

Please include cover sheet with "PCD File No. PPR2325" and Drainage Report signature blocks. See link: <https://planningdevelopment.elpasoco.com/wp-content/uploads/Engineering/EngineeringDocuments/Standard-Signature-Blocks-1.doc>

Update

MEMORANDUM

TO: El Paso County
FROM: Element Engineering
DATE: October 13, 2022
SUBJECT: Town of Ramah Wastewater System Improvements – Grading and Drainage Plan

Due to land disturbance a Final Drainage Report is required. Please refer to El Paso County DCM Vol 1 Section 1 Chapter 4 for report guidelines and requirements.

PURPOSE:

The purpose of this memorandum is to provide a detailed description of the grading and drainage items necessary for the design and construction of the proposed Ramah Wastewater System Improvements.

GRADING

Excavation will be limited to a small area (approximately 40 x 30) for the installation of the lift station. A trench with a width of less than three-ft will be excavated for the installation of the force main. No grading or drainage changes are proposed as a part of the lift station and force main construction and existing drainage patterns will not be impacted. All excavated areas will be replaced at their current elevation and disturbed areas will either be re-seeded or re-paved (as applicable). Furthermore, no additional impermeable or semi-permeable area will be added or modified as a part of this project. Figure 1 below displays the proposed layout for the lift station site.

Except for the evaporation ponds.

The site development plan shows a 34' x 9' concrete pad being installed. Please revise statement.

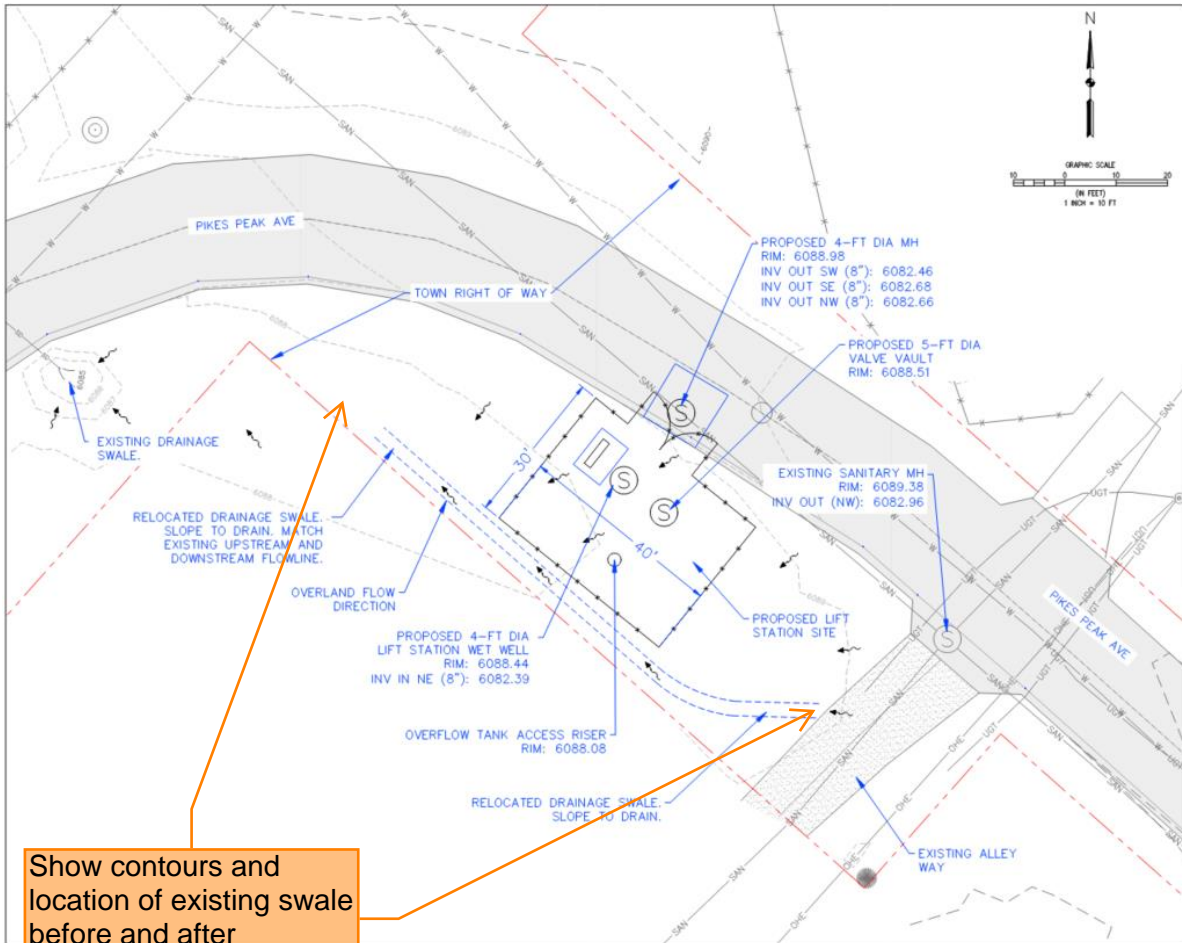
The CD's state that an existing drainage swale shall be relocated. Discuss the impacts as a result of that and document the proposed relocation. The slopes, size, and vegetation cover must be equivalent and sufficient to convey the runoff and not impact the lift station or road.

