MVE, INC.
ENGINEERS' SURVEYORS

1903 lelaray street, suite 200
colorado springs, co 80909
719.576.0311

Drainage Letter

The Landings of Denmark

Filing No. 2

MVE Project No. 61108

December 29, 2022

PCD Proj No.: CDR-22-012

Drainage Letter

for

The Landings of Denmark
Filing No. 2
El Paso County, Colorado

Project No. 61108

December 29, 2022

prepared for:

Charles M. McAllister
PO Box 6797
Colorado Springs, CO 80934

prepared by:

MVE, Inc.
1903 Lelaray Street, Suite 200
Colorado Springs, CO 80909
719.576.0311

61108-LOD-Drainage Letter.odt

Statements and Acknowledgments

Engineer's Statement

The attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by the County for drainage reports and said report is in conformity with the applicable master plan of the drainage basin. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.

David R. Gorman, P.E. Colorado No. 31672 Date
For and on Behalf of MVE, Inc.

Developer's Statement

I, the owner/developer have read and will comply with all of the requirements specified in this drainage report and plan.

Charles M. McAllister Date
PO Box 6797
Colorado Springs, CO 80934

El Paso County

Filed in accordance with the requirements of the Drainage Criteria Manual, Volumes 1 and 2, El Paso County Engineering Criteria Manual and Land Development Code as amended.

Joshua Palmer, P.E., Date
County Engineer / ECM Administrator

Conditions:

Drainage Letter

The purpose of this Drainage Letter for The Landings of Denmark Filing No. 2 is to update the approved drainage report to allow the construction of the subdivision improvements which have not been constructed following the recording of the Final Plat on August 4, 2006. The approved drainage report is titled "Final Drainage Report The Landings of Denmark Filing No. 2" prepared by Premier Engineering, Inc., dated January, 2005. The property owners intend at this time to complete the subdivision improvements.

The existing subdivision known as "The Landings of Denmark Filing No. 2" is located in the West One-Half of Section 11, Township 13 South, Range 63 West of the 6th P.M., El Paso County, Colorado. The site is made up of two (2) separate parcels made up of 13 vacant lots located in the northwest and southeast corners of The Landings of Denmark Filing No. 1. The subdivision is located on the east side of Log Road, north of Falcon Highway, south of Highway 110, and west of McClelland Road. The Final Plat for The Landings of Denmark Filing No. 2 was recorded August 4, 2006 under Reception Number 206712385 of the records of El Paso County, Colorado. Copies of the recorded plat have been included for reference. The site is located in both the Hook and Line Ranch Drainage Basin (CHBS1800), and the La Vega Ranch Drainage Basin (CHBR0400). The subdivision is zone RR-5 and contains thirteen (5-acre rural) residential lots. The site is split into two (2) parcels (A and B). Parcel A is located northwest of The Landings of Denmark Filing No. 1, and Parcel B is located southeast of The Landings of Denmark Filing No. 1. The subdivision is 75.167± acres in area, including the right-of-way that was dedicated to El Paso County for Osteen Ct., and Byrd Ct.

Parcel A, which is located northwest of The Landings of Denmark Filing No. 1, is bounded on the north by an unplatted parcel containing a single-family residence, several detached garages/sheds, and an unpaved driveway (zone A-35). The east side of Parcel A is adjacent to a vacant unplatted parcel (zone PUD). Parcel A is bounded on the south by lots 57, 65, 66, and 67 of The Landings of Denmark Filing No. 1 (zone RR-5). Log Road borders the west side of the Parcel A. Three (3) vacant unplatted lots lie across Log Road to the west.

Parcel B, which is located southeast of The Landings of Denmark Filing No. 1, is bounded on the north by lot 115 of The Landings of Denmark Filing No. 1 and on the east by a vacant unplatted parcel (zone PUD). Parcel B is bounded on the west by lot 29 of The Landings of Denmark Filing No. 1 (zone RR-5). Falcon Highway borders the south side of the Parcel B. Three (3) unplatted lots, each containing a single-family residence, lie across Falcon Highway to the south.

All of The Landings of Denmark Filing No. 2 is vacant.

According to the Federal Emergency Management Agency's Flood Insurance Rate Map (FIRM) Community Panel Numbers 08041C0585G, and 08041C0595G, dated December 7, 2018, for El Paso County, Colorado the site is not located within any Federal Emergency Management Agency (FEMA) designated Special Flood Hazard Areas (SFHA). A portion of the **FIRM** is included with this Drainage Letter for reference.

According to the Natural Resources Conservation Service Web National Cooperative Soil Survey, the soil of the site is Truckton Sandy Loam (map unit 96), which is part of hydrologic soil group A.

Truckton Sandy Loam soil is typically deep and well drained. The permeability of the soil is moderate to rapid, surface runoff is medium and hazard of erosion is moderate. A portion of the **National Cooperative Soil Survey Map** is included with this Drainage Letter.

The existing drainage patterns of the The Landings of Denmark Filing No. 2 site are indicated in the attached **Drainage Map Historic Conditions.** The site is described by five (5) sub-basins: H1- H4 where sub-basins H1 and H3 include Filing No.2.

Parcel A drains easterly in sub-basin H1 to Design Point 1. This sub-basins features slopes of 5-10% within the Filing No. 2 parcel and slopes of 10-15% east of said parcel. The flows exit the site at Design Point 1 and into the gravel Right-of-way, McClelland Road.

Parcel B drains southerly in sub-basin H3 to Design Point 3. This sub-basins features average slopes of 0.5-2% with slopes of 1-2% within the Filing No. 2 parcel. This flow combines with flows from H4 west of Design Point 3. This runoff collects at DP3 where a portion of the runoff drains via the existing 30” CMP culvert that drains under Falcon Highway. The majority of this runoff continues northeast of DP3 and flows into H2 where it will combine flows at Design Point 2.

Sub-basin H4 drains in a southerly direction and flows to an existing 24” CMP owned by El Paso County. However, this pipe is currently silted full and is unable to drain any flows from this sub-basin. All flows from this sub-basin currently travel into H3 and H2 via the existing roadside ditch that drains to the east. This pipe requires immediate maintenance before any construction can begin.

All flows from the site eventually enter Chico Creek. The sub-basins are described in more detail in the previously approved Final Drainage Report.

The Proposed drainage patterns of the Drainage Letter site are indicated on the attached **Drainage Map Proposed Conditions** from the previously approved Final Drainage Report. The drainage patterns are described by four (4) onsite sub-basins, and four (4) offsite sub-basins. The site will continue to drain as in existing conditions with Parcel A draining offsite to the east and Parcel B draining offsite to the south. The sub-basins are described in more detail in the previously approved Final Drainage Report.

The proposed improvements to be constructed are Byrd Court, and O'Steen Court, public paved rural local roadways each in a 60' right-of-way. These roads will contain a roadside ditch draining into 2-24” RCP culvert with Flared End Sections and Type VL Riprap at the outlet . All flows from these sites will drain into a proposed trap channel that diverts the flows into the natural channels or existing drainage easements. The roadside ditches were sized to safely convey the stormwater runoff from the proposed roadways. Further details and calculations can be found in the previously approved Final Drainage Report and are included in this report's appendix.

The proposed development will not alter the existing basic drainage patterns of the site. The site will continue to drain off-site to the south and east as in existing conditions. The developed flow runoff quantities will not change from those described in the approved Final Drainage Report For The Landings of Denmark Filing No. 2.

Four Step Process:

The El Paso County Engineering Criteria Manual (Appendix I, Section I.7.2) requires the consideration of a "Four Step Process for receiving water protection that focuses on reducing runoff volumes, treating the water quality capture volume (WQCV), stabilizing drainageways, and implementing long term source controls". The Four Step Process is incorporated in this project and the elements are discussed below.

The portion of the site that is contained within the 5-acre single family residential lots are excluded from Post Construction Stormwater Management requirements by ECM 1.7.1.B.5 due to the low development density as 5-acre lots. However, Byrd Court and O'Steen Court, which are both public roadways, are subject to Post Construction Stormwater Treatment requirements. This site will meet the requirements based the Runoff Reduction Standard indicated in ECM 1.7.1.C.3.

1) Runoff Reduction Practices are employed in this project. Impervious surfaces have been reduced as much as practically possible with the low residential density. All impervious surfaces on the site will drain to the surrounding pervious areas allowing infiltration and water quality mitigation. Minimized Directly Connected Impervious Areas (MDCIA) is employed on the project because runoff from the impervious areas of the future home sites will pass over the adjacent natural grassed areas for a distance of 25 feet to 300 feet before entering a roadside ditch or natural drainage way. Runoff from the paved public road will drain to the adjacent native vegetated roadside ditches that will capture and infiltrate runoff from the roadway surface. Runoff Reduction calculations are included in the appendix showing that the roadway runoff will infiltrate into the ground, evaporate, or evapotranspire a quantity of water equal to at least 60% of what the calculated WQCV would be if all impervious area for the applicable development site discharged without infiltration.
2) All drainage paths on the site will remain stabilized with the natural native grass lining. Disturbed areas will be reseeded. All culverts will have rip-rap aprons at the exits. The proposed grass-lined drainage channels for both roadways are adequate to convey the minor and major storm flows without erosion and sedimentation. No further stabilization is required.
3) The project contains no potentially hazardous uses. The site is exempted from the use of WQCV BMPs by ECM 1.7.1.B.5 by virtue of the large lot rural residential nature of the site having percent imperviousness of less than 10%. The site includes the use of permanent rip rap aprons at the culvert crossings to control potential sedimentation. The runoff in the roadside ditches of the public roadway will infiltrate into the ground, evaporate, or evapotranspire a quantity of water equal to at least 60% of what the calculated WQCV would be if all impervious area for the applicable development site discharged without infiltration. Runoff Reduction can be found in the Previously Approved Preliminary and Final Drainage Report and are included in this report's appendix.
4) The site contains no storage of potentially harmful substances or use of potentially harmful substances. No Site Specific or Other Source Control BMP's are required.

No offsite drainage improvements will be required for the project. Costs for public non-reimbursable drainage improvements are listed below:

186 LF 24" RCP Pipe	at	$83 / LF	=	$ 15,438
8 - 24" RCP Flared End Section	at	$498/ EA	=	$ 3,984
22 Tons Rip-Rap Type VL	at	$89 /ton	=	$ 1,958
Total			=	$ 21,380

The Hook and Line Ranch and the La Vega Ranch Drainage Basins have not been studied and are not Fee Basins at this time. No Drainage Fees or Bridge Fees were due or paid for the proposed Final Plat of The Landings of Denmark Filing No. 2 at the time it was platted.

In Conclusion, the drainage patterns generated by the The Landings of Denmark site under proposed developed conditions are essentially the same as those which existed for the existing Plan. The site and drainage are substantially in accordance with the previously approved Drainage Report prepared at the time of the Plan in 2005. The proposed development as described in this Drainage Letter will have no adverse impacts to downstream and surrounding developments or downstream drainage ways or storm drain facilities.

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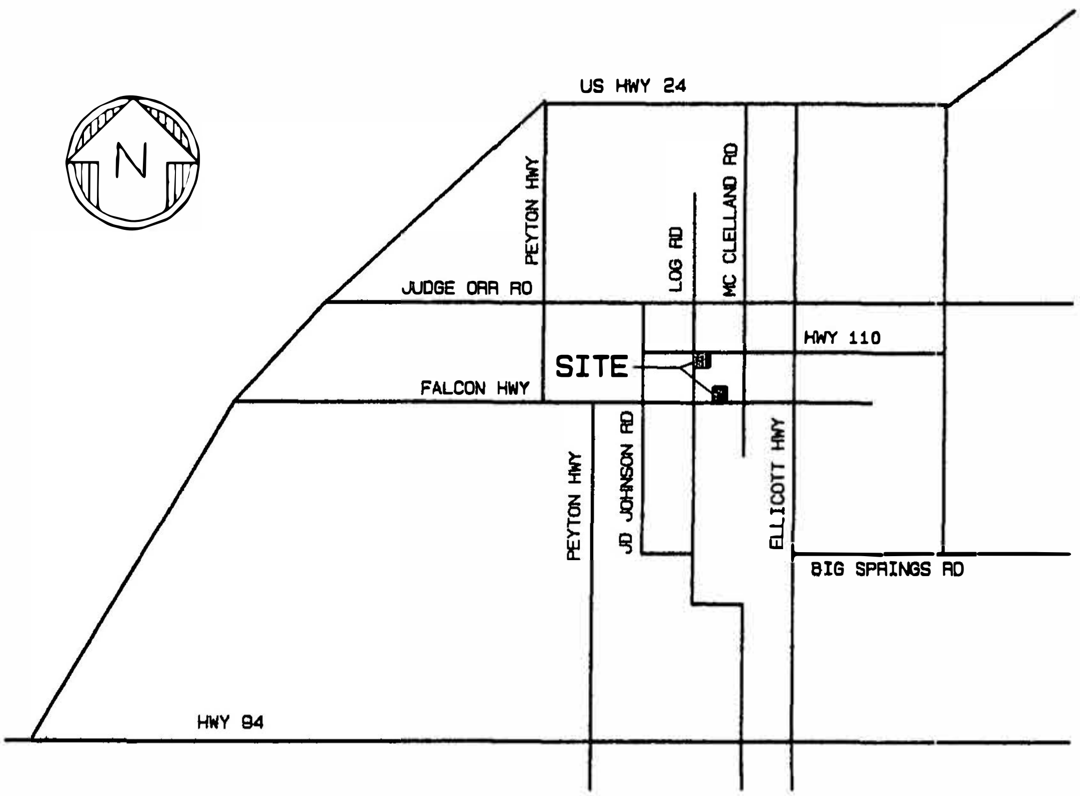
Attachments



VICINITY MAP

NO SCALE

National Flood Hazard Layer FIRMette

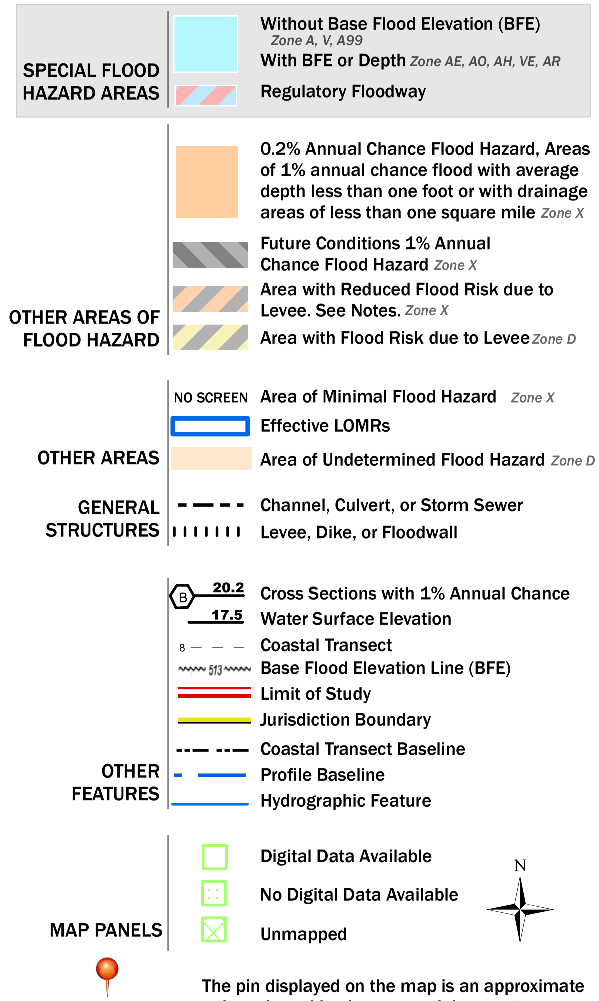
104°25'30"W 38°56'29"N

104°24'53"W 38°56'1"N

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT



The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 7/27/2021 at 6:38 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

National Flood Hazard Layer FIRMette

FEMA

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) *Zone A, V, A99*
		With BFE or Depth *Zone AE, AO, AH, VE, AR*
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
		Future Conditions 1% Annual Chance Flood Hazard *Zone X*
		Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
		Area with Flood Risk due to Levee *Zone D*
OTHER AREAS	NO SCREEN	Area of Minimal Flood Hazard *Zone X*
		Effective LOMRs
		Area of Undetermined Flood Hazard *Zone D*
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES	B 20.2 17.5	Cross Sections with 1% Annual Chance Water Surface Elevation
	8	Coastal Transect
	513	Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

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Map Scale: 1:3,670 if printed on A landscape (11" x 8.5") sheet.

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 18, Jun 5, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 11, 2018—Oct 20, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
96	Truckton sandy loam, 0 to 3 percent slopes	A	41.9	100.0%
Totals for Area of Interest			**41.9**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

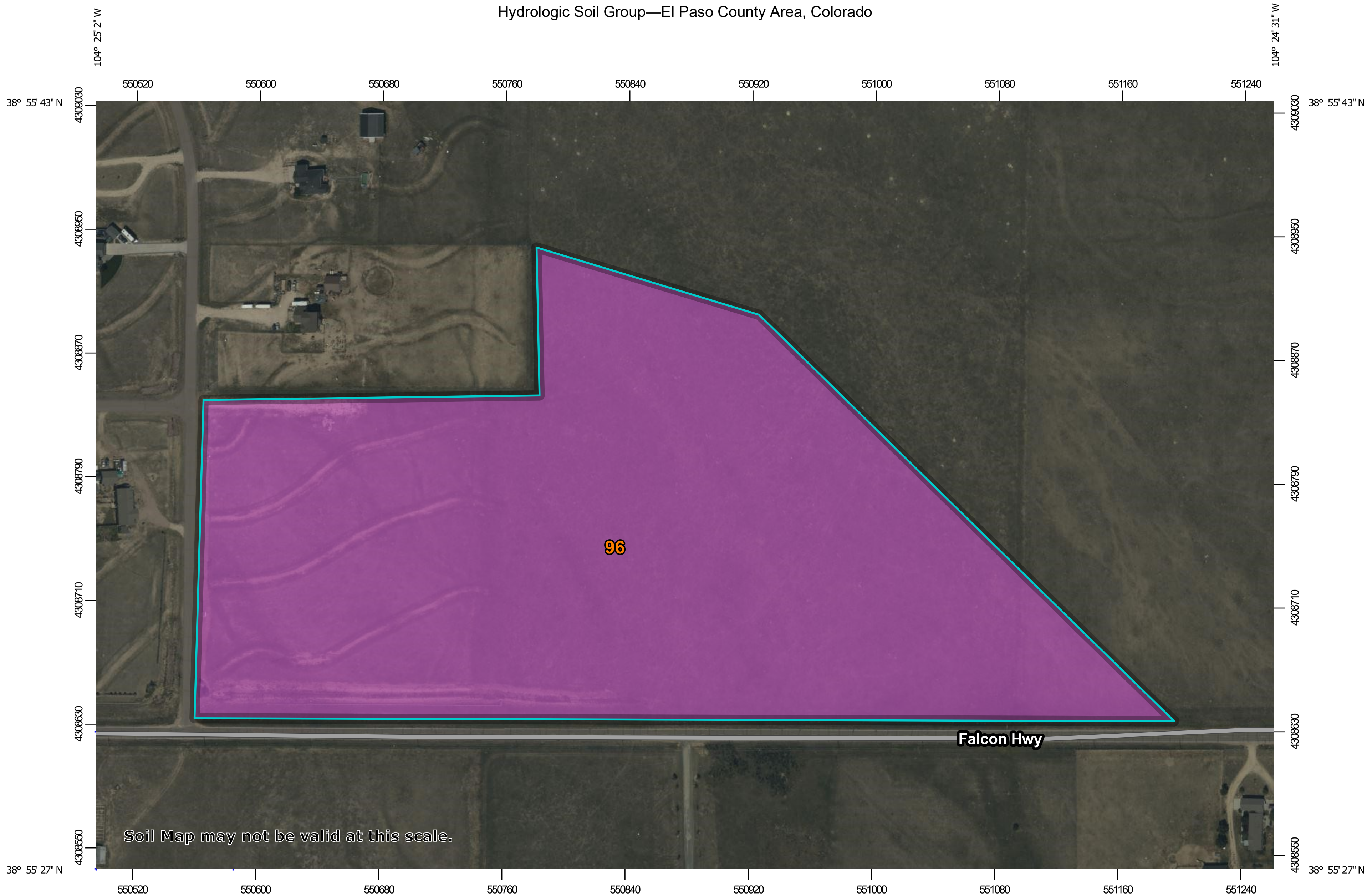
If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher



Map Scale: 1:3,500 if printed on A landscape (11" x 8.5") sheet.

