

DRAINAGE RUN #78

TRENCH EXCAVATION CALC. FOR 18" PIPE
 $13' \times 5' = 65 \text{ ft}^2$
 $(10.5 \times 8.5) / 2 \times 5' = 47.5 \text{ ft}^2$ For 5'
 $(13' \times 5') / 2 \times 5' = 47.5 \text{ ft}^2$
 $157.50 \text{ ft}^2 \times 4.5 \text{ ft} = 708.75 \text{ ft}^3$
 $= 26.25 \text{ CY}$

For 4 ft Below 5'
 $1/2 (4.5 \times 13) = 29.25 \text{ ft}^2$
 $1/2 (4.5 \times 3) \times 8.5 = 31.5 \text{ ft}^2$
 $1/2 (13 \times 3) = 19.5 \text{ ft}^2$
 $10.5 \text{ ft} \times 150' = 1575 \text{ ft}^2$
 Total = 26.25 CY + 16.02 CY = 42.27 CY

granular Backfill for structures - 204.30
 $(34' - 2') \times 4.5' \times 1.0' = 144 \text{ ft}^3$
 $= 144 \text{ ft}^3 / 27 \text{ ft}^3/\text{CY} = 5.33 \text{ CY}$

Summary of Items

- ITEM 204.20 - Trench Excavation of Earth = 18.95 CY For Structure + 42.27 CY For Pipe = 61.22 CY
- ITEM 204.30 - Granular Backfill for Structures = 5.33 CY For Pipe Building = 5.33 CY
- TOTAL = 66.55 CY

- Item 613.12 - STONE FILL, Type III = 1 CY Used at outlet per plan.
- Item 601.2615 - 18" CPEP (SL) = 134 LF Field Measured.
- Item 900.6020 - 6" (Vertical Control Structure) EACH

TRENCH EXCAVATION CALC.
 ITEM 204.20
 Volume for first 5' depth of structure = $3.14 \times (2.915)^2 \times 5' = 34.4 \text{ ft}^3$
 Volume for Depth Below 5' deep = $3.14 \times (2.915)^2 \times (40 - 7.5) / 2 = 481.5 \text{ ft}^3$
 $481.5 \text{ ft}^3 \times 3.75 = 1805.6 \text{ ft}^3$
 $1805.6 \text{ ft}^3 \times 1.50 = 2708.4 \text{ ft}^3$
 TOTAL = $34.4 \text{ ft}^3 + 2708.4 \text{ ft}^3 = 2742.8 \text{ ft}^3$
 $2742.8 \text{ ft}^3 / 27 \text{ ft}^3/\text{CY} = 101.59 \text{ CY}$

TRENCH EXCAVATION CALC.
 ITEM 204.20
 Volume for first 5' depth of structure = $3.14 \times (2.915)^2 \times 5' = 34.4 \text{ ft}^3$
 Volume for Depth Below 5' deep = $3.14 \times (2.915)^2 \times (40 - 7.5) / 2 = 481.5 \text{ ft}^3$
 $481.5 \text{ ft}^3 \times 3.75 = 1805.6 \text{ ft}^3$
 $1805.6 \text{ ft}^3 \times 1.50 = 2708.4 \text{ ft}^3$
 TOTAL = $34.4 \text{ ft}^3 + 2708.4 \text{ ft}^3 = 2742.8 \text{ ft}^3$
 $2742.8 \text{ ft}^3 / 27 \text{ ft}^3/\text{CY} = 101.59 \text{ CY}$

