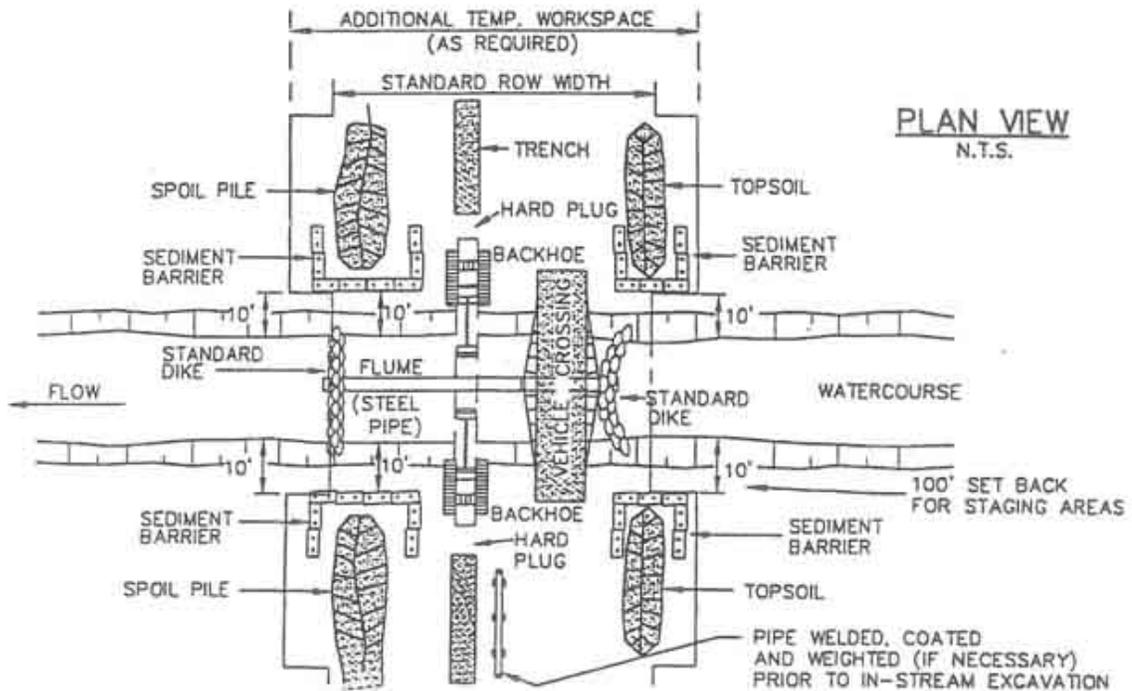


APPENDIX D:
OPEN CUT STREAM CROSSING METHODS

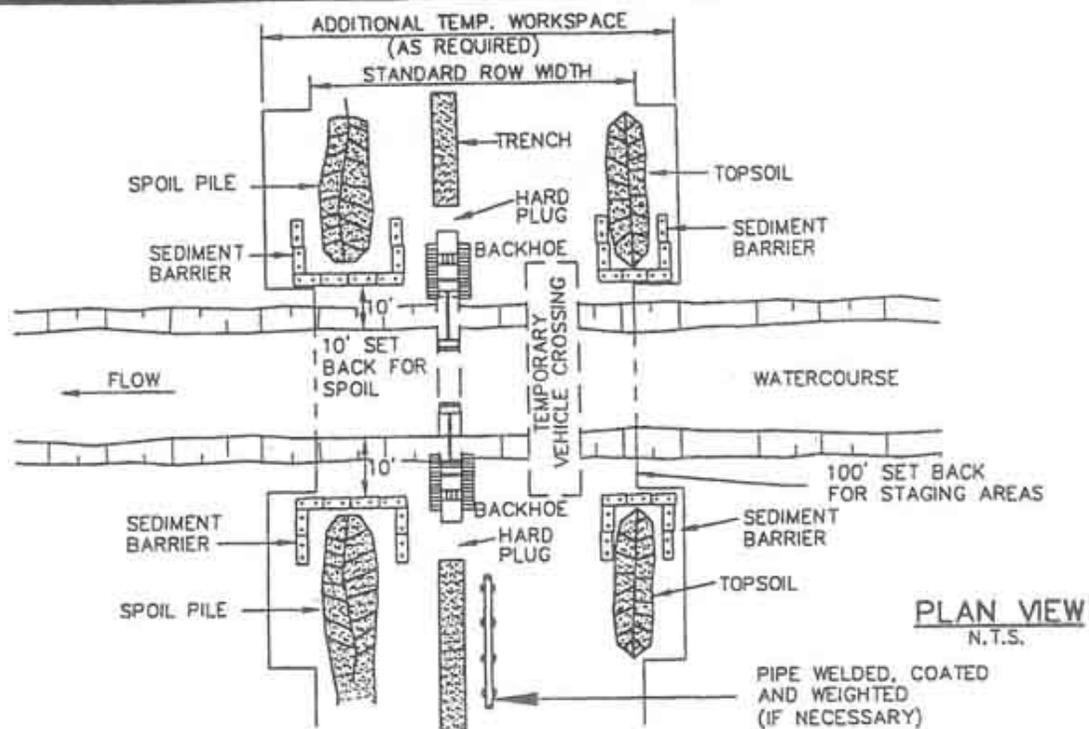


NOTES:

- THIS METHOD APPLIES TO WATERBODIES LESS THAN OR EQUAL TO 10 FEET WIDE AT THE WATERS EDGE THAT CONTAIN COLDWATER AND WARMWATER FISHERIES CONSIDERED SIGNIFICANT BY THE STATE.
2. SCHEDULE CROSSING DURING LOW FLOW PERIOD, IF POSSIBLE.
 3. COMPLETE ALL WATERCOURSE ACTIVITIES WITHIN 24 HOURS.
 4. NO REFUELING OF MOBILE EQUIPMENT WITHIN 100 FEET OF STREAM BANK. REFUEL STATIONARY EQUIPMENT AS PER STREAM CROSSING AND WETLAND PROTECTION PLAN.
 5. INSTALL TEMPORARY VEHICLE CROSSING, IF REQUIRED.
 6. IN-STREAM SPOIL TO BE STORED ON BANKS A MINIMUM OF 10 FEET FROM THE WATERS EDGE.
 7. LEAVE HARD PLUGS AT THE STREAM BANK EDGE, UNTIL JUST PRIOR TO PIPE INSTALLATION.
 8. SIZE FLUME TO HANDLE ANTICIPATED FLOWS. INSTALL FLUME IN WATERCOURSE AND MAINTAIN CORRECT ALIGNMENT UNTIL REMOVED.
 9. CONSTRUCT UPSTREAM DIKE FOLLOWED BY DOWNSTREAM DIKE. WHERE NECESSARY TO ENSURE A WATERTIGHT BARRIER, INSTALL A FLANGE ON UPSTREAM END OF FLUME AND SEAL TO SUBSTRATE WITH SANDBAGS AND POLYETHYLENE LINER. "KEY" DIKES INTO BANKS OR CONSTRUCT SECONDARY DIKE, IF NECESSARY.
