

May 27, 2025

Gilbert LaForce, PE  
El Paso County  
2880 International Circle, Suite 110  
Colorado Springs, CO 80910

Re: **Winsome Filing No. 3 PCM Certification Letter**  
**El Paso County, Colorado**

Dear Mr. LaForce:

Add clarification that there are both ponds (A, 1, 2, 3) and runoff reduction providing WQCV treatment on site. Runoff reduction must be certified as well and include calcs

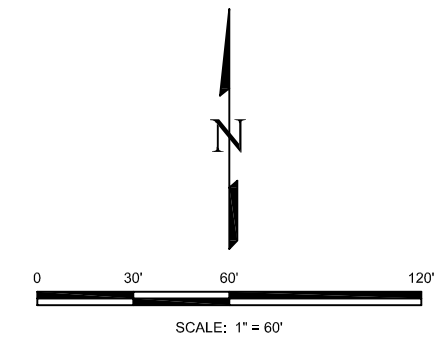
This letter serves as the certification for Winsome Filing No. 3, El Paso County, CO consistent with El Paso County Engineering Manual ("ECM") Section 5.10.6.B, which states that Engineering Record Drawings shall be accompanied by a certification letter from the Engineer of Record which shall state that facilities constructed provide the required storage volume, meet the required release rates, the stage areas, elevations and outlet dimensions. Based upon this information and information gathered during periodic site visits to the site during significant/key phases of the infrastructure installation, Kimley-Horn & Associates, Inc. is of the opinion that the work performed under the County Permit, per Section 5.10.6.B of the ECM, have been constructed in general compliance with the approved Construction Plans as filed with the County dated April 28, 2023 and approved by El Paso County on May 31, 2023.

**Statement Of Engineer In Responsible Charge:**

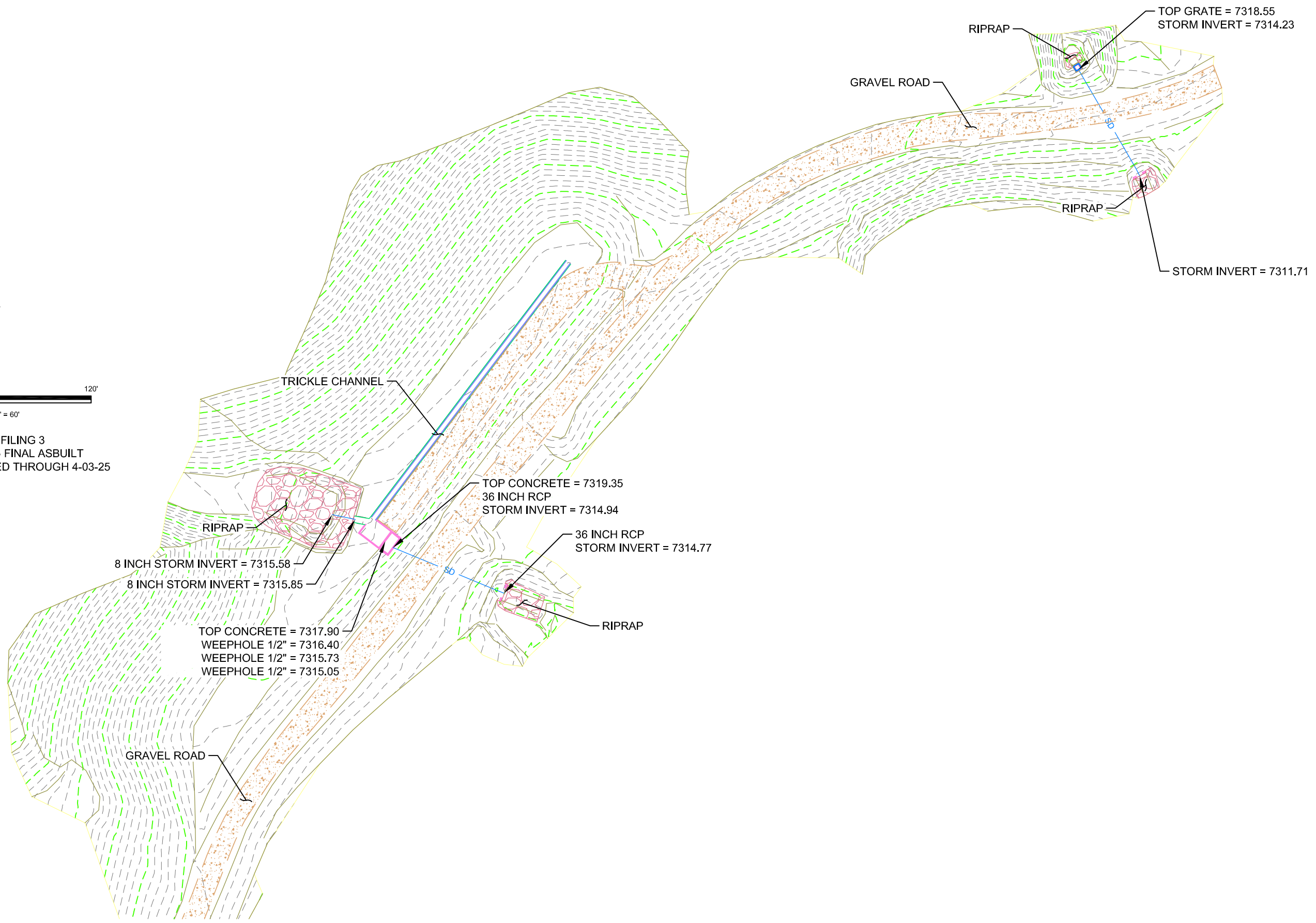
I, Kevin R. Kofford, a registered Professional Engineer in the State of Colorado, in accordance with Sections 5.2 and 5.3 of the Bylaws and Rules of the State Board of Registration for Professional Engineers and Professional Land Surveyors, do hereby certify that I or a person under my responsible charge periodically observed the construction of the above-mentioned project. Based on the on-site field observations and review of pertinent documentation, it is my professional opinion that the required infrastructure improvements have been installed and are in general compliance with the approved Construction Plans as filed with El Paso County.

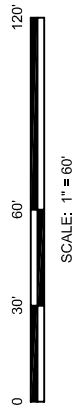


Kevin R. Kofford, P.E.  
Colorado No. 57234

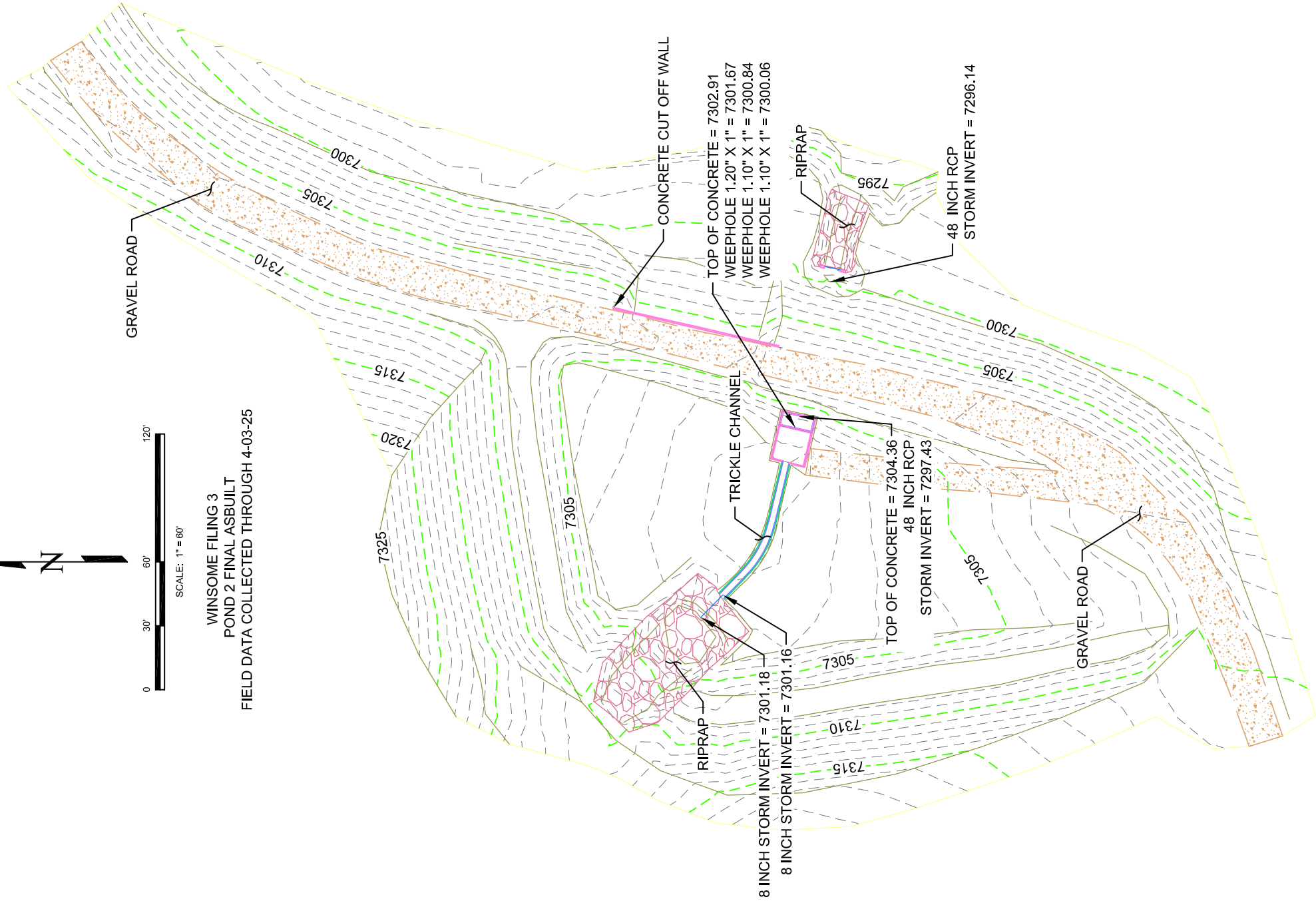


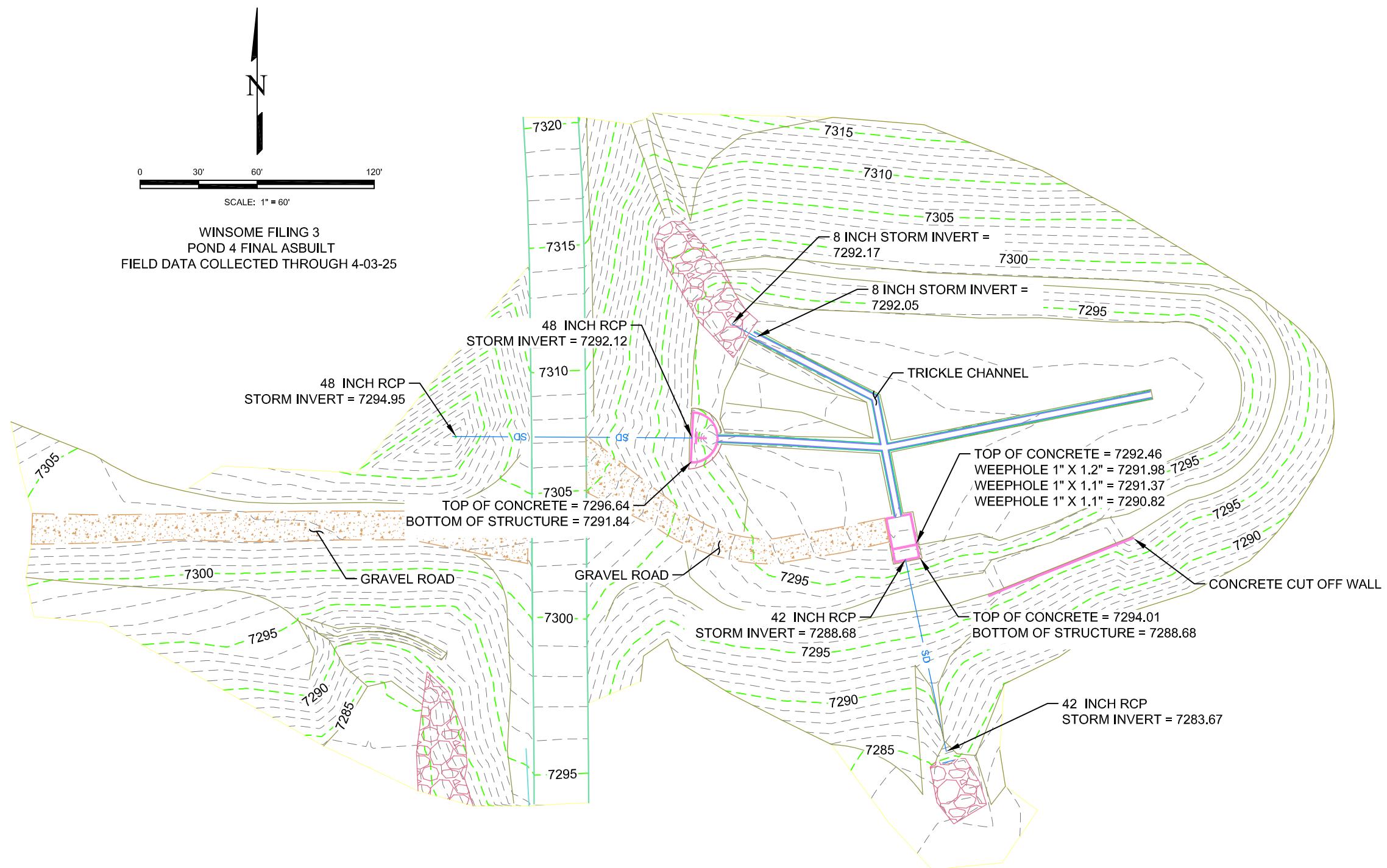
WINSOME FILING 3  
POND 1 AND HB5 FINAL ASBUILT  
FIELD DATA COLLECTED THROUGH 4-03-25



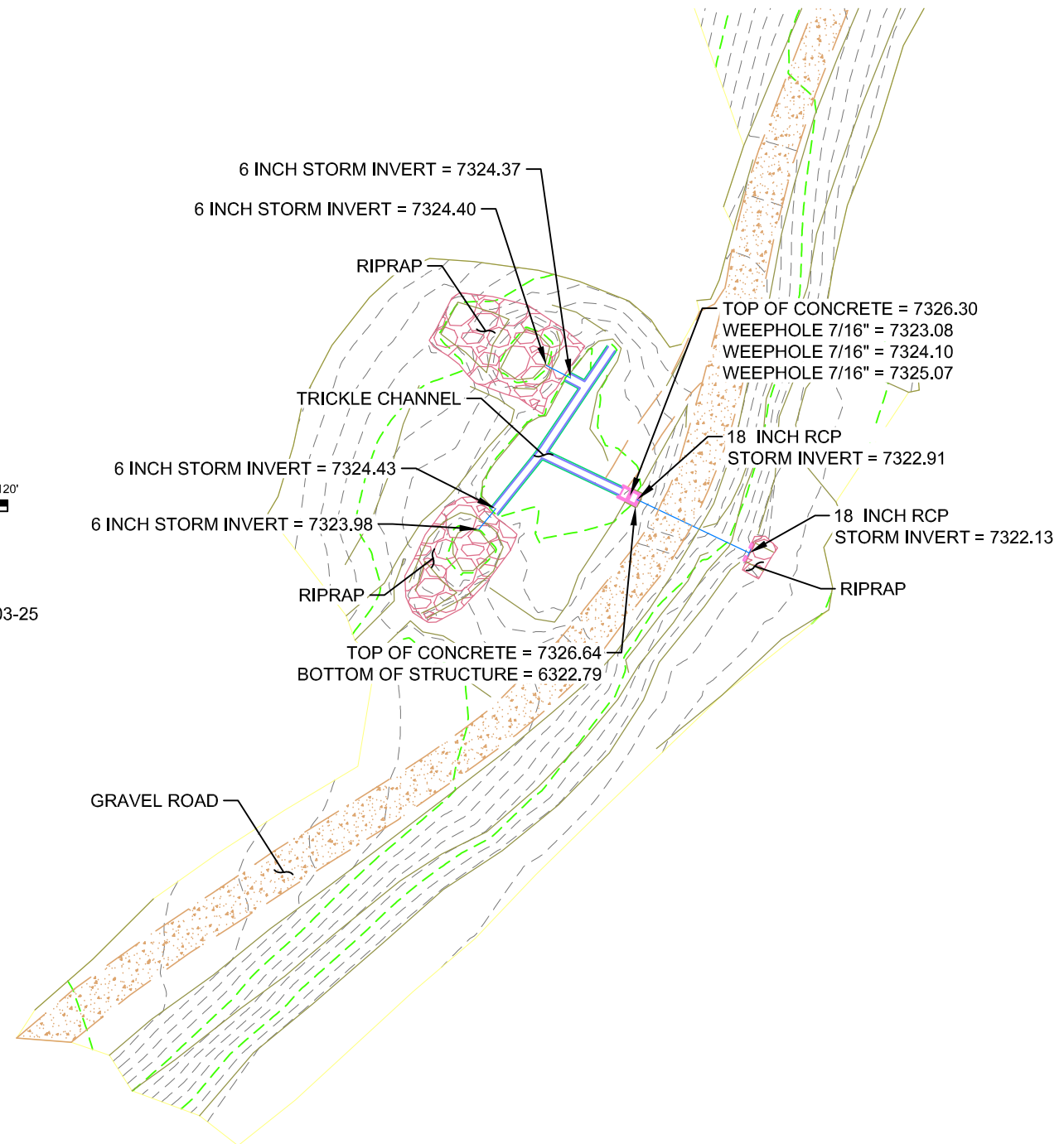
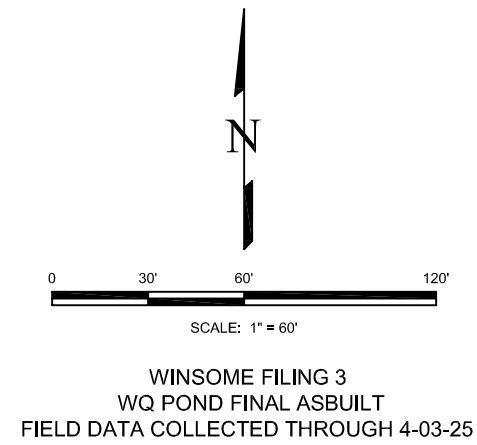


WINSOME FILING 3  
POND 2 FINAL ASBUILT  
FIELD DATA COLLECTED THROUGH 4-03-25



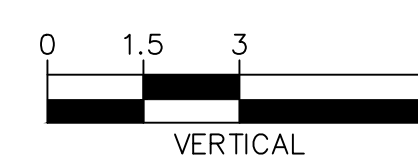
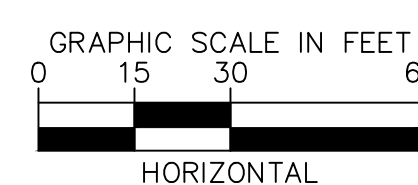
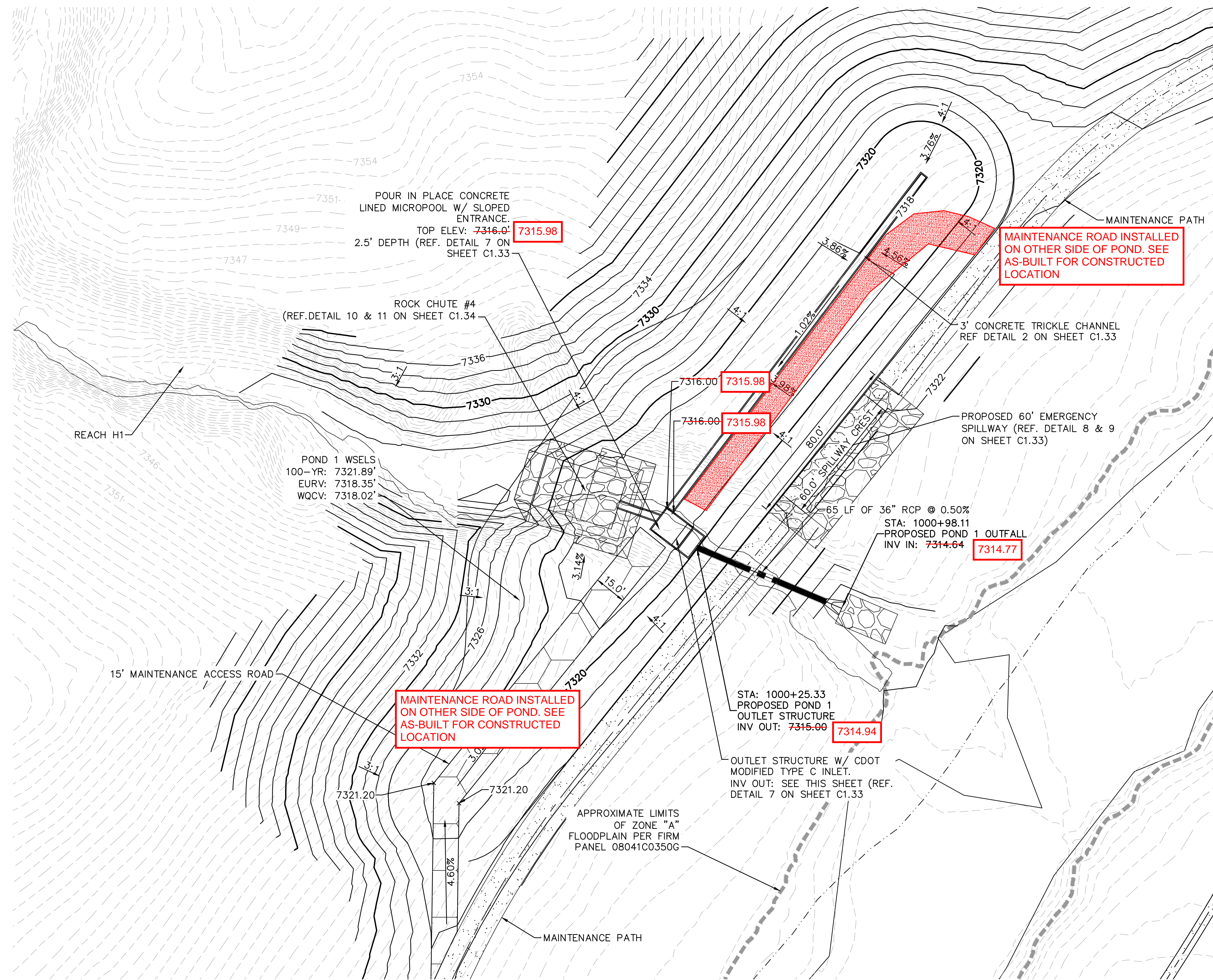
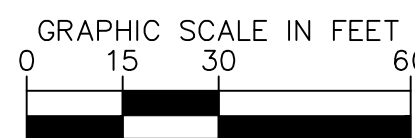
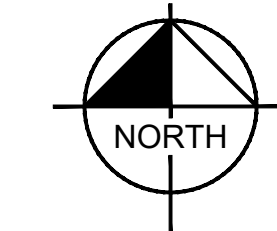




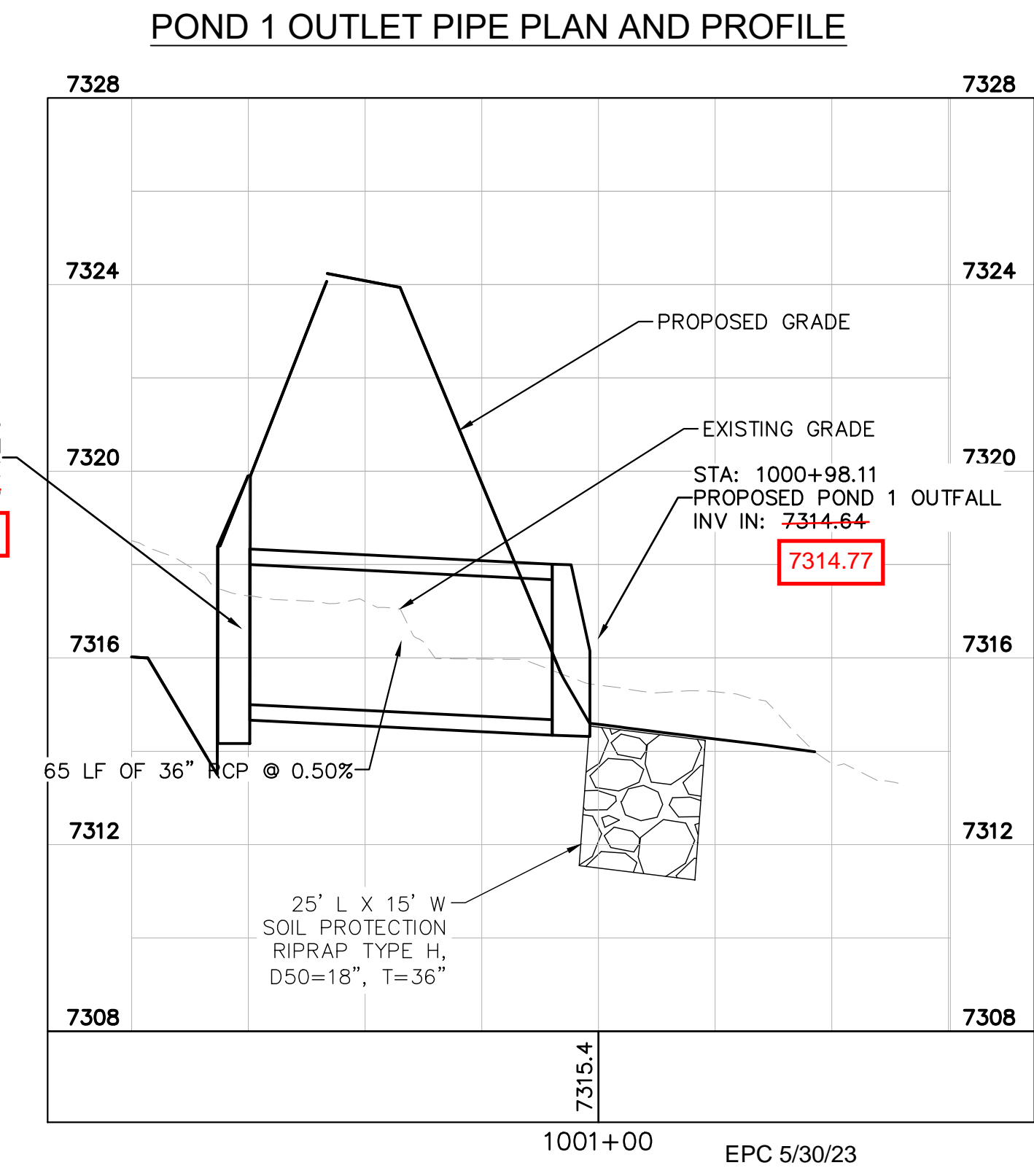




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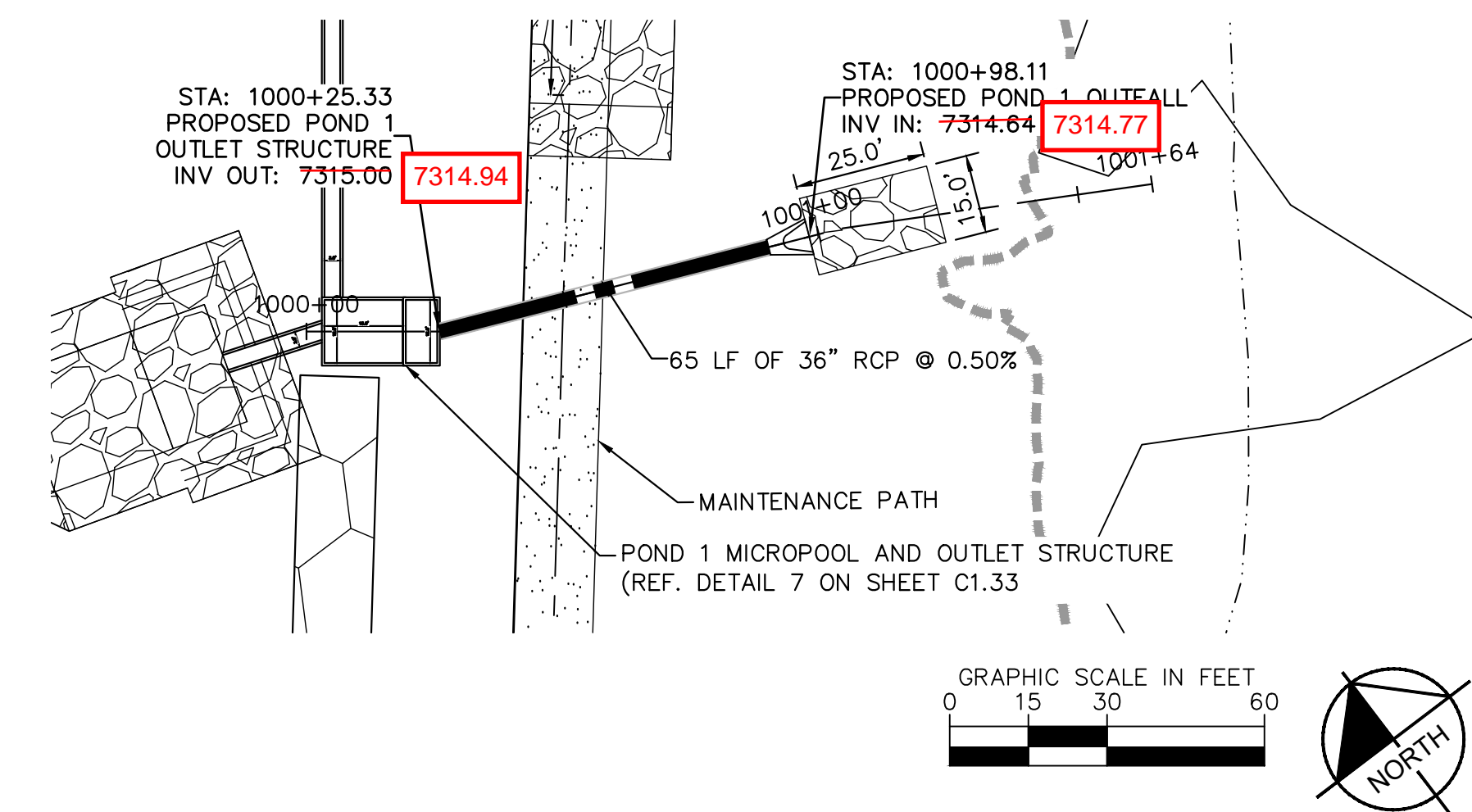


STA: 1000+25.33  
PROPOSED POND 1  
OUTLET STRUCTURE  
INV OUT: 7315.00  
7314.94



LEGEND

FG	FINISH GRADE
FBT	TOP OF FOREBAY AT FINISHED GRADE
FBB	BOTTOM OF FOREBAY AT FINISHED GRADE
TCT	TOP OF TRICKLE CHANNEL AT FINISHED GRADE
TCB	BOTTOM OF TRICKLE CHANNEL AT FINISHED GRADE
MPT	TOP OF MICROPOOL AT FINISHED GRADE
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GRATE	OUTLET STRUCTURE GRATE ELEVATION
ME	MATCH EXISTING
PT	TOP OF STEEL PLATE AT FINISHED GRADE
PB	BOTTOM OF STEEL PLATE AT FINISHED GRADE
-----	FLOODPLAIN LIMITS
-----	TOP OF POND
-----	PROPOSED STORM SEWER



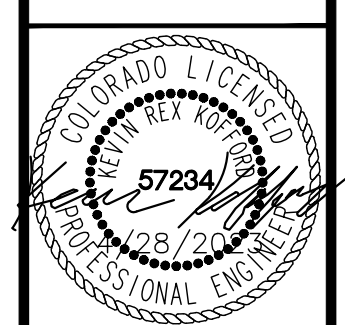
NO.	REVISION	COUNTY COMMENTS	DATE	BY
1		COUNTY COMMENTS	3/10/23	KRK
2		COUNTY COMMENTS	4/28/23	KRK

**Kimley»Horn**

2021 KIMLEY-HORN AND ASSOCIATES, INC.  
2 North Nevada Avenue Suite 300  
Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: KRK  
DRAWN BY: A.J.L.  
CHECKED BY: KRK  
DATE: 12/16/2021

WINSOME FILING NO. 3  
EL PASO COUNTY, COLORADO  
CONSTRUCTION DOCUMENTS  
POND 1 OVERVIEW

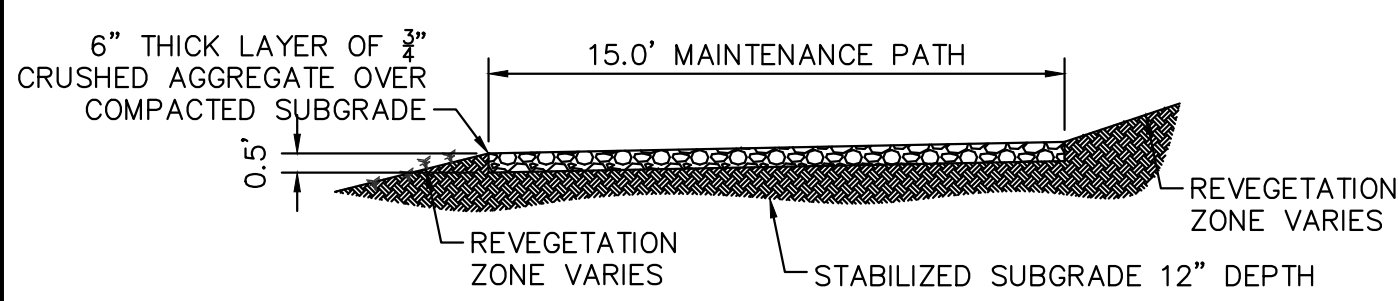


PROJECT NO.  
196106001

SHEET  
**C1.32**

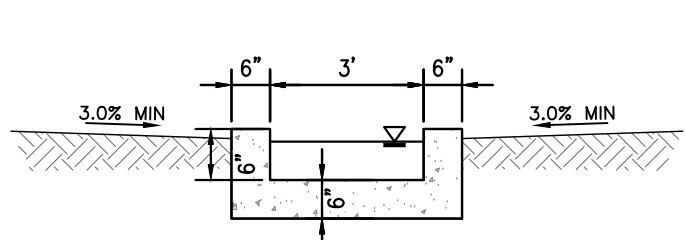


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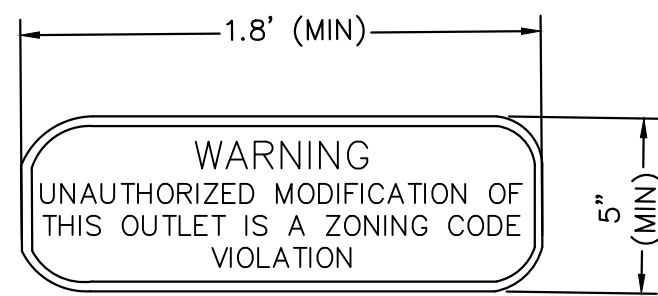
### 1 MAINTENANCE ROAD

- 1"=5'
- MAINTENANCE PATH NOTES
1. MAINTENANCE PATH SHALL INCLUDE SUBGRADE PREPARATION, GRAVEL BASE, AND COMPACTION.



### 2 CONCRETE TRICKLE CHANNEL

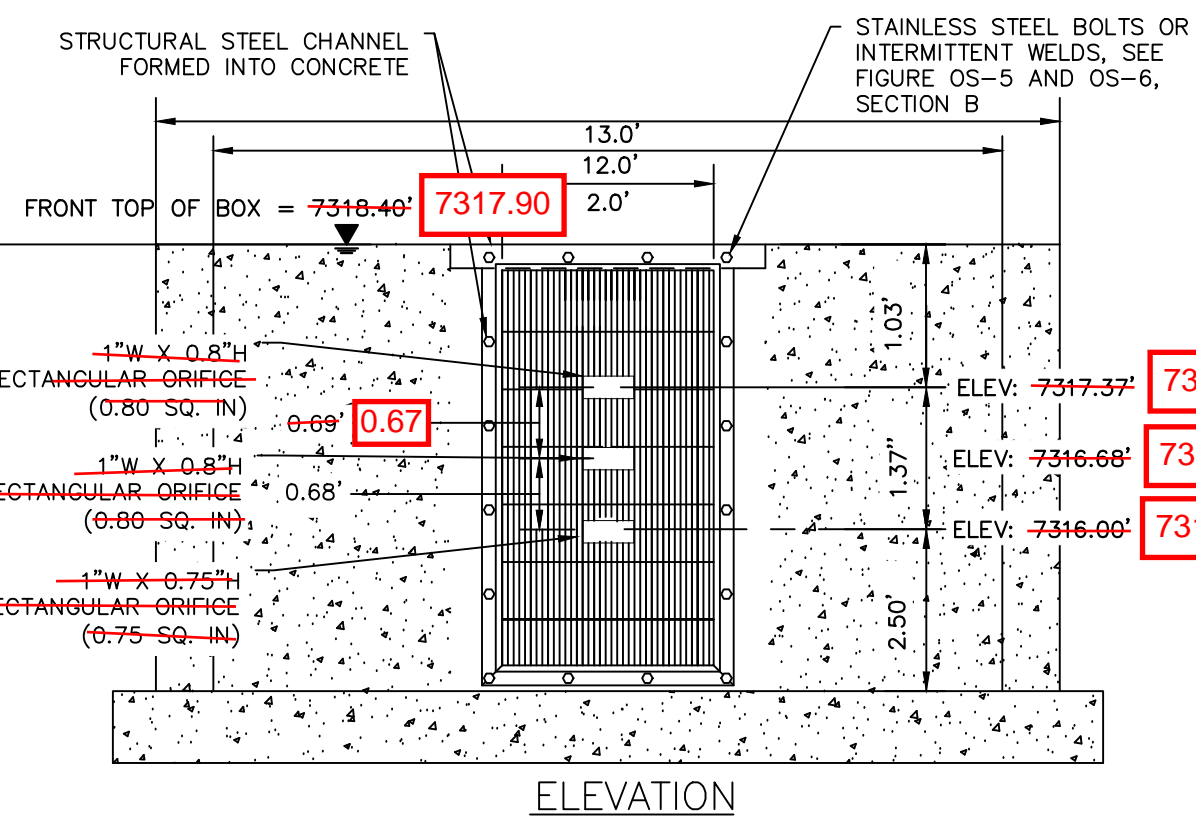
N.T.S.



