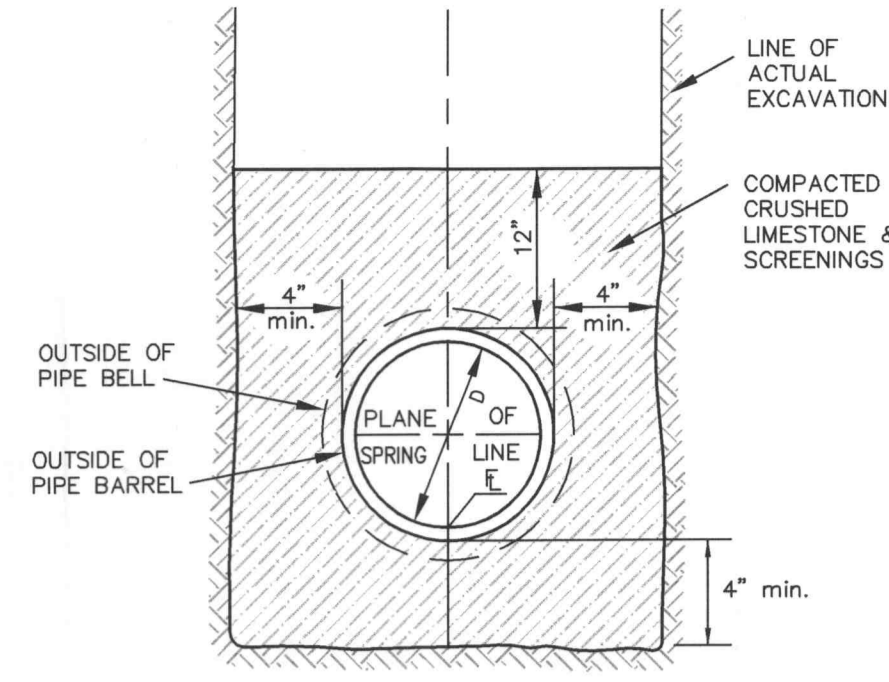


PIPE BEDDING CLASS "C"  
(MODIFIED FOR REINFORCED CONCRETE PIPE)