Please discuss the floodplain and wetlands in the area.

Determine minor and major flows which will reach proposed swale. Provide calculation to show design is able to adequately handle flow. Show if flow is same, more or less than existing flows releasing into existing wash area. If more, determine what impacts this has on the existing wash.

Discuss how flow is conveyed along E Ramah Road. Are there roadside ditches, are they adequate? Any culvert crossings to convey flows across road and are they adequately sized? Provide any analysis/calculations to support if these facilities are able to handle flows.

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Provide drainage basins and calculations for existing/proposed flows.



Show contours and location of existing swale before and after proposed relocation

Figure 1 - Proposed Lift Station Site

As shown above, the existing grading of the lift station site will be maintained to keep the natural flowline traveling in a northwest direction along Pikes Peak Ave towards the existing drainage swale and culvert.

Please include dimension.

Excavation and earth work for the evaporative ponds will consist of a substantially larger area, comprising an approximate 630 x 860 footprint. The earth work will be evenly dispersed between excavation cuts and fill for the pond embankments with approximately 43,243 CY of cut and 43,226 CY of fill for a net volume of approximately 17 CY of excavation cut. Figure 2 below shows the proposed grading footprint of the evaporation ponds and drainage swale.

Cut and fill quantities do not match with what is shown on the CD set. Please verify quantities and update accordingly.

ESTIMATED CUT/FILL QUANTITIES
CUT (EST): 49,781 CY
FILL (EST): 38,341 CY (1.15 COMPACTION FACTOR)
TOP SOIL REMOVAL (EST): 9,916 CY

