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INTRODUCTION

This study was commissioned to determine recommended ultimate improvements to 120th Avenue between Washington Street and Claude Court in anticipation of the new rail transit station at East Lake, the eventual redevelopment of Karl’s Farm and the potential development of other vacant properties in the area. The City of Northglenn seeks a safe and efficient roadway facility that provides for appropriate access to adjacent properties, presenting a pleasing pedestrian and driver experience and maintains an overall roadway “character” consistent with prior planning efforts for the City’s arterial corridors.

TRAFFIC

A traffic study was conducted to determine the future traffic demand expected on 120th Avenue. The focus of this study was to estimate the potential trip generation and distribution of those new trips from the current undeveloped area north and east of Washington Street and 120th Avenue bounded on the north 128th Avenue and on the east by the Claude Court. Working with the Community Development staff, a land use scenario was developed for roughly 220 acres of undeveloped property including Karl’s Farm within this area. Assuming this land use scenario, a total trip generation estimate was prepared. The trip generation analysis assumed full build out of the 960 parking spaces planned by RTD at the East Lake Transit Station. Through conversation with City staff, a general trip distribution and resulting trip assignment was made to a proposed roadway network within the same area. The emphasis was directing traffic to 120th Avenue via either Irma Drive or Race Street. Claude Court was assumed to be a “non-through” street to 124th Avenue.

To determine future (2034) “background” traffic, a nominal growth rate was applied to existing traffic volumes obtained from traffic counts conducted as part of this study. The estimated total traffic demand is the sum of the new trips, assigned to the network, plus the future (2034) “background” traffic. Using total traffic demand, the operational character of the existing 120th Avenue roadway was then checked and improvements designed to:

- Create a consistent six lane cross section from west of Washington Street to east of the railroad tracks.
- Respond to the turning movement demand on and off of 120th Avenue at Washington Center Parkway, Irma Drive, Race Street and Claude Court by identifying required auxiliary (right turn and left turn) lane requirements.

Recommendations for signal synchronization were also included to improve the efficiency of 120th Avenue to accommodate the through traffic.

The proposed concept plan is shown at the end of this report.

The results of this detailed analysis are presented in the Appendix and summarized below:

DRAINAGE

1.0 GENERAL LOCATION AND SITE DESCRIPTION

This report represents a Conceptual Drainage Report for the reconstruction and widening of 120th Avenue from Washington Street to east of Claude Court (railroad tracks) in Northglenn, Colorado. 120th Avenue is currently a four/six lane minor arterial that will be reconstructed and/or widened to a six lane divided arterial roadway. 120th Avenue is primarily surrounded by residential property and housing on the south and commercial properties on the north.

Although no major drainage ways or facilities are present in the area, the present flows are conveyed northerly on Race Street to a channel located southerly of the City of Northglenn’s maintenance facility. The drainage area associated with 120th Avenue is very linear and is roughly south to 119th Avenue north to the north right-of-way (ROW) line of 120th Avenue. According to FEMA flood maps, this site is not located in a flood hazard area.

Proposed construction includes widening 120th Avenue and installing storm sewers to accommodate the 10-year event from the tributary drainage area. Flows exceeding the capacity of the system will be conveyed by the street section. This report has been prepared with the assumption that surrounding and contributing land (south of 120th Avenue) will remain as currently developed (2015). Likewise, it is assumed that any future development will also include adequate on-site detention to reduce the discharges to the current existing conditions with a runoff coefficient equal to existing and as shown in the drainage calculations found in the Appendix.

2.0 DRAINAGE FACILITY DESIGN

The hydrologic analysis and hydraulic design for the site is based on criteria established in the Northglenn Storm Drainage Design and Technical Criteria Manual. The Rational Method was used to calculate peak runoff rates during the 10-year storm event. 100-year peak runoffwas also calculated and are found in the tables in the Appendix. Street inlets were also sized based on the 10-year flows and were sized based on curb opening inlets similar to CDOT Type R inlets.

Final pipe sizes and slopes will be finalized during the Preliminary and Final Design processes. Potholes of utilities will also be used to determine the final design. Water quality for this project will be provided by a regional water quality facility that will likely be part of a regional storm water detention facility. Neither the sizing nor the design of either the regional water quality facility or the regional storm water detention facility is being developed as part of this conceptual design.

