LEE'S SUMMIT
MISSOURI

DESIGN AND CONSTRUCTION MANUAL DESIGN MODIFICATION REQUEST

PROJECT NAME: Discovery Park Phase 1

PREMISE ADDRESS: NW Lee's Summit Rd & NE Douglas St.

PERMIT NUMBER:

OWNER'S NAME: Discovery Park Lee's Summit, LLC Brian Maenner

TO: The City Engineer

In accordance with the Lee's Summit Design and Construction Manual (DCM) Section 1002.A, I wish to apply for a modification to one or more specification (s). The following articulates my request for your review and action. (NOTE: Cite specific code sections and engineering justification and drawings.)

A waiver is being requested to remove 10.3 acres of stream buffer located within the project site, established as required in Section 5605.3.B of the Kansas City Metropolitan Chapter, American Public Works Association, Standard Specifications & Design Criteria, Section 5600 – Storm Drainage Systems & Facilities. Removal of the existing creek channel, as described in the attached memo, is driven by:

- The site layout includes a wet-bottom detention basin that is part of a development amenity space with a pond, parkland, and trail. The basin will provide regional stormwater rate control and water quality treatment for the development.
- A required entrance drive off of NE Douglas Road with minimum spacing allowed by the project traffic study to the adjacent intersection placing it in conflict with the existing creek channel.

See the attached memo for background and discussion.

SUBMITTED BY:

NAME: Nicholas D. Heiser ( ) OWNER (X) OWNER'S AGENT

ADDRESS: 1301 Burlington St. Suite 100 Tel.# 816-442-6056

CITY, STATE, ZIP North Kansas City, MO 64116

Email: nheiser@olsson.com SIGNATURE:

FORWARDING MANAGER: RECOMMENDATION ( ) APPROVAL ( ) DENIAL

SIGNATURE: DATE:

GEORGE BINGER III, P.E. – CITY ENGINEER: ( ) APPROVED ( ) DENIED

SIGNATURE: DATE:

COMMENTS

A COPY MUST BE ATTACHED TO THE APPROVED PLANS

May 3, 2023

City of Lee's Summit, Missouri
220 SE Green Street
Lee's Summit, MO 64063

RE: PL2023011 – Discovery Park Stream Buffer Waiver

Dear Mr. Binger:

We are submitting this memorandum to support the attached waiver request for the Discovery Park Zone 1 & 2 development to remove 10.3 acres of stream buffer, established as required in Section 5605.3.B of the Kansas City Metropolitan Chapter, American Public Works Association, Standard Specifications & Design Criteria, Section 5600 – Storm Drainage System & Facilities, which falls at the upper-most reach of the existing native channel. An existing box culvert crossing NE Douglas Street will be extended approximately 720 feet to the proposed wet-bottom detention basin, and the existing creek channel removed.

The need to remove the existing creek channel is driven by:

- The site layout includes a wet-bottom detention basin that is part of a development amenity space with a pond, parkland, and trail. The basin will provide regional stormwater rate control and water quality treatment for the development.
- A required entrance drive off of NE Douglas Road with minimum spacing allowed by the project traffic study to the adjacent intersection placing it in conflict with the existing creek channel.

The proposed development has been extensively coordinated with Unity Village, the owner/operator of Unity Lake #2, an existing lake that is located approximately ½ mile downstream of the proposed stream buffer impacts. As indicated in the attached letter from Unity Village, with the level of storm water quality treatment and peak runoff rate control being provided by the proposed improvements, this project has their full support.

As part of the due diligence performed for the development, review of existing FEMA floodplains was completed and determined no regulated floodplains exist within the impacted creek channel, and a jurisdictional determination was requested by the United States Army Corps of Engineers (USACE) and a determination letter was received that states the affected creek channel and attached wetlands are not jurisdictional waters of the US. Copies of the USACE determination and FEMA FIRM panel are attached to this memo, for reference.

Along with the above listed reviews, a macro and first phase micro stormwater study, covering Zones 1 and 2, was completed to establish peak allowable flowrates and provide design of a detention basin within the development to meet those allowable flowrates. As shown in the study, peak flowrates are lower than the allowable flowrates for the channel at the downstream point of interest for the development.

In addition to peak rate reductions, the city requires that 40-hour extended dry detention of the water quality storm event, or equivalent on-site water quality treatment be provided per the MARC BMP Manual. The proposed development will provide an equivalent, or greater, level of service than 40-hr extended dry detention through a mix of 40-hr extended detention of the water quality storm and individual best management practices (BMPs) constructed upstream of the proposed detention basin. Upstream BMPs will be constructed internally to the project pad sites, closer to the source point of the pollutant. Water

quality analysis treatment measures and calculations will be provided in future micro stormwater studies as each phase of the project is finalized through the Final Development Plan process.

Furthermore, with the culvert discharging into the wet-bottom detention basin with approximately 680 feet of travel length through a permanent pool of water, suspended solids and floatables that are conveyed into the basin from upstream (offsite) areas, not required to be treated by this development, will have an opportunity to settle out or be collected and disposed of through the development's maintenance program. Discharging the culvert extension directly into the permanent pool basin will also provide scour and erosion protection that is a common problem at pipe outlets into dry basins or creek channels. Permanent pool detention basins also promote wildlife and aquatic habitats where dry basins are typically mowed and maintained to prevent vegetation, often deemed as 'unsightly' by landowners, from growing.

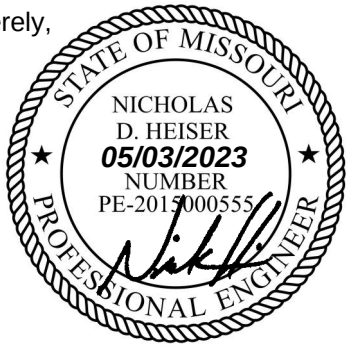
To improve the aesthetics and quality of the proposed wet detention basin, landscape design guidelines are being established for the development. The proposed guidelines require a 15-ft buffer of native plantings in areas not encumbered by retaining walls around the perimeter of the pond, restricting the use of turf grass in that zone. The taller native plantings and grasses provide wildlife habitat and refuse while filtering physical and chemical pollutants. Native planted buffer zones in conjunction with the existing old growth tree preservation (when possible) will enhance wildlife habitat and connectivity.

In addition to the water quality treatment being provided for the development prior to discharging runoff into the creek, 5.2 acres of enhanced stream buffer is being proposed to be set aside downstream of the impacted creek channel to further offset any environmental/wildlife impact caused by removing stream buffer described.

With the support of Unity Village, due diligence performed on the project site, and increased level of water quality being provided to on- and off-site discharges with separate water quality treatment measures and a wet detention basin, we request this waiver be approved.

Should you have any questions, please contact me at (816) 442-6056 or nheiser@olsson.com.

