

TOWNSHIP OF CRANFORD
UNION COUNTY, NEW JERSEY

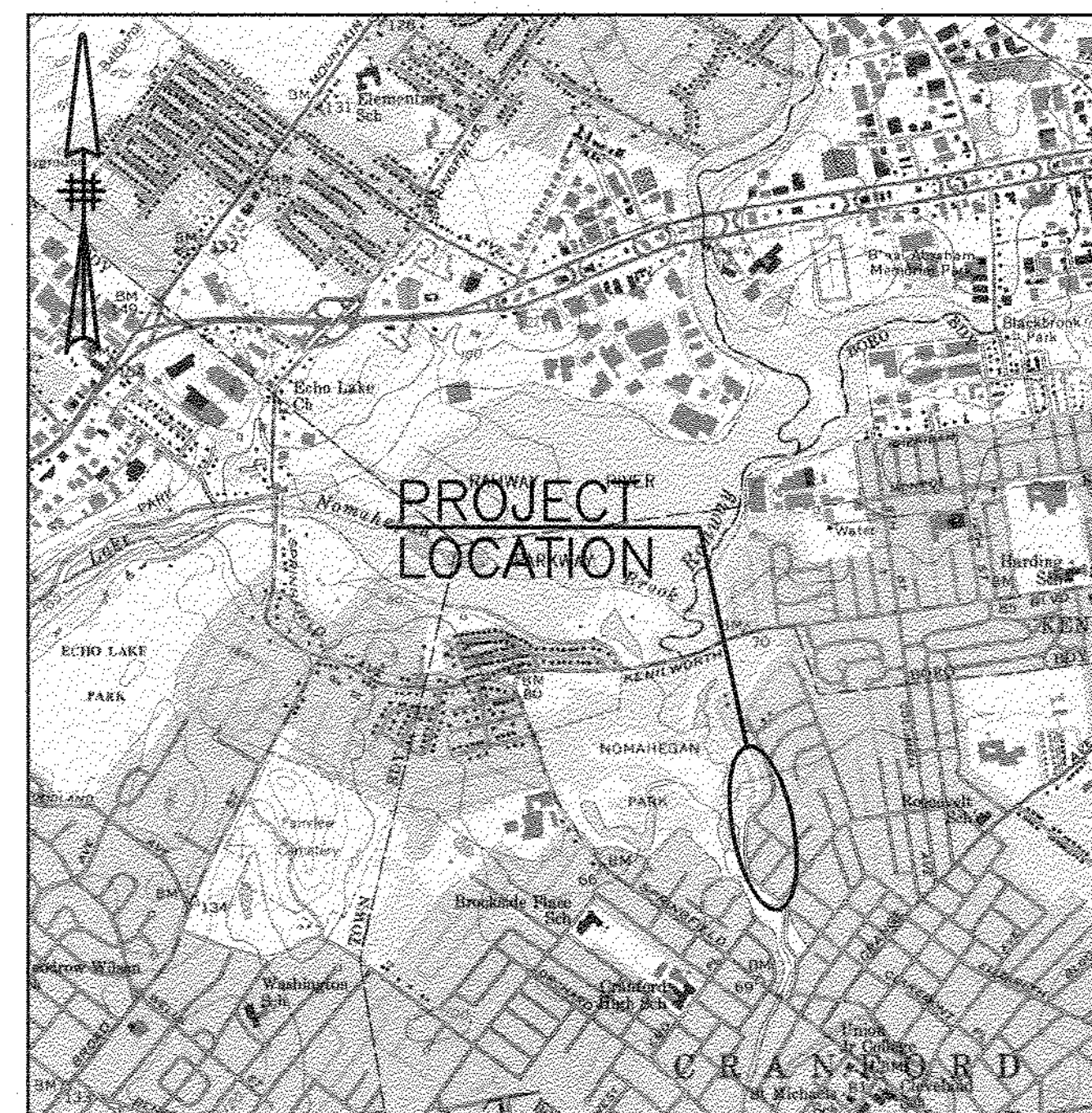
ANDIS KALNINS, MAYOR
MARY O'CONNOR, DEPUTY MAYOR
JOHN MALLON
THOMAS H. HANNEN, JR.
PATRICK GIBLIN

DIANE DABULAS, ESQ.

TERENCE WALL, MPA, RMC, QPA

CARL O'BRIEN

TARA ROWLEY



LOCATION PLAN



SOURCE: U.S.G.S. ROSELLE, NEW JERSEY QUADRANGLE
7.5 MINUTE SERIES TOPOGRAPHIC MAPPING,
PHOTO REVISED 1981

JANUARY 2016
REVISED DECEMBER 2016



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UTILITIES

ELECTRIC

PUBLIC SERVICE ELECTRIC AND GAS COMPANY
ELECTRIC DIVISION
472 WESTON CANAL ROAD
SOMERSET, NEW JERSEY 08873
(908) 558-7524

WATER

ELIZABETHTOWN WATER COMPANY
1341 NORTH AVENUE
PLAINFIELD, NEW JERSEY 07062
(908) 791-3465

COUNTY ROADS AND BRIDGES

UNION COUNTY DEPARTMENT OF PUBLIC WORKS
2371 SOUTH AVENUE
SCOTCH PLAINS, NEW JERSEY 07076
(908) 789-3675

TELEPHONE

VERIZON TELEPHONE COMPANY
445 GEORGES ROAD
NORTH BRUNSWICK, NEW JERSEY 08902
(732) 418-5601

CABLE

COMCAST CABLEVISION OF NEW JERSEY
800 RAHWAY AVENUE
UNION, NEW JERSEY 07083
(732) 602-7444

GAS

ELIZABETHTOWN GAS COMPANY
UNION DIVISION HEADQUARTERS
520 GREEN LANE
UNION, NEW JERSEY 07083
(908) 289-5000
(908) 289-5000

SANITARY SEWER

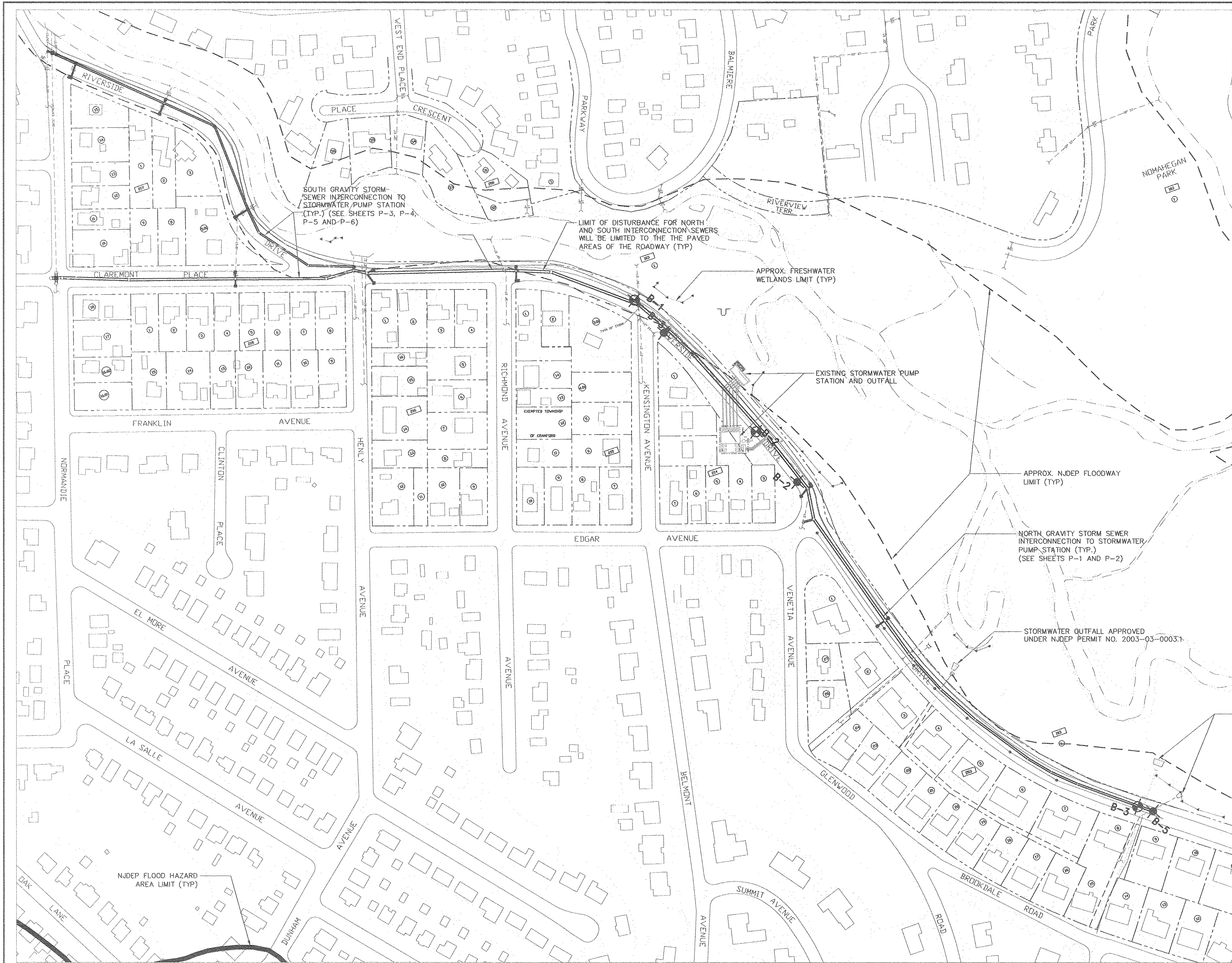
TOWNSHIP OF CRANFORD
PUBLIC WORKS DEPARTMENT
MUNICIPAL BUILDING
8 SPRINGFIELD AVENUE
CRANFORD, NJ 07016
(908) 709-7217

RVSA

RAHWAY VALLEY SEWERAGE AUTHORITY
1050 EAST HAZELWOOD AVENUE
RAHWAY, NEW JERSEY 07065
(732) 388-0868

JOHN K. RUSCHKE
Professional Engineer—N.J. Lic. No. 37148

Cadd: L:\municipal\cranford\363145 Phase 2B NE Quad\SS-1.dwg



LEGEND

- NEW DRAIN INLET
- NEW STORM MANHOLE
- NEW STORM SEWER PIPE
- NEW TEMPORARY SHEETING
- EXISTING DRAIN INLET
- EXISTING SEWER MANHOLE
- 8" SAN EXISTING SANITARY
- 30" STORM EXISTING STORM
- 6" W EXISTING WATER
- 8" G EXISTING GAS
- UTILITY POLE
- FIRE HYDRANT
- TREE LINE
- FENCE
- PROPERTY BOUNDARY
- WETLANDS
- APPROX. NJDEP FLOODWAY LIMIT
- BLOCK
- LOT
- APPROXIMATE LOCATIONS OF BORINGS TAKEN IN NOVEMBER 2003
- APPROXIMATE LOCATIONS OF BORINGS TAKEN IN JANUARY 2000

NOTES:

- CONTRACTOR SHALL FIELD VERIFY THE LOCATIONS AND DEPTHS OF ALL EXISTING UTILITY LINES AT PROPOSED STORM SEWER CROSSINGS SHOWN ON THIS PLAN
- DATUM: ALL ELEVATIONS REFERRED TO NGVD OF 1929
- PROPERTY LINES AND LOT AND BLOCK NUMBERS TAKEN FROM TOWNSHIP OF CRANFORD TAX MAPS PREPARED BY LITTON AERO SERVICE, DATED 1977

STORMWATER OUTFALLS APPROVED UNDER NJDEP PERMIT NO. 2003-03-0003.1

PLAN- NORTHEAST QUADRANT STORMWATER MANAGEMENT PROJECT - CONTRACT 2B RIVERSIDE DRIVE NORTH AND SOUTH GRAVITY STORM SEWER INTERCONNECTIONS

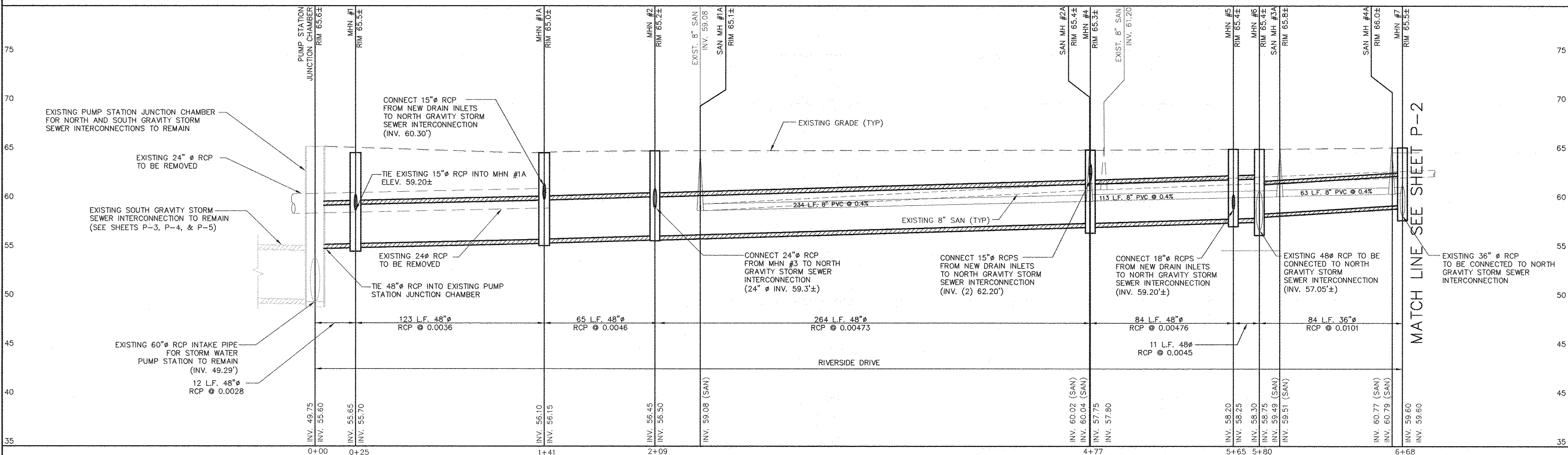
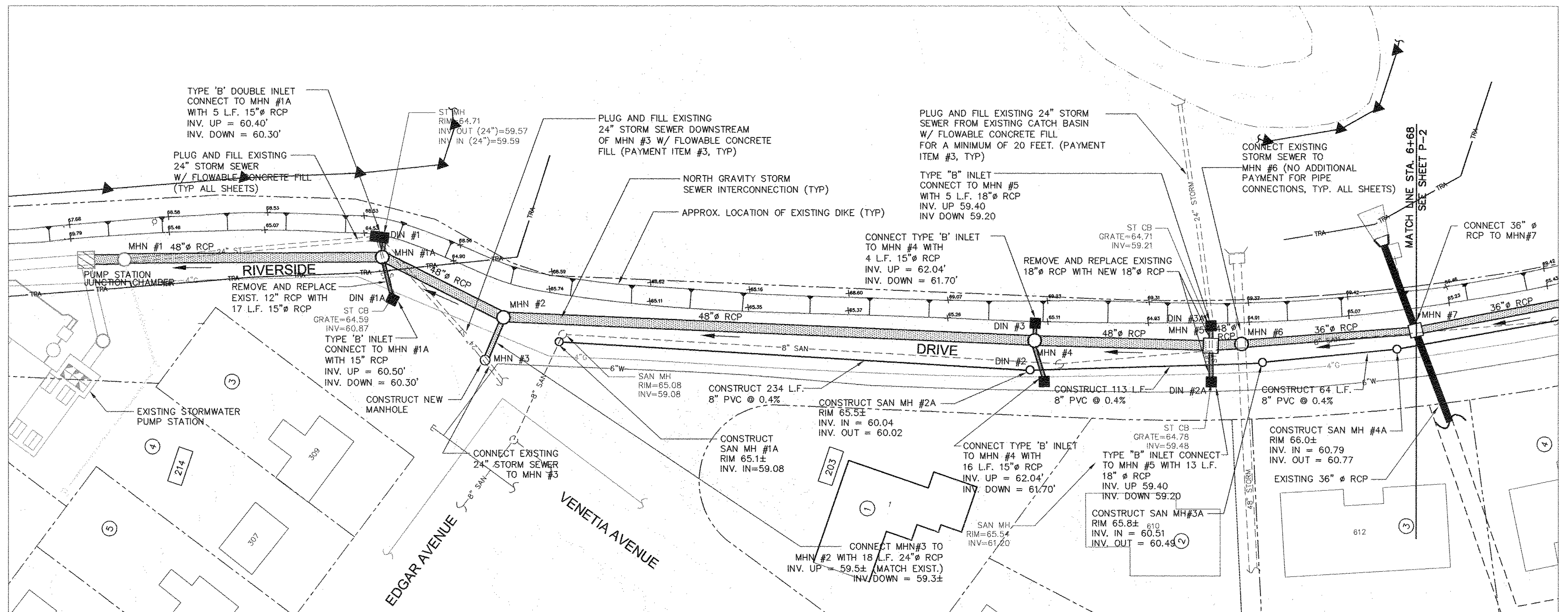
JOHN K. RUSCHKE PROFESSIONAL ENGINEER - N.J. LIC. NO. 37148		Date 1/25/16
Hatch Mott MacDonald Certificate No. 24GA28016600 412 Mount Kemble Avenue Suite G22 Morristown, New Jersey 07960 Tel: 908.736.6000 Fax: 973.267.2890		Approved J.K.R.
TOWNSHIP OF CRANFORD UNION COUNTY, NEW JERSEY NORTHEAST QUADRANT STORMWATER MANAGEMENT PROJECT - CONTRACT 2B RIVERSIDE DRIVE NORTH AND SOUTH GRAVITY STORM SEWER INTERCONNECTIONS GENERAL SITE PLAN		Checked D.H.
File CRANFORD RIVERSIDE DR		Drawn S.A.
Book 363145		Designated K.K.N.
Job 363145		No. S-1
Scale AS NOTED		B/O 2
		Total 13



LEGEND

- NEW DRAIN INLET
- NEW STORM MANHOLE
- NEW STORM SEWER PIPE
- EXISTING DRAIN INLET
- EXISTING SEWER MANHOLE
- 8" SAN EXISTING SANITARY
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- FIRE HYDRANT
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- FENCE
- PROPERTY BOUNDARY
- BLOCK
- LOT

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 - CONTRACTOR TO INSTALL TEMPORARY SHEETING TO PROTECT THE EXISTING DIKE AS REQUIRED OR AS ORDERED BY THE ENGINEER. TYPICAL FOR THE ENTIRE LENGTH OF THE STORM SEWERS.



JOHN K. RUSCHKE
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TOWNSHIP OF CRANFORD
UNION COUNTY, NEW JERSEY
NORTHEAST QUADRANT
STORMWATER MANAGEMENT PROJECT - CONTRACT 2B
RIVERSIDE DRIVE NORTH AND SOUTH GRAVITY STORM
SEWER INTERCONNECTIONS
PLAN AND PROFILE - NORTH INTERCONNECTION

File	CRANFORD RIVERSIDE DR
Book	Page PAGE
Job	363145
No.	P-1
Scale	AS NTD
B/O	3
Total	13

Drawing No.