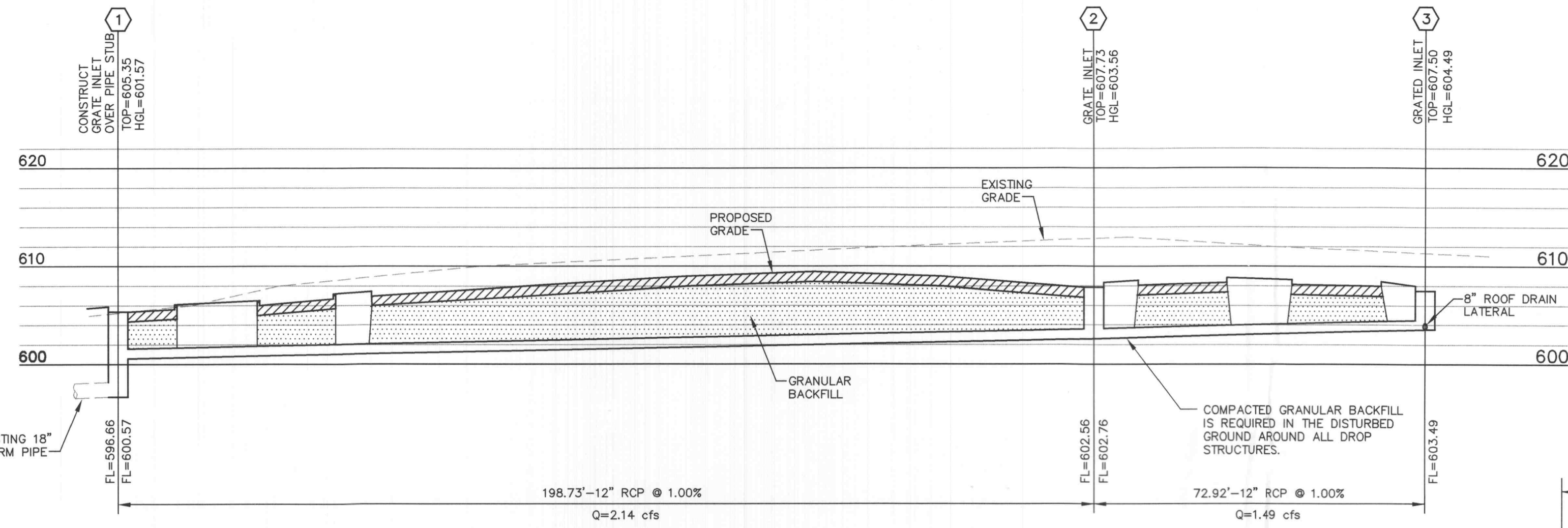


PIPE BEDDING CLASS "C"  
(FOR ALL PIPE EXCEPT REINFORCED CONCRETE PIPE)

PIPE BEDDING DETAILS  
(n.t.s.)

HYDRAULIC CALCULATION SHEET (SEE DRAINAGE AREA MAP SHEET C9.0 FOR P.I. AND Q (inflow) FOR EACH STRUCTURE)