N

0 50 100 200 300 Meters

0 150 300 600 900 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
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Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

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Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

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Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 18, Jun 5, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 11, 2018—Oct 20, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
96	Truckton sandy loam, 0 to 3 percent slopes	A	30.2	100.0%
Totals for Area of Interest			**30.2**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Almost all areas of this soil are used as rangeland. A few areas of crops such as alfalfa and corn are grown under sprinkler irrigation.

This soil is well suited to the production of native vegetation suitable for grazing. It is best suited to deep-rooted grasses. The native vegetation is mainly cool- and warm-season grasses such as western wheatgrass, sideoats grama, and needleandthread.

Proper range management is needed to prevent excessive removal of the plant cover. Interseeding is used to improve the existing vegetation. Deferment of grazing in spring increases plant vigor and soil stability. Properly locating livestock watering facilities helps to control grazing.

Windbreaks and environmental plantings are fairly well suited to this soil. Blowing sand is the main limitation for the establishment of trees and shrubs. The soil is so loose that trees need to be planted in shallow furrows and plant cover needs to be maintained between the rows. Supplemental irrigation may be needed to insure survival. Trees that are best suited and have good survival are Rocky Mountain juniper, eastern redcedar, ponderosa pine, and Siberian elm. Shrubs that are best suited are skunkbush sumac, lilac, and Siberian peashrub.

This soil is suited to wildlife habitat. It is best suited to openland and rangeland wildlife habitat. Rangeland wildlife, such as pronghorn antelope, can be encouraged by developing livestock watering facilities, properly managing livestock grazing, and reseeding range where needed.

This soil has good potential for use as homesites. The main limitation of this soil for roads and streets is frost action potential. Special designs for roads are needed to minimize this limitation. Practices are needed to control soil blowing and water erosion on construction sites where the plant cover has been removed. Capability subclass VIe, nonirrigated.

96—Truckton sandy loam, 0 to 3 percent slopes. This deep, well drained soil formed in alluvium and residuum derived from arkosic sedimentary rock on uplands. Elevation ranges from 6,000 to 7,000 feet. The average annual precipitation is about 15 inches, the average annual air temperatue is about 47 degrees F, and the average frost-free period is about 135 days.

Typically, the surface layer is grayish brown sandy loam about 5 inches thick. The next layer is dark grayish brown sandy loam about 3 inches thick. The subsoil is brown sandy loam about 16 inches thick. The substratum is light yellowish brown coarse sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Blakeland loamy sand, 1 to 9 percent slopes; Bresser sandy loam, 0 to 3 percent slopes; Ellicott loamy coarse sand, 0 to 5 percent slopes; and Ustic Torrifluvents, loamy.

Permeability of this Truckton soil is moderately rapid. Effective rooting depth is 60 inches or more. Available water capacity is moderate. Surface runoff is slow, and the hazards of erosion and soil blowing are moderate.

This soil is used mainly for cultivated crops. It is also used for livestock grazing, for wildlife habitat, and as homesites.

Crops are commonly grown in combination with summer fallow because moisture is insufficient for annual cropping. Alfalfa can also be grown on this soil. When this soil is used as cropland, crop residue management and minimum tillage are necessary conservation practices.

This soil is well suited to the production of native vegetation suitable for grazing (fig. 7). It favors deep-rooted grasses. The native vegetation is mainly cool- and warm-season grasses such as western wheatgrass, sideoats grama, and needleandthread.

Proper range management is needed to prevent excessive removal of the plant cover. Interseeding is used to improve the existing vegetation. Deferment of grazing in spring increases plant vigor and soil stability. Properly locating livestock watering facilities helps to control grazing.

Windbreaks and environmental plantings generally are suited to this soil. Soil blowing is the main limitation to the establishment of trees and shrubs. This limitation can be overcome by cultivating only in the tree rows and leaving a strip of vegetation between the rows. Supplemental irrigation may be needed when planting and during dry periods. Trees that are best suited and have good survival are Rocky Mountain juniper, eastern redcedar, ponderosa pine, Siberian elm, Russian-olive, and hackberry. Shrubs that are best suited are skunkbush sumac, lilac, and Siberian peashrub.

This soil is suited to wildlife habitat. It is best suited to habitat for openland and rangeland wildlife. In cropland areas, habitat favorable for ring-necked pheasant, mourning dove, and many nongame species can be developed by establishing areas for nesting and escape cover. For pheasant, undisturbed nesting cover is vital and should be provided in plans for habitat development. This is especially true in areas of intensive farming. Rangeland wildlife, such as pronghorn antelope, can be encouraged by developing livestock watering facilities, properly managing livestock grazing, and reseeding range where needed.

This soil has good potential for use as homesites. The main limitation of this soil for roads and streets is frost-action potential. Special designs for roads are needed to overcome this limitation. Capability subclasses IIIe, nonirrigated, and IIe, irrigated.

97—Truckton sandy loam, 3 to 9 percent slopes. This deep, well drained soil formed in alluvium and residuum derived from arkosic sedimentary rock on uplands. Elevation ranges from 6,000 to 7,000 feet. The average annual precipitation is about 15 inches, the average annual air temperature is about 47 degrees F, and the average frost-free period is about 135 days.

Typically, the surface layer is grayish brown sandy loam about 5 inches thick. The next layer is dark grayish brown sandy loam about 3 inches thick. The subsoil is brown sandy loam about 16 inches thick. The substratum is light yellowish brown coarse sandy loam to a depth of 60 inches or more.

THE LANDINGS OF DENMARK FILING NO. 2

12385

A Portion of the Northwest One-Quarter (N.W.1/4) of Section 11,
and a Portion of the South One-Half (S.1/2) of Section 11,
Township 13 South, Range 63 West of the 6th P.M.,
County of El Paso, State of Colorado

KNOW ALL MEN BY THESE PRESENTS:

That Landings of Denmark, L.L.C., a Limited Liability Company, being the owner of the described tract of land, to wit:

LAND DESCRIPTION: PARCEL A

A portion of the Northwest One-Quarter (N.W.1/4) of Section 11, Township 13 South, Range 63 West of the 6th P.M., County of El Paso, State of Colorado, being more particularly described as follows:

Beginning at the Northwest corner of said Section 11; Thence S89°45'39"E along the northerly line of said Section 11, a distance of 1378.16 feet; Thence S20°13'15"E, a distance of 531.10 feet; Thence S15°37'19"E, a distance of 355.20 feet to the most northwesterly corner of Lot 67 of The Landings of Denmark Filing No. 1 as recorded under Reception No. 201031405 of the records of the Clerk and Recorder's Office of said County; Thence along the northerly line of said The Landings of Denmark Filing No. 1 the following nine (9) courses;

1) S32°17'28"W, a distance of 248.67 feet;
2) Thence N58°54'22"W, a distance of 634.63 feet;
3) Thence along the arc of a non-tangential curve to the right, having a central angle of 40°12'55", a radius of 55.00 feet, an arc length of 38.60 feet, whose chord bears S40°52'43"W;
4) Thence S60°59'10"W, a distance of 64.20 feet;
5) Thence along the arc of a curve to the left having a central angle of 16°42'28", a radius of 100.00 feet, an arc length of 29.16 feet;
6) Thence S44°16'42"W, a distance of 41.95 feet;
7) Thence along the arc of a curve to the left having a central angle of 43°23'11", a radius of 530.00 feet, an arc length of 401.33 feet;
8) Thence S00°53'31"W, a distance of 232.35 feet;
9) Thence N89°06'29"W, a distance of 715.85 feet to a point on the Westerly line of said Section 11;

Thence N00°53'25"E along said westerly Section line, a distance of 1419.18 feet to the Point of Beginning.

Said parcel contains 1,752,281 sq.ft. (40.227 acres), more or less.

LAND DESCRIPTION: PARCEL B

A portion of the South One-Half (S.1/2) of Section 11, Township 13 South, Range 63 West of the 6th P.M., County of El Paso, State of Colorado, being more particularly described as follows:

Beginning at the most Southeasterly corner of The Landings of Denmark Filing No. 1 as recorded under Reception No. 201031405 of the records of the Clerk and Recorder's Office of said County, Said point being also a point on the easterly right-of-way line of O'Toole Drive; Thence along the southerly and easterly lines of said The Landings of Denmark Filing No. 1 and said easterly right-of-way line of O'Toole Drive the following four (4) courses:

1) N00°16'47"E, a distance of 718.66 feet to the Southwest corner of Lot 115 of said subdivision;
2) Thence S89°43'13"E along the South line of said Lot 115, a distance of 671.08 feet to the point of curvature of said Lot 115;
3) Thence along the arc of a curve to the left having a central angle of 01°30'12", a radius of 720.00 feet, an arc length of 18.89 feet to the Southeast corner of said Lot 115;
4) Thence N00°16'47"E along the East line of said Lot 115, a distance of 655.11 feet to the angle point of Lot 114 of said Subdivision;

Thence N67°53'15"E, a distance of 39.16 feet; Thence S51°41'17"E, a distance of 666.60 feet; Thence S52°16'47"W, a distance of 173.71 feet; Thence S37°43'13"E, a distance of 60.00 feet; Thence S34°59'49"E, a distance of 377.58 feet; Thence S78°39'06"E, a distance of 545.46 feet; Thence S33°09'53"E, a distance of 492.61 feet to a point on the Southerly line of said Section 11; Thence N89°43'13"W along said Southerly line, a distance of 2176.16 feet to the Point of Beginning.

Said parcel contains 1,522,002 sq.ft. (34.940 acres), more or less.

BASIS OF BEARINGS STATEMENT

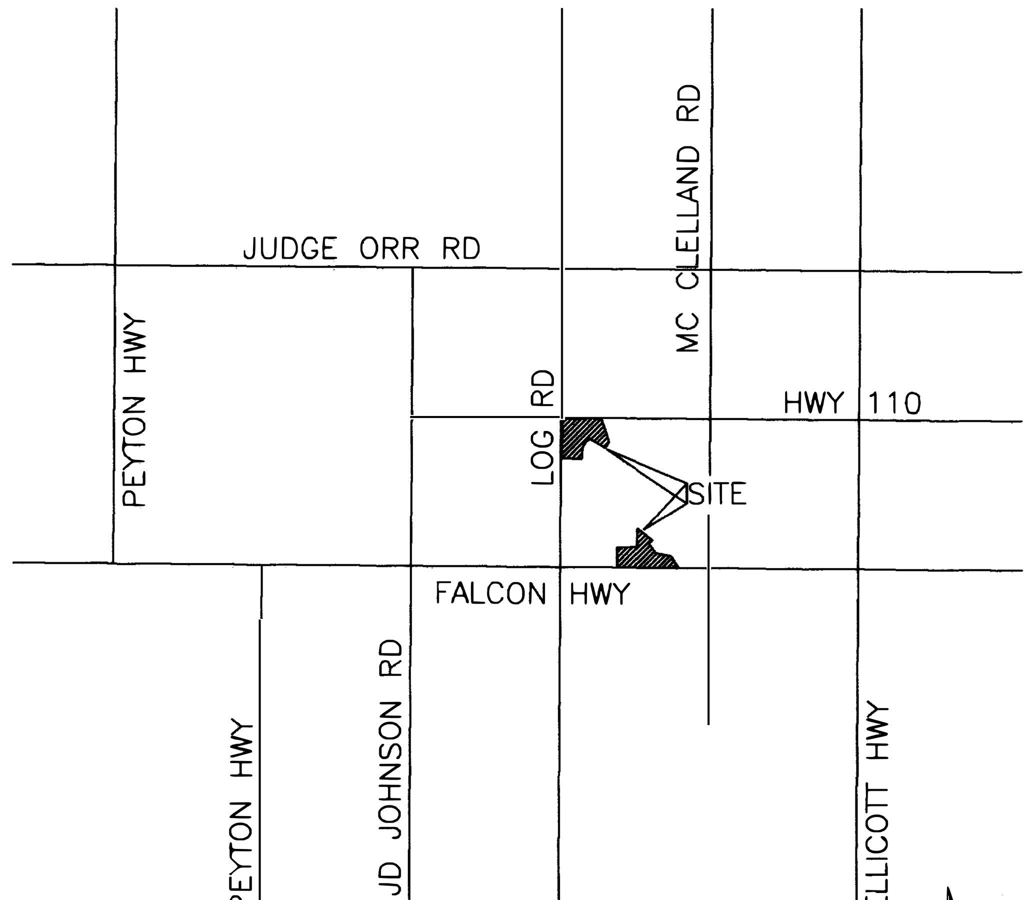
The Basis of Bearings for this description are relative to Southerly line of said Section 11, Township 13 South, Range 63 West of the 6th P.M., County of El Paso, State of Colorado, being monumented by a found 3-1/4" Aluminum Cap L.S. #25968 at the most southwesterly corner of said Section 11 and a found 3-1/4" Aluminum Cap L.S. #27270 at the most southeasterly corner of said Section 11. Said line bears S89°43'13"E, a distance of 5254.83 feet.

EASEMENTS:

Unless otherwise indicated, side, front and rear lot lines are hereby platted on either side with a ten (10') foot public utilities and draiange easement. All exterior subdivision bounadries shall have a twenty (20') foot public utilities and draiange easement. The sole responsibility for maintenance of these easements is hereby vested with individual property owners.

DEDICATION:

The above party in interest has caused said tract to be platted into Lots, Streets, and Easements as shown on the plat, which is drawn to a fixed scale as indicated thereon, and accurately sets forth the boundaries and dimensions of said Lots, Streets, and Easements which shall be known as "THE LANDINGS OF DENMARK FILING NO. 2" EL Paso County, Colorado. All streets as platted are hereby dedicated to public use and said owner does hereby personally covenant and agree that all platted streets will be graded, graveled, paved and that proper drainage for same will be provided at his own expense, all to the satisfaction of the Board of County Commissioners of El Paso County, Colorado, and upon acceptance by resolution, all streets so dedicated will become matters of maintenance by EL Paso County, Colorado.



VICINITY MAP
N.T.S.

APPROVALS:

The accompanying plat was approved by the EL Paso County Planning Department this 1st day of August, 2006 A.D.

R F Andersild
Development Services Director

The occompanying plat was approved by the Board of County Commissioners this 14th day of April, 2005 A.D.

Sallie Clark
Chair County Commissioners

RECORDING:

STATE OF COLORADO)
) SS
COUNTY OF EL PASO)

I hereby certify that this instrument was filed for record in my office at 10:21 o'clock A.M., this 4th day of August 2006 A.D., and is duly recorded at Reception No. 206112385 of the records of El Paso County, Colorado.

SURCHARGE: 1.00 ROBERT C. BALINK, Recorder

FEE: 20.00 By: Michelle Thomson
Deputy

IN WITNESS WHEREOF:

The aforementioned, Landings of Denmark, L.L.C., has executed this instrument this 28th day of July, 2006 A.D.

P.L. Howerton
P.L. Howerton, Member

NOTARIAL:

STATE OF COLORADO)
) SS
COUNTY OF EL PASO)

The foregoing instrument was acknowledged before me this 28Th day of July, 2006 A.D., by Phil Howerton of Landings of Denmark, L.L.C.

Witness my Hand and Seal: Sylvia Scott
Notary Public

My Commission Expires: 10/04/09
Address: 6893 Duke DR.
Colo. Spgs, CO. 80918

SYLVIA SCOTT NOTARY PUBLIC STATE OF COLORADO

BRIDGE FEES: Ø SCHOOL FEES: District #22 $2405.00
DRAINAGE FEES: Ø PARK FEES: $3991.00

SURVEYOR'S CERTIFICATION:

The undersigned Registered land Surveyor in the State of Colorado hereby certifies that the accompanying plat was surveyed and drawn under his supervision and accurately shows the described tract of land, and subdivision thereof, and that the requirements of Title 38 of the Colorado Revised Statutes, 1973, as amended, have been met to the best of his professional knowledge and belief.

PINNACLE LAND SURVEYING CO., INC.
John W. Towner 4/28/05
John W. Towner, Registered Professional Land Surveyor No. 25968

COLORADO REGISTERED JOHN W. TOWNER 25968 PROFESSIONAL LAND SURVEYOR

NOTES:

1. These tracts of land are subject to the following:

a) Protective Covenants, recorded at Reception No. 201031404, of the records of the El Paso County Clerk and Recorder.

b) Reservations contained in United States Patent recorded in Book 350 at Page 122 and in Book 420 at Page 209 and in Book 165 at Page 364 as follows: Subject to the right of the proprietor of a vein or lode to extract and remove his ore therefrom, should the same be found to penetrate or intersect the premises hereby granted, as provided by law. And there is reserved from the lands hereby granted, a right of way thereof for ditches or canals constructed by the authority of the United States.

c) Except 60 foot Right of Way to El Paso County along all section lines as recorded in Road Record A at Page 78 being 30 feet on each side of each section line.

d) Undivided one-half interest in and to all oil, gas and other minerals on, in and under subject property, with right of ingress and egress, as reserved in the deed recorded in Book 1770 at Page 36, and any interests therein or rights thereunder.

e) Right of Way and easement to El Paso County Telephone Company in instrument recorded in Book 2399 at Page 635.

f) Terms, agreements, provisions, conditions, and obligations as contained in Final Order and Decree of the Upper Black Squirrel Creek Ground Water Management District recorded in Book 3260 at Page 701.

g) Right of Way and easement granted to Mountain View Electric Association, Inc., in instrument recorded in Book 3649 at Page 438.

h) Right of Way and easement granted to Mountain View Electric Association, Inc., in instrument recorded in Book 3649 at Page 369.

i) Right of Way and easement granted to Mountain View Electric Association, Inc., in instrument recorded in Book 6015 at Page 704.

j) Right of Way and easement granted to Mountain View Electric Association, Inc., in instrument recorded in Book 6774 at Page 1346.

k) Right of Way and easement granted to Mountain View Electric Association, Inc., in instrument recorded at Reception No. 20101774.

l) Terms, agreements, provisions, conditions, and obligations as contained in Resolution No. 00-146 recorded at Reception No. 201033975.

m) Right of way and easement granted to Mountain View Electric Association, Inc., in instrument recorded at Reception No. 201140748.

n) Terms, agreements, provisions, conditions, and obligations as contained in Order and Decree creating the Ellicott Metropolitan District recorded at Reception No. 97015577.

o) Reservation of minerals rights in the deed recorded at Reception No. 99091488, and any interests therein or rights thereunder.

2. Waste Water and Water:
Sewage treatment is the responsibility of each individual property owner. The El Paso County Department of Health and Environment must approve each system and, in some cases the Department may require an engineer designed system prior to permit approval.
Individual wells are the responsibility of each property owner. Permits for individual wells must be obtained from the State Engineer who by law has the authority to set conditions for the issuance of these permits.

3. Prior to the establishment of any driveway on to a County road, an access permit must be granted by the El Paso County Department of Transportation.

4. All structural foundations shall be located and designed by a Professional Engineer, currently registered in the State of Colorado.

5. The following reports have been submitted and are on file at the County Planning Department: Soils and Geological Study; Water Availability Study; Drainage Report; Wildfire Hazard Report; Natural Features Report; Erosion Control Report.

6. All property owners are responsible for maintaining proper storm water drainage in and through their property.

7. No lot, or interest therein. shall be sold, conveyed or transferred whether by deed or by contract, nor shall building permits be issued, until and unless the required public improvements have been constructed and completed in accordance with the subdivision improvements agreement between the applicant and EL Paso County as recorded at Reception No. 206115196 in the office of the Clerk and Recorder of EL Paso County, Colorado, or in the alternative, other collateral is provided which is sufficient in the judgment of the Board of County Commissioners, to make provision for the completion of said improvements.

8. The addresses (________) exhibited on this plat are for informational purposes only. They are not the legal descriptions and are subject to change.

9. There shall be no direct lot access to Log Road, to Falcon Highway, or to Highway 110.

10. Mailboxes shall be installed in accordance with all El Paso County Department of Transportation and United States Postal Service regulations.

11. The property owner, its successors and assigns, and all future lot owners in this development are hereby on notice that they may be required to comply with applicable rules, if any, of the Colorado Ground Water Commission and/or the Upper Black Squirrel Creek Ground Water Management District, which compliance may result in a reduction of well withdrawal limits and thus a reduction in water availability.

12. Water in the Denver Basin Aquifers is allocated based on a 100 year aquifer life; however, for El Paso County planning purposes, water in the Denver Basin Aquifers is allocated based on a 300 year aquifer life. Applicants, the Home Owners Association, and all future owners in the subdivision should be aware that the economic life of a water supply based on wells in a given Denver Basin Aquifer may be less than either the 100 years or the 300 years indicated due to anticipated water level declines. Furthermore, the water supply plan should not rely solely upon nonrenewable aquifers. Alternative renewable water resources should be acquired and incorporated in a permanent water supply plan that provides future generations with a water supply.

