4. Project Alignment Options

The purpose of this study is to determine if a multi-use paved path is feasible in the Dry Creek Greenway West study corridor. Based on available data collected from Placer County and the City of Roseville, site walks with public and private property owners (see *Photo 4-1*), preliminary engineering analyses, and input from public engagement activities, several project alternatives, or trail alignments, on the north and south sides of Dry Creek were identified, evaluated and ranked to identify a recommended alignment to advance for further study. This section discusses studied alignments, including a brief description of each alignment considered, important existing conditions along that alignment, key opportunities and constraints specific to the alignment, and estimated project costs.

Photo 4-1: Site walk with property owner.

4.1. Descriptions of Alignment Options

The Dry Creek Greenway corridor was divided into six areas to organize and simplify the option descriptions and evaluations. Each area begins and ends with one or more nodes that are located along the various trail alignment alternatives. The nodes, “a” through “w”, are provided both for reference and to designate a decision point. Segments are identified between nodes. Segments are categorized as north (e.g., “N11A”), south (e.g., “S1”), or a connection (e.g., “C3”) and there are multiple options between some nodes. Bridges (e.g., “[B4]”) and stub paths to access points (e.g., “(1)”) are also identified. A trail alignment alternative within one of the areas will be the summation of several segments along the trail.

The areas, nodes and segments are shown on *Exhibit 4-1 – Trail Alignment Options,* at the end of this section. Also at the end of this section, *Exhibits 4-2 through 4-7 – Trail Alignment Options (Area 1 through Area 6),* show trail alignment options for each of the areas defined below. The areas can be generally described as follows:

Area 1: Cook-Riolo Road to Waste Water Treatment Plant / Roseville Corporation Yard

Area 2: Along Waste Water Treatment Plant and Roseville Corporation Yard

Area 3: Waste Water Treatment Plant / Roseville Corporation Yard to Atkinson Street

Area 4: Booth Road/Foothills Boulevard Area

Area 5: Atkinson Street/Foothills Boulevard to Vernon Street

Area 6: Vernon Street to Riverside Avenue

The alignment alternatives within each area are defined in *Tables 4A-4F*. Area 1 alignments are identified as 1-1, 1-2 and so on.

Area 1 – Cook Riolo Road to WWTP/Corp Yard Alignment Options

Area 1 of the potential trail stretches east from Cook Riolo Road to just east of the Placer County/City of Roseville jurisdictional boundary, where the City's Wastewater Treatment Plant and Corporation Yard facilities border Dry Creek. The area is highlighted in Key Map Area 1, below.

Key Map Area 1

Existing Conditions:

The study corridor in Area 1 is within the jurisdiction of Placer County, apart from the eastern end, where the WWTP and Corp. Yard are both within the City of Roseville. Except for the boundaries, which include Cook Riolo Road and the Creek View Ranch School on the west and the WWTP and Corp. Yard on the east, Area 1 is characterized by few large, private, residential and agricultural properties, including pastureland for cattle grazing. Dry Creek runs through this area mostly well-ensconced in undisturbed lowland forest, and spreads into several natural flood channels. This is the most pristine section of Dry Creek within the study area.

Opportunities and Constraints:

In many cases, constraints along the corridor are paired with closely related opportunities to address them. The major opportunities and constraints in Area 1 are related to the following features of this area:

- Cook Riolo Road
- Creek View Ranch School
- Private property
- Placer County Sewer Easement
- Roseville WWTP and Corp. Yard
- Topography

Cook Riolo Road is a two-lane rural major collector connecting the Creekview Ranch School with Vineyard Road and PFE Road. The speed limit is 35 mph, but the project area is within a school zone dropping the speed limit to 25 mph when children are present. Cook Riolo Road has an existing multi-use path on the west side of the road, shown in *Photo 4-2*, which connects the existing Dry Creek Trail to the school entrance, 650 feet north of the creek.

Photo 4-2: Existing multi-use path along west side of Cook Riolo Road, looking north from Dry Creek trailhead.

When Placer County replaced the Cook Riolo Road Bridge over Dry Creek in 2014, a flat area (bench) (*Photo 4-3*) was graded under the bridge at the north abutment to facilitate construction of a future bike trail to the east from the existing Cook Riolo Road Bike Trail. With use of the existing bench, trail users will need to navigate inclines on approach from/ to the existing trail. Vertical clearance under the bridge is adequate for a path. However, additional engineering analysis will be required to determine the appropriate balance between head room over the path and susceptibility to inundation during high-return-frequency flood events.

Photo 4-3: Existing graded area under Cook Riolo Road Bridge at north abutment, looking west.

The proposed trail will provide the opportunity for students and staff to bicycle or walk to school more safely than is currently possible using roads, but it also poses security concerns for the school. The school district is interested in controlled access along the east side of their property (Spur 1), potentially incorporating an emergency vehicle access (EVA) and a drop-off area if private development occurs on the large private parcel to the east.

The sewer access road and easement north of the creek provide potential for a dual-purpose maintenance road and trail for alignments north of the creek.

Most of the length of the trail options in Area 1 will cross private property. Acquisition of the right-of-way required to build the trail will add significantly to the cost of construction.

There is, however, only one private property owner north of the trail, and that owner has expressed interest in working with the County to incorporate the trail in proposed residential development of the property.

Security is a concern for both the WWTP and the Corp. Yard. For the WWTP, the main concern is that a trail along its western and southern boundaries would provide easy access to areas of the plant that are not currently fenced. The northerly boundary of the Corp. Yard is securely fenced. One common challenge for both facilities would be providing employee access while preventing public access.

Following flood events in 1986 and 1995, the City of Roseville implemented projects to reduce the risk of flooding within the Dry Creek watershed. These included relocating an existing levee along the southern perimeter of the WWTP *(Photo 4-4)*. The levee is now 100 feet behind the Dry Creek bank, increasing the capacity of Dry Creek. Setting back the levees re-created a floodplain reach approximately 2,200 feet long and led to about five acres of restored riparian habitat in the floodplain. Trail alignments north of Dry Creek in this area will be within this restored area and will need to cross the expanded floodway. These alignments would require additional mitigation for disturbing the prior mitigation plantings. Fencing along northerly alignments in this area would need to be designed for the competing goals of providing security for the WWTP while not impeding flood flows in the overflow channel.

Photo 4-4: New levee at Roseville WWTP, looking west.

Northerly alignments crossing the creek to the Corporation Yard side would cross the bypass channel between the old and new WWTP levees. This section of trail would need to be designed as a low water crossing, or the bridge across the creek would need to be extended to cross both the main and bypass channels of the creek. Also, the location of a bridge must consider maintenance access to the WWTP outfall.

The topography of Area 1 varies both along the length of the creek and from one side to the other. North of the creek, the terrain beyond the immediate vicinity of the creek is generally 10 to 25 feet above the elevation of the creek, with the westerly portion being higher than the east. South of the creek, elevations are generally closer to those of the creek and more prone to flooding.

Alignment Options:

Table 4A lists the six alignments in Area 1 and provides the segment sequence for each. Refer to *Exhibit 4-2 (at the end of this section)*: *Area 1 Trail Alignment Options* for a graphical representation. The potential trail alignments take trail users either on the north side of the creek, adjacent to Creekview Ranch School, then eastward along the tree line and through a meadow, or on the southern side of the creek, also through an open meadow and adjacent to the tree line. The northern alignments are mostly on higher ground well above the elevation of the creek, whereas the southern alignments are much closer to creek elevation.

Table 4A - Area 1 Alignment Definitions*	
1-1	N1 (1)(2)[B1], N2A, N3
1-2	N1 (1)(2)[B1], N2A, N3, C1 [B6]
1-3	N1 (1)(2)[B1], N2B, N3
1-4	N1 (1)(2)[B1], N2B, N3, C1 [B6]
1-5	S1 [B2, B3, B4, B5]
1-6	S1 [B2, B3, B4, B5], C1 [B6]
*Area 1 begins at node “a” and ends at node “d” or “e”	

Key Features and Issues for Area 1

- Between Cook Riolo Road and the WWTP, this area is entirely within the jurisdiction of Placer County. The County trail standard includes equestrian access. The City trail will not. A potential equestrian staging area at Cook Riolo Road and a natural turnaround somewhere west of the WWTP will be needed.
- The existing Placer County sewer maintenance road east of Cook Riolo Road and north of Dry Creek provides an opportunity for dual use as a trail.
- Public right-of-way immediately east of Cook Riolo Road (along sewer access road) is narrow between private property to the north and steep creek banks to the south, potentially requiring retaining walls to avoid fill into the creek or acquisition of right-of-way from the private parcel to the north.
- The westerly approach to Bridge B1 would traverse a steep hill, requiring a large embankment, retaining wall and/or a long bridge, but would provide beautiful views of the pastureland below.
- Access to private parcels south of and including the creek was not authorized for this study; consequently, the alignment of segment S1 is based entirely on aerial mapping, large portions of which were obscured by heavy vegetation.
- Segment S1 would require four bridges or culverts to cross Dry Creek (B2), a side channel of Dry Creek (B3) and two small tributaries (B4 and B5). A retaining wall is needed as this segment approaches Area 2.

Area 2 – Adjacent to Waste Water Treatment Plant/Corporation Yard

Alignment Options

Area 2, highlighted in *Key Map Area 2*, below, runs north of the City of Roseville Corporation Yard, between the Corporation Yard and the City's Wastewater Treatment Plant north of Dry Creek.

Key Map Area 2

Existing Conditions:

The study corridor in Area 2 is entirely within the City of Roseville. Area 2 is characterized by private and municipal light industrial uses on both sides of Dry Creek and is dominated by the WWTP on the north and the City of Roseville Corporation Yard on the south. Dry Creek runs through this area between well-defined levees, with a leveed bypass channel to the north of the main channel running the entire length. There is a treated water outfall from the WWTP into the creek near the west end of Area 2.

Opportunities and Constraints:

Through Area 2, the northern alignment is limited to following the old levee, which is at a low elevation, generally about 10 feet above the creek bottom and would be prone to frequent inundation. Fencing to secure the WWTP from path users would either need to be at the top of the main detention pond levee or along the path, where it would be prone to inundation and debris damage. Near the western end of the area, the path would have to cross the bypass channel, which would complicate the construction of security fencing and require a low-water crossing of the bypass channel by the trail.

Bridging the creek near the west end of Area 2 would facilitate providing access to both the WWTP and the Corporation Yard by trail users. Because the level of security at both facilities, this access would need to be restricted to employees only. Bridging Dry Creek near the east end of the WWTP would also facilitate employee access to the two facilities,

and would have the added benefit of potentially providing a dual-use bridge carrying a proposed relocated sewer line, along with the trail.

Alignment Options:

Table 4B lists the four alignments in Area 2 and provides the segment sequence for each. Refer to *Exhibit 4-3*: *Area 2 Trail Alignment Options (at the end of this section)* for a graphical representation of each. The two northerly alignments would run along the north side of Dry Creek on land owned by the City and used for the WWTP. The path would be along the old levee or along the overflow channel between the old and new levees along the south side of the WWTP. A fence would separate the path from the facility. Some trees would be affected. The path would be subject to flooding in major storm events. Alignment 2-1 would stop on the north side of the creek. Alignment 2-2 would cross the creek at the east end of the WWTP on a new bridge and stop on the south side of the creek.

Table 4B - Area 2 Alignment Definitions*	
2-1	N4
2-2	N4, C2 [B7]
2-3	S2 (4)
2-4	S2 (4), C2 [B7]
*Area 2 begins at node “d” or “e” and ends at node “f” or “g”	

Photo 4-5: South bank of Dry Creek behind Corp Yard, looking east.

The two southerly alignments would start near the west end of a City parcel behind a private commercial business at the end of Viking Place, then continue east on City owned land behind the City’s Corporation Yard. The open space area behind the Corp. Yard *(Photo 4-5)* is approximately 5 feet further above the creek than the north bank, making the southerly alignments less subject to flooding than the northerly ones. The path would weave through a moderately dense treed area; tree removal would need to be mitigated. Prior surveys have noted potential cultural resources south of Dry Creek. Future surveys are needed to locate any cultural resources and determine appropriate alignment of Segment S2. A spur connection from the southerly alignments for employees of the Corporation Yard is possible. Alignment 2-3 would stop on the south

side of the creek. Alignment 2-4 would cross the creek at the east end of the WWTP on a new bridge and stop on the north side of the creek.

Key Features and Issues for Area 2

- The northerly alignments would follow the old levee between Dry Creek and the northerly bypass channel, which would leave them isolated in flood events.
- The southerly alignments and the spur to the Corp. Yard would pass through an area of mitigation plantings (mitigating impacts from the WWTP expansion), which would require further mitigation planting.
- Prior surveys have noted potential cultural resources south of Dry Creek. Future surveys are needed to locate any cultural resources and determine appropriate alignment of Segment S2.
- The spur to the Corp. Yard would provide employee access from the trail. This would require access control to allow authorized personnel only into the Corp. Yard and would require reconfiguration of a portion of the storage yard.
- Bridge B7 (at the east end of Area 2) could potentially serve a dual purpose in support of the proposed new sewer alignment.
- Retaining walls would be needed for a portion of the southerly alignment due to steep existing slopes between the Corp. Yard and creek.

Area 3 – WWTP/Corp. Yard to Atkinson Street/Booth Road Alignment Options

Area 3, highlighted in *Key Map Area 3,* below, extends from the eastern edge of the WWTP and Corporation Yard properties to Atkinson Street on the east and Booth Road on the north.

Key Map Area 3

Existing Conditions:

The study corridor in Area 3 comprises mostly private property along both sides of Dry Creek, except for a large, vacant, City-owned parcel near the eastern end of Area 3 extending north from Dry Creek to Booth Road. Area 3 is characterized by private light industrial and residential uses on both sides of Dry Creek, although properties south of the creek are mostly lightly or undeveloped. In Area 3, the levees along Dry Creek are less well-defined than in Area 2, with the south bank being more natural than the north bank. As in Area 2, the south bank reaches elevations approximately 5 feet higher than the north bank.

Opportunities and Constraints:

Developed properties and dense trees adjacent to the north bank of Dry Creek leave limited space for a northerly trail alignment without impacting existing trees or facilities. Steep banks further constrain potential alignments north of the creek. Also, several of the property owners north of the creek have expressed opposition to an alignment crossing their properties.

There are only three properties south of the creek in Area 3; none have developed facilities near the creek. The area south of the creek is also less densely treed than the area north of it.