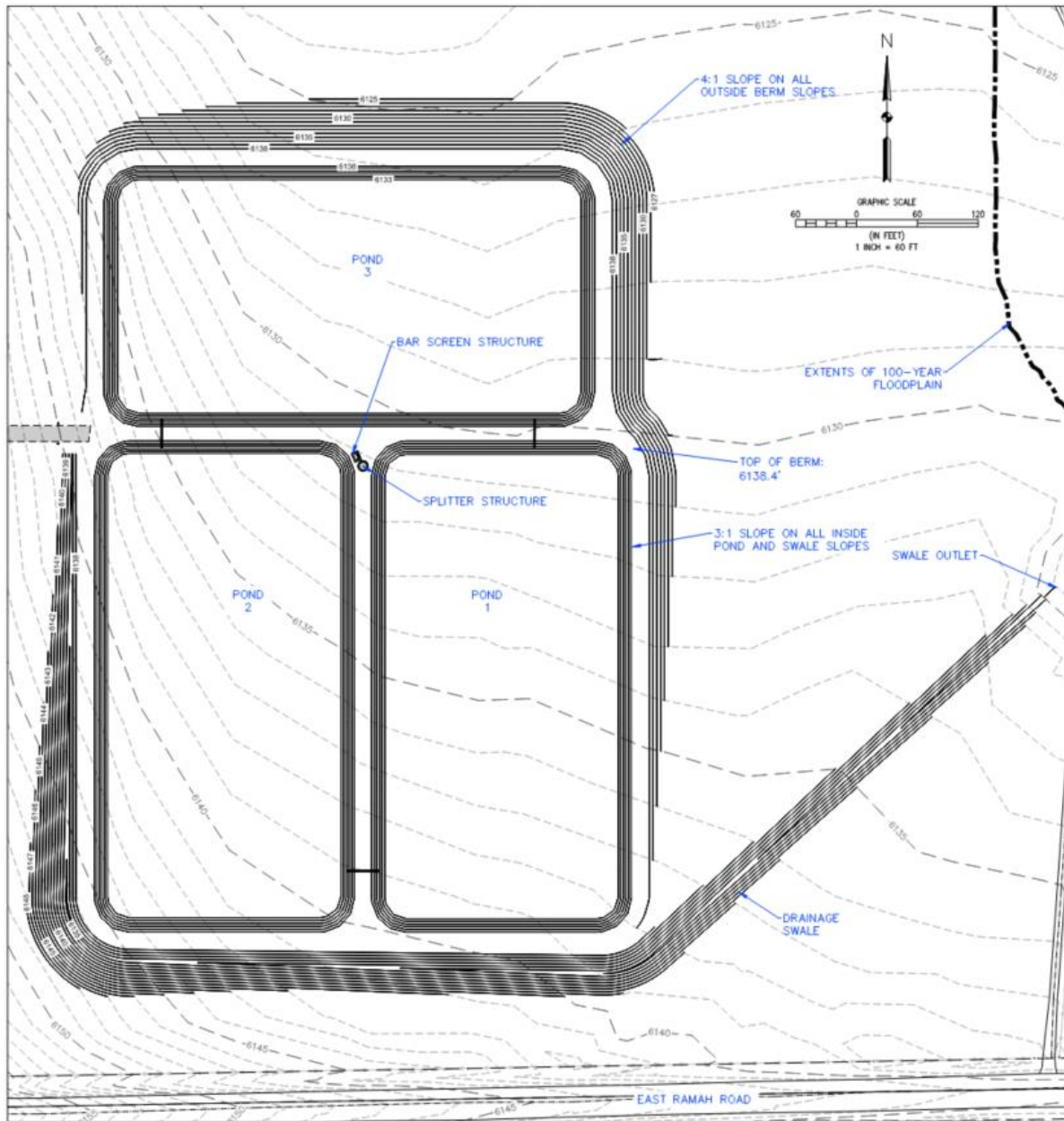


Figure 2 – Proposed Evaporation Ponds Site

The proposed ponds will be 6 feet deep from the top of the berm to the bottom of ponds. Pond 3 will be at the northern end of the evaporative ponds and will be constructed of mostly fill for the embankments with the maximum total depth of the fill material ranging from approximately 9 to 11 feet. At the southwest end of the proposed ponds, the embankments will be constructed predominately by excavation cut into the moderate sloping hillside of the property that runs high to low from the west to the east. For the two southern ponds, the average cut depth will range from about 5 to 7 feet deep with a total maximum cut depth of approximately 14 feet at the far southwest corner where the grading cuts

the furthest into the hillside. The ponds and exterior embankments will be graded at a 3:1 slope per CDPHE design criteria.

The natural topography of the ponds site runs from the southwest to the northeast and joins with an existing natural wash approximately 600 feet to the east of the ponds that flows from the south to the north. Although the evaporative ponds will require a substantial excavation, the natural topography and flow of the area will not change. The topography will continue to travel from the southwest to the northeast of the property as it flows towards the unnamed wash that crosses East Ramah Rd just to the east of the site. The exterior embankments on the east and north sides of the ponds will continue to follow a northeast sloping topography as the existing site does now. The embankments to the south and west will be part of the excavation cut into the existing moderately sloping hillside.

DRAINAGE

To maintain adequate drainage at this section of the ponds, and to ensure that runoff from the existing hillside does not enter the ponds, a secondary drainage berm will be constructed to capture the runoff from the exterior pond embankments and the existing hillside. The drainage berm will follow the exterior contours around the southwest embankment of the ponds and convey any runoff around the ponds so that it continues to follow the natural northeast sloping topography of the site. Figure 3 below shows the proposed drainage swale and outlet to the existing wash east of the proposed ponds.