13. Applicants, the Home Owners Association, and all future owners in the subdivision should be aware that without a plan for augmentation approved by the Water Court, the Denver Aquifer is not available for individual wells in this subdivision. Wells will be allowed in the Arapahoe Aquifer and the Laramie-Fox Hill Aquifer. There may be additional expenses in accessing water in these lower aquifers.

14. A twenty-five foot (25') by twenty-five foot (25') sight triangle no-build area exists for all corner lots. No obstruction greater than eighteen inches (18") in height is allowed in this area.

15. Water withdrawal and wells are subject to limitations, restrictions and augmentation requirements and responsibilities as found within the Covenants for this subdivision recorded in Reception No. 201031404, of the Office of the El Paso County Clerk and Recorder and the terms of the water court approved water augmentation plan.

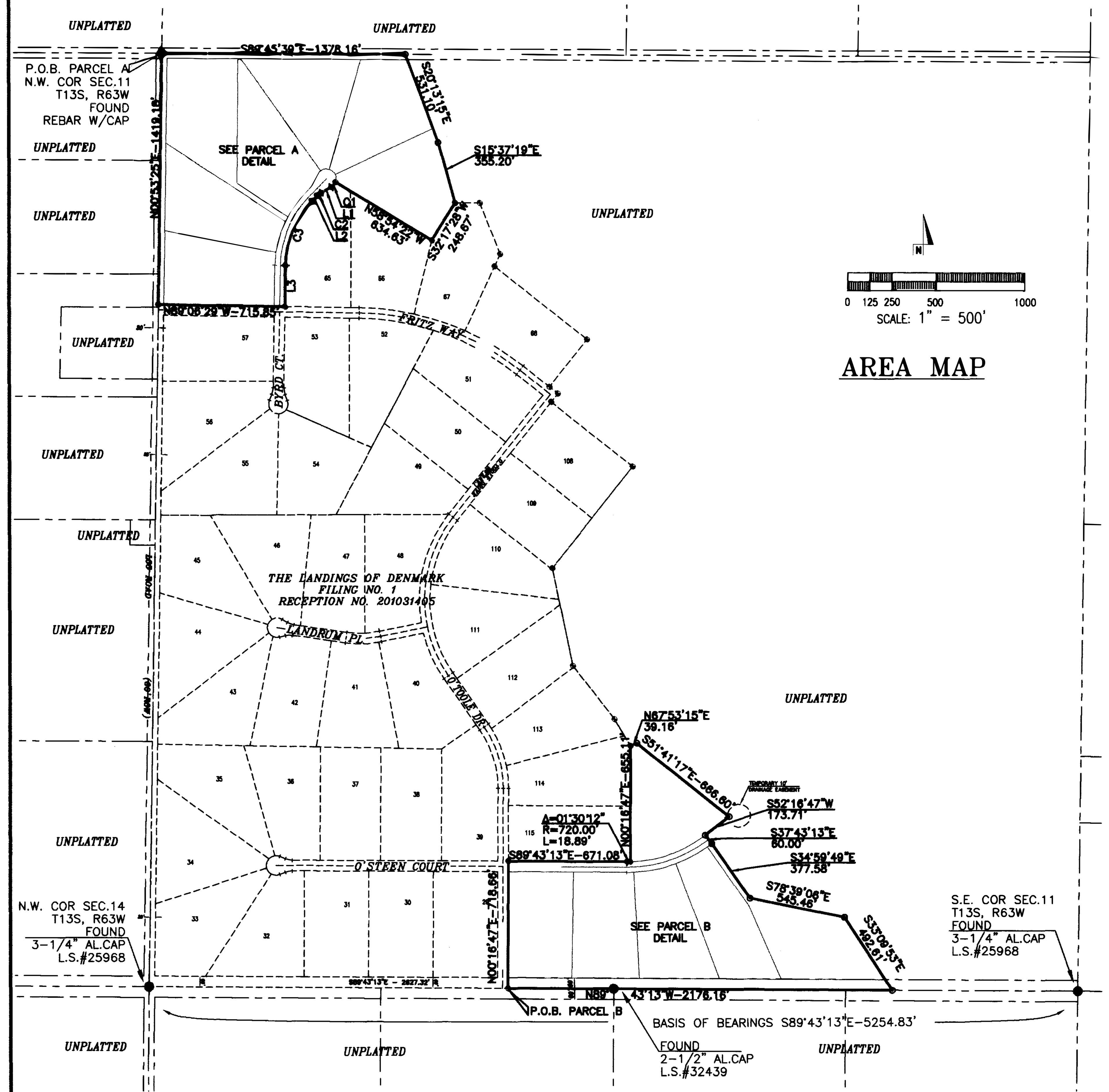
PINNACLE LAND SURVEYING COMPANY, INC.
925 W. CUCHARRAS ST., C.S., CO 634-0751

NOTICE: ACCORDING TO COLORADO LAW YOU MUST COMMENCE ANY LEGAL ACTION BASED UPON ANY DEFECT IN THIS SURVEY WITHIN THREE YEARS AFTER YOU FIRST DISCOVER SUCH DEFECT. IN NO EVENT, MAY ANY ACTION BASED UPON ANY DEFECT IN THIS SURVEY BE COMMENCED MORE THAN TEN YEARS FROM THE DATE OF THE CERTIFICATION SHOWN HEREON.

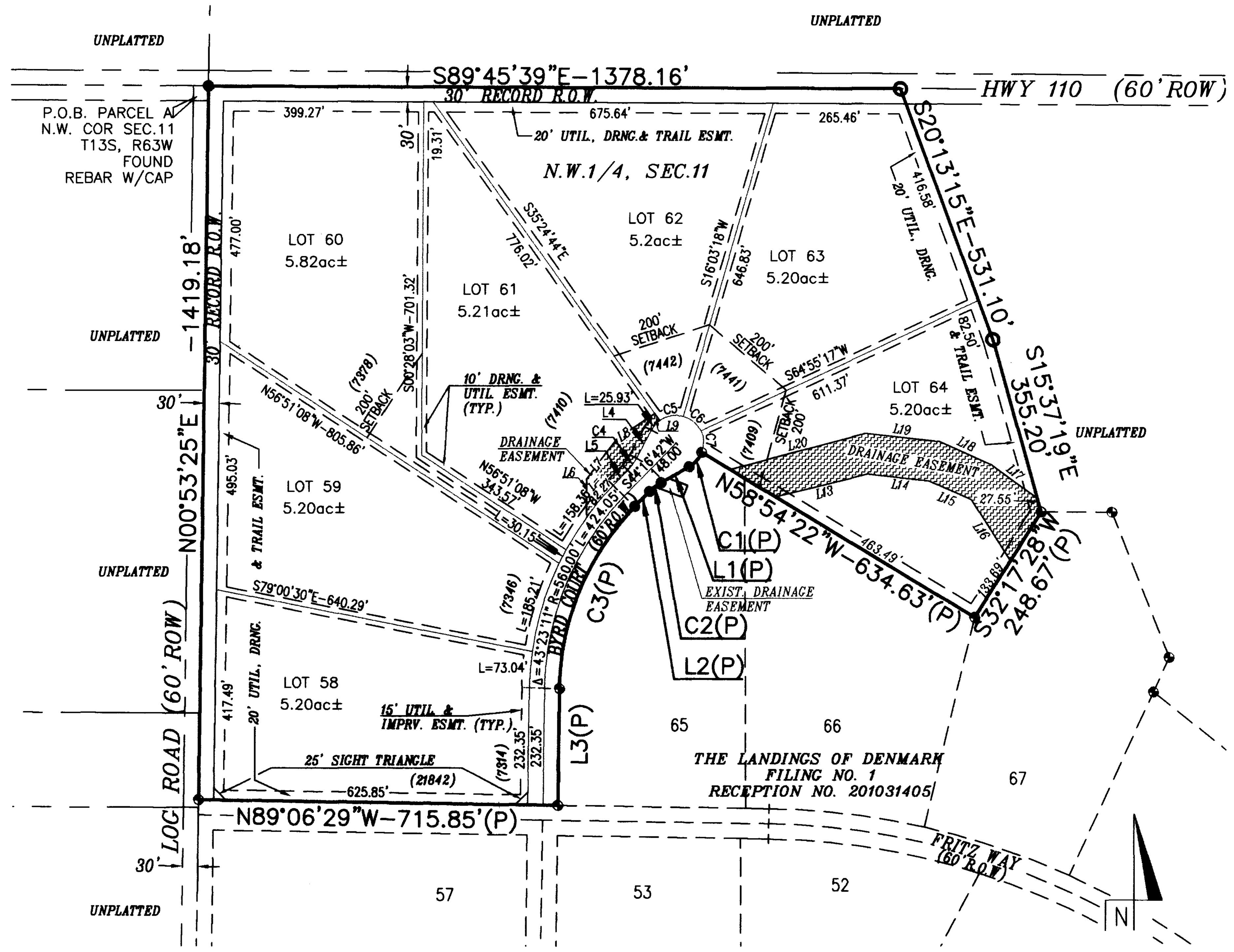
THE LANDINGS OF DENMARK FILING NO. 2		
DRAWN BY: CAJ/MWW	CHECKED BY: JWT	DATE: 03/08/05
JOB NO.: 01012100	DWG: 01012100.DWG	SHEET 1 OF 2

THE LANDINGS OF DENMARK FILING NO. 2

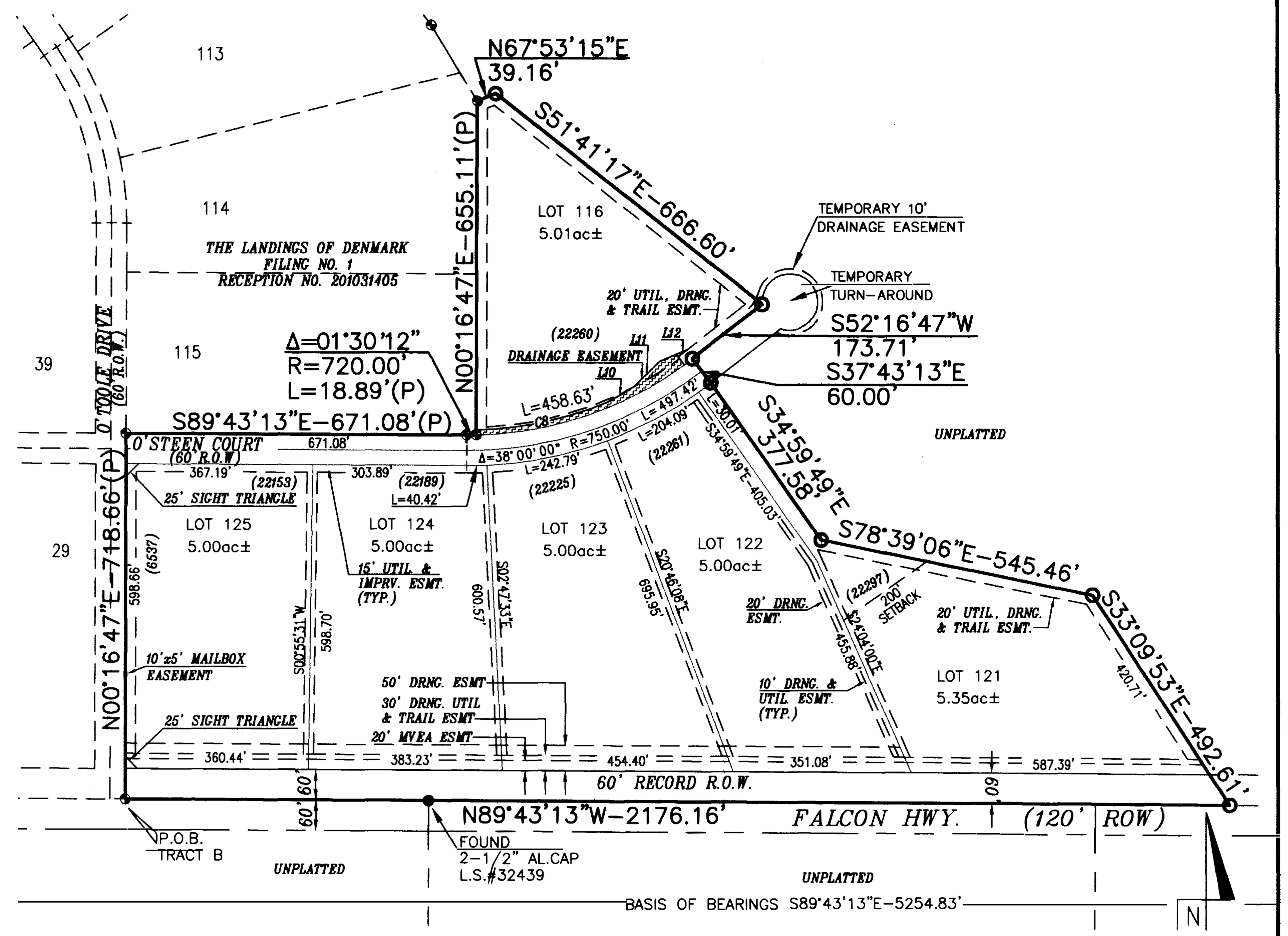
A Portion of the Northwest One-Quarter (N.W.1/4) of Section 11,
and a Portion of the South One-Half (S.1/2) of Section 11,
Township 13 South, Range 63 West of the 6th P.M.,
County of El Paso, State of Colorado



AREA MAP



PARCEL A



PARCEL B

PROPERTY TABLES

LINE TABLE		
LINE	BEARING	LENGTH
L1	S60°59'10"W	64.20'(P)
L2	S44°16'42"W	41.95'(P)
L3	S00°53'31"W	232.35'(P)
L4	N27°34'14"E	64.20'
L5	S44°16'42"W	41.95'

CURVE TABLE			
CURVE	DELTA	RADIUS	LENGTH
C1	40°12'55"	55.00'	38.60'(P)
C2	16°42'28"	100.00'	29.16'(P)
C3	43°23'11"	530.00'	401.33'(P)
C4	16°42'28"	100.00'	29.16'
C5	51°28'02"	55.00'	49.41'
C6	48°51'59"	55.00'	46.91'
C7	45°50'58"	55.00'	44.01'

EASEMENT TABLES

LINE TABLE		
LINE	BEARING	LENGTH
L6	N00°00'56"E	75.68'
L7	N37°05'06"E	98.84'
L8	N55°44'38"E	92.52'
L9	S35°24'44"E	17.25'
L10	S59°53'12"W	59.22'
L11	S45°55'59"W	73.38'
L12	S67°03'39"W	58.77'
L13	N76°04'25"E	188.93'
L14	S83°47'44"E	123.62'
L15	S65°55'28"E	92.40'
L16	S32°44'47"E	143.59'
L17	S53°53'11"E	113.06'
L18	S65°55'28"E	114.43'
L19	S83°51'46"E	147.94'
L20	N74°59'22"E	278.92'

CURVE TABLE			
CURVE	DELTA	RADIUS	LENGTH
C8	21°18'40"	710.00'	264.08'

LEGEND

- BOUNDARY LINE
- LOT LINE
- (P) PLATTED LOT LINE
- EASEMENT LINE
- CENTERLINE
- ADJACENT LOT LINE
- SET #4 REBAR & CAP MARKED "PLSC RLS 25968"
- FOUND AS SHOWN
- FOUND #4 REBAR & CAP "PLSC RLS 25968"
- DRAINAGE EASEMENT

PINNACLE LAND SURVEYING COMPANY, INC.
925 W. CUCHARRAS ST., C.S., CO 634-0751

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THE LANDINGS OF DENMARK FILING NO. 2

DRAWN BY: CAJ/MWW | CHECKED BY: JWT | DATE: 03/08/05
JOB NO.: 01012100 | DWG: 01012100FP.DWG | SHEET 2 OF 2

The Landings of Denmark Filing No. 1
Existing/Historic Conditions

Time of Concentration Computation Table

Project: **Denmark Subdivision - Onsite Existing Drainage Basins** Project Number:

Drainage Basin	Design Point	Overland Flow				Travel Time					Total Time of Concentration		SCS Lag Time
		Length (ft.)	Height (ft.)	C (10 yr.)	Time (min.)	Type	Length (ft.)	Height (ft.)	Velocity (ft./sec.)	Time (min.)	(min.)	(hr.)	(hr.)
H1	1	200	2	0.25	22.48	Natural Channel	5900	55	2.60	37.83	60.3	1.0052	0.6031
H2	2	300	4	0.25	25.04	Natural Channel	5715	65	2.79	34.20	59.2	0.9872	0.5923
H3	3	400	5	0.25	29.53	Natural Channel	2850	32	2.36	20.11	49.6	0.8274	0.4965
H4	4	400	4	0.25	31.79	Natural Channel	3460	40	2.50	23.09	54.9	0.9147	0.5488

Prepared by: jcj Checked by: jcj Date: 6/28/00 Page 1 of 1

Premier Engineering

The Landings of Denmark Filing No. 1
Existing/Historic Conditions

Hydrologic Computation Table - Rational Method

Project: **Denmark Subdivision - Onsite Existing Drainage Basins** Project Number:

Drainage Basin	Design Point	Area	Area x "C"		Development & Soil Type	Runoff Coefficient		Time of Conc. (minutes)	Intensity (in. / hr.)		Flow Rate (c.f.s.)	
			5 yr.	100 yr.		5 yr.	100 yr.		5 yr.	100 yr.	5 yr.	100 yr.
H1	1	185.84	46.46	65.04	Fair Pasture / Range	0.25	0.35	60.31	1.49	2.59	69.0	168.7
H2	2	211.87	52.97	74.15	Fair Pasture / Range	0.25	0.35	59.23	1.50	2.63	79.6	194.7
H3	5	126.09	31.52	44.13	Fair Pasture / Range	0.25	0.35	49.65	1.69	2.95	53.3	130.4
H4	6	65.09	16.27	22.78	Fair Pasture / Range	0.25	0.35	54.90	1.58	2.76	25.7	63.0

Performed by: jcj Checked by: jcj Date: ############# Page 1 of 1

Premier Engineering

The Landings of Denmark Filing No. 1
Existing/Historic Conditions

HYDROLOGIC SUMMARY TABLE

On-site Design / Discharge Points (Existing Conditions)

Drainage Basin	Design Point	Drainage Area (Acres)	Flow Rate (c.f.s.) 5 Year	Flow Rate (c.f.s.) 100 Year
H1	1	185.84	69.0	168.7
H2	2	211.87	79.6	194.7
H3	5	126.09	53.3	130.4
H4	6	65.09	25.7	63.0

The Landings of Denmark Filing No. 2
Proposed Conditions

Time of Concentration Computation Table

Project **Denmark Subdivision No. 2 - Proposed Conditions** Project Number

Drainage Basin	Design Point	Overland Flow				Travel Time					Total Time of Concentration		SCS Lag Time
		Length (ft)	Height (ft)	C (5 yr)	Time (min)	Type	Length (ft)	Height (ft)	Velocity (ft/sec)	Time (min)	(min)	(hr)	(hr)
A	1	300	3 5	0 27	25 5	Natural Channel	735	7	1 6	7 5	33 1	0 5516	0 0092
B		300	5	0 27	22 7	Natural Channel	1050	16	2 1	8 3	31 0	0 5167	0 3100
A,B,OS1&2	2	300	3 5	0 27	25 6	Natural Channel	6056	53	2 55	39 6	65 2	1 0867	0 6520
OS3		300	4	0 27	24 4	Natural Channel	1300	17	2 1	10 4	34 8	0 5802	0 0097
C		300	5	0 25	23 3	Natural Channel	490	7	1 7	4 7	28 0	0 4664	0 2799
C, OS3	3	300	4	0 27	24 4	Natural Channel	2020	19	2 0	16 5	41 0	0 6828	0 4097
D		300	5	0 27	22 7	Natural Channel	260	4	1 5	2 8	25 5	0 4255	0 2553
						Grass Channel	1350	9	1 9	11 7	37 2	0 6200	0 3720
C D,OS3&4	5				50 4 (OS4)	Grass Channel	1350	9	1 9	11 7	62 1		

