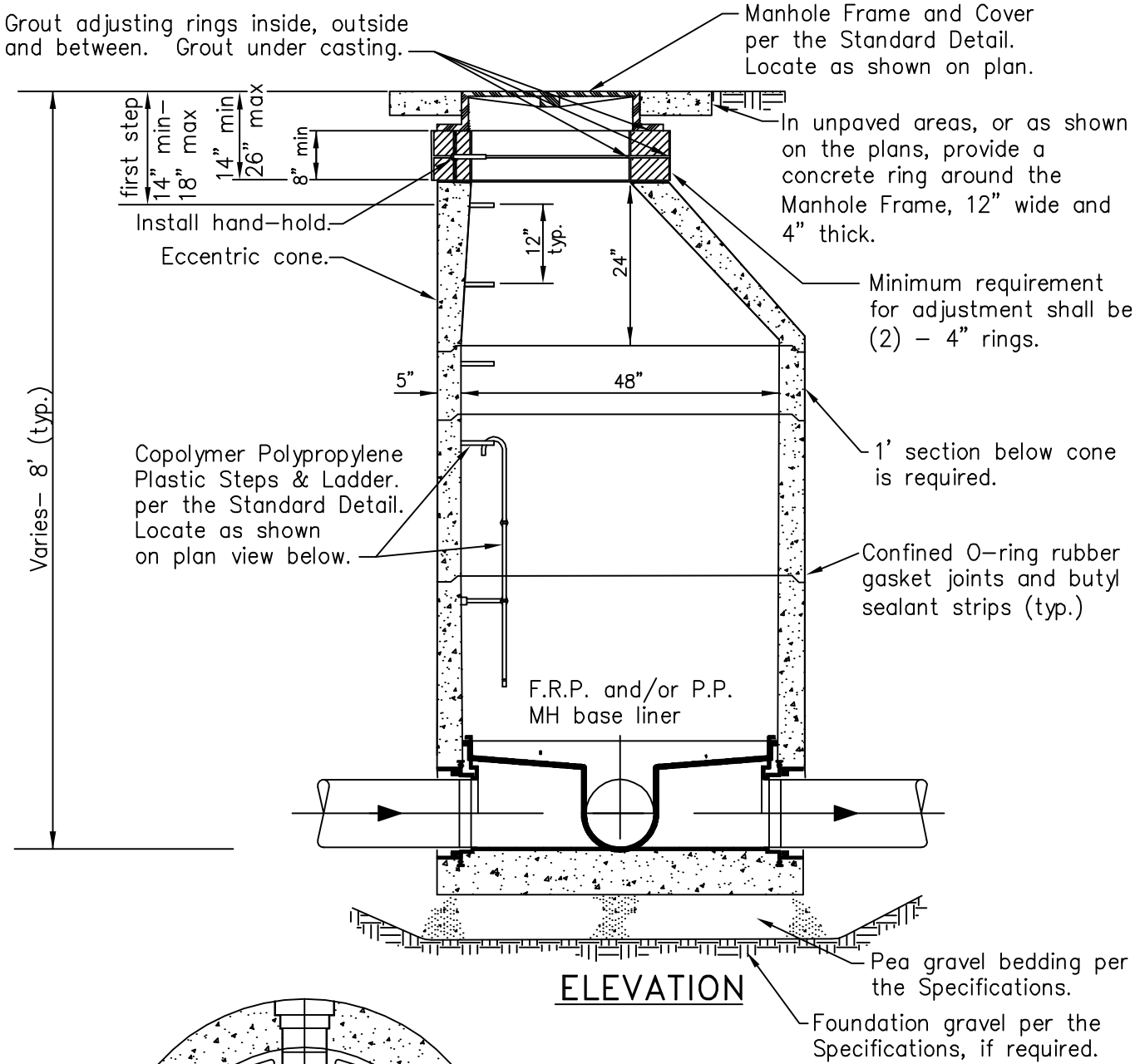


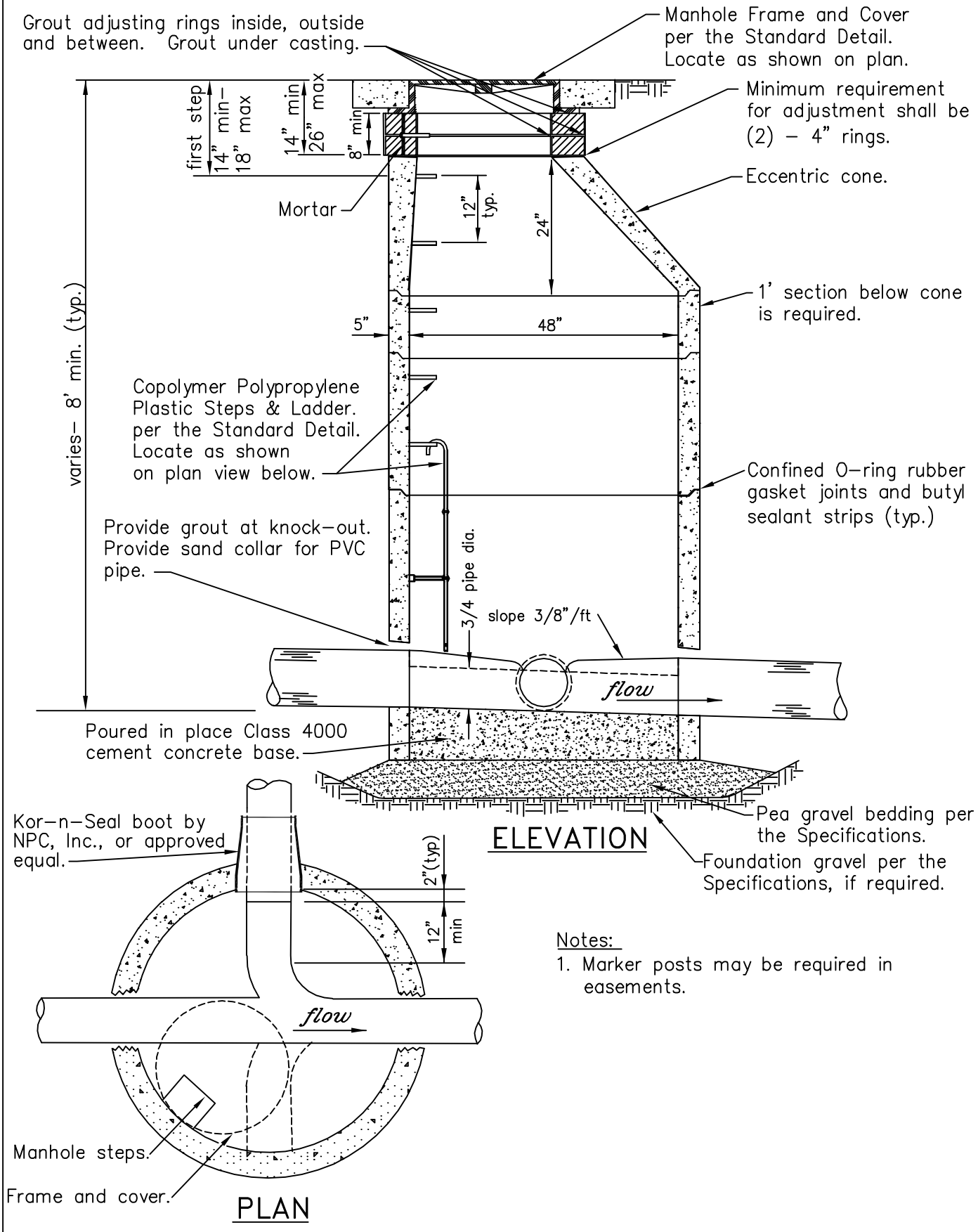
Notes:

1. Minimum drop in the invert elevation through the manhole shall be 0.06'.
2. Marker posts may be required in easements.
3. The manhole baseliner shall be a Fiberglass Reinforced Plastic (F.R.P.) and/or Polypropylene (P.P.) Baseliner System per the Engineering Specifications.
4. For manholes less than 5' in depth, see Sewer Standard Detail #3, Shallow Manhole.