There is an existing sewer north of the creek from the WWTP to Atkinson Street, to which a northerly trail alignment would facilitate maintenance access. On the other hand, there

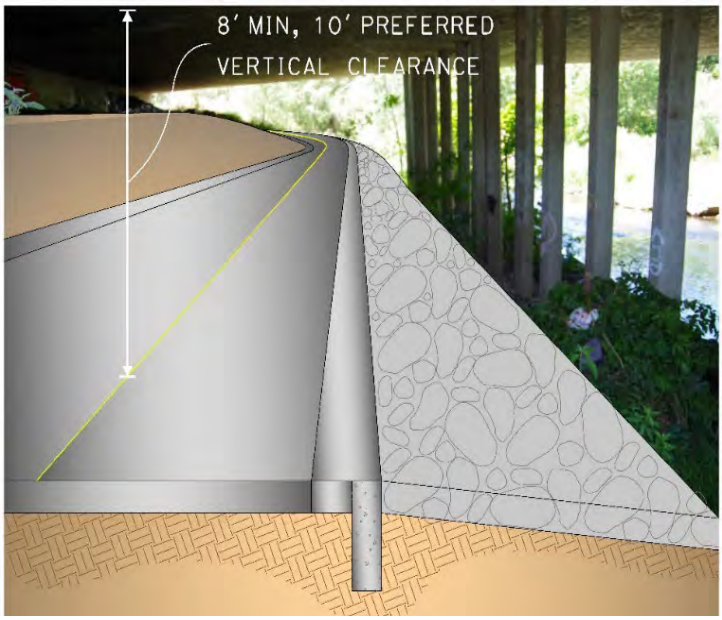
is a proposed sewer alignment south of the creek, which would also provide dual-use opportunities with the trail.

Photo 4-5: End slope at south abutment of Atkinson Street Bridge over Dry Creek.

Overall, the south alignment provides the most promising opportunities for locating the trail within Area 3. To continue east of Atkinson Street (into Area 5), the trail would need to cross both Atkinson Street (see *Photo 4-5*) and the UP Railroad Yard, staying on the south side of Dry Creek. The UP Railroad Yard is the largest rail facility on the west coast. Two tracks cross Dry Creek on a bridge at the west side of the right-of-way adjacent to Atkinson Street, and 13 tracks and a maintenance road cross the creek on two adjacent bridges near the east side of the right-of-way. The most direct route for the proposed trail would need to pass under the south end of all three structures, the longer two extending approximately 350 feet. Detailed information on the longer two bridges was not available for this study because access was not authorized.

The existing Atkinson Street Bridge has standard 1.5:1 end slopes at the abutments, leaving minimal vertical clearance near the abutments. This end slope could be excavated to improve the vertical clearance. This would require either a high-side retaining wall and a low-side cut-off wall with rock slope protection, or retaining walls on both sides. The potential trail undercrossing is shown in *Figure 4-1*.

Figure 4-1: Rendering of Potential Path under Atkinson Street Bridge



This portion of the trail's route would likely be subject to flooding during high flows, would

require protective covers – debris sheds independent of and under the railroad bridges to protect trail users – per the *UPRR Guidelines*, and safety concerns would need to be addressed given the significant length of the underpass. The use of an existing structure that conveys water under an active Union Pacific Railroad line for trail use is explicitly banned in the *UPRR Guidelines*, and the railroad has denied site access to explore the option further.

A related option is the construction of a new underpass for the trail. However, this would face many of the same challenges as the use of the existing bridges, and at considerably greater expense. Indeed, Union Pacific's *Guidelines for Railroad Grade Separation Projects* outlines their policy of discouraging the construction of new trail underpasses beneath their property. For administrative, technical, and financial reasons, this option is likely infeasible.

Given the challenges of a trail along the creek through the UP Railroad Yard, the most feasible routing for the trail East of Area 3 is an on-road route over the rail yard via the existing Foothills Boulevard bridges. This option, explored in more detail in the Area 5 discussion later in this section, would require road and bridge modifications, is approximately 1/2-mile longer, and requires trail users to navigate inclines on approach in both directions. However, the enhanced visibility of the trail from its placement along a well-traveled road may have the side benefit of increased awareness of the trail, promoting its use. Also, the on-road option provides enhanced neighborhood connections.

To get to Foothills Boulevard, the trail would need to cross back to the north side of the creek. This could be done by using the existing Atkinson Street Bridge over Dry Creek or cross on a new bridge to the City-owned property near the east end of Area 2. This City-owned property provides an opportunity to connect to Booth Road and ultimately to Foothills Boulevard (in Area 4).

Atkinson Street is a two-lane major collector that parallels the UP Railroad Yard connecting rural Placer County with the City of Roseville. Atkinson Street crosses over Dry Creek on a bridge (*Photo 4-6*) designed for future widening from two (2) to five (5) lanes, and under Foothills Boulevard approximately 1300 feet to the northeast. A short distance northeast

Photo 4-6: Atkinson Street Bridge over Dry Creek, looking north

of the proposed trail, Atkinson Street borders and provides access to Denio's Farmers Market and the Roseville Heights neighborhood. Atkinson Street is moderately traveled with an Annual Average Daily Traffic (AADT) of approximately 9,000 vehicles at a posted speed limit of 45 mph.

The existing Atkinson Street Bridge over Dry Creek and its roadway approaches – currently carrying two lanes of traffic and a 5-foot sidewalk – were built to accommodate a future widening to five lanes. The existing bridge typical section is shown in *Figure 4-2*. The extra width would allow the shoulder to be reconfigured as a Class I Bike Path, as shown in *Figure 4-3*.

Figure 4-2: Atkinson Street Bridge over Dry Creek – Existing Configuration

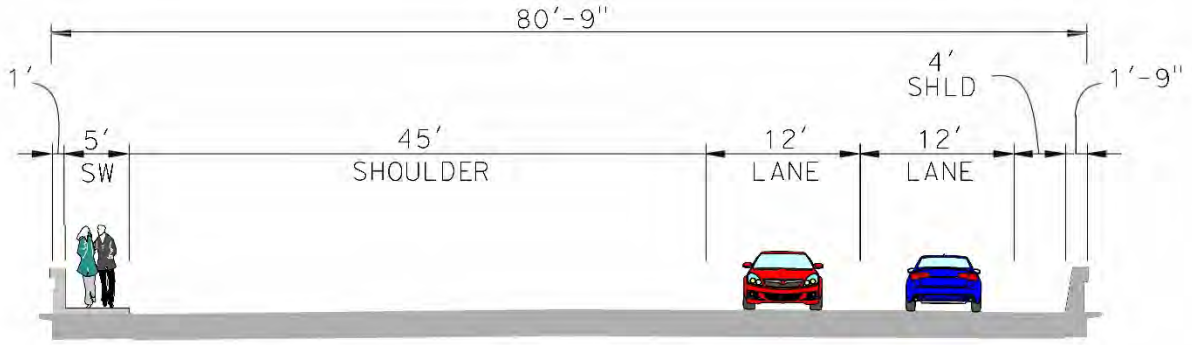
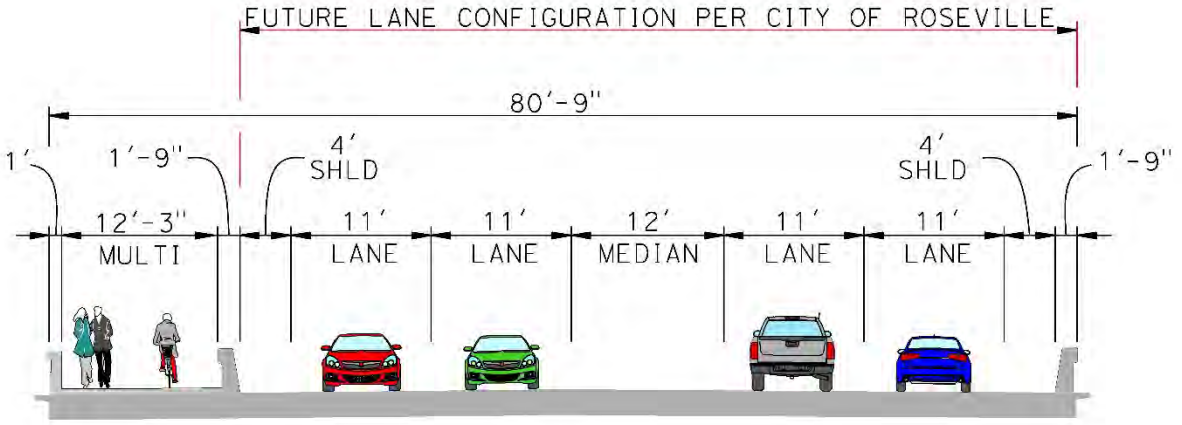


Figure 4-3: Atkinson Street Bridge over Dry Creek – Proposed Configuration



Either creek crossing would provide an access point at Booth Road, while using the existing Atkinson Street Bridge would provide an access point at Atkinson Street, but would also impact additional private property north and south of the creek.

Alignment Options:

Table 4C lists the six alignments in Area 3 and provides the segment sequence for each. Refer to *Exhibit 4-4*: *Area 3 Trail Alignment Options (at the end of this section)* for a graphical representation of each. The three northerly alignments would run along the north side of Dry Creek across one City-owned and five private parcels, with the option of either heading north across the City-owned parcel to Booth Road, crossing Dry Creek on a new bridge at the City-owned parcel, or continuing to Atkinson Street and crossing the creek on the existing Atkinson Street Bridge. The first option would connect to Area 4 and cross the UP Railroad Yard on the existing Foothills Boulevard Bridges. The second two would cross under Atkinson Street at the south end of the existing bridge, and then continue along the south side of the creek across the UP Railroad Yard in Area 5.

Table 4C - Area 3 Alignment Definitions*	
3-1	N5 (5), N6
3-2	N5 (5), C4
3-3	N5 (5), C3 [B8], S4
3-4	S3, S4
3-5	S3, C3 [B8], N6
3-6	S3, S4, C4 (5), N6
*Area 3 begins at node “f” or “g” and ends at node “j” or “k”	

Similarly, the three southerly alignment options would follow the creek through two private parcels to a new bridge across Dry Creek at the City-owned parcel and then continue to Booth Road, cross on the existing Atkinson Street Bridge and then head back west along the north side of the creek to the City-owned parcel and north to Booth Road, or stay on the south side and continue under the south end of the Atkinson Street Bridge into the UP Railroad Yard.

Key Features and Issues for Area 3

- Most of the northerly alignment along the creek and all of the southerly alignment would be on private property.
- Current UPRR policy prohibits crossing the UP Railroad Yard under the existing rail yard bridges; therefore, the only alignments considered feasible at this time will connect to Booth Road across the City-owned parcel.
- In addition to providing right-of-way for the connection to Booth Road, the City-owned parcel provides a potential trailhead with access from Booth Road.
- The City is considering a sewer easement along the south side of the creek from the WWTP to Atkinson Street, which may provide an opportunity for joint use in this area.

(Continued on next page)

Key Features and Issues for Area 3

(Continued from previous page)

- The southerly alignment would require retaining walls on the approach to Atkinson Street.
- A creek crossing using the existing Atkinson Street Bridge would incorporate reallocated space on the bridge to eliminate the cost of a new bridge (see *Figure 4-2* and *Figure 4-3*), while also providing access to the trail from Atkinson Street, but would require more trail and right-of-way, as well as out-of-direction travel by users.

Area 4 – Booth Road to Foothills Boulevard Alignment Options

Area 4, highlighted in *Key Map Area 4,* below, extends from Booth Road at the City/County line to the intersection of Foothills Boulevard and Denio Loop.

Key Map Area 4

Existing Conditions:

The study corridor in Area 4 is almost entirely within the City of Roseville. All alignment options start at the City/County line, and one of the alignment options would start on private property in unincorporated Placer County just west of the City/County line. Area 4 north of Booth Road is at the border of agricultural lands in the unincorporated County and residential development in the City, bounded on the east by Foothills Boulevard and Atkinson Street. South of Booth Road is characterized by light industrial uses to Atkinson Street.

Trail alignments would cross or follow several roads in Area 4, ranging from very low traffic residential streets (Beatty Way and Walker Drive), to major arterials (Foothills Boulevard).

Opportunities and Constraints:

An existing sewer easement and a stormwater detention pond in the Beatty Road neighborhood just north of Booth Road provide an opportunity to keep the trail separated from streets and use existing City land for a northerly alignment. This option, however, would require private right-of-way north of Booth Road to get the trail to the sewer easement, with a mid-block crossing of Beatty Way. It would also place the trail very close to the back fences of homes on Beatty Way, and require retaining walls and tree removal to avoid impacting the detention pond.

The more southerly alignments in Area 4 would be entirely within existing City rights-of-way and would cross under the existing Foothills Boulevard Bridge over Atkinson Street.

All alignments would need to be coordinated with a proposed project to build a southwest Denio Loop ramp and widen Atkinson Street between the Dry Creek Bridge and Denio Loop. Construction of the new ramp would not preclude any of the alignment options but would create an additional relatively high-volume street crossing for each one. Depending on the alignment, this street crossing might be accommodated by incorporating a trail undercrossing of the new ramp into the ramp project.

Alignment Options:

Table 4D lists the three alignments in Area 4 and provides the segment sequence for each. Refer to *Exhibit 4-5*: *Area 4 Trail Alignment Options (at the end of this section)* for a graphical representation of each.

Table 4D - Area 4 Alignment Definitions*	
4-1	N7A
4-2	N7B, N7B1
4-3	N7B, N7B2 (3)
*Area 4 begins at node "k" and ends at node "n" or "o"	

All alignment options in Area 4 are considered "northerly" alignments because they are entirely north of Dry Creek, and all options would start with an at-grade crossing of Booth Road, a low-traffic local road with a posted speed limit of 25 mph and good visibility. The proposed crossing would be marked with a high-visibility crosswalk and appropriate signage.

The more northerly alignment within Area 4 would extend north from Booth Road along the City/County line to an existing sewer easement containing a detention pond in the Sierra Crossings neighborhood just north of Booth Road. It would cross Beatty Way mid-block to get into the area of the detention pond and, at the east end of the neighborhood, climb to meet the grade of Foothills Boulevard. Beatty Way and Walker Drive are narrow, low-traffic residential streets with speed limits of 25 mph. These characteristics render an at-grade crossing appropriate for either location; marked with a high-visibility crosswalk and appropriate signage, similar to the one shown in *Photo 4-7.*

Photo 4-7: Typical Residential Street Crossing

Southerly alignment options would follow the north side of Booth Road within the road right-of-way, requiring a crossing of Walker Drive at its intersection with Booth Road. While this is less than ideal, traffic on both roads is very light, which will minimize conflicts with turning traffic. East of Walker Drive, the trail

would either turn to the northeast and climb to connect with the south/west side of Foothills Boulevard, or follow Booth Road to Atkinson Street, and then Atkinson Street under Foothills Boulevard to the Denio Loop, and along the inside of the Denio Loop to its intersection with the north/east side of Foothills Boulevard. The undercrossing along Atkinson Street would not require reconfiguration of the road, as there is adequate space for a multi-use path along the north side of Atkinson Street, and vertical clearance far exceeds minimum requirements. These alignment options would be entirely within existing City rights-of-way, but would need to be coordinated with the proposed ramp project. Construction of the new ramp would not preclude any of the alignment options.

Key Features and Issues for Area 4

- An at-grade crossing of Booth Road for all alignment options would require passive traffic control features to ensure safety of trail users.
- All alignments would be designed in coordination with proposed improvements at the Foothills Blvd./Atkinson Street interchange.
- The most northerly alignment option would take advantage of City-owned property.
- The most northerly alignment option would require an at-grade crossing of Beatty Way and retaining walls to minimize impacts to the drainage basin. It would also be very close to the back of homes on Beatty Way and Keeble Court that have very small back yards.
- All alignments would include an at-grade crossing or undercrossing of the future southerly loop ramp.
- The alignments along Booth Road would function as a “side path” with conflicts from turning traffic at Walker Drive.