Prepared by jcj Checked by jcj Date Page 1 of 2

Premier Engineering

The Landings of Denmark, Filing No. 2
Proposed Conditions

Hydrologic Computation Table - Rational Method

Project **Denmark Subdivision No. 2 - Proposed Conditions** Project Number

Drainage Basin	Design Point	Area	Area x "C"		Development & Soil Type	Runoff Coefficient		Time of Conc. (minutes)	Intensity (in / hr)		Flow Rate (c f s)	
			5 yr	100 yr		5 yr	100 yr		5 yr	100 yr	5 yr	100 yr
A	1	25 90	6 99	9 58	Five Acre Development	0 27	0 37	33 1	2 19	3 82	15 3	36 6
B		14 17	3 83	5 24	Five Acre Development	0 27	0 37	31 0	2 27	3 97	8 7	20 8
C		7 42	2 00	2 75	Five Acre Development	0 27	0 37	28 0	2 42	4 22	4 8	11 6
D		36 12	9 75	13 36	Five Acre Development	0 27	0 37	37 2	2 03	3 55	19 8	47 5
A,B,OS1&2	2	182 11	46 44	64 65	Five Acre Development Rangeland	0 26	0 36	65 2	1 41	2 46	65 4	159 0
C, OS3	3	30 74	8 30	11 37	Five Acre Development	0 27	0 37	41 0	1 91	3 34	15 9	38 0
D		30 02	8 11	11 11	Five Acre Development	0 27	0 37	37 2	2 03	3 55	16 5	39 5
C D,OS3&4	5	132 84	35 87	49 15	Five Acre Development	0 27	0 37	62 1	1 46	2 54	52 2	125 0

Performed by JCJ Checked by JCJ Date 6/23/04 Page 1 of 2

Premier Engineering

The Landings of Denmark, Filing No. 2
Proposed Conditions

HYDROLOGIC SUMMARY TABLE
On-site Sub-basins

Drainage Basin	Design Point	Drainage Area (Acres)	Flow Rate (c f s)	
			5 Year	100 Year
A	1	25 9	15 3	36 6
B		14 17	8 7	20 8
C		7 42	4 8	11 6
A,B,OS1&2	2	182 11	65 4	159 0
C, OS3	3	30 74	15 9	38 0
D		30 02	16 5	39 5
C D,OS3&4	5	132 84	52 2	125 0

OS-5 Calculation

From The Landings of Denmark, Filing No. 1: Proposed Conditions

Time of Concentration Computation Table

Project: **Denmark Subdivision - Proposed Conditions** Project Number:

Drainage Basin	Design Point	Overland Flow				Travel Time					Total Time of Concentration		SCS Lag Time
		Length (ft.)	Height (ft.)	C (5 yr.)	Time (min.)	Type	Length (ft.)	Height (ft.)	Velocity (ft./sec.)	Time (min.)	(min.)	(hr.)	(hr.)
A1		300	3	0.27	26.88	Natural Channel	690	8	1.73	6.66	33.5	0.5591	0.0093
B1		300	3	0.27	26.88	Natural Channel	1300	19	2.18	9.93	36.8	0.6135	0.3681
B2		200	2	0.27	21.95	Grass Channel	1250	15	2.57	8.10	30.0	0.5008	0.3005
B3		300	3	0.27	26.88	Natural Channel	350	4	1.47	3.97	30.9	0.5143	0.3086
C1		300	4	0.27	24.45	Natural Channel	1300	17	2.09	10.36	34.8	0.5802	0.3481
D1		300	4	0.27	24.45	Natural Channel	2150	23	2.17	16.49	40.9	0.6824	0.4094
D2		300	3	0.27	26.88	Natural Channel	1550	17	2.03	12.70	39.6	0.6597	0.3958
D3		300	4	0.27	24.45	Natural Channel	730	8	1.71	7.11	31.6	0.5260	0.3156
E1	6	300	3.7	0.27	25.09	Natural Channel	4030	41	2.46	27.28	52.4	0.8727	0.5236
OS1		300	4	0.25	25.04	Natural Channel	6040	55	2.59	38.87	63.9	1.0652	0.6391
OS2		300	5.5	0.25	22.54	Natural Channel	4065	43	2.50	27.05	49.6	0.8265	0.4959
OS3		300	5	0.25	23.26	Natural Channel	1440	19	2.15	11.17	34.4	0.5739	0.0096

Prepared by: jcj Checked by: jcj Date: 6/28/00 Page 1 of 2

Premier Engineering

Original Filing No. 2 Drainage Report omitted this sub-basin. Now represents OS-5 on Proposed Conditions Drainage Map.

OS-5 Calculation
From The Landings of Denmark Filing No.1: Proposed Conditions

Hydrologic Computation Table - Rational Method

Project: **Denmark Subdivision - Proposed Conditions** Project Number:

Drainage Basin	Design Point	Area	Area x "C"		Development & Soil Type	Runoff Coefficient		Time of Conc. (minutes)	Intensity (in. / hr.)		Flow Rate (c.f.s.)	
			5 yr	100 yr		5 yr	100 yr		5 yr	100 yr	5 yr	100 yr
A1		21.40	5.78	7.92	Five Acre Development	0.27	0.37	33.55	2.17	3.79	12.5	30.0
B1		21.59	5.83	7.99	Five Acre Development	0.27	0.37	36.81	2.05	3.58	11.9	28.6
B2		9.47	2.56	3.50	Five Acre Development	0.27	0.37	30.05	2.32	4.05	5.9	14.2
B3		19.23	5.19	7.12	Five Acre Development	0.27	0.37	30.86	2.28	3.98	11.8	28.3
C1		23.32	6.30	8.63	Five Acre Development	0.27	0.37	34.81	2.12	3.70	13.3	31.9
D1		30.02	8.11	11.11	Five Acre Development	0.27	0.37	40.94	1.92	3.35	15.5	37.2
D2		25.33	6.84	9.37	Five Acre Development	0.27	0.37	39.58	1.96	3.42	13.4	32.0
D3		10.63	2.87	3.93	Five Acre Development	0.27	0.37	31.56	2.25	3.93	6.5	15.5
E1	6	65.09	17.57	24.08	Five Acre Development	0.27	0.37	52.36	1.63	2.85	28.7	68.7
OS1		166.84	45.05	61.73	Rangelend	0.27	0.37	63.91	1.43	2.49	64.3	153.9
OS2		157.60	42.55	58.31	Rangelend	0.27	0.37	49.59	1.69	2.96	72.0	172.4
OS3		43.55	11.76	16.11	Rangelend	0.27	0.37	34.43	2.13	3.73	25.1	60.1

Performed by: JCJ Checked by: JCJ Date: 6/28/00 Page 1 of 2

Premier Engineering

Original Filing No. 2 Drainage Report omitted this sub-basin. Now represents OS-5 on Proposed Conditions Drainage Map.

OS-5 Calculation
From The Landings of Denmark Filing No. 1:
Proposed Conditions

HYDROLOGIC SUMMARY TABLE

On-site Design / Discharge Points (Proposed Conditions)

Drainage Basin	Design Point	Drainage Area (Acres)	Flow Rate (c.f.s.)	
			5 Year	100 Year
A1, OS1	1	188.24	67.7	165.2
B1-3,OS2	2	207.89	81.7	198.7
D1,D2	3	55.35	25.8	61.8
D1-3	4	65.98	28.2	67.6
D1-3, C1 ,OS3	5	132.85	46.7	112.9
E1	6	65.09	28.7	68.7

Original Filing No. 2 Drainage Report omitted this sub-basin. Now represents OS-5 on Proposed Conditions Drainage Map.

Design Point 7 Calculation
From The Landings of Denmark Filing No.1: Proposed Conditions

HYDROLOGIC SUMMARY TABLE

On-site Design / Discharge Points (Proposed Conditions)

Drainage Basin	Design Point	Drainage Area (Acres)	Flow Rate (c.f.s.) 5 Year	Flow Rate (c.f.s.) 100 Year
A1, OS1	1	188.24	67.7	165.2
B1-3,OS2	2	207.89	81.7	198.7
D1,D2	3	55.35	25.8	61.8
D1-3	4	65.98	28.2	67.6
D1-3, C1 ,OS3	5	132.85	46.7	112.9
E1	6	65.09	28.7	68.7

Proposed Design Point 7 includes Filing No. 1's Proposed Design Point 2. However, the original calculation for Design Point 2 does not account for additional flows from OS-3.

Culvert Report

61108 - Byrd Ct 2-24 inch RCP Class III w/ FES (5-yr)

Invert Elev Dn (ft)	=	6389.70
Pipe Length (ft)	=	57.25
Slope (%)	=	1.01
Invert Elev Up (ft)	=	6390.28
Rise (in)	=	24.0
Shape	=	Circular
Span (in)	=	24.0
No. Barrels	=	2
n-Value	=	0.013
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Groove end projecting (C)
Coeff. K,M,c,Y,k	=	0.0045, 2, 0.0317, 0.69, 0.2

Embankment

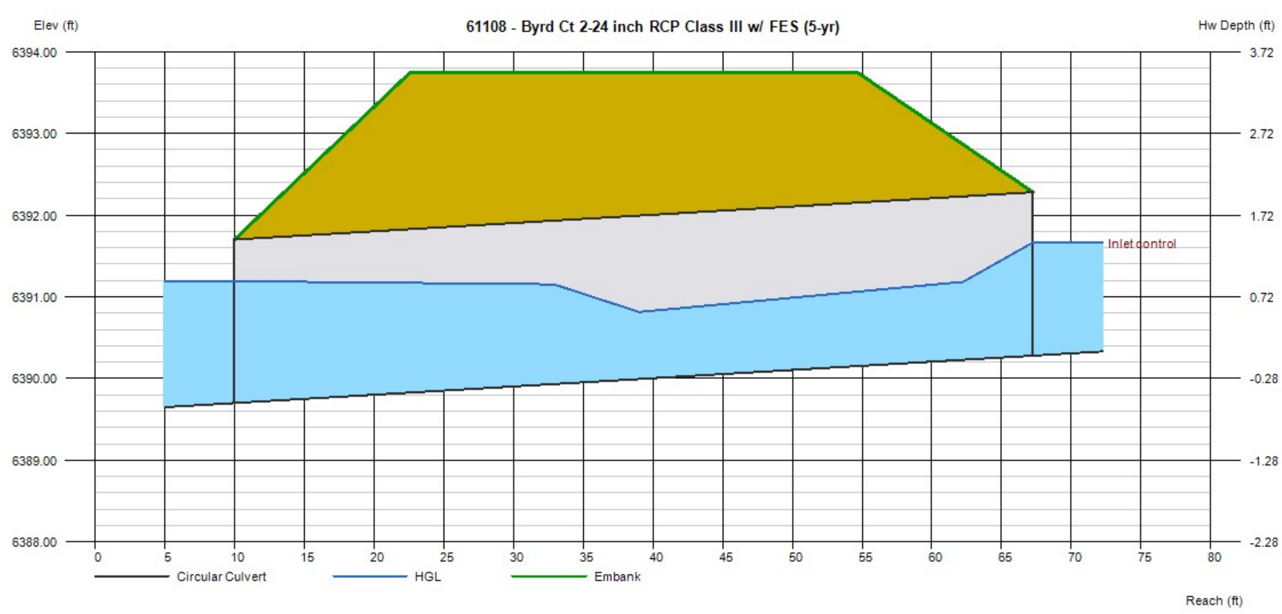
Top Elevation (ft)	=	6393.75
Top Width (ft)	=	32.00
Crest Width (ft)	=	50.00

Calculations

Qmin (cfs)	=	15.30
Qmax (cfs)	=	15.30
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	15.30
Qpipe (cfs)	=	15.30
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	3.05
Veloc Up (ft/s)	=	4.98
HGL Dn (ft)	=	6391.19
HGL Up (ft)	=	6391.26
Hw Elev (ft)	=	6391.67
Hw/D (ft)	=	0.69
Flow Regime	=	Inlet Control



Culvert Report

61108 - Byrd Ct 2-24 inch RCP Class III w/ FES (100-yr)

Invert Elev Dn (ft)	=	6389.70
Pipe Length (ft)	=	57.25
Slope (%)	=	1.01
Invert Elev Up (ft)	=	6390.28
Rise (in)	=	24.0
Shape	=	Circular
Span (in)	=	24.0
No. Barrels	=	2
n-Value	=	0.013
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Groove end projecting (C)
Coeff. K,M,c,Y,k	=	0.0045, 2, 0.0317, 0.69, 0.2

Embankment

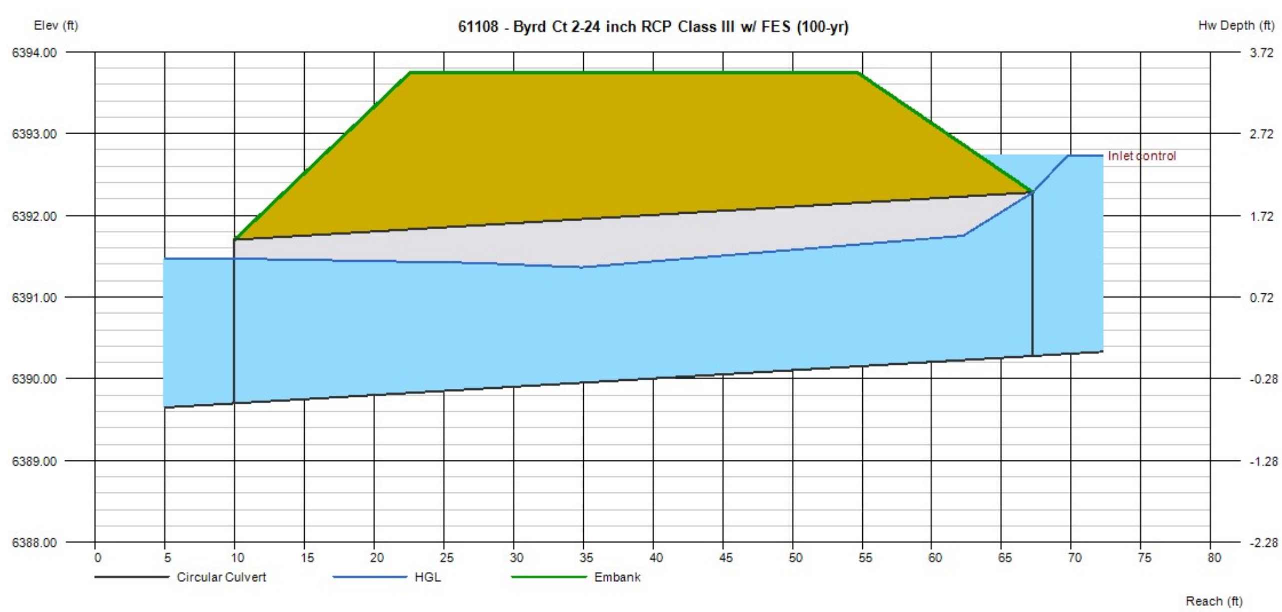
Top Elevation (ft)	=	6393.75
Top Width (ft)	=	32.00
Crest Width (ft)	=	50.00

Calculations

Qmin (cfs)	=	36.60
Qmax (cfs)	=	36.60
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	36.60
Qpipe (cfs)	=	36.60
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	6.22
Veloc Up (ft/s)	=	7.05
HGL Dn (ft)	=	6391.47
HGL Up (ft)	=	6391.82
Hw Elev (ft)	=	6392.74
Hw/D (ft)	=	1.23
Flow Regime	=	Inlet Control

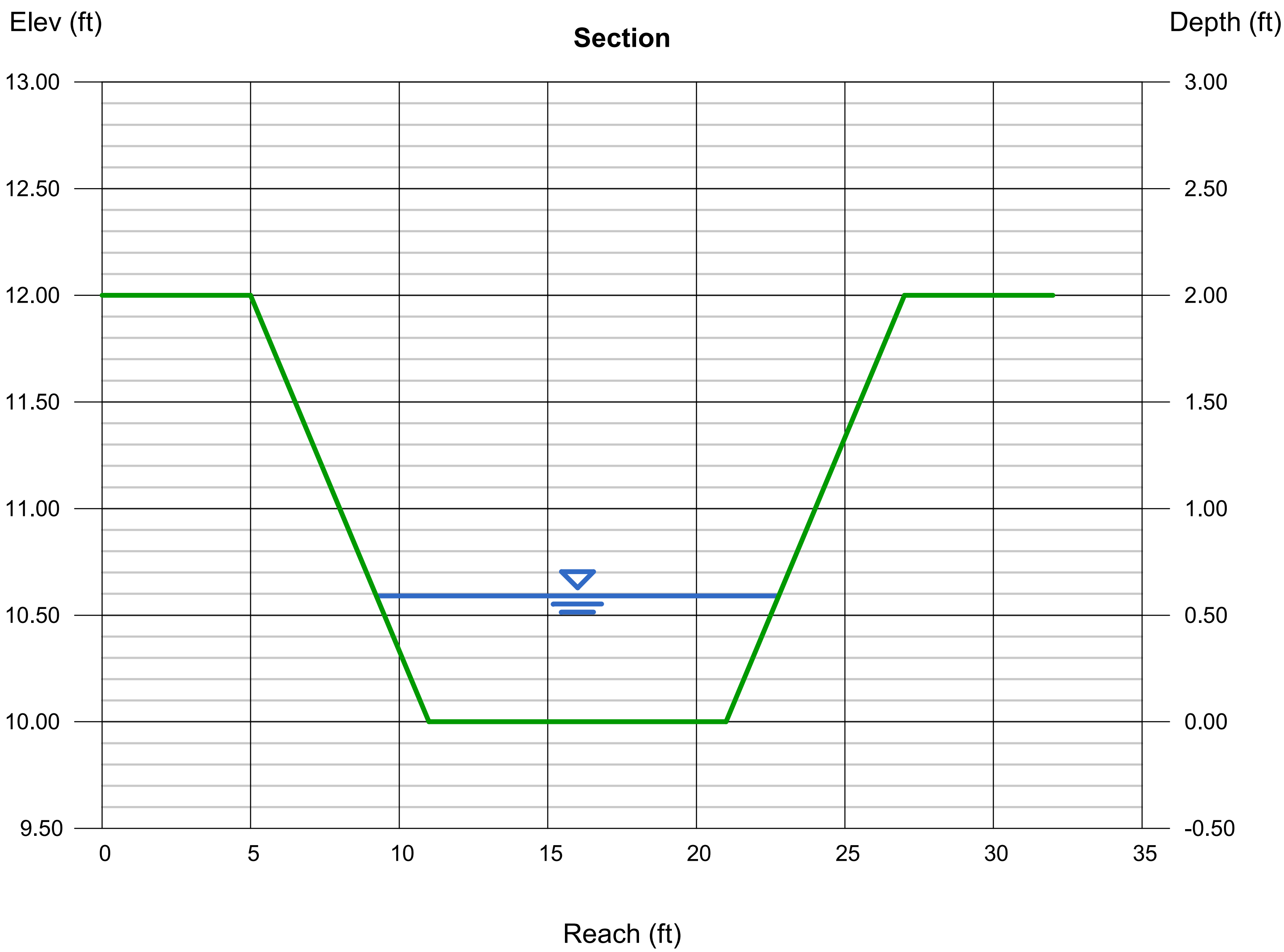


Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. — Friday, Feb 10 2023

61108-Byrd Ct Trap Channel - 5yr

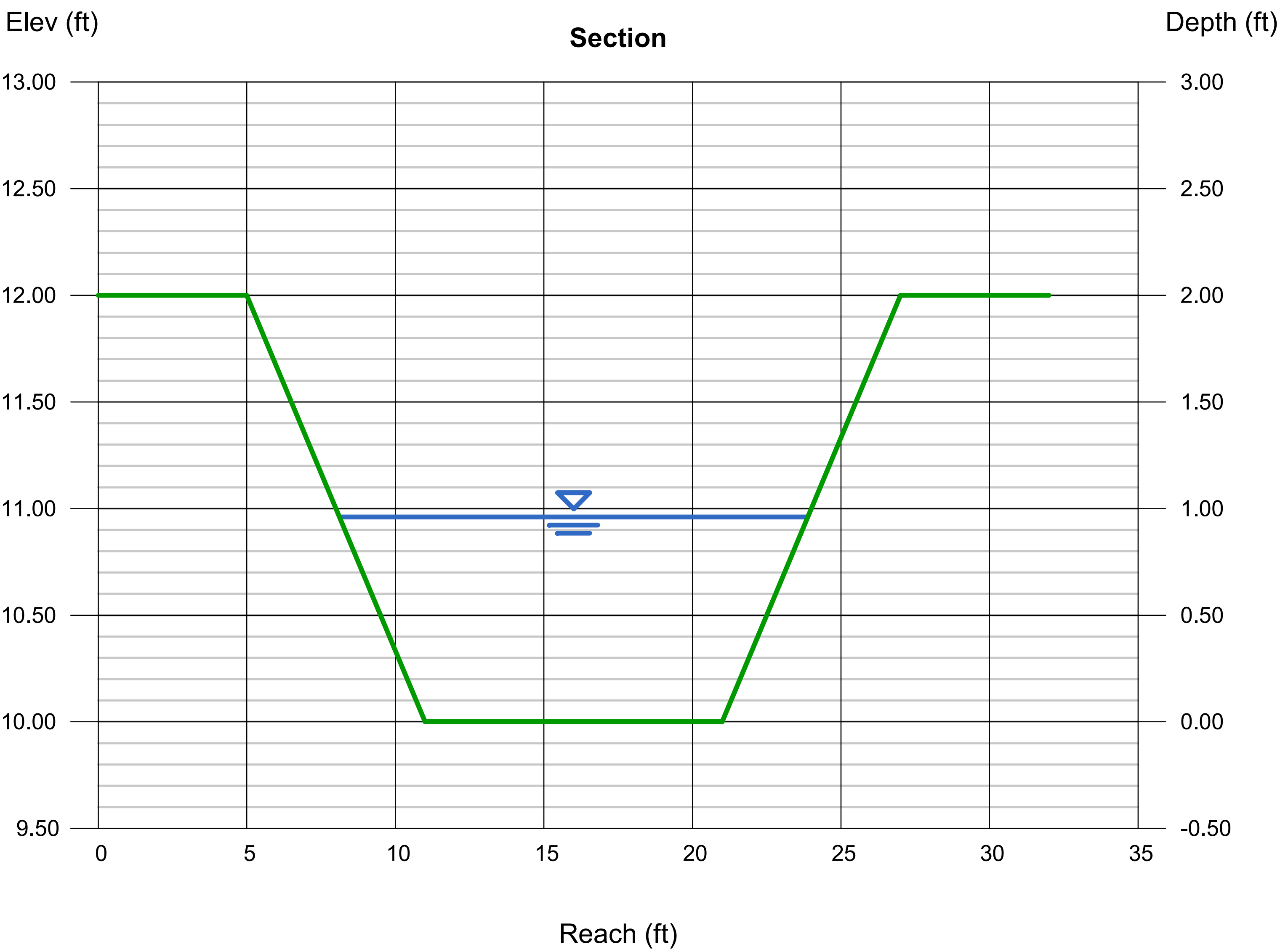
Trapezoidal		**Highlighted**	
Bottom Width (ft)	= 10.00	Depth (ft)	= 0.59
Side Slopes (z:1)	= 3.00, 3.00	Q (cfs)	= 15.30
Total Depth (ft)	= 2.00	Area (sqft)	= 6.94
Invert Elev (ft)	= 10.00	Velocity (ft/s)	= 2.20
Slope (%)	= 0.70	Wetted Perim (ft)	= 13.73
N-Value	= 0.035	Crit Depth, Yc (ft)	= 0.41
		Top Width (ft)	= 13.54
Calculations		EGL (ft)	= 0.67
Compute by:	Known Q		
Known Q (cfs)	= 15.30		



