CONSULTING GROUP
Civil Engineering * Land Surveying * Construction Services

April 28th, 2025

City of Loveland
Attn: Public Works Department
500 E 3rd St
Loveland, CO 80537

DRAINAGE CONFORMANCE LETTER
CENTERRA SOUTH THIRD SUBDIVISION

CWC Consulting Group is submitting this drainage conformance letter on behalf of our client, McWhinney, to present the findings in drainage analysis for this project compares to how it was originally analyzed with the Centerra South First Subdivision (PZ24-00131).

Centerra South Third Subdivision (hereby referred to as Site) is multiple commercial building pads (5 lots) being platted within the existing Centerra South First Subdivision. It consists of a large natural grocery store, and several single-story commercial buildings & restaurants accompanied by landscape and lighting elements.

This letter will aim to prove that the area, imperviousness value, and projected flows generated by the Site are at or below those found in the drainage analysis conducted with the Centerra South First Subdivision. The Site is represented by basins A2, B4, B6, B8, B13, B17, and D3 in the Centerra South First Subdivision Drainage Report (PZ24-00131 FDR). Original area, imperviousness, Q_2 and Q_{100} values for these basins are as follows:

Table 1-1

A2	B4	B6	B8
A: 0.85 acres	**A:** 0.21 acres	**A:** 0.19 acres	**A:** 0.38 acres
I: 95%	**I:** 95%	**I:** 95%	**I:** 95%
Q_2: 2.33 cfs	**Q_2:** 0.57 cfs	**Q_2:** 0.51 cfs	**Q_2:** 1.04 cfs
Q_{100}: 6.85 cfs	**Q_{100}:** 1.68 cfs	**Q_{100}:** 1.51 cfs	**Q_{100}:** 3.06 cfs

B11	B15	D2
A: 0.17 acres	**A:** 0.27 acres	**A:** 0.35 acres
I: 95%	**I:** 95%	**I:** 95%
Q_2: 0.46 cfs	**Q_2:** 0.73 cfs	**Q_2:** 0.84 cfs
Q_{100}: 1.34 cfs	**Q_{100}:** 2.15 cfs	**Q_{100}:** 2.48 cfs

Area, impervious, 2-year flow and 100-year flow from existing site, Centerra South First Subdivision (PZ24-00131 FDR)

The basin geometry and hydrology will remain the same going into the Centerra South Third Subdivision, with those values depicted in the table below, noted with an "-A" designation to show progression from the Centerra South First Subdivision.

Table 1-2

A2-A **A:** 0.85 acres **I:** 95% **Q_2:** 2.33 cfs **Q_{100}:** 6.85 cfs	B4-A **A:** 0.21 acres **I:** 95% **Q_2:** 0.57 cfs **Q_{100}:** 1.68 cfs	B6-A **A:** 0.19 acres **I:** 95% **Q_2:** 0.51 cfs **Q_{100}:** 1.51 cfs	B8-A **A:** 0.38 acres **I:** 95% **Q_2:** 1.04 cfs **Q_{100}:** 3.06 cfs

B11-A **A:** 0.17 acres **I:** 95% **Q_2:** 0.46 cfs **Q_{100}:** 1.34 cfs	B15-A **A:** 0.27 acres **I:** 95% **Q_2:** 0.73 cfs **Q_{100}:** 2.15 cfs	D2-A **A:** 0.35 acres **I:** 95% **Q_2:** 0.84 cfs **Q_{100}:** 2.48 cfs

Area, impervious, 2-year flow and 100-year flow from proposed Site, Centerra South Third Subdivision (PZ00-00000)

It can be seen from the Tables above and the material in Appendix B that the drainage values calculated here are being met by the conditions originally set in the Centerra South First Subdivision.

The Site is not featuring any utility construction other than services designated for the building. With this being the case, the Site will utilize the measures set forth in the SOP (PZ24-00131 SOP) and SWMP (PZ24-00131 SWMP) from the Centerra South First Subdivision.

CONSULTING GROUP
Civil Engineering * Land Surveying * Construction Services

April 28th, 2025

1. CONTRIBUTORS:

Contribution	Name, Title	Initials
Letter Prepared By:	Dylan Lektorich, Civil Designer	
Letter Reviewed By:	Bryan Clerico, P.E., Project Manager	

Note: Contributors to initial each prepared report prior to submittal.

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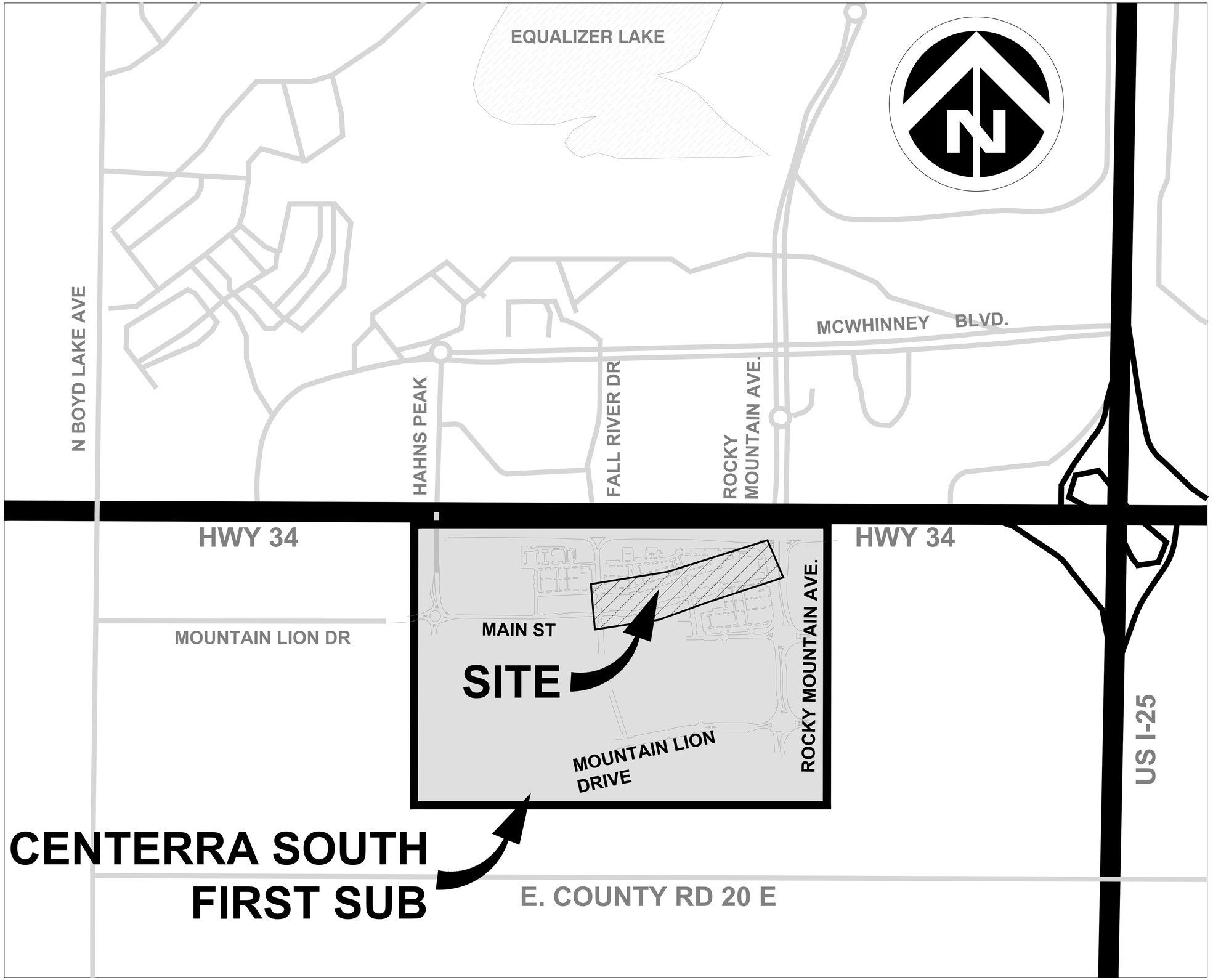
APPENDIX A – SUPPORTING DOCUMENTS

Vicinity Map
USGS Soils Map and Properties
UDFCD Table 6-2
UDFCD Table 6-3



VICINITY MAP

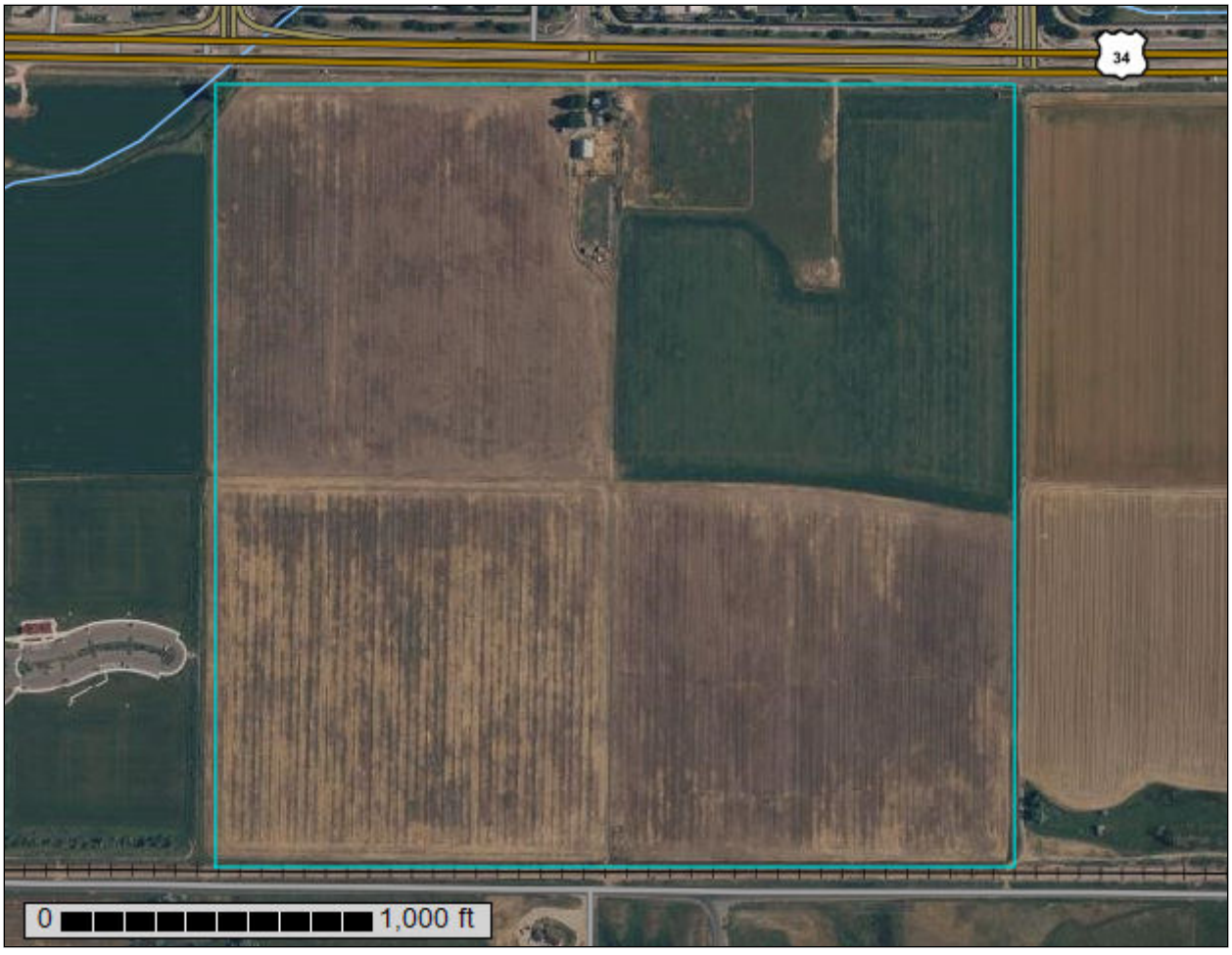
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Larimer County Area, Colorado



November 16, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:6,470 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 300 600 1200 1800

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 Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

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: Larimer County Area, Colorado
Survey Area Data: Version 17, Sep 7, 2022

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

Date(s) aerial images were photographed: Jul 2, 2021—Aug 25, 2021

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.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
73	Nunn clay loam, 0 to 1 percent slopes	133.6	90.0%
74	Nunn clay loam, 1 to 3 percent slopes	14.8	10.0%
Totals for Area of Interest		**148.4**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Larimer County Area, Colorado

73—Nunn clay loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2tlng
Elevation: 4,100 to 5,700 feet
Mean annual precipitation: 14 to 15 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 135 to 152 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Nunn and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nunn

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Pleistocene aged alluvium and/or eolian deposits

Typical profile

Ap - 0 to 6 inches: clay loam
Bt1 - 6 to 10 inches: clay loam
Bt2 - 10 to 26 inches: clay loam
Btk - 26 to 31 inches: clay loam
Bk1 - 31 to 47 inches: loam
Bk2 - 47 to 80 inches: loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 7 percent
Maximum salinity: Nonsaline (0.1 to 1.0 mmhos/cm)
Sodium adsorption ratio, maximum: 0.5
Available water supply, 0 to 60 inches: High (about 9.1 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R067BY042CO - Clayey Plains
Hydric soil rating: No

Minor Components

Heldt

Percent of map unit: 10 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R067BY042CO - Clayey Plains
Hydric soil rating: No

Wages

Percent of map unit: 5 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R067BY002CO - Loamy Plains
Hydric soil rating: No

74—Nunn clay loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2tlpl
Elevation: 3,900 to 5,840 feet
Mean annual precipitation: 13 to 17 inches
Mean annual air temperature: 50 to 54 degrees F
Frost-free period: 135 to 160 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Nunn and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Nunn

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Pleistocene aged alluvium and/or eolian deposits

Typical profile

Ap - 0 to 9 inches: clay loam
Bt - 9 to 13 inches: clay loam
Btk - 13 to 25 inches: clay loam
Bk1 - 25 to 38 inches: clay loam
Bk2 - 38 to 80 inches: clay loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 7 percent
Maximum salinity: Nonsaline to very slightly saline (0.1 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 0.5
Available water supply, 0 to 60 inches: High (about 9.9 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R067BY042CO - Clayey Plains
Hydric soil rating: No

Minor Components

Heldt

Percent of map unit: 10 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R067BY042CO - Clayey Plains
Hydric soil rating: No

Satanta

Percent of map unit: 5 percent
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R067BY002CO - Loamy Plains
Hydric soil rating: No

Soil Information for All Uses

Soil Properties and Qualities

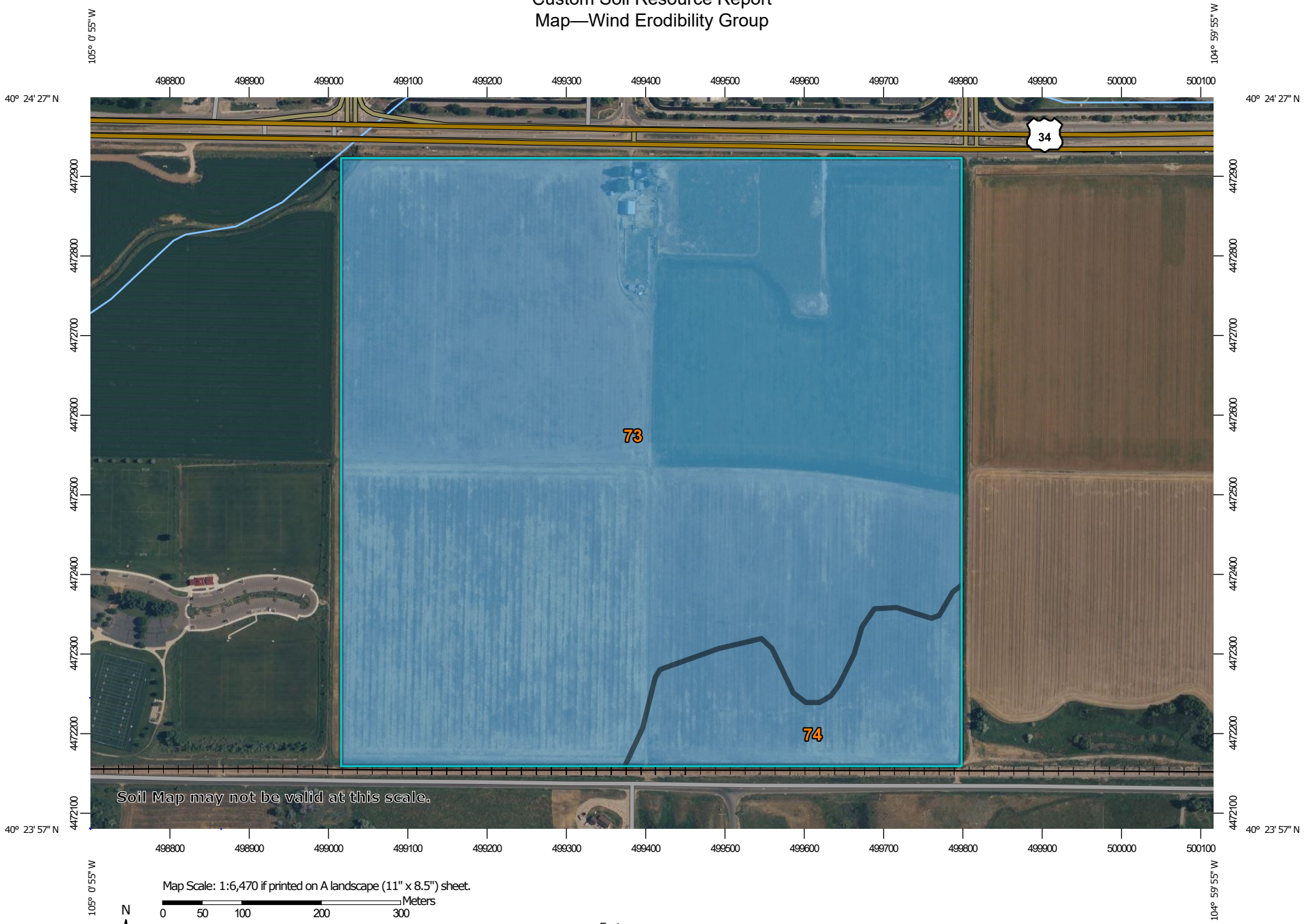
The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Erosion Factors

Soil Erosion Factors are soil properties and interpretations used in evaluating the soil for potential erosion. Example soil erosion factors can include K factor for the whole soil or on a rock free basis, T factor, wind erodibility group and wind erodibility index.

Wind Erodibility Group

A wind erodibility group (WEG) consists of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible.



Map Scale: 1:6,470 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 300 600 1200 1800

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

1
2
3
4
4L
5
6
7
8
Not rated or not available

Soil Rating Lines

1
2
3
4
4L
5
6
7
8
Not rated or not available

Soil Rating Points

1
2
3
4
4L
5
6
7
8
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.

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

Date(s) aerial images were photographed: Jul 2, 2021—Aug 25, 2021

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.