Sincerely,

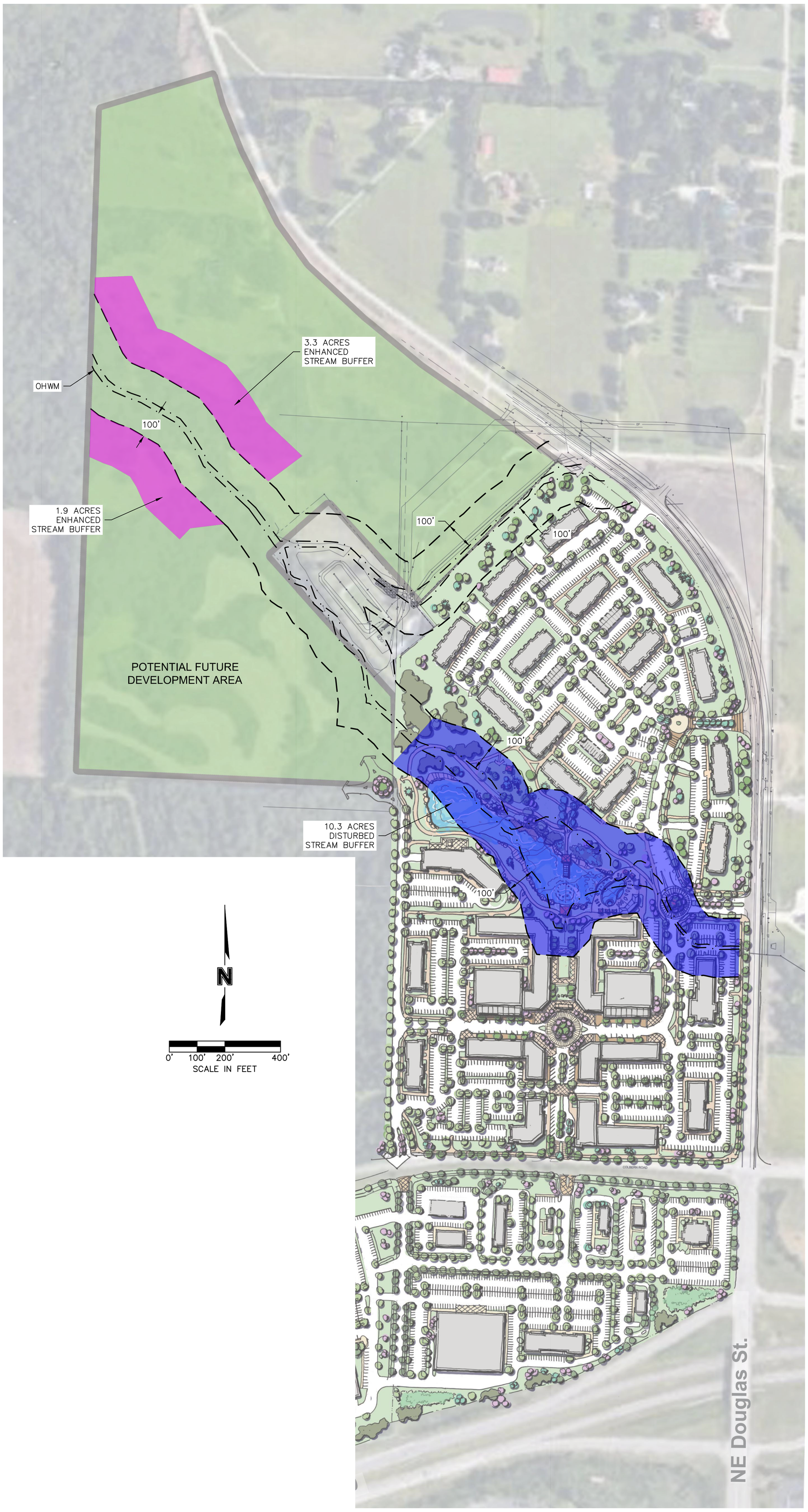


Nicholas D. Heiser, PE
Senior Civil Engineer

Stream Buffer Impact Exhibit

1301 Burlington Street / Suite 100 / North Kansas City, MO 64116
O 816.361.1177 **/ olsson.com**

DWG: F:\2021\04501-05000\021-04643-A\40-Design\Exhibits\EX-005 Stream Impact Exhibit\EX-005A_A2104643.dwg USER: cholmquist
DATE: Jan 09, 2023 11:34am XREFS: C_PBASE_A2104643 C_FBASE_A2104643 C_FROAD_A2104643 L_PBASE02_A2104643 C_XSURF_A2104643 C_XBASE_A2103436



SHEET
EX-005A

drawn by: CJH
checked by: JFE
approved by: CP
QA/QC by: JFE
project no.: A21-04643
drawing no.: EX-005A_A2104643
date: 2023.01.09

ZONE 1 STREAM BUFFER EXHIBIT

DISCOVERY PARK

LEE'S SUMMIT, MO | 2022

REV. NO.	DATE	REVISIONS DESCRIPTION	BY

REVISIONS

olsson

Olsson - Civil Engineering
Missouri Certificate of Authority #001592
1301 Burlington Street
North Kansas City, MO 64116 TEL 816.361.1177 www.olsson.com

Letter of Support

1301 Burlington Street / Suite 100 / North Kansas City, MO 64116
O 816.361.1177 **/ olsson.com**

unity®
World Headquarters
at Unity Village

David Vest, CPA
Chief Financial Officer

January 17, 2023

Re: Discovery Park Zones 1 & 2 – Proposed Stormwater Best Management Practices (BMPs)

To whom it may concern,

We have reviewed the proposed stormwater management plan proposed for the Discovery Park Zones 1 & 2 development. Water quality treatment being provided by the proposed development appears to help mitigate any impacts to stormwater being conveyed by the existing creek channel and thus we are in support of the proposed development and removal of the existing creek channel.

We do not believe this will have any negative impacts to Unity Lake #1.

Sincerely,

David R. Vest, CPA
Mayor – Town of Unity Village

Chief Financial Officer – Unity School of Christianity

1901 NW Blue Parkway | Unity Village, MO 64065-0001 | Tel: 816-524-3550 | www.unity.org
Email: vestdr@unityonline.org | Tel: 816-347-5509

Landscape Design Guidelines

1301 Burlington Street / Suite 100 / North Kansas City, MO 64116
O 816.361.1177 **/ olsson.com**

LANDSCAPE

Landscape Buffers

Vegetative buffers and riparian should be included to reduce noise pollution, enhance long term wildlife habitat connectivity, and improve storm water quality.

