City of Louisville
COLORADO • SINCE 1878

Planning Commission

Agenda

December 11, 2025
City Hall, Council Chambers
749 Main Street
6:30 PM for Regular Meeting

Members of the public are welcome to attend and give comments remotely.

1) ***You can call in to + +1 719-359-4580 or 833-928-4610 Webinar ID # 899 0108 8931 Passcode 650368***
2) ***You can log in via your computer. Please visit the City's website here to link to the meeting:*** www.louisvilleco.gov/planningcommission

The Commission will accommodate public comments during the regular meeting. Anyone may also email comments to the Commission prior to the meeting at: planning@louisvilleco.gov

1. Call to Order
2. Roll Call
3. Approval of Agenda
4. Approval of Minutes (November 13)
5. Public Comment on Items Not on the Agenda
6. New Business
    a. **Louisville Center for the Arts Sign** (APPLICATION WITHDRAWN) Continued from 11/13/25 – Resolution 16, Series 2025 with a recommendation to City Council for a PUD amendment to allow a new sign for the Louisville Center for the Arts located at 801 Grant Ave. The applicant has decided to withdraw the request for the PUD amendment.

Persons planning to attend the meeting who need sign language interpretation, translation services, assisted listening systems, Braille, taped material, or special transportation, should contact the City Clerk's Office at 303 335-4536 or MeredythM@LouisvilleCO.gov. A forty-eight-hour notice is requested.

Si requiere una copia en español de esta publicación o necesita un intérprete durante la reunión, por favor llame a la Ciudad al 303.335.4536 o 303.335.4574.

City of Louisville
Community Development
749 Main Street Louisville CO 80027
303.335.4592 (phone) www.louisvilleco.gov

b. **Nonfunctional Turf Zoning Code Amendment -** Resolution 19, Series 2025, with a recommendation to City Council for an amendment to Louisville Municipal Code Title 17 and supplemental Commercial, Industrial, and Mixed Use Design Standards and Guidelines to address Colorado SB 24-005 and HB 25-1113 that prohibits certain types of landscaping to address water conservation goals.

c. **Redtail Ridge/ConocoPhillips General Development Plan (GDP) Amendment** – Resolution 20, Series 2025, with a recommendation to City Council for a GDP amendment to change which design standards apply to certain areas of Redtail Ridge to address future proposed light industrial uses.

d. **Redtail Ridge Planned Unit Development (PUD) No. 1 for Light Industrial Buildings** – Resolution 21, Series 2025, with a recommendation to City Council for a PUD for new light industrial buildings in the central area of Redtail Ridge (Lot 1, Block 1 of Redtail Ridge Filing No. 1).

7. Planning Commission Comments
8. Staff Comments
9. Select Items Tentatively Scheduled for Future Meetings
    a. January 8
        i. Comprehensive Plan public draft review
        ii. EV charging zoning code amendment to address HB 24-1173
10. Adjourn

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Planning Commission
Meeting Minutes
November 13, 2025
City Hall, Council Chambers
749 Main Street
6:30 PM

Call to Order – Chair **Brauneis** called the meeting to order at 6:30 PM.

Roll Call was taken, and the following members were present:

Commission Members Present:	Steve Brauneis, Chair Debra Baskett, Vice Chair Cullen Choi, Secretary Jennifer Hunt Jonathan Mihaly Jeff Moline
Commission Members Absent:	David Bangs
Staff Members Present:	Rob Zuccaro, Director of Community Development Emily Cline-Gibson, Planner II Iris Belensky, Arts & Special Events Program Manager

APPROVAL OF AGENDA
Motion to approve the agenda was moved by **Moline**, seconded by **Baskett**, and adopted by voice vote.

APPROVAL OF MEETING MINUTES
Meeting minutes for September 25, 2025 and October 9, 2025 were approved unanimously.

PUBLIC COMMENTS ON ITEMS NOT ON THE AGENDA
None were heard.

PUBLIC HEARING ITEMS – NEW BUSINESS

a. Louisville Center for the Arts Sign (CONTINUED FROM 10/9/25)– Resolution 16, Series 2025 with a recommendation to City Council for a PUD amendment to allow a new sign for the Louisville Center for the Arts located at 801 Grant Ave.

Staff Presentation:
Planner Emily Cline-Gibson presented a request for Resolution 16, Series 2025, seeking approval of the first amendment to the Memory Square PUD to allow a new freestanding sign with an electronic message panel at the Louisville Center for the Arts at 801 Grant Avenue. The previous sign was destroyed in a 2024 storm, and the proposed replacement—approximately 5 feet tall and 7.7 feet wide with a 1.3-by-6-foot electronic panel—would display City-managed programming, hours, and emergency information. The sign would be installed near the prior location but moved back to meet the current 8-foot setback requirement, and it complies with all applicable sign code and PUD standards, including limits on illumination, transition types, dimming, malfunction controls, and residential lighting restrictions. Staff found the electronic panel well-integrated into the sign design, consistent with city signage, and capable of meeting all technical criteria through its software controls, and therefore recommended approval of the resolution with no conditions.

Staff Recommendation:
Staff recommended approval of Resolution 16, Series 2025 with a recommendation to City Council for a PUD amendment to allow a new sign for the Louisville Center for the Arts located at 801 Grant Ave.

Commissioner Questions of Staff:
Mihaly asked whether the proposed 0.3-foot-candle illumination level matches what is used on similar digital signs in town, especially those at schools, and whether the white text shown in the example could be changed to a less intense color such as red.
Cline-Gibson explained that they do not know the illumination levels of school digital signs because schools are exempt from city zoning and their signs were installed without city oversight.

Hunt sought confirmation that the sign would comply with the requirement to turn off illumination after 11 p.m. or 30 minutes after building closure.
Cline-Gibson confirmed that the sign would have to comply with those requirements.

Belensky added that the text color on the electronic panel can be changed to

whatever Planning Commission or City Council recommends and noted that they would address operating hours further in their presentation.

Applicant Presentation:
Belensky explained that the Louisville Center for the Arts is a heavily used and culturally significant facility—booked for over 330 days this year and similarly busy next year—yet most of the diverse programming hosted by small local organizations is not visible to the public because those groups lack access to city communication channels. She described the proposed electronic sign as the most accessible, sustainable, and economical way to inform residents about daily activities, rental opportunities, and the breadth of cultural events occurring at the Art Center. Belensky emphasized that the sign's design is sensitive to the historic building and the calm nature of Memory Square Park, and she assured commissioners that it would operate conservatively: displaying only static text, using dimming controls, avoiding bright or abrasive colors, remaining off between roughly 8 p.m. and 8 a.m., and adhering to all sign code limits. She concluded that the sign would enhance public awareness without adding light pollution or disrupting the park's character.

Commissioner Questions of Applicant:
Baskett asked whether traffic or passerby counts exist for the area.
Belensky responded that no specific numbers are available but noted it is one of the most heavily used pedestrian areas downtown.

Mihaly asked if the dimming function is fully automated with no human control needed.
Belensky confirmed that the dimming is entirely automatic and responds to environmental conditions.

Choi asked about the display technology used for the sign.
Cline-Gibson said the software is Ignite OPX but did not have hardware details.
Belensky added that Artcraft Sign Company manufactures the city's signs.

Brauneis asked how many households or passersby might see the sign.
Belensky replied that only homes on the immediate block would have direct visibility and that no pedestrian or vehicle count data exists.

Hunt asked whether the sign is one-sided with an open back.
Belensky confirmed that it is one-sided.

Choi asked for more detailed hardware specifications.
Belensky said they can obtain those details from the sign company.

Choi asked about the visibility range and viewing angle of the display.
Belensky said visibility would be similar to BVSD school signs and that the color and temperature are fully tunable.
Moline asked about historic preservation review of the sign.
Cline-Gibson explained that the building is landmarked, but the site is not, so no HPC review was required.
Belensky added that HPC did approve the electrical connection needed for the sign.

Brauneis asked about annual electricity costs or carbon impact.
Belensky said they did not have numbers but noted the sign is considered energy-efficient by the manufacturer.

Mihaly asked how much time the digital sign saves compared to changing manual letterboard signs.
Belensky said the time savings would be significant because schedules can be pre-programmed and updates follow event schedules.

Choi asked whether the purpose of the digital sign is day-to-day adaptability rather than visual brightness.
Belensky confirmed this and said the intent is non-abrasive messaging that avoids conflicts with temporary signs.

Brauneis asked whether a designated bulletin board for organizations was considered.
Belensky said printing costs make that option less practical than a digital sign.
Zuccaro added that private organizations cannot legally post their own yard signs and that without a digital sign the city would not have capacity to display all daily programming.

Choi asked how emergency messages would be integrated.
Belensky explained that the sign is updated through an app and that staff would manually add any emergency messages .

Public Comment:
JR Ketlesen expressed support for the proposed electronic sign at the Center for the Arts, noting that although he was initially skeptical, he finds the design tasteful and effective for promoting events. He emphasized that many cultural programs at the Art Center lack visible signage today, leaving residents unaware of what is

happening, and said the new sign would help highlight ongoing performances, city events, and potentially even rental availability, which could boost revenue. Ketlesen added that the area receives significant foot traffic during summer programming and pool use, making the sign especially valuable, and concluded that the sign would be a positive addition for both the Art Center and the community.

Jim Hollestelle who has lived across from Memory Square Park for 23 years spoke in opposition to the proposed electronic sign, arguing that very few people would naturally see it because the surrounding streets carry limited traffic and the location sits on a small, lightly traveled intersection. He expressed concern that the city has not replaced the previous damaged sign for nearly a year, questioning the practicality of investing in a more complex sign that will require ongoing maintenance, power, and operational effort. He also felt the electronic sign would be aesthetically incompatible with the historic 19th-century Art Center and the character of the park, comparing its appearance to commercial signage and calling the proposal unnecessary, wasteful, and visually intrusive.

Conny Pontasch spoke strongly against the proposed electronic sign, arguing that it would detract from the historic 1894 schoolhouse building and clash with the residential character of the neighborhood. She described the sign as unattractive, non–era-appropriate, and unnecessary given that theater and arts organizations already maintain online information, and she praised the existing handmade placards on the rose trellises as more fitting, artistic, and minimally light-polluting. She questioned why an electronic sign should be placed in this location when similar signs are not used at other cultural facilities in town and emphasized that Grant and Spruce are not major thoroughfares, making the sign's impact minimal. She also expressed concern that the sign would be illuminated year-round and visible from many windows of her home and others nearby, concluding with clear opposition to its approval.

Keith Keller spoke in opposition to the electronic sign, stating that it would not be compatible with the historic character of the surrounding structures. He described the Arts Center as a prominent historic building and expressed a desire to preserve its existing appearance. While acknowledging the applicant's need to advertise events, he urged that it be done in a way that does not detract from the historic nature of the building or the neighborhood.

Applicant Response:
Belensky clarified that the previous sign had not been replaced for nearly a year because staff had been working through the design process, gathering quotes, and navigating scheduling delays—including a postponed Planning Commission

hearing—rather than intentionally leaving the sign unrepaired.

Staff Response:
Cline-Gibson clarified that the sign would not be illuminated 24 hours a day, noting that the city's sign code requires it to be turned off at minimum between 11 p.m. and 7 a.m.

Choi asked whether "illumination" referred to external lighting versus the sign emitting its own light.
Cline-Gibson confirmed that the electronic display itself would be shut off during required hours.
Zuccaro also added that while the sign code sets minimum illumination limits, the PUD could include additional restrictions to formally require the operating practices the applicant described, rather than relying solely on staff discretion.

Commissioner Discussion:
Hunt expressed appreciation for the presentations and said the sign's low light levels, automatic dimming, and similarity to school signs eased concerns. Supported adding PUD conditions such as an 8 p.m. shutoff or alternative text colors to minimize nighttime impact. Acknowledged historic sensitivity but noted the area already includes modern elements like the pool. Felt the sign would help inform the public about programming and stated they would vote yes with limitations.

Choi that the electronic panel would dynamically adjust brightness via photo cells to stay at or below 0.3 foot-candles above ambient, and shared context that exit signs are around 5 foot-candles and confirmed the PUD can include additional restrictions consistent with the applicant's stated operating intentions.

Brauneis questioned whether enough people would see the sign to make it effective and suggested such signage might make more sense at the rec center. Felt the neighborhood's residential character made this location less suitable.

Moline questioned whether effectiveness is within the commission's purview and said historic preservation hinges on successful reuse, and a sign might support that goal. They felt the design is consistent with other city signage and stated they were leaning toward support.

Hunt agreed with concerns about applying standards consistently and noted that for-profit applicants adjacent to neighborhoods would be treated differently, but that the Art Center is a public facility, which changes the context.

Mihaly said the Art Center is already a strong example of successful historic reuse. They personally opposed the sign but acknowledged it meets the technical criteria; argued there is a significant void in the code regarding electronic signs near historic buildings. Stated they would vote no for that reason.

Baskett said they would also vote no.

Brauneis also opposed the sign, feeling it does not enhance the city or neighborhood and that organizations have managed without it. Questioned whether it would achieve its intended goals.

Mihaly felt increased community awareness could be pursued through other, more effective venues. Emphasized concerns about placing a digital sign directly in a residential neighborhood.

Choi discussed the difference between personal dislike of the sign and the commission's responsibility to evaluate based on criteria rather than personal preference. Noted that even traditional lit signs could be more visually intrusive than the proposed 0.3-foot-candle electronic panel. Supported the value of emergency communications and leaned toward support but acknowledged difficulty.

Brauneis said that this application is different because the city—not a private business—is the applicant. Felt that distinction affects how to weigh the public benefit.

Hunt compared the proposal to school electronic signs, which exist in residential neighborhoods and are not perceived as intrusive. Questioned how this sign is substantively different.

Mihaly said they would vote no, stating that despite technical compliance, the code is inadequate for this situation and needs revision before such signs are approved.

Brauneis said they would vote no due to location, energy use concerns, and the broad availability of digital communication alternatives. Felt the downsides outweighed the benefits.

Choi said they would vote yes, viewing the sign as consistent with other modern updates to the park and emphasizing its potential value for emergency messaging and public safety.

Motion to approve Resolution 16, Series 2025 with a condition that the text color be

matched to the most prevalent color temperature and formally restricted operating hours was moved by **Moline** and seconded by **Choi**. There was a 3 to 3 vote. Commissioner Bangs' vote will be required as the tie breaker. **Moline** moved to continue the issue to the next meeting, December 11, 2025, seconded by **Choi** and adopted by a voice vote.

b. Redtail Ridge Wastewater Lift Station – Resolution 17, Series 2025 with a recommendation to City Council for a Planned Unit Development (PUD) request to allow construction of a 1,031 square foot lift station to address wastewater for the future Redtail Ridge development.

Staff Presentation:
Cline-Gibson presented a proposal for a wastewater lift station at 1020 Rock Crest Drive, serving the entire Redtail Ridge development. The project includes a 1,031-square-foot equipment building, screened mechanical equipment, maintenance access, and adjacent trail connections. Two waivers are requested: allowing metal siding as a primary exterior material and permitting minor light spill (0.1–0.5 foot-candles) into the adjacent lot. Staff finds both waivers reasonable, notes the project meets all other commercial design and PUD standards.

Staff Recommendation:
Staff recommended approval of Resolution 17, Series 2025 with no conditions.

Commissioner Questions of Staff:
Moline asked the applicant to review landscaping and drainage to prevent stormwater runoff from creating maintenance issues or hazards on the trail.
Cline-Gibson said Public Works had approved the drainage plan but she would bring the concern back to them.

Choi asked about the generator's fuel tank type and whether it could be permitted in a severe non-attainment air quality zone.
Cline-Gibson said she did not have that information and would follow up but noted that the applicant would be able to address the generator question shortly.

Brauneis urged minimizing light spill and asked whether dark-sky-friendly lighting strategies—such as lighting from the outside inward—had been discussed.
Cline-Gibson said those strategies had not been discussed but she could ask the applicant about them.

Commissioner Questions of Applicant:
Franzen explained that the generator used a diesel belly tank sized for 24 hours of

operation and said he could provide the exact generator size later.

Choi asked for the generator's size, which the applicant did not know immediately.

Brauneis asked about options to reduce light spill, and the applicant said they could explore full cut-off fixtures aimed back toward the building and possibly mounting west-side lights on the screen wall. **Brauneis** further noted that minimizing spill would be best practice given the 12-foot encroachment and encouraged those adjustments.

Choi confirmed that the lift station and generator would be transferred to the City and that the generator would fall under the City's air emissions permit, which the applicant affirmed.

Public Comment:
None were heard.

Staff Response:
Staff had no additional response.

Applicant Response:
The applicant had no additional response.

Commissioner Discussion:
Moline said they supported the application and were nearly ready to make a motion.

Choi expressed strong support as well.

Brauneis supported the project but suggested adding a condition requiring Public Works to evaluate lighting with the goal of achieving zero light trespass.

Baskett voiced support and agreed with adding the light-spill condition.

Mihaly also supported the application and endorsed the lighting condition.

Hunt echoed the support, noted agreement with the condition, and remarked that the lift station design was impressively attractive given its visibility.

Motion to approve Resolution 17, Series 2025 with a condition that the lighting plan will be amended to remove light spill was made by **Moline** and seconded by

Baskett. The motion was adopted by a vote of 6 to 0.

c. Louisville Mill Site Redevelopment – Resolution 18, Series 2025 with a recommendation to City Council for a Planned Unit Development (PUD) Amendment request for an Outdoor Eating and Drinking Establishment and Mobile Food Court at 500-544 Front Street.

Choi recused himself from this resolution due to a conflict of interest.

Staff Presentation:
Zuccaro explained that the request is for a PUD amendment and special review use at the historic Louisville Mills grain elevator site to enable a first-phase activation focused on the elevator lot and front lot, including restoration of the grain elevator (with a small rear "boxcar" addition, reconstructed boardwalk and porte cochère), creation of an outdoor bar and mobile food court with three food truck pads, a stage, and associated outdoor seating and lighting, plus 24 on-site parking spaces and shared parking arrangements. He reviewed the long public-investment history in the property, prior but now-expired PUD approvals, and the existing conservation "no-build" easement intended to preserve public view corridors, noting staff's conclusion that the low, transparent food court improvements can fit within that easement while materially maintaining those views and helping make the challenging site viable. He stated the proposal complies with the Downtown Design Handbook (general, transition-area, and historic-building standards), downtown's reduced and flexible parking rules, and the criteria for both PUDs and special review uses, with hours, amplified-music cutoffs, and decorative-light shutoff times tailored to the surrounding neighborhoods. He summarized requested waivers from CB zoning standards (setbacks and lot coverage) as modest and supportable in context and recommended approval with two conditions: obtaining a Historic Preservation Commission alteration certificate and resolving remaining drainage comments before City Council, while dropping an earlier condition that would have required full civil construction plans prior to Council since those will instead be handled at building permit.

Staff Recommendation:
Staff recommended approval of Resolution 18, Series 2025 with two conditions. One condition being applicant obtainment of an Alteration Certificate from the Historic Preservation Commission and the other being applicant revision of PUD plans and Drainage Report to address outstanding Public Works comments related to drainage infrastructure.

Commissioner Questions of Staff:

Baskett asked whether the interior of the grain elevator would be used and what it would contain.
Zuccaro confirmed it would be used as a bar and noted that interior floor plans are included in the packet, with more detail to come from the applicant.

Mihaly asked where the historic accessory building being relocated to the northwest corner was coming from.
Zuccaro said it would be moved from the Warnberg Farm and that the applicant could provide additional details.

Mihaly also asked for clarification on how many food-truck pads were included, noting only two were clearly visible in one image
Zuccaro confirmed there are three pads and pointed out their locations on the SRU plan.

Applicant Presentation:
The applicant team—longtime Louisville and Boulder County residents and business owners—described their plan to “reactivate” the historic grain elevator site as the Grainyard, a locally run bar and outdoor gathering space anchored by the restored elevator. They explained that the interior of the elevator would house a bar while preserving and showcasing historic wood structure and equipment, with a small “boxcar” rear addition for restrooms and back-of-house functions, and a seasonal tap house created by relocating and restoring the historic Warberg granary. Outside, they proposed a landscaped courtyard with three electrically powered food-truck pads (no generators), a small low platform for ambient music rather than concert-level events, fire pits, and play space, emphasizing sensitivity to nearby homes, adherence to sound and lighting limits, and efforts to create a welcoming neighborhood hangout. They outlined a parking strategy that includes 24 new spaces on-site, shared parking with neighboring properties, existing nearby public and on-street parking, and hoped for collaboration with the city to add more spaces along the rail line, plus incentives for patrons who walk or bike. The original grain-elevator developer and a neighboring property owner recounted the long, costly history of stabilizing and preserving the building and expressed strong support for finally activating the site, while also raising concern about how required electrical upgrades and transformer requirements might affect costs and access for adjacent properties, asking the city and Xcel to work toward a fair solution.

Commissioner Questions of Applicant:
Mihaly asked whether the mobile food-truck pads required water, drainage, or gray-water connections in addition to electrical power.

Zuccaro responded that the pads require only electrical hookups and that food trucks are not required to be hard-plumbed.

Brauneis asked the applicant how the food trucks would operate, whether they would rotate and what the envisioned model was.
The **applicant** explained that the intention is to rotate trucks to provide ongoing variety and that operational ideas such as coordinating local delivery from nearby restaurants are also being explored.

Mihaly sought confirmation that the pads are strictly electric from an infrastructure standpoint.
The applicant confirmed this, adding that the seasonal tap house will have plumbing available for limited needs like filling water buckets, but the pads themselves will not have permanent plumbing.

Public Comment:
Caranci said he strongly supported activating the grain elevator and small business generally but was very concerned about unknown costs from Xcel's required electrical and transformer upgrades that could heavily impact his adjacent properties. He stated he was rescinding his previously signed support letters and asked that the project be put on hold until those costs were clarified, but after staff explained that nothing could advance without his future authorization, he agreed to let the hearing proceed while keeping his concerns on the record.

Horst said he was very excited about the proposal, noting that grain elevators are difficult to repurpose and this building has been unused for too long. He believed the project would boost all downtown businesses, help fill empty spaces, attract families, and urged the commission to approve it.

Baker explained that she lives directly across from the site and moved there for Louisville's downtown vibrancy, coming to the meeting mainly worried about lighting, noise, and hours. After hearing the proposal and comparing it to the considerate operations of nearby Crystal Springs, she said she supported the project despite some skepticism about food trucks and urged approval, saying downtown is struggling and needs this activation.

Muckle said he had been deeply involved in the original purchase and preservation of the grain elevator and considers it one of the most historic buildings in town. He argued that the best way to preserve historic structures is to give them an active, vibrant use, praised the project for doing exactly that, and encouraged approval.

Reed spoke as a business owner, Chamber of Commerce leader, and nearby resident, emphasizing that the commission's role is to apply the rules and that staff has recommended approval. He highlighted the addition of 24 on-site parking

spaces, the benefit of activating a long-empty historic building, the value of outdoor "third spaces" for families, and the importance of supporting local investors who bring vibrancy to downtown, urging the commission not to miss this opportunity.

Ramos described his own recent, ultimately unsuccessful effort to create a historic rail-themed project nearby and said ventures like this grain elevator proposal, backed by local owners willing to take major risks, are rare and hard-fought. He argued that if the community doesn't rally behind such locally driven projects, only large outside developers will shape Louisville's future, and he strongly urged support for this project as a huge win for downtown and for preserving the city's character and history.

Applicant Response:
The applicant expressed relief and gratitude that the project had finally reached this stage, saying it had been a long time coming. He stated confidence that the team could resolve the outstanding electrical and transformer issues with Randy and Xcel, and that they would be able to move the project forward to City Council as planned. He thanked the commission for hearing the proposal and said he looked forward to their deliberation.

Staff Response:
Staff had no additional response.

Commissioner Discussion:
Mihaly said he strongly supported the project, found the setbacks and lot-coverage waivers reasonable, and especially appreciated the addition of 24 parking spaces that were not required but significantly strengthened the proposal.

Hunt thanked staff and the applicants for their thorough work, praised the historical context and local involvement, and said the proposal felt like an authentic, community-driven project that she was excited to support.

Baskett called it a great project, emphasizing that local ownership and investment would ensure it is carried through successfully, and stated she would vote in favor.

Moline praised the collaborative effort among applicants, neighbors, and the city, reflected on having seen the site come before the commission in the past, and said community testimony demonstrated how important the grain elevator is. He expressed strong enthusiasm for moving the project forward.

Brauneis also voiced full support, noting the site has awaited activation for decades and commending past city leaders for preserving the structure rather than

demolishing it, saying the community is fortunate to still have it and to now see a viable plan for its reuse.

Motion to approve Resolution 18, Series 2025 with the two conditions as amended made by **Baskett** and seconded by **Mihaly**. The motion was adopted by a vote of 6 to 0.

PLANNING COMMISSION COMMENTS

None were heard.

STAFF COMMENTS

Zuccaro mentioned that there may need to be an overflow meeting in December and dates will be polled around that.

Zuccaro additionally reminded commissioners that the comprehensive plan discussion is planned for December.

ADJOURNMENT

Motion to adjourn was moved by **Moline**, seconded by **Brauneis**, and adopted by voice vote.
The Commission adjourned at 9:42PM.

ITEM:	LMCA-000576-2025
PLANNER:	Emily Cline-Gibson, Planner II
REQUEST:	Approval of Resolution 19, Series 2025 recommending to the City Council approval of an ordinance amending the City's Development Design Standards and Title 17 of the Louisville Municipal Code to prohibit nonfunctional turf, artificial turf, and invasive plant species for certain developments to address new state laws.

SUMMARY:
The Colorado General Assembly recently adopted Senate Bill (SB) 24-005 and House Bill (HB) 25-1113, which prohibit nonfunctional turf, nonfunctional artificial turf, and invasive plant species in new non-residential development, certain redevelopment projects, and multifamily residential projects with twelve or more units, while allowing functional turf only in designated recreational areas by January 1, 2026.The legislation also requires local governments to regulate turf installation for all new residential properties by January 1, 2028. To comply with these requirements and ensure consistency across City regulations, staff propose adding a new section to Louisville Municipal Code (LMC) Chapter 17.16 and making related terminology updates to Chapters 17.16, 17.28, and the Sign Code.

BACKGROUND:
Senate Bill (SB) 24-005
The purpose of SB 24-005 is to conserve Colorado's water resources by prohibiting the installation of nonfunctional turf, artificial turf, and invasive plant species for landscaping purposes. Under the bill, *turf* is defined as continuous plant coverage consisting of nonnative grasses or grasses not hybridized for arid conditions. *Nonfunctional turf* is turf that is installed for ornamental purposes instead of for designated recreational use.

The prohibition on nonfunctional turf applies to commercial, institutional, and industrial properties, community properties, street rights-of way, medians, and transportation corridors. This requirement also applies to redevelopment projects where more than 50% of the existing landscape area will be removed or disturbed.

Recreational use areas, such as athletic fields, playgrounds, picnic areas, parks, and other spaces that are regularly used for civic, community, or recreational purposes may allow turf as an acceptable material, as this is considered *functional turf*. Turf used as part of an approved water-quality treatment solution with no irrigation and no pesticide application is also considered functional turf. The bill does not prohibit the continued maintenance of nonfunctional turf, artificial turf, or invasive species that were planted prior to January 1, 2026.

The City's Parks, Recreation, and Open Space (PROS) Department manages landscaping at City facilities, within rights-of-way, and along medians. PROS is actively implementing a median conversion program to replace bluegrass turf with water-wise plantings, which aligns with the requirements of SB 24-005. The amendments proposed in this ordinance apply specifically to LMC Title 17 and the adopted development design standards.

House Bill (HB) 25-1113

HB 25-1113 expands the implementation of SB 24-005 by extending the same turf limitations outlined in SB 24-005 to multifamily residential developments of 12 or more dwelling units. The House Bill also clarifies that artificial turf may be used as a permitted material in functional recreation use areas. Both of these measures from HB 25-1113 are included with the proposed ordinance.

The House Bill also requires local governments to adopt regulations that address the installation of turf in all new residential developments, including single-family properties, by January 1, 2028. This section of the bill is not part of this proposal and is anticipated to be addressed in the municipal code re-write, which is scheduled to begin in 2026.

Currently, the proposed ordinance applies only to new non-residential developments, certain redevelopments if over 50% of the total landscaped area is disturbed, and new multi-family and mixed-use developments with 12 or more dwelling units.

Title 17 and Adopted Design Standards

Title 17 of the LMC establishes zoning and development requirements, including yard and bulk standards, allowable uses, and criteria for Planned Unit Development review. Landscaping standards are not located within Title 17 and are instead contained in the City's adopted development design standards and guidelines.

The Commercial Development Design Standards and Guidelines (CDDSG), Industrial Development Design Standards and Guidelines (IDDSG), and the Mixed-Use Design Standards and Guidelines (MUDDSG) were adopted by City Council between 1997-2007. Each design standard includes a landscaping chapter which references turf, sod, lawn, and grass as acceptable plant materials, without distinguishing between native and non-native species. To comply with SB 24-005 and HB 25-1113, staff proposes to amend these documents only to remove references to plant materials that constitute nonfunctional turf and to replace them with allowable grass species that are native to Colorado or hybridized for arid conditions. The Design Standards for Downtown Louisville do not address landscaping. The Development Code update planned to begin in early 2026 will also more comprehensively address each of these design standards and guidelines.

The City of Louisville Sign Code, adopted in 2019, regulates all signage within the city. The section pertaining to freestanding signs includes landscaping requirements that reference turf as an acceptable material (Sign Code p. 33). Only this section of the Sign Code is affected by the State bills.

PROPOSAL:

Proposed Addition to Title 17

A new section is proposed for Chapter 17.16 – General Regulations to implement the requirements of SB 24-005 and HB 25-1113. This section establishes clear prohibitions on nonfunctional turf and nonfunctional artificial turf for all new commercial, industrial, mixed-use, and institutional development, new multifamily residential developments of 12 or more dwelling units, and development on common property, like areas maintained by homeowners' associations. The new section also prohibits the planting of invasive species, as defined by state law, on any property.

Summary of Changes to Design Standards

The CDDSG, MUDDSG, and IDDSG are amended through the attached draft ordinance to comply with state law. The revisions remove outdated references to sod, grass, turf, and lawn where these terms previously referred to nonfunctional turf and replace them with terms that clarify that the grass must be native to Colorado or hybridized for arid conditions. These amendments are limited to the landscaping chapters of each document, which are Chapter 5 of the CDDSG and IDDSG and Chapter 7 of the MUDDSG. No other chapters of the design standards are affected. These amendments do not modify the amount of landscaping required, the landscape buffer widths, or any other design or landscaping standards.

Below is a summary of all locations in each design standard that include proposed amended language. The proposed language to be added is underlined, and language to be removed is ~~stricken~~.

Table 1. Design Standards Guide for Page / Section Amendments	
Design Standard	Page(s) / Section(s) Containing Amendments
MUDDSG	P. 20
CDDSG	Landscape Design 5-2, 5-3, 5-4, 5-8, 5-9
IDDSG	P. 36, 38, 42, 43, 44

Proposed Amendment to Sign Code

Section 4.10.5 of the sign code is proposed to be amended as follows:

> *When required, landscaping shall include shrubs, ornamental grasses, perennials, ground covers and other enhancements. Landscaping areas shall not consist of more than twenty-five (25) percent ~~turf or~~ native grasses.*

ANALYSIS:

The proposed addition to Chapter 17.16 places the new turf and invasive plant species restrictions in a central section of the Louisville Municipal Code, rather than within the development design standards. This ensures that the requirements of SB 24-005 and HB 25-1113 are applied consistently to all qualifying development types, including multifamily residential developments containing 12 or more dwelling units, since there are no adopted comprehensive design standards for residential developments.

Providing these regulations in Title 17 allows for a clear framework that can be applied uniformly for all new qualifying development and redevelopment.

The amendments to the CDDSG, IDDSG, and MUDDSG are complementary updates to the new Title 17 section. These changes remove outdated references to turf, sod, lawn, and grass where those terms previously implied the use of plant materials that are now prohibited under state law. Replacing these terms with references to grass species native to Colorado or hybridized for arid conditions aligns the City's design standards with the State's definition of turf, which is defined only as nonnative grasses or grasses not hybridized for arid conditions. The revisions are limited in scope and do not alter landscape quantities, buffer requirements, screening standards, or other elements of the design standards. These terminology updates provide clarity for applicants and staff while preserving flexibility for compliance with the adopted landscape design standards.

The proposal is also supported by the City of Louisville's Sustainability Action Plan, which includes strategies to expand water-conservation education for residents and businesses (Action Plan p. 37). The City's Drought Management Plan further outlines the need for water-efficient landscaping by establishing drought response strategies and conservation goals that include reducing unnecessary outdoor water use and discouraging the installation of landscapes with higher water use (Drought Plan p. 6).

Under SB 24-005, redevelopment is defined as a project requiring a building permit or design review in which more than 50% of the existing landscaped area is disturbed. Staff anticipate that most commercial and industrial redevelopment projects in Louisville will not trigger this threshold. Projects that do meet the threshold typically involve full-site redevelopment where existing landscaping would be replaced regardless of the state requirement.

Landscape compliance for commercial and industrial projects will continue to be evaluated during staff review of Planned Unit Development applications, which require detailed landscape plans and full plant material lists. New freestanding signs requiring sign permits will also be reviewed for compliance with the amended landscaping provisions. Staff will apply the updated regulations and design standard terminology to ensure all new development and redevelopment proposals are consistent with the requirements of SB 24-005 and HB 25-1113.

PUBLIC COMMENTS:
Public comments can be found in Attachment 5.

STAFF RECOMMENDATION:
Staff recommend approval of Resolution 19, Series 2025 recommending to the City Council approval of an ordinance amending the City's Development Design Standards and Title 17 of the Louisville Municipal Code to prohibit nonfunctional turf, artificial turf, and invasive plant species for certain new development and redevelopment.

ATTACHMENTS:

1. Resolution 19, Series 2025
2. Draft Ordinance
3. Senate Bill 24-005
4. House Bill 25-1113
5. Public Comments

RESOLUTION NO. 19
SERIES 2025

A RESOLUTION RECOMMENDING APPROVAL OF AN ORDINANCE AMENDING TITLE 17 OF THE LOUISVILLE MUNICIPAL CODE AND DEVELOPMENT DESIGN STANDARDS TO PROHIBIT NONFUNCTIONAL TURF, ARTIFICIAL, TURF, AND INVASIVE PLANT SPECIES FOR CERTAIN NEW DEVELOPMENT AND REDEVELOPMENT

WHEREAS, the City of Louisville (the "City"), is a Colorado home rule municipal corporation duly organized and existing under laws of the State of Colorado and the City of Louisville Home Rule Charter (the "City Charter");

WHEREAS, the Colorado General Assembly enacted Senate Bill 24-005, which added a new Article 99 to the Colorado Revised Statutes, prohibiting nonfunctional turf, artificial turf, and invasive plant species, and which requires local entities, including the City, to prohibit the installation, planting, or placement of any nonfunctional turf, artificial turf, or invasive plant species as part of a new non-residential development project or redevelopment project within the City; and

WHEREAS, the Colorado General Assembly enacted House Bill 25-1113, which supplements Senate Bill 24-005 by expanding the definition of "applicable property" to include multifamily residential housing of more than 12 dwelling units, and further requires local entities, including the City, on or before January 1, 2028, to enact or amend its laws regulating new development and redevelopment projects within its jurisdiction so as to limit the installation of turf to reduce irrigation water demand for residential real property; and

WHEREAS, the Planning Commission finds it is in the interest of the public health, safety and welfare of the City and its residents to prevent the installation, planting or placement of nonfunctional turf, artificial turf, and invasive plant species on certain properties as set forth herein.

