

APPENDIX B

Alternatives Analysis

Alternative Name:	Alternative 3: Glenwood Springs River Recreation Enhancements
Potential Use Description:	The configuration of the channel would allow for one whitewater feature with large eddies and big waves. Terraced banks would lead to large eddies to provide put-in and boaters can access the feature or the calm learning pool. Both banks of the river are currently rip-rapped and could be made into terraced spectating areas. There is an adjacent parcel owned by the city which could be converted into a small riverside park. The Bridge sidewalk, South Bank Sidewalk, Proposed Pedestrian trail expansion and room to develop viewing decks makes this an excellent location to hold whitewater events. This site is highest priority to develop as an access location for the Glenwood river recreation enhancements. This highest priority is based on stakeholder agreement, central location, ideal river channel and attraction for general users.
Measures:	<ul style="list-style-type: none"> • Create one whitewater features upstream of the Midland Ave. Bridge that operates at three different flow levels. • Create a take-out eddy and bank access upstream of Midland Ave. Bridge. • Terrace existing riprap banks for viewing and access. • Install educational signage • Remove invasive vegetation • Revegetate with native riparian • Provide drift boat passage
Stakeholder Issues:	<ul style="list-style-type: none"> • The City of Glenwood Springs owns parcels immediately adjacent to project site. • Landowners in the vicinity have expressed support for the project(GWS WWP TF 2006). • Hot Springs Pool issued a letter of support for the project • A CLOMR is being applied for
Environmental Impacts:	The bridge, channelization, utility crossings, invasive vegetation and riprapped banks are existing disturbances to the channel. The Midland Ave Bridge structure and associated rip-rap was constructed with heavy equipment in the channel. The proposed construction disturbance would be similar to bridge construction conditions; however, additional channel work into the native bed would be required. Tamarisk would be removed an replaced with native riparian vegetation.

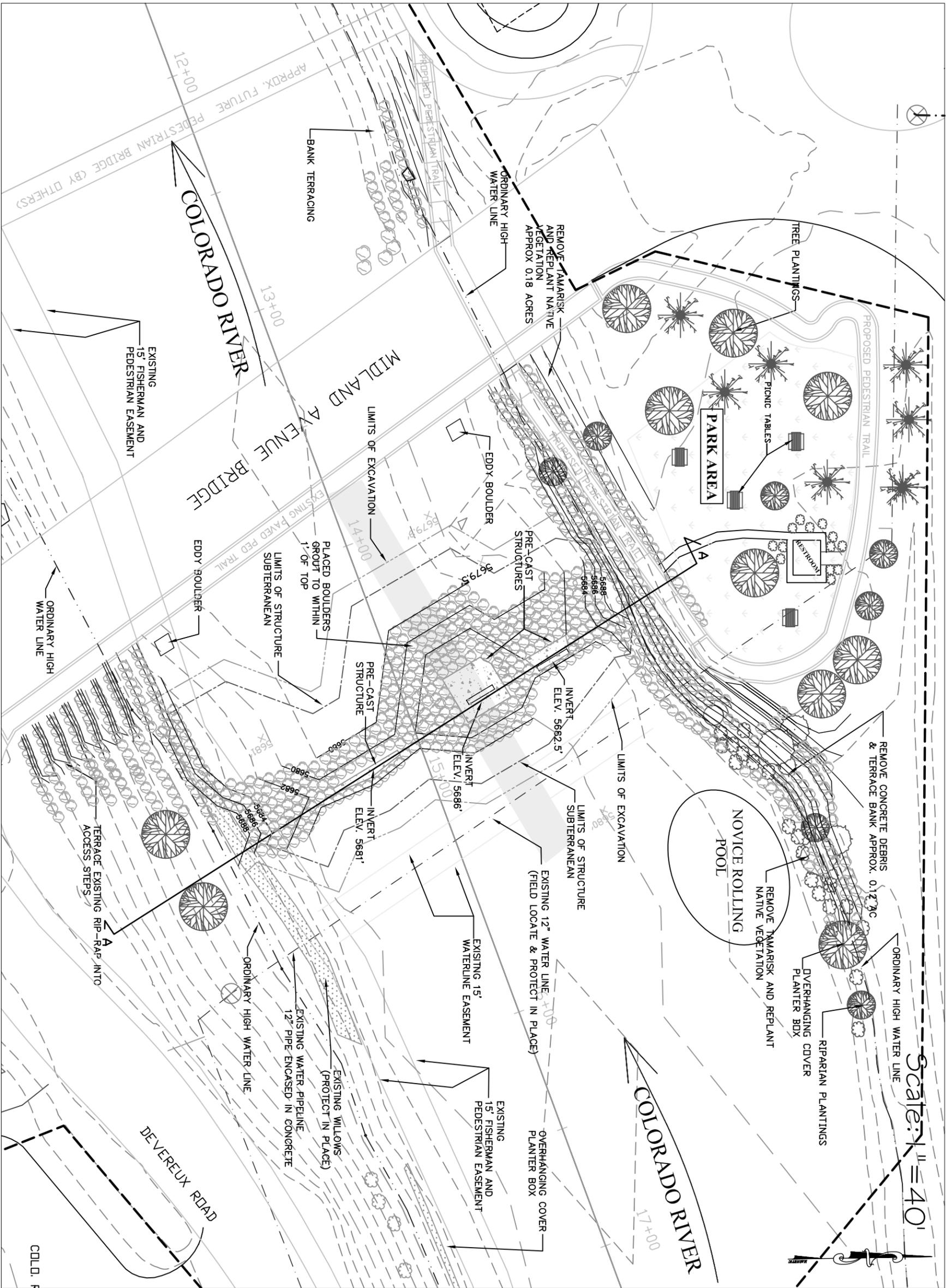
Social Impacts:	Social issues would improve by creating a central location where the City of Glenwood Springs can identify with the river. This project would mainly benefit water craft users. Bank fisher persons would also benefit from designated access at bank enhancements. General users would also benefit by being able to access and experience the riparian environment within City limits. Drift Boat fisherman and rafters would be accommodated by designed boat passage channels at all flows.
Economic Impacts:	Whitewater destinations have been recognized as economic boons at other Towns throughout Colorado and the City of Glenwood Springs has an ideal location for this type of venue. Furthermore, spectators could be greatly facilitated at this location and events could be staged here. Commercial whitewater rafting is very popular on the Colorado River contributing \$13.8M to the economy of Glenwood(CRO 2005).

