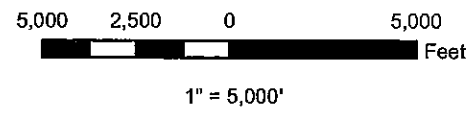


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 Haegler Ranch Drainage Basin
 Roads

URS
 9960 Federal Dr.
 Suite 300
 Colorado Springs, CO 80921
 719.531.0001



DATE: 02/09

HAEGLER RANCH DRAINAGE BASIN
AREAS CALCULATED
AS UNPLATTED ACREAGE
FIGURE 7-1

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9.0 APPENDICES

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Appendix A HYDROLOGY

Reference Attached CD

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Appendix B HYDRAULICS

Reference Attached CD

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Appendix C ALTERNATIVES AND COST ESTIMATES

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Table C1

| Regional Ponds | | | | |
|---|------|---------|-----------|--------------------|
| Note: Total Costs in Bold have used a minimum expected cost instead of QTY * COST/UNIT | | | | |
| Pond RG-01 | | | | |
| Item | UNIT | QTY | COST/UNIT | TOTAL COST |
| Detention Reservoir Excavation | CY | 14,552 | \$15 | \$218,284 |
| Seeding | Acre | 2 | \$580 | \$2,500 |
| Topsoil | CY | 970 | \$8 | \$7,761 |
| Land Costs | Acre | 2 | \$55,000 | \$124,025 |
| Outlet Culvert | EACH | 1 | \$14,150 | \$14,150 |
| Outlet Structure | EACH | 1 | \$7,280 | \$7,280 |
| Subtotal | | | | \$374,000 |
| 30% Construction Contingency | | | | \$112,200 |
| 15% Engineering Contingency | | | | \$56,100 |
| Total | | | | \$542,300 |
| Pond RG-02 | | | | |
| Item | UNIT | QTY | COST/UNIT | TOTAL COST |
| Detention Reservoir Excavation | CY | 104,092 | \$15 | \$1,561,384 |
| Seeding | Acre | 13 | \$580 | \$7,484 |
| Topsoil | CY | 6,939 | \$8 | \$55,516 |
| Land Costs | Acre | 14 | \$55,000 | \$780,692 |
| Outlet Culvert | EACH | 1 | \$382,950 | \$382,950 |
| Outlet Structure | EACH | 1 | \$7,280 | \$7,280 |
| Subtotal | | | | \$2,795,306 |
| 30% Construction Contingency | | | | \$838,592 |
| 15% Engineering Contingency | | | | \$419,296 |
| Total | | | | \$4,053,194 |
| Pond RG-03 | | | | |
| Item | UNIT | QTY | COST/UNIT | TOTAL COST |
| Detention Reservoir Excavation | CY | 65 | \$7 | \$5,000 |
| Seeding | Acre | 1 | \$580 | \$2,500 |
| Topsoil | CY | 538 | \$8 | \$5,000 |
| Land Costs | Acre | 1 | \$55,000 | \$68,750 |
| Outlet Culvert | EACH | 1 | \$12,500 | \$12,500 |
| Outlet Structure | EACH | 1 | \$7,280 | \$7,280 |
| Subtotal | | | | \$101,030 |
| 30% Construction Contingency | | | | \$30,309 |
| 15% Engineering Contingency | | | | \$15,155 |
| Total | | | | \$146,494 |
| Pond RG-04 | | | | |
| Item | UNIT | QTY | COST/UNIT | TOTAL COST |
| Detention Reservoir Excavation | CY | 1,726 | \$7 | \$12,084 |
| Seeding | Acre | 1 | \$580 | \$2,500 |
| Topsoil | CY | 538 | \$8 | \$5,000 |
| Land Costs | Acre | 1 | \$55,000 | \$68,750 |
| Outlet Culvert | EACH | 1 | \$14,400 | \$14,400 |
| Outlet Structure | EACH | 1 | \$7,280 | \$7,280 |
| Subtotal | | | | \$110,014 |
| 30% Construction Contingency | | | | \$33,004 |
| 15% Engineering Contingency | | | | \$16,502 |
| Total | | | | \$159,520 |
| Pond RG-05 | | | | |
| Item | UNIT | QTY | COST/UNIT | TOTAL COST |
| Detention Reservoir Excavation | CY | 48 | \$7 | \$5,000 |
| Seeding | Acre | 1 | \$580 | \$2,500 |
| Topsoil | CY | 538 | \$8 | \$5,000 |
| Land Costs | Acre | 1 | \$55,000 | \$68,750 |
| Outlet Culvert | EACH | 1 | \$12,475 | \$12,475 |
| Outlet Structure | EACH | 1 | \$7,280 | \$7,280 |
| Subtotal | | | | \$101,005 |
| 30% Construction Contingency | | | | \$30,302 |
| 15% Engineering Contingency | | | | \$15,151 |
| Total | | | | \$146,457 |
| Subtotal Regional Ponds | | | | \$5,047,965 |
| Sub-Regional Ponds | | | | |
| Note: Total Costs in Bold have used a minimum expected cost instead of QTY * COST/UNIT | | | | |
| Pond SR-01 | | | | |
| Item | UNIT | QTY | COST/UNIT | TOTAL COST |
| Detention Reservoir Excavation | CY | 26,800 | \$9 | \$241,200 |
| Seeding | Acre | 5 | \$580 | \$2,726 |
| Topsoil | CY | 2,528 | \$8 | \$20,220 |
| Land Costs | Acre | 6 | \$55,000 | \$323,125 |
| Outlet Culvert | EACH | 1 | \$25,275 | \$25,275 |
| Outlet Structure | EACH | 1 | \$7,280 | \$7,280 |
| Subtotal | | | | \$619,826 |
| 30% Construction Contingency | | | | \$185,948 |
| 15% Engineering Contingency | | | | \$92,974 |
| Total | | | | \$898,748 |
| Pond SR-02 | | | | |
| Item | UNIT | QTY | COST/UNIT | TOTAL COST |
| Detention Reservoir Excavation | CY | 18,339 | \$9 | \$165,051 |
| Seeding | Acre | 3 | \$580 | \$2,500 |
| Topsoil | CY | 1,828 | \$8 | \$14,628 |
| Land Costs | Acre | 4 | \$55,000 | \$233,750 |
| Outlet Culvert | EACH | 1 | \$18,490 | \$18,490 |
| Outlet Structure | EACH | 1 | \$7,280 | \$7,280 |
| Subtotal | | | | \$441,699 |
| 30% Construction Contingency | | | | \$132,510 |
| 15% Engineering Contingency | | | | \$66,255 |
| Total | | | | \$640,463 |
| Pond SR-03 | | | | |
| Item | UNIT | QTY | COST/UNIT | TOTAL COST |
| Detention Reservoir Excavation | CY | 14,141 | \$9 | \$127,269 |
| Seeding | Acre | 6 | \$580 | \$3,480 |
| Topsoil | CY | 3,227 | \$8 | \$25,813 |
| Land Costs | Acre | 8 | \$55,000 | \$412,500 |
| Outlet Culvert | EACH | 1 | \$22,410 | \$22,410 |
| Outlet Structure | EACH | 1 | \$7,280 | \$7,280 |
| Subtotal | | | | \$598,752 |
| 30% Construction Contingency | | | | \$179,626 |
| 15% Engineering Contingency | | | | \$89,813 |
| Total | | | | \$868,191 |
| Pond SR-04 | | | | |
| Item | UNIT | QTY | COST/UNIT | TOTAL COST |
| Detention Reservoir Excavation | CY | 29,750 | \$9 | \$267,750 |
| Seeding | Acre | 9 | \$580 | \$5,162 |
| Topsoil | CY | 4,786 | \$8 | \$38,290 |
| Land Costs | Acre | 11 | \$55,000 | \$611,875 |
| Outlet Culvert | EACH | 3 | \$23,900 | \$71,700 |
| Outlet Structure | EACH | 1 | \$7,280 | \$7,280 |
| Subtotal | | | | \$1,002,057 |
| 30% Construction Contingency | | | | \$300,617 |
| 15% Engineering Contingency | | | | \$150,309 |
| Total | | | | \$1,452,982 |

| Pond SR-05 | | | | |
|--------------------------------|------|--------|-------------------------------------|-------------|
| Item | UNIT | QTY | COST/UNIT | TOTAL COST |
| Detention Reservoir Excavation | CY | 42,235 | \$9 | \$380,115 |
| Seeding | Acre | 9 | \$580 | \$5,220 |
| Topsoil | CY | 4,840 | \$8 | \$38,720 |
| Land Costs | Acre | 11 | \$55,000 | \$618,750 |
| Outlet Culvert | EACH | 1 | \$23,900 | \$23,900 |
| Outlet Structure | EACH | 1 | \$7,280 | \$7,280 |
| | | | Subtotal | \$1,073,985 |
| | | | 30% Construction Contingency | \$322,196 |
| | | | 15% Engineering Contingency | \$161,098 |
| | | | Total | \$1,557,278 |
| Pond SR-06 | | | | |
| Item | UNIT | QTY | COST/UNIT | TOTAL COST |
| Detention Reservoir Excavation | CY | 11,460 | \$9 | \$103,140 |
| Seeding | Acre | 4 | \$580 | \$2,500 |
| Topsoil | CY | 2,312 | \$8 | \$18,500 |
| Land Costs | Acre | 4 | \$55,000 | \$236,500 |
| Outlet Culvert | EACH | 1 | \$9,250 | \$9,250 |
| Outlet Structure | EACH | 1 | \$7,280 | \$7,280 |
| | | | Subtotal | \$377,170 |
| | | | 30% Construction Contingency | \$113,151 |
| | | | 15% Engineering Contingency | \$56,575 |
| | | | Total | \$546,896 |
| Pond SR-07 | | | | |
| Item | UNIT | QTY | COST/UNIT | TOTAL COST |
| Detention Reservoir Excavation | CY | 13,860 | \$9 | \$124,740 |
| Seeding | Acre | 3 | \$580 | \$2,500 |
| Topsoil | CY | 1,560 | \$8 | \$12,476 |
| Land Costs | Acre | 4 | \$55,000 | \$199,375 |
| Outlet Culvert | EACH | 1 | \$15,050 | \$15,050 |
| Outlet Structure | EACH | 1 | \$7,280 | \$7,280 |
| | | | Subtotal | \$361,421 |
| | | | 30% Construction Contingency | \$108,426 |
| | | | 15% Engineering Contingency | \$54,213 |
| | | | Total | \$524,061 |
| Pond SR-08 | | | | |
| Item | UNIT | QTY | COST/UNIT | TOTAL COST |
| Detention Reservoir Excavation | CY | 6,235 | \$9 | \$56,115 |
| Seeding | Acre | 2 | \$580 | \$2,500 |
| Topsoil | CY | 1,076 | \$8 | \$8,604 |
| Land Costs | Acre | 3 | \$55,000 | \$137,500 |
| Outlet Culvert | EACH | 1 | \$12,990 | \$12,990 |
| Outlet Structure | EACH | 1 | \$7,280 | \$7,280 |
| | | | Subtotal | \$224,989 |
| | | | 30% Construction Contingency | \$67,497 |
| | | | 15% Engineering Contingency | \$33,748 |
| | | | Total | \$326,235 |
| Pond SR-09 | | | | |
| Item | UNIT | QTY | COST/UNIT | TOTAL COST |
| Detention Reservoir Excavation | CY | 15,210 | \$9 | \$136,890 |
| Seeding | Acre | 6 | \$580 | \$3,422 |
| Topsoil | CY | 3,173 | \$8 | \$25,383 |
| Land Costs | Acre | 7 | \$55,000 | \$405,625 |
| Outlet Culvert | EACH | 1 | \$15,275 | \$15,275 |
| Outlet Structure | EACH | 1 | \$7,280 | \$7,280 |
| | | | Subtotal | \$593,875 |
| | | | 30% Construction Contingency | \$178,163 |
| | | | 15% Engineering Contingency | \$89,081 |
| | | | Total | \$861,119 |
| Pond SR-10 | | | | |
| Item | UNIT | QTY | COST/UNIT | TOTAL COST |
| Detention Reservoir Excavation | CY | 20,000 | \$9 | \$180,000 |
| Seeding | Acre | 6 | \$580 | \$3,422 |
| Topsoil | CY | 3,173 | \$8 | \$25,383 |
| Land Costs | Acre | 7 | \$55,000 | \$405,625 |
| Outlet Culvert | EACH | 1 | \$115,550 | \$115,550 |
| Outlet Structure | EACH | 1 | \$7,280 | \$7,280 |
| | | | Subtotal | \$737,260 |
| | | | 30% Construction Contingency | \$221,178 |
| | | | 15% Engineering Contingency | \$110,589 |
| | | | Total | \$1,069,027 |
| Pond SR-11 | | | | |
| Item | UNIT | QTY | COST/UNIT | TOTAL COST |
| Detention Reservoir Excavation | CY | 3,800 | \$9 | \$34,200 |
| Seeding | Acre | 1 | \$580 | \$2,500 |
| Topsoil | CY | 538 | \$8 | \$5,000 |
| Land Costs | Acre | 1 | \$55,000 | \$68,750 |
| Outlet Culvert | EACH | 1 | \$7,900 | \$7,900 |
| Outlet Structure | EACH | 1 | \$7,280 | \$7,280 |
| | | | Subtotal | \$125,630 |
| | | | 30% Construction Contingency | \$37,689 |
| | | | 15% Engineering Contingency | \$18,845 |
| | | | Total | \$182,164 |
| Pond SR-12 | | | | |
| Item | UNIT | QTY | COST/UNIT | TOTAL COST |
| Detention Reservoir Excavation | CY | 7,860 | \$9 | \$70,740 |
| Seeding | Acre | 3 | \$580 | \$2,500 |
| Topsoil | CY | 1,721 | \$8 | \$13,767 |
| Land Costs | Acre | 4 | \$55,000 | \$220,000 |
| Outlet Culvert | EACH | 1 | \$14,700 | \$14,700 |
| Outlet Structure | EACH | 1 | \$7,280 | \$7,280 |
| | | | Subtotal | \$328,987 |
| | | | 30% Construction Contingency | \$98,696 |
| | | | 15% Engineering Contingency | \$49,348 |
| | | | Total | \$477,031 |
| Pond SR-13 | | | | |
| Item | UNIT | QTY | COST/UNIT | TOTAL COST |
| Detention Reservoir Excavation | CY | 5,953 | \$9 | \$53,577 |
| Seeding | Acre | 2 | \$580 | \$2,500 |
| Topsoil | CY | 1,183 | \$8 | \$9,465 |
| Land Costs | Acre | 3 | \$55,000 | \$151,250 |
| Outlet Culvert | EACH | 1 | \$34,990 | \$34,990 |
| Outlet Structure | EACH | 1 | \$7,280 | \$7,280 |
| | | | Subtotal | \$259,062 |
| | | | 30% Construction Contingency | \$77,719 |
| | | | 15% Engineering Contingency | \$38,859 |
| | | | Total | \$375,640 |
| | | | Land Acquisition Subtotal | \$3,788,125 |
| | | | Subtotal SubRegional Ponds | \$9,779,835 |

**Table C2
Outlet Pipe Cost Estimates**

| Detention | Pipe Size (in) | Number of Barrels | Pipe Length (ft) | Slope (ft/ft) | Pipe Cost | End Section Cost | Total Cost |
|-----------|----------------|-------------------|------------------|---------------|-----------|------------------|------------|
| SR-01 | 36 | 1 | 300 | 0.02 | \$24,000 | \$1,275 | \$25,275 |
| SR-02 | 48 | 1 | 150 | 0.03 | \$16,500 | \$1,990 | \$18,490 |
| SR-03 | 72 | 1 | 87 | 0.02 | \$20,010 | \$2,400 | \$22,410 |
| SR-04 | 54 | 3 | 150 | 0.02 | \$65,250 | \$6,450 | \$71,700 |
| SR-05 | 54 | 1 | 150 | 0.02 | \$21,750 | \$2,150 | \$23,900 |
| SR-06 | 24 | 1 | 150 | 0.02 | \$8,400 | \$850 | \$9,250 |
| SR-07 | 42 | 1 | 135 | 0.02 | \$13,500 | \$1,550 | \$15,050 |
| SR-08 | 48 | 1 | 100 | 0.02 | \$11,000 | \$1,990 | \$12,990 |
| SR-09 | 36 | 1 | 175 | 0.01 | \$14,000 | \$1,275 | \$15,275 |
| SR-10 | 60 | 2 | 300 | 0.01 | \$111,000 | \$4,550 | \$115,550 |
| SR-11 | 30 | 1 | 100 | 0.03 | \$6,800 | \$1,100 | \$7,900 |
| SR-12 | 30 | 1 | 200 | 0.01 | \$13,600 | \$1,100 | \$14,700 |
| SR-13 | 48 | 1 | 300 | 0.01 | \$33,000 | \$1,990 | \$34,990 |
| RG-01 | 36 | 1 | 150 | 0.01 | \$12,000 | \$2,150 | \$14,150 |
| RG-02 | 6x6 | 6 | 300 | 0.01 | \$333,000 | \$49,950 | \$382,950 |
| RG-03 | 30 | 1 | 150 | 0.01 | \$10,200 | \$2,300 | \$12,500 |
| RG-04 | 36 | 1 | 150 | 0.01 | \$12,000 | \$2,400 | \$14,400 |
| RG-05 | 30 | 1 | 150 | 0.01 | \$12,000 | \$475 | \$12,475 |

**Table C3
Existing Condition Culvert Improvements Cost Estimate**

| Facility Number | Road Crossing | Channel | Existing Size | Existing 100-yr Flow (cfs) | Deficiency | Necessary Facility for Existing 100-year Flow | Number of Culverts | Assumed Length (LF) ¹ | Unit Cost | End Section Unit Cost | Headwall Concrete (LF/HW) | Headwall Steel (LB/HW) | Wingwall Concrete (CY) | Wingwall Steel (tons) | Concrete Unit Cost \$/CY | Steel Unit Cost \$/ton | Total Cost |
|-----------------|---------------------|---------------------|-----------------|----------------------------|----------------|---|--------------------|----------------------------------|-----------|-----------------------|---------------------------|------------------------|------------------------|-----------------------|--------------------------|------------------------|------------|
| 301 | Peyton Highway | Main Stem (MS-02) | 2-33"X48" CMPs | 2,500 | Overtops | 7-6'X6' RCBs | 7 | 90 | \$475 | | 0.581 | 151 | 19.7 | 774.4 | \$435 | \$1.1 | \$314,535 |
| 401 | Jones Road | Tributary 1 (T1) | 2-24" CMPs | 370 | Overtops | 6'X6' RCB | 1 | 90 | \$475 | | 0.652 | 169.4 | 19.7 | 774.4 | \$435 | \$1.1 | \$53,111 |
| 403 | Jones Road | Main Stem (MS-03) | 3-60" CMPs | 2,300 | Overtops | 6-6'X6' RCBs | 6 | 90 | \$475 | | 0.581 | 151 | 19.7 | 774.4 | \$435 | \$1.1 | \$270,947 |
| 405 | Murr Road | Main Stem (MS-04) | 66" RCP | 1,700 | Overtops | 5-6'X6' RCBs | 5 | 70 | \$475 | | 0.652 | 169.4 | 19.7 | 774.4 | \$435 | \$1.1 | \$180,371 |
| 407 | Murr Road | Tributary 3 (T3-01) | 66" RCP | 670 | Overtops | 2-6'X6' RCBs | 2 | 70 | \$475 | | 0.652 | 169.4 | 19.7 | 774.4 | \$435 | \$1.1 | \$77,801 |
| 507 | Peerless Farms Road | Tributary 3 (T3-01) | 60" CMP | 600 | Overtops | 2-6'X6' RCBs | 2 | 110 | \$475 | | 0.652 | 169.4 | 19.7 | 774.4 | \$435 | \$1.1 | \$115,801 |
| 509 | Murr Road | Tributary 1 (T1) | 2-15" RCPs | 220 | Overtops | 66" RCP | 1 | 70 | \$210 | \$2,300 | | | | | | | \$19,300 |
| 601 | Whiting Way | Tributary 1 (T1) | 24" CMP | 220 | Overtops | 66" RCP | 1 | 90 | \$210 | \$2,300 | | | | | | | \$23,500 |
| 604 | Max Road | Tributary 1 (T1) | 18" CMP | 220 | Overtops | 66" RCP | 1 | 70 | \$210 | \$2,300 | | | | | | | \$19,300 |
| 609 | Falcon Highway | Tributary 3 (T3-02) | 18" CMP | 180 | Overtops | 66" RCP | 1 | 100 | \$210 | \$2,300 | | | | | | | \$25,600 |
| 610 | Falcon Highway | Tributary 4 (T4) | 24" CMP | 200 | Overtops | 66" RCP | 1 | 90 | \$210 | \$2,300 | | | | | | | \$23,500 |
| 612 | Falcon Highway | Tributary 5 (T5) | 24" CMP | 150 | Overtops | 60" RCP | 1 | 90 | \$185 | \$2,275 | | | | | | | \$21,200 |
| 628 | Falcon Highway | Main Stem (MS-05) | 2-60" CMPs | 1,000 | Overtops | 3-6'X6' RCBs | 3 | 100 | \$475 | | 0.652 | 169.4 | 19.7 | 774.4 | \$435 | \$1.1 | \$154,741 |
| 702 | Curtis Road | Tributary 6 (T6) | 36" CMP | 120 | Overtops | 54" RCP | 1 | 130 | \$145 | \$2,150 | | | | | | | \$23,150 |
| 703 | Curtis Road | Main Stem (MS-06) | 24" CMP | 590 | Overtops | 2-6'X6' RCBs | 2 | 120 | \$475 | | 0.652 | 169.4 | 19.7 | 774.4 | \$435 | \$1.1 | \$125,301 |
| 704 | Judge Orr Road | Main Stem (MS-06) | Blocked Culvert | 540 | Overtops | 2-72" RCPs | 2 | 160 | \$230 | \$2,400 | | | | | | | \$83,200 |
| 801 | Pedestrian Bridge | Main Stem (MS-06) | Bridge | 350 | Meets Capacity | Existing Bridge | | | | | | | | | | | \$0 |
| 802 | US24 | Main Stem (MS-06) | 2-66" CMPs | 350 | Meets Capacity | Existing Culvert | | | | | | | | | | | \$0 |
| 803 | Eastonville Road | Main Stem (MS-07) | 27"X21" CMP | 25 | Overtops | 30" RCP | 1 | 110 | \$68 | \$1,100 | | | | | | | \$9,680 |
| 804 | Eastonville Road | Tributary 7 (T7) | 18" CMP | 99 | Overtops | 48" RCP | 1 | 100 | \$110 | \$1,990 | | | | | | | \$14,980 |
| N/A | Peyton Highway | Tributary 1 (T1) | No Culvert | 500 | Overtops | 2-72" RCPs | 2 | 90 | \$230 | \$2,400 | | | | | | | \$51,000 |
| N/A | Falcon Highway | Tributary 1 (T1) | No Culvert | 33 | Overtops | 36" RCP | 1 | 90 | \$80 | \$1,275 | | | | | | | \$9,750 |