Table—Wind Erodibility Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
73	Nunn clay loam, 0 to 1 percent slopes	6	133.6	90.0%
74	Nunn clay loam, 1 to 3 percent slopes	6	14.8	10.0%
Totals for Area of Interest			**148.4**	**100.0%**

Rating Options—Wind Erodibility Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

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United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

Site-specific conditions may vary from the representative values presented in this chapter. The engineer is responsible for assuring that the selected imperviousness values represent the imperviousness of the catchment or the proposed development. During master planning or in early stages of design, select imperviousness values that are unlikely to be exceeded as final design plans are developed to avoid the need to increase the size of infrastructure during later design stages.

TABLE 6-2. RECOMMENDED IMPERVIOUSNESS BY LAND USE

LAND USE/DENSITY	IMPERVIOUSNESS
Residential	
Single-family Housing (SFH) – Rural (0 – 3 du/ac)	35%
SFH – Low & Medium-density (3 – 5 du/ac)	55%
SFH – High-density (5 - 20 du/ac)	65%
Manufactured Housing (>= 10 du/ac)	65%
Multi-family Housing (MFH) – Medium-density (5 – 20 du/ac)	65%
MFH – High-density MFH (>20 du/ac)	70%
Commercial	
Commercial – Low-density	65%
Commercial – Medium- to High-density	80%
Commercial – Urban Core	90%
Industrial/Institutional	
Schools	55%
Office/institutional	65%
Industrial Areas	75%
Solar Fields, Gravel Cover[1,2]	60%
Solar Fields, Grass Cover[1,2]	45%
Parks and Open Space	
Open Space, Undisturbed Native Grasses	5%
Community Parks	25%
Neighborhood Parks	15%
Golf Courses	30%
Cemeteries	25%

Note: Recommended imperviousness values shown in the table are the minimum imperviousness values for a specific land use. It is the engineer's responsibility to select imperviousness values that appropriately reflect the actual density of the proposed development.

[1] Use these values at the master planning scale or when the specific layout of panels is not known. Use values from the surface type (Table 6-3) at the site planning and design stage when panel width, panel spacing, and panel orientation relative to contours are known.

[2] Assumes 1:1 ratio of panels to aisles. See MHFD's technical memorandum regarding *Determination of Solar Panel Field Runoff Coefficients and Imperviousness Values* for additional information on procedures to reflect other impervious areas such as roads and pads that may be part of a solar field and layouts with wider inter-panel spacing.

TABLE 6-3. RECOMMENDED IMPERVIOUSNESS BY SURFACE TYPES

SURFACE TYPES		IMPERVIOUSNESS
Roadways and Paved Streets		95%
Concrete Driveways and Walks		95%
Roofs		95%
Gravel	No Traffic (Pedestrian Use)	40%
	Low-traffic Areas (Maintenance Paths and Substations)	60%
	High-traffic Areas (Roadways and Parking)	80%
Disturbed Soil (Including Lawns, Managed/Active Turf, Landscaped Areas with Water-Wise Vegetation, and Uncompacted Gravel/Mulch Planting Beds)		20%
Undisturbed or Decompacted Soil (Native Grasses and Open Space Areas)		5%
Artificial Turfs[1]	Landscape Applications (without Subgrade Drainage Layer)	25% – 45%
	Sport Fields (with Underdrain Pipe System)	60% – 80%
Water Surfaces (Lakes/Reservoirs/Irrigation Ponds)		100%
Solar Fields[2]	Grass Cover (Varies with Panel Orientation Relative to Ground Contours)	10% – 45%
	Gravel Cover (Varies with Panel Orientation Relative to Ground Contours)	50% – 75%
Historic Flow Analysis, Greenbelts, Agricultural		5%
Newly Graded Areas		65%
Stormwater Control Measures[3]	Retention Ponds & Constructed Wetland Ponds	100%
	Rooftop Systems – Blue Roofs	95%
	Rooftop Systems – Green Roofs (extensive)	65%
	Rooftop Systems – Green Roofs (intensive)	50%
	Permeable Pavement – CGP/PGP/RGP	55%
	Permeable Pavement – PICP	45%
	Extended Detention Basins	25%
	Receiving Pervious Areas (incl. Grass Buffers & Grass Swales)	20%
	Bioretention & Sand Filters	10%

[1] Consult with the manufacturer to get a recommended value.

[2] Assumes 1:1 ratio of panels to aisles. See MHFD's technical memorandum regarding *Determination of Solar Panel Field Runoff Coefficients and Imperviousness Values* for additional information on procedures for determining percent imperviousness based on panel width, panel spacing, and panel orientation relative to ground contours and how to reflect other impervious areas such as roads and pads that may be part of a solar field and layouts with wider inter-panel spacing.

[3] See MHFD's technical memorandum regarding *Evaluation of Percent Imperviousness for Stormwater Control Measures* for background information.

APPENDIX B – PREVIOUS STUDIES

Excerpts taken from:

Final Drainage Report for Centerra South,
March 2025, by CWC.

FINAL DRAINAGE REPORT
FOR
CENTERRA SOUTH
PZ# 24-00131

May 2025

Prepared for:

McWhinney
2725 Rocky Mountain Ave., Suite 200
Loveland, CO 80538
970-962-9900
Contact: Kim Perry

Prepared by:

CONSULTING GROUP
Civil Engineering * Land Surveying * Construction Services

9360 Teddy Lane, Suite 203
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Composite Imperviousness Calculations

Developed Conditions

CENTERRA SOUTH

Loveland, Colorado

Job No. 130-00201
Date 05/17/25
Calculated By DFL
Checked By BEC

Basin	Sub-Basin	Area (acres)	Parcel Imperviousness									
			Multi-family Housing (MFH) - Medium Density (5-20 du/ac) 65	MFH - High Density (>20 du/ac) 70	Commercial - Medium to High Density 80	Commercial - Urban Core 90	Disturbed Soil 20	Undisturbed Soil 5	Roadways & Paved Streets 95	Roofs 95	Detention Facilities 25	Composite Imperviousness
A	A1	1.27							1.27			95.0
	A2	0.85								0.85		95.0
	A3	1.84					0.35		1.49			80.7
	A4	1.24			0.37		0.12		0.75			83.0
	A5	1.69			0.17		0.17		1.35			86.0
	A6	0.52					0.23		0.29			61.3
	A7	2.05					0.31		1.74			83.8
	OS-2	0.68					0.33		0.03	0.32		58.7
	A8	0.76					0.19		0.57			76.3
	A9	0.94					0.19		0.75			80.0
	OS-3	0.66					0.35		0.06	0.24		54.8
	A10	0.64					0.16		0.48			76.3
	A11	0.73					0.22		0.51			72.5
	Sum	**13.87**			**0.54**		**2.62**		**9.29**	**1.41**		**80.2**
B	B1	0.49							0.49			95.0
	B2	0.17					0.03		0.14			80.0
	B3	0.09					0.03		0.05			65.0
	B4	0.21								0.21		95.0
	B5	2.52					0.75		1.76			72.5
	B6	0.19								0.19		95.0
	B7	2.58			0.26		0.26		2.07			86.0
	B8	0.38								0.38		95.0
	B9	0.30			0.15				0.15			87.5
	B10	0.22			0.11				0.11			87.5
	B11	0.17								0.17		95.0
	B12	0.25			0.15				0.10			86.0
	B13	0.34			0.27				0.07			83.0
	B14	0.12			0.06				0.06			87.5
	B15	0.27								0.27		95.0
	B16	0.67			0.40				0.27			86.0
	B17	0.29								0.29		95.0
	B18	0.59			0.29				0.29			87.5
	B19	1.75					0.35		1.40			80.0
	B20	0.15			0.03		0.03		0.09			77.0
	OS-1	0.58					0.37		0.04	0.17		47.1
	B21	0.42		0.21			0.10		0.10			63.8
	Sum	**12.73**		**0.21**	**1.72**		**1.94**		**7.19**	**1.67**		**81.2**

Basin	Sub-Basin	Area (acres)	Parcel Imperviousness									
			Multi-family Housing (MFH) - Medium Density (5-20 du/ac) 65	MFH - High Density (>20 du/ac) 70	Commercial - Medium to High Density 80	Commercial - Urban Core 90	Disturbed Soil 20	Undisturbed Soil 5	Roadways & Paved Streets 95	Roofs 95	Detention Facilities 25	Composite Imperviousness
C	C1	1.36								1.36		95.0
	A106	0.48					0.02		0.27	0.19		92.1
	A108	0.25					0.16		0.09			47.4
	C2	1.07					1.07					20.0
	A200	2.71					0.30		1.94	0.46		86.6
	A202	1.80					0.25		1.17	0.37		84.4
	A104	0.38					0.11		0.23	0.04		73.7
	A100	2.66					0.36		1.66	0.64		84.9
	A102	0.41					0.10		0.27	0.04		76.6
	Sum	**11.12**					**2.37**		**5.63**	**3.10**		**78.8**
D	D1	3.15					0.63		2.52			80.0
	D2	0.35								0.35		95.0
	D3	2.87			1.15				1.72			89.0
	D4	2.98			0.90		0.30		1.79			83.0
	D5	3.47			1.04		0.52		1.91			79.3
	D6	0.11			0.07				0.05			86.0
	D7	0.33			0.25				0.08			83.8
	D8	0.26			0.17				0.09			85.1
	D9	0.46			0.31				0.16			85.1
	D10	6.51			6.51							80.0
	D11	0.39			0.12				0.27			90.5
	D12	0.16			0.05				0.11			90.5
	D13	1.59			0.48				1.11			90.5
	D14	0.27			0.20				0.07			83.8
	D15	0.72					0.07		0.64			87.5
	D16	0.37			0.22				0.15			86.0
	D17	0.24		0.06			0.06		0.12			70.0
	D18	0.34								0.34		95.0
	D19	0.44			0.18				0.26			89.0
	D20	1.20		0.90			0.06		0.24			72.5
	D21	0.35			0.28					0.07		83.0
	D22	0.25			0.24				0.01			80.8
	D23	0.26			0.24				0.03			81.5
	D24	0.12			0.12							80.0
	D25	0.15			0.15							80.0
	D26	0.45								0.45		95.0
	D27	0.59								0.59		95.0
	D28	0.19			0.09				0.10			88.1
	D29	0.11					0.01		0.10			85.4
	D30	0.43								0.43		95.0
	D31	0.41			0.16				0.24			89.0
	OS-5	0.28					0.05		0.07	0.17		81.7
	D32	0.73			0.33				0.40			88.3
	D33	1.55					0.78		0.78			57.5
	D34	1.53					0.76		0.76			57.5
	D35	12.51		11.88					0.63			71.3
	D36	1.08					0.16		0.92			83.8
	D37	1.22					0.61		0.61			57.5
	D38	13.09		13.09								70.0
	OS-4	1.53					0.54		0.36	0.62		68.4
	D39	1.81					0.45		1.36			76.3
	D40	1.35					0.34		1.01			76.3
	Sum	**66.22**		**25.93**	**13.23**		**5.35**		**18.69**	**3.01**		**76.2**