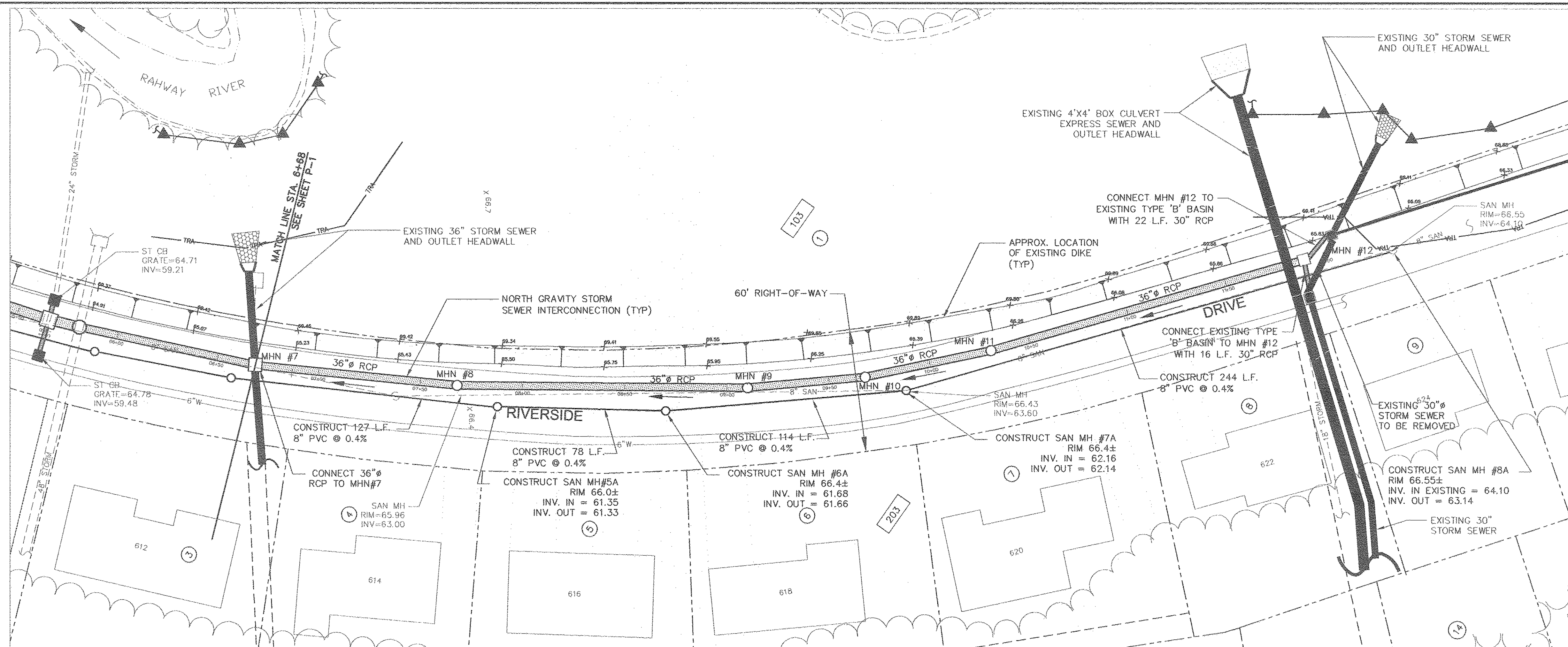
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|  | NEW STORM MANHOLE |
|  | NEW STORM SEWER PIPE |
|  | EXISTING DRAIN INLET |
|  | EXISTING SEWER MANHOLE |
| --- 8" SAN --- | EXISTING SANITARY |
| --- 30" STORM --- | EXISTING STORM |
| --- 6" W --- | EXISTING WATER |
| --- 8" G --- | EXISTING GAS |
|  | UTILITY POLE |
|  | FIRE HYDRANT |
|  | TREE LINE |
| -X-X-X- | FENCE |
| ----- | PROPERTY BOUNDARY |
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| (15) | LOT |

2. DATUM: ALL ELEVATIONS REFERRED TO NGVD OF 1929

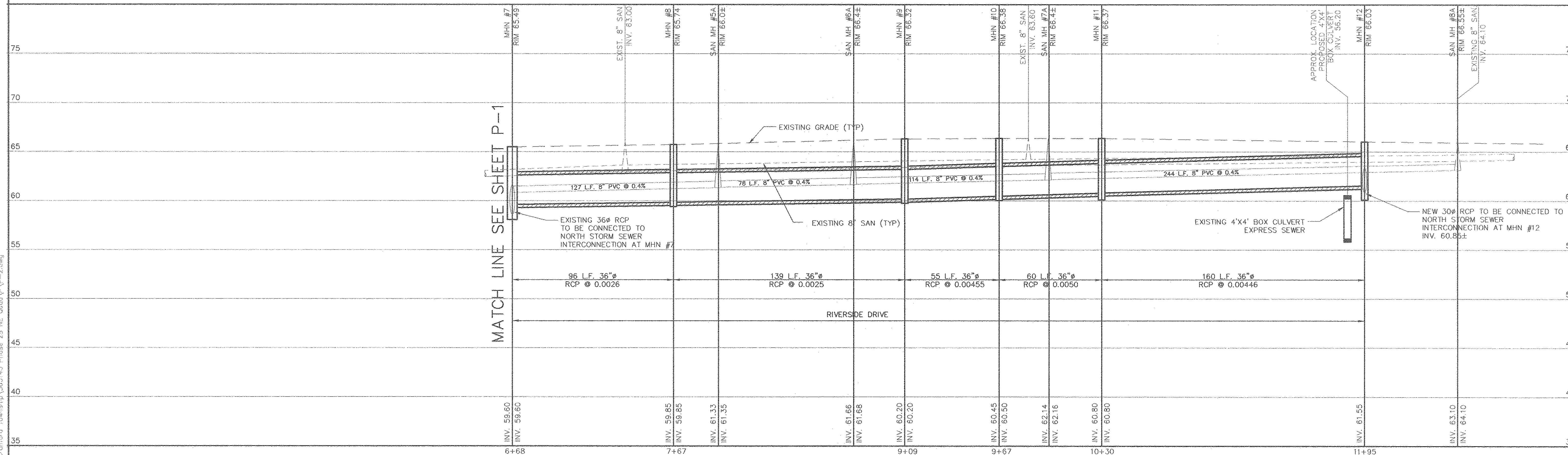
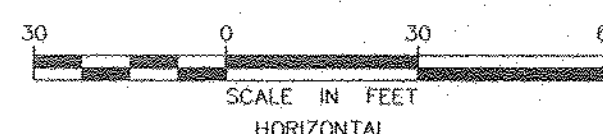
3. PROPERTY LINES AND LOT AND BLOCK NUMBERS
TAKEN FROM TOWNSHIP OF CRANFORD TAX MAPS
PREPARED BY LITTON AERO SERVICE, DATED 1977

4. CONTRACTOR SHALL PROTECT SEWER TRUNK LINE AND LOCAL SEWER SYSTEMS DURING CONSTRUCTION. ANY DAMAGE INCURRED TO THE 36" SANITARY SEWER OR THE LOCAL SEWER SYSTEMS DURING CONSTRUCTION SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST. ALL WORK TO THE SEWER SYSTEMS SHALL BE APPROVED BY THE RAYHAW VALLEY SEWERAGE AUTHORITY AND/OR THE TOWNSHIP.

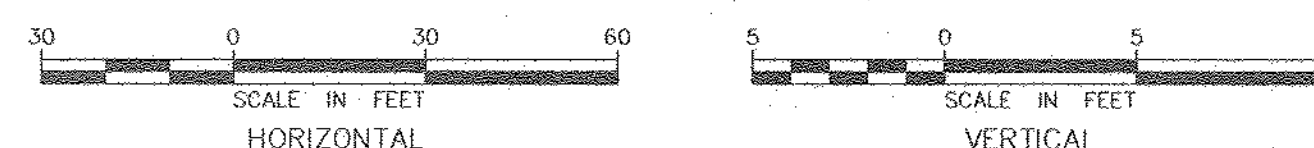
5. CONTRACTOR TO INSTALL TEMPORARY SHEETING TO PROTECT THE EXISTING DIKE AS REQUIRED OR AS ORDERED BY THE ENGINEER. TYPICAL FOR THE ENTIRE LENGTH OF THE STORM SEWERS.



PLAN - NORTH GRAVITY STORM SEWER INTERCONNECTIONS



PROFILE - NORTH GRAVITY STORM SEWER INTERCONNECTIONS



JOHN K. RUSCHKE
PROFESSIONAL ENGINEER - N.J. LIC. NO. 37148


Hatch Mott

TOWNSHIP OF CRANFORD
UNION COUNTY, NEW JERSEY
NORTHEAST QUADRANT
STORMWATER MANAGEMENT PROJECT - CONTRACT 2B
DRIVERSIDE DRIVE NORTH AND SOUTH GRAVITY STORM
SEWER INTERCONNECTIONS
PLAN AND PROFILE - NORTH INTERCONNECTION

File CRANFORD RIVERSIDE DR		
Book	Page PAGE	
Job 363145	No. P-2	
Scale AS NTD	B/O 4	Total 13

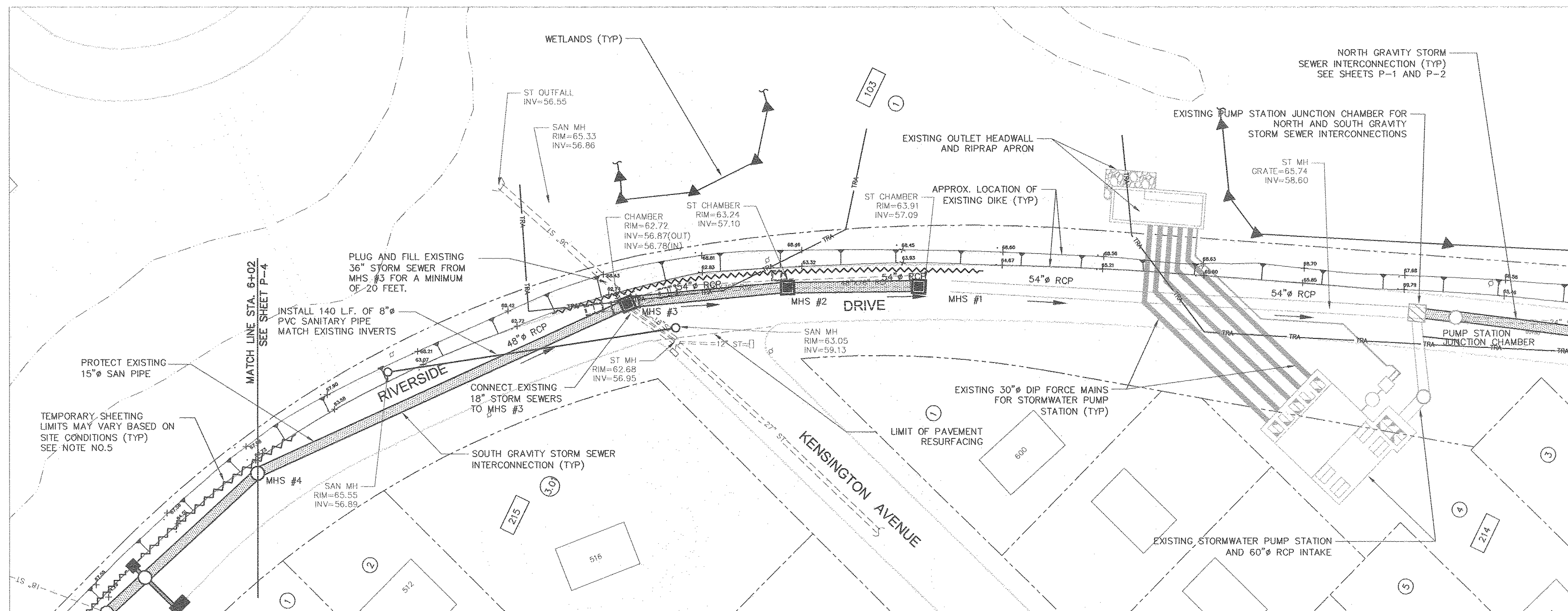
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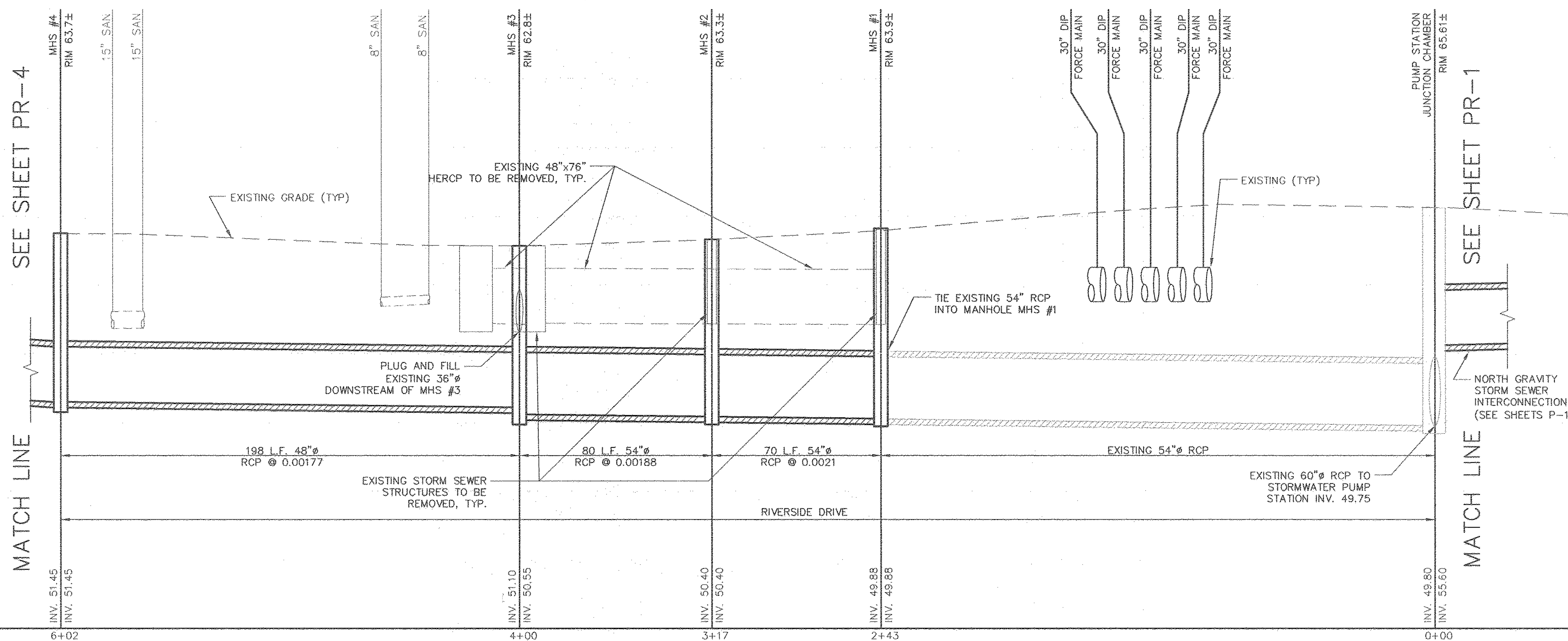
LEGEND

- NEW DRAIN INLET
- NEW STORM MANHOLE
- NEW STORM SEWER PIPE
- EXISTING DRAIN INLET
- EXISTING SEWER MANHOLE
- 8" SAN EXISTING SANITARY
- 30" STORM EXISTING STORM
- 6" W EXISTING WATER
- 8" G EXISTING GAS
- UTILITY POLE
- FIRE HYDRANT
- TREE LINE
- FENCE
- PROPERTY BOUNDARY
- 216 BLOCK
- 15 LOT

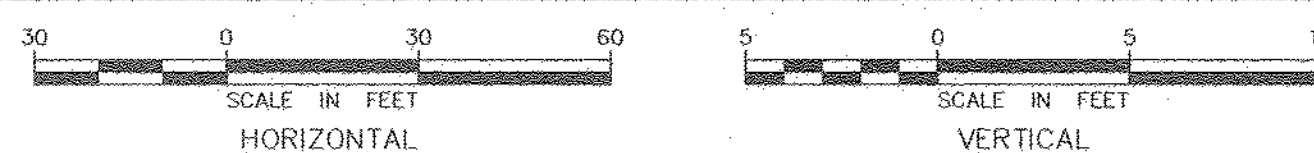
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PLAN - SOUTH GRAVITY STORM SEWER INTERCONNECTIONS



PROFILE - SOUTH GRAVITY STORM SEWER INTERCONNECTIONS



Revision	Date	Comments
12/7/16	1/25/16	REVISED AS PER N.J.P.E. COMMENTS

JOHN K. RUSCHKE
PROFESSIONAL ENGINEER - N.J. LIC. NO. 37148

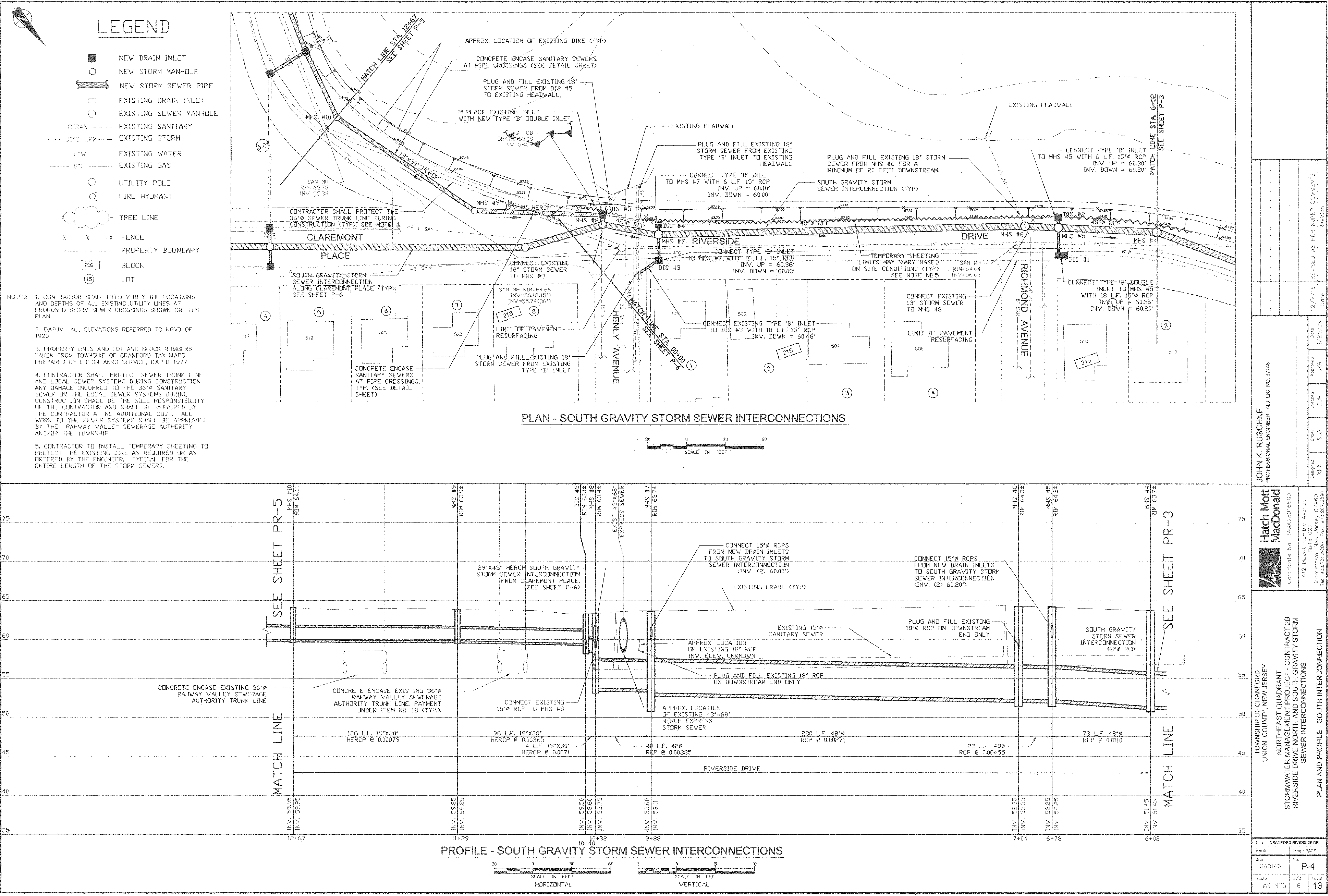
Hatch Mott MacDonald
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TOWNSHIP OF CRANFORD
UNION COUNTY, NEW JERSEY
NORTHEAST QUADRANT
STORMWATER MANAGEMENT PROJECT - CONTRACT 2B
RIVERSIDE DRIVE NORTH AND SOUTH GRAVITY STORM
SEWER INTERCONNECTIONS
PLAN AND PROFILE - SOUTH INTERCONNECTION

File	CRANFORD RIVERSIDE DR
Book	Page PAGE
Job	No. 363145
Scale	AS NOTED
Sheet	5
Total	13

Drawing No.