¹ Length is based on Future Land Use Road widths

² Wingwalls assumed 15' long for calculations. Calculations based on CDOT cross sections.

| | |
|-------------------------------------|--------------------|
| Sub-Total | \$1,616,769 |
| 30% Construction Contingency | \$485,031 |
| 15% Engineering Contingency | \$242,515 |
| Total | \$2,344,315 |

**Table C4
Regional Detention Alternative Culvert Cost Calculation**

| Facility Number | Road Crossing | Channel | Existing Size | Existing 100-yr Flow (cfs) | Deficiency | Necessary Facility for Existing 100-year Flow | Proposed 100-yr Flow (cfs) | Deficiency | Necessary Facility for Proposed 100-year Flow | Number of Culverts | Assumed Length (LF) ¹ | Unit Cost | End Section Unit Cost | Headwall Concrete (LF/HW) | Headwall Steel (LB/HW) | Wingwall ² Concrete (CY) | Wingwall ² Steel (tons) | Concrete Unit Cost \$/CY | Steel Unit Cost \$/ton | Total Cost | |
|-----------------|------------------------|---------------------|-----------------|----------------------------|------------|---|----------------------------|------------|---|--------------------|----------------------------------|-----------|-----------------------|---------------------------|------------------------|-------------------------------------|------------------------------------|--------------------------|------------------------|------------|----------|
| 405 | Murr Road | Main Stem (MS-04) | 66" RCP | 2,200 | Overtops | 5-6'X6' RCBs | 3,400 | Overtops | 6-10x6 Box | 6 | 70 | \$570 | | 0.581 | 151 | 24.42 | 1144 | \$435 | \$1.10 | \$256,307 | |
| 507 | Peerless Farms Road | Tributary 3 (T3-01) | 60" CMP | 600 | Overtops | 2-6'X6' RCBs | 1200 | Overtops | 2-10x6 Box | 2 | 110 | \$570 | | 0.581 | 151 | 24.42 | 1144 | \$435 | \$1.10 | \$138,956 | |
| 609 | Falcon Highway | Tributary 3 (T3-02) | 18" CMP | 180 | Overtops | 66" RCP | 460 | Overtops | 2-66" RCPs | 2 | 100 | \$210 | \$2,300 | | | | | | | | \$51,200 |
| 610 | Falcon Highway | Tributary 4 (T4) | 24" CMP | 200 | Overtops | 66" RCP | 570 | Overtops | 2-72" RCPs | 2 | 90 | \$230 | \$2,400 | | | | | | | | \$51,000 |
| 612 | Falcon Highway | Tributary 5 (T5) | 24" CMP | 150 | Overtops | 60" RCP | 240 | Overtops | 72" RCP | 1 | 90 | \$230 | \$2,400 | | | | | | | | \$25,500 |
| 628 | Falcon Highway | Main Stem (MS-05) | 2-60" CMPs | 1,100 | Overtops | 3-6'X6' RCBs | 2,400 | Overtops | 4-10x6 Box | 4 | 100 | \$570 | | 0.581 | 151 | 24.42 | 1144 | \$435 | \$1.10 | \$243,232 | |
| 702 | Curtis Road | Tributary 6 (T6) | 36" CMP | 120 | Overtops | 54" RCP | 140 | Overtops | 60" RCP | 1 | 130 | \$185 | \$2,275 | | | | | | | | \$28,600 |
| 703 | Curtis Road | Main Stem (MS-06) | 24" CMP | 590 | Overtops | 2-6'X6' RCBs | 890 | Overtops | 2-8x6 Box | 2 | 120 | \$535 | | 0.581 | 151 | 24.42 | 1144 | \$435 | \$1.10 | \$141,956 | |
| 704 | Judge Orr Road | Main Stem (MS-06) | Blocked Culvert | 540 | Overtops | 2-72" RCPs | 830 | Overtops | 2-8x6 Box | 2 | 160 | \$535 | | 0.581 | 151 | 24.42 | 1144 | \$435 | \$1.10 | \$184,756 | |
| N/A | New Santa Fe Springs 1 | Main Stem (MS-06) | N/A | 660 | N/A | No Culvert | 930 | New Road | 2-8x6 Box | 2 | 80 | \$535 | | 0.581 | 151 | 24.42 | 1144 | \$435 | \$1.10 | \$99,156 | |
| N/A | New Santa Fe Springs 3 | Main Stem (MS-06) | N/A | 660 | N/A | No Culvert | 930 | New Road | 2-8x6 Box | 2 | 80 | \$535 | | 0.581 | 151 | 24.42 | 1144 | \$435 | \$1.10 | \$99,156 | |
| N/A | New Santa Fe Springs 3 | Main Stem (MS-06) | N/A | 720 | N/A | No Culvert | 1500 | New Road | 3-8x6 Box | 3 | 80 | \$535 | | 0.581 | 151 | 24.42 | 1144 | \$435 | \$1.10 | \$142,794 | |
| N/A | New Santa Fe Springs 1 | Tributary 6 (T6) | N/A | 200 | N/A | No Culvert | 440 | New Road | 2-66" RCPs | 2 | 80 | \$210 | \$2,300 | | | | | | | | \$42,800 |
| N/A | New Santa Fe Springs 2 | Tributary 6 (T6) | N/A | 200 | N/A | No Culvert | 440 | New Road | 2-66" RCPs | 2 | 80 | \$210 | \$2,300 | | | | | | | | \$42,800 |
| N/A | New Santa Fe Springs 3 | Tributary 6 (T6) | N/A | 200 | N/A | No Culvert | 440 | New Road | 2-66" RCPs | 2 | 80 | \$210 | \$2,300 | | | | | | | | \$42,800 |

¹ Length is based on Future Land Use Road widths

² Wingwalls assumed 15' long for calculations. Calculations based on CDOT cross sections.

| | |
|------------------------------|--------------------|
| Sub-Total | \$1,591,015 |
| 30% Construction Contingency | \$477,305 |
| 15% Engineering Contingency | \$238,652 |
| Total | \$2,306,972 |

**Table C5
Sub Regional Detention Alternative Culvert Cost Calculation**

| Facility Number | HMS Design Point | Road Crossing | Channel | Existing Size | Existing 100-yr Flow (cfs) | Deficiency | Necessary Facility for Existing 100-year Flow | Proposed 100-yr Flow (cfs) | Deficiency | Necessary Facility for Proposed 100-year Flow | Number of Culverts | Assumed Length (LF) | Unit Cost | End Section Unit Cost | Headwall Concrete (LF/HW) | Headwall Steel (LB/HW) | Wingwall Concrete (CY) | Wingwall Steel (tons) | Concrete Unit Cost \$/CY | Steel Unit Cost \$/ton | Total Cost | |
|-----------------|------------------|--------------------|-------------------|----------------|----------------------------|------------|---|----------------------------|---------------|---|--------------------|---------------------|-----------|-----------------------|---------------------------|------------------------|------------------------|-----------------------|--------------------------|------------------------|------------|----------|
| 301 | JHR0465 | Peyton Highway | Main Stem (MS-02) | 2-33"X48" CMPs | 2,500 | 3,370 | 35 | Overtops | 9-6'X6' RCBs | 7-6'X6' RCBs | 9 | 90 | \$475 | | 0.581 | 151 | 19.7 | 774.4 | \$435 | \$1.10 | \$401,710 | |
| 401 | JHR0570 | Jones Road | Tributary 1 (T1) | 2-24" CMPs | 370 | 390 | 5 | Overtops | 6'X6' RCB | 6'X6' RCB | 1 | 90 | \$475 | | 0.652 | 169.4 | 19.7 | 774.4 | \$435 | \$1.10 | \$53,111 | |
| 601 | JHR0520 | Whiting Way | Tributary 1 (T1) | 24" CMP | 220 | 210 | -5 | Overtops | 66" RCP | 66" RCP | 1 | 90 | \$210 | \$2,300 | 0.652 | 169.4 | 19.7 | 774.4 | \$435 | \$1.10 | \$33,861 | |
| 803 | JHR0010 | Eastonville Road | Main Stem (MS-07) | 27"X21" CMP | 25 | 50 | 100 | Overtops | 24" RCP | 30" RCP | 1 | 110 | \$56 | \$850 | 0.652 | 169.4 | 19.7 | 774.4 | \$435 | \$1.10 | \$18,221 | |
| 804 | JHR0020 | Eastonville Road | Tributary 7 (T7) | 18" CMP | 99 | 90 | -9 | Overtops | 48" RCP | 48" RCP | 1 | 100 | \$110 | \$1,990 | 0.652 | 169.4 | 19.7 | 774.4 | \$435 | \$1.10 | \$25,341 | |
| N/A | JHR0060 | Santa Fe Springs 1 | Main Stem (MS-06) | N/A | 660 | 610 | -8 | N/A | 2-6'X6' RCB's | No Culvert | 2 | 100 | \$475 | | 0.652 | 169.4 | 19.7 | 774.4 | \$435 | \$1.10 | \$106,301 | |
| N/A | JHR0070 | Santa Fe Springs 3 | Main Stem (MS-06) | N/A | 720 | 530 | -26 | N/A | 2-6'X6' RCB's | No Culvert | 2 | 80 | \$475 | | 0.652 | 169.4 | 19.7 | 774.4 | \$435 | \$1.10 | \$87,301 | |
| N/A | JHR0610 | Peyton Highway | Tributary 1 (T1) | No Culvert | 500 | 520 | 4 | Overtops | 2-72" RCPs | 2-72" RCPs | 2 | 90 | \$230 | \$2,400 | | | | | | | | \$51,000 |
| N/A | JHR0310 | Falcon Highway | Tributary 1 (T1) | No Culvert | 33 | 110 | 233 | Overtops | 2-36" RCP | 36" RCP | 2 | 90 | \$80 | \$1,275 | | | | | | | | \$19,500 |
| N/A | JHR0110 | Santa Fe Springs 1 | Tributary 6 (T6) | N/A | 200 | 440 | 120 | N/A | 2-66" RCP | No Culvert | 2 | 80 | \$210 | \$2,300 | | | | | | | | \$42,800 |
| N/A | JHR0110 | Santa Fe Springs 2 | Tributary 6 (T6) | N/A | 200 | 440 | 120 | N/A | 2-66" RCP | No Culvert | 2 | 80 | \$210 | \$2,300 | | | | | | | | \$42,800 |
| N/A | JHR0110 | Santa Fe Springs 3 | Tributary 6 (T6) | N/A | 200 | 440 | 120 | N/A | 2-66" RCP | No Culvert | 2 | 80 | \$210 | \$2,300 | | | | | | | | \$47,000 |

¹ Length is based on Future Land Use Road widths

² Wingwalls assumed 15' long for calculations. Calculations based on CDOT cross sections.

| | |
|-------------------------------------|--------------------|
| Sub-Total | \$1,582,078 |
| 30% Construction Contingency | \$474,624 |
| 15% Engineering Contingency | \$237,312 |
| Total | \$2,294,014 |

**Table C6
General Channel Design**



Job: Haegler DBPS
Description: Channelization

Project No: 21711039 Sheet:
Computed by: KAP Date: 6/18/08
Checked by: Date:

| | | |
|---|-----------------------------------|---|
| Assumptions: | | Unit Cost |
| 4' bottom width minimum. | | Common Excavation \$7.00 /CY |
| Bottom width is at least twice the flow depth | El Paso County DCM Section 10.5.3 | Structure Excavation \$18.00 /CY |
| Allowable Shear Stress | | Topsoil \$8.00 /CY |
| t _d = | 1.00 psf Grass | Seeding \$580.00 /Acre |
| | 2.00 psf 6" Riprap | 6" Riprap \$80.00 /CY |
| | 4.00 psf 12" Riprap | 12" Riprap \$76.00 /CY |
| | 6.00 psf 18" Riprap | 18" Riprap \$64.00 /CY |
| | 8.00 psf 24" Riprap | 24" Riprap \$75.00 /CY |
| Limit slope to 0.30% minimum | | Grouted Riprap \$90.00 /CY |
| Limit Velocity of flow to 20 fps for concrete channels. | | Slope Paving \$300.00 /CY |
| Limit Constructed Depth to 5 ft. or less. | | Concrete Class B \$500.00 /CY *This includes steel reinforcing cost |
| | | Geotextile \$3.00 /yd ² |

| Channel Dimensions | | | | | | | | | | | | | Channel Costs | | | | | | | | |
|--------------------|-------|-------|------------|-------------------|-------------------|---------------|------------------------|----------------|----------------|-----------------------|--------|----------------------|--|-------------------------|------------------------------|---------------------------|-------------------------|------------------------------|----------------|---------------------------|--------------------|
| Q (cfs) | n | Slope | Side Sopes | Bottom Width (ft) | Normal Depth (ft) | Froude Number | Constructed Depth (ft) | Velocity (fps) | Flow Area (sf) | Wetted Perimeter (ft) | R (ft) | t _d (psf) | Excavation Area (ft ² /lin. ft) | Excavation (cy/lin. ft) | Excavation Cost (\$/lin. ft) | Surface Area (ft/lin. ft) | 4" Topsoil (cy/lin. ft) | 4" Topsoil Cost (\$/lin. ft) | Seeding (acre) | Seeding Cost (\$/lin. ft) | TOTAL COST (\$/LF) |
| GRASS | | | | | | | | | | | | | | | | | | | | | |
| 300 | 0.035 | 0.90% | 4 | 6 | 2.93 | 0.77 | 5 | 5.79 | 51.92 | 30.16 | 1.721 | Sub 0.97 | 130 | 4.8 | \$33.70 | 47.23 | 0.58 | \$4.66 | 0.00108 | \$0.63 | \$39.00 |
| 500 | 0.035 | 0.70% | 4 | 8 | 3.68 | 0.70 | 5 | 5.97 | 83.61 | 38.35 | 2.180 | Sub 0.95 | 140 | 5.2 | \$36.30 | 49.23 | 0.61 | \$4.86 | 0.0011 | \$0.66 | \$41.81 |
| 600 | 0.035 | 0.60% | 4 | 15 | 3.55 | 0.66 | 5 | 5.80 | 103.66 | 44.27 | 2.341 | Sub 0.88 | 175 | 6.5 | \$45.37 | 56.23 | 0.69 | \$5.55 | 0.0013 | \$0.75 | \$51.67 |
| 800 | 0.035 | 0.60% | 4 | 20 | 3.72 | 0.67 | 5 | 6.16 | 129.75 | 50.68 | 2.560 | Sub 0.96 | 200 | 7.4 | \$51.85 | 61.23 | 0.76 | \$6.05 | 0.0014 | \$0.82 | \$58.71 |
| 900 | 0.035 | 0.60% | 4 | 25 | 3.64 | 0.68 | 5 | 6.25 | 144.00 | 55.02 | 2.617 | Sub 0.98 | 225 | 8.3 | \$58.33 | 66.23 | 0.82 | \$6.54 | 0.0015 | \$0.88 | \$65.76 |
| 1000 | 0.035 | 0.60% | 4 | 30 | 3.57 | 0.68 | 5 | 6.31 | 158.08 | 59.44 | 2.660 | Sub 1.00 | 250 | 9.3 | \$64.81 | 71.23 | 0.88 | \$7.04 | 0.0016 | \$0.95 | \$72.80 |
| 1500 | 0.035 | 0.50% | 4 | 50 | 3.71 | 0.63 | 5 | 6.22 | 240.56 | 80.59 | 2.985 | Sub 0.93 | 350 | 13.0 | \$90.74 | 91.23 | 1.13 | \$9.01 | 0.0021 | \$1.21 | \$100.97 |
| 2000 | 0.035 | 0.40% | 4 | 80 | 3.66 | 0.57 | 5 | 5.76 | 346.38 | 110.18 | 3.144 | Sub 0.78 | 500 | 18.5 | \$129.63 | 121.23 | 1.50 | \$11.97 | 0.0028 | \$1.61 | \$143.22 |
| 3000 | 0.035 | 0.45% | 4 | 120 | 3.59 | 0.61 | 5 | 6.22 | 482.35 | 149.60 | 3.224 | Sub 0.91 | 700 | 25.9 | \$181.48 | 161.23 | 1.99 | \$15.92 | 0.0037 | \$2.15 | \$199.55 |
| 3500 | 0.035 | 0.45% | 4 | 140 | 3.61 | 0.61 | 5 | 6.29 | 557.53 | 169.77 | 3.284 | Sub 0.92 | 800 | 29.6 | \$207.41 | 181.23 | 2.24 | \$17.90 | 0.0042 | \$2.41 | \$227.72 |

| Channel Dimensions | | | Drop Structures & Costs | | | | | | | | | | | | | | | | | | | | |
|--------------------|-------|-------|-------------------------|--------------------------------------|-----------------|--|-------------------------|------------------------|---------------------------|------------------------------------|-------------------------------|----------------------------------|---|--|---|---------------------------------|---------------------------|----------------------------------|-------------------------------------|--|---|--|---------------------|
| Q (cfs) | n | Slope | Constructed Depth (ft) | Length Perp. To Channel (ft/lin. ft) | Drop Depth (ft) | Height of Concrete Cutoff Wall (1' thick) (ft) | Volume of Concrete (cy) | Concrete Cost (\$/Str) | Structure Excavation (cy) | Structure Excavation Cost (\$/Str) | Approach Armoring Length (ft) | Approach Armoring Thickness (ft) | Approach Armoring Volume of Riprap (cy) | Approach Armoring Cost - 12" Riprap (\$/Str) | Approach Armoring Geotextile (yd ²) | Approach Armoring Cost (\$/Str) | Exit Armoring Length (ft) | Exit Armoring Bed Thickness (ft) | Exit Armoring Volume of Riprap (cy) | Exit Armoring Cost - 24" Riprap (\$/Str) | Exit Armoring Geotextile (yd ²) | Exit Armoring Geotextile Cost (\$/Str) | TOTAL COST (\$/STR) |
| GRASS | | | | | | | | | | | | | | | | | | | | | | | |
| 300 | 0.035 | 0.90% | 5 | 47.23 | 4 | 12 | 21.0 | \$10,496 | 13.99 | \$251.90 | 20 | 3 | 104.96 | \$7,976.80 | 104.96 | \$314.87 | 40 | 3 | 209.92 | \$15,743.69 | 209.92 | \$629.75 | \$35,500 |
| 500 | 0.035 | 0.70% | 5 | 49.23 | 4 | 12 | 21.9 | \$10,940 | 14.59 | \$262.57 | 20 | 3 | 109.40 | \$8,314.58 | 109.40 | \$328.21 | 40 | 3 | 218.80 | \$16,410.35 | 218.80 | \$656.41 | \$37,000 |
| 600 | 0.035 | 0.60% | 5 | 56.23 | 4 | 12 | 25.0 | \$12,496 | 16.66 | \$299.90 | 20 | 3 | 124.96 | \$9,496.80 | 124.96 | \$374.87 | 40 | 3 | 249.92 | \$18,743.69 | 249.92 | \$749.75 | \$42,200 |
| 800 | 0.035 | 0.60% | 5 | 61.23 | 4 | 12 | 27.2 | \$13,607 | 18.14 | \$326.57 | 20 | 3 | 136.07 | \$10,341.25 | 136.07 | \$408.21 | 40 | 3 | 272.14 | \$20,410.35 | 272.14 | \$816.41 | \$46,000 |
| 900 | 0.035 | 0.60% | 5 | 66.23 | 4 | 12 | 29.4 | \$14,718 | 19.62 | \$353.23 | 20 | 3 | 147.18 | \$11,185.69 | 147.18 | \$441.54 | 40 | 3 | 294.36 | \$22,077.02 | 294.36 | \$883.08 | \$49,700 |
| 1000 | 0.035 | 0.60% | 5 | 71.23 | 4 | 12 | 31.7 | \$15,829 | 21.11 | \$379.90 | 20 | 3 | 158.29 | \$12,030.13 | 158.29 | \$474.87 | 40 | 3 | 316.58 | \$23,743.69 | 316.58 | \$949.75 | \$53,500 |
| 1500 | 0.035 | 0.50% | 5 | 91.23 | 4 | 12 | 40.5 | \$20,274 | 27.03 | \$486.57 | 20 | 3 | 202.74 | \$15,407.91 | 202.74 | \$608.21 | 40 | 3 | 405.47 | \$30,410.35 | 405.47 | \$1,216.41 | \$68,500 |
| 2000 | 0.035 | 0.40% | 5 | 121.23 | 4 | 12 | 53.9 | \$26,940 | 35.92 | \$646.57 | 20 | 3 | 269.40 | \$20,474.58 | 269.40 | \$808.21 | 40 | 3 | 538.80 | \$40,410.35 | 538.80 | \$1,616.41 | \$90,900 |
| 3000 | 0.035 | 0.45% | 5 | 161.23 | 4 | 12 | 71.7 | \$35,829 | 47.77 | \$859.90 | 20 | 3 | 358.29 | \$27,230.13 | 358.29 | \$1,074.87 | 40 | 3 | 716.58 | \$53,743.69 | 716.58 | \$2,149.75 | \$120,900 |
| 3500 | 0.035 | 0.45% | 5 | 181.23 | 4 | 12 | 80.5 | \$40,274 | 53.70 | \$966.57 | 20 | 3 | 402.74 | \$30,607.91 | 402.74 | \$1,208.21 | 40 | 3 | 805.47 | \$60,410.35 | 805.47 | \$2,416.41 | \$135,900 |