The existing storm sewer is primarily corrugated metal pipe (CMP). The life of the pipe has likely been reached and should be replaced before failure of the pipes begins to occur. Reinforced concrete pipe (RCP) is the selected replacement pipe type due to it being longer lasting and is more hydraulically efficient due to its relatively smooth interior, especially compared to CMP. The outfall in Race Street north is believed to be CMP as well and should be replaced with the reconstruction of the street.
3.0 CONCEPTUAL DRAINAGE FACILITY SYSTEM

The primary drainage outfall system is located on the south side of 120th Avenue. The south side was selected for several reasons: the largest contributing drainage area is south of 120th Avenue and the number of inlets is greatest on the south and minimizes inlet cross pipe sizes; the increased number of inlets on the outfall side allows the most opportunities to adjust pipe slopes and depths; a large portion of the existing drainage system is on the south and reconstruction will likely be easier in a corridor already constructed around an existing storm sewer system; and lastly the existing utilities, including the existing irrigation system, are currently located around the existing storm sewer system.

The generalized conceptual storm sewer system is as follows based on the north-south street grid:

Washington St. to Sylvia Dr.
- Q10 = 18 cfs, Q100 = 30.4 cfs
- Street Slope = 2%
- 10-yr. Pipe = 21” RCP

Sylvia Dr. to Washington Ctr.
- Q10 = 26.4 cfs, Q100 = 44.5 cfs
- Street Slope = 1.6%
- 10-yr. Pipe = 24” RCP

Washington Ctr. to Lafayette St.
- Q10 = 33.4 cfs, Q100 = 56.2 cfs
- Street Slope = 1.6%
- 10-yr. Pipe = 30” RCP

Lafayette St. to Irma Dr.
- Q10 = 39.4 cfs, Q100 = 66.2 cfs
- Street Slope = 0.3%
- 10-yr. Pipe = 36” RCP

Irma Dr. to Race St.
- Q10 = 46.6 cfs, Q100 = 77.9 cfs
- Street Slope = 0.18%
- 10-yr. Pipe = 42” RCP

Race St. to Claude Ct.
- Q10 = 9.9 cfs, Q100 = 16.5 cfs
- Street Slope = 3.1%
- 10-yr. Pipe = 30” RCP

Claude Ct. East to Railroad
- Q10 = 21.3 cfs, Q100 = 38.7 cfs
- Street Slope = 3%
- 10-yr. Pipe = 30” RCP

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ROADWAY IMPROVEMENTS

The current roadway section varies where generally, there are two through lanes eastbound and three through lanes westbound starting just west of Irma Drive. In the eastbound direction the section narrows to two lanes with the lane drop at Sylvia Drive. It remains a two lane section eastbound until east of the railroad where, in Thornton, it changes to a 3 lane section.

The alignment was designed to use the north curb line along the Washington Center shopping complex (within Thornton). This places the centerline (the project control line) slightly south of the center of the right-of-way. The exception is at Washington Center Parkway where a right turn is recommended. A right turn lane at Lafayette Street is not shown in this design but could be considered during the preparation of the preliminary/final design.

An intersection or access point for the proposed Karl’s Farm is not recommended or shown. Access to the future development of the Karl’s Farm property is recommended to be focused to and from the collector street network of Irma Drive on the west, Race Street to the east, or to a potential future street between Irma Drive and Race Street approximately on the 122nd Avenue alignment. Connections to Irma Drive and Race Street should be a minimum of 500 feet north of 120th Avenue. An intersection or access point for the proposed Karl’s Farm directly to 120th Avenue is not recommended or shown on the Concept Plan.

Salient features of the proposed roadway include:

Section: 6-lane major arterial section with raised medians and turn lanes at major crossing roadways. Right turn lanes are recommended at each crossing public street. Double left turn lanes (eastbound to northbound) are recommended at Washington Center Parkway, Irma Drive and Race Street. The following design criteria is recommended:

- Design speed = 50 mph (posted speed = 45 mph)
- Through lanes = 12 feet
- Turn lanes (right and left) = 11 feet
- Outside gutter = 2 feet
- Median gutter = 1 foot
- Side Streets = 11 feet

Traffic Control: the design will replace or modify four signals (Washington Center Parkway, Irma Drive and Claude Court) and install one new signal (at Race Street). The signal control for intersections along 120th is recommended to be an eight phase, coordinated system. Generally, it is recommended that a protected only phase be provided where there are double left turns. Final design should consider the phase treatments for the other turning movements.