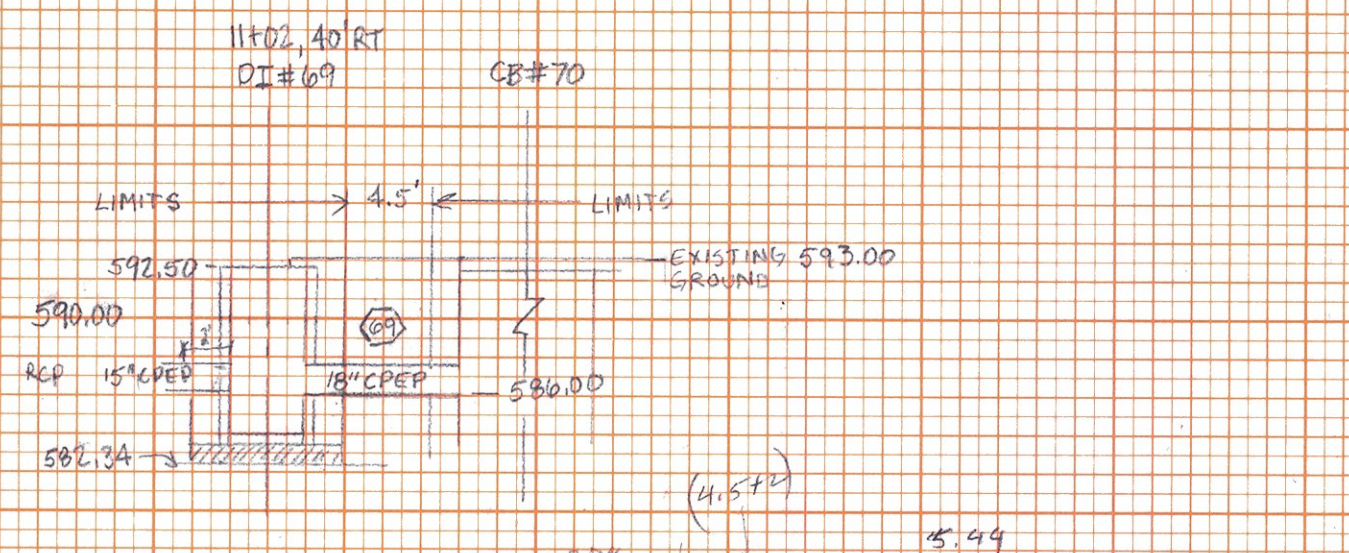
TRENCH EXCAVATION CALC.
 Calculated on sheet 71/339
 Vitrified Drainage Pipe
 Joint for this structure
 Pipe from DMH #74
 to OPS is calculated on this sheet
 1) 18" CPEP TRENCH
 $(10' - 11.5' - 1.5' \times 7) \times 4.5' / 2 = 7 \text{ CY}$
 PLUS 150' of 6" = $(6 \times 2 \times 1.5 \times 17) \times 0.50 = 1 \text{ CY}$
 TOTAL = 8 CY

TRENCH EXCAVATION (OPS)
 $(10' - 11.5' - 1.5') / 2 \times 4.5' = 7 \text{ CY}$
 TRENCH EXCAVATION (PIPE)
 $(10' - 11.5' - 1.5') / 2 \times 4.5' = 7 \text{ CY}$
 TOTAL FOR OPS = 14.36 CY

GRANULAR BACKFILL FOR STRUCTURES SUMMARY
 (A) $(18 \times 4.5 \times 1) / 27 = 3.3 \text{ CY}$ For under OPS
 (B) $(28 \times 4.5 \times 1) / 27 = 4.5 \text{ CY}$ For under OPS outlet per plan
 TOTAL = 7.8 CY