Alternative Name:	Alternative 2: Whitewater Park Diversion
Potential Use Description:	An out of channel course would be installed in a newly created channel. This option would create an artificial river bed which could be shaped specifically for whitewater recreation. This option would cause construction disturbance associated with an inchannel grade control. This option could be highly utilized by whitewater recreationists because it would create an area exclusively for whitewater recreation.
Measures:	<ul style="list-style-type: none"> • Install grade control for diversion head • Construct head gate from the Colorado River • Construct entirely new channel on existing vacant lot • Construct pedestrian and spectator amenities and Install signage • Install return channel • Relocate municipal water line • Obtain water rights • Accommodate drift boat passage
Stakeholder Issues:	<ul style="list-style-type: none"> • The City of Glenwood Springs owns the immediately adjacent land. • Water Rights may be difficult to obtain and insufficient for out of channel flows. • A CLOMR may be required for the grade control structure • Stabilization of I-70 should be reviewed

Environmental Impacts:	This option has temporary impacts associated with construction activities to the existing channel of the Colorado River. The impacts to the existing channel would be construction of a grade control structure, head gate and a return channel. Long-term impacts to the channel could be significant with large diversion and potential drying of the channel for 700ft. Other impacts would be similar to Alternatives 2 & 3 because a river wide grade control structure would be required to develop adequate head for the lower gradient of the off channel course.
Social Impacts:	Social issues would improve by creating a central location where the City of Glenwood Springs can identify with whitewater, however not necessarily the river. Bank fisher persons would be unaffected by the project. The season of use may be extremely limited due to availability of water. River Stewardship would not improve because of the location of the project out of channel. Drift boat passage would be required over the grade control structure.
Economic Impacts:	Whitewater destinations have been recognized as economic boons at other Towns throughout Colorado and Glenwood has a potential location for this type of venue. Furthermore, spectators could be greatly facilitated at this location and large events could be staged here.

Alternative Name:	Alternative 1, Whitewater Park at Two Rivers Park
Potential Use Description:	The Two Rivers Park location was chosen as the ideal location for river enhancements by the Whitewater Park Task Force and the City of Glenwood Springs in 2003. This alternative progressed until the Hot Springs Pool had concerns about the aquifer which they depend upon which could not be addressed.
Measures:	<ul style="list-style-type: none"> • Create four whitewater features. • Improve boat ramp. • Enhance bank area with terracing. • Install additional educational signage.
Stakeholder Issues:	<ul style="list-style-type: none"> • The City of Glenwood Springs owns the adjacent land. • The Hot Springs Pool is dependent upon an underground aquifer for their hot water supply. • A CLOMR may be required

