

CONSTRUCTION PLANS FOR A
RECHARGE STATION

"White Property"
RIO GRANDE COUNTY, COLORADO.
PREPARED FOR

**SPECIAL IMPROVEMENT
SUBDISTRICT NO. 1**

BY
DAVIS ENGINEERING SERVICE, INC.
P.O. BOX 1840 – 1314 11TH STREET
ALAMOSA, CO 81101



VICINITY MAP
SCALE: 1"=1000'

RECHARGE POND CONSTRUCTION NOTES

GENERAL NOTES

- EXCAVATION OF RECHARGE POND AND SETTLING POND WILL PRODUCE $\pm 3,650$ C.Y. OF CUT. ANY OF THE EXCAVATED MATERIAL NOT NEEDED TO BUILD THE BANKS AROUND THE TWO PONDS WILL BE USED TO CREATE OVERFLOW AREA EMBANKMENTS OR STOCKPILED IN THE DESIGNATED CUT STOCKPILE AREA.
- THE DIMENSIONS OF THE BOTTOM OF THE RECHARGE POND SHALL BE 20' X 255'. THE RECHARGE POND SHALL BE 8' DEEP WITH A 3:1 (HORIZONTAL : VERTICAL) SIDE SLOPE MAKING THE TOP OF THE RECHARGE POND AT ITS INNER BANK DIMENSIONS 77.30' X 312.30' AT THE GREATEST POINTS. THE CORNERS OF THE POND HAVE BEEN ROUNDED TO FACILITATE CONSTRUCTION. THE TOP OF THE BANKS SHALL BE APPROXIMATELY 1.55' ABOVE GRADE AT AN ELEVATION OF 7779.75'.
- THE LENGTH OF THE BOTTOM OF THE SETTLING POND SHALL BE 234', THE CHANNEL SHALL BE V-SHAPED. THE SETTLING POND SHALL BE 3.25' DEEP WITH 3:1 SIDE SLOPE MAKING THE DIMENSIONS OF THE TOP OF THE SETTLING POND AT ITS INNER BANK 19.50' X 243.00'. THE TOP OF THE BANKS SHALL BE APPROXIMATELY 1' ABOVE GRADE AT AN ELEVATION OF 7779.75'.
- THE CONTRACTOR SHALL EMPLOY FOR THE WORK OF LAYING THE PIPE ONLY WORKMEN WHO ARE SKILLED AND EXPERIENCED IN LAYING CMP PIPE AND INSTALLING STEEL IRRIGATION STRUCTURES. THE PIPE AND STRUCTURES SHALL BE LAID TO THE LINES AND GRADES SHOWN ON THE DRAWINGS OR ESTABLISHED IN THE FIELD BY THE ENGINEER OR HIS REPRESENTATIVE. PIPE SHALL BE INSTALLED IN A SHAPED SUBGRADE BEDDING. THE TRENCH BOTTOM AND SHAPED SUBGRADE ALONG THE ENTIRE LENGTH OF THE CMP BEDDING SHALL BE PROPERLY GRADED AND COMPACTED TO ASSURE ADEQUATE BEARING OF THE PIPE ALONG ITS TOTAL LENGTH.
- DRAWINGS SHOWN ON SHEET 7 OF 9 OF THE STEEL CONTROL STRUCTURES ARE SCHEMATIC DRAWINGS ONLY. THE CONTRACTOR SHALL SUPPLY SHOP DRAWINGS OF THE STEEL CONTROL STRUCTURES TO THE ENGINEER, OR HIS REPRESENTATIVE TO VERIFY DIMENSIONS AND STRUCTURAL INTEGRITY.

CONSTRUCTION PREPARATION

- PRIOR TO PLACEMENT OF THE NEW FILL THE AREAS ON WHICH FILL IS TO BE PLACED SHALL BE CLEANED OF TREES, ROOTS, VEGETATION, AND OTHER OBJECTIONABLE MATERIAL. THE AREA WHICH FILL IS TO BE PLACED SHALL BE SCARIFIED. NO SNOW, ICE OR FROZEN MATERIAL SHALL BE INCORPORATED IN THE FILLS AND POND EMBANKMENT.

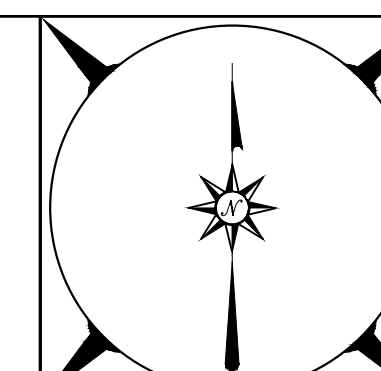
RIPRAP

- THE RIPRAP PADS AT THE INLET AND OUTLET OF THE SETTLING POND SHALL BE PLACED SUCH THAT THEY ARE 3' WIDE AND EXTEND 3' INTO THE MAIN DITCH AND 3' PAST THE CATCH POINT OF THE SETTLING POND.
- THE RIPRAP PAD IN THE RECHARGE POND SHALL BE PLACED SUCH THAT IT IS 18 INCHES ACROSS AT THE OUTLET OF THE PIPE AND INCREASES IN WIDTH UNIFORMLY TO A 3' WIDTH AT THE CATCH POINT OF THE RECHARGE POND. THIS PAD IS THEN TO EXTEND 3' BEYOND THE CATCH POINT OF THE RECHARGE POND.
- MATERIALS USED IN THE CONSTRUCTION OF THE RIPRAP ON THE DISCHARGE SLOPE OF THE PONDS SHALL BE SOUND ANGULAR ROCK AND SHALL NOT CONTAIN MATERIAL LARGER THAN 6 INCHES IN MAXIMUM DIMENSION AND NOT LESS THAN 40 PERCENT PLUS 2 INCH. THE RIPRAP PADS SHOULD BE AT LEAST 6 INCHES THICK. NONE OF THE RIPRAP PADS ARE TO EXTEND ABOVE THE FINAL GRADING, AS PER THE PROFILE SHEETS.
- THE OVERFLOW DITCH RIPRAP PAD AT THE INVERT IS TO BE 3' WIDE AND 3' LONG. AT THE OUTLET OF THE OVERFLOW DITCH THE RIPRAP PAD SHALL BE PLACED SUCH THAT IT IS 3' WIDE AND EXTENDS TO A POINT 3' BEFORE THE INVERT OF THE OVERFLOW DITCH AND 3' PAST THE CATCHPOINT OF THE OVERFLOW POND.

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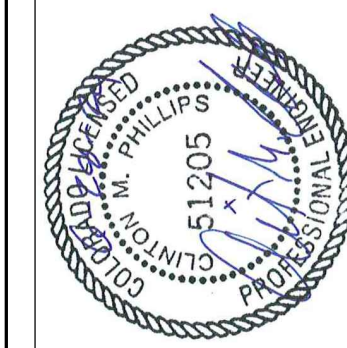
DAVIS ENGINEERING SERVICE, INC.
1314 11TH STREET, P.O. BOX 1840
ALAMOSA, CO 81101
PHONE: (719) 586-3064
FAX: (719) 586-3172



AS NOTED
DATE: 6/28/2024

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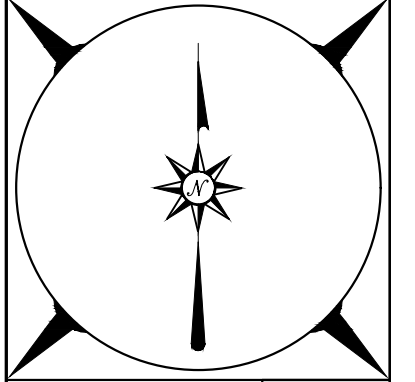
Special Improvement
Subdistrict No. 1
8805 Independence Way
Alamosa, CO 81101
White Property Recharge Station
Cover Sheet & Notes

NOTE:

1. The property consists of a previously center pivot irrigated field. The sprinkler has been removed, and ditch water is run across the property for groundwater recharge purposes.
2. Several hydraulic structures currently exist in the project area: a cutthroat flume and a tee structure.
3. An old irrigation well, cattle tank, and electrical panel are present near the project area. These items are not to be disturbed as part of this construction.
4. Access to the project site is available from County Road 7N via a road at the Northwest corner of the property.
5. One GPS Base Point and One GPS control point have already been set by DES.



EXISTING CONDITIONS MAP
SCALE: 1"=30'



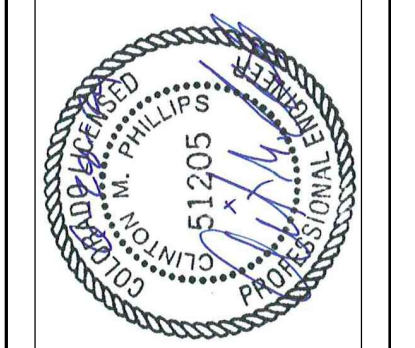
DAVIS ENGINEERING SERVICE, INC.
 SINCE 1946
 DES

DAVIS ENGINEERING SERVICE, INC.
 1314 110th STREET, P.O. BOX 1840
 ALAMOSA, CO 81101
 PHONE: (719) 586-3004
 FAX: (719) 586-3172

ELEVATION BASE ASSUMED
 0' 1" 2" 3"