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File: CRANFORD RIVERSIDE DR	
Back	Page PAGE
Jub: 363145	No: P-4
Scale: AS NOTED	6
Total: 13	

Drawing No.

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JOHN K. RUSCHKE
PROFESSIONAL ENGINEER - N.J. LIC. NO. 37148

TOWNSHIP OF CRANFORD
UNION COUNTY, NEW JERSEY
NORTHEAST QUADRANT
STORMWATER MANAGEMENT PROJECT - CONTRACT 2B
RIVERSIDE DRIVE NORTH AND SOUTH GRAVITY STORM SEWER INTERCONNECTIONS

PLAN AND PROFILE - SOUTH INTERCONNECTION

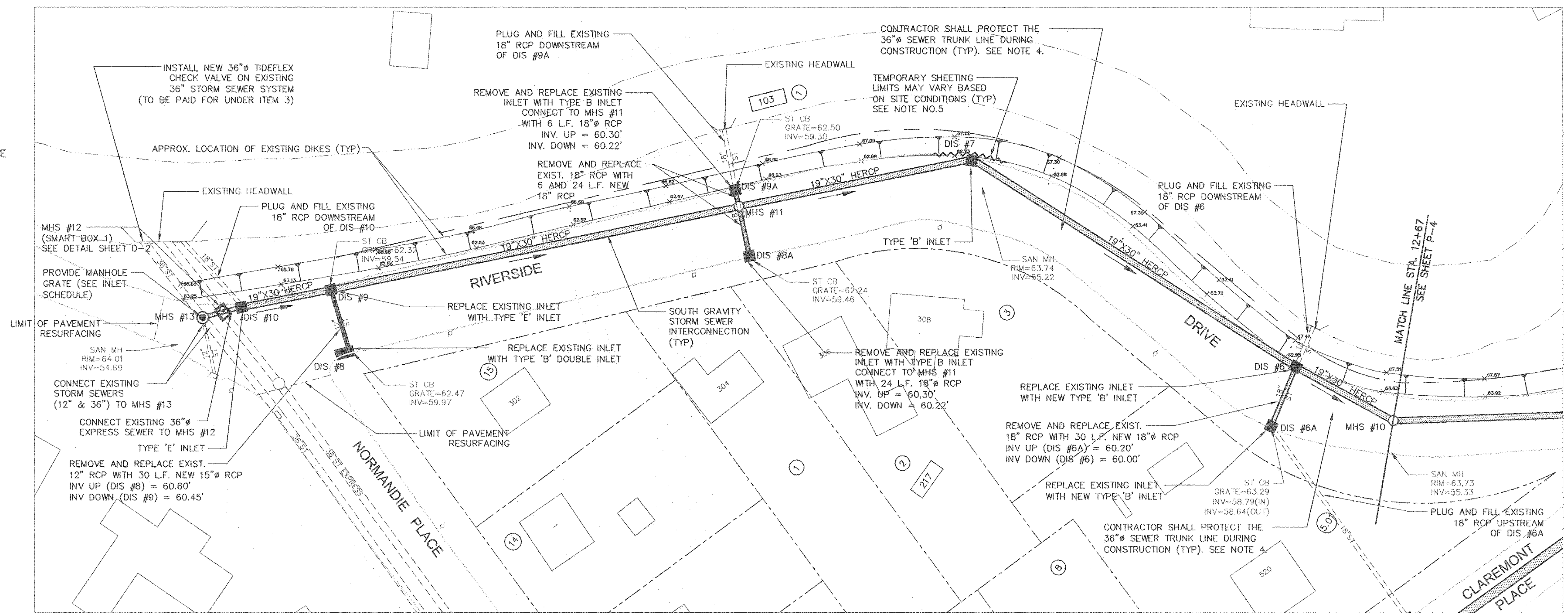
1/27/16 REVISED AS PER NYPE COMMENTS
Date
1/25/16
Approved: JKR
Checked: D.H.
Drawn: S.J.A.
Designed: K.K.K.



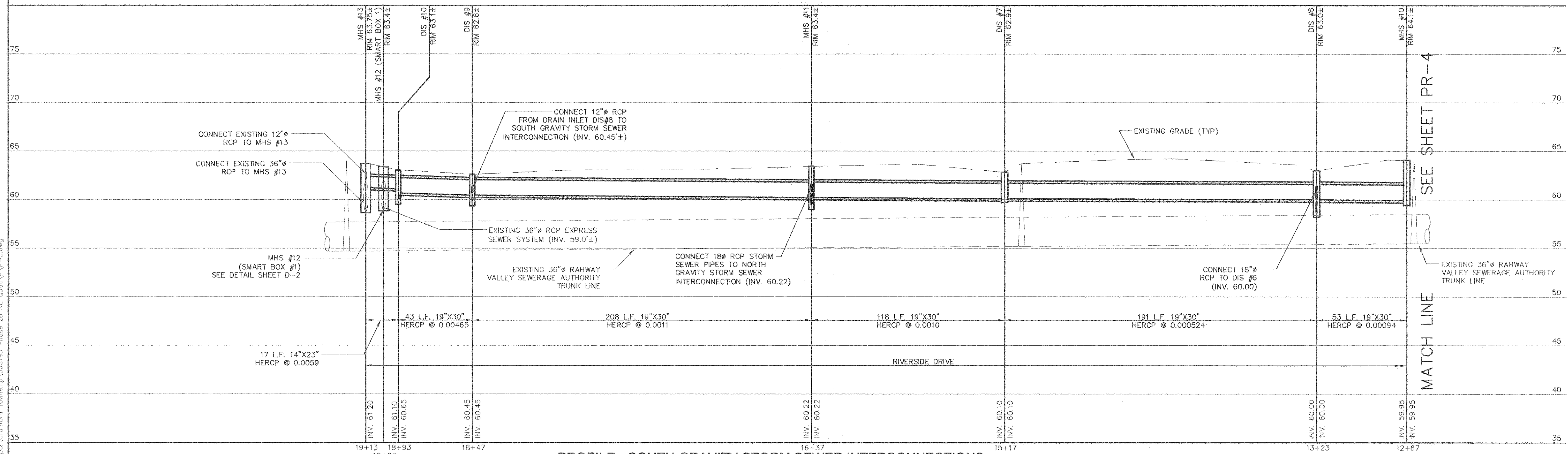
LEGEND

- NEW DRAIN INLET
- NEW STORM MANHOLE
- NEW STORM SEWER PIPE
- EXISTING DRAIN INLET
- EXISTING SEWER MANHOLE
- 6" SAN EXISTING SANITARY
- 30" STORM EXISTING STORM
- 6" W EXISTING WATER
- 8" C EXISTING GAS
- UTILITY POLE
- FIRE HYDRANT
- TREE LINE
- FENCE
- PROPERTY BOUNDARY
- 216 BLOCK
- 15 LOT

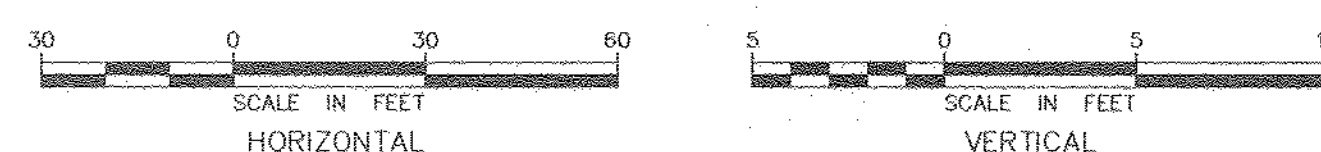
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PLAN - SOUTH GRAVITY STORM SEWER INTERCONNECTIONS



PROFILE - SOUTH GRAVITY STORM SEWER INTERCONNECTIONS



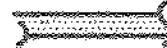
PROFESSIONAL ENGINEER - N.J. LIC. NO. 37148											
Designated	KKK	Drawn	SJA	Checked	DJH	Approved	JKR	Date	1/25/16	Revised	AS PER NUPED COMMENTS
JOHN K. RUSCHKE											
									Date	12/7/16	
											Revision

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TOWNSHIP OF CRANFORD
UNION COUNTY, NEW JERSEY
NORTHEAST QUADRANT
STORMWATER MANAGEMENT PROJECT - CONTRACT 2B
RIVERSIDE DRIVE NORTH AND SOUTH GRAVITY STORM
SEWER INTERCONNECTIONS
PLAN AND PROFILE - SOUTH INTERCONNECTION

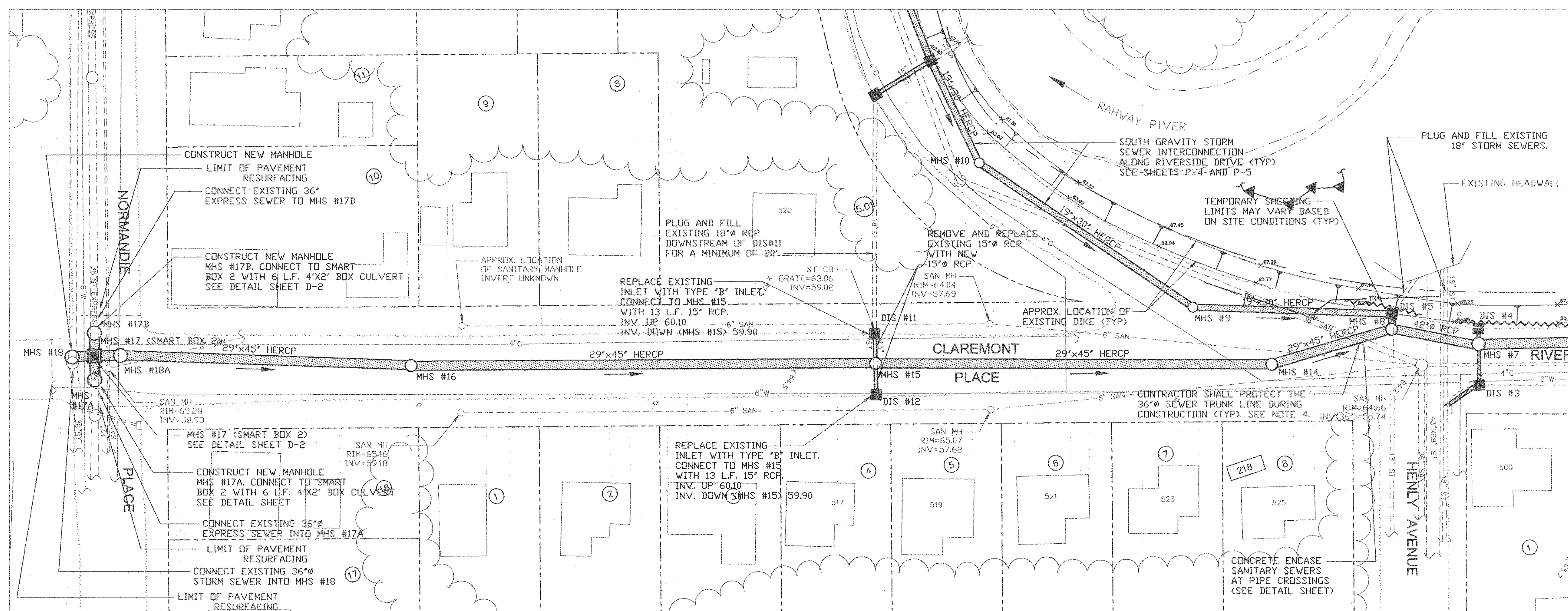
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Book	Page PAGE
Job	363145
No	P-5
Scale	AS NOTED
B/O	7
Total	13



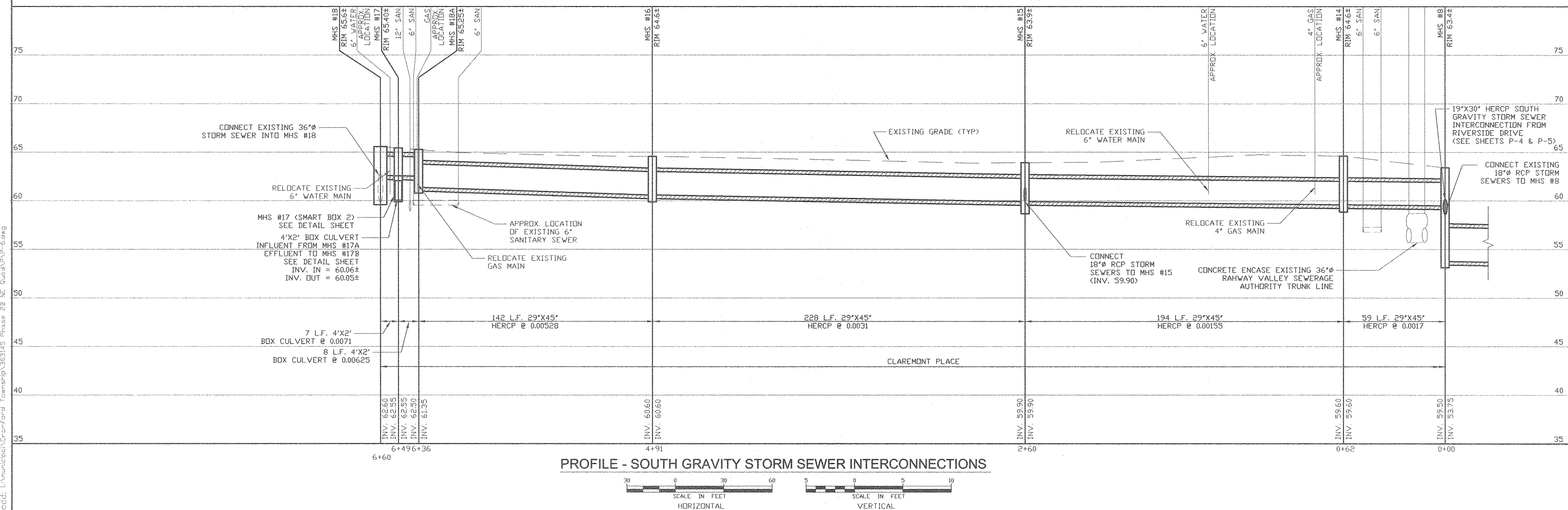
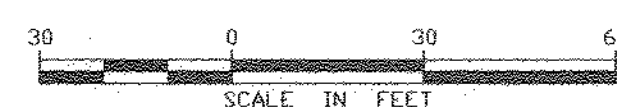
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|---|------------------------|
|  | NEW DRAIN INLET |
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|  | FIRE HYDRANT |
|  | TREE LINE |
|  | FENCE |
|  | PROPERTY BOUNDARY |
|  | BLOCK |
|  | LOT |

NOTES:

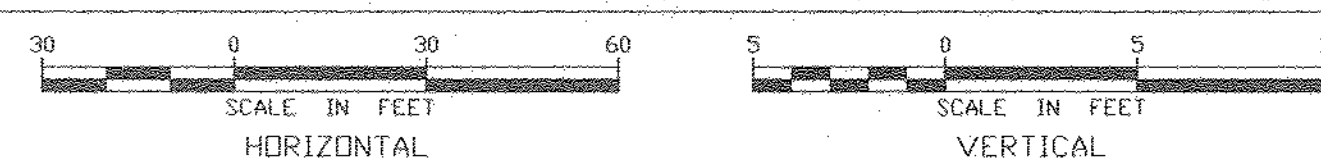
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PLAN - SOUTH GRAVITY STORM SEWER INTERCONNECTIONS



PROFILE - SOUTH GRAVITY STORM SEWER INTERCONNECTIONS



		9/7/16	REVISED AS PER NJDEP COMMENTS
		Date	Revision

JOHN K. RUSCHKE
PROFESSIONAL ENGINEER - N.J. LIC. NO. 37148

**Hatch Mott
MacDonald**

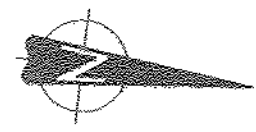
Certificate No. 24GA28016600

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Morristown, New Jersey 07960
Tel: 908.730.6000 Fax: 973.257.2890

TOWNSHIP OF GRANFORD
UNION COUNTY, NEW JERSEY
NORTHEAST QUADRANT
STORMWATER MANAGEMENT PROJECT- CONTRACT 2B
RIVERSIDE DRIVE NORTH AND SOUTH GRAVITY STORM
SEWER INTERCONNECTIONS
PLAN AND PROFILE - SOUTH INTERCONNECTION

File CRANFORD RIVERSIDE DR		
Book	Page PAGE	
Job 363145	No. P-6	
Scale AS NTD	B/O 8	Total 13

Drawing No.