### 3 OUTLET SIGNAGE

N.T.S.

- OUTLET SIGNAGE NOTES
1. SIGN SHALL BE A MINIMUM OF 0.75 SQUARE FEET AND SHALL BE ATTACHED TO THE OUTLET OR POSTED NEARBY.



### 4 ORIFICE PLATE AND TRASH RACK DETAIL

N.T.S.

#### ORIFICE PLATE NOTES

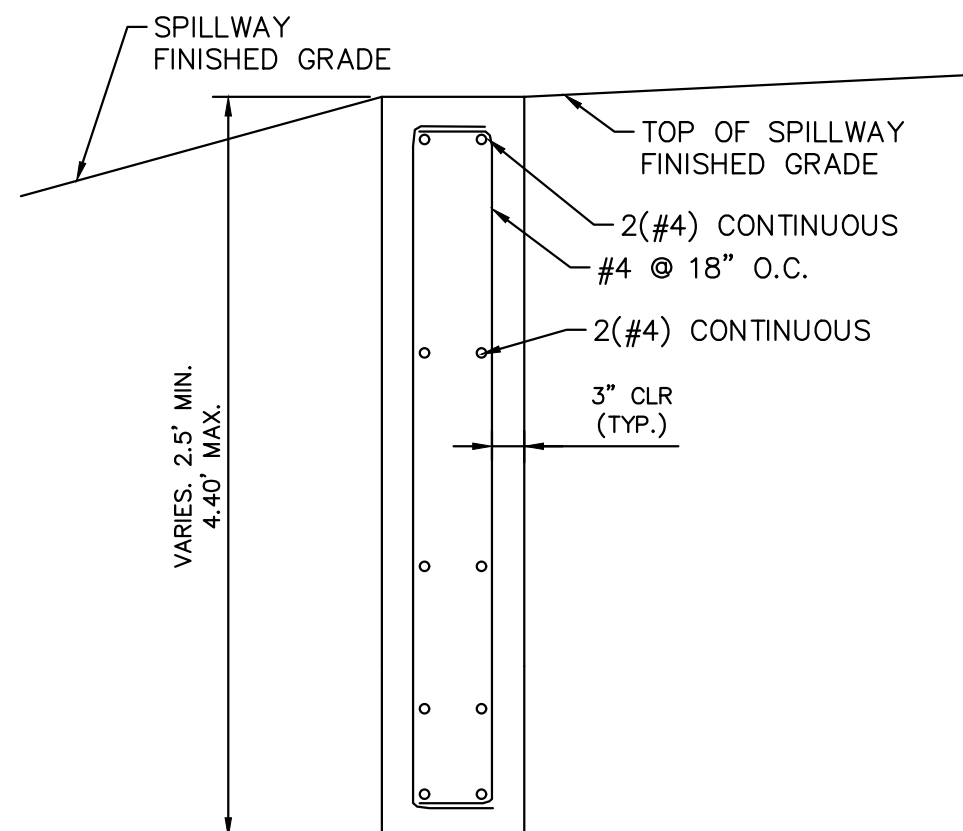
1. PROVIDE CONTINUOUS NEOPRENE GASKET MATERIAL BETWEEN THE ORIFICE PLATE AND CONCRETE.
2. BOLT PLATE TO CONCRETE 12" MAX. ON CENTER, WITH A PLATE THICKNESS OF 0.25".

#### EURV AND WQCV TRASH RACKS

1. WELL-SCREEN TRASH RACKS SHALL BE STAINLESS STEEL AND SHALL BE ATTACHED BY INTERMITTENT WELDS ALONG THE EDGE OF THE MOUNTING FRAME.
  2. BAR GATE TRASH RACKS SHALL BE ALUMINUM AND SHALL BE BOLTED USING STAINLESS STEEL HARDWARE.
- GAPS IN TRASH RACK WERE INSTALLED HORIZONTALLY, RATHER THAN VERTICALLY AS SHOWN IN THE PLAN

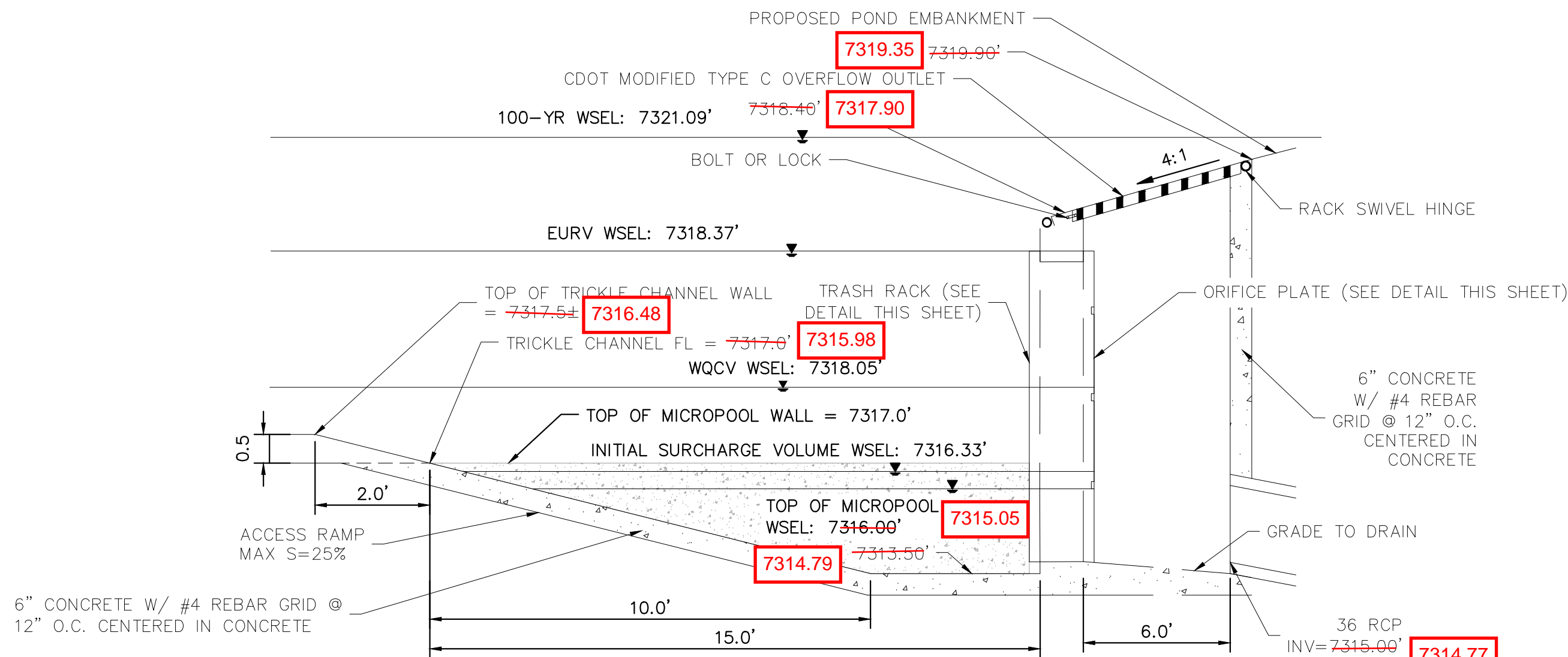
#### OVERFLOW SAFETY GRATES

1. ALL SAFETY GRATES SHALL BE MOUNTED USING STAINLESS STEEL HARDWARE AND PROVIDED WITH HINGED AND LOCKABLE OR BOLTABLE ACCESS PANELS.
2. SAFETY GRATES SHALL BE STAINLESS STEEL, ALUMINUM, OR STEEL. STEEL GRATES SHALL BE HOT DIP GALVANIZED AND MAY BE HOT POWDER COATED AFTER GALVANIZING.



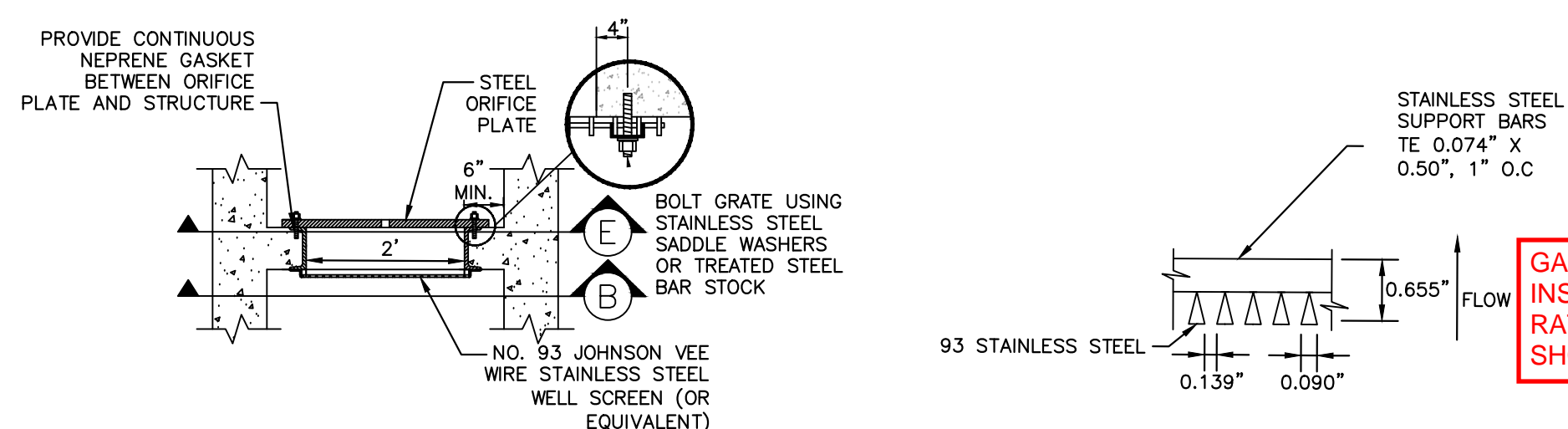
### 6 SECTION CREST WALL DETAIL

N.T.S.



### 7 OUTLET STRUCTURE DETAIL

N.T.S.

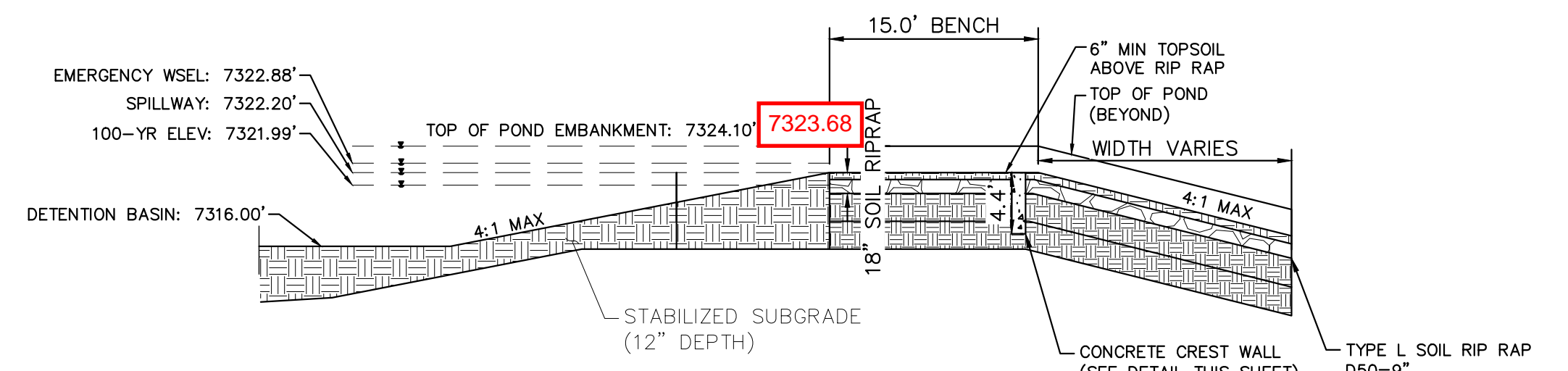


### A SECTION A

N.T.S.

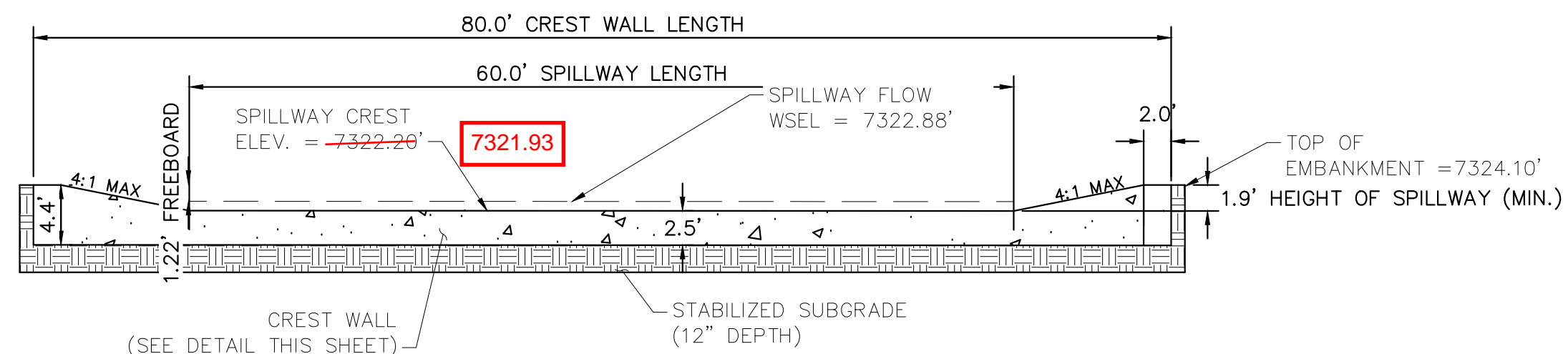
### B SECTION B

N.T.S.



### 8 EMERGENCY SPILLWAY DETAILS

1"=10'



### 9 EMERGENCY SPILLWAY CREST WALL

1"=10'

EPC 5/30/23

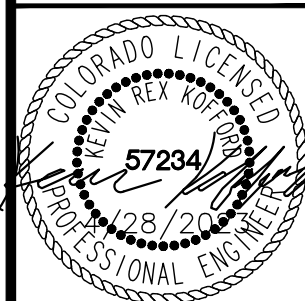


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CHECKED BY: KRK  
DATE: 12/16/2021

WINSOME FILING NO. 3  
EL PASO COUNTY, COLORADO  
CONSTRUCTION DOCUMENTS  
POND 1 DETAILS



PROJECT NO.  
196106001

SHEET

C1.33



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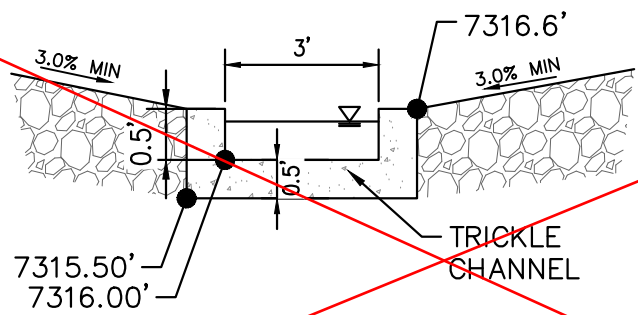


Know what's below.  
Call before you dig.



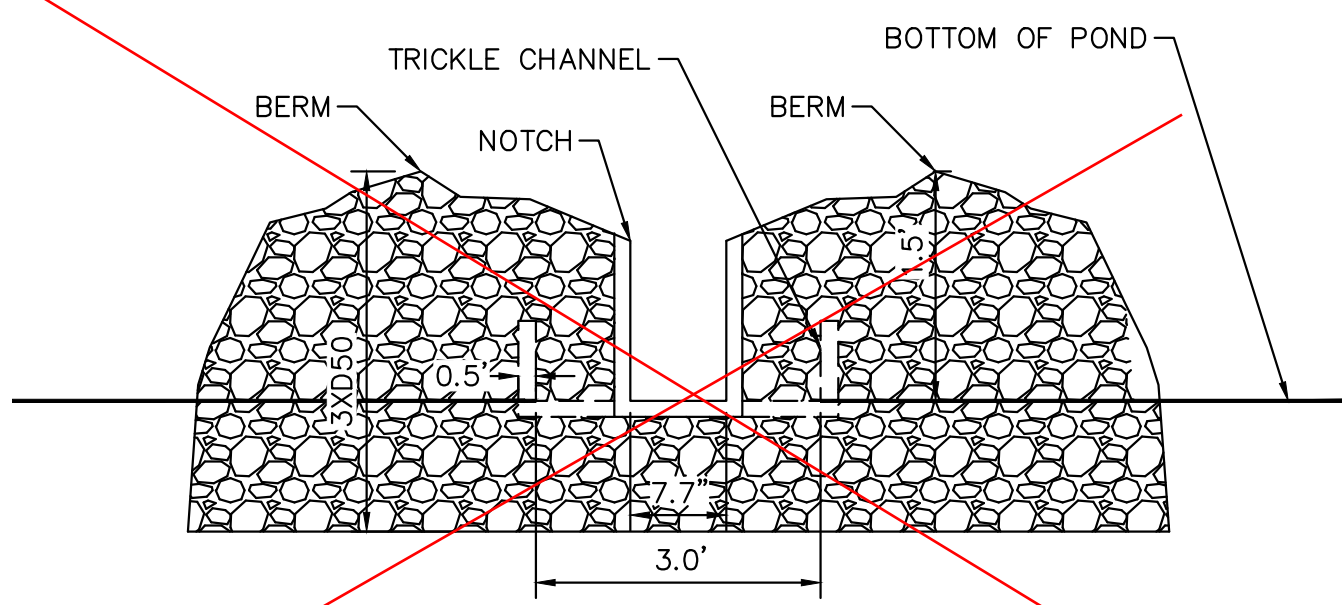
### 13 ROCK CHUTE TO TRICKLE CHANNEL TRANSITION

N.T.S.



### 12 ROCK CHUTE #4 PROFILE- CROSS SECTION 2

N.T.S.

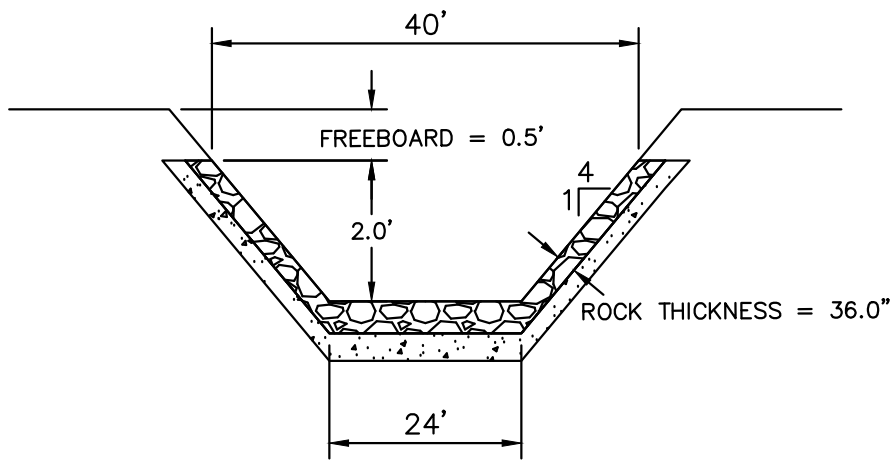


NOTCH REPLACED  
WITH PVC PIPE PER  
FIELD CHANGE.  
VERIFIED WITH EPC  
STORMWATER PIROW  
TO FIELD CHANGE

Provide detail for PVC  
pipe to trickle channel

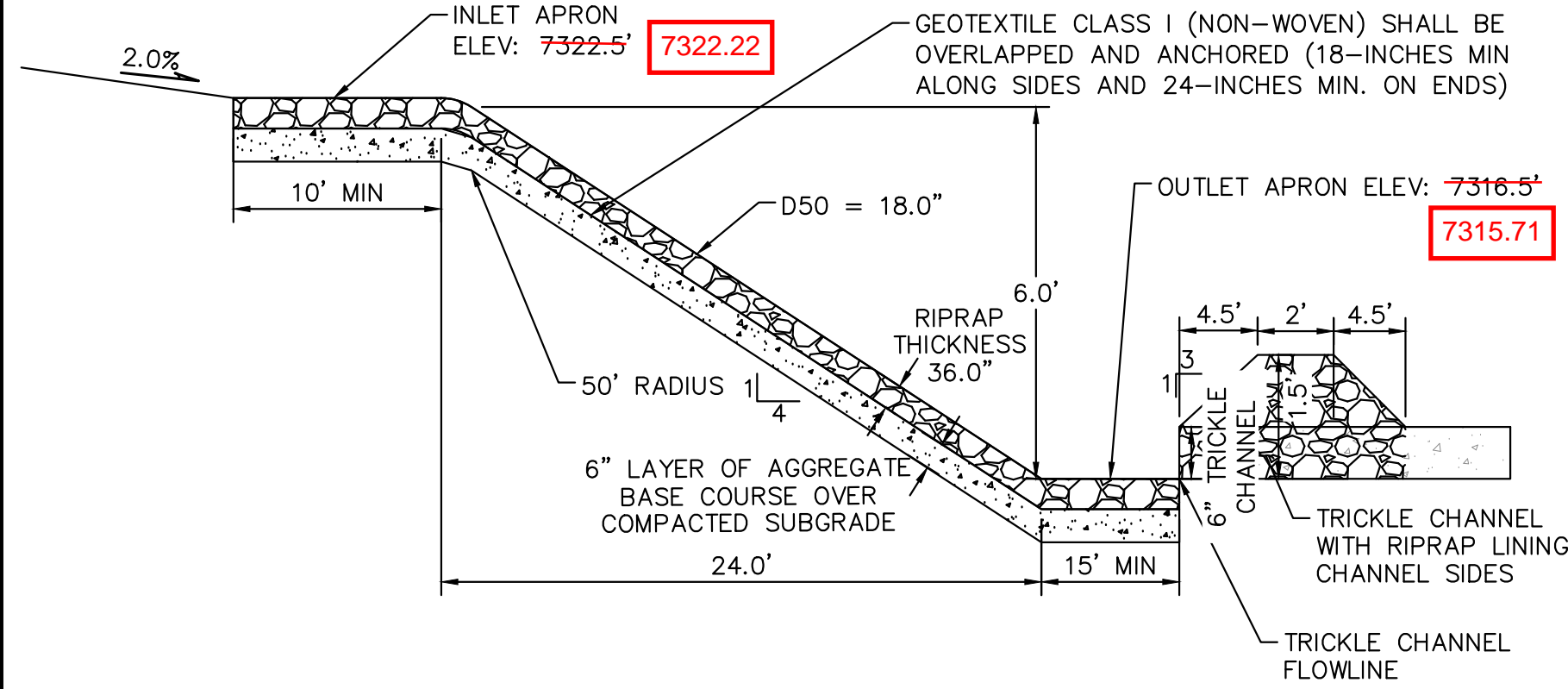
### 11 ROCK CHUTE #4 PROFILE- CROSS SECTION 2

N.T.S.



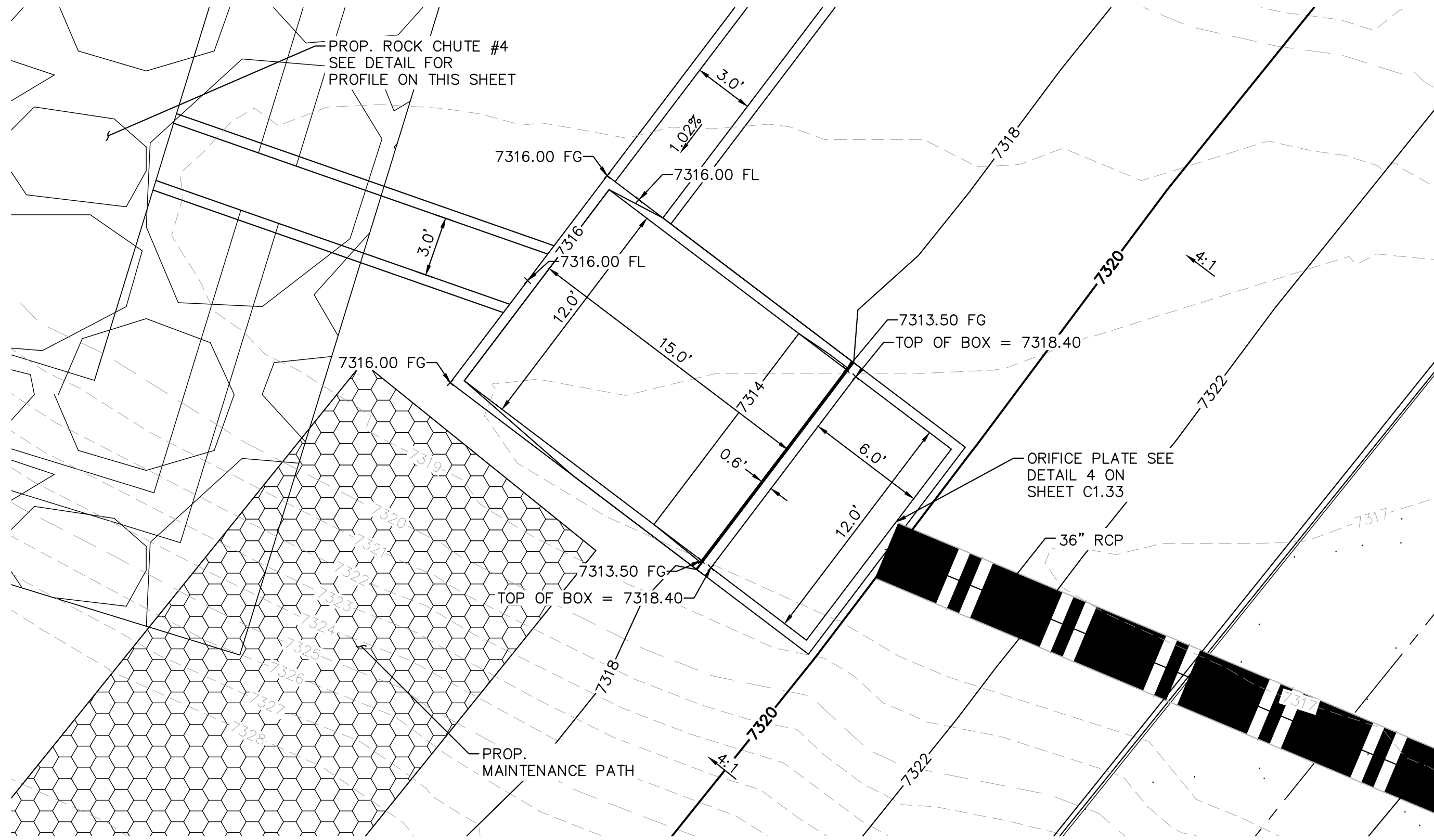
### 10 ROCK CHUTE #4 PROFILE- CROSS SECTION 1

N.T.S.



### 16 OUTLET STRUCTURE PLAN VIEW DETAIL

1"=5'



### 15 STANDARD ROCK CHUTE DIMENSION TABLE

N.T.S.

1. SEE GRADING PLANS FOR ROCK CHUTE LOCATIONS

Rock Chute ID	Channel Location	Flow (cfs)	Upstream Inlet Apron Length (ft)	Drop (ft) (Inlet Apron to Outlet Apron)	Chute Length (ft)	Downstream Outlet Apron Length (ft)	Chute Width (ft)	D50 (in)	Rock Chute Thickness (in)	Radius (ft)	Min Rock Chute Depth (ft)	Rock Chute Depth (ft)	Top Chute Width (ft)
4	Pond 1	107	10	6	24	15	24	18	36	50	1.27	1.50	40
6	Pond 2	110	10	8	32	18	17	18	36	50	1.57	2.00	33
11	Pond 4	26	10	10	40	11	10	9	18	25	0.85	1.50	26
12	WQ Pond	100	11	5	20	20	12	18	36	50	1.81	2.00	28
13	WQ Pond	57	10	3	12	16	10	18	36	50	1.38	1.50	26

WINSOME FILING NO. 3  
EL PASO COUNTY, COLORADO  
CONSTRUCTION DOCUMENTS  
POND 1 DETAILS



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SHEET

C1.34

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DESIGNED BY: KRK  
DRAWN BY: A.J.L.  
CHECKED BY: KRK  
DATE: 12/16/2021

NO.	REVISION	BY	DATE	APPR.
2	COUNTY COMMENTS	KRK	4/28/23	KRK
1	COUNTY COMMENTS	KRK	3/10/23	KRK



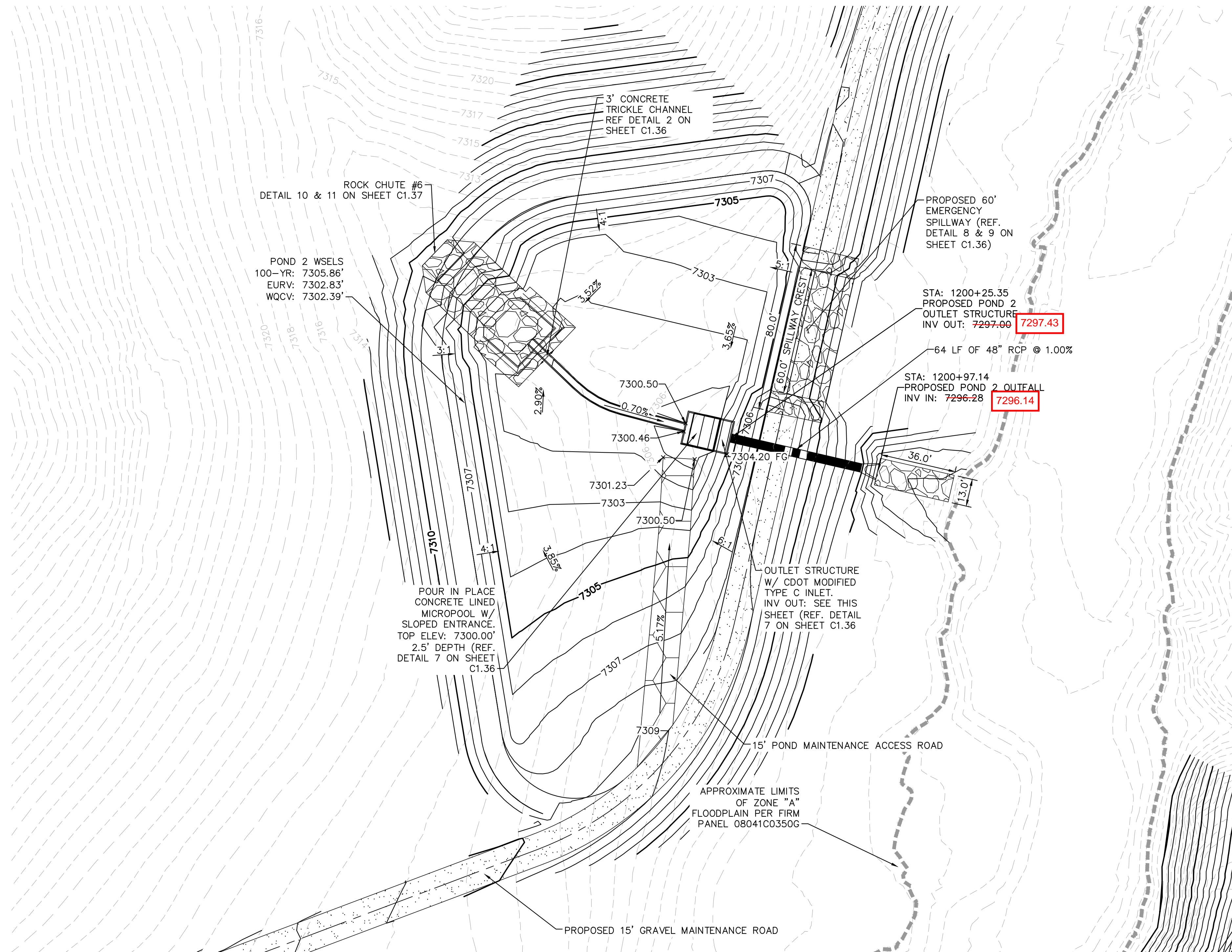
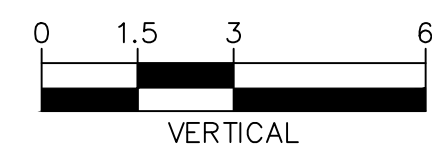
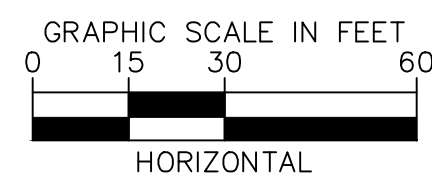
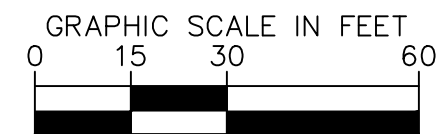
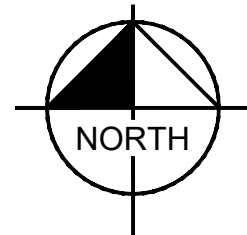
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Know what's below.  
Call before you dig.