DATE: 6/28/2024
 SCALE: AS NOTED

DESIGNED BY	CMP, WSS
DRAWN BY	WSS
CHECKED BY	CMP
APPROVED BY	
DATE	
SCALE	
PROJECT	
CLIENT	
LOCATION	
DATE	
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CLIENT	
LOCATION	
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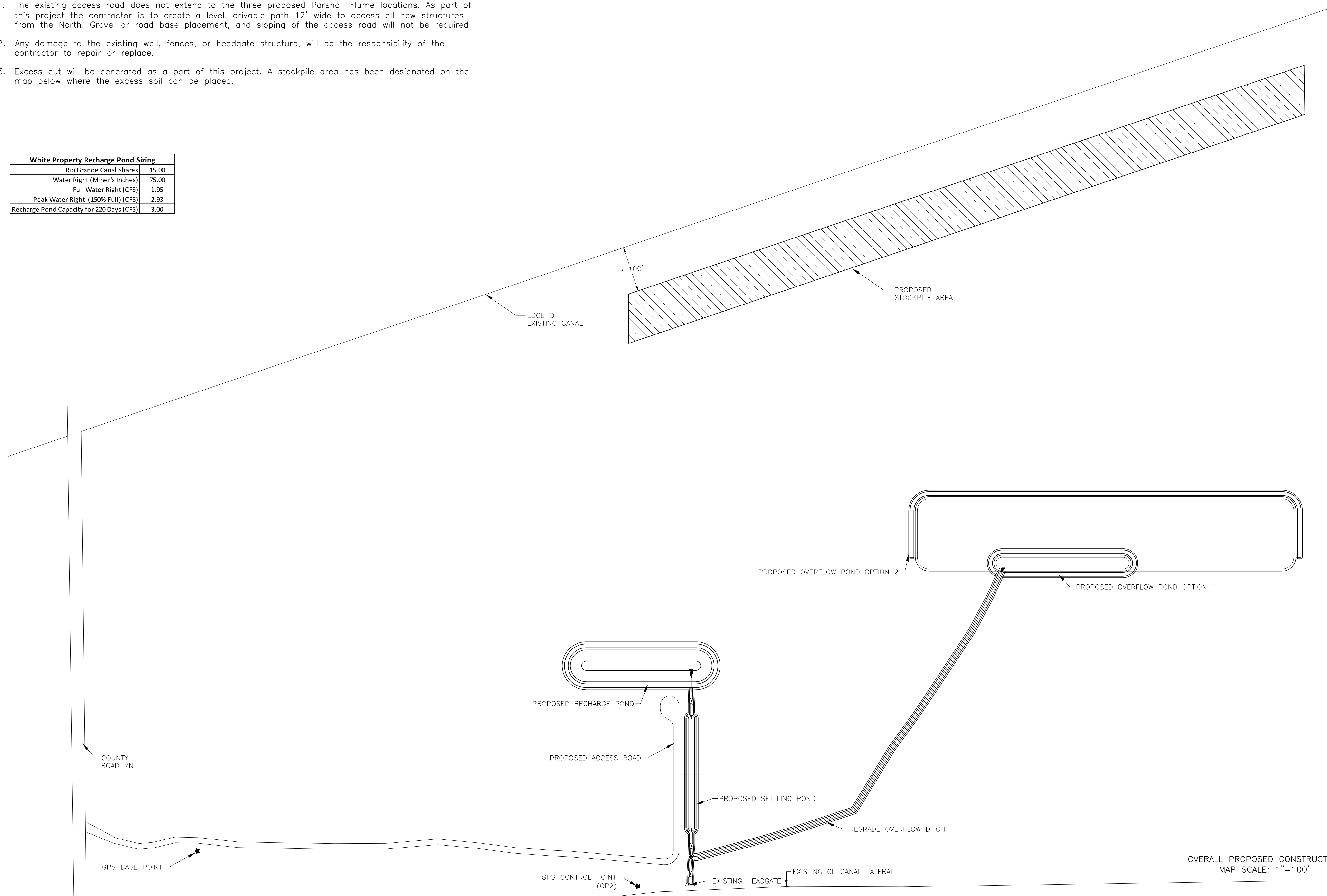


Special Improvement
 Subdistrict No. 1
 8805 Independence Way
 Alamosa, CO 81101
White Property Recharge Station
 Existing Conditions Map

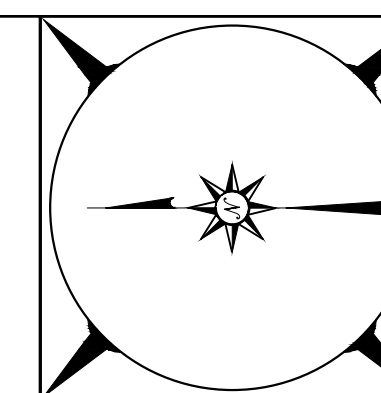
NOTE:

1. The existing access road does not extend to the three proposed Parshall Flume locations. As part of this project the contractor is to create a level, drivable path 12' wide to access all new structures from the North. Gravel or road base placement, and sloping of the access road will not be required.
2. Any damage to the existing well, fences, or headgate structure, will be the responsibility of the contractor to repair or replace.
3. Excess cut will be generated as a part of this project. A stockpile area has been designated on the map below where the excess soil can be placed.

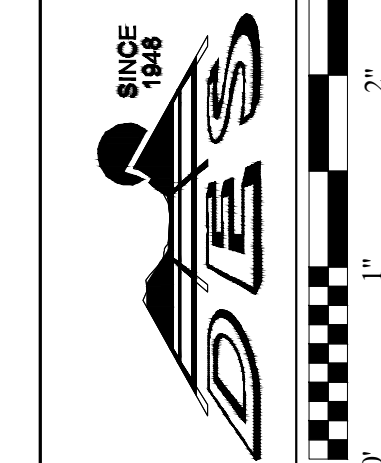
White Property Recharge Pond Sizing	
Rio Grande Canal Shares	15.00
Water Right (Miner's Inches)	75.00
Full Water Right (CFS)	1.95
Peak Water Right (150% Full) (CFS)	2.93
Recharge Pond Capacity for 220 Days (CFS)	3.00



OVERALL PROPOSED CONSTRUCTION
MAP SCALE: 1"=100'

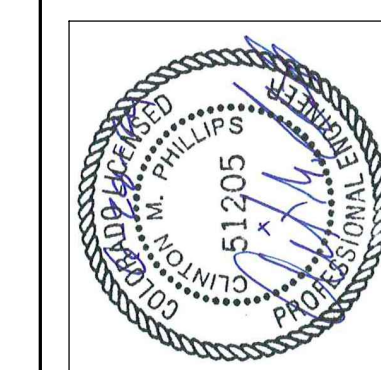


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Alamosa, CO 81101
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FAX: (719) 586-3172



DATE: 6/28/2024
AS NOTED

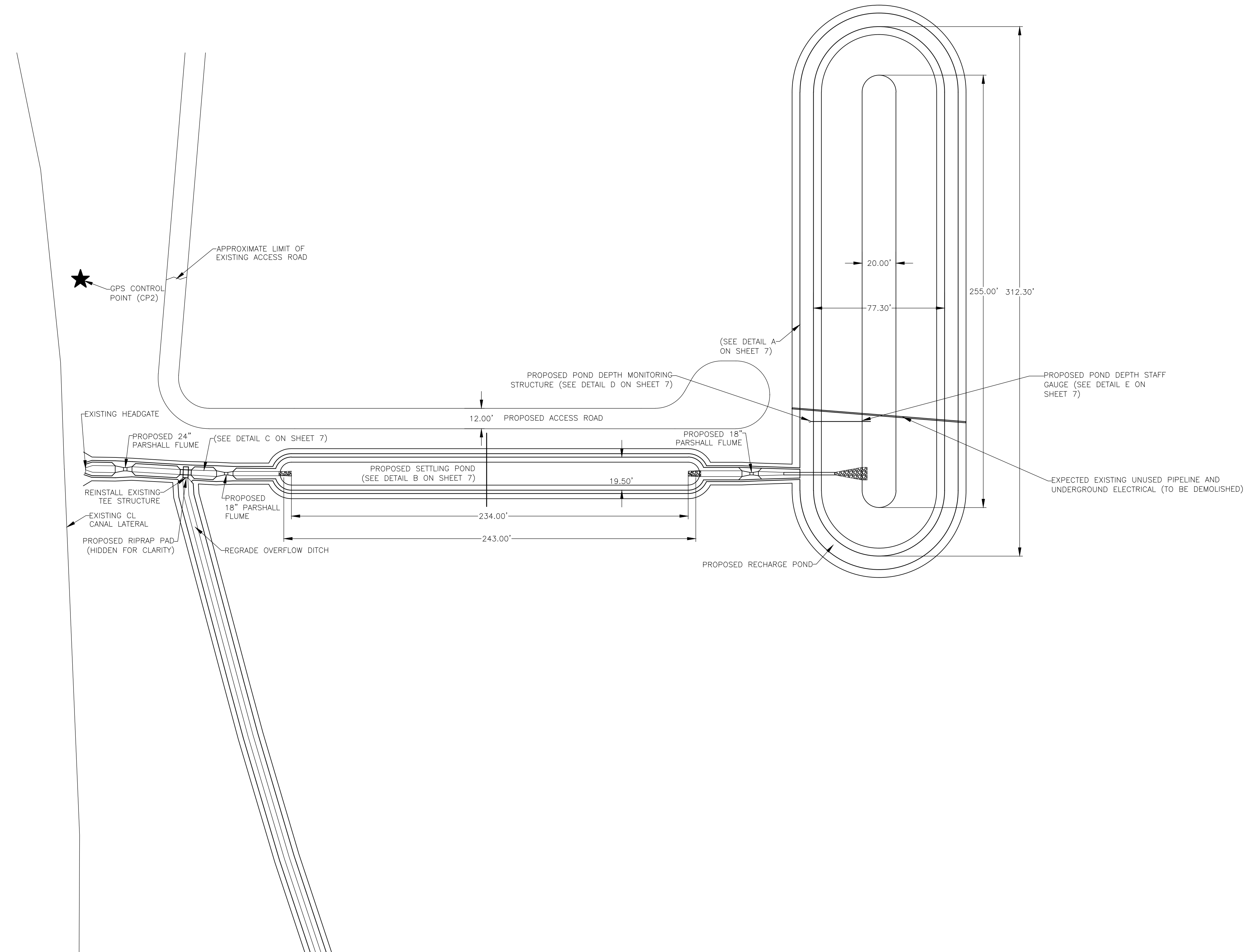
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DATE	WSS
DESIGNED BY	CMP
CHECKED BY	
APPROVED BY	



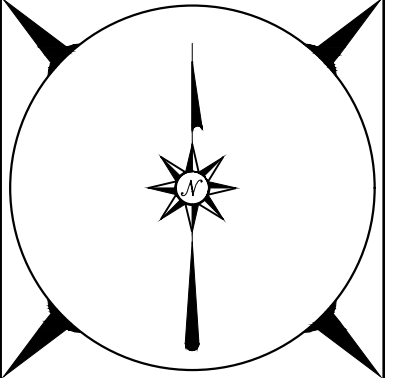
Special Improvement
Subdistrict No. 1
8805 Independence Way
Alamosa, CO 81101
White Property Recharge Station
Overall Proposed Construction Map

NOTE:

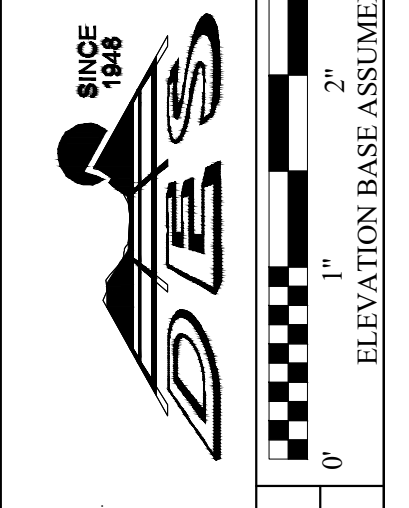
1. 8' wide embankments on the recharge pond and overflow area are to facilitate construction with a bulldozer. If the contractor elects to use a scraper, or other equipment which would benefit from a greater bank width it is acceptable to expand the bank outwards, in a manner deemed acceptable to the engineer.
2. The settling pond will require approximately 185 cubic yards of cut, and 45 cubic yards of fill to construct. The recharge pond will require approximately 3,465 cubic yards of cut and 610 cubic yards of fill to construct.
3. The above cut and fill values do not account for riprap volumes, the culvert, the main ditch, or the pond depth monitoring structure. Excess fill is to be stockpiled in the area indicated on sheet 3.