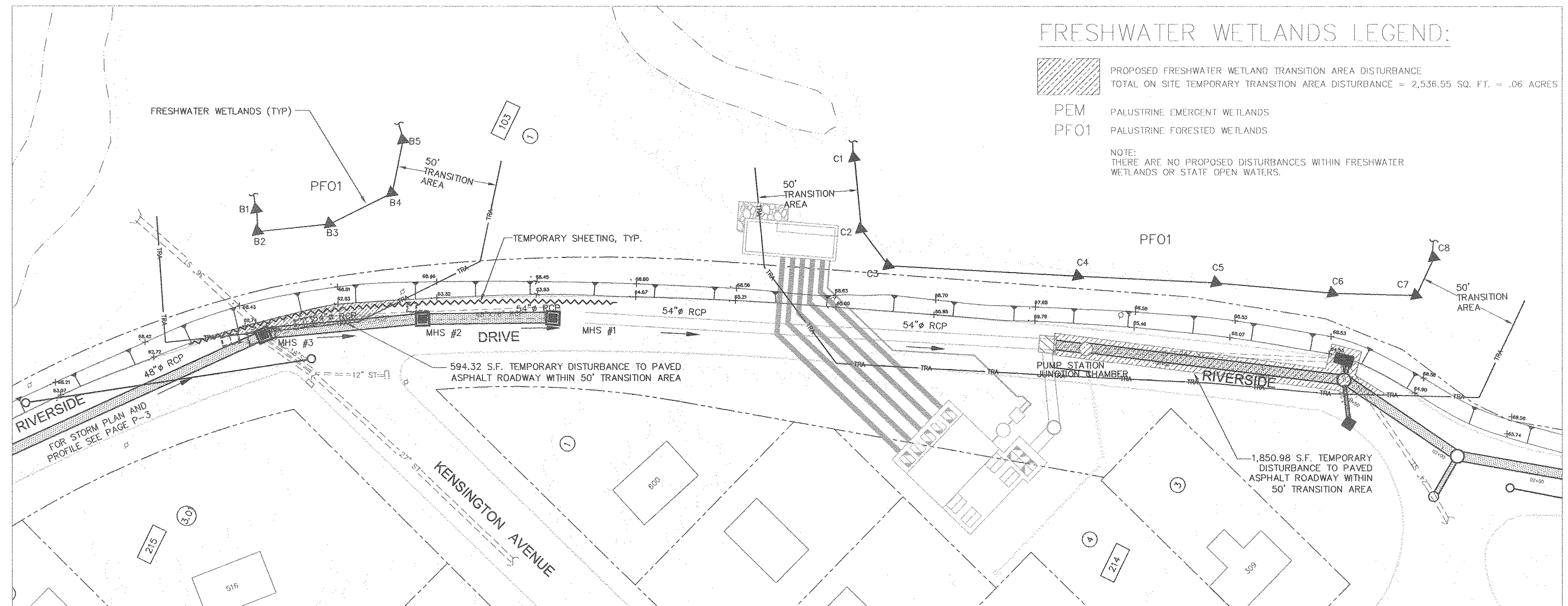
LEGEND

- NEW DRAIN INLET
- NEW STORM MANHOLE
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- EXISTING DRAIN INLET
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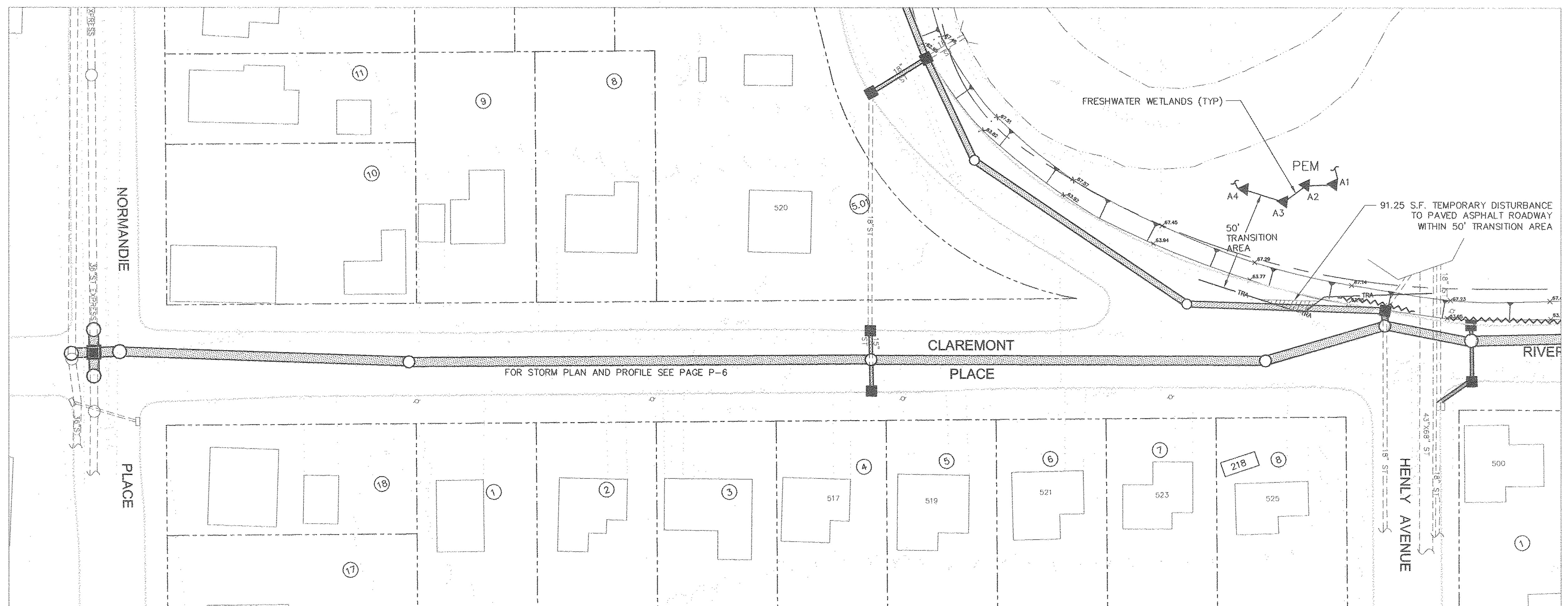
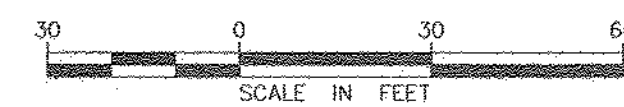
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 3. PROPERTY LINES AND LOT AND BLOCK NUMBERS TAKEN FROM TOWNSHIP OF CRANFORD TAX MAPS PREPARED BY LITTON AERO SERVICE, DATED 1977
 4. CONTRACTOR SHALL PROTECT SEWER TRUNK LINE AND LOCAL SEWER SYSTEMS DURING CONSTRUCTION. ANY DAMAGE INCURRED TO THE 36" SANITARY SEWER OR THE LOCAL SEWER SYSTEMS DURING CONSTRUCTION SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST. ALL WORK TO THE SEWER SYSTEMS SHALL BE APPROVED BY THE RAHWAY VALLEY SEWERAGE AUTHORITY AND/OR THE TOWNSHIP.
 5. CONTRACTOR TO INSTALL TEMPORARY SHEETING TO PROTECT THE EXISTING DIKE AS REQUIRED OR AS ORDERED BY THE ENGINEER. TYPICAL FOR THE ENTIRE LENGTH OF THE STORM SEWERS.

FRESHWATER WETLANDS LEGEND:

- PROPOSED FRESHWATER WETLAND TRANSITION AREA DISTURBANCE
TOTAL ON SITE TEMPORARY TRANSITION AREA DISTURBANCE = 2,536.55 SQ. FT. = .06 ACRES
- PEM PALUSTRINE EMERGENT WETLANDS
- PF01 PALUSTRINE FORESTED WETLANDS
- NOTE:
THERE ARE NO PROPOSED DISTURBANCES WITHIN FRESHWATER WETLANDS OR STATE OPEN WATERS.



PLAN - FRESHWATER WETLANDS GENERAL PERMIT NO. 2



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TOWNSHIP OF CRANFORD
UNION COUNTY, NEW JERSEY
NORTHEAST QUADRANT
STORMWATER MANAGEMENT PROJECT - CONTRACT 2B
RIVERSIDE DRIVE NORTH AND SOUTH GRAVITY STORM
SEWER INTERCONNECTIONS
FRESHWATER WETLANDS GENERAL PERMIT NO. 2

File	CRANFORD RIVERSIDE DR
Book	Page PAGE
Job	No
363145	W-1
Scale	B/O
AS NTD	9
Total	13

Drawing No.



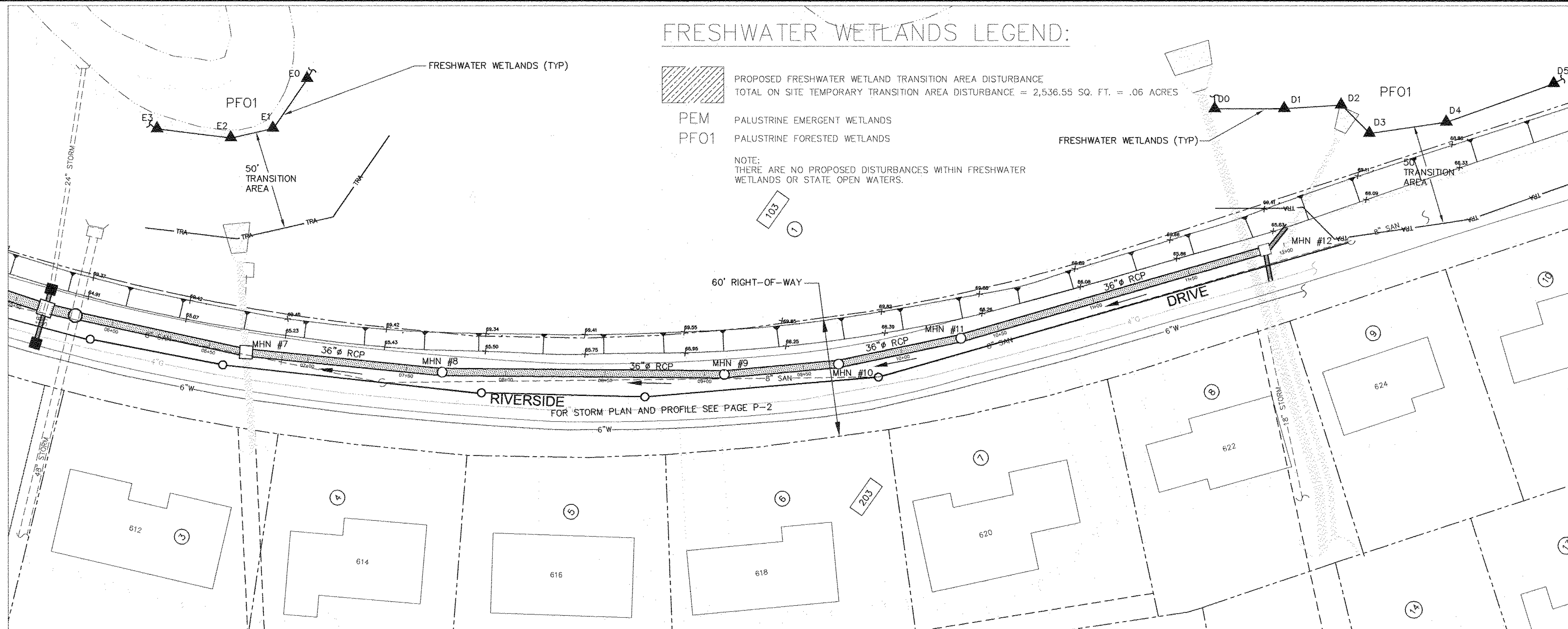
LEGEND

- NEW DRAIN INLET
- NEW STORM MANHOLE
- NEW STORM SEWER PIPE
- NEW TEMPORARY SHEETING
- EXISTING DRAIN INLET
- EXISTING SEWER MANHOLE
- 8" SAN
- 30" STORM
- 6" W
- 8" G
- UTILITY POLE
- FIRE HYDRANT
- TREE LINE
- FENCE
- PROPERTY BOUNDARY
- 216 BLOCK
- 15 LOT

- NOTES:
1. CONTRACTOR SHALL FIELD VERIFY THE LOCATIONS AND DEPTHS OF ALL EXISTING UTILITY LINES AT PROPOSED STORM SEWER CROSSINGS SHOWN ON THIS PLAN
 2. DATUM: ALL ELEVATIONS REFERRED TO NGVD OF 1929
 3. PROPERTY LINES AND LOT AND BLOCK NUMBERS TAKEN FROM TOWNSHIP OF CRANFORD TAX MAPS PREPARED BY LITTON AERO SERVICE, DATED 1977
 4. CONTRACTOR SHALL PROTECT SEWER TRUNK LINE AND LOCAL SEWER SYSTEMS DURING CONSTRUCTION. ANY DAMAGE INCURRED TO THE 36" SANITARY SEWER OR THE LOCAL SEWER SYSTEMS DURING CONSTRUCTION SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST. ALL WORK TO THE SEWER SYSTEMS SHALL BE APPROVED BY THE RAHWAY VALLEY SEWERAGE AUTHORITY AND/OR THE TOWNSHIP.
 5. CONTRACTOR TO INSTALL TEMPORARY SHEETING TO PROTECT THE EXISTING DIKE AS REQUIRED OR AS ORDERED BY THE ENGINEER. TYPICAL FOR THE ENTIRE LENGTH OF THE STORM SEWERS.

FRESHWATER WETLANDS LEGEND:

- PROPOSED FRESHWATER WETLAND TRANSITION AREA DISTURBANCE
TOTAL ON SITE TEMPORARY TRANSITION AREA DISTURBANCE = 2,536.55 SQ. FT. = .06 ACRES
- PEM PALUSTRINE EMERGENT WETLANDS
- PFO1 PALUSTRINE FORESTED WETLANDS
- NOTE:
THERE ARE NO PROPOSED DISTURBANCES WITHIN FRESHWATER WETLANDS OR STATE OPEN WATERS.



PLAN - FRESHWATER WETLANDS GENERAL PERMIT NO. 2



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TOWNSHIP OF CRANFORD
UNION COUNTY, NEW JERSEY
NORTHEAST QUADRANT
STORMWATER MANAGEMENT PROJECT - CONTRACT 2B
RIVERSIDE DRIVE NORTH AND SOUTH GRAVITY STORM
SEWER INTERCONNECTIONS
FRESHWATER WETLANDS GENERAL PERMIT NO. 2

File	CRANFORD RIVERSIDE DR
Book	
Job	363145
No.	W-2
Scale	AS NTD
B/O	10
Total	13

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GENERAL NOTES:

1. ALL ELEVATIONS ON DRAWINGS ARE NGVD, 1929.
2. TOPOGRAPHIC SURVEY OF TOWNSHIP OF CRANFORD, UNION COUNTY, N.J., BY AOR ASSOCIATES, INC., RIVERSIDE, N.J., APRIL, 1973, AND SUPPLEMENTED BY FIELD SURVEY DATA BY HMM FORMALLY KILAM ASSOCIATES, 1999.
3. THE CONTRACTOR IS ADVISED THAT THE PROJECT IS SITUATED IN A FLOOD PRONE AREA AND SHALL CONDUCT AND COORDINATE CONSTRUCTION ACTIVITIES ACCORDINGLY.
4. ALL CONSTRUCTION RIGHT-OF-WAY, EASEMENT AND TEMPORARY CONSTRUCTION EASEMENT LIMITS, CONSTRUCTION ACTIVITY, STORAGE, STOCKPILING AND ACCESS SHALL NOT TAKE PLACE ON PRIVATE PROPERTY UNLESS SUCH ARRANGEMENTS HAVE BEEN MADE BY CONTRACTOR. THE CONTRACTOR SHALL REMOVE AND PROTECT EXISTING TREES IN THE PROJECT AREA FROM DAMAGE DUE TO HIS CONSTRUCTION ACTIVITIES TO THE GREATEST EXTENT POSSIBLE. THE CONTRACTOR SHALL OBTAIN WRITTEN AUTHORIZATION FROM THE OWNER AND/OR THE ENGINEER PRIOR TO REMOVAL OF ANY TREES GREATER THAN 6 INCHES IN DIAMETER OR OF SUBSTANTIAL CONCERN. THE CONTRACTOR SHALL REPLACE SELECT TREES AUTHORIZED AND REMOVED IN ACCORDANCE WITH THE SPECIFICATIONS AND AS DIRECTED BY THE OWNER AND/OR ENGINEER.
5. THE CONTRACTOR SHALL NOTIFY THE OWNER, ENGINEER AND AFFECTED PROPERTY OWNERS OF CONSTRUCTION ACTIVITIES IMPEDING ACCESS OR OPERATIONS PRIOR TO COMMENCING CONSTRUCTION.
6. THE CONTRACTOR SHALL DIG TEST PITS AS NECESSARY AND AS INDICATED ON THE PLANS WELL IN ADVANCE OF CONSTRUCTION ACTIVITY TO LOCATE EXISTING UTILITIES. THE LOCATIONS AND ELEVATIONS OF ALL EXISTING PIPES ARE ESTIMATED AND THE CONTRACTOR SHALL DIG THE NECESSARY TEST PITS TO ACCURATELY DETERMINE THE POSITION OF THE EXISTING PIPES AS REQUIRED TO COMPLETE CONSTRUCTION OF THE NEW STRUCTURES AND PIPING.
7. ALL SOIL EROSION AND SEDIMENT CONTROL MEASURES MUST BE INSTALLED PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES. THE REQUIREMENTS DETAILED IN THE STANDARDS FOR SOIL EROSION AND SEDIMENT CONTROL IN NEW JERSEY SHALL BE STRICTLY COMPLIED WITH. THIS INCLUDES PROVISIONS FOR MINIMIZING EROSION, INSTALLING AND MAINTAINING SEDIMENT TRAPS AT STORM DRAIN INLETS, STREET SWEEPING AND PROTECTING STOCKPILED SOIL FROM EROSION. ALL NECESSARY EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE IN PLACE PRIOR TO COMMENCING EXCAVATION AND SHALL BE MAINTAINED DURING THE CONSTRUCTION.
8. THE CONTRACTOR SHALL COORDINATE HIS CONSTRUCTION ACTIVITIES WITH THE TOWNSHIP OF CRANFORD WITH REGARD TO ANY ROAD CLOSING AND/OR TRAFFIC DETOURS AND SHALL COMPLY WITH ALL REQUIREMENTS OF THE TOWNSHIP.
9. ALL EXISTING STRUCTURES AND PIPING REMOVED, SHALL BE INSPECTED BY THE OWNER, WHO MAY DECIDE WHETHER OR NOT TO KEEP REMOVED STRUCTURES AND PIPING. THE CONTRACTOR SHALL REMOVE SUCH EQUIPMENT TO A LOCATION DESIGNATED BY THE OWNER. IF THE OWNER DEEMES SUCH MATERIALS ARE NOT SALVAGEABLE, THE CONTRACTOR SHALL REMOVE OF SUCH MATERIALS OFF-SITE, AT NO ADDITIONAL COST TO THE OWNER. STRUCTURES AND PIPING SHALL BE REMOVED BY THE CONTRACTOR IN SUCH A MANNER TO NOT DAMAGE MATERIALS SHOULD THE OWNER DECIDE TO KEEP SUCH MATERIALS.
10. IF IN THE COURSE OF REMOVAL OF EXISTING STORM PIPING, IT IS DETERMINED BY THE ENGINEER AND/OR OWNER THAT SUCH REMOVAL WOULD DAMAGE ADJACENT TREES AND/OR STRUCTURES, THE CONTRACTOR SHALL LEAVE IN PLACE SUCH QUANTITIES OF EXISTING PIPING AS DIRECTED BY THE ENGINEER AND/OR OWNER. THE CONTRACTOR SHALL FILL AND/OR PLUG SUCH ABANDONED EXISTING STORM SEWER PIPE WITH SUITABLE MATERIAL AS DIRECTED BY THE ENGINEER.
11. ANY EXISTING UTILITY THAT IS IN CONFLICT WITH THE NEW CONSTRUCTION SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE ENGINEER AND SHALL BE RELOCATED AS REQUIRED TO AVOID CONFLICT.
12. ALL PIPE LENGTHS SHOWN AND INDICATED ON THE DRAWINGS ARE APPROXIMATE. THE CONTRACTOR SHALL PROVIDE PIPING AS REQUIRED.
13. ALL ROW AND GRADE ELEVATIONS SHOWN AND INDICATED ARE APPROXIMATE AND SHALL BE ADJUSTED AS NECESSARY TO MEET ACTUAL FIELD CONDITIONS.
14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ARRANGING A MARKOUT OF ALL UTILITIES PRIOR TO STARTING WORK OR OBTAINING MATERIALS.
15. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LAYING OUT THE NEW STORM SEWER AND SANITARY SEWER PIPES PRIOR TO COMMENCING CONSTRUCTION OR PLACING MATERIAL ORDERS. THE CONTRACTOR IS ALERTED THAT UPON COMPLETION OF LAYOUT, FINAL ADJUSTMENTS IN THE ALIGNMENT, LENGTH AND QUANTITY OF NEW PIPING AND STRUCTURES WILL BE MADE BY THE OWNER AND/OR ENGINEER TO BEST SUIT FIELD CONDITIONS AND TO AVOID EXISTING TREES, AND STRUCTURES AS REQUIRED.
16. THE CONTRACTOR SHALL MINIMIZE DISTURBANCE IN AND AROUND EXISTING UTILITIES AND SHALL PROTECT EXISTING UTILITIES FROM DAMAGE OR SERVICE INTERRUPTION AS REQUIRED. CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE STATE OF NEW JERSEY CONSTRUCTION SAFETY ACT, HIGH VOLTAGE PROXIMITY ACT AND ALL OTHER LOCAL, STATE AND FEDERAL SAFETY REGULATIONS.
17. ALL EXISTING SURFACE FEATURES DAMAGED, DISTURBED OR REMOVED DURING CONSTRUCTION SHALL BE REPLACED OR RESTORED. THIS WORK IS INCLUDED IN THE VARIOUS BID ITEMS AND NO SEPARATE PAYMENT WILL BE MADE FOR RESTORATION WORK.
18. PRIOR TO THE START OF CONSTRUCTION, A DETAILED CONSTRUCTION SCHEDULE SHALL BE SUBMITTED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.
19. SHEETING MUST BE DESIGNED AND USED IN ACCORDANCE WITH APPLICABLE STANDARDS AND AS NOTED IN THE SPECIFICATIONS.
20. THE CONTRACTOR SHALL COORDINATE HIS ACTIVITIES WITH THE OWNER AND/OR ENGINEER CONCERNING STOCKPILING AND STORAGE OF MATERIALS AND EQUIPMENT FOR CONSTRUCTION.
21. THE CONTRACTOR SHALL NOT DISCHARGE SOIL, CONSTRUCTION DEBRIS OR WASTE MATERIALS INTO THE RIVER OR WATERWAY.
22. THE CONTRACTOR SHALL RESTORE DRIVEWAY PAVEMENT AND CURBING DISTURBED BY HIS CONSTRUCTION ACTIVITIES TO MEET EXISTING CONDITIONS.
23. SURFACE FEATURES, INCLUDING, BUT NOT LIMITED TO, SIDEWALKS, CURB CUTS, DRIVEWAYS, UTILITY POLES, AND SIGNS, ARE GENERALLY NOT SHOWN ON THE PLANS. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL SURFACE FEATURES AS NECESSARY PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES.
24. UTILITIES SHOWN ARE BASED UPON AVAILABLE INFORMATION. ACTUAL LOCATIONS MUST BE VERIFIED IN THE FIELD.
25. ALL OPEN TRENCHES MUST BE SUITABLY COVERED AT THE END OF THE DAILY CONSTRUCTION ACTIVITY AND/OR WHEN CONSTRUCTION ACTIVITY IS NOT BEING UNDERTAKEN AT THAT LOCATION. TO MEET ALL APPLICABLE SAFETY REQUIREMENTS, IF STEEL PLATES ARE USED TO TEMPORARILY COVER TRENCHES, THE STEEL PLATES SHALL BE FLUSH WITH THE ADJACENT PAVEMENT AND/OR GRADE AND SUITABLY RESTRAINED.
26. THE CONTRACTOR SHALL ADEQUATELY PROTECT ALL EXISTING PIPELINES AND STRUCTURES DURING THE INSTALLATION OF NEW WORK.