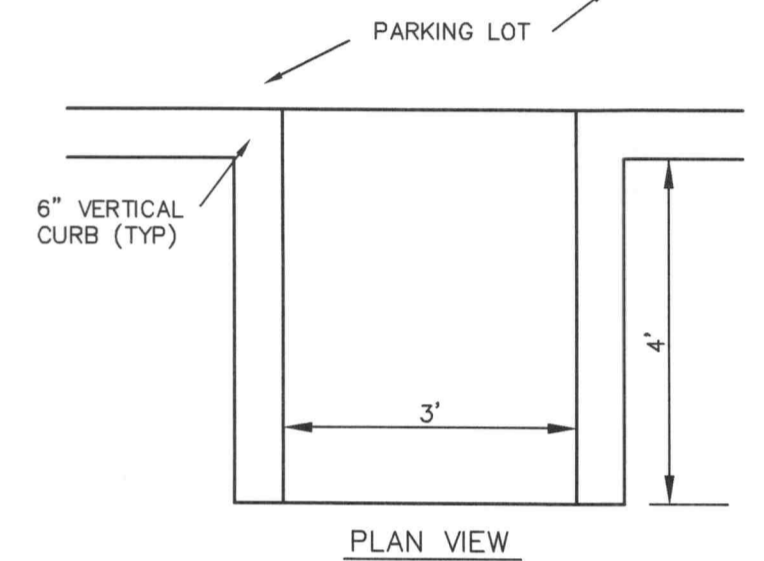
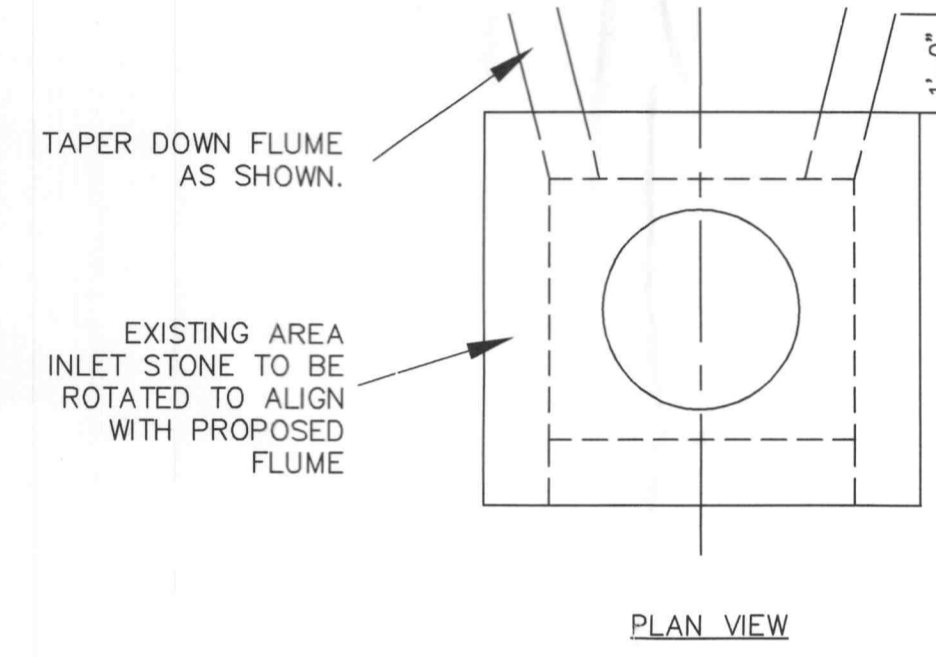
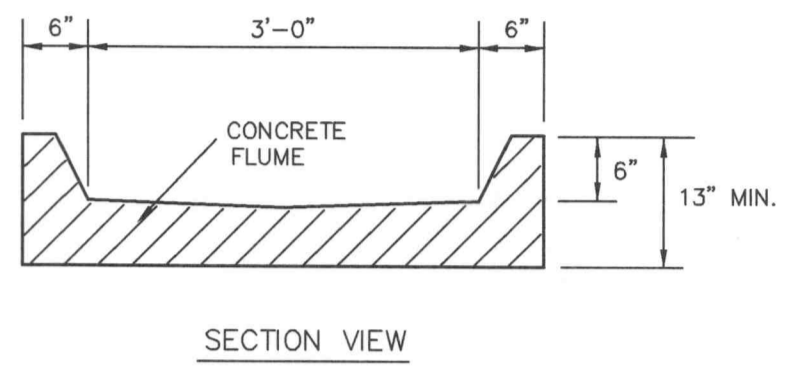
Project name: HEARTLAND BANK		Calculated By: JPP		Bena Coefficients:		HEAD LOSS		Hydraulic Elevations		Structure		Free	
Project number: 205-3584		Checked By: GMS		5 <sup>th</sup> = 0.06	20 <sup>th</sup> = 0.24	35 <sup>th</sup> = 0.4	50 <sup>th</sup> = 0.50	65 <sup>th</sup> = 0.57	80 <sup>th</sup> = 0.65	Upper	Lower	Upper	Lower
Storm: 75yr-20min.		Date: 02-09-06		10 <sup>th</sup> = 0.11	25 <sup>th</sup> = 0.30	40 <sup>th</sup> = 0.43	55 <sup>th</sup> = 0.52	70 <sup>th</sup> = 0.60	85 <sup>th</sup> = 0.67	Number	Structure	Number	Structure
LINE	FLOW LINE	Length (ft)	Flowline Grade (ft)	Pipe Size (in.)	Full Flow Cap. (cfs)	Total (Q) (cfs)	Mean Full Flow Vel. (ft/s)	Bend Coef.	Velocity Head (ft)	Q <sub>v</sub> (ft <sup>3</sup> /s)	Pipe Coef. (n)	H <sub>f</sub> (ft)	Junction Bend
2	2	602.56	600.57	12	3.57	1.49	0.06	0.08	0.013	0.13	0.00	0.00	0.00
3	3	602.56	600.57	12	3.57	2.14	0.12	0.25	0.013	0.72	0.00	0.00	0.00
FORMULAS: MEAN FULL FLOW VELOCITY: $V = Q_{full} / A_{pipe}$ FRICTION LOSS (H <sub>f</sub> ): $H_f = 2.87 \cdot n^2 \cdot (L \cdot V^4 / d^{4.75})$ VELOCITY HEAD: $V_v = V^2 / 2g$ JUNCTION LOSSES (JUNC.): $J = [Q_{in} \cdot V_{in} / \sum (Q_{out} \cdot V_{out})] \cdot 1.33 / Q_{out}$ BEND LOSSES (BEND) = $(V_b / V) \cdot \alpha \cdot H_f$ Note: 1. IF MORE THAN ONE COMING LINE, CALCULATE EACH BEND LOSS AND ADD TOGETHER. 2. NO STRUCTURE LOSSES TO BE CALCULATED AT A DROP. 3. IF $Q_{V_{min}} > Q_{V_{critical}}$ , NO JUNCTION LOSSES TO BE CALCULATED.													