NOW THEREFORE, BE IT RESOLVED that the Planning Commission of the City of Louisville, Colorado does hereby recommend approval of an ordinance amending Louisville Municipal Code to prohibit nonfunctional turf, artificial turf, and invasive plant species for certain new development and redevelopment.

PASSED AND ADOPTED this 11th day of December, 2025.

By: _____
Steve Brauneis, Chair
Planning Commission

Attest: _____
Cullen Choi, Secretary
Planning Commission

ORDINANCE NO. XXXX
SERIES 2025

AN ORDINANCE AMENDING THE CITY'S DEVELOPMENT DESIGN STANDARDS AND TITLE 17 OF THE LOUISVILLE MUNICIPAL CODE TO PROHIBIT NONFUNCTIONAL TURF, ARTIFICIAL TURF, AND INVASIVE PLANT SPECIES FOR CERTAIN NEW DEVELOPMENT AND REDEVELOPMENT

WHEREAS, in order to mitigate the impacts of climate change, green urban spaces such as urban tree canopies are a vital adaptation tool, especially for mitigating the urban heat island effect, which can increase energy costs, air pollution, and heat-related illnesses and deaths; and

WHEREAS, water supply in the western United States is under increasing pressure due to climate change and increasing demand; and

WHEREAS, the City Council finds the overuse of nonnative grass for landscaping purposes requires large amounts of water to maintain; and

WHEREAS, the City Council further finds that, while there are appropriate and important uses for turf, including for civic, community, and recreational purposes such as use in parks, sports fields, and playgrounds, much of the turf in the non-residential and certain multifamily areas of the City is nonfunctional, located in areas that receive little, if any use, and could be replaced with landscaping that adheres to water-wise landscaping principles without adversely impacting quality of life or landscape functionality; and

WHEREAS, prohibiting the installation, planting, or placement of nonfunctional turf in non-residential areas and certain multifamily areas of the City can help conserve the City's water resources; and

WHEREAS, installed vegetation that adheres to water-wise landscaping principles can help reduce outdoor demand of water; and

WHEREAS, installation of artificial turf can cause negative environmental impacts, such as exacerbating heat island effects in urban areas and releasing harmful chemicals, including plastics, microplastics, and perfluoroalkyl and polyfluoroalkyl chemicals, into the environment and watersheds; and

WHEREAS, the Colorado General Assembly enacted Senate Bill 24-005, which added a new Article 99 to the Colorado Revised Statutes, prohibiting nonfunctional turf, artificial turf, and invasive plant species, and which requires local entities, including the City, to prohibit the installation, planting, or placement of any nonfunctional turf, artificial turf, or invasive plant species as part of a new non-residential development project or redevelopment project within the City; and

WHEREAS, the Colorado General Assembly enacted House Bill 25-1113, which supplements Senate Bill 24-005 by expanding the definition of "applicable property" to include multifamily residential housing of more than 12 dwelling units, and further requires local entities, including the City, on or before January 1, 2028, to enact or amend its laws regulating new development and redevelopment projects within its jurisdiction so as to limit the installation of turf to reduce irrigation water demand for residential real property; and

WHEREAS, the City Council has adopted ordinances amending Title 17 of the Louisville Municipal Code to implement the Louisville Commercial Development Design Standards and Guidelines (the "CDDSG"), the Louisville Industrial Development Design Standards and Guidelines (the "IDDSG"), and the Louisville Mixed Use Design Standards and Guidelines ("MUDSG"), all of which contain certain regulations regarding landscaping for commercial, industrial, and mixed-use development; and

WHEREAS, the City Council has adopted a Sign Code, which is set forth in Appendix B to Title 17 of the Louisville Municipal Code, and which Sign Code establishes the requirements, standards, and guidelines applicable to signs within the City; and

WHEREAS, after a duly noticed public hearing held _____, at which evidence and testimony were entered into the record, including the Louisville Planning Commission Staff Report dated _____, the Louisville Planning Commission has recommended the City Council adopt the amendments to the Louisville Municipal Code set forth in this ordinance; and

WHEREAS, City Council has provided notice of a public hearing on said ordinance by publication as provided by law and held a public hearing as provided in said notice; and

WHEREAS, the City Council finds it is in the interest of the public health, safety and welfare of the City and its residents to prevent the installation, planting or placement of nonfunctional turf, artificial turf, and invasive plant species on non-residential property as set forth herein.

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF LOUISVILLE, COLORADO:

Section 1. Louisville Municipal Code Chapter 17.16 – General Regulations is hereby amended by the addition of a new Section 17.16.370 as follows:

Sec. 17.16.370 – Water Efficient Landscaping Standards.

A. *Applicability*. The requirements of this section apply to:

1. All new commercial, industrial, mixed-use, and institutional development;
2. All new multifamily residential development containing twelve (12) or more dwelling units;
3. All new development on common property; and
4. Any redevelopment of the above properties where more than 50% of the existing landscaped area is proposed to be removed or disturbed.

B. *Turf limitations.* Turf and artificial turf may be installed only within functional recreational use areas, including playgrounds, sports fields, picnic areas, and other spaces that are regularly used for civic, community, or recreational purposes. All turf and artificial turf located outside of these areas is considered nonfunctional and is prohibited. Functional recreational use areas do not include decorative lawn areas, narrow landscape strips, parking lot islands, or rights-of-way.

C. For the purpose of this section, "turf" is defined in C.R.S. § 37-60-135 (2)(i) as continuous plant coverage consisting of nonnative grasses or grasses not hybridized for arid conditions and "artificial turf" shall be interpreted consistent with state law definitions for functional and nonfunctional artificial turf as set forth in C.R.S. § 37-99-102.

D. Invasive plant species. Invasive plant species, as defined in C.R.S. *§* 37-60-135 (2)(e), are prohibited in all landscaped areas.

E. In the event that this section conflicts with landscaping requirements set forth in any other applicable section of Title 17, including all adopted design standards, the provisions of this section shall control.

Section 2. Section 4.10.5 of the Sign Code adopted by reference in Section 17.24.010 and set forth in full as Appendix B to the Louisville Municipal Code is hereby amended to read as follows (words to be added underlined; words to be deleted ~~stricken~~):

4.10 Freestanding Signs.

5. When required, landscaping shall include shrubs, ornamental grasses, perennials, ground covers and other enhancements. Landscaping areas shall not consist of more than twenty-five (25) percent ~~turf or~~ native grasses.

Section 3. The Mixed-Use Development Design Standards and Guidelines referenced in Appendix A to Chapter 17.16 of the Louisville Municipal Code is hereby amended to read as set forth in Exhibit A to this ordinance, attached hereto and incorporated herein by this reference (words to be added underlined; words to be deleted ~~stricken~~).

Section 4. The Commercial Development Design Standards and Guidelines referenced in Appendix A to Chapter 17.28 of the Louisville Municipal Code is hereby amended to read as set forth in Exhibit B to this ordinance, attached hereto and incorporated herein by this reference (words to be added underlined; words to be deleted ~~stricken~~).

Section 5. The Industrial Development Design Standards and Guidelines referenced in Appendix C to Chapter 17.28 of the Louisville Municipal Code are hereby amended to read as set forth in Exhibit C to this ordinance, attached hereto and incorporated herein by this reference (words to be added underlined; words to be deleted ~~stricken~~).

Section 6. If any portion of this ordinance is held to be invalid for any reason, such decision shall not affect the validity of the remaining portions of this ordinance. The City Council hereby declares that it would have passed this ordinance and each part hereof irrespective of the fact that any one part be declared invalid.

Section 7. The repeal or modification of any provision of the Municipal Code of the City of Louisville by this ordinance shall not release, extinguish, alter, modify, or change in whole or in part any penalty, forfeiture, or liability, either civil or criminal, which shall have been incurred under such provision, and each provision shall be treated and held as still remaining in force for the purpose of sustaining any and all proper actions, suits, proceedings, and prosecutions for the enforcement of the penalty, forfeiture, or liability, as well as for the purpose of sustaining any judgment, decree, or order which can or may be rendered, entered, or made in such actions, suits, proceedings, or prosecutions.

Section 8. All other ordinances or portions thereof inconsistent or conflicting with this ordinance or any portion hereof are hereby repealed to the extent of such inconsistency or conflict.

INTRODUCED, READ, PASSED ON FIRST READING AND ORDERED PUBLISHED this __ day of _____, 2025.

_____
Christopher M. Leh, Mayor

ATTEST:

_____
Genny Kline, Interim City Clerk

APPROVED AS TO FORM:
Kelly PC

_____
Kathleen Kelly, City Attorney

PUBLIC HEARING AND SECOND READING WILL BE THE ____ DAY OF _____, 2025, AT 6:00 P.M. AT LOUISVILLE CITY HALL, 749 MAIN STREET, LOUISVILLE, CO 80027.

PASSED AND ADOPTED ON SECOND AND FINAL READING, this __ day of _____, 2025.

_____
Christopher M. Leh, Mayor

ATTEST:

_____
Genny Kline, Interim City Clerk

Exhibit A
Mixed Use Development Design Standards and Guidelines

LOUISVILLE, COLORADO
IMPLEMENTATION OF THE HIGHWAY 42 REVITALIZATION AREA PLAN

Appendix A
MIXED USE DEVELOPMENT DESIGN STANDARDS AND GUIDELINES

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CITY OF LOUISVILLE MIXED USE DESIGN STANDARDS AND GUIDELINES

INTRODUCTION

PURPOSE AND INTENT

Major improvements to U.S. Highway 42 and the potential development of a commuter rail station in Louisville are creating the conditions for significant development and change in the Highway 42 Revitalization Area. In anticipation of such change, the City of Louisville hereby declares that it is the purpose and intent of these Mixed Use Development Design Standards and Guidelines (MUDDSG) to:

1. Implement the Highway 42 Revitalization Area Comprehensive Plan;
2. Strengthen and enhance adjacent residential neighborhoods while protecting them from potential adverse impacts associated with new development;
3. Complement and integrate the area with historic downtown Louisville through the establishment of strong pedestrian, and multimodal connections;
4. Capture the potential for high-quality, mixed use development that will serve adjacent neighborhoods and the citizens of Louisville and enhance the city's long-term tax base;
5. Avoid incompatible industrial and large-scale or heavy commercial growth;
6. Adopt a regulatory framework that promotes and encourages redevelopment to integrate principles of sustainable architecture and energy conservation.
7. Adopt design standards for the development of a commuter rail station that promote the public health and safety, adequate ingress and egress, and parking.
8. Decentralized surface parking shall be constructed in a manner so that it does not overwhelm the redevelopment area.
9. Capture the potential for highway commercial development adjacent to State Highway 42 providing a restricted range of retail sales and services.

APPLICABILITY

The regulations and requirements of this manual shall apply to all land, existing development, and proposed development in the Residential Mixed Use Zone District (MU-R), and the Commercial Community Zone District (CC). All new development, changes in use, or substantial alterations or expansions of an existing use in these zone districts shall comply with these Mixed Use Development Design Standards and Guidelines.

HOW TO USE THIS MANUAL

1. *Who Uses This Manual.*

These Mixed Use Development Design Standards and Guidelines are to be used by property owners/applicants and their design consultants in the planning of development in the MU-R or CC Zone District within the City of Louisville. The MUDSG will also be used by city staff, the planning

commission, and the city council as part of their review of development proposals in the MU-R and CC Districts.

2. *How to Use the Mixed Use Development Design Standards and Guidelines.*

The MUDDSG are generally organized in a descending order of scale, from overall site planning concerns, to circulation issues, to building and site details, and then to signs and lighting. When first developing overall planning concepts for a development in the MU-R and CC Districts, the earlier sections of the manual will be most relevant. At advanced stages of project design, when architectural details and specific landscaping ideas are being developed, sections appearing later in the manual will be most relevant.

3. *How the Manual is Organized.*

This manual is organized into sections, with the first five sections comprising this introduction and explaining the manual's intent, how to use this document, and how other city regulations apply and interplay with this Manual. The fifth section in this introduction provides definitions of terms of art used in the Manual and not otherwise defined in the city's Zoning Ordinance (Title 17) of the city's municipal code.

The remainder of the sections each addresses a different substantive area, such as blocks and streets, off-street parking, pedestrian circulation, and architectural and building design. In many cases, the section may refer back to the City of Louisville Commercial Development Design Standards and Guidelines (CDDSG) and direct the user to apply the standards and guidelines in that document to the proposed project in the mixed use zone district. In other cases, the user is directed to apply the relevant CDDSG standard or guideline, but with specific variations appropriate to implementing the vision for the MU-R and CC Districts.

The remaining sections, which are especially applicable to development in the MU-R and CC Districts, are generally comprised of the following components:

A. **Intent and purpose statement**, which is a broad statement explaining the general or specific reasons and goals for the approach taken and substance found in the particular standard or guideline.

B. **Standards**, which mandate the specific course of planning and design action that the applicant must incorporate in its project application. Compliance with standards is mandatory. Statements of standards are indicated by use of the word "shall" in the rule or directive. A failure to meet a standard may be used as a basis for the city's denial of a project application.

C. **Guidelines**, if any, follow the standards and are indicated by the words "may" or "should." Guidelines are voluntary and not mandatory; however, compliance is strongly encouraged to fulfill the intent of the section. A failure to meet a guideline cannot be used by the city as a basis for project denial.

D. **Graphic illustrations** showing one or more suggested design solutions that would be appropriate or inappropriate with respect to the standards and guidelines. Graphics may include photographs or drawings, and are intended to be illustrative of the text and not regulatory. In the event of a conflict between a graphic illustration and the text of a MUDDSG standard, the text shall control.

RELATIONSHIP TO OTHER REGULATIONS

1. *Relationship to the Louisville Commercial Development Design Standards and Guidelines and Downtown Design Handbook for Downtown Louisville.*

The City of Louisville Commercial Development Design Standards and Guidelines (CDDSG) shall not apply to development subject to these Mixed Use Development Design Standards and Guidelines except as expressly cross-referenced or provided in this manual. The standards and guidelines set forth in the Downtown Design Handbook for Louisville and the yard, bulk, and other requirements applicable to Downtown Louisville (including but not limited to Section 17.12.050 and Section 17.20.025 of this Zoning Ordinance) shall not apply to development subject to these Mixed Use Development Design Standards and Guidelines except as specifically cross-referenced or provided in this manual.

2. *Relationship to General Zoning Regulations.*

When these Mixed Use Development Design Standards and Guidelines state a development or design standard specific to the MU-R or CC Zone District, such standards shall apply in lieu of any general regulation stated in Chapter 17.16 or in other parts of Title 17 that addresses the same subject. When the general development or design regulations in Chapter 17.16 or in other provisions of Title 17 regulate a subject that these standards and guidelines do not clearly address, the general regulation shall apply to development in the MU-R District.

DEFINITIONS

1. Maximum Extent Feasible

No feasible and prudent alternative exists, and all possible efforts to comply with the regulation or minimize potential harm or adverse impacts have been undertaken. Economic considerations may be taken into account but shall not be the overriding factor in determining "maximum extent feasible."

2. Maximum Extent Practicable

Under the circumstances, reasonable efforts have been undertaken to comply with the regulation or requirement, that the cost of additional compliance measures clearly outweigh the potential benefits to the public or would unreasonably burden the proposed project, and reasonable steps have been undertaken to minimize any potential harm or adverse impacts resulting from the noncompliance.

1. Street and Block Design Standards.

1.1. *Intent.*

In order to encourage a synergistic mix of uses within the MU-R and CC Districts and to complement existing Downtown development, clear pedestrian and automobile links and safe pedestrian movements within the districts and between the districts and Downtown Louisville are essential. With the districts organized into regular-sized blocks, an internal public street system is created that can work to disperse and distribute project-generated traffic to multiple access points, rather than funneling such traffic through a single primary access way. The street and block standards are a fundamental cornerstone in creating a pedestrian-oriented and pedestrian-friendly district. Finally, the street and block standards purposely model the existing street grid and block system in Downtown Louisville to encourage the MU-R and CC Districts to mature as an extension of Downtown, and to enable present and future vehicle, pedestrian, and visual access between the areas.

1.2. *General Street and Block Layout Standards.*

A. To the maximum extent practicable, the general layout of blocks and streets within the Highway 42 Revitalization Area shall conform to an interconnected traditional grid pattern similar in layout, scale, and function as found in the Louisville Downtown Area. (S)

B. Street alignment within the MU-R and CC Districts shall generally conform to the street pattern adopted in the Highway 42 Plan to the maximum extent practicable. To ensure both visual and physical connections top the Downtown, east-west streets in the MU-R and CC Zone Districts shall align with the east-west streets found in the Louisville Downtown Area to the maximum extent feasible. (S)

C. The street grid pattern may be modified to accommodate changes in natural grade, existing property boundary lines, utility easements, or important visual elements within the district (e.g., a street may terminate at a "T" intersection to accentuate a key building or feature). (S)

1.3. *Allowed Block Dimensions.*

The following block standards apply to all new development:

A. Permitted Block Width: (Generally, the east and west sides of block)

1. MU-R District: 270-320 feet. (S)
2. CC-District: 400 feet (S)

B. Permitted Block Length (Generally, the north and south sides of block)

1. MU-R District: 300-400 feet. (S)
2. CC District: 600 feet (S)

C. All block dimensions shall include area devoted to alleys. (S)

1.4. *General Street Design Standards.*

A. *Internal Public Street System.*

All development sites shall provide for multiple blocks and an internal street system according to the street and block standards in this section, and according to the Louisville Public Works Department's general policies, standards, and guidelines governing street design**.** (S)

B. *Internal Streets.*

Internal streets provided according to this section are to be dedicated to the public. All internal streets shall be constructed according to the Louisville Public Works Department's general policies, standards, and guidelines governing public street construction. On a case-by-case basis, the city may approve alternative private street design that varies from the city's adopted public street cross-sections, based on the city's consideration of the proposed intensity of vehicle and pedestrian use, adequacy of emergency safety access, drainage requirements, and similar issues. (S)

C. *General Street Design Standards.*

Accent paving materials located within the public right-of-way shall meet Louisville Public Works Department criteria. (S)

D. *Mid-Block Alleys Encouraged.*

Guideline: The city encourages the provision of mid-block through alleys to serve both residential and nonresidential uses. For nonresidential uses, alleys may be used to enable secondary vehicle access and service access. (G)

2. Vehicle Access, Circulation, and Connections.

2.1. Intent.

The vehicle access, circulation and connection standards in this section are intended to minimize the number of curb cuts; maximize the amount of on-street parking available for residents, employees, and visitors to the district; encourage the use of shared access ways to off-street parking areas (including the use of alleys for this purpose).

2.2 Site and Vehicular Access Standards and Guidelines.

All new development in the MU-R and CC Districts shall comply with the following **standards** and **guidelines**:

A. Site access to the MU-R and CC Districts from Highway 42 shall be from dedicated public streets only. (S)

B. New curb cuts along Highway 42 to provide direct access to individual parcels via entrance drives are prohibited. Existing curb cuts and entrance drives along Highway 42 that directly access individual parcels shall be closed or consolidated to the maximum extent feasible as parcels are developed or redeveloped. As applicable, applicants shall reference the adopted Access Control Plan as amended from time to time for additional Highway 42 access regulations. (S)

C. Street intersections providing site access to the district shall be enhanced by incorporating signs, accent paving, special landscaping, and lighting. Materials used in entry features shall be consistent with other materials used in the development. (S)

D. A minimum separation of fifty (50) feet shall be maintained between adjacent curb-cuts along private streets. (S)

E. A minimum separation of eighty (80) feet shall be maintained between a public or private street and a parcel curb-cut that is created after the effective date of these standards. (S)

F. Vision clearance areas shall not be required except with respect to fences, walls, landscaping and service enclosures. (S)

G. Applicants for development are strongly encouraged to provide mid-block through alleys to provide primary or secondary access to the site for off-street parking or services. (G)

2.3. *Vehicular Circulation and Connection Standards.*

The policy, standards, and guidelines for vehicular circulation stated in Section 2.1.2 of the CDDSG shall apply in the MU-R and CC Districts, except as varied by the following standard for vehicle connections:

A. *Street Connections to Adjacent Uses.*

Connections between adjacent development parcels shall be provided by aligning new perimeter and internal streets to connect with existing and planned external streets of equivalent functional classifications to create through-street connections from mixed-use development to adjacent development. Where it is necessary to prevent cut-through traffic from entering existing residential areas, street alignments may be discontinuous and traffic calming improvements shall be utilized. (S)

2.4. *Service/Delivery, Emergency and Utility Access.*

The policy, standards, and guidelines for service/delivery, emergency and utility access stated in Section 2.1.4 of the CDDSG shall apply in the MU-R and CC Districts. Shared service and delivery access ways between adjacent parcels and/or buildings shall be employed to the maximum extent feasible. The city shall require cross access easements whenever necessary to ensure that adjacent parcels have adequate access if ownership patterns change. (S)

2.5. *Mass Transit Facilities.*

Transit facilities shall be provided in a manner to make transit an attractive mode of travel for residents and employees.

A. Locate bus shelters close to significant clusters of buildings. Provide a concrete pad in front of bus shelters. Provide protection for bus shelters from prevailing winds. (S)

B. Coordinate any shelter design and locations with RTD. (S)

3. Site Planning.

3.1. *Intent.*

The orientation of a principal building is a major influence on the public realm environment created at the public sidewalk or street edge. When buildings are set back far from the public sidewalk or street, or when a building turns its back on the primary abutting street, the pedestrian experience at the sidewalk or on the street suffers in quality. These building orientation and siting standards are intended to accommodate and invite pedestrians to walk to and between destinations within the MU-R, and CC Districts, to feel safe and comfortable doing so, and to support the use and security of the commuter rail line and transit station located in the Highway 42 plan area.

3.2. *Building Orientation and Building Entrances.*

The policy, standards, and guidelines for building siting and orientation stated in Section 1.1 of the CDDSG shall apply in the MU-R and CC Districts. In addition, the following building orientation standards and guidelines shall apply:

A. *Principal Buildings on Parcels With Highway 42 Frontage.*

1. Principal buildings on parcels with Highway 42 frontage shall have primary facades and entrances oriented either:

a. Toward Highway 42 subject to the standard in subsection 2 below;

b. Toward an abutting internal or perimeter street other than Highway 42, or

c. Toward an adjacent public plaza, park, or on-site amenity. (S)

See Figure 1.

2. If the primary façade and entrance to a principal building orients toward Highway 42, a second primary building entrance of equal size, scale, and prominence shall be provided on a different elevation of the building that orients toward an abutting internal or perimeter street other than Highway 42. (S) **See Figure 1.**

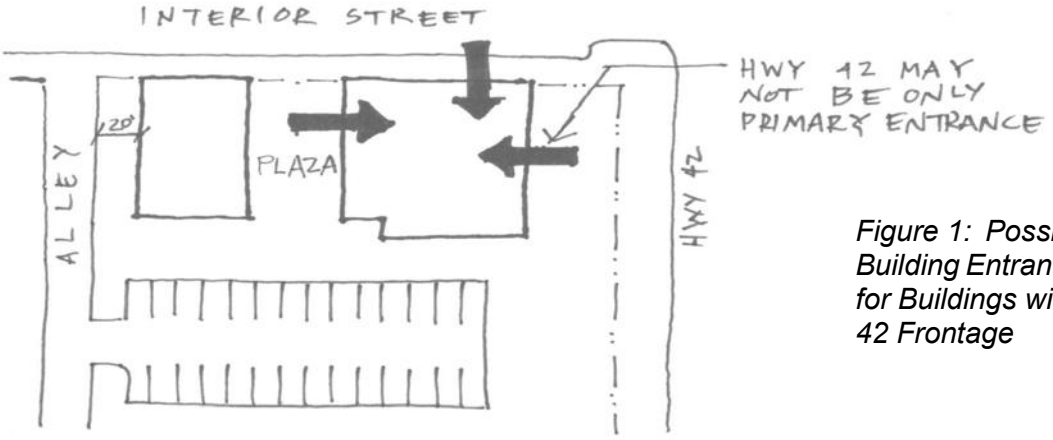


Figure 1: Possible Primary Building Entrance Locations for Buildings with Highway 42 Frontage

3. All primary building entries shall comply with the prominent entry design standards in Section 9.3 below. (S)

4. Secondary building entrances may orient toward and face Highway 42. (G)

B. *All Other Buildings.*

1. All principal buildings shall have their primary façades and entrances oriented toward public street frontages and shall not face parking lots or alleys. The building's primary façade and entrance shall face the primary abutting access street or an adjacent public plaza, park, or on-site amenity. Primary building entries shall comply with the prominent entry design standards in Section 9.3 below. (S)

2. Secondary entrances may face a rear parking area, or other streets with sidewalks or walkways. (G)

3.3. *Utilities, Mechanical, and Telecommunications Equipment.*

The policy, standards, and guidelines for utilities, mechanical, and telecommunications equipment stated in Section 1.5 of the CDDSG shall apply in the MU-R and CC Districts, except that utility meters and other above-ground utility boxes and similar equipment shall be located where they will be least visible from an abutting local street. (S)

3.4. *Water Quality Control and Drainage.*

The policy, standards, and guidelines for water quality control and drainage stated in Section 1.7 of the CDDSG shall apply in the MU-R and CC Districts.

3.5. *Site Grading, Excavation and Erosion Control.*

The policy, standards, and guidelines for site grading, excavation, and erosion control stated in Section 1.8 of the CDDSG shall apply in the MU-R and CC Districts.

4. Off-Street Parking and Loading.

4.1. *Off-Street Parking.*

A. *Intent.*

An adequate supply of off-street parking is necessary for the commercial viability and success of new development in the MU-R and CC Districts. However, commuter rail located within easy walking distance of the entire Highway 42 Revitalization Area may reduce the amount of off-street parking required or supplied in developments where the only travel mode option is the automobile. The city's adopted street design for the Highway 42 Revitalization Area will also ensure that on-street parking spaces can serve the district's visitors and users.

B. *Amount of Off-Street Parking Required.*

1. The amount of off-street parking required for permitted uses in the MU-R and CC Districts is set forth in Table 1 below. Credits and reductions may be allowed according to subsection 4.1.C. below. (S)

2. Unless otherwise specifically noted, all square footage-based parking standards shall be computed pursuant to Section 17.20.025 of the Louisville Municipal Code on the basis of gross floor area, which shall be measured as the floor area primary to the functioning of the particular use of the property and shall exclude stairwells, elevator shafts, hallways, bathrooms, ornamental balconies, space occupied by heating, air conditioning or other utility equipment, common area open spaces (e.g., courtyards), and space devoted to off-street parking or loading. Additionally, the area measured with respect to a restaurant use shall not include floor area designed primarily for use by service and food preparation staff. (S)

3. In all calculations of the minimum or maximum amount of parking, all fractions shall be rounded down to the nearest whole number. (S)

4. Pursuant to Section 17.20.025 of the Louisville Municipal Code, if an off-street parking space has been provided in connection with existing floor area or is added in connection with existing floor area, the existing parking space shall not be eliminated if elimination would result in fewer spaces for the existing floor area than the required ratio set forth in Table 1. Therefore, existing parking may be credited to the parking requirement of Table 1 only if the existing parking space exceeds the required ratio. If the use of a freestanding building occupied solely by a restaurant is changed in whole or part to another use, parking for the floor area changed in use shall be calculated and provided as set forth in this section. (S)

TABLE 1

USE CATEGORY ▼	AMOUNT OF OFF-STREET PARKING SPACES REQUIRED *GLA = Gross Leasable Area* CC DISTRICT	MU-R DISTRICT
All Retail Sales, Service, and Office Uses:		
Professional and Business Office	**Minimum:** 1 space per 400 square feet of GLA **Maximum:** 125% of minimum required spaces	**Minimum:** 1 space per 500 square feet of GLA **Maximum:** 125% of minimum required spaces
Eating/Drinking Establishments	**Minimum:** 1 space per 300 square feet of GLA **Maximum:** 125% of minimum required spaces	**Minimum:** 1 space per 300 square feet of GLA **Maximum:** 125% of minimum required spaces
All Other Retail Sales, Service,	1 space per 300 square feet.	**Minimum:** None **Maximum:** 1 space per 300 square feet.
All Residential Uses [Note 1]:		
1-bedroom unit	**Minimum:** 1 space per unit **Maximum:** 1.25 spaces per unit	**Minimum:** 1 space per unit **Maximum:** 1.25 spaces per unit
2-bedroom unit	**Minimum:** 2 spaces per unit	**Minimum:** 2 spaces per unit
3-or-more-bedroom unit	**Minimum:** 2.0 spaces per unit	**Minimum:** 2.0 spaces per unit
Additional guest parking **[Note 2]**	1 space per 8 dwelling units in addition to the minimum off-street parking spaces.	1 space per 8 dwelling units in addition to the minimum off-street parking spaces.
Civic, Institutional, and Public Uses:		
Educational Institutions	**Minimum and Maximum:** 1 per 4 seats or 1 per 1,000 square feet of floor area, whichever requires the greater amount.	**Minimum and Maximum:** 1 per 4 seats or 1 per 1,000 square feet of floor area, whichever requires the greater amount.
All Other Permitted Public, Institutional, and Civic Uses	**Minimum:** One 1 per 400 square feet of floor area **Maximum:** 3 per 1,000 square feet of floor area	**Minimum:** One 1 per 400 square feet of floor area **Maximum:** 3 per 1,000 square feet of floor area

Notes to Table 1:
1. Off-street parking spaces located in an enclosed parking garage, including in an accessory residential garage, and which comply with these Mixed Use Development Design Standards and Guidelines, shall not be counted toward the maximum amount of spaces permitted.
2. On-street parking spaces abutting the property line(s) of the primary building housing the use may be counted toward the required number of residential guest parking spaces.

C. *Credits and Reductions.*

1. *Credit for On-Street Parking.*

On-street parking spaces abutting the property line(s) of a primary nonresidential building may be credited toward meeting the minimum required off-street parking spaces. On-street parking

spaces abutting the property line(s) of a primary residential building may be counted toward the required number of guest parking spaces only. On-street parking allowed by this provision shall not be counted toward the maximum amount of off-street parking allowed. (G)

2. *Reduction for Shared Parking.*

The amount of off-street parking required may be reduced by an amount determined by the Planning Director when it can be shown through a parking demand study that sufficient parking is or can be met by the subject uses through shared parking. The parking demand study shall provide information and evidence about the anticipated parking demand at peak times during a day and the distance relationship between available shared parking spaces and the specific uses served. A shared parking agreement shall be executed and recorded prior to the issuance of a certificate of occupancy or prior to the issuance of a certificate of completion by the Building Safety Division. (S)

3. *Maximum Total Reductions.*

Total cumulative reductions to the minimum off-street parking requirements through application of this subsection shall not exceed twenty-five (25) percent. (S)

4.2. *Parking Lots and Structures.*

A. *Intent.*

To ensure a more pedestrian-oriented and pedestrian–friendly environment, off-street parking facilities, especially surface parking lots, must not dominate the street front, but should instead be sited, designed, and screened to be as unobtrusive as possible. Perimeter and interior landscaping shall be required for screening and/or to break up hard-surfaced parking lots and soften their edges.

B. *Remote Parking Allowed.*

The city may permit all or a portion of required off-street parking to be located off-site subject to the following standards:

1. *Location.*

Remote off-street parking spaces shall be located no farther than six hundred (600) feet away from the principal building they are intended to serve, as measured from the nearest point of the remote off-street parking facility to the nearest point of the building or structure served. (S)

2. *Zoning Classification.*

Remote parking areas shall be considered accessory to the principal use that the parking spaces are intended to serve. Parking areas shall require the same or a more intensive zoning classification than that required for the most intensive of the uses served by the remote parking area, provided that remote parking facilities may be located in any zoning district that allows commercial parking lots and garages. (S)

3. *Remote Parking Agreement.*

If a remote parking area is not under the same ownership as the principal use served, an executed and recorded written agreement among the owners of record shall be required. A remote parking agreement may be revoked by the parties to the agreement only if off-street parking is provided under this Section. (S)

C. *Surface Parking Lot Development and Design Standards.*

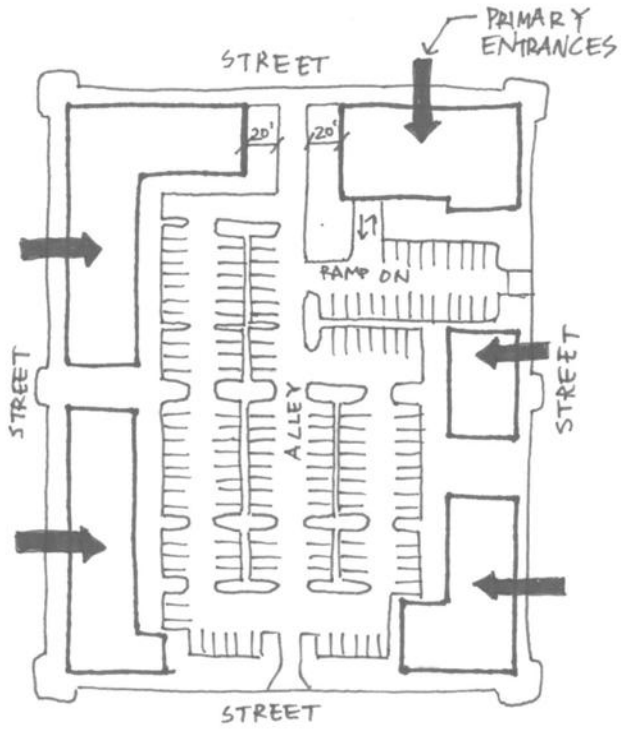


Figure 2: Location of Accessory Surface Parking Lots in the MU-R District.

The policy, standards, and guidelines for surface parking lots stated in Section 2.2.1 of the CDDSG shall apply in the MU-R and CC Districts, except for the minimum parking ratios stated therein. The off-street parking amount standards in Section 4.1.B. shall apply in the mixed use districts. In addition, the following standards and guidelines shall apply in the mixed-use zone districts:

1. *Location of Surface Parking Lots.*

   On-site, off-street accessory surface parking lots shall be located to the side or to the rear of a building face that contains a primary building entrance. No on-site, off-street parking lots shall be located between a building's front facade and the adjacent street in the MU-R District. **See Figure 2.** Off-street parking may be permitted between the building's front façade and Highway 42 frontage, subject to parking lot landscape screening requirements for properties zoned CC. (S)

2. *Parking Lot Landscaping and Screening.*

   See Section 7 for parking lot landscaping and screening requirements.