**Table C7
Regional Detention Alternative Channel Design**

| Regional Channel Improvements | | | | | | | | |
|-------------------------------|--------|----------------------------|----------------------------|-------------------|----------------|----------|-----------|-------------|
| Channel | Basins | Existing 100-yr Flow (cfs) | Proposed 100-yr Flow (cfs) | Design Flow (cfs) | Channel Length | Material | Unit Cost | Total Cost |
| Main Stem (MS-04) | HR0250 | 1,700 | 3,400 | 3,500 | 7,140 | Grass | \$227.72 | \$1,626,000 |
| Main Stem (MS-05) | HR0200 | 1,500 | 3,000 | 3,000 | 11,100 | Grass | \$199.55 | \$2,216,000 |
| Main Stem (MS-06) | HR0060 | 590 | 890 | 900 | 7,330 | Grass | \$65.76 | \$482,000 |
| Main Stem (MS-06) | HR0070 | 660 | 930 | 1,000 | 3,170 | Grass | \$72.80 | \$231,000 |
| Main Stem (MS-06) | HR0080 | 720 | 1,500 | 1,500 | 4,450 | Grass | \$100.97 | \$450,000 |
| Main Stem (MS-06) | HR0090 | 750 | 1,600 | 2,000 | 3,330 | Grass | \$143.22 | \$477,000 |
| Tributary 3 (T3-01) | HR0360 | 720 | 1,500 | 1,500 | 10,710 | Grass | \$100.97 | \$1,082,000 |
| Tributary 4 (T4) | HR0300 | 200 | 570 | 600 | 1,840 | Grass | \$51.67 | \$96,000 |
| Tributary 5 (T5) | HR0210 | 150 | 240 | 300 | 930 | Grass | \$39.00 | \$37,000 |
| Tributary 5 (T5) | HR0230 | 270 | 410 | 500 | 7,770 | Grass | \$41.81 | \$325,000 |
| Tributary 6 (T6) | HR0110 | 200 | 440 | 500 | 4,270 | Grass | \$41.81 | \$179,000 |
| Tributary 6 (T6) | HR0120 | 240 | 570 | 600 | 3,940 | Grass | \$51.67 | \$204,000 |

| | |
|-------------------------------------|---------------------|
| Sub-Total | \$7,405,000 |
| 30% Construction Contingency | \$2,221,500 |
| 15% Engineering Contingency | \$1,110,750 |
| Total | \$10,737,250 |

| Regional Drop Structures | | | | | | | | | | | |
|--------------------------|--------|----------------------------|----------------------------|-------------------|----------------|----------------|----------------|------------------|--------------|-----------|-------------|
| Channel | Basins | Existing 100-yr Flow (cfs) | Proposed 100-yr Flow (cfs) | Design Flow (cfs) | Channel Length | Existing Slope | Proposed Slope | Elevation Change | No. of Drops | Unit Cost | Total Cost |
| Main Stem (MS-05) | HR0200 | 1,500 | 3,000 | 3,000 | 11,100 | 1.20% | 0.45% | 83.25 | 21 | \$120,900 | \$2,538,900 |
| Main Stem (MS-06) | HR0060 | 590 | 890 | 1,000 | 7,330 | 1.20% | 0.60% | 44.0 | 11 | \$53,500 | \$588,500 |
| Main Stem (MS-06) | HR0070 | 660 | 930 | 1,000 | 3,170 | 1.20% | 0.60% | 19.0 | 5 | \$53,500 | \$267,500 |
| Main Stem (MS-06) | HR0080 | 720 | 1,500 | 1,500 | 4,450 | 1.20% | 0.50% | 31.2 | 8 | \$68,500 | \$548,000 |
| Main Stem (MS-06) | HR0090 | 750 | 1,600 | 2,000 | 3,330 | 1.20% | 0.40% | 26.6 | 7 | \$90,900 | \$636,300 |
| Tributary 3 (T3-01) | HR0360 | 720 | 1,500 | 1,500 | 10,710 | 1.20% | 0.50% | 75.0 | 19 | \$68,500 | \$1,301,500 |
| Tributary 4 (T4) | HR0300 | 200 | 570 | 600 | 1,840 | 1.20% | 0.60% | 11.0 | 3 | \$42,200 | \$126,600 |
| Tributary 5 (T5) | HR0210 | 150 | 240 | 300 | 930 | 1.20% | 0.90% | 2.8 | 1 | \$35,500 | \$35,500 |
| Tributary 5 (T5) | HR0230 | 270 | 410 | 500 | 7,770 | 1.20% | 0.70% | 38.9 | 10 | \$37,000 | \$370,000 |
| Tributary 6 (T6) | HR0110 | 200 | 440 | 500 | 4,270 | 1.20% | 0.70% | 21.4 | 6 | \$37,000 | \$222,000 |
| Tributary 6 (T6) | HR0120 | 240 | 570 | 600 | 3,940 | 1.20% | 0.60% | 23.6 | 6 | \$42,200 | \$253,200 |

| | |
|-------------------------------------|--------------------|
| Sub-Total | \$6,888,000 |
| 30% Construction Contingency | \$2,066,400 |
| 15% Engineering Contingency | \$1,033,200 |
| Total | \$9,987,600 |

**Table C8
Sub-Regional Detention Alternative Channel Design**

| Subregional Channel Improvements | | | | | | | | |
|----------------------------------|--------|----------------------------|----------------------------|-------------------|---------------------|-----------------|-----------|------------|
| Channel | Basins | Existing 100-yr Flow (cfs) | Proposed 100-yr Flow (cfs) | Design Flow (cfs) | Channel Length (ft) | Lining Material | Unit Cost | Total Cost |
| Main Stem (MS-05) | HR0200 | 1,460 | 1,680 | 2,000 | 1,560 | Grass | \$143.22 | \$224,000 |
| Main Stem (MS-06) | HR0070 | 660 | 530 | 600 | 3,120 | Grass | \$51.67 | \$162,000 |
| Main Stem (MS-06) | HR0080 | 720 | 970 | 1,000 | 4,535 | Grass | \$72.80 | \$331,000 |
| Main Stem (MS-06) | HR0090 | 750 | 740 | 800 | 3,190 | Grass | \$58.71 | \$188,000 |
| Tributary 3 (T3-01) | HR0330 | 600 | 600 | 600 | 5,000 | Grass | \$51.67 | \$259,000 |
| Tributary 3 (T3-02) | HR0300 | 220 | 500 | 500 | 420 | Grass | \$41.81 | \$18,000 |
| Tributary 4 (T4) | HR0300 | 220 | 500 | 500 | 940 | Grass | \$41.81 | \$40,000 |
| Tributary 6 (T6) | HR0110 | 200 | 440 | 500 | 4,280 | Grass | \$41.81 | \$179,000 |
| Tributary 6 (T6) | HR0120 | 240 | 250 | 300 | 1,400 | Grass | \$39.00 | \$55,000 |

| | |
|-------------------------------------|--------------------|
| Sub-Total | \$1,456,000 |
| 30% Construction Contingency | \$436,800 |
| 15% Engineering Contingency | \$218,400 |
| Total | \$2,111,200 |

| Subregional Drop Structures | | | | | | | | | | | |
|-----------------------------|--------|----------------------------|----------------------------|-------------------|---------------------|--------------------|----------------|------------------|--------------|-----------|------------|
| Channel | Basins | Existing 100-yr Flow (cfs) | Proposed 100-yr Flow (cfs) | Design Flow (cfs) | Channel Length (ft) | Existing Slope (%) | Proposed Slope | Elevation Change | No. of Drops | Unit Cost | Total Cost |
| Main Stem (MS-05) | HR0200 | 1,460 | 1,680 | 2,000 | 1,560 | 1.40% | 0.40% | 15.6 | 4 | \$90,900 | \$363,600 |
| Main Stem (MS-06) | HR0070 | 660 | 530 | 600 | 3,120 | 1.40% | 0.60% | 25.3 | 7 | \$42,200 | \$295,400 |
| Main Stem (MS-06) | HR0080 | 720 | 970 | 1,000 | 4,535 | 1.03% | 0.60% | 24.6 | 7 | \$53,500 | \$374,500 |
| Main Stem (MS-06) | HR0090 | 750 | 740 | 800 | 3,190 | 1.40% | 0.60% | 31.8 | 8 | \$46,000 | \$368,000 |
| Tributary 3 (T3-01) | HR0330 | 600 | 600 | 600 | 4,725 | 1.30% | 0.60% | 37.9 | 10 | \$42,200 | \$422,000 |
| Tributary 3 (T3-02) | HR0300 | 220 | 500 | 500 | 420 | 1.30% | 0.70% | 2.5 | 1 | \$37,000 | \$37,000 |
| Tributary 4 (T4) | HR0300 | 220 | 500 | 500 | 940 | 1.33% | 0.70% | 5.0 | 2 | \$37,000 | \$74,000 |
| Tributary 6 (T6) | HR0110 | 200 | 440 | 500 | 4,280 | 1.32% | 0.70% | 33.6 | 9 | \$37,000 | \$333,000 |
| Tributary 6 (T6) | HR0120 | 240 | 250 | 300 | 1,400 | 1.40% | 0.90% | 10.7 | 3 | \$35,500 | \$106,500 |

| | |
|-------------------------------------|--------------------|
| Sub-Total | \$2,374,000 |
| 30% Construction Contingency | \$712,200 |
| 15% Engineering Contingency | \$356,100 |
| Total | \$3,442,300 |

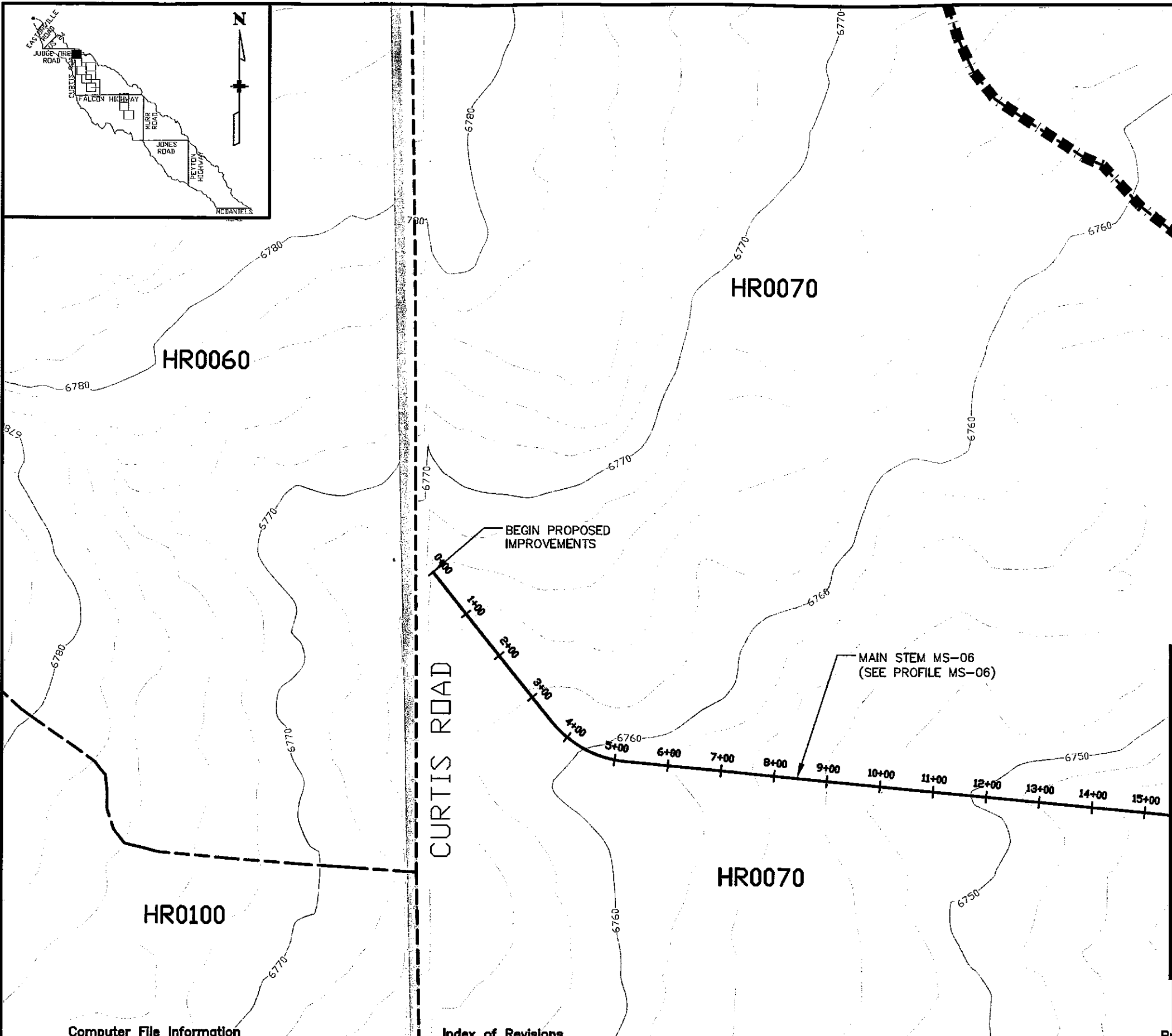
Table C9

| Regional Ponds | | | | |
|---|------|---------|-----------|--------------------|
| Note: Total Costs in Bold have used a minimum expected cost instead of QTY * COST/UNIT | | | | |
| Pond RG-01 | | | | |
| Item | UNIT | QTY | COST/UNIT | TOTAL COST |
| Detention Reservoir Excavation | CY | 14,552 | \$15 | \$218,284 |
| Seeding | Acre | 2 | \$580 | \$2,500 |
| Topsoil | CY | 970 | \$8 | \$7,761 |
| Outlet Culvert | EACH | 1 | \$14,150 | \$14,150 |
| Outlet Structure | EACH | 1 | \$7,280 | \$7,280 |
| Subtotal | | | | \$249,975 |
| 30% Construction Contingency | | | | \$74,993 |
| 15% Engineering Contingency | | | | \$37,496 |
| Total | | | | \$362,464 |
| Pond RG-02 | | | | |
| Item | UNIT | QTY | COST/UNIT | TOTAL COST |
| Detention Reservoir Excavation | CY | 104,092 | \$15 | \$1,561,384 |
| Seeding | Acre | 13 | \$580 | \$7,484 |
| Topsoil | CY | 6,939 | \$8 | \$55,516 |
| Outlet Culvert | EACH | 1 | \$382,950 | \$382,950 |
| Outlet Structure | EACH | 1 | \$7,280 | \$7,280 |
| Subtotal | | | | \$2,014,614 |
| 30% Construction Contingency | | | | \$604,384 |
| 15% Engineering Contingency | | | | \$302,192 |
| Total | | | | \$2,921,191 |
| Pond RG-03 | | | | |
| Item | UNIT | QTY | COST/UNIT | TOTAL COST |
| Detention Reservoir Excavation | CY | 65 | \$7 | \$5,000 |
| Seeding | Acre | 1 | \$580 | \$2,500 |
| Topsoil | CY | 538 | \$8 | \$5,000 |
| Outlet Culvert | EACH | 1 | \$12,500 | \$12,500 |
| Outlet Structure | EACH | 1 | \$7,280 | \$7,280 |
| Subtotal | | | | \$32,280 |
| 30% Construction Contingency | | | | \$9,684 |
| 15% Engineering Contingency | | | | \$4,842 |
| Total | | | | \$46,806 |
| Pond RG-04 | | | | |
| Item | UNIT | QTY | COST/UNIT | TOTAL COST |
| Detention Reservoir Excavation | CY | 1,726 | \$7 | \$12,084 |
| Seeding | Acre | 1 | \$580 | \$2,500 |
| Topsoil | CY | 538 | \$8 | \$5,000 |
| Outlet Culvert | EACH | 1 | \$14,400 | \$14,400 |
| Outlet Structure | EACH | 1 | \$7,280 | \$7,280 |
| Subtotal | | | | \$41,264 |
| 30% Construction Contingency | | | | \$12,379 |
| 15% Engineering Contingency | | | | \$6,190 |
| Total | | | | \$59,833 |
| Pond RG-05 | | | | |
| Item | UNIT | QTY | COST/UNIT | TOTAL COST |
| Detention Reservoir Excavation | CY | 48 | \$7 | \$5,000 |
| Seeding | Acre | 1 | \$580 | \$2,500 |
| Topsoil | CY | 538 | \$8 | \$5,000 |
| Outlet Culvert | EACH | 1 | \$12,475 | \$12,475 |
| Outlet Structure | EACH | 1 | \$7,280 | \$7,280 |
| Subtotal | | | | \$32,255 |
| 30% Construction Contingency | | | | \$9,677 |
| 15% Engineering Contingency | | | | \$4,838 |
| Total | | | | \$46,770 |
| Subtotal Regional Ponds | | | | \$3,437,063 |
| Sub-Regional Ponds | | | | |
| Note: Total Costs in Bold have used a minimum expected cost instead of QTY * COST/UNIT | | | | |
| Pond SR-01 | | | | |
| Item | UNIT | QTY | COST/UNIT | TOTAL COST |
| Detention Reservoir Excavation | CY | 26,800 | \$9 | \$241,200 |
| Seeding | Acre | 5 | \$580 | \$2,726 |
| Topsoil | CY | 2,528 | \$8 | \$20,220 |
| Outlet Culvert | EACH | 1 | \$25,275 | \$25,275 |
| Outlet Structure | EACH | 1 | \$7,280 | \$7,280 |
| Subtotal | | | | \$296,701 |
| 30% Construction Contingency | | | | \$89,010 |
| 15% Engineering Contingency | | | | \$44,505 |
| Total | | | | \$430,217 |
| Pond SR-02 | | | | |
| Item | UNIT | QTY | COST/UNIT | TOTAL COST |
| Detention Reservoir Excavation | CY | 18,339 | \$9 | \$165,051 |
| Seeding | Acre | 3 | \$580 | \$2,500 |
| Topsoil | CY | 1,828 | \$8 | \$14,628 |
| Outlet Culvert | EACH | 1 | \$18,490 | \$18,490 |
| Outlet Structure | EACH | 1 | \$7,280 | \$7,280 |
| Subtotal | | | | \$207,949 |
| 30% Construction Contingency | | | | \$62,385 |
| 15% Engineering Contingency | | | | \$31,192 |
| Total | | | | \$301,525 |
| Pond SR-03 | | | | |
| Item | UNIT | QTY | COST/UNIT | TOTAL COST |
| Detention Reservoir Excavation | CY | 14,141 | \$9 | \$127,269 |
| Seeding | Acre | 6 | \$580 | \$3,480 |
| Topsoil | CY | 3,227 | \$8 | \$25,813 |
| Outlet Culvert | EACH | 1 | \$22,410 | \$22,410 |
| Outlet Structure | EACH | 1 | \$7,280 | \$7,280 |
| Subtotal | | | | \$186,252 |
| 30% Construction Contingency | | | | \$55,876 |
| 15% Engineering Contingency | | | | \$27,938 |
| Total | | | | \$270,066 |
| Pond SR-04 | | | | |
| Item | UNIT | QTY | COST/UNIT | TOTAL COST |
| Detention Reservoir Excavation | CY | 29,750 | \$9 | \$267,750 |
| Seeding | Acre | 9 | \$580 | \$5,162 |
| Topsoil | CY | 4,786 | \$8 | \$38,290 |
| Outlet Culvert | EACH | 3 | \$23,900 | \$71,700 |
| Outlet Structure | EACH | 1 | \$7,280 | \$7,280 |
| Subtotal | | | | \$390,182 |
| 30% Construction Contingency | | | | \$117,055 |
| 15% Engineering Contingency | | | | \$58,527 |
| Total | | | | \$565,764 |