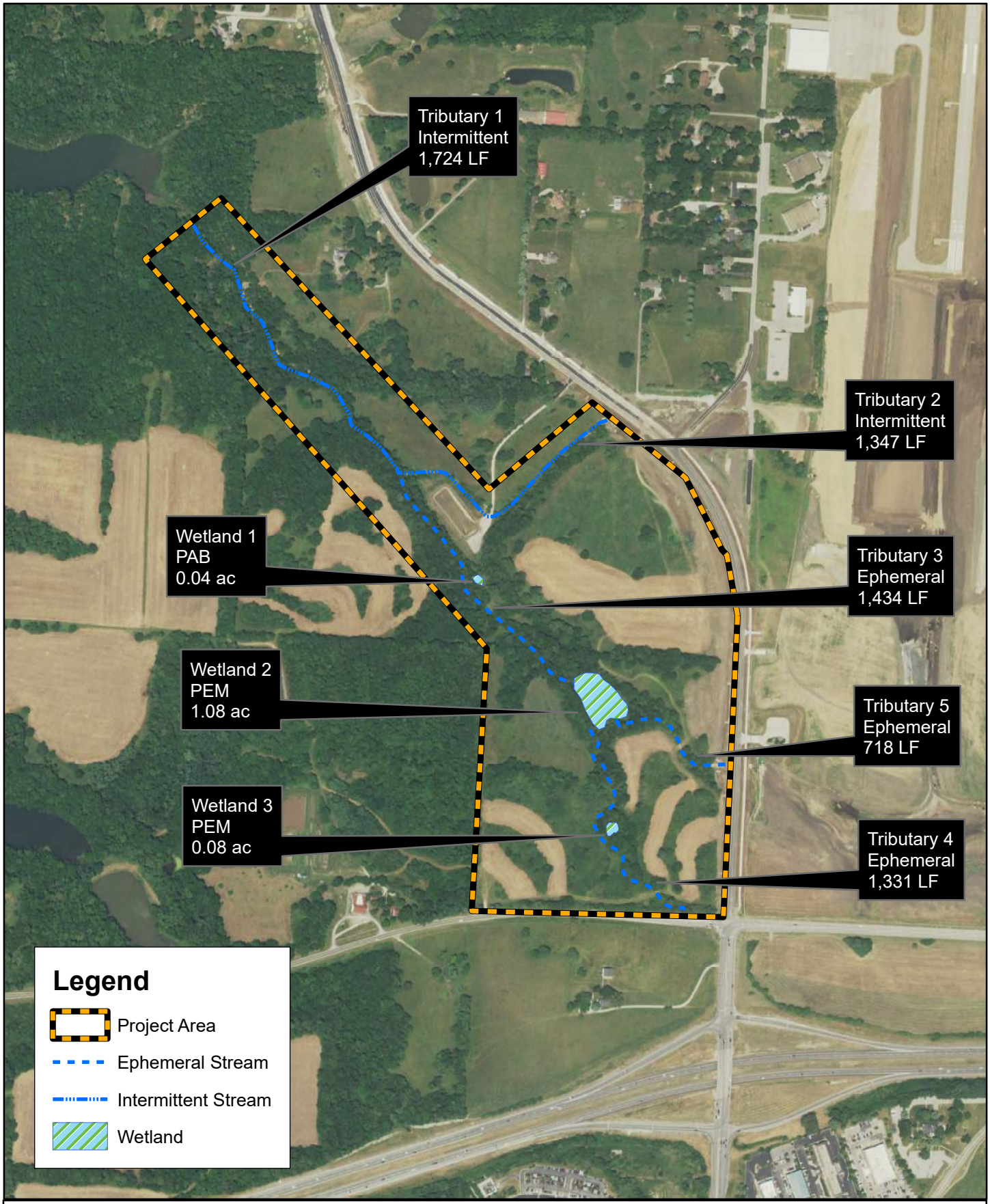
Dense vegetative buffering should be included in any portion of the development adjacent to I-470. This buffering should include a variety of native deciduous and evergreen trees as well as stands of native understory shrubs and grasses. These plantings will assist in minimizing noise pollution from the adjacent interstate. Buffer plantings along Colbern Rd. and Lee's Summit Rd. should include a combination of street tree plantings, native prairie stands with bermed landforms.

Native plantings/grasses that require minimal maintenance should be included along stream buffers and planned detention areas. Turf lawn areas should not be allowed within 15' of delineated detention area or ponds. These taller native plantings and grasses provide wildlife habitat and refuse while filtering physical and chemical pollutants. Native planted buffer zones in conjunction with the existing old growth tree preservation (when possible) will enhance wildlife habitat and connectivity.

Native buffer and riparian plantings should require temporary irrigation until established.

Jurisdictional Determination

1301 Burlington Street / Suite 100 / North Kansas City, MO 64116
O 816.361.1177 / **olsson.com**



Project Number: B19-0012	**Aquatic Resources Map** Aria Apartments NW Colbern Rd and NE Douglas St Lee's Summit, Missouri	DISCLAIMER : This Geographic Information System (GIS) and its components are designed as a source of reference for answering inquiries, for planning and for modeling. GIS is not intended, nor does it replace legal description information in the chain of title and other information contained in official government records such as the County Clerk and Recorders office or the courts. In addition, the representations of locations in this GIS cannot be substituted for actual legal surveys.	olsson 7301 West 133rd Street Suite 200 Overland Park, Kansas 66213 P: 913.381.1170 F: 913.381.1174	Figure **5**
Drawn By: CRW				
Revision Date: 8/12/2019				

F:\2019\0001-0500\019-0012\40-Design\GIS\MXD\NRPL\Ex5_AquResources_cw.mxd

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, KANSAS CITY DISTRICT
635 FEDERAL BUILDING
601 E. 12TH STREET
KANSAS CITY, MISSOURI 64106-2824

September 16, 2020

Regulatory Branch
NWK-2020-765

Ms. Kyleen Kelly
Olsson Associates
7301 West 133rd Street, Suite 200
Overland Park, Kansas 66213

Dear Ms. Kelly:

This letter is in response to your request, submitted on behalf of Central States Construction, for a Jurisdictional Determination for the Aria Apartments residential development. The site is located in Section 19 & 30, Township 48 north, Range 31 west, Jackson County, Missouri. Your request has been assigned Regulatory File No. NWK-2020-765. Please reference this file number on any correspondence to us or to other interested parties concerning this matter.

This letter contains an approved jurisdictional determination for your project site. This jurisdictional determination is valid for a 5-year period from the date of this letter unless new information warrants revision of the determination before the expiration date. If you object to this determination, you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed you will find a Notification of Administrative Appeal Options and Process and Request for Appeal (NAO-RFA) form. If you request to appeal this determination, you must submit a completed NAO-RFA form to the Northwestern Division Office at the following address:

Division Engineer
U.S. Army Corps of Engineers, Northwestern Division
ATTN: Melinda M. Larsen
Regulatory Appeals Review Officer
1201 NE Lloyd Blvd., Suite 400
Portland, OR 97232
Telephone: 503-808-3888

In order for an NAO-RFA to be accepted by the Corps, the Corps must determine that it is completed, that it meets the criteria for appeal under 33 CFR Part 331.5, and that it has been received by the Division Office within 60 days of the date of the NAO-RFA. Should you decide to submit an NAO-RFA form, it must be received at the above address by November 15, 2020. It is not necessary to submit an NAO-RFA form to the Division Office if you do not object to the determination in this letter.

In the event that you disagree with an approved jurisdictional determination and you have **new information** not considered in the original determination, you may request reconsideration of that determination by the Corps District prior to initiating an appeal. To request this reconsideration based upon new information, you must submit the completed NAO-RFA form and the new information to the District Office so that it is received within 60 days of the date of the NAO-RFA. Send approved jurisdictional determination reconsideration requests to:

District Commander
U.S. Army Corps of Engineers, Kansas City District
ATTN: Mark D. Frazier
Chief, Regulatory Branch
601 East 12th Street, Suite 402
Kansas City, MO 64106-2824
Telephone: 816-389-3990 - FAX: 816-389-2032

The Corps of Engineers has jurisdiction over all waters of the United States. Discharges of dredged or fill material in waters of the United States, including wetlands, require prior authorization from the Corps under Section 404 of the Clean Water Act (33 USC 1344). The implementing regulation for this Act is found at 33 CFR 320-332.

We are interested in your thoughts and opinions concerning your experience with the Kansas City District, Corps of Engineers Regulatory Program. Please feel free to complete our Customer Service Survey form on our website at: http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey. You may also call and request a paper copy of the survey which you may complete and return to us by mail.

If you have any questions concerning this matter, please feel free to write or contact me at 816-389-3115 or by email at connor.n.bickford@usace.army.mil. Please reference Permit No. NWK-2020-765 in all comments and/or inquiries relating to this project. This letter is only being provided to you electronically at kkelly@olsson.com.