D. *Parking Structures and Parking Beneath Buildings.*

The policy, standards, and guidelines for parking structures and parking beneath buildings stated in Section 2.2.2 of the CDDSG shall apply in the MU-R and CC District, except for the standard stated therein regarding ground-level parking structure use and design (Standard 2.2.2.D.) Instead, the use and design of the ground floor of all above-ground parking structures, including a commuter parking structure, are subject to the following standards:

1. *Design of Entries/Access.*

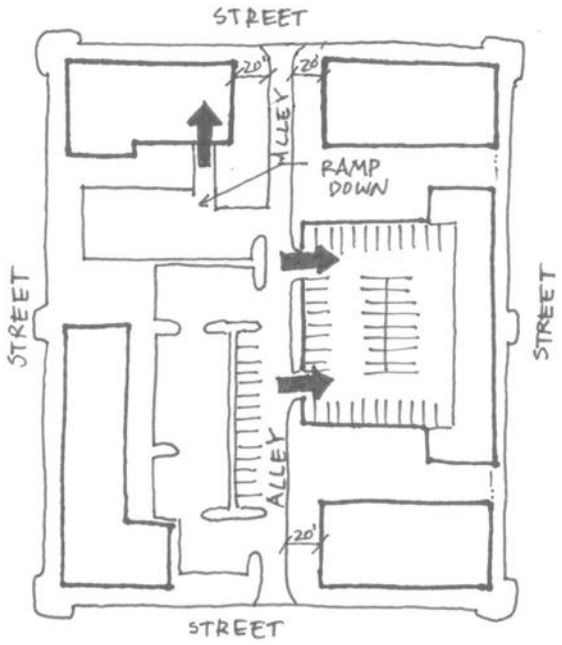


Figure 3: Parking Structure Access

Vehicle entries to off-street parking structures shall be internalized in building groupings or oriented away from the primary street frontage, to the maximum extent practicable. At a minimum, parking structures facilities shall have user vehicle access from alleys or from secondary streets at locations that do not conflict with pedestrian circulation. (S) **See Figure 3.**

2. *Ground Floor Parking Structure Use.*

The following standard shall apply to all parking structures, but not including parking structures used exclusively as parking for transit riders and commuters:

a. When structured parking occupies the ground floor of a building or structure, the length of the street-facing wall for that portion of the building/structure containing the parking spaces shall not be credited toward compliance with the "Minimum % of Street-Facing Property Front Lot Line that Must Contain a Building or Building Wall" standard stated in Section 17.14.060.B (Table 3: Mixed Use Zoning Districts Dimensional and Bulk Standards). (S)

b. In order to maintain an active and attractive street presence, when a parking structure provides commercial or accessory parking, or is integrated into a building containing principal permitted uses, commercial or other nonresidential use of the ground-floor street frontage is strongly encouraged. (G)

3. *Ground Floor Parking Structure Design.*

In order to maintain an active, attractive, and safe street presence for pedestrians, when a parking structure provides parking on the ground floor, and the ground floor does not contain ground-floor commercial or other nonresidential "active" uses the ground-level façade of the parking structure (at least the first 12 vertical feet of the structure) shall include at least two (2) of the following design features:

a. Facade articulation and modulation through changes in vertical wall plane and/or a change in building material;

b. Use of real windows with glazing that may be translucent, but shall not include black or mirrored glass or similar opaque glazing;

c. Use of false windows defined by frames, lintels, or sills;

d. Integration of multiple building entrances;

e. Buffering of the street edge with landscaping, berms, or landscaped built-in or movable planters; or

f. Similar architectural detailing consistent with the intent to maintain an attractive and safe streetscape for pedestrians. (S)

See Figure 4.

Figure 4: Example of Ground Floor Parking Structure Design

4. *Motorcycle Parking.*

The policy, standards, and guidelines for motorcycle parking stated in Section 2.2.4 of the CDDSG shall apply in the MU-R and CC Districts.

4.3. Off-Street Loading.

A minimum of one (1) dedicated, off-street loading space is required for nonresidential uses greater than 50,000 square feet in gross leasable area and for multi-family residential uses containing more than fifteen (15) units. All other uses should have adequate alleys, private drives, or on-street parking spaces available for intermittent loading/delivery needs. If the city determines, based on experience with similar uses, that a particular use typically has a demonstrated need for a dedicated loading area, the city may require the applicant to make provision for an off-street loading area on-site. (S)

5. Pedestrian and Bicycle Circulation.

5.1. *General Connectivity Standards.*

All new development shall provide pedestrian and bicycle systems that provide continuous connections with off-site destinations according to the following standards:

A. Provide well-identified and differentiated bicycle and pedestrian access from the development site. Access shall be provided to existing and designated public bike paths or greenways located on or adjacent to the development site. (S)

B. On-site connections shall be made at points necessary to provide direct pedestrian and bicycle travel from within the development to residential areas and to major pedestrian destinations located within the adjacent neighborhood(s), including, but not limited to adjacent parks, schools, and the Louisville Downtown area. In order to provide direct pedestrian connections to these adjacent destinations, the city may require additional sidewalks, walkways, or bike paths not associated with a street, or the extension of a sidewalk from the end of a dead-end street to another street or walkway. (S)

C. Connections from a perimeter public sidewalk system to the on-site sidewalks and walkways shall be made at the same block length intervals as exists within the development site. (S)

D. Separate pedestrian and vehicle movement to the extent practical with the use of landscaping, barriers or other appropriate design solutions recommended in Section 3.3 of the CDDSG.

5.2. *Internal Pedestrian Circulation and Connections.*

All new development shall provide and contribute to an on-site system of pedestrian walkways and/or public sidewalks throughout the district. The on-site pedestrian circulation system shall provide the most efficient access routes between intended points of travel. Specifically, on-site pedestrian connections shall be provided to and between the following points:

A. The primary entrance or entrances to each building housing a principal use;

B. Existing or planned transit stations, shelters, and park and ride locations;

C. Any sidewalks or walkways on adjacent properties that extend to the boundaries shared with the development site;

D. Any public sidewalk system along the perimeter streets adjacent to the development site; and

E. On-site amenities, as provided according to Section 6.3.

F. On-site and remote surface parking lots. (S)

5.3. *On-Site Pedestrian Walkway Design Standards.*

In the MU-R and CC Districts, all on-site pedestrian walkways shall maintain a minimum unobstructed pathway of five (5) feet at all times. (S) **See Figure 5.**

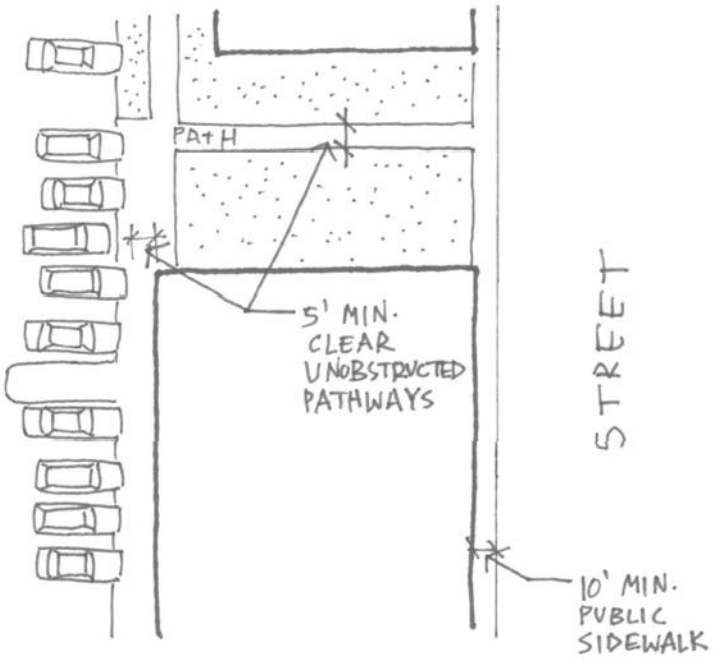


Figure 5: 5-Foot Unobstructed On-Site Pedestrian Pathways

5.4. *Public Sidewalk Design Standards.*

A. Sidewalks provided within a public street right-of-way shall comply with the City of Louisville public street standards and the standards stated in this subsection. In the case of conflict between the city's public street standards and this subsection's public sidewalk standards, the public sidewalk standards in this Section shall apply and control. (S)

B. In the MU-R and CC Districts, all public sidewalks shall be a minimum of ten (10) feet wide incorporating tree planting within the right-of-way. The right-of-way shall be landscaped with street trees and other living plant material or, as an alternative, tree grates for street trees combined with decorative paving and/or moveable planters may be utilized. (S)

1. Provide a minimum of one (1) tree per twenty (20) lineal feet of public and private street frontage. (S)

2. Place annual and perennial planting areas at project entries. (G)

3. Trees shall be irrigated from subsurface irrigation. (S)

5.5. *Bicycle Parking Standards*.

A. Functional and convenient bike parking shall be provided in adequate numbers for both customers and employees.

1. Provide one (1) bicycle parking space for every ten (10) required off-street automobile parking spaces up to a total of twenty (20) bicycle parking spaces. (S)

2. Providing protection from the elements for bicycle parking is encouraged. (G)

3. Coordinate the design of the bicycle shelter with adjacent buildings or other street furniture designs. (G)

4. Do not position bicycle racks or shelters where they will obstruct building entrances or the flow of pedestrian traffic. (S)

6. Open Space and On-Site Amenities.

6.1. *Intent.*

An attractive public realm is a fundamental ingredient in the success of a mixed use development. Open air and semi-enclosed public gathering spaces can act as central organizing elements in a mixed use district. They can also help to shape the relationship between different uses and provide focal points and anchors for pedestrian activity. On-site amenities can create a strong image and unique character for a mixed use development, making it a special place for the community, instead of just a project.

This subsection is intended to create on-site amenities and features, such as outdoor plazas, parks, and public art. Such amenities and features provide desirable open space, create an inviting image for customers, visitors, and employees, enhance the pedestrian environment and streetscape in a zone district, offer attractive spaces for people to gather, interact, rest, shop, and eat, and contribute to the character of the city.

6.2. Applicability.

This section shall apply to all commercial and mixed-use development in the MU-R and CC Zone districts.

6.3. Provision of On-Site Amenities.

A. Pedestrian amenities should be incorporated into both overall and individual site development plans.

1. Furnish spaces with pedestrian amenities such as benches, landscaping, fountains and play areas. These outdoor spaces should be 'functional' and accessible for a substantial part of the year. (S)

2. Delineate areas of pedestrian activity with accent paving, landscaping, lighting and furnishings. (S)

3. All common amenities within commercial developments shall be owned and maintained by the developer or by an organization established for such purpose. (S)

B. In addition, development on sites smaller than one (1) acre shall incorporate at least one (1) of the following on-site amenities or features, and developments on sites one (1) acre or larger shall incorporate at least two (2) of the following on-site amenities or features, as highly-visible, easily-accessible, focal points or gathering places for residents, employees, or other visitors to the development site: (S)

1. Patio or plaza with seating area, provided such patio or plaza has a minimum depth and width of ten (10) feet, and a minimum total area of one hundred fifty (150) square feet.

2. For outdoor patios or plazas, asphalt is prohibited as a paver; use of decorative pavers or textured, colored concrete is required.

3. Patios and plazas shall include pedestrian amenities intended to support these places as gathering areas. Amenities may include, but are not limited to, seating, lighting, special paving, planting, food and flower venders, artwork, and/or special recreational features.

4. Landscaped mini-parks, squares, or greens, provided such park or green has a minimum depth and width of ten (10) feet and a minimum total area of two hundred fifty (250) square feet. Such parks, squares, or greens shall include pedestrian amenities intended to support these places as gathering areas. Amenities may include, but are not limited to, seating, lighting, additional landscaping and plantings, food and flower venders, artwork, and/or special recreational features.

5. Protected pedestrian walkways; arcades; recessed corner entries with a minimum area of 100 square feet; or easily identifiable building pass-throughs containing window displays and intended for general public access.

6. Water feature, such as a pond or fountain, provided the feature is easily accessed by pedestrians and includes or integrates seating areas for pedestrians.

7. Outdoor public art, as approved by the city, in an area that is:

a. Visible from an adjacent public sidewalk or street, and

b. Easily accessed for viewing by pedestrians (e.g., a sculpture mounted to an exterior building wall).

8. Any other, well-designed area and/or focal feature that, in the city's judgment, is consistent with the intent of this section, and adequately enhances such development and serves as a gathering place for visitors, customers, and employees. (S)

C. On-site amenities provided according to this Section 6.3 may be located on the interior of the development site, and need not be accessible or visible to the general public, unless a provision in Section 6.3.B expressly states otherwise. (G)

D. Credit for one (1) on-site amenity otherwise required in Section 6.3.B. may be taken for any park dedicated to the City by the developer located within one hundred (100) feet of the development site's boundary. (G)

6.4. *Buildings Adjacent to Outdoor Amenities.*

Providing good public visibility of outdoor amenities is intended to encourage pedestrian use of on-site outdoor amenities, while at the same time enhancing the security of such places. Accordingly, when a building will be adjacent to a pedestrian plaza, patio, or park provided under this subsection, the building wall facing such outdoor amenity shall contain at least one (1) of the following elements: (S)

A. A building entry;

B. Windows facing onto the outdoor amenity;

C. Arcades along the edges of the outdoor amenity;

D. Outdoor seating areas or cafes; or

E. A similar feature that the city finds will, to at least the equivalent degree, bolster security and encourages pedestrian use of the outdoor amenity.

6.5. *Maintenance.*

The property owner shall be responsible for the continued maintenance and repair of all on-site amenities provided according to this subsection. (S)

7. Landscaping and Buffers.

7.1. Perimeter Landscaping Adjacent to Public and Private Roads.

A. *Applicability in the MU-R and CC Districts.*

The perimeter landscaping standards and guidelines shall apply only to parcels adjacent to Highway 42 and South Boulder Road as set forth in Section 7.2.

B. *Applicability of Parking Lot Buffer Provisions.*

In the MU-R and CC Districts, the perimeter of all surface parking lots adjacent to a public plaza, park, or public or private street (including alleys) shall be screened from view. Visual buffering shall be incorporated by the provision of planting strips between public right-of-way and edge of the parking lot pavement. The following parking lot buffer standards and guidelines shall apply:

1. The buffer area shall be installed between the parking lot edge and the back of the public sidewalk or right-of-way, and shall have a minimum five (5) foot width. (S)

2. As applicable, screening materials shall be installed to align with the adjacent front building lines to continue the prevailing street wall on a block face. (S)

3. Raised planters and masonry screen walls may be incorporated to provide parking lot screening. (G) Bermed turf areas shall be avoided due to their tendency to waste irrigation water. (S)

4. The minimum width of a buffer area may be reduced from five (5) feet to three (3) feet when used to screen a parking lot. A three (3) foot wide buffer area shall incorporate an ornamental fence or masonry wall. Permitted fence and wall materials shall be limited to brick, stone, and other masonry materials, and to decorative metals (e.g., wrought iron). Use of an ornamental fence or wall shall be combined with live landscaping material such as flowering and evergreen shrubs, grasses native to Colorado or hybridized for arid conditions, vines, and ground cover. The maximum height of a fence or wall shall be no taller than three (3) feet when used to screen the parking lot All landscaping material shall be installed on the outside of the screening wall (closest to the sidewalk). (S)

7.2. *Highway 42 and South Boulder Road Buffer Area.*

The required landscaped buffer is intended to convey a uniform and high-quality image of the CC District to persons traveling and using Highway 42 and South Boulder Road, and to screen from public view conditions such as parking or ground-mounted utilities or equipment that might adversely affect the district's image.

A. On all properties adjacent to Highway 42 and South Boulder Road within the CC District, a minimum ten (10) foot wide landscaped buffer shall be provided adjacent to the Highway 42 or South Boulder Road right-of-ways. (S)

B. The buffer area shall be landscaped with a combination of deciduous and evergreen trees, shrubs, and ground covering.

1. Provide a minimum of one (1) tree per 40 lineal feet of public street frontage within ten (10) feet outside the sidewalk, internal to the development. (S)

2. Provide a minimum of one (1) shrub per five (5) lineal feet plus ground cover or native or hybridized grass ~~turf~~ outside the sidewalk, internal to the development. ~~Turf~~ Grass should be limited in this area and when use should be planned in a manner that can be efficiently irrigated. Low water using species should be chosen, providing a green appearance. (S)

3. Landscaping within public easements is limited to shrubs, ground covers, and small ornamental trees. No canopy/shade trees may be planted within such easements. (S)

7.3. *Parking Lot Landscaping.*

A. *Intent.*

These standards are intended to encourage landscaped surface parking lots, including the planting of trees, that will improve the aesthetics of a development site by breaking up expanses of paved areas; will reduce the significant solar heat gain ("urban heat island effect") from parked automobiles and paved parking areas; and will provide a more pedestrian-friendly environment.

B. *Interior and Perimeter Parking Lot Landscaping.*

The policies, standards, and guidelines for parking lot landscaping shall apply in the MU-R and CC Zone Districts.

1. *Perimeter Landscaping.*

Except for the parking lot buffer required by subsection 7.1.B. above, perimeter parking lot landscaping is not required in the MU-R District.

2. *Interior Parking Lot Landscaping.*

a. Applicability.

The parking lot interior landscaping requirements shall apply to all new off-street surface parking lots with more than five (5) parking spaces and to existing lots that are expanded by more than twenty-five percent (25%) of existing spaces.

b. Minimum Standards.

i. Parking lots with six (6) to one hundred (100) spaces shall have 5% of the total interior area landscaped. (S)

ii. Utilize landscaped islands and medians to improve the definition of circulation patterns, provide shading for paved areas and break up continuous rows of parking. (S)

iii. No landscaped area within a parking lot shall be less than one hundred (100) square feet. (S)

iv. Surface parking lots with more than one hundred (100) spaces shall have 10% of the interior area landscaped. (S)

C. *Parking Lot Buffer Credit.*

Surface parking lot buffer landscaping in excess of the dimensions required in subsection 7.1.B. may be credited towards meeting the interior landscaping standards. (G)

D. *Spacing of Internal Landscape Islands.*

Internal planting islands shall be spaced no farther than fifteen (15) parking spaces apart. (S)

E. *Spacing of Required Trees.*

One (1) tree shall be provided for every 300 square feet of internal landscaped area. (S)

F. *Landscaping Used to Break Up Large Parking Lots.*

Surface parking lots with more than 50 spaces shall be broken up into blocks of no more than 25 spaces. Each block shall be separated from other parking blocks by a landscaped area that is at least six (6) feet wide, by a pedestrian walkway or sidewalk within a landscaped median with a minimum width of ten (10) feet, or by a low decorative fence or wall with a maximum height of four (4) feet bordered by landscaping on at least one side. (S)

7.4. *Building Site Landscaping.*

A. *Intent.*

Landscaping at the individual building site scale is intended to provide respites from the overall higher densities and intensities of development encouraged in the MU-R and CC Zone Districts, and to provide public and community gathering places.

B. *Applicable Standards.*

The policy, standards, and guidelines for building site landscaping shall apply in the MU-R and CC Zone Districts.

1. *Minimum Landscape Area.*

a. The minimum landscape area required within each building site shall be ten (10) percent in the MU-R District, and twenty (20) percent in the CC Zone District including hardscaped plazas, outdoor seating/serving areas, walkways within on-site open space areas, and other similar hardscaped on-site amenities. (S)

b. Hardscaped elements such as those listed in this provision shall account for no more than two-thirds of the minimum landscape area requirement. (S)

c. In a development proposal including multiple building sites, the percent area required for each building site may be transferred between individual building sites, provided the aggregated landscape area enhances the connection to transit facilities or provides a more centralized landscaped area(s) convenient to the development's residents, employees, and visitors, enhances the pedestrian environment, and creates a publicly accessible space. (S)

d. Protect landscaping from vehicular and pedestrian encroachments with raised planting surfaces, depressed walks, and /or curbs. (S)

e. Landscaping within public easements is limited to shrubs, ground covers, and small ornamental trees. No canopy/shade trees may be planted within such easements. (S)

7.5. *Landscape Irrigation/Water Conservation.*

The policy, standards, and guidelines for landscape irrigation/water conservation stated in Section 5.5 of the CDDSG shall apply in the MU-R and CC Zone Districts. Xeriscape concepts shall be incorporated into landscape design without compromising the intent to establish significant visual amenities through landscaping.

A. *Applicable Standards.*

1. Incorporate a 'zoned planting scheme' to reduce water demand by grouping similar varieties of plants that are drought and disease tolerant. (S)
2. For all irrigated areas, potential runoff should be avoided through the proper selection of irrigation devices. (S)

7.6. *Landscape Materials Standards, Maintenance, and Replacement.*

The policy, standards, and guidelines for landscape standards and plant material selection, for planting size standards, and landscape maintenance and replacement stated in Section 5.6 through Section 5.8 of the CDDSG shall apply in the MU-R and CC Zone Districts.

7.7. *Existing Vegetation.*

The policy, standards, and guidelines for preserving existing vegetation stated in Section 5.9 of the CDDSG shall apply in the MU-R and CC Zone Districts.

8. Residential Protection and Transitional Standards.

8.1. *Intent.*

This section is intended to ensure that site planning and building design of new development in the MU-R and the CC Zone Districts mitigate to the maximum extent possible any potential adverse visual or operational impacts on adjacent residentially zoned properties in adjacent neighborhoods.

8.2. *Applicability.*

This section's standards are applicable to development or redevelopment in a MU-R or CC zone district as a more intensive use adjacent to an existing, less-intense residential use located in an R-L or R-M Residential Zone District. For purpose of this Section, "adjacent" shall include properties separated only by a local or collector street.

8.3. *Building Setback and Height Transitions Required.*

A. *MU Development Across a Street from Residential Zone District (Front Transition).*

When new development in a MU-R or CC Zone District is separated from an existing residential use in an R-L or R-M District by a local or collector street, the following transition standards shall apply:

1. *Required Building Setbacks.*

All buildings and structures on the MU-R, or CC zoned property shall be setback from the street-facing property line at least ten (10) feet. The maximum building setback applicable in the zone district, as stated in Section 17.14.060 of the Zoning Ordinance, shall apply. (S) **See Figure 6.**

2. *Transition Building Heights Required.*

Within fifty (50) feet from the edge of the street right-of-way, the average height of a building shall not exceed thirty-five (35) feet. (S) **See Figures 6 and 7.**

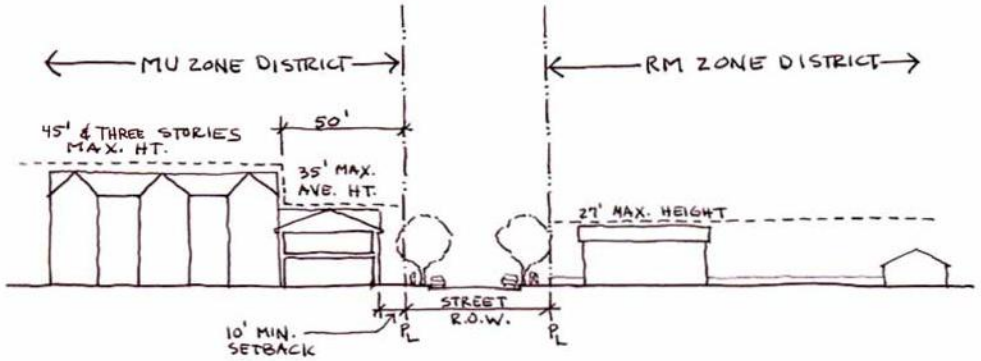


Figure 6: Transition to RM Zone District Across a Street

Figure 7: Example of 35 Feet Average Height

B. *Development Abutting Residential Zone District or Separated by Alley (Rear or Side Transition).*

When new development in a MU-R or CC Zone District is separated from an existing residential use in an R-L or R-M District by only an alley, or abuts the rear or side property line of the protected residential use, the following transition standards shall apply:

1. *Required Building Setbacks.*

All buildings and structures on the MU-R or CC zoned property shall be setback a minimum of fifteen (15) feet from the rear property line of the R-L or R-M residential use. If the MU-R or CC zoned property abuts the residential use's side yard or property line (rather than its rear yard), the minimum setback for a building or structure on the MU-R zoned property shall be five (5) feet. The maximum building setback applicable in the zone district, as stated in Section 17.14.060 of the Zoning Ordinance, shall apply. (S) **See Figure 8.**

2. *Transition Building Heights Required.*

Within fifty (50) feet from the alley centerline, or from the rear or side property line of the protected residential use, the maximum height of a building shall not exceed twenty-seven (27) feet. (S) **See Figure 8.**

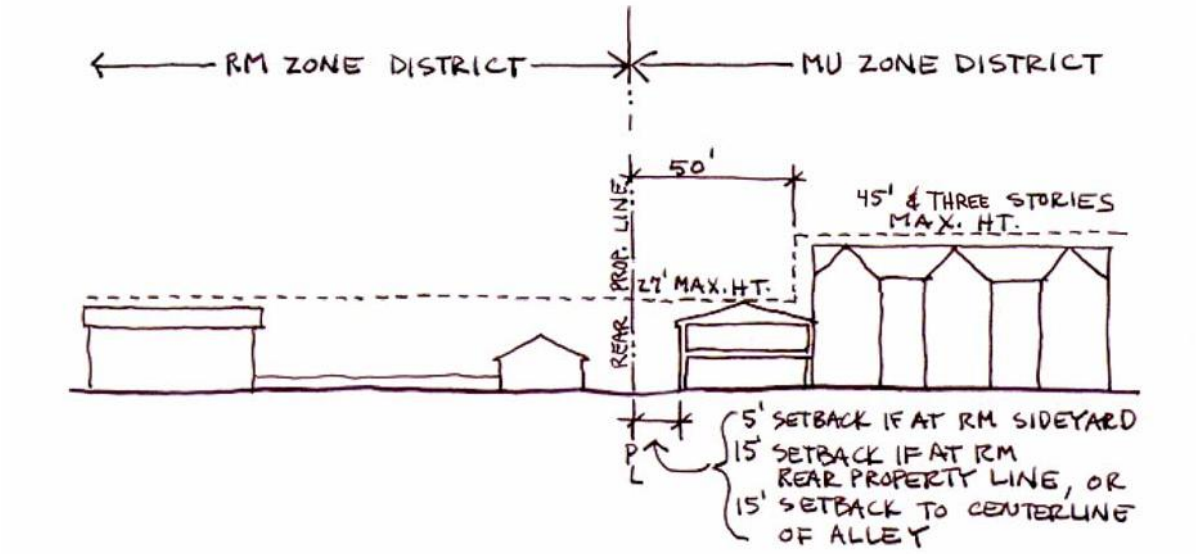


Figure 8: Transition to RM District Across Rear Alley or Rear/Side Property Line

8.4. *Conditions for Operational Compatibility.*

The city may impose conditions upon the approval of rezonings, PUD development plans, site plans, special review uses, and other development actions to ensure that development in a mixed use zone district will be compatible with existing and planned neighborhoods and uses, including but not limited to conditions on the following:

A. As a condition of rezoning approval only, the availability or ability to develop specific uses otherwise allowed by Chapter 17.14;

B. Hours of operation;

C. Hours of deliveries and other similar activities;

D. Location, intensity, and hours of operation of exterior lighting, including security lighting;

E. Placement of trash receptacles;

F. Amplification of music in a commercial place of entertainment;

G. Location of delivery and loading zones;

H. Placement and illumination of outdoor activity areas and equipment, including outdoor vending machines;

I. Venting of nuisance fumes and vapors from non-residential uses;

J. Illumination of signage and, or architectural building features.

9. Architectural and Building Design.

9.1. *Intent.*

The architectural and building design standards and guidelines of this section are intended to promote high-quality building, streetscape, and open area design and construction that will give the MU-R and CC Zone Districts an identifiable character and unique physical image.

More specifically, to create the appearance of development that occurred over a period of time, architectural features of new developments, including rooflines, materials, colors, door and window patterns, and decorative elements, should vary in form and style. Especially important is the ground-floor design of buildings and its interaction with adjacent public streets, sidewalks, and open spaces. The ground-floor is the portion of a building that, if designed well, can create high-quality visual interest and a human scale that pedestrians find comforting, inviting, and safe. Key elements that contribute to such a pedestrian environment include first-floor openings (doors and windows), emphasized customer/user entrances, materials, targeted landscaping, and continuity of the front building line along a block (to heighten the sense of "enclosure").

9.2. Applicability.

The architectural and building design standards and guidelines in this subsection shall apply to all new development in the MU-R and CC Zone Districts. Development of residential uses in the MU-R District shall also comply with the residential site and building design standards in subsection 10 that follows.

9.3. *Building Massing, Forms, Prominent Entries, and Pedestrian Scale.*

The policy, standards, and guidelines for building massing, forms, and pedestrian scale shall apply in the MU-R and CC Zone Districts.

A. *General Standards and Guidelines*.

1. Variations in façade elements should be incorporated to reduce perceived scale and mass. (S)
2. Variations in color and/or texture shall be used. (S)
3. Step downs and step backs shall follow the terrain and be tiered and reinforced by landscape or hardscape elements. (S)
4. Variation in roof forms and height of roof elements should be used. (G)

B. *Ground Floor Façade Design—Doors and Windows.*

The following standards shall apply to the facades of all buildings in the MU-R District.

1. *Amount of Openings Required—Ground Floor Facades.*

In the MU-R Zone District, a minimum of thirty-five (35) percent of the total wall area of each street-facing ground floor building façade shall be comprised of pedestrian entrances (doors), windows, and/or vehicle entry drives. The thirty-five (35) percent shall be measured using elevation views of the building plan, and "ground floor" shall be measured from floor plate to floor plate. In the CC Zone District, the minimum shall be twenty (20) percent. (S)

2. *Minimum Glazing Requirements.*

a. *Nonresidential Uses on Ground Floor.*

Glazing on all ground floor windows shall be transparent. (S)

C. *Building Entries and Doorways.*

The standards, and guidelines for building entrances shall apply in the MU-R and the CC Zone Districts.

1. *Placement of Entries.*

a. Locate main entrances to be clearly identifiable from the adjoining road or drive. (S)

b. Design building entrances to contrast with the surrounding wall plane. (S)

c. Design primary entrances to be accessible to handicapped users without complex ramp systems. (S)

2. *Entry Emphasis Required.*

All building entrances shall be emphasized through incorporation of a building recess, projection, canopy, or similar design element. (S)

3. *Primary Entry Emphasis.*

a. The primary entry should be recessed through the incorporation of a building recess or projection, or similar design element. (G)

b. Corner buildings should provide a prominent corner entrance to street level commercial retail uses or common residential or office lobby space in a manner consistent with primary entries, as described in Section C.1.a. As applicable, corner building entries should be anchored at the sidewalk edge and beveled, recessed, and/or sheltered by a covered arcade structure, canopy, or awning to provide an area for retail displays. Recessed entries should be illuminated. (G)

D. *Equal Treatment of Visible Building Facades.*

All sides of a building or structure that face a public street, other than an alley, or that are visible from any commuter rail line, shall be finished with the same mix of primary building materials and the same degree of articulation that is used on the building's primary façade. (S)

9.4. *Roof Forms and Materials.*

The policy, standards, and guidelines for roof forms and materials stated in Section 4.4 of the CDDSG shall apply in the MU-R and CC Zone Districts.

9.5. *Building Materials and Colors.*

Exterior materials and colors should be of a high quality and compatible with materials and colors of nearby structures. The following standards and guidelines shall apply:

A. All sides of building visible to the public from a street, park, public open space, or other public right-of-way shall be finished to an equivalent quality with the primary façade. (S)

B. Large, blank, featureless walls are not allowed. (S)

C. Use materials manufactured in units and measurable in human proportions such as brick, tile and modular stone. Other appropriate materials include: stucco, wood, metal accents, glass and decorative tiles. (S) Painted block or concrete is not an acceptable building material. (S)

9.6. *Service Entrances and Loading Areas.*

The policy, standards, and guidelines for service entrances and loading areas shall apply in the MU-R and CC Zone Districts.

A. *General Standards and Guidelines.*

1. Orient service entrances, loading docks, dumpster enclosures, and other similar uses away from local, collector, and arterial roadways. (S)
2. All dumpster and service enclosures shall be fully screened by masonry wall construction using building materials consistent with materials as employed elsewhere on the building or site. (S)
3. Coordinate the location of service areas with adjacent development, so that shared service drives may be feasible. (G)

B. *Provision of Recycling Centers.*

All new and significantly remodeled structures where refuse is generated by the use for the structure shall provide adequate space for the collection and storage of refuse and recyclable materials per Section 17.16.265 of the Louisville Municipal Code.

9.7. *Energy Conservation Measures.*

New development should evaluate increased opportunities to implement resource conservation and sustainable building practices. Local climate conditions afford the opportunity to incorporate passive and/or active solar energy applications. Buildings should be designed and sited to maximize the use of solar gain.

The policy, standards, and guidelines for energy conservation measures shall apply in the MU-R and CC Zone Districts.

A. Builders and contractors are encouraged to be members of a national green program which promote construction practices and products and materials which improve energy efficiency, and conservation of resources. (G)

B. The following energy design concepts are encouraged but not limited to: (G)

1. Types of materials and insulation characteristics.
2. The arrangement of windows and doors.
3. Direct solar or photovoltaic energy.
4. Daylighting concepts.
5. Recycling of construction materials.
6. Water conservation.
7. The provision of a sustainable roof.
8. Providing an on-premise shower facilities for bicycle commuters.
9. Use of recycled building products

10. Multi-Family Residential Site and Building Design.

All development of buildings that are predominantly multi-family in terms of gross square footage or that provide garages serving multi-family units shall comply with this section's standards and guidelines, as applicable.

10.1. *Siting of Accessory Parking Lots and Structures.*

A. *Intent.*

These siting standards for accessory parking lots and structures (private parking garages or carports) are intended to reduce the visual prominence of the garage and open parking lots along multi-family streetscapes and common areas; to encourage a more varied multi-family streetscape through the use of a variety of garage orientations and types; and to emphasize the prominence of primary pedestrian and vehicular entrances, open spaces, and residential units along multi-family streetscapes and common areas.

B. *Applicability.*

The following standards shall apply to development of new multi-family dwellings in the MU-R District.

C. *Residential Alleys Encouraged.*

Private garages, carports, and parking lots accessory to a principal multi-family residential dwelling use should be accessed from a street or alley other than the primary abutting access street. (G)

D. *Multi-Family Dwellings Other than Attached Townhomes.*

The following standards and guidelines shall apply to development of new predominantly multi-family dwellings in the MU-R District, except that new multi-family townhome dwellings shall comply with the following standards.

1. To the maximum extent feasible, garage entries, carports, parking lots, and parking structures shall be internalized in building groupings or located away from street frontages. (S)

2. When access to parking lots, carports, or common garages is **not** from an alley, the following limitations shall apply. *See also* the limitation on garage parking wall that may occupy a street-facing property line stated in Section 17.14.060 (Dimensional and Bulk Standards) of the Zoning Ordinance.

a. Carports and garages shall be limited to sixty-five (65) feet in length. (S)

b. Parking lots and freestanding parking structures (detached garages or carports) shall not occupy more than thirty percent (30%) of each perimeter public street frontage. (S)

c. To the maximum extent practicable, freestanding parking structures (detached garages or carports) that are visible from perimeter public streets shall be sited perpendicular to the perimeter street in order to reduce visual impacts on the streetscape. (S)

d. Garage doors of attached garages shall not comprise more than thirty-three percent (33%) of the total length of a multi-family building's front façade, and the plane of a garage door shall be offset by at least four (4) feet from the plane of an adjacent garage door. (S)

e. Rear walls of detached garages over forty (40) feet in length that back onto the perimeter street shall be articulated or punctuated through the use of two or more of the following options:

i. Six (6) or more window openings defined by frames, sills and lintels;

ii. Three (3) one-hundred (100) square feet trellis structures spaced along the rear wall, planted with an approved vine or creeping plant to cover the trellis structure at maturity;

iii. Change in wall plane of at least six (6) inches every ten (10) feet;

iv. Vertical change in material or masonry pattern; or

v. One (1) roof dormer for each ten (10) feet of length. (S)

f. Detached garages and carports shall incorporate compatible materials, scale, colors, architectural details, and roof slopes similar to those of the primary multi-family buildings. (S)

E. *Parking Lot/ Structure Design for Townhome Dwelling Developments.*

The following standards and guidelines shall apply to development of new townhome dwellings. For purposes of this provision, a "townhome dwelling" is defined as a residential multi-family dwelling containing two (2) or more dwelling units attached by common vertical walls, with each dwelling unit located on its own legal lot.