TRENCH EXCAVATION SUMMARY
 FOR OPS = 14.36 CY
 FOR OPS PIPE = 14.36 CY
 FOR PIPE FROM WET = 0.64 CY
 TOTAL = 29.36 CY

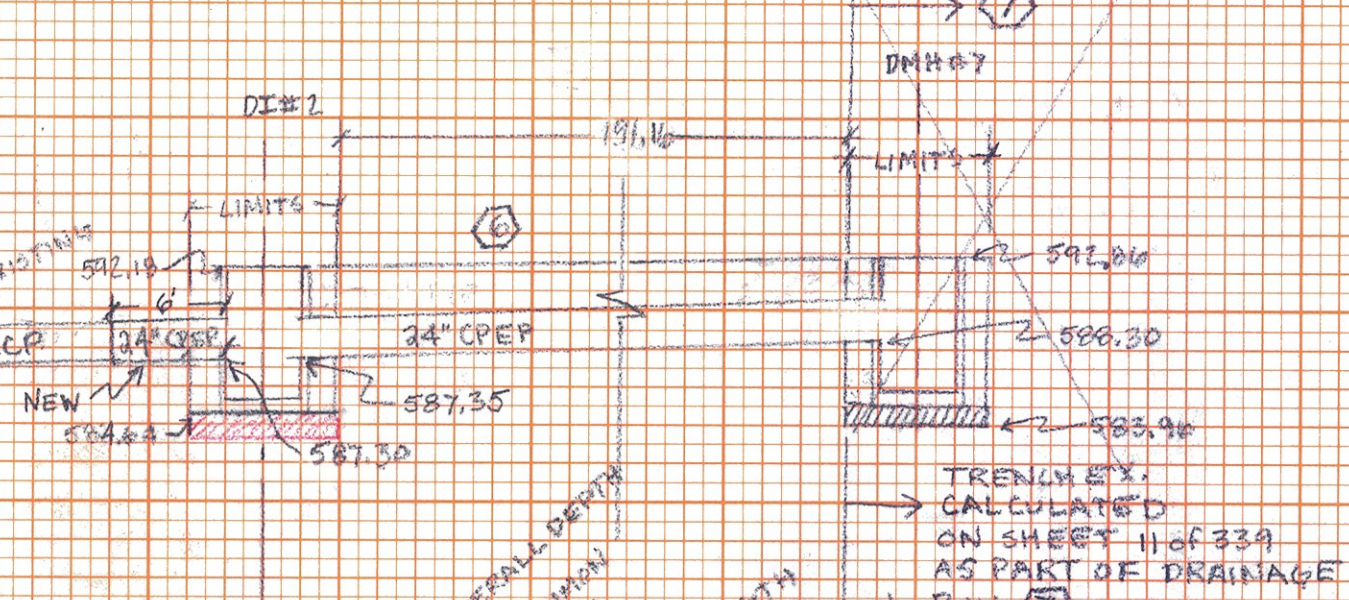
MT	TE	Gran Backfill	D"
32.62	3.01		
2.0	40		10
OPS	113.17	6.33	
0.4 Pipe	14.36	4.15	38
	162.15	12.47	38



ITEM 204.20 STRUCTURE 44
 $V = 1/27 (48.20(5') + 1.5(44.5)(5.16) + 5(4.5)(4.5) + 1.5(2(4.5)(4.5))) = 28.74 \text{ CY}$