Composite "C" Calculations
Developed Conditions

CENTERRA SOUTH
Loveland, Colorado

Job No. 130-00201
Date 05/17/25
Calculated By DFL
Checked By BEC

			2 Year Calculation										5 Year Calculation										10 Year Calculation										100 Year Calculation									
			Area Type										Area Type										Area Type										Area Type									
Basin	Sub-Basin	Area	Multi-family Housing (MFH) - Mediu	MFH - High Density (>20 du/ac)	Commercial - Medium to High Dens	Commercial - Urban Core	Disturbed Soil	Undisturbed Soil	Roadways & Paved Streets	Roofs	Detention Facilities	C2	Multi-family Housing (MFH) - Mediu	MFH - High Density (>20 du/ac)	Commercial - Medium to High Dens	Commercial - Urban Core	Disturbed Soil	Undisturbed Soil	Roadways & Paved Streets	Roofs	Detention Facilities	C5	Multi-family Housing (MFH) - Mediu	MFH - High Density (>20 du/ac)	Commercial - Medium to High Dens	Commercial - Urban Core	Disturbed Soil	Undisturbed Soil	Roadways & Paved Streets	Roofs	Detention Facilities	C10	Multi-family Housing (MFH) - Mediu	MFH - High Density (>20 du/ac)	Commercial - Medium to High Dens	Commercial - Urban Core	Disturbed Soil	Undisturbed Soil	Roadways & Paved Streets	Roofs	Detention Facilities	C100
		(acres)	0.51	0.56	0.65	0.74	0.14	0.03	0.79	0.79	0.83		0.55	0.60	0.68	0.76	0.19	0.07	0.80	0.80	0.84		0.61	0.65	0.72	0.79	0.28	0.17	0.83	0.83	0.87		0.75	0.77	0.81	0.85	0.57	0.50	0.87	0.87	0.89	
A	A1	1.27	0.00	0.00	0.00	0.00	0.00	0.00	1.27	0.00	0.00	0.79	0.00	0.00	0.00	0.00	0.00	0.00	1.27	0.00	0.00	0.80	0.00	0.00	0.00	0.00	0.00	0.00	1.27	0.00	0.00	0.83	0.00	0.00	0.00	0.00	0.00	0.00	1.27	0.00	0.00	0.87
	A2	0.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00	0.87
	A3	1.84	0.00	0.00	0.00	0.00	0.35	0.00	1.49	0.00	0.00	0.66	0.00	0.00	0.00	0.00	0.35	0.00	1.49	0.00	0.00	0.68	0.00	0.00	0.00	0.00	0.35	0.00	1.49	0.00	0.00	0.73	0.00	0.00	0.00	0.00	0.35	0.00	1.49	0.00	0.00	0.81
	A4	1.24	0.00	0.00	0.37	0.00	0.12	0.00	0.75	0.00	0.00	0.68	0.00	0.00	0.37	0.00	0.12	0.00	0.75	0.00	0.00	0.70	0.00	0.00	0.37	0.00	0.12	0.00	0.75	0.00	0.00	0.74	0.00	0.00	0.37	0.00	0.12	0.00	0.75	0.00	0.00	0.82
	A5	1.69	0.00	0.00	0.17	0.00	0.17	0.00	1.35	0.00	0.00	0.71	0.00	0.00	0.17	0.00	0.17	0.00	1.35	0.00	0.00	0.73	0.00	0.00	0.17	0.00	0.17	0.00	1.35	0.00	0.00	0.76	0.00	0.00	0.17	0.00	0.17	0.00	1.35	0.00	0.00	0.84
	A6	0.52	0.00	0.00	0.00	0.00	0.23	0.00	0.29	0.00	0.00	0.49	0.00	0.00	0.00	0.00	0.23	0.00	0.29	0.00	0.00	0.52	0.00	0.00	0.00	0.00	0.23	0.00	0.29	0.00	0.00	0.58	0.00	0.00	0.00	0.00	0.23	0.00	0.29	0.00	0.00	0.73
	A7	2.05	0.00	0.00	0.00	0.00	0.31	0.00	1.74	0.00	0.00	0.69	0.00	0.00	0.00	0.00	0.31	0.00	1.74	0.00	0.00	0.71	0.00	0.00	0.00	0.00	0.31	0.00	1.74	0.00	0.00	0.75	0.00	0.00	0.00	0.00	0.31	0.00	1.74	0.00	0.00	0.83
	OS-2	0.68										0.47										0.51										0.56										0.72
	A8	0.76	0.00	0.00	0.00	0.00	0.19	0.00	0.57	0.00	0.00	0.62	0.00	0.00	0.00	0.00	0.19	0.00	0.57	0.00	0.00	0.65	0.00	0.00	0.00	0.00	0.19	0.00	0.57	0.00	0.00	0.69	0.00	0.00	0.00	0.00	0.19	0.00	0.57	0.00	0.00	0.80
	A9	0.94	0.00	0.00	0.00	0.00	0.19	0.00	0.75	0.00	0.00	0.66	0.00	0.00	0.00	0.00	0.19	0.00	0.75	0.00	0.00	0.68	0.00	0.00	0.00	0.00	0.19	0.00	0.75	0.00	0.00	0.72	0.00	0.00	0.00	0.00	0.19	0.00	0.75	0.00	0.00	0.81
	OS-3	0.66										0.44										0.48										0.53										0.71
	A10	0.64	0.00	0.00	0.00	0.00	0.16	0.00	0.48	0.00	0.00	0.62	0.00	0.00	0.00	0.00	0.16	0.00	0.48	0.00	0.00	0.65	0.00	0.00	0.00	0.00	0.16	0.00	0.48	0.00	0.00	0.69	0.00	0.00	0.00	0.00	0.16	0.00	0.48	0.00	0.00	0.80
	A11	0.73	0.00	0.00	0.00	0.00	0.22	0.00	0.51	0.00	0.00	0.59	0.00	0.00	0.00	0.00	0.22	0.00	0.51	0.00	0.00	0.62	0.00	0.00	0.00	0.00	0.22	0.00	0.51	0.00	0.00	0.66	0.00	0.00	0.00	0.00	0.22	0.00	0.51	0.00	0.00	0.78
B	B1	0.49	0.00	0.00	0.00	0.00	0.00	0.00	0.49	0.00	0.00	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.49	0.00	0.00	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.49	0.00	0.00	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.49	0.00	0.00	0.87
	B2	0.17	0.00	0.00	0.00	0.00	0.03	0.00	0.14	0.00	0.00	0.66	0.00	0.00	0.00	0.00	0.03	0.00	0.14	0.00	0.00	0.68	0.00	0.00	0.00	0.00	0.03	0.00	0.14	0.00	0.00	0.72	0.00	0.00	0.00	0.00	0.03	0.00	0.14	0.00	0.00	0.81
	B3	0.09	0.00	0.00	0.00	0.00	0.03	0.00	0.05	0.00	0.00	0.53	0.00	0.00	0.00	0.00	0.03	0.00	0.05	0.00	0.00	0.55	0.00	0.00	0.00	0.00	0.03	0.00	0.05	0.00	0.00	0.61	0.00	0.00	0.00	0.00	0.03	0.00	0.05	0.00	0.00	0.75
	B4	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.87
	B5	2.52	0.00	0.00	0.00	0.00	0.75	0.00	1.76	0.00	0.00	0.59	0.00	0.00	0.00	0.00	0.75	0.00	1.76	0.00	0.00	0.62	0.00	0.00	0.00	0.00	0.75	0.00	1.76	0.00	0.00	0.66	0.00	0.00	0.00	0.00	0.75	0.00	1.76	0.00	0.00	0.78
	B6	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	0.00	0.87
	B7	2.58	0.00	0.00	0.26	0.00	0.26	0.00	2.07	0.00	0.00	0.71	0.00	0.00	0.26	0.00	0.26	0.00	2.07	0.00	0.00	0.73	0.00	0.00	0.26	0.00	0.26	0.00	2.07	0.00	0.00	0.76	0.00	0.00	0.26	0.00	0.26	0.00	2.07	0.00	0.00	0.84
	B8	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.38	0.00	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.38	0.00	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.38	0.00	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.38	0.00	0.87
	B9	0.30	0.00	0.00	0.15	0.00	0.00	0.00	0.15	0.00	0.00	0.72	0.00	0.00	0.15	0.00	0.00	0.00	0.15	0.00	0.00	0.74	0.00	0.00	0.15	0.00	0.00	0.00	0.15	0.00	0.00	0.78	0.00	0.00	0.15	0.00	0.00	0.00	0.15	0.00	0.00	0.84
	B10	0.22	0.00	0.00	0.11	0.00	0.00	0.00	0.11	0.00	0.00	0.72	0.00	0.00	0.11	0.00	0.00	0.00	0.11	0.00	0.00	0.74	0.00	0.00	0.11	0.00	0.00	0.00	0.11	0.00	0.00	0.78	0.00	0.00	0.11	0.00	0.00	0.00	0.11	0.00	0.00	0.84
	B11	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.87
	B12	0.25	0.00	0.00	0.15	0.00	0.00	0.00	0.10	0.00	0.00	0.70	0.00	0.00	0.15	0.00	0.00	0.00	0.10	0.00	0.00	0.73	0.00	0.00	0.15	0.00	0.00	0.00	0.10	0.00	0.00	0.76	0.00	0.00	0.15	0.00	0.00	0.00	0.10	0.00	0.00	0.84
	B13	0.34	0.00	0.00	0.27	0.00	0.00	0.00	0.07	0.00	0.00	0.68	0.00	0.00	0.27	0.00	0.00	0.00	0.07	0.00	0.00	0.70	0.00	0.00	0.27	0.00	0.00	0.00	0.07	0.00	0.00	0.74	0.00	0.00	0.27	0.00	0.00	0.00	0.07	0.00	0.00	0.82
	B14	0.12	0.00	0.00	0.06	0.00	0.00	0.00	0.06	0.00	0.00	0.72	0.00	0.00	0.06	0.00	0.00	0.00	0.06	0.00	0.00	0.74	0.00	0.00	0.06	0.00	0.00	0.00	0.06	0.00	0.00	0.78	0.00	0.00	0.06	0.00	0.00	0.00	0.06	0.00	0.00	0.84
	B15	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27	0.00	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27	0.00	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27	0.00	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27	0.00	0.87
	B16	0.67	0.00	0.00	0.40	0.00	0.00	0.00	0.27	0.00	0.00	0.70	0.00	0.00	0.40	0.00	0.00	0.00	0.27	0.00	0.00	0.73	0.00	0.00	0.40	0.00	0.00	0.00	0.27	0.00	0.00	0.76	0.00	0.00	0.40	0.00	0.00	0.00	0.27	0.00	0.00	0.84
	B17	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.29	0.00	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.29	0.00	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.29	0.00	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.29	0.00	0.87
	B18	0.59	0.00	0.00	0.29	0.00	0.00	0.00	0.29	0.00	0.00	0.72	0.00	0.00	0.29	0.00	0.00	0.00	0.29	0.00	0.00	0.74	0.00	0.00	0.29	0.00	0.00	0.00	0.29	0.00	0.00	0.78	0.00	0.00	0.29	0.00	0.00	0.00	0.29	0.00	0.00	0.84
	B19	1.75	0.00	0.00	0.00	0.00	0.35	0.00	1.40	0.00	0.00	0.66	0.00	0.00	0.00	0.00	0.35	0.00	1.40	0.00	0.00	0.68	0.00	0.00	0.00	0.00	0.35	0.00	1.40	0.00	0.00	0.72	0.00	0.00	0.00	0.00	0.35	0.00	1.40	0.00	0.00	0.81
	B20	0.15	0.00	0.00	0.03	0.00	0.03	0.00	0.09	0.00	0.00	0.63	0.00	0.00	0.03	0.00	0.03	0.00	0.09	0.00	0.00	0.65	0.00	0.00	0.03	0.00	0.03	0.00	0.09	0.00	0.00	0.70	0.00	0.00	0.03	0.00	0.03	0.00	0.09	0.00	0.00	0.80
	OS-1	0.58										0.37										0.42										0.48										0.68
	B21	0.42	0.00	0.21	0.00	0.00	0.10	0.00	0.10	0.00	0.00	0.51	0.00	0.21	0.00	0.00	0.10	0.00	0.10	0.00	0.00	0.54	0.00	0.21	0.00	0.00	0.10	0.00	0.10	0.00	0.00	0.60	0.00	0.21	0.00	0.00	0.10	0.00	0.10	0.00	0.00	0.74
	C1	1.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.36	0.00	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.36	0.00	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.36	0.00	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.36	0.00	0.87
	A106	0.48										0.76										0.79										0.81										0.86
	A108	0.25										0.38										0.42										0.48										0.68
	C2	1.07	0.00	0.00	0.00	0.00	1.07	0.00	0.00	0.00	0.00	0.14	0.00	0.00	0.00	0.00	1.07	0.00	0.00	0.00	0.00	0.19	0.00	0.00	0.00	0.00	1.07	0.00	0.00	0.00	0.00	0.28	0.00	0.00	0.00	0.00	1.07	0.00	0.00	0.00	0.00	0.57
	A200	2.71										0.71										0.74										0.77										0.84
	A202	1.80										0.70										0.72										0.75										0.83
	A104	0.38										0.60										0.63										0.67										0.78
	A100	2.66										0.70										0.73										0.76										0.83
	A102	0.41										0.63										0.66										0.69										0.80
D	D1	3.15	0.00	0.00	0.00	0.00	0.63	0.00	2.52	0.00	0.00	0.66	0.00	0.00	0.00	0.00	0.63	0.00	2.52	0.00	0.00	0.68	0.00	0.00	0.00	0.00	0.63	0.00	2.52	0.00	0.00	0.72	0.00	0.00	0.00	0.00	0.63	0.00	2.52	0.00	0.00	0.81
	D2	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.35	0.00	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.35	0.00	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.35	0.00	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.35	0.00	0.87
	D3	2.87	0.00	0.00	1.15	0.00	0.00	0.00	1.72	0.00	0.00	0.73	0.00	0.00	1.15	0.00	0.00	0.00	1.72	0.00	0.00	0.75	0.00	0.00	1.15	0.00	0.00	0.00	1.72	0.00	0.00	0.79	0.00	0.00	1.15	0.00	0.00	0.00	1.72	0.00	0.00	0.85
	D4	2.98	0.00	0.00	0.90	0.00	0.30	0.00	1.79	0.00	0.00	0.68	0.00	0.00	0.90	0.00	0.30	0.00	1.79	0.00	0.00	0.70	0.00	0.00	0.90	0.00	0.30	0.00	1.79	0.00	0.00	0.74	0.00	0.00	0.90	0.00	0.30	0.00	1.79	0.00	0.00	0.82
	D5	3.47	0.00	0.00	1.04	0.00	0.52	0.00	1.91	0.00	0.00	0.65	0.00	0.00	1.04	0.00	0.52	0.00	1.91	0.00	0.00	0.67	0.00	0.00	1.04	0.00	0.52	0.00	1.91	0.00	0.00	0.71	0.00	0.00	1.04	0.00	0.52	0.00	1.91	0.00	0.00	0.81
	D6	0.11	0.00	0.00	0.07	0.00	0.00	0.00	0.05	0.00	0.00	0.70	0.00	0.00	0.07	0.00	0.00	0.00	0.05	0.00	0.00	0.73	0.00	0.00	0.07	0.00	0.00	0.00	0.05	0.00	0.00	0.76	0.00	0.00	0.07	0.00	0.00	0.00	0.05	0.00	0.00	0.84
	D7	0.33	0.00	0.00	0.25	0.00	0.00	0.00	0.08	0.00	0.00	0.68	0.00	0.00	0.25	0.00	0.00	0.00	0.08	0.00	0.00	0.71	0.00	0.00	0.25	0.00	0.00	0.00	0.08	0.00	0.00	0.75	0.00	0.00	0.25	0.00	0.00	0.00	0.08	0.00	0.00	0.83
	D8	0.26	0.00	0.00	0.17	0.00	0.00	0.00	0.09	0.00	0.00	0.70	0.00	0.00	0.17	0.00	0.00	0.00	0.09	0.00	0.00	0.72	0.00	0.00	0.17	0.00	0.00	0.00	0.09	0.00	0.00	0.76	0.00	0.00	0.17	0.00	0.00	0.00	0.09	0.00	0.00	0.83
	D9	0.46	0.00	0.00	0.31	0.00	0.00	0.00	0.16	0.00	0.00	0.70	0.00	0.00	0.31	0.00	0.00	0.00	0.16	0.00	0.00	0.72	0.00	0.00	0.31	0.00	0.00	0.00	0.16	0.00	0.00	0.76	0.00	0.00	0.31	0.00	0.00	0.00	0.16	0.00	0.00	0.83
	D10	6.51	0.00	0.00	6.51	0.00	0.00	0.00	0.00	0.00	0.00	0.65	0.00	0.00	6.51	0.00	0.00	0.00	0.00	0.00	0.00	0.68	0.00	0.00	6.51	0.00	0.00	0.00	0.00	0.00	0.00	0.72	0.00	0.00	6.51	0.00	0.00	0.00	0.00	0.00	0.00	0.81
	D11	0.39	0.00	0.00	0.12	0.00	0.00	0.00	0.27	0.00	0.00	0.75	0.00	0.00	0.12	0.00	0.00	0.00	0.27	0.00	0.00	0.76	0.00	0.00	0.12	0.00	0.00	0.00	0.27	0.00	0.00	0.80	0.00	0.00	0.12	0.00	0.00	0.00	0.27	0.00	0.00	0.85
	D12	0.16	0.00	0.00	0.05	0.00	0.00	0.00	0.11	0.00	0.00	0.75	0.00	0.00	0.05	0.00	0.00	0.00	0.11	0.00	0.00	0.76	0.00	0.00	0.05	0.00	0.00	0.00	0.11	0.00	0.00	0.80	0.00	0.00	0.05	0.00	0.00	0.00	0.11	0.00	0.00	0.85
	D13	1.59	0.00	0.00	0.48	0.00	0.00	0.00	1.11	0.00	0.00	0.75	0.00	0.00	0.48	0.00	0.00	0.00	1.11	0.00	0.00	0.76	0.00	0.00	0.48	0.00	0.00	0.00	1.11	0.00	0.00	0.80	0.00	0.00	0.48	0.00	0.00	0.00	1.11	0.00	0.00	0.85
	D14	0.27	0.00	0.00	0.20	0.00	0.00	0.00	0.07	0.00	0.00	0.68	0.00	0.00	0.20	0.00	0.00	0.00	0.07	0.00	0.00	0.71	0.00	0.00	0.20	0.00	0.00	0.00	0.07	0.00	0.00	0.75	0.00	0.00	0.20	0.00	0.00	0.00	0.07	0.00	0.00	0.83
	D15	0.72	0.00	0.00	0.00	0.00	0.07	0.00	0.64	0.00	0.00	0.72	0.00	0.00	0.00	0.00	0.07	0.00	0.64	0.00	0.00	0.74	0.00	0.00	0.00	0.00	0.07	0.00	0.64	0.00	0.00	0.78	0.00	0.00	0.00	0.00	0.07	0.00	0.64	0.00	0.00	0.84
	D16	0.37	0.00	0.00	0.22	0.00	0.00	0.00	0.15	0.00	0.00	0.70	0.00	0.00	0.22	0.00	0.00	0.00	0.15	0.00	0.00	0.73	0.00	0.00	0.22	0.00	0.00	0.00	0.15	0.00	0.00	0.76	0.00	0.00	0.22	0.00	0.00	0.00	0.15	0.00	0.00	0.84
	D17	0.24	0.00	0.06	0.00	0.00	0.06	0.00	0.12	0.00	0.00	0.57	0.00	0.06	0.00	0.00	0.06	0.00	0.12	0.00	0.00	0.60	0.00	0.06	0.00	0.00	0.06	0.00	0.12	0.00	0.00	0.65	0.00	0.06	0.00	0.00	0.06	0.00	0.12	0.00	0.00	0.77
	D18	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.00	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.00	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.00	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.00	0.87
	D19	0.44	0.00	0.00	0.18	0.00	0.00	0.00	0.26	0.00	0.00	0.73	0.00	0.00	0.18	0.00	0.00	0.00	0.26	0.00	0.00	0.75	0.00	0.00	0.18	0.00	0.00	0.00	0.26	0.00	0.00	0.79	0.00	0.00	0.18	0.00	0.00	0.00	0.26	0.00	0.00	0.85
	D20	1.20	0.00	0.90	0.00	0.00	0.06	0.00	0.24	0.00	0.00	0.58	0.00	0.90	0.00	0.00	0.06	0.00	0.24	0.00	0.00	0.62	0.00	0.90	0.00	0.00	0.06	0.00	0.24	0.00	0.00	0.66	0.00	0.90	0.00	0.00	0.06	0.00	0.24	0.00	0.00	0.78
	D21	0.35	0.00	0.00	0.28	0.00	0.00	0.00	0.00	0.07	0.00	0.68	0.00	0.00	0.28	0.00	0.00	0.00	0.00	0.07	0.00	0.70	0.00	0.00	0.28	0.00	0.00	0.00	0.00	0.07	0.00	0.74	0.00	0.00	0.28	0.00	0.00	0.00	0.00	0.07	0.00	0.82
	D22	0.25	0.00	0.00	0.24	0.00	0.00	0.00	0.01	0.00	0.00	0.66	0.00	0.00	0.24	0.00	0.00	0.00	0.01	0.00	0.00	0.68	0.00	0.00	0.24	0.00	0.00	0.00	0.01	0.00	0.00	0.73	0.00	0.00	0.24	0.00	0.00	0.00	0.01	0.00	0.00	0.81
	D23	0.26	0.00	0.00	0.24	0.00	0.00	0.00	0.03	0.00	0.00	0.66	0.00	0.00	0.24	0.00	0.00	0.00	0.03	0.00	0.00	0.69	0.00	0.00	0.24	0.00	0.00	0.00	0.03	0.00	0.00	0.73	0.00	0.00	0.24	0.00	0.00	0.00	0.03	0.00	0.00	0.82
	D24	0.12	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.65	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.68	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.72	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.81
	D25	0.15	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.65	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.68	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.72	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.81
	D26	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.45	0.00	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.45	0.00	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.45	0.00	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.45	0.00	0.87
	D27	0.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.59	0.00	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.59	0.00	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.59	0.00	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.59	0.00	0.87
	D28	0.19	0.00	0.00	0.09	0.00	0.00	0.00	0.10	0.00	0.00	0.72	0.00	0.00	0.09	0.00	0.00	0.00	0.10	0.00	0.00	0.74	0.00	0.00	0.09	0.00	0.00	0.00	0.10	0.00	0.00	0.78	0.00	0.00	0.09	0.00	0.00	0.00	0.10	0.00	0.00	0.84
	D29	0.11	0.00	0.00	0.00	0.00	0.01	0.00	0.10	0.00	0.00	0.70	0.00	0.00	0.00	0.00	0.01	0.00	0.10	0.00	0.00	0.72	0.00	0.00	0.00	0.00	0.01	0.00	0.10	0.00	0.00	0.76	0.00	0.00	0.00	0.00	0.01	0.00	0.10	0.00	0.00	0.83
	D30	0.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.43	0.00	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.43	0.00	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.43	0.00	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.43	0.00	0.87
	D31	0.41	0.00	0.00	0.16	0.00	0.00	0.00	0.24	0.00	0.00	0.73	0.00	0.00	0.16	0.00	0.00	0.00	0.24	0.00	0.00	0.75	0.00	0.00	0.16	0.00	0.00	0.00	0.24	0.00	0.00	0.79	0.00	0.00	0.16	0.00	0.00	0.00	0.24	0.00	0.00	0.85
	OS-5	0.28										0.67										0.70										0.73										0.82
	D32	0.73	0.00	0.00	0.33	0.00	0.00	0.00	0.40	0.00	0.00	0.73	0.00	0.00	0.33	0.00	0.00	0.00	0.40	0.00	0.00	0.74	0.00	0.00	0.33	0.00	0.00	0.00	0.40	0.00	0.00	0.78	0.00	0.00	0.33	0.00	0.00	0.00	0.40	0.00	0.00	0.84
	D33	1.55	0.00	0.00	0.00	0.00	0.78	0.00	0.78	0.00	0.00	0.46	0.00	0.00	0.00	0.00	0.78	0.00	0.78	0.00	0.00	0.49	0.00	0.00	0.00	0.00	0.78	0.00	0.78	0.00	0.00	0.55	0.00	0.00	0.00	0.00	0.78	0.00	0.78	0.00	0.00	0.72
	D34	1.53	0.00	0.00	0.00	0.00	0.76	0.00	0.76	0.00	0.00	0.46	0.00	0.00	0.00	0.00	0.76	0.00	0.76	0.00	0.00	0.49	0.00	0.00	0.00	0.00	0.76	0.00	0.76	0.00	0.00	0.55	0.00	0.00	0.00	0.00	0.76	0.00	0.76	0.00	0.00	0.72
	D35	12.51	0.00	11.88	0.00	0.00	0.00	0.00	0.63	0.00	0.00	0.57	0.00	11.88	0.00	0.00	0.00	0.00	0.63	0.00	0.00	0.61	0.00	11.88	0.00	0.00	0.00	0.00	0.63	0.00	0.00	0.66	0.00	11.88	0.00	0.00	0.00	0.00	0.63	0.00	0.00	0.78
	D36	1.08	0.00	0.00	0.00	0.00	0.16	0.00	0.92	0.00	0.00	0.69	0.00	0.00	0.00	0.00	0.16	0.00	0.92	0.00	0.00	0.71	0.00	0.00	0.00	0.00	0.16	0.00	0.92	0.00	0.00	0.75	0.00	0.00	0.00	0.00	0.16	0.00	0.92	0.00	0.00	0.83
	D37	1.22	0.00	0.00	0.00	0.00	0.61	0.00	0.61	0.00	0.00	0.46	0.00	0.00	0.00	0.00	0.61	0.00	0.61	0.00	0.00	0.49	0.00	0.00	0.00	0.00	0.61	0.00	0.61	0.00	0.00	0.55	0.00	0.00	0.00	0.00	0.61	0.00	0.61	0.00	0.00	0.72
	D38	13.09	0.00	13.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.56	0.00	13.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.60	0.00	13.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.65	0.00	13.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.77
	OS-4	1.53										0.56										0.59										0.63										0.76
	D39	1.81	0.00	0.00	0.00	0.00	0.45	0.00	1.36	0.00	0.00	0.62	0.00	0.00	0.00	0.00	0.45	0.00	1.36	0.00	0.00	0.65	0.00	0.00	0.00	0.00	0.45	0.00	1.36	0.00	0.00	0.69	0.00	0.00	0.00	0.00	0.45	0.00	1.36	0.00	0.00	0.80
	D40	1.35	0.00	0.00	0.00	0.00	0.34	0.00	1.01	0.00	0.00	0.62	0.00	0.00	0.00	0.00	0.34	0.00	1.01	0.00	0.00	0.65	0.00	0.00	0.00	0.00	0.34	0.00	1.01	0.00	0.00	0.69	0.00	0.00	0.00	0.00	0.34	0.00	1.01	0.00	0.00	0.80
OS	OS-101	3.37	0.00	0.00	0.00	0.00	1.68	0.17	1.51	0.00	0.00	0.42	0.00	0.00	0.00	0.00	1.68	0.17	1.51	0.00	0.00	0.46	0.00	0.00	0.00	0.00	1.68	0.17	1.51	0.00	0.00	0.52	0.00	0.00	0.00	0.00	1.68	0.17	1.51	0.00	0.00	0.70
	OS-102	0.47	0.00	0.00	0.00	0.00	0.05	0.02	0.40	0.00	0.00	0.68	0.00	0.00	0.00	0.00	0.05	0.02	0.40	0.00	0.00	0.70	0.00	0.00	0.00	0.00	0.05	0.02	0.40	0.00	0.00	0.74	0.00	0.00	0.00	0.00	0.05	0.02	0.40	0.00	0.00	0.82
	OS-103	2.77	0.00	0.00	0.00	0.00	1.39	0.14	1.25	0.00	0.00	0.42	0.00	0.00	0.00	0.00	1.39	0.14	1.25	0.00	0.00	0.46	0.00	0.00	0.00	0.00	1.39	0.14	1.25	0.00	0.00	0.52	0.00	0.00	0.00	0.00	1.39	0.14	1.25	0.00	0.00	0.70
	OS-104	3.34	0.00	0.00	0.00	0.00	0.67	0.17	2.51	0.00	0.00	0.62	0.00	0.00	0.00	0.00	0.67	0.17	2.51	0.00	0.00	0.64	0.00	0.00	0.00	0.00	0.67	0.17	2.51	0.00	0.00	0.69	0.00	0.00	0.00	0.00	0.67	0.17	2.51	0.00	0.00	0.79
	E-1	0.33	0.00	0.00	0.00	0.00	0.10	0.00	0.23	0.00	0.00	0.60	0.00	0.00	0.00	0.00	0.10	0.00	0.23	0.00	0.00	0.62	0.00	0.00	0.00	0.00	0.10	0.00	0.23	0.00	0.00	0.67	0.00	0.00	0.00	0.00	0.10	0.00	0.23	0.00	0.00	0.78
	E-2	0.28	0.00	0.00	0.00	0.00	0.07	0.00	0.21	0.00	0.00	0.62	0.00	0.00	0.00	0.00	0.07	0.00	0.21	0.00	0.00	0.64	0.00	0.00	0.00	0.00	0.07	0.00	0.21	0.00	0.00	0.69	0.00	0.00	0.00	0.00	0.07	0.00	0.21	0.00	0.00	0.79
	E-3	0.20	0.00	0.00	0.00	0.00	0.06	0.00	0.14	0.00	0.00	0.59	0.00	0.00	0.00	0.00	0.06	0.00	0.14	0.00	0.00	0.61	0.00	0.00	0.00	0.00	0.06	0.00	0.14	0.00	0.00	0.66	0.00	0.00	0.00	0.00	0.06	0.00	0.14	0.00	0.00	0.78
	E-4	0.21	0.00	0.00	0.00	0.00	0.07	0.00	0.15	0.00	0.00	0.59	0.00	0.00	0.00	0.00	0.07	0.00	0.15	0.00	0.00	0.61	0.00	0.00	0.00	0.00	0.07	0.00	0.15	0.00	0.00	0.66	0.00	0.00	0.00	0.00	0.07	0.00	0.15	0.00	0.00	0.78
	UD-1	0.84	0.00	0.00	0.00	0.00	0.31	0.00	0.53	0.00	0.00	0.55	0.00	0.00	0.00	0.00	0.31	0.00	0.53	0.00	0.00	0.58	0.00	0.00	0.00	0.00	0.31	0.00	0.53	0.00	0.00	0.63	0.00	0.00	0.00	0.00	0.31	0.00	0.53	0.00	0.00	0.76