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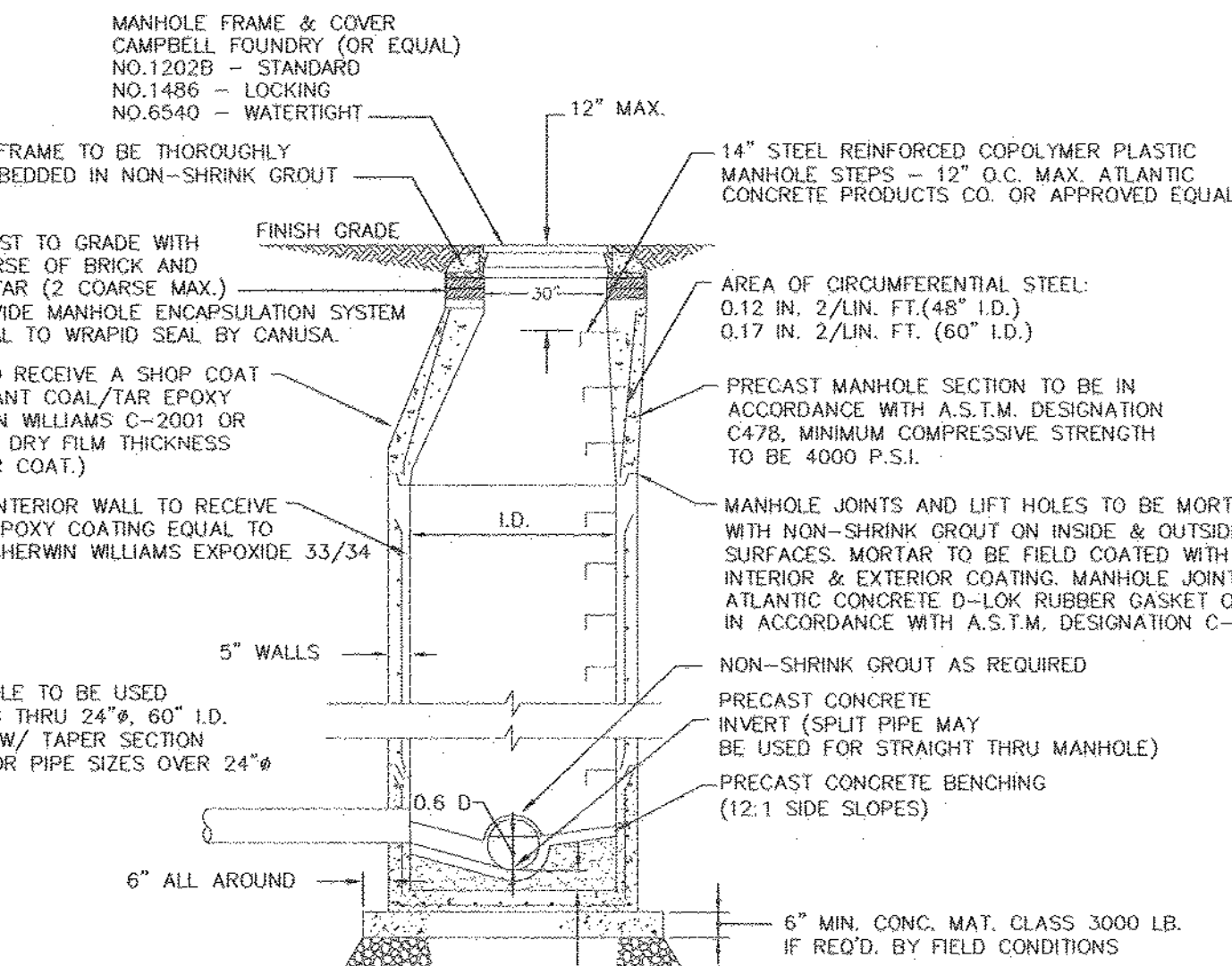
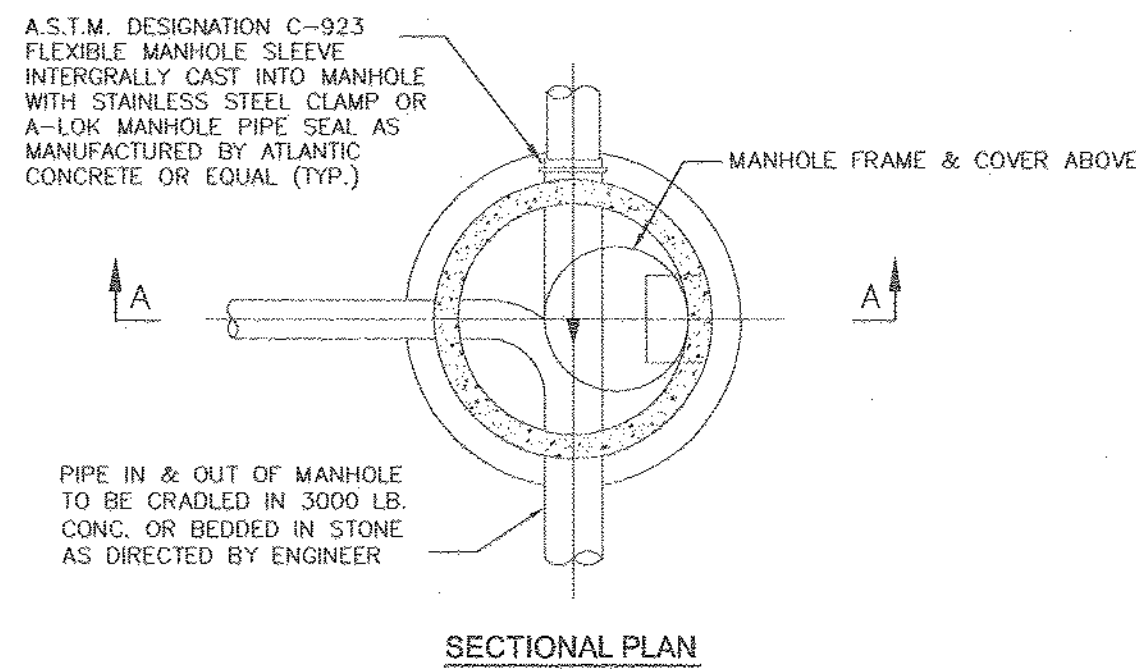
TOWNSHIP OF CRANFORD
UNION COUNTY, NEW JERSEY

NORTHEAST QUADRANT
STORMWATER MANAGEMENT PROJECT - CONTRACT 2B
RIVERSIDE DRIVE NORTH AND SOUTH GRAVITY STORM
SEWER INTERCONNECTIONS

DETAILS AND NOTES

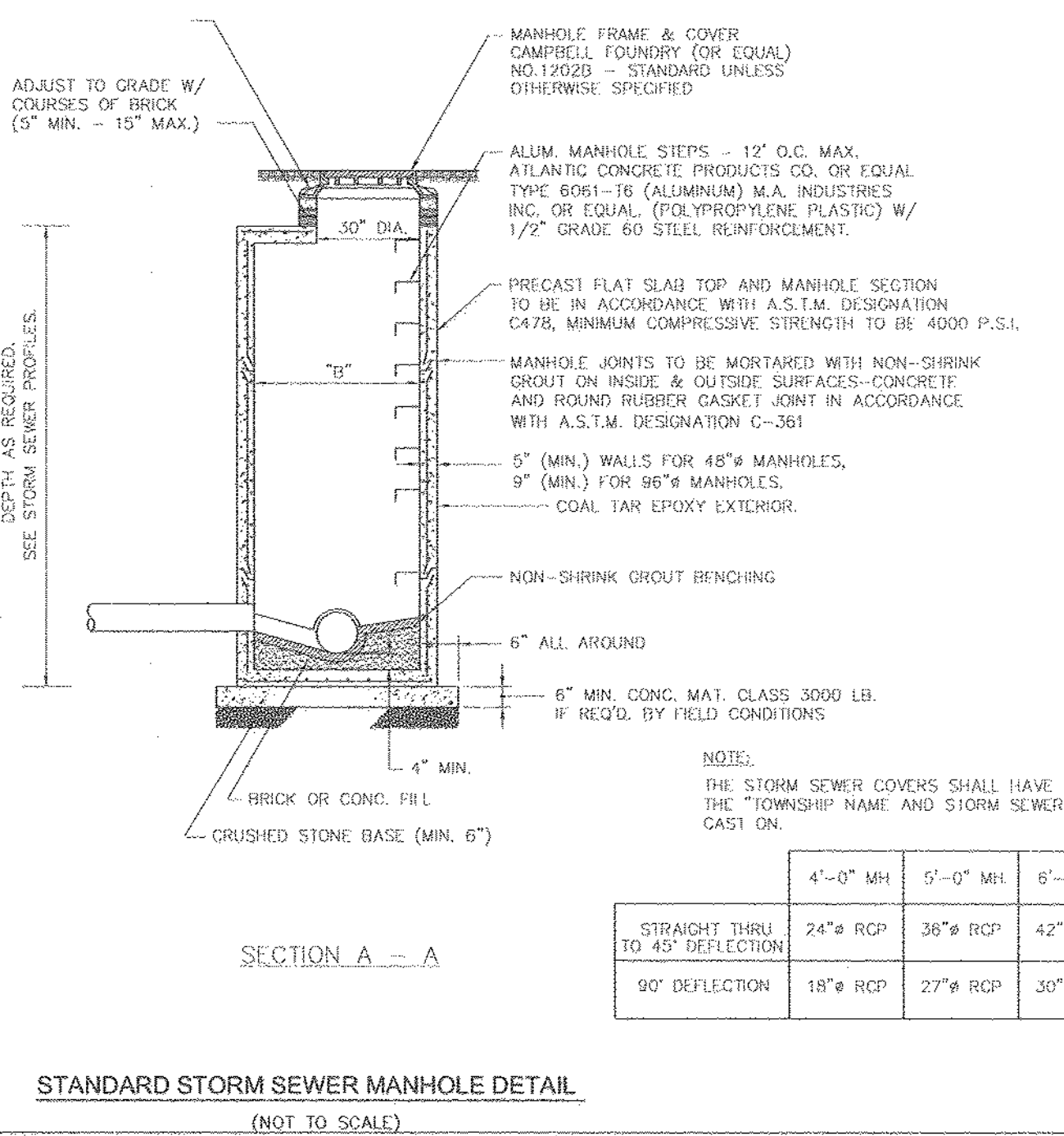
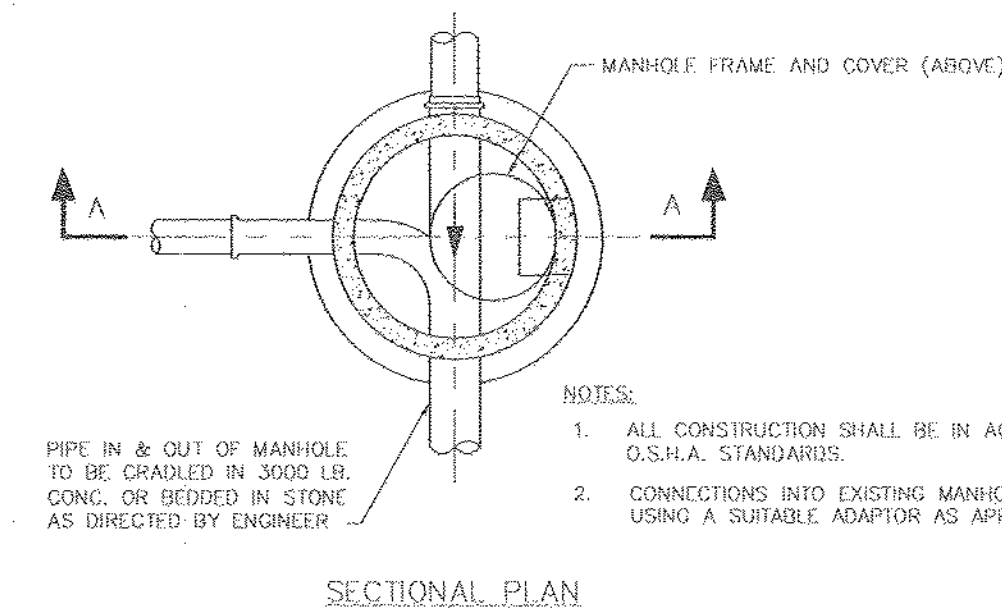
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Job	363145
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Total	13

Drawing No.



STANDARD SANITARY SEWER MANHOLE DETAIL
(NOT TO SCALE)

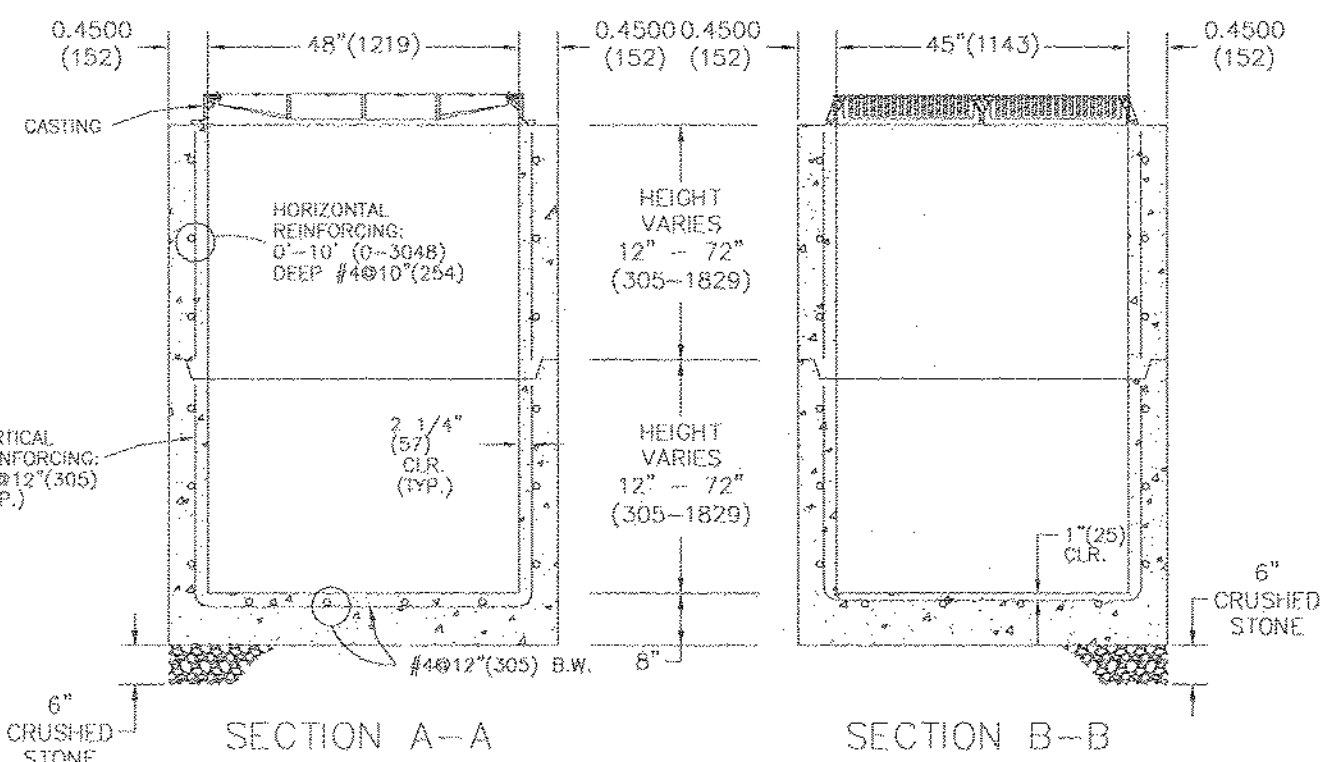
M.H.#	INTERIOR DIMENSION
MHN #1	7'
MHN #1A	8'
MHN #2	8'
MHN #3	5'
MHN #4	8'
MHN #5	8'
MHN #6	7' X 7' BOX
MHN #7	6' X 6' BOX
MHN #8	5'
MHN #9	5'
MHN #10	5'
MHN #11	5'
MHN #12	5' X 5' BOX
MHS #1	8' X 6' BOX
MHS #2	8' X 6' BOX
MHS #3	8' X 6' BOX
MHS #4	7'
MHS #5	7'
MHS #6	7'
MHS #7	7'
MHS #8	7'
MHS #9	5'
MHS #10	5'
MHS #11	5'
MHS #12	SMART BOX #1 (SEE DETAIL)
MHS #13	6'
MHS #14	6'
MHS #15	7'
MHS #16	6'
MHS #17	SMART BOX #2 (SEE DETAIL)
MHS #17A	7'
MHS #17B	7'
MHS #18	7'
MHS #18A	7'



