HABITAT ARCHITECTS

MEMORANDUM

TO: HG Consult

FROM: Jonathan Polak, P.E. – Habitat Architects

DATE: September 29, 2022

RE: Colton's Crossing Development - Stream Buffer Setback Evaluation

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Habitat Architects (***Habitat***) was contacted by HG Consult to complete an independent evaluation of applicable stream buffer setback requirements within the limits of the proposed Colton's Crossing Development. This evaluation was completed in accordance with the American Public Works Association (APWA) Section 5600 – Storm Drainage Systems and Facilities regulations and guidelines as adopted by the City of Lee's Summit, Jackson County, Missouri. The results of this evaluation are discussed in this memorandum and depicted on the attached graphics.

Field Evaluation

Habitat completed a field reconnaissance to identify and delineate water resources on the property (07/12/22). The field reconnaissance identified the project site as having one perennial tributary, known as Big Creek, traversing along the northern property boundary, and entering the property in two short segments. There were also four drainage features that exhibited ephemeral characteristics identified within the limits of the property. These characteristics include conveyance of hydrology, non-continuous flow, dependent upon direct precipitation event, and no groundwater influence.

These four drainages were similarly compared to the common features of stream geometry and characteristics as presented in APWA Section 5600, Subsection 5605, Figures 5605–1 through 5606-3. As mapped on the attached graphics, these drainages are each located within woodland corridors adjacent to farmed agricultural activities along the southern and western limits of the property. A brief description of each of the drainages are provided below:

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Perennial Tributary

The perennial tributary found on the property, Big Creek, enters the property in two separate locations along the northern property boundary. The two locations are meanders in the tributary which only encroach on the property a few feet. There is a total of 151 linear feet (L.F.) of tributary that lie within the limits of the property. As noted during the field reconnaissance, Big Creek is approximately 25 feet wide at the ordinary high-water mark (OHM) with a bed composition made up of a mixture of silt and rock substrate. Big Creek maintains a base flow and exhibits a differentiation between a low flow channel and a bank full width. The tributary also has varying riffle/pool structures along its alignment.

Ephemeral Drainage 1 (E-1)

E-1 is an ephemeral drainage in the very northwest corner of the property where it traverses toward the northeast and eventually leaves the property and discharges into Big Creek north of the property boundary. The drainage only averages approximately 3 feet in width at the OHM and traverses approximately 511 L.F. of the northwest corner of the property. There is no base flow within the channel from a contributing groundwater or upland source. There is no channel characteristics such as riffles, pools, or sediment bars present within the narrow base width. The drainage exhibits erosive characteristic rather than traditional tributary or stream features.

Ephemeral Drainage 2 (E-2)

E-2 is an ephemeral drainage located in the southwest corner of the property where it originates in an existing wooded corridor. Similar to E-1, the drainage only averages approximately 3 feet in width at the OHM and traverses approximately 665 L.F. of the property before discharging off the property. The base of the drainage has an excessive amount of broken glass that appears to have been from previous dumping activities over several years. Below the glass the base is entirely comprised of soil with very little stone or rock present, indicative of erosive conditions likely attributable to the adjacent farming activities. There is no base flow within the channel from a contributing groundwater or upland source. There is no channel characteristics such as riffles, pools, or sediment bars present within the narrow base width.

Ephemeral Drainage 3 (E-3)

E-3 is a small ephemeral drainage, approximately 1 foot in width at the OHM. The drainage is located along the southern property boundary which originates from a visible erosive drainage within the adjacent agricultural field to the north. The drainage traverses approximately 223 L.F. of the property before existing the southern boundary.

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There is no base flow within the channel from a contributing groundwater or upland source. There is no channel characteristics such as riffles, pools, or sediment bars present within the narrow 1-foot base width. As noted, the drainage appears to be a continuation of the erosive characteristic from the adjacent field rather than a traditional tributary or stream feature.

Ephemeral Drainage 4 (E-4)

E-4 is the last ephemeral drainage identified during the field reconnaissance and is located in a wooded corridor in the southern portion of the property. The drainage originates just north of the tree line from an erosive drainage coming off the adjacent agricultural field. The drainage exhibits similar erosive characteristics and averages approximately 4 feet in width at the OHM. The drainage traverses approximately 297 L.F. before exiting the property through the southern boundary. There is no base flow within the channel from a contributing groundwater or upland source. As the widest base width of the four drainages, there are signs of sediment deposition along the alignment; however, there are no typical stream or tributary characteristics such as riffles, pools, or a traditional meander sequence within the short section of drainage located on the property.