1. *Access Requirements.*

   Residential garages accessed from the public street adjoining the front lot line ("front-loading garages") are allowed only when access from an adjoining side street or rear alley to a garage is not feasible. (S)

2. *Front-Loading Garages.*

   Front-loading garages that protrude towards the street in front of the primary façade of the principal structure are prohibited. Garage doors on all front-loading (street-oriented) garages shall be either:

   a. Recessed a minimum of four (4) feet behind the front façade of the dwelling portion of the structure (including side-loading garages), or a front porch that is at minimum of five (5) feet wide by eight feet long; or

   b. Recessed a minimum of two (2) feet beneath a second floor bay. (S)

3. *Side-Loading Garages.*

   Side-loaded garages shall provide windows or other architectural details that mimic the features of the living portion of the dwelling on the side of the garage facing the front street. (S)

4. Front-loading (street-oriented) garage doors shall not comprise more than 45% of the front façade of the principal dwelling structure. (S)

10.2. *Multi-Family Building Design.*

A. *Intent.*

These building design standards and guidelines are intended to improve the appearance of multi-family developments through the incorporation of architectural detailing, façade articulation, and other features designed to provide a more distinct character and human scale for multi-family buildings of all sizes.

B. *Applicability and Conflicting Regulations.*

The building design standards in this subsection shall apply to all new multi-family development in the MU-R District. In case of conflict between a specific multi-family building design standard in this subsection and a more general architectural and building design standard stated in Section 9 of this manual, the more specific multi-family standard in this subsection shall apply.

C. *Building Design Standards.*

1. All sides of a multi-family building visible from a public right-of-way (not including an alley) shall display a similar level of quality and architectural detailing. The majority of a building's architectural features and treatments shall not be restricted to a single façade. Building details, including roof forms, windows, doors, trim, and siding materials, shall reflect the architectural style of the building. (S)

2. The maximum length of any multi-family building shall be 200 feet. (S)

3. The facades of all multi-family buildings shall be articulated through the incorporation of two (2) or more of the following:

a. Balconies,

b. Bay or box windows,

c. Insets or other relief in the wall plane,

d. Porches,

e. Dormers,

f. Variations in materials; or

g. Variations in roof forms. (S)

4. Horizontal variations in materials along the façade of a multi-family building shall occur in conjunction with a change in wall plane, preferably at the inside corner of a wall. (S)

10.3. *Architectural Variety.*

A. *Intent.*

The architectural variety standards and guidelines in this subsection are intended to ensure that individual groupings of multi-family buildings within a larger development exhibit a distinct variation in size and mass that allows them to be easily distinguished from surrounding building groupings. The standards are specifically intended to avoid the bleak, "barracks-type" appearance associated with large concentrations of identical or very similar structures.

B. *Design Standards.*

1. *Apartments.*

a. Apartment developments shall incorporate a variety of distinct exterior building designs according to the scale of the development, as follows: (S)

i. 3-10 buildings: 2 models minimum;

ii. 11-20 buildings: 3 models minimum;

iii. 21 or more buildings: 1 model for every 6 buildings minimum.

b. Distinct building designs, as required above, shall be easily distinguished through a minimum of three (3) of the following: (S)

i. A variation in length of 30% or more;

ii. A variation in the footprint of the building of 30% or more;

iii. A distinct variation in color and use of materials;

iv. A variation in the type of dwelling unit contained in the building that results in a significantly different scale and mass, e.g., apartments vs. attached townhomes; or

v. A distinct variation in building height and roof form.

c. Apartment buildings shall provide concentrated unit access points. Monotonous access balconies and corridors running the length of the exterior of a building are prohibited. (S)

2. Townhomes.

Within each townhome row or cluster of more than ten (10) attached units, individual units shall be differentiated through two (2) or more of the following methods: (S)

a. Use of distinct variations in materials between individual units;

b. Use of distinct variations in architectural style or features, such as a porch or similar feature, between individual units;

c. Use of distinct variations in roof form,

d. Variation in garage orientations; or

e. A variation in the plane of the front façade to provide a minimum three-foot variation between individual units.

11. Site Furniture and Features.

The policy, standards, and guidelines for site furniture and features stated in Section 5.10 of the CDDSG shall apply in the MU-R and CC Zone Districts.

12. Screen Walls and Fences.

The policy, standards, and guidelines for screen walls and fences stated in Section 6 of the CDDSG shall apply in the MU-R and CC Zone Districts, except as varied by the following provisions:

12.1. *Retaining Walls.*

Use of retaining walls is encouraged to reduce the steepness of man-made slopes and to provide planting pockets conducive to vegetation. Retaining walls shall comply with the following standards:

A. Retaining walls shall not exceed three (3) feet in height from the finished grade. (S)

B. Terracing shall be limited to three (3) tiers, except that the city may approve more than three (3) tiers when a greater number of tiers will result in less land disturbance and less steep man-made slopes. The width of any terrace between any two retaining walls shall be a minimum of four (4) feet with a maximum slope of 3:1. Terraces created between retaining walls shall be permanently landscaped or revegetated. (S)

C. Retaining walls shall be constructed from durable materials such as stone, brick or metal with dark finishes (wrought iron or similar), or a combination of these materials. Wood is not an acceptable material for retaining walls. Concrete walls are permitted if faced with masonry or stone or earth-colored materials similar to the surrounding natural landscape. (S)

13. Sign Design. *Repealed pursuant to Ord. 1779, Series 2019 and replaced with the City of Louisville Sign Code*

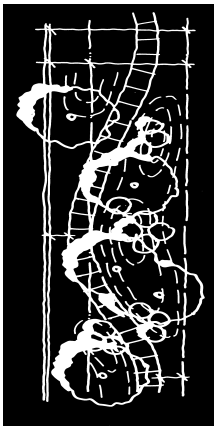
14. Exterior Site Lighting.

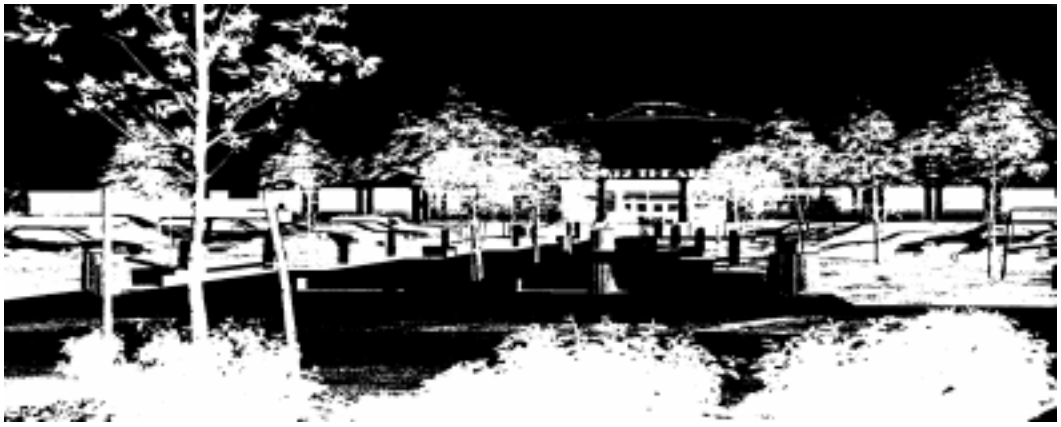
The policy, standards, and guidelines for exterior site lighting stated in Section 8 of the CDDSG shall apply in the MU-R and CC Zone Districts.

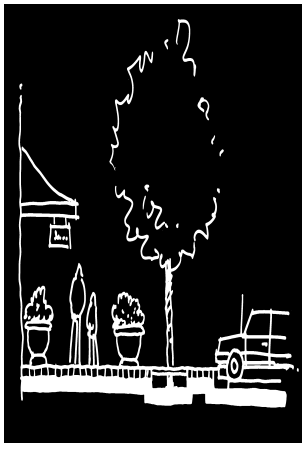
Exhibit B
Commercial Development Design Standards and Guidelines

City of Louisville

COMMERCIAL DEVELOPMENT DESIGN STANDARDS AND GUIDELINES







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COMMERCIAL DEVELOPMENT DESIGN STANDARDS AND GUIDELINES

Adopted 17 JUNE 1997 by Ordinance 1242, Series 1996
Amended by Ordinance 1287, Series 1998 &
Ordinance 1341, Series 2000

PREPARED FOR:
CITY OF LOUISVILLE, COLORADO

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COMMERCIAL DEVELOPMENT DESIGN STANDARDS AND GUIDELINES

June 17, 1997

Acknowledgments and Credits

Honorable Mayor and Members of the City of Louisville City Council

Chairman and Members of the City of Louisville Planning Commission

Downing, Thorpe & James, Inc. (Assisted by: Blackwood & Company)

City of Louisville Departments of Administration, Public Works and Planning

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"A" Recommended Plant Materials List

INTRODUCTION

A. Purpose

The Commercial Development Design Standards and Guidelines (**"CDDSG"**) establish design criteria and minimum standards for commercial developments within the City of Louisville. The purpose of the CDDSG is to:

1) Enhance and protect Louisville's quality of life and community image through clearly articulated commercial development design goals and policies, design guidelines and minimum design standards; and
2) Protect and promote Louisville's long-term economic vitality through commercial design standards which encourage and reward high quality development, while discouraging less attractive and less enduring alternatives; and
3) Minimize adverse impacts of vehicular circulation to existing neighborhoods and to the surrounding physical environment; and
4) Enhance and protect the security and health**,** safety and welfare of all residents of the City of Louisville.

B. Applicability

The provisions of the Guidelines shall apply to all commercial development within the City, except commercial development for which there exists a vested property right to develop under other approved design guidelines and/or development standards.

The CDDSG provide general design guidelines, as well as mandatory minimum development standards. The CDDSG will be utilized by staff, planning commission, and city council to review commercial development applications submitted under the City's PUD Development Plan review process.

The goals and policies set forth in this document are expected to be met through compliance with all mandatory design standards and consideration of design guidelines. Modifications to or waivers of mandatory design standards may be recommended by the Planning Commission and authorized by City Council as part of the PUD Development Plan Review process.

C. Who Uses the CDDSG

The CDDSG are to be used by property owners/ applicants and their design consultants in the planning of commercial development projects within the City of Louisville. The CDDSG will also be utilized by staff, planning commission, and city council as part of the PUD Development Plan process in their reviews of commercial projects to which the CDDSG apply.

D. Desirable Elements of Commercial Project Design

The city considers the following design features to be desirable elements of commercial development, and the standards and guidelines set forth in the following chapters are intended to facilitate the incorporation of these features into a commercial project:

1. Prominent access driveways with clear visibility of entrances and retail signage
2. Multi-modal transportation
3. Landscaped and screened parking
4. Quality of exterior building materials, surfaces, and textures
5. Significant landscape and hardscape elements
6. Building locations which provide pedestrian courtyards and common gathering areas with coordinated site furniture and lighting
7. Visual compatibility with development on adjacent sites
8. Visual connections between entrances and associated pedestrian areas of individual buildings to encourage visual and physical integration into a strengthened "sense of place"
9. Step-down of building scale adjacent to pedestrian routes and building entrances
10. Pedestrian-oriented ornamentation and detail at ground level
11. Multi-planed, pitched roofs with meaningful overhangs and arcades
12. Regular or traditional window rhythm
13. Articulated building forms and massing with significant wall articulation (e.g. insets, canopies, wing-walls, trellises)
14. Preservation of natural site features
15. Enhancement of view corridors to open areas and mountain vistas

E. Undesirable Elements of Commercial Project Design

The city considers the following design features to be undesirable elements of commercial development:

1. Poorly defined site access points
2. Disjointed parking areas, or confusing or unsafe circulation pattern
3. Square, "box-like" structures with large, blank, unarticulated wall surfaces
4. Highly reflective surfaces or heavily-tinted glass storefronts
5. Metal siding on primary facades
6. Mix of unrelated styles (such as rustic wood shingles or siding and polished chrome)
7. Strongly thematic architectural styles including some forms of "franchise" architectural styles associated with some chain commercial developments
8. Visible outdoor storage, loading, and equipment areas
9. Signage which is redundant or out of scale with building architecture

F. Relation of the CDDSG to Other City Regulations, Ordinances and Private Development Covenants

The CDDSG are a supplement to the City of Louisville's Zoning and Subdivision Regulations, PUD Ordinance, City of Louisville Department of Public Works Engineering Division Design and Construction Standards, and City of Louisville Storm Drainage Design and Technical Criteria.

Where a mandatory standard in this document is in conflict with any provision of the City of Louisville municipal code, the most restrictive requirement shall take precedence and shall apply. Building and life safety codes and the City of Louisville Department of Public Works Engineering Division Design and Construction Standards, and the City of Louisville Storm Drainage Design and Technical Criteria take precedence over the standards in this document in cases where the standards in this document require action that is in conflict with those codes.

All commercial development within the City of Louisville shall meet the guidelines of the Americans with Disabilities Act (ADA).

G. How to Use the CDDSG

The CDDSG are generally organized in a descending order of scale, from overall site planning concerns, to circulation issues, to buildings, site details, and then signs. When first developing overall planning concepts for a parcel, the earlier sections will be most relevant. At advanced stages of design, when architectural details and specific landscaping ideas are being developed, sections appearing later in the document will be most relevant.

This document has nine chapters and one appendix. Each chapter has four basic components:

1. A goal statement, which sets forth the city's overall design goal to be achieved in the PUD Commercial Planned Unit Development Plan review process with regard to the subject matter of the chapter.
2. A policy statement, which establishes a more specific design goal with regard to a more specific subject matter.
3. The statements of **standards,** indicated with an (S), and **guidelines,** indicated with a (G), which establish the specific design standards with which compliance is mandatory, and the design guidelines with which compliance is strongly encouraged. A failure to meet a mandatory standard may be used as a basis for denial of an application. A failure to meet a guideline shall not be a basis for denial of an application.
4. Graphic Illustrations showing one or more suggested design solutions that would be appropriate or inappropriate with respect to the standards and guidelines. These may be photographs or sketches. In the event of conflict between a graphic illustration and the text of the CDDSG, the text shall control.

H. Definitions

For purposes of this document, the following terms shall have the following meanings:

“Commercial Development”: Any land development activity in the city, including but not limited to retail and office development, but not including development activity intended solely for residential, industrial or light industrial use. Commercial development also includes any addition, remodeling, relocation or construction requiring an amendment to an approved, Final Commercial Planned Unit Development Plan.

“Open Space”: Land that is undeveloped or developed that can support plant materials; or has decorative landscape treatment; or that may be used by customers for recreation, circulation, or may be viewed by them. Walkways, plant beds, lawns, and terraces within an open space area may be included as part of such open space area. Paved parking lot areas used for auto circulation or parking do not qualify as Open Space.

“Parcel”: A parcel is the minimum amount that a single user may occupy. In many cases, more than one parcel will be combined for development of a single building or cluster of buildings to be used by a single user.

“Pedestrian Scale/Human Scale”: The relationship between the dimensions of a building, street, outdoor space, or streetscape element to the average dimensions of the human body.

1. SITE PLANNING

Goal:

Locate buildings to be visible from major roadways and entries, to provide clear orientation and access for both vehicles and pedestrians and to facilitate internal pedestrian circulation. Place structures in consideration of the existing built context, the location of adjoining uses, and the location of major roads. Include an analysis of the site's physical and natural characteristics and other influences. Create pedestrian courtyards and common gathering areas through creative design solutions. Create walkable, well-landscaped environments that encourage pedestrian movement between uses and gathering places.

1.1 Building Siting and Orientation

Policy:

Buildings should be sited so that the character of existing land forms and site features is enhanced; the relationships between buildings are strengthened; and pedestrian and vehicular circulation is facilitated.

Standards and Guidelines:

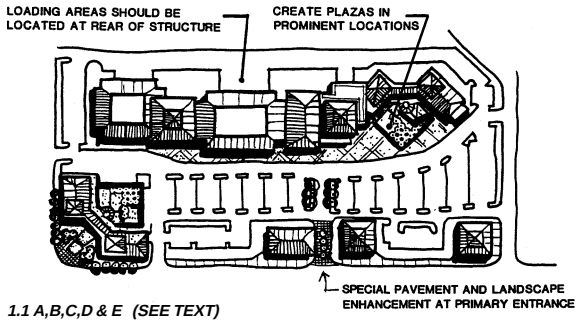
A. Provide pedestrian connections from buildings to public walkways and between buildings to buffer pedestrians from vehicle circulation areas. (S)

B. Locate retail buildings to create plazas and pedestrian gathering places which are of a sufficient size and scale to buffer the pedestrian areas from traffic and circulation areas. (G)

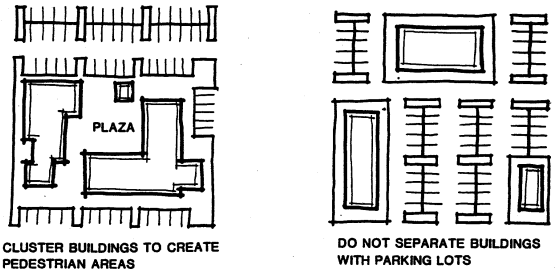
C. Orient buildings to promote views through and into each commercial development. (G)

D. Orient single free-standing buildings and their primary facades and primary pedestrian entrances toward streets. (G)

E. Position entries to buildings so they are easily identifiable from the interior drives and parking lots. (G)



1.1 A,B,C,D & E (SEE TEXT)



1.1 B CLUSTER BUILDINGS TO CREATE PLAZAS AND PEDESTRIAN GATHERING PLACES.

1.2 Building and Parking Setbacks

Policy:

Provide a well-landscaped and pedestrian-friendly character along major streets which promotes a comfortable walkable environment. To attain this objective, all buildings and parking should be set back from perimeter and interior streets a sufficient distance to create a distinct landscape zone between buildings, parking, and adjacent roadways. Varying building setbacks to enhance visual interest along the streetscape is strongly encouraged.

Parking setbacks from all streets should allow for adequate visual buffering or screening.

Surrounding buildings or wrapping the project perimeter with parking lots, especially along the street front is strongly discouraged; orienting some buildings closer to the street to screen parking in the interior of the site and provide strong pedestrian connections to buildings is encouraged.

Standards and Guidelines:

A. Minimum Building Setbacks *EXCEPT WITHIN THE OLD TOWN CC-DISTRICT* **(for building footprints less than or equal to 30,000 gross square feet): (S)**

- Street R.O.W. Line:
  - Arterial Street 30 ft.
  - Collector Street 20 ft
  - Local Street 15 ft.
  - Internal/Common Property Boundary 10 ft.
  - Internal/Private Driveway 10 ft.
    (to back of curb)

B. Minimum Building Setbacks *EXCEPT IN OLD TOWN CC-ZONE DISTRICT* **(for building footprints greater than 30,000 gross square feet): (S)**

- Street R.O.W. Line:
  - Arterial Street 50 ft.
  - Collector Street 40 ft.
  - Local Street 35 ft.
  - Internal/Common Property Boundary 25 ft.
  - Internal/Private Driveway 10 ft.
    (to back of curb)

C. Minimum Parking Setbacks *EXCEPT IN OLD TOWN CC-ZONE DISTRICT* **(from all perimeter property lines or rights-of-way): (S)**

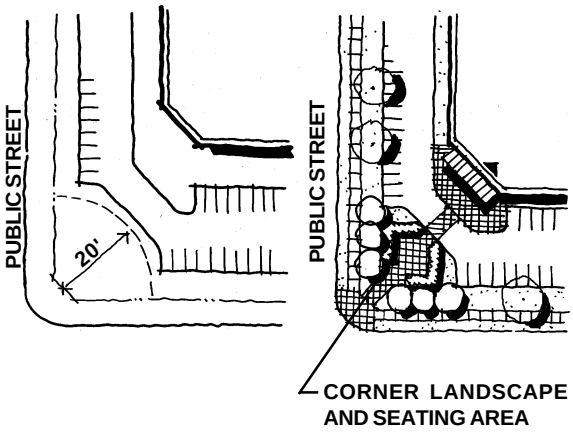
- Property Lines Adjacent to U.S. 36 40 ft.
- Arterial Street R.O.W. 25 ft.
- Collector & Local Street R.O.W. 15 ft.
- Internal/Common Property Boundary 10 ft.

D. No portion of any building, including canopies, overhangs, or other projections shall encroach into the above setbacks. (S)

E. Building and Parking Setbacks at Street Corners - If an intervening parking or a drive aisle is located between a building and the street corner, a corner landscape area must be provided. (S) In addition, no parking may be located within a radius of 15 feet measured from the point of intersection of the required parking setback lines. (S)

F. The clustering of buildings within larger master planned and multiple building projects is strongly encouraged, and the minimum building setbacks may be waived or modified for such purpose. (G) However, all fire and emergency access and building code requirements must be met. (S)

G. Consider orienting buildings, including some of the buildings in multiple building projects, to perimeter streets, rather than orienting all buildings to internal parking lots. (G)



1.2 E TREATMENT OF STREET CORNERS WITH PARKING

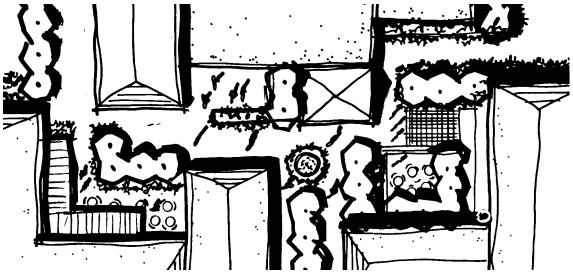
1.3 Pedestrian Amenities

Policy:

Plazas, courtyards or similar pedestrian amenities should be incorporated into both overall and individual site development plans. These areas should be easily accessible and comfortable for a substantial part of the year.

Standards and Guidelines:

A. Furnish spaces with pedestrian amenities such as benches, landscaping, fountains and play areas. These outdoor spaces should be "functional" and should not appear as "left-over" spaces. (S)
B. Aggregate open space areas for pedestrian use. (G) Do not distribute them in low impact areas, such as building peripheries, areas behind structures, or where barely visible. (S)
C. Delineate areas of pedestrian activity with accent paving, landscaping, lighting and furnishings. (S)
D. Provide seating that is useable year-round. Position seating which is buffered from exposed areas and takes advantage of sunny locations. (S)
E. All common amenities within commercial developments shall be owned and maintained by the developer or by an organization established for such purpose . (S)
F. Where feasible, create a sense of enclosure for outdoor seating areas. (G)
G. Orient open spaces to views of activities, architectural landmarks or distinctive natural land forms. (G)



1.3 A FURNISH OUTDOOR SPACES WITH PEDESTRIAN AMENITIES.

1.3 C DELINEATE AREAS OF INTENSE PEDESTRIAN ACTIVITY.

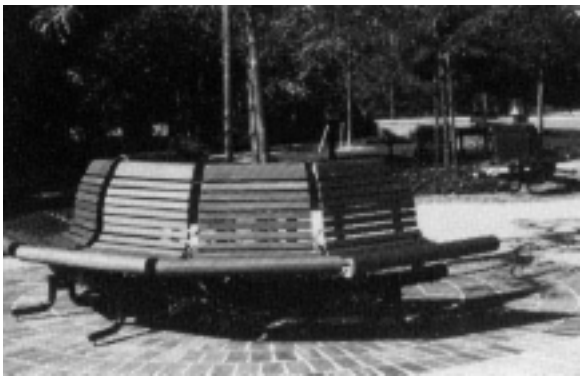
1.4 Site Coverage Requirements

Policy:

Open space is a valued amenity. Building, parking, and driveway site coverage within each parcel should be limited.

Standards and Guidelines:

A. The maximum building, parking, and driveway coverage within each parcel and for the entire development is 70%. (S)
B. The minimum amount of open space provided within a commercial development parcel or cluster of parcels is 30%. (S) Open space can include "pedestrian-oriented" areas such as sidewalks and hardscape plazas within open space areas and pedestrian gathering places. (G) This open space area is in addition to any required public land dedication. (S)



1.3 D PROVIDE SEATING THAT IS USABLE YEAR ROUND.

1.5 Utilities, Mechanical, and Telecommunications Equipment

Policy:

The visual and noise impacts of utilities, mechanical equipment, data transmission dishes, towers, and similar antennas and equipment should be mitigated.

Standards and Guidelines:

A. Install all permanent utility lines underground. (S)
B. Temporary overhead power and telephone facilities are permitted during construction only. (S)
C. Locate transformers away from major pedestrian routes and outdoor seating areas. (S)
D. Buffer all transformers, telecommunications devices, equipment switching boxes and other utility cabinets from street and pedestrian areas with landscaping or architectural screens. (S) Do not leave meters exposed where visible to the public. (S) (See also Section 6. Screen Walls and Fencing). (S)

1.6 Service, Delivery and Storage Areas

Policy:

Service, delivery and storage areas can be visually obtrusive. The visual impact of service and delivery areas should be minimized, especially views of such areas from public ways and along designated view corridors.

Standard and Guidelines:

A. Locate loading docks and service areas a minimum of 20 feet from any public street in areas of low visibility such as the rear of buildings. (S)
B. Combine loading docks and service areas between multiple sites. (G) Screen from public view with fencing, walls and/or landscaping. (S) (See also Section 6. Screen Walls and Fencing).
C. Clearly identify service entrances with signs to discourage the use of main entrances for deliveries. (G)

1.7 Water Quality Control and Drainage

Policy:

Storm water and snow-melt from rooftops, paved areas, and lawns carry plant debris, soil particles, and dissolved chemicals into the City's storm drainage system. Site development plans should employ management and engineering practices to protect stormwater from these undesirable elements, before releasing water into the City's storm drainage system.

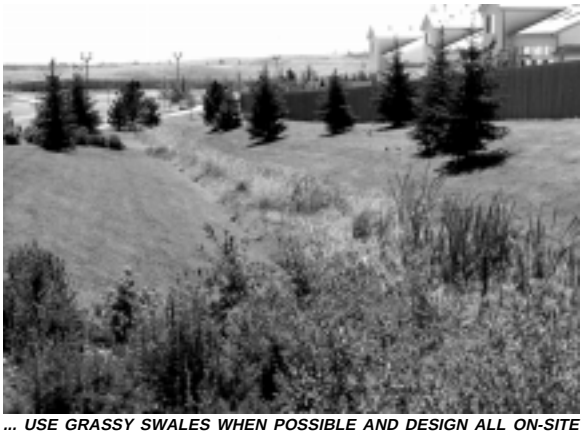
Site drainage should be designed to minimize water collection near building foundations, entrances and service ramps. In addition to the City of Louisville's Storm Drainage and Technical Criteria, the following standards and guidelines apply:

Standards and Guidelines*:*

A. Storm water should not drain directly into the public storm drainage system without first going through a detention pond and a grassy swale. (G)
B. Design and maintain all grassed swales and other drainage channels in accordance with City of Louisville Storm Drainage Design and Technical Criteria. (S)

C. Avoid hard concrete-lined channel designs. If a hard channel design is required use a more natural approach that incorporates river rock or natural rock channel lining when possible. (G)
D. Utilize accepted design criteria and recommendations of the Urban Drainage and Flood Control District (UD & FCD) and the City of Louisville for detention pond design to enhance water quality. (S)
E. The use of consolidated detention pond facilities is encouraged. (G)
F. Design on-site drainage and detention facilities with attractive, landscape features and amenities. (S)

1.7 C AVOID HARD CHANNEL DESIGNS...



... USE GRASSY SWALES WHEN POSSIBLE AND DESIGN ALL ON-SITE DRAINAGE AND DETENTION FACILITIES WITH ATTRACTIVE, YEAR-ROUND SITE FEATURES AND AMENITIES.

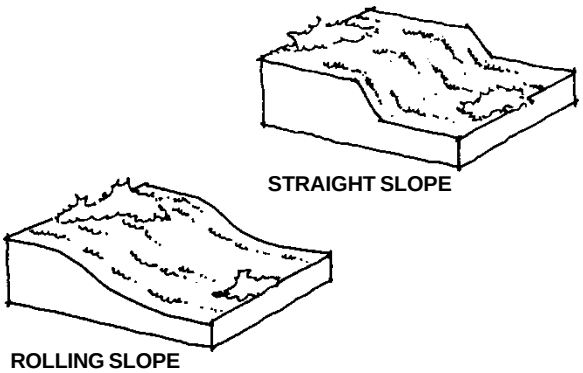
1.8 Site Grading, Excavation and Erosion Control

Policy:

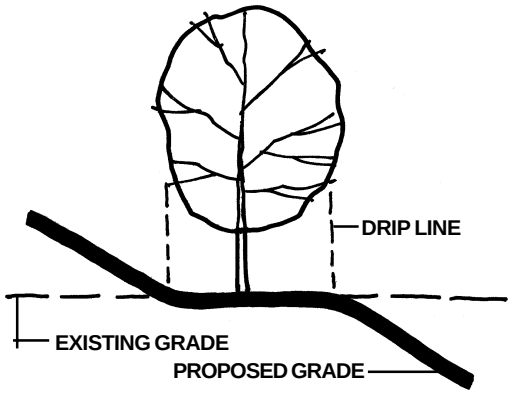
The design of site improvements should minimize cut-and-fill in order to preserve each site's natural terrain to the maximum extent possible. Site grading designs should be executed in such a manner to avoid drainage impacts (such as erosion and road damage), both on-site and downstream.

Standards and Guidelines:

A. Preserve the natural setting with grading designs that are sensitive to existing land forms and topography. (G)
B. In developing sites, limit slopes to 4:1 or less. (G) Slopes in excess of 4:1 may be allowed when engineering or site constraints dictate a steeper slope. (G)
C. In general, transition grades between old and new elevations should be rolling rather than one continuous straight slope. (G)
D. Avoid grade changes within the drip-line of existing trees that are to be maintained. (G)
E. Stockpile and protect topsoil during construction. (S)
F. Preserve existing site vegetation, to the extent possible, during over-lot grading activities. (G) Replant all disturbed soil and slopes with an approved grass mixture or ground cover. (S) Prepare the soil prior to seeding. (S)



1.8 C TRANSITION GRADES SHOULD BE ROLLING RATHER THAN ONE CONTINUOUS STRAIGHT SLOPE.



1.8 D AVOID GRADING WITHIN THE DRIPLINE OF EXISTING TREES.

2. VEHICULAR CIRCULATION AND PARKING

Goal:

The on-site vehicular circulation and parking system is a critical factor in the safety and success of a commercial development. The parking/access/circulation system should provide for the safe, efficient, convenient, and functional movement of multiple modes of transportation both on and off the site where pedestrian/bicycle/vehicle conflicts are minimized. Alternate modes of transportation, including public transit, bicycles and pedestrians should be given priority in the site design.

2.1 Site Access and Vehicular Circulation

2.1.1 Vehicular Access

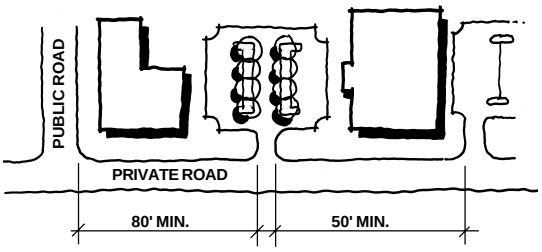
Policy:

Promote the safety and mobility of through traffic by minimizing the number of access points to private property from public streets. Design vehicle entrances as Gateways.

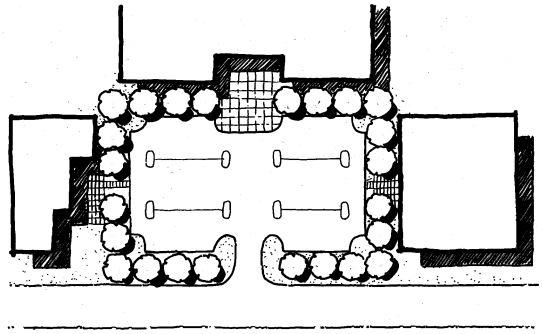
Standards and Guidelines:

A. Enhance the intersections of entrance drives with arterial and collector streets by incorporating signs, accent paving, special landscaping and lighting. (S)
B. Materials used in entry features shall be consistent with other materials used in the development. (S)
C. Utilize street intersections for access into commercial developments. (G)
D. Locate site access points as far as possible from street intersections to provide adequate vehicle stacking room. (G) More than one access to a site may be permitted when it will not be hazardous to the safety and operation of the street or to pedestrians. (G)
E. Maintain a minimum 50.0' separation between adjacent curb cuts along private roadways. (S)
F. Maintain a minimum 80.0' separation between a public or private road intersection and a parcel curb cut. (S)
G. When the opportunity exists, provide common or shared entries. (G) (See Section 5.2.C for landscaping details)
H. Locate site entries to minimize pedestrian/vehicular conflicts. (G)
I. Design entrances to align with focal points within the development such as landmark towers or landscape features. (G)
J. Entrances that lead directly into head-in parking are not allowed. (G)
K. Design internal roadways to incorporate design elements of gateway entries. (G)
L. Accent pavement materials located within the public right-of-way must meet City of Louisville Public Works Department criteria. (S).

2.1.1 DESIGN VEHICLE ENTRANCES AS ENHANCED "GATEWAYS".



2.1.1 D, E & F MINIMUM SEPARATION BETWEEN INTERSECTIONS AND CURB CUTS



2.1.1 G PROVIDE COMMON OR SHARED ENTRIES WHEN POSSIBLE.

2.1.1 I DESIGN ENTRANCES TO ALIGN WITH FOCAL POINTS SUCH AS LANDMARK TOWERS.

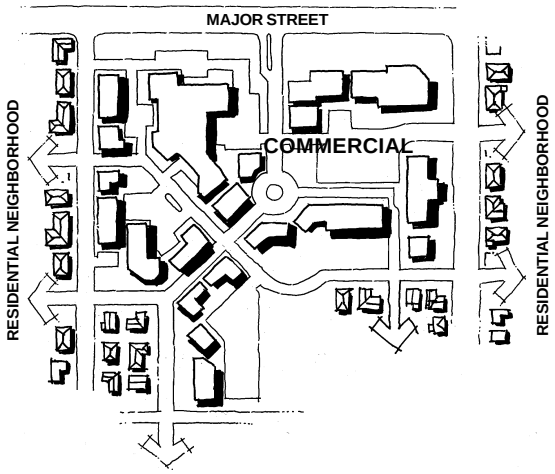
2.1.2 Vehicular Circulation

Policy:

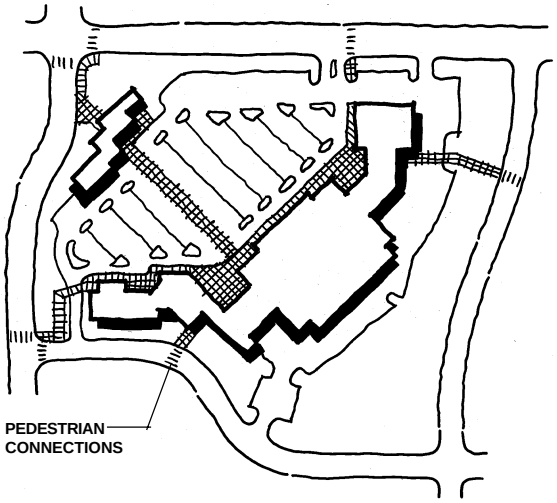
Projects with multiple building sites or parcels should include a hierarchy of internal roadways such as: 1) Internal Collector 2) Internal Drives and Parking Aisles; and 3) Service Drives. This hierarchy should be implemented by engineering and landscape treatments. The street, access and parking network shall provide for the smooth, safe, convenient and functional movement of all modes of transportation, including vehicles, public transit, bikes and pedestrians, with priority to the pedestrians.