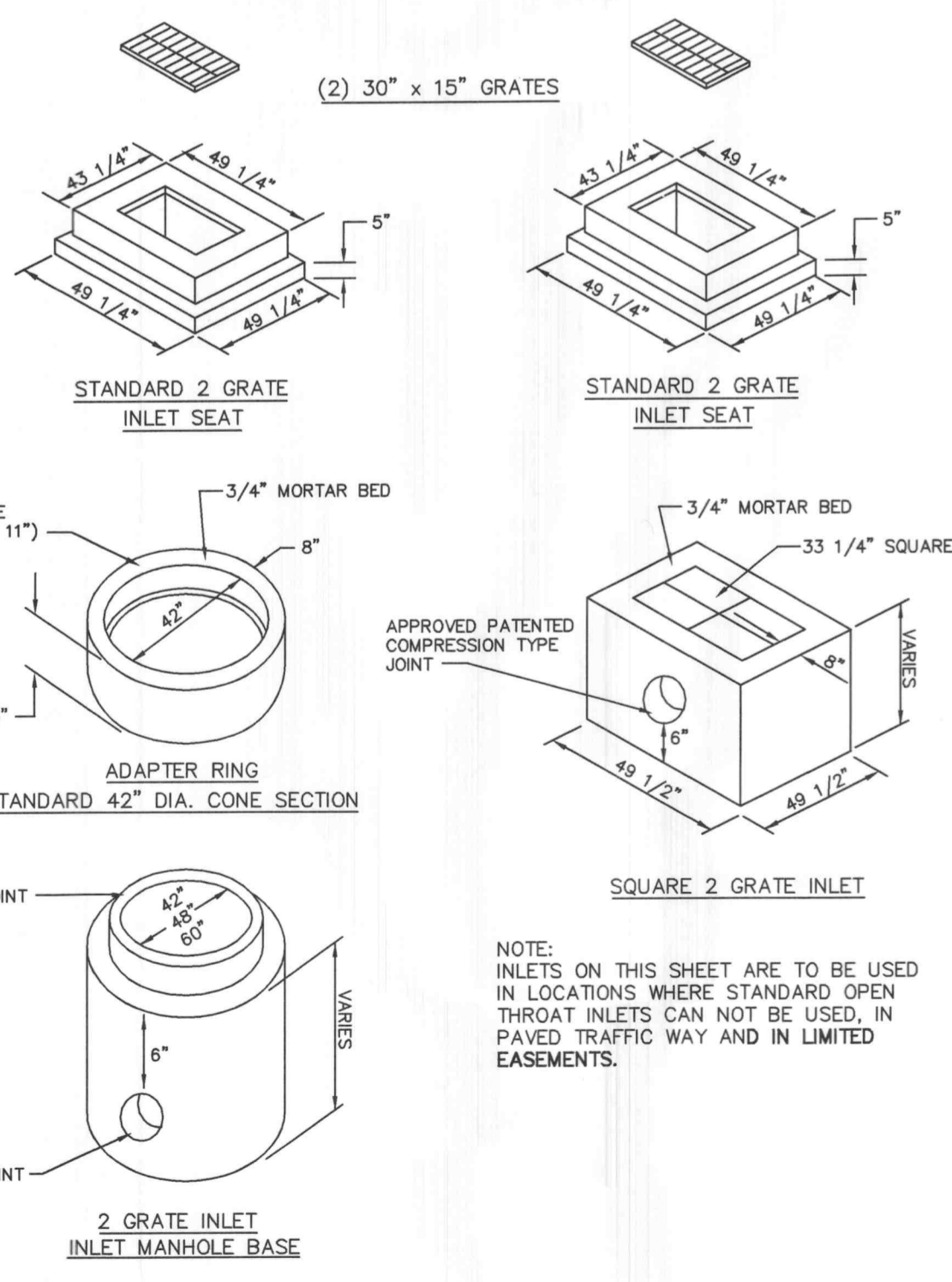
STORM SEWER PROFILE (PRIVATE)  
HORIZONTAL SCALE: 1"=20'  
VERTICAL SCALE: 1"=10'

