

NOTE:
THE ABOVE INFORMATION IS A CONCEPT ONLY. ACTUAL DESIGN OF RETAINING WALL SHALL BE BY A LICENSED PROFESSIONAL ENGINEER SUBMITTED TO STOCK AND ASSOCIATES FOR GENERAL COMPLIANCE WITH GRADING PLAN.

WALL HEIGHT OF GRID	LENGTH	AREA	PERCENTAGE
3	3.00	3.00	1.00
4	3.50	4.00	1.33
5	4.00	4.50	1.50
6	4.50	5.00	1.67
7	5.00	5.50	1.83
8	5.50	6.00	2.00
9	6.00	6.50	2.17
10	6.50	7.00	2.33
11	7.00	7.50	2.50

- NOTES:
- 1.) ALL CONSTRUCTION SHALL BE PER THE MANUFACTURERS RECOMMENDATION.
 - 2.) SHOP DRAWINGS BEARING THE SEAL OF A REGISTERED ENGINEER IN THE STATE OF MISSOURI TO BE SUPPLIED TO CITY FOR APPROVAL.
 - 3.) ACCEPTED ALTERNATE WALL SYSTEM: KEYSTONE OR HERCULES
 - 4.) TW= TOP OF RETAINING WALL, BW= GRADE AT BASE OF WALL
 - 5.) COLOR TO CLOSELY MATCH EX. WALL AT N.E. CORNER OF SITE.

HYDRAULIC CALCULATION SHEET (SEE DRAINAGE AREA MAP SHEETS FOR P.I. AND Q (INFLOW) FOR EACH STRUCTURE)

Project name: VCC OF FALLON
 Project number: 202-2739
 Project Location: O'FALLON, MO
 Date: April 4, 2003

Calculated By: CAM
 Checked By: GMS

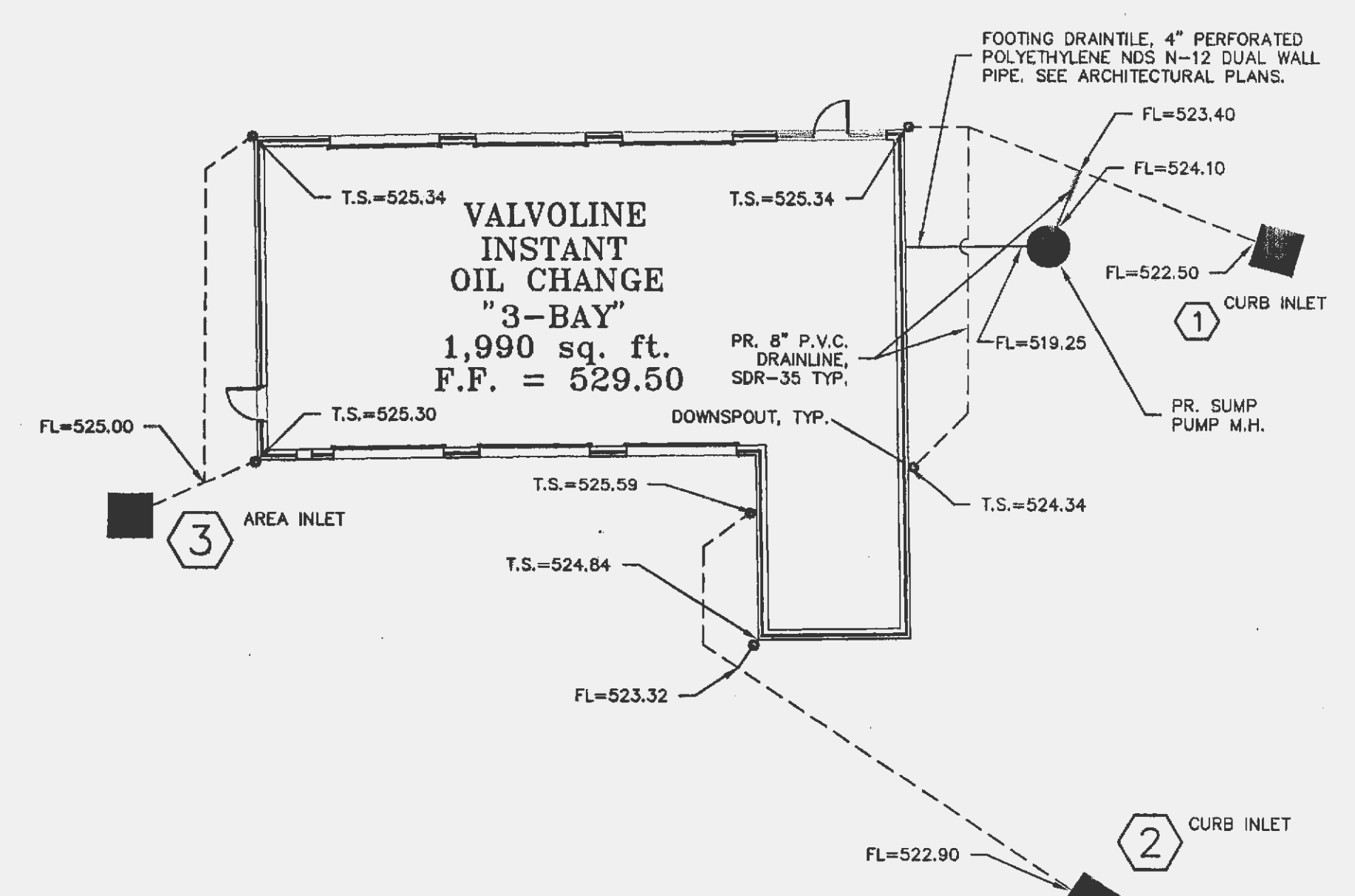
Bend Coefficients:
 5°= 0.06, 20°= 0.24, 35°= 0.4, 50°= 0.50, 65°= 0.57, 80°= 0.65
 10°= 0.11, 25°= 0.30, 40°= 0.43, 55°= 0.52, 70°= 0.60, 85°= 0.67
 15°= 0.18, 30°= 0.35, 45°= 0.47, 60°= 0.55, 75°= 0.62, 90°= 0.70