T:\JOBS\McWhinney\McDonough\Engineering\Drainage\3rd Submittal\Hydrology\[MCD-HYDROLOGY.xls]Composite C

Orange highlight notes values were retrieved from third party report - "FINAL DRAINAGE REPORT, AVENUE SOUTH MULTIFAMILY" By Kimley Horn Dated April 25, 2025

TIME OF CONCENTRATION

Developed Conditions

CENTERRA SOUTH

Job No. 130-00201
Date 5/17/25
Calculated By DFL
Checked By BEC

SUB-BASIN DATA			INITIAL/OVERLAND TIME (Tc)			TRAVEL TIME (Tt)						Rational Tc	Imperviousness	First Design Point Time of Concentration The Final Tc shall be the lesser of the Comp Tc and the First Design Point Tc	FINAL Tc	CONVEYANCE REMARKS
DESIG:	AREA (acres)	C_5	LENGTH (ft)	SLOPE (ft/ft)	Ti (min)	LENGTH (ft)	AVG. SLOPE DY	(%)	Conv. Type*	VEL (fps)	Tt (min)	COMP Tc (min)	%	$Tc=(26-17i)+(L_t/(60*(14i+9)*\sqrt{S_t})$ (min)	(min)	
A1	1.27	0.80				615	3.6	0.6	6	1.5	6.7	6.7	95.0	15.9	**6.7**	Paved Gutter
A2	0.85	0.80				330		0.5	6	1.4	3.9	3.9	95.0	13.3	**5.0**	Paved Gutter
A3	1.84	0.68				487	7.7	1.6	6	2.5	3.2	3.2	80.7	15.5	**5.0**	Paved Gutter
A4	1.24	0.70				385	2.3	0.6	6	1.5	4.2	4.2	83.0	15.9	**5.0**	Paved Gutter
A5	1.69	0.73							6				86.0		**5.0**	Paved Gutter
A6	0.52	0.52							6				61.3		**5.0**	Paved Gutter
A7	2.05	0.71				919	10.2	1.1	6	2.1	7.3	7.3	83.8	18.8	**7.3**	Paved Gutter
OS-2	0.68	0.51			1.4						4.2	5.6			**5.6**	
A8	0.76	0.65				577	5.3	0.9	6	1.9	5.0	5.0	76.3	18.1	**5.0**	Paved Gutter
A9	0.94	0.68							6				80.0		**5.0**	Paved Gutter
OS-3	0.66	0.48			1.4						2.4	3.7			**5.0**	
A10	0.64	0.65				551	4.8	0.9	6	1.9	4.9	4.9	76.3	18.0	**5.0**	Paved Gutter
A11	0.73	0.62							6				72.5		**5.0**	Paved Gutter
B1	0.49	0.80							6				95.0		**5.0**	Paved Gutter
B2	0.17	0.68							6				80.0		**5.0**	Paved Gutter
B3	0.09	0.55							6				65.0		**5.0**	Paved Gutter
B4	0.21	0.80							6				95.0		**5.0**	Paved Gutter
B5	2.52	0.62							6				72.5		**5.0**	Paved Gutter
B6	0.19	0.80							6				95.0		**5.0**	Paved Gutter
B7	2.58	0.73	143	0.011	7.8	304	6.7	2.2	6	3.0	1.7	9.5	86.0	13.0	**9.5**	Paved Gutter
B8	0.38	0.80							6				95.0		**5.0**	Paved Gutter
B9	0.30	0.74							6				87.5		**5.0**	Paved Gutter
B10	0.22	0.74							6				87.5		**5.0**	Paved Gutter
B11	0.17	0.80							6				95.0		**5.0**	Paved Gutter
B12	0.25	0.73							6				86.0		**5.0**	Paved Gutter
B13	0.34	0.70							6				83.0		**5.0**	Paved Gutter
B14	0.12	0.74							6				87.5		**5.0**	Paved Gutter
B15	0.27	0.80							6				95.0		**5.0**	Paved Gutter
B16	0.67	0.73							6				86.0		**5.0**	Paved Gutter
B17	0.29	0.80							6				95.0		**5.0**	Paved Gutter
B18	0.59	0.74							6				87.5		**5.0**	Paved Gutter
B19	1.75	0.68				562	3.8	0.7	6	1.7	5.7	5.7	80.0	18.0	**5.7**	Paved Gutter
B20	0.15	0.65							6				77.0		**5.0**	Paved Gutter
OS-1	0.58	0.42			1.3						4.1	5.4			**5.4**	
B21	0.42	0.54				554	3.8	0.7	6	1.7	5.5	5.5	63.8	21.3	**5.5**	Paved Gutter
C1	1.36	0.80							6				95.0		**5.0**	Paved Gutter
A106	0.48														**5.0**	
A108	0.25														**5.0**	
C2	1.07	0.19				720	5.0	0.7	6	1.7	7.2	7.2	20.0	34.8	**7.2**	Paved Gutter
A200	2.71	0.74			0.7						4.5	5.2			**5.2**	
A202	1.80	0.72			1.6						1.7	3.2			**5.0**	
A104	0.38	0.63			2.3						1.1	3.4			**5.0**	
A100	2.66	0.73			0.6						1.2	1.8			**5.0**	
A102	0.41	0.66			1.3						0.7	2.0			**5.0**	

TIME OF CONCENTRATION

CENTERRA SOUTH

Developed Conditions

Job No. 130-00201
Date 5/17/25
Calculated By DFL
Checked By BEC

SUB-BASIN DATA			INITIAL/OVERLAND TIME (Tc)			TRAVEL TIME (Tt)						Rational Tc	Imperviousness	First Design Point Time of Concentration The Final Tc shall be the lesser of the Comp Tc and the First Design Point Tc	FINAL Tc	CONVEYANCE REMARKS
DESIG:	AREA (acres)	C_5	LENGTH (ft)	SLOPE (ft/ft)	Ti (min)	LENGTH (ft)	AVG. SLOPE DY	AVG. SLOPE (%)	Conv. Type*	VEL (fps)	Tt (min)	COMP Tc (min)	%	$Tc=(26-17i)+(L_t/(60*(14i+9)*\sqrt{S_t})$ (min)	(min)	
D1	3.15	0.68				1245	7.2	0.6	6	1.5	13.6	13.6	80.0	25.9	**13.6**	Paved Gutter
D2	0.35	0.80	125	0.020	4.8	312	5.1	1.6	6	2.5	2.0	6.9	95.0	11.7	**6.9**	Paved Gutter
D3	2.87	0.75	125	0.020	5.6	312	5.1	1.6	6	2.5	2.0	7.7	89.0	12.8	**7.7**	Paved Gutter
D4	2.98	0.70				735	10.6	1.4	6	2.4	5.1	5.1	83.0	16.8	**5.1**	Paved Gutter
D5	3.47	0.67				687	10.5	1.5	6	2.5	4.6	4.6	79.3	17.1	**5.0**	Paved Gutter
D6	0.11	0.73							6				86.0		**5.0**	Paved Gutter
D7	0.33	0.71							6				83.8		**5.0**	Paved Gutter
D8	0.26	0.72							6				85.1		**5.0**	Paved Gutter
D9	0.46	0.72							6				85.1		**5.0**	Paved Gutter
D10	6.51	0.68				930		1.0	6	2.0	7.8	7.8	80.0	20.1	**7.8**	Paved Gutter
D11	0.39	0.76							6				90.5		**5.0**	Paved Gutter
D12	0.16	0.76							6				90.5		**5.0**	Paved Gutter
D13	1.59	0.76				1135	13.2	1.2	6	2.2	8.8	8.8	90.5	18.7	**8.8**	Paved Gutter
D14	0.27	0.71							6				83.8		**5.0**	Paved Gutter
D15	0.72	0.74				865	9.8	1.1	6	2.1	6.8	6.8	87.5	17.5	**6.8**	Paved Gutter
D16	0.37	0.73							6				86.0		**5.0**	Paved Gutter
D17	0.24	0.60							6				70.0		**5.0**	Paved Gutter
D18	0.34	0.80							6				95.0		**5.0**	Paved Gutter
D19	0.44	0.75							6				89.0		**5.0**	Paved Gutter
D20	1.20	0.62							6				72.5		**5.0**	Paved Gutter
D21	0.35	0.70							6				83.0		**5.0**	Paved Gutter
D22	0.25	0.68							6				80.8		**5.0**	Paved Gutter
D23	0.26	0.69							6				81.5		**5.0**	Paved Gutter
D24	0.12	0.68							6				80.0		**5.0**	Paved Gutter
D25	0.15	0.68							6				80.0		**5.0**	Paved Gutter
D26	0.45	0.80							6				95.0		**5.0**	Paved Gutter
D27	0.59	0.80							6				95.0		**5.0**	Paved Gutter
D28	0.19	0.74							6				88.1		**5.0**	Paved Gutter
D29	0.11	0.72							6				85.4		**5.0**	Paved Gutter
D30	0.43	0.80							6				95.0		**5.0**	Paved Gutter
D31	0.41	0.75							6				89.0		**5.0**	Paved Gutter
OS-5	0.28	0.70			2.1						2.4	4.4			**5.0**	
D32	0.73	0.74							6				88.3		**5.0**	Paved Gutter
D33	1.55	0.49				953	11.7	1.2	6	2.2	7.2	7.2	57.5	24.6	**7.2**	Paved Gutter
D34	1.53	0.49				953	11.7	1.2	6	2.2	7.2	7.2	57.5	24.6	**7.2**	Paved Gutter
D35	12.51	0.61				1246	11.2	0.9	6	1.9	11.0	11.0	71.3	25.5	**11.0**	Paved Gutter
D36	1.08	0.71				690		0.7	6	1.7	6.9	6.9	83.8	18.4	**6.9**	Paved Gutter
D37	1.22	0.49				756	5.1	0.7	6	1.6	7.7	7.7	57.5	25.2	**7.7**	Paved Gutter
D38	13.09	0.60				1420		0.9	6	1.9	12.5	12.5	70.0	27.4	**12.5**	Paved Gutter
OS-4	1.53	0.59			1.1						2.4	3.5			**5.0**	
D39	1.81	0.65				1050		0.9	6	1.9	9.2	9.2	76.3	22.4	**9.2**	Paved Gutter
D40	1.35	0.65				640		0.5	6	1.4	7.5	7.5	76.3	20.7	**7.5**	Paved Gutter
OS-101	3.37	0.46							5				53.0		**5.0**	Grass Swale
OS-102	0.47	0.70							5				83.0		**5.0**	Grass Swale
OS-103	2.77	0.46							5				53.0		**5.0**	Grass Swale
OS-104	3.34	0.64							6				75.5		**5.0**	Paved Gutter

Note: Conveyance Coefficients - Type 1-Heavy Meadow, Type 2-Tillage/field, Type 3-Short Pasture & Lawn, Type 4-Bare Soil, Type 5-Grass Swale, Type 6-Paved Gutter
Type 4-Nearly Bare Ground, Type 5-Grassed Waterway, Type 6-Paved Areas & Shallow Paved Swales.

Note: C Orange highlight notes values were retrieved from third party report - "FINAL DRAINAGE REPORT, AVENUE SOUTH MULTIFAMILY" By Kimley Horn Dated April 25, 2025

STANDARD FORM SF-2
STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)

2-year P1 = **1.00**
100-year P1 = 2.66

CALCULATED BY: DFL
CHECKED BY: BEC

PROJECT: CENTERRA SOUTH
BASIN: Minor

DESIGN STORM: **2-YEAR (Minor Storm)**
JOB NO: 130-00201
LOCATION: Loveland, Colorado