Area 5 – Atkinson Street/Foothills Boulevard at Denio Loop to Vernon Street
Alignment Options

Area 5, highlighted in *Key Map Area 5,* below, extends from Atkinson Street (Area 3) or the intersection of Foothills Boulevard and Denio Loop (Area 4) to Vernon Street.

Key Map Area 5

Existing Conditions:

The study corridor in Area 5 is entirely within the City of Roseville and almost entirely within or adjacent to the northerly end of the UP Railroad Yard. Dry Creek flows relatively undisturbed through approximately half of the UP Railroad Yard between the two-track railroad bridge just east of Atkinson Street and the main rail yard bridges, which carry thirteen tracks and a maintenance road over Dry Creek. East of the rail yard bridges, the creek crosses under Foothills Boulevard and continues to Vernon Street.

Opportunities and Constraints:

The most significant constraint in Area 5, and in the corridor overall, is the large railroad parcels and facilities that stretches along the study corridor from Atkinson Street to Vernon Street. As previously noted in the Area 3 discussion, the UPRR is opposed to at grade crossings of the rail yard and a new underground or overhead facility is prohibitively expensive. Fortunately, the existing Foothill Boulevard overcrossing provides an opportunity to use the existing elevated route over the rail yard for a part of the trail system.

Given the complexities in this area, additional discussion about opportunities and constraints have been incorporated into the following alignment discussion for Area 5.

Alignment Options:

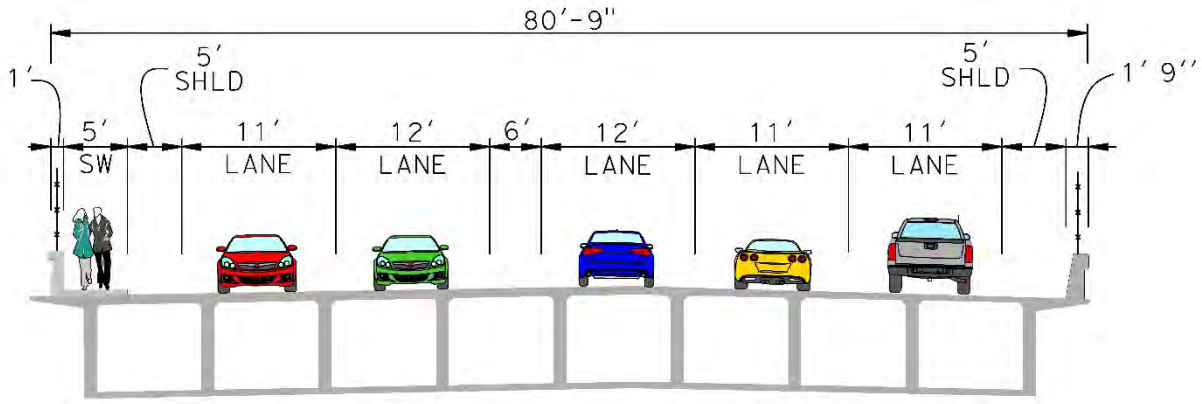
Table 4E lists the nine alignments in Area 5 and provides the segment sequence for each. Refer to *Exhibit 4-6*: *Area 5 Trail Alignment Options (at the end of this section)* for a graphical representation of each.

Table 4E - Area 5 Alignment Definitions*	
5-1	N8A, S6
5-2	N8A, S6, C6, N10
5-3	N8A, C5, N9 (6) [B9], N10
5-4	N8B, N9 (6) [B9], N10
5-5	N8B, C5, S6
5-6	N8B, C5, S6, C6, N10
5-7	S5, N9 (6) [B9], N10
5-8	S5, C5, S6
5-9	S5, C5, S6, C6, N10
*Area 5 begins at node "j", "n" or "o" and ends at node "r" or "t"	

The northerly alignment options start at the intersection of Foothills Boulevard and Denio Loop. The southerly alignment option starts at the south side of Dry Creek at Atkinson Street.

The northerly alignments start with a barrier-protected path along either the east or west side of Foothills Boulevard. The configuration of the existing structures is shown in *Figure 4-4*. They are 80'-9" wide with five lanes of traffic (two northbound and three southbound), two 5-foot shoulders, a 5-foot sidewalk on the north side, and a 6-foot median.

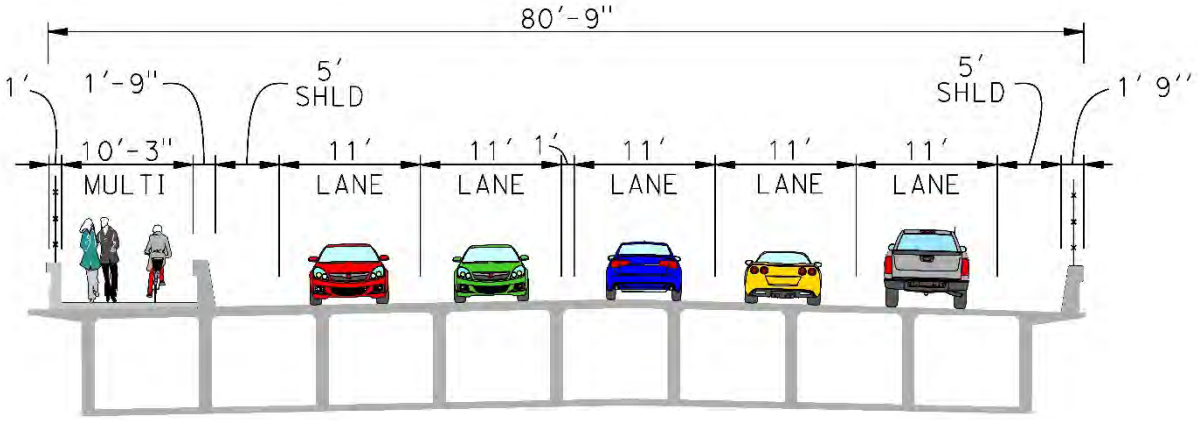
Figure 4-4: Foothills Boulevard Overhead and Bridge – Existing Configuration



The northern alignment (N8A) would take the opportunity to reconfigure the structures without requiring widening, and would limit the required coordination with the UPRR, because the work would all be done on the bridge deck, which would remain 80'-9" wide. The work to reconfigure the structures would consist of widening the existing northern sidewalk toward the center of the bridge to create a 10'-3" multi-use path, adding a protective concrete traffic barrier, and restriping the deck to reduce the median to 1 foot

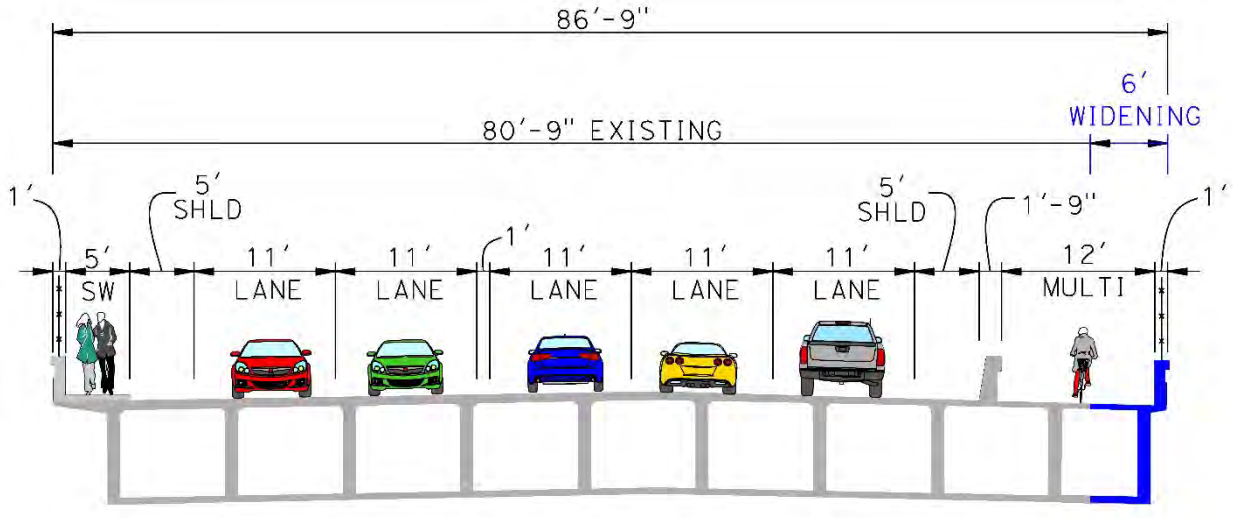
and the lanes to 11 feet, while maintaining the 5-foot shoulder/bike lanes. The proposed configuration is shown in *Figure 4-5*.

Figure 4-5: Foothills Boulevard Overhead and Bridge – Proposed Configuration for Northerly Path (N8A)



A trail alignment (N8B) on the south side of the bridge would require widening by a minimum of 6 feet to add the multi-use path while still accommodating the five lanes of traffic, two 5-foot shoulders and the 5-foot sidewalk on the north side, as shown in *Figure 4-6*. This alternative would be substantially more expensive than the northern path alternative because of the narrow structure widening, and the fact that this would have to be done without disrupting UP Railroad Yard traffic.

Figure 4-6: Foothills Boulevard Overcrossing – Proposed Configuration for Southerly Path (N8B)



At the southeast end of the Foothills Boulevard rail yard and Dry Creek bridge crossing, the east side path alignment (N8A) would turn 180-degrees, heading downhill and back

towards the creek, while the west side alignment (N8B) would loop more gradually back towards the creek on UP Railroad Yard property.

From the south end of the Foothills Boulevard Bridge, alignments would either follow the south bank of Dry Creek to Vernon Street, or cross Dry Creek and follow the north bank to Vernon Street.

The southerly alignment (S5) would cross under the existing Atkinson Street Bridge over Dry Creek and continue along the south side of the creek through an undeveloped part of the Union Pacific Railroad right-of-way and then under the existing UPRR bridges over Dry Creek. There is a potential spur path for employee access to the UPRR offices in this area. While this is the most direct route for the path, and as indicated previously, the UPRR has indicated that they would not allow the path to cross their property. Other concerns with this alignment are the length of the undercrossing of the UP Railroad Yard (over 350 feet), which would make it very challenging to create a path environment conducive to actual and perceived safety for users and security for the UP Railroad Yard. While the northerly alignments along Foothills Boulevard appear most feasible in the short-term, the Rails-to-Trails Conservancy investigated three case studies that may be instructive for a longer-term routing of the path through the UP Railroad Yard. This document can be found in *Appendix E*.

Photo 4-8: Location of potential trail at south end of Foothills Boulevard Bridge.

Once through the UP Railroad Yard property, the south alignment options to arrive at Vernon Street are the same as the Foothills Blvd alignment options. Several of the alignment options in this area would pass under the Foothill Boulevard Bridge near its south abutment (see *Photo 4-8*). Vertical clearance under this bridge is generous; however, near the south abutment the existing side slopes are steep and there is a large drainage feature flowing into Dry Creek from the south across potential trail alignments south of the creek. Retaining walls would be needed to support the trail in this area, and a large culvert would be required to carry the existing drainage across the trail to the creek. Further engineering design and analyses during the next

project phase will be necessary to better define the extent of retaining walls and size of culvert in this area.

East of Foothills Boulevard, the north side of the creek is relatively flat, with a larger and lightly-used UPRR parking lot abutting the north bank. This area includes City of Roseville right-of-way remaining from the abandoned subway under the rail yard. South of Dry Creek, potential alignments are constrained by adjacent industrial uses and steep, eroded creek banks. Extensive and tall retaining walls would be required to construct a trail south of the creek.

Potential trail alignments would need to cross Vernon Street and/or cross Dry Creek near Vernon Street. Crossing Vernon Street at-grade is feasible, but not ideal due to the traffic volume. Vernon Street is a two-lane major collector with a double left-turn lane starting from Cirby Way and continuing across the Dry Creek Bridge. Vernon Street is moderately traveled with an AADT of approximately 9,200 vehicles at a posted speed limit of 40 mph.

Figure 4-7: Vernon Street Bridge over Dry Creek – Existing Configuration

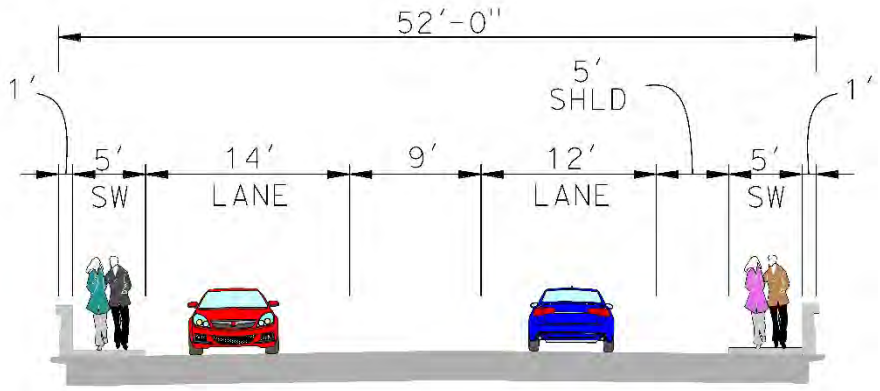
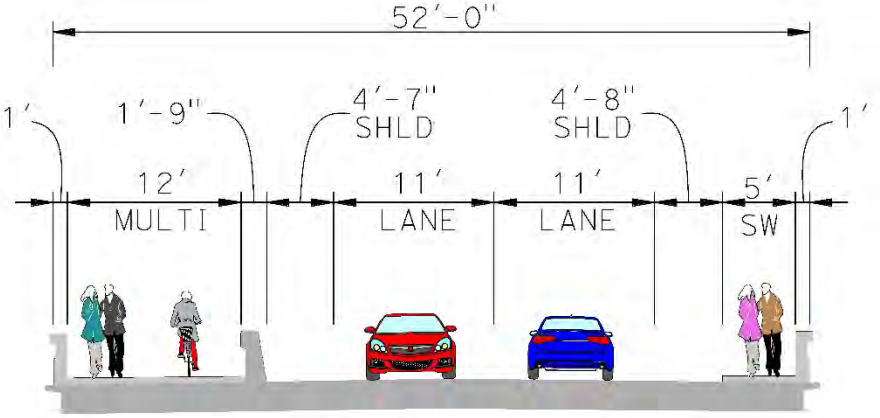


Figure 4-8: Vernon Street Bridge over Dry Creek – Proposed Configuration



The bridge has well-used sidewalks on both sides. The existing Vernon Street Bridge over Dry Creek is shown on the previous page in *Figure 4-7*.

The reconfigured bridge, shown on the previous page in *Figure 4-8*, would have two 11-foot lanes, two shoulders averaging 4 feet 7.5 inches, a 5-foot sidewalk and a 12-foot, barrier-separated path.

The turn lane is unnecessary because there are no businesses north of the bridge that require a designated left turn.