Channel Report

61108-Byrd Ct Trap Channel - 100 yr

Trapezoidal		**Highlighted**	
Bottom Width (ft)	= 10.00	Depth (ft)	= 0.96
Side Slopes (z:1)	= 3.00, 3.00	Q (cfs)	= 36.60
Total Depth (ft)	= 2.00	Area (sqft)	= 12.36
Invert Elev (ft)	= 10.00	Velocity (ft/s)	= 2.96
Slope (%)	= 0.70	Wetted Perim (ft)	= 16.07
N-Value	= 0.035	Crit Depth, Yc (ft)	= 0.70
		Top Width (ft)	= 15.76
Calculations		EGL (ft)	= 1.10
Compute by:	Known Q		
Known Q (cfs)	= 36.60		



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Dec 28 2022

61108 - O'Steen Ct: 2-24 inch Class III RCP w/ FES (5 yr)

Invert Elev Dn (ft)	=	6349.98
Pipe Length (ft)	=	60.25
Slope (%)	=	1.00
Invert Elev Up (ft)	=	6350.58
Rise (in)	=	24.0
Shape	=	Circular
Span (in)	=	24.0
No. Barrels	=	2
n-Value	=	0.013
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Groove end projecting (C)
Coeff. K,M,c,Y,k	=	0.0045, 2, 0.0317, 0.69, 0.2

Embankment

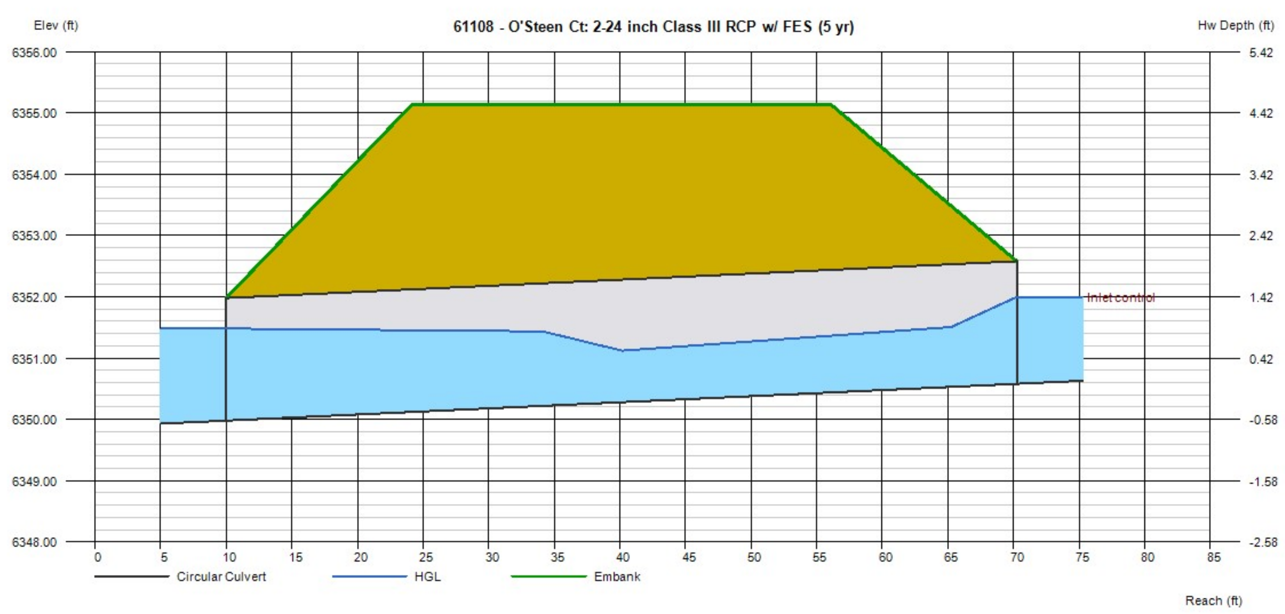
Top Elevation (ft)	=	6355.13
Top Width (ft)	=	32.00
Crest Width (ft)	=	50.00

Calculations

Qmin (cfs)	=	15.90
Qmax (cfs)	=	15.90
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	15.90
Qpipe (cfs)	=	15.90
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	3.14
Veloc Up (ft/s)	=	5.04
HGL Dn (ft)	=	6351.48
HGL Up (ft)	=	6351.58
Hw Elev (ft)	=	6352.00
Hw/D (ft)	=	0.71
Flow Regime	=	Inlet Control



Culvert Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Dec 28 2022

61108 - O'Steen Ct: 2-24 inch Class III RCP w/ FES (100 yr)

Invert Elev Dn (ft)	=	6349.98
Pipe Length (ft)	=	60.25
Slope (%)	=	1.00
Invert Elev Up (ft)	=	6350.58
Rise (in)	=	24.0
Shape	=	Circular
Span (in)	=	24.0
No. Barrels	=	2
n-Value	=	0.013
Culvert Type	=	Circular Concrete
Culvert Entrance	=	Groove end projecting (C)
Coeff. K,M,c,Y,k	=	0.0045, 2, 0.0317, 0.69, 0.2

Embankment

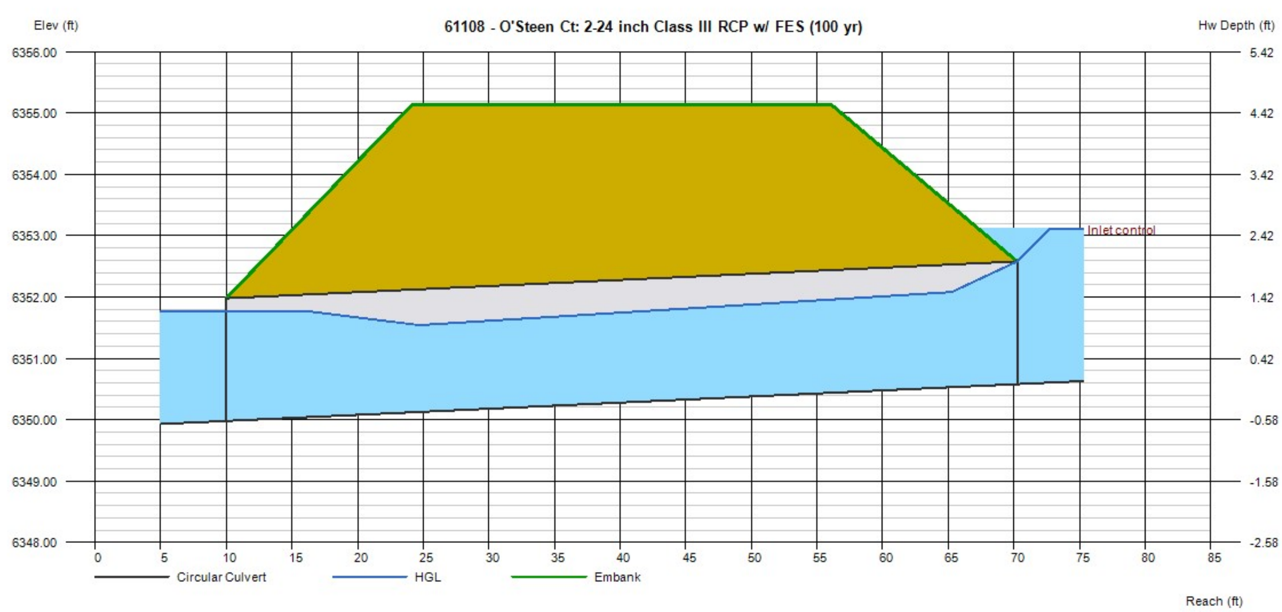
Top Elevation (ft)	=	6355.13
Top Width (ft)	=	32.00
Crest Width (ft)	=	50.00

Calculations

Qmin (cfs)	=	38.00
Qmax (cfs)	=	38.00
Tailwater Elev (ft)	=	(dc+D)/2

Highlighted

Qtotal (cfs)	=	38.00
Qpipe (cfs)	=	38.00
Qovertop (cfs)	=	0.00
Veloc Dn (ft/s)	=	6.42
Veloc Up (ft/s)	=	7.20
HGL Dn (ft)	=	6351.76
HGL Up (ft)	=	6352.15
Hw Elev (ft)	=	6353.11
Hw/D (ft)	=	1.26
Flow Regime	=	Inlet Control



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Friday, Feb 10 2023

61108-O'Steen Ct 10 Bottom Width Transition to 8' Bottom Width Trap Channel-5yr

Trapezoidal

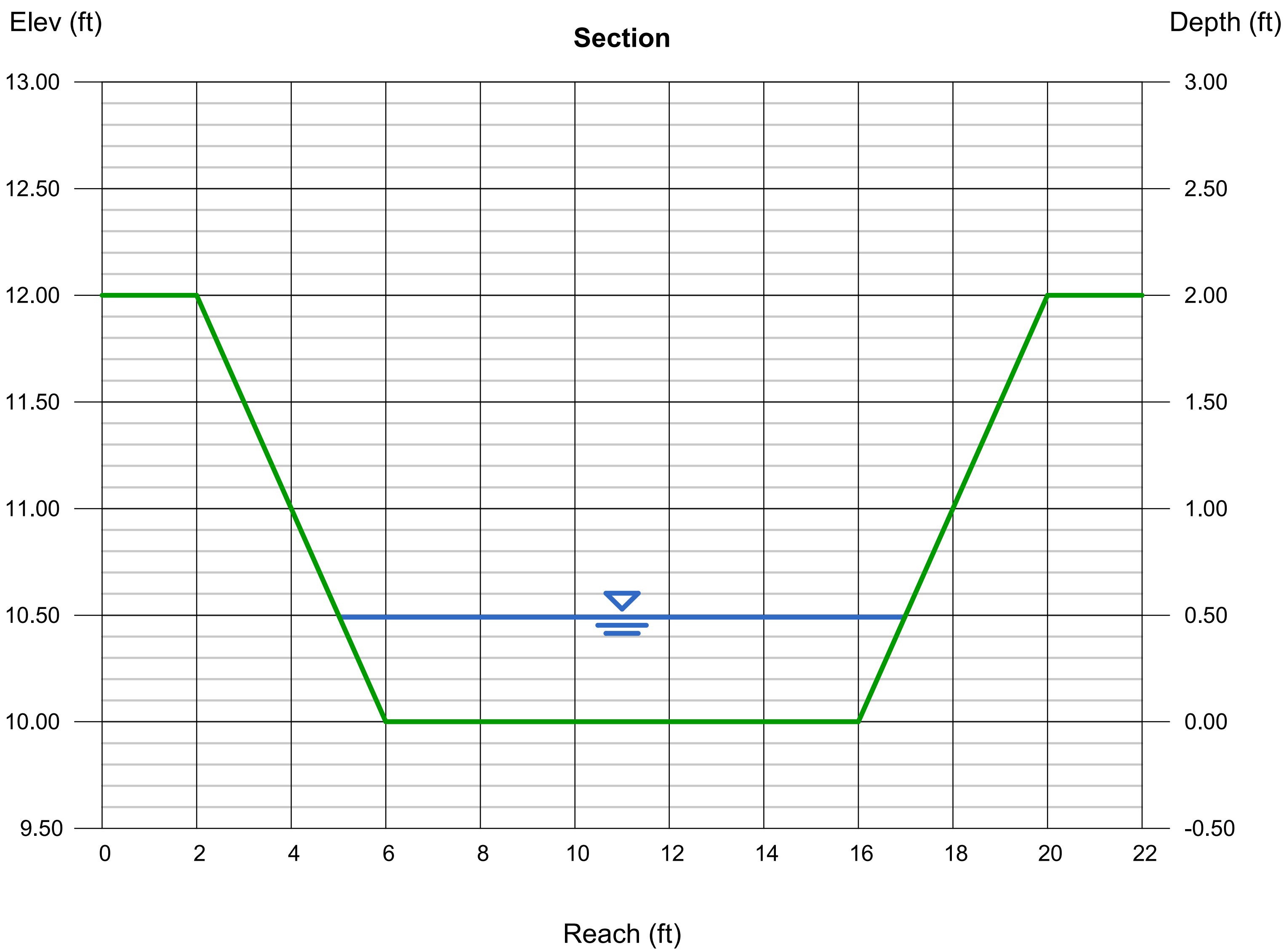
Bottom Width (ft)	= 10.00
Side Slopes (z:1)	= 2.00, 2.00
Total Depth (ft)	= 2.00
Invert Elev (ft)	= 10.00
Slope (%)	= 3.00
N-Value	= 0.050

Calculations

Compute by:	Known Q
Known Q (cfs)	= 15.90

Highlighted

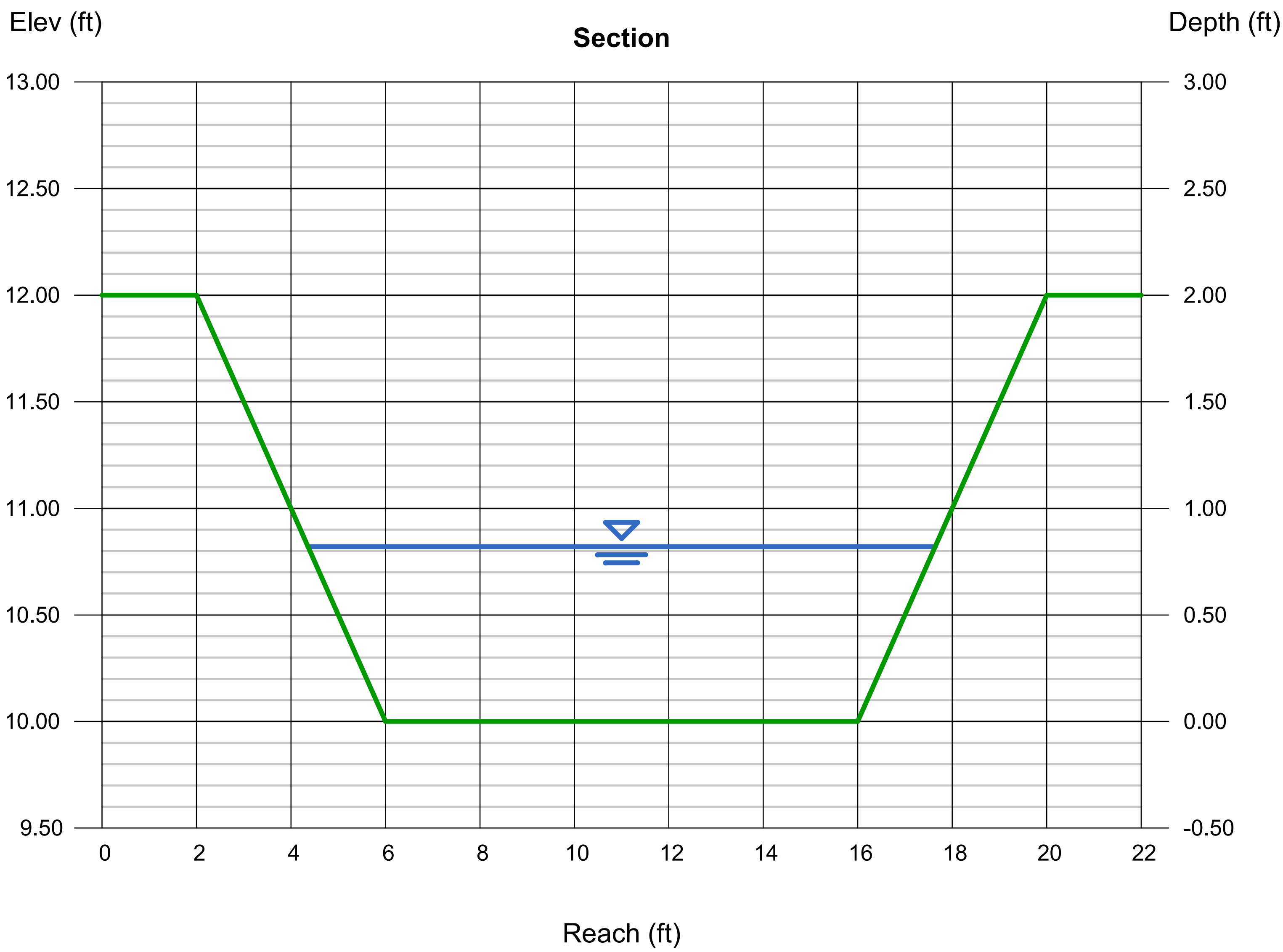
Depth (ft)	= 0.49
Q (cfs)	= 15.90
Area (sqft)	= 5.38
Velocity (ft/s)	= 2.96
Wetted Perim (ft)	= 12.19
Crit Depth, Yc (ft)	= 0.42
Top Width (ft)	= 11.96
EGL (ft)	= 0.63



Channel Report

61108-O'Steen Ct 10 Bottom Width Transition to 8' Bottom Width Trap Channel-100yr

Trapezoidal		**Highlighted**	
Bottom Width (ft)	= 10.00	Depth (ft)	= 0.82
Side Slopes (z:1)	= 2.00, 2.00	Q (cfs)	= 38.00
Total Depth (ft)	= 2.00	Area (sqft)	= 9.54
Invert Elev (ft)	= 10.00	Velocity (ft/s)	= 3.98
Slope (%)	= 3.00	Wetted Perim (ft)	= 13.67
N-Value	= 0.050	Crit Depth, Yc (ft)	= 0.73
		Top Width (ft)	= 13.28
Calculations		EGL (ft)	= 1.07
Compute by:	Known Q		
Known Q (cfs)	= 38.00		



