

Superior Town Center FDP 1 Phase 3 (McCaslin Roundabout)

Project Overview

The purpose of this improvement project is to create an intersection along McCaslin Boulevard allowing one new intersecting road on the east (Main Street) and a future intersecting road on the west. Previous to this submittal, intersection treatments were studied/considered. The modern roundabout was selected as an appropriate and favorable intersection treatment. Studies conducted worldwide have found that roundabouts yield better safety performance over other types of intersections. Maintaining safety at this new intersection was the primary goal when selecting the proposed intersection treatment. Therefore, safety has remained a primary focus throughout the design development process.

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Location

The proposed roundabout is located on existing McCaslin Boulevard South of Coal Creek Drive and North of Discovery Parkway.



Right-of-way Dedication

The existing McCaslin Boulevard right-of-way is approximately 200 feet wide at the roundabout location. This is wide enough to accommodate the main roundabout travel lanes. A 0.16 acre dedication will be required on the west side for the sidewalk and west roundabout leg. The dedication will be granted by RC Superior LLC, the same entity which owns most of the undeveloped acreage within the Town Center project.

Roundabout Geometric Design

The horizontal design of the roundabout was performed previously by consultants retained by RC Superior, LLC and peer reviewed by a consultant retained by the Town of Superior. Minor revisions have been made to the previously approved horizontal design upon further operation and safety analysis. The improvements made will allow for increased pedestrian safety while maintaining desired traffic circulation elements.

Horizontal Elements in the design exist to aid in controlling approach speeds of each approach into the circulating lanes which ensures safe driving speeds upon entry. The vertical design continued along that theme; keeping approach speeds around 20-25mph which allows for safe yielding upon entry to the circulating element in addition to achieving desired driver response times to crossing pedestrians.

The Elevation Plans found within this set are useful for the contractor to layout the horizontal and vertical staking points and for the inspector to be able to perform checks in the field to ensure that the roundabout is being staked and constructed according to plan. The vertical design can best be seen on the Flowline Plan & Profile sheets as well as the Contour Elevation Plan. In general, the roundabout was vertically designed to allow for the low point to fall at the northeast corner of the roundabout where stormwater can be directed into the existing 30-inch storm sewer along the east side of McCaslin Boulevard. The detailed grading along the approaches and the circulating roadway allow for intermediate collection points to minimize surface flow of runoff, especially across the roundabout's circulating roadway from the high side (south) to the low side (north).

Utilities

Water:

An 8-inch diameter water main was recently installed along Main Street and connected to the existing 12-inch main on the west side of McCaslin Blvd. The alignment of this water main was designed to follow the roundabout lanes. A section of this existing line on the east leg may need to be lowered in order to provide adequate cover under the finished pavement elevations.

Earlier hydraulic studies of the entire Superior water system have identified that the existing 12-inch main on the west side of McCaslin needs to be upsized to a 16-inch pipe to provide fire flow to the Town Center area and Superior Marketplace. This main will be upsized from the Water Treatment Plant to the roundabout area. The water main work is not specifically included as part of this Final

Development Plan, but it will be constructed prior to or concurrently with the roundabout. The upsizing work is shown on the FDP utility sheets UT-1 and UT-2 to depict this separate project. The applicant is currently having the Town's water hydraulics updated to confirm the extent of upsizing required. Any upsizing work that is required through the roundabout work area will be done concurrent with the roundabout work.

Reuse Water:

An 8-inch diameter reclaimed water main exists within the northbound lanes of McCaslin Boulevard. This line will not be directly affected by the roundabout construction. A new irrigation tap will be made within the center island of the roundabout to feed the roundabout, median and future landscaping within the right-of-way. The existing irrigation within the medians will be capped and all new proposed landscaping will be fed from the new tap within the roundabout. At this time, the disturbed portion of right-of-way will be seeded with native grasses and will not be irrigated. Sleeving will be provided to accommodate future irrigation for the entire portion of right-of-way adjacent to STC Blocks 2 and 8 on the east side of McCaslin and for the portion adjacent to RC1 and RC2 on the west side of McCaslin. The formal landscaping and irrigation for these right-of-way areas is intended to be designed and built with future projects and returned to its existing naturalized condition at the time of this project as to not be impacted by future construction of the adjacent properties.

Storm Drainage:

There is an existing 48-inch diameter storm sewer in the median of McCaslin Boulevard that discharges to Coal Creek under the existing bridge. This storm sewer is connected to a series of roadway inlets on McCaslin Boulevard south of Discovery Parkway. There is also an existing 30-inch diameter storm sewer on the east side of McCaslin Boulevard. This storm sewer conveys flow from the Discovery Office Park detention pond and discharges it to Coal Creek. The roundabout design will make use of both of these existing storm sewer pipes. Currently, most of the gutter flow along McCaslin Boulevard flows in extra wide bike lane. With the reduced pavement width at the southern roundabout approach due to the merging bike traffic, this gutter flow would spread into the travel lanes unless storm inlets are added.