PRECAST MANHOLE W/ BASE LINER

NOT TO SCALE

Detail Approvals	NORTHSHORE UTILITY DISTRICT	1
Engineer GSM	STANDARD SEWER DETAILS	
Manager DPK		August 2011 S1(PRECASTMH w–LINER).DWG



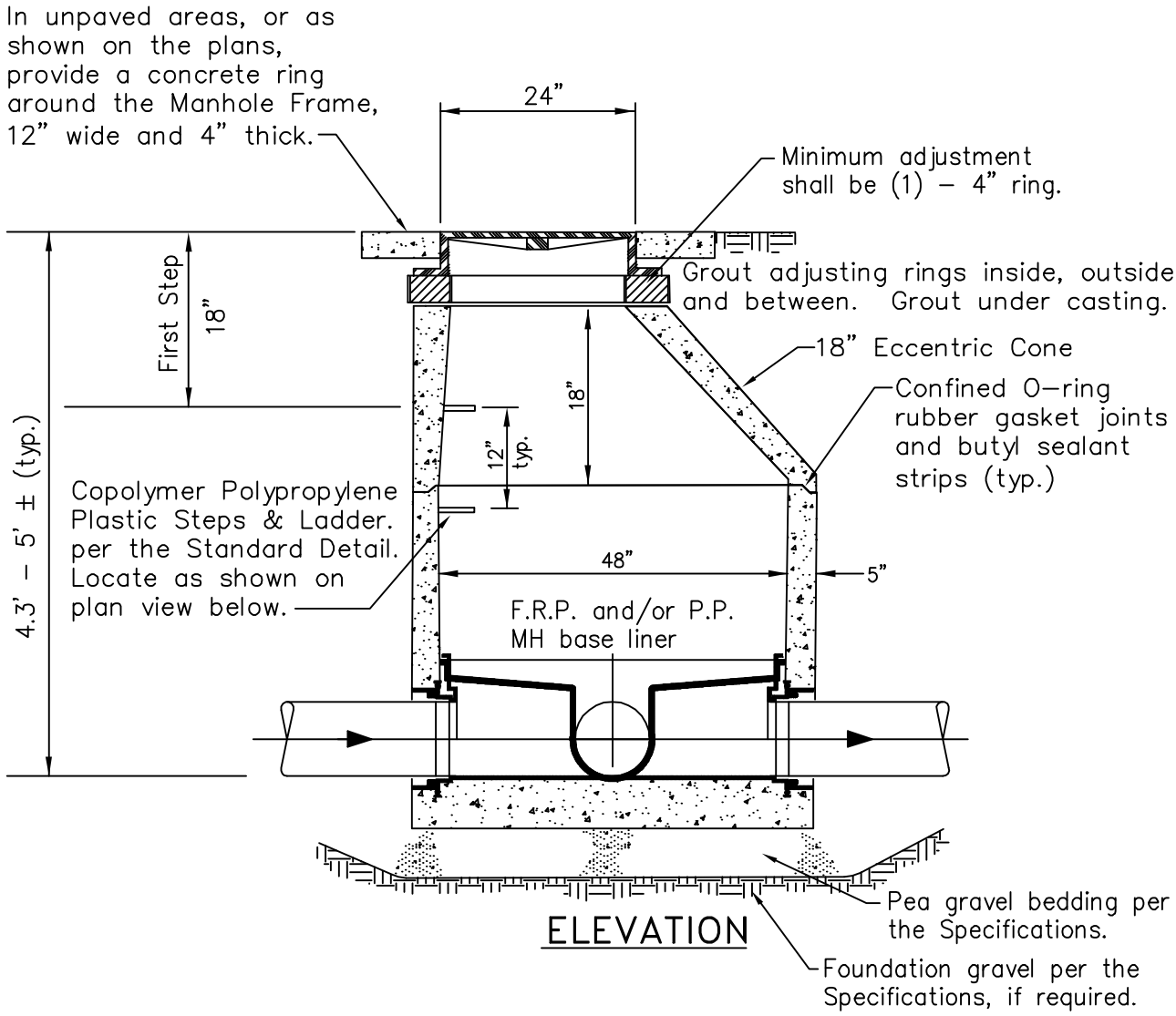
Notes:

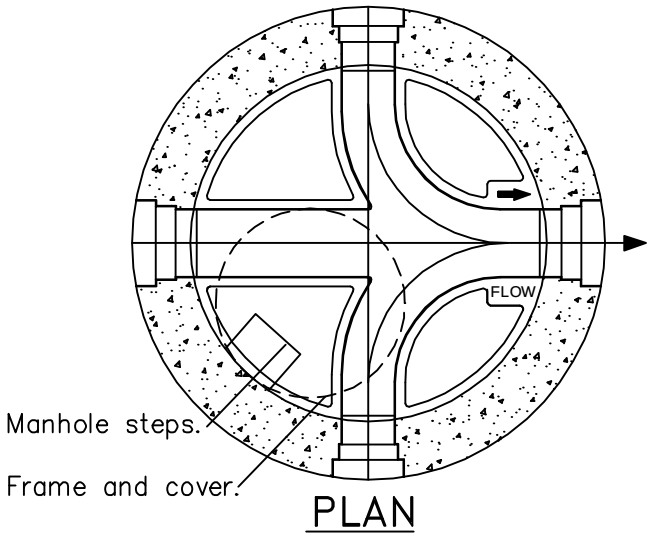
1. Marker posts may be required in easements.

SADDLE MANHOLE

NOT TO SCALE

Detail Approvals	NORTHSHORE UTILITY DISTRICT	2
Engineer GSM	STANDARD SEWER DETAILS	
Manager DPK		August 2011 S2(SADDLEMH).DWG





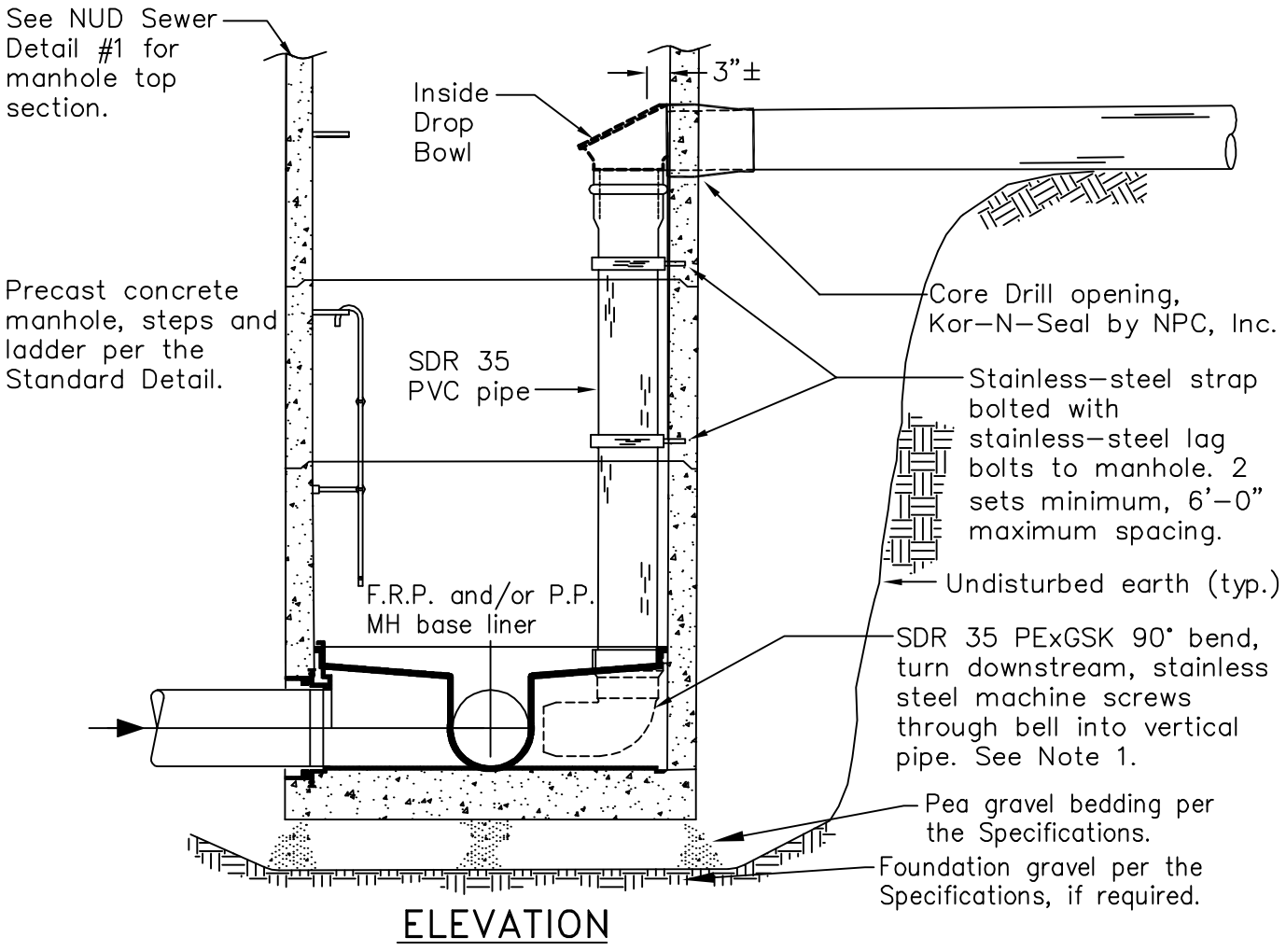
Notes:

1. Use 18" eccentric cone and 2' base for shallow manhole application.
2. Minimum drop in the invert elevation through the manhole shall be 0.06'.
3. Marker posts may be required in easements.
4. The manhole baseliner shall be a Fiberglass Reinforced Plastic (F.R.P.) and/or Polypropylene (P.P.) Baseliner System per the Engineering Specifications.