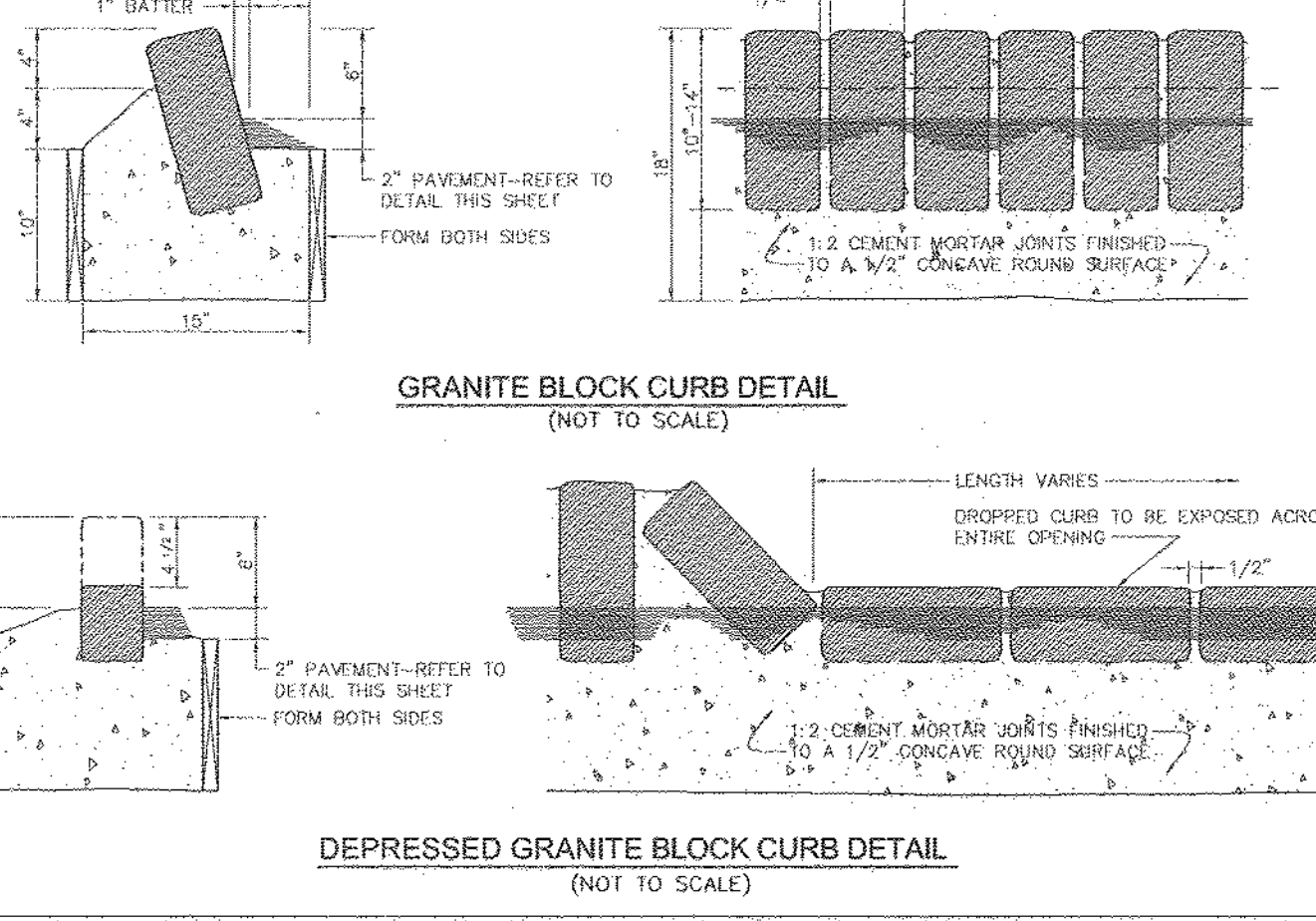
STANDARD STORM SEWER MANHOLE DETAIL
(NOT TO SCALE)

D.I.#	INTERIOR DIMENSION**	GRATE*	GRATE TYPE	NUDOT DESIGNATION
DIS #1	102" X 42"	2618	BICYCLE TYPE	TYPE 'B' DOUBLE
DIS #2	48" X 42"	2618	BICYCLE TYPE	TYPE 'B'
DIS #3	48" X 42"	2618	BICYCLE TYPE	TYPE 'B'
MHS #1	72" X 72"	3425	BICYCLE TYPE	TYPE 'E' CHAMBER
MHS #2	72" X 72"	3425	BICYCLE TYPE	TYPE 'E' CHAMBER
MHS #3	72" X 72"	3425	BICYCLE TYPE	TYPE 'E' CHAMBER
DIS #1	102" X 42"	2618	BICYCLE TYPE	TYPE 'B' DOUBLE
DIS #2	48" X 42"	2618	BICYCLE TYPE	TYPE 'B'
DIS #3	48" X 42"	2618	BICYCLE TYPE	TYPE 'B'
DIS #4	48" X 42"	2618	BICYCLE TYPE	TYPE 'B'
DIS #5	48" X 42"	2618	BICYCLE TYPE	TYPE 'B' DOUBLE
DIS #6	48" X 45"	3425	BICYCLE TYPE	TYPE 'B'
DIS #7	48" X 45"	3425	BICYCLE TYPE	TYPE 'B'
DIS #8	102" X 42"	2618	BICYCLE TYPE	TYPE 'B' DOUBLE
DIS #9	48" X 45"	3425	BICYCLE TYPE	TYPE 'E'
DIS #10	48" X 45"	3425	BICYCLE TYPE	TYPE 'E'
MHS #13	8" DIAMETER MANHOLE	2224	MANHOLE GRATE	STORM SEWER MANHOLE
DIS #1A	48" X 42"	2618	BICYCLE TYPE	TYPE 'B'
DIS #2A	48" X 42"	2618	BICYCLE TYPE	TYPE 'B'
DIS #3A	48" X 42"	2618	BICYCLE TYPE	TYPE 'B'
DIS #8A	48" X 42"	2618	BICYCLE TYPE	TYPE 'B'
DIS #9A	48" X 42"	2618	BICYCLE TYPE	TYPE 'B'
DIS #6A	48" X 42"	2618	BICYCLE TYPE	TYPE 'B'
DIS #11	48" X 42"	2618	BICYCLE TYPE	TYPE 'B'
DIS #12	48" X 42"	2618	BICYCLE TYPE	TYPE 'B'

- GENERAL NOTES:
1. CONCRETE IS TO OBTAIN A STRENGTH OF 4,000 PSI (27 MPa) IN 28 DAYS.
 2. REINFORCING STEEL TO HAVE A YIELD STRENGTH OF 60,000 PSI (414 MPa).
 3. THE INLET TO MEET THE REQUIREMENTS OF ASTM C-913 3, "PRECAST CONCRETE WATER AND WASTEWATER STRUCTURES".
 4. THE WALLS AND BASE SLAB TO BE DESIGNED FOR A MINIMUM EARTH COVER OF 10 FT. (3048).
 5. FRAME AND GRATE TO BE #2618 INLET WITH BICYCLE SAFE GRATE AND TYPE J-ECO CURB PIECE AS MANUFACTURED BY CAMPBELL FOUNDRY CO. OR EQUAL.
 6. PROVIDE ALUMINUM LADDER RINGS @ 12" CENTER TO CENTER.
 7. CURB HEAD TO BE 6"



PRECAST CONCRETE INLET TYPE E
(NOT TO SCALE)



DEPRESSED GRANITE BLOCK CURB DETAIL
(NOT TO SCALE)

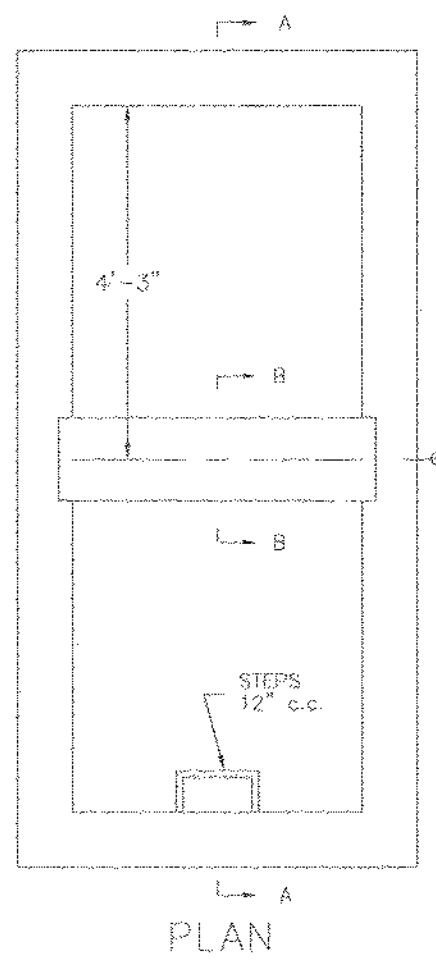
PLAN VIEW

SECTION A-A

SECTION B-B

PRECAST CONCRETE INLET TYPE B
(NOT TO SCALE)

- GENERAL NOTES:
1. CONCRETE IS TO OBTAIN A STRENGTH OF 5,000 PSI (34 MPa) IN 28 DAYS.
 2. REINFORCING STEEL TO HAVE A YIELD STRENGTH OF 60,000 PSI (414 MPa).
 3. W.W.P. HAS A YIELD STRENGTH OF 75,000 PSI (517 MPa).
 4. THE INLET TO MEET THE REQUIREMENTS OF ASTM C-913 3, "PRECAST CONCRETE WATER AND WASTEWATER STRUCTURES".
 5. THE WALLS AND BASE SLAB TO BE DESIGNED FOR A MINIMUM EARTH COVER OF 20 FT. (6096).
 6. FRAME AND GRATES TO BE #2618 WITH TYPE J-ECO CURB PIECE AS MANUFACTURED BY CAMPBELL FOUNDRY CO. OR EQUAL. BICYCLE SAFE GRATE SHALL BE USED.
 7. PROVIDE ALUMINUM LADDER RINGS @ 12" CENTER TO CENTER.
 8. CURB HEAD TO BE 6"



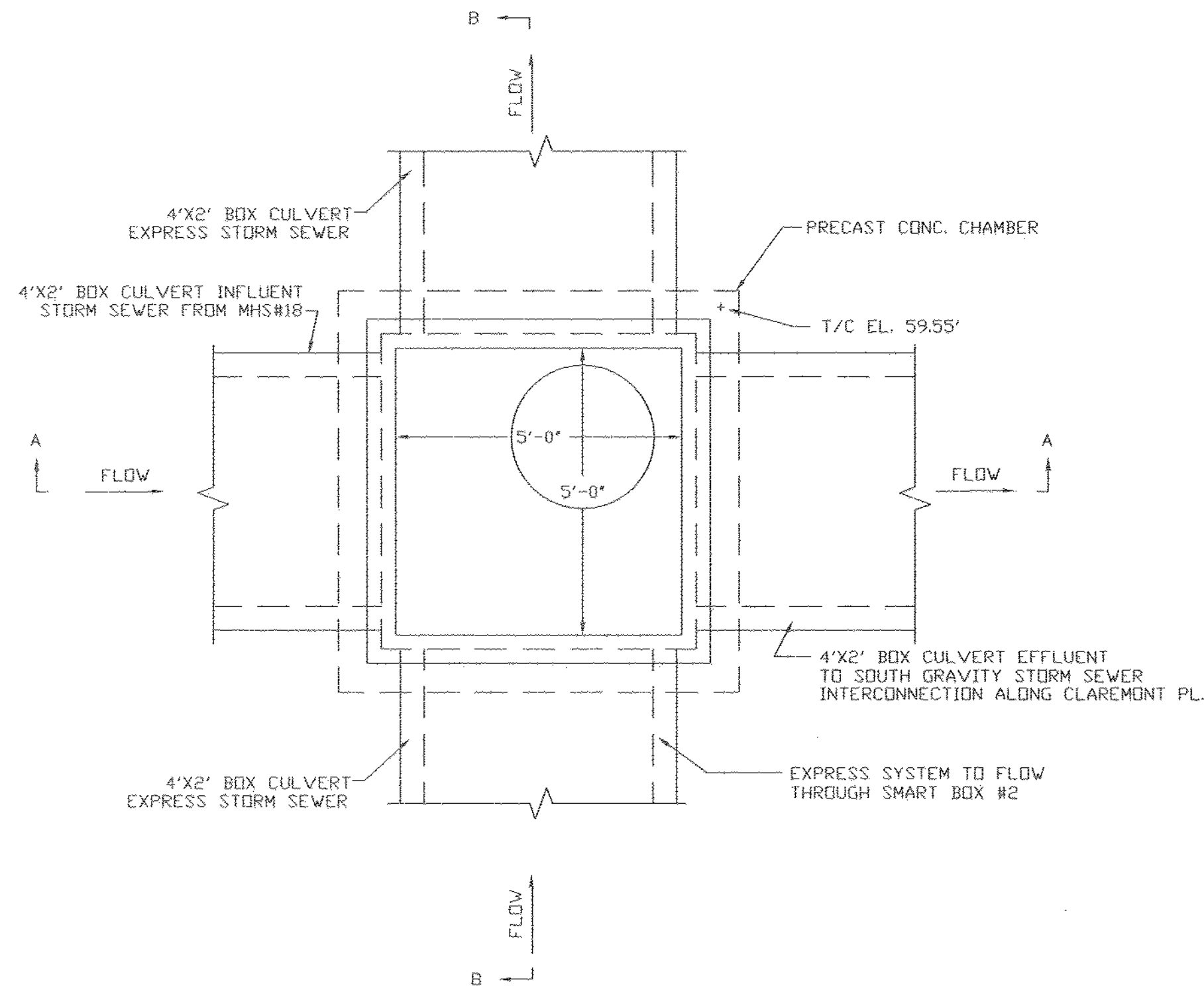
PLAN

SECTION A-A

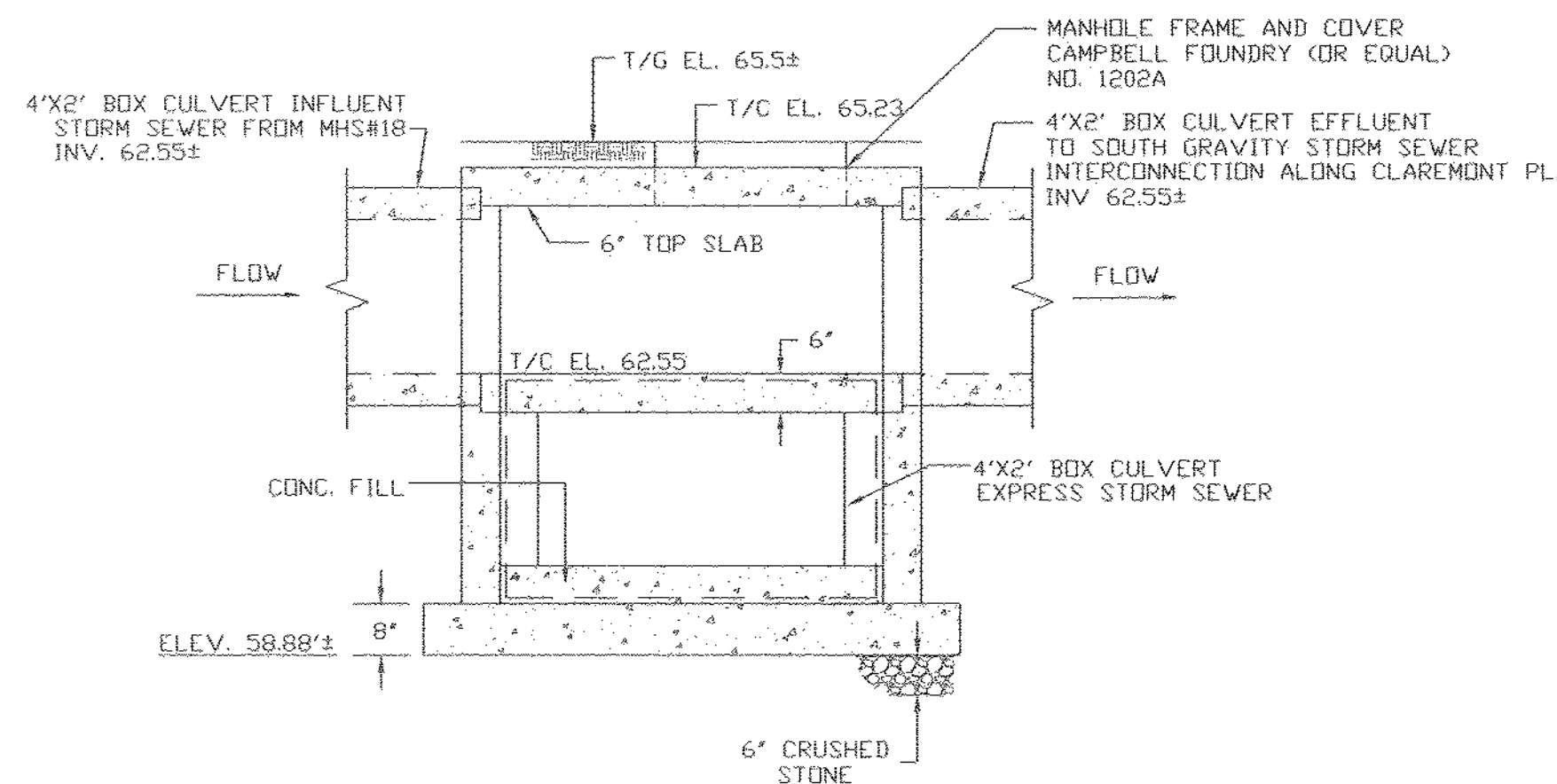
PRECAST CONCRETE INLET DOUBLE B
(NOT TO SCALE)

PLAN REINF.