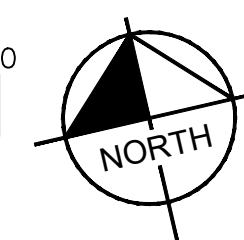
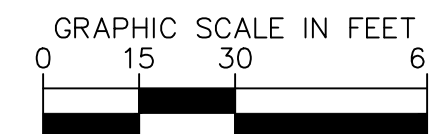
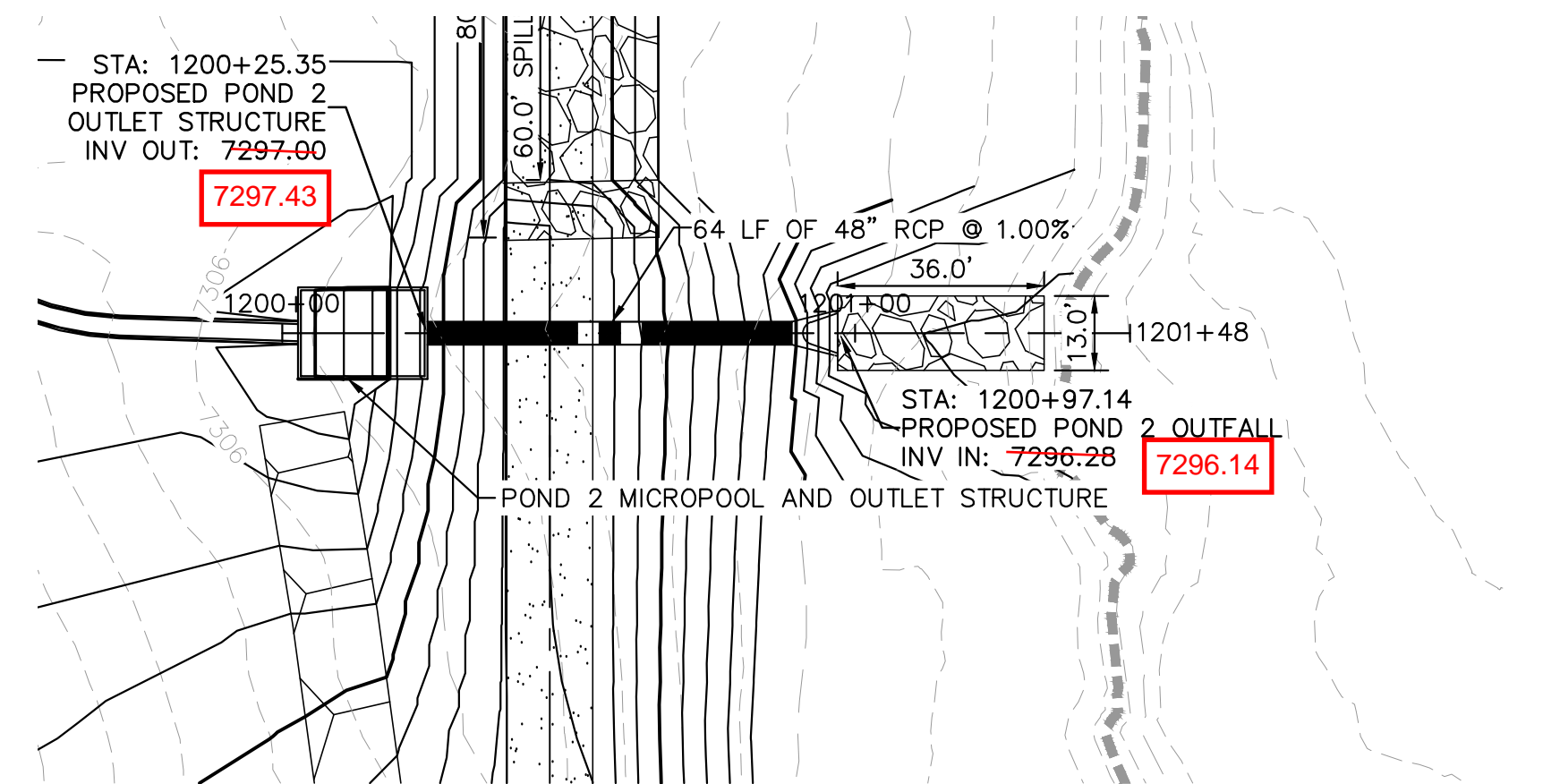
CALL UTILITY NOTIFICATION  
CENTER OF COLORADO  
1-800-922-1987  
CALL 2-BUSINESS DAYS IN ADVANCE  
BEFORE YOU DIG, GRADE, OR EXCAVATE  
FOR THE MARKING OF UNDERGROUND  
MEMBER UTILITIES



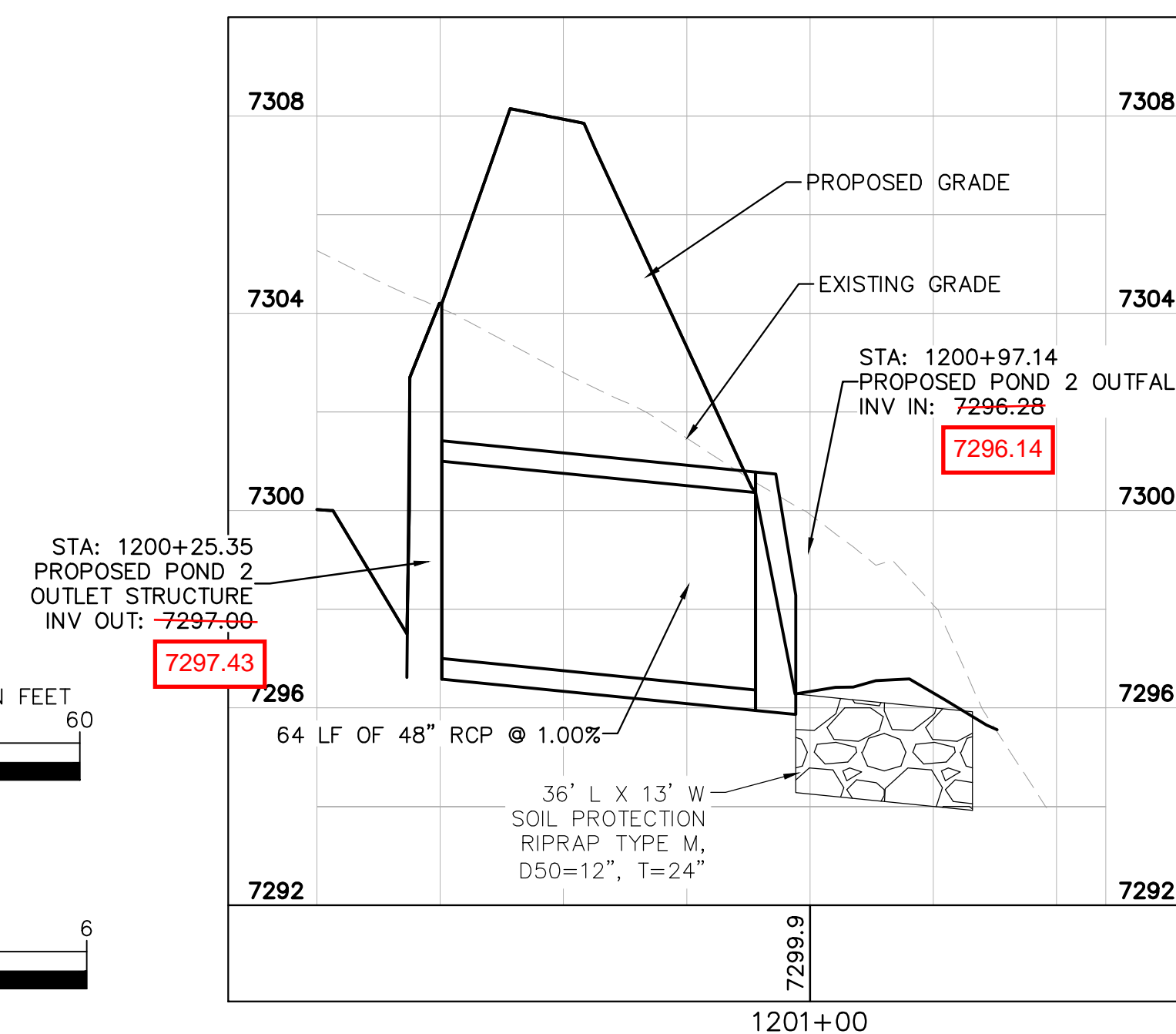
#### LEGEND

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ME	MATCH EXISTING
PT	TOP OF STEEL PLATE AT FINISHED GRADE
PB	BOTTOM OF STEEL PLATE AT FINISHED GRADE

■■■■■■■■■■ FLOODPLAIN LIMITS  
▬▬▬▬▬▬ TOP OF POND  
▬▬▬▬▬▬ PROPOSED STORM SEWER



POND 2 OUTLET PIPE PLAN AND PROFILE



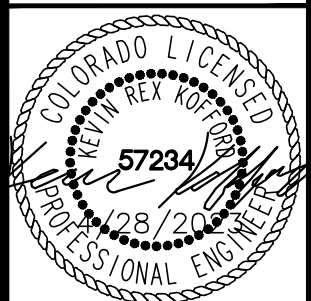
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POND 2 OVERVIEW



PROJECT NO.  
196106001

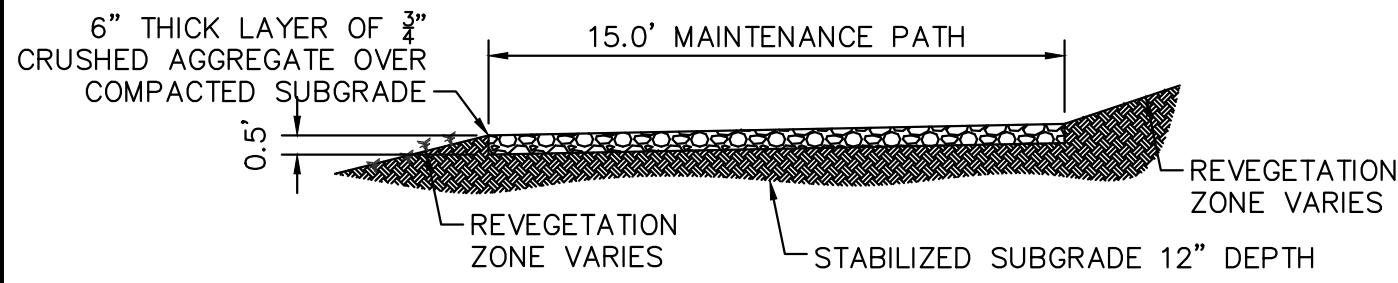
SHEET

C1.35

NO.	REVISION	COUNTY COMMENTS	COUNTY COMMENTS	BY	DATE	APPR.
2	1			KRK	4/28/23	KRK
				KRK	3/10/23	KRK

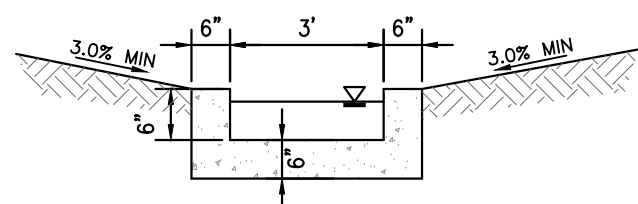


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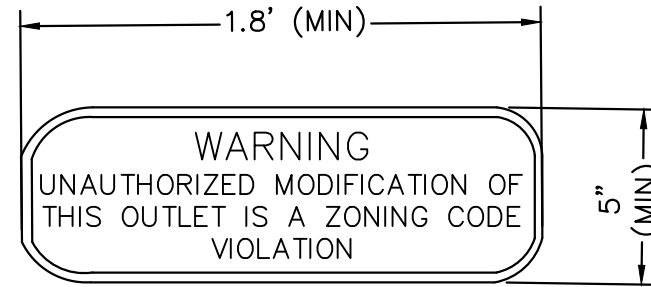
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- 1"=5'
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#### 2 CONCRETE TRICKLE CHANNEL

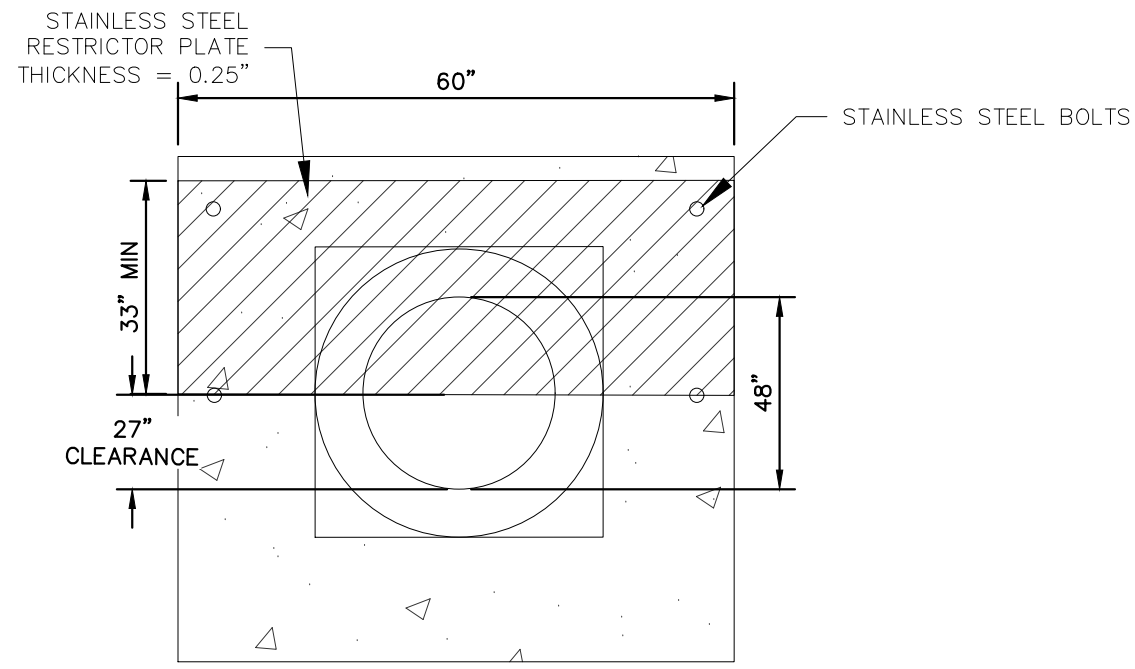
N.T.S.



#### 3 OUTLET SIGNAGE

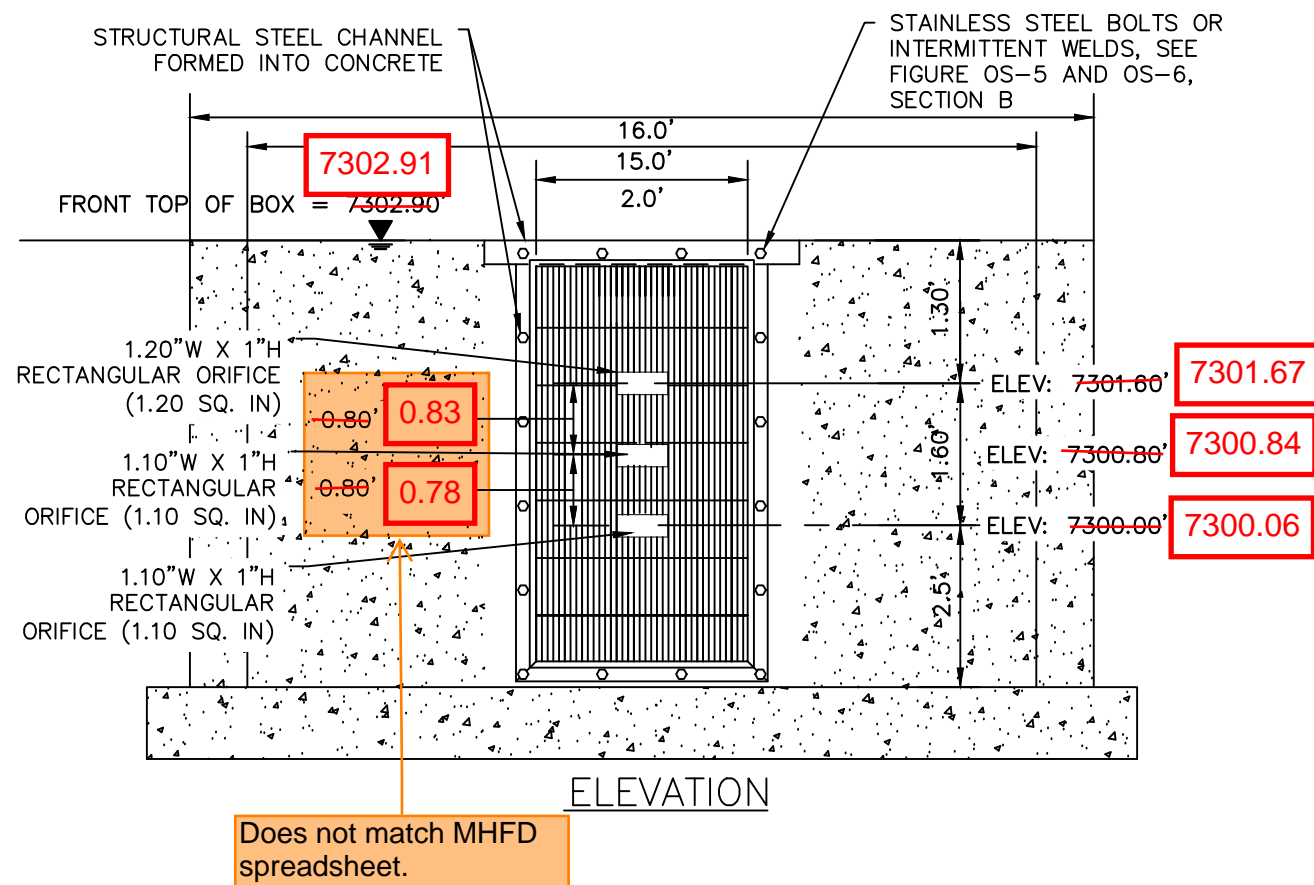
N.T.S.

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#### 5 100-YEAR FLOW RESTRICTOR B

N.T.S.



#### 4 ORIFICE PLATE AND TRASH RACK DETAIL

N.T.S.

##### ORIFICE PLATE NOTES

1. PROVIDE CONTINUOUS NEOPRENE GASKET MATERIAL BETWEEN THE ORIFICE PLATE AND CONCRETE.
2. BOLT PLATE TO CONCRETE 12" MAX. ON CENTER, WITH A PLATE THICKNESS OF 0.25".

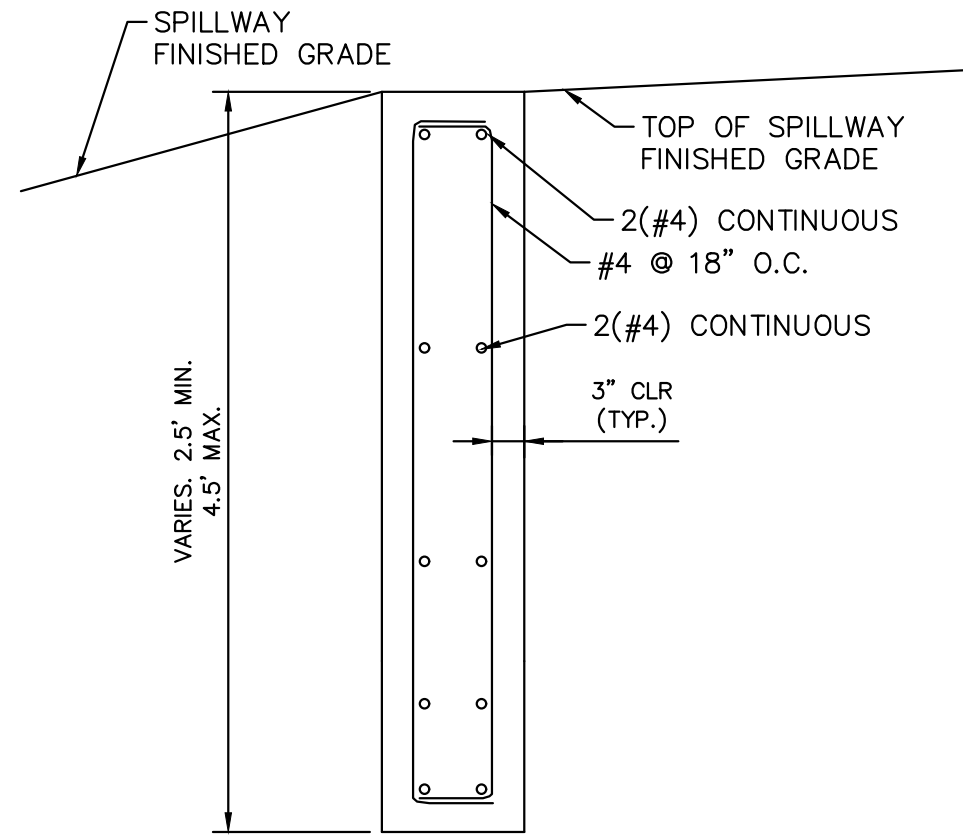
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1. WELL-SCREEN TRASH RACKS SHALL BE STAINLESS STEEL AND SHALL BE ATTACHED BY INTERMITTENT WELDS ALONG THE EDGE OF THE MOUNTING FRAME.
2. BAR GATE TRASH RACKS SHALL BE ALUMINUM AND SHALL BE BOLTED USING STAINLESS STEEL HARDWARE.
3. TRASH RACK OPEN AREAS ARE FOR SPECIFIED TRASH RACK MATERIALS. TOTAL TRASH RACK SIZE MAY NEED TO BE ADJUSTED FOR MATERIALS HAVING DIFFERENT OPEN AREA/GROSS AREA RATIO (R VALUE).
4. STRUCTURAL DESIGN OF TRASH RACKS SHALL BE BASED ON FULL HYDROSTATIC HEAD WITH ZERO HEAD DOWNSTREAM OF THE RACK.

##### OVERFLOW SAFETY GRATES

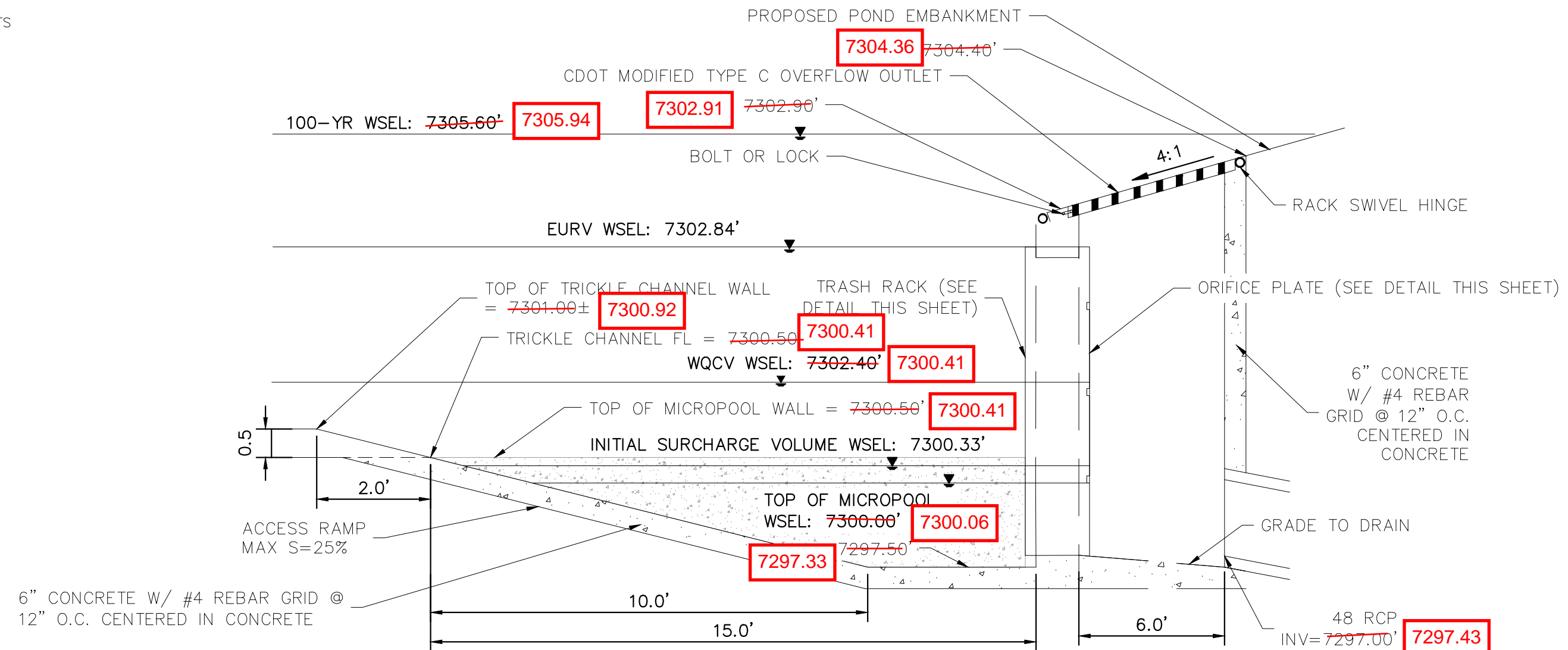
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2. SAFETY GRATES SHALL BE STAINLESS STEEL, ALUMINUM, OR STEEL. STEEL GRATES SHALL BE HOT DIP GALVANIZED AND MAY BE HOT POWDER COATED AFTER GALVANIZING.
3. SAFETY GRATES SHALL BE DESIGNED SUCH THAT THE DIAGONAL DIMENSION OF EACH OPENING IS SMALLER THAN THE DIAMETER OF THE OUTLET PIPE.
4. STRUCTURAL DESIGN OF SAFETY GRATES SHALL BE BASED ON FULL HYDROSTATIC HEAD WITH ZERO HEAD DOWNSTREAM OF THE RACK.

GAPS IN TRASH RACK WERE INSTALLED HORIZONTALLY, RATHER THAN VERTICALLY AS SHOWN IN THE PLAN



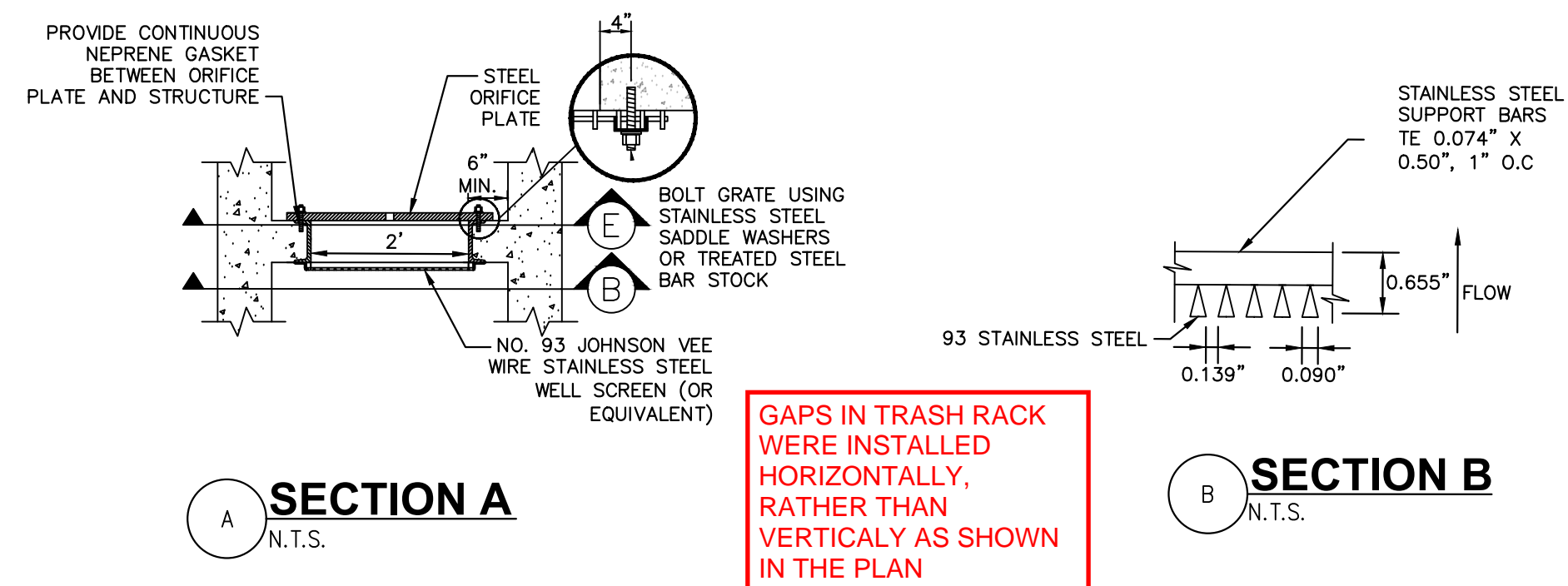
#### 6 SECTION CREST WALL DETAIL

N.T.S.



#### 7 OUTLET STRUCTURE DETAIL

N.T.S.

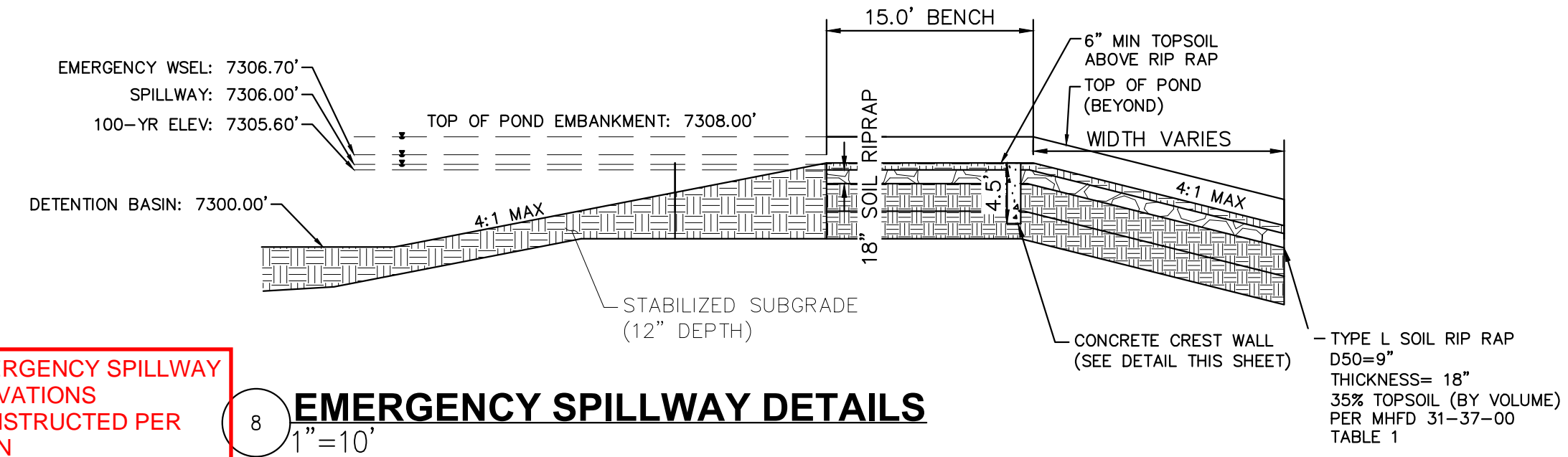


#### A SECTION A

N.T.S.

#### B SECTION B

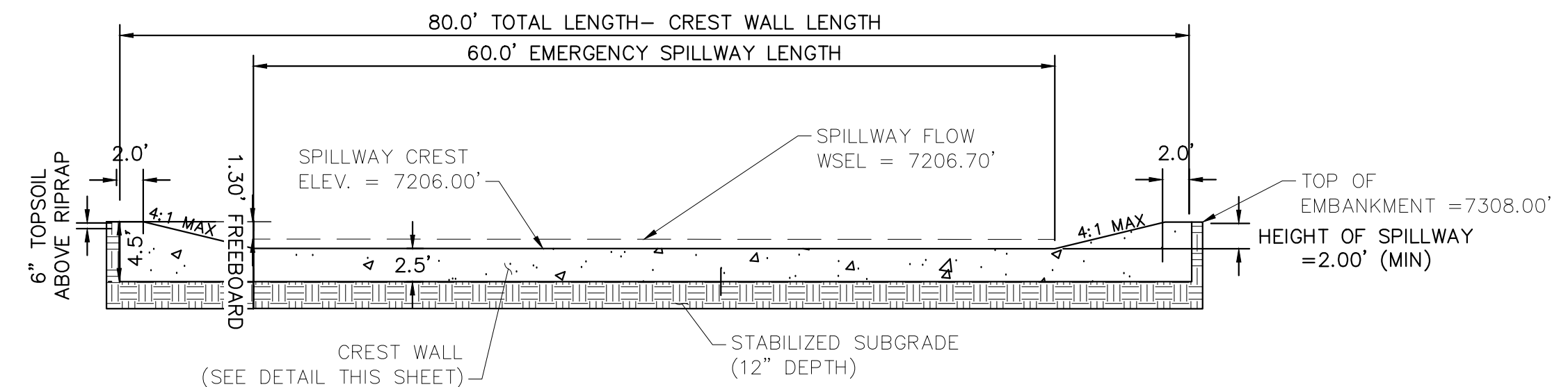
N.T.S.



EMERGENCY SPILLWAY ELEVATIONS CONSTRUCTED PER PLAN

#### 8 EMERGENCY SPILLWAY DETAILS

1"=10'



EMERGENCY SPILLWAY ELEVATIONS CONSTRUCTED PER PLAN

#### 9 EMERGENCY SPILLWAY

1"=10'

EPC 5/30/23



Kimley»Horn

2021 KIMLEY-HORN AND ASSOCIATES, INC.  
2 North Nevada Avenue Suite 300  
Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: KRK  
DRAWN BY: A.JL  
CHECKED BY: KRK  
DATE: 12/16/2021

WINSOME FILING NO. 3  
EL PASO COUNTY, COLORADO  
CONSTRUCTION DOCUMENTS  
POND 2 DETAILS



PROJECT NO.  
196106001  
SHEET

C1.36



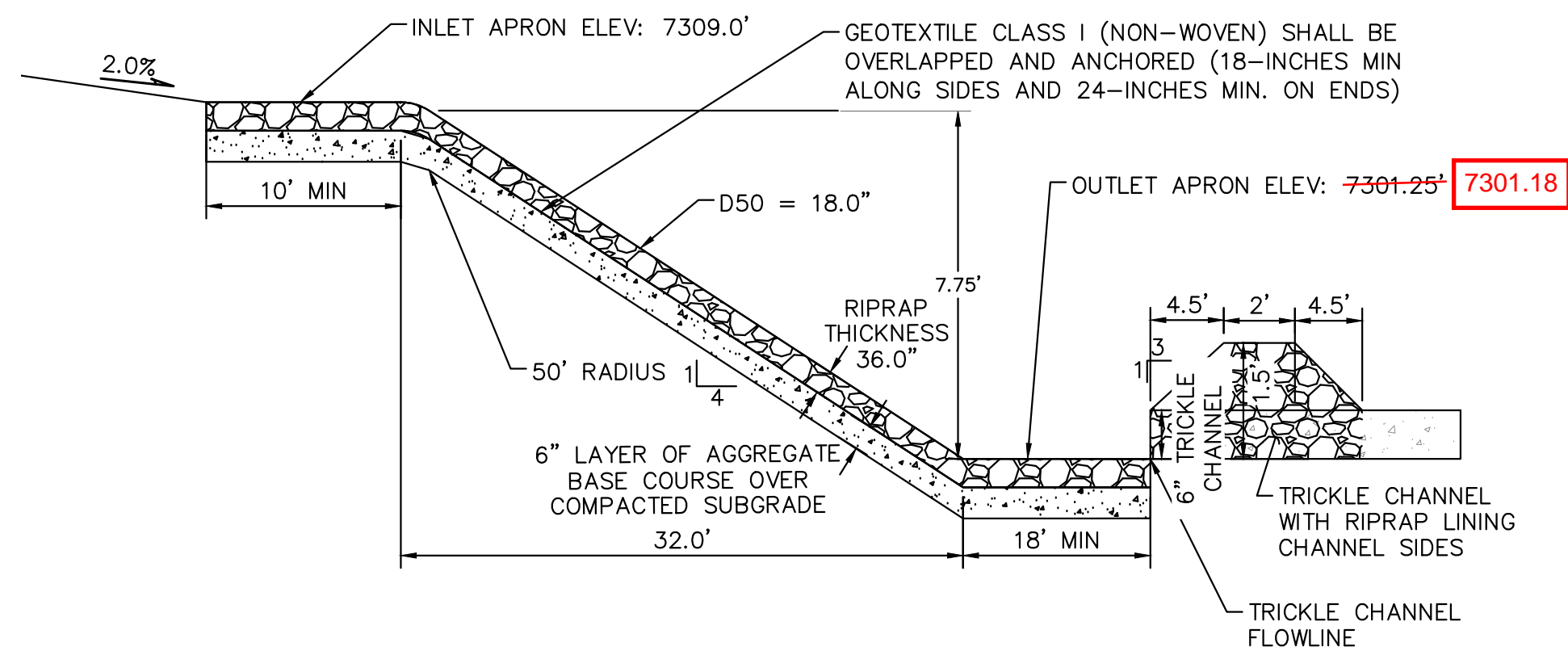
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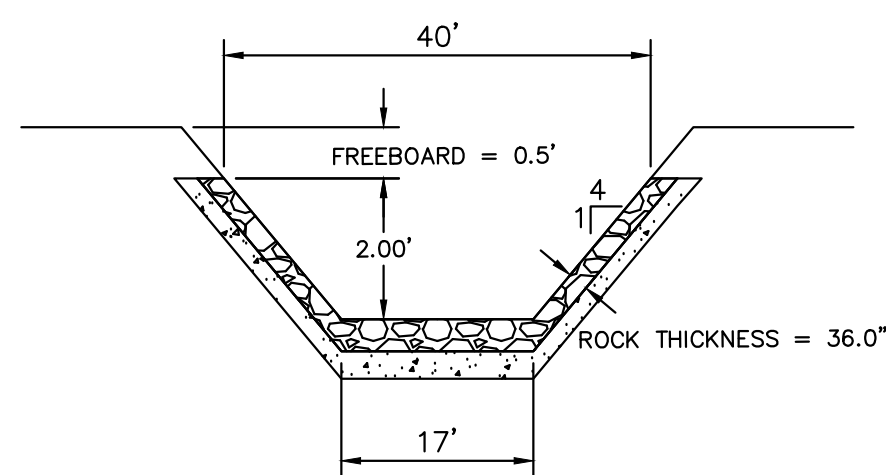
Know what's below.  
Call before you dig.



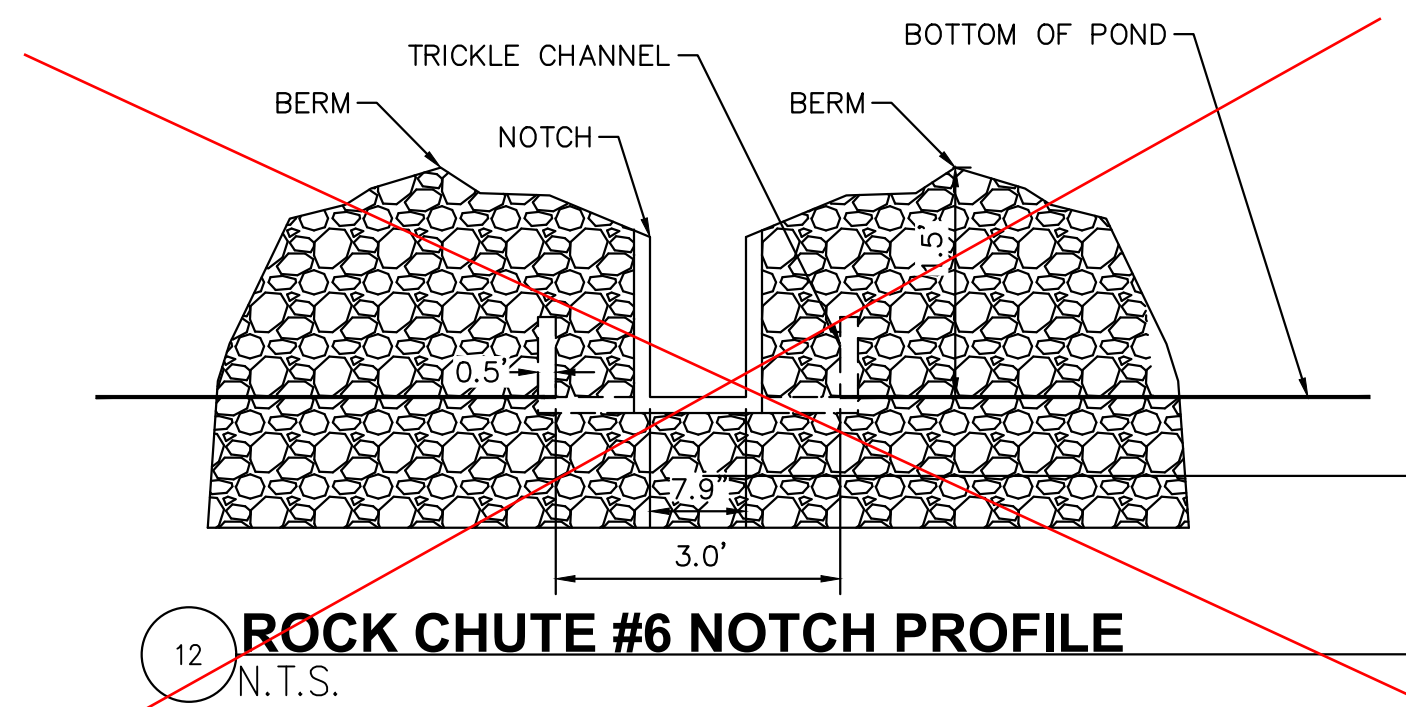
CALL UTILITY NOTIFICATION  
CENTER OF COLORADO  
1-800-922-1987  
CALL 2-BUSINESS DAYS IN ADVANCE  
BEFORE YOU DIG, GRADE, OR EXCAVATE  
FOR THE MARKING OF UNDERGROUND  
MEMBER UTILITIES



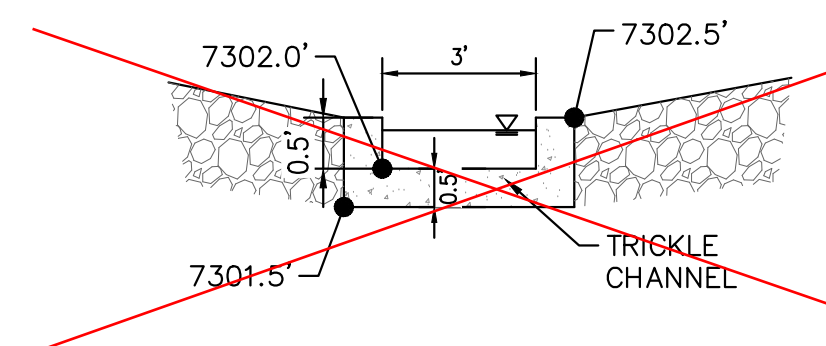
10 **ROCK CHUTE #6 PROFILE- CROSS SECTION 1**  
N.T.S.