			DIRECT RUNOFF						TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			
LOCATION	DESIGN POINT	AREA DESIG.	AREA (Acres)	RUNOFF COEFF	Tc (min)	C A (Acres)	I (in/hour)	Q (cfs)	Tc (min)	(C A) (Acres)	I (in/hour)	Q (cfs)	SLOPE (%)	STREET FLOW (cfs)	DESIGN FLOW (cfs)	SLOPE (%)	PIPE SIZE	LENGTH (ft)	VELOCITY (fps)	Tt (min)	REMARKS
A	A1	A1	1.27	0.79	6.7	1.00	3.09	3.08						3.08							
															3.08	0.50	18	58	4.1	0.2	Surface Flow to Inlet 01_14 at DP A1, Inlet Capture Pipe Flow to JP-1
OS-101	OS-101	OS-101	3.37	0.42	5.0	1.43	3.48	4.97						4.97							Surface Flow to ex. offsite inlet at DP OS-101, Inlet Capture
															4.97	0.53	24	64	5.0	0.2	Pipe Flow to JP-1
	JP-1	Sum A1, OS-101	4.63	0.52					7.0	2.42	3.03	7.34									Combined Flow at JP-1
															4.97	0.50	30	270	5.6	0.8	Pipe Flow to JP-2
OS-104	OS-104	OS-104	3.34	0.62	5.0	2.07	3.48	7.20						7.20							Surface Flow to ex. offsite inlet at DP OS-104, Inlet Capture
															7.20	0.85	24	360	6.5	0.9	Pipe Flow to JP-2
	JP-2	Sum JP-1, OS-104	7.97	0.56					7.8	4.49	2.92	13.12									Combined Flow at JP-2
															13.12	1.00	30	118	8.2	0.2	Pipe Flow to JP-4
	A2	A2	0.85	0.79	5.0	0.67	3.48	2.33						2.33							Roof Drain Flow to DP A2
															2.33	1.00	8	60	3.5	0.3	Pipe Flow to JP-3
	A3	A3	1.84	0.66	5.0	1.22	3.48	4.25													Surface Flow to Inlet 01E_01 at DP A3, Inlet Capture
	JP-3	Sum A2, A3	2.69	0.70					5.3	1.89	3.40	6.43									Combined Flow at JP-3
																					Pipe Flow to JP-4
	JP-4	Sum JP-2, JP-3	10.66	0.60					8.0	6.38	2.90	18.52									Combined Flow at JP-4
															6.43	0.50	36	161	6.3	0.4	Pipe Flow to JP-6
	A4	A4	1.24	0.68	5.0	0.85	3.48	2.94						2.94							Surface Flow to Inlet 01D_02 at DP A4, Inlet Capture
															2.94	0.50	24	14	4.9	0.0	Pipe Flow to JP-5
	A5	A5	1.69	0.71	5.0	1.20	3.48	4.16													Surface Flow to Inlet 01D_01 at DP A5, Inlet Capture
	JP-5	Sum A4, A5	2.93	0.70					5.0	2.04	3.48	7.10									Combined Flow at JP-5
															7.10	0.50	30	255	5.6	0.8	Pipe Flow to JP-6
	JP-6	Sum JP-2, JP-3	13.59	0.62					8.5	8.43	2.84	23.93									Combined Flow at JP-6
															23.93	0.50	42	204	6.9	0.5	Pipe Flow to JP-7
	A6	A6	0.52	0.49	5.0	0.26	3.48	0.90						0.90							Surface Flow to Inlet 01C_02 at DP A6, Inlet Capture
															0.90	0.50	18	28	4.1	0.1	Pipe Flow to JP-7
	A7	A7	2.05	0.69	7.3	1.41	2.99	4.22						4.22							Surface Flow to Inlet 01C_01 at DP A7, Inlet Capture
															4.22	0.50	18	76	4.1	0.3	Pipe Flow to JP-7
	JP-7	Sum JP-6, A6, A7	16.16	0.62					8.9	10.10	2.80	28.27									Combined Flow at JP-7
															28.27	0.50	42	686	6.9	1.6	Pipe Flow to JP-8
	OS-2	OS-2	0.68	0.47	5.6	0.32	3.32	1.12													Surface Flow from Offsite Basin OS-2 Combines with Surface Flow from Basin A8 at DP A8, Inlet Capture
	A8	A8	0.76	0.62	5.0	0.48	3.48	1.66						2.78							Surface Flow to Inlet 01B_02 at DP A8, Inlet Capture
															2.78	0.50	18	10	4.1	0.0	Pipe Flow to JP-8
	A9	A9	0.94	0.66	5.0	0.62	3.48	2.16						2.16							Surface Flow to Inlet 01B_01 at DP A9, Inlet Capture
															2.16	0.50	18	33	4.1	0.1	Pipe Flow to JP-8
	JP-8	Sum JP-7, OS-2, A8, A9	18.55	0.62					10.6	11.51	2.63	30.28									Combined Flow at JP-8
															30.28	0.50	48	407	7.5	0.9	Pipe Flow to JP-9
	OS-3	OS-3	0.66	0.44	5.0	0.29	3.48	1.01													Surface Flow from Offsite Basin OS-3 Combines with Surface Flow from Basin A10 at DP A10, Inlet Capture
	A10	A10	0.64	0.62	5.0	0.40	3.48	1.39						2.40							Surface Flow to Inlet 01A_01 at DP A10, Inlet Capture
															2.40	0.50	18	44	4.1	0.2	Pipe Flow to JP-9
	JP-9	Sum JP-8, OS-3, A10	19.85	0.61					11.5	12.20	2.54	30.99									Combined Flow at JP-9
															30.99	0.50	48	25	7.5	0.1	Pipe Flow to JP-10
	A11	A11	0.73	0.59	5.0	0.43	3.48	1.51													Surface Flow to Inlet 01_02 at DP A11, Inlet Capture
	JP-10	Sum JP-9, A11	20.58	0.61					11.5	12.63	2.54	32.09									Combined Flow at JP-10
															32.09	0.50	48	62	7.5	0.1	Pipe Flow to POND
POND	JP-11	Sum JP-10, Travel time	20.58	0.61					11.7	12.63	2.52	31.84									
B	B1	B1	0.49	0.79	5.0	0.39	3.48	1.35						1.35							Surface Flow to Inlet 02G_01 at DP B1, Inlet Capture
															1.35	0.50	18	168	4.1	0.7	Pipe Flow to JP-12
OS-102	OS-102	OS-102	0.47	0.68	5.0	0.32	3.48	1.13						1.13							Surface Flow to ex. offsite inlet at DP OS-102, Inlet Capture
															1.13	0.50	24	95	4.9	0.3	Pipe Flow to JP-12, (Slope is unknown due to conditions at time of survey)
	JP-12	SUM B1, OS-102	0.97	0.74					5.7	0.71	3.30	2.35									Combined Flow at JP-12
															2.35	2.00	24	276	10.3	0.4	Pipe Flow to JP-18
	B2	B2	0.17	0.66	5.0	0.11	3.48	0.39						0.39							Surface Flow to Inlet 02F_07 at DP B2, Inlet Capture
															0.39	0.40	10	51	2.5	0.3	Pipe Flow to JP-13
	B3	B3	0.09	0.53	5.0	0.05	3.48	0.16													Surface Flow to Inlet 02F_06 at DP B3, Inlet Capture
	JP-13	SUM B2, B3	0.26	0.61					5.3	0.16	3.40	0.54									Combined Flow at JP-13
															0.54	0.50	18	160	4.1	0.7	Pipe Flow to JP-14
	B4	B4	0.21	0.79	5.0	0.16	3.48	0.57						0.57							Roof Drain Flow to DP B4
															0.57	1.00	8	45	3.5	0.2	Pipe Flow to JP-14
	JP-14	SUM JP-13, B4	0.47	0.69					6.0	0.32	3.22	1.04									Combined Flow at JP-14
															1.04	0.50	18	102	4.1	0.4	Pipe Flow to JP-16
	B5	B5	2.52	0.59	5.0	1.49	3.48	5.18						5.18							Surface Flow to Inlet 02F.2_01 at DP B5, Inlet Capture
															5.18	0.50	18	102	4.1	0.4	Pipe Flow to JP-15
	B6	B6	0.19	0.79	5.0	0.15	3.48	0.51						0.51							Roof Drain Flow to DP B6
															0.51	1.00	8	45	3.5	0.2	Pipe Flow to JP-15
	JP-15	SUM B5, B6	2.70	0.61					5.4	1.64	3.38	5.53									Combined Flow at JP-15
															5.53	1.00	8	45	3.5	0.2	Pipe Flow to JP-16
	JP-16	SUM JP-14, JP-15	3.17	0.62					6.4	1.96	3.15	6.18									Combined Flow at JP-16
															6.18	0.50	30	148	5.6	0.4	Pipe Flow to JP-18
	B7	B7	2.58	0.71	9.5	1.83	2.74	5.01						5.01							Surface Flow to Inlet 02F_01 at DP B7, Inlet Capture
															5.01	0.50	18	79	4.1	0.3	Pipe Flow to JP-17

STANDARD FORM SF-2
STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)

2-year P1 = **1.00**
100-year P1 = 2.66

CALCULATED BY: DFL
CHECKED BY: BEC

PROJECT: CENTERRA SOUTH
BASIN: Minor

DESIGN STORM: **2-YEAR (Minor Storm)**
JOB NO: 130-00201
LOCATION: Loveland, Colorado

LOCATION	DESIGN POINT	AREA DESIG.	DIRECT RUNOFF AREA (Acres)	DIRECT RUNOFF RUNOFF COEFF	DIRECT RUNOFF Tc (min)	DIRECT RUNOFF C A (Acres)	DIRECT RUNOFF I (in/hour)	DIRECT RUNOFF Q (cfs)	TOTAL RUNOFF Tc (min)	TOTAL RUNOFF (C A) (Acres)	TOTAL RUNOFF I (in/hour)	TOTAL RUNOFF Q (cfs)	STREET SLOPE (%)	STREET STREET FLOW (cfs)	PIPE DESIGN FLOW (cfs)	PIPE SLOPE (%)	PIPE PIPE SIZE	TRAVEL TIME LENGTH (ft)	TRAVEL TIME VELOCITY (fps)	TRAVEL TIME Tt (min)	REMARKS
	B8	B8	0.38	0.79	5.0	0.30	3.48	1.04						1.04							Roof Drain Flow to DP B8
															1.04	1.00	8	45	3.5	0.2	Pipe Flow to JP-17
	JP-17	SUM B7, B8	2.96	0.72					9.8	2.13	2.72	5.79									Combined Flow at JP-17
															5.79	0.50	30	163	5.6	0.5	Pipe Flow to JP-18
	JP-18	SUM JP-12, JP-16, JP-17	7.10	0.68					10.3	4.80	2.67	12.82									Combined Flow at JP-18
															12.82	0.50	36	80	6.3	0.2	Pipe Flow to JP-19
	B9	B9	0.30	0.72	5.0	0.22	3.48	0.76						0.76							Surface Flow at Inlet 02E_01 at DP B9, Inlet Capture
															0.76	0.50	18	25	4.1	0.1	Pipe Flow to JP-19
	JP-19	SUM JP-18, B9	7.40	0.68					10.5	5.02	2.64	13.25									Combined Flow at JP-19
															13.25	0.50	36	80	6.3	0.2	Pipe Flow to JP-23
	B10	B10	0.22	0.72	5.0	0.16	3.48	0.55						0.55							Surface Flow at Inlet 02D_05 at DP B11, Inlet Capture
															0.55	0.50	18	87	4.1	0.4	Pipe Flow to JP-23
	B11	B11	0.17	0.79	5.0	0.13	3.48	0.46						0.46							Roof Drain Flow to DP B11
															0.46	0.50	8	30	2.4	0.2	Pipe Flow to JP-20
	B12	B12	0.25	0.70	5.0	0.18	3.48	0.62													Surface Flow at Inlet 02D_01 at DP B12, Inlet Capture
	JP-20	SUM B11, B12	0.42	0.74					5.2	0.31	3.43	1.06									Combined Flow at JP-21
															1.06	0.50	18	88	4.1	0.4	Pipe Flow to JP-22
	B13	B13	0.34	0.68	5.0	0.23	3.48	0.80						0.80							Surface Flow at Inlet 02D.4_01 at DP B13, Inlet Capture
															0.80	0.50	18	23	4.1	0.1	Pipe Flow to JP-21
	JP-21	SUM JP-20, B13	0.76	0.71					5.6	0.54	3.32	1.78									Combined Flow at JP-22
															1.78	0.50	30	92	5.6	0.3	Pipe Flow to JP-23
	B14	B14	0.12	0.72	5.0	0.09	3.48	0.30						0.30							Surface Flow at Inlet 02D.3_01 at DP B14, Inlet Capture
															0.30	0.50	18	23	4.1	0.1	Pipe Flow to JP-22
	JP-22	SUM JP-21, B14	0.88	0.71					5.8	0.62	3.27	2.04									Combined Flow at JP-23
															2.04	0.50	18	23	4.1	0.1	Pipe Flow to JP-24
	JP-23	SUM JP-19, JP-22, B10	8.50	0.68					10.8	5.80	2.61	15.14									Combined Flow at JP-23
															15.14	0.50	42	66	6.9	0.2	Pipe Flow to JP-25
	B15	B15	0.27	0.79	5.0	0.21	3.48	0.73						0.73							Roof Drain Flow to DP B15
															0.73	1.00	8	35	3.5	0.2	Pipe Flow to JP-24
	B16	B16	0.67	0.70	5.0	0.47	3.48	1.63													Surface Flow at Inlet 02C_01 at DP B16, Inlet Capture
	JP-24	SUM B15, B16	0.93	0.73					5.2	0.68	3.43	2.33									Combined Flow at JP-24
															2.33	0.50	18	21	4.1	0.1	Pipe Flow to JP-25
	B17	B17	0.29	0.79	5.0	0.23	3.48	0.79						0.79							Roof Drain Flow to DP B17
															0.79	1.00	8	40	3.5	0.2	Pipe Flow to JP-25
	JP-25	SUM JP-23, JP-24, B17	9.72	0.69					10.9	6.71	2.60	17.44									Combined Flow at JP-25
															17.44	0.50	42	147	6.9	0.4	Channel Flow to JP-26
	B18	B18	0.59	0.72	5.0	0.42	3.48	1.46						1.46							Surface Flow at Inlet 02B_01 at DP B18, Inlet Capture
															1.46	0.50	18	23	4.1	0.1	Pipe Flow to JP-26
	JP-26	SUM JP-25, B18	10.31	0.69					11.3	7.13	2.56	18.25									Combined Flow at JP-26
															18.25	0.50	42	93	6.9	0.2	Pipe Flow to JP-29
	B19	B19	1.75	0.66	5.7	1.15	3.30	3.79						3.79							Surface Flow at Inlet 02A_03 at DP B21, Inlet Capture
															0.00	0.50	42	93	6.9	0.2	Pipe Flow to JP-28
	B20	B20	0.15	0.63	5.0	0.09	3.48	0.33													Surface Flow at Inlet 02A_02 at DP B22, Inlet Capture
	JP-27	SUM B19, B20	1.89	0.66					5.9	1.24	3.25	4.03									Combined Flow at JP-27
															4.03	0.50	42	93	6.9	0.2	Pipe Flow to JP-28
	OS-1	OS-1	0.58	0.37	5.4	0.21	3.38	0.76													Surface Flow from Offsite Basin OS-1
																					Combines with Surface Flow from Basin B21 at DP B21, Inlet Capture
	B21	B21	0.42	0.51	5.5	0.21	3.35	0.72						1.48							Surface Flow at Inlet 02A.1_01 at DP B21, Inlet Capture
															1.48	0.50	18	30	4.1	0.1	Pipe Flow to JP-28
	JP-28	SUM JP-27, OS-1, B21	2.89	0.58					6.1	1.67	3.20	5.34									Combined Flow at JP-28
															5.34	0.50	18	30	4.1	0.1	Channel Flow to JP-29
	JP-29	SUM JP-26, JP-28	13.20	0.67					11.5	8.80	2.54	22.35									Combined Flow at JP-30
															22.35	0.50	48	192	7.5	0.4	Pipe Flow to JP-31
C	C1	C1	1.36	0.79	5.0	1.07	3.48	3.71						3.71							Roof Drain Flow to DP C1
															3.71	0.50	8	100	2.4	0.7	Pipe Flow to JP-30
	JP-30	SUM JP-29, C1	14.55	0.68					11.9	9.86	2.50	24.66									Combined Flow at JP-30
															24.66	0.50	48	290	7.5	0.6	Pipe Flow to JP-31
	A106	A106	0.25	0.76	5.0	0.19	3.48	1.28													Surface Flow to Inlet within Future Multifamily Development
																					Pipe Flow to JP-31
	A108	A108	0.48	0.38	5.0	0.18	3.48	0.33													Surface Flow at Inlet 02_05 at DP C2, Inlet Capture
	C2	C2	1.07	0.14	7.2	0.15	3.01	0.44													Surface Flow at Inlet 02_05 at DP C2, Inlet Capture
	JP-31	SUM JP-30, C2, A106, A108	16.36	0.62					12.6	10.19	2.44	24.87									Combined Flow at JP-31
															24.87	0.45	48	171	7.1	0.4	Pipe Flow to JP-32
	A200	A200	2.71	0.71	5.2	1.92	3.43	6.77													Surface Flow to Inlet within Future Multifamily Development
																					Pipe Flow to JP-32
	A202	A202	1.80	0.70	5.0	1.26	3.48	4.37													Surface Flow to Inlet within Future Multifamily Development
																					Pipe Flow to JP-32
	A104	A104	0.38	0.60	5.0	0.23	3.48	0.98													Surface Flow to Inlet within Future Multifamily Development
																					Pipe Flow to JP-32
	A100	A100	2.66	0.70	5.0	1.86	3.48	6.52													Surface Flow to Inlet within Future Multifamily Development
																					Pipe Flow to JP-32
	A102	A102	0.41	0.63	5.0	0.26	3.48	0.90													Surface Flow to Inlet within Future Multifamily Development
																					Pipe Flow to JP-32
	JP-32	SUM JP-31, A200, A202, A104, A100, A102	24.32	0.65					13.0	15.73	2.41	37.90									Combined Flow at JP-32

STANDARD FORM SF-2
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CALCULATED BY: DFL
CHECKED BY: BEC

PROJECT: CENTERRA SOUTH
BASIN: Minor

DESIGN STORM: **2-YEAR (Minor Storm)**
JOB NO: 130-00201
LOCATION: Loveland, Colorado

LOCATION	DESIGN POINT	AREA DESIG.	DIRECT RUNOFF AREA (Acres)	DIRECT RUNOFF RUNOFF COEFF	DIRECT RUNOFF Tc (min)	DIRECT RUNOFF C A (Acres)	DIRECT RUNOFF I (in/hour)	DIRECT RUNOFF Q (cfs)	TOTAL RUNOFF Tc (min)	TOTAL RUNOFF (C A) (Acres)	TOTAL RUNOFF I (in/hour)	TOTAL RUNOFF Q (cfs)	STREET SLOPE (%)	STREET FLOW (cfs)	PIPE DESIGN FLOW (cfs)	PIPE SLOPE (%)	PIPE SIZE	TRAVEL TIME LENGTH (ft)	TRAVEL TIME VELOCITY (fps)	TRAVEL TIME Tt (min)	REMARKS
Pond	JP-33	SUM JP-32, Travel time	24.32	0.65					13.4	15.73	2.38	37.43			37.90	0.88	54	296	11.0	0.4	Pipe Flow to POND
D	D1	D1	3.15	0.66	13.6	2.07	2.37	4.91						4.91	4.91	0.49	18	46	4.0	0.2	Surface Flow to Inlet 03_15 at DP D1, Inlet Capture Pipe Flow to JP-34
OS-103	OS-103	OS-103	2.77	0.42	5.0	1.18	3.48	4.10						4.10	4.10	3.00	24	46	12.8	0.1	Surface Flow to ex. offsite inlet at DP OS-103, Inlet Capture Pipe Flow to JP-34
	JP-34	SUM D1, OS-103	5.92	0.55					13.8	3.25	2.35	7.63			7.63	1.40	30	440	9.8	0.7	Combined Flow at JP-34 Pipe Flow to JP-37
	D2	D2	0.35	0.79	6.9	0.28	3.05	0.84						0.84	0.84	0.50	24	24	4.9	0.1	Roof Drain Flow to DP D3 Pipe Flow to JP-35
	D3	D3	2.87	0.73	7.7	2.10	2.94	6.18													Surface Flow at Inlet 03G_01 at DP D2, Inlet Capture
	JP-35	SUM D2, D3	3.22	0.74					7.7	2.38	2.94	6.99			6.99	0.50	24	175	4.9	0.6	Combined Flow at JP-35 Pipe Flow to JP-37
	D4	D4	2.98	0.68	5.1	2.03	3.45	7.01						7.01	7.01	0.50	24	215	4.9	0.7	Surface Flow at Inlet 03G_05 at DP D4, Inlet Capture Pipe Flow to JP-36
	D5	D5	3.47	0.65	5.0	2.25	3.48	7.82						7.82	7.82	0.50	24	22	4.9	0.1	Surface Flow at Inlet 03G.2_01 at DP D5, Inlet Capture Pipe Flow to JP-36
	JP-36	SUM D4, D5	6.45	0.66					5.8	4.28	3.27	14.00			14.00	0.50	36	169	6.3	0.4	Combined Flow at JP-36 Pipe Flow to JP-37
	JP-37	SUM JP-34, JP-35, JP-36	15.60	0.64					14.5	9.91	2.31	22.88			22.88	0.50	48	84	7.5	0.2	Combined Flow at JP-37 Pipe Flow to JP-38
	D6	D6	0.11	0.70	5.0	0.08	3.48	0.28						0.28	0.28	0.50	18	30	4.1	0.1	Surface Flow at Inlet 03F_01 at DP D6, Inlet Capture Pipe Flow to JP-38
	D7	D7	0.33	0.68	5.0	0.23	3.48	0.78						0.78	0.78	0.50	18	17	4.1	0.1	Surface Flow at Inlet 03F_02 at DP D7, Inlet Capture Pipe Flow to JP-38
	JP-38	SUM JP-37, D6, D7	16.04	0.64					14.7	10.21	2.30	23.49			23.49	0.50	48	84	7.5	0.2	Combined Flow at JP-38 Pipe Flow to JP-45
	D8	D8	0.26	0.70	5.0	0.18	3.48	0.62						0.62	0.62	0.50	18	27	4.1	0.1	Surface Flow at Inlet 03E_07 at DP D8, Inlet Capture Pipe Flow to JP-39
	D9	D9	0.46	0.70	5.0	0.32	3.48	1.12						1.12	1.12	0.50	18	20	4.1	0.1	Surface Flow at Inlet 03E.1_01 at DP D9, Inlet Capture Pipe Flow to JP-39
	JP-39	SUM D8, D9	0.72	0.70					5.1	0.50	3.45	1.73			1.73	0.50	18	139	4.1	0.6	Combined Flow at JP-39 Channel Flow to JP-45
	D10	D10	6.51	0.65	7.8	4.23	2.92	12.34						12.34	12.34	0.50	36	50	6.3	0.1	Future Development Pipe Flow at DP D10 Pipe Flow to JP-40
	D11	D11	0.39	0.75	5.0	0.29	3.48	1.01						1.01							Surface Flow at Inlet 03E_01 at DP D11, Inlet Capture
	JP-40	SUM D10, D11	6.90	0.65					7.9	4.52	2.91	13.15			13.15	0.50	36	19	6.3	0.1	Combined Flow at JP-40 Pipe Flow to JP-41
	D12	D12	0.16	0.75	5.0	0.12	3.48	0.42						0.42	0.42	0.50	18	9	4.1	0.0	Surface Flow at Inlet 03E.4_01 at DP D12, Inlet Capture Pipe Flow to JP-41
	JP-41	SUM JP-40, D12	7.06	0.66					7.9	4.64	2.91	13.50			13.50	0.50	42	92	6.9	0.2	Combined Flow at JP-41 Pipe Flow to JP-42
	D13	D13	1.59	0.75	8.8	1.19	2.81	3.34						3.34	3.34	0.50	24	153	4.9	0.5	Surface Flow at Inlet 03E.5_02 at DP D13, Inlet Capture Pipe Flow to JP-42
	JP-42	SUM JP-41, D13	8.66	0.67					9.3	5.83	2.76	16.09			0.00	0.50	42	95	6.9	0.2	Combined Flow at JP-42 Pipe Flow to JP-43
	D14	D14	0.27	0.68	5.0	0.19	3.48	0.65						0.65	0.65	0.50	18	23	4.1	0.1	Surface Flow at Inlet 03E.3_01 at DP D14, Inlet Capture Pipe Flow to JP-43
	D15	D15	0.72	0.72	6.8	0.52	3.07	1.59						1.59	1.59	0.50	18	15	4.1	0.1	Surface Flow at Inlet 03E.3_02 at DP D15, Inlet Capture Pipe Flow to JP-43
	JP-43	SUM JP-42, D14, D15	9.65	0.68					9.5	6.53	2.74	17.90			17.90	0.50	42	183	6.9	0.4	Combined Flow at JP-43 Pipe Flow to JP-44
	D16	D16	0.37	0.70	5.0	0.26	3.48	0.90						0.90	0.90	0.50	18	23	4.1	0.1	Surface Flow at Inlet 03E.2_01 at DP D16, Inlet Capture Pipe Flow to JP-44
	D17	D17	0.24	0.57	5.0	0.14	3.48	0.48						0.48	0.48	1.00	18	15	5.9	0.0	Surface Flow at Inlet 03E.2_02 at DP D17, Inlet Capture Pipe Flow to JP-44
	JP-44	SUM JP-43, D16, D17	10.26	0.68					10.0	6.93	2.70	18.71			18.71	0.50	42	184	6.9	0.4	Combined Flow at JP-44 Pipe Flow to JP-45
	JP-45	SUM JP-38, JP-39, JP-44	27.02	0.65					14.9	17.64	2.29	40.40			40.40	0.50	54	187	8.1	0.4	Combined Flow at JP-45 Pipe Flow to JP-47
	D18	D18	0.34	0.79	5.0	0.27	3.48	0.93						0.93	0.93	1.00	8	30	3.5	0.1	Roof Drain Flow at DP D18 Pipe Flow to JP-46
	D19	D19	0.44	0.73	5.0	0.32	3.48	1.12													Surface Flow at Inlet 03D_01 at DP D19, Inlet Capture
	JP-46	SUM D18, D19	0.78	0.76					5.1	0.59	3.45	2.03			2.03	0.50	18	30	4.1	0.1	Combined Flow at JP-46 Pipe Flow to JP-47
	D20	D20	1.20	0.58	5.0	0.70	3.48	2.43						2.43	2.43	0.50	18	17	4.1	0.1	Surface Flow at Inlet 03D_02 at DP D20, Inlet Capture Pipe Flow to JP-47
	JP-47	SUM JP-45, JP-46, D20	29.00	0.65					15.3	18.93	2.26	42.79			42.79	0.56	54	102	8.6	0.2	Combined Flow at JP-47 Pipe Flow to JP-48
	D21	D21	0.35	0.68	5.0	0.24	3.48	0.82													Future Commercial Surface Flow at DP D21, Inlet Capture
	D22	D22	0.25	0.66	5.0	0.17	3.48	0.58													Future Commercial Surface Flow at DP D22, Inlet Capture