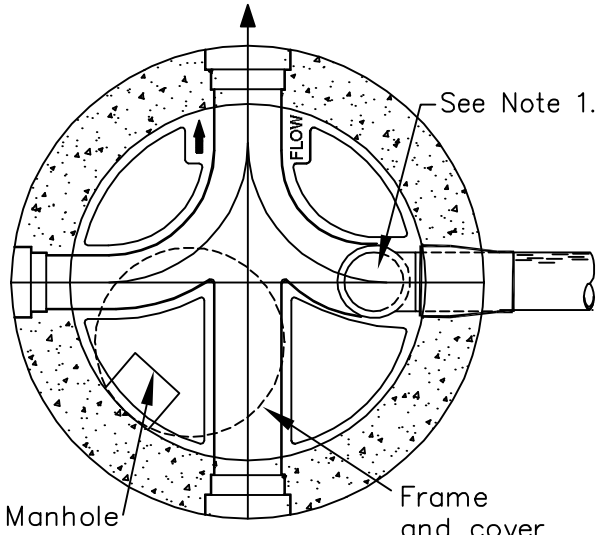
PRECAST SHALLOW MANHOLE W/ BASE LINER

NOT TO SCALE

Detail Approvals	NORTHSHORE UTILITY DISTRICT	3
Engineer GSM	STANDARD SEWER DETAILS	
Manager DPK		August 2011 S3(SHALLOWMH w–LINER).DWG



ELEVATION



PLAN

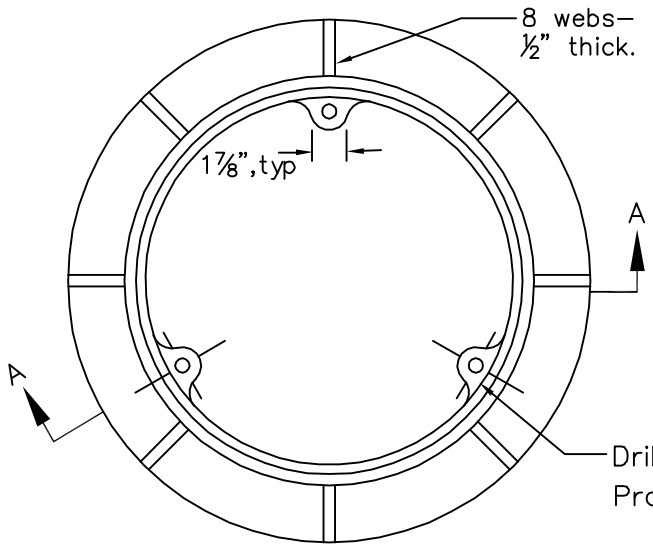
Notes:

1. Fiberglass channel receiving the inside drop flow shall be sized one pipe size larger than the incoming pipe to accommodate the 90° bend.
2. Existing manholes without the FRP baseliner and no concrete channel to accommodate the 90° bend, shall have the bend set on top of the existing concrete bench and grouted in-place. Additional PVC pipe may be required to direct flow to flowline.
3. Minimum drop in the invert elevation through the manhole shall be 0.06'.
4. Marker posts may be required in easements.
5. The manhole baseliner shall be a Fiberglass Reinforced Plastic (F.R.P.) and/or Polypropylene (P.P.) Baseliner System per the Engineering Specifications.

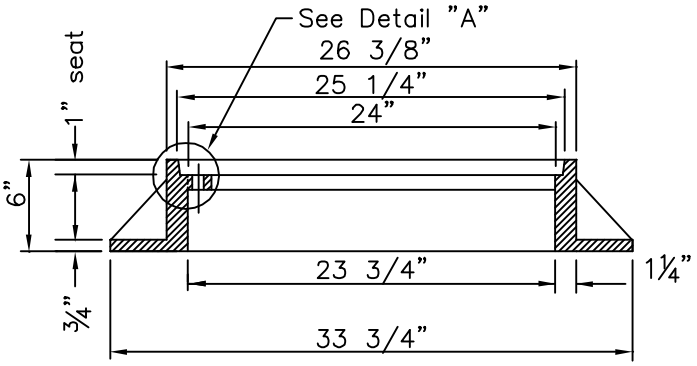
INSIDE DROP MANHOLE W/ BASE LINER

NOT TO SCALE

Detail Approvals	NORTHSHORE UTILITY DISTRICT	4
Engineer GSM	STANDARD SEWER DETAILS	
Manager DPK		August 2011 S4(DROPMH w-LINER).DWG



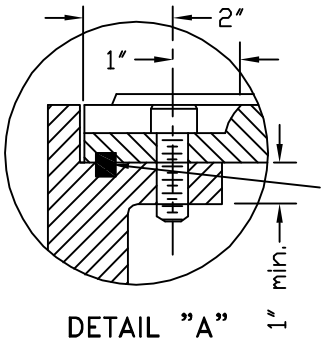
PLAN



SECTION A–A

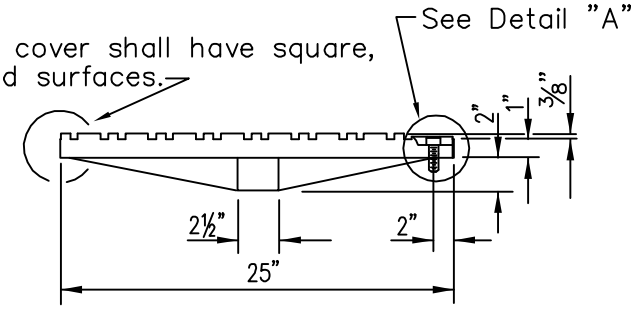
Drill and tap: $\frac{5}{8}$"–11 NC at 120° (typ. 3 places).
Provide $\frac{5}{8}$"–11 NC x $1\frac{1}{4}$" socket head screws.

LOCKING FRAME



DETAIL "A"

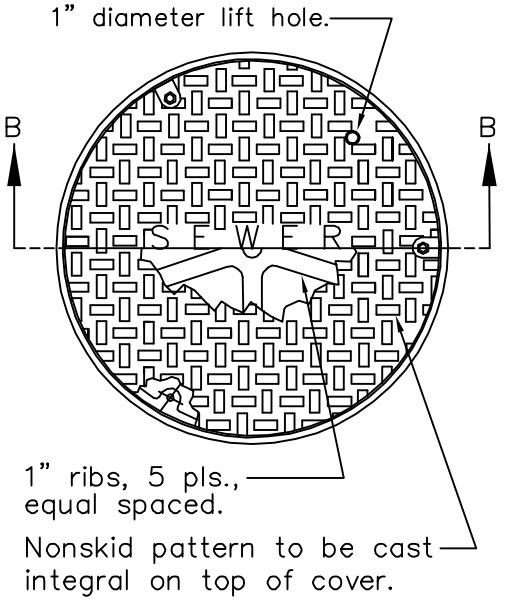
(for locking and/or watertight applications)



SECTION B–B

Notes:

1. Frames shall be locking type, Olympic Foundry Part Number MH30AD/T or East Jordan Iron Works Part Number 370512.
2. Covers shall be locking type, Olympic Foundry part number MH30AD/T or East Jordan Iron Works part number 370523.
3. Water tight covers, where required, shall be Olympic Foundry part number MH30AW/T or East Jordan Iron Works part number 370586.
4. Holes for locking cover shall be in alignment and interchangeable.
5. Allowable tolerance between cover & frame is $\frac{1}{8}$" maximum.
6. Cover shall have the word "Sewer" cast with 3" high letters and raised $\frac{3}{8}$".