Environmental Impacts:	The channel bed would be disturbed with in stream construction associated with a whitewater feature. The channel has seen similar disturbances associated with the construction of the existing boat ramp and Highway 82 Bridge. This alternative may also impact the Gold Medal waters of the Roaring Fork River at the confluence.
Social Impacts:	Social issues would improve by creating a central whitewater location where the citizens of Glenwood Springs already recreate. This project would mainly benefit kayakers and rafters. General users would also benefit by having passive enjoyment of the river and the excitement of watching whitewater enthusiasts. Drift Boat fisherman and rafters would be accommodated by maintaining boat passage channels at all flows.
Economic Impacts:	Whitewater destinations have been recognized as economic boons at other Towns throughout Colorado. Commercial whitewater rafting is very popular in the area. The stretch of river immediately upstream in Glenwood Canyon contributes \$13.8M to the economy of Glenwood Springs(CRO 2005). These recreation enhancements would be beneficial to that industry. The Hot Springs Pool had concerns about the aquifer. These concerns were not adequately addressed by the city during the planning stages of the whitewater enhancements in 2003. The Hot Springs Pool is a major economic generator for the city and this alternative may have a negative impact.



Scale: 1" = 40'

General Notes

Glenwood Springs River Recreation Enhancement Channel Plan View

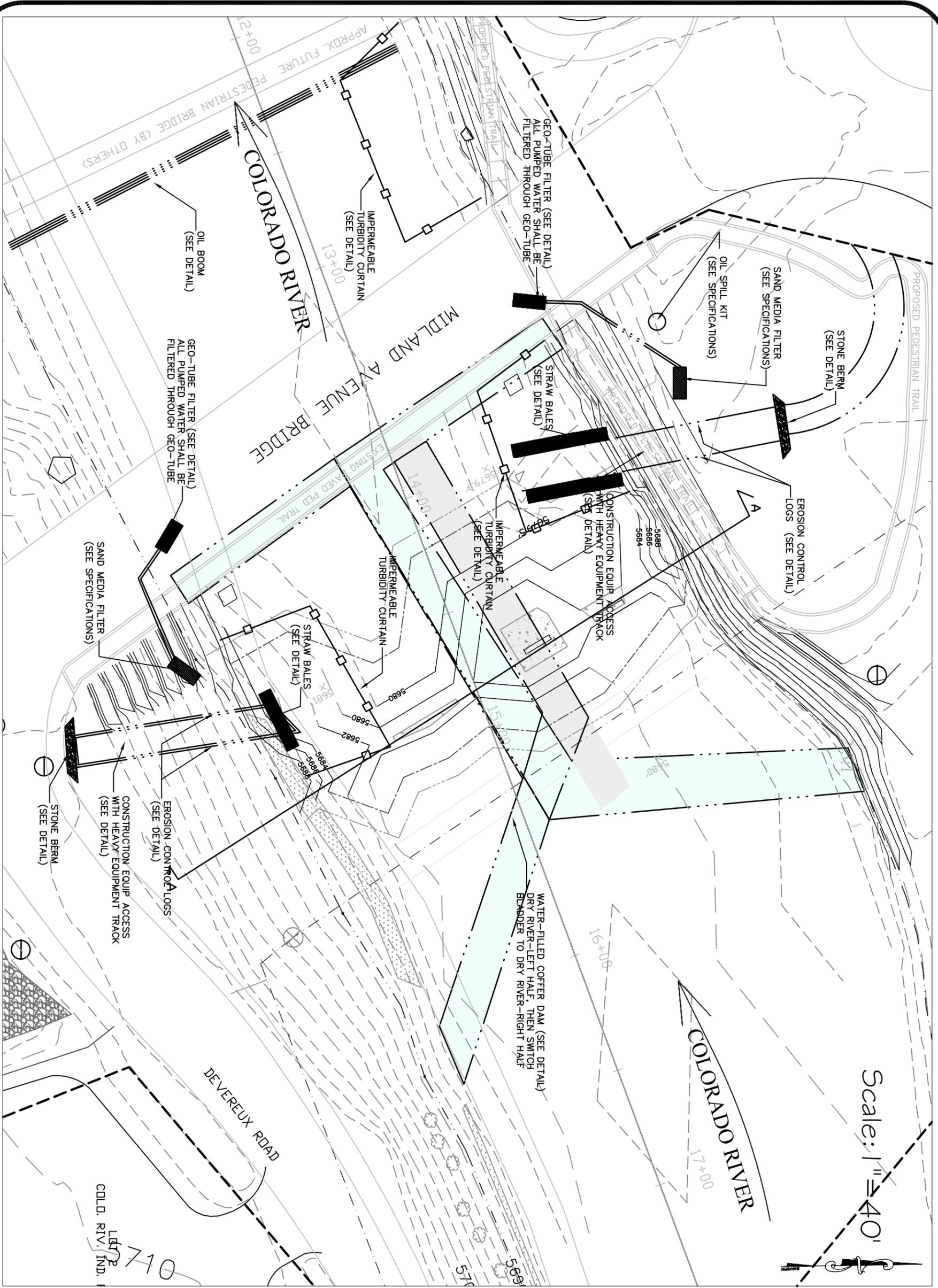


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Project Name and Address
 Glenwood Springs River
 Recreation Enhancements

Project	Sheet
Date	PLATE C-1
Scale	

No.	Revision/Issue	Date



Scale: 1" = 40'



General Notes

Glenwood Springs River Recreation Enhancements

Care of Water Plan View

SCALE 1" = 40'



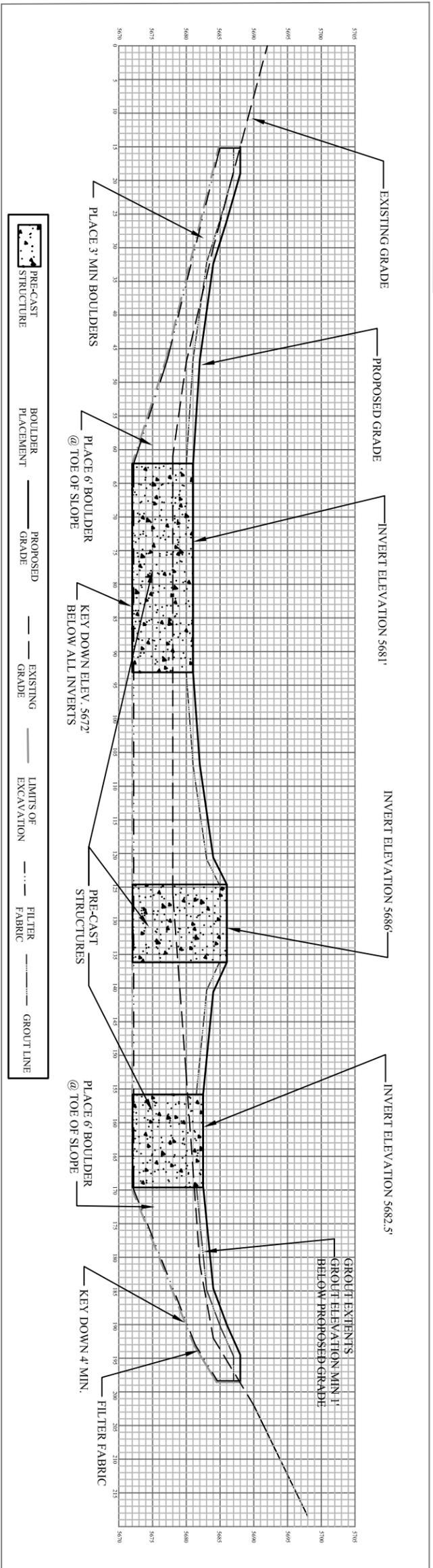
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Project	Sheet
Date	PLATE C-2
Scale	