| Pond SR-05 | | | | |
|--------------------------------|------|--------|-----------|-------------|
| Item | UNIT | QTY | COST/UNIT | TOTAL COST |
| Detention Reservoir Excavation | CY | 42,235 | \$9 | \$380,115 |
| Seeding | Acre | 9 | \$580 | \$5,220 |
| Topsoil | CY | 4,840 | \$8 | \$38,720 |
| Outlet Culvert | EACH | 1 | \$23,900 | \$23,900 |
| Outlet Structure | EACH | 1 | \$7,280 | \$7,280 |
| Subtotal | | | | \$455,235 |
| 30% Construction Contingency | | | | \$136,571 |
| 15% Engineering Contingency | | | | \$68,285 |
| Total | | | | \$660,091 |
| Pond SR-06 | | | | |
| Item | UNIT | QTY | COST/UNIT | TOTAL COST |
| Detention Reservoir Excavation | CY | 11,460 | \$9 | \$103,140 |
| Seeding | Acre | 4 | \$580 | \$2,500 |
| Topsoil | CY | 2,312 | \$8 | \$18,500 |
| Outlet Culvert | EACH | 1 | \$9,250 | \$9,250 |
| Outlet Structure | EACH | 1 | \$7,280 | \$7,280 |
| Subtotal | | | | \$140,670 |
| 30% Construction Contingency | | | | \$42,201 |
| 15% Engineering Contingency | | | | \$21,100 |
| Total | | | | \$203,971 |
| Pond SR-07 | | | | |
| Item | UNIT | QTY | COST/UNIT | TOTAL COST |
| Detention Reservoir Excavation | CY | 13,860 | \$9 | \$124,740 |
| Seeding | Acre | 3 | \$580 | \$2,500 |
| Topsoil | CY | 1,560 | \$8 | \$12,476 |
| Outlet Culvert | EACH | 1 | \$15,050 | \$15,050 |
| Outlet Structure | EACH | 1 | \$7,280 | \$7,280 |
| Subtotal | | | | \$162,046 |
| 30% Construction Contingency | | | | \$48,614 |
| 15% Engineering Contingency | | | | \$24,307 |
| Total | | | | \$234,967 |
| Pond SR-08 | | | | |
| Item | UNIT | QTY | COST/UNIT | TOTAL COST |
| Detention Reservoir Excavation | CY | 6,235 | \$9 | \$56,115 |
| Seeding | Acre | 2 | \$580 | \$2,500 |
| Topsoil | CY | 1,076 | \$8 | \$8,604 |
| Outlet Culvert | EACH | 1 | \$12,990 | \$12,990 |
| Outlet Structure | EACH | 1 | \$7,280 | \$7,280 |
| Subtotal | | | | \$87,489 |
| 30% Construction Contingency | | | | \$26,247 |
| 15% Engineering Contingency | | | | \$13,123 |
| Total | | | | \$126,860 |
| Pond SR-09 | | | | |
| Item | UNIT | QTY | COST/UNIT | TOTAL COST |
| Detention Reservoir Excavation | CY | 15,210 | \$9 | \$136,890 |
| Seeding | Acre | 6 | \$580 | \$3,422 |
| Topsoil | CY | 3,173 | \$8 | \$25,383 |
| Outlet Culvert | EACH | 1 | \$15,275 | \$15,275 |
| Outlet Structure | EACH | 1 | \$7,280 | \$7,280 |
| Subtotal | | | | \$188,250 |
| 30% Construction Contingency | | | | \$56,475 |
| 15% Engineering Contingency | | | | \$28,238 |
| Total | | | | \$272,963 |
| Pond SR-10 | | | | |
| Item | UNIT | QTY | COST/UNIT | TOTAL COST |
| Detention Reservoir Excavation | CY | 20,000 | \$9 | \$180,000 |
| Seeding | Acre | 6 | \$580 | \$3,422 |
| Topsoil | CY | 3,173 | \$8 | \$25,383 |
| Outlet Culvert | EACH | 1 | \$115,550 | \$115,550 |
| Outlet Structure | EACH | 1 | \$7,280 | \$7,280 |
| Subtotal | | | | \$331,635 |
| 30% Construction Contingency | | | | \$99,491 |
| 15% Engineering Contingency | | | | \$49,745 |
| Total | | | | \$480,871 |
| Pond SR-11 | | | | |
| Item | UNIT | QTY | COST/UNIT | TOTAL COST |
| Detention Reservoir Excavation | CY | 3,800 | \$9 | \$34,200 |
| Seeding | Acre | 1 | \$580 | \$2,500 |
| Topsoil | CY | 538 | \$8 | \$5,000 |
| Outlet Culvert | EACH | 1 | \$7,900 | \$7,900 |
| Outlet Structure | EACH | 1 | \$7,280 | \$7,280 |
| Subtotal | | | | \$56,880 |
| 30% Construction Contingency | | | | \$17,064 |
| 15% Engineering Contingency | | | | \$8,532 |
| Total | | | | \$82,476 |
| Pond SR-12 | | | | |
| Item | UNIT | QTY | COST/UNIT | TOTAL COST |
| Detention Reservoir Excavation | CY | 7,860 | \$9 | \$70,740 |
| Seeding | Acre | 3 | \$580 | \$2,500 |
| Topsoil | CY | 1,721 | \$8 | \$13,767 |
| Outlet Culvert | EACH | 1 | \$14,700 | \$14,700 |
| Outlet Structure | EACH | 1 | \$7,280 | \$7,280 |
| Subtotal | | | | \$108,987 |
| 30% Construction Contingency | | | | \$32,696 |
| 15% Engineering Contingency | | | | \$16,348 |
| Total | | | | \$158,031 |
| Pond SR-13 | | | | |
| Item | UNIT | QTY | COST/UNIT | TOTAL COST |
| Detention Reservoir Excavation | CY | 5,953 | \$9 | \$53,577 |
| Seeding | Acre | 2 | \$580 | \$2,500 |
| Topsoil | CY | 1,183 | \$8 | \$9,465 |
| Outlet Culvert | EACH | 1 | \$34,990 | \$34,990 |
| Outlet Structure | EACH | 1 | \$7,280 | \$7,280 |
| Subtotal | | | | \$107,812 |
| 30% Construction Contingency | | | | \$32,344 |
| 15% Engineering Contingency | | | | \$16,172 |
| Total | | | | \$156,327 |
| Subtotal SubRegional Ponds | | | | \$3,944,129 |

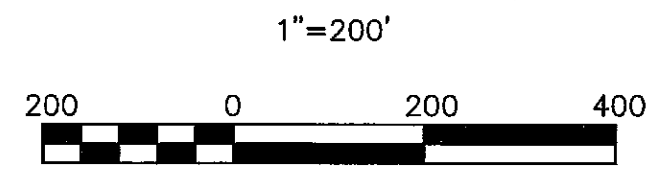
Appendix D PREFERRED ALTERNATIVE

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LEGEND

- 6630 CONTOURS - MAJOR ELEVATION
- CONTOURS - MINOR ELEVATION
- WATERSHED BOUNDARY
- BASIN BOUNDARY
- ROADS
- RIVER AND ALIGNMENT



CHANNEL: MAIN STEM (MS-06)
 BASIN: HR0070

STA: 0+00 TO STA: 31+34

Q: 600 CFS

MATCHLINE MS-06 PG 2

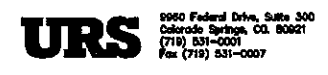
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| Acad. Ver. | 2006 |
| Scale: | 1"=200' |
| Units: | Feet |

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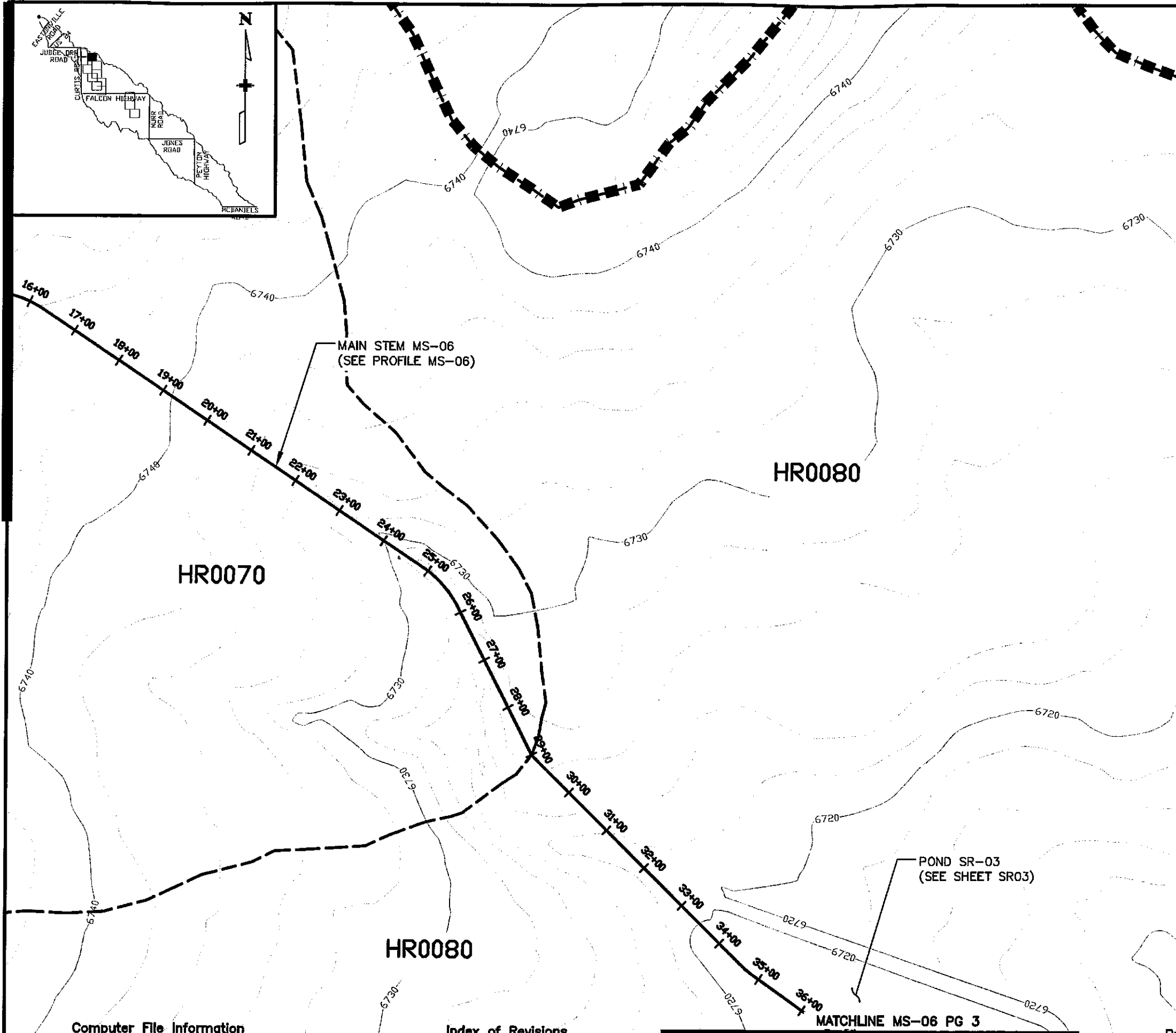
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 Colorado Springs, CO 80921
 (719) 531-0001
 Fax (719) 531-0007

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| Designed by: | KAP |
| Detailed by: | DRM |
| Checked by: | JAJ |

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| Structure Numbers | |
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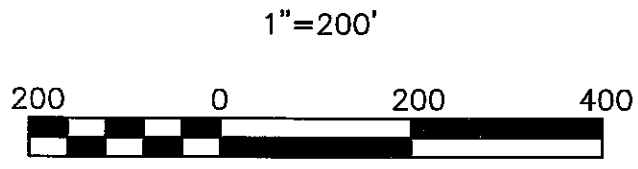
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| HAEGLER RANCH SUB-REGIONAL DETENTION ALTERNATIVE CONCEPTUAL CHANNELS | |
| Sheet Number | MAIN STEM PG 1 |

MATCHLINE MS-06 PG 1



LEGEND

- CONTOURS - MAJOR ELEVATION
- CONTOURS - MINOR ELEVATION
- WATERSHED BOUNDARY
- BASIN BOUNDARY
- ROADS
- RIVER AND ALIGNMENT



CHANNEL: MAIN STEM (MS-06)
 BASIN: HR0070

STA: 0+00 TO STA: 31+34

Q: 600 CFS

CHANNEL: MAIN STEM (MS-06)
 BASIN: HR0080

STA: 31+34 TO STA: 74+61

Q: 1000 CFS

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MATCHLINE MS-06 PG 3

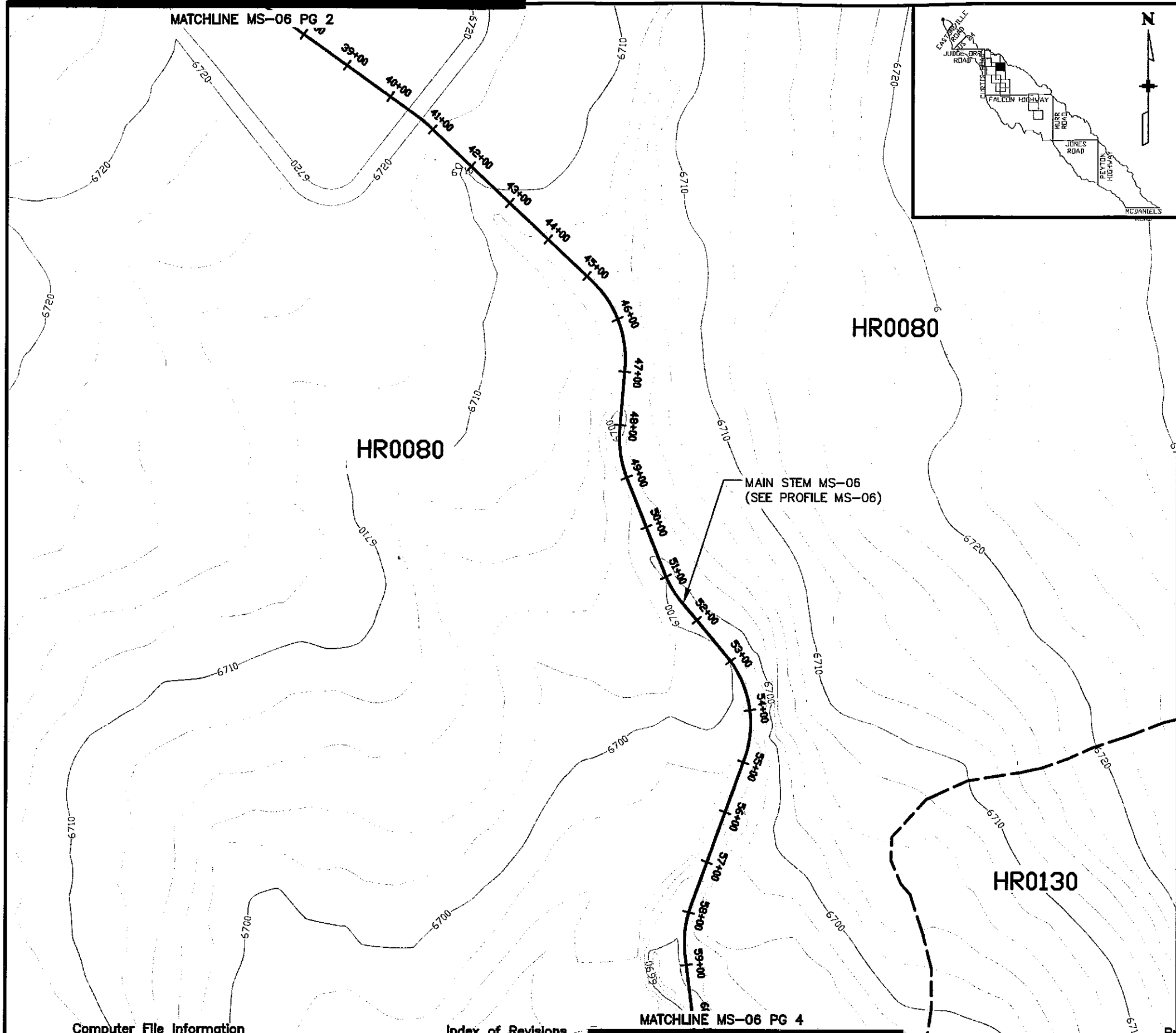
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 Detailed by: DRM
 Checked by: JAJ

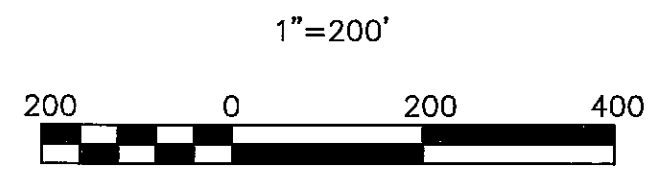
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HAEGLER RANCH SUB-REGIONAL DETENTION
 ALTERNATIVE CONCEPTUAL CHANNELS
 Sheet Number MAIN STEM PG 2



LEGEND

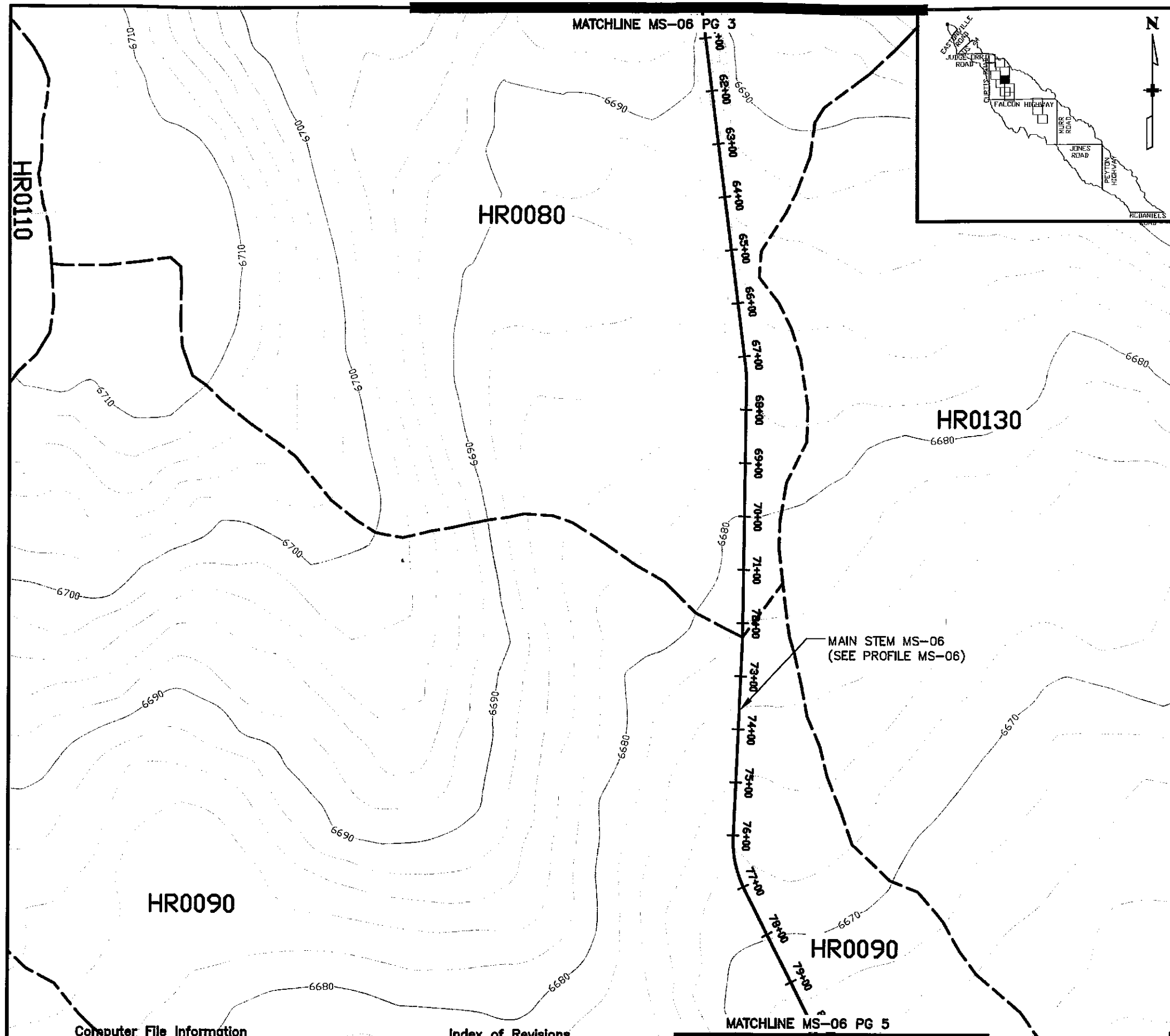
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- CONTOURS — MINOR ELEVATION
- ▬▬▬▬▬▬ WATERSHED BOUNDARY
- - - - - BASIN BOUNDARY
- ▬▬▬▬▬▬ ROADS
- 20+00 — RIVER AND ALIGNMENT



CHANNEL: MAIN STEM (MS-06)
 BASIN: HR0080

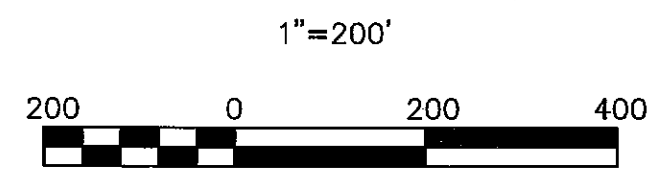
STA: 31+34 TO STA: 74+61

Q: 1000 CFS



LEGEND

- 6630 — CONTOURS — MAJOR ELEVATION
- CONTOURS — MINOR ELEVATION
- ▬▬▬▬ WATERSHED BOUNDARY
- - - - - BASIN BOUNDARY
- ▨▨▨▨ ROADS
- 20+00 — RIVER AND ALIGNMENT