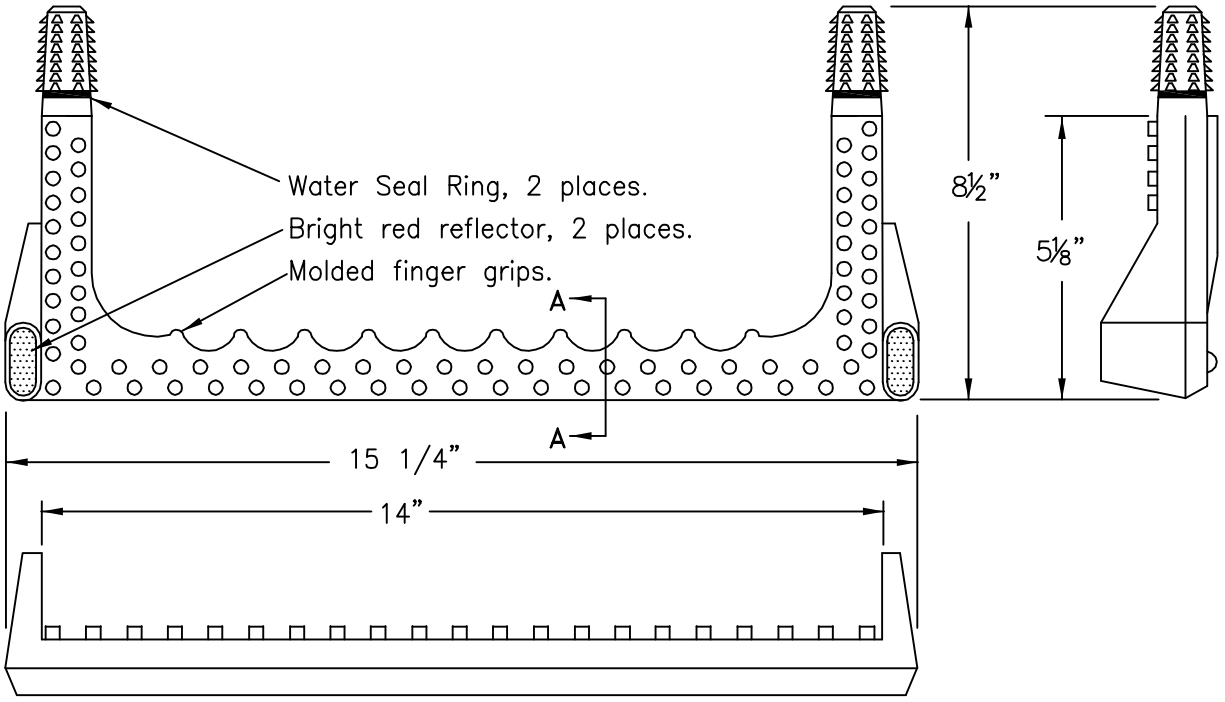


COVER

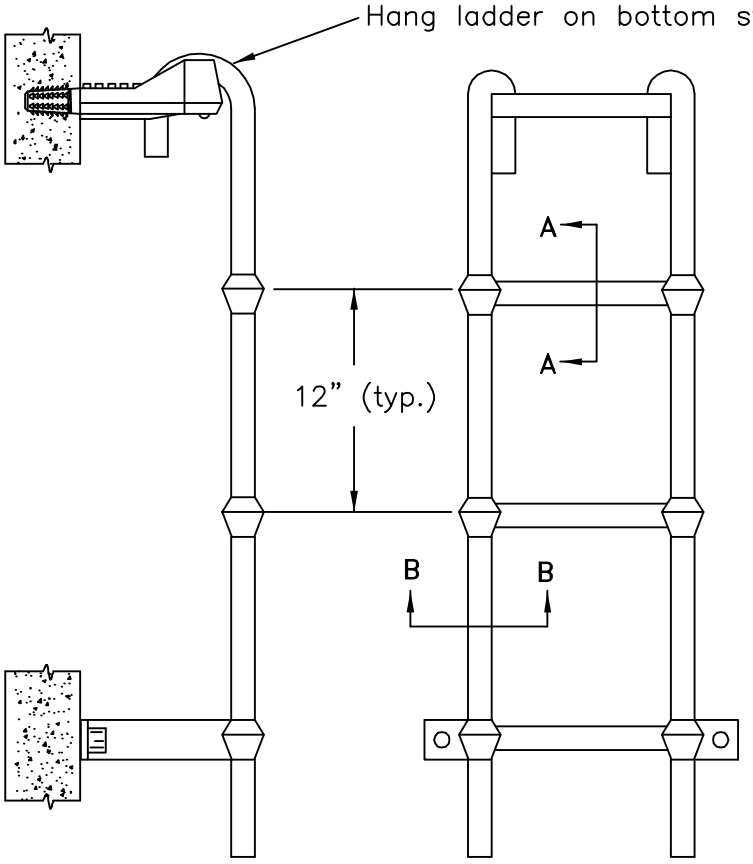
MANHOLE LOCKING FRAME AND COVER

NOT TO SCALE

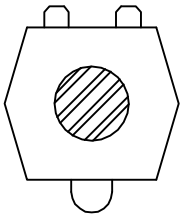
Detail Approvals	NORTHSHORE UTILITY DISTRICT	5
Engineer GSM	STANDARD SEWER DETAILS	
Manager DPK		August 2011 S5(MHCOVER).DWG



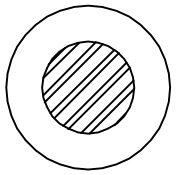
STEP



HANGING LADDER



Section A



Section B

Notes :
Steps to be Lane #P−14850 or District approved equal.

Fasten ladder to MH structure with stainless steel lag screws into lead anchors, or set ladder base into MH shelf prior to curing.