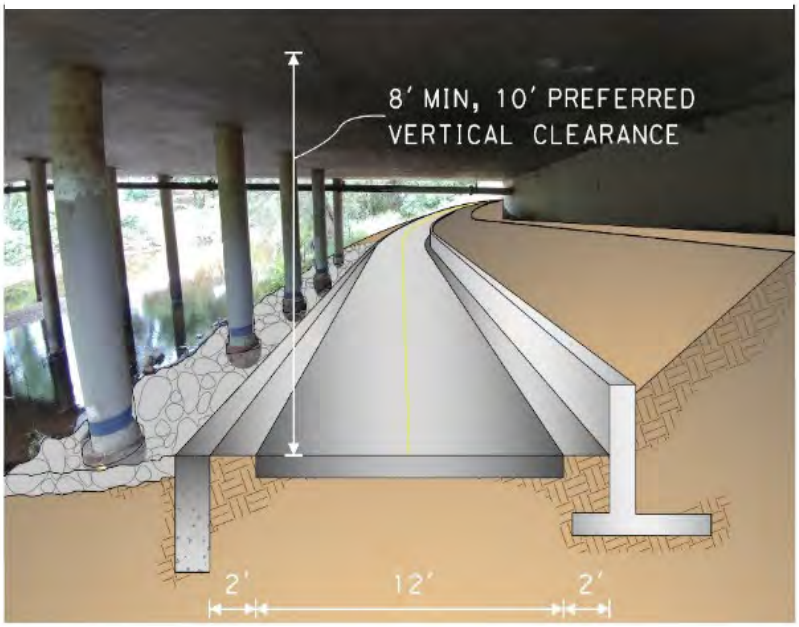
Heading east from Vernon Street, both the north and south alignments would cross under the existing Vernon Street Bridge near the north and south bridge abutments, respectively, with access to the west side of Vernon Street. The area near the south abutment is shown in *Photo 4-9*.

Photo 4-9: Existing graded area at the south abutment of the Vernon Street Bridge, looking west.

These options are like those at Atkinson Street and would require either a high-side retaining wall and a low-side cut-off wall with slope protection, as shown in *Figure 4-9*, or retaining walls on both sides.

At both the north and south abutments, with some excavation and supplementary support for the bridge abutments, the trail could pass under the bridge. Additional hydraulic and structural analyses will be required to determine the appropriate balance between head room over the path and susceptibility to inundation during common flood events.

Figure 4-9: Rendering of Potential Path under Vernon Street Bridge



Key Features and Issues for Area 5

- UPRR policy prohibits crossing their rail yard; therefore, the only alignments considered feasible at this time will use the existing Foothills Boulevard Bridges.
- The alignment through the rail yard would provide a potential employee access to the UPRR offices but would also require security fencing and potentially other security measures along the entire alignment within UPRR right-of-way.
- The undercrossing of the rail yard would use space under the existing bridges over the creek, would be nearly 350 feet long and would require retaining walls at the approaches to the undercrossing, protective covers over the trail, lighting, and mitigation measures for the large resident bat colony.
- The alignment option along the east side of Foothills Boulevard would reallocate space by narrowing lanes, shoulders and the median, while incorporating the existing sidewalk into a barrier-separated path on the east side.
- The south end of the east alignment option along Foothills Boulevard would require a short-radius, 180-degree curve on a 2.7% grade, as well as retaining walls and fencing to protect the adjacent storage facilities.
- The option along the west side of Foothills Boulevard would require widening both Foothills Boulevard bridges to the west to provide a barrier-separated path.
- Retaining walls and a large drainage structure would be required for segments passing under the Foothills Boulevard bridge near the south abutment.
- The option along the north side of Dry Creek east of the UP Railroad Yard would use historic City right-of-way. Further investigation is needed to determine the status of mapped right-of-way; the UPRR may no longer recognize this right-of-way.
- The alignment option south of Dry Creek would traverse the top of a steep bank and require significant retaining walls and right-of-way acquisition.
- The alignment option crossing Dry Creek at Vernon Street would reallocate space by narrowing lanes and shoulders and eliminating the existing, unused, 2-way left turn lane, while incorporating the existing sidewalk into a barrier-separated path on the west side of the existing Vernon Street bridge.
- East of the rail yard, options traverse areas with large homeless encampments.

Area 6 – Vernon Street to Riverside Avenue Alignment Options

Area 6, highlighted in *Key Map Area 6*, extends from Vernon Street to Riverside Avenue.

Key Map Area 6

Existing Conditions:

The study corridor in Area 6 is entirely within the City of Roseville. All alignment options start at Vernon Street and end with a connection to the proposed Dry Creek Greenway East on the east side of Riverside Avenue north of Dry Creek. The property north of Dry Creek is undeveloped except for a BMX bike park and has a single owner who has tentative development plans. South of the creek is a mixture of multi-family housing and light industrial uses with multiple owners.

The topography north of the creek is generally flat and at a lower elevation than south of the creek. Because the area to the north is undeveloped, there is potentially space to keep the trail away from the steep, eroded banks of the creek. Particularly near Riverside Avenue, development south of the creek extends nearly to the top of the high and severely eroded banks (in some area, bank erosion has undermined fences and other facilities).

Opportunities and Constraints:

The flat, undeveloped terrain north of Dry Creek provides the best opportunities for the trail. The existing sewer maintenance easement provides both a dual-use potential for the trail and the easiest area for construction. The potential development of this area provides an opportunity for collaboration to beneficially incorporate the trail into the development, but the owner has expressed some concern about how trail development would impact the property's development potential.

The steep banks south of Dry Creek make an alignment to the south infeasible, except for the westerly 800-1000 feet. Use of this portion would require a new bridge across Dry

Creek but would facilitate access to both sides of the creek in Area 6. There was some neighborhood opposition to this segment.

All alignment options would connect to the Dry Creek Greenway East Trail by crossing Riverside Avenue under the existing bridge along the north side of Dry Creek to the north east corner of Riverside Avenue and Dry Creek. The existing vertical clearance is adequate, but the trail will likely be inundated by relatively frequent storm events. This undercrossing would require a low-side retaining wall to enable a path wider than the existing bench.

Alignment Options:

Table 4F lists the five alignments in Area 6 and provides the segment sequence for each. Refer to *Exhibit 4-7: Area 6 Trail Alignment Options (at the end of this section)* for a graphical representation of each. There are three basic alignment options in Area 6, two north and one south of Dry Creek. The most northerly would follow an existing sewer maintenance road easement through the middle of the single, large, private parcel to the north. The other northerly alignment would closely follow the creek, just above the top of bank, avoiding areas of bank erosion. The southerly alignment would follow the south bank, much of which is steep and eroded, and considered infeasible, except for the westerly portion. This westerly portion would potentially facilitate a spur to the Cirby Woods neighborhood.

Table 4F - Area 6 Alignment Definitions*	
6-1	N11A,
6-2	N11B, N12
6-3	N11B, C7 [B10], S8 (7)
6-4	S7, S8 (7)
6-5	S7, C7 [B10], N12
*Area 6 begins at node “r” or “t” and ends at node “w”.	

Key Features and Issues for Area 6

- Beyond Vernon Street, Area 6 north of Dry Creek is entirely within a single private parcel. The owner has indicated a desire to sell or develop the property as an RV resort.
- Either side of Vernon Street north of Dry Creek provides an opportunity for access from the street and/or a trailhead.
- Either north or south alignments would cross under the existing Vernon Street bridge, requiring retaining walls and replacement of existing gabion basket slope protection (for the south alignment).

(Continued on next page)

Key Features and Issues for Area 6

(Continued from previous page)

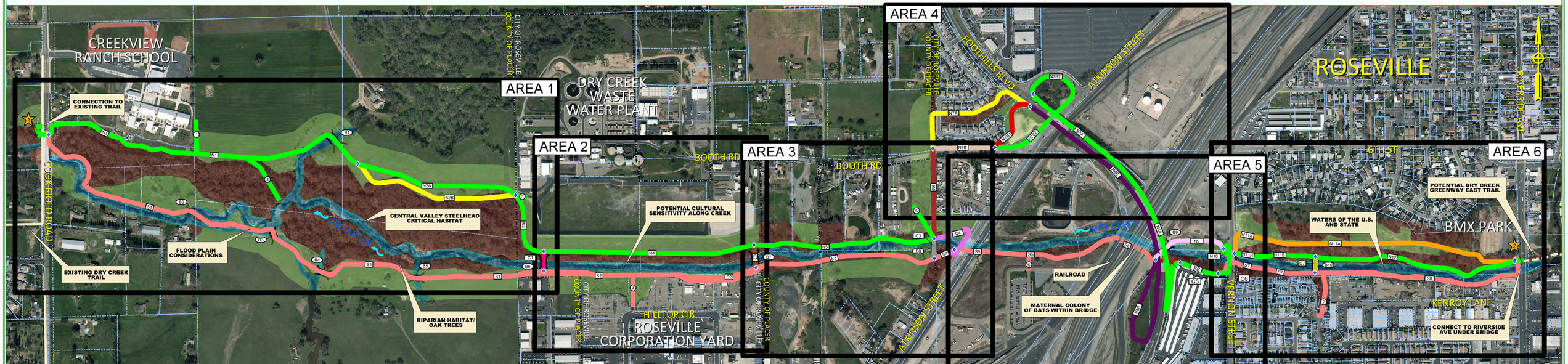
- The most northerly alignment would follow the existing sewer maintenance road through the center of the property on generally flat, open terrain.
- The north alignment closer to Dry Creek would roughly follow the north bank of the creek, following the gently rolling terrain above the bank. This would both provide for good views of the creek and minimize impacts to the potential development of the property.
- The southerly alignment would pass south of the Cirby Woods community on rolling to steep terrain. In conjunction with a potential bridge (B10) shifting the trail back to the north side, this would provide access to both sides of the creek within Area 6, as well as potential direct access to the Cirby Woods neighborhoods.
- The eastern portion of the south alignment would traverse very steep terrain in a narrow swath of land between Dry Creek and the industrial uses to the south. Construction would require very tall retaining walls over nearly the entire segment length, as well as widening of the Riverside Avenue Bridge over Dry Creek. As a result, this segment is considered infeasible.
- All alignments would cross under the north end of the Riverside Avenue Bridge to connect to the planned Dry Creek Greenway East trail near a planned trailhead north of Dry Creek. The undercrossing would require retaining walls and would be only slightly higher than the normal water surface elevation.

4.2. Estimated Cost of Alignment Options

Table 4G, on the following page, is a summary of planning-level cost estimates for each of the alignment options described in *Section 4.1*. Estimated costs include preliminary engineering and environmental documentation, right-of-way, construction and construction administration, and include 10 percent for mobilization and a 25 percent contingency. The right-of-way costs are based on acquisition of a 30-foot wide easement along properties not owned by the City or County. The cost estimates do not include any annual maintenance costs, nor can they anticipate many details that might further inform the capital costs, such as the results of drainage and geotechnical investigations, and the need for utility relocations. Trailhead improvements are also not included in the costs. The unit costs for the estimate are based on Caltrans cost data and recent relevant completed projects in the region. For detailed cost estimates for all alignments, see *Appendix F*.

Table 4G - Alignment Alternative Cost Estimate			
	Alignment		
	Name	Segment Definition	Project Cost
Area 1	1-1	N1 (1)(2)[B1], N2A (3), N3	$ 4,190,000
	1-2	N1 (1)(2)[B1], N2A (3), N3, C1 [B6]	$ 5,860,000
	1-3	N1 (1)(2)[B1], N2B (3), N3	$ 4,260,000
	1-4	N1 (1)(2)[B1], N2B (3), N3, C1 [B6]	$ 5,880,000
	1-5	S1 [B2, B3, B4, B5]	$ 2,950,000
	1-6	S1 [B2, B3, B4, B5], C1 [B6]	$ 4,560,000
Area 2	2-1	N4	$ 310,000
	2-2	N4, C2 [B7]	$ 2,360,000
	2-3	S2 (4)	$ 1,420,000
	2-4	S2 (4), C2 [B7]	$ 3,450,000
Area 3	3-1	N5 (5), N6	$ 770,000
	3-2	N5 (5), C4	$ 1,410,000
	3-3	N5 (5), C3 [B8], S4	$ 2,590,000
	3-4	S3, S4	$ 880,000
	3-5	S3, C3 [B8], N6	$ 2,650,000
	3-6	S3, S4, C4 (5), N6	$ 1,890,000
Area 4	4-1	N7A	$ 1,380,000
	4-2	N7B, N7B1	$ 130,000
	4-3	N7B, N7B2	$ 220,000
Area 5	5-1	N8A, S6	$ 4,710,000
	5-2	N8A, S6, C6, N10	$ 5,290,000
	5-3	N8A, C5, N9 [B9], N10	$ 5,560,000
	5-4	N8B, N9 [B9], N10	$ 16,400,000
	5-5	N8B, C5, S6	$ 15,700,000
	5-6	N8B, C5, S6, C6, N10	$ 16,400,000
	5-7	S5 (6), N9 [B9], N10	$ 6,660,000
	5-8	S5 (6), C5, S6	$ 6,000,000
	5-9	S5 (6), C5, S6, C6, N10	$ 6,620,000
Area 6	6-1	N11A	$ 460,000
	6-2	N11B, N12	$ 650,000
	6-3	N11B, C7 [B10], S8 (7)	$ 9,930,000
	6-4	S7, S8 (7)	$ 8,310,000
	6-5	S7, C7 [B10], N12	$ 3,740,000
Key:	N## = North segment S## = South segment	(#) = Spur Trail # [B#] = Bridge #	

TRAIL AREA OVERVIEW - ALIGNMENT OPTIONS

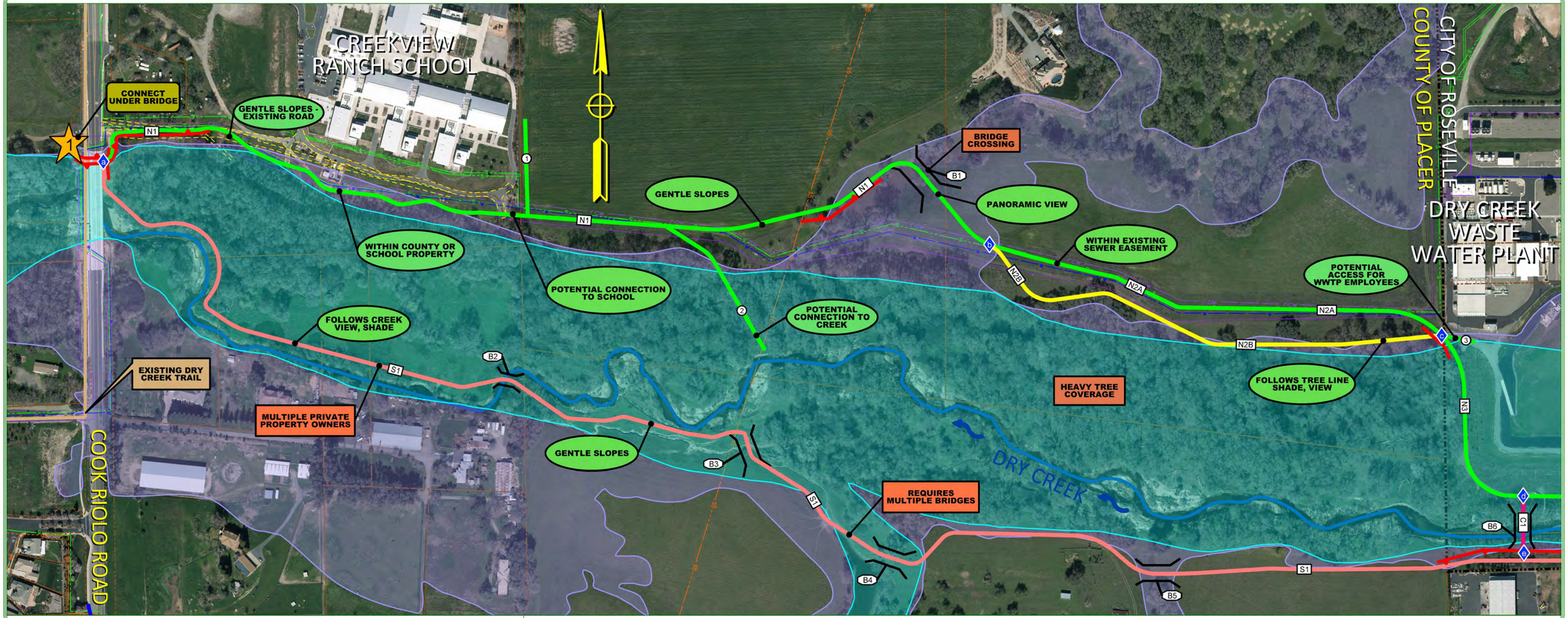


DRY CREEK GREENWAY WEST MULTI-USE TRAIL PLANNING & FEASIBILITY STUDY

Exhibit 4-1

[THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK]