CHANNEL: MAIN STEM (MS-06)
 BASIN: HR0080

STA: 31+34 TO STA: 74+61

Q: 1000 CFS

CHANNEL: MAIN STEM (MS-06)
 BASIN: HR0090

STA: 74+61 TO STA: 103+62

Q: 800 CFS

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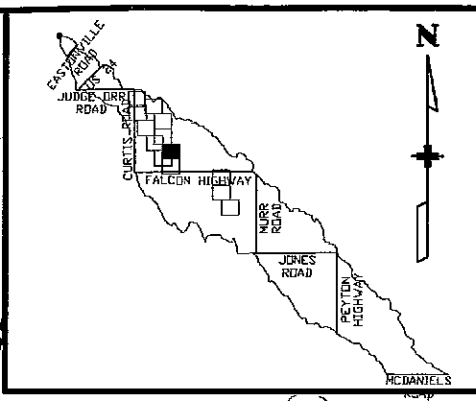
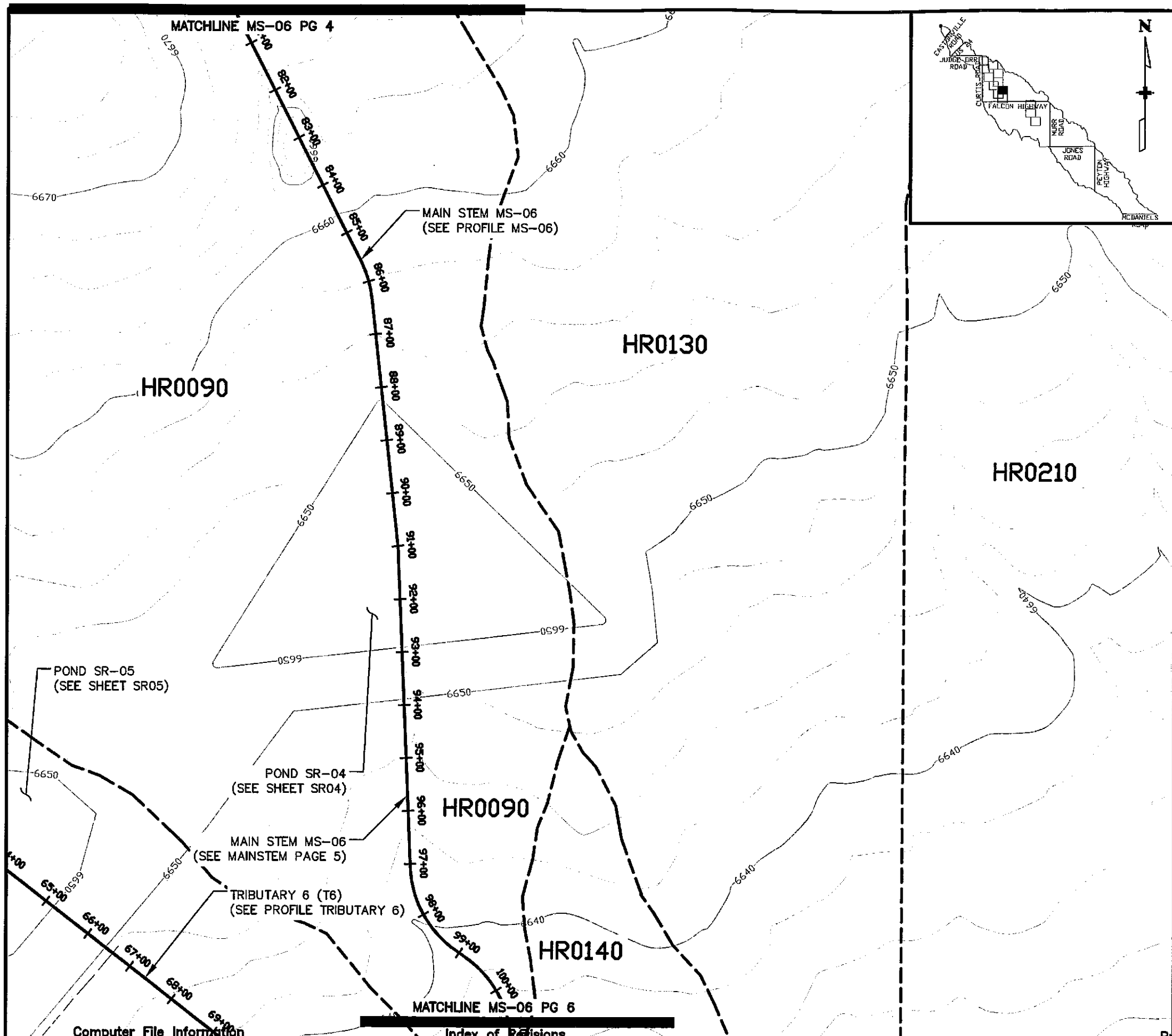
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 Colorado Springs, CO 80921
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 Fax (719) 531-0007

Designed by: KAP
 Detailed by: DRM
 Checked by: JAJ

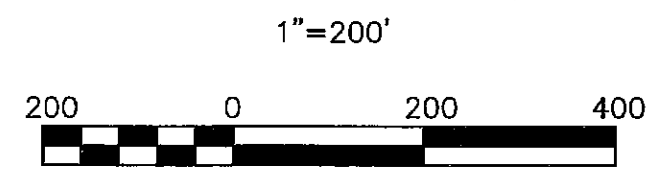
Structure Numbers

HAEGLER RANCH SUB-REGIONAL DETENTION
 ALTERNATIVE CONCEPTUAL CHANNELS
 Sheet Number MAIN STEM PG 4



LEGEND

- CONTOURS - MAJOR ELEVATION
- CONTOURS - MINOR ELEVATION
- WATERSHED BOUNDARY
- BASIN BOUNDARY
- ROADS
- RIVER AND ALIGNMENT



CHANNEL: MAIN STEM (MS-06)
 BASIN: HR0090

STA: 74+61 TO STA: 103+62

Q: 800 CFS

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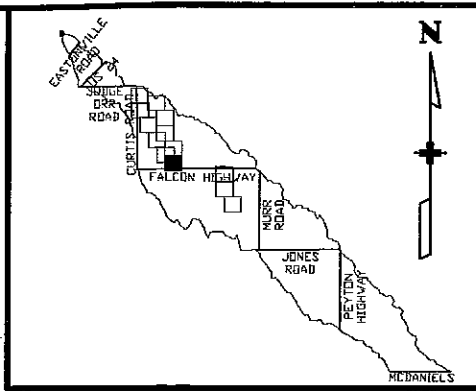
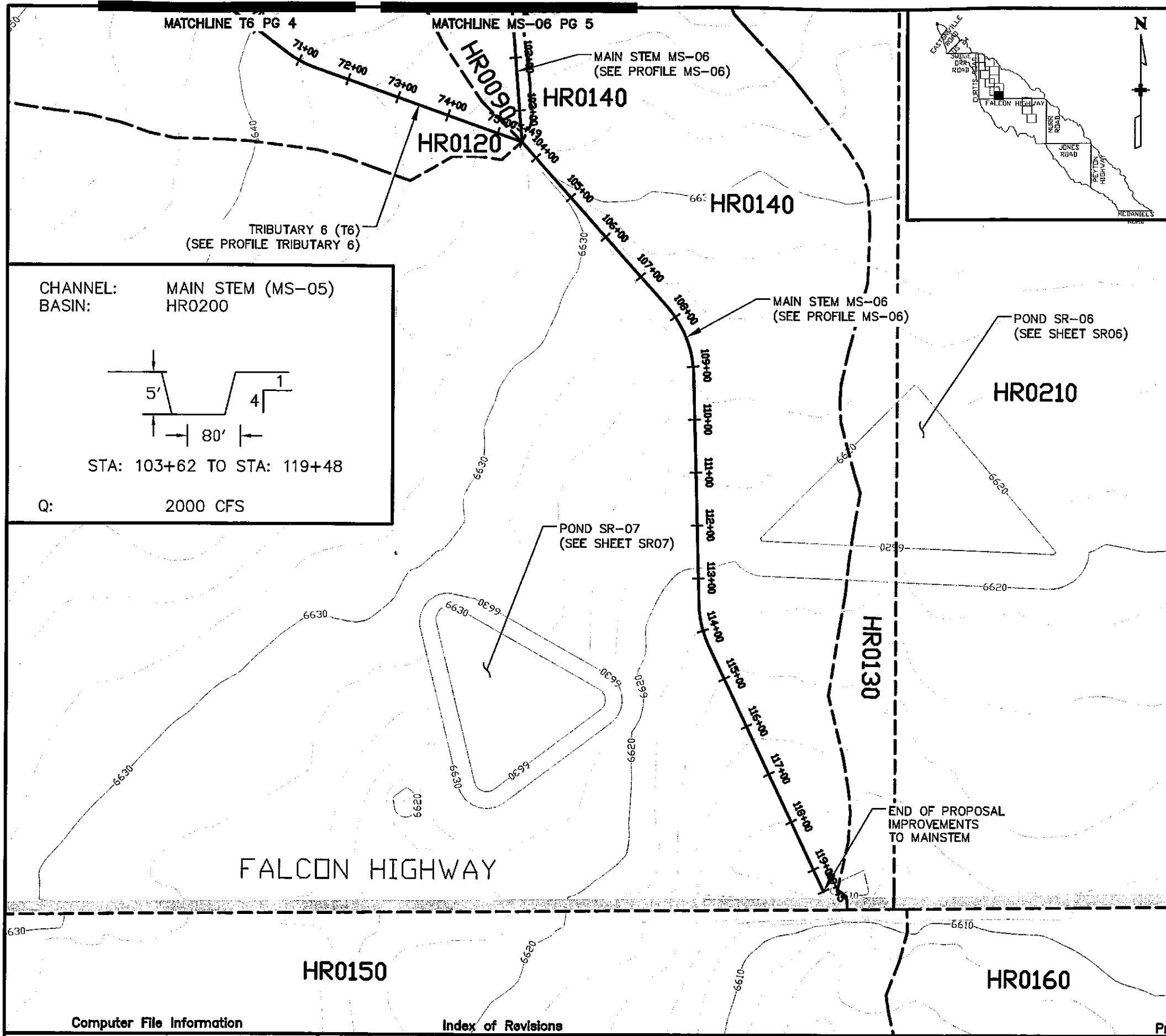
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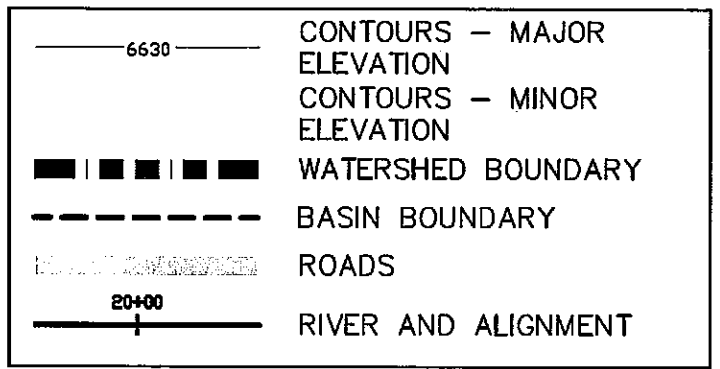
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 Detailed by: DRM
 Checked by: JAJ

Structure Numbers

HAEGLER RANCH SUB-REGIONAL DETENTION
 ALTERNATIVE CONCEPTUAL CHANNELS
 Sheet Number MAIN STEM PG 5



LEGEND



1"=200'



CHANNEL: MAIN STEM (MS-05)
 BASIN: HR0200

STA: 103+62 TO STA: 119+48

Q: 2000 CFS

CHANNEL: MAIN STEM (MS-06)
 BASIN: HR0090

STA: 74+61 TO STA: 103+62

Q: 800 CFS

CHANNEL: TRIBUTARY 6 (T6)
 BASIN: HR0120

STA: 41+73 TO STA: 75+50

Q: 300 CFS

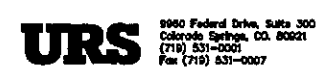
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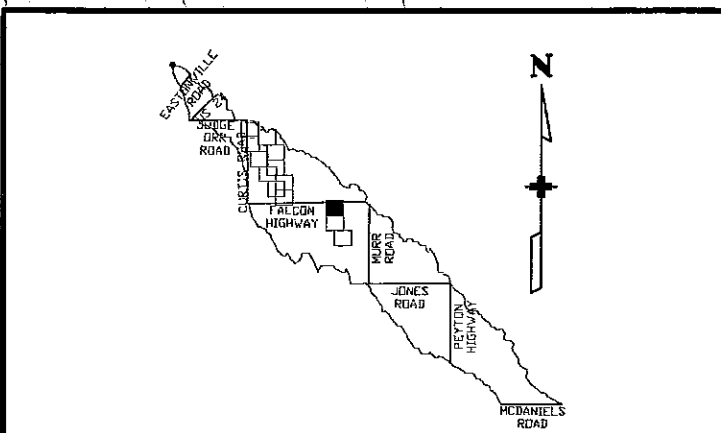
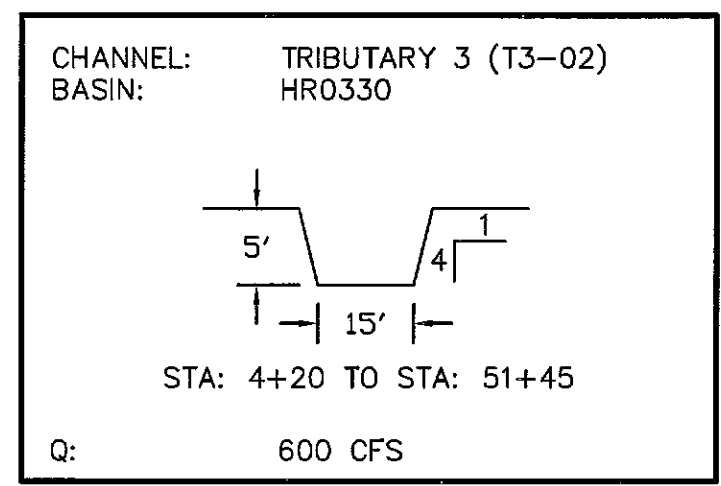
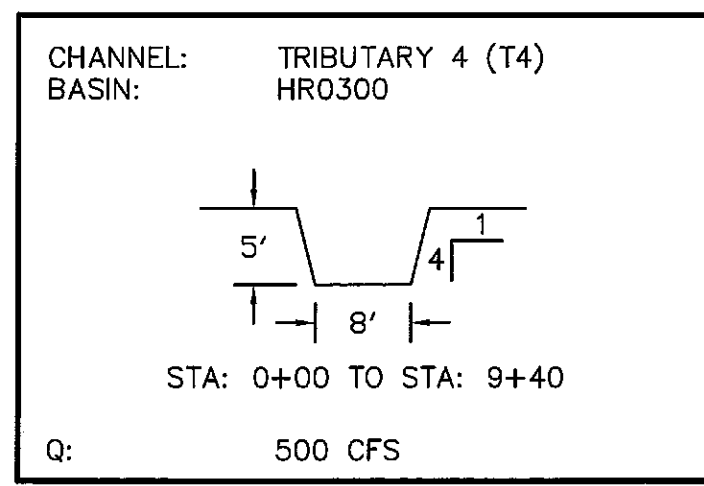
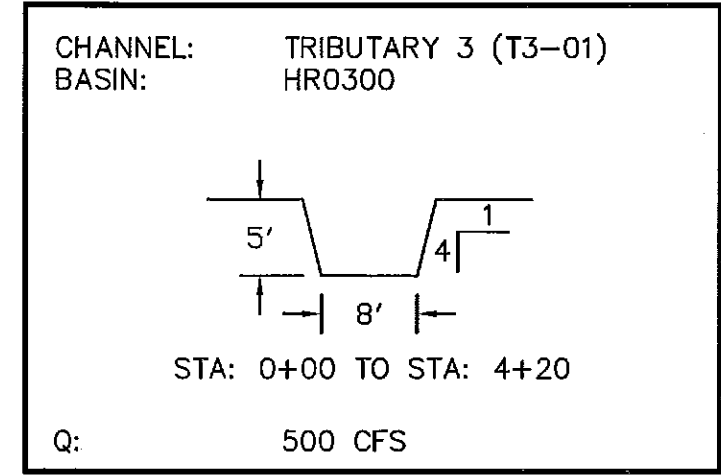
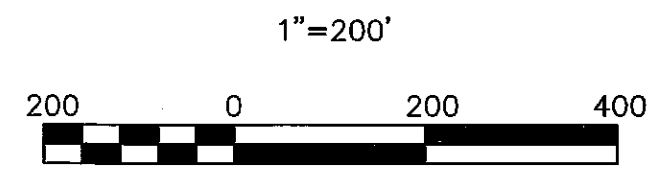
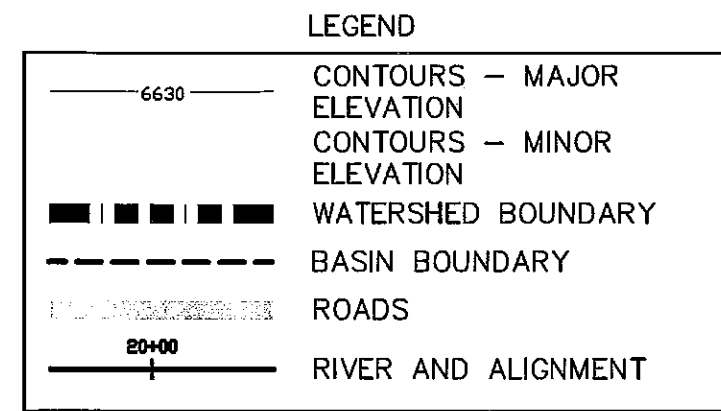
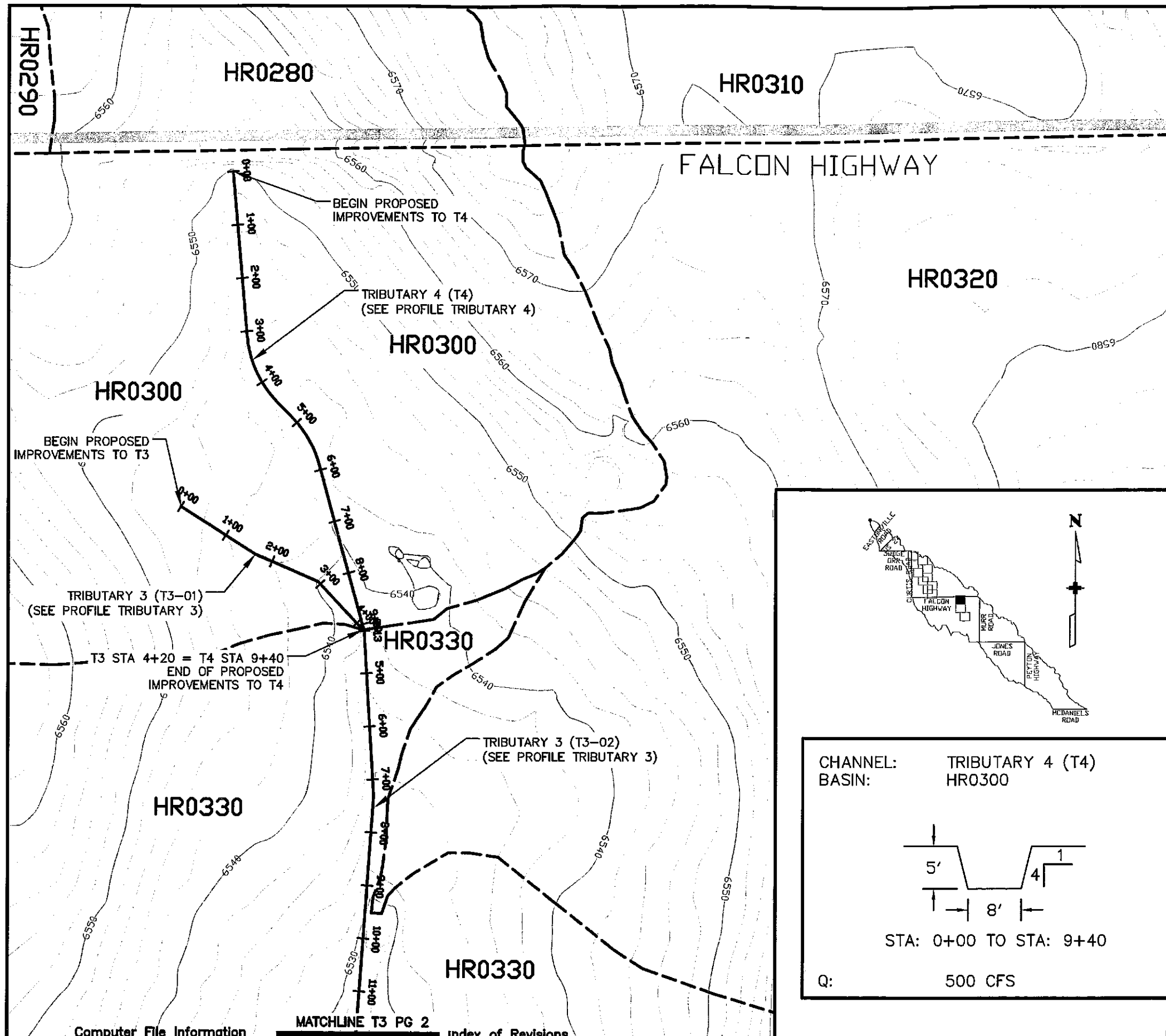


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 Checked by: JAJ

Structure Numbers

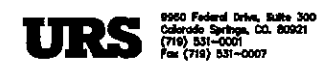
HAEGLER RANCH SUB-REGIONAL DETENTION
 ALTERNATIVE CONCEPTUAL CHANNELS
 Sheet Number MAIN STEM PG 6



Computer File Information MATCHLINE T3 PG 2 Index of Revisions

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| Acad. Ver. | 2006 |
| Scale: | 1"=200' |
| Units: | Feet |

