



## **Concept Drainage Report Carbondale Marketplace**

**NWC of Hwy 133 and Main Street  
Located in Section 33, Township 7 South, Range 88  
West, of the 6<sup>th</sup> Principal Meridian  
Town of Carbondale, Garfield County, Colorado**

### **Prepared for:**

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## **INTRODUCTION**

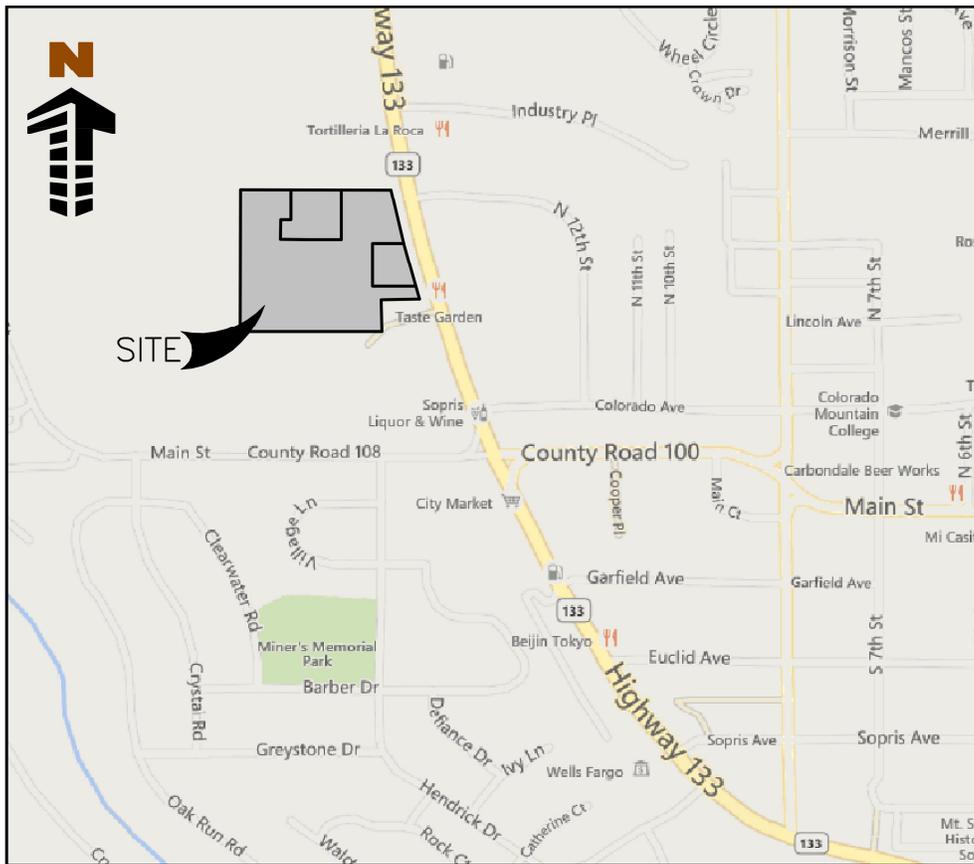
This conceptual drainage report is being prepared for the City Market at Highway 133 and Main Street in Carbondale, CO. This report is to establish the expected drainage characteristics and fulfill the drainage requirements per the Town of Carbondale standards. The report analyzes on-site runoff for the 10-year, 25-year, and 100-year frequency storms. The concepts and strategies used to route, contain, and control excess rainfall runoff from the proposed commercial development are contained within this study and are illustrated on the included Drainage Plan (Back Pocket).

The existing site is currently undeveloped and consists of irrigated pasture. Proposed development will be a 59,000 square foot grocery store with drive-thru pharmacy, approximately 9,500 square feet of retail, a seven-dispenser fuel center with 180 square foot kiosk and 5,418 square foot canopy, and associated drive, parking, and landscape areas.

### **I. General Location and Description**

#### **A. Location**

This development is located at the northwest corner of Highway 133 and Main Street, within Section 33, T.7S, R.88W. of the 6<sup>th</sup> P.M., Town of Carbondale, County of Garfield, State of Colorado. The development is bound by irrigated pasture on the north and west, by Highway 133 on the East, and by Main Street on the south. The development will be served by two access points on Highway 133 and two access drives that will be constructed with this development to Main Street.



**PROJECT LOCATION MAP**  
NOT TO SCALE

**B. Description of Property**

The existing property is approximately 24 acres. The property will be replatted into five lots with this development. Additional right-of-way for Hendrick Drive, Pabst Way and Nieslanik Avenue will also be dedicated as part of the project.