Sincerely,

Connor N. Bickford

Connor Bickford
Regulatory Specialist

Enclosures

cc (electronically w/o enclosures):

Environmental Protection Agency,
Watershed Planning and Implementation Branch
U.S. Fish and Wildlife Service, Columbia, Missouri
Missouri Department of Natural Resources,
Water Protection Program
State Historic Preservation Office
Missouri Department of Conservation

U.S. ARMY CORPS OF ENGINEERS
REGULATORY PROGRAM
APPROVED JURISDICTIONAL DETERMINATION FORM (INTERIM)
NAVIGABLE WATERS PROTECTION RULE

I. ADMINISTRATIVE INFORMATION

Completion Date of Approved Jurisdictional Determination (AJD): 9/15/2020
ORM Number: NWK-2020-765
Associated JDs: N/A
Review Area Location[1]: State/Territory: MO City: Lee's Summit County/Parish/Borough: Jackson County
Center Coordinates of Review Area: Latitude 38.950502 Longitude -94.380472

II. FINDINGS

A. Summary: Check all that apply. At least one box from the following list MUST be selected. Complete the corresponding sections/tables and summarize data sources.

- ☐ The review area is comprised entirely of dry land (i.e., there are no waters or water features, including wetlands, of any kind in the entire review area). Rationale: N/A
- ☐ There are "navigable waters of the United States" within Rivers and Harbors Act jurisdiction within the review area (complete table in Section II.B).
- ☒ There are "waters of the United States" within Clean Water Act jurisdiction within the review area (complete appropriate tables in Section II.C).
- ☒ There are waters or water features excluded from Clean Water Act jurisdiction within the review area (complete table in Section II.D).

B. Rivers and Harbors Act of 1899 Section 10 (§ 10)[2]

§ 10 Name	§ 10 Size		§ 10 Criteria	Rationale for § 10 Determination
N/A.	N/A.	N/A	N/A.	N/A.

C. Clean Water Act Section 404

Territorial Seas and Traditional Navigable Waters ((a)(1) waters):[3]				
(a)(1) Name	(a)(1) Size		(a)(1) Criteria	Rationale for (a)(1) Determination
N/A.	N/A.	N/A.	N/A.	N/A.

Tributaries ((a)(2) waters):				
(a)(2) Name	(a)(2) Size		(a)(2) Criteria	Rationale for (a)(2) Determination
NWK-2020-765 Tributary 1	1,724	linear feet	(a)(2) Intermittent tributary contributes surface water flow directly or indirectly to an (a)(1) water in a typical year.	Tributary 1 is classified as an (a)(2) water per evidence gathered from the consultant's site visit 2019-8-6. From aerial photographs and NWI provided, Tributary 1 flows northwest and makes a downstream hydrologic connection with an (a)(3) water, Unity Lake 2. The water feature is naturally occurring and field data exhibits stream flow in absence of precipitation events, though defined as discrete and confined flow. Upstream, the tributary makes hydrologic connections with both a jurisdictional water feature (Tributary 2) and non-

[1] Map(s)/figure(s) are attached to the AJD provided to the requestor.
[2] If the navigable water is not subject to the ebb and flow of the tide or included on the District's list of Rivers and Harbors Act Section 10 navigable waters list, do NOT use this document to make the determination. The District must continue to follow the procedure outlined in 33 CFR part 329.14 to make a Rivers and Harbors Act Section 10 navigability determination.
[3] A stand-alone TNW determination is completed independently of a request for an AJD. A stand-alone TNW determination is conducted for a specific segment of river or stream or other type of waterbody, such as a lake, where upstream or downstream limits or lake borders are established. A stand-alone TNW determination should be completed following applicable guidance and should NOT be documented on the AJD Form.

Tributaries ((a)(2) waters):				
(a)(2) Name	(a)(2) Size		(a)(2) Criteria	Rationale for (a)(2) Determination
				jurisdictional feature (Tributary 3, ephemeral). Under new NWPR language, this hydrologic connection with a non-jurisdictional ephemeral feature does not sever jurisdiction for Tributary 1 due to downstream jurisdictional connection. Therefore, Tributary 1 is a jurisdictional (a)(2) water.
NWK-2020-765 Tributary 2	1,347	linear feet	(a)(2) Intermittent tributary contributes surface water flow directly or indirectly to an (a)(1) water in a typical year.	Tributary 2 is classified as an (a)(2) water per evidence gathered from the consultant's site visit 2019-8-6. The stream channel is described as wide and manipulated, having had a culvert constructed along the channel. Data collected shows stream flow occurring in Tributary 2 without aid of significant precipitation, though described as discrete and confined. As well, Tributary #2 makes a downstream hydrologic connection with Tributary 1, which further makes a connection to an (a)(3) water, Unity Lake 2. Based on this evidence, Tributary 2 is a jurisdictional (a)(2) water.

Lakes and ponds, and impoundments of jurisdictional waters ((a)(3) waters):				
(a)(3) Name	(a)(3) Size		(a)(3) Criteria	Rationale for (a)(3) Determination
N/A.	N/A.	N/A.	N/A.	N/A.

Adjacent wetlands ((a)(4) waters):				
(a)(4) Name	(a)(4) Size		(a)(4) Criteria	Rationale for (a)(4) Determination
N/A.	N/A.	N/A.	N/A.	N/A.

D. Excluded Waters or Features

Excluded waters ((b)(1) – (b)(12)):[4]				
Exclusion Name	Exclusion Size		Exclusion[5]	Rationale for Exclusion Determination
NWK-2020-765 Tributary 3	1,434	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Tributary 3 is classified as a (b)(3) exclusion under new NWPR language per evidence from a 2019-8-6 site visit and delineation by the consultant. In this data, Tributary 3 had no flowing or standing water in the stream channel, thus meeting definitions of an ephemeral water feature. Therefore, Tributary 3 is a non-jurisdictional feature.
NWK-2020-765 Tributary 4	1,331	linear feet	(b)(3) Ephemeral feature, including an ephemeral	Tributary 4 is classified as a (b)(3) exclusion under new NWPR language per evidence from a 2019-8-6 site visit and delineation by the consultant. In this data, Tributary 4 had no

[4] Some excluded waters, such as (b)(2) and (b)(4), may not be specifically identified on the AJD form unless a requestor specifically asks a Corps district to do so. Corps districts may, in case-by-case instances, choose to identify some or all of these waters within the review area.
[5] Because of the broad nature of the (b)(1) exclusion and in an effort to collect data on specific types of waters that would be covered by the (b)(1) exclusion, four sub-categories of (b)(1) exclusions were administratively created for the purposes of the AJD Form. These four sub-categories are not new exclusions, but are simply administrative distinctions and remain (b)(1) exclusions as defined by the NWPR.