No.	Revision/Issue	Date

SECTION A-A
Station 14+80
Cross-Section



Glenwood Springs
 River Recreation Enhancements
 Cross Section A-A

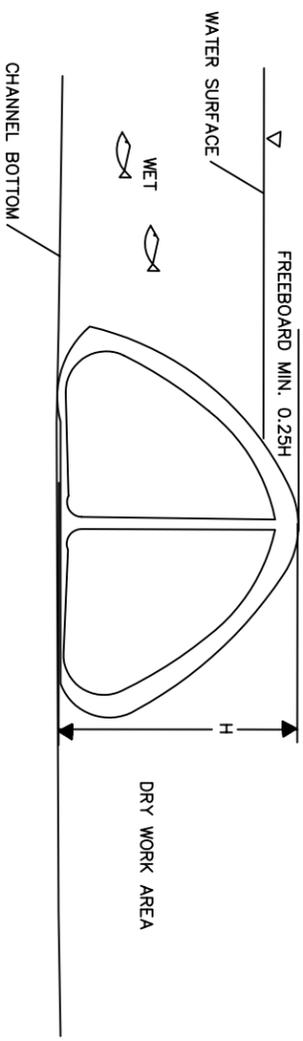


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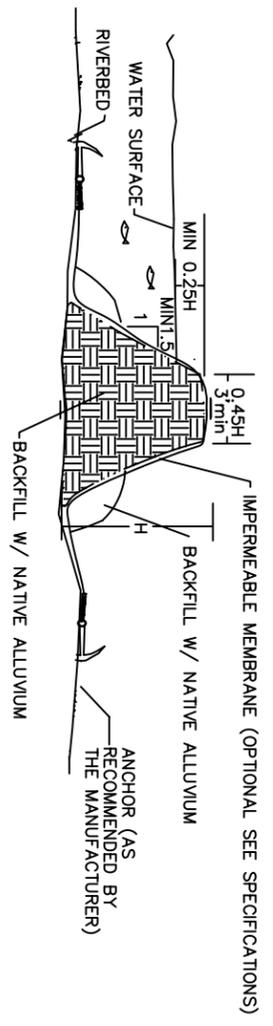
Project Name and Address
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 Recreation Enhancements

Project	Sheet
Date	PLATE C-3
Scale	

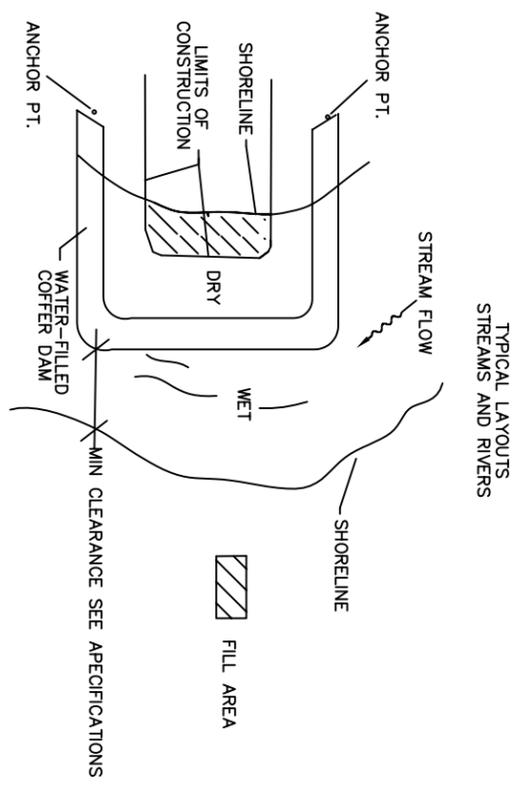
No.	Revision/Issue	Date



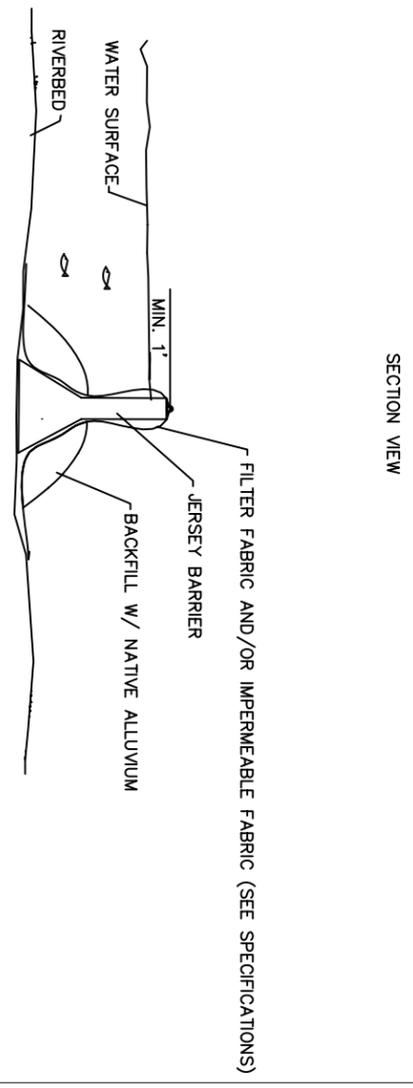
WATER-FILLED COFFER DAM (TYPICAL)
SECTION VIEW - NTS



ALLUVIAL COFFER WITH IMPERMEABLE MEMBRANE (TYPICAL)
SECTION VIEW
NTS



TYPICAL LAYOUTS
STREAMS AND RIVERS
WATER-FILLED COFFER DAM (TYPICAL)
PLAN VIEW - NTS



TEMP. JERSEY BARRIER COFFER (TYPICAL)
SECTION VIEW
NTS

Glenwood Springs
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Details 1 - Diversion
NO SCALE