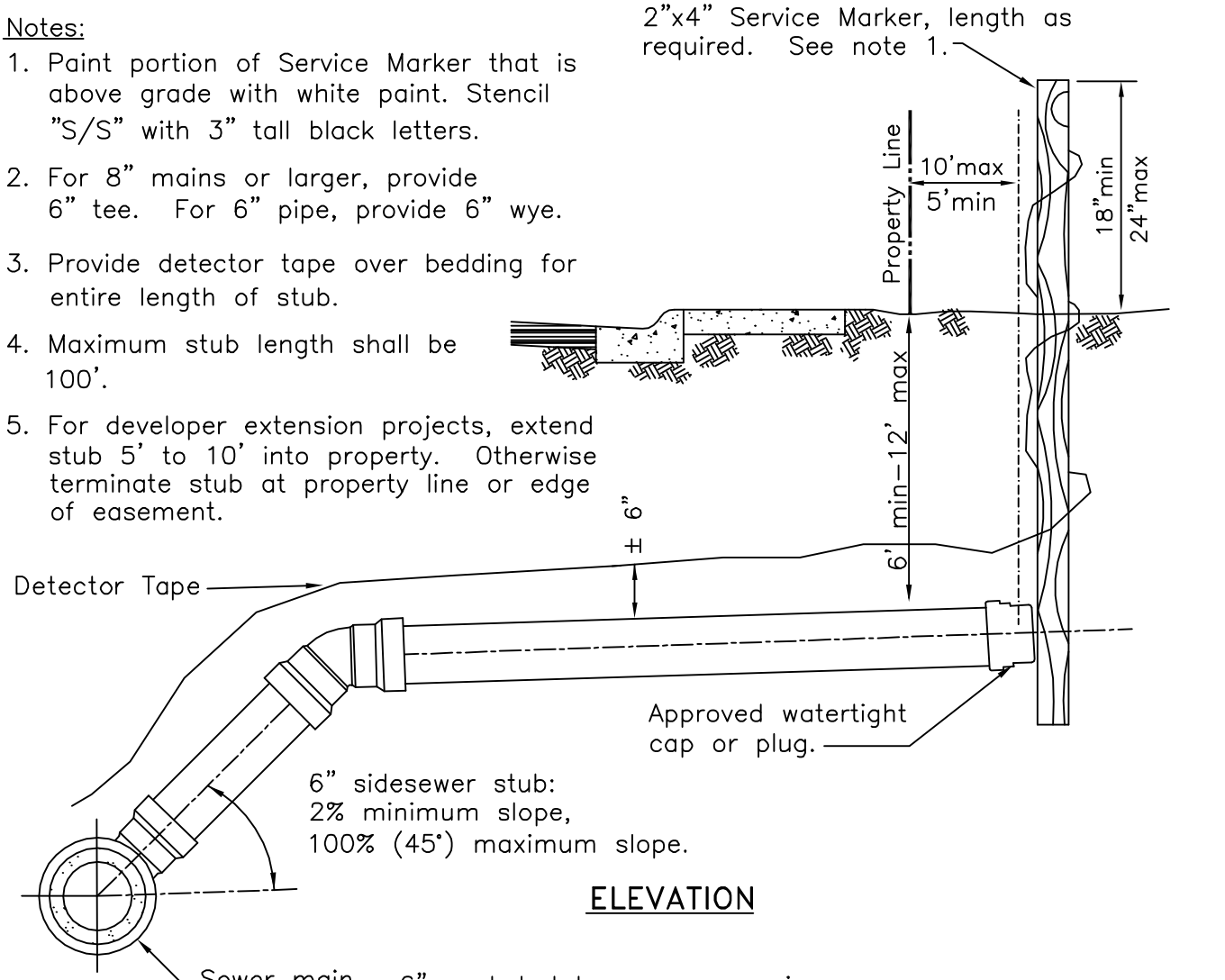
MANHOLE STEPS AND LADDER

NOT TO SCALE

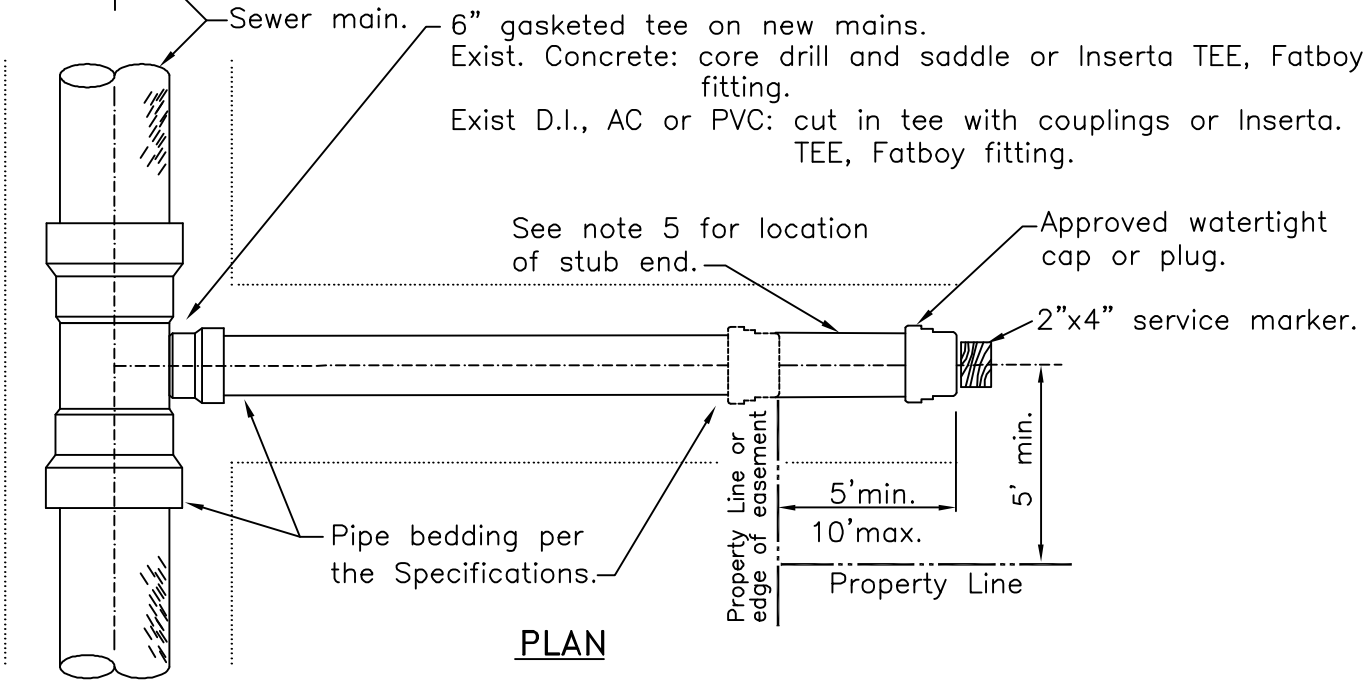
Detail Approvals	NORTHSHORE UTILITY DISTRICT	6
Engineer GSM	STANDARD SEWER DETAILS	
Manager DPK		August 2011 S6(STEPSLADDER).DWG

Notes:

1. Paint portion of Service Marker that is above grade with white paint. Stencil "S/S" with 3" tall black letters.
2. For 8" mains or larger, provide 6" tee. For 6" pipe, provide 6" wye.
3. Provide detector tape over bedding for entire length of stub.
4. Maximum stub length shall be 100'.
5. For developer extension projects, extend stub 5' to 10' into property. Otherwise terminate stub at property line or edge of easement.



ELEVATION

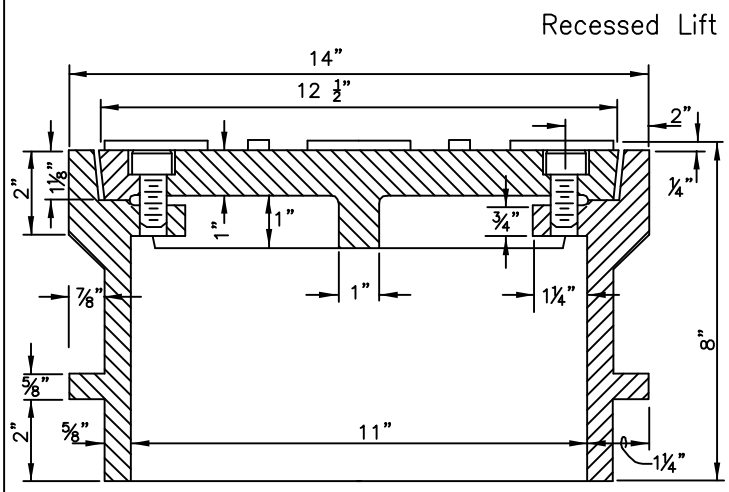


PLAN

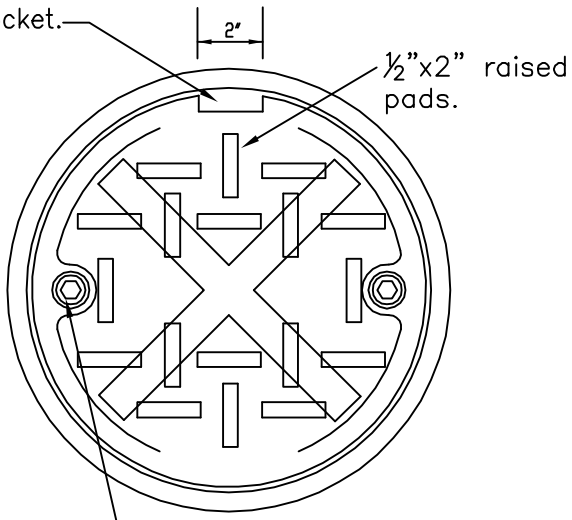
SIDE SEWER STUB

NOT TO SCALE

Detail Approvals	NORTHSHORE UTILITY DISTRICT	7
Engineer GSM	STANDARD SEWER DETAILS	
Manager DPK		August 2011 S7(SIDESEWER).DWG

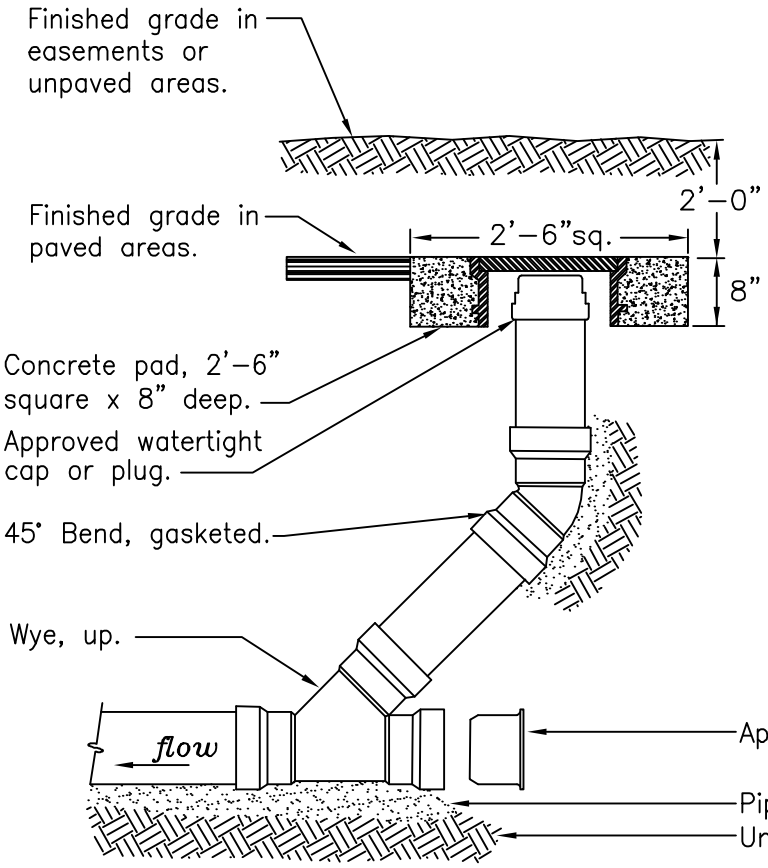


SECTION



PLAN

Provide (2) ⅝", 11 N.C. socket head screws, 1¼" long.



ELEVATION

Notes:

1. Cleanouts located in paved areas shall be brought to grade. In unpaved areas, bring pipe to within 2' of finished grade and place steel plate (⅛"x2'x2') over cap or plug for detection by metal detectors.