Excluded waters ((b)(1) – (b)(12)):[4]				
Exclusion Name	Exclusion Size		Exclusion[5]	Rationale for Exclusion Determination
			stream, swale, gully, rill, or pool.	flowing or standing water in the stream channel, thus meeting definitions of an ephemeral water feature. Therefore, Tributary 4 is a non-jurisdictional feature.
NWK-2020-765 Tributary 5	718	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Tributary 5 is classified as a (b)(3) exclusion under new NWPR language per evidence from a 2019-8-6 site visit and delineation by the consultant. In this data, Tributary 5 had no flowing or standing water in the stream channel, thus meeting definitions of an ephemeral water feature. Therefore, Tributary 5 is a non-jurisdictional feature.
NWK-2020-765 Wetland 1	0.04	acre(s)	(b)(1) Non-adjacent wetland.	Wetland 1 is a small, palustrine aquatic bed wetland located in the middle of the project site. It is a stand-alone wetland that makes no hydrologic connection with a jurisdictional feature, with its nearest nexus being adjacency to a non-jurisdictional ephemeral feature. Therefore, Wetland 1 is a non-jurisdictional feature under a (b)(1) exclusion.
NWK-2020-765 Wetland 2	1.08	acre(s)	(b)(1) Non-adjacent wetland.	Wetland 2 is a palustrine emergent wetland classified as (b)(1) exclusion per evidence gathered from a 2019-8-6 delineation and site visit by the consultant. Wetland 2 is located upstream of Tributary 3 and downstream of Tributaries 4 and 5, with Tributaries 4 and 5 draining into Wetland 2 and then draining to Tributary 3. These hydrologic connections are only with non-jurisdictional ephemeral features. Therefore, Wetland 2 is a non-jurisdictional feature under a (b)(1) exclusion.
NWK-2020-765 Wetland 3	0.08	acre(s)	(b)(1) Non-adjacent wetland.	Wetland 3 is a palustrine emergent wetland located in the southern region of the project site. It is a stand-alone wetland that makes no hydrologic connection with a jurisdictional feature, with its nearest nexus being adjacency to a non-jurisdictional ephemeral feature. Therefore, Wetland 3 is a non-jurisdictional feature under a (b)(1) exclusion.

III. SUPPORTING INFORMATION

A. Select/enter all resources that were used to aid in this determination and attach data/maps to this document and/or references/citations in the administrative record, as appropriate.

☒ Information submitted by, or on behalf of, the applicant/consultant: Stream & wetland delineation report furnished by Olsson Associates, 2020-09-09

This information is sufficient for purposes of this AJD.

Rationale: N/A

- ☐ Data sheets prepared by the Corps: N/A
- ☐ Photographs: Select. N/A
- ☐ Corps site visit(s) conducted on: N/A
- ☐ Previous Jurisdictional Determinations (AJDs or PJDs): N/A
- ☒ Antecedent Precipitation Tool: *provide detailed discussion in Section III.B*.
- ☐ USDA NRCS Soil Survey: N/A
- ☒ USFWS NWI maps: NWI map sourced through USACE Regulatory Viewer, 2020-09-15
- ☐ USGS topographic maps: N/A

Other data sources used to aid in this determination:

Data Source (select)	Name and/or date and other relevant information
USGS Sources	N/A.
USDA Sources	N/A.
NOAA Sources	N/A.
USACE Sources	N/A.
State/Local/Tribal Sources	N/A.
Other Sources	N/A.

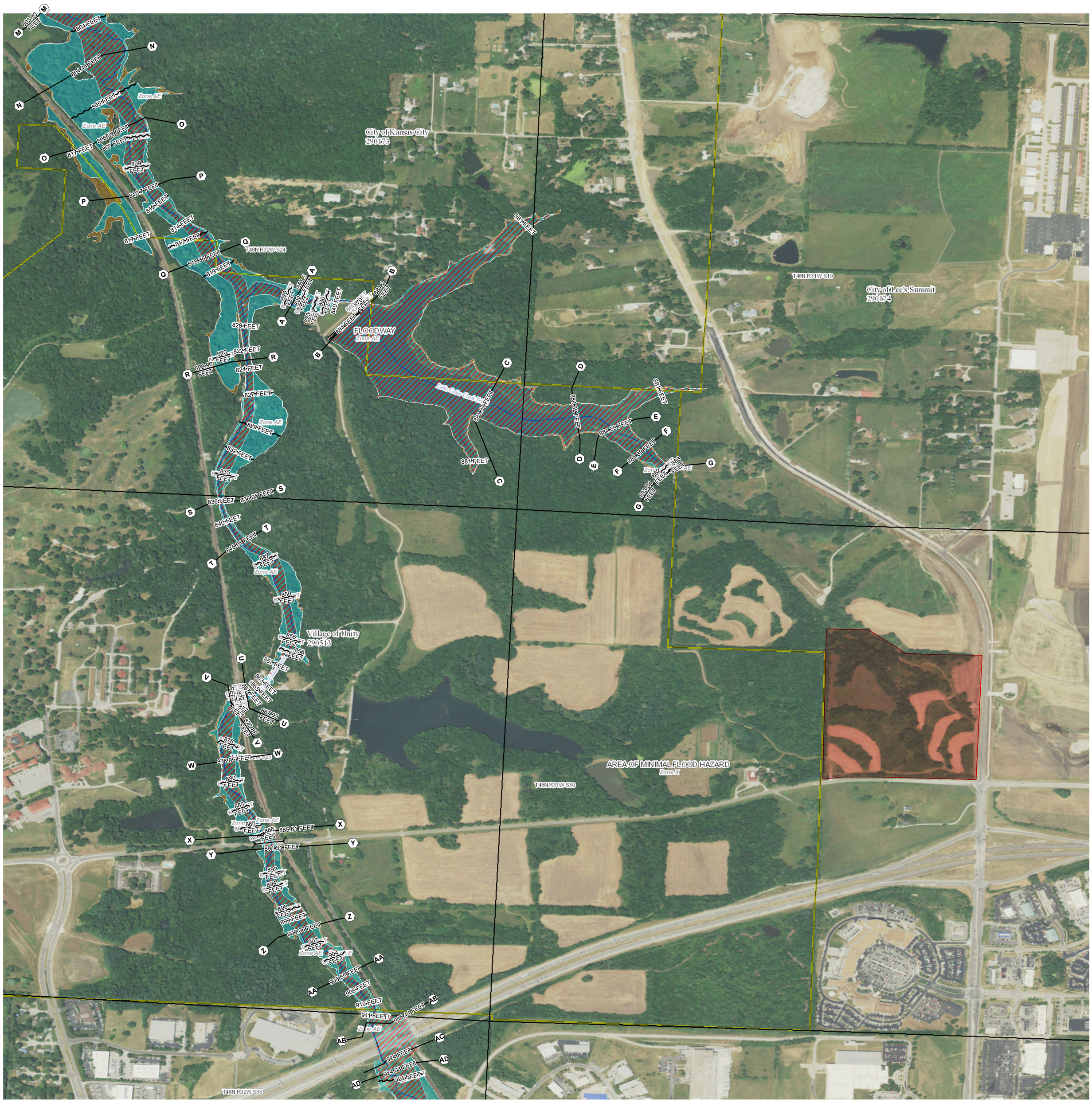
B. Typical year assessment(s): The APT data generated for site and date show higher precipitation rates over the last 30 days from 2019-08-06 compared to the normal 30 year range. This data supports the site experiencing wetter than normal conditions of precipitation. There were small precipitation events a couple days before the date of the site visit and delineation, but this appears to be neglibile and have little effect on the findings of the site.