Structure Number	Upper structure	Lower structure	FLOW LINE ELEVATIONS		Length (ft)	Flowline Grade ft/ft	Pipe Size (in.)	Full Flow Cap. (cfs)	Total (Q) (cfs)	Mean Full Flow Vel. (V) (ft/s)	Bend Coef.	Velocity Head (V _v) (ft)	QV _v (ft ³ /s)	Pipe Coef. (n)	H _f (ft)	Junction (ft)	Bend (ft)	Total H _f (ft)	Hydraulic Elevations			Structure TOP Elevation	Free Board	Structure Number
			Upper	Lower															Upper H.E.	Lower H.E.	Lower H.E.			
1	C18	C18	520.00	519.66	27.70	0.0123	15	7.18	0.96	0.78	0	0.01	0.01	0.013	0.01	0.00	0.00	0.00	521.25	521.92	521.91	521.91	4.88	1
HYDRAULIC FLOW LINE =																								
2	2	2	521.36	519.66	48.13	0.0353	15	12.17	4.62	3.78	0.6	0.22	1.02	0.013	0.25	0.02	0.13	0.15	522.61	522.15	521.91	522.76	5.28	2
3	3	2	522.46	521.36	94.24	0.0117	15	7.00	4.5	3.70	0	0.21	0.96	0.013	0.46	0.00	0.00	0.00	523.71	523.22	522.76	523.71	5.28	3
4	C18	C17	519.66	518.38	67.00	0.0191	15	8.95	6.27	5.11	0.6	0.43	2.54	0.013	0.63	0.32	0.13	0.45	520.91	521.46	520.82	521.91	5.28	4
5	C17	C17	518.38	517.21	91.78	0.0127	15	7.31	6.59	5.61	0.62	0.49	3.37	0.013	1.04	0.16	0.25	0.41	519.63	520.41	519.37	520.82	5.28	5
6	MH6	MH6	517.21	515.62	195.52	0.0081	15	5.84	6.89	5.61	0.57	0.49	3.37	0.013	2.22	0.00	0.28	0.28	518.46	519.09	516.87	519.37	9.39	6
ASSUME HYDRAULIC FLOW LINE =																								

FORMULAS:
 MEAN FULL FLOW VELOCITY: $V = Q / A$
 FRICTION LOSS (H_f): $H_f = 2.47 n^2 (L/V^{4.49})$
 VELOCITY HEAD: $V_v = V^2 / 2g$
 JUNCTION LOSSES (JUNC.): $H_j = \sum (Q_i / Q)^2 - \sum (Q_j / Q)^2$
 BEND LOSSES (BEND): $H_b = K (V^2 / 2g)$

NOTES:
 1. IF MORE THAN ONE INCOMING LINE, CALC. EACH BEND LOSS AND ADD TOGETHER.
 2. NO STRUCTURE LOSSES TO BE CALCULATED AT A DROP.
 3. IF QV_v > QV_{max}, NO JUNCTION LOSSES TO BE CALCULATED.

VERSA-LOK RETAINING WALL - TYPICAL SECTION (n.t.s.)



DRAINLINE TAIL STAKE & FLOWLINE ELEVATIONS (n.t.s.)

- ▲ CITY 05/22/2003
- ▲ REVISED PER CITY COMMENTS 04/01/2003
- ▲ REVISED PER ARCHITECTS COMMENTS 02/27/2003
- ▲ REVISED PER ARCHITECTS COMMENTS 02/11/2003

CITY FILE: #98-74.04

VALVOLINE INSTANT OIL CHANGE - O'FALLON, MISSOURI
SEWER AND WALL PROFILES AND DETAILS

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