ITEM 204.30
 $V = 48.20(5') / 27 = 1.79 \text{ CY}$

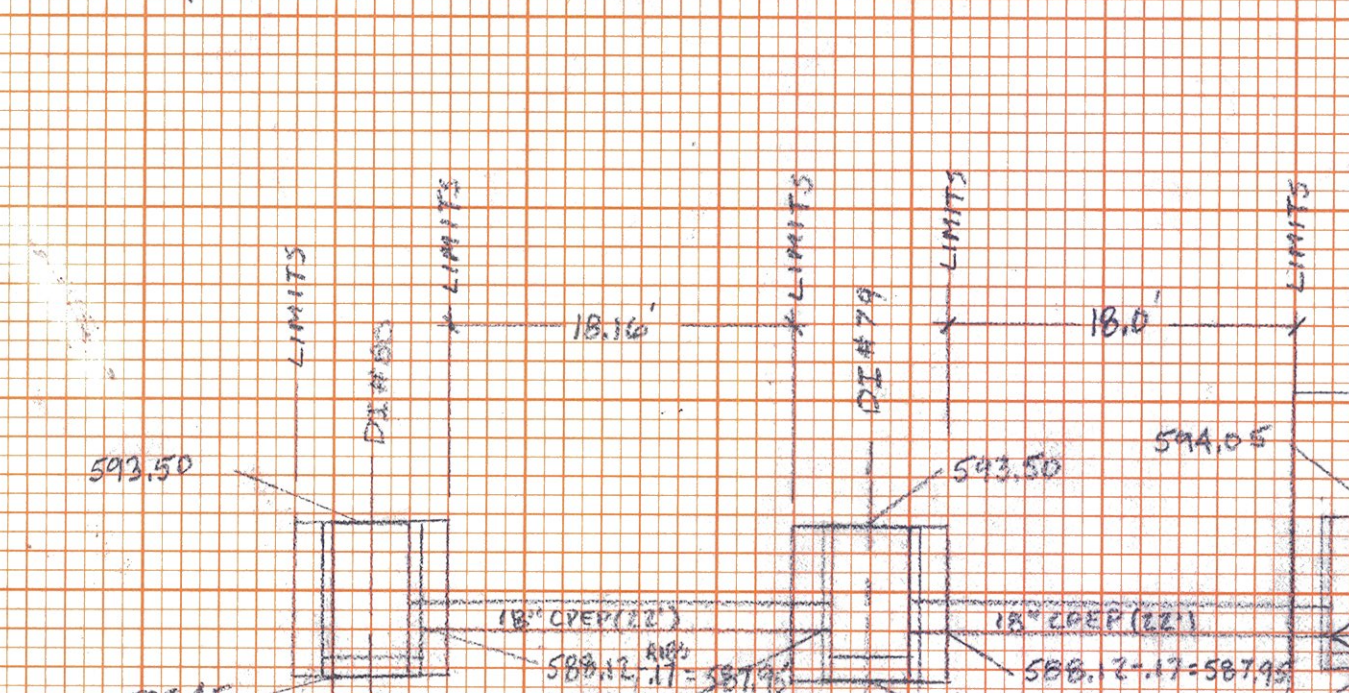
ITEM 204.21
 $(4' \times 6' \times 6') / 27 = 8 \text{ CY}$



ITEM 204.20
 $V = 1/27 (4.06(6.3 \times 5') + 48.20(8.54 - 4.25) + 1.5(1.5)(1.5)(5')) = 20.20 \text{ CY}$