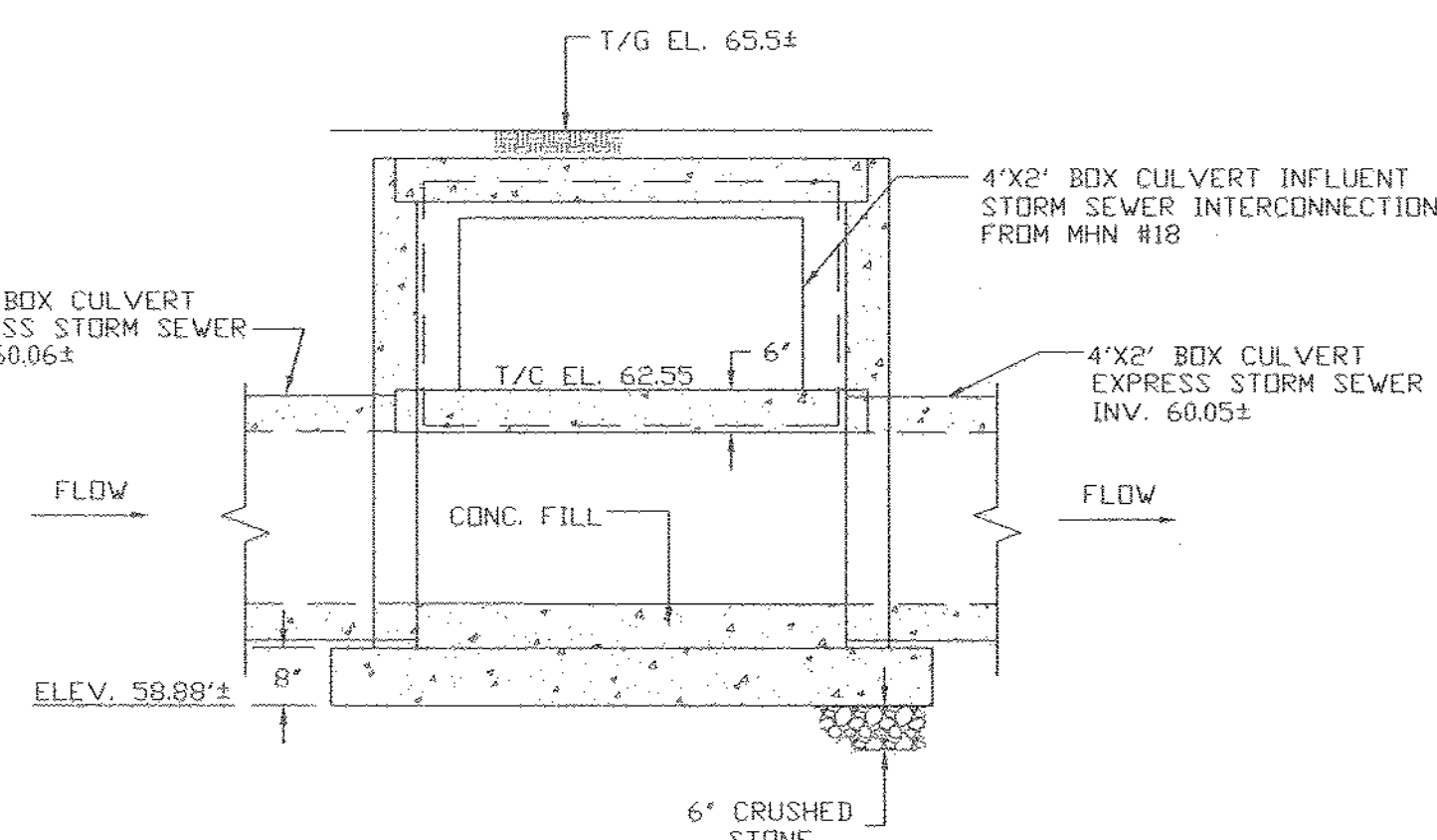
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PLAN VIEW



SECTION A-A



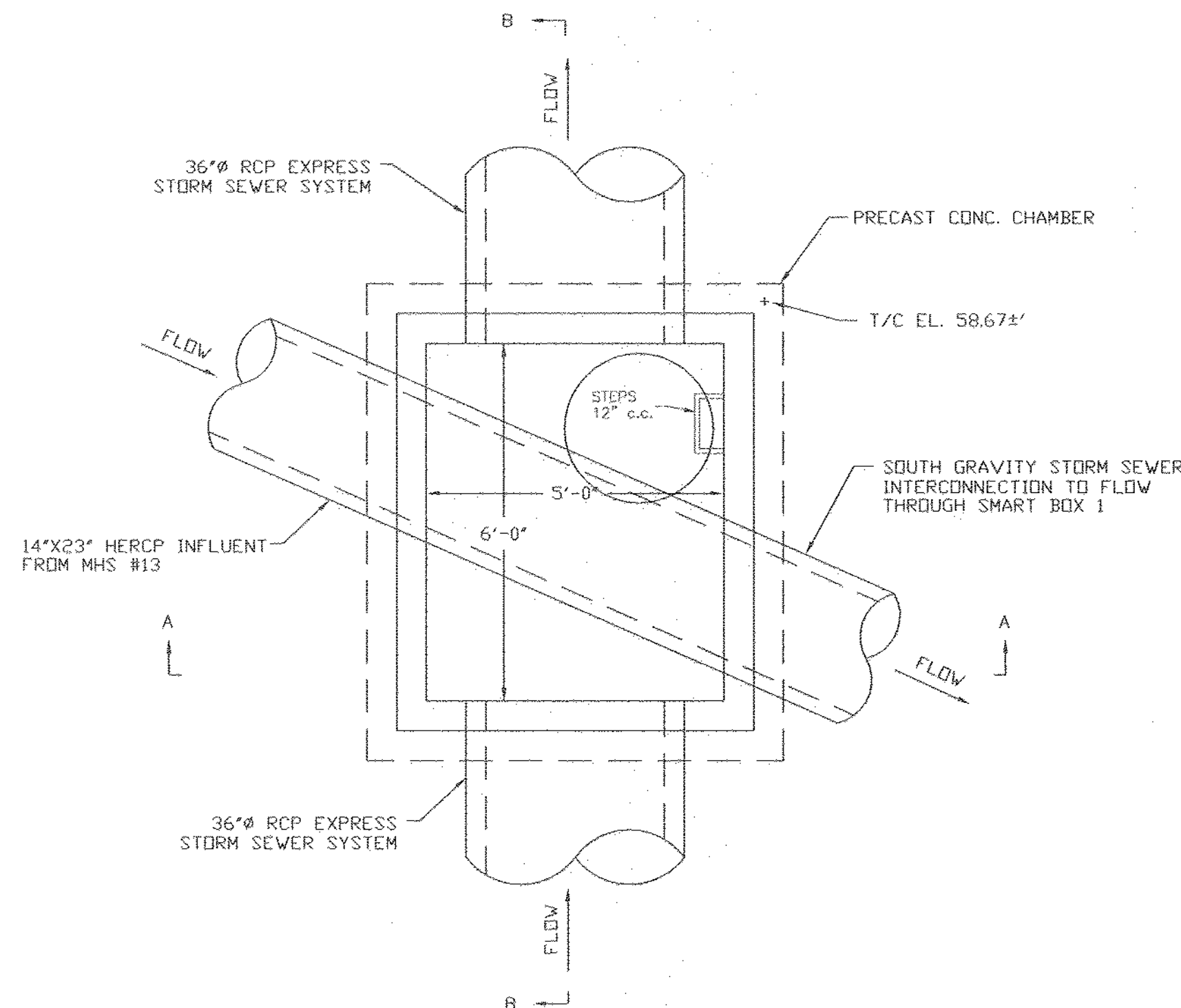
SECTION B-B

GENERAL NOTES:

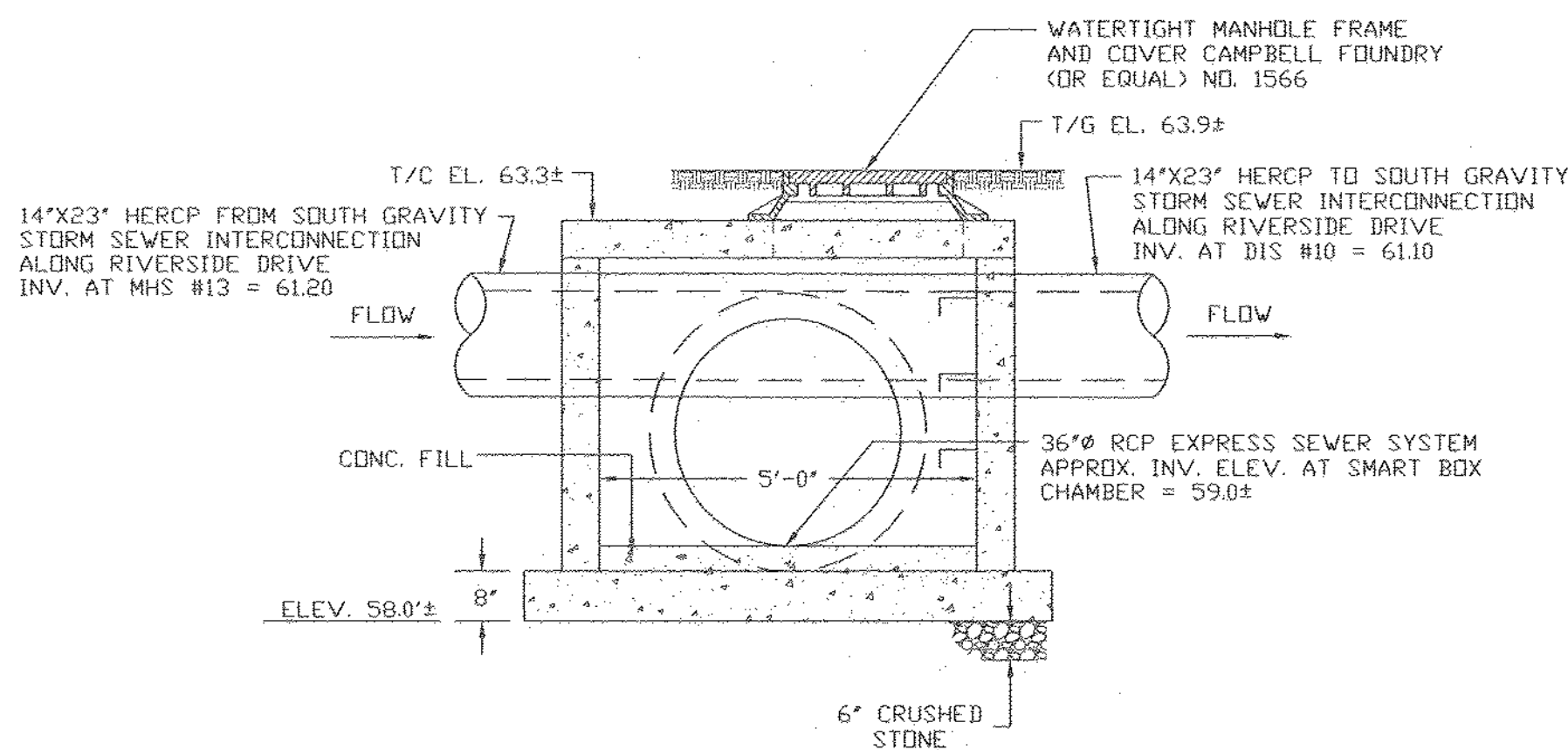
1. PRECAST CONCRETE SMART BOX SHALL OBTAIN A STRENGTH OF 5,000 PSI IN 28 DAYS.
2. REINFORCING STEEL SHALL HAVE A YIELD STRENGTH OF 60,000 PSI.
3. THE WALLS AND BASE SLAB TO BE DESIGNED FOR A MINIMUM EARTH COVER OF 10FT. (EARTH COVER = FINISH GRADE TO TOP OF BASE SLAB.)

SMART BOX 2 DETAIL

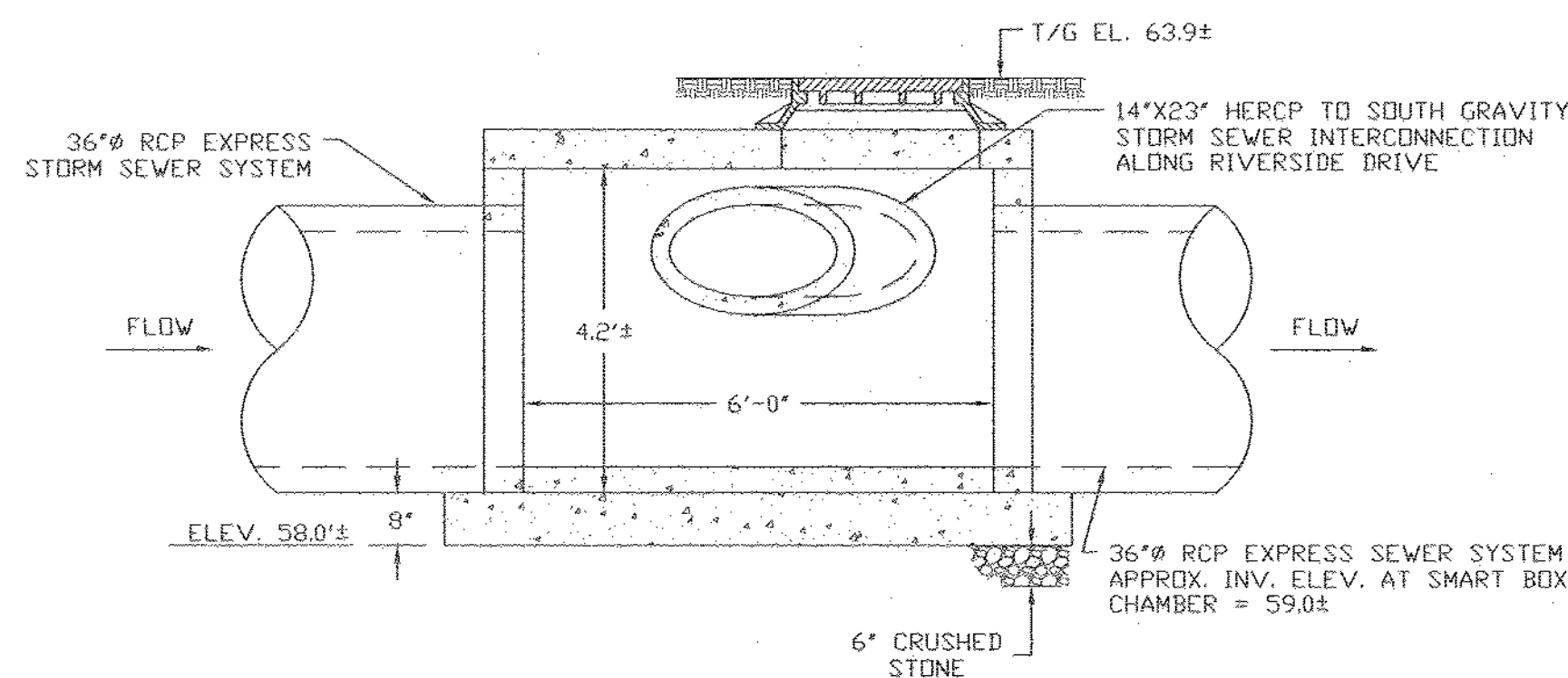
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PLAN VIEW



SECTION A-A



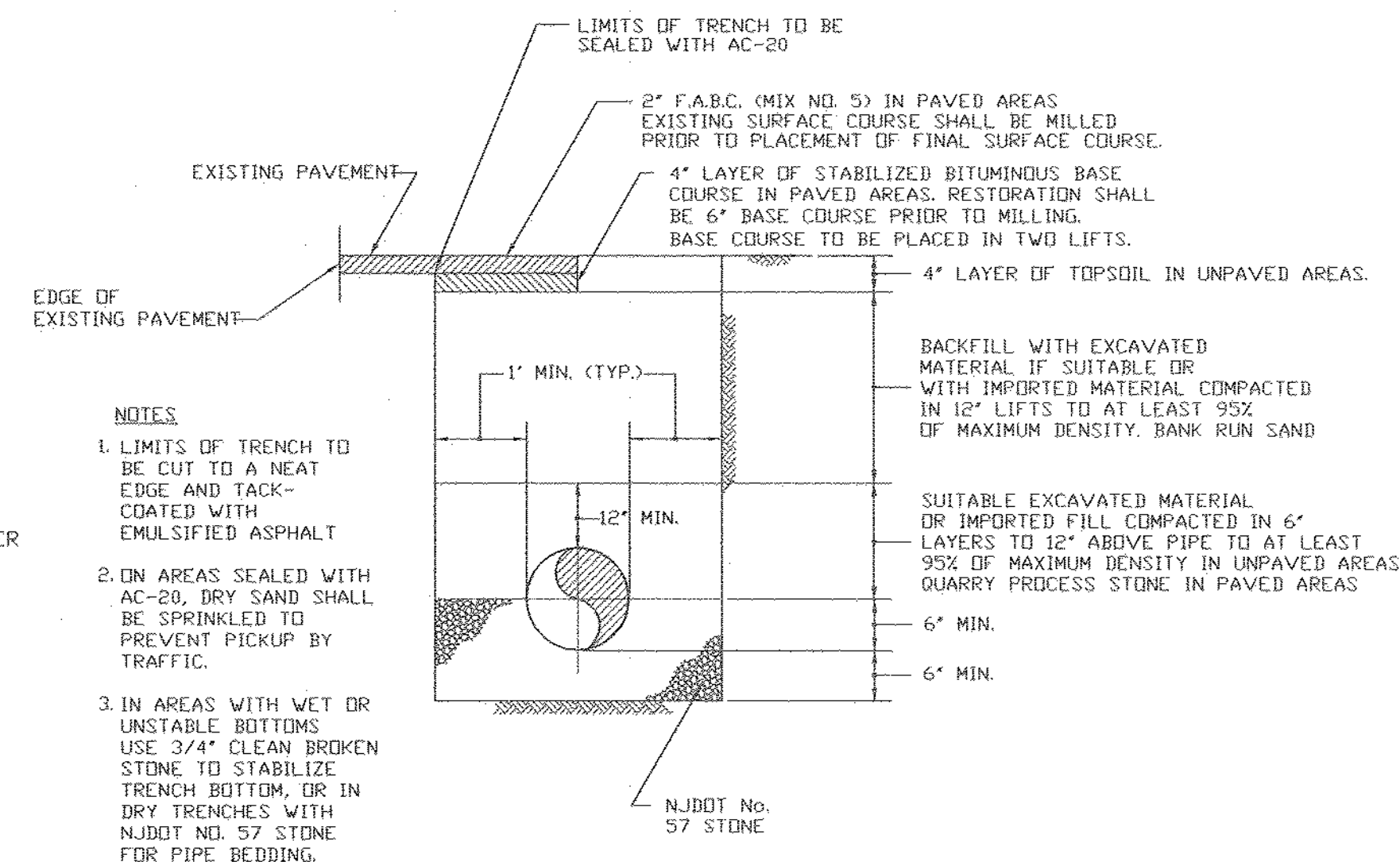
SECTION B-B

GENERAL NOTES:

1. PRECAST CONCRETE SMART BOX SHALL OBTAIN A STRENGTH OF 5,000 PSI IN 28 DAYS.
2. REINFORCING STEEL SHALL HAVE A YIELD STRENGTH OF 60,000 PSI.
3. THE WALLS AND BASE SLAB TO BE DESIGNED FOR A MINIMUM EARTH COVER OF 10FT. (EARTH COVER = FINISH GRADE TO TOP OF BASE SLAB.)
4. PRECAST CONCRETE SMART BOX CHAMBER SHALL BE WATERTIGHT WITH A WATERTIGHT ACCESS MANHOLE COVER.

