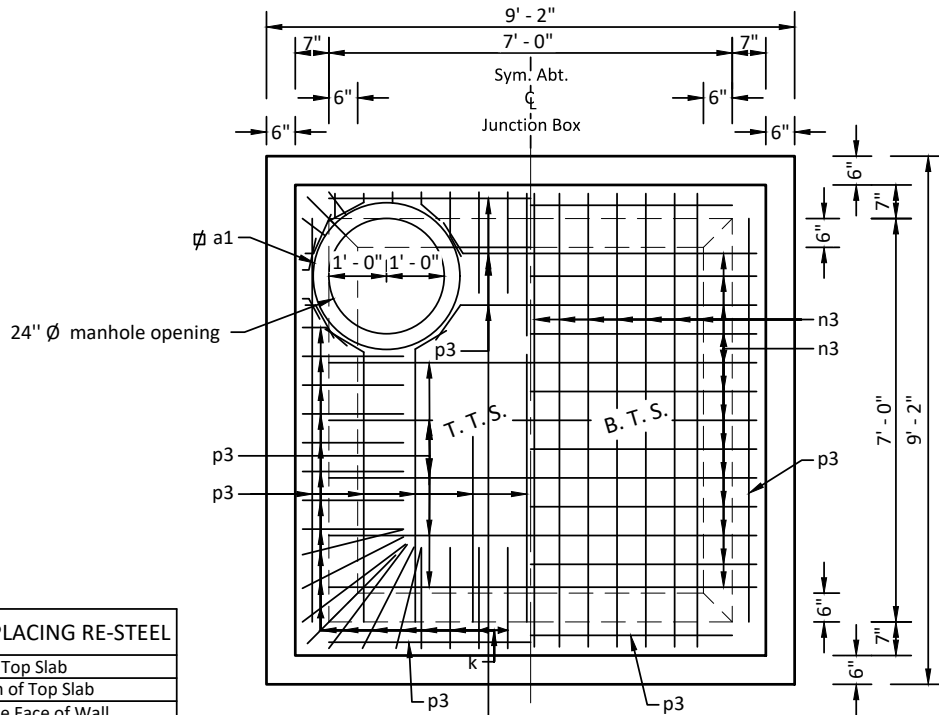
Mk.	No.	Size	Length	Type
H = 7'-6"				
∅ a1	1	6	9'-0"	T3
h32	40	4	9'-3"	17A
k32	64	4	12'-9"	17
m3	26	6	8'-9"	Str.
n3	26	6	7'-9"	Str.
p3	76	4	7'-0"	Str.
q1	16	4	3'-6"	17A
H = 8'-0"				
∅ a1	1	6	9'-0"	T3
h33	40	4	9'-9"	17A
k33	64	4	13'-3"	17
m3	26	6	8'-9"	Str.
n3	26	6	7'-9"	Str.
p3	84	4	7'-0"	Str.
q1	20	4	3'-6"	17A

LEGEND FOR PLACING RE-STEEL
 T. B. S. - Top of Bottom Slab
 B. B. S. - Bottom of Bottom Slab

∅ Locate in center of top slab with 3" clearance at manhole opening.
 All dimensions are out to out of bars.

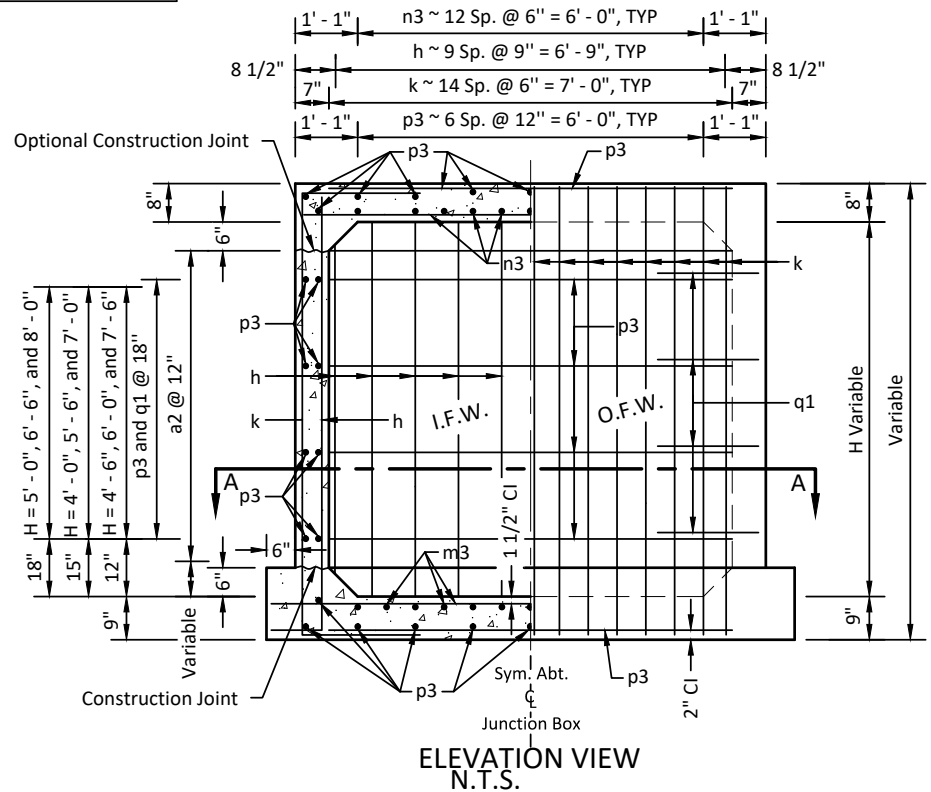


N.T.S.



LEGEND FOR PLACING RE-STEEL	
T. T. S. -	Top of Top Slab
B. T. S. -	Bottom of Top Slab
O. F. W. -	Outside Face of Wall
I. F. W. -	Inside Face of Wall

PLAN VIEW



ELEVATION VIEW
N.T.S.

7' x 7' JUNCTION BOX