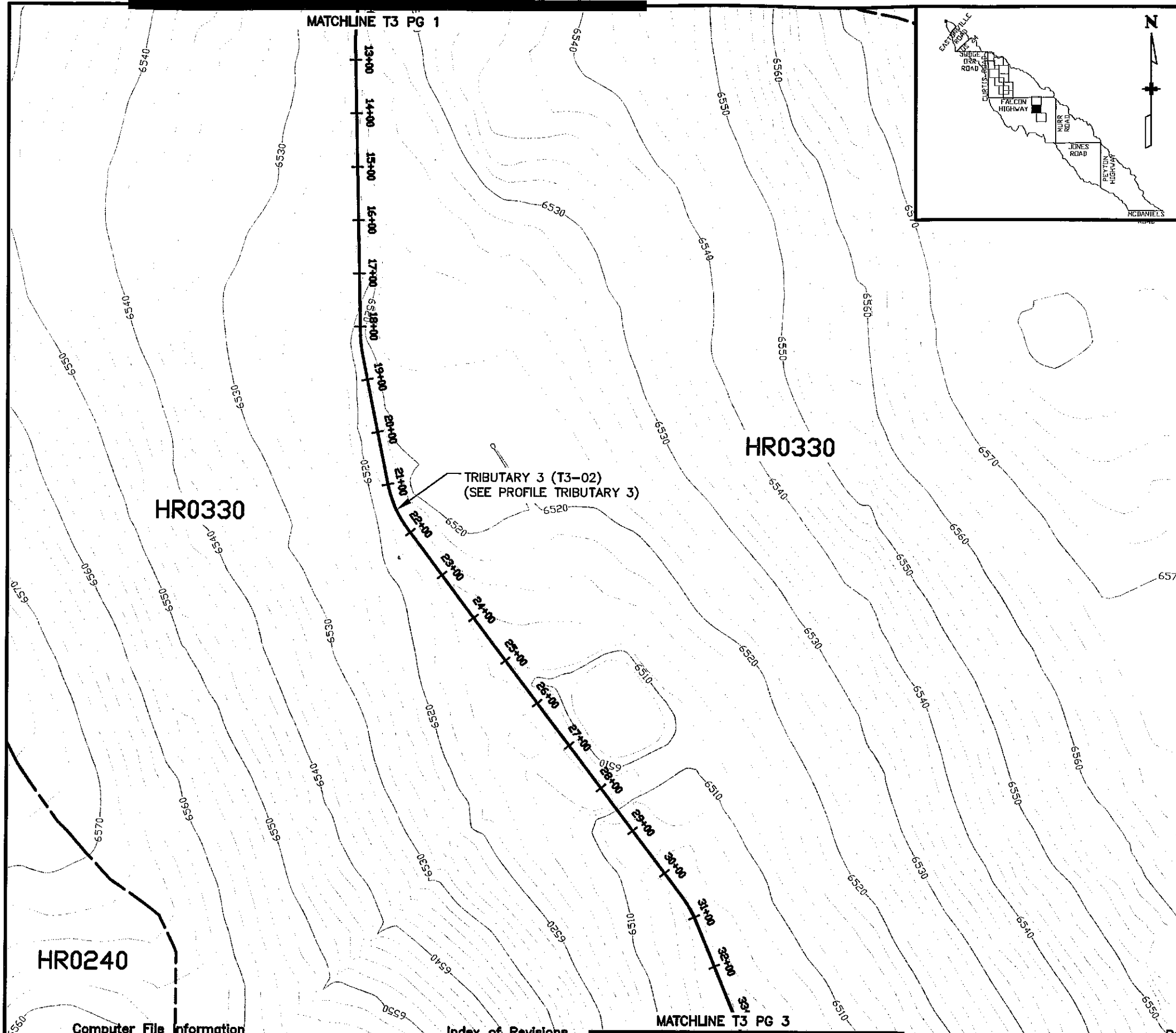
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Profiles

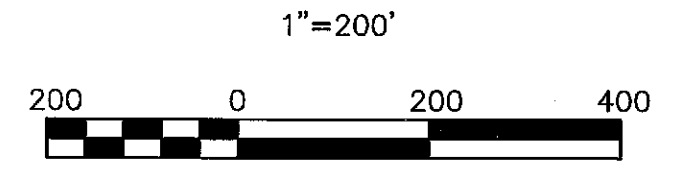
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| Designed by: | KAP |
| Detailed by: | DRM |
| Checked by: | JAJ |

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| Structure Numbers | |
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LEGEND

- CONTOURS - MAJOR ELEVATION
- CONTOURS - MINOR ELEVATION
- WATERSHED BOUNDARY
- BASIN BOUNDARY
- ROADS
- RIVER AND ALIGNMENT



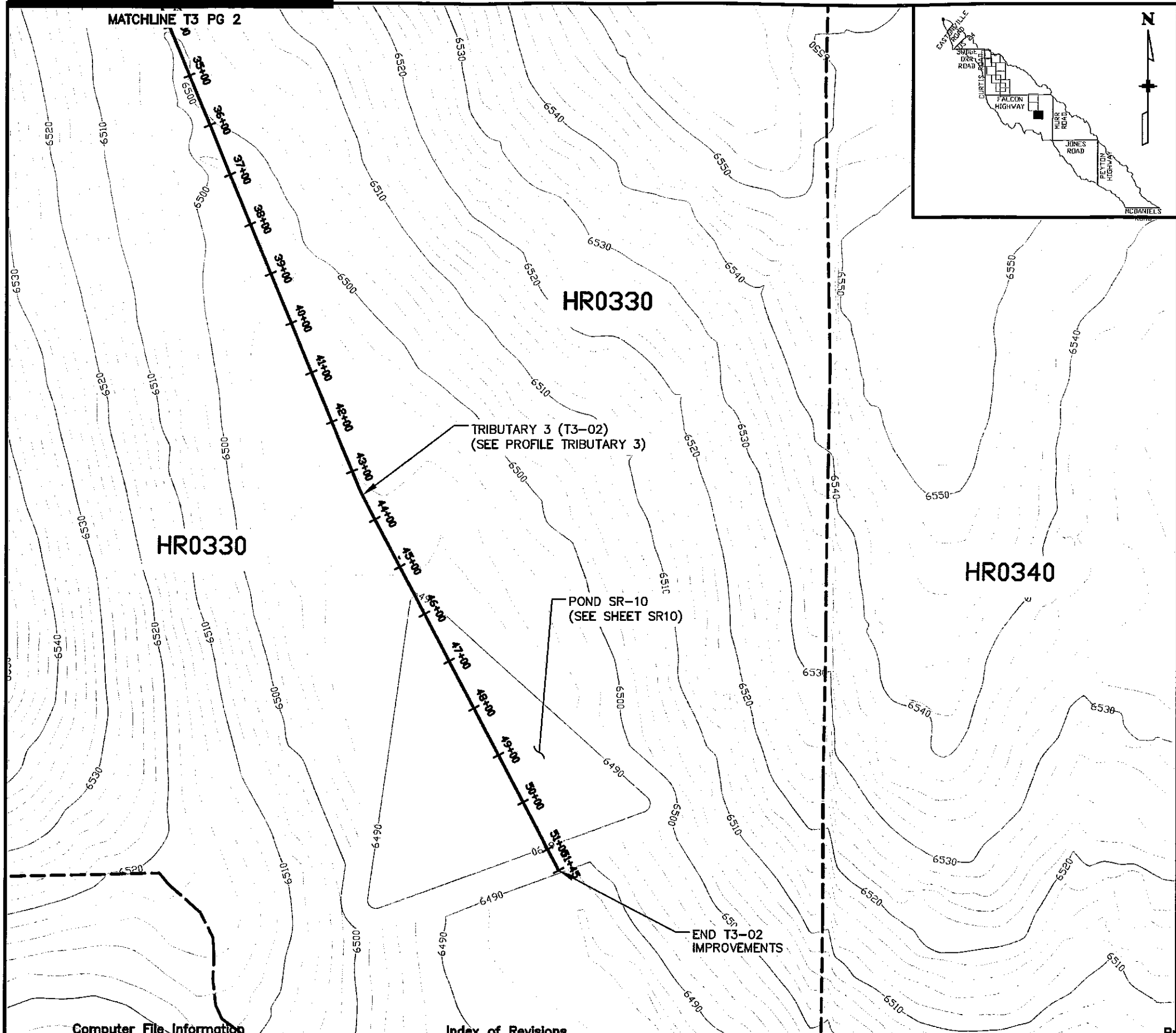
CHANNEL: TRIBUTARY 3 (T3-02)
 BASIN: HR0330

STA: 4+20 TO STA: 51+45

Q: 600 CFS

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| Computer File Information Full Path: P:\21711039\CAD\PLANSHTS | Index of Revisions <table border="1" style="width: 100%; height: 20px;"> <tr><td> </td><td> </td><td> </td><td> </td></tr> </table> | | | | | MATCHLINE T3 PG 3 9960 Federal Drive, Suite 300 Colorado Springs, CO 80921 (719) 531-0200 Fax: (719) 531-0007 | Profiles Designed by: KAP Detailed by: DRM Checked by: JAJ |
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MATCHLINE T3 PG 2



LEGEND

| | |
|--|----------------------------|
| | CONTOURS - MAJOR ELEVATION |
| | CONTOURS - MINOR ELEVATION |
| | WATERSHED BOUNDARY |
| | BASIN BOUNDARY |
| | ROADS |
| | RIVER AND ALIGNMENT |

1"=200'



CHANNEL: TRIBUTARY 3 (T3-2)
 BASIN: HR0330

STA: 4+20 TO STA: 51+45

Q: 600 CFS

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| Units: | Feet |

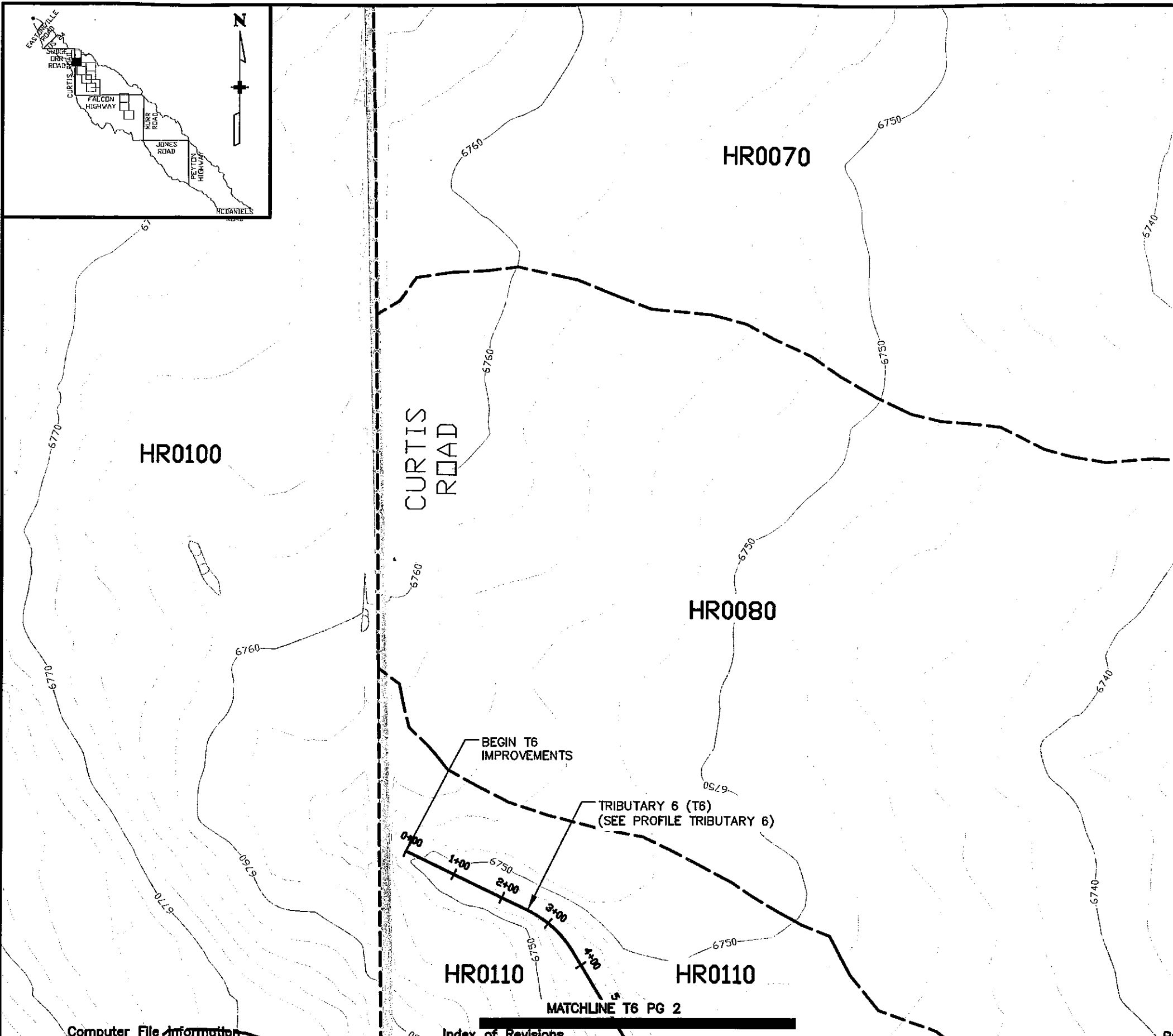
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 Colorado Springs, CO 80921
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| Checked by: | JAJ |

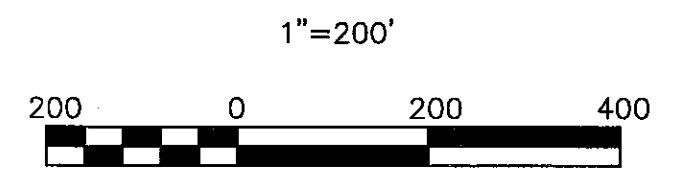
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| Structure Numbers | |
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HAEGLER RANCH SUB-REGIONAL DETENTION
 ALTERNATIVE CONCEPTUAL CHANNELS
 Sheet Number TRIBUTARY 3 PG 3



LEGEND

- 6630 — CONTOURS — MAJOR ELEVATION
- - - - CONTOURS — MINOR ELEVATION
- ▬▬▬▬▬▬ WATERSHED BOUNDARY
- - - - BASIN BOUNDARY
- ▬▬▬▬▬▬ ROADS
- 20+00 — RIVER AND ALIGNMENT



CHANNEL: TRIBUTARY 6 (T6)
 BASIN: HR0110

STA: 0+00 TO STA: 41+73

Q: 500 CFS

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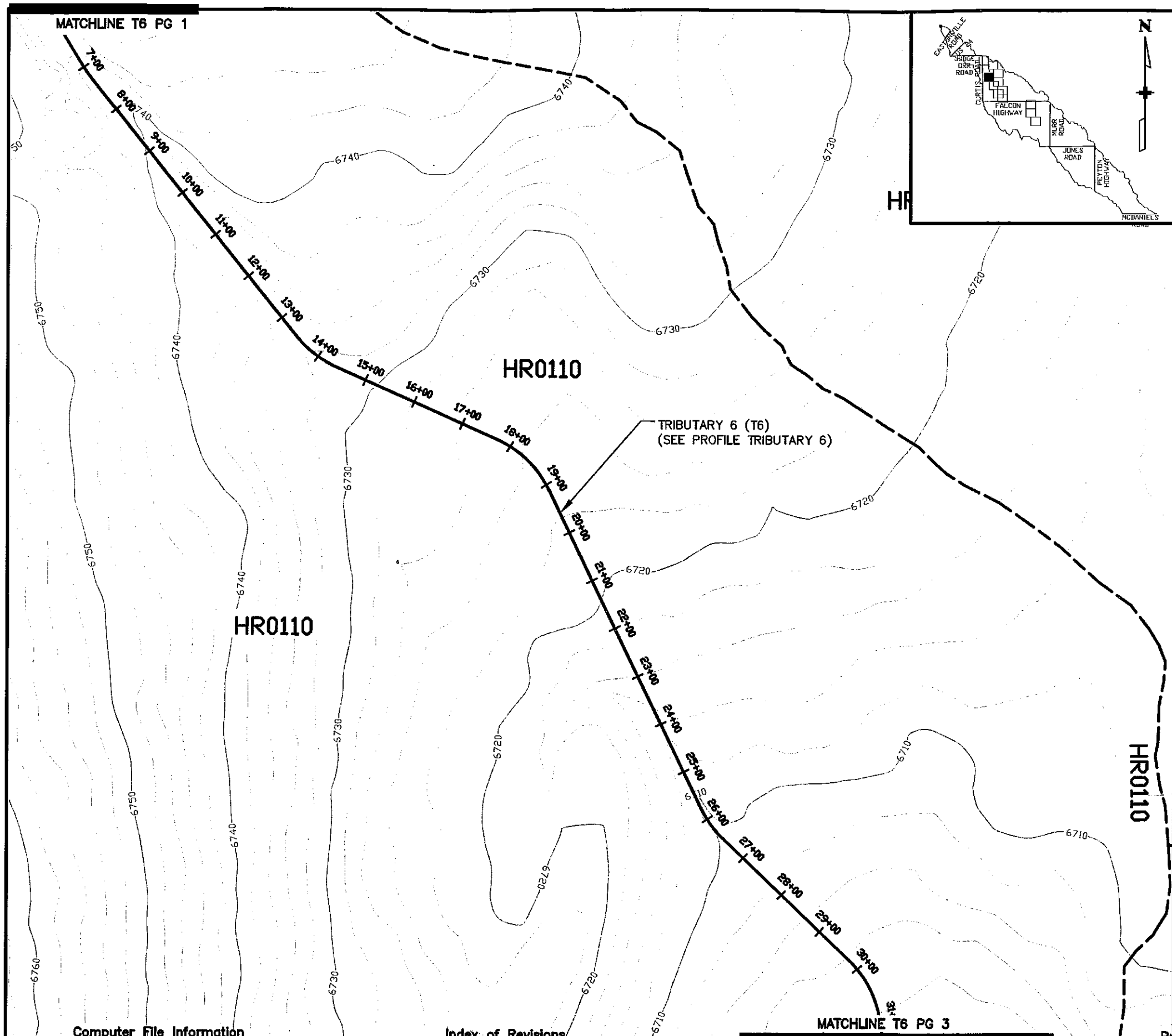
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| Checked by: | JAJ |

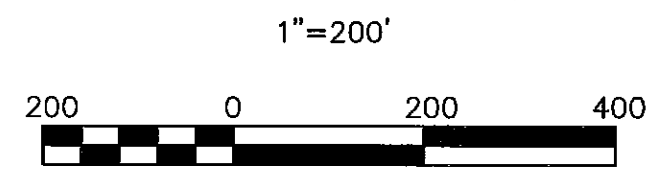
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| Structure Numbers | |
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HAEGLER RANCH SUB-REGIONAL DETENTION
 ALTERNATIVE CONCEPTUAL CHANNELS
 Sheet Number TRIBUTARY 6 PG 1



LEGEND

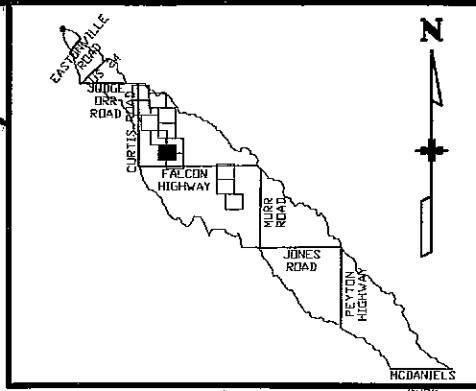
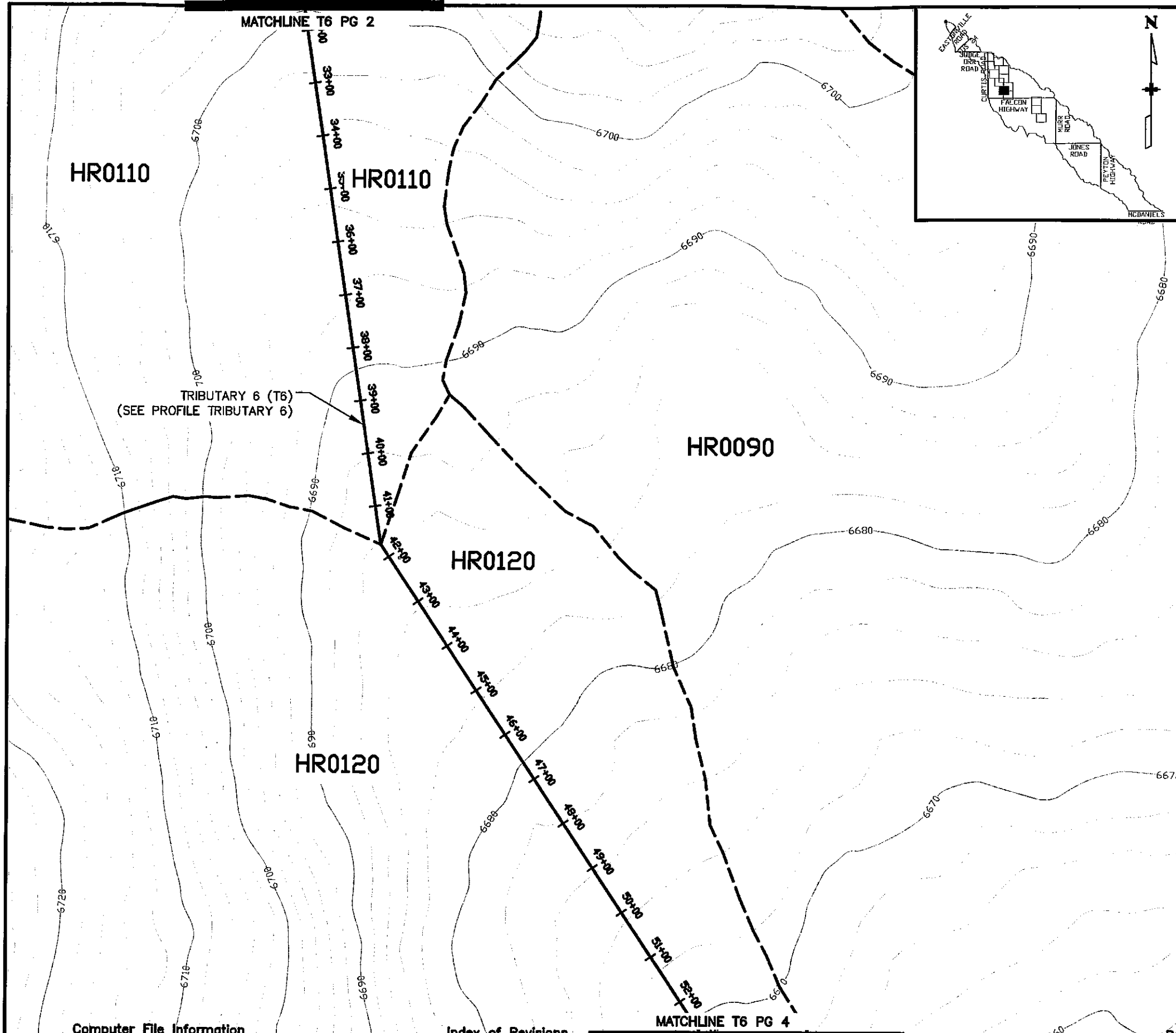
- 6630 — CONTOURS — MAJOR ELEVATION
- CONTOURS — MINOR ELEVATION
- ▬▬▬▬▬ WATERSHED BOUNDARY
- - - - - BASIN BOUNDARY
- ▬▬▬▬▬ ROADS
- 20+00 — RIVER AND ALIGNMENT