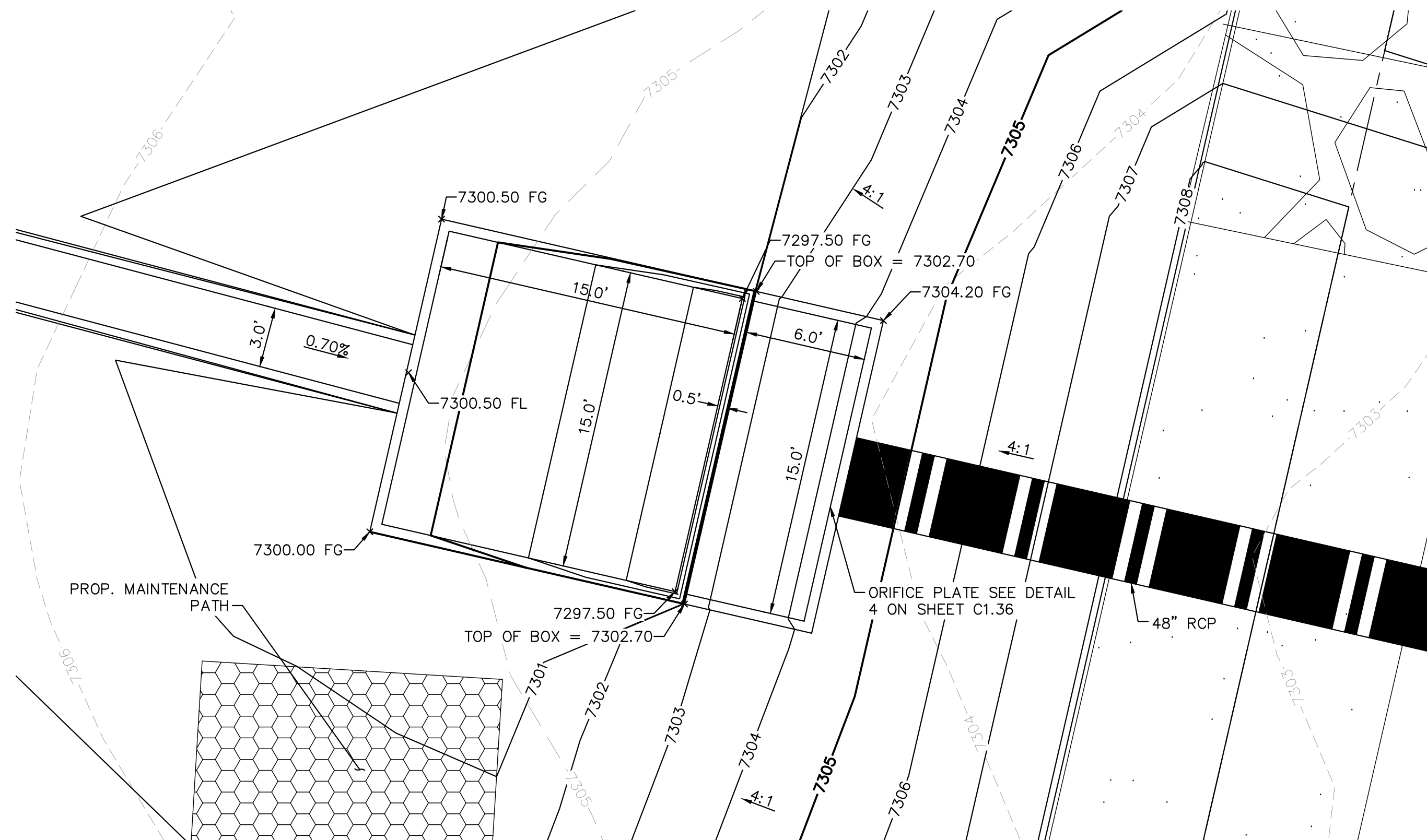
11 **ROCK CHUTE #6 PROFILE- CROSS SECTION 2**  
N.T.S.



12 **ROCK CHUTE #6 NOTCH PROFILE**  
N.T.S.



13 **ROCK CHUTE TO TRICKLE CHANNEL TRANSITION**  
N.T.S.



14 **OUTLET STRUCTURE PLAN VIEW DETAIL**  
1"=5'

Rock Chute ID	Channel Location	Flow (cfs)	Upstream Inlet Apron Length (ft)	Drop (ft) (Inlet Apron to Outlet Apron)	Chute Length (ft)	Downstream Outlet Apron Length (ft)	Chute Width (ft)	D50 (in)	Rock Chute Thickness (in)	Radius (ft)	Min Rock Chute Depth (ft)	Rock Chute Depth (ft)	Top Chute Width (ft)
4	Pond 1	107	10	6	24	15	24	18	36	50	1.27	1.50	40
6	Pond 2	110	10	8	32	18	17	18	36	50	1.57	2.00	33
11	Pond 4	26	10	10	40	11	10	9	18	25	0.85	1.50	26
12	WQ Pond	100	11	5	20	20	12	18	36	50	1.81	2.00	28
13	WQ Pond	57	10	3	12	16	10	18	36	50	1.38	1.50	26

15 **STANDARD ROCK CHUTE DIMENSION TABLE**  
N.T.S.

1. SEE GRADING PLANS FOR ROCK CHUTE LOCATIONS

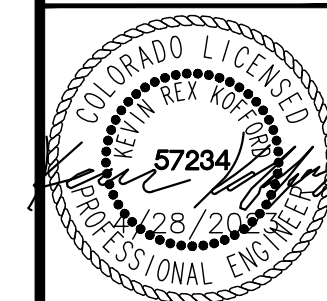
EPC 5/30/23

NO.	REVISION	DATE	BY
2	COUNTY COMMENTS	KRK 4/28/23	KRK
1	COUNTY COMMENTS	KRK 3/10/23	KRK

**Kimley»Horn**  
2021 KIMLEY-HORN AND ASSOCIATES, INC.  
2 North Nevada Avenue Suite 300  
Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: KRK  
DRAWN BY: A.J.L.  
CHECKED BY: KRK  
DATE: 12/16/2021

WINSOME FILING NO. 3  
EL PASO COUNTY, COLORADO  
CONSTRUCTION DOCUMENTS  
POND 2 DETAILS



PROJECT NO.  
196106001

SHEET

C1.37



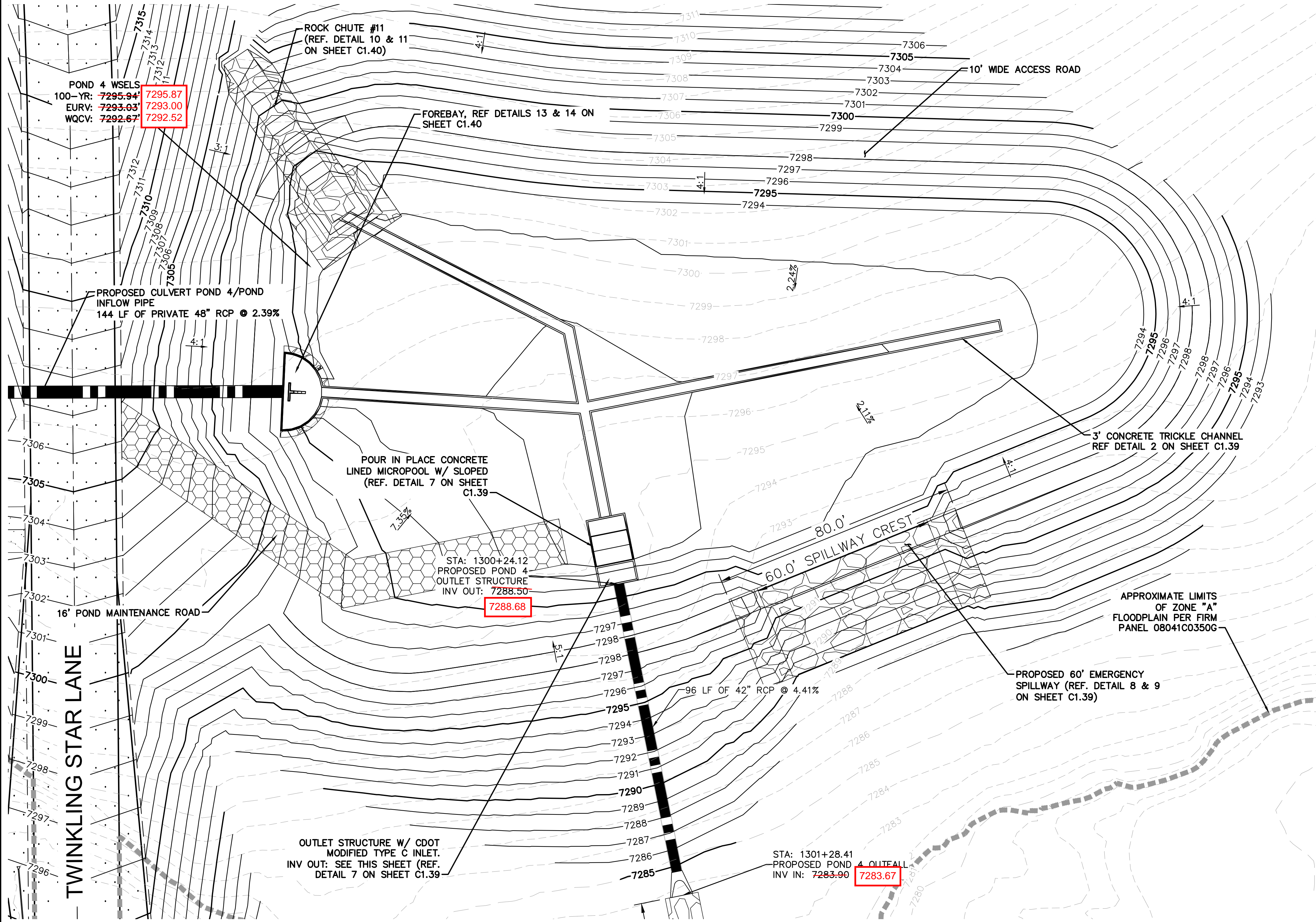
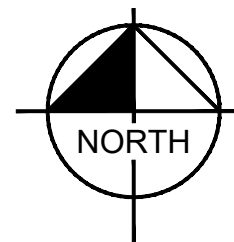
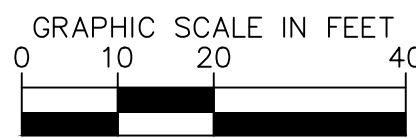
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Know what's below.  
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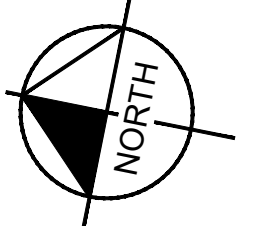
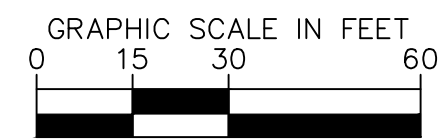
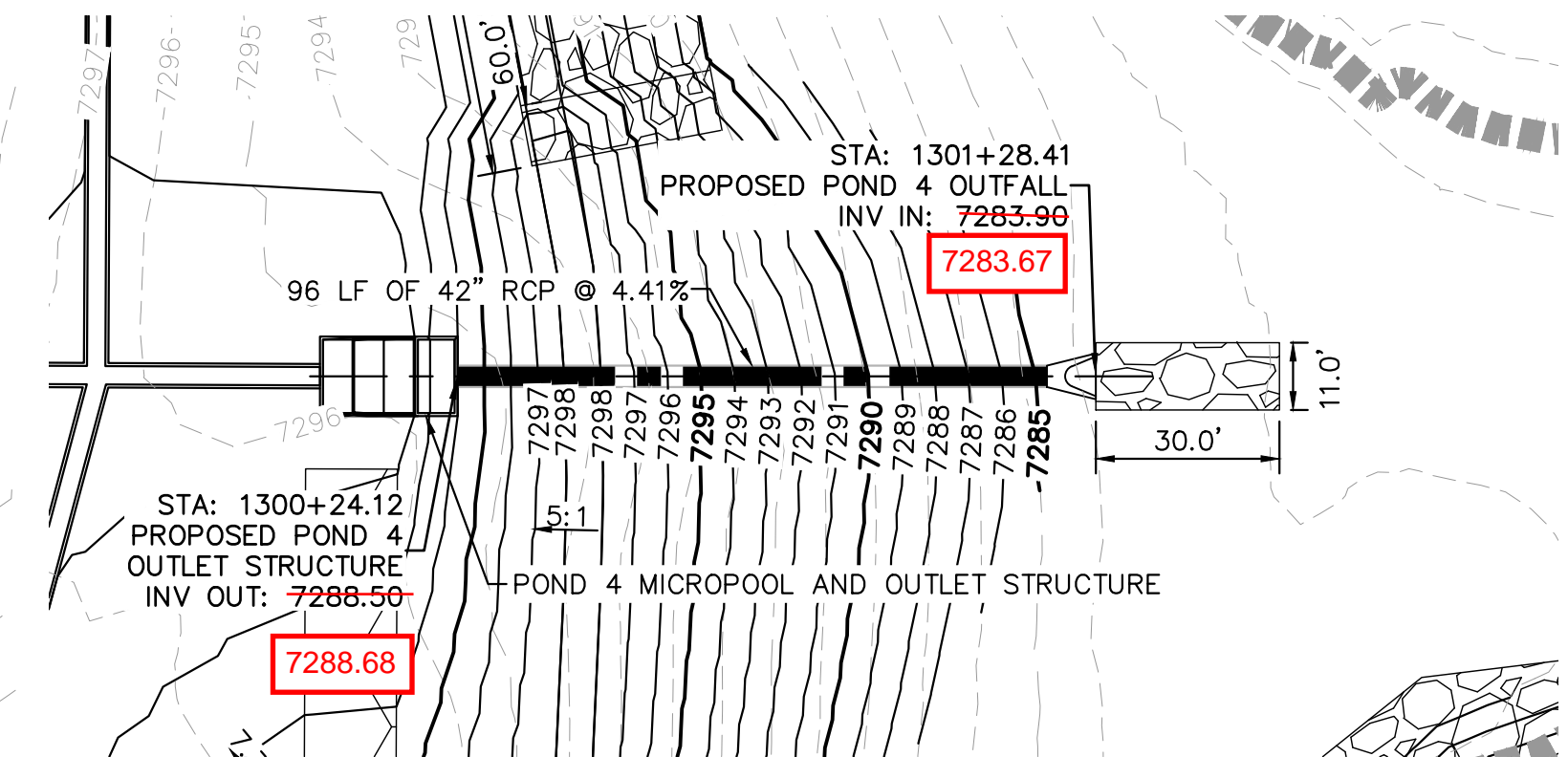


CALL UTILITY NOTIFICATION  
CENTER OF COLORADO  
1-800-922-1987  
CALL 2-BUSINESS DAYS IN ADVANCE  
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MEMBER UTILITIES

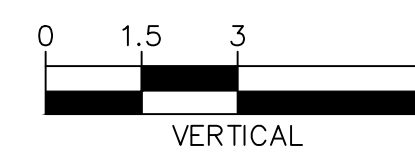
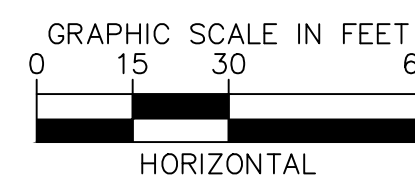
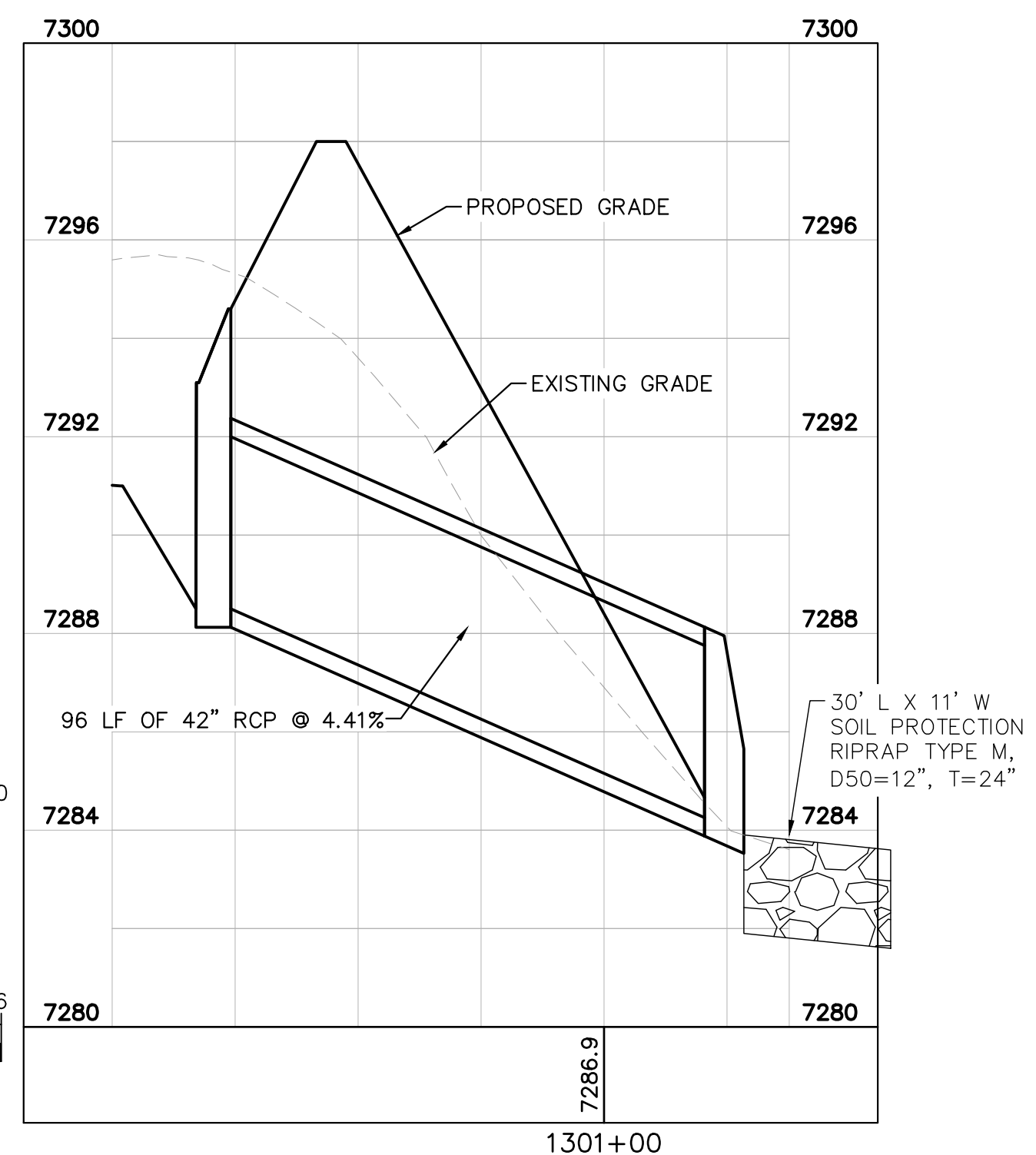


#### LEGEND

FG	FINISH GRADE
FBT	TOP OF FOREBAY AT FINISHED GRADE
FBB	BOTTOM OF FOREBAY AT FINISHED GRADE
TCT	TOP OF TRICKLE CHANNEL AT FINISHED GRADE
TCB	BOTTOM OF TRICKLE CHANNEL AT FINISHED GRADE
MPT	TOP OF MICROPOL AT FINISHED GRADE
MPB	BOTTOM OF MICROPOL AT FINISHED GRADE
GRATE	OUTLET STRUCTURE GRATE ELEVATION
ME	MATCH EXISTING
PT	TOP OF STEEL PLATE AT FINISHED GRADE
PB	BOTTOM OF STEEL PLATE AT FINISHED GRADE



#### POND 4 OUTLET PIPE PLAN AND PROFILE



EPC 5/30/23

WINSOME FILING NO. 3  
EL PASO COUNTY, COLORADO  
CONSTRUCTION DOCUMENTS  
POND 4 OVERVIEW



PROJECT NO.  
196106001  
SHEET

C1.38

**Kimley»Horn**  
2021 KIMLEY-HORN AND ASSOCIATES, INC.  
2 North Nevada Avenue Suite 300  
Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: KRK  
DRAWN BY: AUL  
CHECKED BY: KRK  
DATE: 12/16/2021

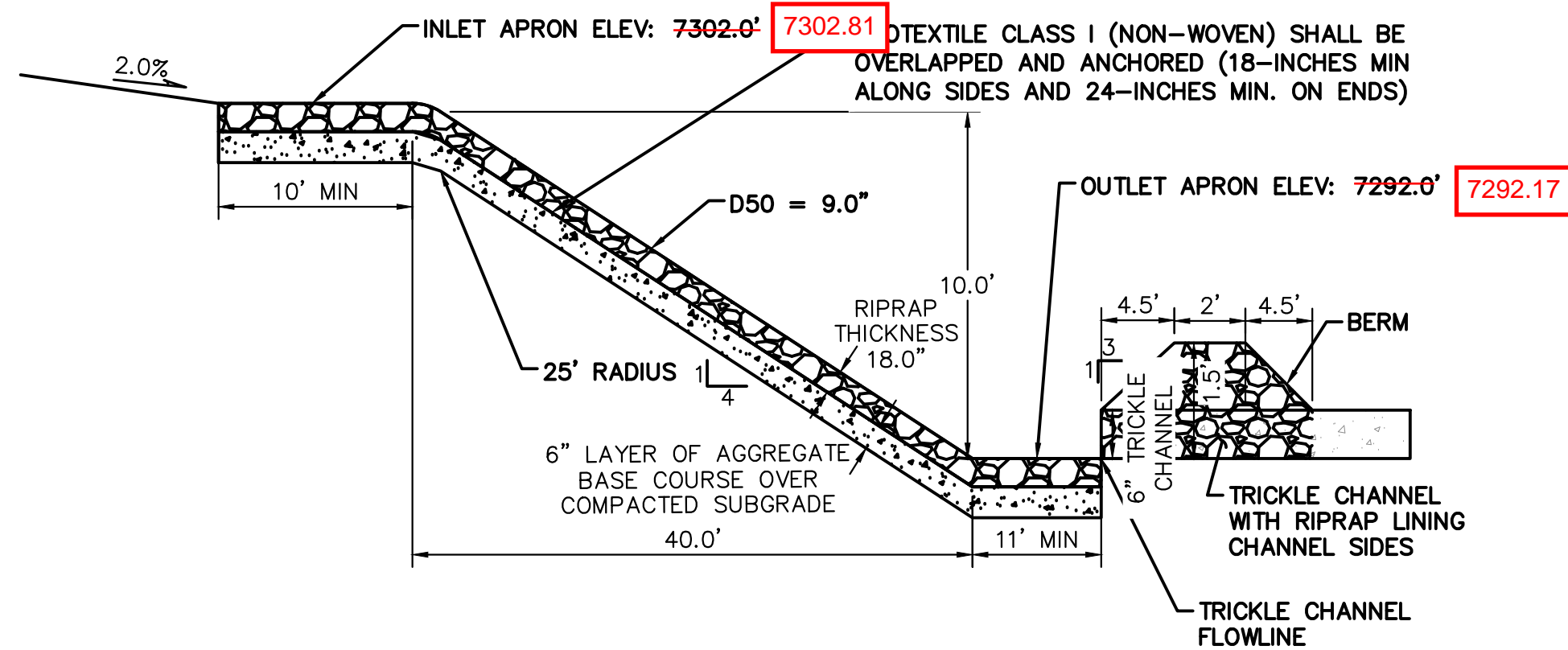
NO.	REVISION	COUNTY COMMENTS	COUNTY COMMENTS	DATE	BY
1				3/10/23	KRK
2				4/28/23	KRK



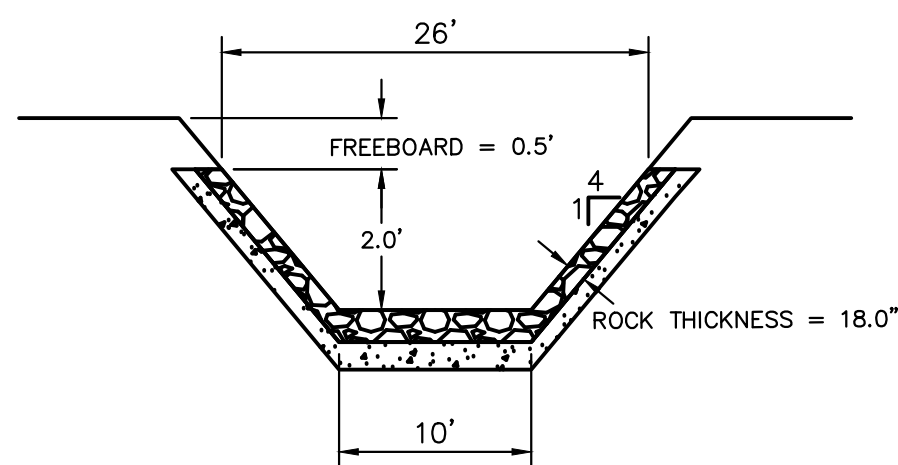




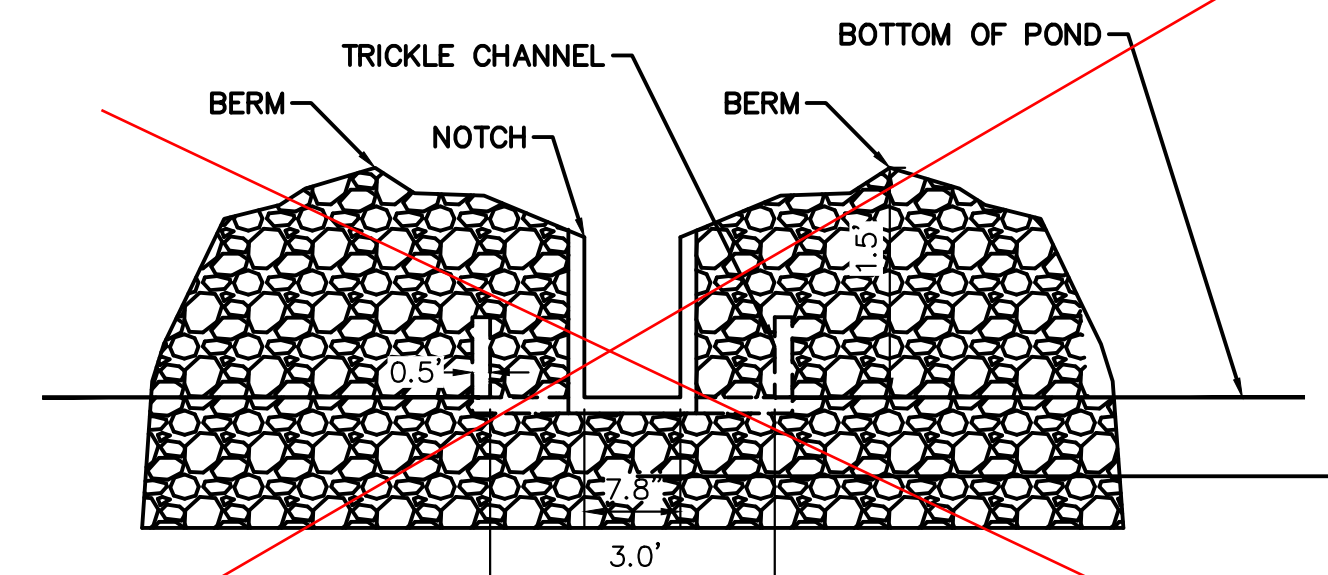
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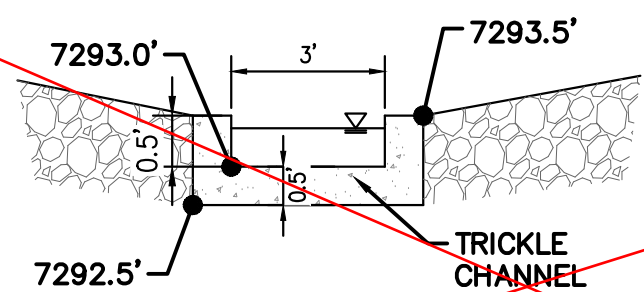
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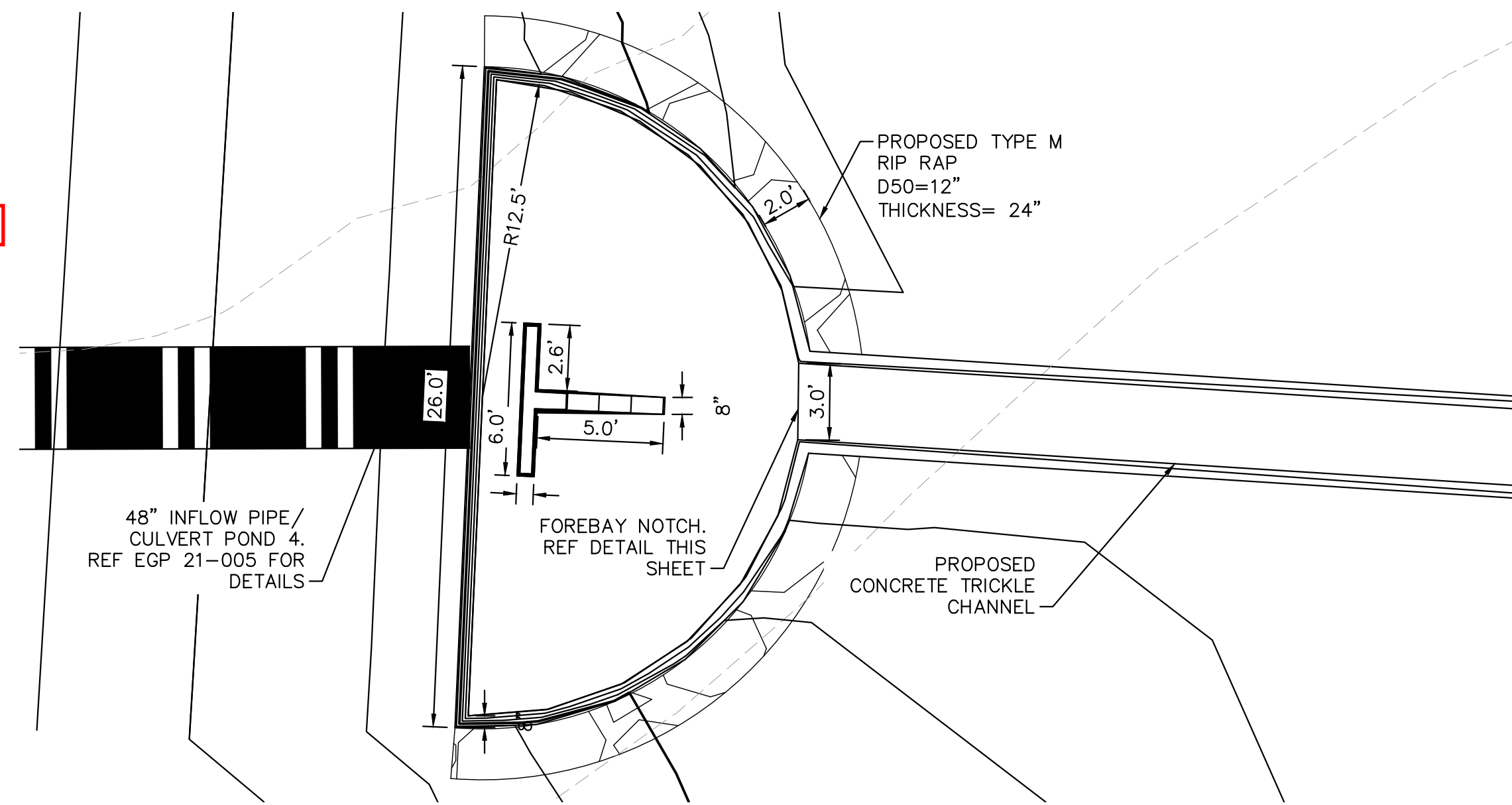
11 **ROCK CHUTE #11 PROFILE- CROSS SECTION 2**  
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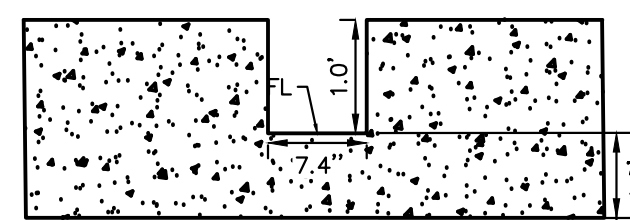
11 **ROCK CHUTE #11 PROFILE- CROSS SECTION 2**  
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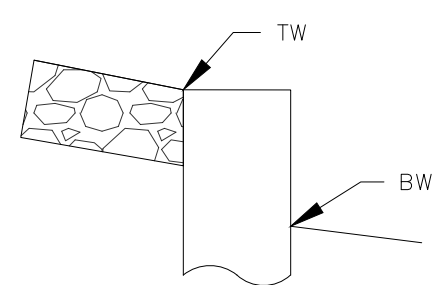
12 **ROCK CHUTE TO TRICKLE CHANNEL TRANSITION**  
N.T.S.



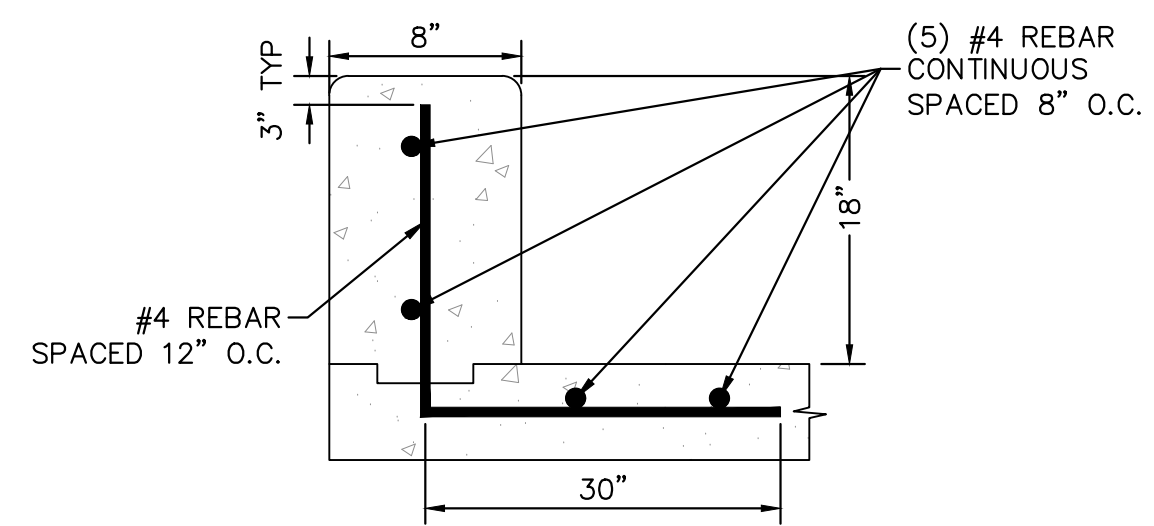
13 **FOREBAY DETAIL PLAN VIEW**  
1"=5'



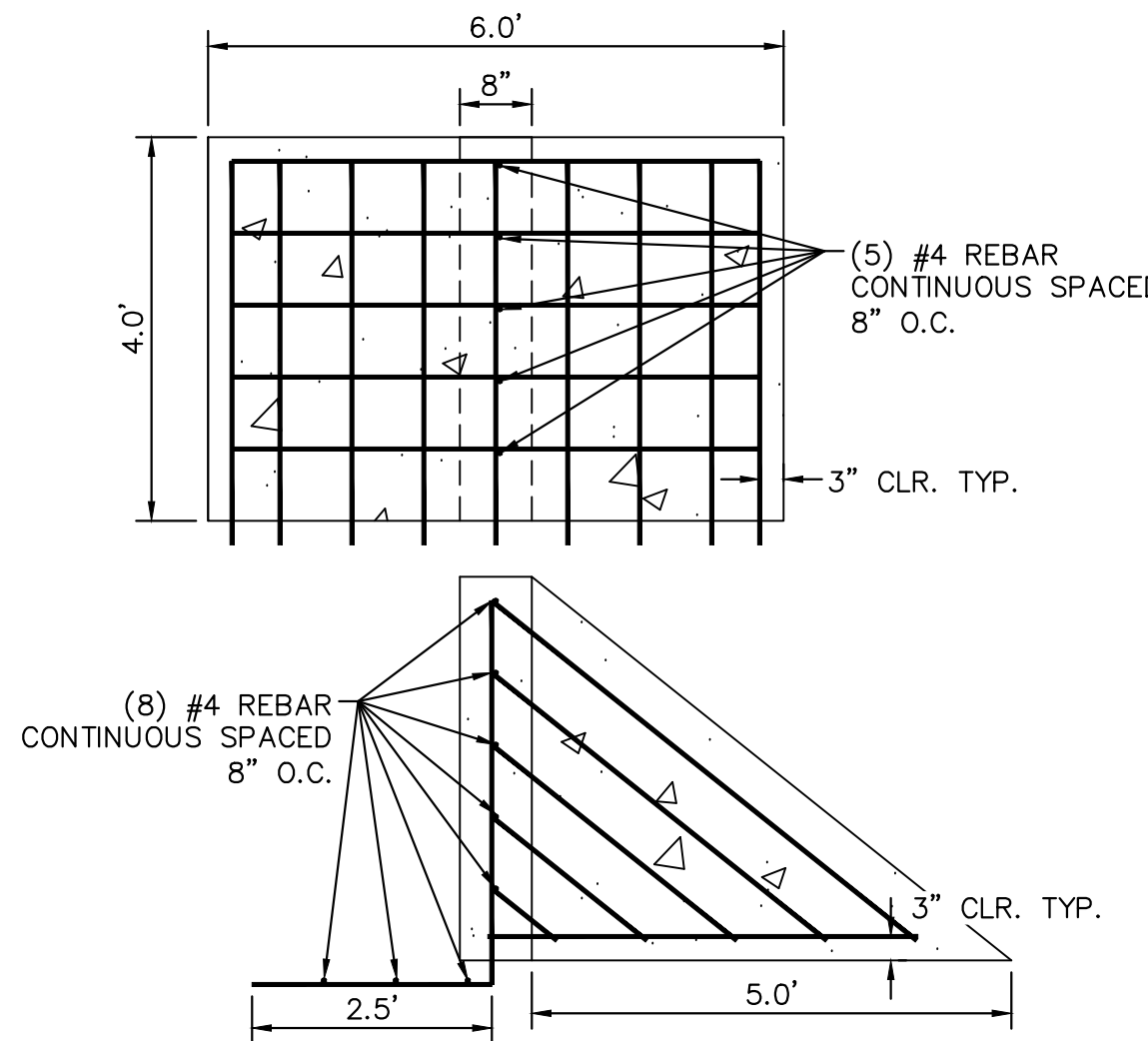
A **FOREBAY NOTCH DETAIL**  
N.T.S.