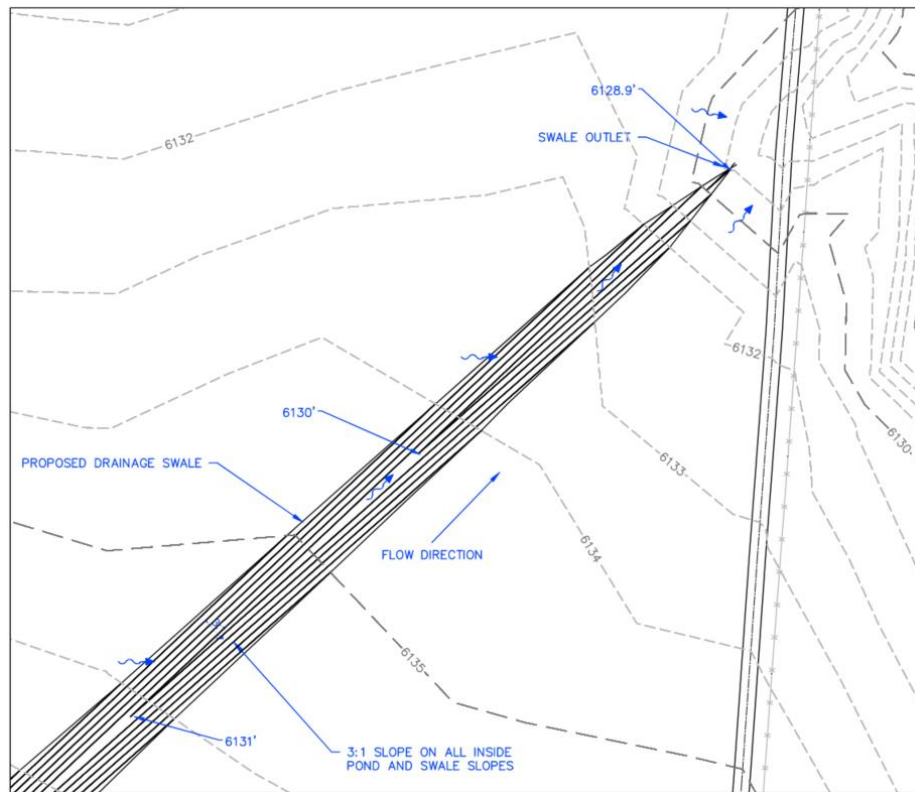


Figure 3 – Pond Drainage Swale

Per the comments on page 1 - the ditch design needs to be analyzed. Verify velocities are acceptable or provide erosion protection for ditch if necessary.



DILIGENT • INNOVATIVE • RESPONSIVE

Provide the range of depths if the ditch size varies

The drainage swale will be approximately 2 feet deep, graded at 3:1 slope and will run approximately 900 feet starting at the middle embankment of the ponds and running south and then east until it meets with the natural, existing topography of the site. The berm will be graded so that it conveys flow at an approximate 0.5 % slope with the high point of 6,137.0 ft in elevation to a low point of approximately 6,128.9 ft.

As shown in Figure 1, the lift station site will be regraded to convey site drainage towards the existing swale and culvert on Pikes Peak Ave. The relocated drainage will slope to drain to the west and the existing culvert under Pikes Peak Ave. The swale will be graded to match the existing upstream and downstream flowline along the west side of the proposed lift station site. The relocated swale will not change the existing drainage pattern of the site and will work to only prevent ponding around the lift station structures.

Because the proposed ponds and lift station work will be constructed to maintain the natural topography and stormwater of the respective sites, no further grading or drainage analysis was determined to be necessary for this project.

BEST MANAGEMENT PRACTICES (EROSION CONTROL)