LINETYPE LEGEND

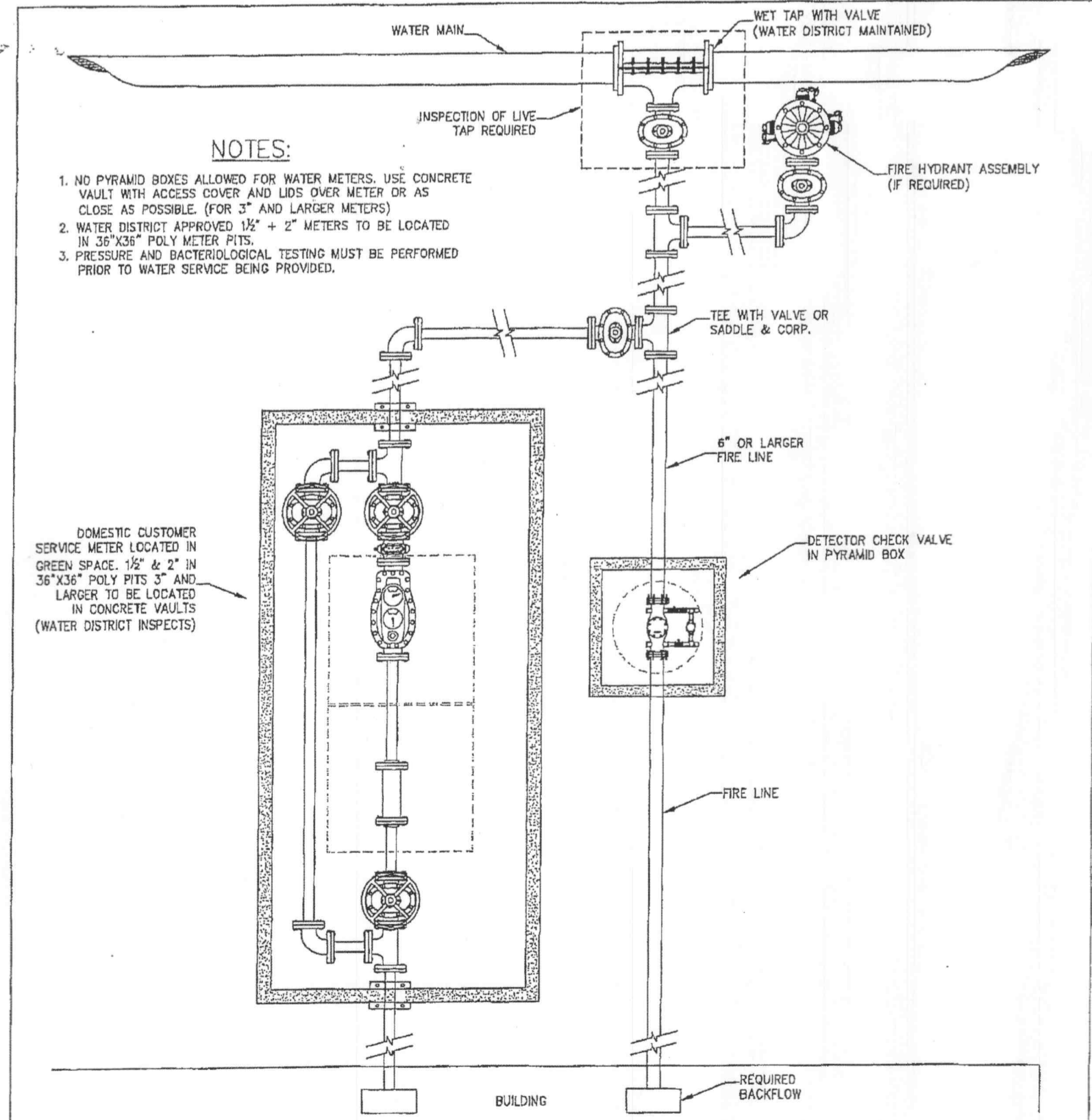
EXISTING GRADE.....	--- --
PROPOSED GRADE...	— — — —
HYDRAULIC GRADE...	— — — —
PROPOSED PAVEMENT...	▨ ▨ ▨ ▨
GRANULAR BACKFILL.....	▧ ▧ ▧ ▧
COMPACTED FILL.....	▩ ▩ ▩ ▩