STANDARD FORM SF-2
STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)

2-year P1 = 1.00
100-year P1 = 2.66

CALCULATED BY: DFL
CHECKED BY: BEC

PROJECT: CENTERRA SOUTH
BASIN: Major

DESIGN STORM: **100-YEAR (Minor Storm)**
JOB NO: 130-00201
LOCATION: Loveland, Colorado

		DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			
LOCATION	DESIGN POINT	AREA DESIG.	AREA (Acres)	RUNOFF COEFF	Tc (min)	C A (Acres)	I (in/hour)	Q (cfs)	Tc (min)	(C A) (Acres)	I (in/hour)	Q (cfs)	SLOPE (%)	STREET FLOW (cfs)	DESIGN FLOW (cfs)	SLOPE (%)	PIPE SIZE	LENGTH (ft)	VELOCITY (fps)	Tt (min)	REMARKS
A	A1	A1	1.27	0.87	6.7	1.10	8.22	9.07						9.07							
															9.07	0.50	18	58	4.1	0.2	Surface Flow to Inlet 01_14 at DP A1, Inlet Capture Pipe Flow to JP-1
OS-101	OS-101	OS-101	3.37	0.70	5.0	2.36	9.24	21.79						21.79							Surface Flow to ex. offsite inlet at DP OS-101, Inlet Capture
															21.79	0.53	24	64	5.0	0.2	Pipe Flow to JP-1
	JP-1	Sum A1, OS-101	4.63	0.75					7.0	3.46	8.07	27.94									Combined Flow at JP-1
															21.79	0.50	30	270	5.6	0.8	Pipe Flow to JP-2
OS-104	OS-104	OS-104	3.34	0.79	5.0	2.65	9.24	24.47						24.47							Surface Flow to ex. offsite inlet at DP OS-104, Inlet Capture
															24.47	0.85	24	360	6.5	0.9	Pipe Flow to JP-2
	JP-2	Sum JP-1, OS-104	7.97	0.77					7.8	6.11	7.78	47.54									Combined Flow at JP-2
															47.54	1.00	30	118	8.2	0.2	Pipe Flow to JP-4
	A2	A2	0.85	0.87	5.0	0.74	9.24	6.85						6.85							Roof Drain Flow to DP A2
															6.85	1.00	8	60	3.5	0.3	Pipe Flow to JP-3
	A3	A3	1.84	0.81	5.0	1.50	9.24	13.86													Surface Flow to Inlet 01E_01 at DP A3, Inlet Capture
	JP-3	Sum A2, A3	2.69	0.83					5.3	2.24	9.04	20.26									Combined Flow at JP-3
																					Pipe Flow to JP-4
	JP-4	Sum JP-2, JP-3	10.66	0.78					8.0	8.35	7.71	64.39									Combined Flow at JP-4
															20.26	0.50	36	161	6.3	0.4	Pipe Flow to JP-6
	A4	A4	1.24	0.82	5.0	1.02	9.24	9.46						9.46							Surface Flow to Inlet 01D_02 at DP A4, Inlet Capture
															9.46	0.50	24	14	4.9	0.0	Pipe Flow to JP-5
	A5	A5	1.69	0.84	5.0	1.41	9.24	13.03													Surface Flow to Inlet 01D_01 at DP A5, Inlet Capture
	JP-5	Sum A4, A5	2.93	0.83					5.0	2.43	9.24	22.49									Combined Flow at JP-5
															22.49	0.50	30	255	5.6	0.8	Pipe Flow to JP-6
	JP-6	Sum JP-2, JP-3	13.59	0.79					8.5	10.79	7.57	81.64									Combined Flow at JP-6
															81.64	0.50	42	204	6.9	0.5	Pipe Flow to JP-7
	A6	A6	0.52	0.73	5.0	0.38	9.24	3.54						3.54							Surface Flow to Inlet 01C_02 at DP A6, Inlet Capture
															3.54	0.50	18	28	4.1	0.1	Pipe Flow to JP-7
	A7	A7	2.05	0.83	7.3	1.69	7.97	13.48						13.48							Surface Flow to Inlet 01C_01 at DP A7, Inlet Capture
															13.48	0.50	18	76	4.1	0.3	Pipe Flow to JP-7
	JP-7	Sum JP-6, A6, A7	16.16	0.80					8.9	12.86	7.46	95.93									Combined Flow at JP-7
															95.93	0.50	42	686	6.9	1.6	Pipe Flow to JP-8
	OS-2	OS-2	0.68	0.72	5.6	0.49	8.83	1.12													Surface Flow from Offsite Basin OS-2 Combines with Surface Flow from Basin A8 at DP A8, Inlet Capture
	A8	A8	0.76	0.80	5.0	0.61	9.24	5.61						6.73							Surface Flow to Inlet 01B_02 at DP A8, Inlet Capture
															6.73	0.50	18	10	4.1	0.0	Pipe Flow to JP-8
	A9	A9	0.94	0.81	5.0	0.77	9.24	7.07						7.07							Surface Flow to Inlet 01B_01 at DP A9, Inlet Capture
															7.07	0.50	18	33	4.1	0.1	Pipe Flow to JP-8
	JP-8	Sum JP-7, OS-2, A8, A9	18.55	0.79					10.6	14.72	7.02	103.35									Combined Flow at JP-8
															103.35	0.50	48	407	7.5	0.9	Pipe Flow to JP-9
	OS-3	OS-3	0.66	0.71	5.0	0.47	9.24	1.01													Surface Flow from Offsite Basin OS-3 Combines with Surface Flow from Basin A10 at DP A10, Inlet Capture
	A10	A10	0.64	0.80	5.0	0.51	9.24	4.70						5.71							Surface Flow to Inlet 01A_01 at DP A10, Inlet Capture
															5.71	0.50	18	44	4.1	0.2	Pipe Flow to JP-9
	JP-9	Sum JP-8, OS-3, A10	19.85	0.79					11.5	15.70	6.77	106.28									Combined Flow at JP-9
															106.28	0.50	48	25	7.5	0.1	Pipe Flow to JP-10
	A11	A11	0.73	0.78	5.0	0.57	9.24	5.27													Surface Flow to Inlet 01_02 at DP A11, Inlet Capture
	JP-10	Sum JP-9, A11	20.58	0.79					11.5	16.27	6.77	110.14									Combined Flow at JP-10
															110.14	0.50	48	62	7.5	0.1	Pipe Flow to POND
POND	JP-11	Sum JP-10, Travel time	20.58	0.79					11.7	16.27	6.72	109.33									
B	B1	B1	0.49	0.87	5.0	0.43	9.24	3.98						3.98							Surface Flow to Inlet 02G_01 at DP B1, Inlet Capture
															3.98	0.50	18	168	4.1	0.7	Pipe Flow to JP-12
OS-102	OS-102	OS-102	0.47	0.82	5.0	0.39	9.24	3.60						3.60							Surface Flow to ex. offsite inlet at DP OS-102, Inlet Capture
															3.60	0.50	24	95	4.9	0.3	Pipe Flow to JP-12, (Slope is unknown due to conditions at time of survey)
	JP-12	SUM B1, OS-102	0.97	0.85					5.7	0.82	8.76	7.18									Combined Flow at JP-12
															7.18	2.00	24	276	10.3	0.4	Pipe Flow to JP-18
	B2	B2	0.17	0.81	5.0	0.14	9.24	1.29						1.29							Surface Flow to Inlet 02F_07 at DP B2, Inlet Capture
															1.29	0.40	10	51	2.5	0.3	Pipe Flow to JP-13
	B3	B3	0.09	0.75	5.0	0.06	9.24	0.60													Surface Flow to Inlet 02F_06 at DP B3, Inlet Capture
	JP-13	SUM B2, B3	0.26	0.79					5.3	0.20	9.04	1.85									Combined Flow at JP-13
															1.85	0.50	18	160	4.1	0.7	Pipe Flow to JP-14
	B4	B4	0.21	0.87	5.0	0.18	9.24	1.69						1.69							Roof Drain Flow to DP B4
															1.69	1.00	8	45	3.5	0.2	Pipe Flow to JP-14
	JP-14	SUM JP-13, B4	0.47	0.83					6.0	0.39	8.56	3.32									Combined Flow at JP-14
															3.32	0.50	18	102	4.1	0.4	Pipe Flow to JP-16
	B5	B5	2.52	0.78	5.0	1.96	9.24	18.14						18.14							Surface Flow to Inlet 02F.2_01 at DP B5, Inlet Capture
															18.14	0.50	18	102	4.1	0.4	Pipe Flow to JP-15
	B6	B6	0.19	0.87	5.0	0.16	9.24	1.51						1.51							Roof Drain Flow to DP B6
															1.51	1.00	8	45	3.5	0.2	Pipe Flow to JP-15
	JP-15	SUM B5, B6	2.70	0.79					5.4	2.13	8.97	19.07									Combined Flow at JP-15
															19.07	1.00	8	45	3.5	0.2	Pipe Flow to JP-16
	JP-16	SUM JP-14, JP-15	3.17	0.79					6.4	2.51	8.37	21.04									Combined Flow at JP-16
															21.04	0.50	30	148	5.6	0.4	Pipe Flow to JP-18
	B7	B7	2.58	0.84	9.5	2.16	7.31	15.77						15.77							Surface Flow to Inlet 02F_01 at DP B7, Inlet Capture
															15.77	0.50	18	79	4.1	0.3	Pipe Flow to JP-17

STANDARD FORM SF-2
STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)

2-year P1 = 1.00
100-year P1 = 2.66

CALCULATED BY: DFL
CHECKED BY: BEC

PROJECT: CENTERRA SOUTH
BASIN: Major

DESIGN STORM: **100-YEAR (Minor Storm)**
JOB NO: 130-00201
LOCATION: Loveland, Colorado

LOCATION	DESIGN POINT	AREA DESIG.	DIRECT RUNOFF AREA (Acres)	DIRECT RUNOFF RUNOFF COEFF	DIRECT RUNOFF Tc (min)	DIRECT RUNOFF C A (Acres)	DIRECT RUNOFF I (in/hour)	DIRECT RUNOFF Q (cfs)	TOTAL RUNOFF Tc (min)	TOTAL RUNOFF (C A) (Acres)	TOTAL RUNOFF I (in/hour)	TOTAL RUNOFF Q (cfs)	STREET SLOPE (%)	STREET FLOW (cfs)	PIPE DESIGN FLOW (cfs)	PIPE SLOPE (%)	PIPE PIPE SIZE	TRAVEL TIME LENGTH (ft)	TRAVEL TIME VELOCITY (fps)	TRAVEL TIME Tt (min)	REMARKS
	B8	B8	0.38	0.87	5.0	0.33	9.24	3.06						3.06							Roof Drain Flow to DP B8
															3.06	1.00	8	45	3.5	0.2	Pipe Flow to JP-17
	JP-17	SUM B7, B8	2.96	0.84					9.8	2.49	7.25	18.05									Combined Flow at JP-17
															18.05	0.50	30	163	5.6	0.5	Pipe Flow to JP-18
	JP-18	SUM JP-12, JP-16, JP-17	7.10	0.82					10.3	5.82	7.11	41.40									Combined Flow at JP-18
															41.40	0.50	36	80	6.3	0.2	Pipe Flow to JP-19
	B9	B9	0.30	0.84	5.0	0.25	9.24	2.35						2.35							Surface Flow at Inlet 02E_01 at DP B9, Inlet Capture
															2.35	0.50	18	25	4.1	0.1	Pipe Flow to JP-19
	JP-19	SUM JP-18, B9	7.40	0.82					10.5	6.08	7.05	42.85									Combined Flow at JP-19
															42.85	0.50	36	80	6.3	0.2	Pipe Flow to JP-23
	B10	B10	0.22	0.84	5.0	0.19	9.24	1.72						1.72							Surface Flow at Inlet 02D_05 at DP B11, Inlet Capture
															1.72	0.50	18	87	4.1	0.4	Pipe Flow to JP-23
	B11	B11	0.17	0.87	5.0	0.15	9.24	1.34						1.34							Roof Drain Flow to DP B11
															1.34	0.50	8	30	2.4	0.2	Pipe Flow to JP-20
	B12	B12	0.25	0.84	5.0	0.21	9.24	1.94													Surface Flow at Inlet 02D_01 at DP B12, Inlet Capture
	JP-20	SUM B11, B12	0.42	0.85					5.2	0.35	9.10	3.23									Combined Flow at JP-21
															3.23	0.50	18	88	4.1	0.4	Pipe Flow to JP-22
	B13	B13	0.34	0.82	5.0	0.28	9.24	2.58						2.58							Surface Flow at Inlet 02D.4_01 at DP B13, Inlet Capture
															2.58	0.50	18	23	4.1	0.1	Pipe Flow to JP-21
	JP-21	SUM JP-20, B13	0.76	0.84					5.6	0.63	8.83	5.60									Combined Flow at JP-22
															5.60	0.50	30	92	5.6	0.3	Pipe Flow to JP-23
	B14	B14	0.12	0.84	5.0	0.10	9.24	0.93						0.93							Surface Flow at Inlet 02D.3_01 at DP B14, Inlet Capture
															0.93	0.50	18	23	4.1	0.1	Pipe Flow to JP-22
	JP-22	SUM JP-21, B14	0.88	0.84					5.8	0.73	8.70	6.39									Combined Flow at JP-23
															6.39	0.50	18	23	4.1	0.1	Pipe Flow to JP-24
	JP-23	SUM JP-19, JP-22, B10	8.50	0.82					10.8	7.00	6.96	48.71									Combined Flow at JP-23
															48.71	0.50	42	66	6.9	0.2	Pipe Flow to JP-25
	B15	B15	0.27	0.87	5.0	0.23	9.24	2.15						2.15							Roof Drain Flow to DP B15
															2.15	1.00	8	35	3.5	0.2	Pipe Flow to JP-24
	B16	B16	0.67	0.84	5.0	0.56	9.24	5.14													Surface Flow at Inlet 02C_01 at DP B16, Inlet Capture
	JP-24	SUM B15, B16	0.93	0.85					5.2	0.79	9.10	7.18									Combined Flow at JP-24
															7.18	0.50	18	21	4.1	0.1	Pipe Flow to JP-25
	B17	B17	0.29	0.87	5.0	0.25	9.24	2.34						2.34							Roof Drain Flow to DP B17
															2.34	1.00	8	40	3.5	0.2	Pipe Flow to JP-25
	JP-25	SUM JP-23, JP-24, B17	9.72	0.83					10.9	8.04	6.93	55.72									Combined Flow at JP-25
															55.72	0.50	42	147	6.9	0.4	Channel Flow to JP-26
	B18	B18	0.59	0.84	5.0	0.49	9.24	4.55						4.55							Surface Flow at Inlet 02B_01 at DP B18, Inlet Capture
															4.55	0.50	18	23	4.1	0.1	Pipe Flow to JP-26
	JP-26	SUM JP-25, B18	10.31	0.83					11.3	8.53	6.82	58.20									Combined Flow at JP-26
															58.20	0.50	42	93	6.9	0.2	Pipe Flow to JP-29
	B19	B19	1.75	0.81	5.7	1.42	8.76	12.40						12.40							Surface Flow at Inlet 02A_03 at DP B21, Inlet Capture
															0.00	0.50	42	93	6.9	0.2	Pipe Flow to JP-28
	B20	B20	0.15	0.80	5.0	0.12	9.24	1.10													Surface Flow at Inlet 02A_02 at DP B22, Inlet Capture
	JP-27	SUM B19, B20	1.89	0.81					5.9	1.53	8.63	13.24									Combined Flow at JP-27
															13.24	0.50	42	93	6.9	0.2	Pipe Flow to JP-28
	OS-1	OS-1	0.58	0.68	5.4	0.39	8.97	0.76													Surface Flow from Offsite Basin OS-1
																					Combines with Surface Flow from Basin B21 at DP B21, Inlet Capture
	B21	B21	0.42	0.74	5.5	0.31	8.90	2.78						3.54							Surface Flow at Inlet 02A.1_01 at DP B21, Inlet Capture
															3.54	0.50	18	30	4.1	0.1	Pipe Flow to JP-28
	JP-28	SUM JP-27, OS-1, B21	2.89	0.77					6.1	2.24	8.51	19.07									Combined Flow at JP-28
															19.07	0.50	18	30	4.1	0.1	Channel Flow to JP-29
	JP-29	SUM JP-26, JP-28	13.20	0.82					11.5	10.77	6.77	72.94									Combined Flow at JP-30
															72.94	0.50	48	192	7.5	0.4	Pipe Flow to JP-31
C	C1	C1	1.36	0.87	5.0	1.18	9.24	10.93						10.93							Roof Drain Flow to DP C1
															10.93	0.50	8	100	2.4	0.7	Pipe Flow to JP-30
	JP-30	SUM JP-29, C1	14.55	0.82					11.9	11.96	6.67	79.75									Combined Flow at JP-30
															79.75	0.50	48	290	7.5	0.6	Pipe Flow to JP-31
	A106	A106	0.25	0.86	5.0	0.22	9.24	1.28													Surface Flow to Inlet within Future Multifamily Development
																					Pipe Flow to JP-31
	A108	A108	0.48	0.68	5.0	0.33	9.24	0.33													Surface Flow at Inlet 02_05 at DP C2, Inlet Capture
	C2	C2	1.07	0.57	7.2	0.61	8.00	4.86													Surface Flow at Inlet 02_05 at DP C2, Inlet Capture
	JP-31	SUM JP-30, C2, A106, A108	16.36	0.79					12.6	12.89	6.51	83.92									Combined Flow at JP-31
															83.92	0.45	48	171	7.1	0.4	Pipe Flow to JP-32
	A200	A200	2.71	0.84	5.2	2.28	9.10	6.77													Surface Flow to Inlet within Future Multifamily Development
																					Pipe Flow to JP-32
	A202	A202	1.80	0.83	5.0	1.49	9.24	4.37													Surface Flow to Inlet within Future Multifamily Development
																					Pipe Flow to JP-32
	A104	A104	0.38	0.78	5.0	0.30	9.24	0.98													Surface Flow to Inlet within Future Multifamily Development
																					Pipe Flow to JP-32
	A100	A100	2.66	0.83	5.0	2.21	9.24	6.52													Surface Flow to Inlet within Future Multifamily Development
																					Pipe Flow to JP-32
	A102	A102	0.41	0.80	5.0	0.33	9.24	0.90													Surface Flow to Inlet within Future Multifamily Development
																					Pipe Flow to JP-32
	JP-32	SUM JP-31, A200, A202, A104, A100, A102	24.32	0.80					13.0	19.49	6.42	125.15									Combined Flow at JP-32