 10. PUMP STREAM CHANNEL DRY BETWEEN DIKES, IF NECESSARY. DISCHARGE WATER INTO SEDIMENT BARRIERS TO PREVENT EROSION AND SEDIMENTATION. NO HEAVILY SILT-LADEN WATER MAY BE DISCHARGED IN THE STREAM.
 11. COMPLETE CONSTRUCTION OF IN-STREAM PIPE SECTION. WEIGHT PIPE AS NECESSARY PRIOR TO COMMENCEMENT OF IN-STREAM ACTIVITY.
 12. TRENCH THROUGH WATERCOURSE. INSTALL TEMPORARY (SOFT) PLUGS, IF NECESSARY, TO CONTROL WATER FLOW AND TRENCH SLOUGHING.
 13. MAINTAIN STREAM FLOW, IF PRESENT, THROUGHOUT CROSSING CONSTRUCTION.
 14. CONSTRUCT SEDIMENT BARRIER (STRAW BALES AND/OR SILT FENCE) TO PREVENT SILT LADEN WATER AND SPOIL FROM FLOWING BACK INTO WATERCOURSE. CONSTRUCTED SEDIMENT BARRIERS SHALL EXTEND ALONG THE SIDES OF THE STOCKPILES.
 15. LOWER-IN PIPE AND BACKFILL IMMEDIATELY.
 16. RESTORE WATERCOURSE CHANNEL TO APPROXIMATE PRE-CONSTRUCTION PROFILE AND SUBSTRATE.
 17. RESTORE STREAM BANKS TO APPROXIMATE ORIGINAL CONDITION AND STABILIZE, AS REQUIRED, (VEHICLE ACCESS CAN REMAIN IN PLACE.)
 18. RESTORE STREAM BANKS TO APPROXIMATE ORIGINAL CONDITION AND STABILIZE, AS REQUIRED, WITHIN 24 HOURS OF BACKFILLING (VEHICLE ACCESS CAN REMAIN IN PLACE.)
 19. REMOVE VEHICLE CROSSING AND RESTORE BANK DURING RESTORATION.