SETTLING & RECHARGE POND
PROPOSED CONSTRUCTION MAP
SCALE: 1"=35'



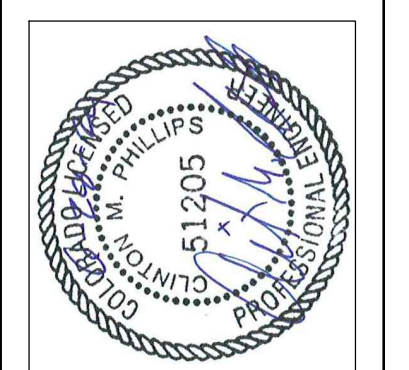
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1314 110th STREET, P.O. BOX 1840
ALAMOSA, CO 81101
PHONE: (719) 586-3004
FAX: (719) 586-3112



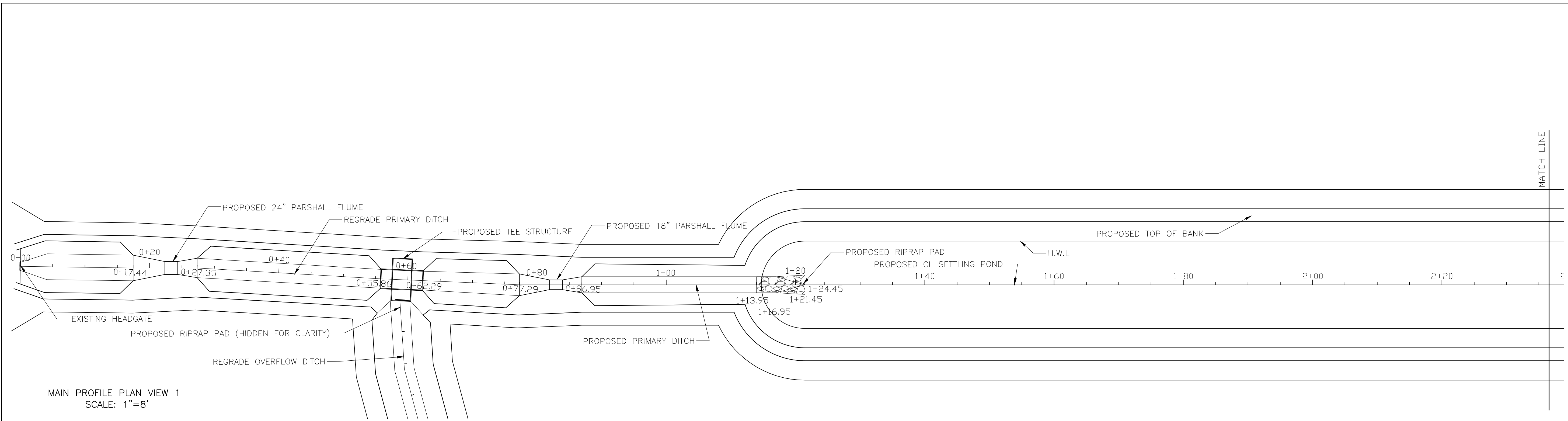
DATE: 6/28/2024
AS NOTED

DESIGNED BY	CMP, WSS
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CHECKED BY	CMP
APPROVED BY	

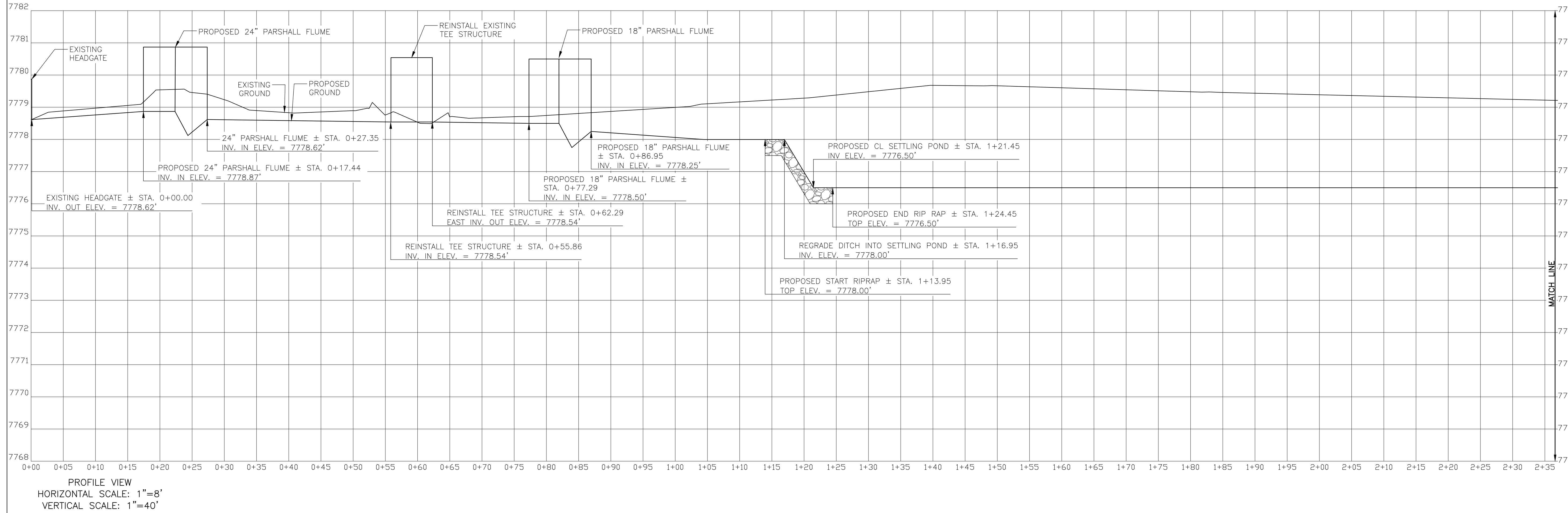
DATE	
TIME	



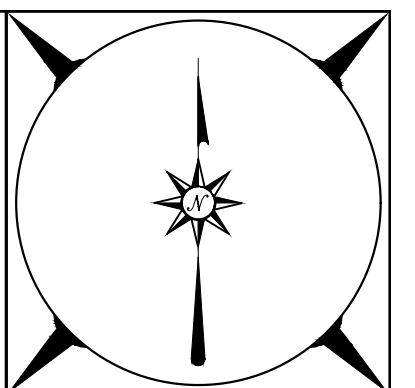
Special Improvement
Subdistrict No. 1
8805 Independence Way
Alamosa, CO 81101
White Property Recharge Station
Main Recharge Station Map



MAIN PROFILE PLAN VIEW 1
SCALE: 1"=8'



PROFILE VIEW
HORIZONTAL SCALE: 1"=8'
VERTICAL SCALE: 1"=40'



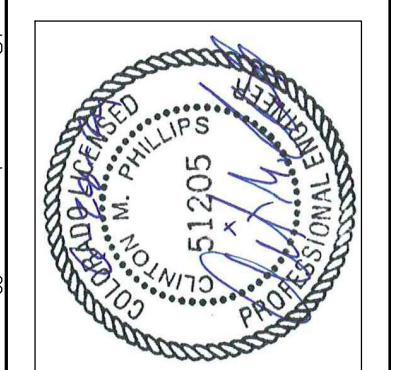
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SINCE 1946
DES

1314 11th Street, P.O. Box 1840
Alamosa, CO 81101
PHONE: (719) 586-3004
FAX: (719) 586-3172

ELEVATION BASE ASSUMED
0' 1' 2' 3'

DATE: 6/28/2024
BY: AS NOTED

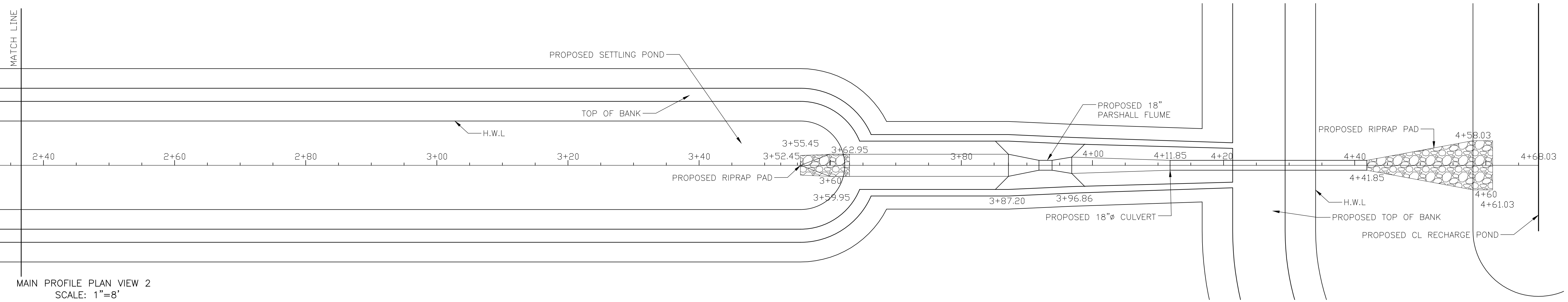
DESIGNED BY	CMP, WSS
DRAWN BY	WSS
CHECKED BY	CMP
APPROVED BY	



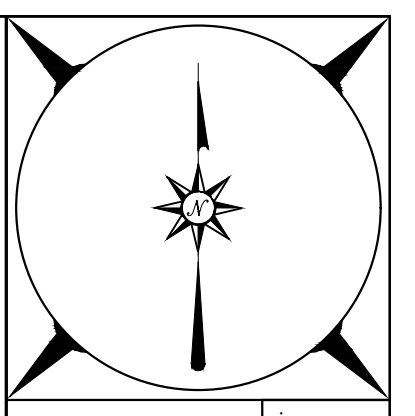
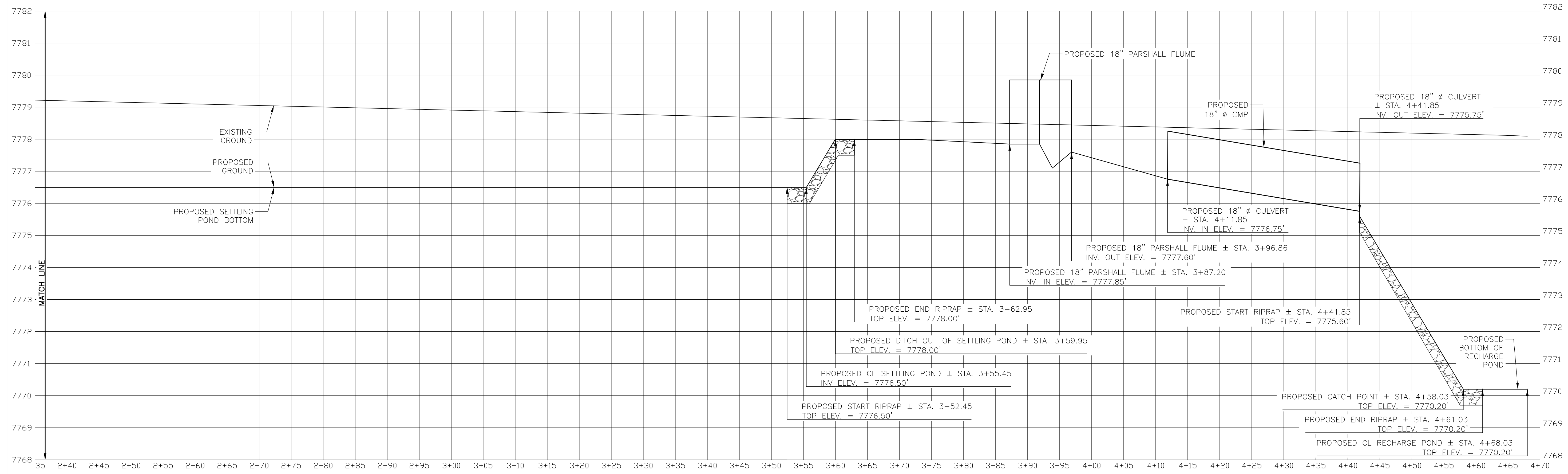
Special Improvement
Subdistrict No. 1
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Alamosa, CO 81101

