JOHNSON ANNEXATION PROPERTY ASSESSMENT

STORMWATER MANAGEMENT REVIEW

February 3, 2016

Phelps Engineering (PES) reviewed data made available from the City of Fort Collins (The City), the Federal Emergency Management Agency (FEMA), and the Natural Resources Conservation Service, National Cooperative Soil Survey to gain insight into the potential stormwater management requirements of the proposed Johnson Annexation development.

A. PROJECT LOCATION

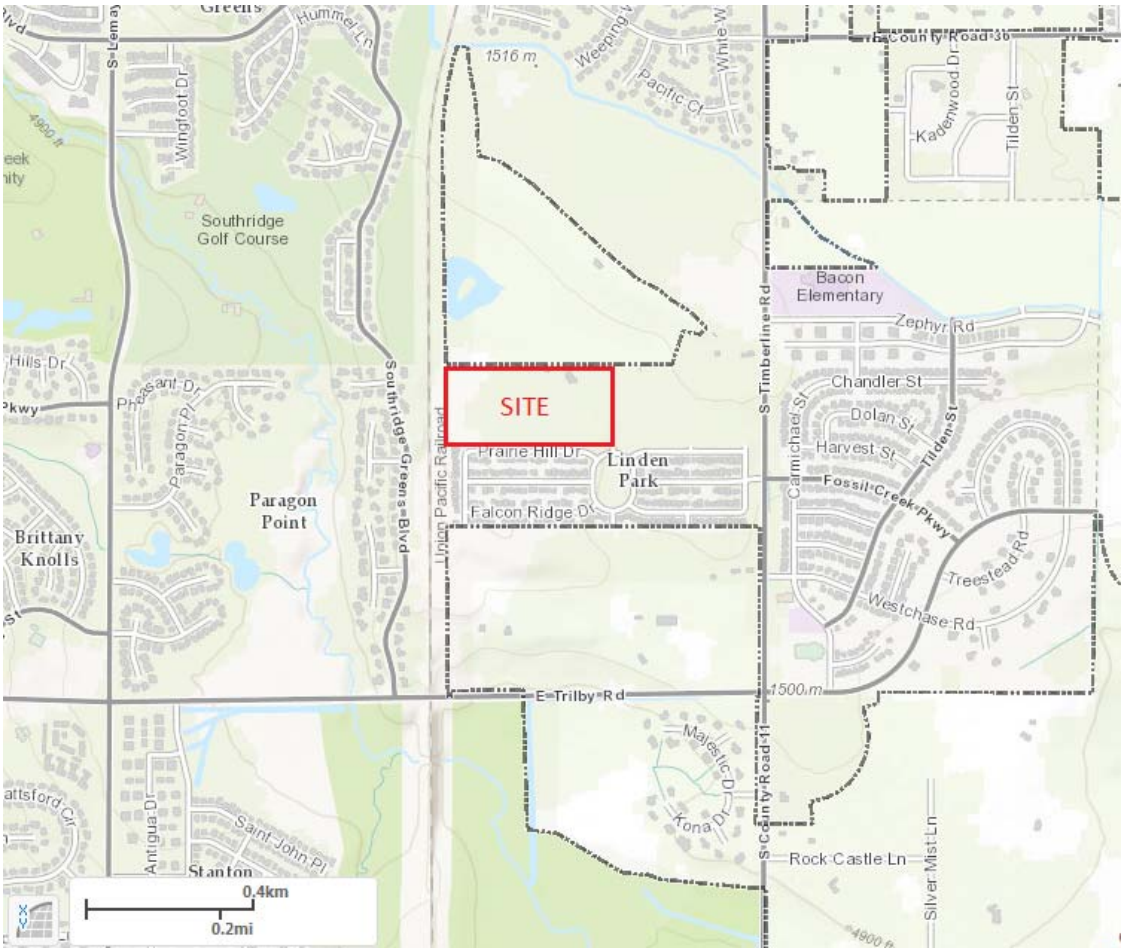
1. Streets, Subdivision Name, Lot and Block, Site Plan Name

Project/Site Name:		**Johnson Annexation Property**			
Project Street/Location:		1801 Rosen Drive			
City: State: ZIP Code:		Fort Collins, CO 80528			
County or Similar Subdivision:		City of Fort Collins, Larimer County			
Latitude/Longitude (Use one of three possible formats, and specify method)					
Latitude:	40°30' 3.96"N	**Longitude:**	105° 2'46.01"W		
Township	6 north	**Range**	68 west	**Section**	SE ¼ of 7

2. Surrounding Development

The site is located west of I-25 in the southern portion of Fort Collins. It's nearest main cross-roads are Timberline Road and Trilby Road located to the southeast. The project is surrounded by; unplatted land to the north; the Timberline Development to the east, a luxury apartment project that is currently under construction; Linden Park development to the south, (a newly constructed single family development), and the Union Pacific Railroad to the west.