Design Guidelines and Desktop Review

A desktop review and stream buffer evaluation of the water resources identified on the property were performed consistent with APWA Section 5600, subsection 5605 Natural Streams. The guidance addressed by this evaluation includes the following criteria.

> ***SECTION 5605 NATURAL STREAMS***
>
> ***5605.1 Scope***
>
> *This section sets forth requirements for the protection of natural streams as a conveyance for stormwater. Unless otherwise provided for by City, State, or Federal ordinance, regulation, or standards, existing natural streams shall be preserved and protected in accordance with this section. Where natural streams are not preserved, the drainage will be handled through systems designed in accordance with Sections 5606 and 5607.*
>
> ***5605.3 Stream Preservation and Buffers Zones***
>
> ***B. Default Approach:*** *Where such comprehensive strategies have not been adopted, the following requirements shall be satisfied for all development/redevelopment proposed adjacent to or ultimately discharging to an existing natural channel:*

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1. *Streams having a tributary area in excess of 40 acres shall be preserved. Preservation of smaller streams is encouraged. Preservation may be waived by the City/County Engineer where it is impractical, provided that the project has also received appropriate state and federal permits.*

2. *Buffer zones shall be established around all preserved streams. The limit of buffer zones shall be formally designated on a plat, deed, easement, or restrictive covenant, as directed by the City. Buffer widths as measured from the ordinary high-water mark (OHM) outward in each direction shall exceed the dimensions shown in Table 5605-1.*

Table 5605-1: Stream Buffer Widths

Contributing Drainage Basin Size (acres)	Buffer Width*
Less than 40 acres	40 Feet
40 acres to 160 acres	60 Feet
160 acres to 5000 acres	100 Feet
Greater than 5000 acres	120 Feet

*Measured from OHM outwards, measured separately in each direction

The perennial tributary (Big Creek) and the four ephemeral drainages on site were evaluated to determine drainage basin size. The results of the desktop evaluation are presented below.

Results

The evaluation for the contributing basin size of each tributary and drainage found on the property identified that Big Creek requires a buffer width of 100 feet due to it having a contributing water shed size of approximately 1,700 acres. The remaining drainages on the property (E-1, E-2, E-3, and E-4) all had contributing basin sizes between 8-11 acres. These basin sizes are well below the 40-acre threshold required for buffering. These drainages, although they do convey stormwater from the property, do not exhibit the general characteristics of a stream and tributary as defined in Section 5605 of the APWA guidance. Their respective size and continued erosive characteristics from adjacent agricultural practices contribute to minimal if not negative impacts to water quality due to soil loss within the drainage.

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Recommendations

Habitat recommends the placement of a 100-foot buffer along Big Creek, especially those portions that encroach on the property. The remaining four ephemeral drainages do not require a stream setback or stream buffer preservation based on the APWA guidance; however, changes in the discharge of stormwater as it relates to future development and the removal of the existing drainages should be designed in accordance with APWA Section 5606 and 5607.

Furthermore, all potential impacts to either the ephemeral drainages or elements of Big Creek would require permitting with the U.S. Army Corps of Engineers due to the presence of water resources on the site.

Please contact me at (913) 526-5085 or by email at jpolak@habitatarchitects.net if you have any questions concerning the evaluation results.

Sincerely,

Jonathan L. Polak, P.E.
Environmental Engineer

Enclosures: Watershed Map
Stream Buffer Setback Map

References:

Kansas City Metropolitan Chapter, American Public Works Association, Standard Specifications & Design Criteria, Section 5600 -Storm Drainage Systems & Facilities, February 16, 2011.