White Property Recharge Station

Main Profile Sheet 1



MAIN PROFILE PLAN VIEW 2
SCALE: 1"=8'



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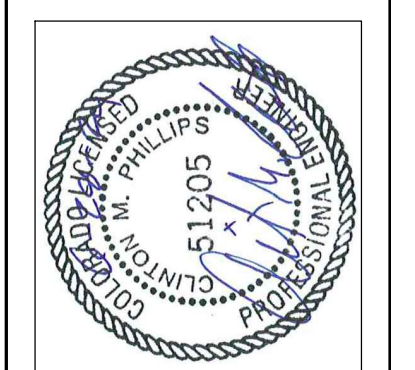
DAVIS ENGINEERING SERVICE, INC.
1314 110th STREET, SUITE 100
ALAMOSA, CO 81101
PHONE: (719) 586-3004
FAX: (719) 586-3172

ELEVATION BASE ASSUMED

0' 1' 2' 3'

DATE: 6/28/2024
AS NOTED

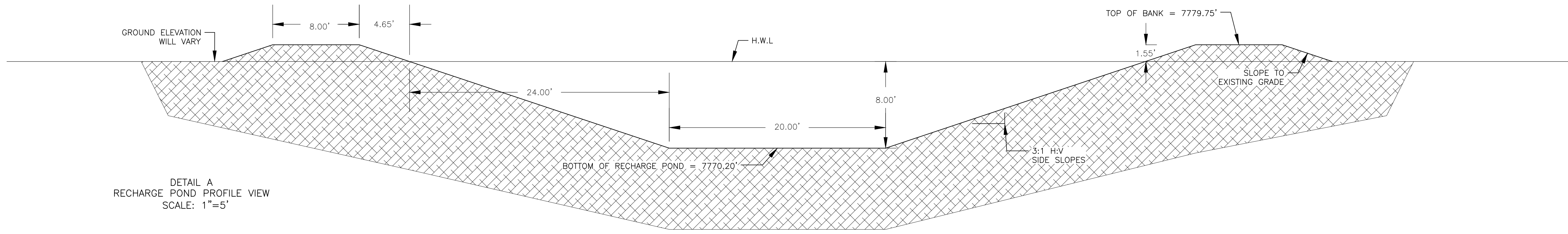
DESIGNED BY	CMP, WSS
CHECKED BY	WSS
APPROVED BY	CMP



Special Improvement
Subdistrict No. 1
8805 Independence Way
Alamosa, CO 81101

White Property Recharge Station

Main Profile Sheet 1



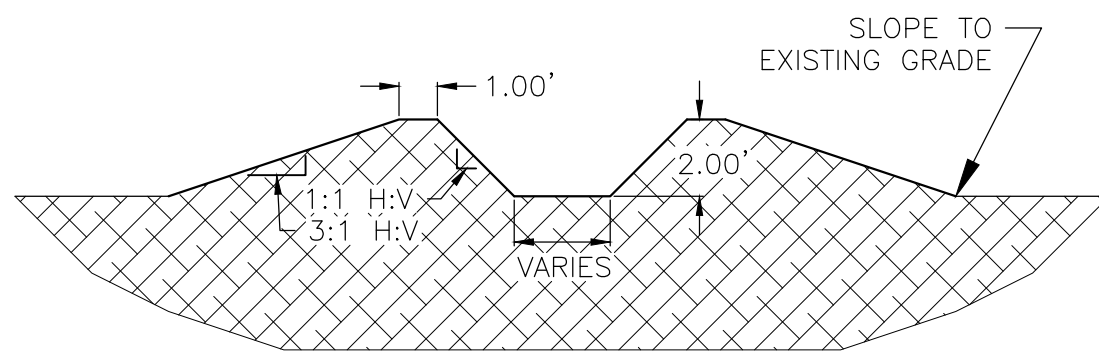
DETAIL A
RECHARGE POND PROFILE VIEW
SCALE: 1"=5'

EMBANKMENT NOTES:

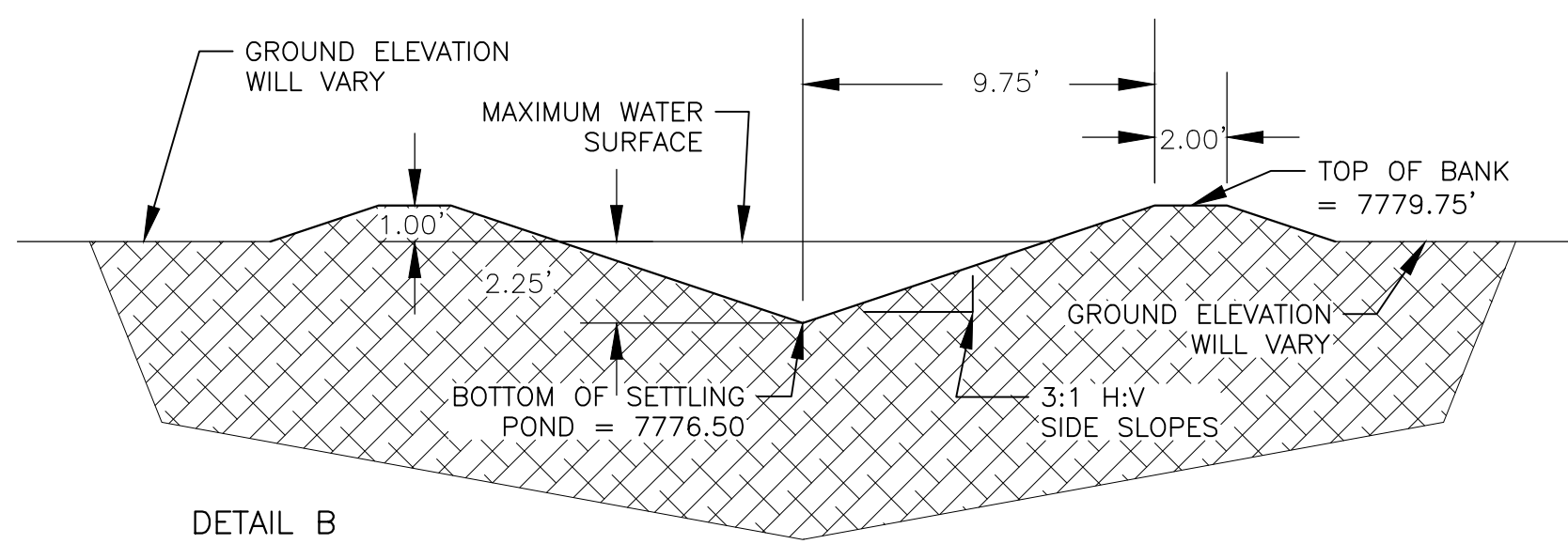
1. For all elements of this design, elevations are to take precedent over depths shown in these profiles as the ground surface varies depending on location.
2. The channel bottom width of the "primary ditch" that links the headgate, flumes, settling pond, and recharge pond will vary. This dimension is controlled by the inlet and outlet widths of the hydraulic structures, as per the structure detail sheet. Transitions from one width to another are to be gradual across a section of ditch.
3. The top of bank, sides, and bottom of the primary ditch are to be compacted to a minimum 85% standard proctor density.

STRUCTURE NOTE:

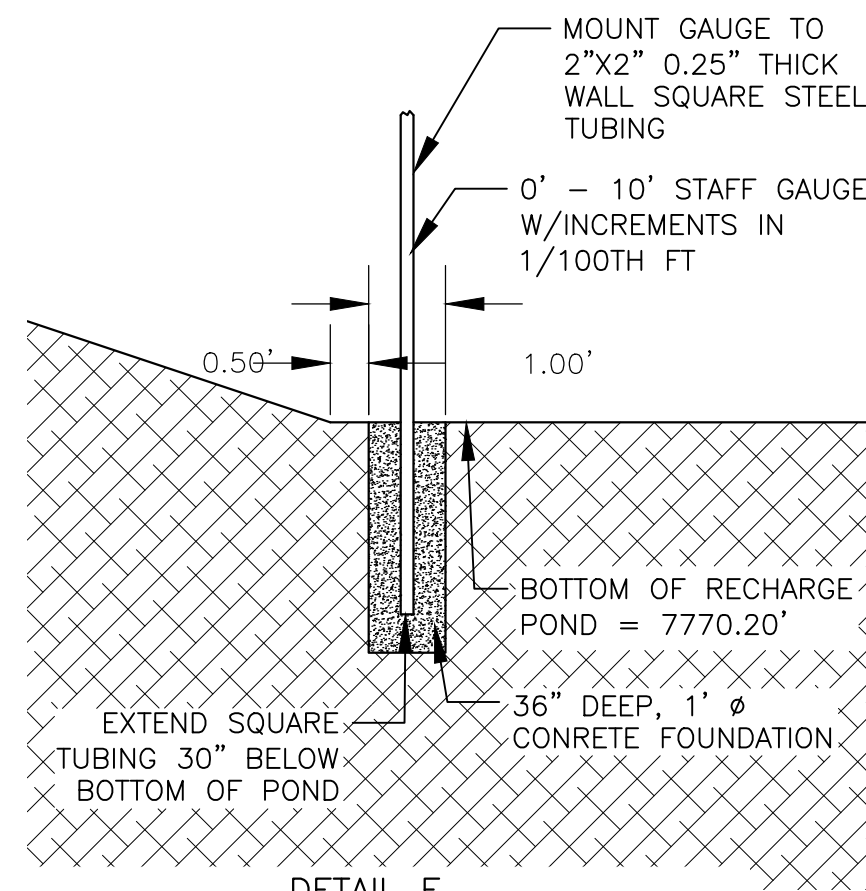
1. The first structure downstream of the headgate is a new Parshall flume with a 24" wide throat. The invert in of the flume is 7778.87 ft. The invert out is 7778.62 ft.
2. An existing cutthroat flume is to be removed intact and set aside.
3. The second structure will be an existing tee structure. The elevation of the inverts in and out will be adjusted to 7778.54 ft, and the structure is to be leveled. New tightly fitting check boards are to be provided for all three outlets. The North outlet is to have check boards installed and then compacted fill matching the surrounding ditch bank elevations is to be placed to semi-permanently close that outlet in.
4. The third structure will be a new Parshall flume with an 18" wide throat. The invert in of the flume is 7778.50 ft. The invert out is 7778.25 ft.
4. The fourth structure will be a new Parshall flume with an 18" wide throat located downstream of the settling pond. The invert in of the flume is 7777.85 ft. The invert out is 7777.60 ft.
5. The fifth structure will be a new 30ft long, 18"Ø culvert to carry flows under the recharge pond embankment. The invert in is to be 7776.75 ft, and invert out 7775.60 ft.
6. The sixth structure will consist of a recharge pond depth monitoring structure, utilizing a 12"Ø CMP with a 2"Ø pipe sloping from the bottom of the structure towards the recharge pond bottom. At the pond bottom the last 5 feet are to have 3/4" perforations, protected by a geotextile sleeve. A staff gauge is to be installed 2' North of the 2" pipe. All structures are to be fabricated and installed according to the specifications.
7. All electronic data logging systems for flume flow rates and recharge pond depth are to be installed by the owner and are not a part of this contract.