AREA 1 TRAIL ALIGNMENT OPTIONS



LEGEND

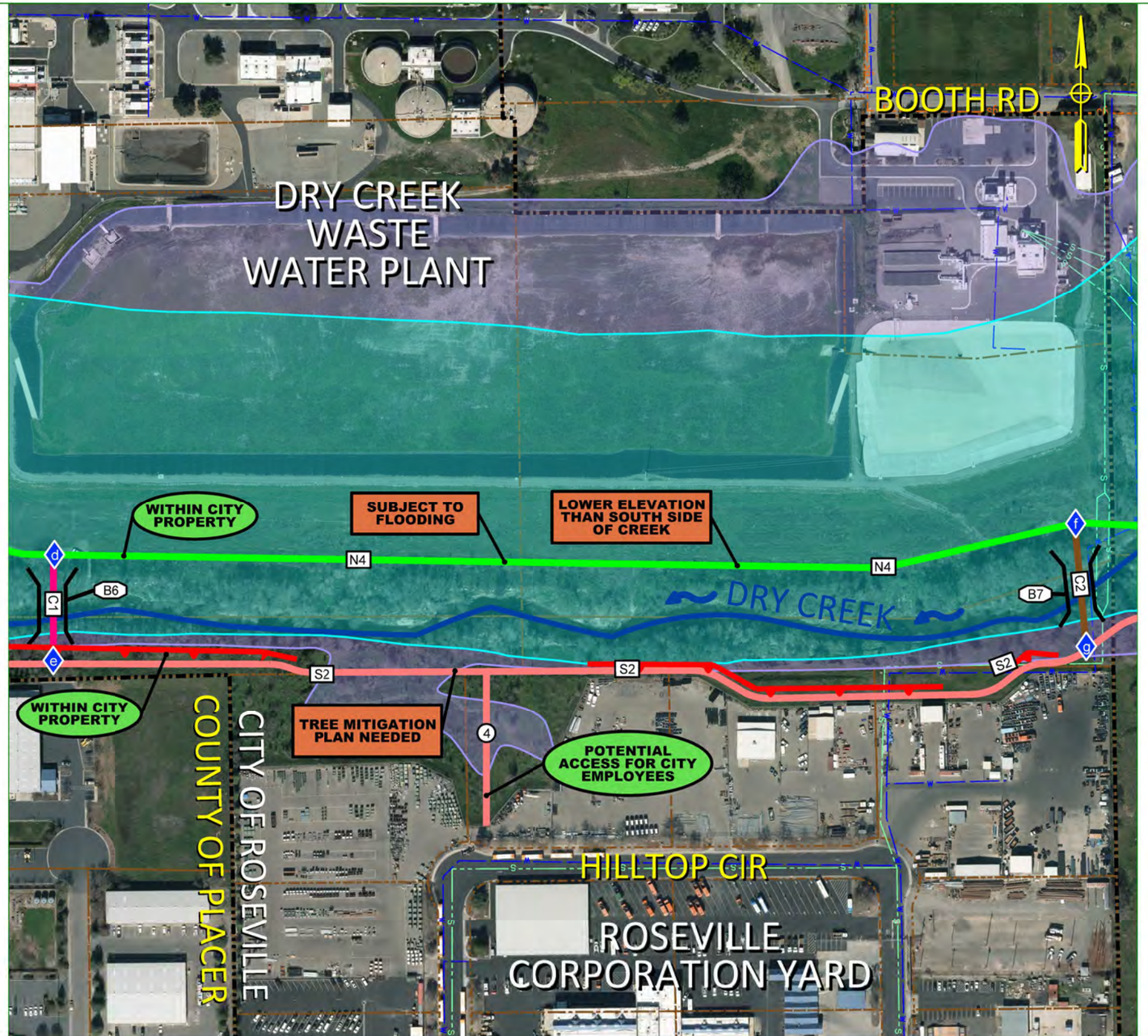
- CONNECTION TO EXISTING/PROPOSED TRAIL
- N# NORTH ALIGNMENT SEGMENT IDENTIFIER
- S# SOUTH ALIGNMENT SEGMENT IDENTIFIER
- NODE
- # ACCESS POINT
- RETAINING WALL
- B# PROPOSED BRIDGE IDENTIFIER
- PROPOSED BRIDGE
- C# CROSSING LABEL
- EXISTING BIKE TRAIL
- PROPERTY LINE
- CITY/COUNTY LINE
- OPPORTUNITY
- NEUTRAL
- CONSTRAINT
- REGULATORY FLOODWAY
- HIGH HAZARD FLOOD ZONE

DRY CREEK GREENWAY WEST MULTI-USE TRAIL PLANNING & FEASIBILITY STUDY

Exhibit 4-2

[THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK]

AREA 2 TRAIL ALIGNMENT OPTIONS



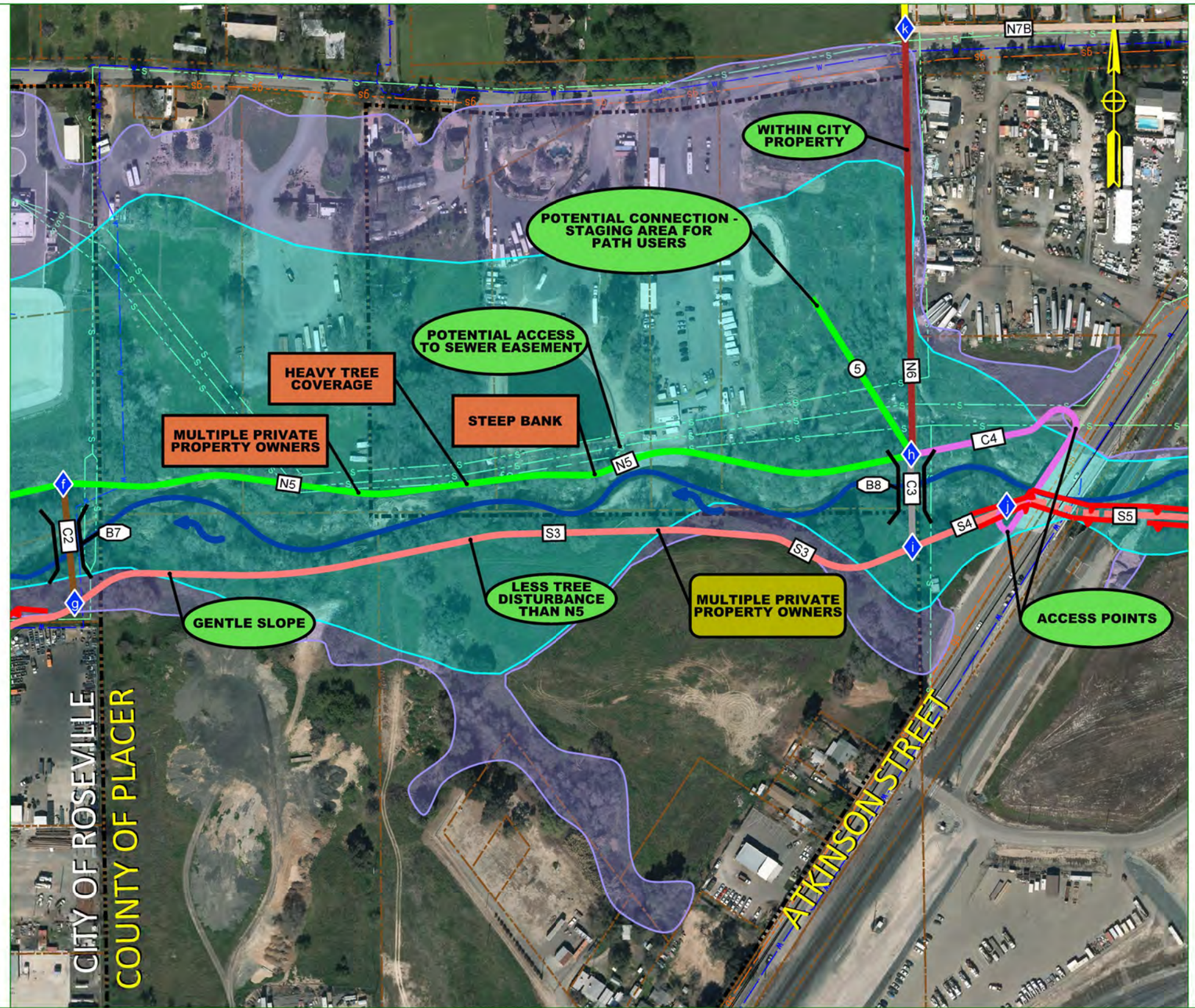
LEGEND

- CONNECTION TO EXISTING/PROPOSED TRAIL
- N# NORTH ALIGNMENT SEGMENT IDENTIFIER
- S# SOUTH ALIGNMENT SEGMENT IDENTIFIER
- NODE
- # ACCESS POINT
- RETAINING WALL
- B# PROPOSED BRIDGE IDENTIFIER
- PROPOSED BRIDGE
- C# CROSSING LABEL
- EXISTING BIKE TRAIL
- PROPERTY LINE
- CITY/COUNTY LINE
- OPPORTUNITY
- NEUTRAL
- CONSTRAINT
- REGULATORY FLOODWAY
- HIGH HAZARD FLOOD ZONE

DRY CREEK GREENWAY WEST MULTI-USE TRAIL PLANNING & FEASIBILITY STUDY Exhibit 4-3

[THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK]

AREA 3 TRAIL ALIGNMENT OPTIONS



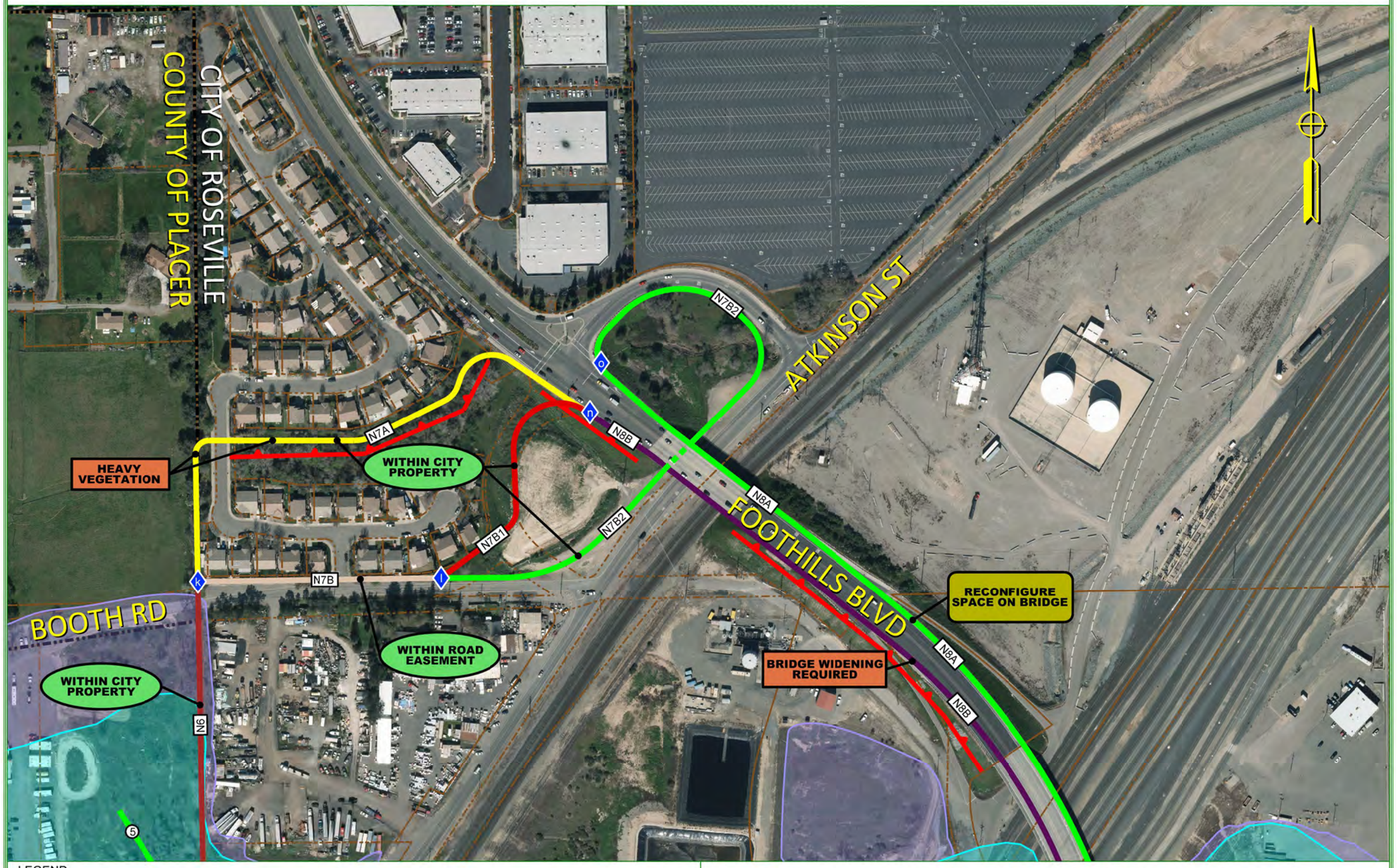
LEGEND

- CONNECTION TO EXISTING/PROPOSED TRAIL
- NORTH ALIGNMENT SEGMENT IDENTIFIER
- SOUTH ALIGNMENT SEGMENT IDENTIFIER
- NODE
- ACCESS POINT
- RETAINING WALL
- PROPOSED BRIDGE IDENTIFIER
- PROPOSED BRIDGE
- CROSSING LABEL
- EXISTING BIKE TRAIL
- PROPERTY LINE
- CITY/COUNTY LINE
- OPPORTUNITY
- NEUTRAL
- CONSTRAINT
- REGULATORY FLOODWAY
- HIGH HAZARD FLOOD ZONE

DRY CREEK GREENWAY WEST MULTI-USE TRAIL PLANNING & FEASIBILITY STUDY Exhibit 4-4

[THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK]