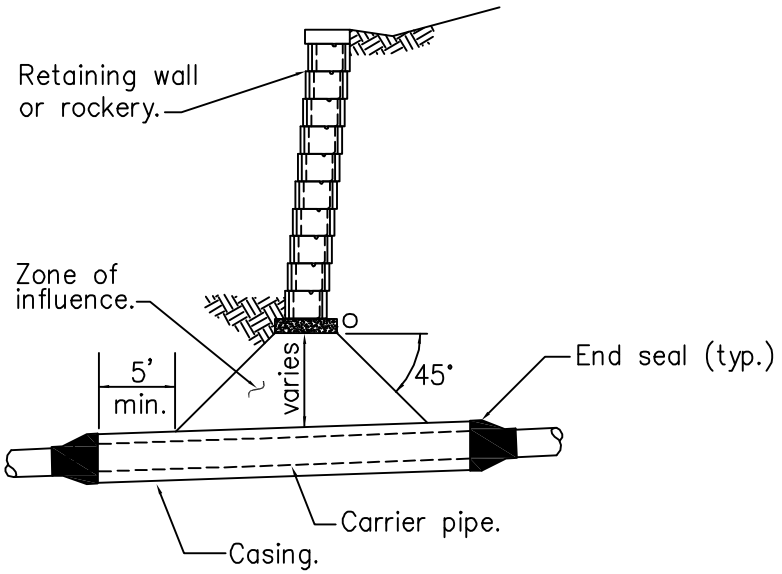
2. Frame and cover shall be locking type, Olympic Foundry #M1025 or Sather 12" Lamphole.

3. All pipe material shall be bell & spigot type with rubber gasket joint and shall be in conformance with ASTM D3034 (SDR–35).

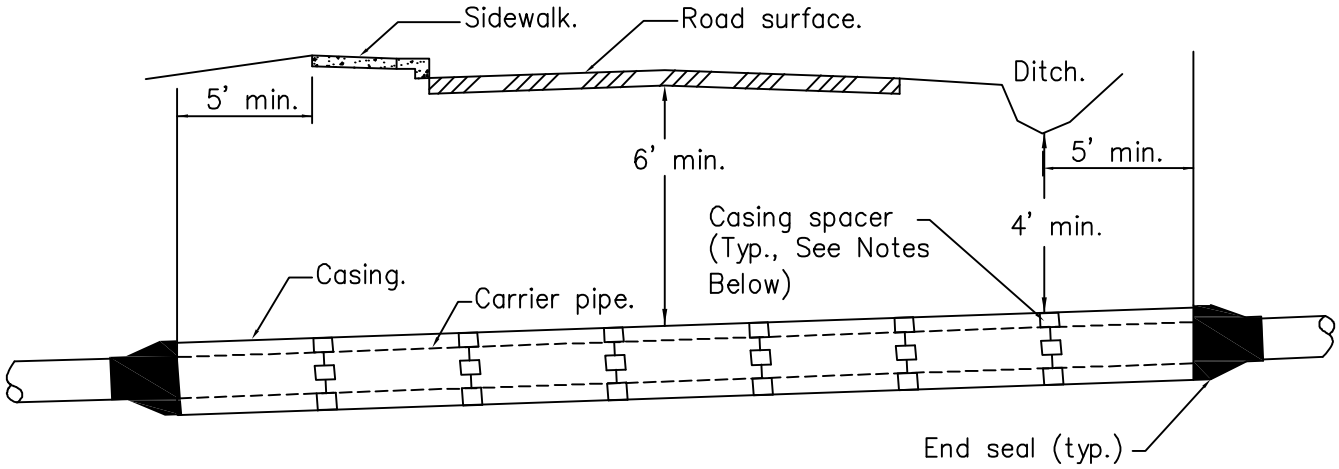
CLEAN-OUT

NOT TO SCALE

Detail Approvals	NORTHSHORE UTILITY DISTRICT	8
Engineer GSM	STANDARD SEWER DETAILS	
Manager DPK		August 2011 S–8(CLEANOUT).DWG



ROCKERY OR WALL SECTION



ROADWAY SECTION

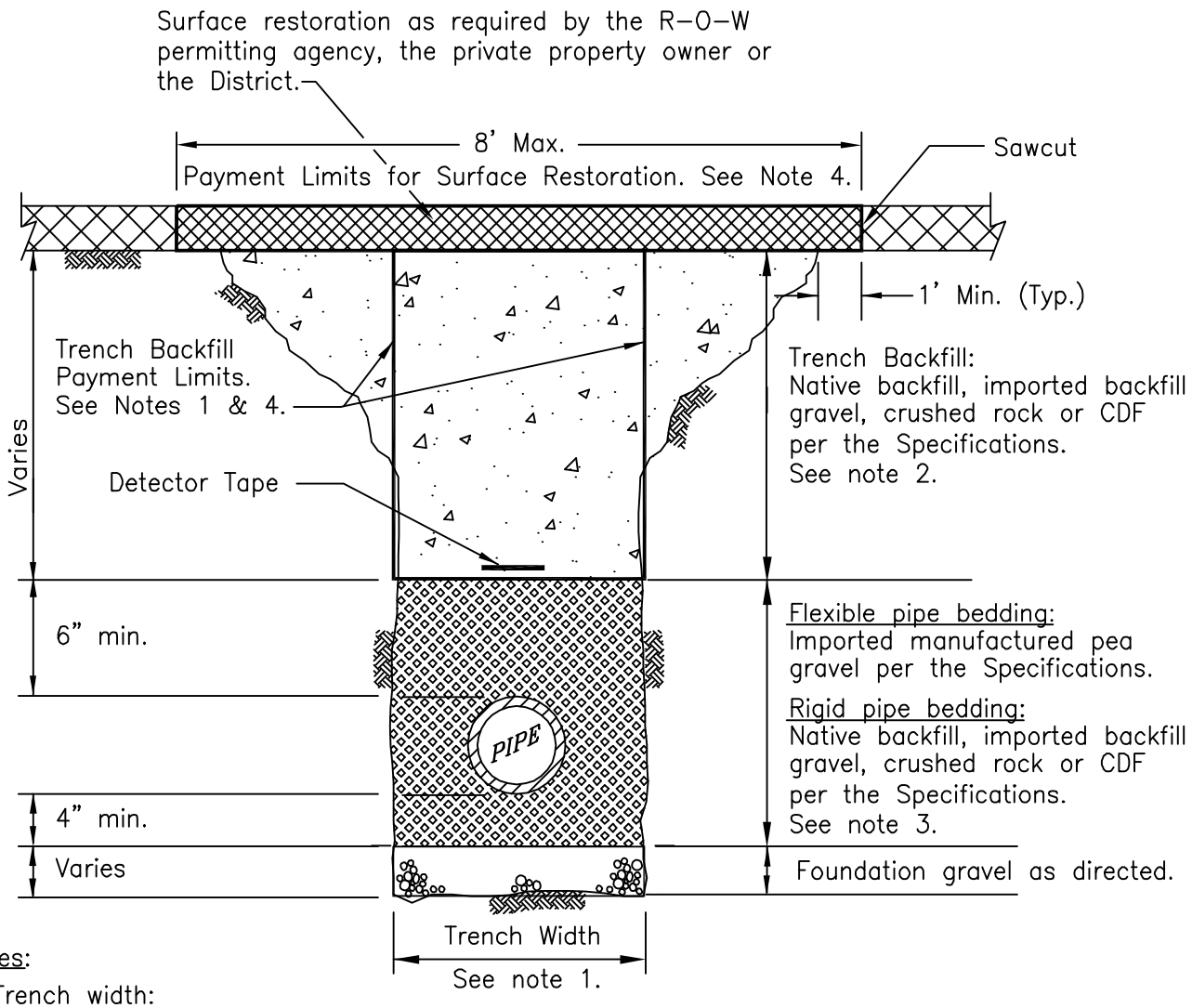
Notes:

1. Casing length, type, location and size shall be as shown on the plans or as directed by the District and shall be in accordance with the Specifications.
2. Casing spacers shall include polyethylene runners with stainless steel bands per the Specifications.
3. Casing spacers shall be installed at a maximum 10' spacing, with a spacer located behind each pipe bell and with spacers located within 2' of casing ends.
4. Carrier pipe shall be CL 52 Ductile Iron Restrained Joint pipe unless otherwise specified.