- Lot 1 (5.37 acres) will consist of the access drives, 10-foot wide bicycle and pedestrian trails, and will otherwise remain undeveloped per the scope of this project.
- Lot 2 (6.00 acres) will consist of the 59,000 square foot City Market grocery store with pharmacy drive-thru, the onsite retention/infiltration pond, and associated drive, parking and landscape areas. The store will be located in the west portion of the site

and will face east. The pharmacy drive-thru will be located on the south side of the store. The majority of the parking for the store will be front field with landscape islands. The primary delivery truck route will be from the north access point on Highway 133 to the truck docks located at the back of the building, continuing south to Main Street.

- Lot 3 (0.47 acres) will consist of the City Market fuel center canopy, kiosk, underground fuel storage tanks, and associated drive and landscaping areas. The fuel center will be located on the east side of the site and will face west towards the store. The fuel truck will utilize the south access off Highway 133.
- Lot 4 (1.03 acres) will consist of the 9,500 square foot retail building, the community gathering area, and associated parking, drive and landscaping areas. The retail building will be located adjacent to the City Market on the north side of the store and will face east.
- Lot 5 (7.62 acres) will consist of the area north of Nieslanik Avenue and will otherwise remain undeveloped per the scope of this project.

As part of this project, right-of-way for Hendrick Drive will be dedicated in the east portion of the site, connecting Main Street and Highway 133. Right-of-way for Pabst Way will be dedicated along the west edge of the site. Right-of-way for Nieslanik Avenue will be dedicated along the south edge of Lot 5. The Rockford Irrigation Ditch flows through the site in a northwesterly direction. This ditch will be undergrounded and routed around the south and west of the site as part of this development. Overhead electric lines also exist onsite, and will be undergrounded as part of this development.

## **II. Drainage Basins and Sub-Basins**

### **A. Existing Drainage Conditions and Features**

A review of USDA Soil Mapping indicates that the majority of onsite soils are Atencio-Azeltine complex. These soils are categorized as hydrologic group B (See Appendix C). The geotechnical report for this site describe the onsite soils as ½ foot to 1 foot of topsoil and up to 2 ½ feet of silty clay overlying relatively dense sandy gravel with cobbles.

A review of Flood Insurance Rate maps (FIRM) by the Federal Emergency Management Agency (FEMA) shows that the entire proposed development is outside of the 500-year floodplain according to FIRM Map 0802341858A (See Appendix D).

### **Existing Basin Description**

The site is undeveloped and consists of irrigated pasture that slopes to the north at grades of 1.0% to 2.0%.

Several irrigation ditches cross the property and flow from southwest to northeast. The irrigation ditches cross under Main Street and supply water to the existing pasture land, as well as convey stormwater runoff during snowmelt periods and intense thunderstorms.

## **B. Proposed Drainage Conditions and Features**

### **Proposed Basin Description**

#### East Basin (Basin A)

Basin A (4.32 acres) consists of the front parking field and the fuel area, and a portion of the Nieslanik Avenue right-of-way.

Basin A will utilize bio-swale landscape islands, which will provide water quality for the front parking field and fuel area. The bio-swale landscape islands will consist of a sand/peat rain garden growing media in a depressed landscape island with an underdrain system. During minor stormwater events, runoff will filter through the growing media to the underdrain, which will filter hydrocarbons and other pollutants. During the major event, the bio-swale landscape islands will be designed to pond to the flowline elevation, where an inlet will be installed to convey runoff directly to the infiltration/water quality pond in the northwest corner of the site.

#### West Basin (Basin B)

Basin B (1.70 acres) consists of drive and parking areas to the south and west of the store and retail building, and Pabst Way right-of-way. Runoff from Basin B will be directed to

inlets west of the building, and conveyed via storm sewer to the infiltration/water quality pond in the northwest corner of the site where water quality will be provided.

#### North Basin (Basin C)

Basin C (0.06 acres) consists of a portion of Nieslanik Avenue. Runoff from Basin C will be directed to an inlet in the private access drive and will be conveyed to the infiltration/water quality pond in the northwest corner of the site.

#### Roof Basins (Basin R)

Basin R (1.71 acres) consists of roof areas for the City Market store, the retail building, and the fuel facility. Runoff from the City Market Store and retail building roofs will be conveyed via roof drains underground to the proposed storm sewer in the west portion of the site. Runoff from the fuel center canopy will be conveyed via roof drains to the proposed storm sewer in the front parking field. All three roof areas will drain to the infiltration/water quality pond in the northwest corner of the site where water quality will be provided.