Standards and Guidelines:

A. Link developments with surrounding areas and uses by extending streets, drives and sidewalks directly into and across the development, and across property lines, thereby providing convenient, direct pedestrian, bicycle, and vehicular access to adjoining development. (G)
B. Provide separate vehicular and pedestrian circulation systems with a strong emphasis on pedestrian linkages between uses. (S)
C. Separate parking aisles from vehicle circulation routes and entry drives. (G)
D. Avoid conflicts between adjacent parking lots by maintaining similar directions of travel and parking designs. (G)
E. Design drive-thru lanes to allow for a vehicle stacking distance that accommodates anticipated demand without impairing traffic circulation. (S) For drive-thru restaurants, the vehicle staking distance must anticipate and accommodate periods of peak demand. (S)
F. Drive-thru facilities and lanes shall be separated from parcel access points. (G)
G. Drive-thru facilities and stacking lanes shall not be located within the front yard setbacks, and when located adjacent to public right-of-ways, residential zone districts, or pedestrian gathering areas shall be adequately screened from view. (S)
H. One-way access ways require a minimum 12 foot wide (FL to FL) driveways, a minimum 15 foot radius intersection, and a maximum 100 foot length. (S)



2.1.2 A LINK DEVELOPMENTS WITH SURROUNDING AREAS.



2.1.2 B PROVIDE SEPARATE VEHICULAR AND PEDESTRIAN CIRCULATION SYSTEMS WITH A STRONG EMPHASIS ON PEDESTRIAN LINKAGES.

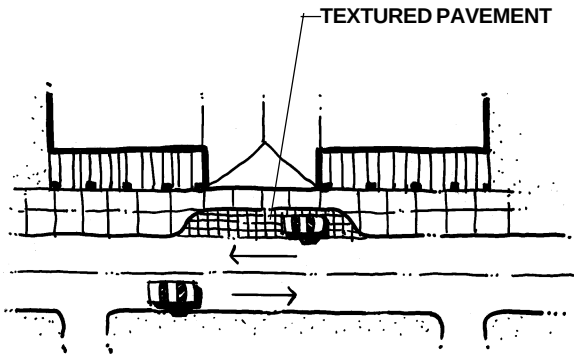
2.1.3 Passenger Drop-Off Areas

Policy:

Passenger drop-off areas should provide for safe and convenient access to building entries.

Standards and Guidelines:

A. Passenger drop-off areas should be incorporated into all projects. (G)
B. All schools and child care facilities having a capacity greater than 25 students shall incorporate drop-off areas. (S)
C. Provide a clear separation of vehicular traffic between drop-off zones and accesses to either parking lots or parking structures. (S)
D. Design drop-off lanes so as not to obstruct traffic flow when motorists are stopped to discharge passengers. (S)
E. Use a textured paving material that is distinguishable from the travel lane at the drop-off. (G)
F. Use signs to indicate “drop-off zone” or “passenger loading only”. (S)



2.1.3 D & E DESIGN DROP -OFF LANES SO AS TO NOT OBSTRUCT TRAFFIC FLOW AND USE TEXTURED PAVEMENT TO DELINEATE THIS ZONE.

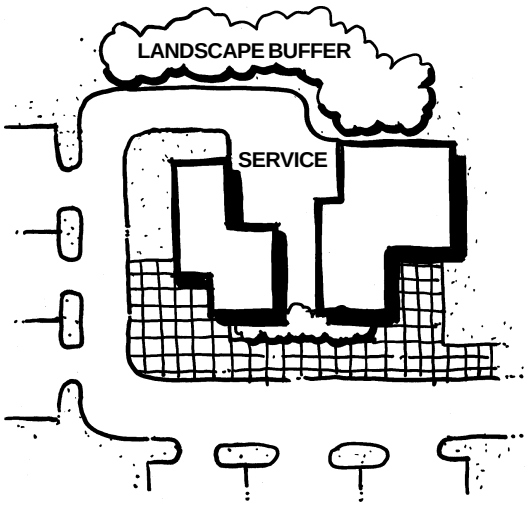
2.1.4 Service/Delivery, Emergency and Utility Access

Policy:

Routes for service, emergency and utility access should be clearly marked. Service circulation within a development shall be designed to provide safe movements for all anticipated vehicles. The design of individual parcels to accommodate truck access shall meet all regulatory requirements for turning radii without sacrificing other important goals and policies of the CDDSG.

Standards and Guidelines:

A. Meet all Louisville Fire Protection District regulations in the design and provision of emergency access to buildings for fire suppression, police, ambulance and other emergency vehicles. (S)
B. Avoid the creation of “blind areas” that cannot be patrolled by police or security staff. (G)
C. Provide shared service and delivery access ways between adjacent parcels and/or buildings. (G)

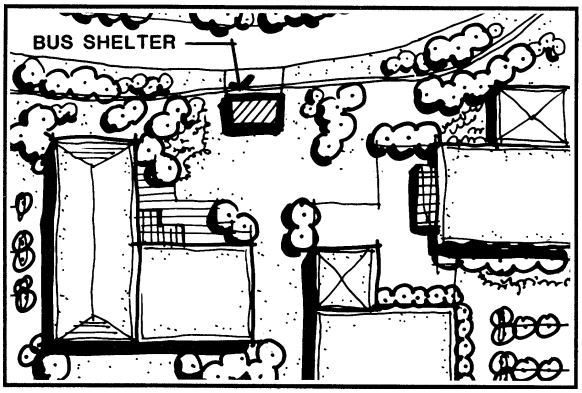


2.1.4 C PROVIDE SHARED SERVICE AREAS BETWEEN BUILDINGS OR PARCELS.

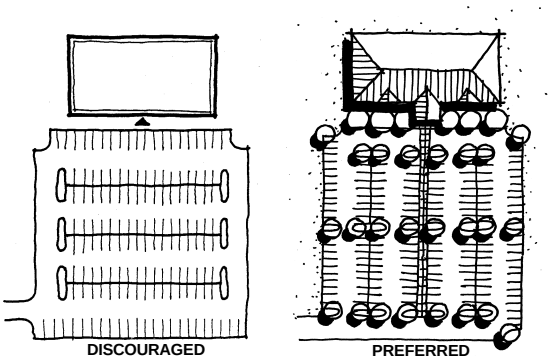
2.1.5 Mass Transit Facilities

Policy:

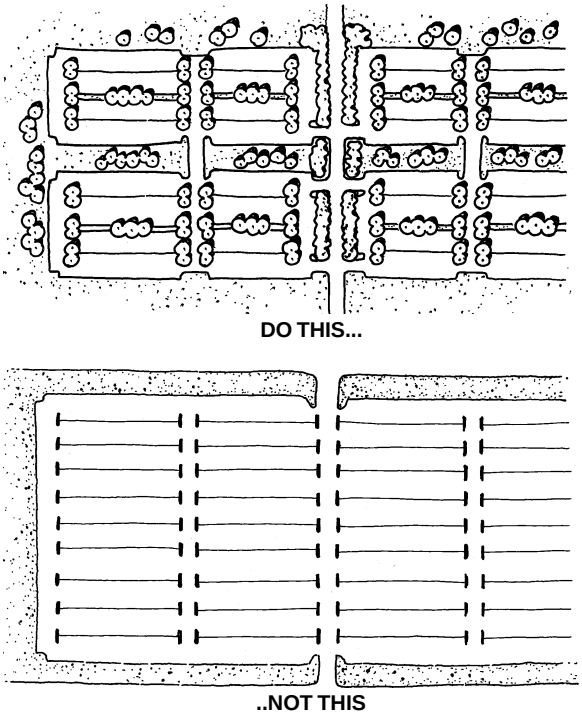
Mass transit facilities should be accommodated within all major commercial developments that could generate high volumes of transit use. Transit routes, access points and shelter locations should be addressed along major roadways within and on the perimeter of such projects. Transit facilities shall be provided in a manner to make transit an attractive mode of travel for both employees and patrons.



2.1.5 A LOCATE BUS SHELTERS CLOSE TO SIGNIFICANT CLUSTERS OF BUILDINGS.



2.2.1 E ORIENT PARKING AISLES PERPENDICULAR TO BUILDING ENTRANCES SO PEDESTRIANS WALK PARALLEL TO MOVING CARS.



2.2.1 G DIVIDE LARGE PARKING AREAS INTO A SERIES OF SMALLER, CONNECTED LOTS.

Standards and Guidelines:

A. Locate bus shelters close to significant clusters of buildings. Provide a concrete pad in front of bus shelters. Provide protection for bus shelters from the prevailing winds. Consider incorporating passive solar heating features. (G)
B. Coordinate any shelter design and locations with RTD. (S)

2.2 Parking Lots and Structures

This section provides standards and guidelines for the siting and layout of parking lots and structures. Specific landscape standards for parking areas are included in Section 5.3, Parking Lot Landscaping.

2.2.1 Surface Parking Lots

Policy:

Vehicle parking should be provided to meet the location and quantity requirements of specific uses without undermining the function of other modes of transportation or detracting from the creation of attractive pedestrian environments.

Standards and Guidelines:

A. Design parking lots to avoid dead-end aisles. (G)
B. Where a dead-end aisle is authorized, adequate space for unimpeded turn-around must be provided. (S)
C. Separate parking areas from buildings by either a raised concrete walkway, pedestrian plaza or landscaped strip. (S)
D. Avoid head in parking, except handicap parking, which causes hazardous backing movements into major drive aisles. (G)
E. Orient parking aisles perpendicular to buildings so pedestrians walk parallel to moving cars. Minimize the need for pedestrians to cross multiple parking aisles and landscape areas. (G)
F. Design parking areas that incorporate pedestrian walkways in a manner that links buildings to the street sidewalk system. (S)
G. Divide parking areas which accommodate more than 125 vehicles into a series of smaller, connected lots. (S)
H. Landscape and offset portions of the lot to reduce the visual impact of large parking areas. (G)
I. Avoid aligning all travel lanes in parking lots in long straight configurations. (G)
J. Provide cross-access easements between adjacent lots to facilitate the flow of traffic between complementary users. (G)

K. Minimum Parking Ratios:
Except for uses in the area designated as *Downtown Louisville,* the minimum number of parking spaces required per parcel/ use is based on the following ratios (# Parking Spaces/Floor Area as defined in Section 17.08.165) (S):

• Retail Uses	4.5 spaces/1000 SF
• Restaurants	15 spaces / 1000 SF
• Theaters	1 spaces / 3 seats
• Professional Offices	4 spaces/1000 SF
• Medical/Dental Offices	6 spaces/1000 SF
• Warehouse	1 / 1000 SF
• Showroom	4.5 / 1000 SF
• Hotel/Motel/Extended Stay Lodging/ Bed & Breakfast	1space/guest room
plus	1 space/2 employees

The minimum number of parking spaces required for any construction, expansion or modification in Downtown Louisville that creates additional floor area is one space per 400 square feet of new floor area, rounded to the nearest 400 square feet. See Section 17.20.025 of the Louisville Municipal Code for additional requirements regarding parking in Downtown Louisville.

L. Locate special parking spaces for van pool and car pool parking close to building entrances. (G)

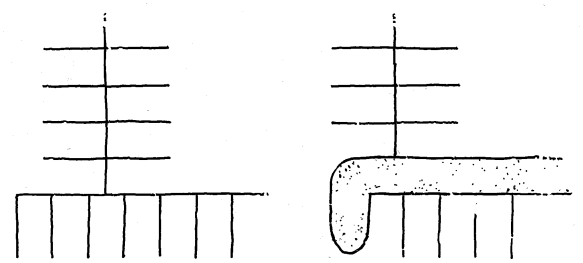
M. When opportunities exist for shared parking between different uses with staggered peak parking demand, make every effort to take advantage of this opportunity to reduce the total number of parking spaces within the development, especially in multi-tenant and mixed-use commercial centers. (G)

N. Use curbed landscaped islands to designate a change in direction of parking stalls and aisles. (S)

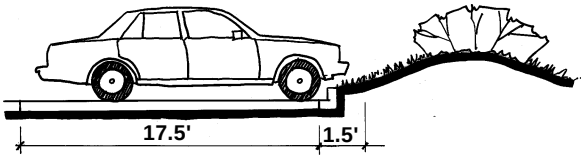
O. Provide landscaped islands at the ends of all rows of parking. (S) (See Section 5 for required sizes.)

P. Parking bumpers in surface lots are prohibited. (S)

Q. Where parking spaces abut landscaped islands, medians, or perimeter curbs or sidewalks, the length of spaces may be shortened by 1.5 feet to account for the car overhang, and the width of the sidewalk or landscape strip increased by that same amount. (G)

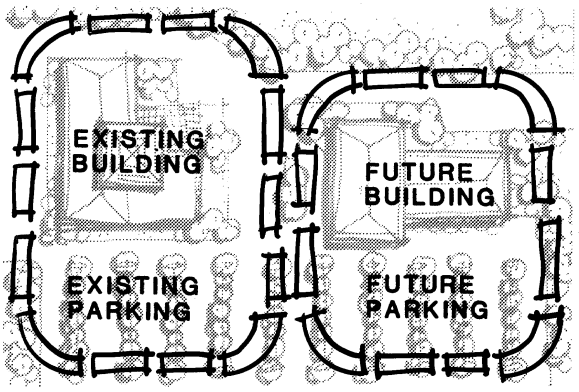


2.2.1 N USE CURBED LANDSCAPED ISLANDS TO DESIGNATE A CHANGE IN DIRECTION OF PARKING STALLS AND AISLES.



2.2.1 Q PARKING SPACES MAY BE SHORTENED BY 1.5' WHERE THEY ABUT LANDSCAPED ISLANDS.

2.2.2 D THE GROUND LEVEL OF PARKING STRUCTURES SHOULD BE INTERESTING TO THE PEDESTRIAN.



2.2.3 WHERE EXPANSION OF A BUILDING IS PLANNED, RESERVE APPROPRIATE AMOUNTS OF LAND FOR THAT PURPOSE.

2.2.2 Parking Structures and Parking Beneath Buildings

Policy:

The appearance of parking structures, whether free-standing or attached, should relate to the buildings they serve, and contribute to the character of the development. The incorporation of parking structures in a commercial development is encouraged in order to minimize site coverage.

Standards and Guidelines:

A. The general architectural criteria shall apply to all parking structures. (S) (See Section 4 Architectural Design Criteria)
B. Provide convenient pedestrian connections between parking structures and main buildings. (S)
C. Separate vehicular access to parking structures from access to general surface parking lots, and clearly identify the access with signs. (G)
D. Where the ground level of the parking structure fronts a public way, provide decorative screens, murals, or plant materials to create interest for pedestrians. (S)

2.2.3 Provisions for Future Parking Lots and Structures

Policy:

Many large projects which are expected to be developed in phases should anticipate and accommodate such phasing in the parking lot design. Provision should be made for increased parking demands related to anticipated expansions, and for possible changes in use of a building or complex of buildings.

Standards and Guidelines:

A. Where expansion of a building is planned, appropriate amounts of unimproved land for additional parking should be reserved at the outset. (G)

2.2.4 Motorcycle Parking

Policy:

Motorcycle parking should be designed and sited in such a way that it is clearly distinguishable from automobile parking. Parking stalls should be identified to encourage orderly positioning of parked motorcycles. Adequate security for parked motorcycles and visibility of motorcyclists by automobile drivers is also a concern.

Standards and Guidelines:

A. Locate motorcycle parking bays separately from automobiles. (G)
B. Use concrete paving in these parking areas to support kickstand pressure. (S)
C. Provide 1 motorcycle space/40 vehicle parking spaces up to a total of 10 spaces. (G)

3. PEDESTRIAN AND BICYCLE CIRCULATION

Goal:

Pedestrian and bicycle systems should be incorporated into all developments and designed to be safe and invite walking and bicycling throughout the project. Individual parcels and sites (within larger projects) should be integrated with adjacent properties design to form a comprehensive system and to provide convenient access to the adjacent neighborhoods as well as the regional systems.

3.1 Overall Pedestrian and Bicycle Circulation

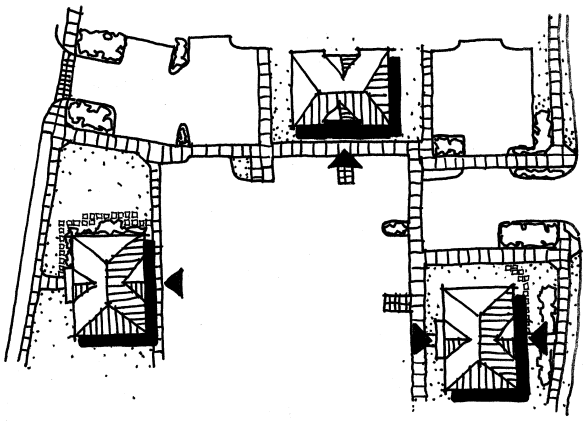
Policy:

Pedestrian spaces and routes should be designed to invite walking throughout and around each commercial development. Routes should be integrated to form a comprehensive circulation system providing convenient, safe and visually attractive access to all destinations on the site. Ease of maintenance should be considered.

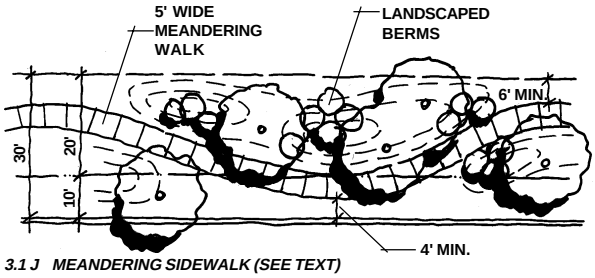
Standards and Guidelines:

A. Locate buildings and design on-site circulation to minimize pedestrian/vehicle conflicts. (S)
B. Separate pedestrian and vehicle movements with the use of landscaping, barriers or other appropriate design solutions. (G) (See also Section 3.4)
C. Differentiate areas of pedestrian and bicycle/vehicle interface with accent pavement and signage to alert drivers to potential conflicts. (S)
D. Where a driveway crosses a walkway, make the walkway continuous in grade without a ramp down to the road bed. (G)
E. Provide well-identified connections from the primary pedestrian and bicycle paths within the development to the perimeter sidewalks and bikepaths. (S)
F. Align walkways directly and continuously to connect pedestrian destinations. (S) Avoid following the outline of parking lots that do not provide direct pedestrian access. (G)
G. Locate pedestrian access and walkways away from the north sides of buildings. (G)
H. Sidewalks shall be at least 5 feet wide and detached from all arterial, collector and local public streets by a minimum 6 foot wide landscaped parkway, except at intersections where acceleration & deceleration lanes are provided. (S)
I. Sidewalks should be aligned parallel to the adjacent street. (G)

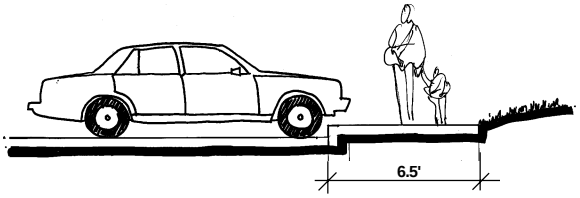
3.1 B SEPARATE PEDESTRIAN AND VEHICULAR MOVEMENTS WITH LANDSCAPING, BARRIERS, OR OTHER APPROPRIATE DESIGN SOLUTIONS.



3.1 F ALIGN WALKWAYS DIRECTLY AND CONTINUOUSLY TO PEDESTRIAN DESTINATIONS.

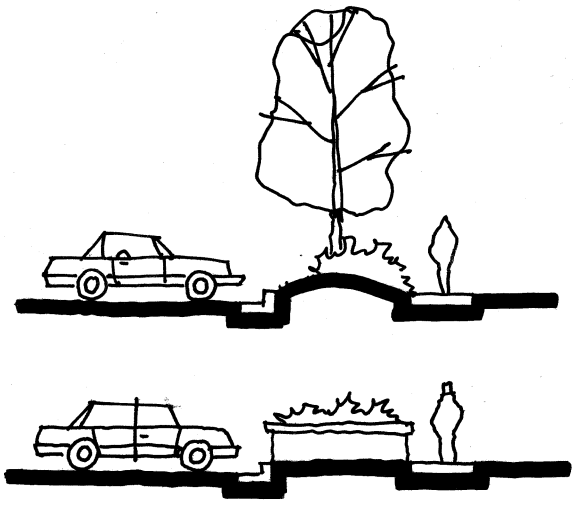


3.1 J MEANDERING SIDEWALK (SEE TEXT)



3.1 L WALKWAYS SHOULD BE 6.5' WIDE WHERE ATTACHED TO END OF HEAD-IN PARKING STALLS.

3.2 PROVIDE CLEARLY DEFINED PEDESTRIAN PATHWAYS THROUGH PARKING LOTS TO BUILDINGS.



3.3 USE ATTRACTIVE BARRIERS TO SEPARATE PEDESTRIAN AND VEHICULAR TRAFFIC.

J. In cases where a meandering sidewalk is desired along an arterial street, provide adequate width within which to accommodate berming and landscaping that enhances the meander and defines the walkways. (G) If the appropriate width is not provided within the public right of way to meet this guideline, a sidewalk easement will be required. (G)

K. Attached sidewalks are permitted only adjacent to acceleration and deceleration lanes, internal drives, the front of parking stalls and designated drop-off areas outside of the traffic flows. (S)

L. Attached sidewalks shall be a minimum of 5 feet wide, except those sidewalks attached to head in parking stalls shall be 6.5 feet in width. (S)

3.2 Pedestrian Connections through Parking Lots

Policy:

Bikeways and pedestrian walkways should be separated and buffered from external and internal automobile circulation within parking lots. Walkways should lead pedestrians from parking areas to building entrances to facilitate convenient movement and to minimize conflicts with cars. Pedestrians should feel comfortable that they are in a clearly defined pathway to the building.

Standards and Guidelines:

A. Internal pedestrian walkways should be designed to avoid the crossing of drive through lanes, and service drives. (S)

3.3 Site Barriers

Policy:

Barriers are intended to separate vehicular and pedestrian traffic for safety purposes, or to restrict access for security reasons. Barriers should be designed as visual assets to the development, and where barriers are used, the following standards and guidelines apply:

Standards and Guidelines:

A. Barriers may include fences, walls, gates, curbs, bollards, low shrubbery, and berms. (G)

B. Barrier materials shall be consistent with site furniture and building materials. (S)

C. Steel post, chain, cable and wire barriers are prohibited. (S)

D. These alternatives to conventional barriers may also be considered (G) :

   1) Change the level between a walkway and the surrounding area as an effective means to keep pedestrians on walks.

2) Install benches, seating walls, bike racks, or raised planters along the edge of a designated route to discourage cross-cutting.

E. The use of movable vehicle barriers such as gates, barricades, and mechanical devices that fold down or recess into the pavement is discouraged.

3.4 Bicycle Parking

Policy:

Functional and attractive bike parking shall be provided in convenient locations and in adequate numbers for both customers and employees.

Standards and Guidelines:

A. Locate bicycle parking spaces near both customer and employee building entrances. (S)
B. Provide sufficient lighting levels to facilitate evening bicycle use. (S)
C. Do not position racks where they will obstruct building entrances or the flow of pedestrian traffic. (S)
D. Provide bicycle parking spaces at bus shelter locations. (S)
E. Provide bicycle parking spaces in the following minimum ratio:
One (1) bicycle space for every ten (10) required off-street automobile parking spaces up to a total of 20 bicycle parking spaces. (S)
F. Providing protection from the elements for bicycle parking is encouraged. (G) Consider the use of shelters. (G) Coordinate the design of the bicycle shelter with adjacent buildings or other street furniture designs. (G)
G. Use bicycle racks that accommodate a range of bicycle types and a variety of security devices. (G)

3.4 A LOCATE BICYCLE PARKING CLOSE TO BUILDING ENTRANCES.

3.4 G PROVIDE RACKS THAT ACCOMMODATE A VARIETY OF BICYCLE TYPES.

4. ARCHITECTURAL DESIGN

Goal:

Architectural design should seek to blend in rather than stand out from adjacent structures. All elements including the scale and mass of buildings, materials, colors, roof styles, door and window openings, and details should be responsive to existing architectural design. New buildings should add to community character without rigid uniformity of design.

All buildings should be energy efficient to conserve natural resources.

Building masses should respond to "human scale" with materials and details that are proportionate to human height and provide visual interest at the street and sidewalk level. Buildings should be reduced in apparent mass or articulated to avoid large monolithic, box-like shapes.

Strongly thematic architectural styles associated with some chain restaurants and service stores are strongly discouraged and if utilized must be modified to be compatible with nearby structures and uses.

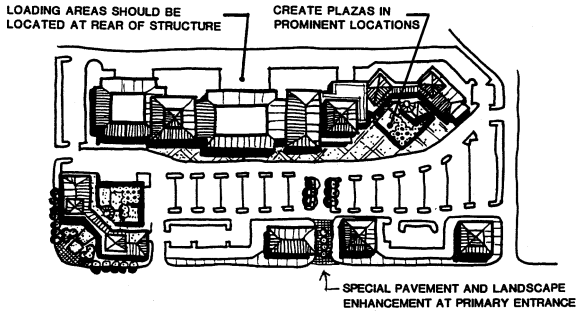
4.1 Building Relationships and Compatibility

Policy:

All buildings within a proposed development should be visually and physically compatible with one another, and with existing buildings on adjacent sites.

Standards and Guidelines:

A. Locate buildings so they will not obscure desired views from existing or proposed buildings nearby. (G)
B. Locate the building(s) to create pedestrian plazas and gathering places. (G) (See Sec 1.1.A)

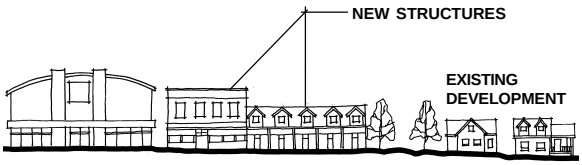


4.1 B LOCATE AND ORIENT BUILDINGS TO CREATE COMFORTABLE PEDESTRIAN PLAZAS AND GATHERING PLACES.

4.2 Building Heights

Policy:

Building heights should be minimized and should not be out of scale with existing or planned development. Buildings should appear "anchored" closely to the ground, although building heights are expected to vary, especially along the perimeter edges, adjacent to the major roadways.



4.2 B TRANSITION THE HEIGHT OF NEW BUILDINGS TO BE COMPATIBLE WITH ADJACENT DEVELOPMENT.

Standards and Guidelines:

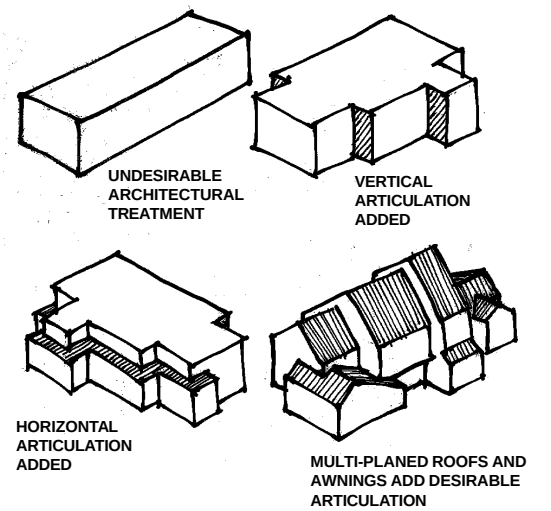
A. Relate building heights to adjacent open spaces to allow maximum sun and ventilation and to provide protection from prevailing winds. (G)
B. The height of new development should be compatible with and transition from the height of adjacent development. (G)
C. The maximum height of all commercial buildings (as measured pursuant to the Louisville Municipal Code) is 35.0', and 42.0' to the top of the rooftop mechanical screen. (S)
D. Architectural elements such as domes, spires, towers, etc. may exceed the 42.0' height limit up to 50.0', when authorized through the PUD process. (S)

4.3 Building Massing, Forms, and Pedestrian Scale

Policy:

Buildings should relate to the terrain and each other in their massing and forms. Square "box-like" structures with large, blank, unarticulated wall surfaces are not an acceptable form.

Facades with a high level of visual interest from auto and pedestrian views are encouraged. The exterior character of buildings should respond to pedestrian scale in the immediate vicinities. Buildings should have features and patterns that provide visual interest at the scale of the pedestrian, that reduce apparent mass, and that relate to local architectural character.



4.3 BREAK LARGE BUILDINGS INTO MODULES OR SUB-PARTS TO REDUCE PERCEIVED SCALE.

Standards and Guidelines:

A. In cases of facades more than 50 feet in length, incorporate significant architectural features and treatments to diminish the building mass. (S)
B. Additional techniques shall be used to reduce scale and apparent massing of buildings. (S) Utilization of the techniques set forth in the following guidelines C thru I, as well as other techniques proposed by the applicant, will be used in determining compliance with this standard.
C. Variations in facade elements can reduce perceived scale and mass. For example:
   1) Variations in color and/or texture should be used. (G)
   2) Step downs and step backs should follow the terrain and be tiered and reinforced by landscape elements. (G)
   3) Variation in roof forms and height of roof elements should be used. (G)
D. Compositions that emphasize floor lines or that express rhythms and patterns of windows, columns, and other architectural features are encouraged. (G)
E. Express the position of each floor in the external skin design:
   1) Consider terracing, articulated structural elements, or a change in materials as methods of defining floors. (G)

4.3 B & C USE A VARIATION IN FACADE ELEMENTS TO REDUCE PERCEIVED SCALE.

2) Consider using belt courses or other horizontal trimbands of contrasting color and materials to define floor lines. (G)

F. Avoid blank walls at ground-floor levels. Use windows, trellises, wall articulation, arcades, material changes, awnings or other features. (G)

G. Use materials manufactured in units and measurable in human proportions such as brick, tile, and modular stone. Other appropriate materials include: stucco, glass, and decorative tiles. (G)

H. Architectural features such as columns, pilasters, canopies, porticos, awnings, brackets or arches should be included. (G)

I. Windows that can reveal indoor amenities and activities and displays are encouraged. (G)

4.3 G USE BUILDING MATERIAL THAT CAN VISUALLY BE MEASURED TO GAIN A SENSE OF HUMAN SCALE.

4.4 Roof Forms and Materials

Policy:

Rooftops should contribute to the unified appearance of each development and should be considered as seen from: higher areas, ground level, other buildings, and roadways.

Standards and Guidelines:

A. Avoid roof lines running in continuous planes of more than fifty (50) feet. (G)

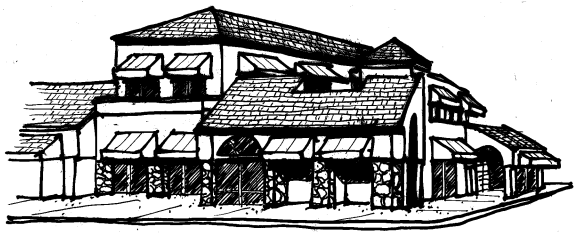
B. Flat roofs are not encouraged. (G)

C. Roof materials should be high quality, durable and consistent with local architectural themes. (S) Concrete tile, asphalt shingles, and standing-seam metal are examples of appropriate roof materials. (G)

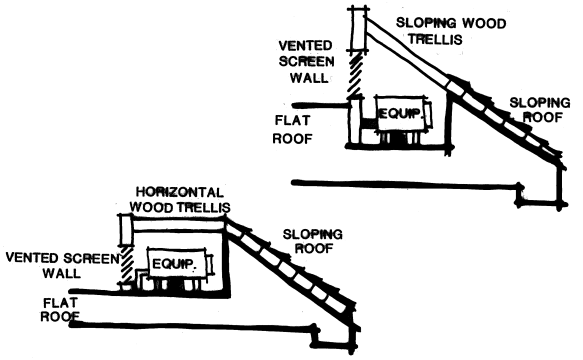
D. Screen roof top mechanical units from view with architecturally integrated screening units, roof parapets, or sloped roof forms. (S)

E. Design roof forms to correspond to and denote building elements and functions such as entrances, arcades, and porches. (S)

F. Roof forms should relate to adjacent buildings or developments. (G)



4.4 MIX ROOF FORMS TO CREATE VARIETY IN THE "ROOFSCAPE".



4.4 D SCREEN ALL ROOF EQUIPMENT WITH MATERIAL CONSISTENT WITH THE MAIN STRUCTURE.

4.5 Building Materials and Colors

Policy:

Exterior materials and colors should be aesthetically pleasing, of a high quality and compatible with materials and colors of nearby structures. Compatibility of building materials is desired throughout a development project consisting of multiple buildings.

4.5.1 F USE HEAVIER MATERIALS AT LOWER PORTIONS OF BUILDINGS.

4.5.1 Building Materials

Standards and Guidelines:

A. Exterior wall materials must be muted. (S) As such:
   1) Matte textures are encouraged. (G)
   2) Masonry, brick, stone and stucco, are strongly preferred. (G)
   3) Textured concrete may also be considered. (G)
   4) Wood is also appropriate in the context of similar adjacent development. (G)
B. Utilize materials in their natural texture and color. (G)
C. Use the same materials and colors on all elevations of a building. (S)
D. Highly reflective materials such as bright aluminum and glass are not permitted as the primary building material, especially at the pedestrian level. (S)
E. Combine building materials in patterns that create a sense of human scale. (G)
   1) Cast or scored concrete that gives a sense of proportion may be appropriate as well as conventional modular materials such as brick or stone. (G)
   2) Avoid large blank featureless or uniform surfaces. (G)
F. Use heavier materials such as natural stone and masonry materials on the lower 3 to 4 feet of buildings to help visually anchor them to the ground. (G)
G. High quality, low-maintenance materials are encouraged. Select durable building materials that will age well. (G)
H. Painted metal, painted concrete, plain unfinished concrete block or large expanses of unarticulate stucco are not acceptable materials. (S)
I. Do not use plexiglass, glossy metal and backlit vinyl awnings. (S)

4.5.2 Building Colors

A. Do not use paints or other covering materials with unproven durability. (S) Do not use bright colors, (including bright white) that may streak, fade or generate glare. (S) While subdued or muted colors generally work best as a dominant, overall color, a bright or primary color can also be appropriate for accent elements, such as door and window frames, and architectural details. (G)
B. Choose color palettes for new buildings that are compatible with the colors of adjacent structures. (S)
C. Minimize the number of colors appearing on a structure's exterior. (G)
D. Paint architectural detailing to complement the facade and coordinate with adjacent buildings. (S)
E. Roof colors shall be muted and compatible with the dominant building color. (S)

4.6 Building Entrances

Policy:

Primary building entrances should be easily identifiable and relate to human scale.

Standards and Guidelines:

A. Locate main entrances to be clearly identifiable from primary driveways and drop-offs. (S)
   For example:
   1) Design building entrances to contrast with the surrounding wall plane. (G)
   2) Consider tinted glass, painted doors, or recessed features that will create a shaded effect. (G)
   3) Create a frame around doorways, by changing materials from the primary facade material. (G)
   4) Design primary entrances to be accessible to handicapped users without complex ramp systems. (G)
B. All building entrances shall be well-lit. (S) (See Chapter 8)
C. Consider using building entrance ways as a transition from the building to the ground. Incorporate walls, terraces, grading and plant materials to accomplish this transition. (G)
D. Consider using terraces or porticos to define entrances. (G)

4.6 A LOCATE AND DESIGN MAIN ENTRANCES TO BE CLEARLY IDENTIFIABLE.

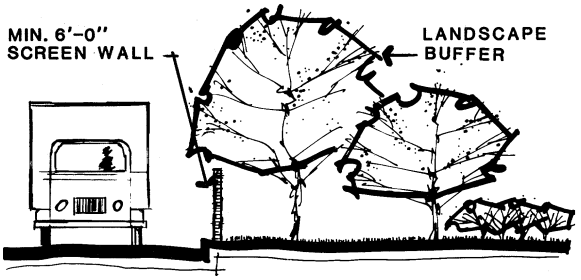
4.7 Service Entrances and Loading Areas

Policy:

Service areas should be visually unobtrusive and integrated with the project site design and architecture.