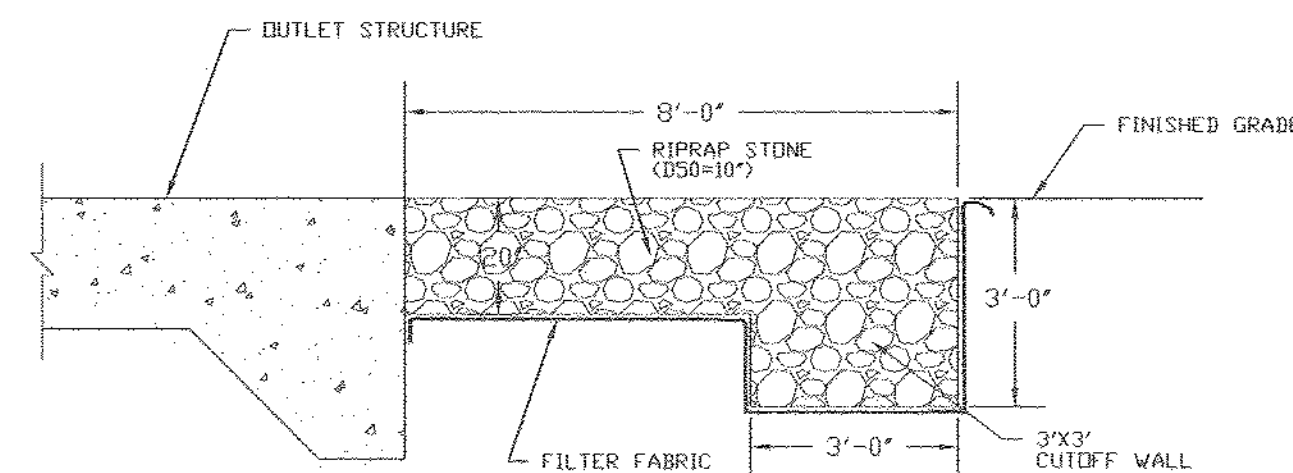
SMART BOX 1 DETAIL (MHS #12)

(NOT TO SCALE)



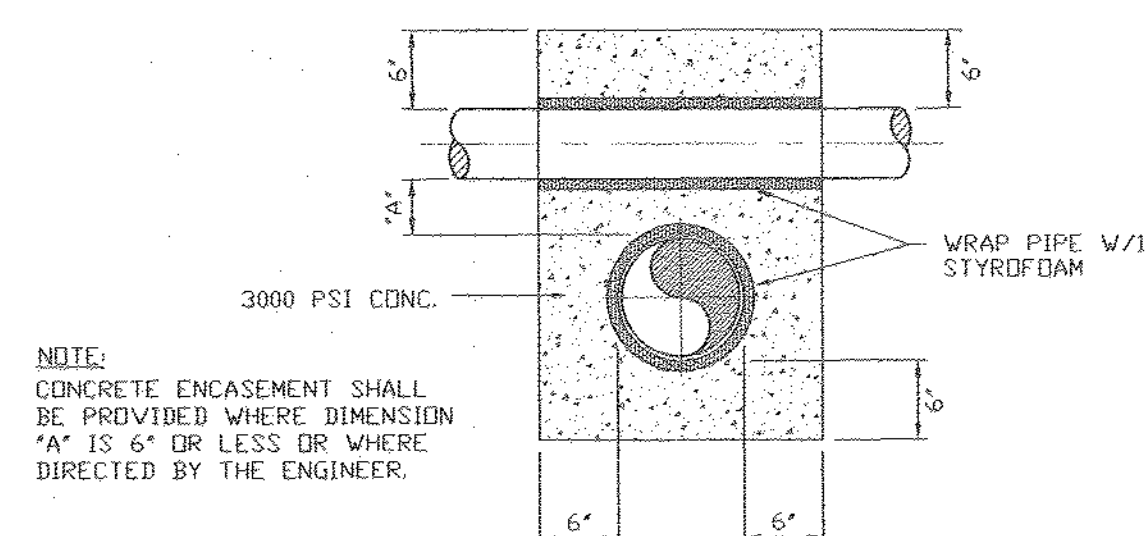
SURFACE RESTORATION AND TRENCH DETAIL

(NOT TO SCALE)



RIPRAP APRON DETAIL AT OUTFALL

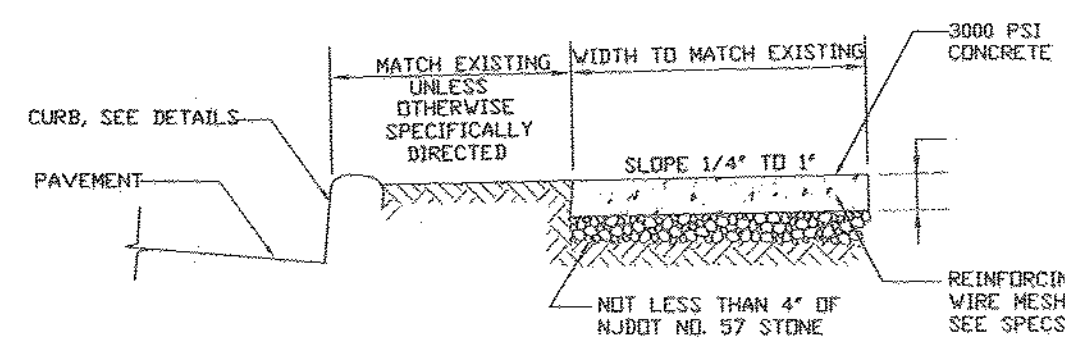
(NOT TO SCALE)



NOTE:
CONCRETE ENCASMENT SHALL BE PROVIDED WHERE DIMENSION "A" IS 6" OR LESS OR WHERE DIRECTED BY THE ENGINEER.

PIPE CROSSING DETAIL

(NOT TO SCALE)



SIDEWALK/SIDEWALK REPLACEMENT DETAILS

(NOT TO SCALE)

NOTES:

1. SIDEWALKS SHALL BE CONSTRUCTED IN EIGHT FOOT SECTIONS WITH CLEAR SPACE OF 3/16 INCH BETWEEN SECTIONS, AND A FALSE JOINT ACROSS THE MIDDLE OF EACH SECTION. EXPANSION JOINTS SHALL BE PROVIDED EQUAL DISTANCES OF NOT MORE THAN 20' JOINTS SHALL BE FILLED WITH PREFORMED BITUMINOUS CELLULAR TYPE EXPANSION JOINT FILLER 1/2" THICK.

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TOWNSHIP OF CRANFORD
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STORMWATER MANAGEMENT PROJECT - CONTRACT 2B
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DETAILS AND NOTES

File	CRANFORD RIVERSIDE DR
Book	
Job	363145
Scale	AS NOTED
Page	D-2
Total	13

Drawing No.

STANDARD FOR PERMANENT VEGETATIVE COVER FOR SOIL STABILIZATION

DEFINITION
ESTABLISHMENT OF PERMANENT VEGETATIVE COVER ON EXPOSED SOILS WHERE PERENNIAL VEGETATION IS NEEDED FOR LONG TERM PROTECTION.

PURPOSE
TO PERMANENTLY STABILIZE THE SOIL, ASSURING CONSERVATION OF SOIL AND WATER, AND TO ENHANCE THE ENVIRONMENT.

WHERE APPLICABLE
ON EXPOSED SOILS THAT HAVE A POTENTIAL FOR CAUSING OFF-SITE ENVIRONMENTAL DAMAGE.

METHODS AND MATERIALS

- SITE PREPARATION**
 - GRASS AS NEEDED AND FEASIBLE TO PERMIT THE USE OF CONVENTIONAL EQUIPMENT FOR SEEDING PREPARATION. SEEDING, MULCH APPLICATION AND ANCHORING AND MAINTENANCE. ALL GRADING SHOULD BE DONE IN ACCORDANCE WITH STANDARDS FOR LAND GRADING, P. 4-11.
 - INSTALL NEEDED EROSION CONTROL PRACTICES AND FACILITIES SUCH AS INVERSIONS, GRASS STABILIZATION TECHNIQUES, CHANNEL STABILIZATION MEASURES, SEDIMENT BASINS, AND WATERWAYS. SEE STANDARDS 4.2 THROUGH 4.10.
- SEEDING PREPARATION**
 - APPLY LIME/STON AND FERTILIZER ACCORDING TO SOIL TEST RECOMMENDATIONS SUCH AS THOSE OFFERED BY Rutgers UNIVERSITY SOIL TESTING LABORATORY. SOIL SAMPLE MULCHES ARE AVAILABLE FROM THE LOCAL COOPERATIVE EXTENSION SERVICE OFFICE. IF SOIL TESTING IS NOT FEASIBLE ON SMALL OR VARIABLE SITES, OR WHERE TURNS IS CRITICAL, FERTILIZER MAY BE APPLIED AT THE RATE OF 500 POUNDS PER ACRE OR 10 POUNDS PER 1,000 SQUARE FEET OF 10-20-10 OR EQUIVALENT. IN ADDITION, 300 POUNDS PER ACRE OR 6 POUNDS PER 1,000 SQUARE FEET OF SLOW RELEASE NITROGEN MAY BE USED IN LIEU OF TOPDRESSING (SEE PAGE 3.2.7, SECTION IV). APPLY LIME/STON EQUIVALENT TO 50 PERCENT CALCIUM PPM (MAGNESIUM ORDS) AS FOLLOWS:

SOIL TEXTURE	TONS/ACRE	LIBS./1,000 SQ. FT.
CLAY, CLAY LOAM, AND SILT LOAM	4	100
SANDY CLAY, LOAM, SILT LOAM	2	50
LOAMY SAND, SAND	1	25

- SEEDING**
 - SELECT A MIXTURE FROM TABLE 3.2-1 OR USE MIXTURE RECOMMENDED BY THE COOPERATIVE EXTENSION SERVICE OR SOIL CONSERVATION SERVICE WHICH IS APPROVED BY THE SOIL CONSERVATION DISTRICT.
 - APPLY SEED UNIFORMLY BY HAND, CYCLOPS (CENTRIFUGAL) SEEDER, DROP SEEDER, DRILL, OUTCROPGER SEEDER, OR HYDROSEEDER. THE LATTER MAY BE ADJUSTABLE FOR LARGE, STEEP AREAS WHERE CONVENTIONAL VEHICLES CANNOT TRAVEL. MULCH SHALL NOT BE INCLUDED IN THE TANK WITH THE SEED. EXCEPT FOR MULCH, HYDROSEEDER OR OUTCROPGER SEEDER, SEED SHALL BE INCORPORATED INTO THE SOIL TO A DEPTH OF 1/4 TO 1/2 INCH BY RANING OR DRAGGING. DEPTH OF SEED PLACEMENT MAY BE 1/4 INCH DEEPER ON COARSE, TIGHTER SOIL.
 - AFTER SEEDING, FIRING THE SOIL WITH A CORRUGATED ROLLER WILL ASSURE GOOD SEED-TO-SOIL CONTACT, RESTORE CAPILLARITY, AND IMPROVE SEEDLING ESTABLISHMENT. THIS IS THE PREFERRED METHOD. WHEN PERFORMED ON THE CONTOUR, SEED EROSION WILL BE MINIMIZED AND WATER CONSERVATION ON SITE WILL BE MAXIMIZED.
- MULCHING**
 - MULCHING IS REQUIRED ON ALL SEEDING. MULCH WILL INSURE ANCHOR EROSION BEFORE GRASS IS ESTABLISHED AND WILL PROMOTE FASTER AND EARLIER ESTABLISHMENT. (THE EXISTENCE OF SATISFACTORY PERMANENT VEGETATION AT THE TIME OF THE PROJECT OR LATER MUST BE ASSESSED AS COMPLIANCE WITH THE MULCHING REQUIREMENT.)
 - MULCH MATERIALS SHOULD BE UNWETTED SALT GRASS STRAW, HAY, OR SALT HAY TO BE APPLIED AT THE RATE OF 1-1/2 TONS PER ACRE (25 LIBS. PER 1,000 SQ. FT.), EXCEPT THAT WHERE A CRUMPER IS USED, INSTEAD OF A LIQUID MULCH-BINDER (EXCEPT FOR LIQUID MULCH-BINDER, WHICH MAY BE USED AT A RATE OF APPLICATION WHICH WILL DOUBLE THE LOWER RATE. MULCH CRUMPER-BLINDERS MUST NOT OMBE THE MATERIAL).
 - SPREAD UNIFORMITY BY HAND OR MECHANICALLY SO THAT APPROXIMATELY 75% TO 95% OF THE SOIL SURFACE WILL BE COVERED FOR UNIFORM DISTRIBUTION OF HAND-SPREAD MULCH. OVERIDE AREA UNAPPROXIMATELY 1,000 SQ. FT. SECTIONS AND DISTRIBUTE 70 TO 10 POUNDS WITHIN EACH SECTION.
 - MULCH ANCHORING SHOULD BE ACCOMPLISHED IMMEDIATELY AFTER PLACEMENT TO MINIMIZE LOSS BY WIND OR WATER. THIS MAY BE DONE BY ONE OF THE FOLLOWING METHODS, DEPENDING UPON THE SIZE OF THE AREA, STEEPNESS OF SLOPES, AND COSTS:
 1. PEG AND TWINE - DRIVE 8 TO 10 INCH WOODEN PEGS TO WITHIN 2 TO 3 INCHES OF THE SOIL SURFACE EVERY 4 FEET IN ALL DIRECTIONS. STAKES MAY BE DRIVEN BEFORE OR AFTER APPLYING MULCH. SECURE MULCH TO SOIL SURFACE BY STRETCHING TWINE BETWEEN PEGS IN A CROSS-CROSS AND A SQUARE PATTERN. SECURE TWINE AROUND EACH PEG WITH TWO OR MORE ROUND TURNS.
 2. MULCH NETTINGS - STAPLE PAPER, JUTE, COTTON, OR PLASTIC NETTINGS TO THE SOIL SURFACE. USE A DEGRADABLE NETTING IN AREAS TO BE MOVED.
 3. CRUMPER (MULCH ANCHORING TOOL) - A TRACTOR-DRAWN IMPLEMENT, SOMEWHAT LIKE A DISCHARRROW, ESPECIALLY DESIGNED TO PUSH OR CUT SOME OF THE BRIDGEMAN LONG FIBER MULCH 2 TO 4 INCHES INTO THE SOIL, SO AS TO ANCHOR IT AND LEAVE PART STANDING UPRIGHT. THIS TECHNIQUE IS LIMITED TO AREAS TRAVERSABLE BY A TRACTOR, WHOSE MUST OPERATE ON THE CONTOUR OF SLOPES. STRAW MULCH RATE MUST BE 3 TONS PER ACRE. NO TOPDRESSING OR ADJUVANT AGENT IS REQUIRED.
 4. LIQUID MULCH-BINDERS - MAY BE USED TO ANCHOR SALT HAY, HAY, OR STRAW MULCHES.

- LIQUID MULCH-BINDERS** - MAY BE USED TO ANCHOR SALT HAY, HAY, OR STRAW MULCHES.
 - APPLICATIONS SHOULD BE REPEATED AT EDGES WHERE WIND LAYERS THE MULCH IN VALLEYS, AND AT CRESTS OF BANKS. REMAINDER OF AREA SHOULD BE UNIFORM IN APPEARANCE.
- USE ONE OF THE FOLLOWING:**
 1. CALSIFIED ASPHALT - (CS-1, CS-2, CS-3, CS-4, CS-5, CS-6, CS-7, CS-8, CS-9, CS-10, CS-11, CS-12, CS-13, CS-14, CS-15, CS-16, CS-17, CS-18, CS-19, CS-20, CS-21, CS-22, CS-23, CS-24, CS-25, CS-26, CS-27, CS-28, CS-29, CS-30, CS-31, CS-32, CS-33, CS-34, CS-35, CS-36, CS-37, CS-38, CS-39, CS-40, CS-41, CS-42, CS-43, CS-44, CS-45, CS-46, CS-47, CS-48, CS-49, CS-50, CS-51, CS-52, CS-53, CS-54, CS-55, CS-56, CS-57, CS-58, CS-59, CS-60, CS-61, CS-62, CS-63, CS-64, CS-65, CS-66, CS-67, CS-68, CS-69, CS-70, CS-71, CS-72, CS-73, CS-74, CS-75, CS-76, CS-77, CS-78, CS-79, CS-80, CS-81, CS-82, CS-83, CS-84, CS-85, CS-86, CS-87, CS-88, CS-89, CS-90, CS-91, CS-92, CS-93, CS-94, CS-95, CS-96, CS-97, CS-98, CS-99, CS-100, CS-101, CS-102, CS-103, CS-104, CS-105, CS-106, CS-107, CS-108, CS-109, CS-110, CS-111, CS-112, CS-113, CS-114, CS-115, CS-116, CS-117, CS-118, CS-119, CS-120, CS-121, CS-122, CS-123, CS-124, CS-125, CS-126, CS-127, CS-128, CS-129, CS-130, CS-131, CS-132, CS-133, CS-134, CS-135, CS-136, CS-137, CS-138, CS-139, CS-140, CS-141, CS-142, CS-143, CS-144, CS-145, CS-146, CS-147, CS-148, CS-149, CS-150, CS-151, CS-152, CS-153, CS-154, CS-155, CS-156, CS-157, CS-158, CS-159, CS-160, CS-161, CS-162, CS-163, CS-164, CS-165, CS-166, CS-167, CS-168, CS-169, CS-170, CS-171, CS-172, CS-173, CS-174, CS-175, CS-176, CS-177, CS-178, CS-179, CS-180, CS-181, CS-182, CS-183, CS-184, CS-185, CS-186, CS-187, CS-188, CS-189, CS-190, CS-191, CS-192, CS-193, CS-194, CS-195, CS-196, CS-197, CS-198, CS-199, CS-200, CS-201, CS-202, CS-203, CS-204, CS-205, CS-206, CS-207, CS-208, CS-209, CS-210, CS-211, CS-212, CS-213, CS-214, CS-215, CS-216, CS-217, CS-218, CS-219, CS-220, CS-221, CS-222, CS-223, CS-224, CS-225, CS-226, CS-227, CS-228, CS-229, CS-230, CS-231, CS-232, CS-233, CS-234, CS-235, CS-236, CS-237, CS-238, CS-239, CS-240, CS-241, CS-242, CS-243, CS-244, CS-245, CS-246, CS-247, CS-248, CS-249, CS-250, CS-251, CS-252, CS-253, CS-254, CS-255, CS-256, CS-257, CS-258, CS-259, CS-260, CS-261, CS-262, CS-263, CS-264, CS-265, CS-266, CS-267, CS-268, CS-269, CS-270, CS-271, CS-272, CS-273, CS-274, CS-275, CS-276, CS-277, CS-278, CS-279, CS-280, CS-281, CS-282, CS-283, CS-284, CS-285, CS-286, CS-287, CS-288, CS-289, CS-290, CS-291, CS-292, CS-293, CS-294, CS-295, CS-296, CS-297, CS-298, CS-299, CS-300, CS-301, CS-302, CS-303, CS-304, CS-305, CS-306, CS-307, CS-308, CS-309, CS-310, CS-311, CS-312, CS-313, CS-314, CS-315, CS-316, CS-317, CS-318, CS-319, CS-320, CS-321, CS-322, CS-323, CS-324, CS-325, CS-326, CS-327, CS-328, CS-329, CS-330, CS-331, CS-332, CS-333, CS-334, CS-335, CS-336, CS-337, CS-338, CS-339, CS-340, CS-341, CS-342, CS-343, CS-344, CS-345, CS-346, CS-347, CS-348, CS-349, CS-350, CS-351, CS-352, CS-353, CS-354, CS-355, CS-356, CS-357, CS-358, CS-359, CS-360, CS-361, CS-362, CS-363, CS-364, CS-365, CS-366, CS-367, CS-368, CS-369, CS-370, CS-371, CS-372, CS-373, CS-374, CS-375, CS-376, CS-377, CS-378, CS-379, CS-380, CS-381, CS-382, CS-383, CS-384, CS-385, CS-386, 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