The design intent of the storm drainage system is to provide a minimum of one clear lane during the 100-year storm event and minimize the amount of gutter flow traveling through the roundabout. A total of eight (8) new Type R roadway inlets will be constructed on McCaslin Boulevard on the south side of the proposed roundabout. These inlets will intercept most of the roadway flows from south of the roundabout. These inlets will be connected to the existing 48 inch storm sewer in the median. A single new inlet will also be constructed at the southwest corner of the roundabout to minimize the amount of flows directed to the west leg. This inlet will also be connected to the 48 inch storm sewer. A pair of inlets will be constructed at the southeast corner to collect runoff from a local low point in the roundabout. These inlets will be connected to the existing 30 inch storm sewer.

In addition to the roadway inlets, underdrains will be provided at the back of curbs and within the medians in accordance with Town standards. These underdrains will be connected to the proposed roadway inlets or directly to one of the existing storm sewers.

Dry Utilities:

There are multiple electric and telecommunication facilities on the east and west sides of McCaslin Boulevard, within the right-of-way. There is not expected to be any direct impact on these utilities with construction of the roundabout.

There is an existing electric line within the median which feeds the existing street lights. This line will be abandoned or removed as part of the roundabout construction. A new line will be installed to feed the reconfigured street lights. Empty conduits will be placed across each leg of the roundabout, and to the center island, to accommodate the new line and other future dry utilities.

There is a gas line that crosses McCaslin and enters the south side of Main Street. The applicant is working with Xcel to determine if this gas line needs to be adjusted based on the proposed roundabout design.

Pedestrians

Pedestrians are accommodated at pedestrian crosswalks around the perimeter of the roundabout setback from the circulating lanes allowing adequate stacking distance for vehicles exiting the roundabout to yield to pedestrians without disrupting circulating traffic flow. The pavement markings and signage are carefully placed to allow for desired driver awareness and conformance to pedestrian yielding. We are proposing a pedestrian signal to be installed. Based on previous experience and analysis of existing roundabouts, it has been noted that the best yielding rates are achieved with the Rectangular Rapid Flash Beacon (see image below). This device exceeds FHWA Standards and provide the option of being passively activated.



Splitter Islands are also utilized to allow pedestrians to cross one direction of traffic at a time. The splitter islands provide desired protection to waiting pedestrians.

Bicyclists

It is important that roundabouts are designed to accommodate a varying ranges of cyclists' skill and comfort level. Many experienced road cyclists prefer to remain within the roadway and will, therefore, choose to merge with the vehicles and travel through the roundabout with the vehicles. This design accommodates for these cyclists utilizing appropriate pavement markings to denote shared lanes



This design also accommodates those cyclists who do not feel comfortable sharing the lane with vehicles and traversing through the roundabout. This design proposes bicycle bypass ramps which connect the cyclists from the bike lane to the widened sidewalk.

Landscaping

The roundabout and median landscaping has been carefully designed for pedestrian safety, to match the existing median landscape, to coordinate with the future Superior Town Center median landscaping and to provide colorful visual impact within the roundabout itself. The roundabout will contain (3) central evergreen trees with a colorful shrub, ornamental grass, and perennial foreground. At the crosswalks, plant material that has less than a 24" maximum height has been specified. Trees have been carefully placed to not block views as vehicles approach the crosswalks. The existing median landscape pattern of alternating turf, shrub beds, and some planting areas containing only rock mulch and trees has been used. Planting material has been shown at 75% to 100% expected mature size and placed at a density to match the existing McCaslin median shrub beds. Landscape boulders are dispersed throughout to match the character of the existing medians and it is intended that many of the existing median boulders will be salvaged and relocated. These replacement quantities and boulder locations will be detailed at the time of construction documents.

The landscape plan is primarily composed of low-water use plant species. Some medium-water use trees species have been specified for visual interest.

Each of the new medians as well as the roundabout will be contained by colored concrete slope paving. The north, south, and west medians leading up to the roundabout will be red concrete and have a broom finish and score joints to match the existing McCaslin Boulevard medians. The median and splitter island to the east of the roundabout will be a charcoal color to match the colored concrete color of Main Street and provide a visual cue for the entry to Superior Town Center. The truck apron surrounding the roundabout will be red concrete to match that along McCaslin and will be stamped in a pattern that matches the crosswalks at the Double Diamond Interchange.