STANDARD FORM SF-2
STORM DRAINAGE SYSTEM DESIGN
(RATIONAL METHOD PROCEDURE)

2-year P1 = 1.00

100-year P1 = 2.66

DESIGN STORM: **100-YEAR (Minor Storm)**

CALCULATED BY: DFL

PROJECT: CENTERRA SOUTH

JOB NO: 130-00201

CHECKED BY: BEC

BASIN: Major

LOCATION: Loveland, Colorado

		DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			
LOCATION	DESIGN POINT	AREA DESIG.	AREA (Acres)	RUNOFF COEFF	Tc (min)	C A (Acres)	I (in/hour)	Q (cfs)	Tc (min)	(C A) (Acres)	I (in/hour)	Q (cfs)	SLOPE (%)	STREET FLOW (cfs)	DESIGN FLOW (cfs)	SLOPE (%)	PIPE SIZE	LENGTH (ft)	VELOCITY (fps)	Tt (min)	REMARKS
									13.4						125.15	0.88	54	296	11.0	0.4	
Pond	JP-33	SUM JP-32, Travel time	24.32	0.80						19.49	6.35	123.78									Pipe Flow to POND
D	D1	D1	3.15	0.81	13.6	2.56	6.31	16.12						16.12							Surface Flow to Inlet 03_15 at DP D1, Inlet Capture
															16.12	0.49	18	46	4.0	0.2	Pipe Flow to JP-34
OS-103	OS-103	OS-103	2.77	0.70	5.0	1.94	9.24	17.96						17.96							Surface Flow to ex. offsite inlet at DP OS-103, Inlet Capture
	JP-34	SUM D1, OS-103	5.92	0.76					13.8	4.50	6.28	28.26			17.96	3.00	24	46	12.8	0.1	Pipe Flow to JP-34
															28.26	1.40	30	440	9.8	0.7	Combined Flow at JP-34 Pipe Flow to JP-37
	D2	D2	0.35	0.87	6.9	0.31	8.12	2.48						2.48							Roof Drain Flow to DP D3
															2.48	0.50	24	24	4.9	0.1	Pipe Flow to JP-35
	D3	D3	2.87	0.85	7.7	2.44	7.82	19.04													Surface Flow at Inlet 03G_01 at DP D2, Inlet Capture
	JP-35	SUM D2, D3	3.22	0.85					7.7	2.74	7.82	21.43			21.43	0.50	24	175	4.9	0.6	Combined Flow at JP-35 Pipe Flow to JP-37
	D4	D4	2.98	0.82	5.1	2.46	9.17	22.53						22.53							Surface Flow at Inlet 03G_05 at DP D4, Inlet Capture
															22.53	0.50	24	215	4.9	0.7	Pipe Flow to JP-36
	D5	D5	3.47	0.81	5.0	2.80	9.24	25.89						25.89							Surface Flow at Inlet 03G.2_01 at DP D5, Inlet Capture
															25.89	0.50	24	22	4.9	0.1	Pipe Flow to JP-36
	JP-36	SUM D4, D5	6.45	0.82					5.8	5.26	8.70	45.76									Combined Flow at JP-36 Pipe Flow to JP-37
															45.76	0.50	36	169	6.3	0.4	
	JP-37	SUM JP-34, JP-35, JP-36	15.60	0.80					14.5	12.50	6.16	77.00									Combined Flow at JP-37 Pipe Flow to JP-38
															77.00	0.50	48	84	7.5	0.2	
	D6	D6	0.11	0.84	5.0	0.10	9.24	0.88						0.88							Surface Flow at Inlet 03F_01 at DP D6, Inlet Capture
															0.88	0.50	18	30	4.1	0.1	Pipe Flow to JP-38
	D7	D7	0.33	0.83	5.0	0.27	9.24	2.51						2.51							Surface Flow at Inlet 03F_02 at DP D7, Inlet Capture
															2.51	0.50	18	17	4.1	0.1	Pipe Flow to JP-38
	JP-38	SUM JP-37, D6, D7	16.04	0.80					14.7	12.87	6.13	78.88									Combined Flow at JP-38 Pipe Flow to JP-45
															78.88	0.50	48	84	7.5	0.2	
	D8	D8	0.26	0.83	5.0	0.21	9.24	1.98						1.98							Surface Flow at Inlet 03E_07 at DP D8, Inlet Capture
															1.98	0.50	18	27	4.1	0.1	Pipe Flow to JP-39
	D9	D9	0.46	0.83	5.0	0.39	9.24	3.57						3.57							Surface Flow at Inlet 03E.1_01 at DP D9, Inlet Capture
															3.57	0.50	18	20	4.1	0.1	Pipe Flow to JP-39
	JP-39	SUM D8, D9	0.72	0.83					5.1	0.60	9.17	5.50									Combined Flow at JP-39 Channel Flow to JP-45
															5.50	0.50	18	139	4.1	0.6	
	D10	D10	6.51	0.81	7.8	5.28	7.78	41.08						41.08							Future Development Pipe Flow at DP D10
															41.08	0.50	36	50	6.3	0.1	Pipe Flow to JP-40
	D11	D11	0.39	0.85	5.0	0.33	9.24	3.08						3.08							Surface Flow at Inlet 03E_01 at DP D11, Inlet Capture
	JP-40	SUM D10, D11	6.90	0.81					7.9	5.61	7.75	43.51									Combined Flow at JP-40 Pipe Flow to JP-41
															43.51	0.50	36	19	6.3	0.1	
	D12	D12	0.16	0.85	5.0	0.14	9.24	1.29						1.29							Surface Flow at Inlet 03E.4_01 at DP D12, Inlet Capture
															1.29	0.50	18	9	4.1	0.0	Pipe Flow to JP-41
	JP-41	SUM JP-40, D12	7.06	0.81					7.9	5.75	7.75	44.60									Combined Flow at JP-41 Pipe Flow to JP-42
															44.60	0.50	42	92	6.9	0.2	
	D13	D13	1.59	0.85	8.8	1.36	7.48	10.18						10.18							Surface Flow at Inlet 03E.5_02 at DP D13, Inlet Capture
															10.18	0.50	24	153	4.9	0.5	Pipe Flow to JP-42
	JP-42	SUM JP-41, D13	8.66	0.82					9.3	7.11	7.36	52.37									Combined Flow at JP-42 Pipe Flow to JP-43
															0.00	0.50	42	95	6.9	0.2	
	D14	D14	0.27	0.83	5.0	0.23	9.24	2.08						2.08							Surface Flow at Inlet 03E.3_01 at DP D14, Inlet Capture
															2.08	0.50	18	23	4.1	0.1	Pipe Flow to JP-43
	D15	D15	0.72	0.84	6.8	0.60	8.17	4.93						4.93							Surface Flow at Inlet 03E.3_02 at DP D15, Inlet Capture
															4.93	0.50	18	15	4.1	0.1	Pipe Flow to JP-43
	JP-43	SUM JP-42, D14, D15	9.65	0.82					9.5	7.94	7.31	58.06									Combined Flow at JP-43 Pipe Flow to JP-44
															58.06	0.50	42	183	6.9	0.4	
	D16	D16	0.37	0.84	5.0	0.31	9.24	2.85						2.85							Surface Flow at Inlet 03E.2_01 at DP D16, Inlet Capture
															2.85	0.50	18	23	4.1	0.1	Pipe Flow to JP-44
	D17	D17	0.24	0.77	5.0	0.19	9.24	1.73						1.73							Surface Flow at Inlet 03E.2_02 at DP D17, Inlet Capture
															1.73	1.00	18	15	5.9	0.0	Pipe Flow to JP-44
	JP-44	SUM JP-43, D16, D17	10.26	0.82					10.0	8.44	7.20	60.76									Combined Flow at JP-44 Pipe Flow to JP-45
															60.76	0.50	42	184	6.9	0.4	
	JP-45	SUM JP-38, JP-39, JP-44	27.02	0.81					14.9	21.91	6.10	133.63									Combined Flow at JP-45 Pipe Flow to JP-47
															133.63	0.50	54	187	8.1	0.4	
	D18	D18	0.34	0.87	5.0	0.29	9.24	2.72						2.72							Roof Drain Flow at DP D18
															2.72	1.00	8	30	3.5	0.1	Pipe Flow to JP-46
	D19	D19	0.44	0.85	5.0	0.37	9.24	3.45													Surface Flow at Inlet 03D_01 at DP D19, Inlet Capture
	JP-46	SUM D18, D19	0.78	0.86					5.1	0.67	9.17	6.13									Combined Flow at JP-46 Pipe Flow to JP-47
															6.13	0.50	18	30	4.1	0.1	
	D20	D20	1.20	0.78	5.0	0.94	9.24	8.64						8.64							Surface Flow at Inlet 03D_02 at DP D20, Inlet Capture
															8.64	0.50	18	17	4.1	0.1	Pipe Flow to JP-47
	JP-47	SUM JP-45, JP-46, D20	29.00	0.81					15.3	23.51	6.02	141.53									Combined Flow at JP-47 Pipe Flow to JP-48
															141.53	0.56	54	102	8.6	0.2	
	D21	D21	0.35	0.82	5.0	0.29	9.24	2.64													Future Commercial Surface Flow at DP D21, Inlet Capture
	D22	D22	0.25	0.81	5.0	0.21	9.24	1.90													Future Commercial Surface Flow at DP D22, Inlet Capture

Project Number:	130-00192
Designed By:	DFL
Drawn By:	HLM/MLG
Reviewed By:	BEC
Sheet Number:	1 OF 1

CWC CONSULTING GROUP
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CENTERRA SOUTH FIRST SUBDIVISION
CIVIL CONSTRUCTION PLANS

OVERALL DRAINAGE MAP

McWHINNEY
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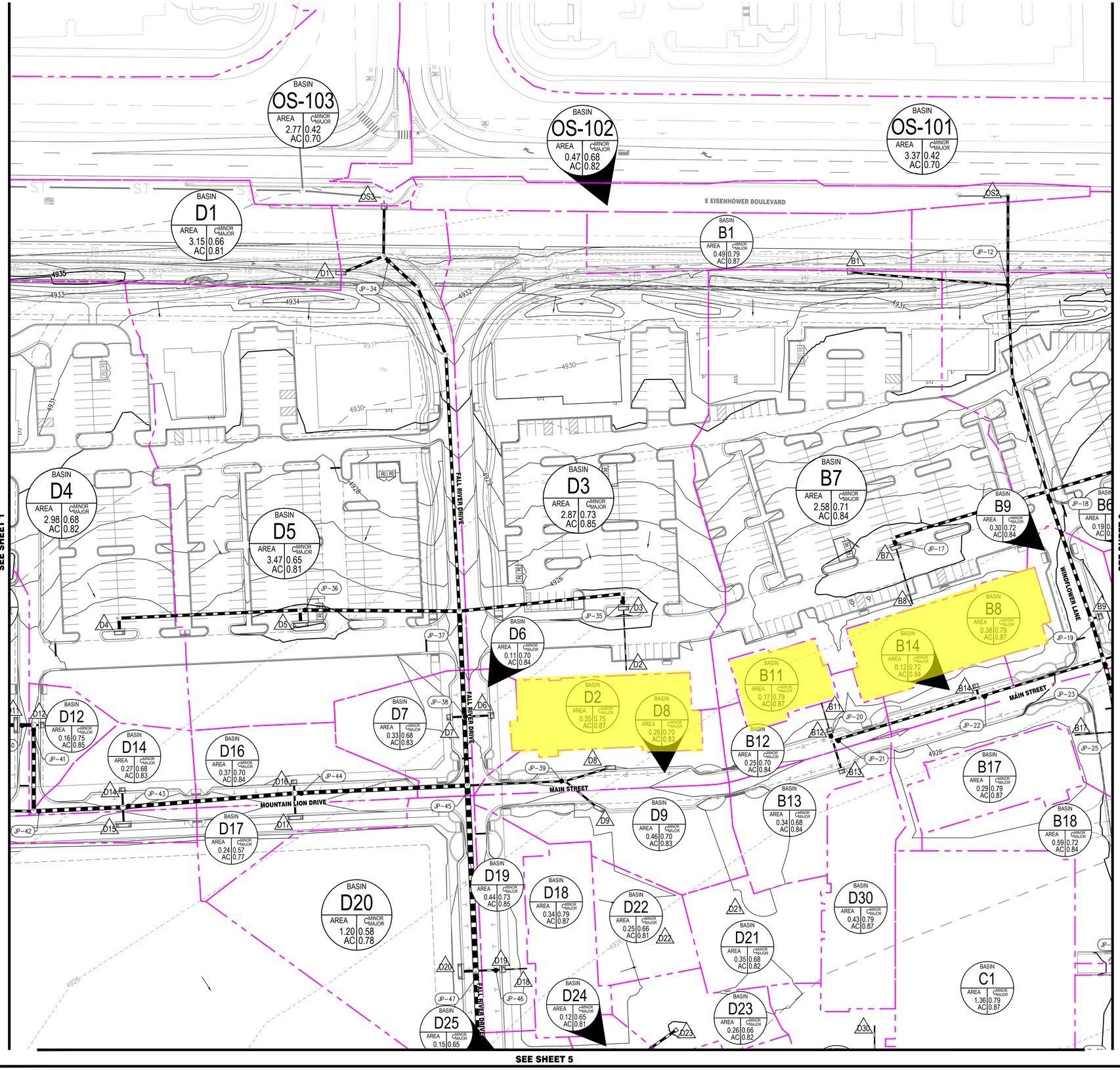
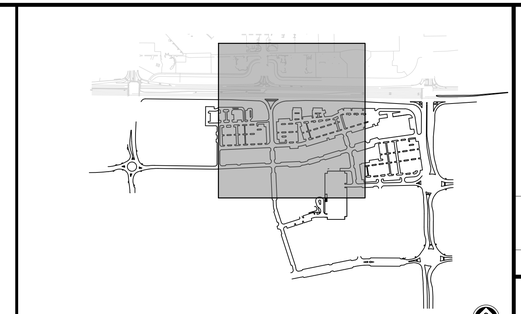
2725 ROCKY MOUNTAIN AVE.
SUITE 200
LOVELAND, CO 80538
TEL: (970) 962-9900

No.	Date	Description
		DOCUMENT AMENDMENTS





KEY MAP NTS

40 0 40 80

SCALE: 1"= 40'

LEGEND

- DESIGN POINT
- EXISITNG DESIGN POINT
- JUNCTION POINT
- EXISITNG JUNCTION POINT
- MINOR BASIN BASIN I.D.
- TRIBUTARY AREA (ACRES)
- RUNOFF COEFFICIENTS: MINOR STORM C2; MAJOR STORM C100
- PROPERTY BOUNDARY
- PROPOSED MAJOR & MINOR CONTOURS
- EXISTING MAJOR & MINOR CONTOURS
- PROPOSED STORM SEWER WITH MH & INLET
- EXISTING STORM SEWER WITH MH & INLET
- BASIN BOUNDARY
- FLOW ARROW
- EXISTING / FUTURE FLOW ARROW
- SECTION LETTER

To request marking of underground facilities

811 Know what's **below.** **Call** before you dig.
Call 811 or visit call811.com for more information

It is the contractor's responsibility to contact UNCC a minimum of 2 days prior to the start of construction operations. CWC Consulting Group claims no responsibility for the underground facilities depicted in this plan set.