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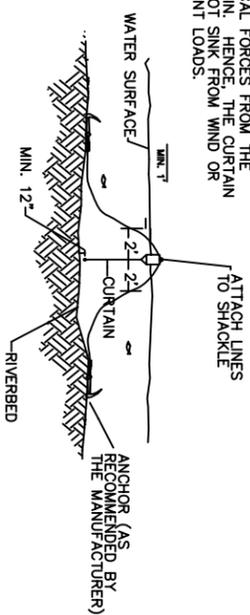
Project Name and Address
Glenwood Springs River
Recreation Enhancements

Project	Sheet
Date	PLATE C-4
Scale	

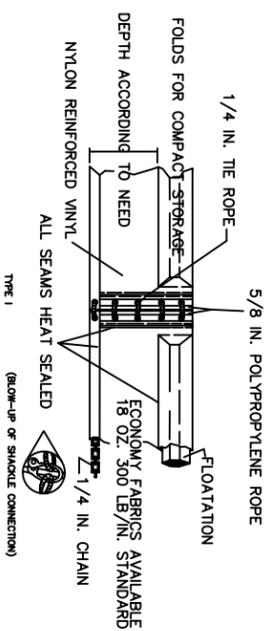
No.	Revision/Issue	Date

ORIENTATION WHEN INSTALLED

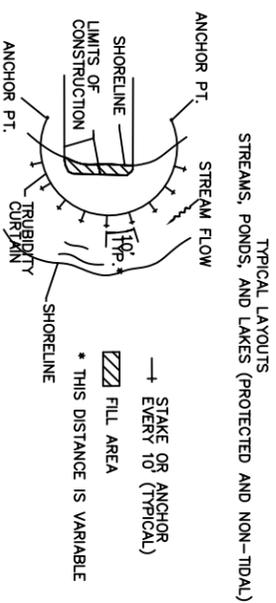
NOTE: ANCHORING WITH BUOYS, AS SHOWN, REMOVES ALL VERTICAL FORCES FROM THE CURTAIN. HENCE, THE CURTAIN WILL NOT SINK FROM WIND OR CURRENT LOADS.



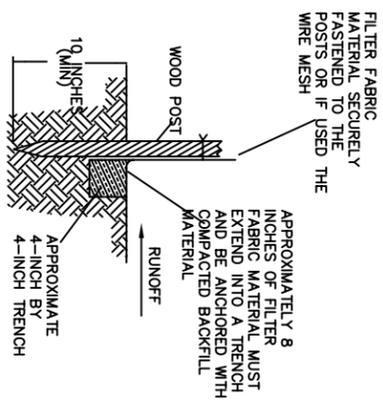
TURBIDITY CURTAIN SECTION (TYPICAL)
NTS



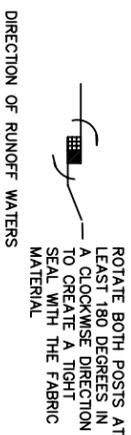
TURBIDITY CURTAIN (TYPICAL)
NTS



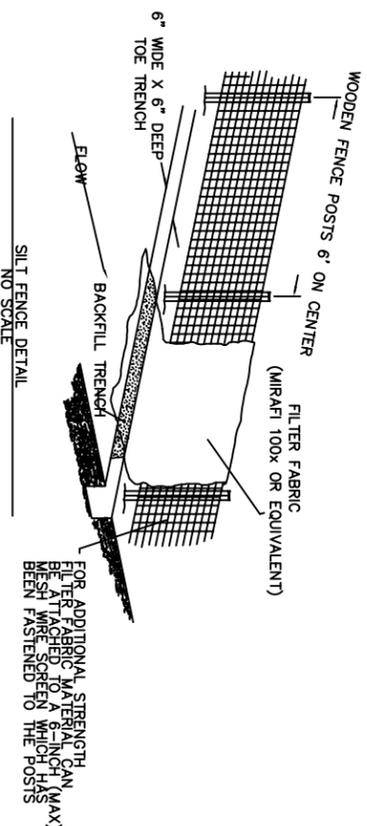
IMPERVIOUS TURBIDITY CURTAIN (TYPICAL)
NTS