ITEM 204.30
 $V = 48.20(5') / 27 = 1.79 \text{ CY}$

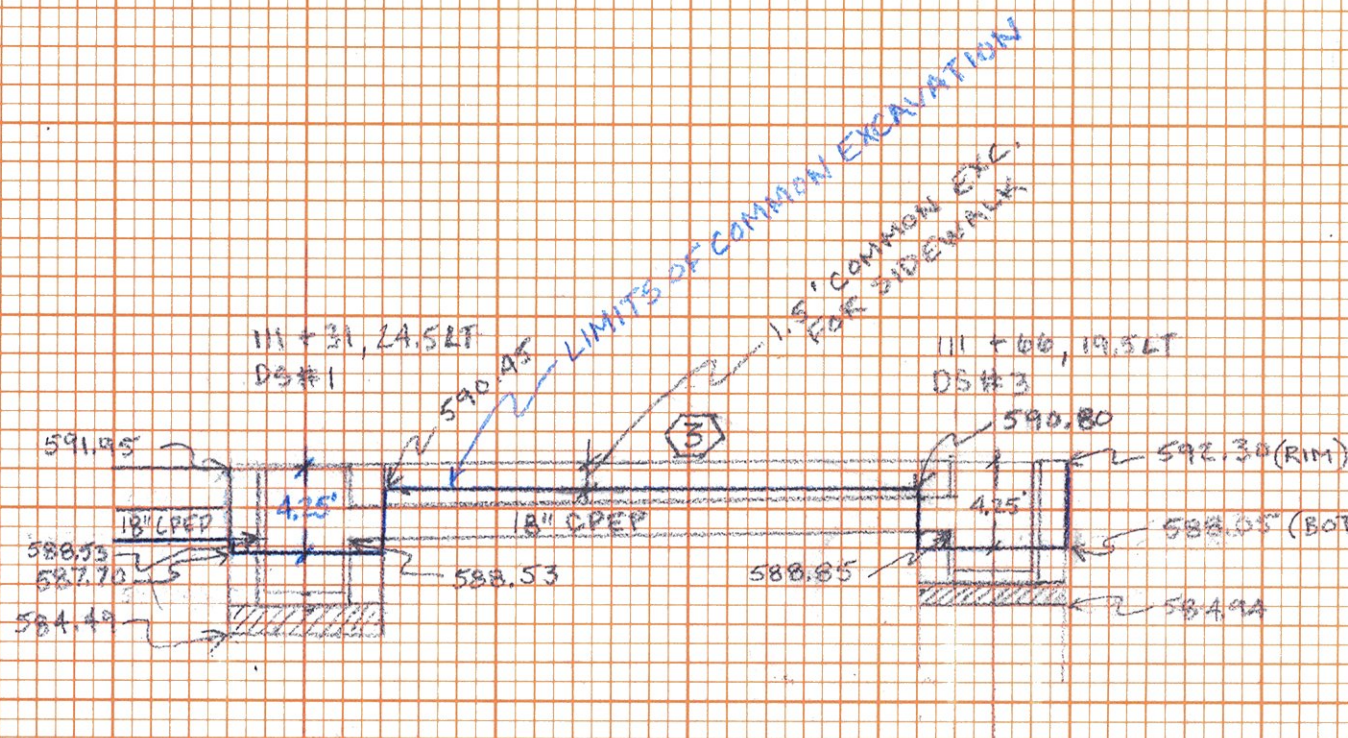
ITEM 204.21
 $(4' \times 4' \times 5') / 27 = 2.96 \text{ CY}$



ITEM 204.20
 $V = 1/27 (48.20(8.05) + (8.16)(4.5) + 1.5(1.5)(1.5)(5')) = 31.8 \text{ CY}$

ITEM 204.21
 $1/2 (4 \times 4 \times 4) = 2.4 \text{ CY}$

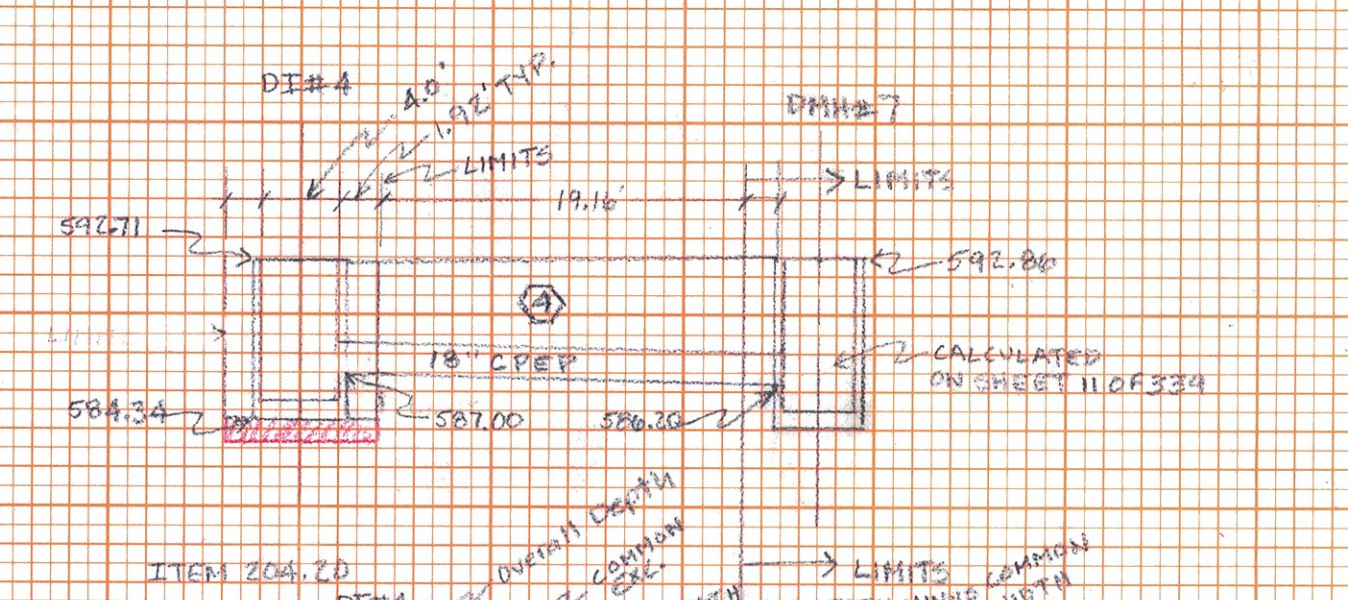
Trench Excavation of Earth 204.20
 Repair failed 6' from DI #80 upstage
 Measured in field
 $84' \times 3.5' \times 3.5' \times 1/2 = 38.1 \text{ CY}$