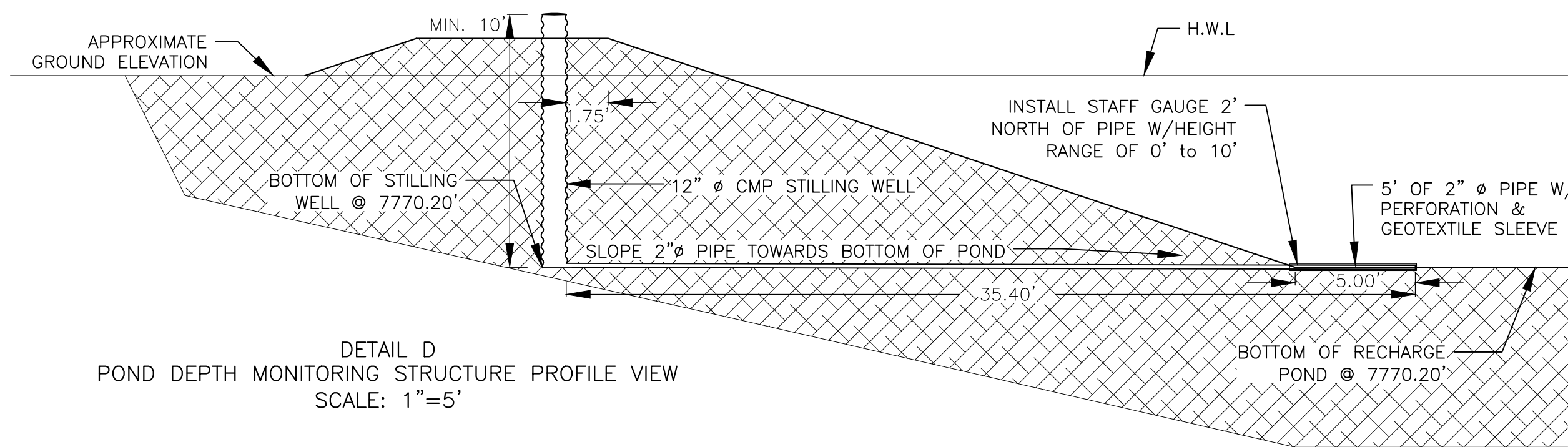
DETAIL C
PRIMARY DITCH PROFILE VIEW
SCALE: 1"=5'



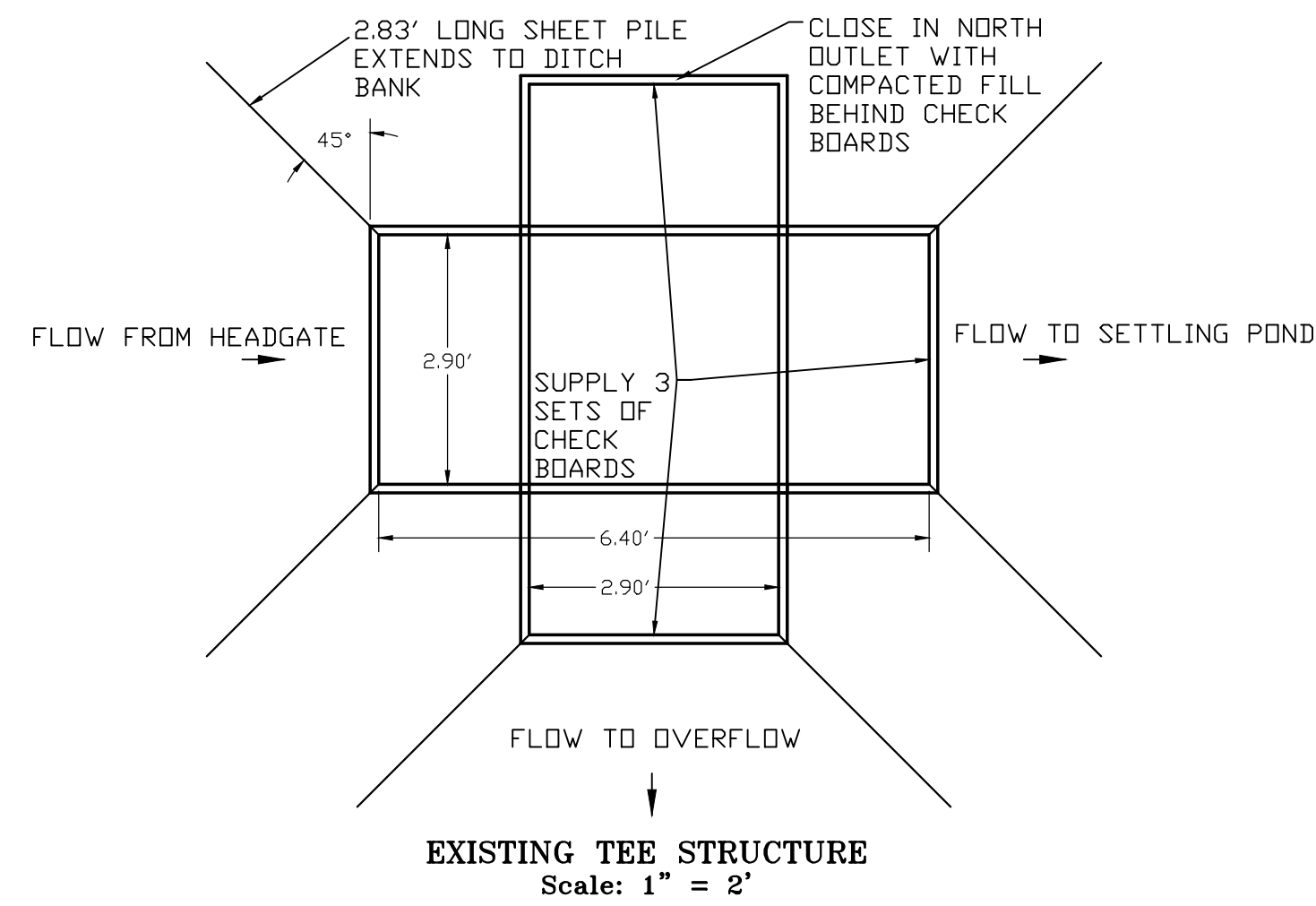
DETAIL B
SETTLING POND PROFILE VIEW
SCALE: 1"=5'



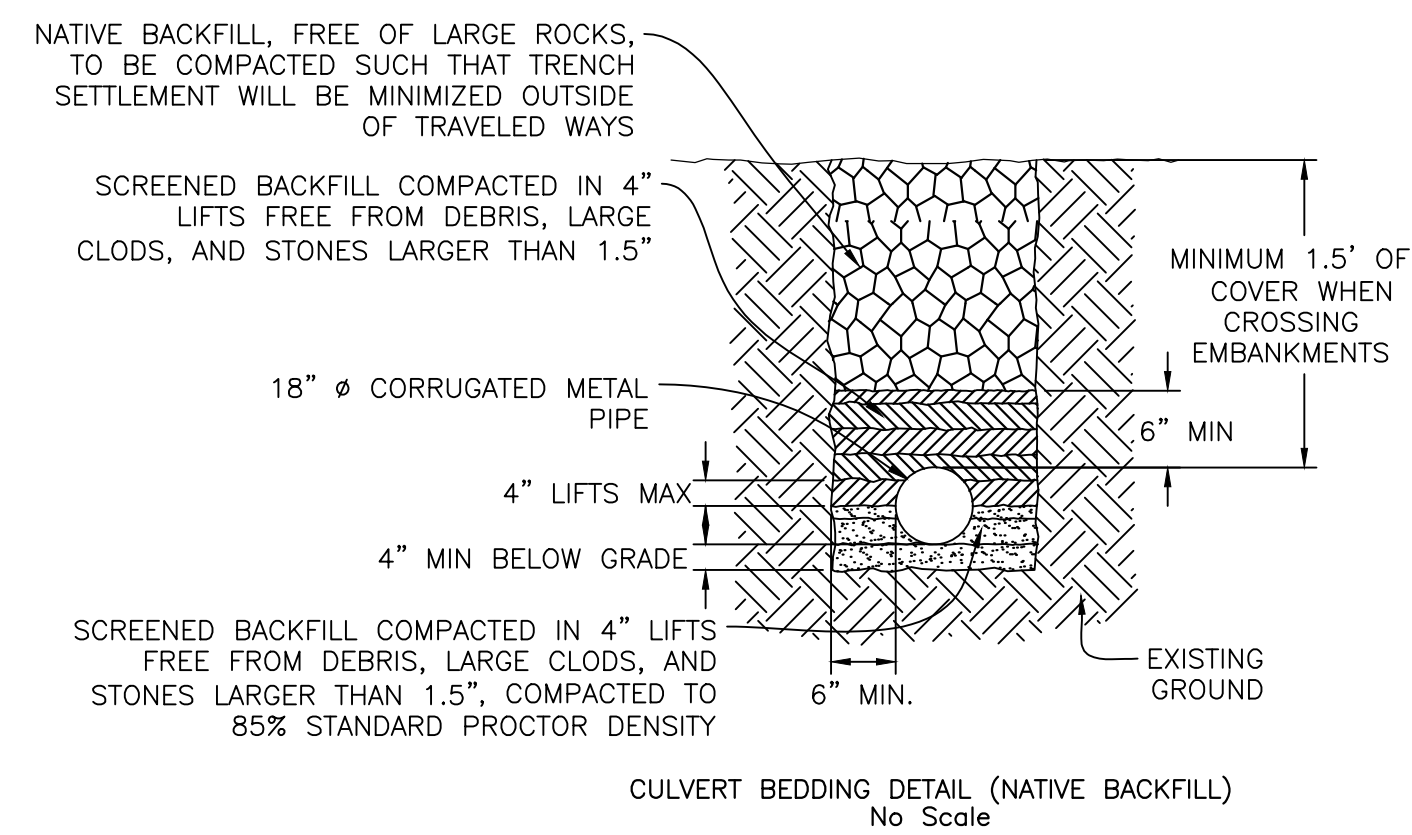
DETAIL E
POND DEPTH STAFF GAUGE PROFILE VIEW
SCALE: 1"=5'