Lighting

The purpose of lighting at a roundabout is to alert approaching motorists or cyclists and improve visibility and perception of users. A good lighting design will provide illumination of key features to aid users' understanding of, and navigation through, the roundabout.

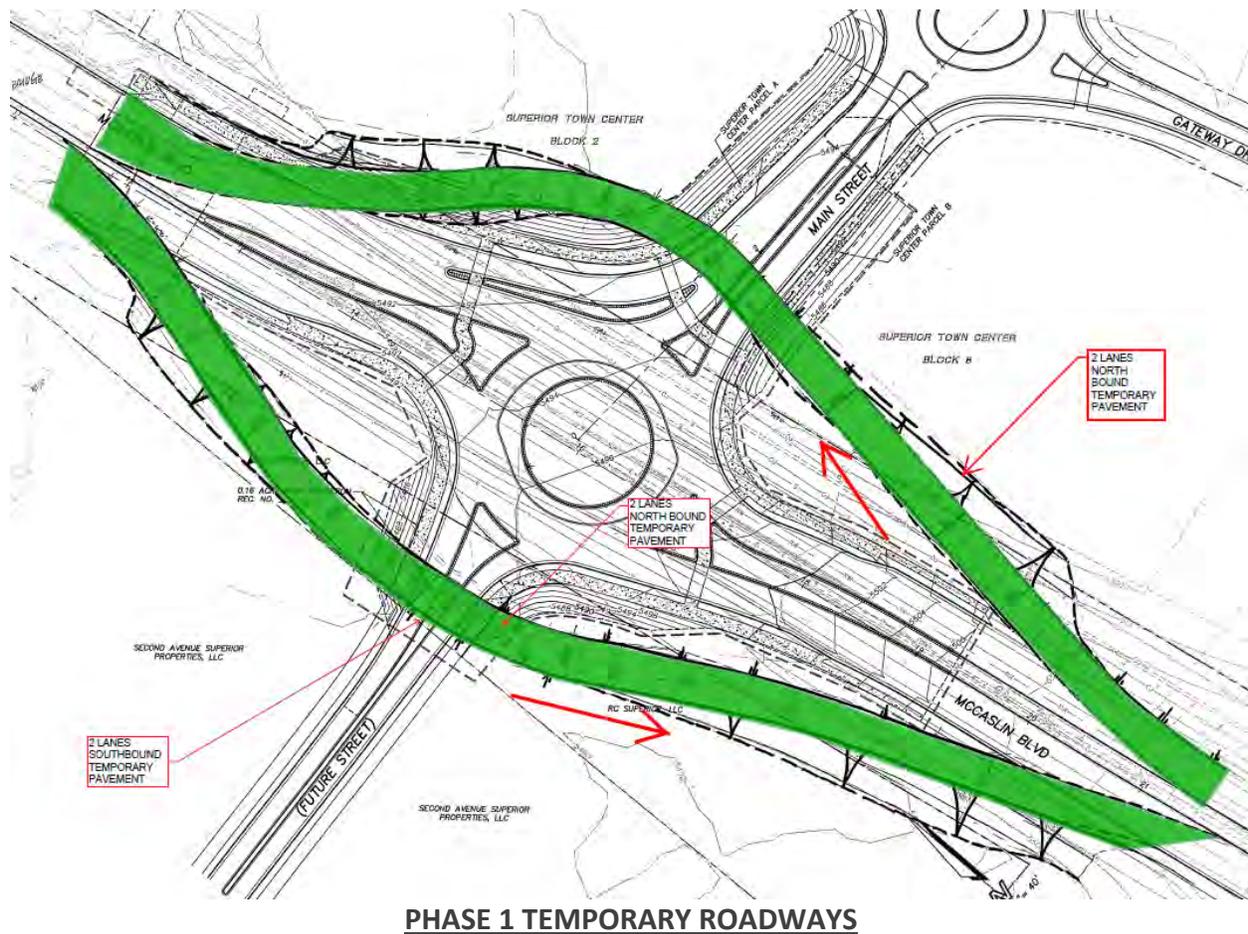
Key lighting design considerations for the roundabout include supplementing automotive headlights whose effectiveness is limited due to the curve of the roundabout. Also, lighting at the approaches is positioned to provide critical vertical illumination at crosswalks. Finally, consideration is given to the distribution of light from the luminaires in order to limit light trespass onto adjacent properties.

The lighting equipment layout and target light levels will reference criteria established in the design guide from the IESNA *DG-19-09 Design Guide for Roundabout Lighting*. The selected lighting equipment will conform to Xcel Energy Design and Construction standards and will match the existing lighting assemblies along McCaslin Boulevard with respect to materials, height, and color. The lighting system will utilize full-cutoff cobra head-style LED luminaires. The luminaires will be Xcel Energy-standard equipment to facilitate future maintenance by Xcel Energy.