ITEM 204.20
 $V = 1/27 (48.20(3.21) + 1/2 (1.42 + 1.45)(4.5)(2.81) + 48.20(3.11)) = 20.36 \text{ CY}$

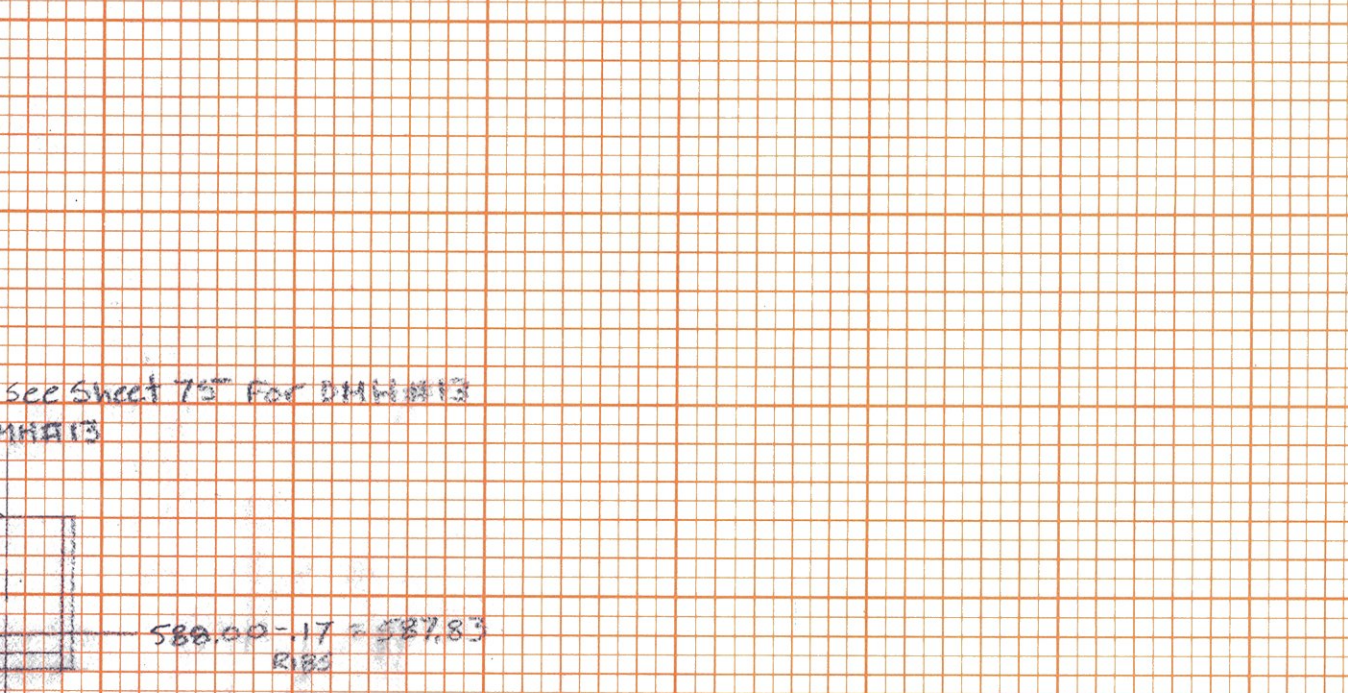
ITEM 204.30
 $V = 48.20(3.11) / 27 = 1.79 \text{ CY}$