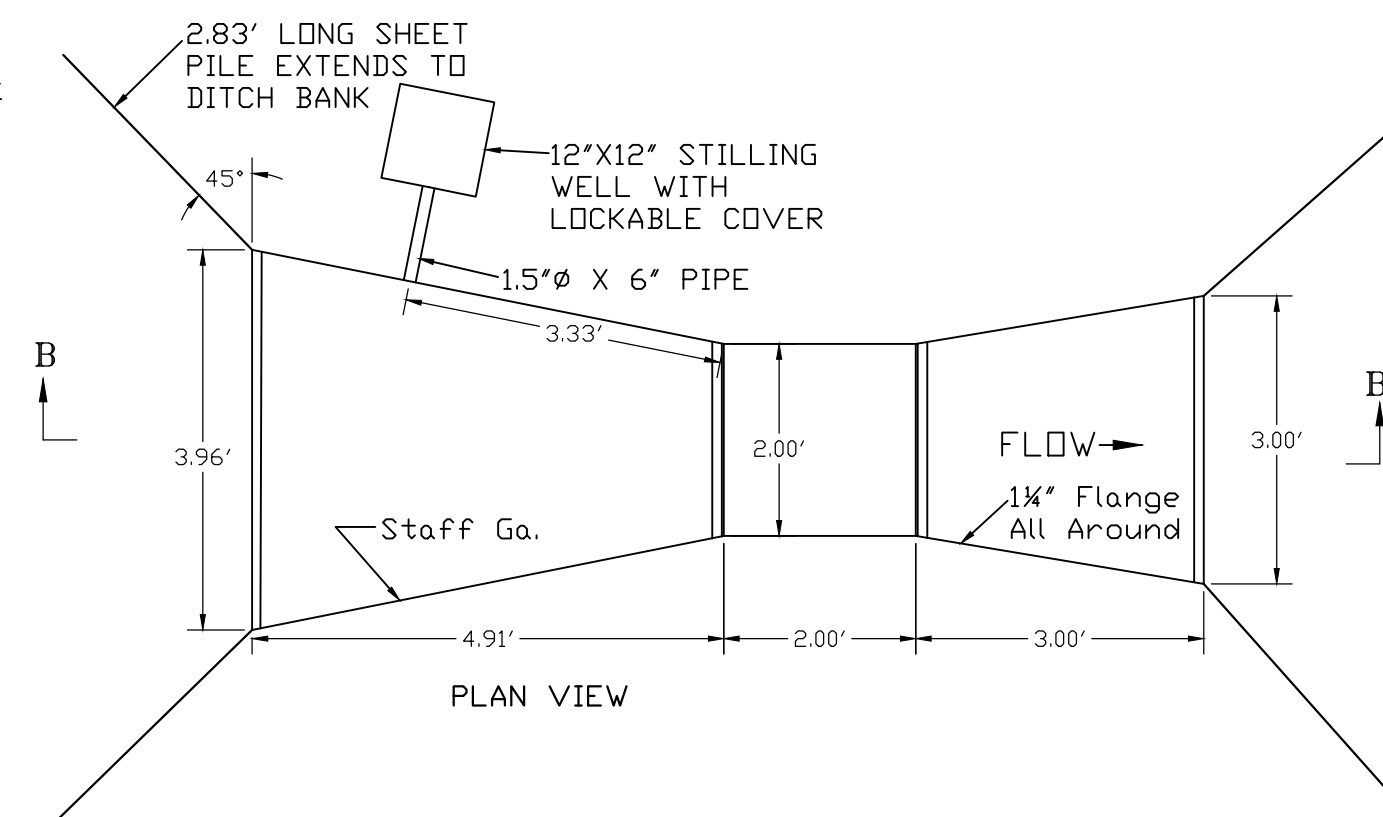
DETAIL D
POND DEPTH MONITORING STRUCTURE PROFILE VIEW
SCALE: 1"=5'



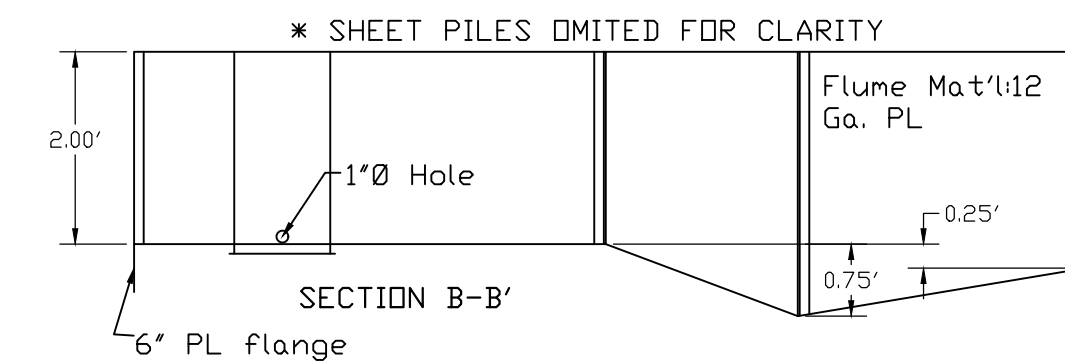
EXISTING TEE STRUCTURE
Scale: 1" = 2'



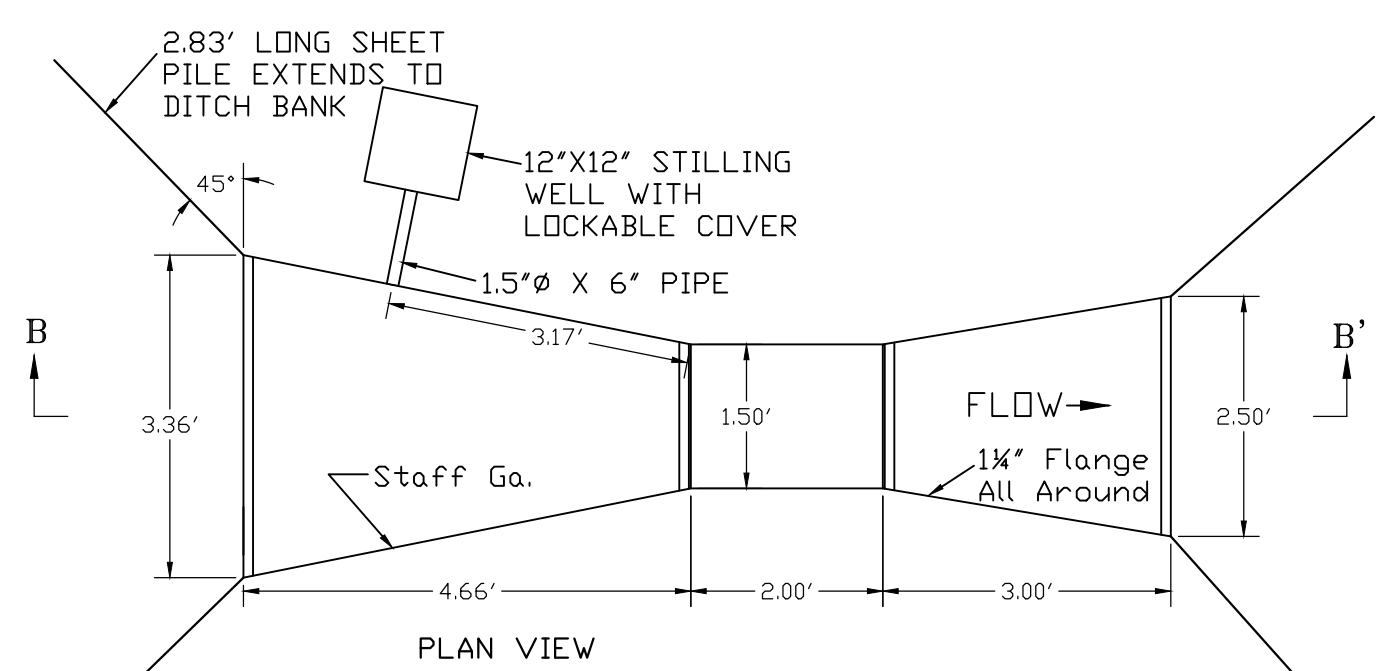
CULVERT BEDDING DETAIL (NATIVE BACKFILL)
No Scale



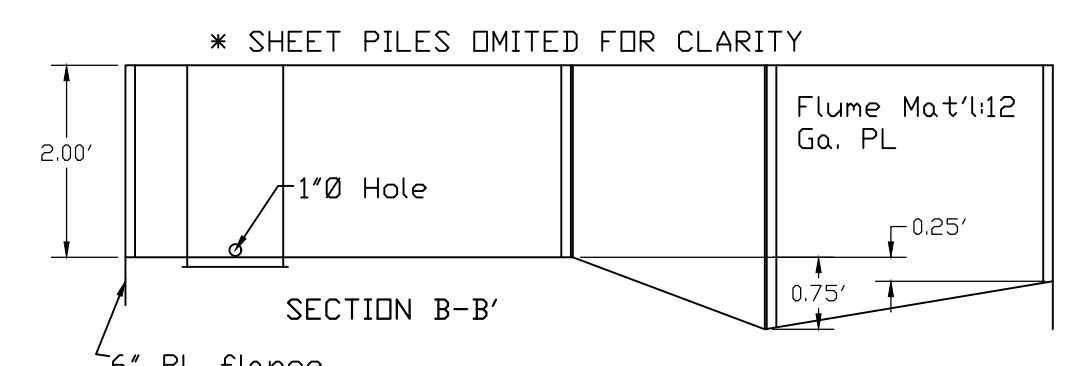
PLAN VIEW



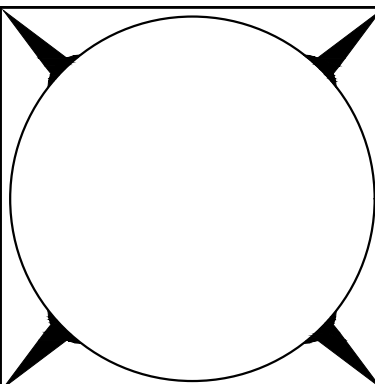
24" PARSHALL FLUME
Scale: 1" = 2'



PLAN VIEW



18" PARSHALL FLUME
Scale: 1" = 2'



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DAVIS ENGINEERING SERVICE, INC.
1314 110th STREET, P.O. BOX 1660
ALAMOSA, CO 81101
PHONE: (719) 586-3064
FAX: (719) 586-3172