AREA 4 TRAIL ALIGNMENT OPTIONS



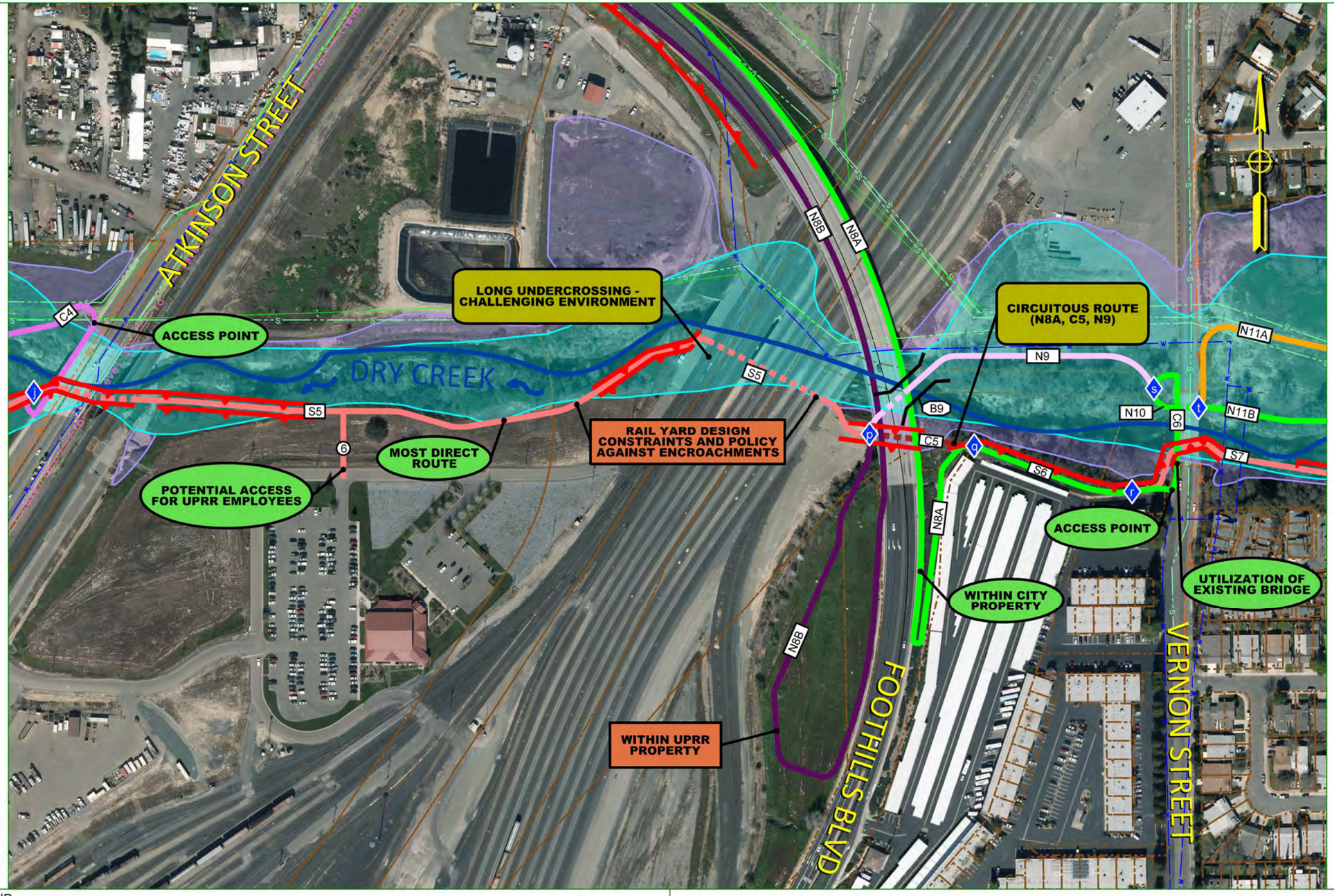
LEGEND

- CONNECTION TO EXISTING/PROPOSED TRAIL
- N# NORTH ALIGNMENT SEGMENT IDENTIFIER
- S# SOUTH ALIGNMENT SEGMENT IDENTIFIER
- NODE
- # ACCESS POINT
- RETAINING WALL
- B# PROPOSED BRIDGE IDENTIFIER
- PROPOSED BRIDGE
- C# CROSSING LABEL
- EXISTING BIKE TRAIL
- PROPERTY LINE
- CITY/COUNTY LINE
- OPPORTUNITY
- NEUTRAL
- CONSTRAINT
- REGULATORY FLOODWAY
- HIGH HAZARD FLOOD ZONE

DRY CREEK GREENWAY WEST MULTI-USE TRAIL PLANNING & FEASIBILITY STUDY Exhibit 4-5

[THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK]

AREA 5 TRAIL ALIGNMENT OPTIONS



LEGEND

- CONNECTION TO EXISTING/PROPOSED TRAIL
- NORTH ALIGNMENT SEGMENT IDENTIFIER
- SOUTH ALIGNMENT SEGMENT IDENTIFIER
- NODE
- ACCESS POINT
- RETAINING WALL
- PROPOSED BRIDGE IDENTIFIER
- PROPOSED BRIDGE
- CROSSING LABEL
- EXISTING BIKE TRAIL
- PROPERTY LINE
- OPPORTUNITY
- NEUTRAL
- CONSTRAINT
- REGULATORY FLOODWAY
- HIGH HAZARD FLOOD ZONE

DRY CREEK GREENWAY WEST MULTI-USE TRAIL PLANNING & FEASIBILITY STUDY Exhibit 4-6

[THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK]

AREA 6 TRAIL ALIGNMENT OPTIONS

LEGEND

- CONNECTION TO EXISTING/PROPOSED TRAIL
- NORTH ALIGNMENT SEGMENT IDENTIFIER
- SOUTH ALIGNMENT SEGMENT IDENTIFIER
- NODE
- ACCESS POINT
- RETAINING WALL
- PROPOSED BRIDGE IDENTIFIER
- PROPOSED BRIDGE
- CROSSING LABEL
- PROPOSED BIKE TRAIL (EAST)
- PROPERTY LINE
- OPPORTUNITY
- NEUTRAL
- CONSTRAINT
- REGULATORY FLOODWAY
- HIGH HAZARD FLOOD ZONE

DRY CREEK GREENWAY WEST MULTI-USE TRAIL PLANNING & FEASIBILITY STUDY Exhibit 4-7

[THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK]

5. Recommendations

5.1. Evaluation Criteria

A rating system was developed to compare alignment alternatives based on a variety of technical and non-technical considerations, including comments and concerns raised during the public engagement efforts. *Table 5A – Alignment Evaluation Criteria* (on the following page) lists the constituency, the rating criteria, and the measure for the criteria. Some comments or concerns are not directly measurable, including effects on neighborhood privacy, tranquility, and property values. In those cases, the criteria considered path characteristics such as the relative separation or buffer of path alternatives to private property areas.

Evaluation of the alternatives is presented in *Section 5.2, Evaluation of Alignment Options*, with the recommended alignment, estimated costs for the recommended alignment, potential funding sources and proposed phasing presented in the following sections. Alignment recommendations could change depending on the outcome of studies during the environmental documentation and preliminary engineering phase of the project.

5.2. Evaluation of Alignment Options

A system of “+”, “o”, and “-” was used in each table to rate each alignment. A “+” (+1 point) indicates favorable conditions, a “o” (0 points) indicates mixed or neutral conditions, and a “-” (-1 point) indicates unfavorable conditions. These ratings were then added to assist in determining a preferred alignment. The complete evaluation tables can be found in *Appendix G.*

Because the alignments within individual areas are not truly independent of those in the adjacent areas, the ratings of adjacent areas were considered together to select the recommended alignments from both areas. For example, the best rated combination of workable alignments for Areas 1 and 2 comprises Alignments 1-1 and 2-3 or 2-4. Analysis of the Area 3 ratings leads to the conclusion that the trail should stay south of the creek, leading to the choice of Alignment 2-3 in Area 2, even though Segment 2-4 is rated higher in Area 2.

Table 5B, following, is a summary table showing the results for each area. Recommended alignments are highlighted yellow in the table. Alternate recommended alignments are highlighted in green in the table.

Table 5A - Alignment Evaluation Criteria

Constituency		Rating Criteria	Does the Alignment…
Property Owners	Property owners near the path	Compatibility with Nearby Property	Provide a separation or buffer between sensitive uses and path or path access points?
		Parking & Traffic	Minimize neighborhood traffic and parking by providing access to off-street public parking?
		Aesthetics	Minimize potential for cuts, fills, walls or structures?
	Property owners directly impacted by the path (criteria in addition to those for nearby owners)	Availability of Right-of-Way	Require property from owners willing to sell or grant an easement?
		Public vs. private property	Maximize the use of public property?
		Impact on property	Minimize impacts to existing/planned uses of private property?
Path Users	Walkers and cyclists	Path Design	And path design (width/materials) accommodate anticipated users?
		Path User Comfort	Minimize user exposure to busy roadways and advance a lower stress level environment?
		Transportation System Performance	Provide direct connections between key destinations and other pathways and close gaps?
		Recreation Facility Performance	Result in a continuous off-street facility with well distributed access points?
		Environmental Interpretation	Afford opportunities for enjoyment of natural resources/interpretation?
		Exposure to hazards	Minimize exposure to noise and air pollution?
Public Safety	Property owners and path users	Natural Surveillance	Support visibility of path and minimizes exposure to dark or confined crossings?
		Separation	Provide spatial separation or barriers between adjacent properties and path users to discourage trespassing?
		Emergency response	Provide access points for emergency vehicles?
Environ mental	Flora and fauna in the Greenbelt/Path Users	Habitat & Wildlife	Minimize the impact to sensitive environmental resources?
		Flooding	Minimize the potential for obstruction of creek flows or erosion?
Municipal Operations	City of Roseville or Placer County	Utility System Performance	Facilitate access to and minimize the potential for impacts to existing utilities?
		Consistency with Local Plans	Achieve consistency with adopted plans?
		Cost Efficiency	Efficiently use limited resources for construction and maintenance?
Municipal Facilities	Roseville Waste Water Treatment Plant and Corporation Yard	Facility Performance	Facilitate access to and minimize the potential for impacts to existing facilities?
		Compatible with Planned Improvements	Conform with planned facility improvements?
		Security	Maintain or enhance security of the facility?

Table 5B – Evaluation Matrix Summary			
	Alignment		
	Name	Segment Definition	Rating
Area 1	1-1	N1 (1)(2)[B1], N2A (3), N3	7
	1-2	N1 (1)(2)[B1], N2A (3), N3, C1 [B6]	5
	1-3	N1 (1)(2)[B1], N2B (3), N3	7
	1-4	N1 (1)(2)[B1], N2B (3), N3, C1 [B6]	5
	1-5	S1 [B2, B3, B4, B5]	-2
	1-6	S1 [B2, B3, B4, B5], C1 [B6]	-3
Area 2	2-1	N4	-6
	2-2	N4, C2 [B7]	0
	2-3	S2 (4)	4
	2-4	S2 (4), C2 [B7]	5
Area 3	3-1	N5 (5), N6	0
	3-2	N5 (5), C4	-5
	3-3	N5 (5), C3 [B8], S4	-7
	3-4	S3, S4	4
	3-5	S3, C3 [B8], N6	6
	3-6	S3, S4, C4 (5), N6	1
Area 4	4-1	N7A	-1
	4-2	N7B, N7B1	4
	4-3	N7B, N7B2	6
Area 5	5-1	N8A, S6	-2
	5-2	N8A, S6, C6, N10	-1
	5-3	N8A, C5, N9 [B9], N10	4
	5-4	N8B, N9 [B9], N10	0
	5-5	N8B, C5, S6	-5
	5-6	N8B, C5, S6, C6, N10	-4
	5-7	S5 (6), N9 [B9], N10	1
	5-8	S5 (6), C5, S6	-2
	5-9	S5 (6), C5, S6, C6, N10	-1
Area 6	6-1	N11A	10
	6-2	N11B, N12	11
	6-3	N11B, C7 [B10], S8 (7)	-8
	6-4	S7, S8 (7)	-10
	6-5	S7, C7 [B10], N12	5

Key: Recommended alignments are highlighted yellow.
Alternate recommended alignments are highlighted green.

N## = North segment
S## = South segment
(#) = Spur Trail #
[B#] = Bridge #

5.3. Recommended Alignment

The recommended alignment is described by area in this section and shown in *Exhibit 5-1* at the end of this section.

Area 1 – Cook Riolo Road to WWTP/Corp Yard Recommended Alignment

Alignment:	1-2
Segments:	N1 (Bridge B1), N2A, N3 and C1 (Bridge B6)
Alternate Alignment:	1-4
Alternate Segments:	N1 (Bridge B1), N2B, N3 and C1 (Bridge B6)
Spurs:	1 (Creekview Ranch School), 2 (Dry Creek), 3 (WWTP)

Starting with a connection to the existing Cook Riolo Road Bike Path just north of the Cook Riolo Road Bridge over Dry Creek, the alignment loops under the north end of the bridge, follows the existing utility access road north of the creek, passes the south side of the Creekview Ranch School, continues along the south edge of the open pasture *(Photo 5-1)*, roughly following the sewer easement to near the southwest corner of the Waste Water Treatment Plant. From there it turns to the south, following the maintenance road *(Photo 5-2, on following page)* towards the creek, crosses the bypass channel and then Dry Creek.

Photo 5-1: Pasture on high ground north of Dry Creek.

The major factors leading to selection of Alignment 1-2 are the as follows:

- This northerly alignment is nearly all on high ground, limiting exposure to flooding and impacts on the flood plain.
- It generally follows an existing sewer easement, providing improved sewer access.
- Approximately one quarter of the alignment would be on publicly-owned lands, minimizing right-of-way costs.
- It would provide an opportunity for a direct link to the Creekview Ranch School (Spur 1), which alignments south of Dry Creek would not.

Photo 5-2: WWTP maintenance road north of Dry Creek.

- It would provide opportunity for an employee access to the WWTP (Spur 3).
- It would affect only two private parcels. One has an existing sewer maintenance road in an easement crossing the entire property. The other is tentatively planned for development; the owners' have expressed willingness to work with the County to incorporate the trail into their development plans.
- It connects to the strongly recommended alignment in Area 2.

The major challenges associated with the recommended alignment are as follows:

- Cost. Although it includes only two bridges, compared to four for the southerly alignments, both would be significant structures, whereas three of the four on the southerly alignments would be pipe or box culverts. The northerly alignment would also require retaining walls near the Cook Riolo Road Bridge and on the approach to Bridge B1.
- The need to cross the bypass channel north of Dry Creek (Segment N3) without restricting flood flows in that channel.
- Security concerns for the Waste Water Treatment Plant.

Alignments south of Dry Creek scored poorly for the following reasons:

- They would cross multiple private parcels while not utilizing any existing publicly-owned property or easements. At least one of the affected property owners has expressed strong opposition.
- They would traverse mostly riparian lowlands, creating much greater environmental and floodway impacts, and be much more prone to flooding.

Alternate Segment N2B is included because the alignment including this segment is essentially the same as the one including N2A, with the difference being that N2B diverges from the sewer easement to more closely follow the edge of woodland and top of bank, making for a shadier and more pleasant experience for users. The cost difference between the two would be negligible. This is a decision that can be left for final design, taking into consideration development plans for the private parcel crossed by Segment N2A or N2B.