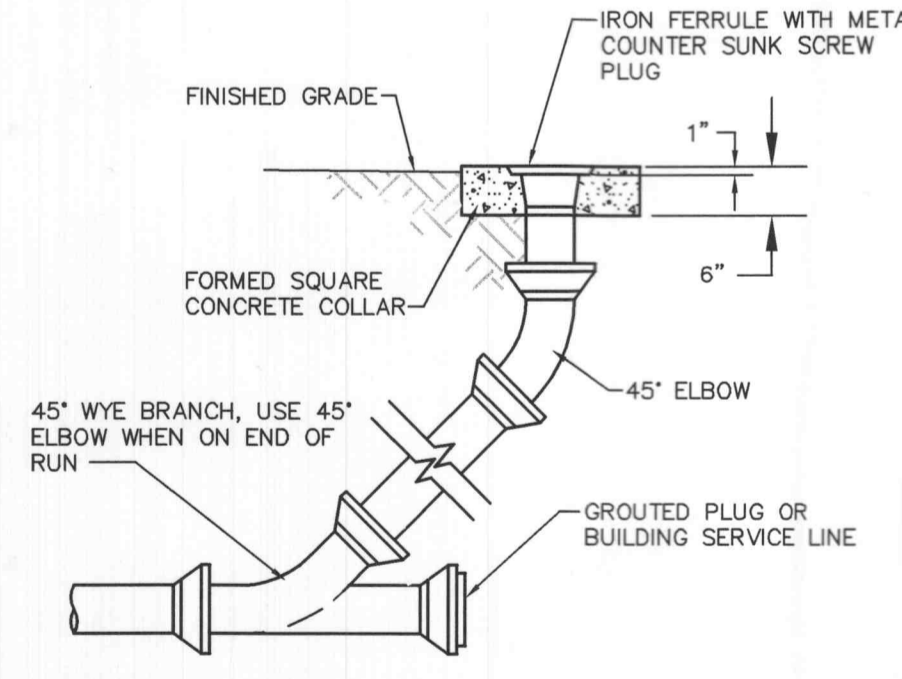
TYPICAL FLUME DETAIL



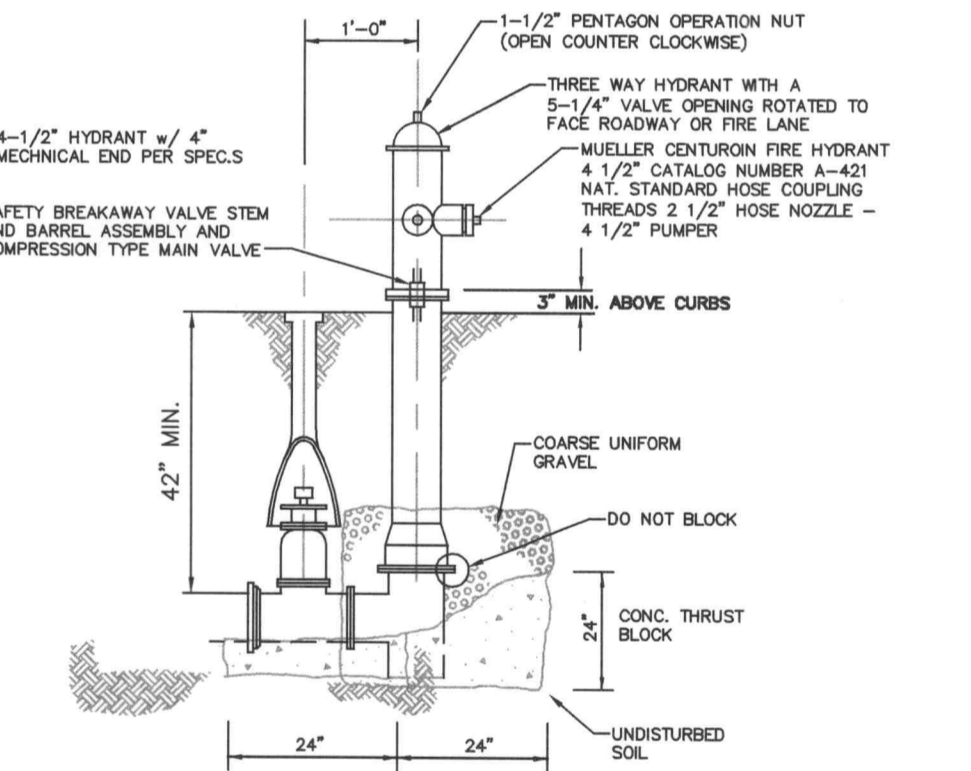
2-GRADE INLET DETAIL  
(n.t.s.)