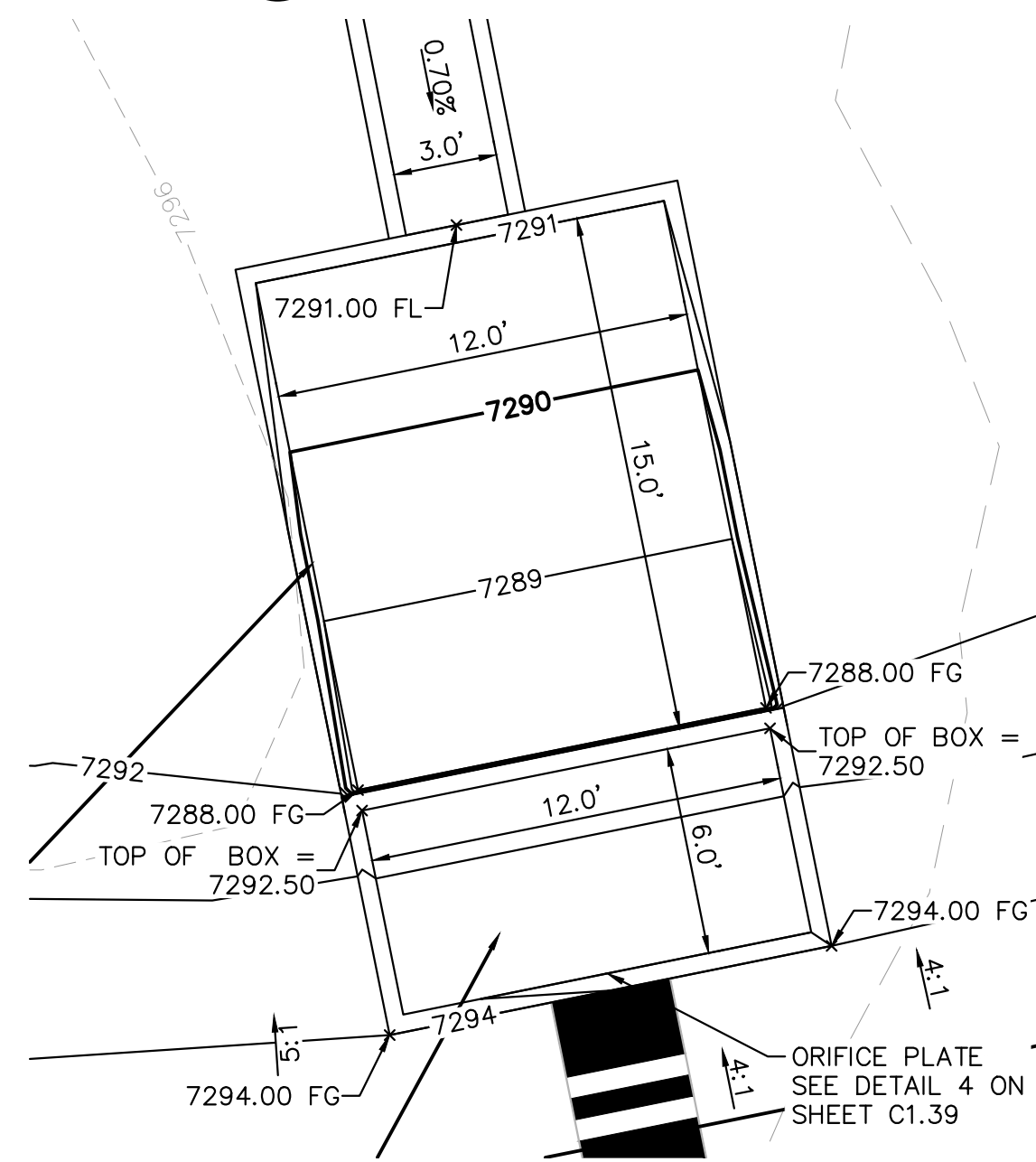
B **SECTION A-A FOREBAY WALL WITH REINFORCING**  
N.T.S.



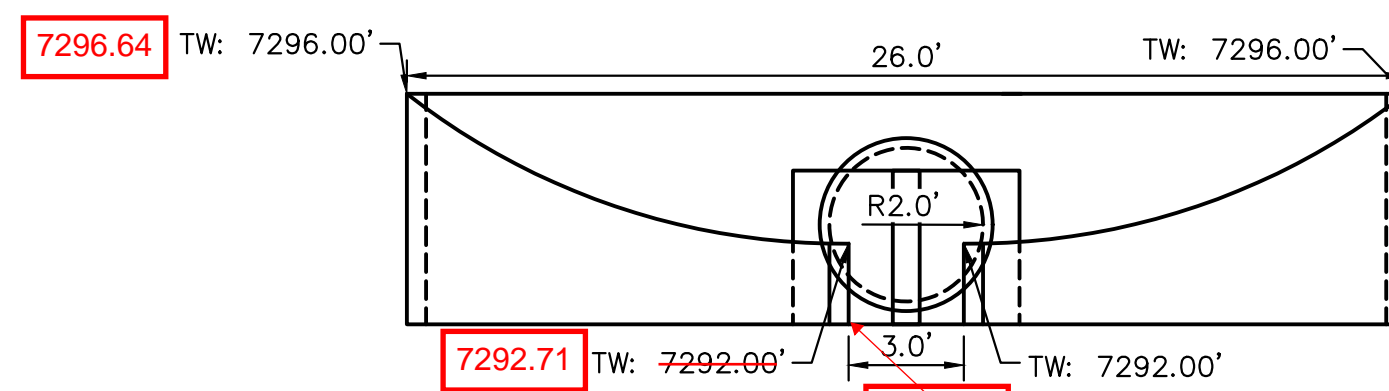
D **FOREBAY WALL CROSS SECTION**  
N.T.S.



C **FOREBAY DISSIPATER DETAIL**  
1"=2'



14 **OUTLET STRUCTURE PLAN VIEW DETAIL**  
1"=5'



13 **FOREBAY SECTION VIEW**  
1"=5'

RETAINING WALL NOTES  
1. TW = FINISHED GRADE AT TOP OF WALL  
2. BW = FINISHED GRADE AT BOTTOM OF WALL  
3. SEE DETAIL THIS SHEET FOR FOREBAY DIMENSIONS AND CROSS-SECTION.

Rock Chute ID	Channel Location	Flow (cfs)	Upstream Inlet Apron Length (ft)	Drop (ft) (Inlet Apron to Outlet Apron)	Chute Length (ft)	Downstream Outlet Apron Length (ft)	Chute Width (ft)	D50 (in)	Rock Chute Thickness (in)	Radius (ft)	Min Rock Chute Depth (ft)	Rock Chute Depth (ft)	Top Chute Width (ft)
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13	WQ Pond	57	10	3	12	16	10	18	36	50	1.38	1.50	26

15 **STANDARD ROCK CHUTE DIMENSION TABLE**  
N.T.S.

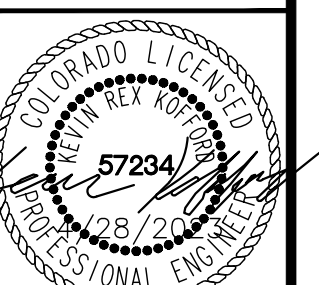
1. SEE GRADING PLANS FOR ROCK CHUTE LOCATIONS

EPC 5/30/23

**Kimley»Horn**

2021 KIMLEY-HORN AND ASSOCIATES, INC.  
2 North Nevada Avenue Suite 300  
Colorado Springs, Colorado 80903 (719) 453-0180

WINSOME FILING NO. 3  
EL PASO COUNTY, COLORADO  
CONSTRUCTION DOCUMENTS  
POND 4 DETAILS



PROJECT NO.  
196106001

SHEET

C1.40



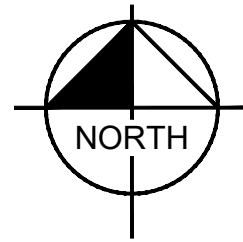
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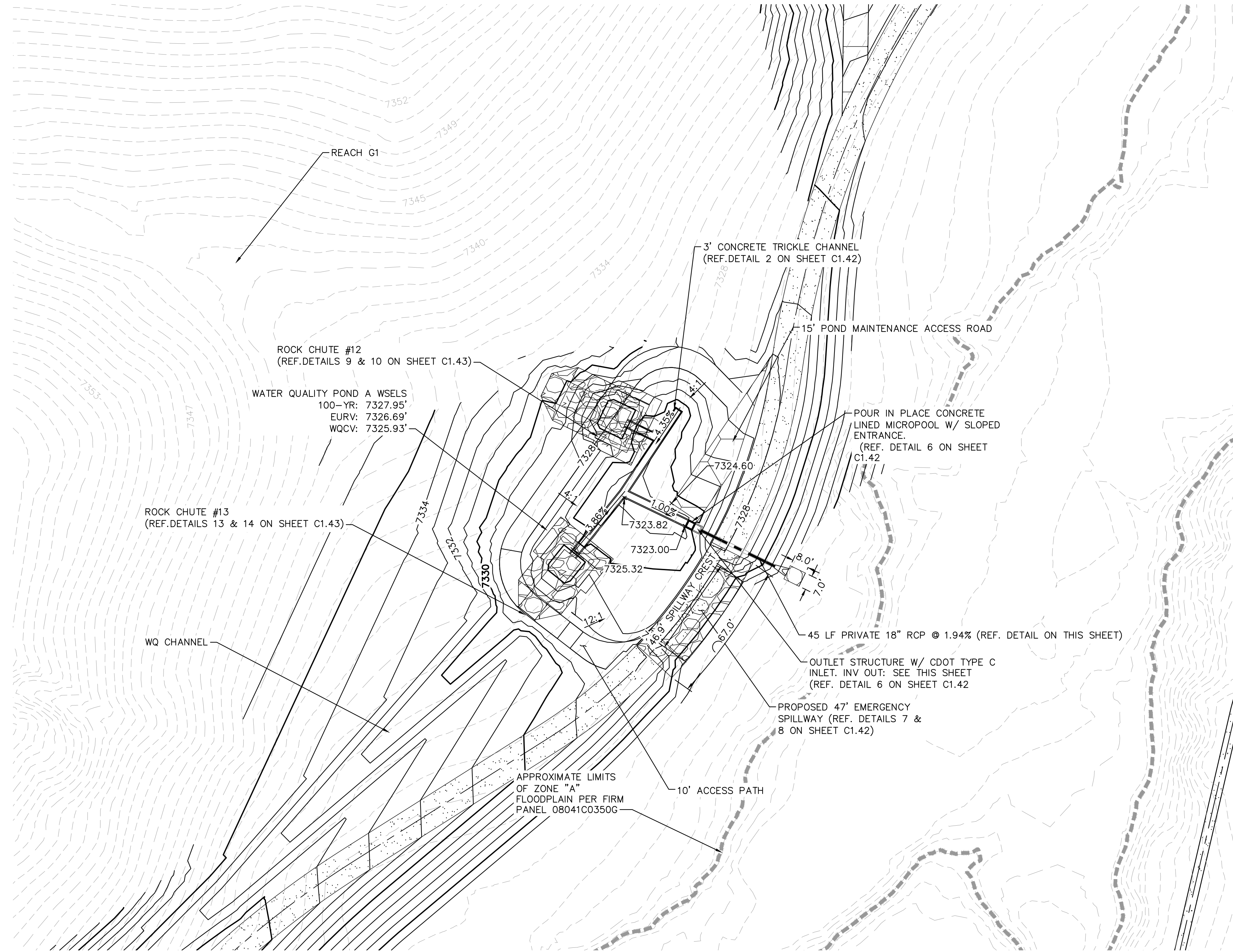
CALL UTILITY NOTIFICATION  
CENTER OF COLORADO  
1-800-922-1987  
CALL 2-BUSINESS DAYS IN ADVANCE  
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FOR THE MARKING OF UNDERGROUND  
MEMBER UTILITIES



GRAPHIC SCALE IN FEET  
0 15 30 60

GRAPHIC SCALE IN FEET  
0 15 30 60  
HORIZONTAL

0 1.5 3 6  
VERTICAL





K:\COS\_Civil\196106001\_Winsome Filing No. 3\CADD\PlanSheets\CDs\196106001\_CD\_WQ\_Pond.dwg Kofford, Kevin 4/28/2023 12:22 PM



#### 4 ORIFICE PLATE AND TRASH RACK DETAIL

N.T.S.

##### ORIFICE PLATE NOTES

1. PROVIDE CONTINUOUS NEOPRENE GASKET MATERIAL BETWEEN THE ORIFICE PLATE AND CONCRETE.
2. BOLT PLATE TO CONCRETE 12" MAX. ON CENTER, WITH A PLATE THICKNESS OF 0.25".

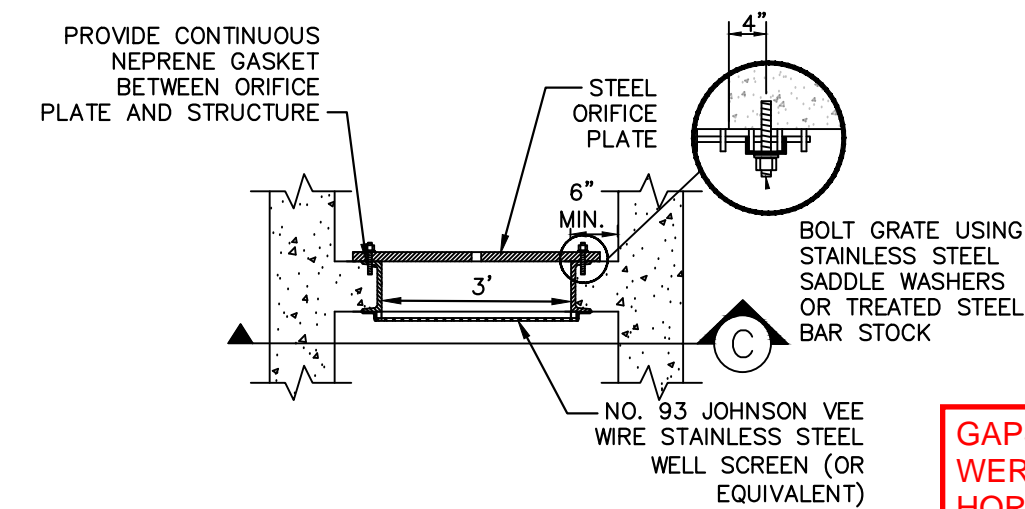
##### EURV AND WQCV TRASH RACKS

1. WELL-SCREEN TRASH RACKS SHALL BE STAINLESS STEEL AND SHALL BE ATTACHED BY INTERMITTENT WELDS ALONG THE EDGE OF THE MOUNTING FRAME.
2. BAR GATE TRASH RACKS SHALL BE ALUMINUM AND SHALL BE BOLTED USING STAINLESS STEEL HARDWARE.
3. TRASH RACK OPEN AREAS ARE FOR SPECIFIED TRASH RACK MATERIALS. TOTAL TRASH RACK SIZE MAY NEED TO BE ADJUSTED FOR MATERIALS HAVING DIFFERENT OPEN AREA/GROSS AREA RATIO (R VALUE).
4. STRUCTURAL DESIGN OF TRASH RACKS SHALL BE BASED ON FULL HYDROSTATIC HEAD WITH ZERO HEAD DOWNSTREAM OF THE RACK.

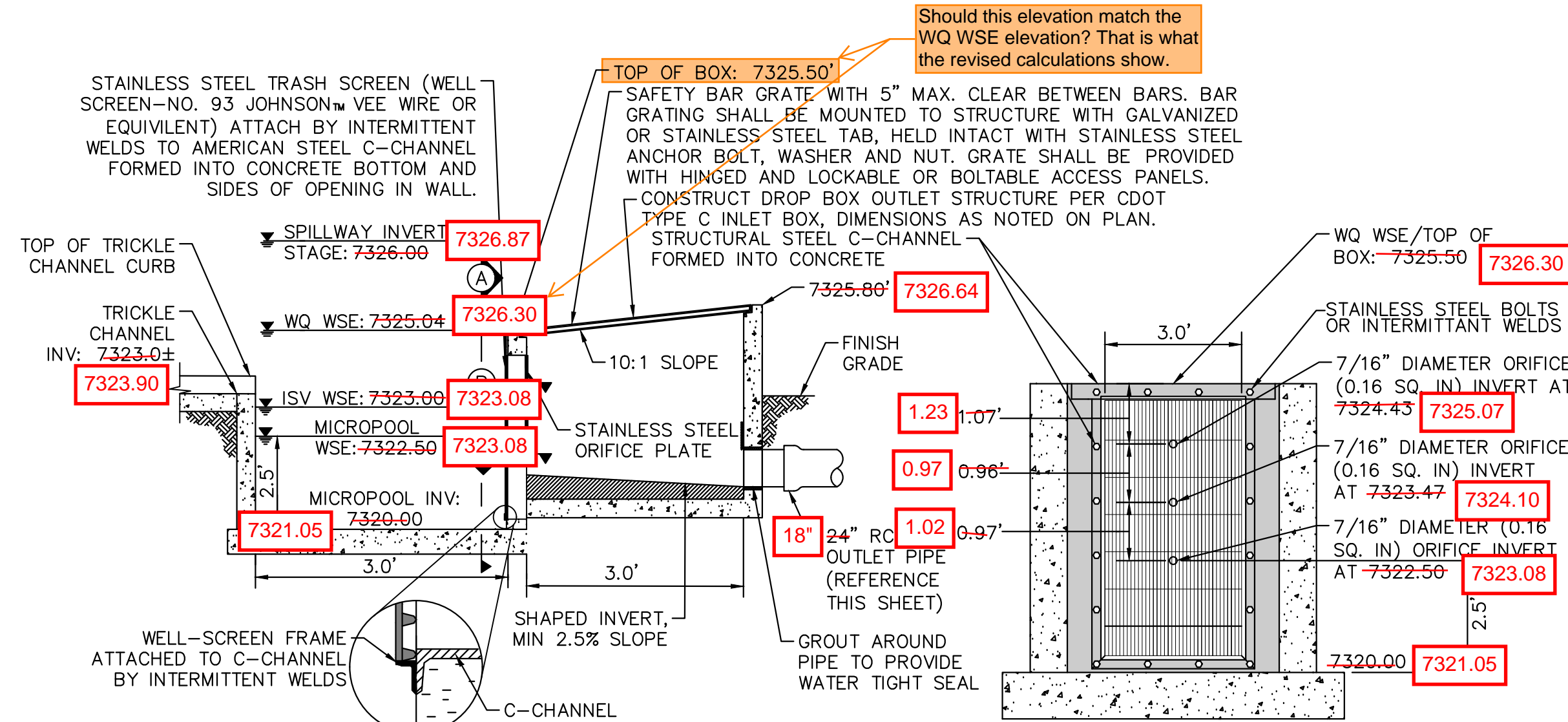
##### OVERFLOW SAFETY GRATES

1. ALL SAFETY GRATES SHALL BE MOUNTED USING STAINLESS STEEL HARDWARE AND PROVIDED WITH HINGED AND LOCKABLE OR BOLTABLE ACCESS PANELS.
2. SAFETY GRATES SHALL BE STAINLESS STEEL, ALUMINUM, OR STEEL. STEEL GRATES SHALL BE HOT DIP GALVANIZED AND MAY BE HOT POWDER COATED AFTER GALVANIZING.
3. SAFETY GRATES SHALL BE DESIGNED SUCH THAT THE DIAGONAL DIMENSION OF EACH OPENING IS SMALLER THAN THE DIAMETER OF THE OUTLET PIPE.
4. STRUCTURAL DESIGN OF SAFETY GRATES SHALL BE BASED ON FULL HYDROSTATIC HEAD WITH ZERO HEAD DOWNSTREAM OF THE RACK.

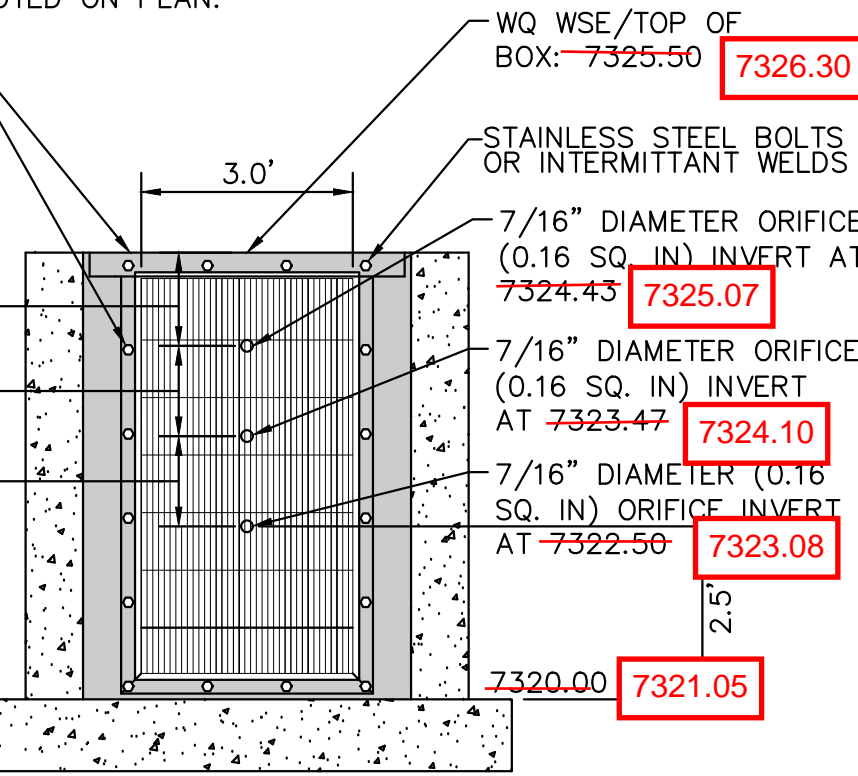
GAPS IN TRASH RACK WERE INSTALLED HORIZONTALLY, RATHER THAN VERTICALLY AS SHOWN IN THE PLAN



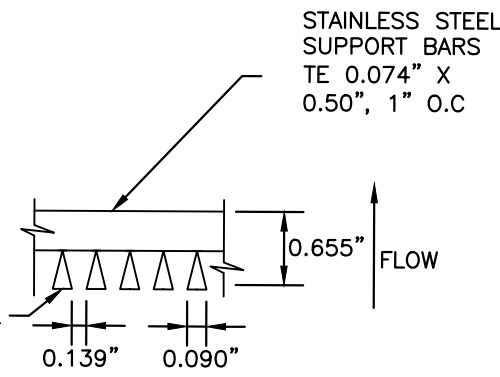
**SECTION B**  
N.T.S.



**5 OUTLET STRUCTURE DETAIL**  
N.T.S.

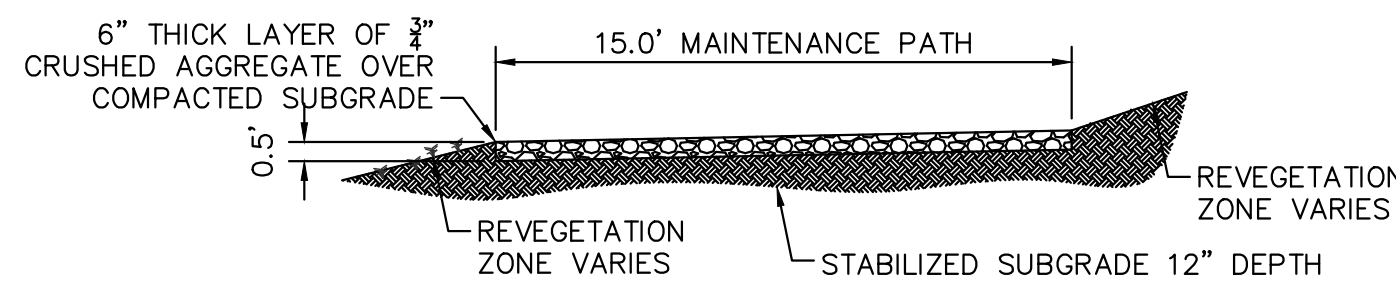


**SECTION A**  
N.T.S.



**SECTION C**  
N.T.S.

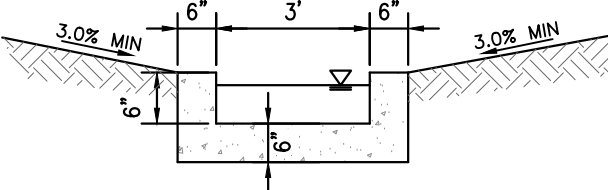
GAPS IN TRASH RACK WERE INSTALLED HORIZONTALLY, RATHER THAN VERTICALLY AS SHOWN IN THE PLAN



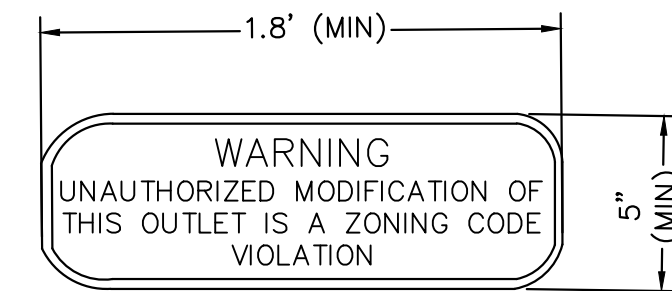
#### 1 MAINTENANCE ROAD

1"=5'

- MAINTENANCE PATH NOTES
1. MAINTENANCE PATH SHALL INCLUDE SUBGRADE PREPARATION, GRAVEL BASE, AND COMPACTION.



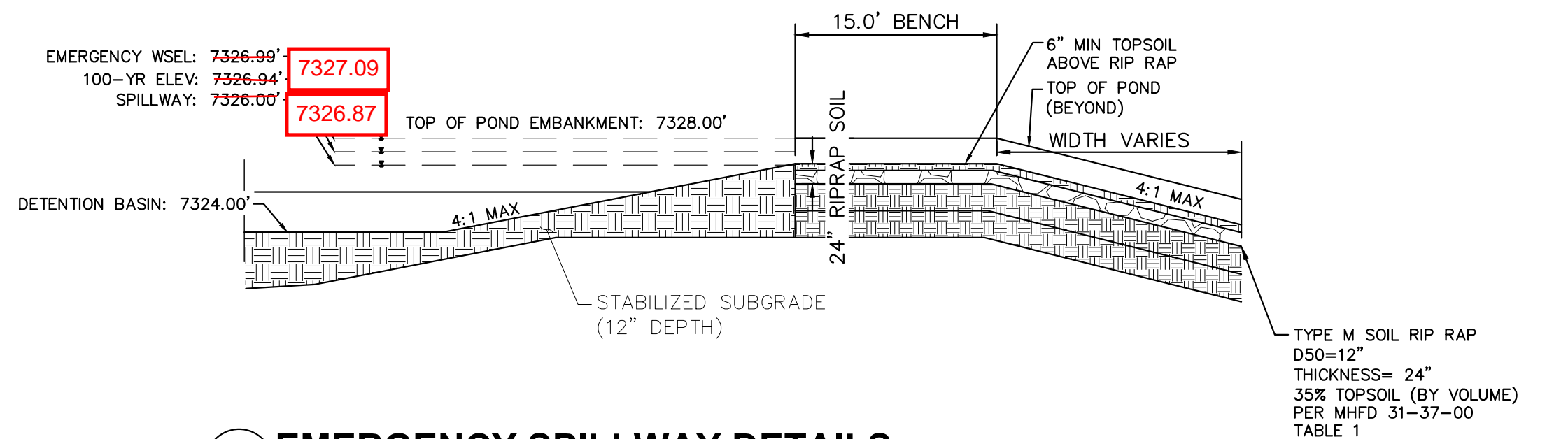
**2 CONCRETE TRICKLE CHANNEL**  
N.T.S.



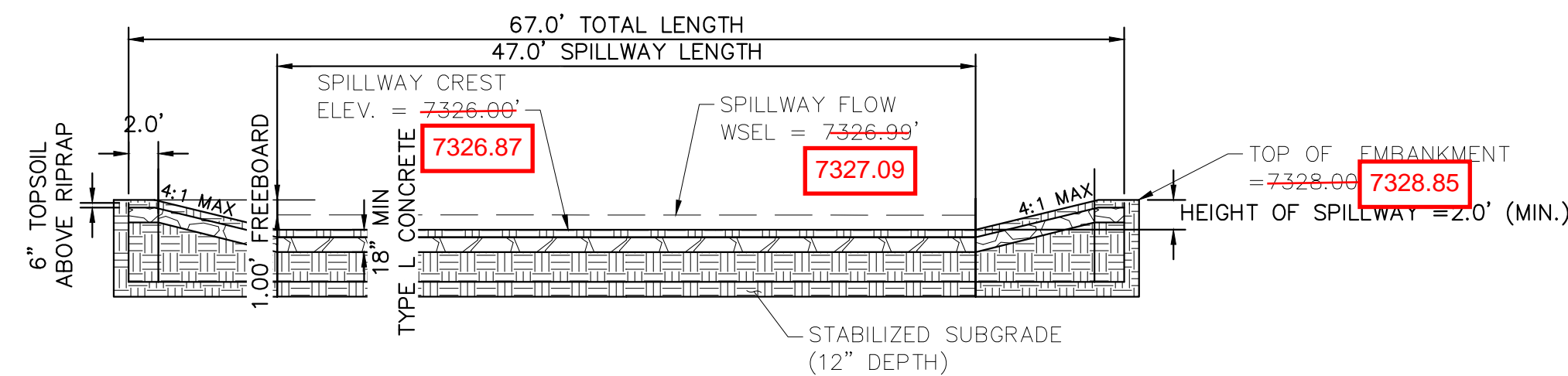
#### 3 OUTLET SIGNAGE

N.T.S.

- OUTLET SIGNAGE NOTES
1. SIGN SHALL BE A MINIMUM OF 0.75 SQUARE FEET AND SHALL BE ATTACHED TO THE OUTLET OR POSTED NEARBY.



**6 EMERGENCY SPILLWAY DETAILS**  
1"=10'



**7 EMERGENCY SPILLWAY**  
1"=10'

NO.	REVISION	DATE	BY	APPR.
1	COUNTY COMMENTS	3/10/23	KRK	
2	COUNTY COMMENTS	4/28/23	KRK	

**Kimley»Horn**  
2021 KIMLEY-HORN AND ASSOCIATES, INC.  
2 North Nevada Avenue Suite 300  
Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: KRK  
DRAWN BY: A.J.L.  
CHECKED BY: KRK  
DATE: 12/16/2021

WINSOME FILING NO. 3  
EL PASO COUNTY, COLORADO  
CONSTRUCTION DOCUMENTS  
WQ POND A DETAILS



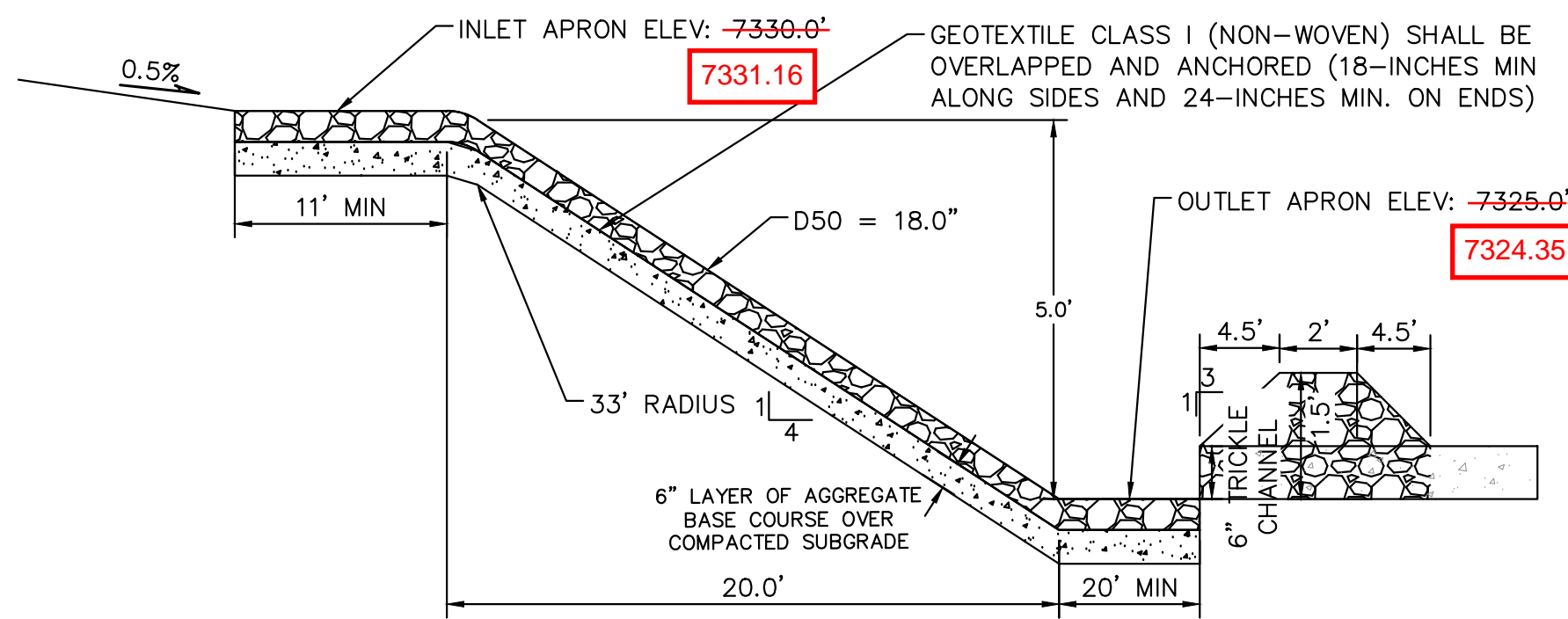
PROJECT NO.  
196106001  
SHEET

C1.42

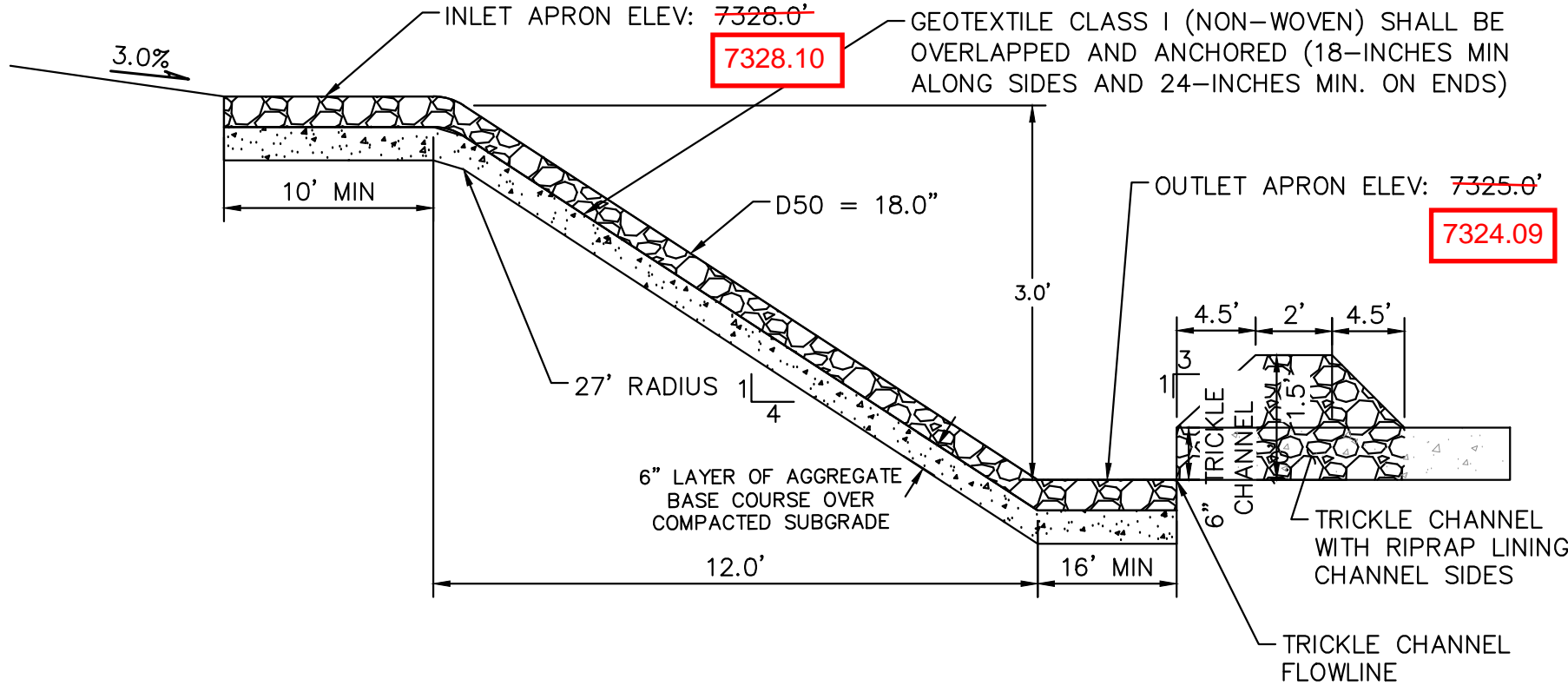
EPC 5/30/23



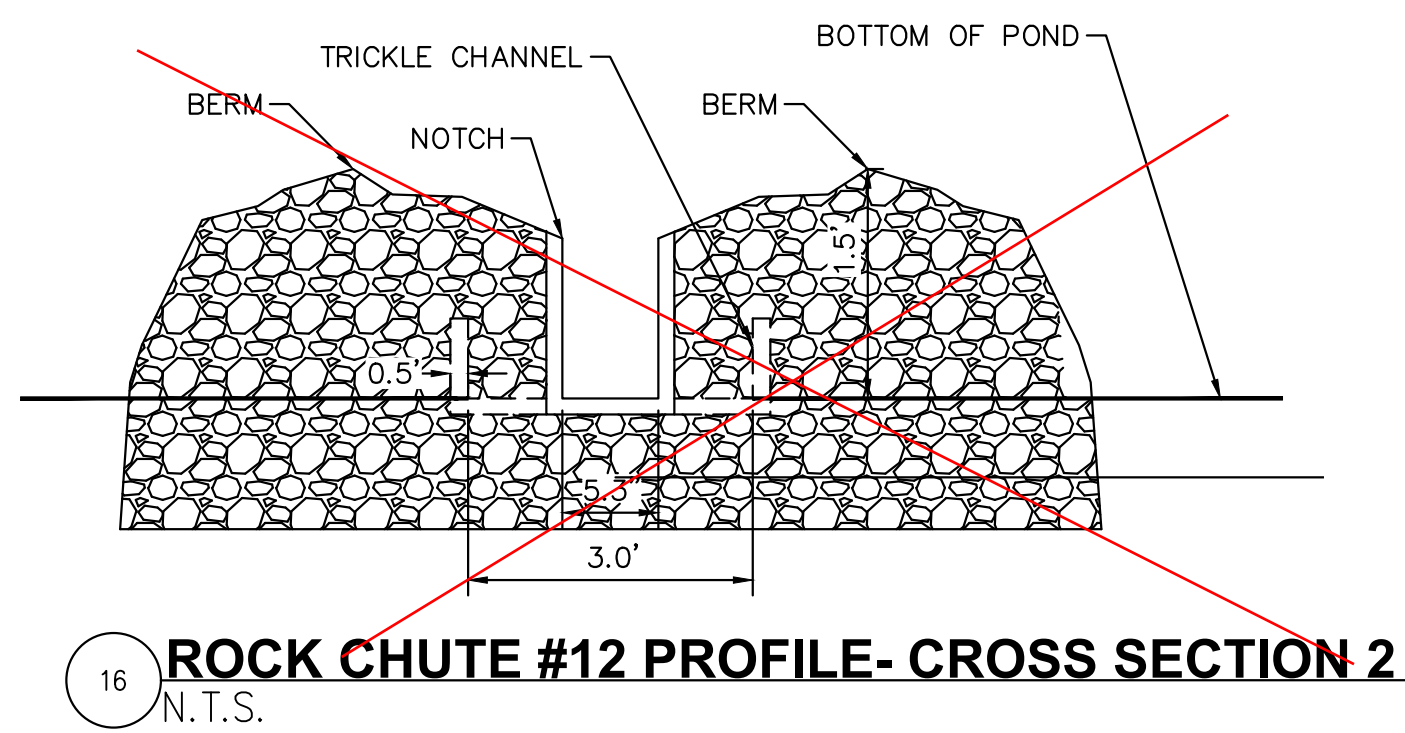
K:\COS\_Civil\196106001\_Winsome Filing No. 3\CADD\PlanSheets\CDs\196106001\_CD\_WQ\_Pond.dwg Kofford, Kevin 4/28/2023 12:23 PM



9 **ROCK CHUTE #12 PROFILE- CROSS SECTION 1**  
N.T.S.