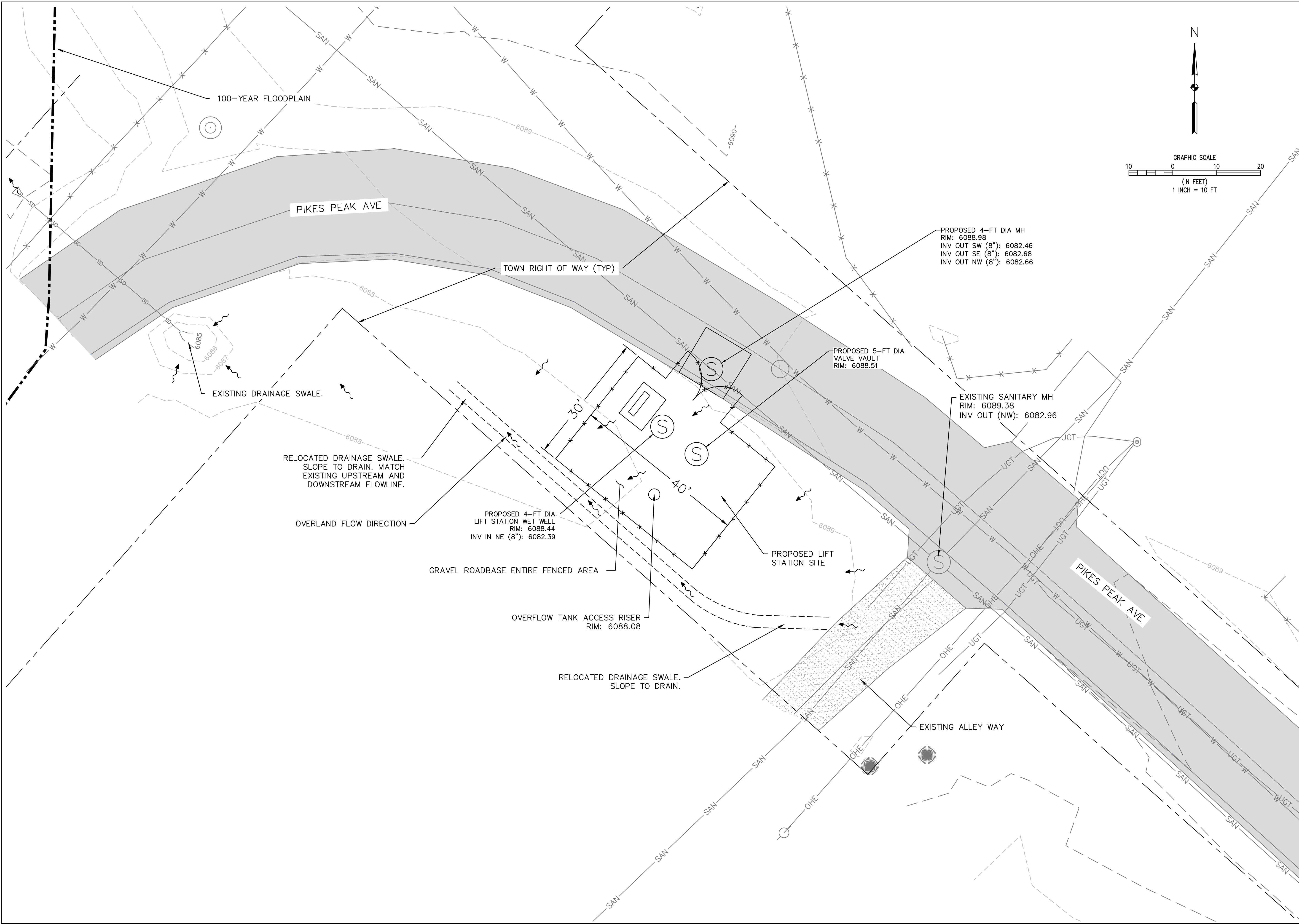
Erosion control layout and details have been provided in the updated plan set. Erosion control measures will be installed to prevent sediment from being carried away from the excavation area and excessive erosion from occurring.

Please include the Four-Step Process (ECM Appendix I.7.2.A.). This includes any exclusions to the process that may apply. Discuss any other permits that cover the evaporation ponds. If a regional WQ facility is utilized as noted on the SWMP, discuss that as well.

ATTACHMENTS

1. PROPOSED LIFT STATION SITE DRAINAGE PLAN
2. PROPOSED EVAPORATIVE PONDS SITE DRAINAGE PLAN
3. PROPOSED LIFT STATION SITE EROSION & SEDIMENTATION CONTROL PLAN
4. PROPOSED EVAPORATIVE PONDS EROSION & SEDIMENTATION CONTROL PLAN

We need to know how much of the proposed disturbed (not impervious) area is treated vs untreated and if there are any exclusions that apply to the untreated areas. So please create a basic overview map (or modify an existing drainage map) with color shading/hatching that shows areas tributary to each PBMP (pond, runoff reduction, etc.) and those disturbed areas that are not treated by a PBMP, with the applicable exclusion labeled (ex: 20% up to 1ac of development can be excluded per ECM App I.7.1.C.1 and exclusions listed in ECM App I.7.1.B.#). Based on the PBMP it appears that all areas will be excluded under different exclusions so the map should show that.