TYPICAL COMMERCIAL SERVICE CONNECTION WITH FIRE PROTECTION  
(n.t.s.)



CLEANOUT DETAIL  
(n.t.s.)

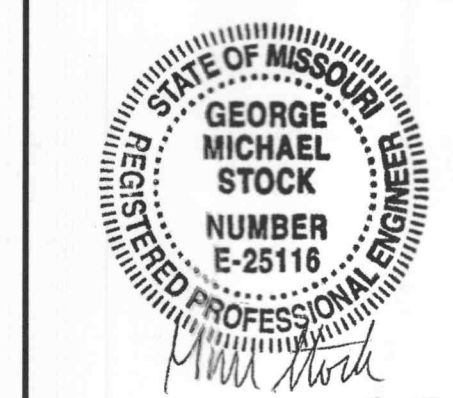


FIRE HYDRANT DETAIL  
SCALE = N.T.S.

- NOTES:
- NO PYRAMID BOXES ALLOWED FOR WATER METERS. USE CONCRETE VAULT WITH ACCESS COVER AND LIDS OVER METER OR AS CLOSE AS POSSIBLE (FOR 3" AND LARGER METERS).
  - WATER DISTRICT APPROVED 1/2" + 2" METERS TO BE LOCATED IN 36"x36" POLY METER PITS.
  - PRESSURE AND BACTERIOLOGICAL TESTING MUST BE PERFORMED PRIOR TO WATER SERVICE BEING PROVIDED.
- FIRE HYDRANT NOTES:
- THE FIRE HYDRANT SHALL BE PROVIDED WITH A CONTROL VALVE IN THE HYDRANT CONNECTION SUCH THAT THE HYDRANT CAN BE REMOVED FROM SERVICE WITHOUT SHUTTING OFF WATER SUPPLY TO OTHER FIRE HYDRANTS.
  - THE FIRE HYDRANT SHALL HAVE NOT LESS THAN TWO 2-1/2" INCH OUTLETS AND ONE 4-1/2" INCH OUTLET, A 5-1/4" INCH VALVE, A 6 INCH BARREL, AND SHALL BE OF THE BREAKAWAY DESIGN, FROST FREE WITH CHAIN, LEFT HAND OPEN DESIGN AND HAVE NATIONAL STANDARD THREADS.

SEWER PROFILES, DETAILS, AND HYDRAULICS  
TERRA RETAIL DEVELOPMENT/HEARTLAND BANK

P&Z NOS: 98-126.06



**STOCK & ASSOCIATES**  
Consulting Engineers, Inc.

257 Chesterfield Business Parkway  
St. Louis, MO 63005  
PH. (636) 530-9100  
FAX (636) 530-9130  
e-mail: general@stockassoc.com  
Web: www.stockassoc.com