CHANNEL: TRIBUTARY 6 (T6)
 BASIN: HR0110

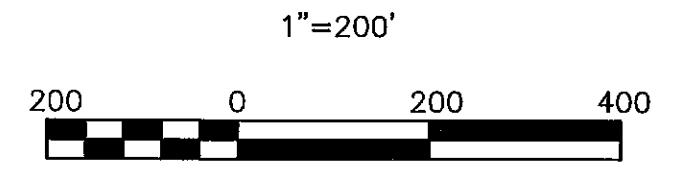
STA: 0+00 TO STA: 41+73

Q: 500 CFS



LEGEND

- 6630 — CONTOURS — MAJOR ELEVATION
- - - - - CONTOURS — MINOR ELEVATION
- ▬▬▬▬▬▬ WATERSHED BOUNDARY
- - - - - BASIN BOUNDARY
- ▬▬▬▬▬▬ ROADS
- 20+00 — RIVER AND ALIGNMENT



CHANNEL: TRIBUTARY 6 (T6)
 BASIN: HR0110

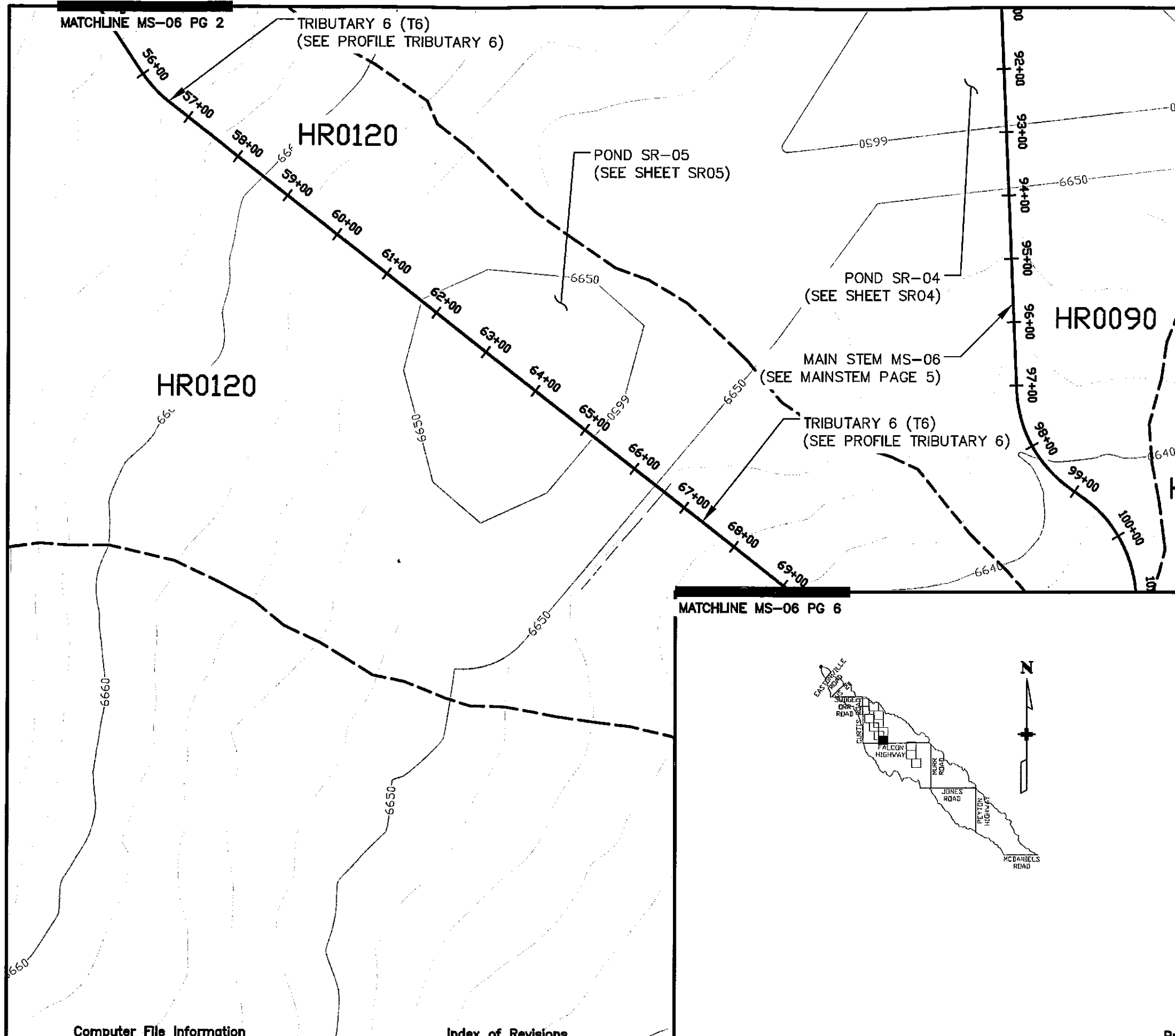
STA: 0+00 TO STA: 41+73

Q: 500 CFS

CHANNEL: TRIBUTARY 6 (T6)
 BASIN: HR0120

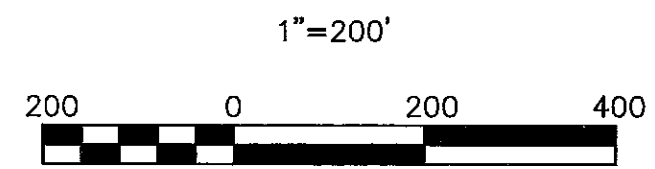
STA: 41+73 TO STA: 75+50

Q: 300 CFS



LEGEND

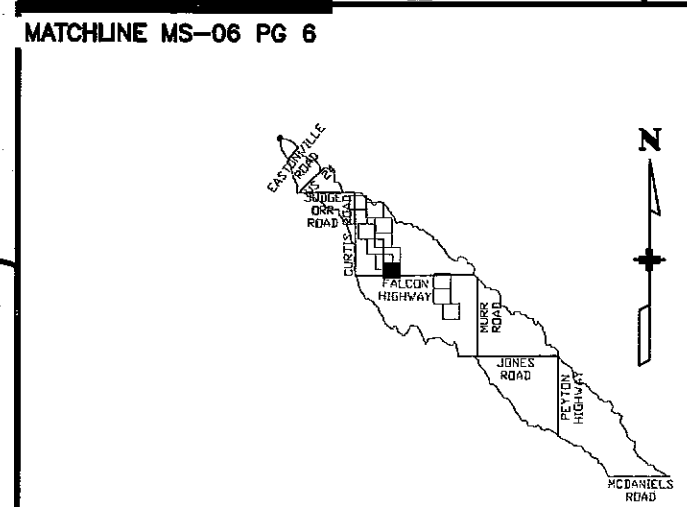
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- CONTOURS — MINOR ELEVATION
- ▬▬▬▬▬ WATERSHED BOUNDARY
- - - - - BASIN BOUNDARY
- ▬▬▬▬▬ ROADS
- 20+00 — RIVER AND ALIGNMENT



CHANNEL: TRIBUTARY 6 (T6)
 BASIN: HR0120

STA: 41+73 TO STA: 75+50

Q: 300 CFS



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| | Detailed by: DRM | | |
| | Checked by: JAJ | | |

MS-06 HR0070

SLOPE = 0.60%

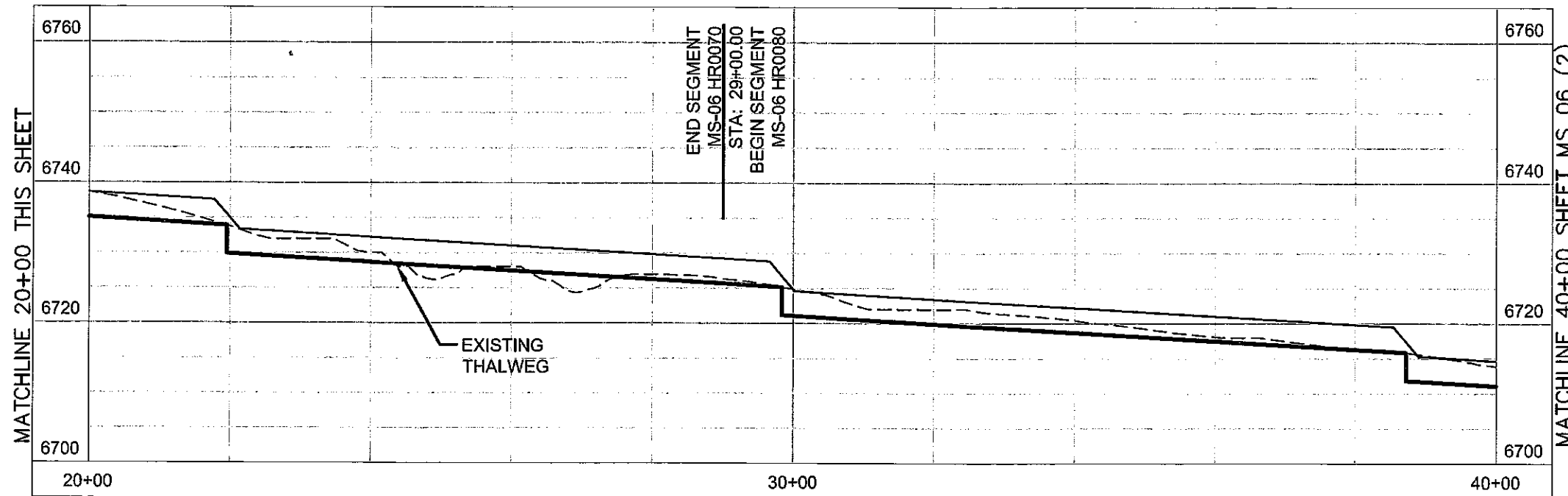
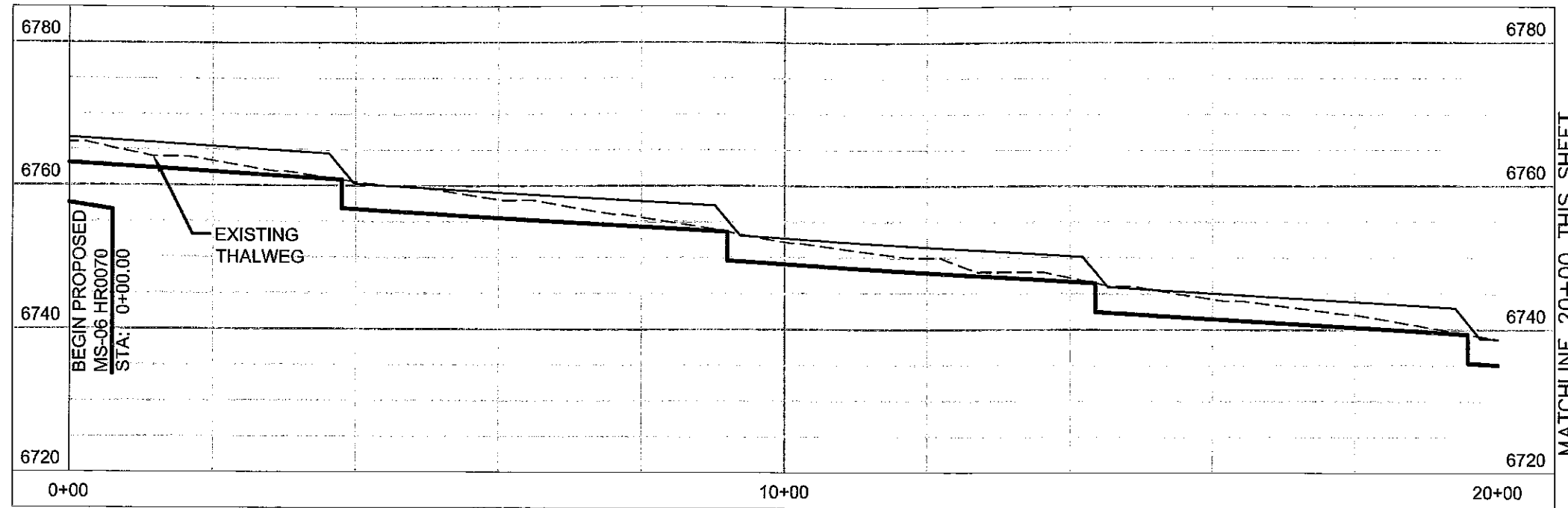
(7) 4' DROPS

MS-06 HR0080

SLOPE = 0.60%

(7) 4' DROPS

PROFILE MAIN STEM (MS-06 & MS-05)



LEGEND

- PROPOSED DROP STRUCTURE
- EXISTING THALWEG
- HYDRAULIC GRADE LINE

Computer File Information

Full Path: P:\21711039\CAD\PLANSHTS
 Drawing File Name: MAINSTEM_PROFILES_PROPOSED.DWG
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Designed by: KAP
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 Checked by:

Structure Numbers

HAEGLER RANCH SUB-REGIONAL DETENTION
 ALTERNATIVE CONCEPTUAL PROFILES

Sheet Number MS 06

MS-06 HR0080

SLOPE = 0.60%

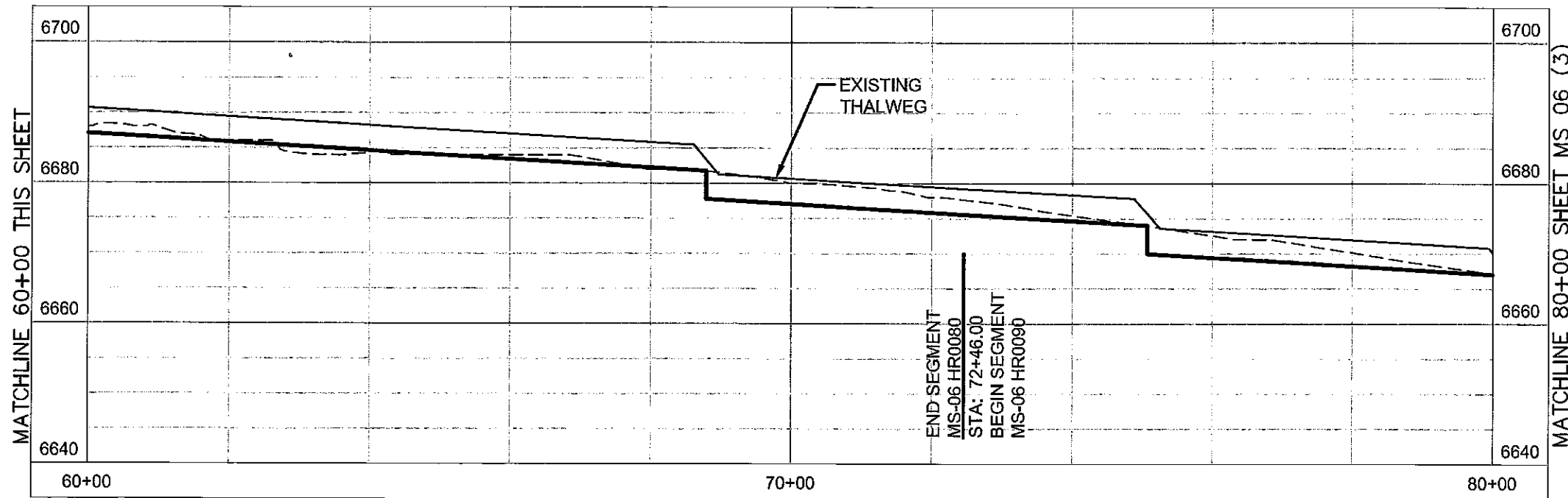
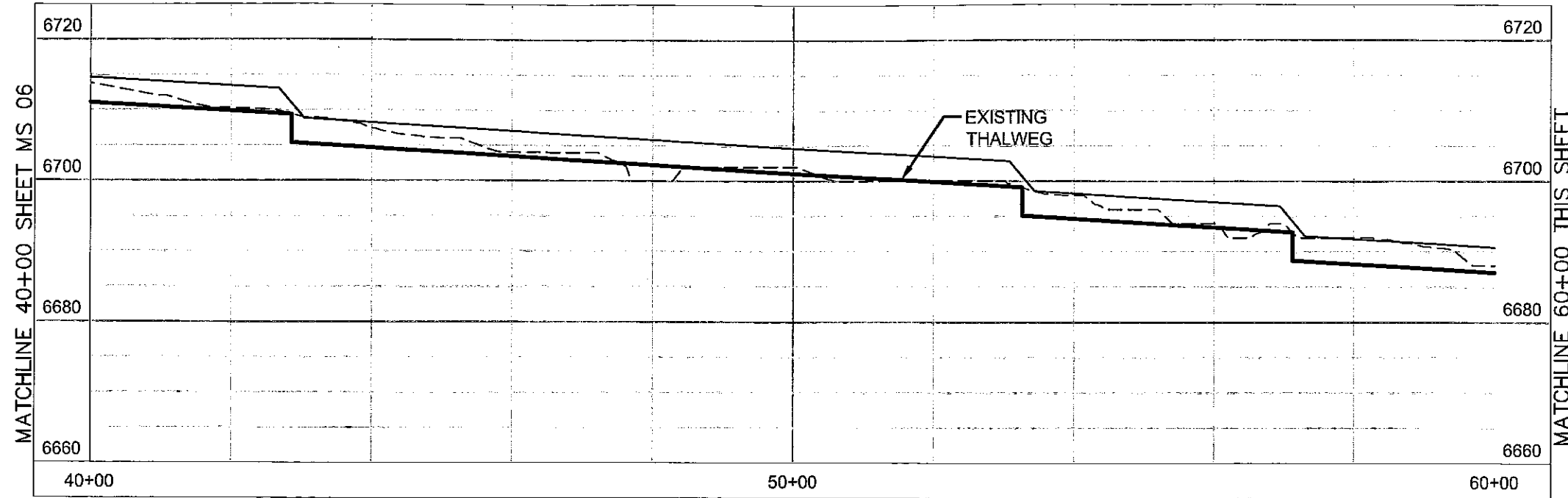
(7) 4' DROPS

MS-06 HR0090

SLOPE = 0.60%

(8) 4' DROPS

PROFILE MAIN STEM (MS-06 & MS-05)



LEGEND

| | |
|--|-------------------------|
| | PROPOSED DROP STRUCTURE |
| | EXISTING THALWEG |
| | HYDRAULIC GRADE LINE |

Computer File Information

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Structure Numbers

HAEGLER RANCH SUB-REGIONAL DETENTION
 ALTERNATIVE CONCEPTUAL PROFILES

Sheet Number MS06 (2)