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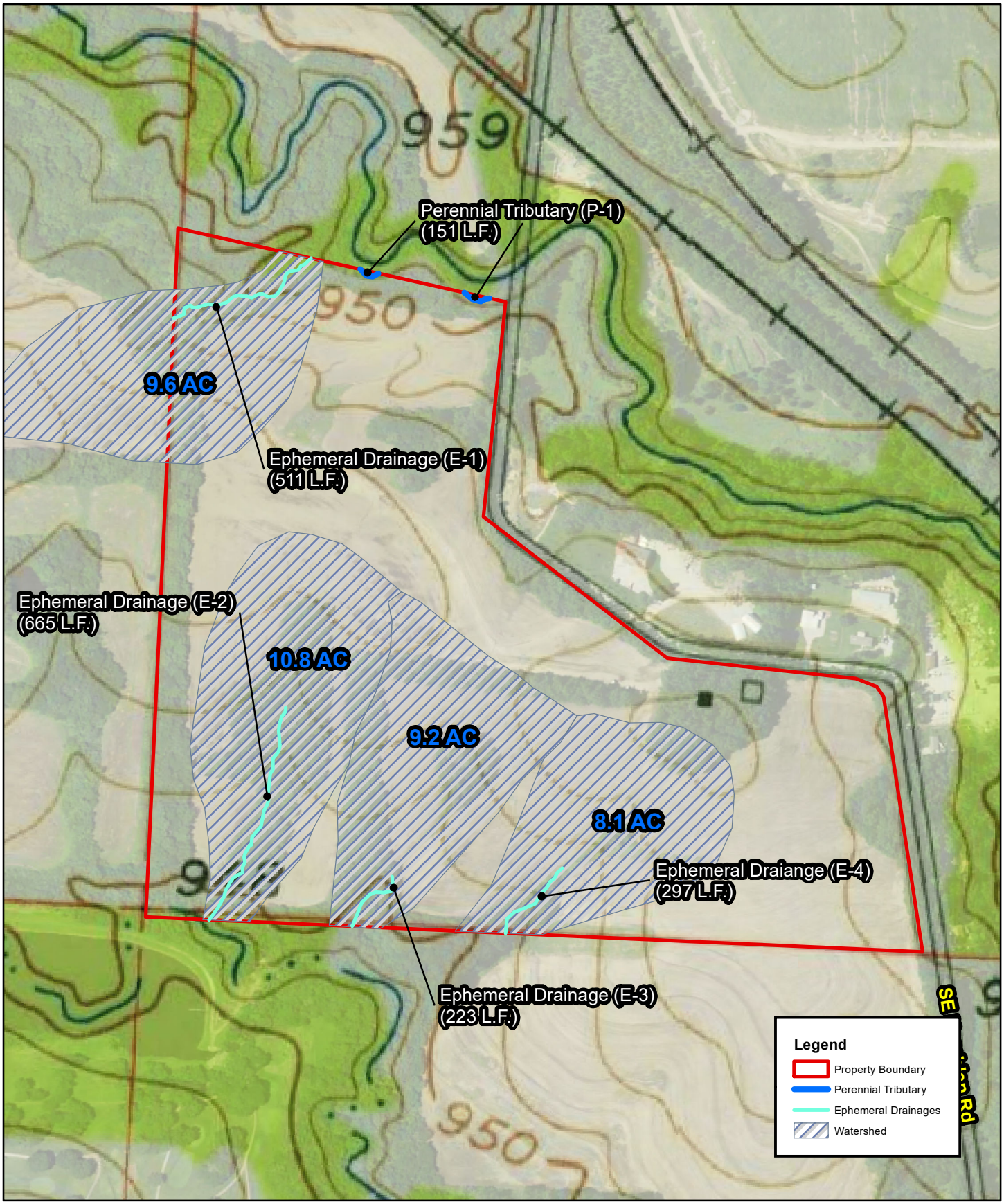

NORTH

0 200 400

1 in. = 400 ft.