3. Vicinity Map



B. PROPERTY DESCRIPTION

1. Site Acreage - 19.8± acre site is agrarian in use

2. Site Cover, Slopes and Soils
Historically, the site has an agrarian use and has a house at the northeast corner of the site, and farm utility building just west of the home. Driveway access and landscaping along with fencing surround the home. The remainder of the site is covered in vegetation, presumably agricultural related growth from farmed crops. A pond is located in the central portion of the property. It is believed that this pond was used for crop irrigation in the farm's history. A stand of dense vegetation consisting of trees, bushes and shrubs is located around the westerly side of the pond. Two hundred feet or so south of the pond lies another stand of trees. Finally, an irrigation ditch or lateral transects the site from the middle of the southern property line diagonally to the north and east. (***Please refer to the attached Exhibit A: Existing Topography Map.)***

When examining the site's topography, basically, the existing irrigation ditch (or lateral) creates two basins; an eastern basin, and a western basin.

The eastern basin slopes to the southeast corner of the property at slopes ranging from 0.5% to 4.0% with an average of 2%.

The western portion of the site seems to drain to the pond in the middle. Also, there are several off-site areas that are tributary to this pond from all of the surrounding properties. In reviewing the existing 2-foot contour data (City of Fort Collins GIS) for this area, it appears that the western portion of the site is in a localized depression with the existing railroad creating a relative basin split for the area. If water were to pond up on this portion of the site, it appears that the overflow path is through the property to the north and its existing pond. Ultimately, it appears that pond's outfall is to the west beneath the railroad and via a combination of overland flow and piped flow eventually outfalls to Fossil Creek. This should be verified with the City and its overall drainage plans.

Since there may be ponding that extends offsite to the neighboring property to the north, in order to develop, agreements must be obtained for the design of conveyance mechanisms (pipe, swale, and ditch) to its natural outfall. If this cannot be obtained, than another alternative would be to negotiate an agreement from UPRR to discharge detained flows to the ditches that they have located adjacent to the track. Finally, if none of these options are available, the downstream capacity of the any storm sewer network east of the site would need to be evaluated. Due to the irrigation ditch and general topographical restrictions and a pump may be required to be installed (if the City of Fort Collins allows.)

Regardless, imported earth will likely be required in order to create a positive drainage scenario. To illustrate this extent, the water surface elevation of the on-site pond is roughly at 4936. Meanwhile, the low lying area along the UPRR is at an elevation of 4941+/- as is the overflow elevation to the north, and the existing house is approximately 4952+/- .

Underscoring this finding, according to the Natural Resources Conservation Service, The National Cooperative Soil Survey indicates that the central area of the site and the northwestern portion of the site has an average of 31cm to the water table. This is indicative of fully saturated soils during certain times of the year at just a foot below the ground surface.