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Friday, Feb 10 2023

61108-O'Steen Ct Trap Channel- 5 yr

Trapezoidal

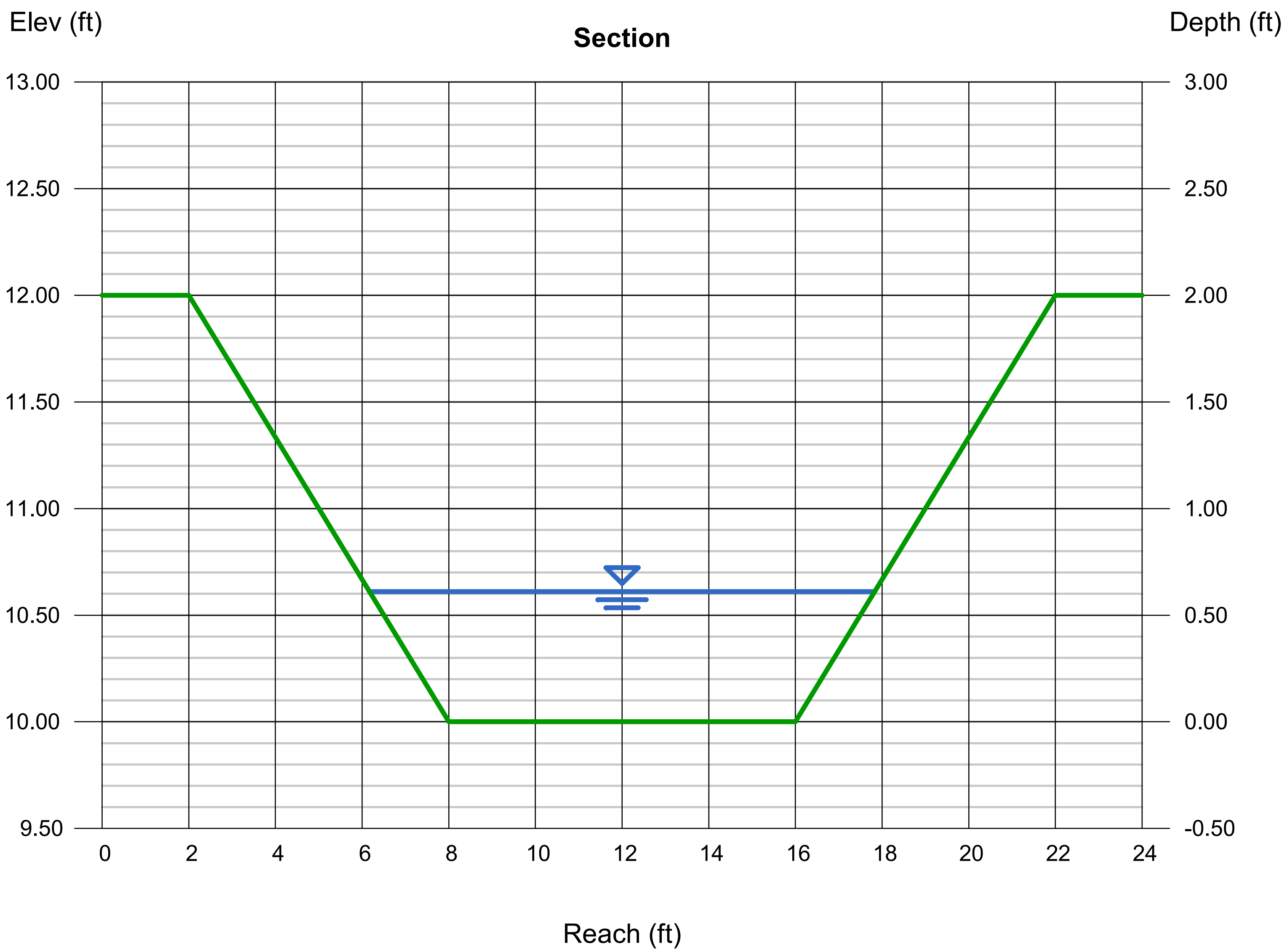
Bottom Width (ft)	= 8.00
Side Slopes (z:1)	= 3.00, 3.00
Total Depth (ft)	= 2.00
Invert Elev (ft)	= 10.00
Slope (%)	= 1.00
N-Value	= 0.035

Calculations

Compute by:	Known Q
Known Q (cfs)	= 15.90

Highlighted

Depth (ft)	= 0.61
Q (cfs)	= 15.90
Area (sqft)	= 6.00
Velocity (ft/s)	= 2.65
Wetted Perim (ft)	= 11.86
Crit Depth, Yc (ft)	= 0.47
Top Width (ft)	= 11.66
EGL (ft)	= 0.72

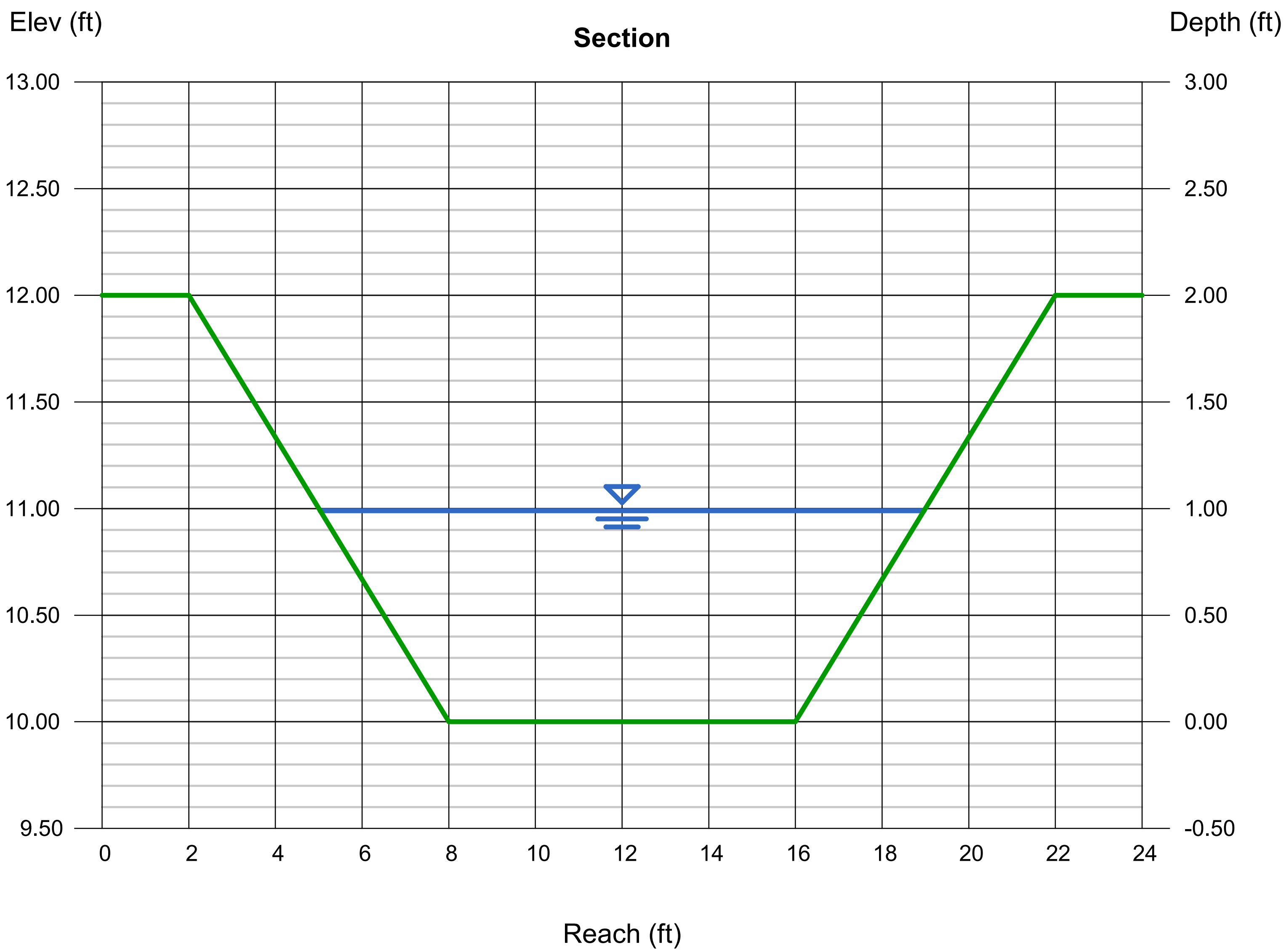


Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Friday, Feb 10 2023

61108-O'Steen Ct Trap Channel-100yr

Trapezoidal		**Highlighted**	
Bottom Width (ft)	= 8.00	Depth (ft)	= 0.99
Side Slopes (z:1)	= 3.00, 3.00	Q (cfs)	= 38.00
Total Depth (ft)	= 2.00	Area (sqft)	= 10.86
Invert Elev (ft)	= 10.00	Velocity (ft/s)	= 3.50
Slope (%)	= 1.00	Wetted Perim (ft)	= 14.26
N-Value	= 0.035	Crit Depth, Yc (ft)	= 0.80
		Top Width (ft)	= 13.94
Calculations		EGL (ft)	= 1.18
Compute by:	Known Q		
Known Q (cfs)	= 38.00		



HY-8 Culvert Analysis Report

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0.00 cfs

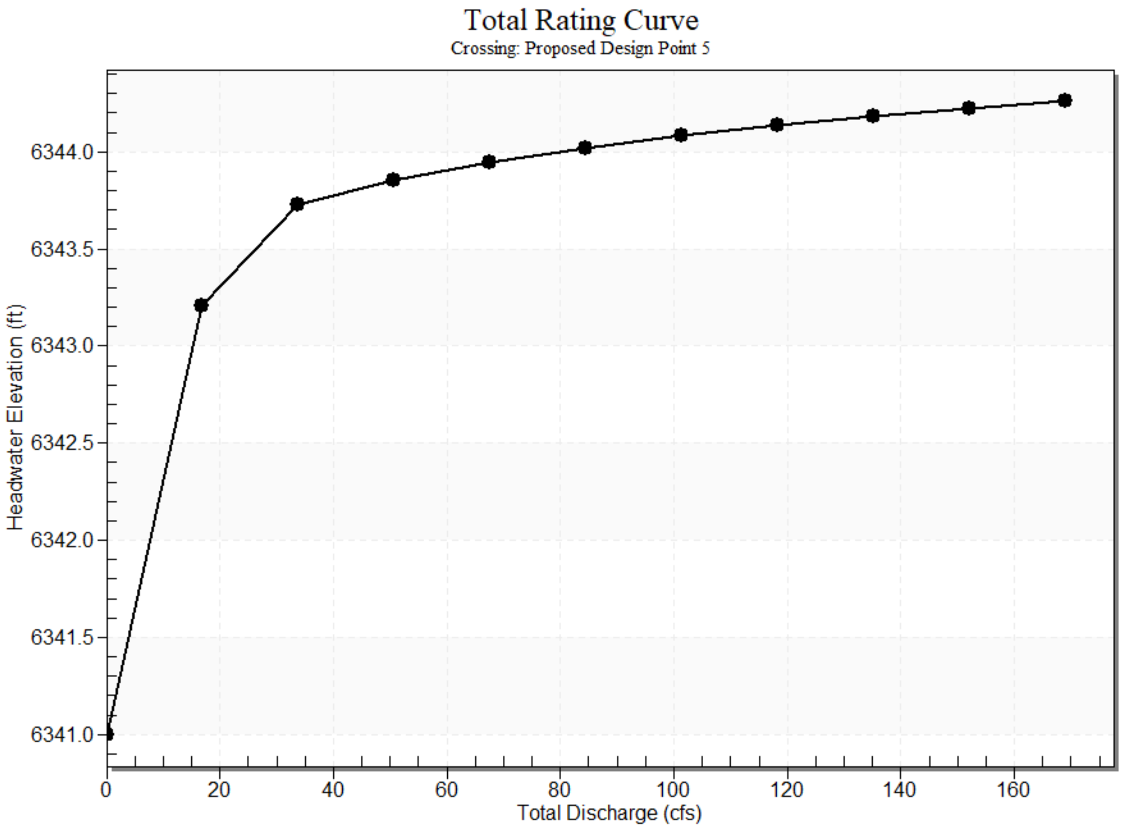
Design Flow: 67.50 cfs

Maximum Flow: 169.00 cfs

Table 1 - Summary of Culvert Flows at Crossing: Proposed Design Point 5

Headwater Elevation (ft)	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
6341.00	0.00	0.00	0.00	1
6343.21	16.90	16.90	0.00	1
6343.73	33.80	22.37	11.24	12
6343.85	50.70	23.59	26.80	7
6343.94	67.50	24.46	42.79	6
6344.02	84.50	25.16	59.05	5
6344.08	101.40	25.73	75.52	5
6344.14	118.30	26.21	91.68	4
6344.19	135.20	26.65	108.20	4
6344.23	152.10	27.00	124.66	3
6344.26	169.00	27.30	141.56	3
6343.66	19.32	19.32	0.00	Overtopping

Rating Curve Plot for Crossing: Proposed Design Point 5



1. Culvert Data: Culvert 1

Table 2 - Culvert Summary Table: Culvert 1

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00 cfs	0.00 cfs	6341.00	0.00	0.000	0-NF	0.00	0.00	0.00	0.00	0.00	0.00
16.90 cfs	16.90 cfs	6343.21	2.21	0.667	6-FFc	0.98	1.39	1.39	1.26	6.03	3.52
33.80 cfs	22.37 cfs	6343.73	2.73	1.277	6-FFt	1.15	1.61	1.64	1.64	6.56	4.19
50.70 cfs	23.59 cfs	6343.85	2.85	1.640	6-FFt	1.19	1.65	1.91	1.91	5.86	4.64
67.50 cfs	24.46 cfs	6343.94	2.94	1.926	6-FFt	1.21	1.68	2.13	2.13	5.50	4.98
84.5	25.1	6344	3.02	2.17	6-	1.23	1.71	2.31	2.31	5.31	5.27

0 cfs	6 cfs	.02		1	FFt						
101.40 cfs	25.73 cfs	6344.08	3.08	2.383	6-FFt	1.25	1.73	2.50	2.48	5.24	5.51
118.30 cfs	26.21 cfs	6344.14	3.14	2.572	4-FFf	1.26	1.75	1.26	2.62	10.56	5.73
135.20 cfs	26.65 cfs	6344.19	3.19	2.745	4-FFf	1.27	1.76	1.27	2.76	10.61	5.92
152.10 cfs	27.00 cfs	6344.23	3.23	2.901	4-FFf	1.28	1.77	1.28	2.88	10.64	6.10
169.00 cfs	27.30 cfs	6344.26	3.26	3.044	4-FFf	1.29	1.78	1.29	3.00	10.67	6.26

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

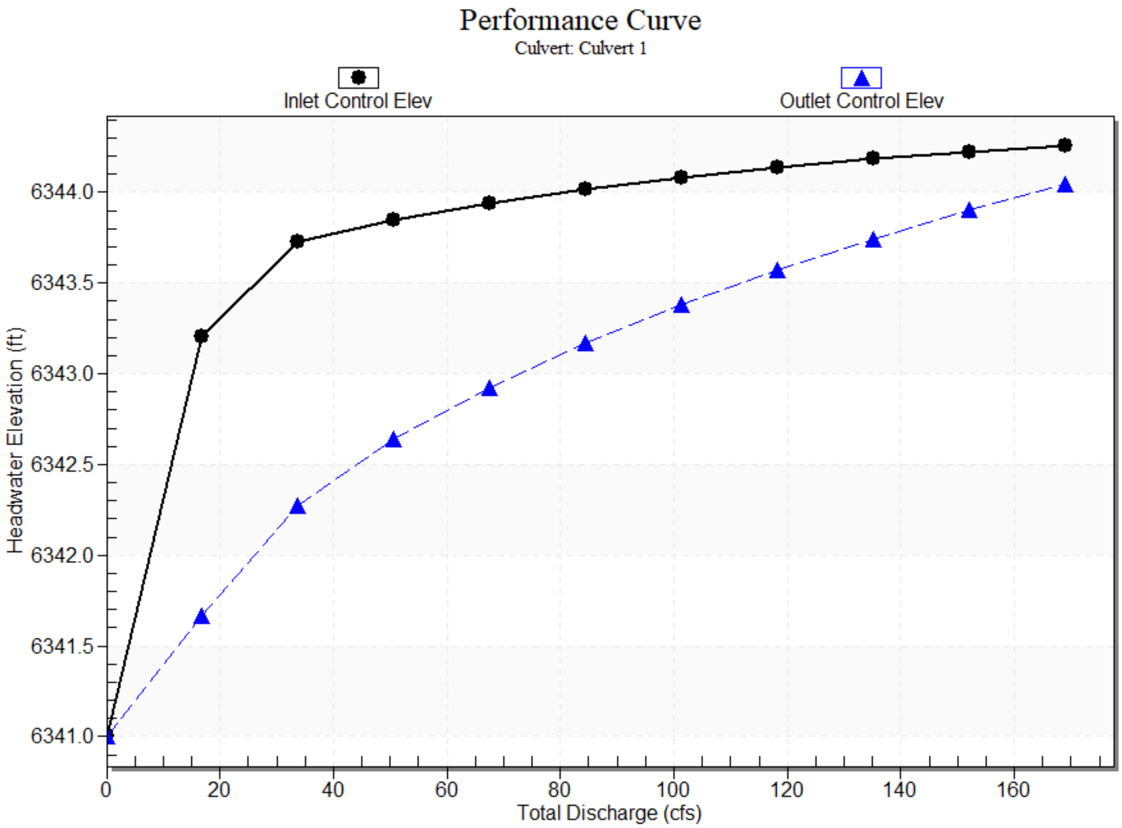
Inlet Elevation (invert): 6341.00 ft,

Outlet Elevation (invert): 6339.80 ft

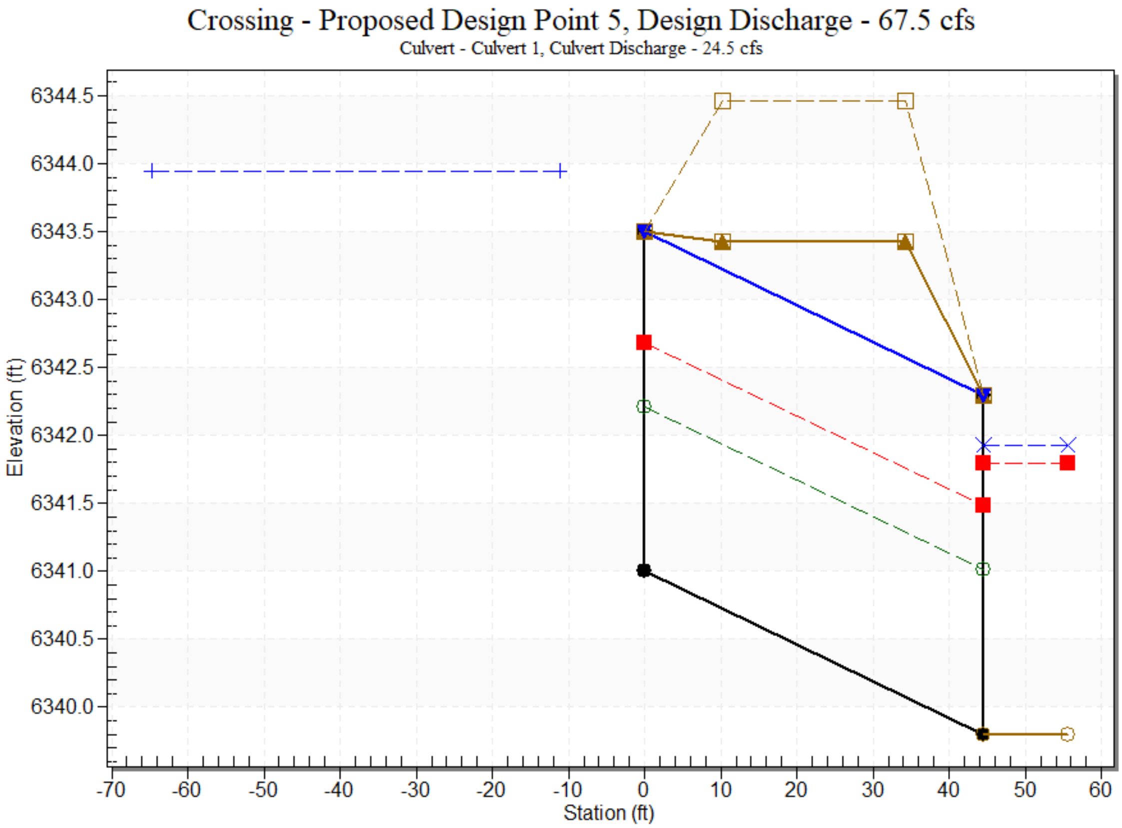
Culvert Length: 44.46 ft,

Culvert Slope: 0.0270

Culvert Performance Curve Plot: Culvert 1



Water Surface Profile Plot for Culvert: Culvert 1



Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 6341.00 ft

Outlet Station: 44.44 ft

Outlet Elevation: 6339.80 ft

Number of Barrels: 1

Culvert Data Summary - Culvert 1

Barrel Shape: Circular

Barrel Diameter: 2.50 ft

Barrel Material: Corrugated Steel

Embedment: 0.00 in

Barrel Manning's n: 0.0170

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting (Ke=0.9)