C. Additional comments to support AJD: N/A

FEMA Flood Map

1301 Burlington Street / Suite 100 / North Kansas City, MO 64116
O 816.361.1177 / **olsson.com**

94°24'22.95"W 38°58'14.11"N



USGS The National Map: Orthoimagery. Data refreshed April 2020

94°22'29.6"W 38°56'8.44"N

FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS

- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD

- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee See Notes *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS

- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES

- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES

- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

For information and questions about this Flood Insurance Rate Map (FIRM), available products associated with this FIRM, including historic versions, the current map date for each FIRM panel, how to order products, or the National Flood Insurance Program (NFIP) in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at https://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates, refer to the Flood Insurance Study Report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Basemap information shown on this FIRM was provided in digital format by USDA, Farm Service Agency (FSA). This information was derived from NAIP, dated April 11, 2018.

This map was exported from FEMA's National Flood Hazard Layer (NFHL) on **8/26/2020 8:37 AM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time. For additional information, please see the Flood Hazard Mapping Updates Overview Fact Sheet at https://www.fema.gov/media-library/assets/documents/118418

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards. This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date.

SCALE

Map Projection:
GCS, Geodetic Reference System 1980;
Vertical Datum: NAVD88
For information about the specific vertical datum for elevation features, datum conversions, or vertical monuments used to create this map, please see the Flood Insurance Study (FIS) Report for your community at https://msc.fema.gov

N

1 inch = 500 feet 1:6,000

0 250 500 1,000 1,500 2,000 Feet

0 50 100 200 300 400 Meters

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

JACKSON COUNTY, MISSOURI AND INCORPORATED AREAS

PANEL 409 OF 605

Panel Contains:

COMMUNITY	NUMBER	PANEL
CITY OF KANSAS CITY	290173	0409
VILLAGE OF UNITY	290513	0409
CITY OF LEE'S SUMMIT	290174	0409

MAP NUMBER
29095C0409G
EFFECTIVE DATE
January 20, 2017

Stormwater Management Study Excerpt

1301 Burlington Street / Suite 100 / North Kansas City, MO 64116
O 816.361.1177 / **olsson.com**

DISCOVERY PARK MACRO STORMWATER REPORT

Prepared for:

Discovery Park Lee's Summit, LLC
Columbia, Missouri

January 2023

Revised March 2023

Olsson Project No. A21-04643

olsson

1. INTRODUCTION

This Stormwater Drainage Study has been prepared to evaluate the stormwater hydrology of multiple developments (current and future) that are being proposed within the watershed. Once fully developed, the area treated by improvements proposed within this study will include:

- Aria Apartments: a 22.50-ac apartment development (Zoned RP-4)
- Discovery Park Phase 1: a 39.42-ac commercial development (Zoned CP-2, currently being rezoned to PMIX)
- Discovery Park Phase 2: a 19.82-ac commercial development (Zoned PMIX)
- Discovery Park Future: a 116.26-ac planned mixed use development (Zoned PMIX)
- A future Multi-Family Residential development of approximately 14.96-ac along the west side of NW Lee's Summit Road (Zoned RP-4)

The site is located at the northwest corner of NE Douglas Street and NE Colbern Road, in the NE ¼ of Section 30 & SE ¼ of Section 19, Township 48 North, Range 31 West, entirely within the City of Lee's Summit, Jackson County, Missouri.

Stormwater runoff from the project site is tributary to Unity Lake Number One and Unity Lake Number Two. Unity Lake Number One is approximately 1,000 feet downstream of the Discovery Park Future study area. Unity Lake Number Two is approximately 2,500 feet downstream of the Discovery Park Phase 1 and Aria study areas.

This report, intended to serve as the project Macro Stormwater Drainage Study for Aria, Discovery Park Phase 1, and a portion of the Discovery Park Phase 2 Development, has been prepared to evaluate the Existing Conditions stormwater hydrology to establish Allowable Release Rates and to review impacts the proposed development has on the existing hydrology. The Existing Conditions stormwater hydrology will be analyzed for the Discovery Park Future areas to establish Allowable Release Rates similar to the Macro-study area, however, no proposed detention will be analyzed. A future Macro-study for that development area will be required with its Preliminary Development Plan submittal. Refer to Section 7 for hydrologic model input data and simulation results for Existing- and Proposed Conditions. Refer to Section 8 for maps and exhibits depicting the watersheds evaluated in the analyses.

Vicinity Map

1.1. FEMA Floodplain Classification

The FEMA FIRM Panel 29095C-0409G (eff. 20 January, 2017) depict the proposed development areas as “Zone X.” This is the FEMA flood insurance rate zone that “corresponds to areas outside the 0.2-percent-annual-chance floodplain, areas within the 0.2-percent-annual-chance floodplain, areas of 1-percent-annual-chance flooding where average depths are less

than 1 foot, areas of 1-percent-annual-chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 1-percent-annual-chance flood by levees. No BFE's or base flood depths are shown for this zone." Refer to the attached FEMA Floodplain Map (Exhibit 8-1.1) for depiction of the established floodplains relative to the project site.

The lower reaches of the modeled sub-watershed that is the subject of this report does include a "Zone AE" boundary along the Little Cedar Creek – Tributary No. 2 channel that forms the main branch of the Unity Lake Number 2 impoundment. No construction proposed for these three areas is proposed to affect the boundaries of the defined floodway for this channel.

1.2. Soil Classification

Soil Maps published in the Soil Survey for Jackson County, Missouri categorizes soils in this watershed as:

Table 1.2-1. Soil Classifications

HSG	Map Symbol	Type	Land-Form
C	10000	Arisburg Silt Loam	1% to 5% Slopes
D	10024	Greenton-Urban Land Complex	5% to 9% Slopes
C	10026	Higginsville Silt Loam	5% to 9% Slopes
C	10082	Arisburg-Urban Land Complex	1% to 5% Slopes
D	10113	Oska Silty Clay Loam	5% to 9% Slopes, E
C/D	10116	Sampsel Silty Clay Loam	2% to 5% Slopes
C/D	10117	Sampsel Silty Clay Loam	5% to 9% Slopes
C	10120	Sharpsburg Silt Loam	2% to 5% Slopes
D	10128	Sharpsburg-Urban Land Complex	2% to 5% Slopes
D	10129	Sharpsburg-Urban Land Complex	5% to 9% Slopes
C	10132	Sibley Silt Loam	2% to 5% Slopes
C	10136	Sibley-Urban Land Complex	2% to 5% Slopes
D	10143	Snead-Urban Land Complex	9% to 30% Slopes
C	10179	Udarents-Urban Land-Oska Complex	5% to 9% Slopes
C	10180	Udarents-Urban Land-Sampsel Complex	2% to 5% Slopes
C/D	30080	Greenton Silty Clay Loam	5% to 9% Slopes
C	30180	Polo Silt Loam	5% to 9% Slopes
C	36083	Kennebec Silt Loam	1% to 4% Slopes, OF
D	40107	Snead-Rock Outcrop Complex, Warm	5% to 14% Slopes
D	40108	Snead-Rock Outcrop Complex, Warm	14% to 30% Slopes
-	99001	Water	-
-	99012	Urban Land, Upland	5% to 9% Slopes

(HSG = Hydrologic Soil Group, E=Eroded, OF=Occasionally Flooded)

NRCS Runoff Curve Numbers (CN's) in this study have been assigned to tributary areas based upon these Hydrologic Soil Groups and associated existing and proposed land use. The majority of land within the modeled sub-watersheds is previously developed, and the CN's are assigned accordingly. Refer to the Soils Map in Section 8 for distribution of soil types throughout the sub-watersheds.