#### Pond Basin (Basin P)

Basin P (0.44 acres) consists of the infiltration/water quality pond for this development. 100-year volume will be provided. A sand/peat peat rain garden growing medium will be installed in the bottom of the pond to provide water quality. Dry wells will be installed in the bottom of the pond to allow infiltration, which is a common practice in the Carbondale area for accommodating stormwater runoff.

#### Other Basins

There are also several minor basins along the periphery of the site (01, 02, 03, and OS1 Basins) that drain onsite. Basins 01, 02, 03, and OS1 (0.49 acres) comprise the north portion of the north and south-east private access drive. Runoff from these basins will be captured by inlets in the north and south private access drive and will be routed via storm sewer to the infiltration / water quality basin in the northwest corner of the site.

### **III. Drainage Design Criteria**

## **A. Regulations**

This Final report was prepared using the criteria from the *Town of Carbondale Public Works Manual, February, 2009* as well as Urban Drainage and Flood Control Districts *Urban Storm Drainage Criteria Manual*.

## **B. Hydrology Criteria**

NOAA Atlas 14, Volume 8, Version 2 was used to determine rainfall intensity frequency values. Refer to the appendix in this report for these values. Excess runoff was determined within this study area using the Rational Method in accordance with the Town of Carbondale Public Works Manual. Intensities, times of concentration, composite “C” values, and routed flow accumulation were all calculated using the formulas and/or charts provided in that document. As mentioned, retention and water quality for this development is provided in the infiltration / water quality pond in the northwest corner of the site; the design of which accounted, in excess, for both the land area and percent impervious to which the basins of Carbondale Marketplace will improve. Calculations included herein demonstrate runoff and flow accumulations for the 10-, 25- and 100-year event. Refer to Appendix A for calculations.

## **C. Hydraulic Criteria**

Inlet sizing calculations and pipe sizing calculations will be provided in the final drainage report.

## **IV. Drainage Facility Design**

### **A. General Concept**

In general, the majority of onsite runoff will be conveyed to the infiltration / water quality pond in the northwest corner of the site. Additional water quality for the fuel center and front parking field will be provided by bio-swales in the front parking field.

The infiltration / water quality pond will provide water quality volume and 100-year retention volume, with 1.0 feet of freeboard. Dry wells will be installed in the bottom of the pond to allow stormwater to infiltrate into the gravel and cobble that underlies the site. Eighteen

inches of sand/peat rain garden growing medium will also be installed at the bottom of the pond, which will filter stormwater prior to it entering groundwater. By allowing runoff to pond in this area and infiltrate at a controlled rate, pollutants and other contaminants will settle or be filtered out by the sand/peat material. A conceptual detail of the infiltration / water quality pond has been provided in Appendix D.

Additionally, bio-swale landscape islands will be installed in the front parking field. The bio-swale landscape islands will consist of a depressed landscape island, with 18” of sand/peat rain garden growing medium. Underneath the sand/peat material, an underdrain will be installed, forcing runoff in minor stormwater events to filter through the rain garden medium prior to entering the storm system. An inlet will be installed to capture runoff in major stormwater events. The bio-swales will provide additional storm water quality for this development above and beyond Town of Carbondale requirements. A conceptual detail of the bio-swale landscape island has been provided in Appendix D.

**B. Specific Details**

A design infiltration rate of 2.5” per 10 minutes has been determined for the infiltration / water quality pond per the infiltration test performed by Kumar and Associates as described in the “Geotechnical Engineering Study for the Proposed City Market Store and Retail Development,” dated November 3, 2015 (Project No. 15-1-548). Pond storage volumes are as follows:

<b>INFILTRATION / WATER QUALITY POND SUMMARY</b>	
WQCV Required (cf)	12,144
WQCV Provided (cf)	16,221
100-Yr Detention Volume Required	38,839
100-Yr Detention Volume Provided	41,472
Overflow Weir Elevation	6160
Top of Berm Elevation	6161

## **V. Conclusions**

The results from this drainage study indicate that no long-term, adverse impacts to drainage are anticipated with the proposed development. Compliance with Town of Carbondale drainage criteria will be adhered.

## **VI. References**

1. *Drainage Study for Crystal River Marketplace, Carbondale, CO, prepared by Sopris Engineering, February 14, 2002.*
2. *Town of Carbondale Public Works Manual*, February 2009.
3. *Urban Storm Drainage Criteria Manual, Volumes 1 to 3*, Urban Drainage and Flood Control District, June 2001.