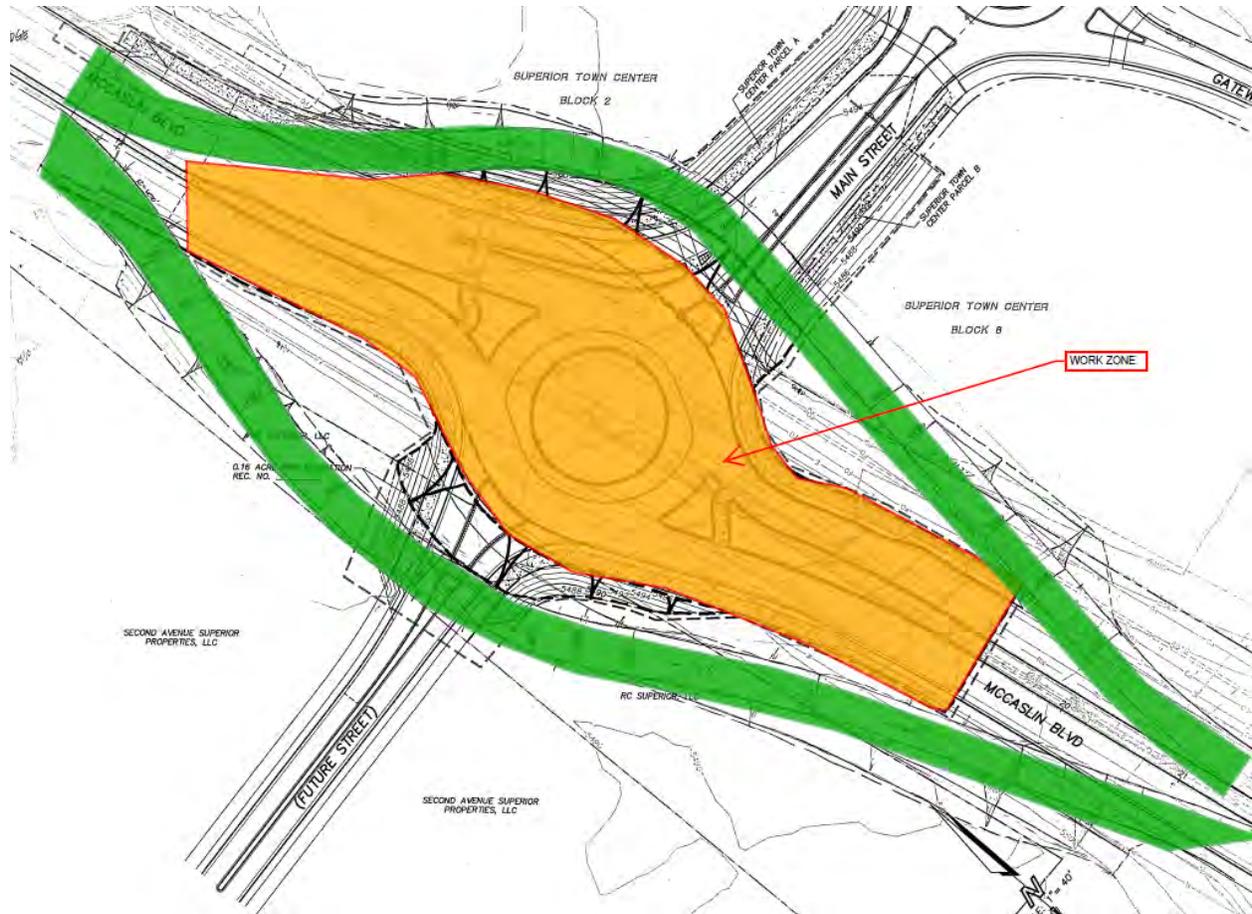
Phasing and Construction Timeline

If approved, construction of the roundabout is anticipated to start in August 2016 with a four month construction schedule, to be completed and opened to traffic by the end of 2016. Installation of landscape final completion will occur in spring of 2017.

Two through lanes will be maintained for peak travel directions at all times. The first phase of construction will include a pair of temporary fly-around roads and pedestrian paths to direct through traffic outside the central roundabout work zone:



The second phase will include construction of the central roundabout, including grading, curbs and gutters, utilities, crosswalks and lighting.



Phase 2 – Central Roundabout Construction

The third phase will shift traffic on McCaslin to the new roundabout through lanes, remove the temporary roadways, and construct the east and west approaches:



Phase 3

The fourth and final phase will include completion of landscape areas.