2. METHODOLOGY

The hydrologic analysis provided in this report utilizes methods prescribed by the City of Lee's Summit, Missouri and the Kansas City Metropolitan Chapter of the APWA "Standard Specifications and Design Criteria," Division V, Section 5600 (February 2011) provides the overall framework for stormwater hydrology. The following approved methods were used in this report to model Existing- and Proposed Conditions for stormwater runoff.

- Haestad Methods, Inc. "PondPack" V8*i* (08.11.01.56).
- NRCS TR-55 Unit Hydrograph Method
- 2-, 10-, and 100-year Return Frequency, 24-hr. Storm Precipitation Depths (TP-40)
- ARC-II Soil Moisture Conditions
- 24-Hour NRCS Type II Rainfall Distribution
- Runoff Curve Numbers per NRCS TR-55 (Tables 2-2a – 2-2c) and APWA Sec.5602.3
- NRCS TR-55 Methods for determination of Time of Concentration and Travel Time.

NOTE: Where detailed information pertaining to channel geometry is unavailable, "length & velocity" estimates for channel-flow Travel Time is utilized per Section 5602.7, Kansas City Metropolitan Chapter- APWA Standard Specifications and Design Criteria.
NOTE: PondPack models utilize "Time of Concentration" rather than "Lag Time" for computing subarea hydrology.

Input data for the Existing- and Proposed Conditions hydrology models and results of computations are included in Section 7. Refer to the attached Drainage Area Maps for Existing- and Proposed Conditions subarea locations, weighted Runoff Curve Numbers, and tributary acreage included in Section 8.

Stormwater runoff models were created for the 2-, 10-, and 100-year design storm events. The precipitation depths used in the analyses have been interpolated from the "Technical Paper No. 40 Rainfall Frequency Atlas of the United States" (TP-40; May 1961) isopluvial maps. The following table depicts the rainfall depths used in this analysis:

Table 2-1. Precipitation Depths

Return Period:	24-hour Precipitation Depth (in):
Water Quality Storm[1]	1.37
2-Year (50% Storm)	3.50
10-Year (10% Storm)	5.34
100-Year (1% Storm)	7.71

[1]The "Water Quality Storm" is defined in the MARC & APWA "Manual of Best Management Practices for Stormwater Quality" as a 24-hr 1.37" rainfall depth. This particular storm event is utilized for proposed water quality analysis.

Each of the PondPack models constructed for this analysis evaluates multiple rainfall events using these three defined design storms.

The overall hydrology defines 9 modeled sub-watersheds (sub-watersheds “A,” “B,” “C,” “D,” “E,” “F,” “G,” “H,” “I”), and 30 subareas, encompassing approximately 998 acres overall.

Several offsite subareas are included in the models prepared for this report that will remain unaltered as a result of the proposed development areas. Sub-watersheds “B” and “C” are both offsite regions, as are some portions of sub-watershed “A,” “D,” “E,” “F,” “G,” “H,” “I”.

- The Aria site lies within portions of Subareas A3, A4(E), and A5(E).
- The Discovery Park Phase 1 site is located within Subareas A4(E), A4(W), A5(E) and A5(W).
- The Discovery Park Phase 2 site is located within Subareas A6 and D2.
- The Discovery Park Future site is located within Subareas D2, E1, F2, G2, H1 and I1.
- The future Multi-Family Residential development is located within Subarea A1(E).

In accordance with the City-specified criterion and design provision established in the 2011 edition of APWA Section 5600, the proposed stormwater management plan shall “be consistent with the Comprehensive Control Strategy.” This requirement establishes the maximum Allowable Release Rates for the 2-year (0.50 cfs/ac), 10-year (2.0 cfs/ac), and 100-year (3.0 cfs/ac) design storms. In addition to the large storm hydrology design constraints, this strategy requires extended detention (≥ 40hr.) of the “Water Quality Storm” runoff volume.

Points of Interest

The hydrologic models prepared for this stormwater Drainage Study includes 30 Points of Interest in total. The 17 critical points of interest to be analyzed are briefly described as:

- **Point A1,** located at the southern inlet to the Unity Lake Number 2 impoundment, the downstream point of interest modeled in this report.
- **Point A2** is the confluence of Channels A and B, located north of an existing sanitary holding basin. All stormwater runoff generated by the Aria and Discovery Park projects is conveyed to this point.
- **Point A3** is a culvert in Channel B crossing an access drive for the existing sanitary holding basin.
- **Point A4** is a point within Channel A, upstream of Point A2, Portions of the Aria and Discovery Park projects contribute flow to this point of interest.
- **Point A5** is the downstream end of an existing pond with a breached embankment within Channel A.
- **Point A6** is the downstream end of an existing culvert under NW Colbern Road. A portion of Discovery Park Phase 2 will contribute flow to this point of interest.

- **Point A7** is the downstream end of an existing culvert within Channel A, located at station 25+65 of NE Douglas Street. All stormwater runoff contributed to this point is generated by offsite areas.
- **Point B1** is the downstream end of an existing culvert within Channel B, located at station 45+15 of NE Douglas Street. All stormwater runoff contributed to this point is generated by offsite areas.
- **Point D1** is located at an eastern inlet to the Unity Lake Number 1 impoundment, the downstream point of interest of sub-watershed D. Portions of Discovery Park Phase 1, Discovery Park Phase 2 and Discovery Park Future will contribute flow to this point of interest.
- **Point D2** is the downstream end of an existing culvert under NW Colbern Road. Portions of Discovery Park Phase 2 and Discovery Park Future will contribute flow to this point of interest. This point is where the majority of offsite stormwater, from areas south of Interstate 470, will drain through the future development area.
- **Point D4** is the downstream end of an existing culvert under I-470 highway. All stormwater runoff contributed to this point is generated by offsite areas. The culvert represents a choke point for all the offsite area draining to Discovery Park Future from South of I-470.
- **Point E1** is the downstream end of an existing culvert under NW Colbern Road. A portion of Discovery Park Future will contribute flow to this point of interest.
- **Point F1** is located at a southeastern inlet to the Unity Lake Number 1 impoundment, the downstream point of interest of sub-watershed F. A portion of Discovery Park Future will contribute flow to this point of interest.
- **Point F2** is the downstream end of an existing culvert under NW Colbern Road. A portion of Discovery Park Future will contribute flow to this point of interest.
- **Point G1** is located at a southwestern inlet to the Unity Lake Number 1 impoundment, the downstream point of interest of sub-watershed G. A portion of Discovery Park Future will contribute flow to this point of interest.
- **Point G2** is the downstream end of an existing culvert under NW Colbern Road. A portion of Discovery Park Future will contribute flow to this point of interest.
- **Point H1** is the downstream end of an existing culvert under N Main Street that discharges directly to Little Cedar Creek. A portion of Discovery Park Future will contribute flow to this point of interest.
- **Point I1** is the downstream end of an existing culvert under N Main Street. A small portion of Discovery Park Future will contribute flow to this point of interest.

Several additional points are utilized in the models to assist with the hydrologic analysis for offsite areas. The locations of these points are depicted in the attached Drainage Area Maps,

and the results of the analyses are included in tables provided in this narrative, and in the attached modeling output.

In order to provide a direct comparison between the Existing and Proposed Conditions hydrology models, efforts have been made to ensure that the points of interest are consistent between these analyses with the exception of Point A5 as discussed in Section 4 of this report. As noted, additional points to those previously described are included in the hydrologic models, these junctions are of secondary interest to this particular development. Refer to the attached Drainage Area Maps for graphical representation of the modeled subareas and points of interest; refer to Section 7 for schematic view of the PondPack watershed model and connectivity between subareas, channel reaches, and points of interest.