MS-06 HR0090

SLOPE = 0.60%

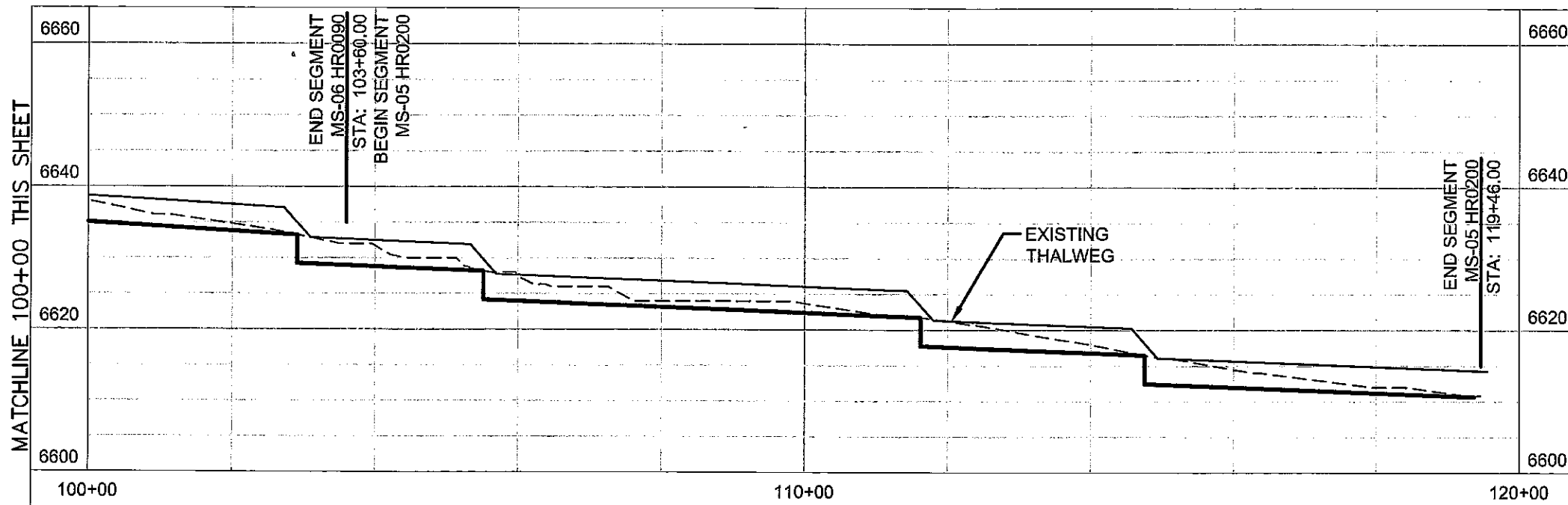
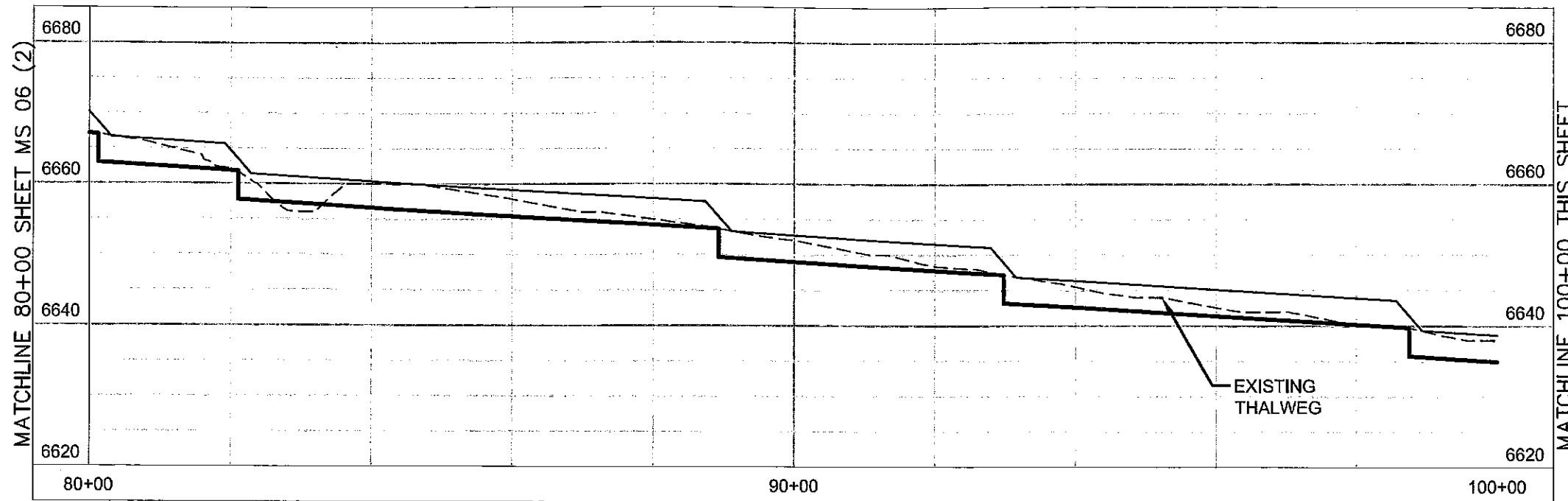
(8) 4' DROPS

MS-05 HR0200

SLOPE = 0.40%

(4) 4' DROPS

PROFILE MAIN STEM (MS-06 & MS-05)



LEGEND

| | |
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| | PROPOSED DROP STRUCTURE |
| | EXISTING THALWEG |
| | HYDRAULIC GRADE LINE |

Computer File Information

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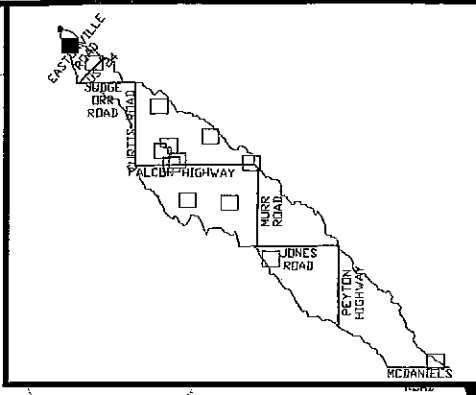
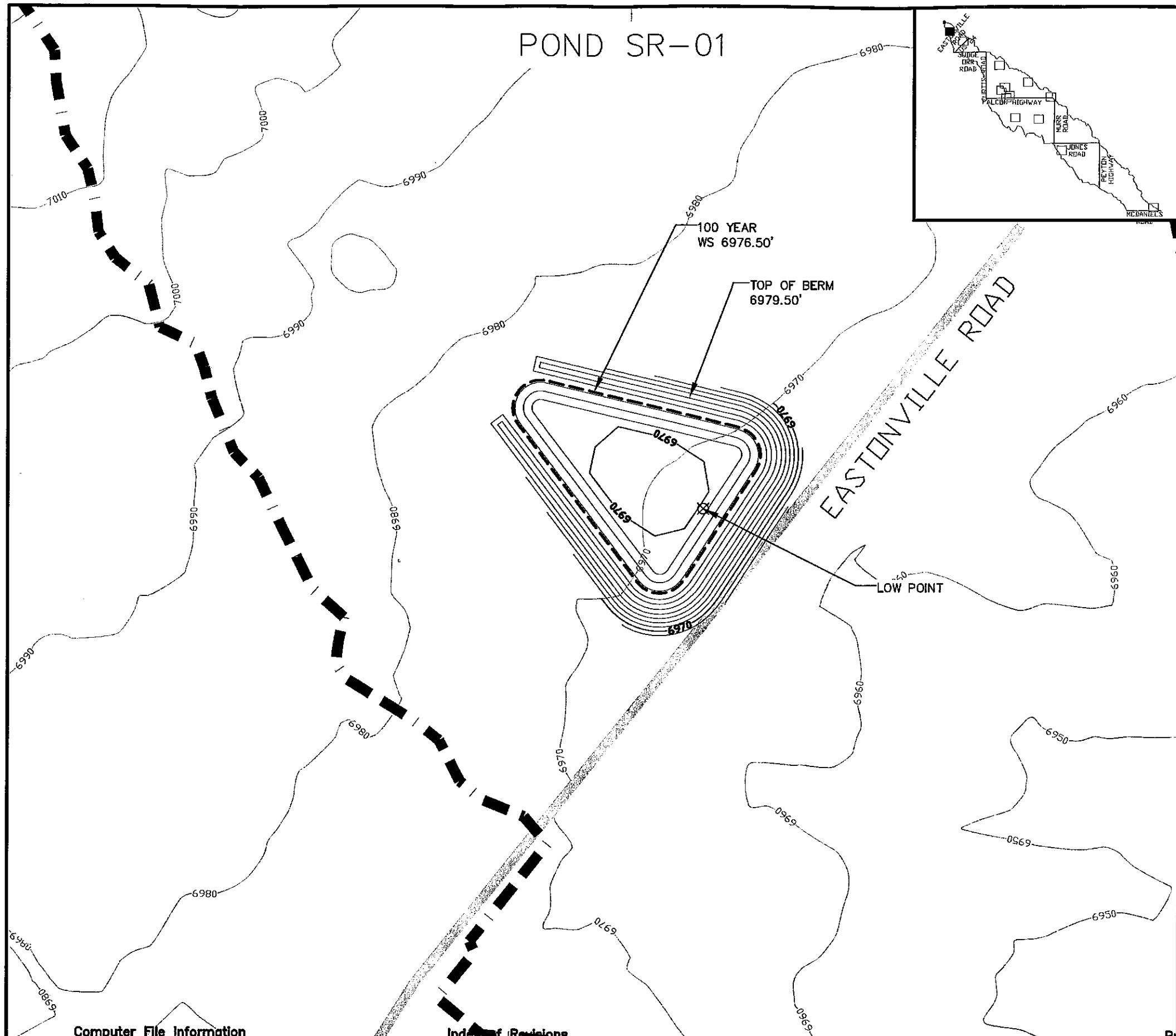
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Structure Numbers

HAEGLER RANCH SUB-REGIONAL DETENTION
 ALTERNATIVE CONCEPTUAL PROFILES
 Sheet Number MS06 & MS05 (3)



LEGEND

- PROPOSED CONTOURS - MAJOR ELEVATION
- PROPOSED CONTOURS - MINOR ELEVATION
- EXISTING CONTOURS - MAJOR ELEVATION
- EXISTING CONTOURS - MINOR ELEVATION
- WATERSHED BOUNDARY
- ROADS
- RIVER
- 100 YEAR WATER SURFACE ELEVATION
- OUTLET

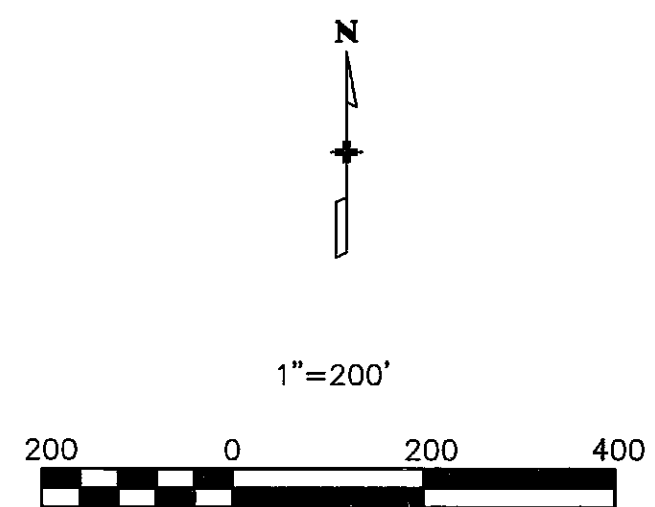
POND SR-01
DISCHARGE

| | |
|------|--------|
| Q100 | 90 CFS |
| Q2 | 8 CFS |

POND VOLUME AC FT 10

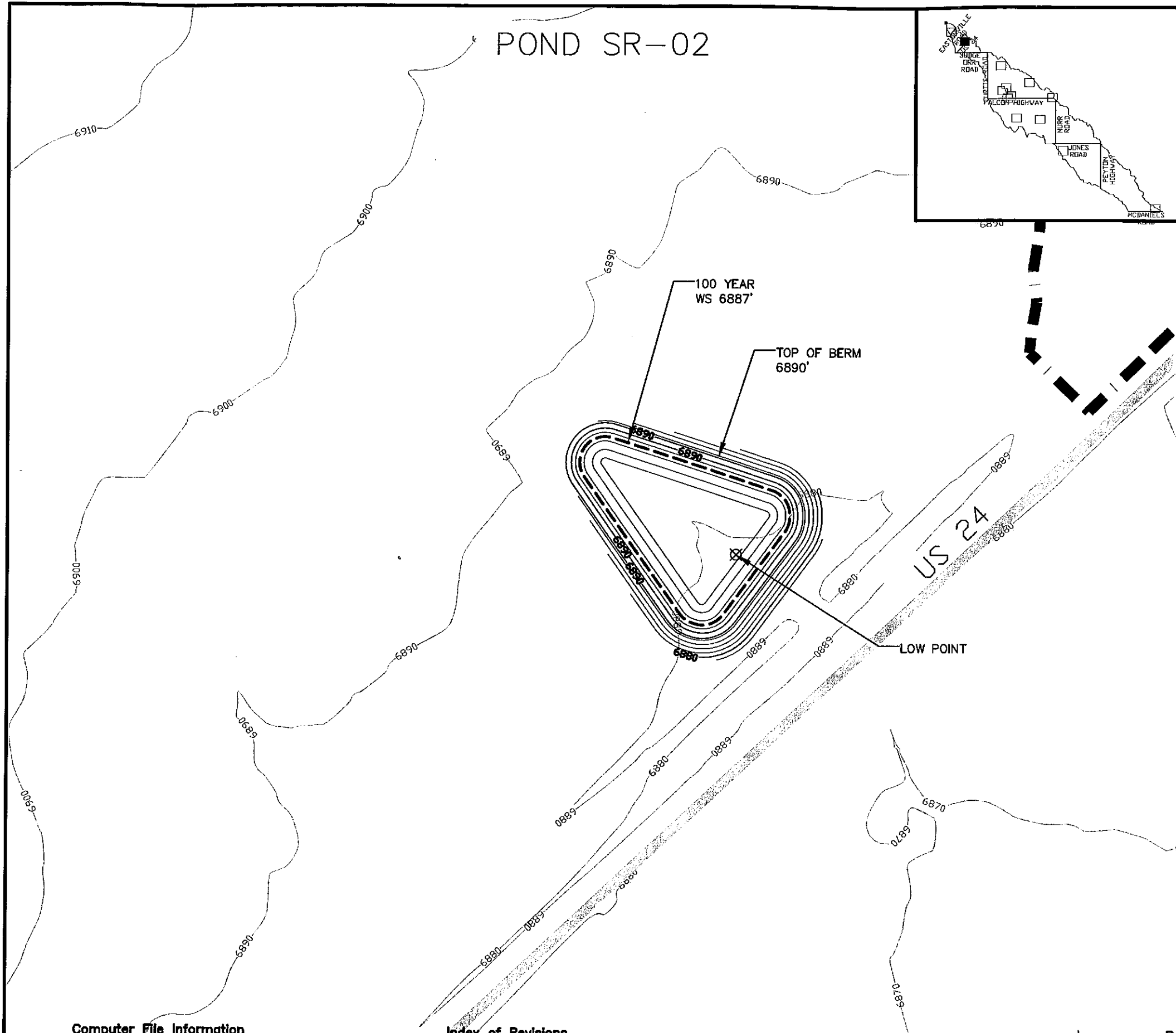
BERM WIDTH 10'

SIDESLOPE 8:1



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| Acad. Ver. 2006 | Scale: 1"=200' | Units: Feet | | | | | | |

POND SR-02



| LEGEND | |
|--------|-------------------------------------|
| | PROPOSED CONTOURS - MAJOR ELEVATION |
| | PROPOSED CONTOURS - MINOR ELEVATION |
| | EXISTING CONTOURS - MAJOR ELEVATION |
| | EXISTING CONTOURS - MINOR ELEVATION |
| | WATERSHED BOUNDARY |
| | ROADS |
| | RIVER |
| | 100 YEAR WATER SURFACE ELEVATION |
| | OUTLET |

POND SR-02
DISCHARGE

| | |
|------|---------|
| Q100 | 250 CFS |
| Q2 | 3 CFS |

POND VOLUME AC FT 5

BERM WIDTH 10'

SIDESLOPES 8:1



1"=200'



Computer File Information

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| Scale: | 1"=200' |
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Structure Numbers

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| HAEGLER RANCH DRAINAGE BASIN | |
| Sheet Number | SR02 |

Profiles

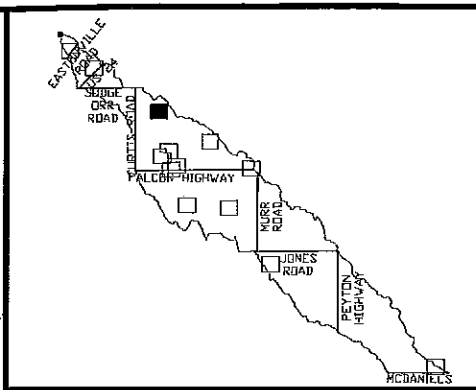
POND SR-03

MAIN STEM MS-06
(SEE MAINSTEM PG 2 & 3)
(SEE PROFILE MS-06)

TOP OF BERM
6724'

100 YEAR
WS 6721'

LOW POINT



LEGEND

- PROPOSED CONTOURS - MAJOR ELEVATION
- PROPOSED CONTOURS - MINOR ELEVATION
- EXISTING CONTOURS - MAJOR ELEVATION
- EXISTING CONTOURS - MINOR ELEVATION
- WATERSHED BOUNDARY
- ROADS
- RIVER
- 100 YEAR WATER SURFACE ELEVATION
- OUTLET

POND SR-03
DISCHARGE

| | |
|------|---------|
| Q100 | 530 CFS |
| Q2 | 29 CFS |

POND VOLUME AC FT 16

BERM WIDTH 10'

SIDESLOPES 8:1



1"=200'



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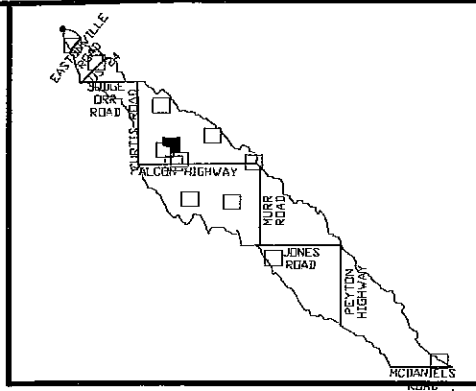
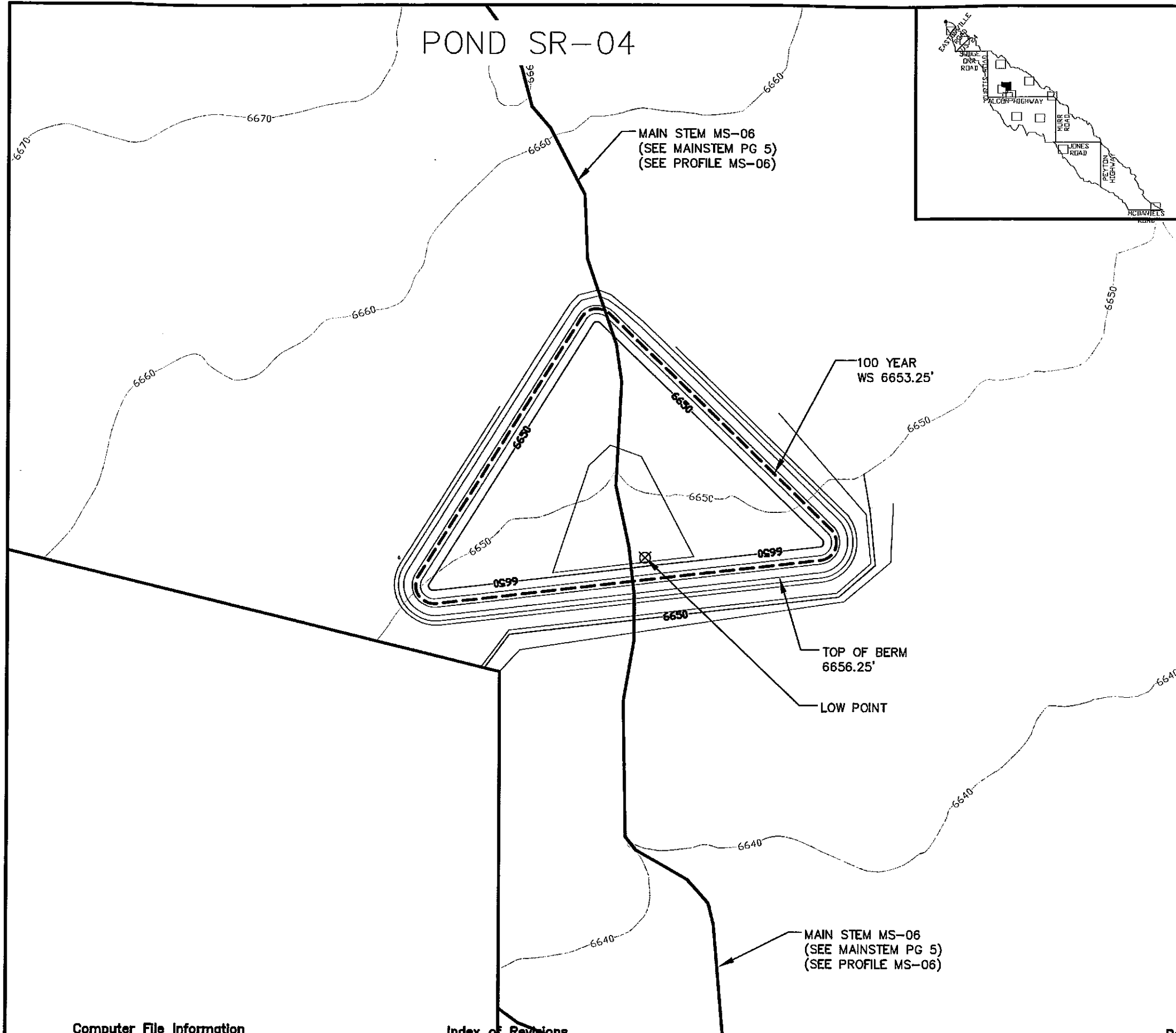
Designed by: KAP
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Structure Numbers

HAEGLER RANCH DRAINAGE BASIN
Sheet Number SR03

Profiles

POND SR-04



| LEGEND | |
|--------|-------------------------------------|
| | PROPOSED CONTOURS - MAJOR ELEVATION |
| | PROPOSED CONTOURS - MINOR ELEVATION |
| | EXISTING CONTOURS - MAJOR ELEVATION |
| | EXISTING CONTOURS - MINOR ELEVATION |
| | WATERSHED BOUNDARY |
| | ROADS |
| | RIVER |
| | 100 YEAR WATER SURFACE ELEVATION |
| | OUTLET |

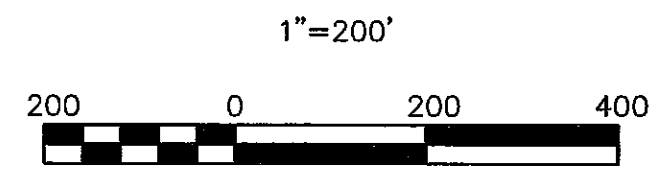
POND SR-04
DISCHARGE

| | |
|------|---------|
| Q100 | 740 CFS |
| Q2 | 33 CFS |

POND VOLUME AC FT 25

BERM WIDTH 10'

SIDESLOPES 8:1



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| Designed by: | KAP |
| Detailed by: | DRM |
| Checked by: | JAJ |

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| Structure Numbers | |
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|------------------------------|------|
| HAEGLER RANCH DRAINAGE BASIN | |
| Sheet Number | SR04 |

Profiles