No.	Date	Description
		DOCUMENT AMENDMENTS

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Contact: KIM PERRY
2725 ROCKY MOUNTAIN AVE.
SUITE 200
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CENTERRA SOUTH FIRST SUBDIVISION
CIVIL CONSTRUCTION PLANS
DETAILED DRAINAGE MAP

Project Number:	130-00192
Designed By:	DFL
Drawn By:	HLM/MLG
Reviewed By:	BEC
Sheet Number:	2/6

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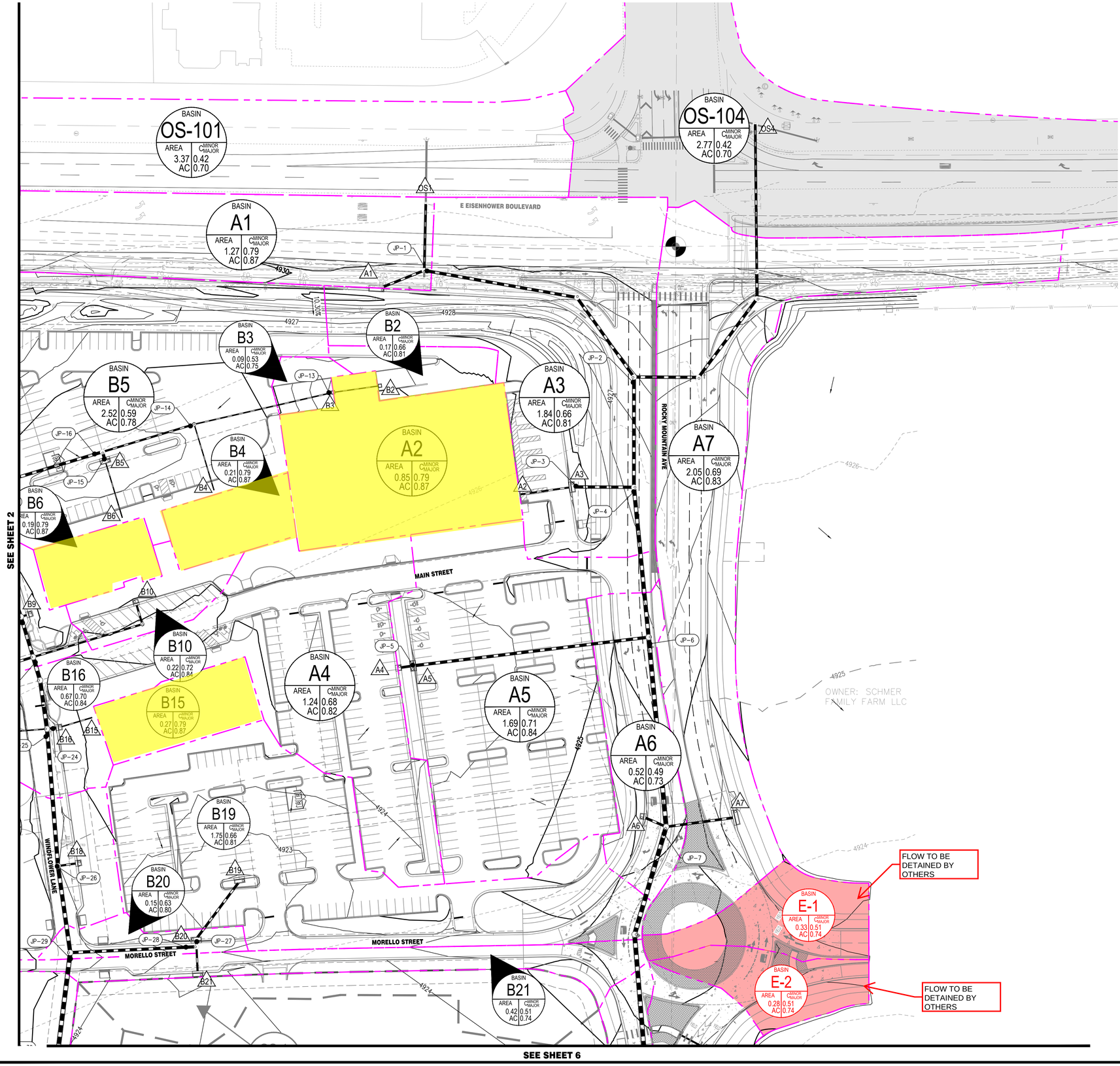

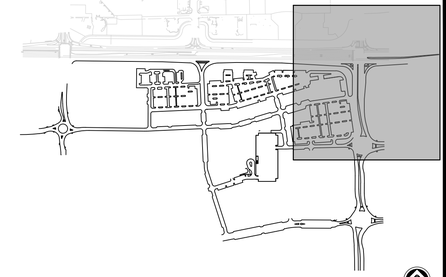

KEY MAP NTS

40 0 40 80
SCALE: 1" = 40'

LEGEND

- DESIGN POINT
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CENTERRA SOUTH FIRST SUBDIVISION
CIVIL CONSTRUCTION PLANS

DETAILED DRAINAGE MAP

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Project Number:	130-00192
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Reviewed By:	BEC
Sheet Number:	3/6

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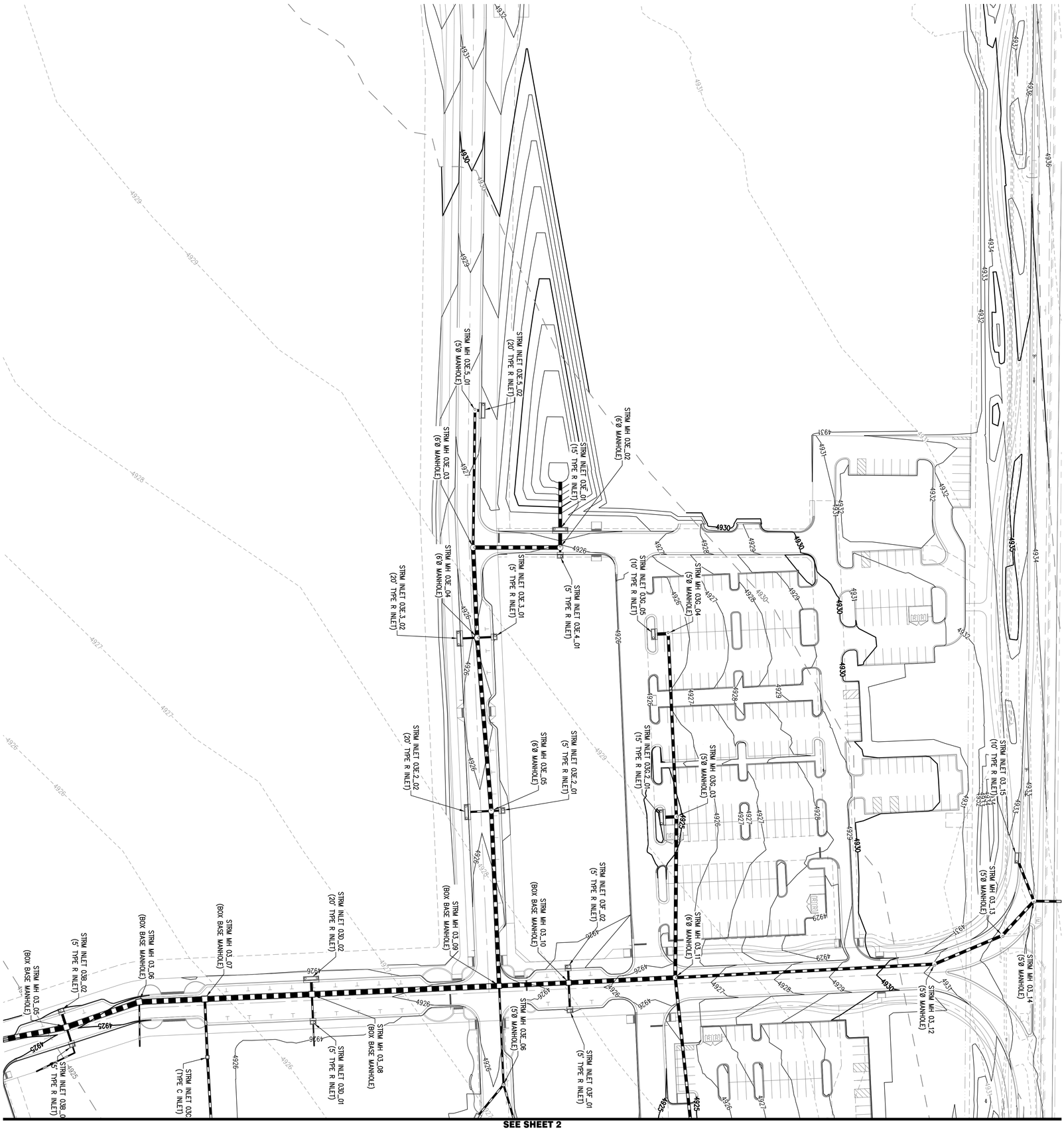
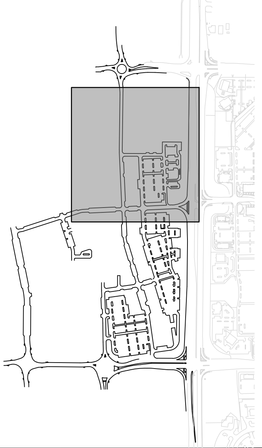


SEE SHEET 2

SCALE: 1" = 50'

KEY MAP

NTS



Project Number:	
130-00192	
Designed By: DFL	Drawn By: HLM/MLG
Reviewed By: BEC	
Sheet Number: 1	

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CENTERRA SOUTH FIRST SUBDIVISION

CIVIL CONSTRUCTION PLANS

STORM SEWER INDEX MAP

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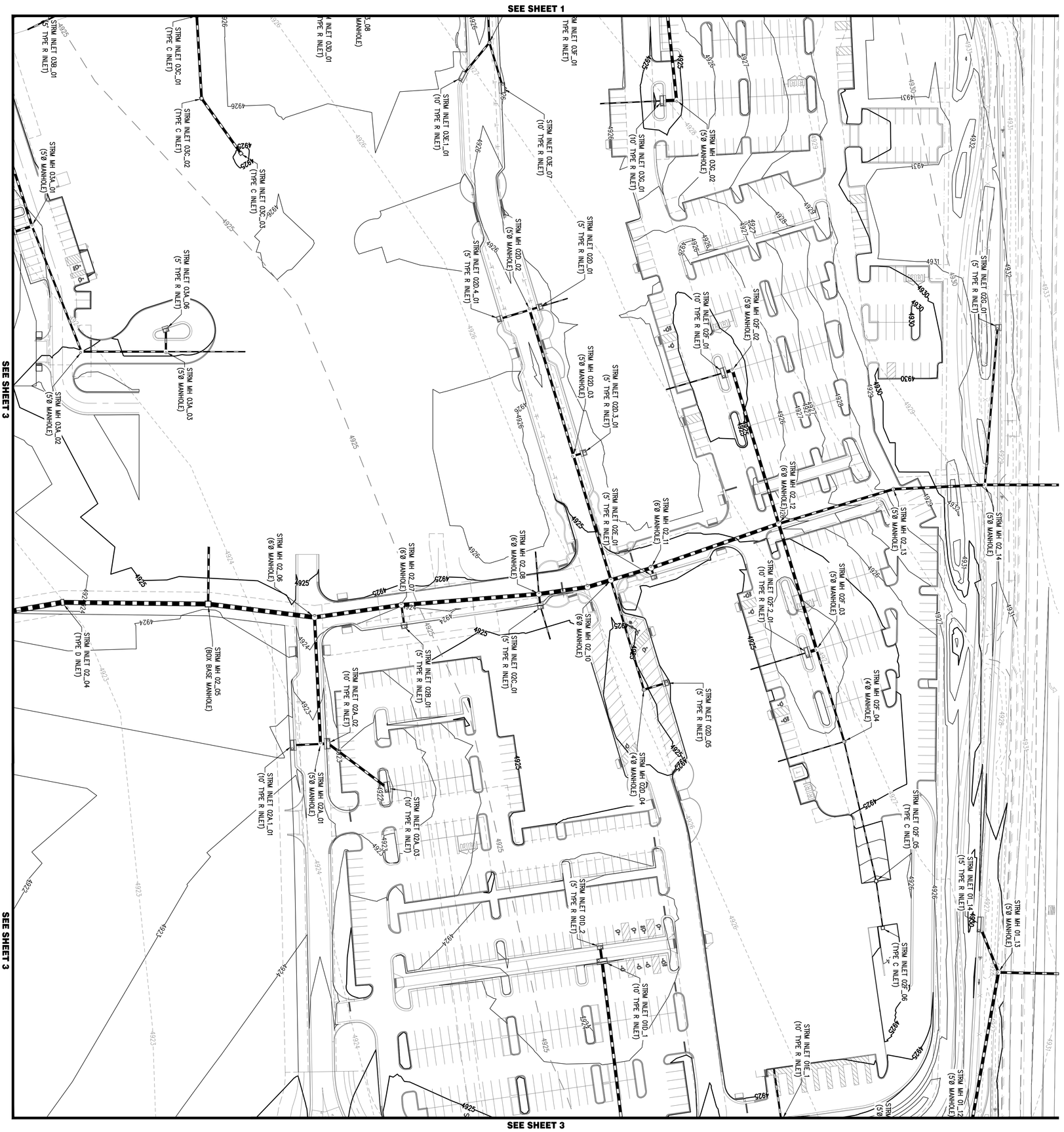
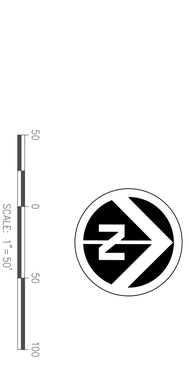
No.	Date	Description
	03/20/2025	2ND SUBMITTAL
	12/23/2024	1ST SUBMITTAL

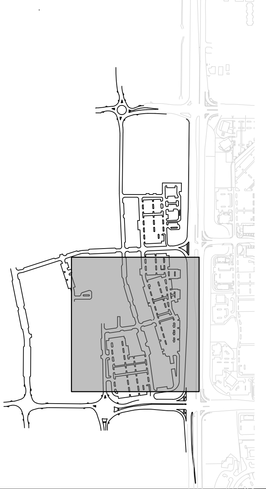
DOCUMENT AMENDMENTS





KEY MAP

NTS



Project Number: 130-00192	CWC CONSULTING GROUP CIVIL ENGINEERING · LAND SURVEYING · CONSTRUCTION SERVICES	**CENTERRA SOUTH FIRST SUBDIVISION** CIVIL CONSTRUCTION PLANS STORM SEWER INDEX MAP
Designed By: DFL Drawn By: HLM/MLG	9360 TEDDY LANE, SUITE 203 LONE TREE, COLORADO 80124 TELEPHONE: 303-395-2700 FAX 303-395-2701	McWHINNEY Contact: KIM PERRY 2725 ROCKY MOUNTAIN AVE. SUITE 200 LOVELAND, CO 80538 TEL: (970) 962-9900
Reviewed By: BEC		
Sheet Number: 2		

No.	Date	Description
	03/20/2025	2ND SUBMITTAL
	12/23/2024	1ST SUBMITTAL

DOCUMENT AMENDMENTS

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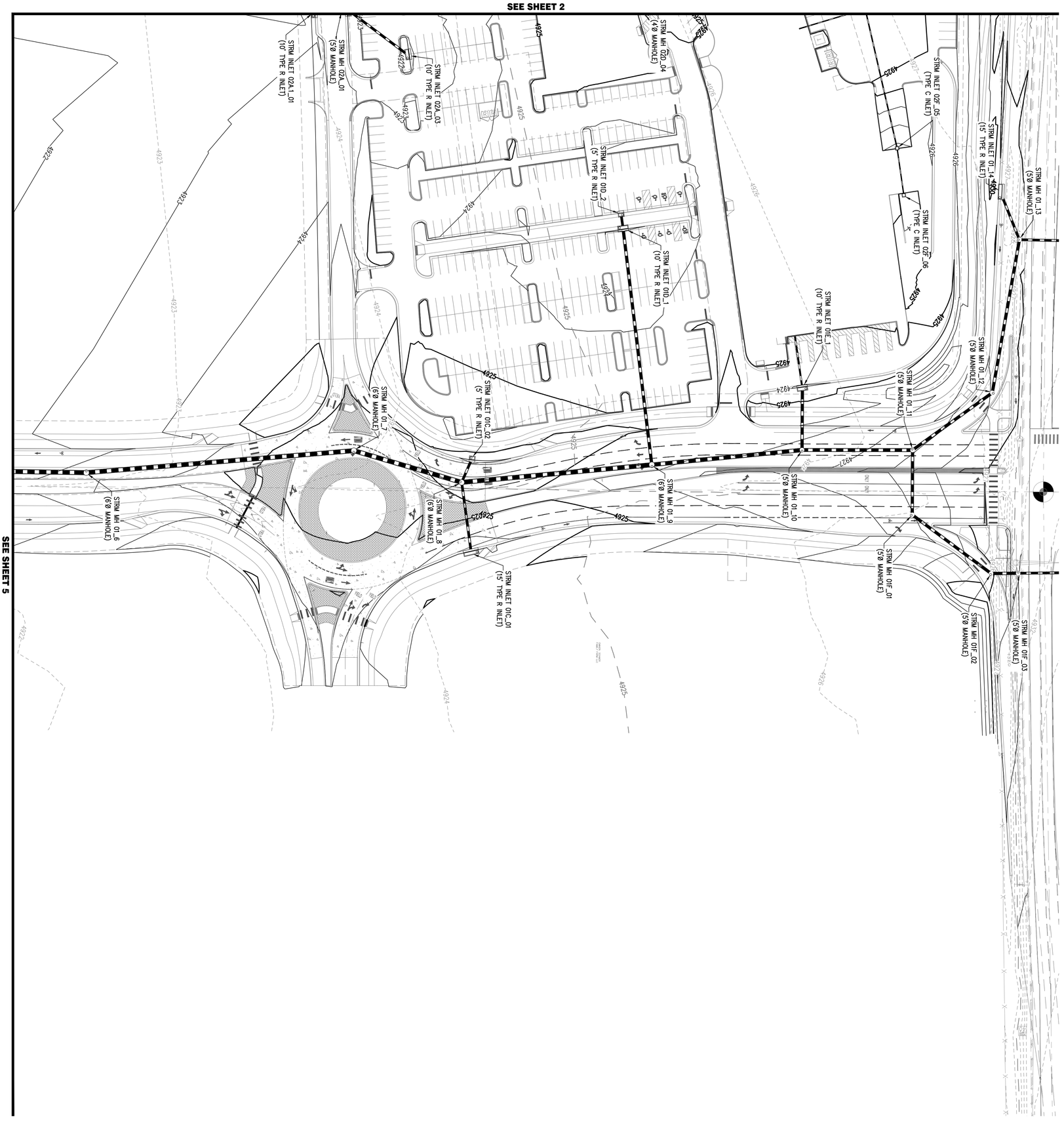

SEE SHEET 5

SCALE: 1" = 50'

KEY MAP

NTS

Project Number:	
130-00192	
Designed By: DFL	Drawn By: HLM/MLG
Reviewed By: BEC	
Sheet Number: 3	

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CENTERRA SOUTH FIRST SUBDIVISION

CIVIL CONSTRUCTION PLANS

STORM SEWER INDEX MAP

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LOVELAND, CO 80538
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No.	Date	Description
	03/20/2025	2ND SUBMITTAL
	12/23/2024	1ST SUBMITTAL

DOCUMENT AMENDMENTS