ITEM 204.21
 $(4' \times 4' \times 4.5') / 27 = 2.67 \text{ CY}$



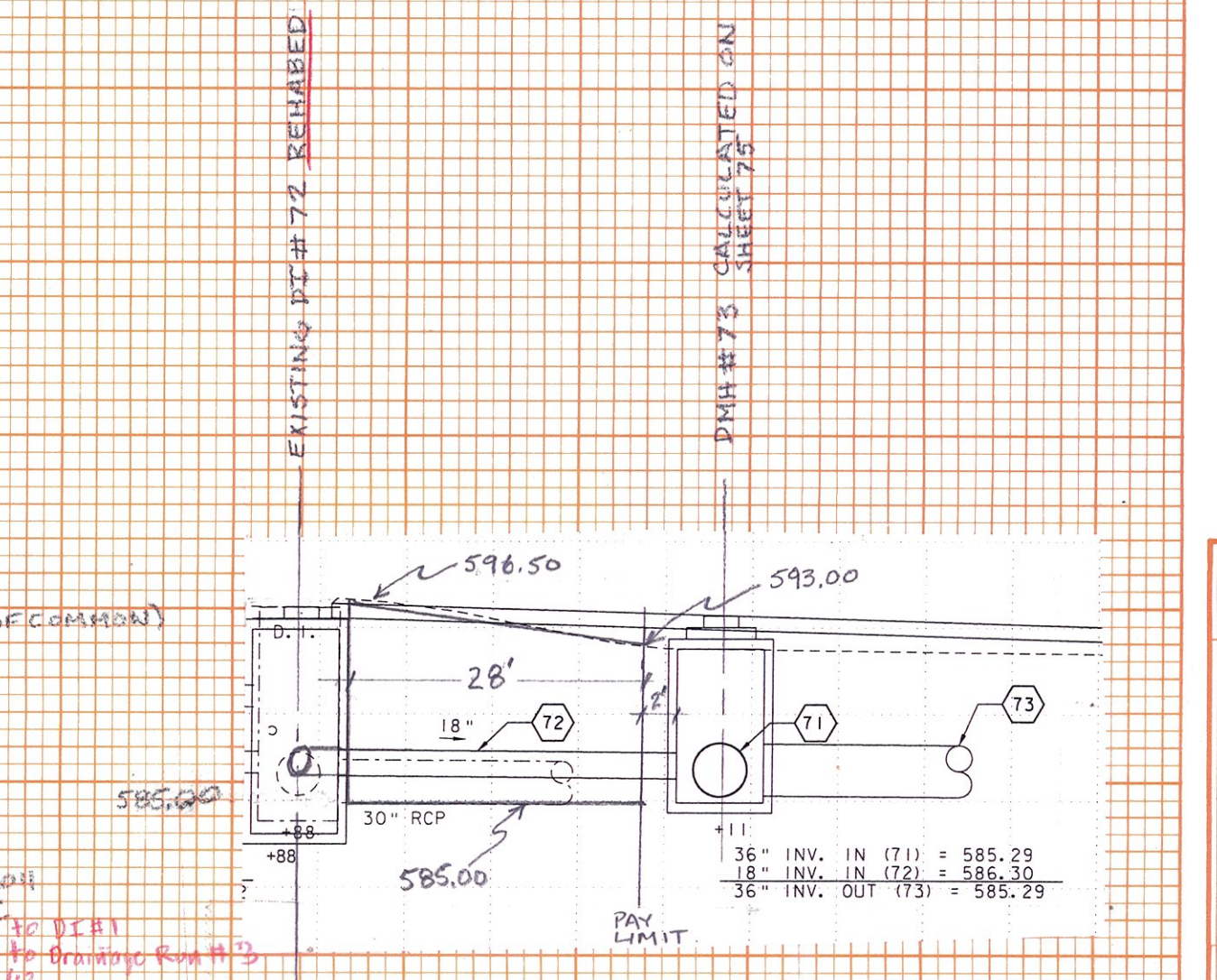
ITEM 204.20
 $V = 1/27 (48.20(6.27 - 4.25) + 1.5(1.5)(1.5)(4.5)) = 13.58 \text{ CY}$