CASING PIPE

NOT TO SCALE

Detail Approvals	NORTHSHORE UTILITY DISTRICT	9
Engineer GSM	STANDARD SEWER DETAILS	August 2011
Manager DPK		S-9(CASING).DWG



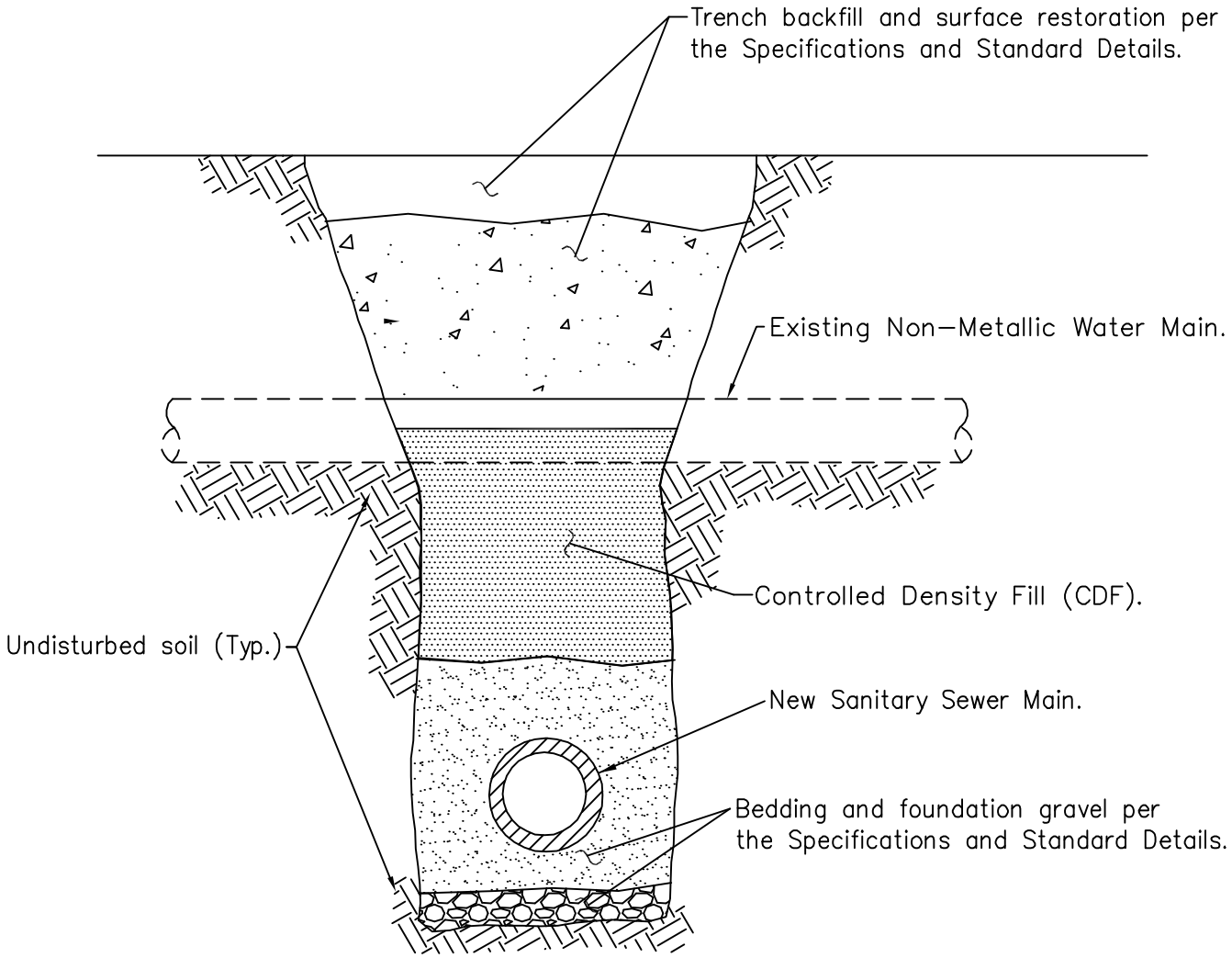
Notes:

1. Trench width:
   Minimum: Pipe O.D. + 12" (6" each side of pipe).
   Maximum: 40" for 15"ø pipe and smaller.
   (1-1/2 x I.D.) + 18" for 18"ø pipe and larger.
   The neat-line payment limits for trench backfill materials shall be based upon the maximum allowable trench width as shown above.
2. Native material, if allowed for trench backfill, shall meet the requirements of select borrow per the Specifications. Trench backfill shall be compacted to a minimum of ninety-five percent (95%) of Modified Proctor in the Right-Of-Way and improved easements and to ninety percent (90%) in unimproved easement areas. See the Specifications for additional information.
3. Native material, if allowed for rigid pipe bedding, shall be sand and gravel with no material larger than 1-1/2". See the Specifications for additional information.
4. The neat-line limits shown will be used to calculate the maximum quantity of trench backfill and surface restoration materials allowed. Payment for bedding gravel will be considered incidental to payment made for pipe. Payment for foundation rock will be based upon the quantities used as directed by the District. See the Contract documents for additional information.

TYPICAL TRENCH SECTION & PAYMENT LIMITS

NOT TO SCALE

Detail Approvals	NORTHSHORE UTILITY DISTRICT	10
Engineer GSM	STANDARD SEWER DETAILS	
Manager DPK		August 2011
		S-10(TypicalTrench w/Limits).dwg



SECTION

Notes:

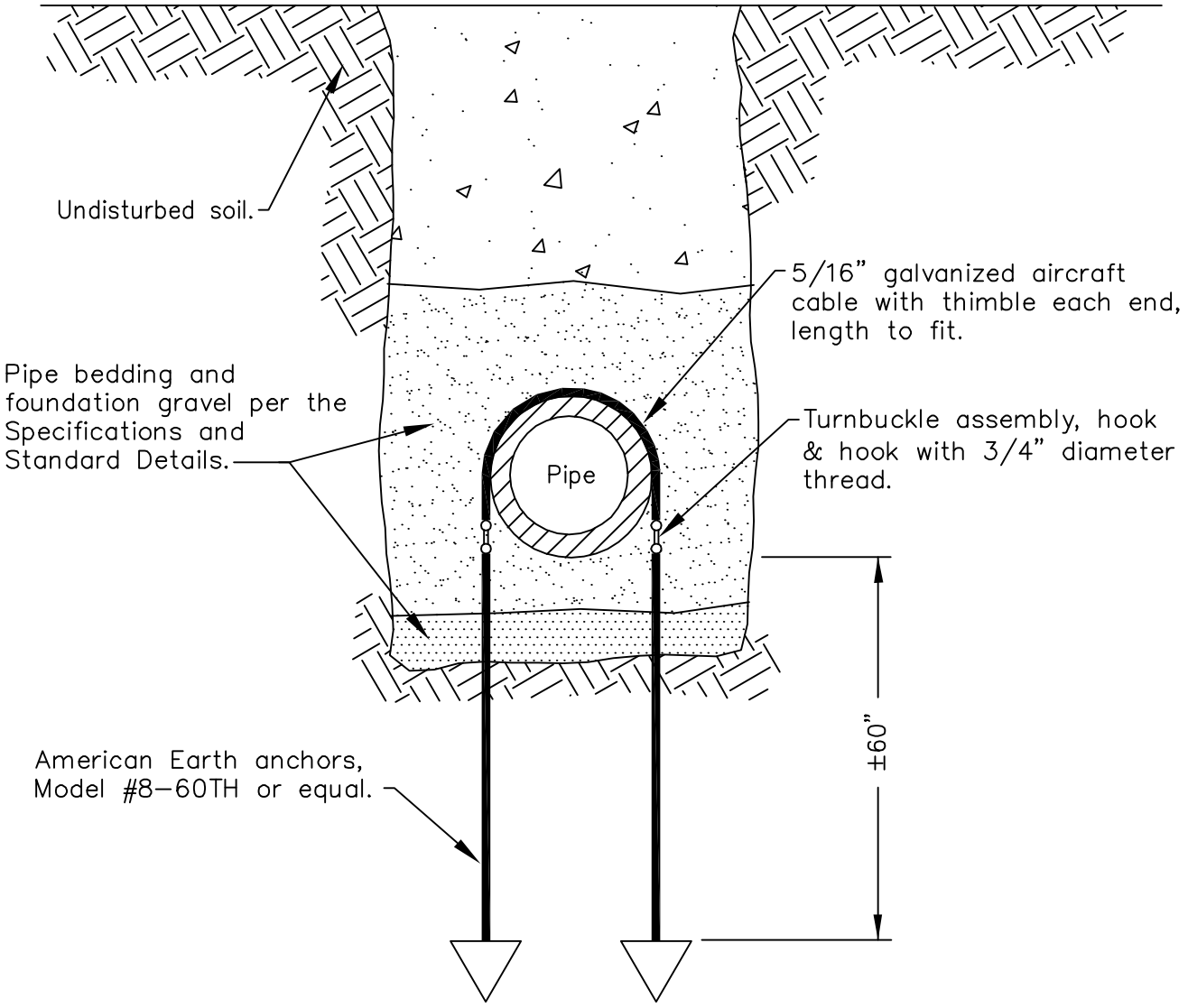
1. Where utility lines cross under existing non–metallic water main such as Asbestos Cement, Permastran, or Class 200 PVC, backfill with Controlled Density Fill (CDF) between the bedding material and the spring line (mid–point) of the non–metallic pipe. Trench backfill can then be used above the CDF to the final grade.