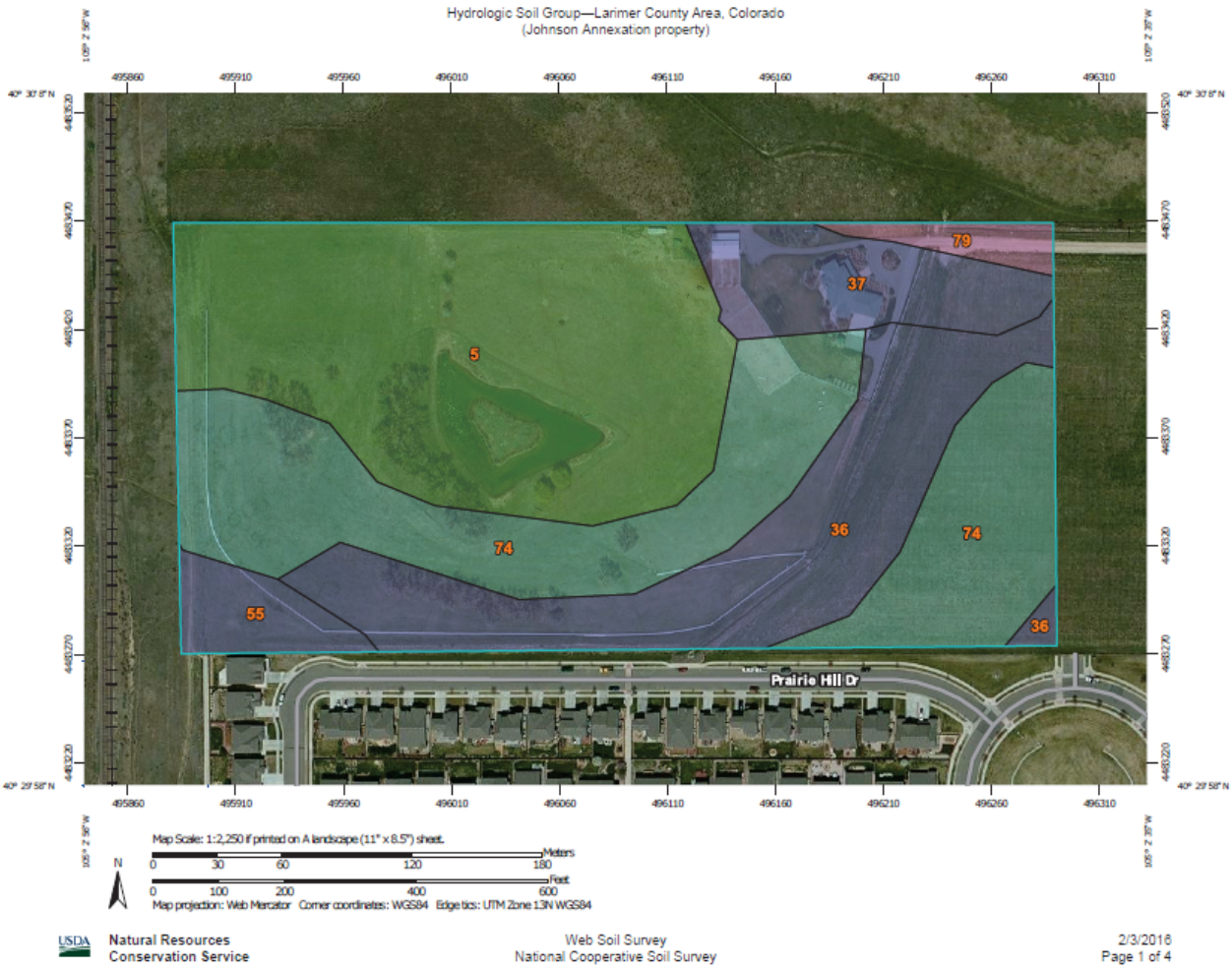
Reasons for this could be low lying topography and the presence of the existing pond on site. This could also indicate the presence of wetlands on site and should be evaluated as such. Wetlands are protected under federal regulations and are either preserved, relocated on site by mitigation, acreages purchased elsewhere, or some combination thereof.

If there is a high water table, it may be that the product type should eliminate basements, or that an underdrain system may be required for all structures. If should be noted that in addition to the pond on site, there is another pond located approximately 450 feet north of the site with (according to the City of Fort Collins GIS) a mere 2-foot higher water surface elevation.

Considering the proximity of the nearby pond, it may be that, even were the westerly portion of the Johnson Annexation Property to be filled in with imported earth, the groundwater may be relatively high due to the proximity of the pond and the irrigation ditches.

Therefore, Phelps Engineering recommends a sub-surface investigation to determine the feasibility of a development considering the possible high water table, and to include a gross analysis of groundwater in the area due to the irrigation features.

Based on information gathered from the Natural Resource Conservation Service and the Web Soil Survey, it is determined that the soil group for this site consists of all four groups (A, B, C and D). Since the site has all four groups, with no soil type predominating, the individual soils types should be used in the existing drainage analysis. In the developed condition, the site will most likely require import of soil to facilitate positive drainage. If that is the case, Hydrologic Soil Group C may be assumed for analysis as it typically results in higher runoff coefficients, and would be more conservative.



Hydrologic Soil Group— Summary by Map Unit — Larimer County Area, Colorado (CO644)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
5	Aquepts, loamy	A/D	7.2	36.2%
36	Fort Collins loam, 3 to 5 percent slopes	B	4.0	20.1%
37	Fort Collins loam, 5 to 9 percent slopes	B	1.6	8.1%
55	Kim loam, 5 to 9 percent slopes	B	0.7	3.4%
74	Nunn clay loam, 1 to 3 percent slopes	C	6.0	30.4%
79	Otero sandy loam, 5 to 9 percent slopes	A	0.4	1.8%
Totals for Area of Interest			**19.9**	**100.0%**

C. Designated Floodplains and Flood Insurance

According to FEMA the Flood Insurance Rate Map (FIRM) panel that covers this area is Panel No. 08069C1000F. Incidentally, this panel is not printed because there are "No Special Flood Hazard Areas" defined on the panel. It is important to note that in spite of this declaration by FEMA, there may be low areas lying on the site that do encounter periods of ponding or flooding from time to time. The FIRM Panel may show no delineated areas because there have been no studies performed on this specific area. To reiterate, there are no floodplain, floodway limits shown on the property. Therefore, any designed stormwater management measures for the site do not have to be reviewed by FEMA.