Standards and Guidelines:

A. Orient service entrances, loading docks, waste disposal areas and other similar uses toward service roads and away from arterial and collector streets and residential areas, unless adequately screened. (S)
B. Screen service entrances and trash dumpsters from public streets, pedestrian gathering areas and primary entrances with fencing, walls and/or landscaping. (S) Use the same materials as employed elsewhere on the building or site. (S)
C. Coordinate the location of service areas with adjacent developments, so that shared service drives may be feasible. (G)
D. Do not place service areas where they will be readily visible from adjacent buildings or where they will negatively impact important/identified view corridors. (S)



4.7 B SCREEN SERVICE ENTRANCES AND TRASH DUMPSTERS WITH FENCING, WALLS, AND/OR LANDSCAPING.

4.8 Energy Conservation Measures

Policy:

Local climate conditions afford the opportunity to take significant advantage of passive and active solar energy applications. Buildings should be designed and sited to maximize the use of solar gain for energy savings, and respect the solar access requirements of adjacent (existing and proposed) buildings.

Standards and Guidelines:

A. Applicants are encouraged to consider energy conserving design concepts, including but are not limited to the following: (G)
   1) Proper orientation and clustering of buildings to take advantage of the prevailing summer winds and to buffer against adverse winter wind conditions.
   2) Types of material and their insulation characteristics.
   3) The arrangement and design of windows and doors.
   4) Direct solar or photovoltaic energy.
   5) Daylighting concepts.
   6) Earth sheltering with creative land forming.
   7) Natural ventilation of outdoor, indoor and attic spaces.

5. LANDSCAPE DESIGN [1]

Goals:

Landscaping for commercial areas is provided within each building site to: 1) enhance the aesthetics of commercial developments, 2) create a pedestrian friendly environment, 3) break up the mass of buildings, 4) soften architectural materials, 5) provide screening of service structures, 6) enhance the streetscape/parkway environment, 7) define building and parking area entrances, 8) provide shade and climate control, 9) control airborne particulates and 10) provide buffers between incompatible land uses or site areas. Drought tolerant plant species that are native to the region or suitable to this climate should be used.

This chapter addresses 4 distinct zones corresponding to the 4 major design influences on each commercial site:

1) Perimeter Landscaping Adjacent to Public and Private Roads
2) Perimeter Landscaping Adjacent to Abutting Property
3) Parking Lot Landscaping
4) Individual Building Landscaping

On smaller sites, there may be overlap between the four (4) planting zones that could result in over planting. Please consult with Planning Division staff to determine whether the requirements of one zone may take precedence over those of another zone.

The City shall strive to:

- Inspect all plant material prior to planting
- Inspect all irrigation designs and implementations
- Inspect installation at one and five year intervals

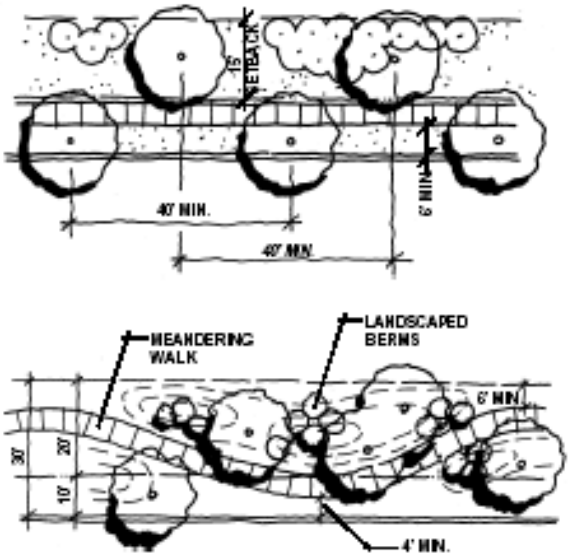
5.1 Perimeter Landscaping Adjacent to Public and Private Roads

Policy:

The corridors along perimeter arterial streets and internal collectors should provide a visually cohesive open space system. Similar landscape treatments should be used at all entrances and intersections. Plant materials, massing, spacing, and height characteristics should reinforce the hierarchy of roadways. Planting and grading should work together to create a variety of experiences along these roadways and to call attention to open space amenities. Perimeter edge treatments should establish identity for the project and convey a high-quality image.

5.1.A INCLUDE A COMBINATION OF MANICURED AND ENHANCED NATURAL LANDSCAPE AREAS.

5.1.D CREATE LANDSCAPE POCKETS IN LONG EXPANSES OF FENCES AND WALLS.



5.1.E2 & E4 LANDSCAPE REQUIREMENT DIAGRAMS

Standards and Guidelines:

A. Include a combination of manicured and enhanced natural landscape areas. (G)
B. Place annual and perennial gardens at entries. (S)
C. Place project identification markers along the perimeter edge of all commercial developments. (G)
D. Design long expanses of fence and wall surfaces to create landscape pockets. In cases of walls or fences over 50 feet in length, provide structural offsets, insets or landscape pockets to break monotony, provide visual interest and reduce heating effects. (S)
E. Parkway and Median Plantings:
    1) Vary street tree planting species in medians and parkways. (S) However, maintain the desired rhythm of plantings by selecting street trees with similar characteristics (i.e., height and branching patterns). (S)
    2) Where detached walks parallel to the street are proposed:
        a. Provide a minimum of 1 tree per 40 lineal feet of public and private street frontage between the sidewalk and curb in a minimum 8-foot width strip (S) Also in this area, provide durable, low growing shrubs at a minimum ratio of 1 shrub per 5 lineal feet, durable ground covers or a combination of the two. Irrigated ~~turf~~ grass that is native to Colorado or hybridized for arid conditions may also be placed in these areas. However, if the width of the area between sidewalk and curb is less than 10 feet, it would require subsurface irrigation. (S)
        b. Provide an additional 1 tree per 40 lineal feet of street frontage within 10 feet outside the sidewalk, internal to the development. (S)
        c. Provide a minimum of 1 shrub per 5 lineal feet plus ground cover or ~~turf~~ grass that is native to Colorado or hybridized for arid conditions outside the sidewalk, internal to the development. ~~Turf~~ Native or hybridized grass should be limited in this area and when used should be planned in a manner that can be efficiently irrigated. Low water using ~~turf~~ species should be chosen, provided they will typically provide a green appearance. (S)
    3) Where attached sidewalks are proposed:
        a. Provide a minimum of 1 tree per 20 lineal feet of public and private street frontage within 15 feet of the edge of the sidewalk. Tree spacing should be evaluated relative to the mature canopy size, as provided in the Recommended Plant Materials List maintained by the

City and on file with the Planning Division. (S)

b. Provide a minimum of 5 shrubs per 20 lineal feet plus perennial flowerbeds, ground cover or grass that is native to Colorado or hybridized for arid conditions ~~lawn~~ within 20 feet of the edge of curb. ~~Lawn~~ grass areas that are less than 10 feet wide in any one dimension and bordered by impervious (or paved) surfaces, may ~~not~~ be ~~turf, unless~~ irrigated with a subsurface (no pop up or spray heads) system. (S)

4) Where meandering sidewalks are proposed:

1) Provide a minimum of 1 tree per 20 lineal feet of public and private street frontage. Tree spacing should be evaluated relative to the mature canopy size, as provided in the Recommended Plant Materials List maintained by the City and on file with the Planning Division. (S)

2) Accompany the trees with a variety of shrubs and ground covers. Terracing of landscape area may also be appropriate in this area; however, berming should be avoided, as it tends to lead to inefficient irrigation and water waste. (G)

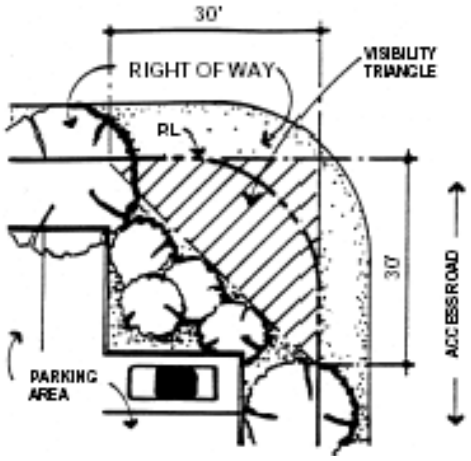
3) Provide a minimum of 8 shrubs per 20 linear feet plus perennial flowerbeds, ground cover or grass that is native to Colorado or hybridized for arid conditions ~~l~~lawn. Grass ~~L~~lawn areas that are less than 10 feet wide in any one dimension and bordered by impervious (or paved) surfaces, may ~~not~~ be ~~turf, unless~~ irrigated with a subsurface (no pop up or spray heads) system. (S)

5) To prevent interference with motorist visibility, plant parkway trees a minimum of 3 feet from the back of curb and choose shrubs that do not exceed 24" mature height. (S)

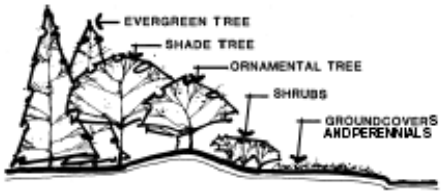
F. Visually buffer all parking lots adjacent to perimeter roadways with adequate screening within a planting strip between the public right of way and the edge of the parking lot pavement. (S) Provide adequate shrub plantings to create a dense visual buffer between parking lots and perimeter roadways. (S) When using Juniper shrubs to create said buffer, a variety of species should be used to avoid the appearance of a single mass. (S) A maximum ratio of 1 Juniper per 3 deciduous shrubs is suggested. (G) Raised planters and screen walls are also encouraged to provide parking lot screening. Bermed turf areas should be avoided due to their tendency to waste irrigation water. (G)

G. Sight-lines at Intersections and within Medians

1) Provide adequate sight lines for an effective 30-foot sight triangle measured from the right



5.1.G TYPICAL SIGHT LINES AT INTERSECTIONS



5.1.H.1 PROVIDE A MINIMUM OF 3 LEVELS OF LANDSCAPE SCALE AT ENTRY DRIVES

of way. (S) Plants and signage are allowed within the sight triangle if:

a. plants do not exceed 30" in height at full maturity; and
b. signs do not exceed 30" in height (measured from top of curb height) unless they are more than 80 percent open. (S)

H. Provide a diversity of landscaping materials at entry drives to development parcels. (S) Therefore:
   1) Provide a minimum of 3 levels of scale, including shade, evergreen, and/or ornamental trees, shrubs, annual and perennial flowers, and ground covers. (S)
   2) Plant clusters that appear as a cohesive visual element, and that complement the overall landscape theme and palette. (G)
   3) Integrate the plant design with the entry sign. Plantings should frame or provide a visual base for the signs. (S)

5.2 Perimeter Landscaping Adjacent to Abutting Property

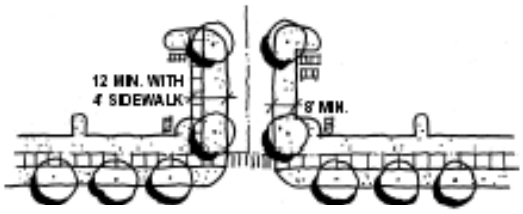
Policy:

Visual buffers should be provided between similar land uses to accomplish transitions and to mitigate potential conflicts between dissimilar uses.

Standards and Guidelines:

5.2.B PROVIDE A 30' WIDE PLANTING STRIP BETWEEN DISSIMILAR USES.

A. Between similar uses (i.e., where the adjoining uses are each permitted in the underlying zone district): Provide a minimum 10 foot wide buffer planting strip next to a perimeter or internal property line containing 1 tree for every 40 lineal feet of property line and appropriate shrubs, ground cover and/or native or hybridized grass ~~turf~~ areas. (S) This may not apply to internal property boundaries within a multiple-lot development to the extent the lots are developed under a single Planned Unit Development Plan and achieve other site design policies of these guidelines.
B. Between dissimilar uses (i.e., where the adjoining uses are not both permitted as a use by right in the underlying zone district(s)): Provide a minimum 30-foot wide buffer planting strip containing a minimum of 1 tree for every 20 lineal feet of property line and a screen hedge incorporating both deciduous and evergreen shrubs a minimum of 3 feet in height (at maturity) along a minimum of 50% of this perimeter area. (S)
C. Common/Shared Access Drives:
   1) Provide a minimum 8-foot wide buffer strip along both sides of a shared access drive when no sidewalk is included. (S)



5.2.C COMMON/SHARED ACCESS DRIVES.

2) Provide a minimum 12-foot wide buffer strip along both sides of a shared access drive where a sidewalk is included. (S)

5.3 Parking Lot Landscaping

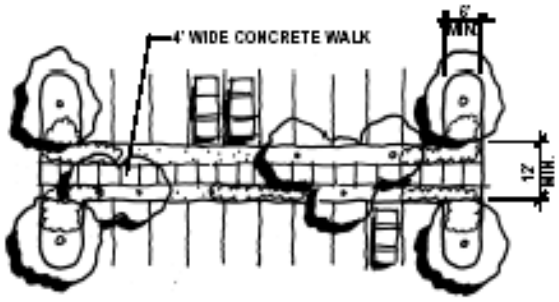
Policy:

Parking lots are necessary features of building sites that can, if not designed properly, visually detract from the overall development character. Parking lots should be designed to blend with each building site's character using landscape plantings and grading.

Standards and Guidelines:

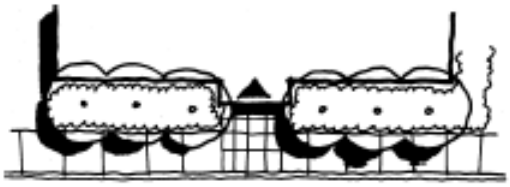
A. Use low, opaque walls and/or flowering plants combined with raised planters to create a dense visual buffer of parking areas from peripheral streets or frontages. (S)
B. Lower the grades of parking lots below existing street elevations to aid in obscuring views of automobiles, while promoting views of architectural elements of the structures beyond. (G)
C. A minimum of 1 canopy shade tree per 8 parking spaces is required in all parking lots, to be planted in islands, medians, and perimeter areas adjacent to lots (excluding streetscape tree plantings). (S)
D. Physical shade structures that incorporate live planting may also be an appropriate means of shading parking lot areas. (G)
E. No Evergreen Tree with a mature width greater than 20 feet, as noted in the Recommended Plant Materials List, should be planted within 15 feet of a hardscaped area. (S)
F. Utilize landscaped islands and medians to improve the definition of circulation patterns, provide shading for paved areas and break up continuous rows of parking. (G)
G. No landscaped area within a parking lot shall be less than 100 square feet. (S)
H. Landscaped Islands
    1) Provide a minimum 6-foot wide landscaped island at the end of every row of parking, equal in length to the length of the parking space(s). (S)
    2) Provide a minimum of 2 canopy shade trees in each island with a minimum mature canopy of 20 feet. (S)
    3) In addition to the trees, plant each island with either a minimum of 8 shrubs, not exceeding 3 feet in height at maturity or a durable and hardy ground cover. (S)
I. Landscaped Medians
    1) Place landscape medians between every other parking bay in lots for more than 100 cars. (S)
    2) Landscape medians should be 12 feet wide, including a 4-foot concrete sidewalk. (S)

5.3.A USE LOW WALLS AND LANDSCAPING TO SCREEN PARKING



5.3.H & I LANDSCAPE MEDIAN AND ISLAND (SEE TEXT)

5.4.B EMPHASIZE AND INTENSIFY LANDSCAPE AT BUILDING ENTRANCES INCLUDING FLOWER BEDS WITH A VARIETY OF PERENNIALS, ANNUALS, GROUND COVERS AND ORNAMENTAL GRASSES.



5.4.C PROVIDE LANDSCAPING AROUND BASES OF BUILDINGS (SEE TEXT)

5.4.D PROTECT LANDSCAPING FROM PEDESTRIAN AND VEHICULAR TRAFFICE WITH ATTRACTIVE BARRIERS.

5.4.E USE CONTAINERS WITH FLOWERING PLANTS TO ENHANCE SIDEWALK SHOPS, PLAZAS AND COURTYARDS.

Where walkways in medians will not be utilized, the medians may be reduced to a width of 8 feet. (G)

3) Provide a minimum of 1 canopy shade tree for each 30 lineal feet of median. (S) In addition to trees, plant each island with either a minimum of 8 shrubs per 30 lineal feet or a durable and hardy ground cover. (S)
4) The use of landscape medians is encouraged as a transition slope between parking bays on hillside parking lots (maximum slope of 4:1). (G)

J. Where head-in parking occurs, locate all shrubs a minimum of 3 feet from the edge of the parking lot curb. (S)

5.4 Building Site Landscaping

Policy:

The coordination of landscape design for individual building sites and larger, multi-parcel projects is essential for creating a consistent, high-quality character. A coordinated design unifies the various buildings and strengthens the cohesiveness of the development. Individual landscape treatments for building sites should compliment the roadway landscapes, create distinctive settings for buildings, reinforce the design of the open space systems, and provide amenities for pedestrians.

Standards and Guidelines:

A. Use landscaping that is of appropriate scale relative to the proposed adjacent structures.
B. Intensify landscaping at building entrances. (G)
C. Provide a minimum planting width of 6 feet adjacent to the building and plant no less than 25% of the building perimeter with multi-stemmed ornamental trees, shrubs, perennial flowers, and ground cover. (S) Emphasis should be given to landscaping along the front building elevation. (G) Provide additional landscaping around the perimeter of buildings to soften the edge between sidewalks/parking lots and structures. (G) To promote irrigation efficiency, no single landscaped area shall be less than 100 square feet, with the exception of deciduous trees planted in grates. (S)
D. Protect landscaping from vehicular and pedestrian encroachments with raised planting surfaces, depressed walks, and/or curbs. (G)
E. Use high quality, durable planters with flowering annual and perennial plants to enhance sidewalk shops, plazas and courtyards. (G)
F. Minimum Landscape Area required within each building site and within the entire development shall be 30% including hardscaped plazas and walkways within open space areas. (S) Hardscape plazas and walkways can account for

a maximum of one-third of the minimum landscape area requirement. (S)

G. Landscaping within Public Easements
   1) Landscaping within public easements is limited to shrubs, ground covers, and small ornamental trees. (G) No canopy/shade trees may be planted within such easements. (S)
   2) Berming is generally acceptable within public easements in conjunction with plant material. (G) Berming is not to be used instead of plant material. (S)

5.5 Landscape Irrigation / Water Conservation

Policy:

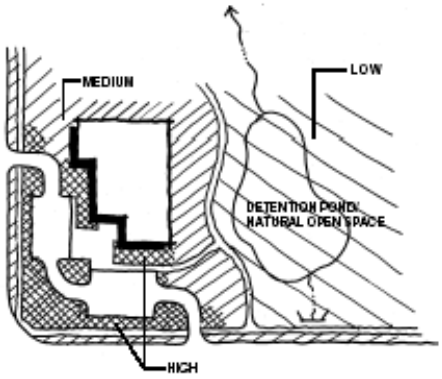
A significant percentage of the City's treated water supply is used to irrigate plant materials and grasses. Every effort should be made to conserve water by utilizing alternative means for maintaining a suitable landscape environment.

Standards and Guidelines:

A. Incorporate Xeriscape Concepts into the landscape design of each commercial development without compromising the intent to establish significant visual amenities through landscaping. Utilize a combination of the following principles to achieve this requirement. (S)
   For Example:
   1) Incorporate a "zoned planting scheme" to reduce water demand by grouping similar varieties of plants that are drought and disease tolerant. (S) The use of water conserving landscapes is encouraged by minimizing manicured grassy areas. (G) The PUD landscape plan should depict what are proposed as low, medium and high water zones. (S) The building permit irrigation plan should calculate GPM/zone. (S)
   2) Use drought tolerant plant species suitable to this climate that have minimum watering and pruning requirements. (G)
   3) For all irrigated areas, potential runoff should be avoided through a combination of locating such areas away from hard surfaces and the proper selection of irrigation devices. (G)
   4) Incorporate heavily mulched planting beds to aid in retaining moisture and to make planting areas easier to maintain. For all grassy areas, soils shall be improved with 3 to 6 yards of organic materials per 1,000 square feet to a depth of 6 to 8 inches. (S)
   5) Incorporate advanced irrigation measures and scheduling. Install an efficient automatic irrigation system that will incorporate water conservation measures. Spray heads are

recommended for lawn and ground cover areas, with drip irrigation for shrubs and trees. (G)

B. The developer is encouraged to investigate alternative sources of irrigation water for all landscaped areas. (G) Alternative sources shall be owned and maintained by the developer or an organization formed for such purpose, unless the City otherwise agrees.



5.6.A LANDSCAPE MAINTENANCE ZONES

5.6 Landscape Standards and Plant Material Selections

Policy:

A. Landscape zones:
Depending on the size and magnitude of an individual parcel, the project's landscape areas should be divided into one or more of the following basic zones (G):

6) High Maintenance Zone (located at site and building entrances and pedestrian areas.) This zone may include:
   a. Manicured <u>grass that is native to Colorado or hybridized for arid conditions</u> ~~lawns which require weekly mowing and regular watering (including blue grass sod or fescue grasses)~~
   b. Formal plantings of trees and shrubs
   c. Planters, with annuals and perennials
7) Medium Maintenance Zone (located along perimeter roadways.) This zone may include:
   a. Drought tolerant <u>native or hybridized</u> grasses, which require less water and maintenance (but still provide a manicured green look during the growing season – including fescue-type grasses)
   b. Large shrubs
   c. Large specimen trees
8) Low Maintenance Zone (located in environmentally sensitive areas, along waterways and the balance of the site.) These may include:
   a. Natural areas and native grasses (which require very low water and maintenance)
   b. Existing vegetation
   c. Drought resistant plant species
   d. Meadow-like, open fields
   e. Wetlands areas

B. The City Manager shall by written order adopt a Recommended Plant Materials List for development subject to the CDDSG, which List may be updated periodically by subsequent written order of the City Manager. Prior to adopting any such order, the City Manager may obtain the input of HFAB, the Planning Department, and any other persons regarding such List, and may notice and hold any public

meetings the Manager deems advisable to assist in formulating any such order or List. The Recommended Plant Materials List shall be maintained on file in the Planning Department. All applicants for development subject to the CDDSG shall be advised as to the existence of the Recommended Plant Materials List and a copy thereof shall be made available to such applicants. Selection of plant materials is preferred from the Recommended Plant Materials List (G), and in light of the following standards and guidelines:

1) Select plan materials on the basis of suitability to climate, setting, long-season of visual appeal (multi-season plants, good architectural appeal, long bloom time, branching structure or ornamental grasses, for instance), and compatibility with other development plantings, character and functions. (G)
2) Select plant materials that are free of disease and harmful insect problems. (S)
3) To avoid the spread of disease, avoid planting more than 20 percent of a site with any single plant species. On small sites (less than 2 acres), some flexibility may be granted to achieve specific design objectives, subject to review and approval of the City Forester. (G)
4) The quality of plant material selected will follow the guidelines of the "American Standard for Nursing Stock" by the American Association of Nurserymen. (S)
5) Proper drainage is required for all major plantings to ensure the establishment of a good root system and healthy growth. (S)
6) The installation of all landscaping shall be done by an established landscape contractor who follows the procedures set forth by the American Association of Landscape Contractors and its local agencies. (S)
7) All landscaping and landscape material shall be backed by a warranty of the owner and the Contractor for a minimum of one year, as detailed in the development agreement. (S)
8) A performance guarantee is required to ensure completion of landscaping. (S)
9) Artificial plants of any type, size or color are not allowed as exterior landscaping within any development parcel. (S)

C. Grasses should provide an immediate cover ~~and sod is recommended~~. In less irrigated/non-irrigated areas, plant drought-tolerant plants. A temporary irrigation system should be maintained for a minimum of one year. (G)
D. Choose plant materials that provide variety and year-round color and screening. Select materials, which highlight each season (G).
   1) Spring: Flowering Plants
   2) Summer: Shade
   3) Fall: Leaf color
   4) Winter: Branch form and texture

5.6.E PLANT FLOWER BEDS IN VISIBLE AREAS

E. Edging is required to separate grass areas from shrubs, ground cover and mulch. (S)
F. Utilize porous paving materials for paths, plazas, etc., such as patio bricks, inter-locking pavers, concrete stepping stones and/or sandstone. (G)
G. Plant annual and perennial flower beds in visible areas such as pedestrian plazas, building entries. (S)
H. Mulching:
    1) All planting beds should be mulched with wood or decorative rock to stabilize soils, control erosion, and conserve water use. (S)
    2) Use organic mulch materials that are best suited and adapted for the local area. (S)
    3) Decorative rock may not constitute more than 50% of the total mulched area. (S)
    4) In parking lot landscape islands, rock mulch may be used as an edger to protect the organic mulch, which should be the primary mulch material. (S)
I. Use landscape or weed barrier fabric within all shrub beds and mulched areas to control weeds. (G)
J. All Landscape Plans should be prepared by a qualified Landscape Architect or landscape designer. (G)

5.7 Planting Size Standards

Policy:

An immediate landscape impact is desired within all commercial developments, and to facilitate this, minimum plant size standards are required. Larger sizes are encouraged for shrubs and perennials.

Standards and Guidelines:

A. Provide landscaping according to the following minimum sizes: (S)
    1) Deciduous shade/canopy trees: 2.0” caliper*
    2) Ornamental trees: 2.0” caliper*, however, 1.5” caliper ornamental trees may be sufficient in some cases.
    3) Evergreen trees: 6’-8’ height (with a minimum of 25% 8’ in height)
    4) Multi-stem Ornamentals: 8’-10’ height
    5) Shrubs: 5 gallon container
    6) Ground Cover/Perennials: 2¼” pots*
    7) Vines: 1 gallon container

    *Measured by ANSI standard Z60.1.

5.8 Landscape Maintenance and Replacement

Policy:

The property owner is responsible for providing, protecting and maintaining all landscaping in a healthy and growing condition.

Standards and Guidelines:

A. The property owner will remove and replace dead plant materials immediately with the same type, size and quantity of plant material as originally installed. If material is diseased or insect-infected, replacement with same species is not advisable unless solution has been found for disease or infestation. Replacement may not be identical, yet should provide same form and function, subject to City Staff review and approval. (S)
B. Avoid replacing landscape materials during the dry winter months between December and February and in midsummer. (G)
C. Contact the Planning Division for specific time requirements for landscape material replacement. (G)

5.8.A REMOVE AND REPLACE DEAD OR DISEASED PLANT MATERIALS IMMEDIATELY.

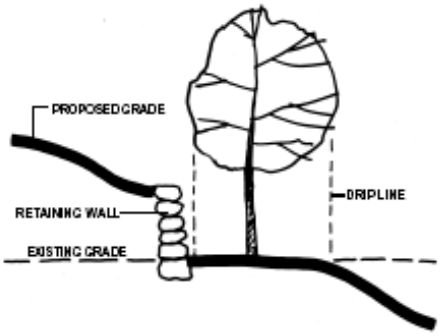
5.9 Existing Vegetation

Policy:

Special attention should be paid to preserving within each commercial development those natural features and vegetation which are significant because of their unique character, history, size, variety, or growth habits. This includes all mature trees greater than 3 inches in diameter and significant understory plants and shrubs.

Standards and Guidelines:

A. Provide an inventory of all existing trees and significant woody vegetation that identifies size, health, and species and trees to be retained and removed. (S) The inventory is to be prepared by a botanist, licensed arborist or landscape architect. (S)
B. Locate site and building improvements to preserve significant natural vegetation. (G)
C. Preserve and incorporate into the landscape plan, any existing health tree 6" caliper or larger, and located more than 20 feet from any proposed building location. (S) Preserve all trees over 24" caliper unless deemed unhealthy or unsuitable for preservation. (S)
D. During construction of site improvements, erect suitable protective barriers (generally located beyond the drip line) around trees to be preserved, making sure trunks, branches and root structures are not damaged by construction equipment. (S)
E. Incorporate tree wells or retaining walls as necessary in the landscape plan to protect existing trees. (G) Maintain historic drip lines. (G)



5.9.E USE TREE WELLS OR RETAINING WALLS TO MAINTAIN GRADE AROUND EXISTING TREES

5.10.A PROVIDE ATTRACTIVE, FUNCTIONAL OUTDOOR SEATNG

5.10.C PROVIDE ATTRACTIVE, HEAVY DUTY TREE GRATES IN PLAZA AREAS.

5.10.D ENCLOSE AND LANDSCAPE AROUND ALL TRASH DUMPSTERS.

5.10 Site Furniture and Features

Policy:

Site furnishings include benches, waste receptacles, planters, railings and bollards. Visual consistency of these elements is desired throughout each development. All components of outdoor site furniture should be low maintenance, highly durable and resistant to vandalism, graffiti, and theft.

Standards and Guidelines:

A. Outdoor Seating
   1) Use outdoor seating that is comfortable, attractive, durable and easy to maintain. (S)
   2) Locate benches at major building entryways, drop-off areas, transit stops, pedestrian courtyards and plazas. (S)
   3) Locate benches in areas that receive direct sunlight in the winter, are sheltered from winds and shaded in the summer. (G)
   4) Where seating is fixed, provide a variety of arrangements (both linear and grouped), which accommodate two (2) to six (6) persons. (G)

B. Planters and Waste Receptacles
   1) Design planters and waste receptacles to coordinate with other furniture. (G)
   2) Use materials and colors similar to those used for benches. (G)

C. Tree Grates
   1) Use of tree grates is discouraged unless used in conjunction with structural soils. If necessary, use tree grates to prevent excessive soil compaction and to give added interest to the pavement. (G)
   2) Choose tree grates that are fabricated of a strong, durable material. (S) In areas which receive heavy use, tree guards may be appropriate to give added protection to young trees. (G)

D. Trash dumpsters
   1) Provide a concrete pad a minimum of 8 feet wide to provide truck access to dumpster locations. (S)
   2) Enclose and landscape around all trash dumpsters. (S) (See also Section 4.7, Service Entrances and Loading Areas and Section 6.0, Screen Walls and Fences.)

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[1] Revised: Ordinance 1422, Series 2003.

6. SCREEN WALLS AND FENCES

Goal:

Fences and walls should be decorative and contribute to the visual quality of the project and the overall development. Walls, fences, and landscape materials shall be used to screen service areas, loading areas, and outdoor storage or sales areas. When not required for security, screening, or grade transitions, the size of walls and fences should be minimized. When required, however, fencing should be as inconspicuous as possible, and walls should be low.

6.1 Wall and Fence Design and Materials

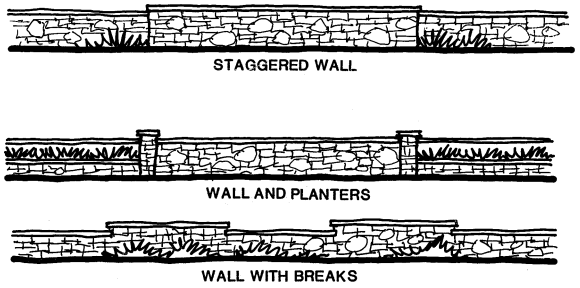
Policy:

Fencing and walls shall be constructed of materials that are compatible with the adjacent building architecture and their appearance softened with landscape materials.

Standards and Guidelines:

A. Avoid using retaining walls in excess of 30 inches in height (G). Where taller retaining walls are required, provide safety protection in the form of railings, fences or hedges, or create a terrace with two (2) shorter walls. (S)
B. Incorporate architectural treatment on both sides of perimeter walls. (S)
C. Provide landscaping in combination with walls and fences to soften their appearances. (G)
D. Chain-link fencing with or without wood slatting is not an acceptable screen material. (S)
E. Break up long expanses of fences or walls, with periodic columns, insets or change in materials. (S)
F. Construct walls and fences from durable materials such as stone, brick, or metal with dark finishes (wrought iron or similar), or a combination of these materials. (G) Wood is not an acceptable fence/screening material. (S)
G. Concrete walls are permitted if faced with masonry or stone, or if the surface is scored or textured. (G)

6.1 A AVOID USING RETAINING WALLS IN EXCESS OF 30 INCHES IN HEIGHT.

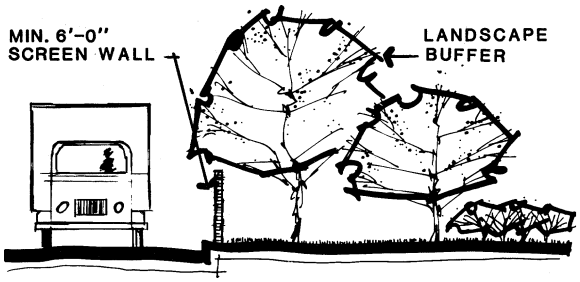


6.1 E BREAK UP LONG EXPANSES OF FENCES OR WALLS WITH COLUMNS, INSETS OR CHANGES IN MATERIAL

6.2 Screening Requirements

Policy:

A project must include adequate screening of meters, transformers, and loading and service areas.



6.2 A MAKE SCREENING FOR LOADING DOCKS AND SERVICE AREAS A MINIMUM OF 6 FEET HIGH.

6.2 B & C ALL AUTHORIZED OUTSIDE STORAGE, UTILITY EQUIPMENT, METERS, AND TRANSFORMERS SHALL BE SCREENED.

Standards and Guidelines:

A. Make screening for loading docks and service areas a minimum of 6 feet high and constructed of the same materials and finishes as the main building. (S)

B. All authorized outside storage shall be screened. (S)
   1) Screen from view all outdoor areas used for the display, storage, or sale of seasonal inventory. (S) Use fencing, walls, and/or landscaping. (S)

C. Screen all utility equipment, meters and transformers from view with fencing, walls, and/or landscaping. (S)

8. EXTERIOR SITE LIGHTING

Goal:

Exterior lighting should be used to provide illumination for the security and safety of entry drives, parking, service and loading areas, pathways, courtyards and plazas, without intruding on adjacent properties. Site lighting shall be architecturally compatible and consistent in design between sites.

8.1 LIGHT FIXTURES SHOULD BE COMPATIBLE AND RELATE TO THE ARCHITECTURAL CHARACTER OF THE BUILDINGS.

8.1 Fixture Design and Illumination Level

Policy:

Exterior light fixtures should be compatible and relate to the architectural character of the buildings on a site. Site lighting should be provided at the minimum level to accommodate safe pedestrian and vehicle movements, without causing any off-site glare.

Standards and Guidelines:

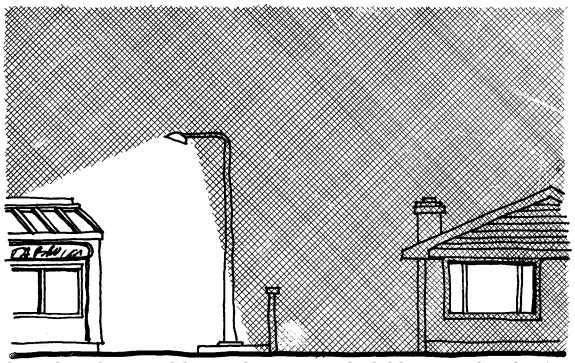
A. Poles and fixtures should be designed to be architecturally compatible with structures and lighting on adjacent properties. (G)
B. Poles and fixtures shall be compatible with all other fixtures on site. (S)
C. Illuminate all intersections with perimeter public roads with similar poles and fixtures used internal to the development. (G)
D. Select and locate all lighting fixtures to shield or confine light spread within a site's boundaries. (S)
E. To facilitate security, specify lighting levels that are adequate for visibility, but not overly bright. All building entrances should be well-lighted. (G)
F. Use metal halide or other white light fixtures. High pressure sodium is not allowed in any application. (S)
G. Maximum height of all poles within landscaped and plaza areas is 20 feet, measured from grade. Poles within these areas may be set on pedestals no more than 8 inches in height. (S)

8.1 A POLES AND FIXTURES SHOULD BE COMPATIBLE WITH ADJACENT STRUCTURES AND LIGHTING.

8.2 Decorative Architectural Lighting

Policy:

Special lighting that accents building features and creates visual interest is permitted in commercial developments, provided that design continuity is maintained among buildings.