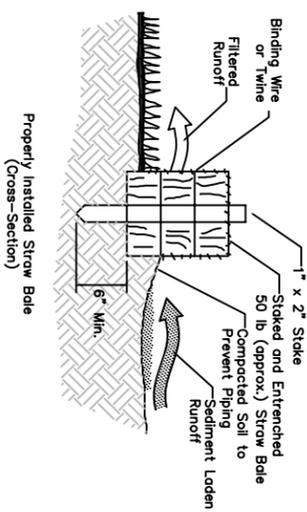
ATTACHING TWO SILT FENCES



DRIVE BOTH POSTS ABOUT 10 INCHES INTO THE GROUND AND BURY FLAP

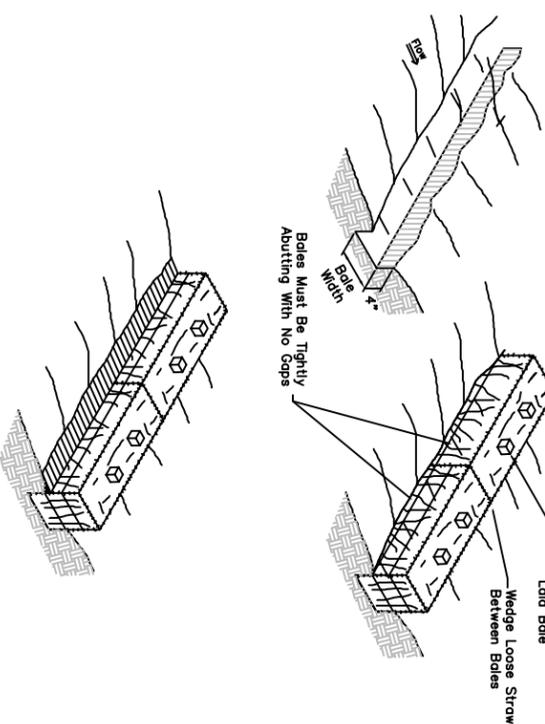


SILT FENCE (TYPICAL)
NTS



1. Excavate the Trench

2. Place and Stake Straw Bales



STRAW BALE (TYPICAL)
NTS



Glenwood Springs
River Recreation enhancements
Details 2 -- BMPs
NO SCALE

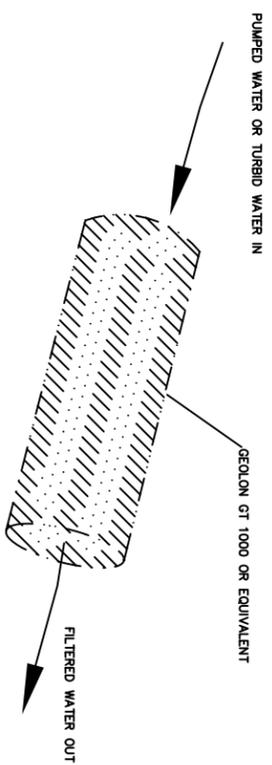
No.	Revision/Issue	Date



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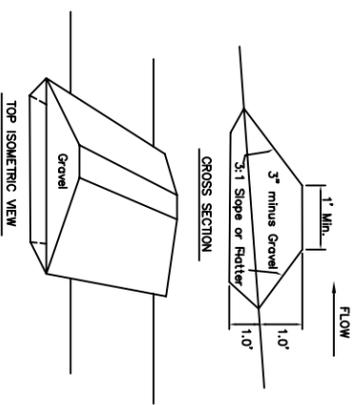
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Recreation Enhancements

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Glenwood Springs River Recreation Enhancements	PLATE C-5