ROW: The design presented avoids taking of additional right-of-way. However, there are several locations within the corridor (the southwest corner of Irma Drive and the southwest corner of Claude Court) that right-of-way is limited. Should the shopping center (and the City of Thornton) wish to provide a westbound to northbound right turn lane at Washington Center Parkway (or Lafayette Street), new right-of-way will be needed. Temporary easements thought out the project will be needed during construction.

Utilities: The utilities that exist in the corridor include:
- Water
- Telephone (underground)
- Fiber Optics (underground) – 2 lines
- Storm Sewer
LANDSCAPE

Lighting: Lighting is currently provided on both the north and south sides of 120th Avenue along then entire corridor. The Xcel standard “cobra head” fixtures are currently installed. There is the desire to create a metered system along 120th Avenue where the City owns and controls this system.

The concept plan unifies landscape treatments from Washington Street to Claude Court with an emphasis on xeriscape plantings and rock mulch. Irrigated turf areas are minimized to reduce water consumption and maintenance activities. Canopy trees bordering the street particularly along the residential sections help to reduce traffic noise, make the trail more comfortable with increased shade and provide a psychological buffer between the vehicular and pedestrian/bicycle traffic.

PEDESTRIAN TREATMENTS

Walkways: Where possible, a 10’ wide trail to provide continuous pedestrian connections on both the south and north sides of 120th Avenue is incorporated. Intermittent benches and directional signage to recreational and other important regional landmarks is included. The irrigation canal may either need to be placed in a conduit or contained by retaining walls in order to maintain the 10 foot multi-use trail section.

Crossings: A major crossing for bicycle and pedestrian movements is incorporated at Irma to encourage safer and more direct access between the south and the north properties. The eastern leg of 120th Avenue at Irma Drive contains a widened median to provide a refuge. A pedestrian crossing button should be provided so as not to trap pedestrians/bicyclist in the median area. The Race Street intersection is a secondary node for bicycle and pedestrian features.

Bicycles: Due to the nature of the arterial with its high traffic volume, an on-street bike lane is not included in the design. Instead, a combined multi-use 10’ wide trail with pavement markings to delineate directional flow will be provided. In some isolated areas, the open irrigation ditch will need to be covered or contained by retaining walls to accommodate this widened trail section.

CONSTRUCTION COSTS

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Total: $9,061,821.00

Concept Contingency (30%): $2,686,000.00

Engineer's Estimate of Probable Cost and Quantities

City of Northglenn Costs Only

120th Avenue from Washington St to East of Claude Ct (Railroad)

Date: May 31, 2015

120th Avenue to Claude Court

City of Northglenn | 120th Avenue Corridor Study

Washington Street to Claude Court

City of Northglenn

Wheat Ridge, Colorado

120th Avenue to Claude Court

City of Northglenn | 120th Avenue Corridor Study

Date: May 31, 2015
ENVIRONMENTAL CONDITIONS/PERMITS

EST conducted a review of the potential environmental impacts that would be encountered during the course of this project.

Potential Significant Natural and Cultural Resources and/or Hazardous Material Conditions in the Project Areas

1. Irrigation Canal - cultural resource
2. Lead based paint
3. Contaminated soil or groundwater
4. Migratory birds
5. Prairie dog burrows- burrowing owl habitat
6. Wetlands/stream
7. Railroad tracks - cultural resource
8. T&E species habitat
9. Temporary closure of City parks or trails

A detailed discussion of these conditions is presented in the Appendix.

CONCEPT LANDSCAPE & ROADWAY PLANS
CONCEPT LANDSCAPE PLANS
CONCEPT ROADWAY PLANS
CONCEPT ROADWAY PLANS
CONCEPT ROADWAY PLANS
CONCEPT ROADWAY PLANS

OPTIONAL LEFT TURN STRIPING AT IRMA DRIVE
CONCEPT ROADWAY PLANS
CONCEPT ROADWAY PLANS
CONCEPT ROADWAY PLANS
CONCEPT ROADWAY PLANS