ELEVATION BASE ASSUMED

DATE	AS NOTED	DATE	6/28/2024
DESIGNED BY	CMP, WSS	CHECKED BY	WSS
DRAWN BY	WSS	APPROVED BY	CMP

PROJECT NO.	
DATE	
SCALE	
BY	
CHECKED	
APPROVED	

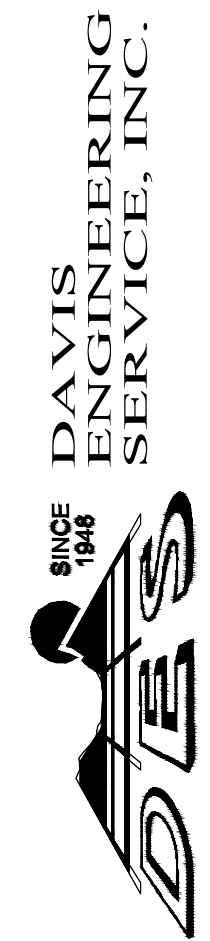
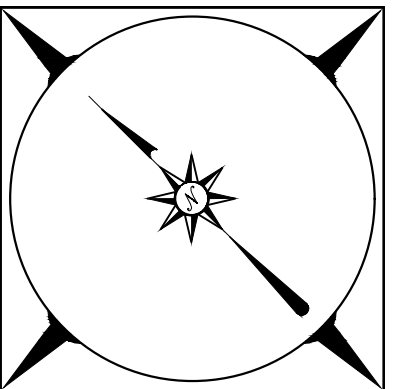
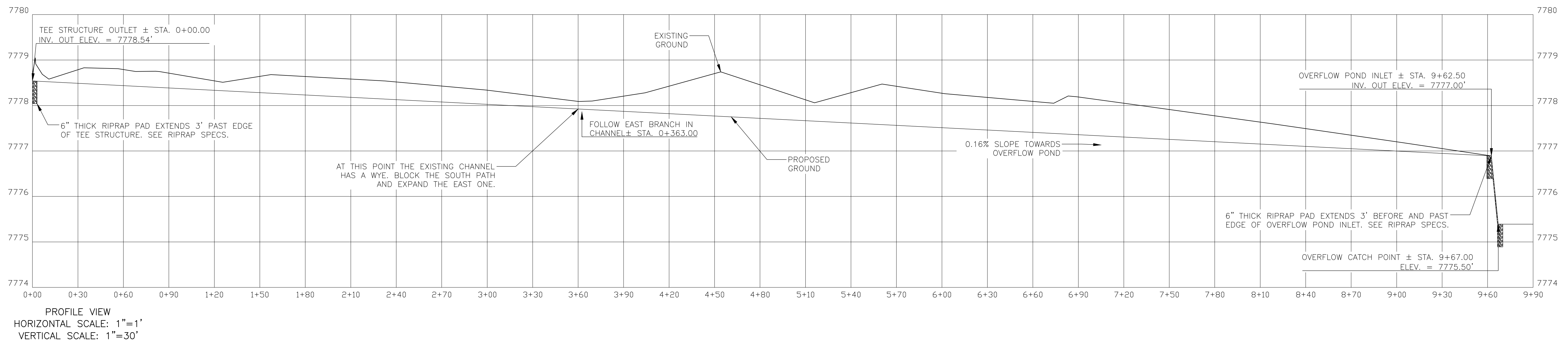
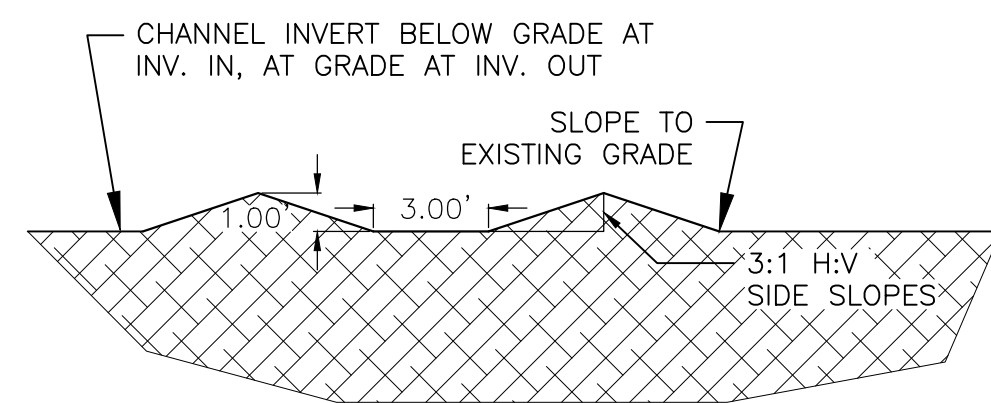
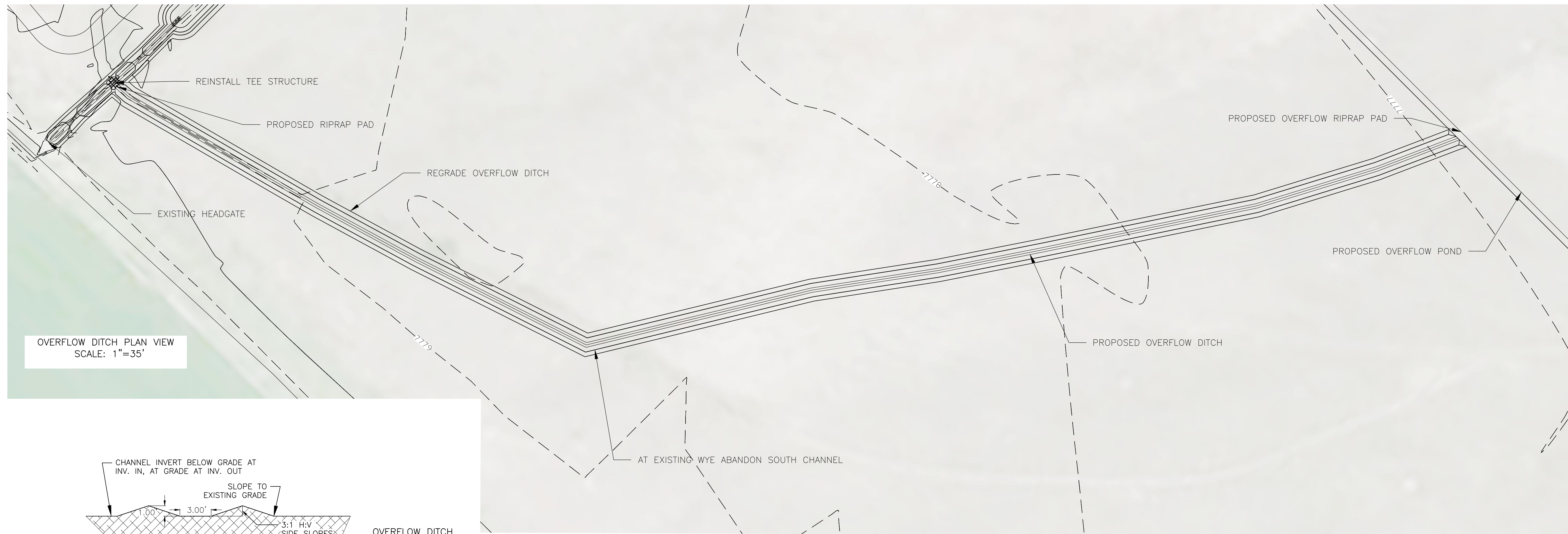


Special Improvement
Subdistrict No. 1
8805 Independence Way
Alamosa, CO 81101
White Property Recharge Station

Detail Sheet

NOTE:

1. The invert in of the overflow ditch will be at 7778.54 ft, equivalent to tee structure bottom elevation. The slope from the tee structure to the overflow pond shall be 0.16%. The invert out elevation is to be 7777.00 feet, approximately equal to the existing ground elevation in that area.
2. At the inlet and outlet of the overflow ditch a riprap pad is to be installed per these drawings to prevent erosion.



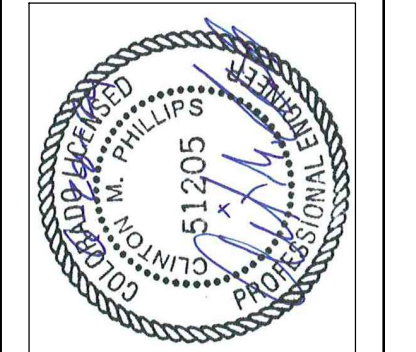
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ALAMOSA, CO 81101
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DATE: 6/28/2024
SCALE: AS NOTED

PROJECT	CMP, WSS
DESIGNER	WSS
CHECKED	CMP
APPROVED	

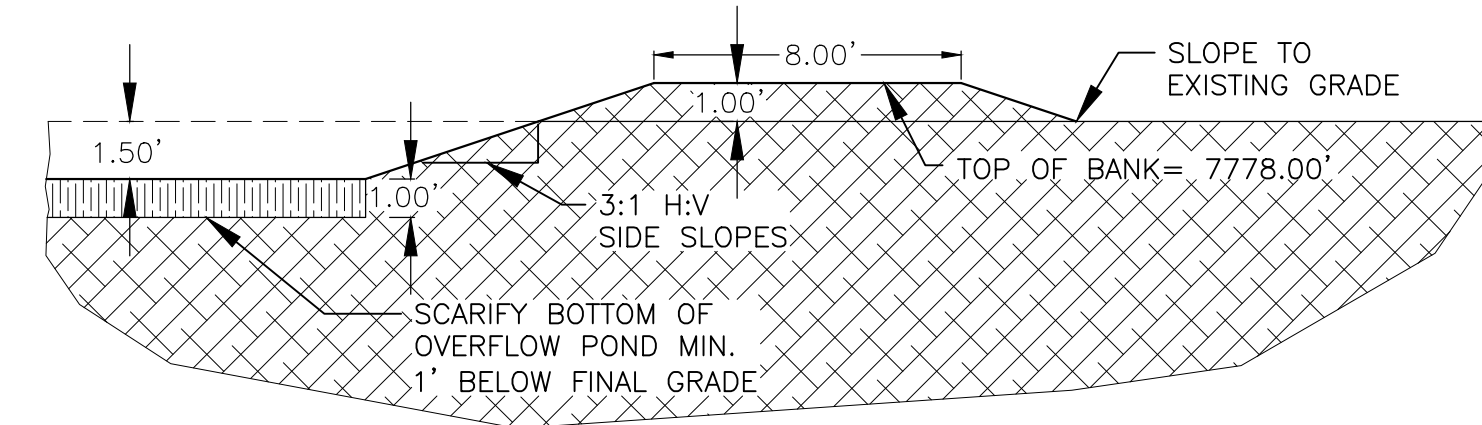


Special Improvement
Subdistrict No. 1
8805 Independence Way
Alamosa, CO 81101
White Property Recharge Station
Overflow Ditch Profile