Inlet Depression: None

Tailwater Data for Crossing: Proposed Design Point 5

Table 3 - Downstream Channel Rating Curve (Crossing: Proposed Design Point 5)

Flow (cfs)	Water Surface Elev (ft)	Velocity (ft/s)	Depth (ft)	Shear (psf)	Froude Number
0.00	6339.80	0.00	0.00	0.00	0.00
16.90	6341.06	1.26	3.52	0.79	0.78
33.80	6341.44	1.64	4.19	1.02	0.82
50.70	6341.71	1.91	4.64	1.19	0.84
67.50	6341.92	2.13	4.98	1.33	0.85
84.50	6342.11	2.31	5.27	1.44	0.86
101.40	6342.27	2.48	5.51	1.54	0.87
118.30	6342.42	2.62	5.73	1.64	0.88
135.20	6342.56	2.76	5.92	1.72	0.89
152.10	6342.68	2.88	6.10	1.80	0.90
169.00	6342.80	3.00	6.26	1.87	0.90

Tailwater Channel Data - Proposed Design Point 5

Tailwater Channel Option: Triangular Channel

Side Slope (H:V): 3.00 (_:1)

Channel Slope: 0.0100

Channel Manning's n: 0.0300

Channel Invert Elevation: 6339.80 ft

Roadway Data for Crossing: Proposed Design Point 5

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section

Coord No.	Station (ft)	Elevation (ft)
0	0.00	6343.43
1	48.23	6343.66
2	97.79	6344.01
3	143.59	6344.29
4	192.15	6344.46
5	239.77	6344.32
6	283.26	6344.20
7	327.91	6344.17
8	376.63	6344.19

Roadway Surface: Paved

Roadway Top Width: 24.00 ft

HY-8 Culvert Analysis Report

Crossing Discharge Data

Discharge Selection Method: Specify Minimum, Design, and Maximum Flow

Minimum Flow: 0.00 cfs

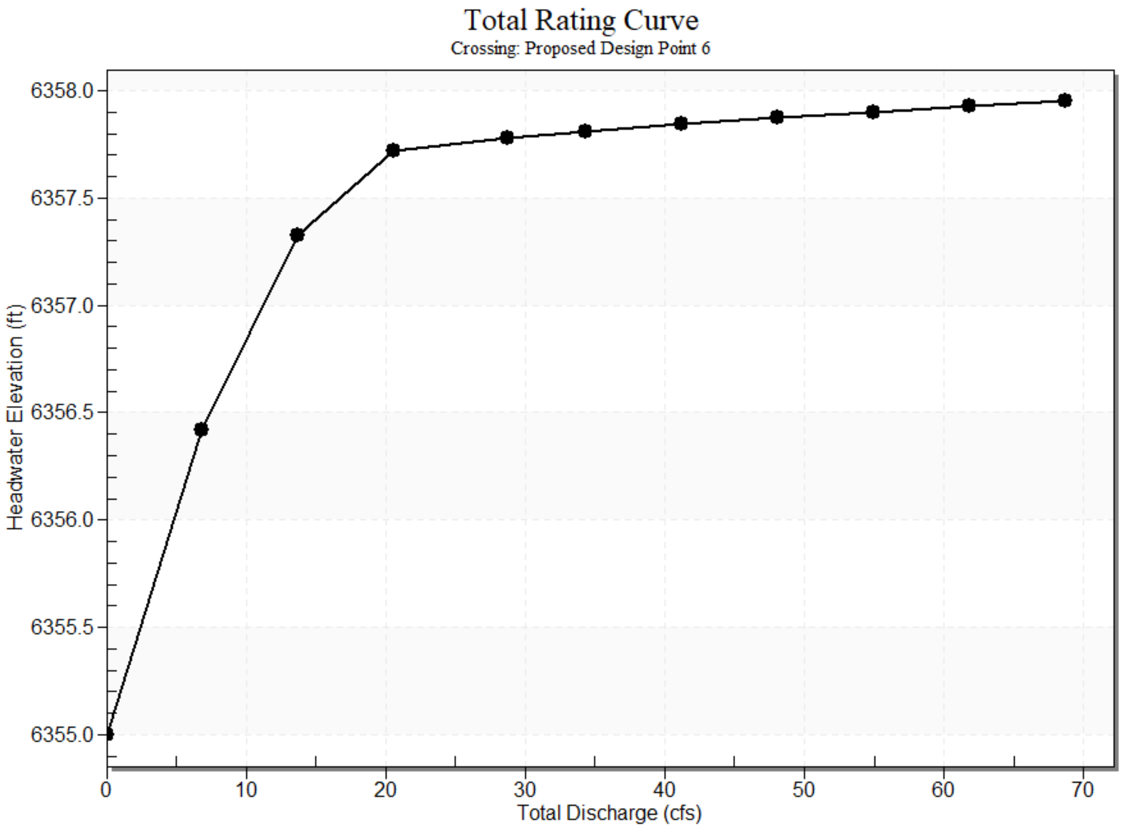
Design Flow: 28.70 cfs

Maximum Flow: 68.70 cfs

Table 1 - Summary of Culvert Flows at Crossing: Proposed Design Point 6

Headwater Elevation (ft)	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
6355.00	0.00	0.00	0.00	1
6356.42	6.87	6.87	0.00	1
6357.32	13.74	13.74	0.00	1
6357.72	20.61	16.25	4.22	16
6357.78	28.70	16.59	11.92	5
6357.81	34.35	16.72	17.44	4
6357.85	41.22	16.83	24.28	4
6357.87	48.09	16.92	30.89	3
6357.90	54.96	17.01	37.76	3
6357.93	61.83	16.98	44.74	3
6357.95	68.70	16.84	51.79	3
6357.62	15.64	15.64	0.00	Overtopping

Rating Curve Plot for Crossing: Proposed Design Point 6



1. Culvert Data: Culvert 1

Table 2 - Culvert Summary Table: Culvert 1

Total Discharge (cfs)	Culvert Discharge (cfs)	Headwater Elevation (ft)	Inlet Control Depth (ft)	Outlet Control Depth (ft)	Flow Type	Normal Depth (ft)	Critical Depth (ft)	Outlet Depth (ft)	Tailwater Depth (ft)	Outlet Velocity (ft/s)	Tailwater Velocity (ft/s)
0.00 cfs	0.00 cfs	6355.00	0.00	0.000	0-NF	0.00	0.00	0.00	0.00	0.00	0.00
6.87 cfs	6.87 cfs	6356.42	1.42	0.391	6-FFc	1.01	0.93	0.93	0.67	4.80	5.14
13.74 cfs	13.74 cfs	6357.32	2.32	1.938	6-FFc	1.68	1.33	1.33	0.87	6.17	6.12
20.61 cfs	16.25 cfs	6357.72	2.72	2.664	6-FFc	2.00	1.45	1.45	1.01	6.65	6.77
28.70 cfs	16.59 cfs	6357.78	2.78	2.770	6-FFc	2.00	1.47	1.47	1.14	6.71	7.35
34.3	16.7	6357	2.80	2.81	6-	2.00	1.47	1.47	1.22	6.74	7.69

5 cfs	2 cfs	.81		1	FFc						
41.2	16.8	6357	2.82	2.84	6-	2.00	1.48	1.48	1.31	6.76	8.05
2 cfs	3 cfs	.85		5	FFc						
48.0	16.9	6357	2.84	2.87	6-	2.00	1.48	1.48	1.38	6.78	8.37
9 cfs	2 cfs	.87		5	FFc						
54.9	17.0	6357	2.85	2.90	6-	2.00	1.49	1.49	1.46	6.79	8.65
6 cfs	1 cfs	.90		3	FFc						
61.8	16.9	6357	2.85	2.92	6-	2.00	1.49	1.52	1.52	6.62	8.91
3 cfs	8 cfs	.93		8	FFt						
68.7	16.8	6357	2.82	2.95	6-	2.00	1.48	1.58	1.58	6.32	9.15
0 cfs	4 cfs	.95		2	FFt						

Culvert Barrel Data

Culvert Barrel Type Straight Culvert

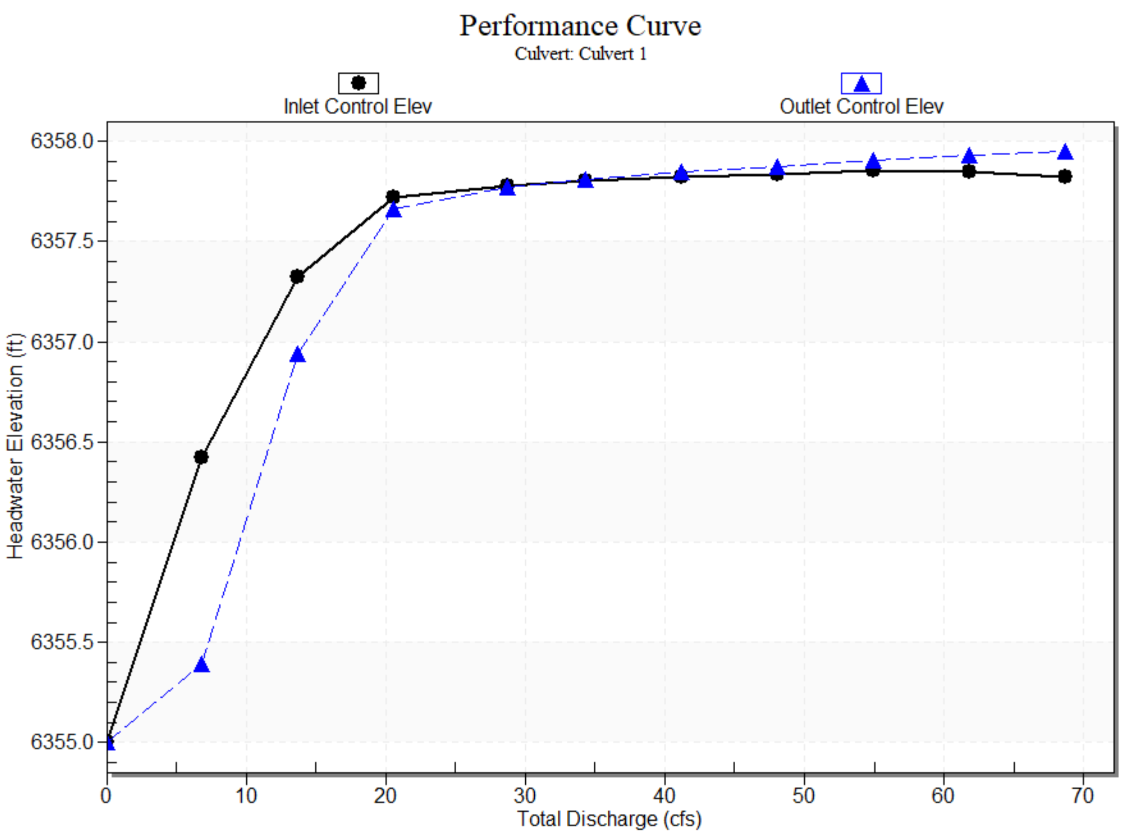
Inlet Elevation (invert): 6355.00 ft,

Outlet Elevation (invert): 6354.08 ft

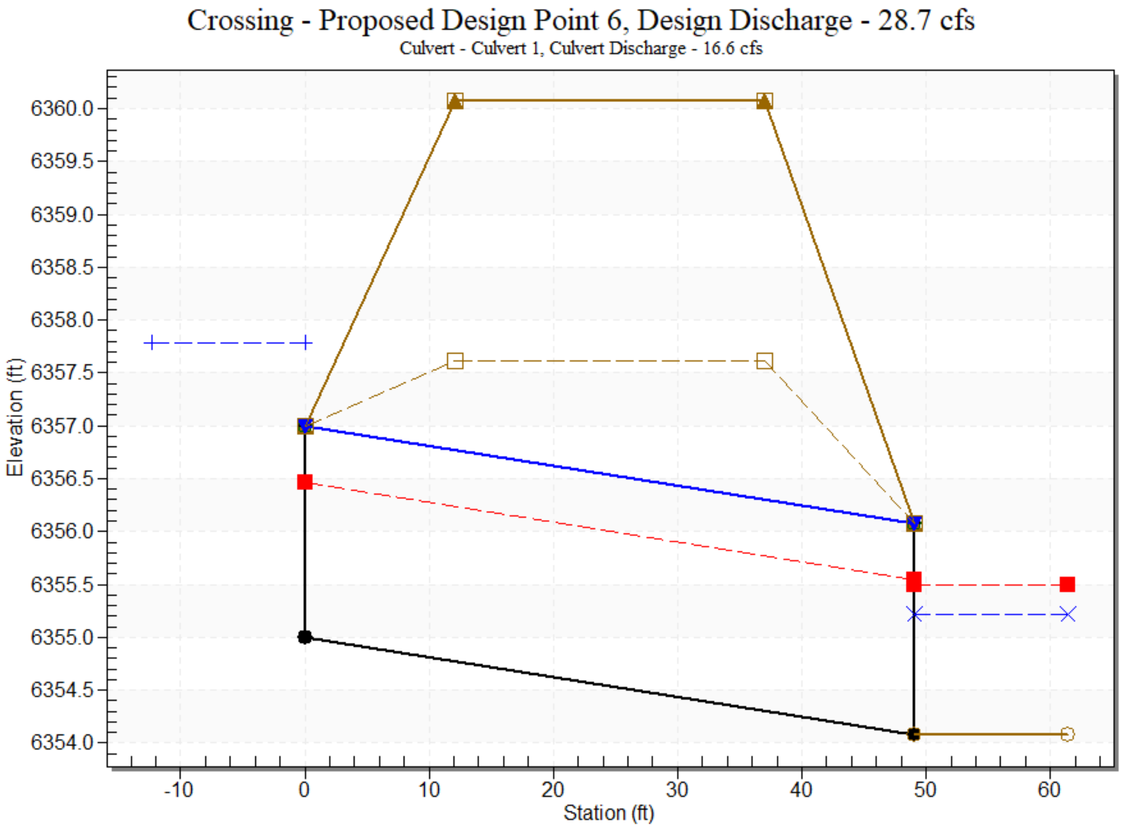
Culvert Length: 49.12 ft,

Culvert Slope: 0.0187

Culvert Performance Curve Plot: Culvert 1



Water Surface Profile Plot for Culvert: Culvert 1



Site Data - Culvert 1

Site Data Option: Culvert Invert Data

Inlet Station: 0.00 ft

Inlet Elevation: 6355.00 ft

Outlet Station: 49.11 ft

Outlet Elevation: 6354.08 ft

Number of Barrels: 1

Culvert Data Summary - Culvert 1

Barrel Shape: Circular

Barrel Diameter: 2.00 ft

Barrel Material: Corrugated Steel

Embedment: 0.00 in

Barrel Manning's n: 0.0300

Culvert Type: Straight

Inlet Configuration: Thin Edge Projecting

Inlet Depression: None

Tailwater Data for Crossing: Proposed Design Point 6

Table 3 - Downstream Channel Rating Curve (Crossing: Proposed Design Point 6)

Flow (cfs)	Water Surface Elev (ft)	Velocity (ft/s)	Depth (ft)	Shear (psf)	Froude Number
0.00	6354.08	0.00	0.00	0.00	0.00
6.87	6354.75	0.67	5.14	2.08	1.57
13.74	6354.95	0.87	6.12	2.70	1.64
20.61	6355.09	1.01	6.77	3.14	1.68
28.70	6355.22	1.14	7.35	3.56	1.72
34.35	6355.30	1.22	7.69	3.81	1.74
41.22	6355.39	1.31	8.05	4.08	1.76
48.09	6355.46	1.38	8.37	4.32	1.77
54.96	6355.54	1.46	8.65	4.54	1.79
61.83	6355.60	1.52	8.91	4.75	1.80
68.70	6355.66	1.58	9.15	4.94	1.81

Tailwater Channel Data - Proposed Design Point 6

Tailwater Channel Option: Triangular Channel

Side Slope (H:V): 3.00 (_:1)

Channel Slope: 0.0500

Channel Manning's n: 0.0300

Channel Invert Elevation: 6354.08 ft

Roadway Data for Crossing: Proposed Design Point 6

Roadway Profile Shape: Irregular Roadway Shape (coordinates)

Irregular Roadway Cross-Section

Coord No.	Station (ft)	Elevation (ft)
0	0.00	6360.07
1	38.46	6359.43
2	82.27	6358.89
3	129.27	6358.56
4	177.03	6358.26
5	222.27	6357.98
6	272.14	6357.71
7	323.36	6357.66
8	371.08	6357.62

Roadway Surface: Paved

Roadway Top Width: 25.00 ft

Design Procedure Form: Runoff Reduction

UD-BMP (Version 3.07, March 2018)

Designer: JO
Company: M.V.E., Inc.
Date: December 23, 2022
Project: THE LANDINGS OF DENMARK FILING NO 2
Location:

SITE INFORMATION (User Input in Blue Cells)

WQCV Rainfall Depth: 0.60 inches

Depth of Average Runoff Producing Storm, d_6 = 0.43 inches (for Watersheds Outside of the Denver Region, Figure 3-1 in USDCM Vol. 3)

Area Type	UIA:RPA	UIA:RPA
Area ID	BYRD CT	O'STEEN CT
Downstream Design Point ID	1	3
Downstream BMP Type	None	None
DCIA (ft^2)	--	--
UIA (ft^2)	27,114	40,933
RPA (ft^2)	20,370	36,460
SPA (ft^2)	--	--
HSG A (%)	100%	100%
HSG B (%)	0%	0%
HSG C/D (%)	0%	0%
Average Slope of RPA (ft/ft)	0.250	0.250
UIA:RPA Interface Width (ft)	100.00	100.00

CALCULATED RUNOFF RESULTS

Area ID	BYRD CT	O'STEEN CT
UIA:RPA Area (ft^2)	47,484	77,393
L / W Ratio	4.75	7.74
UIA / Area	0.5710	0.5289
Runoff (in)	0.00	0.00
Runoff (ft^3)	0	0
Runoff Reduction (ft^3)	1130	1706

CALCULATED WQCV RESULTS

Area ID	BYRD CT	O'STEEN CT
WQCV (ft^3)	1130	1706
WQCV Reduction (ft^3)	1130	1706
WQCV Reduction (%)	100%	100%
Untreated WQCV (ft^3)	0	0

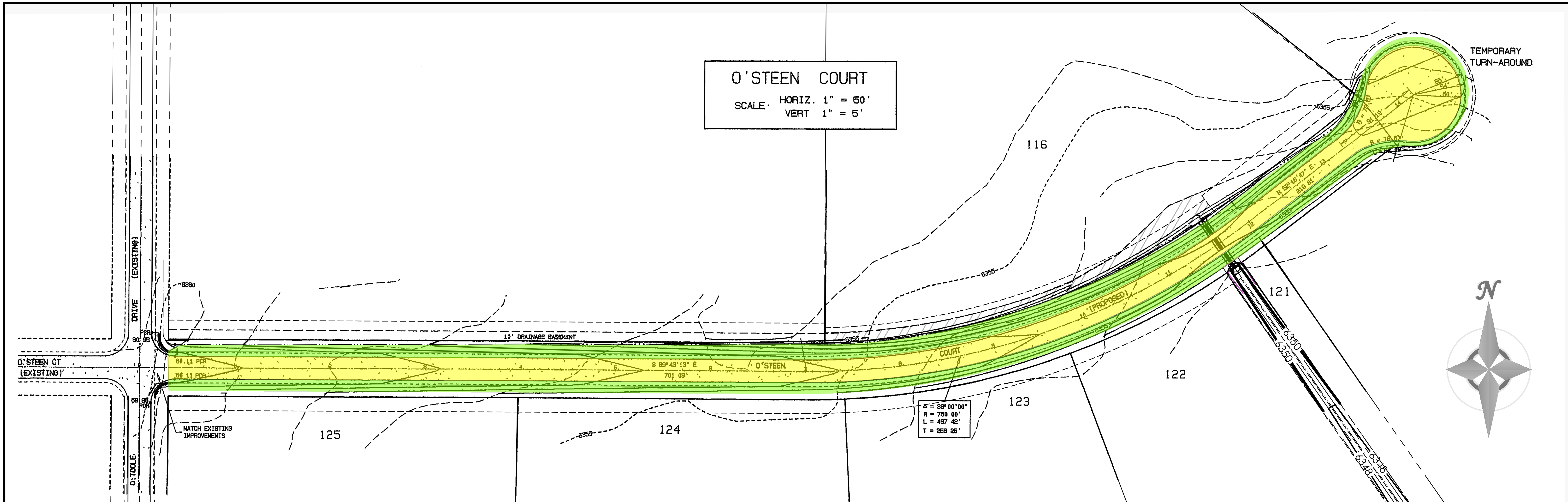
CALCULATED DESIGN POINT RESULTS (sums results from all columns with the same Downstream Design Point ID)