2. If non–metallic pipe must be removed, replace with Cl. 52 ductile iron pipe, size to match. D.I. pipe to extend a minimum of 18" into undisturbed soil (All applicable Environmental Protection Agency, Puget Sound Air Pollution Control Agency, and Labor and Industry requirements and regulations shall be met in cutting, handling or disposing of Asbestos Cement pipe).

NON-METALLIC PIPE CROSSING

NOT TO SCALE

Detail Approvals	NORTHSHORE UTILITY DISTRICT	11
Engineer GSM	STANDARD SEWER DETAILS	August 2011
Manager DPK		S–11(NON–METALLIC PIPE CROSSING).DWG



Notes:

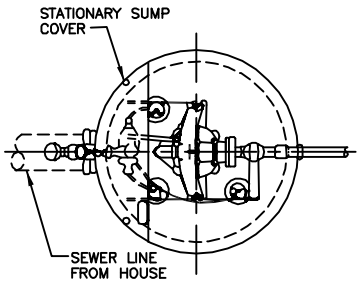
1. Pipe anchors shall be installed on all slopes greater than 20% with spacing as follows:

   A. Not greater than 36 ft. on grades from 20% to 35%.
   B. Not greater than 24 ft. on grades from 35% to 50%.
   C. Not greater than 16 ft. on grades greater than 50%.

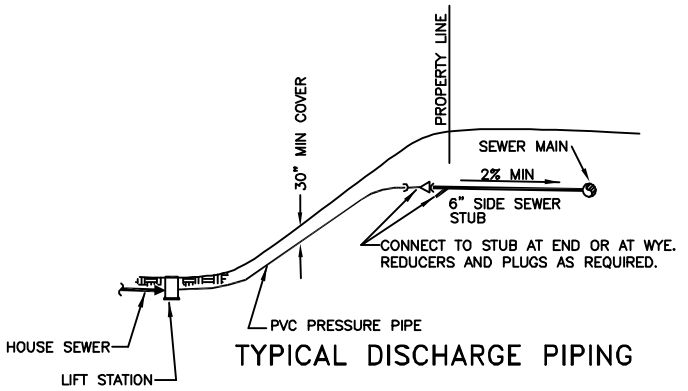
PIPE ANCHOR

NOT TO SCALE

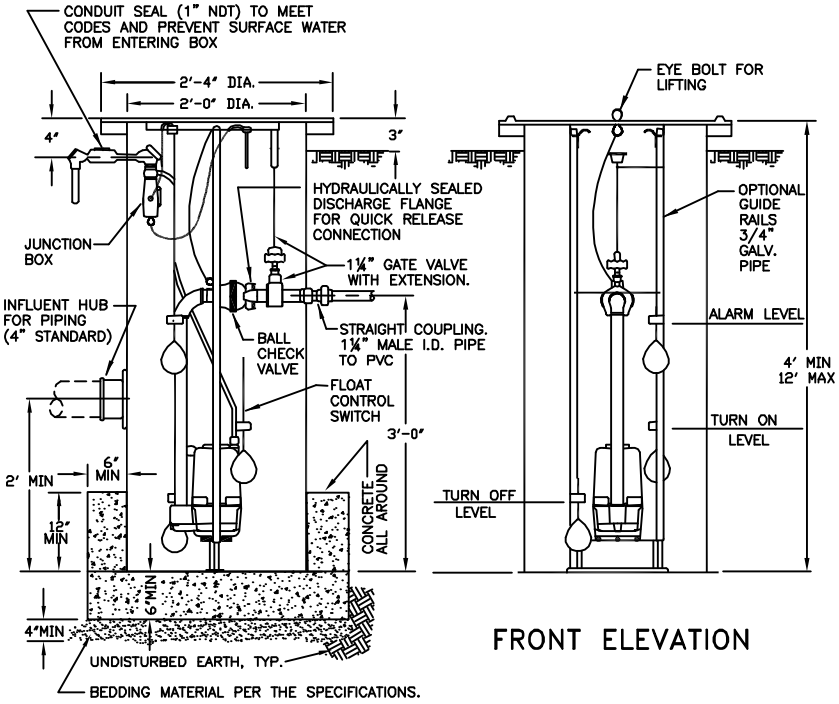
Detail Approvals	NORTHSHORE UTILITY DISTRICT	12
Engineer GSM	STANDARD SEWER DETAILS	August 2011
Manager DPK		S–12(PIPEANCHOR).DWG



PLAN



TYPICAL DISCHARGE PIPING



FRONT ELEVATION

SIDE ELEVATION

COMPLETE HYDROMATIC HPG-200 PACKAGED SEWER GRINDER LIFT STATION TO INCLUDE THE FOLLOWING:

- GRINDER PUMP WITH 2HP SUBMERSIBLE SINGLE PHASE MOTOR (ADEQUATE FOR SINGLE RESIDENCE UP TO 100' HEAD AT 5" IMPELLER DIA.)
- TWO SEALED FLOAT TYPE MERCURY SWITCHES FOR LEVEL CONTROL
- ONE FLOAT SWITCH FOR ALARM CONTROL
- 1" NPT MALE CONDUIT OUTSIDE OF SUMP FOR CONTROL WIRING
- DISCHARGE PIPING SHALL INCLUDE A CHECK VALVE, A GATE VALVE AND NPT FEMALE CONNECTION OUTSIDE OF SUMP (DIA. PER PRESSURE PIPE DIA.)
- INFLUENT PIPING SHALL PROVIDE HUB FOR PVC PIPE OUTSIDE OF SUMP (DIA. PER SIDESEWER DIA.)
- FIBERGLASS SUMP BASIN 24" I.D. x 5'-0" HIGH (PER BULLETIN SPG-604 (HYDROMATIC OR EQUAL))
- NEMA 3R LOCKING CONTROL PANEL WALL MOUNTED
- RED ALARM LIGHT PANEL, WALL MOUNTED

GENERAL NOTES :
THE MINIMUM REQUIREMENTS FOR A RESIDENTIAL SEWAGE PUMPING SYSTEM CONNECTING A SINGLE RESIDENCE TO THE DISTRICT'S SYSTEM ARE SPECIFIED AS FOLLOWS. THE DISTRICT ACCEPTS NO RESPONSIBILITY FOR THE DESIGN, OPERATION AND MAINTENANCE OF SUCH PRIVATELY OWNED AND OPERATED SYSTEMS.

A. ALL EQUIPMENT AND ACCESSORIES SHALL BE STANDARD MANUFACTURED ITEMS AND THOSE COMING IN DIRECT CONTACT WITH SEWAGE SHALL BE SPECIFICALLY MANUFACTURED FOR SEWAGE USE.

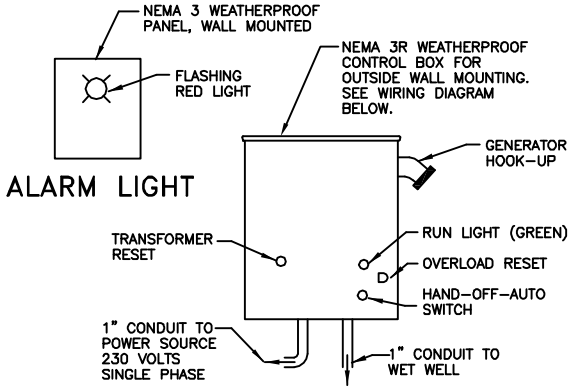
B. LIFT STATION MUST BE LOCATED OUTSIDE THE BUILDING. IF THE STATION IS COMPLETELY BURIED, INSTALL 48" I.D. MANHOLE WITH FRAME AND COVER OVER STATION FOR ACCESS.

C. THE PUMP SHALL BE A SUBMERSIBLE GRINDER TYPE, AS SPECIFIED HEREIN.

D. A 12 GUAGE TRACER WIRE, COATED AND CONTINUOUS SHALL BE WRAPPED AROUND THE FORCE LINE IT'S ENTIRE COURSE AND BROUGHT TO THE SURFACE AT THE STATION.

E. FORCE MAIN TO BE 1¼" MIN. SCH. 80 PIPE OR DISTRICT APPROVED EQUAL.

F. DETECTOR TAPE REQUIRED 1'-0" ABOVE PIPING WHEN FORCE MAIN CROSSES OTHER PROPERTIES OR IS LOCATED ALONG COMMON ACCESS ROADS.



ALARM LIGHT

CONTROL BOX

GRINDER PUMP STATION
SINGLE FAMILY RESIDENCE

NOT TO SCALE

Detail Approvals	NORTHSHORE UTILITY DISTRICT	13
Engineer GSM	STANDARD SEWER DETAILS	August 2011
Manager DPK		S-13(GRINDERPUMP).DWG