D. Major Drainage Basin

The site is a part of the Fossil Creek drainage basin. Historically, this basin has recorded areas of flooding on it, particularly in nearby Fossil Creek Reservoir. The City has identified problematic areas along the creek (***See Exhibit B: Fossil Creek – Problem identification Map***), and also recommended improvements to the stormwater infrastructure. (***See Exhibit C: City of Fort Collins master Plan Basin Recommended Improvements***) The Johnson Annexation Property is not located immediately adjacent to any of these areas. Therefore, the likelihood of being required to construct any major drainageway improvements within the Fossil Creek itself as part of the development are minimal. That being said, there may be development drainage basin fees of some sort that a developer is required to pay in order to develop the property within the Fossil Creek watershed. These fees typically repay a municipality for the capital they have expended in past years to study, improve, and maintain developed watersheds and their conveyances.

E. Existing Drainage Infrastructure

Pertaining to the eastern portion of the site: it is possible that there may be existing drainage infrastructure in the roadway constructed at the west of the Timberline development. A thorough examination of the neighboring construction documents for both the Linden and the timberline development along with any subsequent follow up with The City should ensue to verify this.

As it pertains to the western portion of the site: an initial review of the topography indicates that the westerly portion of the site is in a low lying area, whose overflow outfall is yet to be determined. It is anticipated that there may be an existing culvert or syphon beneath the UPRR track that convey stormwater beneath the track. Since the western portion of the site, and several off-site basins are tributary to the low lying pond with no apparent outfall, Phelps Engineering recommends further evaluation and research from the City of Fort Collins in obtaining existing drainage reports for the surrounding developments and obtaining any stormwater utility information they have on file.

In the event that no natural gravity outfall exists there are two apparent options:

a) Direct the stormwater runoff to a low lying area and pump the stormwater to a point of discharge, or
b) Import earth on site filling in the depression and existing pond and facilitate positive surface drainage to its eventual interception by Fossil Creek.

This item plays a crucial role in project viability and should be determined as early on as possible.

F. Existing Irrigation Facilities

There are existing on-site irrigation facilities on site. Some of these facilities may be associated with the on-site pond. Apart from owner knowledge, updated title work on the property would most likely indicate any recorded irrigation rights concerning the ditches and possible rights to the pond. Any possible realignment should be evaluated with the ditch company. Similarly, utility crossings and street infrastructure will have to be coordinated with the ditch company. Phelps Engineering recommends the following:

- Obtain current title work for the property to review this issue and to determine ditch ownership.
- Meet with the irrigation company and/or its manager early in the conceptual stages of a project to discuss development impacts.

G. Stormwater Detention and Stormwater Quality

Pertaining to long range goals of providing stormwater management and quality, The City did not indicate, on their mapping, (***See Exhibit D***) any specific responsibilities for this site to provide stormwater detention or water quality. This is most likely due to the fact that the site currently is used for agricultural purposes, and did not account for any proposed zoning. However, nearby neighboring properties that have undergone developmental approval in recent years were required to address both stormwater detention and stormwater quality measures. Additionally, according to City stormwater regulations, The City requires that the developed site provide stormwater detention for the 100-year storm and water quality. Therefore, it should be

anticipated that this will be required as part of this development and should be accounted for in the design and layout of the development.

Both preliminary and final drainage reports for the site shall be prepared during the design and review of the project. Once the outfall connections are determined and verified, and initial discussions with the irrigation ditch company are underway, a conceptual drainage analysis determining the volume and size of the detention facilities will be determined.

H. Stormwater Management Permitting (SWMP)

Any site activities disturbing more than one (1.0) acre of ground require permitting. When soils are disturbed, especially during construction activities and grading activities, additional erosion of soils and excessive sedimentation of those soils within stormwater can occur. Due to the Clean water Act, the Environmental Protection Agency (EPA) has jurisdiction over the water quality of certain stormwater conveyances, and these construction activities are regulated due to their potential to pollute drainageways. The EPA authorizes the state to regulate and permit these kinds of activities, and subsequently the state also allows local jurisdictions to regulate and permit activities within their boundaries. Since the proposed development and construction activities must conform to these federal regulations, a Stormwater Management Permit (SWMP) from The City is required to be obtained by the permittee. This document along with a Construction Activities Stormwater Discharge Permit (CASDP) issued by the Colorado Department of Public Health and Environment (CDPHE) is required prior to any grading operations.

Typically these permits are granted to the contractor, on behalf of the owner, immediately prior to grading activities and subsequent to the review and approval of the proposed construction documents for a site.