TYPICAL
OPEN CUT CROSSING -
FLUME METHOD (DRY)

Source: TransColorado Plan of Development

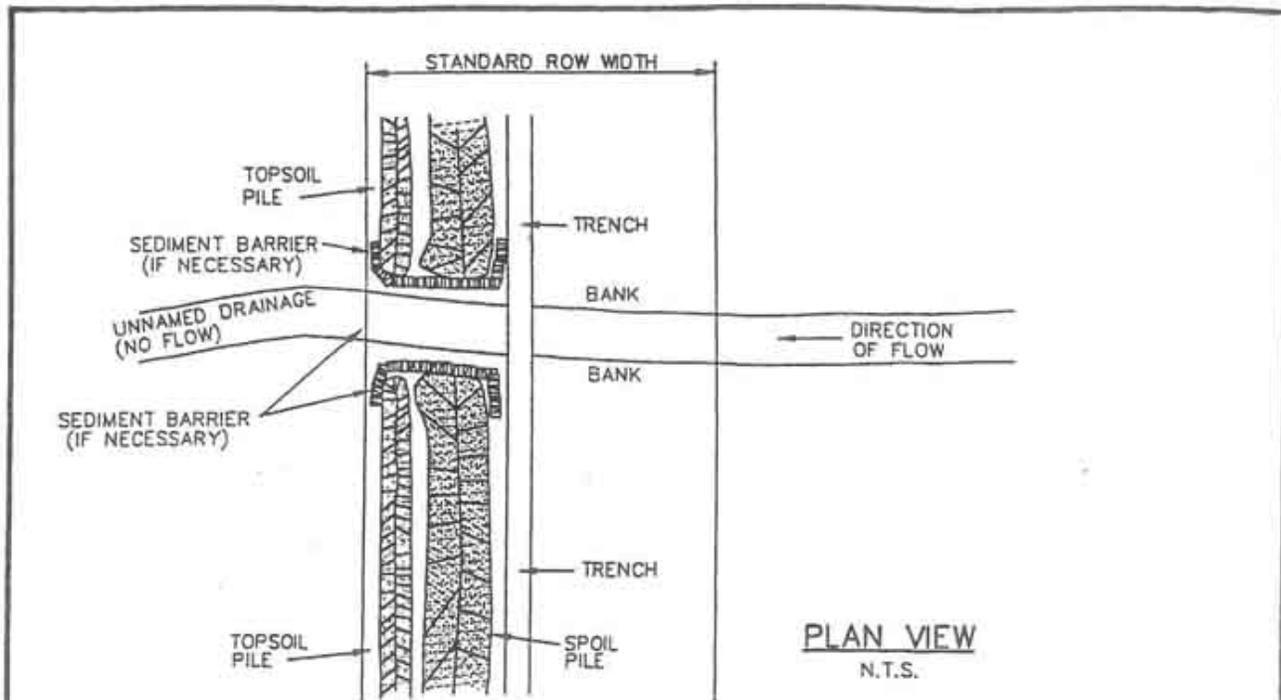


NOTES:

1. THIS METHOD APPLIES TO MINOR WATERBODY CROSSINGS (LESS THAN OR EQUAL TO 10 FEET WIDE AT THE WATER'S EDGE WITH NO SIGNIFICANT COLDWATER OR WARMWATER FISHERIES) AND INTERMEDIATE WATERBODIES (GREATER THAN 10 FEET WIDE BUT LESS THAN OR EQUAL TO 100 FEET WIDE AT THE WATER'S EDGE).
2. SCHEDULE CROSSING DURING LOW FLOW PERIOD, IF POSSIBLE.
3. FOR MINOR WATERBODY CROSSINGS COMPLETE CONSTRUCTION IN THE WATERBODY (NOT INCLUDING BLASTING) WITHIN 24 HOURS. FOR INTERMEDIATE WATERBODY CROSSINGS, ATTEMPT TO COMPLETE TRENCHING AND BACKFILL WORK WITH THE WATERBODY (NOT INCLUDING BLASTING) WITHIN 48 HOURS, UNLESS SITE-SPECIFIC CONDITIONS MAKE COMPLETION WITHIN 48 HOURS INFEASIBLE.
4. NO REFUELING OF MOBILE EQUIPMENT WITHIN 100 FEET OF STREAM BANK. REFUEL STATIONARY EQUIPMENT AS PER THE STREAM CROSSING AND WETLAND PROTECTION PLAN.
5. INSTALL TEMPORARY VEHICLE CROSSING, IF REQUIRED.
6. FOR STREAMS LESS THAN 100' WIDE, INSTREAM SPOILS ARE TO BE STORED OUT OF STREAM CHANNEL A MINIMUM OF 10 FEET FROM THE TOP OF THE BANK. FOR STREAMS AND RIVERS GREATER THAN 100' WIDE, INSTREAM SPOIL MAY BE STORED IN THE STREAM CHANNEL ON THE DOWNSTREAM SIDE OF TRENCH. STREAM SILTATION DURABILITY TO BE MONITORED AND ADDITIONAL MITIGATION MEASURES EMPLOYED AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR.
7. LEAVE HARD PLUGS AT THE STREAM BANK EDGE, UNTIL JUST PRIOR TO PIPE INSTALLATION.
8. COMPLETE CONSTRUCTION OF IN-STREAM PIPE SECTION, WEIGHT PIPE AS NECESSARY PRIOR TO COMMENCEMENT OF IN-STREAM ACTIVITY.
9. TRENCH THROUGH WATERCOURSE, INSTALL TEMPORARY (SOFT) PLUGS, IF NECESSARY TO CONTROL WATER FLOW AND TRENCH SLOUGHING.
10. MAINTAIN STREAM FLOW THROUGHOUT CROSSING CONSTRUCTION.
11. CONSTRUCT SEDIMENT BARRIER, (STRAW BALES AND/OR SILT FENCE) TO PREVENT SILT LADEN WATER AND SPOIL FROM FLOWING BACK INTO WATERCOURSE. CONSTRUCTED SEDIMENT BARRIERS SHALL EXTEND ALONG THE SIDES OF THE STOCKPILES.
12. LOWER-IN PIPE, INSTALL TRENCH PLUG AND BACKFILL IMMEDIATELY.
13. RESTORE WATERCOURSE CHANNEL TO APPROXIMATE PRE- CONSTRUCTION PROFILE AND SUBSTRATE.
14. RESTORE STREAM BANKS TO APPROXIMATE ORIGINAL CONDITION AND STABILIZE, AS REQUIRED.
15. INSTALL AND MAINTAIN TEMPORARY EROSION CONTROL STRUCTURES ACROSS THE RIGHT-OF-WAY AS REQUIRED DURING AND AFTER STREAM/RIVER CROSSING.

TYPICAL
OPEN CUT CROSSING –
FLOWING WATERBODY METHOD

Source: TransColorado Plan of Development



NOTES:

1. THIS METHOD APPLIES TO SWALES AND INCISED DRAINAGES WITH NO PERCEPTIBLE FLOW OR ADJACENT WETLANDS AT TIME OF CROSSING. CLEARING AND GRADING, TOPSOIL SALVAGE AND TOPSOIL STRIPPING DEPTHS SHALL BE THE SAME AS INDICATED FOR ADJACENT UPLAND UNLESS OTHERWISE DIRECTED BY THE COMPANY.
2. NO REFUELING OF MOBILE EQUIPMENT WITHIN 100' OF CHANNEL. PLACE SIGN POSTS 100' BACK FROM WETLAND BOUNDARY AND ADVISE NO REFUELING. REFUEL STATIONARY EQUIPMENT AS PER SPCC PLAN.
3. STOCKPILE TOPSOIL AND SPOIL SEPARATELY. TOPSOIL AND SPOIL SHALL NOT BE STOCKPILED ACROSS THE STREAM CHANNEL.
4. THE CONTRACTOR SHALL PRESERVE AS MUCH VEGETATION AS POSSIBLE ALONG STREAMBANKS WHILE ALLOWING FOR SAFE EQUIPMENT OPERATION.
5. CONTRACTOR SHALL HAVE SILT FENCE AND STRAW BALE SEDIMENT BARRIER MATERIALS READILY AVAILABLE FOR INSTALLATION BETWEEN SPOIL AND TOPSOIL STOCKPILES AND THE STREAM CHANNEL IN THE EVENT RAINFALL OR RUNOFF EVENTS MAY CAUSE SEDIMENTATION INTO THE CHANNEL. SEDIMENT BARRIERS SHALL BE INSTALLED AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR.
6. RESTORE WATERCOURSE CHANNEL TO APPROXIMATE PRE-CONSTRUCTION PROFILE AND SUBSTRATE.
7. RESTORE STREAM BANKS TO APPROXIMATE ORIGINAL CONDITION AND STABILIZE, AS REQUIRED. INSTALL PERMANENT EROSION CONTROLS, AS REQUIRED.

TYPICAL
OPEN CUT CROSSING --
NON FLOWING STREAM METHOD

Source: TransColorado Plan of Development