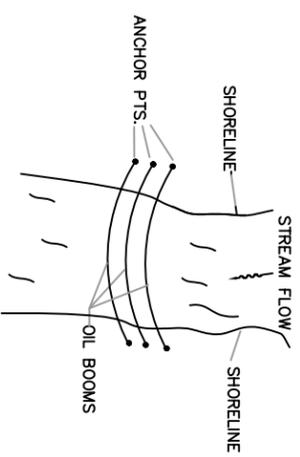


TO BE USED TO FILTER ALL PUMPED WATER

GED-TUBE (TYPICAL)
NTS

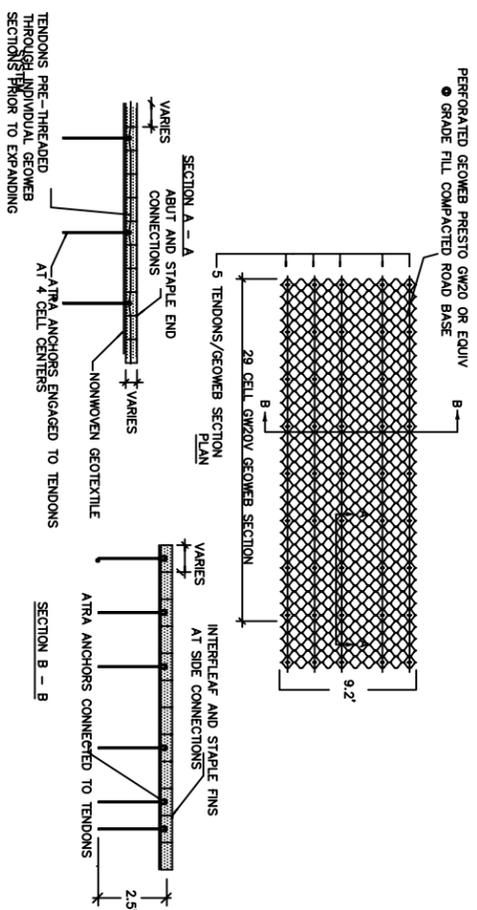


STONE BERM (TYPICAL)
NTS

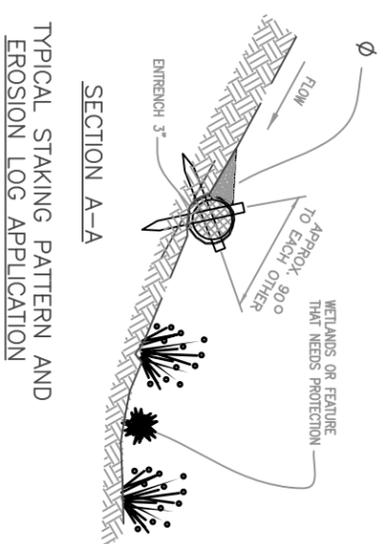


TO BE PLACED DOWNSTREAM OF ANY EQUIPMENT WORKING IN THE WET

OIL BOOM (TYPICAL)
PLAN VIEW - NTS

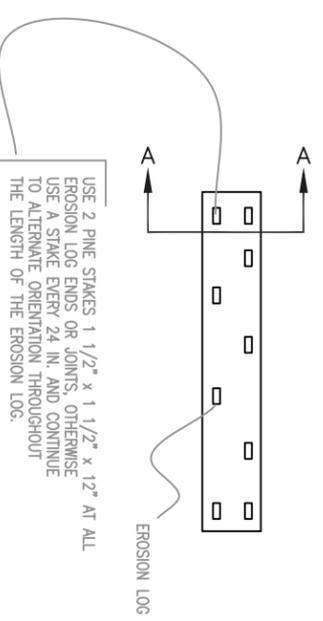


HEAVY EQUIPMENT TRACK (TYPICAL)
NTS

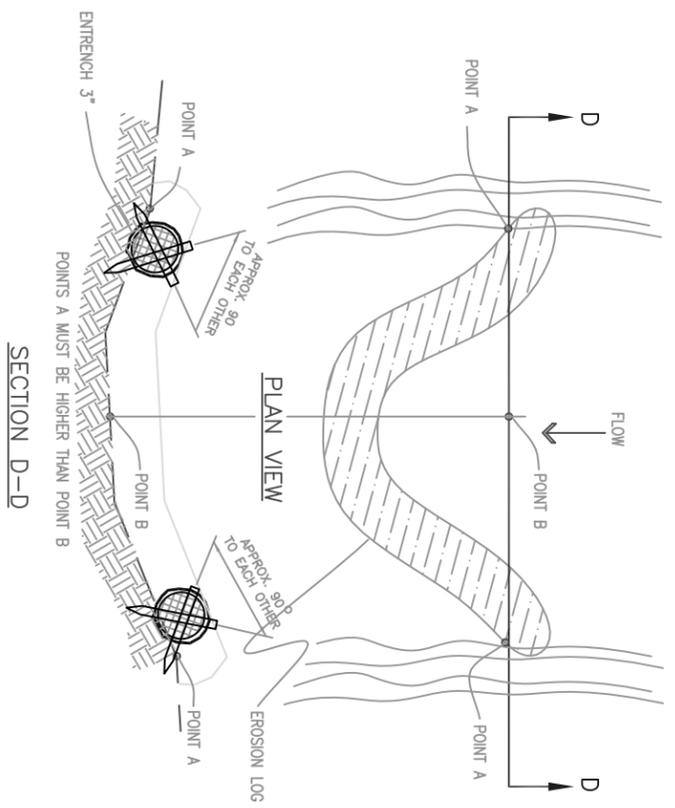


SEDIMENT REMOVAL SHALL BE PERFORMED CONTINUOUSLY FOR PROPER FUNCTION.

TYPICAL STAKING PATTERN AND EROSION LOG APPLICATION



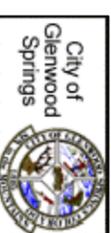
STAKING PLAN



EROSION LOG DETAIL FLOW LINE DITCH INSTALLATION

General Notes

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Details 3 - BMP's
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Scale	

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