8.1 D SELECT AND LOCATE LIGHT FIXTURES TO CONFINE LIGHT SPREAD.

Standards and Guidelines:

A. Lighting fixtures mounted directly on structures may be allowed when utilized to enhance specific architectural elements or to help establish scale or provide visual interest. (G)
B. "Wall paks" are permitted only in loading and service areas, and should be down-lit and shielded from view. (S)
C. Neon tubing is not acceptable as a building accent or to accentuate the building's form. (S)
D. Integrate illuminators or fixtures used to light building mounted signage, building facades, or pedestrian arcades into a building's architectural design. (G)
E. Consider highlighting entrances, art, terraces, and special landscape features. (G)

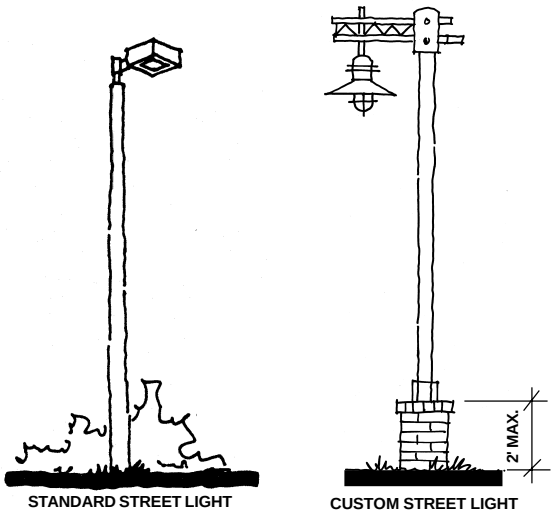
8.3 Parking Lot Lighting

Policy:

Parking lot lighting should be unobtrusive and provide safe light for orderly functions.

Standards and Guidelines:

A. Make all parking lot light fixtures similar in design for all surface parking areas. (S)
B. Select metal halide lighting with a concealed light source of the "cut-off" variety to prevent glare and "light trespass" onto adjacent buildings and sites. (S)
C. Provide separate, pedestrian scale lighting for all pedestrian ways through parking lots. (G)
D. Maximum height of parking lot poles is 24 feet measured from finished grade. (S)
E. Locate poles in medians wherever possible with a maximum base height of two (2) feet. (G)



8.3 PARKING LOT LIGHT FIXTURES (SEE TEXT).

8.4 Pedestrian Area Lighting

Policy:

Walkway lighting should be scaled to the pedestrian and should provide for safe use of pathways and pedestrian areas. Walks should be lighted for the safe passage of pedestrians as should areas which are dangerous if unlit, such as stairs, ramps, intersections, and underpasses.

Standards and Guidelines:

A. Use of lighted bollards or other low level fixtures is encouraged to identify pedestrian walkways and drop-off areas at entrances to buildings. (G)
B. Emphasize pedestrian-to-vehicle intersections with low level decorative street lights. (G)
C. Illuminate all primary walkways, steps or ramps along pedestrian routes. (G)

8.4 A USE LIGHTED BOLLARDS TO IDENTIFY PEDESTRIAN AREAS.

D. Incandescent or metal halide lamps are strongly encouraged. (G)
E. Use building mounted fixtures for walkways or plazas near buildings. (G)

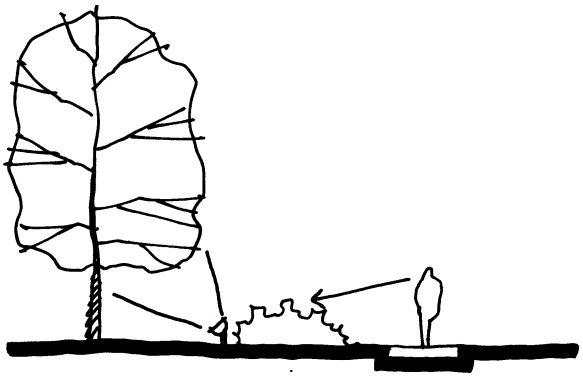
8.5 Landscape Lighting

Policy:

Landscape lighting should enhance and complement, not overpower, the landscape materials.

Standards and Guidelines:

A. Design the landscape lighting to work for all seasons of the year and through the life of the landscape. (G)
B. Conceal fixtures where possible (ie. in trees, by landscape, behind rocks), control glare , and avoid extreme bright spots on the surrounding landscape. (G)



8.5 B CONCEAL LIGHT FIXTURES WHERE POSSIBLE.

8.6 Site Security Lighting

Policy:

Security lighting is anticipated in some sites, but it should not negatively impact the site and building architecture as well as adjacent parcels.

Standards and Guidelines:

A. No light source (bulb) shall be directly visible from adjacent parcels. (S)
B. Provide only as much light/illumination as necessary to provide safety and security of the area. (G)

8.7 Light Intensity

Policy:

The light intensity levels within all areas should correspond to use and potential hazards.

Standards and Guidelines:

A. A photometric lighting plan is required for all proposed commercial developments to ensure adequate and appropriate light levels are provided for each site condition. (S)

B. The following levels of illumination should be maintained for each of the specific locations*: (G)

1)	Building Entrances	5.0 footcandles
2)	Sidewalks	2.0 footcandles
3)	Bikeways	1.0 footcandles
4)	Courts/Plazas/Terraces	1.5 footcandles
5)	Ramps	5.0 footcandles
6)	Stairways	5.0 footcandles
7)	Underpasses	5.0 footcandles
8)	Waiting Areas	1.0 footcandles
9)	Parking Lots	1.0 footcandles
10)	Roadways	1.5 footcandles

* Values given area in minimum average maintained horizontal, footcandles which are measured at the average point of illumination between brightest and darkest areas, 4'-5' above the ground surface. (Source: IES Lighting Handbook - 4th Edition).

C. Site lighting should provide consistent levels of illumination, avoiding pockets of very high or low levels of illumination. (G)

9. SPECIAL DESIGN GUIDELINES FOR LARGE RETAIL ESTABLISHMENTS

Goal:

Large retail establishments, such as "superstores" containing more than 30,000 square feet allocated to a single user, depend on high visibility from major public streets. Correspondingly, the design of these buildings will shape much of the character and attractiveness of the major streetscapes in the commercial areas of Louisville. It is important that these large individual developments contribute to and integrate with the city in a positive way. The following policies, standards and guidelines are meant to provide a means to address the community-wide and regional impacts of large retail store developments and are in addition to the preceding standards and guidelines in this document.

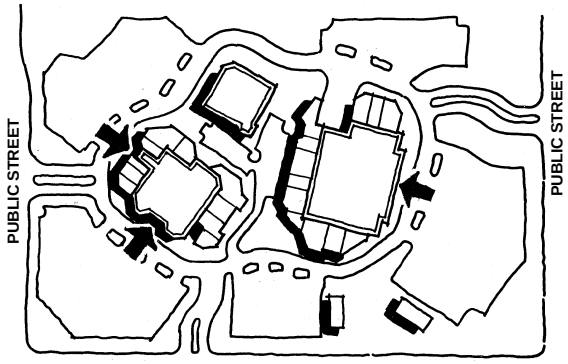
9.1 Parking Lot Orientation

Policy:

Parking should be distributed around large buildings in order to shorten the distance to the buildings and public sidewalks.

Standards and Guidelines:

Locate no more than 75% of the off-street parking area for the entire property between the front facade of the principal building(s) and the primary abutting street. (G)



9.1 DISTRIBUTE PARKING TO MINIMIZE WALKING DISTANCES.

9.2 Rear of Buildings

Policy:

The rear or sides of buildings should be attractive. Architectural and landscape screening techniques should be employed to mitigate the aesthetic impacts of blank walls, loading areas, storage areas, HVAC units and garbage receptacles.

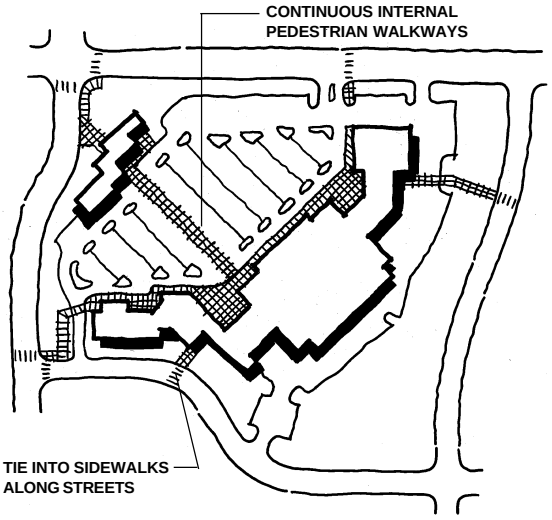
Standards and Guidelines:

A. Provide a minimum 35 foot building setback from the nearest property line along the rear and sides of buildings. (S)
B. Where the parcel is adjacent to a residential use, plant evergreen trees at 15 foot intervals, or in clusters that accommodate mature tree diameter and provides appropriate screening. (S)

9.3 Pedestrian Accessibility

Policy:

Pedestrian accessibility provides linkages with surrounding areas and uses and opens auto-oriented developments to the neighborhood, thereby reducing traffic impacts and enabling the development to project a friendlier, more inviting image.



9.3A PROVIDE CONTINUOUS INTERNAL PEDESTRIAN WALKWAYS WHICH CONNECT ALL FOCAL POINTS OF PEDESTRIAN ACTIVITY.

Standards and Guidelines:

A. Provide continuous internal pedestrian walkways, a minimum of 8 feet wide, from the public sidewalk or right-of-way to the principal customer entrance of all principal buildings on the site. (S) Such walkway can include crosswalks. (G)
B. Provide sidewalks, not less than 8 feet wide along any facade that contains a customer entrance, is adjacent to a parking area, or which would provide functional pedestrian connections. (S)
C. Except where features such as arcades and entry ways are part of the facade, provide a 6 foot wide planting bed between the facade of the building and the adjacent sidewalk. (S)
D. Distinguish all internal pedestrian walkways from driving surfaces with durable, low maintenance surface materials such as concrete or brick pavers. (S)
E. Provide weather protection features such as awnings or arcades within 30 feet of all customer entrances. (G)

9.4 Central Features and Community Spaces

Policy:

Large retail establishments should offer attractive and inviting pedestrian scale features, spaces, and amenities within the overall development area.

Standards and Guidelines:

A. Configure entrances and parking lots to be functional and inviting with walkways conveniently tied to logical destinations. (G)
B. Incorporate bus stops and drop-off/pick-up points as integral parts of the development. (G)
C. Anchor pedestrian ways with special design features such as arcades, porticos, pedestrian-scale light fixtures, bollards, planter walls, towers and other architectural elements that define circulation ways and outdoor spaces. (G)
D. Each large retail establishment within a larger commercial development must contribute to the establishment or enhancement of community and public spaces by providing at least 2 of the following amenities within its site or elsewhere within the overall development: 1) patio/seating area, 2) pedestrian plaza with benches, 3) transit center, 4) bus shelter, 5) window shopping walkway, 6) outdoor playground area, 7) kiosk area, 8) water feature, 9) clock tower, or 10) other such appropriate amenities. (S)

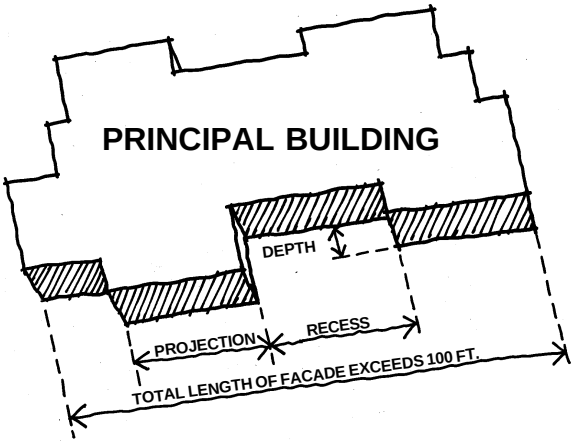
9.5 Facades and Exterior Walls

Policy:

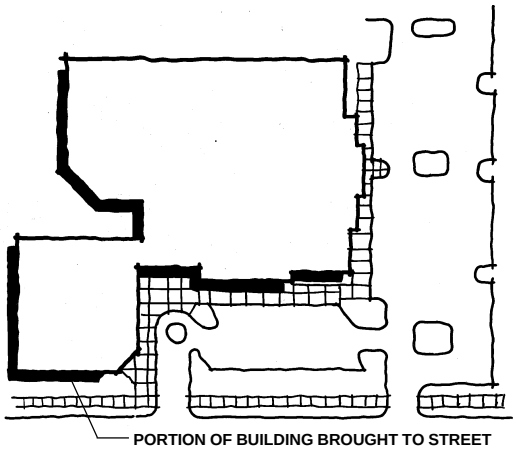
Articulate facades to reduce the massive scale and the uniform impersonal appearances of large retail buildings and provide visual interest that is consistent with Louisville's desired identity, character and scale.

Standards and Guidelines:

A. In cases of facades more than 100 feet in length, incorporate significant architectural features and treatments to diminish the building mass. (S)
B. Incorporate arcades, display windows, entry areas, or other such features along at least 60% of the horizontal length of all the ground floor facade with the primary pedestrian entrance. (S)
C. Incorporate design features that are similar to the front facade in all rear and side facades visible from adjoining properties and/or public streets. (S)
D. In cases of large buildings for employment, storage or auto related uses that have little relationship to pedestrians, or have a need to limit ground floor windows, bring a part of the building to the street. (G) A setback modification may be authorized for such purpose. (G)



9.5A FACADES MORE THAN 100 FEET IN LENGTH SHALL INCORPORATE SIGNIFICANT ARCHITECTURAL FEATURES AND TREATMENTS.



9.5 D IN CASES OF LARGE BUILDINGS BRING A PART OF THE BUILDING TO THE STREET.

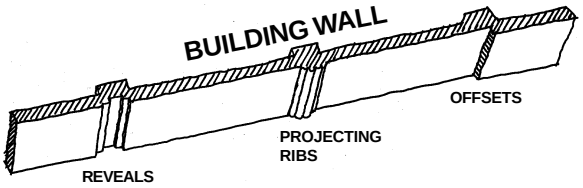
9.6 Detail Features

Policy:

All buildings should incorporate architectural features and patterns that create visual interest, are of a pedestrian scale, and recognize Louisville's desired identity character, and scale.

Standards and Guidelines:

A. Incorporate a repeating pattern in all building facades, to include the following elements: 1) color change, 2) texture change and 3) material module change. (G) Repeat these elements at intervals of no more than 30 horizontal feet. (G)
B. Express architectural or structural bays through a change in plane of at least 12 inches in width, such as an offset, reveal, or projecting rib. (G)



9.6B EXPRESS ARCHITECTURAL OR STRUCTURAL BAYS THROUGH A CHANGE IN PLANE.

9.7 Roofs

Policy:

Variations in roof lines should be used to add interest to, and reduce the massive scale of large retail buildings. Roof features should complement the character of adjoining neighborhoods.

9.7A INCORPORATE A VARIETY OF ROOF FEATURES IN LARGE RETAIL BUILDINGS.

Standards and Guidelines:

A. Incorporate the following features into the roofs of large retail buildings:
   For flat roofs:
   1) Parapets on all building elevations that conceal flat roofs and rooftop equipment. (S)
      If sloping roofs are used, the standards in 2 and 3 below must be applied on all building elevations. (S)
   For sloping roofs:
   2) Overhanging eaves that extend no less than 3 feet past the supporting walls. (S)
   3) Three or more roof slope planes. (S)
B. Design roof slopes within the maximum to minimum range of 1:1 to 3:1. (S)

9.8 Materials and Colors

Policy:

Exterior building materials and colors comprise a significant part of the visual impact of a building. Therefore, they should be aesthetically pleasing and compatible with materials and colors used in adjoining neighborhoods and commercial parcels.

Standards and Guidelines:

A. Incorporate high quality exterior building materials in the design and construction of large retail buildings such as brick, wood, sandstone or other native stone and tinted, textured, concrete masonry units. (G)
B. Avoid using the following exterior building materials: smooth-faced concrete block, tilt-up concrete panels and pre-fabricated steel panels. (G)

9.9 Building Entryways

9.9 A INCORPORATE CLEARLY DEFINED, HIGHLY VISIBLE CUSTOMER ENTRANCES FOR EACH PRINCIPAL BUILDING.

Policy:

Entryway design elements should give orientation and aesthetically pleasing character to a building.

Standards and Guidelines:

A. Incorporate clearly defined, highly visible customer entrances for each principal building on a site. (S)
B. Enhance each entrance with at least 3 of the following features: 1) canopies or porticos, 2) overhangs, 3) recesses/projections, 4) arcades, 5) raised corniced parapets over the door, 6) peaked roof forms, 7) arches, 8) outdoor patios, 9) display windows, 10) architectural details such as tile work and moldings which are integrated into the building structure and design and 11) integral planters or wing walls that incorporate landscaped areas and/or places for sitting. (S)
C. Provide at least 1 exterior customer entrance for each additional store located within a principal building (such as a pharmacy or bank located within a supermarket). (G)

APPENDIX A

RECOMMENDED PLANT MATERIALS LIST

DECIDUOUS TREES

Common Name	Botanical Name	Height[3]	Width[3]	Water Requirement	Maintenance Requirement	Street Tree	Remarks
Western Hackberry	Celtis occidentalis	60’	40’	M-L	L	Yes	Great bird attractant; CO native
Kentucky Coffeetree	Gymnocladus dioica	60’	50’	L	L	Yes	Males have flowers but no seeds; slow growth but superior drought tolerance
Norway Maple	Acer platanoides (2)	50-60’	40-45’	M	L	Yes	Good fall color yellow
Black Walnut	Juglans nigra	50-60’	50-60’	M-L	L	No	Stains sidewalks, streets and cars
American Linden	Tilia americana	50-60’	30-35’	M	L	Yes	
Redmond Linden	Tilia euchlora 'Redmond'	50-60’	30-35’	M	L	Yes	
Horsechestnut	Aesculus hippocastanum	50’	40’	M-L	L		
Western Catalpa	Catalpa speciosa	50’	30’	M-L	M		Fruits can be messy
Swamp White Oak	Quercus bicolor	50’	40’	M-L	L	Yes	
Bur Oak	Quercus macrocarpa	50’	40’	L	L	Yes	Tolerates tough conditions
Northern Red Oak	Quercus rubra borealis	50’	30’	M	L	Yes	
Shumard Oak	Quercus shumardii	50’	40’	M	L	Yes	Red fall color; not fussy; tolerant of high pH
English Oak	Quercus robur	45’	35’	M-L	L	Yes	Good fall color; needs shelter
Red Maple very few	Acer rubrum	40-50’	30-40’	M	L	Yes	Good yellow to red fall color
Texas Shumard Oak	Quercus buckleyi	40’	30’	M-L	L	Yes	More drought tolerant
Honeylocust	Gleditsia triacanthos inermis (2)	36’	25’	L	L	Yes	Shademaster, Imperial & Skyline
Little Leaf Linden	Tilia cordata	35-40’	25-30’	M	L	Yes	
Chinese Catalpa	Catalpa ovata	35’	30’	M-L	M	No	
Turkish Hazel	Corylus colurna	30-40’	20-25’	M-L	L	Yes	Tolerates pollution
Amur Corktree	Phellodendron amurense	30-40’	35-45’	M-L	L	Yes	
Japanese Pagoda Tree	Sophora japonica	30-40’	15-20’	M-L	L	Yes	
Ohio Buckeye	Aesculus glabra	30-35’	26’	M-L	L	Yes	Poisonous seeds, good fall color
Yellow	Aesculus flava	30’	25’	M	L	Yes	Yellow flowers,

Buckeye							smooth fruit
Bigtooth Maple	Acer grandidentatum	20-25’	12-15’	L	L	No	Small tree or large shrub; tolerant of dry & alkaline soils; Ft. Collins selection is cherry-red in fall
Western Soapberry	Sapindus drummondii	20-25’	20-25’	L	M		Native to Baca County, poor soil; watch for co-dominant limbs; small tree
American Hornbeam	Carpinus caroliniana	20’	20-25’	M	L	No	Needs some shade; sensitive to salts; gorgeous winter look
Gambel Oak small tree	Quercus gambelli	15-20’	15-20’	L	L	No	Yellow to orange or red in fall

ORNAMENTAL TREES							
Common Name	**Botanical Name**	**Height**	**Width**	**Water Requirement**	**Maintenance Requirement**	**Street Tree**	**Remarks**
Globe and Purple Robe Locust	Robinia pseudoacacia ‘Globe’ & ‘Purple Robe’	50’	30’	L	L	NA	
Colorado Paper Birch	Betula x andrewsii	40’	20’	M	L	NA	Native of Boulder Cnty., hybrid; white peeling bark
Glen’s Form Callery Pear Aristocrat Pear Chanticleer Pear Stone Hill Pear	Pyrus calleryana (2)	 35’ 35’ 30’	 25’ 15’ 12-15’	M-L	M	NA	Narrower & more cold hardy than Bradford; fruit unimportant; clay ok
Downy Hawthorn	Crataegus mollis	30’	30’	L	L	NA	
White Shield Osage Orange	Maclura pomifera	30’	30’	M	L	NA	No thorns; leathery leaves; fruitless
Mayday Tree	Prunus padus	30’	20’	M-L	L	NA	
Shantung Maple	Acer truncatum	25-30’	20-25’	M-L	L	NA	Replacement candidate for Amur Maple; orange-yellow in fall
Cockspur Hawthorn	Crataegus crus-galli	25’	20’	L	L	NA	Thorns, good fall color orange to red
Des Fontanes Cherry	Prunus x fontanesiana	25’	20’	M	M	NA	Cheyenne USDA Research Station intro. – Ft. Collins Nursery
Thornless Cockspur Hawthorn	Crataegus crus-galli inermis	20-30’	25-35’	L	L	NA	Thornless, good fall color orange to red
Washington Hawthorn	Crataegus phaenopyrum	20-30’	15-20’	M-L	L	NA	Good fall color, red
Amur Maackia	Maackia amurensis	20-30’	25-30’	M	L	NA	Wider than tall; nitrogen fixing; tolerate dry,

							alkaline soils
Peking Lilac	Syringa pekinesis	20-30'	15-25'	M-L	L	NA	Showy flowers
Tatarian Maple 'Hot Wings'	Acer tataricum 'Hot Wings'	20-25'	15-20'	M-L	L	NA	June-pink/brilliant red seeds, fall yellow to orange-red; Fort Collins Nursery introduction 2003
Shadblow Serviceberry	Amelanchier canadensis	20-25'	10-15'	M-L	L	NA	Nice fall color yellow to red
Shubert Chokecherry or Canada Red Cherry	Prunus virginiana 'Shubert'	20-25'	15-20'	M-L	L	NA	Red-purple foliage
Eastern Redbud	Cercis canadensis	20'	15'	M - H	L	NA	Showy flowers
Russian Hawthorn	Crataegus ambigua	20'	20'	M-L	M-L	NA	Some thorns, some suckering, fruit persists through winter; flowers in June
English Hawthorn	Crataegus laevigata	15-25'	15-25'	M-L	L		Tough, good for islands, buffers
Flowering Crab	Malus varieties (2)	15-25'	15-25'	L - M	M	NA	
Amur Maple	Acer ginnala	15-20'	15-20'	M-L	L	NA	Good fall color orange to red
Cornelian Dogwood	Cornus mas	15'	12-15'	M	L	NA	Showy flowers
Gray Dogwood	Cornus racemosa	15'	15'	M-L	L	NA	Very attractive
American Smoketree	Cotinus obovatus	15'	12'	M	L	NA	Plume-like flowers
Wafer Ash or Hoptree	Ptelea trifoliata	15'	15'	M-L	L	NA	Elm-like wafers in late summer; fall-yellow; drought tolerant
Japanese Tree Lilac	Syringa reticulata	15'	12'	M-L	L	NA	Showy flowers, good fall color yellow
American Plum	Prunus americana	10-12'	8-12'	L	M	NA	Suckers

DECIDUOUS SHRUBS

Common Name	Botanical Name	Height	Width	Water Requirement	Maintenance Requirement	Street Tree	Remarks
Thin Leaf Alder	Alnus tenuifolia	15-30'	15-20'	M	L	NA	Nice fall color yellow
Seneca Viburnum	Viburnum sieboldii 'Seneca'	15-20'	10-15'	M-L	L	NA	Hedge, buffer strips, specimen
Yellow-fruited Chokecherry	Prunus virginiana xanthocarpa	12-18'	12'	L	M	NA	Nice flower panicles
Staghorn Sumac	Rhus typhina	10-25'	10-15'	L	M	NA	
Curlleaf Mountain Mahogany	Cercocarpus ledifolius	10-20'	8-12'	L	M	NA	
Wavy Leaf Oak	Quercus undulata	10-20'	8-16'	L	L	NA	
Siberian Peashrub	Caragana arborescens	10-15'	8-12'	L	L	NA	Good windbreak; soil tolerant; many varieties
Beautybush	Kolkwitzia amabilis	10-15'	12-15'	L		NA	
Burning Bush	Euonymus alata (2)	10-12'	8-12'	M	M	NA	Nice fall color red
American Plum	Prunus americana	10-12'	10-12'	L	L	NA	Very fragrant flowers; suckering; good for wildlife
Native	Prunus virginiana	8-20'	8-12'	L - M	M	NA	

Chokecherry	melanocarpa						
Scrub Oak	Quercus gambelii	8-20’	6-12’	L	L	NA	
New Mexico Privet	Forestiera neomexicana	8-15’	8-12’	L	M	NA	Fall: yellow; makes excellent hedge
Smooth Sumac	Rhus glabra	8-15’	8-10’	L	M	NA	Nice fall color orange to red; cismontana is native form
Buffaloberry	Shepherdia sp.	8-15’	6-12’	L	M	NA	Silver, Russet and Round-leaf are best
Hairy Mountain Mahogany	Cercocarpus breviflorus	8-12’	8-12’	L	L	NA	Stays evergreen in protected sites
Tallhedge Buckthorn	Rhamnus frangula columnaris	8-12’	3-4’	M	M	NA	
Siberian Weeping Peashrub	Caragana arborescens ‘Pendula’	8-10’	8-10’	L	L	NA	Yellow flowers; poor soil and wind tolerant
Thimbleberry or Boulder Raspberry	Rubus deliciousus	8’	6’	L	M	NA	Native, prune out older canes every few years
Silver Fountain Butterflybush	Buddleia alternifolia ‘Argentea’	6-8’	6-8’	L	M	NA	Plant Select Winner
Szechwan Fire Cotoneaster	Cotoneaster ignavus	6-8’	4-6’	L	L	NA	Cheyenne USDA Experimental Station intro.; very tough
Forsythia	Forsythia intermedia	6-8’	6-8’	M	M	NA	Showy flowers
Cistena Plum	Prunus cistena	6-8’	4-6’	M	M	NA	
Manchurian Viburnum	Viburnum burejacticum	6-8’	5-7’	M-L	L	NA	Similar to V. lantana in appearance; Cheyenne USDA Station introduction
Singleleaf Ash	Fraxinus anomala	6-20’	6-20’	L	L	NA	Tolerates dry conditions
Saskatoon Serviceberry	Amelanchier alnifolia	6-12’	6-12’	L	L	NA	Nice fall color
Utah Serviceberry	Amelanchier utahensis	6-12’	6-12’	L	L	NA	Native to Western Slope
Butterfly Bush	Buddleia sp. (2)	6-12’	4-8’	M-L	M	NA	

DECIDUOUS SHRUBS							
Common Name	**Botanical Name**	**Height**	**Width**	**Water Requirement**	**Maintenance Requirement**	**Street Tree**	**Remarks**
Hedge Cotoneaster	Cotoneaster lucidus	6-12’	4-6’	M-L	L	NA	
Silverberry	Eleagnus commutata	6-12’	6-12’	M	M	NA	
Smith’s Buckthorn	Rhamnus smithii	6-12’	6-8’	L	L	NA	Tolerates dry; Plant Select Winner
Peking Cotoneaster	Cotoneaster acutifolia	6-10’	6-10’	M-L	L	NA	
Nanking Cherry	Prunus tormentosa	6-10’	6-12’	M-L	L	NA	
Mentor Barberry	Berberis mentorensis	5-7’	5-7’	M-L	M	NA	Thorns, good fall color yellow to red
Western Sandcherry	Prunus besseyi	5-6’	5-6’	L	M	NA	‘Pawnee Buttes’ is very low, wide spreading
Mountain Mahogany	Cercocarpus montanus	4-9’	4-6’	L	M	NA	
Cliffrose	Cowania mexicana	4-8’	4-8’	L	L	NA	
Honeysuckle	Lonicera (2)	4-8’	3-12’	M	M	NA	Honeyrose, Blue

							Velvet, Arnold Red, Clavey's Dwarf & Miniglobe
Yucca sp., Soaptree,	Yucca elata,	4-8'	3-7'	M-L	M	NA	native
Redleaf Japanese Barberry	Berberis thunbergii (2)	4-6'	4-6'	M-L	M	NA	Thorns
Quince	Chaenomeles spp.	4-6'	4-6'	M-L	M	NA	Showy flowers
Spreading Cotoneaster	Cotoneaster divaricata	4-6'	6-8'	M-L	M	NA	
Cliff Fendler Bush	Fendlera rupicola	4-6'	4-6'	L	L	NA	Native, heat & drought tolerant
Privet	Ligustrum (2)	4-6'	3-4'	L	M	NA	Regal, Cheyenne, 'Densiflorum' & 'Lodense'
Mockorange	Philadelphus (2)	4-6'	4-6'	M-L	M	NA	
Golden Currant	Ribes aureum	4-6'	4-6'	L	M	NA	
Crandall Clove Currant	Ribes ordoratum 'Crandall'	4-6'	4-6'	M-L	L	NA	Native; can smell cloves 10-15' away; orange fall color
Emerald Carousel Barberry	Berberis x 'Tara'	4-5'	4-5'	M-L	M	NA	Yellow flowers; very adaptable, cold hardy; persistent red fruit
Privet	Ligustrum vulgare (2)	4-15'	4-15'	M	M	NA	
Viburnum	Viburnum (2)	4-12'	4-15'	M-L	M	NA	Nice fall color varies
Antelope Brush	Purshia tridentata	4'	5'	L		NA	
Gooseberry	Ribes sp. (2)	4'	4'	M-L	M	NA	
Four Wing Saltbush	Atriplex canescens	3-6'	2-4'	L	M	NA	
Apache Plume	Fallugia paradoxa	3-6'	3-6/\'	L	L	NA	Native, silver-pink seed heads all summer
Rock Spirea	Holodiscus dumosus	3-6'	3-6'	M-L	L	NA	Good ornamental winter look
Waxflower	Jamesia americana	3-6'	3-6'	L	L	NA	Prefers good drainage
Threeleaf Sumac	Rhus trilobata	3-6'	3-6'	L	M	NA	Nice fall color orange to red

DECIDUOUS SHRUBS							
Common Name	**Botanical Name**	**Height**	**Width**	**Water Requirement**	**Maintenance Requirement**	**Street Tree**	**Remarks**
Alpine Currant	Ribes alpinum	3-6'	3-6'	L – M	M	NA	
Wood's Rose	Rosa woodsii	3-6'	3-6'	L		NA	
Siberian Spirea	Sibiraea laevigata	3-6'	5-10'	M-L	M	NA	
Littleleaf Mountain Mahogany	Cercocarpus intricatus	3-5'	3-5'	L	L	NA	Very drought tolerant, slow growing, evergreen
Fernbush	Chamaebatiaria millefolium	3-5'	3-6'	L	M	NA	Blooms throughout summer into late fall
Carol Mackie Daphne	Daphne x burkwoodii 'Carol Mackie'	3-5'	3-5'	M-L	L	NA	Part shade; needs good drainage
Fremont's Desert Holly	Mahonia fremontii	3-5'	3-6'	L	L	NA	Very xeric broadleaf evergreen, blue holly foliage
Russian Sage	Perovskia atriplicifolia	3-5'	3-5'	L	M	NA	Must be cut nearly to ground

							in late winter
Blue Mist Spirea	Caryopteris x clandonensis	3-4'	2-3'	L	L	NA	
Blue Stem Joint Fir	Ephedra equisetina	3-4'	5-6'		L	NA	3-4'; red berries against blue foliage
Mountain Ninebark	Physocarpus monogynus	3-4'	3-4'	M-L	M	NA	Orange to red fall color
Aromatic Sumac	Rhus aromatica	3-4'	6-8'	L	L	NA	Non-suckering form; good year-round architecture; 'Gro-low' is low, wide-spreading
Red Lake Currant	Ribes 'Red Lake'	3-4'	3-4'	M-L	M	NA	
Snowberry	Symphoricarpos albus	3-4'	3-5'	M	M	NA	
Lilac	Syringa patula, hyacinthiflora, prestoniae & vulgaris (2)	3-12'	3-12'	M-L	M	NA	All cultivars are drought tolerant
Snowfall Common Ninebark	Physocarpus opulifolius 'Snowfall'	3'	4'	L	L	NA	More compact; larger white-pinkish flowers; fall: yellowish-bronze
Rabbit Brush	Chrysothamnus nauseosus	2-6'	2-6'	L	M	NA	Blue and green varieties
Corallberry	Symphoricarpos sp. (2)	2-6'	3-6'	M-L	L	NA	
Potentilla	Potentilla fruticosa (2)	2-5'	2-5'	M-L	M	NA	Showy flowers
Dwarf Russian Almond	Prunus tenella	2-5'	2-4'	L	L	NA	
Leadplant	Amorpha canescens	2-4'	2-4'	L	M	NA	One of most showy western plants
Broom, Moonlight or Spanish Gold	Cytisus 'Moonlight' & Cytisus purgans 'Spanish Gold'	2-4'	4-6'	L	L	NA	
Wax Currant	Ribes cereum	2-4'	2-4'	L	M	NA	
Rose	Rosa 3	2-4'	2-4'	L – M	M	NA	
Spiraea	Spiraea 3	2-4'	2-4'	M-L	M	NA	
Ponchita Manzanita	Arctostaphylos nevadensis 'Ponchito'	2-3'	3-5'	M-L	L	NA	2-3';Native, drought tolerant; pink-white flowers Apr-May

DECIDUOUS SHRUBS

Common Name	Botanical Name	Height	Width	Water Requirement	Maintenance Requirement	Street Tree	Remarks
Rock Cotoneaster	Cotoneaster horizontalis	2-3'	3-6'	M-L	M	NA	
Royal Gold Woadwaxen	Genista tinctoria 'Royal Gold'	2-3'	2-3'	L	L	NA	Great planted in swaths, blooms twice; bright yellow; holds green leaves into winter
St. Johnswort, Sunburst and Hidcote	Hypericum sp.	2-3'	2-3'	L	L	NA	
Soapweed	Yucca glauca	2.5-3'	3-4'	M-L	M	NA	native
Sagebrush	Artemisia (2)	1-6'	2-3'	L	L	NA	
Winterfat	Ceratoides lanata	1-4'	2-4'	L	L	NA	Needs good drainage
Cascade Manzanita	Arctostaphylos nevadensis 'Cascade'	1-2'	3-5'	M-L	L	NA	1-2' high, Ft. Collins introduction; cascading habit;

							FS-PS
Mock-Bearberry Manzanita	Arctostaphylos x coloradoensis	1-2’	3-5’	M-L	L	NA	1-2’ high; Ft. Collins introduction; red berries; FS-PS
Coral Beauty Cotoneaster	Cotoneaster dammeri ‘Coral Beauty’	1-2’	4-6’	M-L	M	NA	
Creeping Oregon Grape Holly	Mahonia haematocarpa	1-1.5’	3-4’	M-L	L	NA	Red fall color
Cranberry Cotoneaster	Cotoneaster apiculata	1.5-2’	4-6’	M-L	M	NA	
Harriman’s	Yucca harrimaniae	.75-1’	1-1.5’	M-L	M	NA	native

***EVERGREEN TREES* (1)**							
Common Name	**Botanical Name**	**Height**	**Width**	**Water Requirement**	**Maintenance Requirement**	**Street Tree**	**Remarks**
Southwestern White Pine	Pinus strobiformus	80’	40’	M-L	L	No	
Douglas Fir	Pseudotsuga menziesii 'Taxifolia'	75-100’	40’	M	L	No	
Swiss Mountain Pine	Pinus mugo	6-8’	12-15’	L - M	L	No	
Colorado Green Spruce	Picea pungens	60’	30’	M-L	L	No	
Colorado Blue Spruce	Picea pungens 'Glauca'	60’	30’	M-L	L	No	
Serbian Spruce	Picea omorika	50-60’	20-25’	M	L	No	Narrow pyramidal growth; uniform; blue
Austrian Pine	Pinus nigra	50’	20’	M-L	L	No	
Scotch Pine	Pinus sylvestris	50’	30’	M-L	L	No	
Red Cedar	Juniperus virginiana 'Varieties'	40-50’	8-20’	M	L	No	
Ponderosa Pine	Pinus ponderosa	40’	25’	L	L	No	
Rocky Mountain Juniper	Juniperus scopulorum 'Varieties'	30-60’	15’	L - M	L	No	
Bristlecone Pine	Pinus aristata	30’	15’	L	L	No	
Limber Pine	Pinus flexilis	30’	15’	L	L	No	
Pinon Pine	Pinus edulis	25-30’	10-15’	L	L	No	
Smooth Arizona Cypress	Cupressus arizonica var. glabra	20-40’	8-15’	L	L		Blue color
Oneseed Juniper	Juniperus monosperma	10-30’	6-12’	L	L	No	

EVERGREEN SHRUBS

Common Name	Botanical Name	Height	Width	Water Requirement	Maintenance Requirement	Street Tree	Remarks
Yew	Taxus x media 'Hicksii'	8-12’	3-4’	M-L	M	NA	High drought tolerance
Firethorn	Pyracantha coccinea (2)	8’	8’	M	M	NA	
Oregongrape	Mahonia aquifolium	6’	3’	M	M	NA	Nice fall colors red to purple
Euonymus Manhattan	Euonymus kiautschovicus 'Manhattan'	5’	4’	M	M	NA	
Euonymus Sarcoxie	Euonymus fortunei 'Sarcoxie'	4-6’	4-6’	M	M	NA	
Bigleaf Wintercreeper	Euonymus fortunei vegeta	4-5’	4-5’	M	M	NA	
Gnome Firethorn	Pyracantha angustifolia 'Gnome'	4’	4’	M	M	NA	
Juniper	Juniperus sp. (2)	1-30’	4-15’	L	L	NA	Many species; something for any size
Creeping Hollygrape	Mahonia repens	1’	1’	M	M	NA	Nice fall/winter colors red to purple

PERENNIALS, GROUND COVERS, AND ORNAMENTAL GRASSES

Due to the large quantity, variety, and changing availability of these plants, please consult your local nursery preferably a C.N.A. Member.