Area 2 – WWTP/Corp. Yard
Recommended Alignment

Alignment:	2-3
Segments:	S2
Alternate Alignment:	None
Spurs:	4 (Roseville Corp. Yard Employee Access)

Starting from the south end of Bridge B6, the alignment follows the south bank of Dry Creek on City of Roseville property along the north edge of the Roseville Corporation Yard. Retaining walls would be required along potions of this alignment due to steep banks and limited right-of-way width. A portion of the trail and the spur to the Corp. Yard would pass through an area of mitigation plantings from the WWTP expansion project.

The major factors leading to selection of Alignment 2-3 are as follows:

- This southerly alignment is on higher ground than the northerly alignments, limiting exposure to flooding and impacts on the flood plain.
- It minimizes the length of interface between the trail and WWTP, simplifying separation for plant security purposes.
- It would provide opportunity for employee access to the Corp Yard *(Photo 5-3)*, so collectively with Alignment 1-1 in Area 1, access would be provided to both the WWTP and the Corp. Yard.

Photo 5-3: Area for potential spur, S2, to Corp. Yard. Looking south through mitigation plantings towards Corp. Yard.

The major challenges associated with the recommended alignment are as follows:

- Steep banks requiring retaining walls along portions of the alignment.
- Mitigation for mitigation trees impacted by the path and the spur, although the path can be designed to minimize these impacts.
- Maintaining security for both the path and the Corp. Yard for this isolated stretch of path (issues would be similar, but more challenging for northerly alignments), while also providing restricted access.
- Prior surveys have noted potential cultural resources south of Dry Creek. Future surveys are needed to locate any cultural resources and determine an appropriate alignment of Segment S2.
- Access to the Corp. Yard will require some reconfiguration of storage areas.

Alignments north of Dry Creek scored poorly for the following reasons:

- Security issues for the WWTP.
- The location of the alignment between the main and bypass channels of Dry Creek.
- The low-lying ground on which the northerly alignments would be built, with little opportunity to raise the profile.

Area 3 – WWTP/Corp. Yard to Atkinson Street/Booth Road Recommended Alignment

Alignment:	3-5
Segments:	S3, C3 (Bridge B8), N6
Alternate Alignment:	3-6
Alternate Segments:	S3, S4, C4 (Atkinson Street Bridge), N6
Spurs:	5 (Trailhead on City Property on Booth Road)

Starting along the south side of Dry Creek near the east end of the Roseville Corporation Yard, the alignment would continue along the south bank *(Photo 5-4)* on two undeveloped private parcels to a crossing of the creek (Bridge 8) near Atkinson Street. The crossing would take the trail onto the eastern edge of an undeveloped parcel owned by the City of Roseville. The trail would follow the eastern edge of this parcel to an at-grade crossing of Booth Road. Spur 5 (shown schematically) could provide a trailhead on the City-owned parcel.

The major factors leading to selection of Alignment 3-5 are as follows:

- This southerly alignment is unconstrained by existing development.
- It only impacts two private parcels.
- This alignment follows a possible new sewer alignment, providing opportunity for dual use.
- Bridge B8 is a possible crossing for the sewer line as well.
- It makes use of the City-owned parcel on Booth Road, providing a possibile trailhead.

Photo 5-4: Looking southwest across Dry Creek east of the Roseville Corp. Yard.

The major challenges associated with the recommended alignment are as follows:

- The new bridge makes this the costliest alignment in Area 3.
- Attempts to contact one of the two affected property owners were not successful.

Alignments north of Dry Creek scored poorly for the following reasons:

- Opposition from property owners.
- Constrained right-of-way due to development of multiple private parcels and a recent flood protection project on the north bank of the creek.

Alignment 3-4, which would stay south of Dry Creek, cross under the Atkinson Street Bridge and continue into Area 5 onto the UP Railroad Yard property via Alignments 5-7, 5-8 or 5-9, was the second highest rated alignment in Area 3 (Rating = 4), but was dismissed because the aforementioned Area 5 alignments are considered infeasible at this time due to stated objections by the UPRR.

Alternate Segments S4 and C4 are included because the alignment including these segments (Alignment 3-6) would provide a less costly crossing of Dry Creek by utilizing currently unused space on the existing Atkinson street Bridge over Dry Creek. This alternate rated lower because of the additional length of trail, diminished user comfort, the impacts the trail would have on potential development of the private parcels on both sides of the creek between the City parcel and Atkinson Street *(Photo 5-5)*, and the incompatibility with the proposed widening of Atkinson Street.

Photo 5-5: Looking west along Dry Creek from Atkinson Street Bridge.

Area 4 – Booth Road to Foothills Boulevard
Recommended Alignment

Alignment:	4-3
Segments:	N7B, N7B2
Alternate Alignments:	None
Spurs:	None

Starting at the north side of Booth Road at the southwest corner of the Beatty Way neighborhood, the alignment would follow the north side of Booth Road within the road right-of-way as a side path, crossing the Walker Drive entrance to the neighborhood at grade. It would continue along the north side of Booth Road to Atkinson Street *(Photo 5-6)*, and then continue as a side path along Atkinson Street under the Atkinson Undercrossing of Foothhills Boulevard to the Denio's loop, continuing along the inside of the ramp to its intersection with Foothills Boulevard.

The major factors leading to selection of Alignment 4-3 are the as follows:

- Of the two low-cost alignments within this area, it is the only one compatible with the three feasible alignments for Area 5 (5-1, 5-2 and 5-3).
- It is entirely within City right-of-way.

Photo 5-6: Existing intersection of Atkinson Street and Booth Road, looking southwest.

Following are the major challenges associated with the recommended alignment:

- Design of the at-grade crossing of Walker Drive.
- Improvement of the Denio's interchange with a south side loop ramp would require either an at-grade crossing of that ramp, or a realignment of the trail and an undercrossing of the proposed ramp. However, the cost of the undercrossing would be minimized by incorporating it into the interchange project.

The alignment (4-1) through the neighborhood open space scored poorly because:

- Cost associated with retaining walls required to maintain the detention basin.
- Close proximity to open back yard fences of homes along Beatty Way.

Area 5 – Atkinson Street/Booth Road to Vernon Street
Recommended Alignment

Alignment:	5-3
Segments:	N8A, C5, N9 (Bridge B9), N10
Alternate Alignments:	5-2
Alternate Segments:	N8A, S6, C6, N10
Spurs:	None

Starting at the southeasterly corner of the Denio's loop ramp and Foothills Boulevard, this alignment would follow the northeast side of the Foothills Boulevard Bridge as a barrier-separated side path across Atkinson Street, the UP Railroad Yard and Dry Creek, loop sharply back to the north after leaving the south end of the Foothills Boulevard Bridge *(Photo 5-7)*, cross Dry Creek again on Bridge B9 *(Photo 5-8 on following page)*, and follow

Photo 5-7: South end of Foothills Boulevard Bridge, looking south. Proposed path would use a widened sidewalk and loop back under the bridge at this location.

the north side of the creek along the southerly edge of the UPRR parking lot to Vernon Street, and then under the north end of the Vernon Street Bridge over Dry Creek.

The major factors leading to selection of Alignment 5-3 are the as follows:

- It was the only one of the three alignments in Area 5 considered feasible that had a positive rating (Rating = 4).
- By widening the existing sidewalk and narrowing existing lanes, shoulders and median, this alignment can be incorporated into the two Foothills Boulevard bridges without widening the bridges or reducing the number of traffic lanes.

Photo 5-8: Proposed location of Bridge B9 near south end of Foothills Boulevard Bridge.

- Of the feasible alignments, it provides the best user experience and greatest safety for users.
- It is mostly within City right-of-way and the portion within UPRR property would be along the former City Subway right-of-way at the edge of a lightly-used UPRR parking lot.

The major challenges associated with the recommended alignment are as follows:

- The horizontal path geometry at the south end of the Foothills Boulevard Bridge and Overhead is severely constrained by right-of-way, which will require designing the trail with a sharp curve on a down grade with a substandard design speed.
- Vertical geometry for Bridge B9 will also be challenging because of a large drop from Foothills Boulevard to the grade of the parking lot and Vernon Street.
- This alignment requires UPRR right-of-way east of the UP Railroad Yard.

Alignment 5-2 is included as an alternate in consideration of the potential challenges associated with Bridge B9, which will be evaluated during preliminary engineering.

Alignments 5-4 through 5-6 are considered infeasible because they would require a narrow widening of both Foothills Boulevard bridges at a cost roughly three times that of any other alignment. This widening would also require substantial construction within and over the UP Railroad Yard, which would dramatically increase the permitting efforts.

Alignments 5-7 through 5-9 are considered infeasible because they would cross the entire width of the UPRR right-of-way, including passing under existing structures carrying all fifteen tracks in the rail yard. The UPRR has indicated that they will not allow a trail across their right-of-way.

Area 6 – Vernon Street to Riverside Avenue
Recommended Alignment

Alignment:	6-2
Segments:	N11B, N12
Alternate Alignment:	6-1
Alternate Segment:	N11A
Spurs:	None

Starting at the northeastern corner of the Vernon Street Bridge over Dry Creek *(Photo 5-9)*, this alignment would follow the north bank of Dry Creek *(Photo 5-10 on following page)* to Riverside Avenue, and then cross under the existing Riverside Avenue Bridge to connect with the proposed Dry Creek Greenway Trail East.

Photo 5-9: Looking east from Vernon Street north of Dry Creek.

The major factors leading to selection of Alignment 6-2 are the as follows:

- It crosses only one private parcel with a potentially cooperative owner.
- The exact alignment can be designed to minimize impacts to the potential development of this property.
- It has high value for users as it closely follows the contours of the creek bank, while staying on relatively high ground.

Photo 5-10: Typical view of north bank of Dry Creek between Vernon Street and Riverside Avenue, looking east.

The major challenges associated with the recommended alignment are as follows:

- The entire alignment is on private property. The owner has expressed a preference for Alignment 6-5, which would reduce the length of trail on his property by about one third.
- There is limited headroom and hydraulic capacity under the existing Riverside Avenue Bridge (this is common to all alignment options in Area 6).

Alignments all or in part on the south side of the creek (Alignments 6-3 through 6-5) all scored poorly due to high cost for one or both of two reasons:

- All would require an additional crossing of Dry Creek, either via new Bridge B10 or by widening the existing Riverside Avenue Bridge.
- Retaining walls would be required for most of the alignment south of the creek. A significant length of Segment S8 (nearest Riverside Avenue) is considered infeasible due to extremely high, steep and badly eroded slopes.

Alignments 6-1 (Segment N11A) is considered a viable alternative to Alignment 6-2, having similar cost and similar impacts on private property. This alignment would follow the existing sewer maintenance road through the center of the property. The choice of alignment would be left to final design in coordination with potential development plans for the parcel.

5.4. Cost Estimate – Recommended Alignment

Table 5C, on the following page, is a summary of planning-level cost estimates based on the recommended alignment described in *Section 5.3*. Estimated costs include preliminary engineering and environmental documentation, right-of-way, construction and construction administration, and include 10 percent for mobilization and a 25 percent contingency. The right-of-way costs are based on acquisition of a 30-foot wide easement along properties not owned by the City or County. The cost estimates do not include any annual maintenance costs, nor can they anticipate many details that might further inform the capital costs, such as the results of drainage and geotechnical investigations, and the need for utility relocations. Trailhead improvements are also not included in the costs. The unit costs for the estimate are based on Caltrans cost data and recent relevant completed projects in the region. An estimate for each alignment alternative was used as a criterion in the evaluation of the recommended alignment. However, the recommended alignments are not necessarily the least cost options for each area, as cost is only one of the criteria considered. For detailed cost estimates for all alignments, see *Appendix F*.

Table 5C – Estimate of Project Costs

	Recommended Alignment			
	Name	**Description**	**Segment Definition**	**Cost**
Area 1	1-2	Cook Riolo Road Path to WWTP	N1 (1)(2)[B1], N2A (3), N3, C1 [B6]	**$5,860,000**
Area 2	2-3	Along WWTP/ Corp Yard ROW	S2 (4)	**$1,420,000**
Area 3	3-5	Corp Yard to Booth Road	S3, C3 [B8], N6	**$2,650,000**
Area 4	4-3	Booth – Atkinson – Denio's Ramp	N7B, N7B2	**$220,000**
Area 5	5-3	Rail Yard – Denio's to Vernon	N8A, C5, N9 [B9], N10	**$5,560,000**
Area 6	6-2	Vernon to Riverside	N11B, N12	**$650,000**
			TOTAL PROJECT COST	**$16,360,000**

5.5. Funding

Funding for trail construction has not been identified at this time. The proposed multi-use trail project anticipates utilizing several different funding sources to construct the project. There are multiple federal, state, regional and local sources of funding that may be available, as well as private and non-traditional funding sources. It should be noted that General Funds are not included in the list of potential funding sources for this facility as they typically are not used by the City or County for trails. Please see *Appendix H* for a comprehensive discussion of potential funding sources.

5.6. Phasing

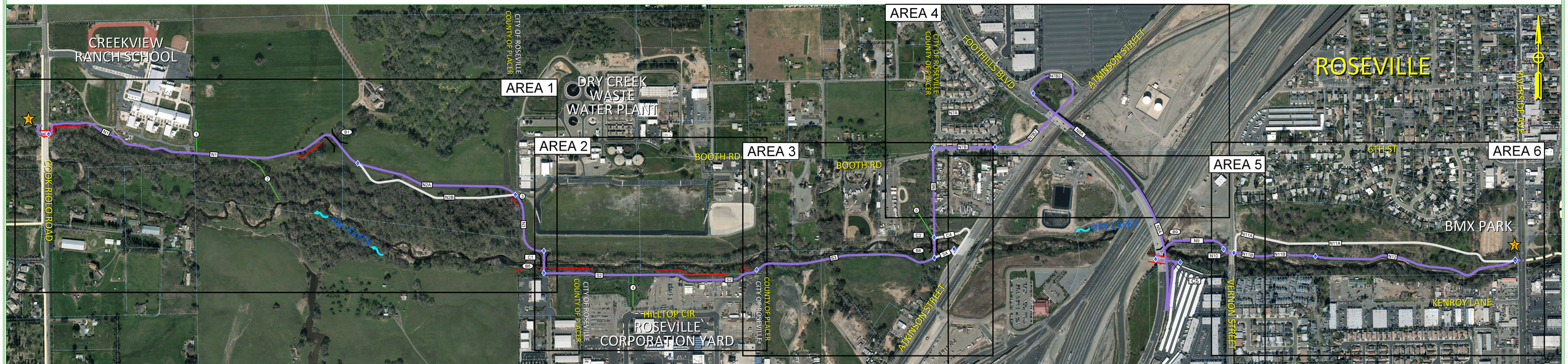
Because of the high cost of the project and the need to obtain grant funding for construction, the Dry Creek Greenway Multi-Use Trail will probably need to be constructed in phases. Construction phases must each have independent utility, so they are valuable for users before and until the other phases are built. For the Dry Creek Greenway West, there are three logical phases for construction as follows:

- Cook Riolo Road Bike Path to Booth Road
- Booth Road to Vernon Street
- Vernon Street to Riverside Avenue (Connection to Dry Creek Greenway East)

Because there are no logical access points within two of the three phases (Cook Riolo to Booth, and Vernon to Riverside), and the second (Booth to Vernon) would result in one very short phase if broken up, there is no logical phasing scheme with more than three phases.