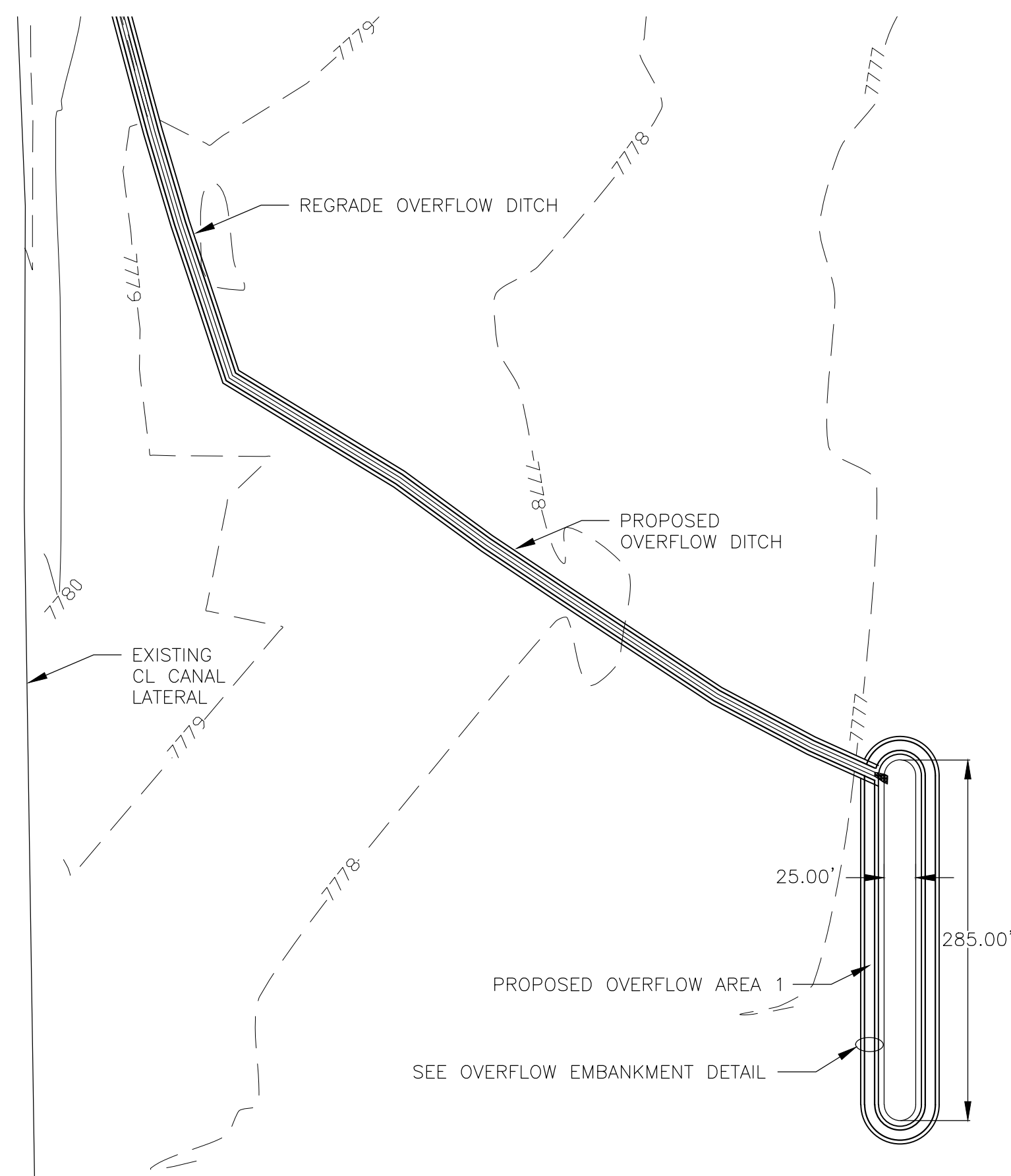
NOTE:

- Two overflow area options are proposed as part of this contract. The client may elect to construct one or the other, or both. If the client opts to construct both ponds, they will be built in a series where water first enters the smaller option 1 pond before entering the larger option 2 pond. In this instance the second pond will be moved towards the East and have its elevations adjusted.
- The table below shows the recharge capacity of both options. As the timeframe increases, recharge capacity declines.
- Both recharge areas are sized for an a scenario where the water table has returned to approximately 25 feet below ground level.
- Overflow Option #1 will consist of approximately 365 cubic yards of cut and 380 cubic yards of fill.
- Overflow Option #2 will consist of approximately 4,525 cubic yards of cut and 990 cubic yards of fill.
- Sheet 3 provides a location for any excess cut to be stockpiled.

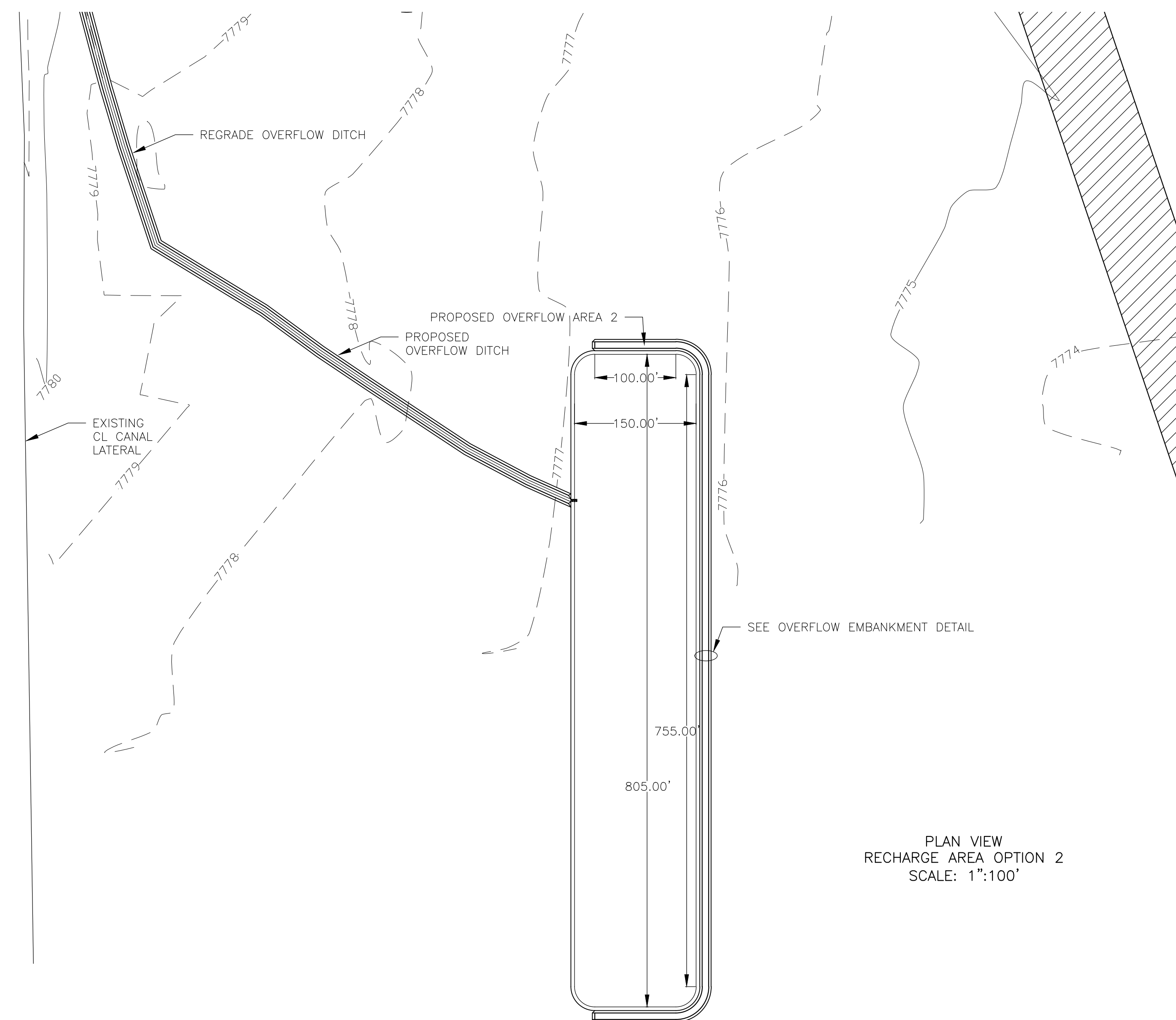
White Property Overflow Area Options				
Dimensions	Recharge Capacity (cfs)			
	30 days	60 days	90 days	
Option 1 275 ft X 25 ft	5.5	5.0	4.5	
Option 2 800 ft X 150 ft	8.0	7.0	6.5	



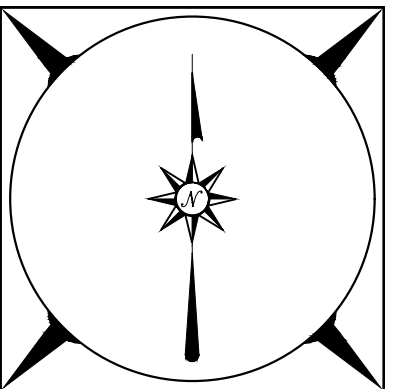
OVERFLOW POND EMBANKMENT
PROFILE VIEW
SCALE: 1"=5'



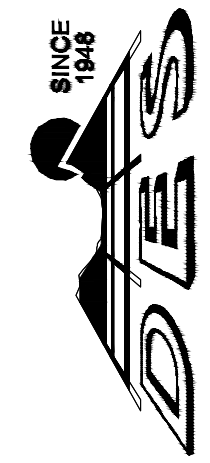
PLAN VIEW
RECHARGE AREA OPTION 1
SCALE: 1"=100'



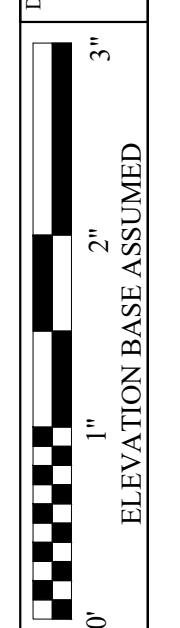
PLAN VIEW
RECHARGE AREA OPTION 2
SCALE: 1"=100'



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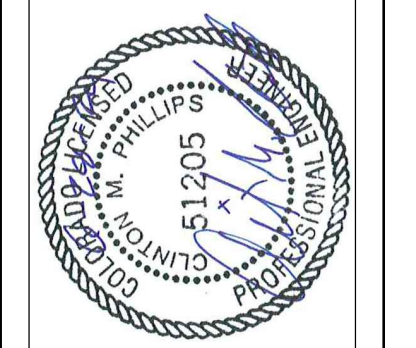
DAVIS ENGINEERING SERVICE, INC.
1314 110th STREET, P.O. BOX 1840
ALAMOSA, CO 81101
PHONE: (719) 586-3004
FAX: (719) 586-3172



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DATE: AS NOTED
DATE: 6/28/2024

DESIGNED BY: CMP, WSS	CHECKED BY: WSS
DRAWN BY: CMP	DATE: 6/28/2024



Special Improvement
Subdistrict No. 1
8805 Independence Way
Alamosa, CO 81101
White Property Recharge Station
Overflow Pond Detail Sheet