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NO.	REVISIONS	DESCRIPTION	DATE	BY

WASTEWATER TREATMENT PLANT
LIFT STATION DRAINAGE PLAN
 TOWN OF RAMAH
 113 S. COMMERCIAL STREET
 RAMAH, CO 80832

PREPARED UNDER THE DIRECT SUPERVISION OF

FOR AND ON BEHALF OF
 ELEMENT ENGINEERING, LLC

DATE
 OCTOBER 2022

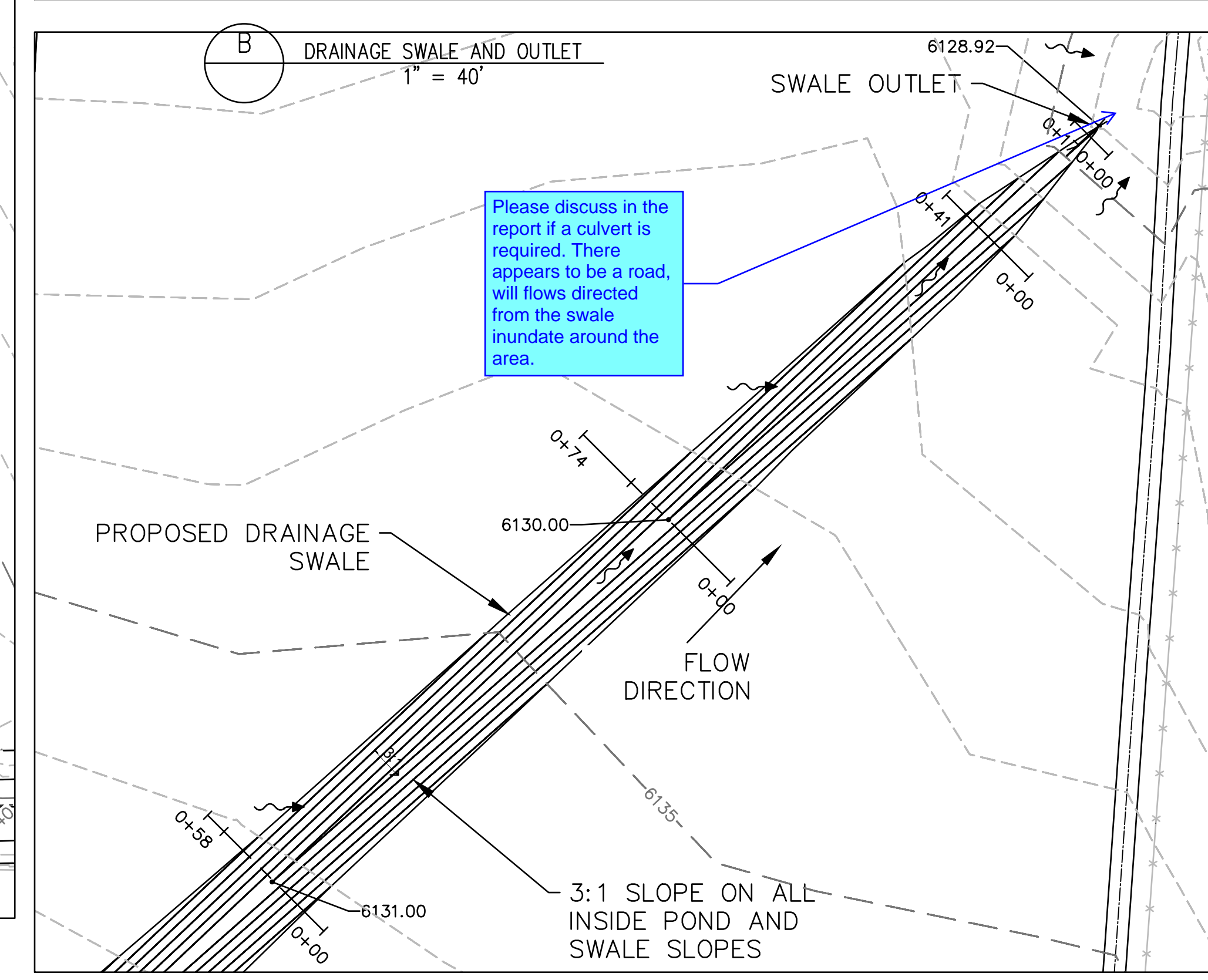
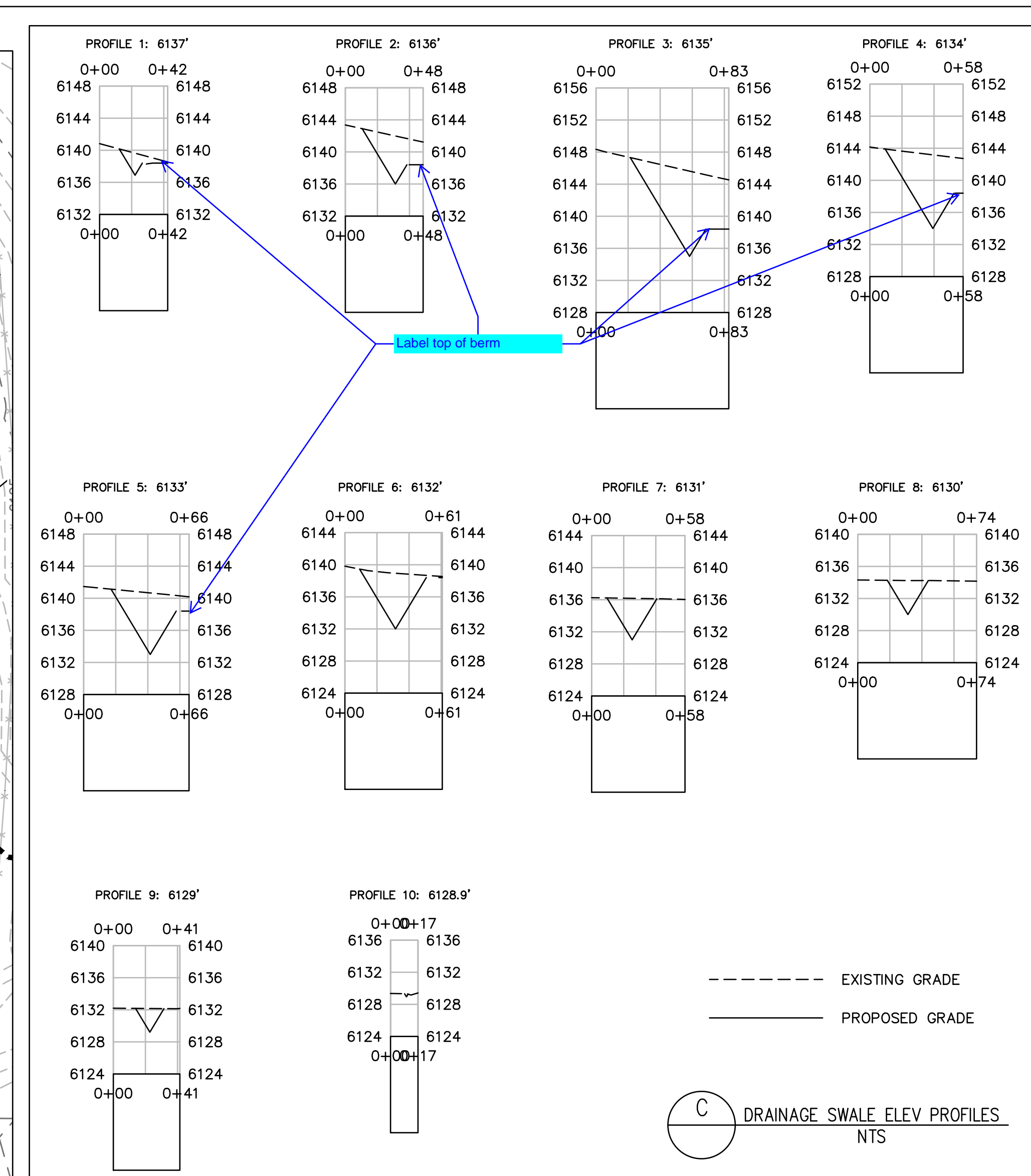
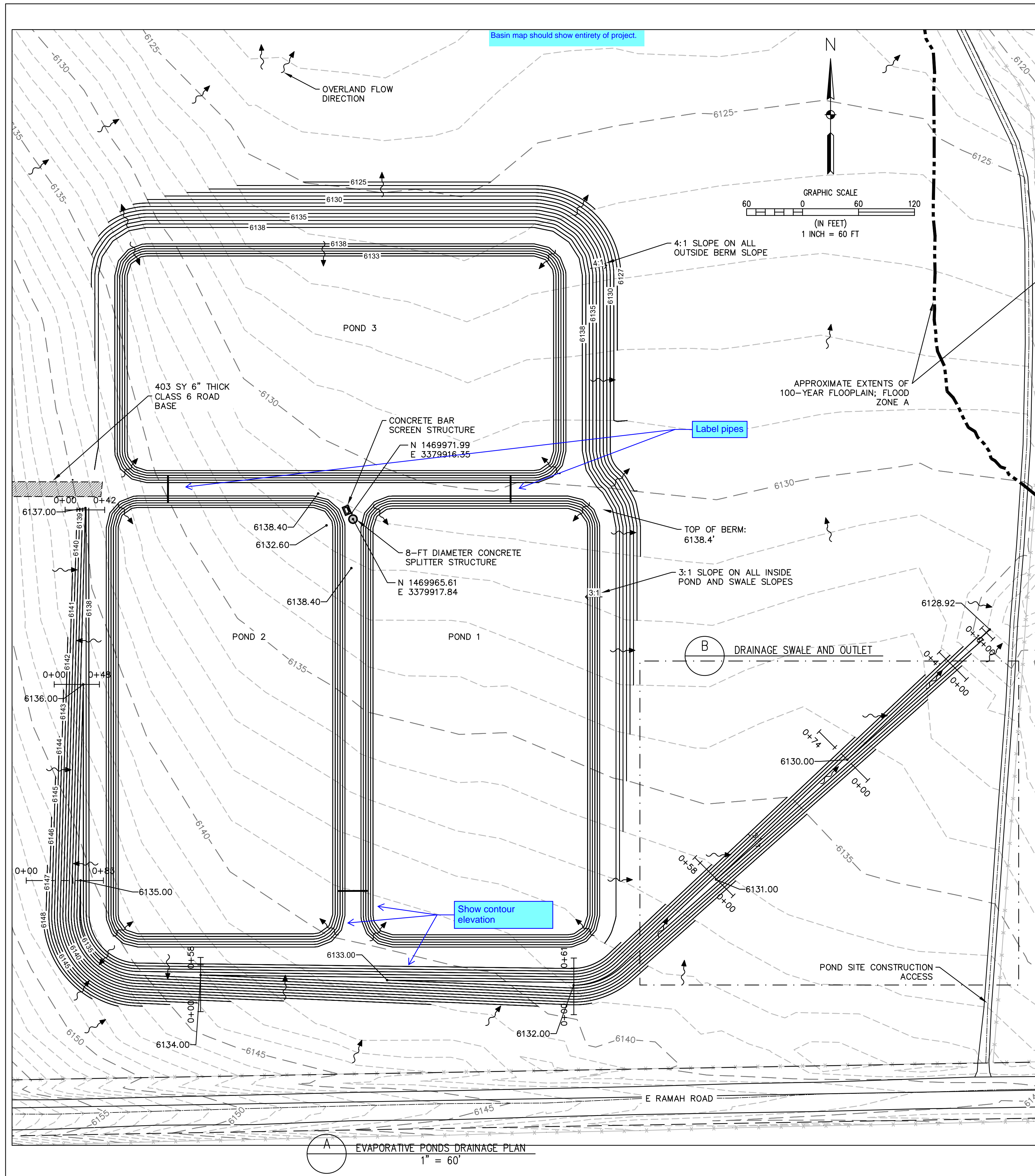
JOB NUMBER
 0043.0001

SCALE
 1" = 10'

EDITION

PERMITTING

SHEET
 OF
 -



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 LAKEWOOD, CO 80228
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POND DRAINAGE PLAN
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 113 S. COMMERCIAL STREET
 RAMAH, CO 80832

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