Source: NAIP 2020
Location: SW 1/4 of Sec 21 - T47N - R31W
Lee's Summit, Jackson County, MO
Pleasant Hill, MO 1:24K Quadrangle

WATERSHED MAP

COLTON'S CROSSING DEVELOPMENT
LEE'S SUMMIT, MISSOURI

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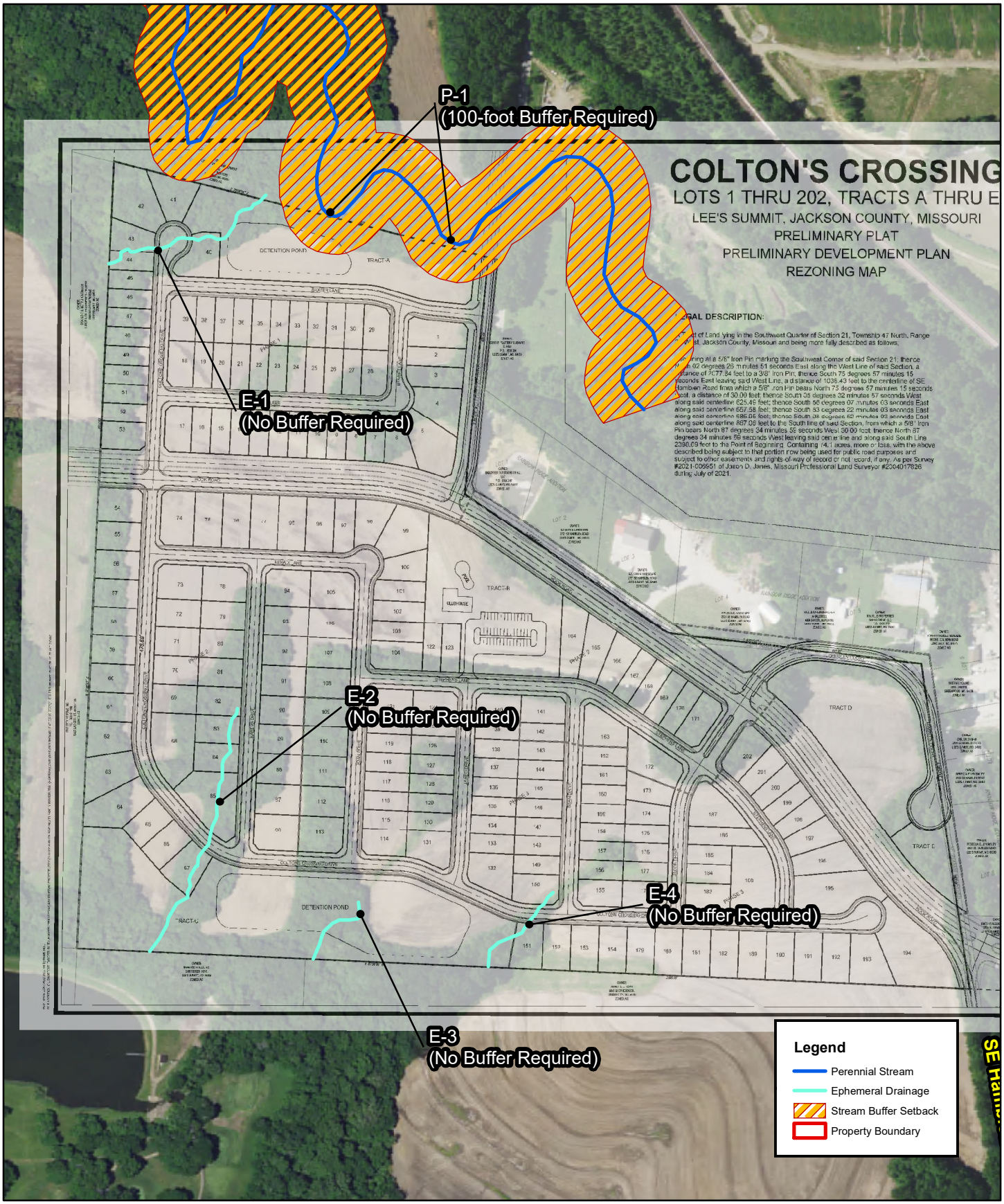
Note: Watershed areas were based on the USGS topographic map contours. The watershed basim for Big Creek is not depicted due to scale and broader inclusion of the northern half of the project area.



NORTH

0 175 350

1 in. = 350 ft.

Source: NAIP 2020
Location: SW 1/4 of Sec 21 - T47N - R31W
Lee's Summit, Jackson County, MO
Pleasant Hill, MO 1:24K Quadrangle

STREAM BUFFER SETBACK

COLTON'S CROSSING DEVELOPMENT
LEE'S SUMMIT, MISSOURI

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