The sequencing of these will be based on availability of funding and right-of-way, as well as timing of potential development projects on adjacent private parcels. The first phase would logically start at one of the two ends, which would connect to existing (Cook Riolo Road Bike Path/Dry Creek Trail) or proposed (Dry Creek Greenway East Multi-Use Trail) trails. Saving the middle phase for last will help to create demand for the final link, while allowing time for reconsideration of the feasibility of alignments through the railroad yard. Both the western and eastern segments would best serve the public as an intermediate phase as these would provide links for residential communities to either local schools or public parks.

TRAIL AREA OVERVIEW - RECOMMENDED ALIGNMENT



DRY CREEK GREENWAY WEST MULTI-USE TRAIL PLANNING & FEASIBILITY STUDY

Exhibit 5-1

[THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK]

6. Design and Implementation

6.1. Next Steps

Once the feasibility study has been approved by the responsible parties, if funding is available, the project will move into the preliminary engineering and environmental documentation phase. During this phase, the engineering will be further refined, and the public will have opportunities to comment on the recommended alternative during public circulation of the draft Environmental Document as well as during approval of the final Environmental Document. Once the final Environmental Document is approved, the project will move into Final Design and Right-of-Way negotiations. *Figure 6-1*, below,

Figure 6-1: Next Steps

shows the steps necessary to advance the proposed multi-use trail through to construction.

6.2. Right-of-Way Strategies

Right-of-way from both public agencies and private property owners will need to be acquired to accommodate the proposed multi-use trail. The City of Roseville and Placer County will work to gain dedicated easements for the multi-use trail along public right-of-way. Right-of-way negotiations would be needed with private property owners. The location of some segments of the trail will be determined during right-of-way negotiations.

6.3. Project Design

The Dry Creek Greenway West Multi-Use Trail will provide Placer County and City of Roseville residents improved active transportation opportunities, additional connectivity between vital local origins and destinations, and regional connectivity to existing and future trails as part of a 70-mile regional loop. While providing these key elements, project design must conform to the surrounding land uses and landscapes, consider local standards, and meet safety needs for all users. Design practices will consider many path improvement features: standard pavement sections, roadway crossings, creek crossings, path access, landscaping, signing, and other aesthetic features. The Dry Creek Greenway West Multi-Use Trail will be designed and constructed to current local, state and federal standards. These will include the following:

- *County of Placer General Specifications* (April 2018) *(County Specifications)*
- *City of Roseville Design Standards* (January 2016) *(City Standards)*
- *Highway Design Manual, Chapter 1000* (Caltrans) *(HDM)*
- *California Manual on Uniform Traffic Control Devices (CA MUTCD)*
- *Design Information Bulletin, DIB 82-06, Pedestrian Accessibility Guidelines for Highway Projects* (Caltrans*) (DIB 82-06)*
- *California Code of Regulations, Title 23. Waters, Division 1., Central Valley Flood Protection Board (CVFPB Regulations)*
- *Guide for the Development of Bicycle Facilities* (American Association of State Highway and Transportation Officials) *(AASHTO Bike Guide)*
- *Load and Resistance Factor Bridge Design Specifications* (AASHTO) *(AASHTO Bridge Specifications)*
- *Load and Resistance Factor Guide Specifications for Design of Pedestrian Bridges* (AASHTO) *(AASHTO Guide for Pedestrian Bridges)*

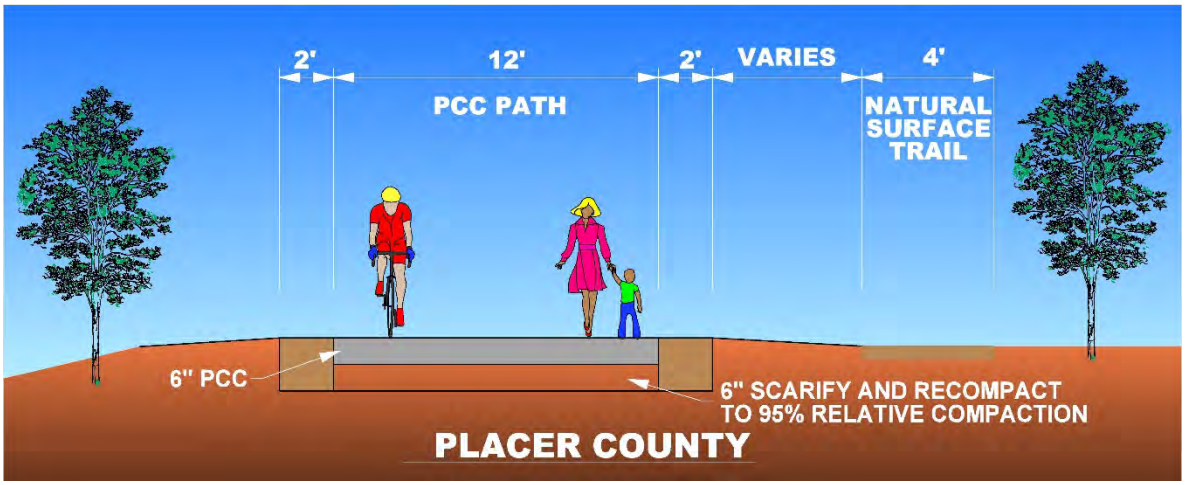
For consistency between the Dry Creek Greenway East and West Trail projects, where applicable, project design features discussed in this section are consistent with those discussed in the *Dry Creek Greenway East Planning and Feasibility Study (DCGE Study)*.

6.3.1. Surface/Typical Sections/Geometrics

The standard path "typical" section for the Dry Creek Greenway West Multi-Use Trail will differ for portions of the trail within the jurisdictions of Placer County and the City of Roseville. In both areas, geotechnical studies during the preliminary design phase of the project will determine if there are soil conditions that require special structural sections.

Within Placer County limits, the trail will conform to the *County of Placer General Specifications, Plate 123, Multi Use Trails,* with the addition of a separated natural surface trail. The proposed typical section consists of a 12-foot wide concrete path with 2-foot aggregate base shoulders and a 4-foot, separated natural surface trail for multi-purpose use, as shown in *Figure 6-2*. The natural surface trail will only be included west of the WWTP. During final design, a logical equestrian turnaround will need to be located and designed.

Figure 6-2: Proposed Typical Trail Section within Placer County

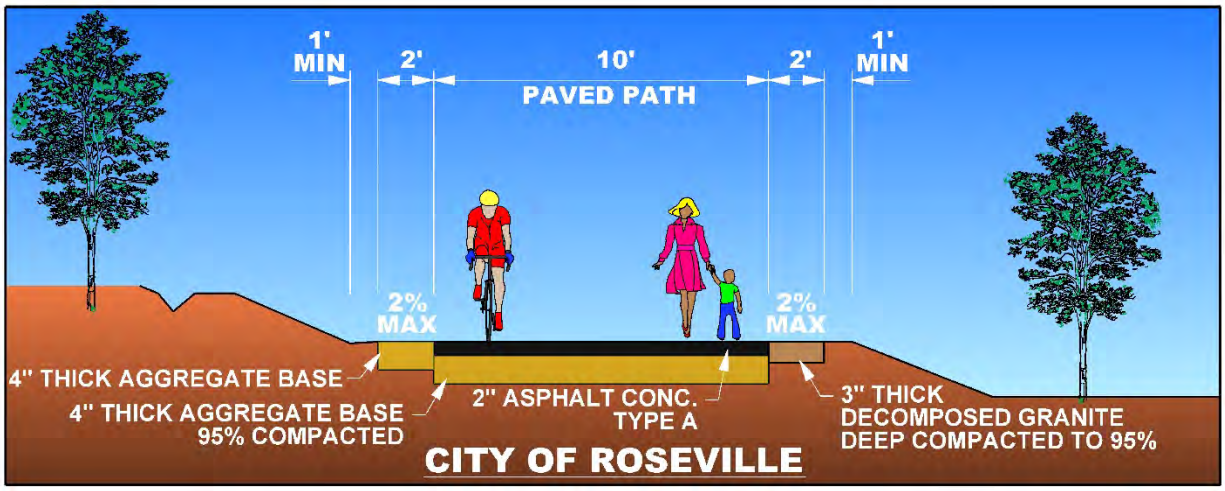


The County standard pavement section consists of a minimum of 6 inches of Portland Cement Concrete over sub-base that is scarified and compacted to a 95% relative compaction.

Within the City limits, the path will conform to *Section 6: Park Standard Details, Detail PK-43, Bike Trail Section* of the *City of Roseville Design Standards*. The proposed typical section, shown in *Figure 6-3***,** on the following page, consists of a 10-foot wide paved path with 2-foot shoulders, the high-side shoulder comprising 4 inches of aggregate base and

the low-side shoulder comprising 3 inches of decomposed granite. The pavement section consists of a minimum of 2 inches of hot mix asphalt, Type A over 4, 6 or 8 inches of Class 2 aggregate base, depending on the R-value of the soil.

Figure 6-3: Proposed Typical Trail Section within the City of Roseville



Within the City of Roseville, where the trail will be constructed more than one foot below the 10-year Water Surface Elevation (WSE), the *City Standards* require a PCC pavement section along with toe-of-slope protection conforming to *Section 13-5, Bike Paths in Floodplains,* to prevent the path from being undermined during flood events.

During final design, logical locations for transition between the City and County typical sections will need to be identified and detailed.

For all trail sections, depending on subsurface soil type and drainage needs, geotextiles may be employed to provide stability and facilitate drainage of subsurface soils. In addition, longitudinal grades determined during final design will need to be reviewed and changes made to the structural section materials if needed to prevent erosion of the shoulder materials.

Where the trail is constructed within cut-slopes, a drainage ditch of suitable dimensions will be required along the uphill side to intercept the hillside drainage. Where the trail is constructed on top of fill slopes, a drainage ditch of suitable dimensions will be required along the downhill side to intercept trail drainage. Cut and fill slopes will be constructed per the recommendations of a licensed Geotechnical Engineer.

Longitudinal grades will follow HDM guidelines and, wherever possible, will be limited to 5% to avoid *Americans with Disabilities Act* (ADA) ramp requirements. Design cross-slopes will be set to 1.5% to ensure ADA compliance when built.

6.3.2. Access Points/Trailheads

Along the Dry Creek Greenway West Multi-Use Trail corridor, there are several potential trail access points. Access points are an oft-overlooked feature that are critical to the success of the trail. Without safe and convenient points of access, trail use will fail to meet expectations. Beyond the obvious functional benefits of access points, they also provide visibility to potential users of the trail who may otherwise not be aware of its existence.

Additionally, there are several opportunities for trailheads along the corridor. These will create formal points of access, typically including parking, trail information, trash receptacles, benches and sometimes additional facilities such as restrooms and water fountains. Further discussions will be required during preliminary design to determine exact trailhead locations.

Potential access points are listed below:

- Cook Riolo Road
- East side of Creekview Ranch School
- Dry Creek Waste Water Plant (Employees Only)
- Roseville Corporation Yard (Employees Only)
- Booth Road
- Beatty Way/Walker Drive (off Booth)
- Atkinson Street (Various Locations)
- Foothills Boulevard at Denio's Ramp
- Foothills Boulevard south of Dry Creek (access to Cirby Way)
- Vernon Street
- Cirby Woods III Neighborhood
- Riverside Avenue

Potential trailhead locations are as follows:

- Cook Riolo Road – west side, south of Dry Creek Trail connection
- City-owned parcel near east end of Booth Road
- Existing UPRR parking lot north of creek on west side of Vernon Street
- North of creek and east of Vernon Street
- City-owned parcel East of Riverside Avenue and north of Dry Creek (Planned with Dry Creek Greenway East project)

6.3.3. Creek Crossings and Access

The recommended alignment for the Dry Creek Greenway West Trail corridor contains six creek crossing, four that cross Dry Creek and two that cross minor drainages feeding Dry Creek. These creek crossings are listed in *Table 6A* below. Please note that Bridges B8 and C4 in *Table 6A* are alternate crossings, one of which will be selected during final design.

Table 6A: Potential Creek Crossing Locations			
Creek Crossing	**Location**	**Feature Crossed**	**Type**
B1	Along N1, east of Creekview Ranch School	Tributary	Bridge
B6 / C1	Between N3 and S2,	Dry Creek	Bridge
B8 / C3	Between S3 and N5,	Dry Creek	Bridge
C4	Atkinson Street	Dry Creek	Existing Bridge
N8A / N8B	Foothills Boulevard	Dry Creek	Existing Bridge
C5	Between S5/N8B & S6, over roadway/bridge drainage	Tributary	Culvert
C6	Vernon Street	Dry Creek	Existing Bridge

Path bridges will conform to the *County Standards* or *City Specifications,* as appropriate, as well as the *HDM*, the *AASHTO Bridge Specifications,* the *AASHTO Guide for Pedestrian Bridges* and *CVFPB Regulations*. The minimum clear width of bridges is 12 feet, with 14 feet preferred. The minimum vertical clearance is 12 feet when Fire Department access is required, otherwise 9 feet. The minimum railing height is 54 inches for the City of Roseville, otherwise 48 inches, and must have a toe board at the base and be designed to resist the 100-year flood event if the bridge is in the flood plain.

Creek crossings using existing bridges would require reconfiguration of the space on the bridges, as described in *Section 4.1, Description of Alignment Options*.

6.3.4. Roadway Intersections/Crossings

Roadway crossings can be a major challenge to continuous path networks. The recommended alignment for the Dry Creek Greenway West Multi-Use Trail has six roadway crossings, ranging from low volume residential streets to six-lane arterials. The proposed path will use several methods to cross these roadways, but the majority would cross under existing bridges to avoid at-grade crossings. The only at-grade crossings would be at Booth Road and Walker Drive. Crossing treatments for both were discussed in *Section 4.1, Description of Alignment Options.*

6.4. Safety and Security

Public safety and security are important concerns when trails are proposed in new areas. The elements of design that help ensure public safety were highlighted and discussed with the public during the community open houses. These elements include emergency access, trail access, trail use, respecting boundaries, maintenance and natural surveillance, as highlighted in *Figure 6-4,* below.

Figure 6-4 – Public Safety and Security

Key elements maximizing public safety include designing the trail to provide vehicular and bike access to the police and fire departments. Although the public will be prohibited from driving on the trail, the pavement will be designed to accommodate emergency and maintenance vehicle access.

Additionally, trail access points will be clearly recognizable through consistent use of design elements such as signage, entrance features and landscaping. Distinct features such as pavement treatment and ornamental planting will help the public identify access points to the multi-use trail. Once users are on the trail, signage and wayfinding systems will help keep users safe by providing essential information about distance, location and

connections to local amenities, transportation routes, and other trails, thus creating clearly-defined navigable routes for the public.

The design of the trail will help reinforce boundaries between public and private property through planting, fencing, signage and other enhancements to help distinguish those areas along the trail corridor specifically intended for public use from adjacent private uses.

To ensure the public feels safe along the multi-use trail, the project will incorporate natural surveillance elements to provide unobstructed lines of visibility into and on the trail corridor. Some elements include pruning and clearing existing vegetation and trees to maintain views along the trail, providing long sightlines at where the trail crosses under bridges, minimizing obstructions and providing lighting at key locations along the trail.