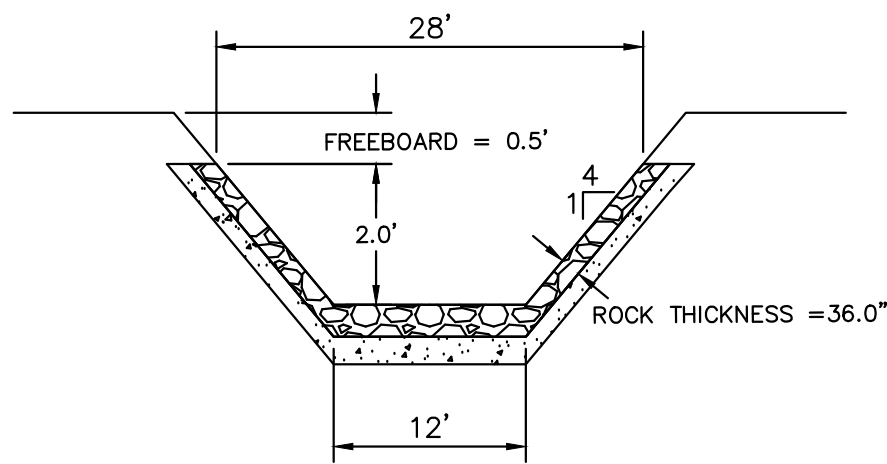
12 **ROCK CHUTE #13 PROFILE- CROSS SECTION 1**  
N.T.S.



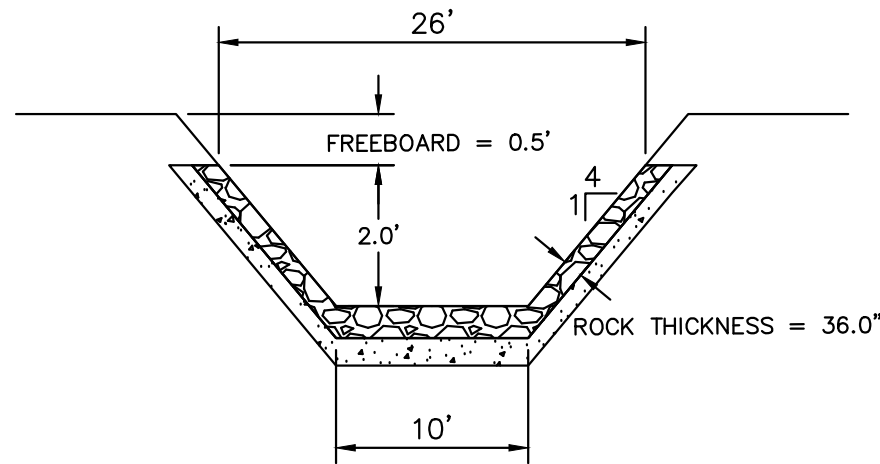
16 **ROCK CHUTE #12 PROFILE- CROSS SECTION 2**  
N.T.S.

Provide detail for PVC pipe to trickle channel

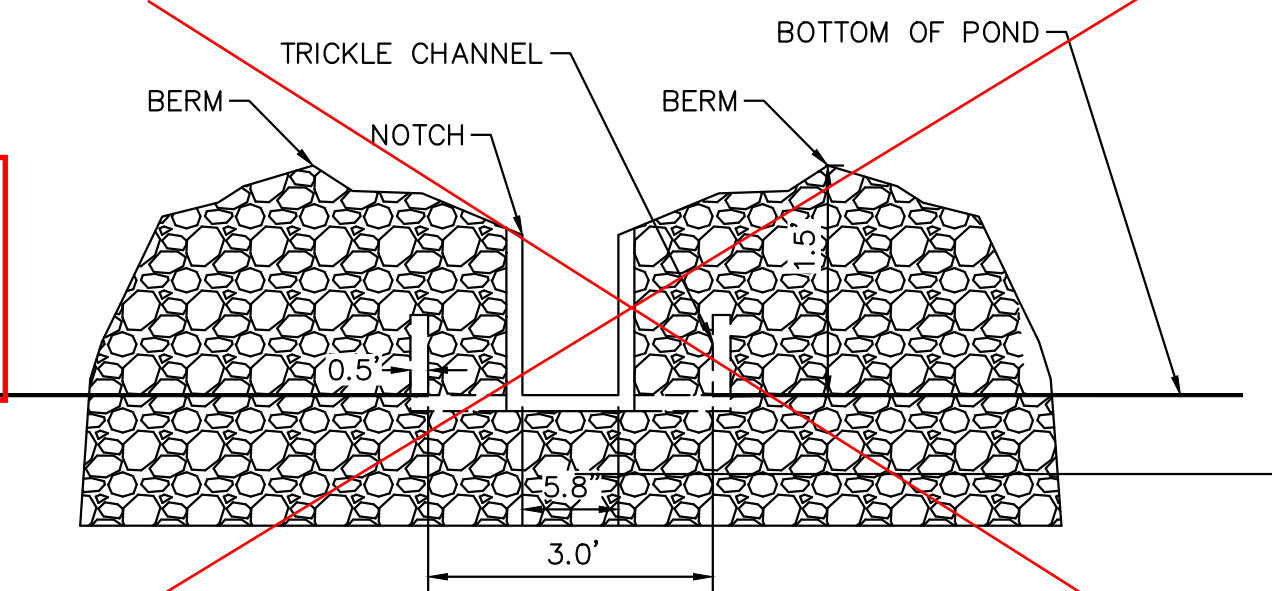
NOTCH REPLACED WITH PVC PIPE PER FIELD CHANGE. VERIFIED WITH EPC STORMWATER PIROW TO FIELD CHANGE



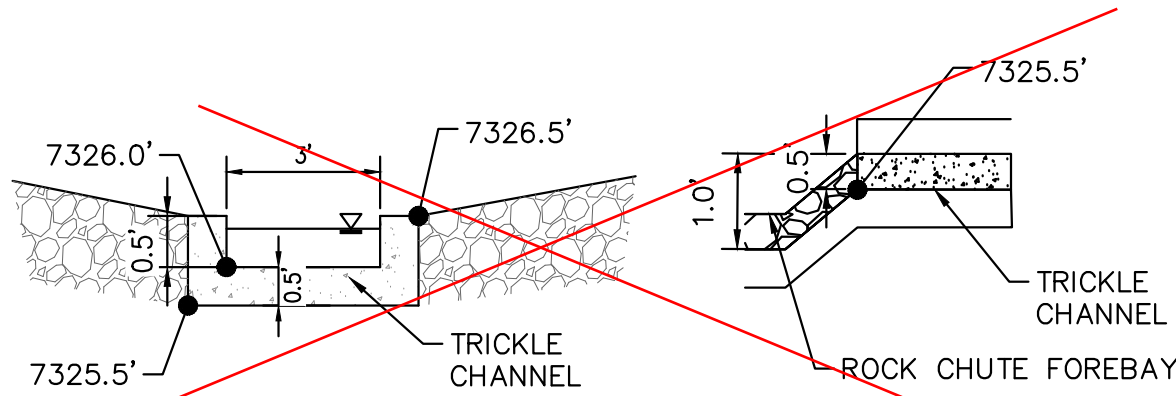
10 **ROCK CHUTE #12 PROFILE- CROSS SECTION 2**  
N.T.S.



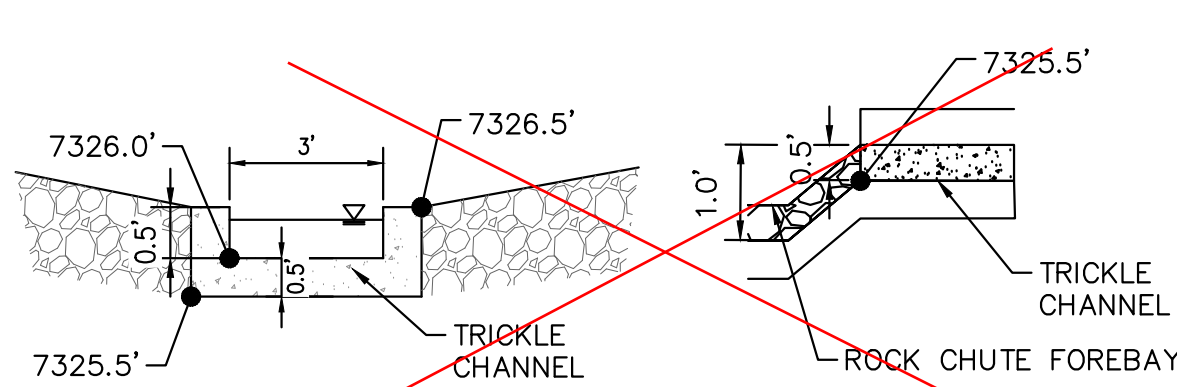
13 **ROCK CHUTE #13 PROFILE- CROSS SECTION 2**  
N.T.S.



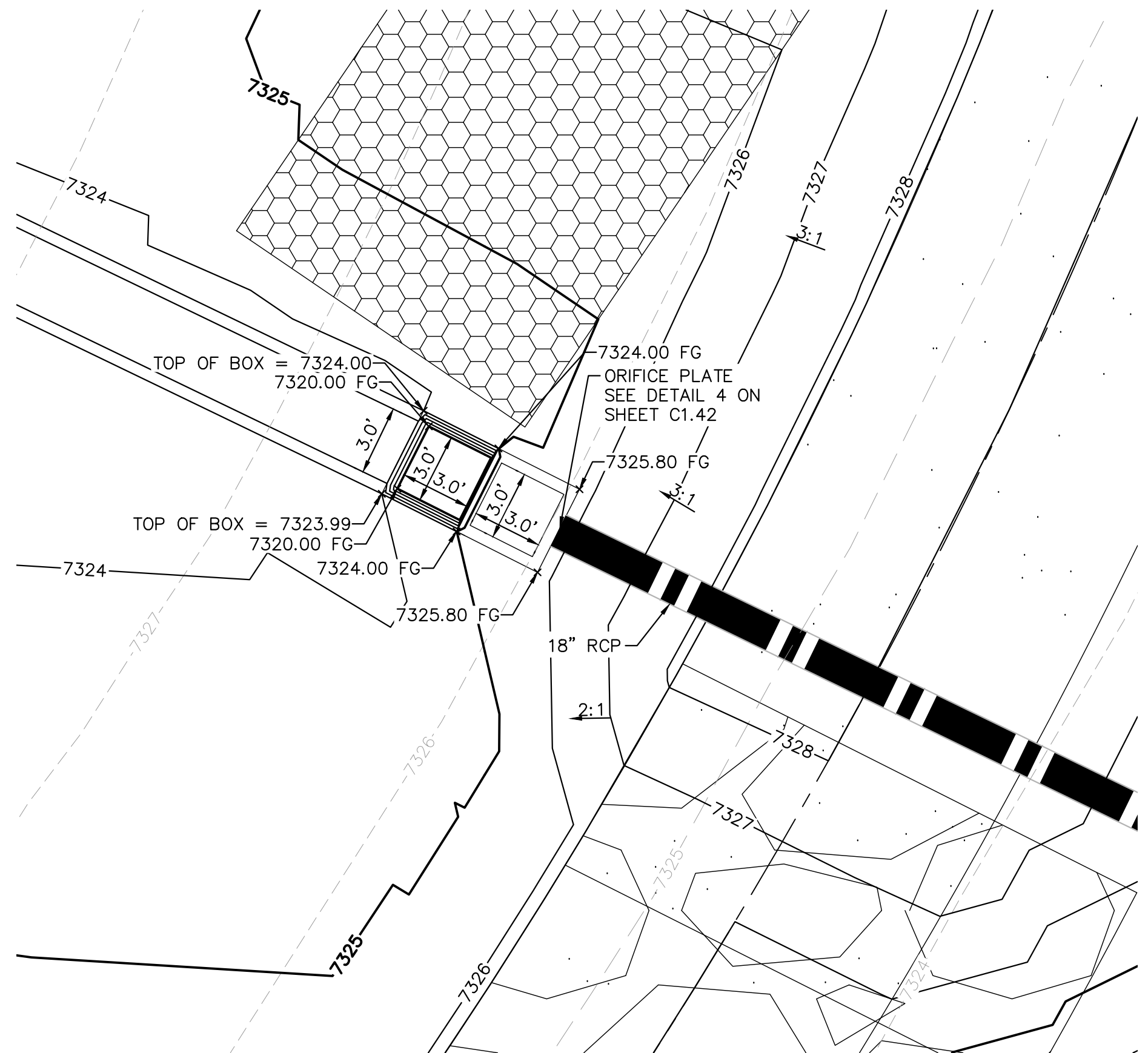
17 **ROCK CHUTE #13 PROFILE- CROSS SECTION 2**  
N.T.S.



11 **ROCK CHUTE #12 TO TRICKLE CHANNEL TRANSITION**  
N.T.S.



14 **ROCK CHUTE #13 TO TRICKLE CHANNEL TRANSITION**  
N.T.S.



15 **OUTLET STRUCTURE PLAN VIEW DETAIL**  
1"=5'



Know what's below.  
Call before you dig.



CALL UTILITY NOTIFICATION  
CENTER OF COLORADO  
1-800-922-1987  
CALL 2-BUSINESS DAYS IN ADVANCE  
BEFORE YOU DIG, GRADE, OR EXCAVATE  
FOR THE MARKING OF UNDERGROUND  
MEMBER UTILITIES

Rock Chute ID	Channel Location	Flow (cfs)	Upstream Inlet Apron Length (ft)	Drop (ft) (Inlet Apron to Outlet Apron)	Chute Length (ft)	Downstream Outlet Apron Length (ft)	Chute Width (ft)	D50 (in)	Rock Chute Thickness (in)	Radius (ft)	Min Rock Chute Depth (ft)	Rock Chute Depth (ft)	Top Chute Width (ft)
4	Pond 1	107	10	6	24	15	24	18	36	50	1.27	1.50	40
6	Pond 2	110	10	8	32	18	17	18	36	50	1.57	2.00	33
11	Pond 4	26	10	10	40	11	10	9	18	25	0.85	1.50	26
12	WQ Pond	100	11	5	20	20	12	18	36	50	1.81	2.00	28
13	WQ Pond	57	10	3	12	16	10	18	36	50	1.38	1.50	26

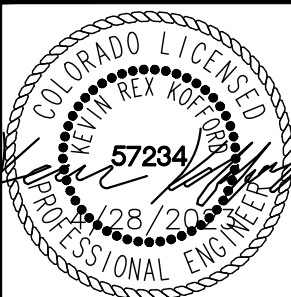
EPC 5/30/23

**Kimley»Horn**

2021 KIMLEY-HORN AND ASSOCIATES, INC.  
2 North Nevada Avenue Suite 300  
Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: KRK  
DRAWN BY: A.JL  
CHECKED BY: KRK  
DATE: 12/16/2021

WINSOME FILING NO. 3  
EL PASO COUNTY, COLORADO  
CONSTRUCTION DOCUMENTS  
WQ POND A DETAILS

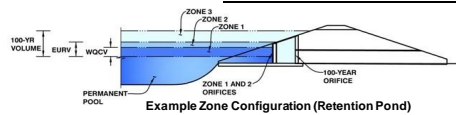


PROJECT NO.  
196106001  
SHEET

C1.43

MHFD-Detention, Version 4.06 (July 2022)

Basin ID:



Selected BMP Type =	EDB	
Watershed Area =	60.00	acres
Watershed Length =	2.399	ft
Watershed Length to Centroid =	960	ft
Watershed Slope =	0.050	ft/ft
Watershed Imperviousness =	7.20%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	6.9%	percent
Percentage Hydrologic Soil Groups C/D =	93.1%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths = User Input		

### Optional User Overrides

Water Quality Capture Volume (WQCV) =	<b>0.172</b>	acre-feet
Excess Urban Runoff Volume (EURV) =	<b>0.242</b>	acre-feet
2-yr Runoff Volume ( $P1 = 1.19 \text{ in.}$ ) =	<b>1.063</b>	acre-feet
5-yr Runoff Volume ( $P1 = 1.5 \text{ in.}$ ) =	<b>2.245</b>	acre-feet
10-yr Runoff Volume ( $P1 = 1.75 \text{ in.}$ ) =	<b>3.366</b>	acre-feet
25-yr Runoff Volume ( $P1 = 2 \text{ in.}$ ) =	<b>4.924</b>	acre-feet
50-yr Runoff Volume ( $P1 = 2.25 \text{ in.}$ ) =	<b>6.155</b>	acre-feet
100-yr Runoff Volume ( $P1 = 2.52 \text{ in.}$ ) =	<b>7.866</b>	acre-feet
500-yr Runoff Volume ( $P1 = 3.14 \text{ in.}$ ) =	<b>11.014</b>	acre-feet
Approximate 2-yr Detention Volume =	<b>0.276</b>	acre-feet
Approximate 5-yr Detention Volume =	<b>0.741</b>	acre-feet
Approximate 10-yr Detention Volume =	<b>1.072</b>	acre-feet
Approximate 25-yr Detention Volume =	<b>1.301</b>	acre-feet
Approximate 50-yr Detention Volume =	<b>1.333</b>	acre-feet
Approximate 100-yr Detention Volume =	<b>1.903</b>	acre-feet

0.172	acre-feet
0.241	acre-feet
1.19	inches
1.50	inches
1.75	inches
2.00	inches
2.25	inches
2.52	inches
	inches

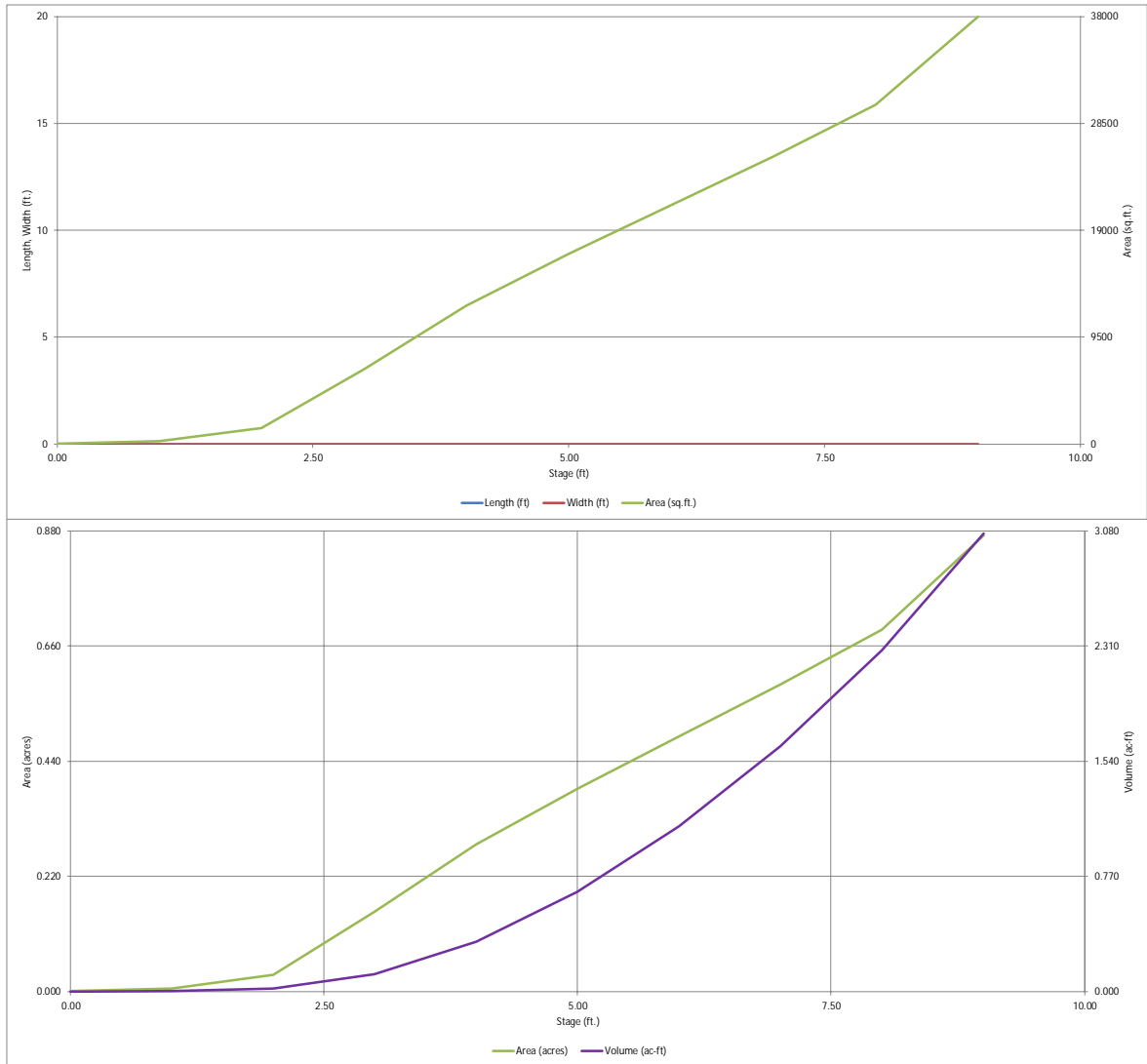
Zone 1 Volume (WQCV) =	0.172	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.069	acre-feet
Zone 3 Volume (100-year - Zone 1 & 2) =	1.662	acre-feet
Total Detention Basin Volume =	1.903	acre-feet
Initial Surge Volume (ISV) =	user	ft <sup>3</sup>
Initial Surge Depth (ISD) =	user	ft
Total Available Detention Depth ( $H_{total}$ ) =	user	ft
Depth of Trickle Channel ( $H_{TC}$ ) =	user	ft
Slope of Trickle Channel ( $S_{TC}$ ) =	user	ft/ft
Slopes of Main Basin Sides ( $S_{main}$ ) =	user	H:V
Basin Length-to-Width Ratio ( $R_{L/W}$ ) =	user	

Initial Surcharge Area ( $A_{ISU}$ )	=	user	ft <sup>2</sup>
Surcharge Volume Length ( $L_{ISU}$ )	=	user	ft
Surcharge Volume Width ( $W_{ISU}$ )	=	user	ft
Depth of Basin Floor ( $H_{1LOOR}$ )	=	user	ft
Length of Basin Floor ( $L_{1LOOR}$ )	=	user	ft
Width of Basin Floor ( $W_{1LOOR}$ )	=	user	ft
Area of Basin Floor ( $A_{1LOOR}$ )	=	user	ft <sup>2</sup>
Volume of Basin Floor ( $V_{1LOOR}$ )	=	user	ft <sup>3</sup>
Depth of Main Basin ( $H_{MAIN}$ )	=	user	ft
Length of Main Basin ( $L_{MAIN}$ )	=	user	ft
Width of Main Basin ( $W_{MAIN}$ )	=	user	ft
Area of Main Basin ( $A_{MAIN}$ )	=	user	ft <sup>2</sup>
Volume of Main Basin ( $V_{MAIN}$ )	=	user	ft <sup>3</sup>
Calculated Total Basin Volume ( $V_{TBSU}$ )	=	USER	acre-feet

[illegible]

# DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)





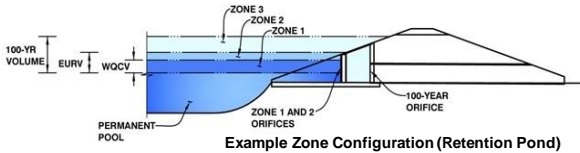
All orange-shaded spreadsheet values do not match as-built drawings. Revise to match.

## DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: Winsome Filling No. 3- Pond 1- Post Construction

Basin ID:



	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	3.34	0.172	Orifice Plate
Zone 2 (EURV)	3.66	0.069	Orifice Plate
Zone 3 (100-year)	7.43	1.662	Weir&Pipe (Restrict)
Total (all zones)		1.903	

✓ Satisfies criteria

✗ Needs to be addressed

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth = N/A ft (distance below the filtration media surface)  
Underdrain Orifice Diameter = N/A inches

Underdrain Orifice Area = N/A ft<sup>2</sup>  
Underdrain Orifice Centroid = N/A feet

Calculated Parameters for Underdrain

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Calculated Parameters for Plate

Centroid of Lowest Orifice = 0.00 ft (relative to basin bottom at Stage = 0 ft)  
Depth at top of Zone using Orifice Plate = 3.59 ft (relative to basin bottom at Stage = 0 ft)  
Orifice Plate: Orifice Vertical Spacing = N/A inches  
Orifice Plate: Orifice Area per Row = N/A sq. inches

WQ Orifice Area per Row = N/A ft<sup>2</sup>  
Elliptical Half-Width = N/A feet  
Elliptical Slot Centroid = N/A feet  
Elliptical Slot Area = N/A ft<sup>2</sup>

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	0.68	1.35					
Orifice Area (sq. inches)	0.20	0.20	0.20					

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

Calculated Parameters for Vertical Orifice

Invert of Vertical Orifice = N/A ft (relative to basin bottom at Stage = 0 ft)  
Depth at top of Zone using Vertical Orifice = N/A ft (relative to basin bottom at Stage = 0 ft)  
Vertical Orifice Diameter = N/A inches

Vertical Orifice Area = N/A ft<sup>2</sup>  
Vertical Orifice Centroid = N/A feet

User Input: Overflow Weir (Dropbox with Flat or Sloped Gate and Outlet Pipe OR Rectangular/Trapezoidal Weir and No Outlet Pipe)

Calculated Parameters for Overflow Weir

Overflow Weir Front Edge Height, H<sub>o</sub> = 2.85 ft (relative to basin bottom at Stage = 0 ft)  
Overflow Weir Front Edge Length = 12.00 feet  
Overflow Weir Gate Slope = 4.00 H:V  
Horiz. Length of Weir Sides = 6.00 feet  
Overflow Gate Type = Type C Gate  
Debris Clogging % = 50%

Height of Gate Upper Edge, H<sub>i</sub> = 4.35 feet  
Overflow Weir Slope Length = 6.18 feet  
Gate Open Area / 100-yr Orifice Area = 7.31  
Overflow Gate Open Area w/o Debris = 51.65 ft<sup>2</sup>  
Overflow Gate Open Area w/ Debris = 25.83 ft<sup>2</sup>

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

Depth to Invert of Outlet Pipe = 0.28 ft (distance below basin bottom at Stage = 0 ft)  
Outlet Pipe Diameter = 36.00 inches  
Restrictor Plate Height Above Pipe Invert = 36.00 inches

Outlet Orifice Area = 7.07 ft<sup>2</sup>  
Outlet Orifice Centroid = 1.50 feet  
Half-Central Angle of Restrictor Plate on Pipe = 3.14 radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Calculated Parameters for Spillway

Spillway Invert Stage = 6.88 ft (relative to basin bottom at Stage = 0 ft)  
Spillway Crest Length = 60.00 feet  
Spillway End Slopes = 4.00 H:V  
Freeboard above Max Water Surface = 1.00 feet

Spillway Design Flow Depth = 0.68 feet  
Stage at Top of Freeboard = 8.56 feet  
Basin Area at Top of Freeboard = 0.79 acres  
Basin Volume at Top of Freeboard = 2.69 acre-ft

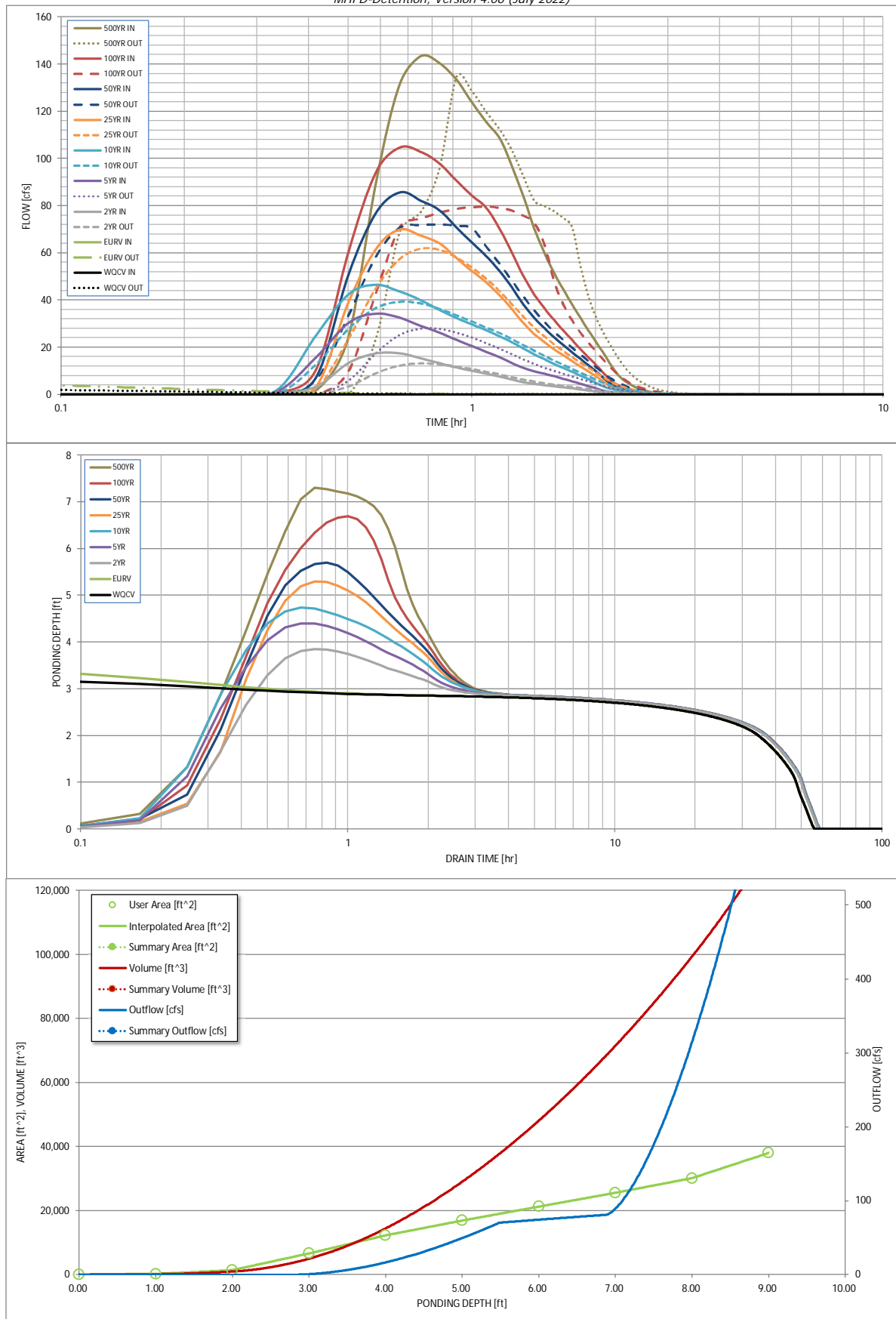
Routed Hydrograph Results

The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	3.14
One-Hour Rainfall Depth (in)	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	3.14
CUHP Runoff Volume (acre-ft)	0.172	0.241	1.063	2.245	3.366	4.924	6.155	7.866	11.014
Inflow Hydrograph Volume (acre-ft)	N/A	N/A	1.063	2.245	3.366	4.924	6.155	7.866	11.014
CUHP Predevelopment Peak Q (cfs)	N/A	N/A	14.9	31.4	43.5	66.8	82.6	101.5	140.2
OPTIONAL Override Predevelopment Peak Q (cfs)	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre)	N/A	N/A	0.25	0.52	0.73	1.11	1.38	1.69	2.34
Peak Inflow Q (cfs)	N/A	N/A	17.5	34.3	46.4	69.9	85.7	104.7	143.4
Peak Outflow Q (cfs)	3.2	7.1	13.2	27.9	39.3	61.8	72.1	79.6	134.7
Ratio Peak Outflow to Predevelopment Q	N/A	N/A	N/A	0.9	0.9	0.9	0.9	0.8	1.0
Structure Controlling Flow	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Outlet Plate 1	Spillway
Max Velocity through Gate 1 (fps)	0.08	0.18	0.26	0.5	0.8	1.2	1.4	1.5	1.6
Max Velocity through Gate 2 (fps)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours)	46	45	32	16	3	3	2	2	2
Time to Drain 99% of Inflow Volume (hours)	50	49	43	37	31	24	18	11	3
Maximum Ponding Depth (ft)	3.34	3.66	3.86	4.40	4.73	5.29	5.71	6.69	7.30
Area at Maximum Ponding Depth (acres)	0.20	0.24	0.26	0.32	0.36	0.42	0.46	0.56	0.62
Maximum Volume Stored (acre-ft)	0.174	0.243	0.291	0.453	0.565	0.783	0.962	1.464	1.822

# DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)



S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

# DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename:

## Inflow Hydrographs

The user can override the calculated inflow hydrographs from this workbook with inflow hydrographs developed in a separate program.