ITEM 204.30
 $V = 48.20(4.25) / 27 = 1.79 \text{ CY}$

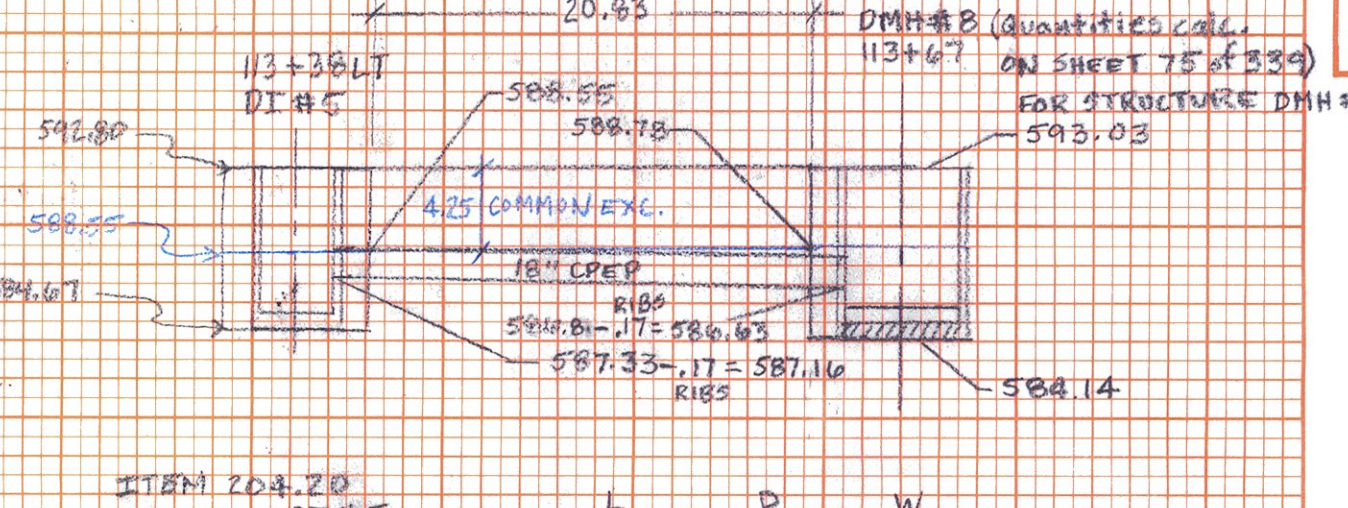


ITEM 204.20
 $V = 1/27 (48.20(8.13 - 4.25) + 20.93(1.39 + 2.15) / 2 \times 4.5) = 13.1 \text{ CY}$

ITEM 204.30
 $V = 1/27 (48.20(4.25)) = 1.79 \text{ CY}$



ITEM 204.20
 $V = 1/27 (5'(20)(4.5) + (0.5)(3.0)(2)(4.5)(1.5)) = 56.58 \text{ CY}$



ITEM 204.20
 $V = 1/27 (48.20(8.13 - 4.25) + 20.93(1.39 + 2.15) / 2 \times 4.5) = 13.1 \text{ CY}$

ITEM 204.30
 $V = 1/27 (48.20(4.25)) = 1.79 \text{ CY}$

NO.	DATE	BY	CHK

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