5. SUMMARY

See Tables 5-1 and 5-2, below, for a summary comparison of Existing, Allowable, and Proposed peak flowrates during the Macro conditions.

Table 5-1. Macro- Proposed Peak Flowrate Comparison

Location:	Event:	Existing Flowrate (cfs):	ARR (cfs):	Proposed Flowrate (cfs):	Difference (Existing vs. Proposed) (cfs):	Difference (ARR vs. Proposed) (cfs):
Point A1	2-Year:	948.96	859.38	822.31	-126.65	-37.07
	10-Year:	1,748.23	1704.07	1511.28	-236.95	-192.79
	100-Year:	2,754.84	2623.74	2280.25	-474.59	-343.49
Point A2	2-Year:	909.05	823.14	782.43	-126.62	-40.71
	10-Year:	1,691.73	1607.68	1425.45	-266.28	-182.23
	100-Year:	2,566.59	2436.65	2141.89	-424.70	-294.76
Point A3	2-Year:	628.64	612.50	625.11	-3.53	12.61
	10-Year:	1,107.67	1092.23	1100.39	-7.28	8.16
	100-Year:	1,595.56	1574.71	1586.54	-9.02	11.83
Point A4	2-Year:	260.92	200.55	149.63	-111.29	-50.92
	10-Year:	539.49	471.95	308.87	-230.62	-163.08
	100-Year:	906.56	771.67	518.01	-388.72	-253.66
Point A6	2-Year:	37.98	16.57	37.88	-0.10	21.31
	10-Year:	70.54	40.65	70.35	-0.19	29.70
	100-Year:	113.19	63.30	112.88	-0.31	49.58

Note: The sign-convention utilized for the information presented in the preceding table is based upon "Proposed Rate minus Existing (or ARR)." Positive values indicate an exceedance of the Existing (or ARR); negative values indicate that the peak rate is lower than the Existing (or ARR).

Table 5-2. Macro-Fully Developed- Peak Flowrate Comparison

Location:	Event:	Existing Flowrate (cfs):	ARR (cfs):	Proposed Flowrate (cfs):	Difference (Existing vs. Proposed) (cfs):	Difference (ARR vs. Proposed) (cfs):
Point A1	2-Year:	948.96	857.17	846.59	-102.37	-12.79
	10-Year:	1,748.23	1702.66	1539.67	-208.56	-164.40
	100-Year:	2,754.84	2621.34	2309.68	-445.16	-314.06
Point A2	2-Year:	909.05	823.14	803.35	-105.70	-19.79
	10-Year:	1,691.73	1607.68	1451.96	-239.77	-155.72
	100-Year:	2,566.59	2436.65	2169.95	-396.64	-266.70
Point A3	2-Year:	628.64	612.5	627.78	-0.86	15.28
	10-Year:	1,107.67	1092.23	1103.02	-4.65	10.79
	100-Year:	1,595.56	1574.71	1588.55	-7.01	13.84
Point A4	2-Year:	260.92	200.55	163.90	-97.02	-36.65
	10-Year:	539.49	471.95	325.28	-214.21	-146.67
	100-Year:	906.56	771.67	534.89	-371.67	-236.78
Point A6	2-Year:	37.98	16.57	54.75	16.77	38.18
	10-Year:	70.54	40.65	87.16	16.62	46.45
	100-Year:	113.19	63.3	128.41	15.22	65.11

Note: The sign-convention utilized for the information presented in the preceding table is based upon "Proposed Rate minus Existing (or ARR)." Positive values indicate an exceedance of the Existing (or ARR); negative values indicate that the peak rate is lower than the Existing (or ARR).

Table 5-3. Macro ARR Comparison

Location:	Return Event (Yr):	Existing Conditions Flow Rate	ARR (cfs):
Point A7			
	2-Year:	229.26	229.26
	10-Year:	397.23	397.23
	100-Year:	603.32	603.32
Point B1			
	2-Year:	615.14	615.14
	10-Year:	1,076.61	1076.61
	100-Year:	1,551.65	1551.65
Point D1			
	2-Year:	560.43	481.87
	10-Year:	941.67	874.92
	100-Year:	1351.30	1262.83
Point D2			
	2-Year:	485.06	427.99
	10-Year:	752.83	707.54
	100-Year:	1052.38	996.29
Point E1			
	2-Year:	65.98	29.51
	10-Year:	106.88	72.41
	100-Year:	143.00	103.59
Point F1			
	2-Year:	47.57	25.75
	10-Year:	74.89	55.17
	100-Year:	106.16	80.20
Point F2			
	2-Year:	31.56	7.75
	10-Year:	45.26	26.59
	100-Year:	65.86	39.78
Point G1			
	2-Year:	58.32	42.99
	10-Year:	102.21	83.33
	100-Year:	163.43	131.84
Point G2			
	2-Year:	23.29	5.94
	10-Year:	36.98	18.02
	100-Year:	62.01	27.70

Location:	Return Event (Yr):	Existing Conditions Flow Rate	ARR (cfs):
Point H1			
	2-Year:	119.54	36.41
	10-Year:	240.90	124.05
	100-Year:	406.43	190.18
Point I1			
	2-Year:	4.44	2.80
	10-Year:	7.87	5.64
	100-Year:	12.29	8.74

The above table establishes ARR rates for locations unaffected in the Phase 1 Fully-Developed conditions. Future developments within the areas will by analyzed by their respective macro studies.

A design waiver is being requested to remove 10.3 acres of stream buffer located within the project site to allow for construction of a permanent pool detention basin, entrance drive off of NE Douglas Road, and clubhouse/pool amenity space for the development. Upstream water quality treatment is being provided to treat pollutants closer to the point source within the development, enhanced landscaping is required around the detention basin to promote wildlife and pollutant removal, and offsite discharges will be routed through the pond to allow for settlement and collection of suspended solids and floatable debris.

6. CONCLUSION

This study has been prepared to provide an analysis of the impacts that the fully-developed conditions of project site areas tributary to Unity Lake #2, and provide prescriptive release rate requirements for future development areas within the Discovery Park development. Once fully developed, the area treated by the proposed detention basin and water quality systems include:

- Aria Apartments: a 22.50-ac apartment development (Zoned RP-4)
- Discovery Park Phase 1: a 39.42-ac commercial development (Zoned CP-2)
- Discovery Park Phase 2: a 19.82-ac commercial development (currently zoned AG and to be rezoned at a future time)

As shown in the tables presented in the sections above, it has been determined that with the proposed development and detention basin, the peak runoff rates for the study area are reduced from the pre-developed conditions at all points analyzed. Comprehensive Control requirements are also met at the outfall point in the 2, 10 and 100 year storm events.

The existing basin located at Point A5 provides a slight attenuation of peak flows and delays in timing for offsite points A7, A8, A9 and A10. With construction of the new basin, the existing basin will be removed and flows from Point A7 will be rerouted into the proposed basin by extending the existing box culvert under Douglas Street. A design waiver is being requested to remove 10.3 acres of stream buffer while providing water quality treatment via upstream water quality systems to promote pollutant removal.

The results of this study demonstrate the overall general compliance with the City of Lee's Summit design criteria and a waiver is being submitted for approval of a deviation from the design criteria. We therefore request approval of this stormwater management report.