	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00_min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.02
	0:15:00	0.00	0.00	0.06	0.10	0.12	0.08	0.10	0.10	0.14
	0:20:00	0.00	0.00	0.23	1.06	1.67	0.23	0.39	0.67	1.58
	0:25:00	0.00	0.00	3.20	15.62	24.87	3.05	6.90	10.32	24.34
	0:30:00	0.00	0.00	13.38	30.35	42.43	39.03	50.84	60.51	89.91
	0:35:00	0.00	0.00	17.37	34.30	46.43	61.69	76.92	94.14	131.53
	0:40:00	0.00	0.00	17.51	32.49	43.63	69.90	85.68	104.70	143.39
	0:45:00	0.00	0.00	15.31	29.16	39.99	67.32	82.23	102.90	140.42
	0:50:00	0.00	0.00	13.26	26.17	35.82	64.04	78.13	97.91	133.39
	0:55:00	0.00	0.00	11.38	23.08	32.38	57.76	70.73	90.50	123.68
	1:00:00	0.00	0.00	10.01	20.46	29.66	52.22	64.26	84.23	115.46
	1:05:00	0.00	0.00	8.83	18.07	27.17	47.46	58.66	79.10	108.58
	1:10:00	0.00	0.00	7.58	15.82	24.68	41.93	52.17	70.10	96.82
	1:15:00	0.00	0.00	6.32	13.34	22.21	36.21	45.44	60.24	83.96
	1:20:00	0.00	0.00	5.17	11.32	19.53	30.22	38.12	50.19	70.48
	1:25:00	0.00	0.00	4.44	9.90	17.06	25.69	32.48	42.48	59.86
	1:30:00	0.00	0.00	3.90	8.75	14.86	22.10	27.97	36.44	51.41
	1:35:00	0.00	0.00	3.45	7.73	12.93	19.14	24.24	31.47	44.41
	1:40:00	0.00	0.00	3.01	6.64	11.18	16.51	20.91	27.08	38.20
	1:45:00	0.00	0.00	2.58	5.59	9.55	14.15	17.92	23.08	32.56
	1:50:00	0.00	0.00	2.15	4.57	8.00	11.92	15.10	19.34	27.29
	1:55:00	0.00	0.00	1.71	3.58	6.47	9.79	12.40	15.84	22.35
	2:00:00	0.00	0.00	1.27	2.61	4.91	7.75	9.83	12.59	17.75
	2:05:00	0.00	0.00	0.82	1.68	3.40	5.67	7.21	9.31	13.11
	2:10:00	0.00	0.00	0.44	1.04	2.43	3.66	4.75	6.24	8.98
	2:15:00	0.00	0.00	0.26	0.71	1.86	2.40	3.20	4.22	6.24
	2:20:00	0.00	0.00	0.17	0.52	1.45	1.62	2.22	2.91	4.42
	2:25:00	0.00	0.00	0.13	0.38	1.13	1.11	1.56	1.99	3.09
	2:30:00	0.00	0.00	0.10	0.28	0.86	0.75	1.08	1.32	2.10
	2:35:00	0.00	0.00	0.08	0.21	0.64	0.51	0.75	0.83	1.38
	2:40:00	0.00	0.00	0.06	0.15	0.46	0.33	0.50	0.48	0.84
	2:45:00	0.00	0.00	0.04	0.11	0.31	0.21	0.32	0.26	0.49
	2:50:00	0.00	0.00	0.03	0.07	0.21	0.14	0.21	0.17	0.32
	2:55:00	0.00	0.00	0.03	0.05	0.14	0.10	0.15	0.12	0.22
	3:00:00	0.00	0.00	0.02	0.04	0.10	0.08	0.11	0.10	0.17
	3:05:00	0.00	0.00	0.02	0.02	0.07	0.06	0.09	0.07	0.13
	3:10:00	0.00	0.00	0.01	0.01	0.05	0.04	0.06	0.06	0.10
	3:15:00	0.00	0.00	0.01	0.01	0.04	0.03	0.05	0.04	0.07
	3:20:00	0.00	0.00	0.00	0.00	0.02	0.02	0.03	0.03	0.05
	3:25:00	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.02	0.03
	3:30:00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02
	3:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
	3:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

## DETENTION BASIN OUTLET STRUCTURE DESIGN

*MHFD-Detention, Version 4.06 (July 2022)*

### Summary Stage-Area-Volume-Discharge Relationships

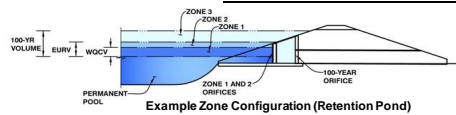
The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.

The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.

[illegible]

*MHFD-Detention, Version 4.06 (July 2022)*

Basin ID: \_\_\_\_\_



Selected BMP Type =	EDB	
Watershed Area =	67.90	acres
Watershed Length =	2.639	feet
Watershed Length to Centroid =	1.158	feet
Watershed Slope =	0.043	ft/ft
Watershed Imperviousness =	8.50%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	0.0%	percent
Percentage Hydrologic Soil Groups C/D =	100.0%	percent
Target WQCV Drain Time =	40.0	hours
Location for 1-hr Rainfall Depths = User Input		

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

Water Quality Capture Volume (WQCV) =	0.267	acre-feet	0.267	acre-feet
Excess Urban Runoff Volume (EURV) =	0.384	acre-feet	0.384	acre-feet
2-yr Runoff Volume ( $P_1 = 1.19 \text{ in.}$ ) =	1.313	acre-feet	1.19	inches
5-yr Runoff Volume ( $P_1 = 1.5 \text{ in.}$ ) =	2.686	acre-feet	1.50	inches
10-yr Runoff Volume ( $P_1 = 1.75 \text{ in.}$ ) =	3.969	acre-feet	1.75	inches
25-yr Runoff Volume ( $P_1 = 2 \text{ in.}$ ) =	5.724	acre-feet	2.00	inches
50-yr Runoff Volume ( $P_1 = 2.25 \text{ in.}$ ) =	7.175	acre-feet	2.25	inches
100-yr Runoff Volume ( $P_1 = 2.52 \text{ in.}$ ) =	9.058	acre-feet	2.52	inches
500-yr Runoff Volume ( $P_1 = 3.14 \text{ in.}$ ) =	12.632	acre-feet		inches
Approximate 2-yr Detention Volume =	0.380	acre-feet		
Approximate 5-yr Detention Volume =	0.970	acre-feet		
Approximate 10-yr Detention Volume =	1.328	acre-feet		
Approximate 25-yr Detention Volume =	1.593	acre-feet		
Approximate 50-yr Detention Volume =	1.641	acre-feet		
Approximate 100-yr Detention Volume =	2.320	acre-feet		

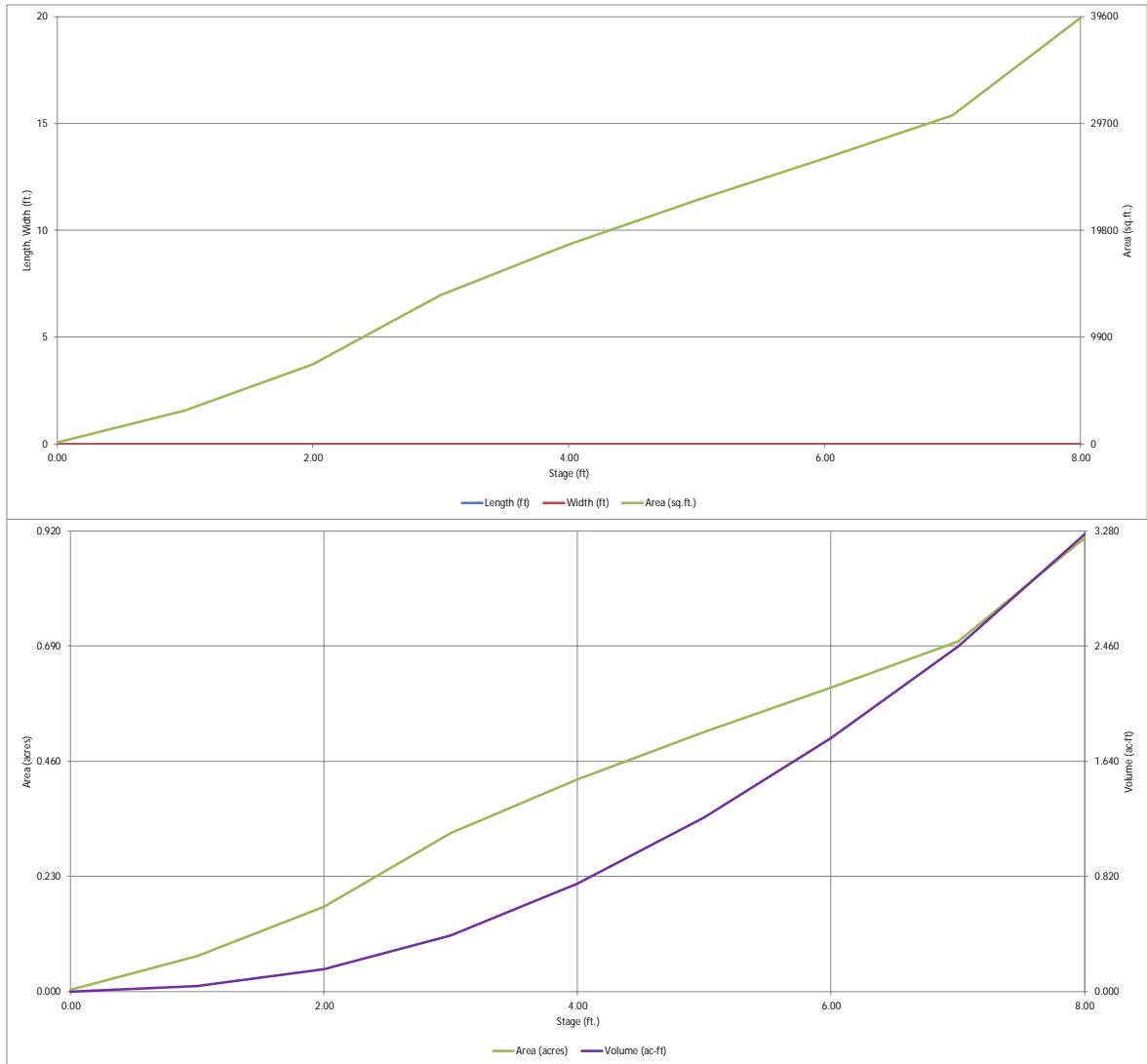
Zone 1 Volume (WOCV) =	0.267	acre-feet
Zone 2 Volume (EURV - Zone 1) =	0.177	acre-feet
Zone 3 Volume (100-year - Zones 1 & 2) =	1.936	acre-feet
Total Detention Basin Volume =	2.320	acre-feet
Initial Surge Volume (ISV) =	user	ft <sup>3</sup>
Initial Surge Depth (ISD) =	user	ft
Total Available Detention Depth (H <sub>total</sub> ) =	user	ft
Depth of Trickle Channel (H <sub>TC</sub> ) =	user	ft
Slope of Trickle Channel (S <sub>TC</sub> ) =	user	ft/ft
Slopes of Main Basin Sides (S <sub>Main</sub> ) =	user	H/V
Basin Length-to-Width Ratio (R <sub>LW</sub> ) =	user	
Initial Surge Area (A <sub>ISV</sub> ) =	user	ft <sup>2</sup>
Surcharge Volume Length (L <sub>SV</sub> ) =	user	ft
Surcharge Volume Width (W <sub>SV</sub> ) =	user	ft
Depth of Basin Floor (H <sub>LFloor</sub> ) =	user	ft
Length of Basin Floor (L <sub>LFloor</sub> ) =	user	ft
Width of Basin Floor (W <sub>LFloor</sub> ) =	user	ft
Area of Basin Floor (A <sub>LFloor</sub> ) =	user	ft <sup>2</sup>
Volume of Basin Floor (V <sub>LFloor</sub> ) =	user	ft <sup>3</sup>
Depth of Main Basin (H <sub>Main</sub> ) =	user	ft
Length of Main Basin (L <sub>Main</sub> ) =	user	ft
Width of Main Basin (W <sub>Main</sub> ) =	user	ft
Area of Main Basin (A <sub>Main</sub> ) =	user	ft <sup>2</sup>
Volume of Main Basin (V <sub>Main</sub> ) =	user	ft <sup>3</sup>
Calculated Total Basin Volume (V <sub>Total</sub> ) =	user	acre-feet

[illegible]



# DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

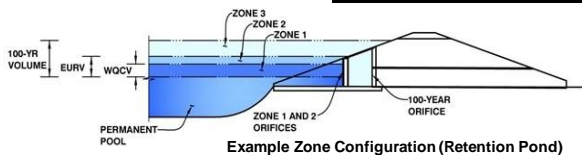


# DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: Winsome Filling No. 3- Pond 2-Post Construction

Basin ID:



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WOCV)	2.53	0.267	Orifice Plate
Zone 2 (EURV)	2.95	0.117	Orifice Plate
Zone 3 (100-year)	6.81	1.936	Weir&Pipe (Restrict)
Total (all zones)		2.320	

✓ Satisfies criteria

✗ Needs to be addressed

User Input: Orifice at Underdrain Outlet (typically used to drain WOCV in a Filtration BMP)

Underdrain Orifice Invert Depth = N/A ft (distance below the filtration media surface)  
Underdrain Orifice Diameter = N/A inches

Underdrain Orifice Area = N/A ft<sup>2</sup>  
Underdrain Orifice Centroid = N/A feet

Calculated Parameters for Underdrain

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WOCV and/or EURV in a sedimentation BMP)

Calculated Parameters for Plate

Centroid of Lowest Orifice = 0.00 ft (relative to basin bottom at Stage = 0 ft)  
Depth at top of Zone using Orifice Plate = 3.14 ft (relative to basin bottom at Stage = 0 ft)  
Orifice Plate: Orifice Vertical Spacing = N/A inches  
Orifice Plate: Orifice Area per Row = N/A sq. inches

WO Orifice Area per Row = N/A ft<sup>2</sup>  
Elliptical Half-Width = N/A feet  
Elliptical Slot Centroid = N/A feet  
Elliptical Slot Area = N/A ft<sup>2</sup>

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	0.80	1.60					
Orifice Area (sq. inches)	1.10	1.10	1.20					

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

Calculated Parameters for Vertical Orifice

Invert of Vertical Orifice = N/A ft (relative to basin bottom at Stage = 0 ft)  
Depth at top of Zone using Vertical Orifice = N/A ft (relative to basin bottom at Stage = 0 ft)  
Vertical Orifice Diameter = N/A inches

Vertical Orifice Area = N/A ft<sup>2</sup>  
Vertical Orifice Centroid = N/A feet

User Input: Overflow Weir (Dropbox with Flat or Sloped Gate and Outlet Pipe OR Rectangular/Trapezoidal Weir and No Outlet Pipe)

Calculated Parameters for Overflow Weir

Overflow Weir Front Edge Height, H<sub>o</sub> = 2.85 ft (relative to basin bottom at Stage = 0 ft)  
Overflow Weir Front Edge Length = 15.00 feet  
Overflow Weir Gate Slope = 4.00 H:V  
Horiz. Length of Weir Sides = 6.00 feet  
Overflow Gate Type = Type C Gate  
Debris Clogging % = 50%

Height of Gate Upper Edge, H<sub>1</sub> = 4.35 feet  
Overflow Weir Slope Length = 6.18 feet  
Gate Open Area / 100-yr Orifice Area = 8.87  
Overflow Gate Open Area w/o Debris = 64.57 ft<sup>2</sup>  
Overflow Gate Open Area w/ Debris = 32.28 ft<sup>2</sup>

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

Depth to Invert of Outlet Pipe = 2.63 ft (distance below basin bottom at Stage = 0 ft)  
Outlet Pipe Diameter = 48.00 inches  
Restrictor Plate Height Above Pipe Invert = 27.00 inches

Outlet Orifice Area = 7.28 ft<sup>2</sup>  
Outlet Orifice Centroid = 1.28 feet  
Half-Central Angle of Restrictor Plate on Pipe = 1.70 radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Calculated Parameters for Spillway

Spillway Invert Stage = 5.94 ft (relative to basin bottom at Stage = 0 ft)  
Spillway Crest Length = 60.00 feet  
Spillway End Slopes = 4.00 H:V  
Freeboard above Max Water Surface = 1.00 feet

Spillway Design Flow Depth = 0.70 feet  
Stage at Top of Freeboard = 7.64 feet  
Basin Area at Top of Freeboard = 0.83 acres  
Basin Volume at Top of Freeboard = 2.95 acre-ft

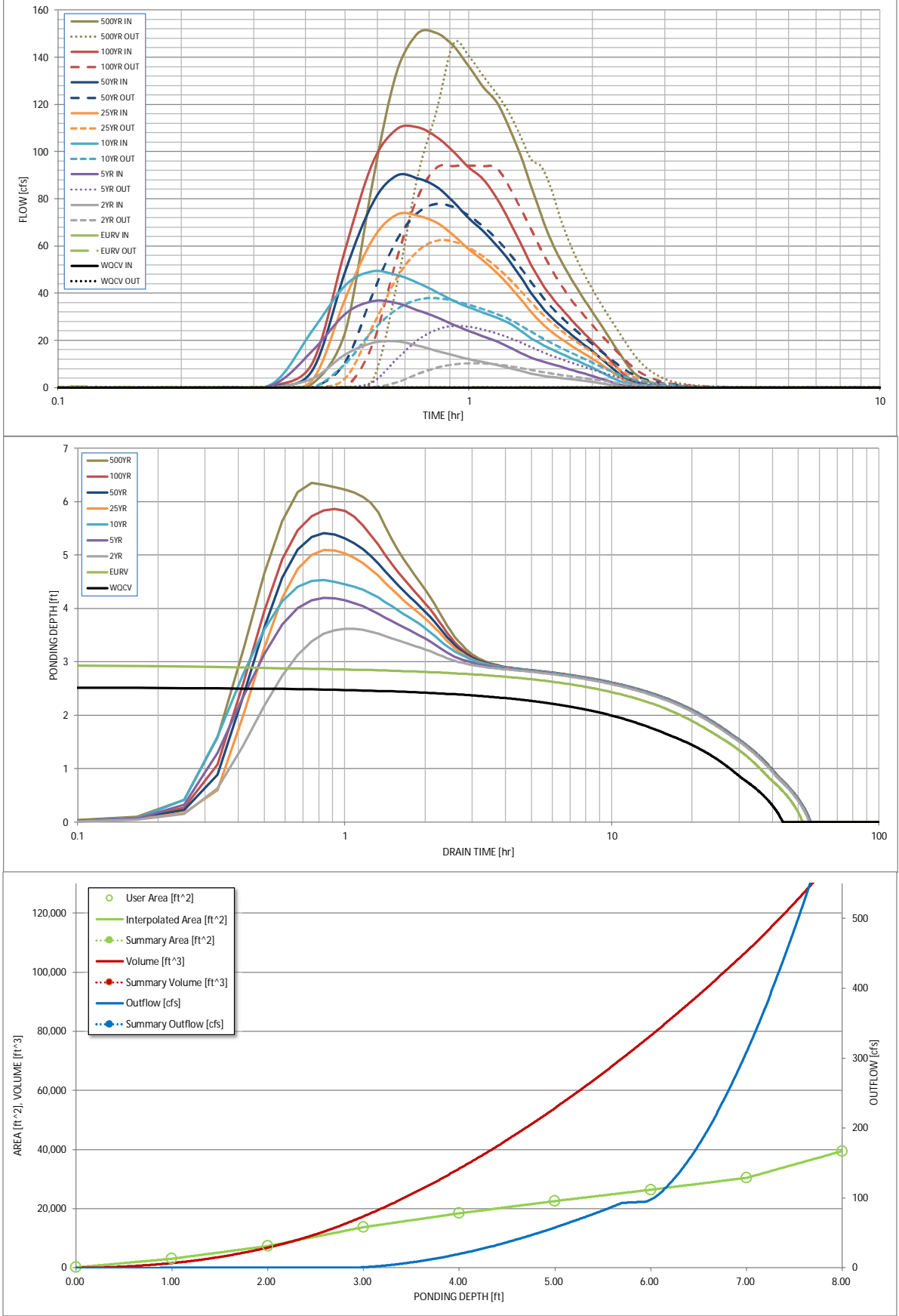
Routed Hydrograph Results

The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

	WOCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	3.14
One-Hour Rainfall Depth (in)	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	3.14
CUHP Runoff Volume (acre-ft)	0.267	0.384	1.313	2.686	3.969	5.724	7.125	9.058	12.632
Inflow Hydrograph Volume (acre-ft)	N/A	N/A	1.313	2.686	3.969	5.724	7.125	9.058	12.632
CUHP Predevelopment Peak Q (cfs)	N/A	N/A	16.1	32.7	45.3	69.8	85.8	107.3	147.5
OPTIONAL Override Predevelopment Peak Q (cfs)	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre)	N/A	N/A	0.24	0.48	0.67	1.03	1.26	1.58	2.17
Peak Inflow Q (cfs)	N/A	N/A	19.6	36.7	49.3	73.4	89.9	110.4	150.3
Peak Outflow Q (cfs)	0.1	0.5	10.4	26.1	37.9	62.3	77.9	94.2	145.9
Ratio Peak Outflow to Predevelopment Q	N/A	N/A	N/A	0.8	0.8	0.9	0.9	0.9	1.0
Structure Controlling Flow	Plate	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Spillway
Max Velocity through Gate 1 (fps)	N/A	0.01	0.16	0.4	0.6	1.0	1.2	1.5	1.5
Max Velocity through Gate 2 (fps)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours)	38	45	39	31	26	20	16	11	4
Time to Drain 99% of Inflow Volume (hours)	41	49	47	42	39	35	33	30	25
Maximum Ponding Depth (ft)	2.53	2.95	3.62	4.20	4.53	5.10	5.42	5.87	6.35
Area at Maximum Ponding Depth (acres)	0.25	0.31	0.38	0.44	0.47	0.53	0.55	0.60	0.64
Maximum Volume Stored (acre-ft)	0.268	0.384	0.617	0.856	1.008	1.288	1.461	1.726	2.022

# DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)



S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

# DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename:

## Inflow Hydrographs

The user can override the calculated inflow hydrographs from this workbook with inflow hydrographs developed in a separate program.

	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00_min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.03
	0:15:00	0.00	0.00	0.08	0.12	0.15	0.10	0.13	0.13	0.19
	0:20:00	0.00	0.00	0.30	1.23	1.90	0.31	0.50	0.80	1.82
	0:25:00	0.00	0.00	3.94	15.71	24.46	3.45	7.51	10.76	24.03
	0:30:00	0.00	0.00	14.11	31.27	43.51	38.00	49.61	59.01	87.95
	0:35:00	0.00	0.00	18.98	36.68	49.33	63.02	78.48	95.59	133.66
	0:40:00	0.00	0.00	19.65	35.86	47.83	73.41	89.85	109.53	150.06
	0:45:00	0.00	0.00	17.81	32.86	44.47	72.87	88.77	110.38	150.35
	0:50:00	0.00	0.00	15.64	29.98	40.63	70.00	85.19	106.37	144.73
	0:55:00	0.00	0.00	13.70	26.74	36.84	64.56	78.72	99.93	136.06
	1:00:00	0.00	0.00	12.05	23.98	34.06	58.49	71.67	93.22	127.41
	1:05:00	0.00	0.00	10.86	21.73	31.81	53.86	66.28	88.31	120.96
	1:10:00	0.00	0.00	9.62	19.64	29.64	48.68	60.25	80.26	110.52
	1:15:00	0.00	0.00	8.37	17.30	27.44	43.42	54.11	71.13	98.70
	1:20:00	0.00	0.00	7.14	14.84	24.27	37.71	47.09	61.39	85.40
	1:25:00	0.00	0.00	6.00	12.72	20.99	32.12	40.17	52.13	72.71
	1:30:00	0.00	0.00	5.15	11.22	18.43	27.37	34.34	44.46	62.26
	1:35:00	0.00	0.00	4.60	10.09	16.36	23.85	29.98	38.69	54.29
	1:40:00	0.00	0.00	4.13	8.96	14.55	21.00	26.42	34.01	47.75
	1:45:00	0.00	0.00	3.70	7.87	12.90	18.51	23.29	29.86	41.95
	1:50:00	0.00	0.00	3.28	6.84	11.38	16.26	20.47	26.11	36.70
	1:55:00	0.00	0.00	2.83	5.85	9.88	14.17	17.84	22.62	31.81
	2:00:00	0.00	0.00	2.38	4.89	8.33	12.17	15.33	19.35	27.22
	2:05:00	0.00	0.00	1.93	3.94	6.78	10.16	12.79	16.17	22.71
	2:10:00	0.00	0.00	1.48	3.01	5.29	8.18	10.29	13.08	18.33
	2:15:00	0.00	0.00	1.04	2.10	3.89	6.24	7.85	10.05	14.06
	2:20:00	0.00	0.00	0.63	1.33	2.73	4.36	5.52	7.14	10.06
	2:25:00	0.00	0.00	0.34	0.87	2.05	2.79	3.64	4.76	6.89
	2:30:00	0.00	0.00	0.23	0.64	1.61	1.89	2.53	3.28	4.87
	2:35:00	0.00	0.00	0.17	0.48	1.26	1.30	1.79	2.28	3.46
	2:40:00	0.00	0.00	0.13	0.36	0.98	0.90	1.26	1.55	2.41
	2:45:00	0.00	0.00	0.10	0.27	0.75	0.62	0.88	1.02	1.63
	2:50:00	0.00	0.00	0.08	0.20	0.55	0.42	0.61	0.63	1.05
	2:55:00	0.00	0.00	0.06	0.15	0.40	0.28	0.41	0.37	0.64
	3:00:00	0.00	0.00	0.05	0.10	0.27	0.19	0.27	0.22	0.40
	3:05:00	0.00	0.00	0.04	0.07	0.18	0.13	0.19	0.16	0.28
	3:10:00	0.00	0.00	0.03	0.05	0.13	0.10	0.14	0.12	0.21
	3:15:00	0.00	0.00	0.02	0.03	0.09	0.07	0.11	0.09	0.17
	3:20:00	0.00	0.00	0.02	0.02	0.07	0.06	0.08	0.07	0.13
	3:25:00	0.00	0.00	0.01	0.01	0.05	0.04	0.06	0.05	0.09
	3:30:00	0.00	0.00	0.01	0.01	0.03	0.03	0.04	0.04	0.07
	3:35:00	0.00	0.00	0.00	0.00	0.02	0.02	0.03	0.02	0.04
	3:40:00	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.01	0.02
	3:45:00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01
	3:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

## DETENTION BASIN OUTLET STRUCTURE DESIGN

*MHFD-Detention, Version 4.06 (July 2022)*

### Summary Stage-Area-Volume-Discharge Relationships

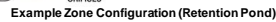
The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.

The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.

[illegible]

MHFD-Detention, Version 4.06 (July 2022)

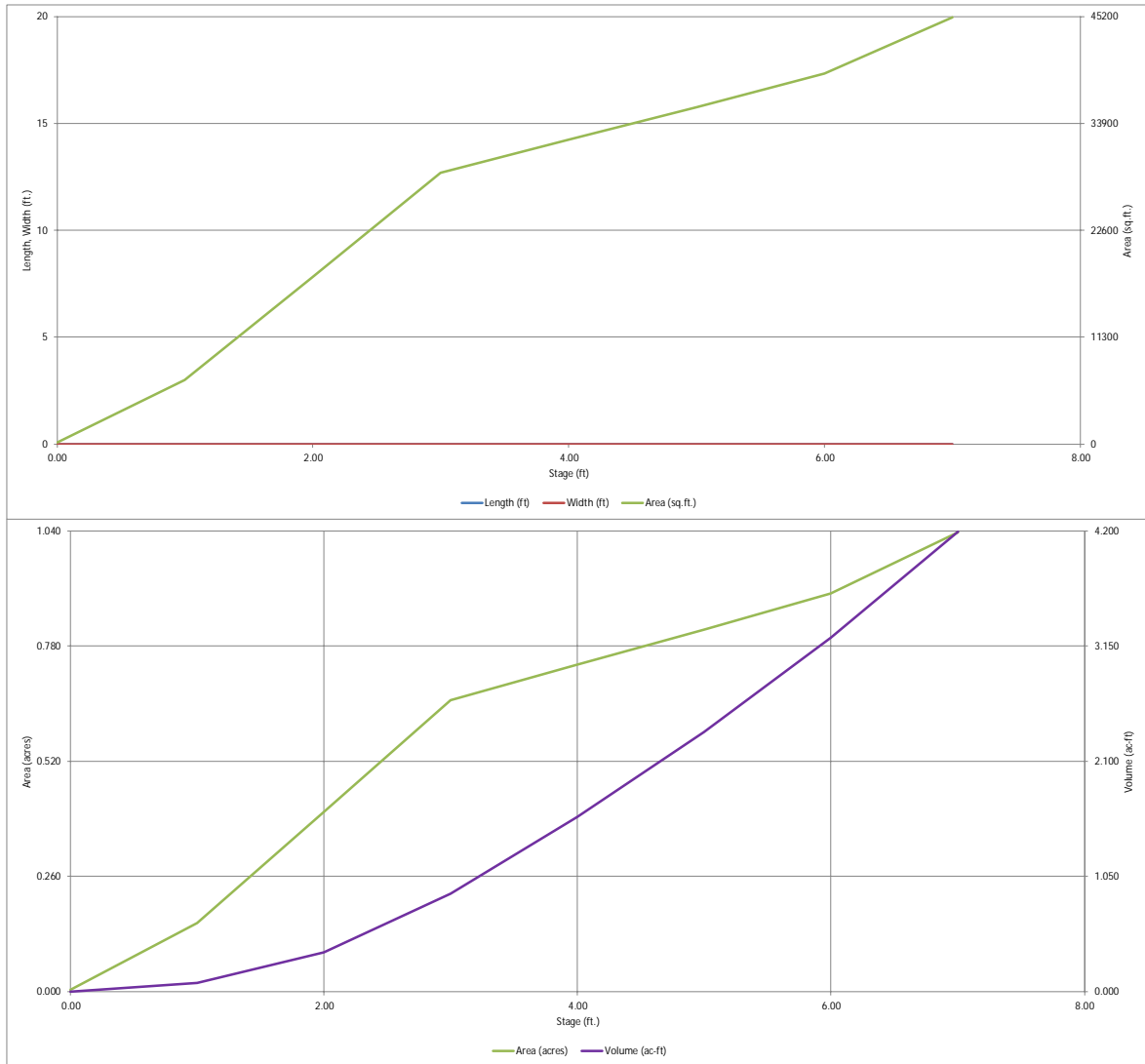
Basin ID: \_\_\_\_\_



0.247	acre-feet
0.433	acre-feet
1.19	inches
1.50	inches
1.75	inches
2.00	inches
2.25	inches
2.52	inches
	inches

# DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)



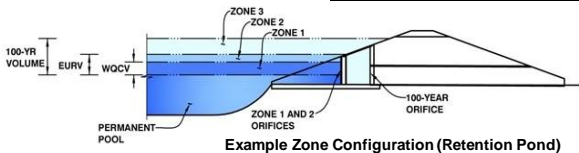


# DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: Winsome Filling No. 3-Pond 4-Post Construction

Basin ID:



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WOCV)	1.70	0.247	Orifice Plate
Zone 2 (EURV)	2.18	0.186	Orifice Plate
Zone 3 (100-year)	5.24	2.128	Weir&Pipe (Restrict)
Total (all zones)		2.561	

✓ Satisfies criteria  
✗ Needs to be addressed

User Input: Orifice at Underdrain Outlet (typically used to drain WOCV in a Filtration BMP)

Underdrain Orifice Invert Depth = N/A ft (distance below the filtration media surface)  
Underdrain Orifice Diameter = N/A inches

Underdrain Orifice Area = N/A ft<sup>2</sup>  
Underdrain Orifice Centroid = N/A feet

Calculated Parameters for Underdrain

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WOCV and/or EURV in a sedimentation BMP)

Calculated Parameters for Plate

Centroid of Lowest Orifice = 0.00 ft (relative to basin bottom at Stage = 0 ft)  
Depth at top of Zone using Orifice Plate = 2.18 ft (relative to basin bottom at Stage = 0 ft)  
Orifice Plate: Orifice Vertical Spacing = N/A inches  
Orifice Plate: Orifice Area per Row = N/A sq. inches

WO Orifice Area per Row = N/A ft<sup>2</sup>  
Elliptical Half-Width = N/A feet  
Elliptical Slot Centroid = N/A feet  
Elliptical Slot Area = N/A ft<sup>2</sup>

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	0.60	1.20					
Orifice Area (sq. inches)	1.10	1.10	1.20					

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

Calculated Parameters for Vertical Orifice

Invert of Vertical Orifice = N/A ft (relative to basin bottom at Stage = 0 ft)  
Depth at top of Zone using Vertical Orifice = N/A ft (relative to basin bottom at Stage = 0 ft)  
Vertical Orifice Diameter = N/A inches

Vertical Orifice Area = N/A ft<sup>2</sup>  
Vertical Orifice Centroid = N/A feet

User Input: Overflow Weir (Dropbox with Flat or Sloped Gate and Outlet Pipe OR Rectangular/Trapezoidal Weir and No Outlet Pipe)

Calculated Parameters for Overflow Weir

Overflow Weir Front Edge Height, H<sub>o</sub> = 1.64 ft (relative to basin bottom at Stage = 0 ft)  
Overflow Weir Front Edge Length = 12.00 feet  
Overflow Weir Gate Slope = 4.00 H:V  
Horiz. Length of Weir Sides = 6.00 feet  
Overflow Gate Type = Type C Gate  
Debris Clogging % = 50%

Height of Gate Upper Edge, H<sub>1</sub> = 3.14 feet  
Overflow Weir Slope Length = 6.18 feet  
Gate Open Area / 100-yr Orifice Area = 8.26  
Overflow Gate Open Area w/o Debris = 51.65 ft<sup>2</sup>  
Overflow Gate Open Area w/ Debris = 25.83 ft<sup>2</sup>

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

Depth to Invert of Outlet Pipe = 2.14 ft (distance below basin bottom at Stage = 0 ft)  
Outlet Pipe Diameter = 42.00 inches  
Restrictor Plate Height Above Pipe Invert = 26.00 inches

Outlet Orifice Area = 6.25 ft<sup>2</sup>  
Outlet Orifice Centroid = 1.23 feet  
Half-Central Angle of Restrictor Plate on Pipe = 1.81 radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Calculated Parameters for Spillway

Spillway Invert Stage = 5.07 ft (relative to basin bottom at Stage = 0 ft)  
Spillway Crest Length = 60.00 feet  
Spillway End Slopes = 4.00 H:V  
Freeboard above Max Water Surface = 1.00 feet

Spillway Design Flow Depth = 0.69 feet  
Stage at Top of Freeboard = 6.76 feet  
Basin Area at Top of Freeboard = 1.00 acres  
Basin Volume at Top of Freeboard = 3.95 acre-ft

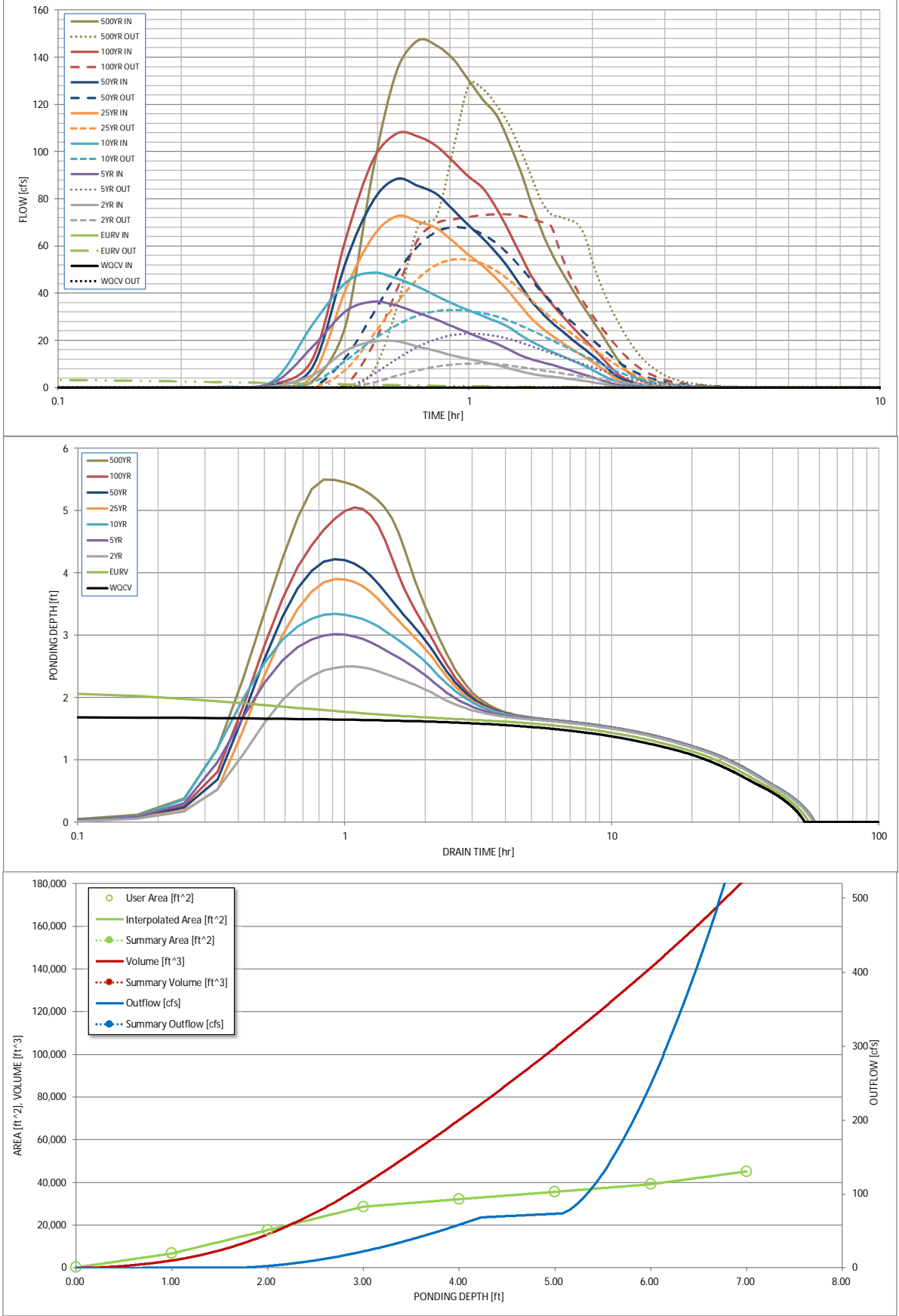
Routed Hydrograph Results

The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

	WOCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	3.14
One-Hour Rainfall Depth (in)	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	3.14
CUHP Runoff Volume (acre-ft)	0.247	0.433	1.333	2.607	3.819	5.479	6.792	8.600	11.978
Inflow Hydrograph Volume (acre-ft)	N/A	N/A	1.333	2.607	3.819	5.479	6.792	8.600	11.978
CUHP Predevelopment Peak Q (cfs)	N/A	N/A	14.4	30.4	42.6	65.8	81.6	101.6	140.1
OPTIONAL Override Predevelopment Peak Q (cfs)	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre)	N/A	N/A	0.22	0.48	0.67	1.03	1.27	1.59	2.19
Peak Inflow Q (cfs)	N/A	N/A	19.7	36.5	48.8	72.7	88.5	107.7	147.0
Peak Outflow Q (cfs)	0.2	4.2	10.2	22.9	33.0	54.3	68.1	73.5	128.6
Ratio Peak Outflow to Predevelopment Q	N/A	N/A	N/A	0.8	0.8	0.8	0.8	0.7	0.9
Structure Controlling Flow	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Outlet Plate 1	Spillway
Max Velocity through Gate 1 (fps)	0.00	0.09	0.19	0.4	0.6	1.0	1.3	1.4	1.5
Max Velocity through Gate 2 (fps)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours)	46	45	36	27	21	14	9	4	3
Time to Drain 99% of Inflow Volume (hours)	50	50	47	41	37	33	30	26	20
Maximum Ponding Depth (ft)	1.70	2.18	2.50	3.02	3.34	3.90	4.22	5.05	5.50
Area at Maximum Ponding Depth (acres)	0.33	0.45	0.53	0.66	0.69	0.73	0.76	0.82	0.86
Maximum Volume Stored (acre-ft)	0.250	0.437	0.595	0.899	1.121	1.517	1.755	2.402	2.788

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)



S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

# DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename:

## Inflow Hydrographs

The user can override the calculated inflow hydrographs from this workbook with inflow hydrographs developed in a separate program.