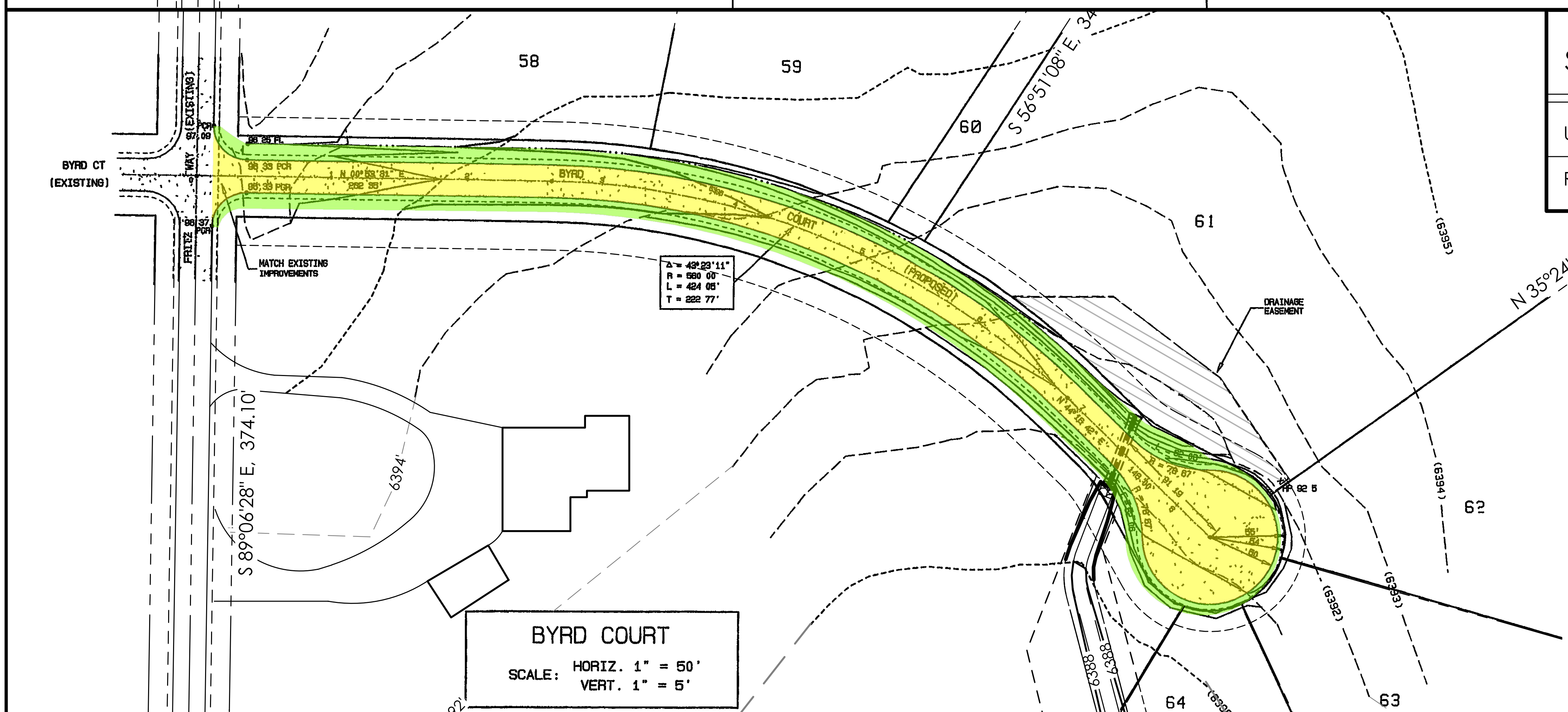
Downstream Design Point ID	1	3
DCIA (ft^2)	0	0
UIA (ft^2)	27,114	40,933
RPA (ft^2)	20,370	36,460
SPA (ft^2)	0	0
Total Area (ft^2)	47,484	77,393
Total Impervious Area (ft^2)	27,114	40,933
WQCV (ft^3)	1,130	1,706
WQCV Reduction (ft^3)	1,130	1,706
WQCV Reduction (%)	100%	100%
Untreated WQCV (ft^3)	0	0

CALCULATED SITE RESULTS (sums results from all columns in worksheet)

Total Area (ft^2)	124,877
Total Impervious Area (ft^2)	68,047
WQCV (ft^3)	2,835
WQCV Reduction (ft^3)	2,835
WQCV Reduction (%)	100%
Untreated WQCV (ft^3)	0

Okay - Meets 60% WQCV Requirement for Runoff Reduction





SURFACE TYPES

UNCONNECTED IMPERVIOUS AREA (UIA)	
RECEIVING PERVIOUS AREA (RPA)	

N

10 0 50 100 200

1" = 100' 1:1,200

TITLE:
BMP AREA

DRAWING NO.
BMP_MAP

MVE PROJ. NO.
61108

DRAWN:	JO
ENGINEER:	DRG
CHECKED:	12/29/22

UPDATED BY

MONUMENT VALLEY ENGINEERS INC.

MVE

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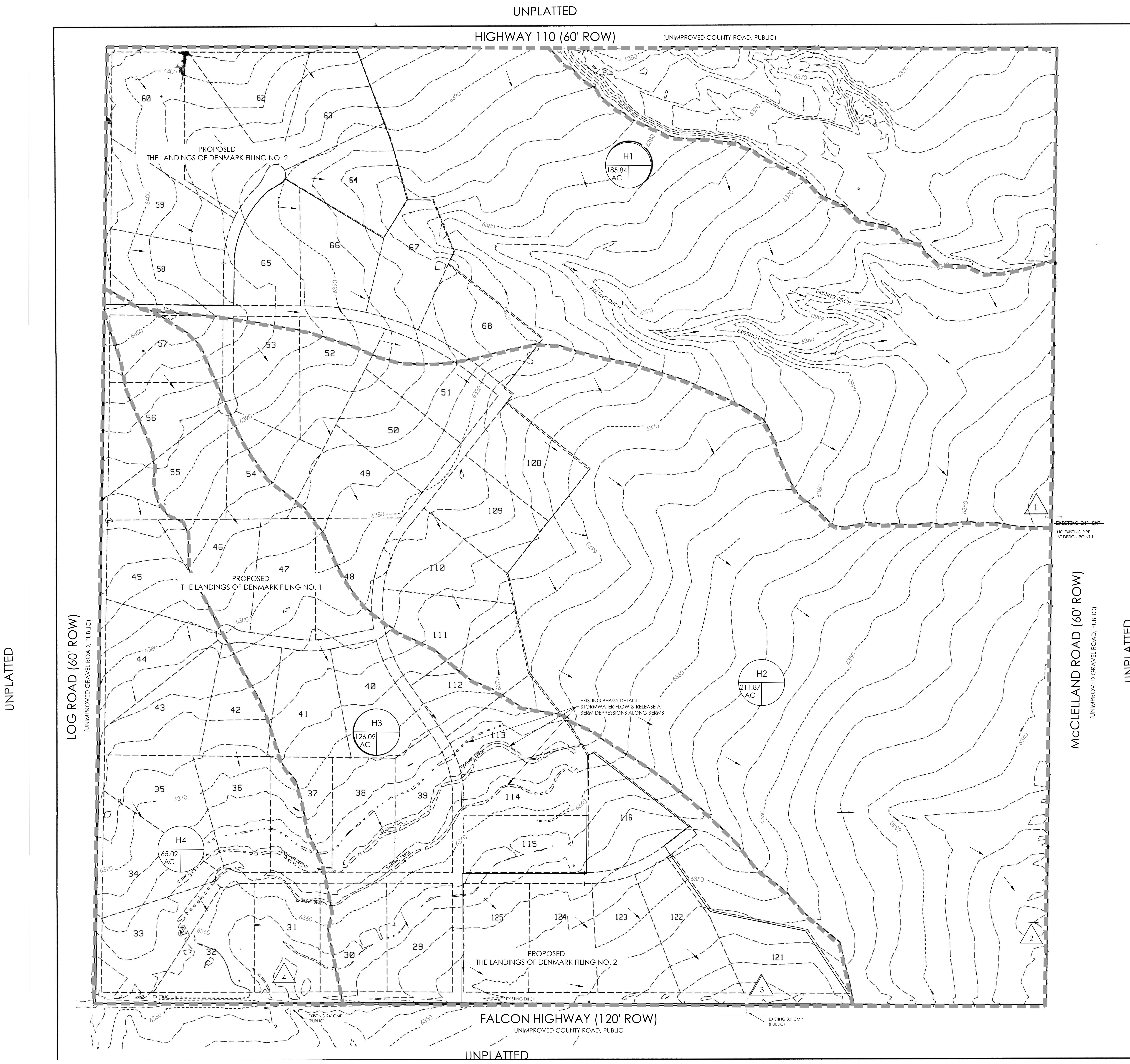
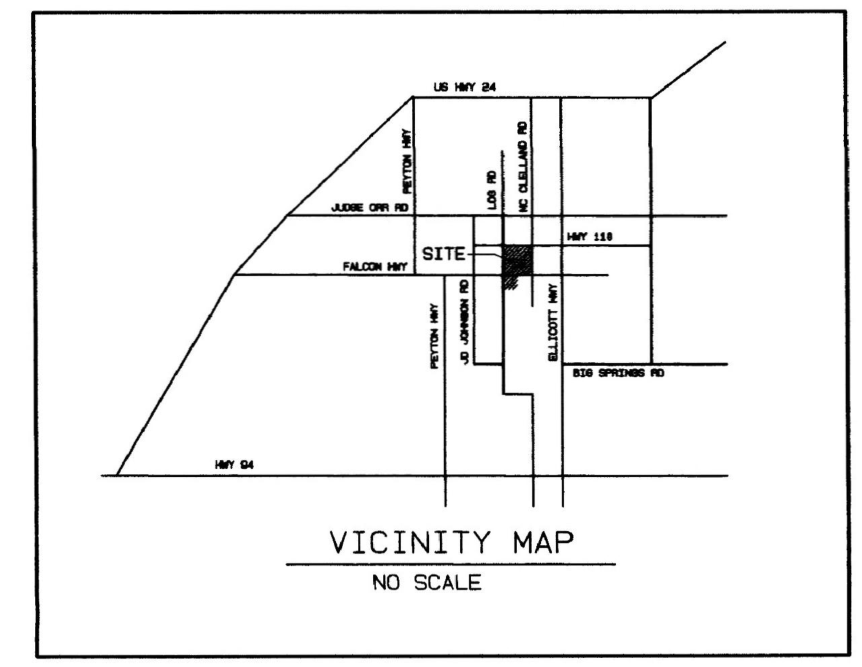
PREPARATION DATE: 12/29/22





Peak Flow Rate Summary Table

Existing Conditions

Sub-basin	Design Point	Peak Flow Rate (CFS) 5 Year	100 Year
H1	1 (185.84 AC)	69.0	168.7
H2	2 (211.87 AC)	79.6	194.7
H3	3 (126.09 AC)	53.3	130.4
H4	4 (65.09 AC)	25.7	63.0

NOTES:
1. ALL ROADS WITHIN THE LANDINGS AT DENMARK FILINGS NO. 1 & NO. 2 WILL BE WITHIN 60' RIGHT OF WAY (PUBLIC) & CLASSIFIED AS RURAL LOCAL.
2. SEE "THE LANDINGS AT DENMARK FILINGS NO. 1 & 2" PLATS UNDER EASEMENTS FOR DESCRIPTION OF UTILITY, DRAINAGE, AND TRAIL EASEMENTS.

LEGEND

EXISTING BASIN BOUNDARY
DIRECTION OF FLOW
(7290) EXISTING CONTOUR
DESIGN POINT
EXISTING CMP CULVERT
SUB-BASIN DESIGNATION
H1
185.84 ac
AREA IN ACRES

N

SCALE 1"= 200'

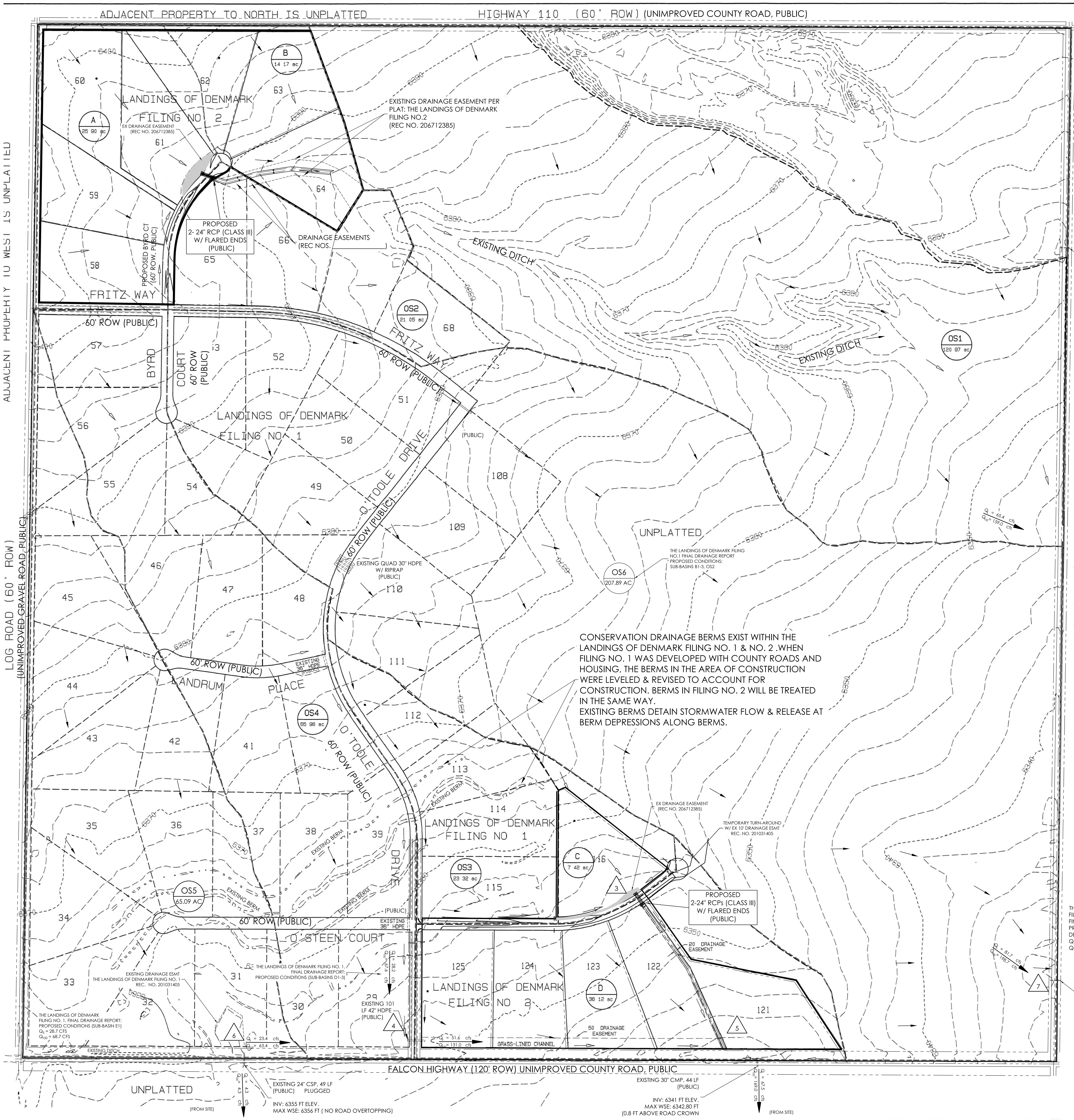
THE LANDINGS OF
DENMARK
SUBDIVISION
FILING NO. 2

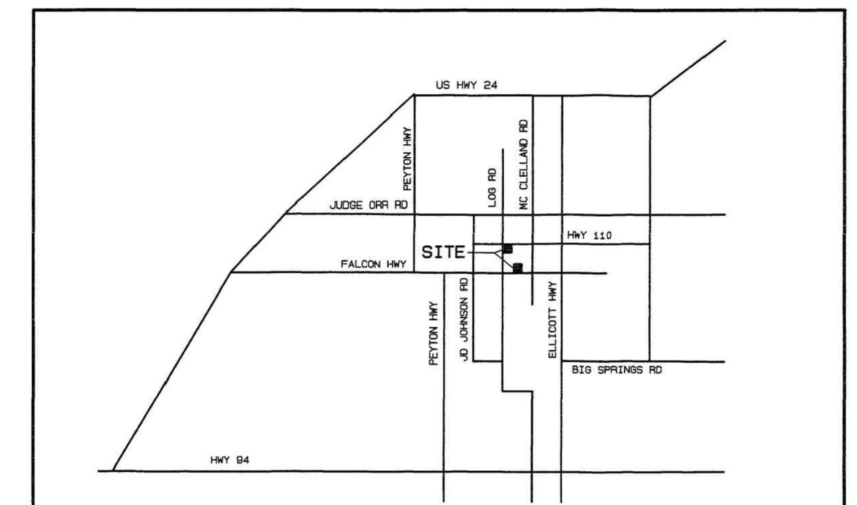
FINAL DRAINAGE PLAN
HISTORIC CONDITIONS

THE LANDINGS OF DENMARK
FILING NO. 2
FINAL DRAINAGE BASIN MA
HISTORIC CONDITIONS

PRINT DATE: 12/29/22

TITLE: DRAINAGE REPORT HIST. DRAINAGE	UPDATED BY MONUMENT VALLEY ENGINEERS INC.	PREMIER ENGINEERING, INC
DRAWING NO. EXDRAIN	ENGINEERS * SURVEYORS 1903 LELARAY STREET, SUITE 200 COLORADO SPRINGS, CO 80909 Phone (719) 635-5736 Fax (719) 635-5450 E-mail mve@mvecivil.com	Professional Civil Engineers 2110 Vickers Drive Colorado Springs, CO 80918 (719) 598 6951 PremierEng@aol com
MVE PROJ. NO. 61108		
DRAWN: JO		
ENGINEER: DRG		
CHECKED: 12/29/22	PREPARATION DATE: 12/29/22	





VICINITY MAP
NO SCALE

NOTE:
1. ALL ROADS WITHIN THE LANDINGS OF DENMARK FILINGS NO. 1 & NO. 2 WILL BE WITHIN 60' RIGHT OF WAY (PUBLIC) & CLASS RURAL LOCAL.

PEAK FLOW RATE SUMMARY TABLE
PROPOSED CONDITIONS

SUB-BASIN	DESIGN POINT	PEAK FLOW RATE (CFS) 5 YEAR	100 YEAR
A	1	15.3	36.6
B		8.7	20.8
C		4.6	11.6
D		19.8	47.5
OS4		28.2	67.6
A,B,OS1-2	2	65.4	159.0
C, OS3	3	15.9	38.0
OS4, OS5	4	51.6	131.0
OS5, OS4, OS3, C, D	5	67.5	169.0
OS5	6	28.7	68.7
OS6	7	81.7	198.7

LEGEND

- EXISTING BASIN BOUNDARY
- PROPOSED BASIN BOUNDARY
- PROPOSED DRAINAGE EASEMENT
- DIRECTION OF FLOW
- (7290) EXISTING CONTOUR
- DESIGN POINT
- PROPOSED RCP CULVERT
- EXISTING CULVERT
- SUBDIVISION BOUNDARY & LOT LINE FILING NO. 1
- SUBDIVISION BOUNDARY FILING NO. 2
- LOT LINE FILING NO. 2
- EXISTING EASEMENT LINE

SUB-BASIN DESIGNATION
E1 25.89 ac
AREA IN ACRES

THE LANDINGS OF
DENMARK
SUBDIVISION
FILING NO. 2
FINAL DRAINAGE PLAN
PROPOSED CONDITIONS
SCALE: 1" = 200 FEET

1" = 200' 1:2,400

THE LANDINGS OF DENMARK
FILING NO. 2
FINAL DRAINAGE BASIN MA
PROPOSED CONDITIONS

PRINT DATE: 12/29/22

TITLE: DRAINAGE REPORT PROP. DRAINAGE
DRAWING NO. PPDRAIN
MVE PROJ. NO. 61108
DRAWN: JO
ENGINEER: DRG
CHECKED: 12/29/22

UPDATED BY
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PREPARATION DATE: 12/29/22

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