	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00_min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.06
	0:15:00	0.00	0.00	0.16	0.26	0.32	0.22	0.28	0.26	0.40
	0:20:00	0.00	0.00	0.63	1.98	2.92	0.62	0.98	1.40	2.83
	0:25:00	0.00	0.00	5.29	17.45	26.81	5.08	8.75	12.20	26.33
	0:30:00	0.00	0.00	15.64	32.36	44.49	41.35	52.95	62.61	92.03
	0:35:00	0.00	0.00	19.56	36.48	48.78	64.01	79.13	96.40	134.06
	0:40:00	0.00	0.00	19.67	34.84	46.23	72.65	88.52	107.73	147.03
	0:45:00	0.00	0.00	17.51	31.68	42.86	70.45	85.58	106.61	145.05
	0:50:00	0.00	0.00	15.49	28.89	38.98	67.63	82.09	102.38	139.08
	0:55:00	0.00	0.00	13.61	25.73	35.41	61.81	75.23	95.65	130.15
	1:00:00	0.00	0.00	12.12	23.06	32.68	56.12	68.60	89.28	121.88
	1:05:00	0.00	0.00	10.92	20.75	30.33	51.46	63.17	84.36	115.35
	1:10:00	0.00	0.00	9.60	18.58	28.00	46.12	56.95	75.79	104.20
	1:15:00	0.00	0.00	8.26	16.18	25.65	40.67	50.58	66.39	91.99
	1:20:00	0.00	0.00	6.95	13.77	22.41	34.83	43.42	56.47	78.48
	1:25:00	0.00	0.00	5.88	12.02	19.64	29.43	36.79	47.59	66.51
	1:30:00	0.00	0.00	5.22	10.81	17.39	25.46	31.89	41.00	57.43
	1:35:00	0.00	0.00	4.69	9.76	15.46	22.28	27.94	35.80	50.20
	1:40:00	0.00	0.00	4.22	8.62	13.71	19.58	24.57	31.33	43.95
	1:45:00	0.00	0.00	3.75	7.49	12.10	17.15	21.52	27.31	38.33
	1:50:00	0.00	0.00	3.30	6.42	10.58	14.94	18.75	23.61	33.16
	1:55:00	0.00	0.00	2.80	5.39	9.06	12.82	16.10	20.14	28.29
	2:00:00	0.00	0.00	2.29	4.38	7.45	10.79	13.56	16.89	23.74
	2:05:00	0.00	0.00	1.78	3.36	5.82	8.69	10.93	13.65	19.15
	2:10:00	0.00	0.00	1.27	2.37	4.28	6.60	8.31	10.43	14.60
	2:15:00	0.00	0.00	0.81	1.56	3.08	4.60	5.84	7.38	10.43
	2:20:00	0.00	0.00	0.51	1.08	2.35	3.03	3.94	5.00	7.26
	2:25:00	0.00	0.00	0.37	0.81	1.86	2.10	2.79	3.50	5.19
	2:30:00	0.00	0.00	0.28	0.62	1.47	1.48	2.01	2.46	3.73
	2:35:00	0.00	0.00	0.22	0.48	1.15	1.05	1.45	1.70	2.64
	2:40:00	0.00	0.00	0.17	0.37	0.89	0.74	1.04	1.14	1.82
	2:45:00	0.00	0.00	0.14	0.28	0.67	0.53	0.74	0.74	1.20
	2:50:00	0.00	0.00	0.11	0.21	0.49	0.37	0.52	0.45	0.77
	2:55:00	0.00	0.00	0.08	0.16	0.35	0.26	0.36	0.30	0.51
	3:00:00	0.00	0.00	0.07	0.11	0.25	0.19	0.27	0.22	0.38
	3:05:00	0.00	0.00	0.05	0.08	0.18	0.15	0.20	0.17	0.29
	3:10:00	0.00	0.00	0.04	0.06	0.14	0.11	0.16	0.14	0.23
	3:15:00	0.00	0.00	0.03	0.04	0.10	0.08	0.12	0.11	0.18
	3:20:00	0.00	0.00	0.02	0.02	0.07	0.06	0.09	0.08	0.13
	3:25:00	0.00	0.00	0.01	0.01	0.05	0.04	0.06	0.05	0.09
	3:30:00	0.00	0.00	0.01	0.01	0.03	0.03	0.04	0.03	0.06
	3:35:00	0.00	0.00	0.00	0.01	0.01	0.02	0.02	0.02	0.03
	3:40:00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01
	3:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

## DETENTION BASIN OUTLET STRUCTURE DESIGN

*MHFD-Detention, Version 4.06 (July 2022)*

The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.

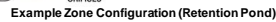
The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	52
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[illegible]

MHFD-Detention, Version 4.06 (July 2022)

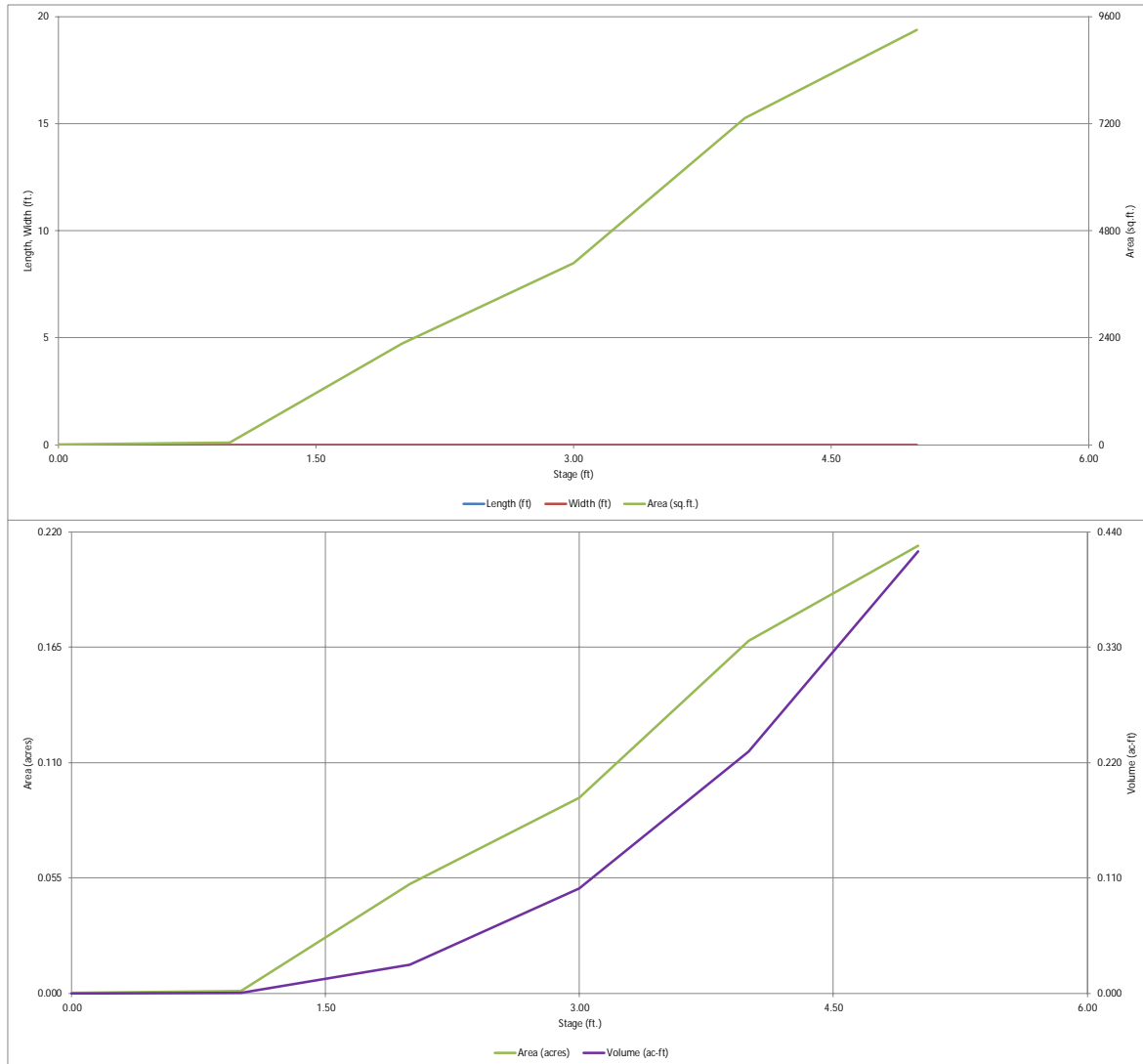
Basin ID: \_\_\_\_\_



0.047	acre-feet
	acre-feet
1.19	inches
1.50	inches
1.75	inches
2.00	inches
2.25	inches
2.52	inches
	inches

# DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.06 (July 2022)

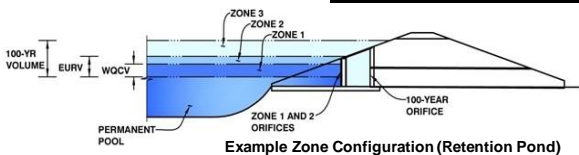


# DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)

Project: Winsome Filling No. 3- WQ Pond A- Post Construction

Basin ID:



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.34	0.047	Orifice Plate
Zone 2 (EURV)	3.36	0.091	Weir&Pipe (Restrict)
Zone 3 (100-year)	#VALUE!	1.607	Not Utilized
Total (all zones)		1.745	

✓ Satisfies criteria  
✗ Needs to be addressed

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth = N/A ft (distance below the filtration media surface)  
Underdrain Orifice Diameter = N/A inches

Calculated Parameters for Underdrain

Underdrain Orifice Area = N/A ft<sup>2</sup>  
Underdrain Orifice Centroid = N/A feet

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Calculated Parameters for Plate

Centroid of Lowest Orifice = 0.00 ft (relative to basin bottom at Stage = 0 ft)  
Depth at top of Zone using Orifice Plate = 3.36 ft (relative to basin bottom at Stage = 0 ft)  
Orifice Plate: Orifice Vertical Spacing = N/A inches  
Orifice Plate: Orifice Area per Row = N/A sq. inches  
WQ Orifice Area per Row = N/A ft<sup>2</sup>  
Elliptical Half-Width = N/A feet  
Elliptical Slot Centroid = N/A feet  
Elliptical Slot Area = N/A ft<sup>2</sup>

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	1.02	1.99					
Orifice Area (sq. inches)	0.16	0.16	0.16					

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

Calculated Parameters for Vertical Orifice

	Not Selected	Not Selected		Not Selected	Not Selected
Invert of Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =	N/A ft <sup>2</sup>
Depth at top of Zone using Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =	N/A feet
Vertical Orifice Diameter =	N/A	N/A	inches		

User Input: Overflow Weir (Dropbox with Flat or Sloped Gate and Outlet Pipe OR Rectangular/Trapezoidal Weir and No Outlet Pipe)

Calculated Parameters for Overflow Weir

	Zone 2 Weir	Not Selected		Zone 2 Weir	Not Selected
Overflow Weir Front Edge Height, H <sub>o</sub> =	3.22	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Gate Upper Edge, H <sub>1</sub> =	3.52 feet
Overflow Weir Front Edge Length =	3.00	N/A	feet	Overflow Weir Slope Length =	3.01 feet
Overflow Weir Gate Slope =	10.00	N/A	H:V	Gate Open Area / 100-yr Orifice Area =	3.56 N/A
Horiz. Length of Weir Sides =	3.00	N/A	feet	Overflow Gate Open Area w/o Debris =	6.30 ft <sup>2</sup>
Overflow Gate Type =	Type C Gate	N/A		Overflow Gate Open Area w/ Debris =	3.15 ft <sup>2</sup>
Debris Clogging % =	50%	N/A	%		

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 2 Restrictor	Not Selected		Zone 2 Restrictor	Not Selected
Depth to Invert of Outlet Pipe =	0.95	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	1.77 ft <sup>2</sup>
Outlet Pipe Diameter =	18.00	N/A	inches	Outlet Orifice Centroid =	0.75 feet
Restrictor Plate Height Above Pipe Invert =	18.00	N/A	inches	Half-Central Angle of Restrictor Plate on Pipe =	3.14 radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Calculated Parameters for Spillway

Spillway Invert Stage =	3.79	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth =
Spillway Crest Length =	47.00	feet	Stage at Top of Freeboard =
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =
Freeboard above Max Water Surface =	1.00	feet	Basin Volume at Top of Freeboard =

Routed Hydrograph Results

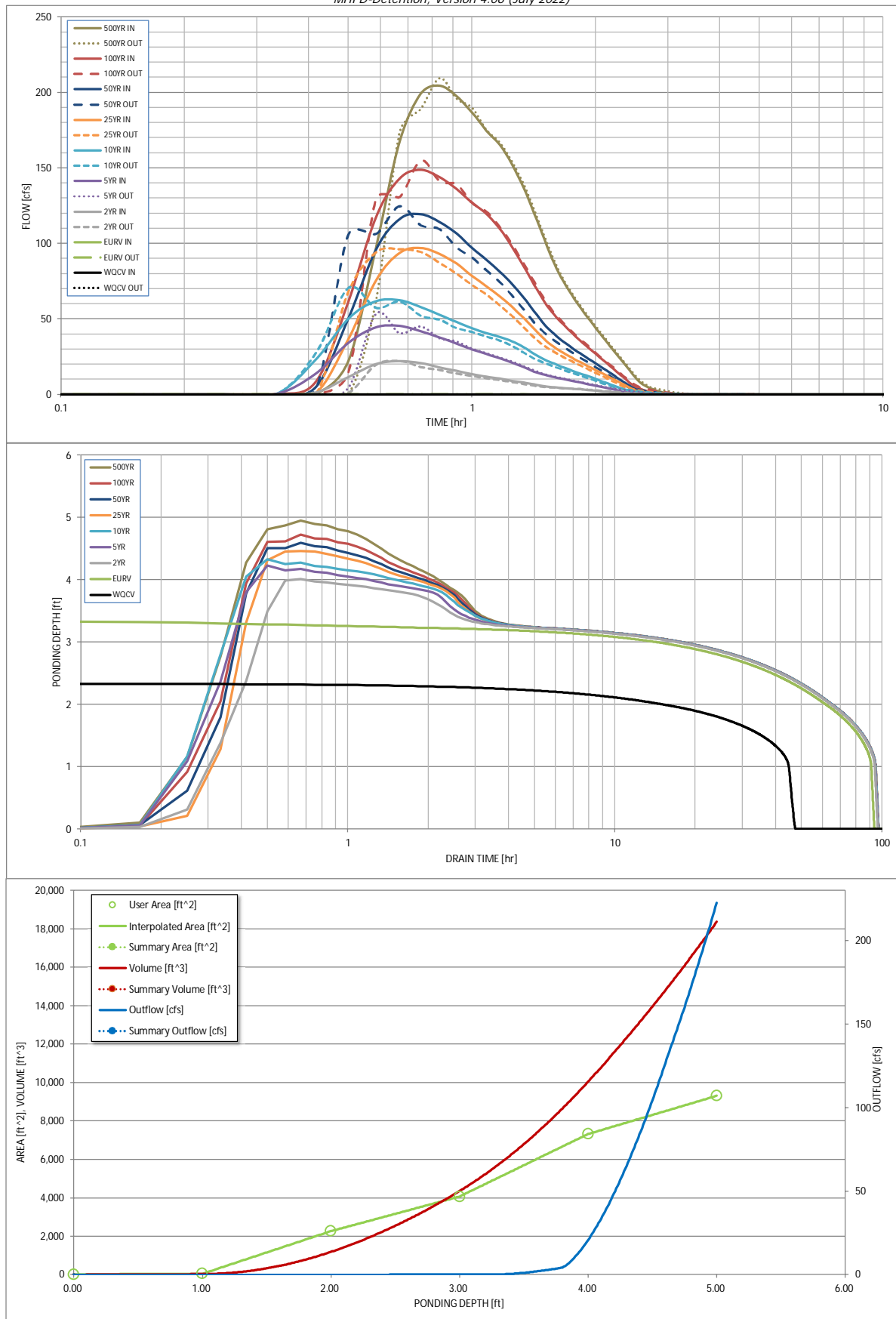
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	3.14
One-Hour Rainfall Depth (in)	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	3.14
CUHP Runoff Volume (acre-ft)	0.047	0.138	1.393	3.212	4.950	7.434	9.361	12.096	17.035
Inflow Hydrograph Volume (acre-ft)	N/A	N/A	1.393	3.212	4.950	7.434	9.361	12.096	17.035
CUHP Predevelopment Peak Q (cfs)	N/A	N/A	22.1	45.3	62.3	97.1	119.4	148.8	204.5
OPTIONAL Override Predevelopment Peak Q (cfs)	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre)	N/A	N/A	0.23	0.48	0.66	1.03	1.26	1.57	2.16
Peak Inflow Q (cfs)	N/A	N/A	22.1	45.3	62.3	97.1	119.4	148.8	204.5
Peak Outflow Q (cfs)	0.0	0.3	22.2	53.3	70.5	96.2	124.7	154.9	209.5
Ratio Peak Outflow to Predevelopment Q	N/A	N/A	N/A	1.2	1.1	1.0	1.0	1.0	1.0
Structure Controlling Flow	Plate	Overflow Weir 1	Spillway	Spillway	Spillway	Spillway	Spillway	Spillway	Spillway
Max Velocity through Gate 1 (fps)	N/A	0.05	1.14	1.7	2.0	2.4	2.8	3.0	3.1
Max Velocity through Gate 2 (fps)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours)	44	86	53	19	3	2	1	1	1
Time to Drain 99% of Inflow Volume (hours)	45	90	78	61	48	32	21	7	3
Maximum Ponding Depth (ft)	2.34	3.36	4.01	4.23	4.33	4.46	4.59	4.73	4.95
Area at Maximum Ponding Depth (acres)	0.07	0.12	0.17	0.18	0.18	0.19	0.19	0.20	0.21
Maximum Volume Stored (acre-ft)	0.047	0.138	0.232	0.270	0.287	0.313	0.338	0.363	0.411

Q5 is higher than design conditions. Suggest adding a restrictor plate to reduce peak outflow.

# DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.06 (July 2022)



S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			



# DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename:

## Inflow Hydrographs

The user can override the calculated inflow hydrographs from this workbook with inflow hydrographs developed in a separate program.

	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
Time Interval	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00_min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:15:00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01
	0:20:00	0.00	0.00	0.04	0.29	0.46	0.02	0.09	0.17	0.43
	0:25:00	0.00	0.00	1.33	13.76	22.95	0.85	4.93	8.35	22.30
	0:30:00	0.00	0.00	11.69	34.13	50.21	36.94	50.57	61.72	97.19
	0:35:00	0.00	0.00	20.03	44.44	61.81	75.52	95.92	117.38	167.65
	0:40:00	0.00	0.00	22.12	45.30	62.28	93.71	116.30	143.06	198.90
	0:45:00	0.00	0.00	20.77	41.81	57.92	97.08	119.41	148.83	204.55
	0:50:00	0.00	0.00	17.91	37.82	52.89	93.01	114.25	143.91	197.61
	0:55:00	0.00	0.00	15.56	33.74	47.88	86.67	106.63	135.94	186.72
	1:00:00	0.00	0.00	13.40	29.85	43.82	78.52	97.07	126.91	174.89
	1:05:00	0.00	0.00	11.78	26.74	40.72	71.79	89.25	119.64	165.40
	1:10:00	0.00	0.00	10.42	24.01	37.99	65.00	81.35	109.82	152.67
	1:15:00	0.00	0.00	9.13	21.17	35.27	58.10	73.29	97.88	137.22
	1:20:00	0.00	0.00	7.86	18.16	31.49	50.82	64.37	85.28	120.06
	1:25:00	0.00	0.00	6.59	15.19	26.79	43.48	55.06	72.75	102.40
	1:30:00	0.00	0.00	5.40	12.98	23.13	36.38	46.23	61.29	86.69
	1:35:00	0.00	0.00	4.75	11.50	20.33	31.37	39.95	52.87	74.93
	1:40:00	0.00	0.00	4.24	10.22	17.97	27.49	35.02	46.34	65.69
	1:45:00	0.00	0.00	3.81	9.03	15.84	24.23	30.86	40.71	57.69
	1:50:00	0.00	0.00	3.39	7.90	13.90	21.29	27.10	35.68	50.53
	1:55:00	0.00	0.00	2.95	6.83	12.05	18.65	23.71	31.07	43.96
	2:00:00	0.00	0.00	2.52	5.79	10.24	16.11	20.46	26.75	37.80
	2:05:00	0.00	0.00	2.08	4.75	8.47	13.66	17.32	22.67	31.97
	2:10:00	0.00	0.00	1.65	3.74	6.77	11.31	14.31	18.87	26.52
	2:15:00	0.00	0.00	1.22	2.75	5.15	8.98	11.36	15.11	21.18
	2:20:00	0.00	0.00	0.80	1.76	3.62	6.70	8.48	11.40	15.95
	2:25:00	0.00	0.00	0.39	0.99	2.44	4.43	5.68	7.83	11.07
	2:30:00	0.00	0.00	0.15	0.58	1.77	2.72	3.60	5.10	7.42
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	2:45:00	0.00	0.00	0.03	0.17	0.77	0.71	1.05	1.47	2.31
	2:50:00	0.00	0.00	0.02	0.12	0.55	0.44	0.67	0.89	1.45
	2:55:00	0.00	0.00	0.02	0.08	0.38	0.26	0.41	0.48	0.82
	3:00:00	0.00	0.00	0.01	0.05	0.24	0.14	0.23	0.21	0.40
	3:05:00	0.00	0.00	0.01	0.03	0.14	0.07	0.12	0.09	0.19
	3:10:00	0.00	0.00	0.01	0.02	0.07	0.04	0.07	0.05	0.10
	3:15:00	0.00	0.00	0.01	0.01	0.04	0.03	0.04	0.03	0.06
	3:20:00	0.00	0.00	0.00	0.01	0.03	0.02	0.03	0.03	0.05
	3:25:00	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.02	0.04
	3:30:00	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.01	0.03
	3:35:00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.02
	3:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
	3:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
	3:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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	4:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

## DETENTION BASIN OUTLET STRUCTURE DESIGN

*MHFD-Detention, Version 4.06 (July 2022)*

### Summary Stage-Area-Volume-Discharge Relationships

The user can create a summary S-A-V-D by entering the desired stage increments and the remainder of the table will populate automatically.

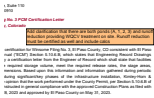
The user should graphically compare the summary S-A-V-D table to the full S-A-V-D table in the chart to confirm it captures all key transition points.


[illegible]

# V1\_PCM Certification Letter and Revised MHFD Calcs (ASB).pdf

## Markup Summary

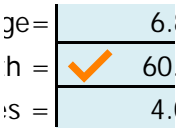
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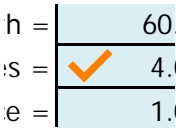
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Add clarification that there are both ponds (A, 1, 2, 3) and runoff reduction providing WQCV treatment on site. Runoff reduction must be certified as well and include calcs

14 (20)




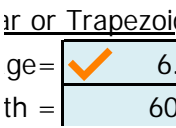
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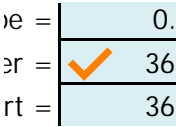
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rt =	36

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is =	6.
ie =	Type C

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	Row 1 (re
(ft)	 0.0
ies)	0.2

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al)	Row 3 (c
	 1.
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ies)	 0.2

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	 0.2


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orifices or Ellip


e =		0.0
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**Page Label:** 14  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:25:01 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**

	
Satisfies criteria	
 Needs to be addressed	
Start Date:	7/8/2025
End Date:	7/8/2025
Job Name:	7/8/2025


**Subject:** Checkmark Legend  
**Page Label:** 14  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 5:20:51 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**


All orange-shaded spreadsheet values do not match as-built drawings. Revise to match.	
7/8/2025 5:23:04 PM	
7/8/2025 5:23:04 PM	
7/8/2025 5:23:04 PM	


**Subject:** SW - Textbox  
**Page Label:** 14  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 5:23:04 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**


All orange-shaded spreadsheet values do not match as-built drawings. Revise to match.


20 (20)


d)	Row 2 (
	 0
	1

**Subject:** Text Box  
**Page Label:** 20  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:32:10 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**

al)	Row 3 (
	 1
	1

**Subject:** Text Box  
**Page Label:** 20  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:32:14 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**

d (ft)	Row 1 (
ches)	 0
	1

**Subject:** Checkmark  
**Page Label:** 20  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:32:17 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**

d (ft)	0.
ches)	1.

**Subject:** Checkmark  
**Page Label:** 20  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:32:25 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

	0.
	1.

**Subject:** Checkmark  
**Page Label:** 20  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:32:27 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

	1.
	1.

**Subject:** Checkmark  
**Page Label:** 20  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:32:29 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

1sq inches			
spread from lowest to highest)			
and)	Row 2 (optional)	Row 3 (optional)	Row
	0.00	1.00	
	1.00	1.00	
small)	Row 10 (optional)	Row 11 (optional)	Row

**Subject:** SW - Rectangle  
**Page Label:** 20  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:32:57 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**


orifices or Ellip	
e =	0.0
e =	3.7

**Subject:** Checkmark  
**Page Label:** 20  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:33:25 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**


	Zone 3
o =	2.8
h =	15.

**Subject:** Checkmark  
**Page Label:** 20  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:34:49 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**


o =	2.8
h =	15.0
e =	4.0

**Subject:** Checkmark  
**Page Label:** 20  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:34:58 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**


h =	15.0
ie =	4.0
s =	6.0

**Subject:** Checkmark  
**Page Label:** 20  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:35:08 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**


ie =	4.0
s =	6.0
ie =	Type C

**Subject:** Checkmark  
**Page Label:** 20  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:35:13 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**


	Zone 3 F
ie =	2.0
er =	48.0

**Subject:** Checkmark  
**Page Label:** 20  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:36:31 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**

ie =	2.0
er =	48.0
rt =	27.0


**Subject:** Checkmark  
**Page Label:** 20  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:36:37 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**


er =	48.0
rt =	27.0


**Subject:** Checkmark  
**Page Label:** 20  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:36:51 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**




ge=		5.
h =		60

**Subject:** Checkmark  
**Page Label:** 20  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:38:10 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**


ge=	5.
th =	 60
es =	4.

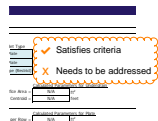
**Subject:** Checkmark  
**Page Label:** 20  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:38:10 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**


h =	60
s =	4.0
e =	1.0

**Subject:** Checkmark  
**Page Label:** 20  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:38:28 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**


es =	4.
de =	1.


**Subject:** Checkmark  
**Page Label:** 20  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:38:32 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**





**Subject:** Checkmark Legend  
**Page Label:** 20  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 5:21:02 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**


	Row 1 (r)
l (ft)	0.1
hes)	1.


**Subject:** Checkmark  
**Page Label:** 26  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:41:01 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**


d)	Row 2
	0
	1

**Subject:** Text Box  
**Page Label:** 26  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:41:06 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**


il)	Row 3 (
	1
	1

**Subject:** Text Box  
**Page Label:** 26  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:41:10 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**


l (ft)	0.
hes)	 1.


**Subject:** Checkmark  
**Page Label:** 26  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:41:16 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**


	0.
	1.

**Subject:** Checkmark  
**Page Label:** 26  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:41:21 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**


	1.
	1.

**Subject:** Checkmark  
**Page Label:** 26  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:41:24 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**


orifices or Ellip	
e =	 0.
e =	2.

**Subject:** Checkmark  
**Page Label:** 26  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:41:44 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**


ge = 5.  
th = 60  
as = 4.

**Subject:** Checkmark  
**Page Label:** 26  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:42:05 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**


th = 60  
as = 4.  
ce = 1.

**Subject:** Checkmark  
**Page Label:** 26  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:42:09 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**

as = 4.  
ce = 1.


**Subject:** Checkmark  
**Page Label:** 26  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:42:11 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**

r or Trapezo  
ge = 5  
h = 60


**Subject:** Text Box  
**Page Label:** 26  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:43:19 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**

X


Zone 3 f  
ce = 2.  
er = 42

**Subject:** Checkmark  
**Page Label:** 26  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:44:15 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**


ce = 2.  
er = 42  
rt = 26

**Subject:** Checkmark  
**Page Label:** 26  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:44:21 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**


er =	42
rt =	26

Subject: Checkmark  
Page Label: 26  
Author: EPC Stormwater- Zachary  
Date: 7/8/2025 3:44:27 PM  
Status:  
Color:   
Layer:  
Space:


	Zone 3
o =	1.6
h =	12.6

Subject: Checkmark  
Page Label: 26  
Author: EPC Stormwater- Zachary  
Date: 7/8/2025 3:44:58 PM  
Status:  
Color:   
Layer:  
Space:


o =	1.6
h =	12.6
ie =	4.6

Subject: Checkmark  
Page Label: 26  
Author: EPC Stormwater- Zachary  
Date: 7/8/2025 3:45:05 PM  
Status:  
Color:   
Layer:  
Space:


h =	12.6
ie =	4.6
s =	6.6


Subject: Checkmark  
Page Label: 26  
Author: EPC Stormwater- Zachary  
Date: 7/8/2025 3:45:12 PM  
Status:  
Color:   
Layer:  
Space:


ie =	4.6
s =	6.6
ie =	Type C


Subject: Checkmark  
Page Label: 26  
Author: EPC Stormwater- Zachary  
Date: 7/8/2025 3:45:15 PM  
Status:  
Color:   
Layer:  
Space:


1/4" inches			
Legend (from bottom to top)			
Row 1	Row 2 (bottom)	Row 3 (bottom)	Row 4
	0.40	1.20	
	1.20	1.20	
Row 10	Row 10 (bottom)	Row 11 (bottom)	Row 12


Subject: SW - Rectangle  
Page Label: 26  
Author: EPC Stormwater- Zachary  
Date: 7/8/2025 3:46:44 PM  
Status:  
Color:   
Layer:  
Space:


**Subject:** SW - Rectangle  
**Page Label:** 26  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:46:58 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**

**Subject:** Checkmark Legend  
**Page Label:** 26  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 5:21:12 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**

**Subject:** Checkmark  
**Page Label:** 32  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:48:16 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**

**Subject:** Checkmark  
**Page Label:** 32  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:50:24 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**

**Subject:** Checkmark  
**Page Label:** 32  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:48:29 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**

**Subject:** Checkmark  
**Page Label:** 32  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:48:37 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**

(ft)	0.0
ies)	0.0

**Subject:** Checkmark  
**Page Label:** 32  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:50:29 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

	1.0
	0.0

**Subject:** Checkmark  
**Page Label:** 32  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:50:29 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

	1.0
	0.0

**Subject:** Checkmark  
**Page Label:** 32  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:50:29 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

lo =	3.0
th =	3.0
oe =	10.0

**Subject:** Checkmark  
**Page Label:** 32  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:51:53 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**


th =	3.0
oe =	10.0
as =	3.0


**Subject:** Checkmark  
**Page Label:** 32  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:52:52 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

oe =	10.0
as =	3.0
oe =	Type C


**Subject:** Checkmark  
**Page Label:** 32  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:52:58 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**





ie =	0.
er =	 18
rt =	18

**Subject:** Checkmark  
**Page Label:** 32  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:53:11 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**


er =	18
rt =	 18


**Subject:** Checkmark  
**Page Label:** 32  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:53:23 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**


h =	47
is =	 4.
e =	1.


**Subject:** Checkmark  
**Page Label:** 32  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:54:55 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**


is =	4.
e =	 1.

**Subject:** Checkmark  
**Page Label:** 32  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:54:57 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**


ge =	3.
h =	 47
is =	4.

**Subject:** Checkmark  
**Page Label:** 32  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:55:02 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**

<u>r or Trapezoid</u>	
ge =	 3.
h =	47


**Subject:** Checkmark  
**Page Label:** 32  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:55:30 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**

	Zone
o =	X 3
h =	3


**Subject:** Text Box  
**Page Label:** 32  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:56:12 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**

X


at or Sloped Grate and Out	
	Zone 2 Weir
y =	3.22
1 =	3.00
3 =	10.00

**Subject:** SW - Rectangle  
**Page Label:** 32  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:56:24 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**


e =	0.0
e =	✓ 3.0
g =	N/A

**Subject:** Checkmark  
**Page Label:** 32  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:59:10 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**

Legend	
✓	Satisfies criteria
✗	Needs to be addressed


**Subject:** Checkmark Legend  
**Page Label:** 32  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 5:21:23 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**

Callout	
Q5 is higher than design conditions. Suggest adding a restrictor plate to reduce peak outflow.	

**Subject:** Callout  
**Page Label:** 32  
**Author:** Joseph Sandstrom  
**Date:** 7/9/2025 1:54:19 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**

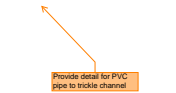
Q5 is higher than design conditions. Suggest adding a restrictor plate to reduce peak outflow.

45.3
53.3
1.2

**Subject:** Highlight  
**Page Label:** 32  
**Author:** Joseph Sandstrom  
**Date:** 7/9/2025 1:54:09 PM  
**Status:**  
**Color:**   
**Layer:**  
**Space:**

53.3

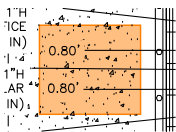
[3] C1.34 POND 1 DETAILS (1)



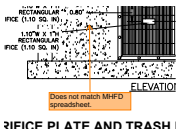
**Subject:** SW - Textbox with Arrow  
**Page Label:** [3] C1.34 POND 1 DETAILS  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 4:11:34 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Provide detail for PVC pipe to trickle channel

[5] C1.36 POND 2 DETAILS (2)



**Subject:** SW - Rectangle  
**Page Label:** [5] C1.36 POND 2 DETAILS  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:33:03 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**



**Subject:** SW - Textbox with Arrow  
**Page Label:** [5] C1.36 POND 2 DETAILS  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 5:14:01 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Does not match MHFD spreadsheet.

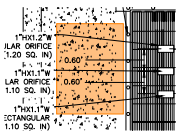
[6] C1.37 POND 2 DETAILS (1)



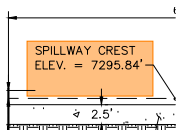
**Subject:** SW - Textbox with Arrow  
**Page Label:** [6] C1.37 POND 2 DETAILS  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 4:11:46 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Provide detail for PVC pipe to trickle channel

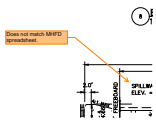
[8] C1.39 POND 4 DETAILS (4)



**Subject:** SW - Rectangle  
**Page Label:** [8] C1.39 POND 4 DETAILS  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:59:36 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

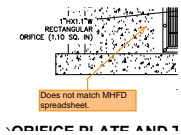


**Subject:** SW - Rectangle  
**Page Label:** [8] C1.39 POND 4 DETAILS  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:59:45 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**



**Subject:** SW - Textbox with Arrow  
**Page Label:** [8] C1.39 POND 4 DETAILS  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 5:17:44 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Does not match MHFD spreadsheet.



**Subject:** SW - Textbox with Arrow  
**Page Label:** [8] C1.39 POND 4 DETAILS  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 5:17:52 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Does not match MHFD spreadsheet.

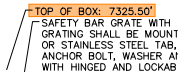
[9] C1.40 POND 4 DETAILS (1)



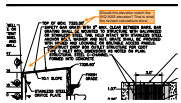
**Subject:** SW - Textbox with Arrow  
**Page Label:** [9] C1.40 POND 4 DETAILS  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 4:11:56 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Provide detail for PVC pipe to trickle channel

[11] C1.42 WQ POND A DETAILS (2)



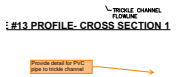
**Subject:** SW - Rectangle  
**Page Label:** [11] C1.42 WQ POND A DETAILS  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 3:51:35 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**



**Subject:** SW - Textbox with Arrow  
**Page Label:** [11] C1.42 WQ POND A DETAILS  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/8/2025 5:20:19 PM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Should this elevation match the WQ WSE elevation? That is what the revised calculations show.

[12] C1.43 WQ POND A DETAILS (1)



**Subject:** SW - Textbox with Arrow  
**Page Label:** [12] C1.43 WQ POND A DETAILS  
**Author:** EPC Stormwater- Zachary  
**Date:** 7/9/2025 7:06:44 AM  
**Status:**  
**Color:** ■  
**Layer:**  
**Space:**

Provide detail for PVC pipe to trickle channel