Height, color, texture, moisture, light requirement, and heartiness need to be considered when specifying these plants.

Most local nurseries provide a yearly catalog of available plants and their descriptions.

Notes:

1. Mature size of all evergreen trees must be considered when determining location for planting. They are not recommended within 8' of any roadway, walkway, entrance, or window as they will eventually obstruct passage or view. Evergreen trees shall not be placed within roadway site triangles. During winter, icy conditions often occur on the north side of evergreen trees. This must be considered for their placement.

2. These plants have numerous different species, varieties and/or cultivars. Consult a local nursery for current availability and proper selection.

3. Heights and widths are anticipated sizes, but will vary due to environmental issues.

Exhibit C
Industrial Development Design Standards and Guidelines

City of Louisville

Industrial Development Design Standards & Guidelines

(IDDSG)

Adopted by Ordinance No. 1322, Series 1999
18 January 2000

ACKNOWLEDGEMENTS

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Charles Sisk
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Rob Lathrop
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INTRODUCTION

A. Purpose

The *Industrial Development Design Standards and Guidelines* (**'IDDSG'**) establish design criteria and minimum standards for industrial developments within the City of Louisville. The purpose of the IDDSG is to:

1. Enhance and protect Louisville's quality of life and community image through clearly articulated industrial development design goals and policies, design guidelines and minimum design standards; and
2. Protect and promote Louisville's long-term economic vitality through industrial design standards which encourage and reward high quality development, while discouraging less attractive and less enduring alternatives; and
3. Minimize adverse impacts of vehicular circulation to existing neighborhoods and to the surrounding physical environment; and
4. Enhance and protect the security and health, safety and welfare of all residents of the City of Louisville; and
5. Facilitate an understanding of the City's expectations and to assist developers in compiling a complete and efficient application.

B. Applicability

The provisions of the IDDSG shall apply to all industrial development within the City, except industrial development for which there exists a vested property right to develop under other approved design guidelines and/or development standards.

The IDDSG provide general design guidelines, as well as mandatory minimum development standards. The IDDSG will be utilized by staff, Planning Commission, and City Council to review *Industrial* development applications submitted under the City's PUD Development Plan review process. All industrial areas must be developed as PUD-I district, including site specific development plans.

The goals and policies set forth in this document are expected to be met through compliance with all mandatory design standards and consideration of design guidelines. Modifications to or waivers from mandatory design standards may be recommended by the Planning Commission and authorized by City Council as part of the PUD Development Plan Review process.

Industrial development applications seeking modifications or waivers to these requirements should anticipate additional review time and must demonstrate a clear benefit to the City in relaxing one or more of these requirements.

C. Who Uses the IDDSG

The IDDSG is to be used by property owners/ applicants and their design consultants in the planning of industrial development projects within the City of Louisville. The IDDSG will also be utilized by staff, Planning Commission, and City Council as part of the PUD Development Plan process in their reviews of industrial projects to which the IDDSG apply.

D. Desirable Elements of Industrial Project Design

The City considers the following design features to be desirable elements of industrial development, and the standards and guidelines set forth in following chapters are intended to facilitate the incorporation of these features into an *Industrial* project:

1. Prominent access driveways with clear visibility of entrances.
2. Multi-modal transportation.
3. Controlled site access.
4. Landscaped and screened parking, and loading and service areas.
5. Service areas located at the rear of buildings.
6. Quality exterior building materials, surfaces, and textures.
7. Significant landscape, streetscape and hardscape elements.
8. Placement of structures that creates

opportunities for plazas, courtyards, or gardens/patio areas which can be utilized as pedestrian gathering places and common employee gathering areas with appropriate site furniture and lighting.
9. A variety of architectural design treatments, including articulated building footprints to reduce massing and to promote architectural definition and interest.
10. Preservation of natural site features.
11. Enhancement of view corridors to open areas and mountain vistas.
12. Support services to industrial development, such as child care accessory to a large corporate campus, may be appropriate in accordance with currently adopted codes and ordinances.
13. Site design and improvements should anticipate the potential re-use of the building for other purposes.
14. Quality architectural designs and building materials should be incorporated into industrial projects.
15. The appearance of both the building and the site landscaping should have a strong emphasis toward public street views, incorporating a concept that emphasizes the 'public zone'.

E. Undesirable Elements of Industrial Project Design

The City considers the following design features to be undesirable elements of industrial development:

1. Poorly defined site access points.
2. Disjointed parking areas, or confusing or unsafe circulation pattern.
3. Square, 'box-like' structures with large, blank, unarticulated wall surfaces.
4. Highly reflective surfaces or repetitious and continuous glazing patterns.
5. Metal siding used as a primary exterior facade treatment.
6. Visible outdoor storage, loading, and equipment areas.
7. Signage which is redundant or out of scale with building architecture.

F. Relation of the IDDSG to Other City Regulations, Ordinances and Private Development Covenants

The IDDSG is a supplement to the City of Louisville's Zoning and Subdivision Regulations, PUD Ordinance, *City of Louisville Department of Public Works Engineering Division Design and Construction Standards*, and *City of Louisville Storm Drainage Design and Technical Criteria*.

Where a mandatory standard in this document is in conflict with any provision of the City of Louisville municipal code, the most restrictive requirement shall take precedence and shall apply. Building and life safety codes, *the City of Louisville Department of Public Works Engineering Division Design and Construction Standards/ and the City of Louisville Storm Drainage Design and Technical Criteria take* precedence over the standards in this document in cases where the standards in this document require action that is in conflict with those codes.

All industrial development within the City of Louisville shall meet the requirements of the Americans with Disabilities Act (ADA).

G. How to Use the IDDSG

The IDDSG is generally organized in a descending order of scale, from overall site planning concerns, to circulation issues, to buildings, site details, and then signs and exterior lighting. When first developing overall planning concepts for a parcel, the earlier chapters will be most relevant. At advanced stages of design, when architectural details and specific landscaping ideas are being developed, chapters appearing later in the document will be most relevant.

Each chapter has four basic components:

1. A goal statement, which sets forth the City's overall design goal to be achieved in the PUD Industrial Planned Unit Development Plan review process with regard to the subject matter of the chapter.
2. A policy statement, which establishes a

more specific design goal with regard to a more specific subject matter.

3. The statements of **standards,** indicated with an **{S)**, and **guidelines,** indicated with a **{G)**, which establish the specific design standards with which compliance is mandatory, and the design guidelines with which compliance is strongly encouraged. **A failure to meet a mandatory standard may be the basis for denial of an application.**
4. Illustrations showing one or more suggested design solutions that would be appropriate or inappropriate with respect to the standards and guidelines. These may be photographs or sketches. In the event of conflict between an illustration and the text of the IDDSG, the text shall control.

H. Definitions

For purposes of this document, the following terms shall have the following meanings:

***nrndustrial Development*"** Any land development activity in the city, including but not limited to non-offensive types of industry, processing and manufacturing activities, but not including development activity intended solely for residential, retail and or office use. Industrial development also includes any addition, remodeling, relocation or construction requiring an amendment to an approved, Final Industrial Planned Unit Development Plan. Specifically, industrial uses as enumerated in Louisville Municipal Code § 17.12.030 and/or in an established Planned Community Zone District-Industrial Plan (PCZD-I).

***nFlex Space or Flex Building*"** A building designed for occupancy by single or multiple, undefined tenants in spaces designed to suit their varied needs. The tenants need significant amounts of fully finished interior space and have employee densities that are higher than the traditional industrial tenant, though the tenant must still have some industrial component, such as warehousing, distribution, assembly, or manufacturing. The building will have more of an office/ commercial appearance on some or all building elevations.

"*Landscape Coverage*" Land that is undeveloped or developed that can support plant materials; or has decorative landscape treatment; or that may be used by customers for recreation, circulation, or may be viewed by them. Paved parking lot areas used for auto circulation or parking do not qualify as landscape coverage.

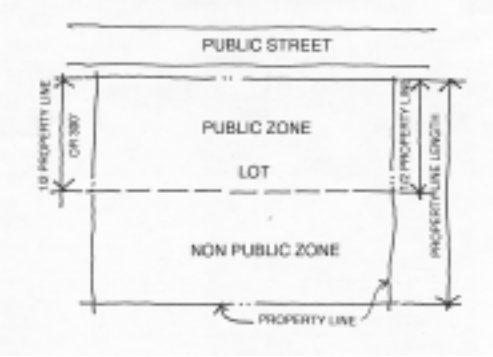
***nParcel*"** A parcel is the minimum amount of real property that a single user may occupy. In many cases, more than one lot will be combined into a single parcel for development of a single building or cluster of buildings to be used by a single user.

***nPedestrian Scale/Human Scale*"** The relationship between the dimensions of a building, street, outdoor space, or streetscape element to the average dimensions of the human body as well as space and the built environment as perceived by the senses of a human being.

***nPublic Zone*"** Building and other associated site improvements located on a development parcel which are within 300-feet of a public right-of-way or within the front half of the parcel (as measured from the front property line to the midpoint of the lot depth) whichever is less.

***nNon-Public Zone*"** Building and other associated site improvements located on a development parcel that is located outside the Public Zone.

***nEffective Landscaping*"** An area is considered landscaped to the extent it provides sufficient quantity and quality of plant materials to screen parking, building, or hardscaped areas of a project and provides color and viewing interest.



1. SITE PLANNING

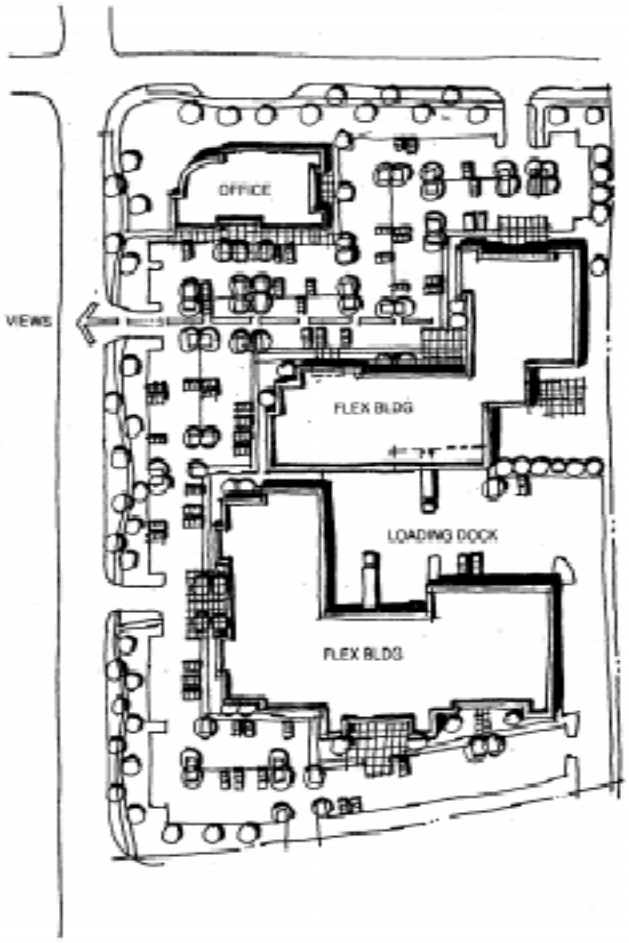
Goal:
Locate buildings so as to maximize the presentation of streetscaping and primary building entries to major roadways/ to provide clear orientation and access for both vehicles and pedestrians and to facilitate internal pedestrian circulation. Place structures in consideration of the existing built context/ the location of adjoining uses/ and the location of major roads. Create pedestrian courtyards and common employee gathering areas.

1.1 Building Siting and Orientation

Policy:
Buildings should be sited so that the character of existing landforms and site features is enhanced; the relationships between buildings are strengthened; and pedestrian and vehicular circulation is facilitated.

Standards and Guidelines:

A. Provide pedestrian connections from building entries and required exits to public walkways to buffer pedestrians from vehicle circulation areas. (S)
B. Provide plazas at primary building entrances as a means of distinguishing primary entries from secondary and service entries. (S)
C. Provide employee-gathering places in areas that are of a sufficient size and scale and buffered from traffic and circulation areas. (S) Employee gathering areas shall not be located in proximity to primary public entrances. (S) Appropriately screened break areas may be considered in proximity to public entrances. (G)
D. Orient buildings to promote views of the mountains through the development. (G)
E. Position entries to buildings so they are easily identifiable from adjoining public right-of-ways and primary access drives. (G)



1.1 POLICY - OVERALL CONCEPT

1.2 Building and Parking Setbacks

Policy:

Provide a well-landscaped image along major streets, which promotes a formal streetscape appearance. To attain this objective, all buildings and parking should be set back from perimeter and interior streets a sufficient distance to create a distinct landscape zone between buildings, parking, and adjacent roadways. Varying building setbacks to enhance visual interest along the streetscape is strongly encouraged. Parking setbacks from all streets should allow for adequate visual buffering or screening.

Standards and Guidelines:

A. Minimum Building Setbacks: (S)

Front, side or rear yards from arterial streets	60-feet
Front yard at a local public street	30-feet
Side yard from a local public street	30-feet
Side yard interior (abutting a similar zoning district)	10-feet
Side yard interior (abutting residential and agricultural zoning districts, or public open space)	25-feet
Rear yard (abutting a similar zoning district)	15-feet
Rear yard (abutting residential and agricultural zoning districts or public open space)	25-feet
Northwest Parkway or other limited access highways	200-feet

B. Minimum Parking Setbacks: (S)

Front, side or rear yards from arterial streets	30-feet
Front yard at a local public street	20-feet
Side yard from a local public street	20-feet
Side yard interior (abutting a similar zoning district)	10-feet
Side yard interior (abutting residential and agricultural zoning districts, or public open space)	10-feet

C. Only architectural projections that do not include floor area, such as roof eaves or other architectural enhancements, may encroach into the above setbacks not more than 3-feet. (S)
D. For multi-building proposals, building setbacks should be varied to enhance visual interest along the streetscape. (S)
E. Building setbacks shall not encroach into platted landscape, drainage and or railroad easements. (S)
F. No portion of any building may encroach or project into any easement. (S)

1.3 Pedestrian Amenities

Policy:

Plazas, courtyards or similar visitor and employee amenities should be incorporated into both overall and individual site development plans. These areas should be easily accessible and comfortable for a substantial part of the year.

Standards and Guidelines:

A. Furnish spaces with pedestrian amenities such as benches, landscaping, and/or recreational areas. These outdoor spaces shall be functional and shall not appear as 'left-over' spaces. (S)
B. Provide seating that is useable year-round. Position seating such that it is buffered from exposed areas and takes advantage of sunny locations. (S)
C. All common amenities within industrial developments shall be owned and maintained by the developer or by an organization established for such purposes. (S)
D. Where feasible, create a sense of enclosure for outdoor seating areas. (G)

1.4 Site Coverage Requirements

Policy:

Open space and landscaped areas are valued amenities. Building, parking, and driveway site coverage within each parcel should be limited.

Standards and Guidelines:

A. The maximum building, parking, walkway and driveway coverage within each parcel and for the entire development is 75%. (S)
B. The minimum amount of landscape coverage provided within an industrial development is 25%. (S) This landscape coverage area is in addition to any required public land dedication. (S)
C. Detention ponds may be included in landscape coverage if located fully within the building lot, and when those areas can be effectively landscaped. Detention ponds that are off-site, but contiguous to the building lot, and that can be effectively landscaped may be credited up to, but not

exceeding one-third of the total required landscape coverage requirement. (G)

1.5 Utilities, Mechanical, and Telecommunications Equipment

Policy:

The visual and noise impacts of utilities, mechanical equipment, data transmission dishes, towers, and similar antennas and equipment should be mitigated.

Standards and Guidelines:

A. Install all permanent utility lines underground. (S)
B. Temporary overhead power and telephone facilities are permitted during construction only. (S)
C. Locate transformers away from major pedestrian routes and outdoor seating areas. (G)
D. Buffer all transformers, telecommunications devices, equipment switching boxes and other utility cabinets from street and pedestrian areas with landscaping or architectural screens. (S) Do not leave meters exposed where visible to the public. (S) (See also Chapter 6: Screen Walls and Fencing). (S)
E. The location of exterior mechanical equipment associated with industrial processing or manufacturing operations shall be such that it minimizes visual and auditory impacts from adjacent property and public streets and shall be mitigated with structural or landscape screening and buffering. (G)

1.5.D - SCREEN THESE AREAS FROM PUBLIC VIEW

1.6 Service, Delivery and Storage Areas

Policy:

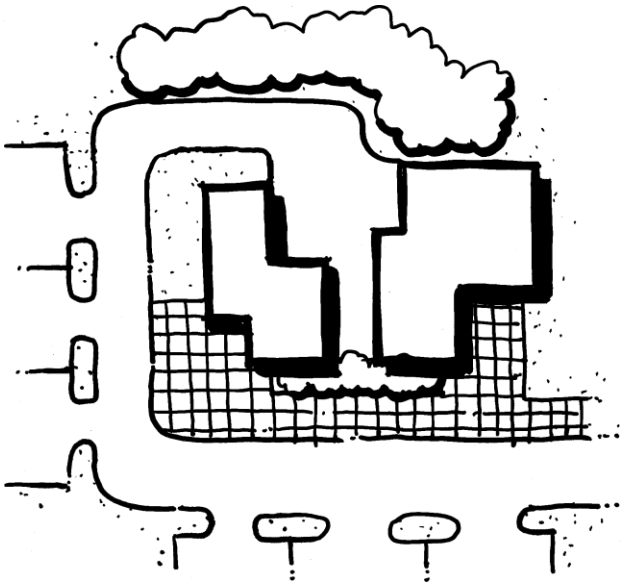
Service, delivery and storage areas should not be visually obtrusive. The visual impact of service and delivery areas should be minimized; especially views of such areas from public ways and along designated view corridors.

Standards and Guidelines:

A. Locate loading docks, outside storage, and service areas in areas of low visibility such

as at the side or at the rear (non-street side) of buildings. (S) Outside storage of any kind in public street rights of way, building setbacks or easement areas is not permitted. (S)

B. With the exception of outside storage areas, when it is not possible to locate loading facilities and service areas on a non-street side of a building, loading docks and doors shall not dominate the building frontage and must be screened from all adjoining public rights of way. Loading and service facilities shall be offset from driveway openings. (S) In no case may outside storage areas be located in the front of a building. (S)
C. Combine loading docks and service areas between multiple sites. (G) Screen from public view with fencing, walls, other structures and/or landscaping. (S)
D. Clearly identify service entrances with signs to discourage the use of main entrances for deliveries. (G)
E. Service and refuse areas shall not encroach into the parking setback. (S) Such areas shall be screened with a minimum six-foot wall height enclosure (as measured from finished grade). (S) Service and refuse areas shall be paved with an impervious surface of asphalt or concrete. (S)
F. Service and outside storage enclosures shall be constructed of materials to match or compliment the building material. No enclosure shall be made of any form of chain link or wood fencing. Gates and/or access doors may be constructed of materials different from the actual enclosure material to facilitate operation of the gates or access doors. (S) Trash enclosures shall enclose an area large enough to accommodate the peak needs of varied potential industrial users of the building. (S)
G. Outside storage areas shall not exceed 10% of the floor area of the principal structure and when authorized must be typically associated with the specific industrial operation proposed for the building. (S)
H. Outside storage areas shall be fully screened by screen wall enclosures. (S) Screen walls shall have a minimum height of 6-feet, and a maximum height of 10-feet. Stored materials may not be stacked or be visible above the enclosure height. (S)



1.6.C - WELL SCREENED SHARED SERVICE COURTYARD

1.6.H - THIS IS NOT PERMITTED - OUTSIDE STORAGE MUST BE FULLY SCREENED

I. Storage areas shall be paved with an impervious surface of asphalt or concrete and designed in accordance with required fire access, and fire lane requirements. (S)
J. Trash compaction and recycling are strongly encouraged and should be accommodated in industrial project design. (G)
K. Sites shall not be designed to accommodate ongoing storage of truck trailers or other cargo storage trailers. (S)

1.6.K - ONGOING PARKING OR STORAGE OF TRUCK TRAILERS IS DETRIMENTAL TO GOOD URBAN DESIGN

1.7 Water Quality Control and Drainage

Policy:

Storm water and snowmelt from rooftops, paved areas, and lawns carry plant debris, soil particles, and dissolved chemicals into the City's storm drainage system. Site development plans should employ management and engineering practices to protect stormwater from these undesirable elements, before releasing water into the City's storm drainage system.

Site drainage should be designed to minimize water collection near building foundations, entrances and service ramps. In addition to the City of Louisville's Storm Drainage and Technical Criteria, the following standards and guidelines apply:

Standards and Guidelines:

A. Storm water shall not drain directly into the public storm drainage system without first going through a natural, landscaped detention pond and/or a grassy swale. (S)
B. Design and maintain all grassy swales and other drainage channels in accordance with City of Louisville Storm Drainage Design and Technical Criteria. (S)
C. Avoid hard concrete-lined channel designs, unless recommended by the City's Public Works Department. If a hard channel design is required use a more natural approach that incorporates river rock or natural rock channel lining when possible. (G)
D. Utilize accepted design criteria and recommendations of the Urban Drainage and Flood Control District (UD & FCD) and the City of Louisville for detention pond design to enhance water quality. (S)

1.7.C - AVOID HARD CHANNELS SUCH AS THIS

1.7.A - GOOD EXAMPLE OF NATURAL GRASSY SWALE

E. The use of consolidated detention pond facilities is encouraged on multi-lot developments. (G)
F. Avoid design of landscape berms that would shed irrigation and stormwater directly onto adjacent paved surfaces. (G)
G. To more effectively implement Best Management Practices (BMPs), detention ponds shall be consolidated on individual developments so there is no more than one pond per five acres, unless otherwise approved by Public Works. (G)
H. Functional detention pond BMPs shall be incorporated to the extent practical, in accordance with Volume III of the Urban Drainage manual, latest edition, and approved by Public Works, or be incorporated in accordance with a comparable design, approved by Public Works. Said BMPs shall be implemented on developments where the surface area tributary to the detention pond is five acres or greater (including the detention pond surface area.) (G) For detention ponds having tributary areas between two and five acres (including the detention pond surface area) grass or cobble lined swales shall be incorporated. Other proposed BMPs shall be reviewed and approved on an individual basis by Public Works. (G)
I. Parking lot detention shall not be permitted, with the exception of development sites smaller than two acres, regardless of the tributary basin size to the detention pond. (G)
J. For developments smaller than two acres, detention up to the 10-year storm event shall be contained completely within a grass lined area of a detention pond. The remainder of the storm water detention volume, between the 10 and 100-year events, may extend into paved areas. The ponding depth may not exceed 8 inches within paved areas. (S)
K. Detention pond landscape materials and planting densities shall be incorporated into the landscape plan in a manner that will minimize the potential for clogging at the outlet structure. Landscaping in and around detention ponds shall not be designed in a manner that would potentially reduce the functionality of the pond. (G) The developer's engineer shall certify in the

drainage report that they have reviewed the landscape plan and that it is consistent in preserving the functionality of the storm water detention system. The proposed landscaping in and around detention ponds shall be subject to Public Works review and approval. (S) Property owner obligations pertaining to detention pond maintenance shall be contained in the final approved drainage report associated with the PUD. (S)

1.8 Site Grading, Excavation and Erosion Control

Policy:

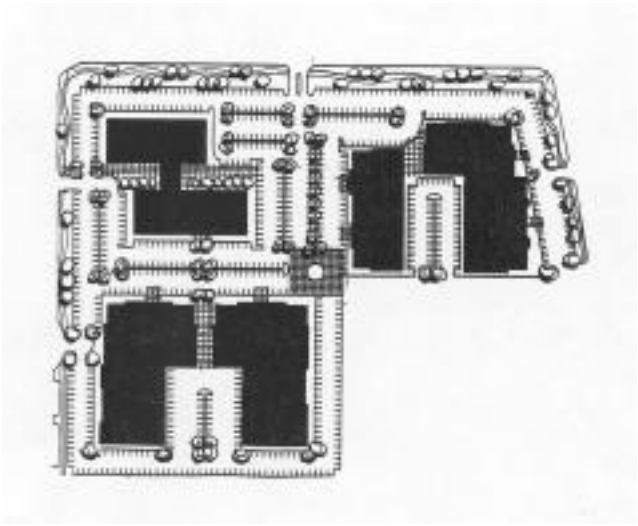
The design of site improvements should minimize cut-and-fill in order to preserve each site's natural terrain to the maximum extent possible. Site grading designs should be executed in such a manner to avoid drainage impacts (such as erosion and road damage), both on-site and downstream.

Standards and Guidelines:

A. Preserve the natural setting with grading designs that are sensitive to existing landforms and topography. (G)
B. In developing sites, limit slopes to 4:1 or less. (G) Slopes in excess of 4:1 may be allowed when engineering or site constraints dictate a steeper slope, and when appropriate erosion control measures are incorporated. (G)
C. In general, transition grades between old and new elevations should be rolling rather than one continuous straight slope. (G)
D. Avoid grade changes within the drip-line of existing trees that are to be maintained. (G)
E. Preserve existing significant site vegetation, to the extent possible, during over-lot grading and construction activities. (G) Replant all disturbed soil and slopes with an approved grass mixture or ground cover. (S) Prepare the soil prior to seeding. (S)
F. Terracing of the finished floor elevations in relation to natural grades on a site should be considered on larger buildings, when appropriate, particularly on multi-tenant flex buildings. (G)

1.8.F - TERRACE BUILDINGS WITH SLOPES

2. VEHICULAR CIRCULATION & PARKING



Goal:

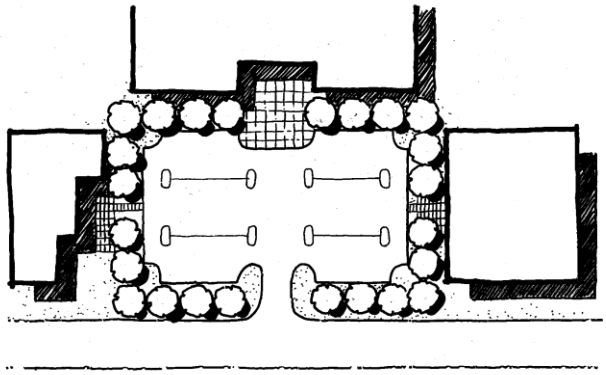
The on-site vehicular circulation and parking system is a critical factor in the safety and success of an industrial development. The parking/access/ circulation system should provide for the safe, efficient, convenient, and functional movement of multiple modes of transportation both on and off the site where pedestrian/bicycle/vehicle conflicts are minimized. The site planning process should make provision for alternate modes of transportation, including public transit, bicycles and pedestrians.

2.1 Site Access and Vehicular Circulation

2.1.1 Vehicular Access

Policy:

Promote the safety and mobility of through traffic by minimizing the number of access points to private property from public streets.



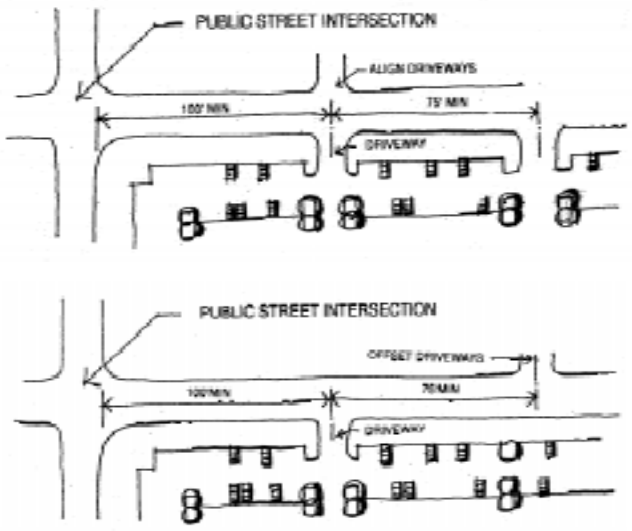
2.1.1 - VEHICULAR ACCESS POLICY

Standards and Guidelines:

A. Enhance the intersections of entrance drives with arterial and collector streets by incorporating signs, accent paving, special landscaping and lighting. (S)
B. Materials used for entry features shall be consistent with other materials used in the development. (S)
C. Two-way access drives shall have a minimum width of 28-feet. (S) One way access drives shall have a minimum width of 18-feet. (S)
D. The number of driveways per street frontage to any building site is determined by the size of building site. Building sites less than two acres shall be permitted **one** driveway, two acres to five acres shall be allowed **two** driveways and greater than five acres shall be permitted **three** driveways. (G)
E. Driveways shall be separated from street intersections by a minimum of 100-feet or by maintaining similar directions of travel and

as required by the Public Works Department. (S)

F. Driveways serving building sites on either side of a public street shall either be aligned or offset to provide a minimum separation of 75-feet when not located adjacent to a public street intersection. (S)
G. Driveways on the same side of a public street shall be separated by a minimum 75-foot distance when not located adjacent to a public street intersection. (S)
H. When possible, shared driveways located on the property line of two building sites are encouraged. (G) If incorporated into the improvements, the City will require evidence that an access easement is in place providing for joint use of the shared driveway. (S)
I. Entrances that lead directly into head-in parking are not allowed. (S)
J. Accent pavement materials located within the public right-of-way must meet City of Louisville Public Works Department criteria. (S).
K. AASHTO site visibility triangles should be considered on parcels located on the inside of horizontal street curves. (G)



2.1.1.E,F,G

2.1.1.K

2.1.2 Vehicular Circulation

Policy:

Projects with multiple building sites or parcels should include a hierarchy of internal roadways, including the following: 1) internal collector, 2) internal private drives serving multiple buildings and parcels, 3) parking aisles, and 4) service drives and truck routes. This hierarchy should be implemented by engineering and landscape treatments. The street, access and parking network shall provide for the smooth, safe, convenient and functional movement of all modes of transportation, including vehicles, public transit, bikes and pedestrians, with priority to the pedestrians.

Standards and Guidelines:

A. Provide separate and safe vehicular and pedestrian circulation systems. (G)
B. For large parking lots, separate parking aisles from truck circulation routes and entry drives. (G)
C. Avoid conflicts between adjacent parking lots

parking designs. (G)

D. Truck and vehicle backing from a public street onto the site for loading or any other purpose is prohibited. (S)
E. Vehicle circulation routes requiring movement onto a public street in order to move from one area to another on the same building site is prohibited. (S)

2.1.3 Service/Delivery, Emergency and Utility Access

Policy:

Routes for service, emergency and utility access should be clearly marked. Service circulation within a development shall be designed to provide safe movements for all anticipated vehicles. The design of individual parcels to accommodate truck access shall meet all regulatory requirements for turning radii without sacrificing other important goals and policies of the IDDSG.

Standards and Guidelines:

A. Meet all Louisville Fire Protection District regulations in the design and provision of emergency access to buildings for fire suppression, police, ambulance and other emergency vehicles. (S)
B. Avoid the creation of 'blind areas' that cannot be patrolled by police or security staff. (G)
C. Provide shared service and delivery access ways between adjacent parcels and/or buildings. (G)

2.1.4 Transit Facilities

Policy:

Transit facilities should be accommodated within all major employment centers that could generate high volumes of transit use. Transit routes, access points and shelter locations should be addressed along major roadways within and on the perimeter of such projects. Transit facilities shall be provided in a manner to make transit an attractive mode of travel for both employees and patrons.

Standards and Guidelines:

A. Locate bus shelters close to significant clusters of buildings. Provide a concrete pad in front of bus shelters. Provide protection for bus shelters from the prevailing winds. Consider incorporating passive solar heating features. (G)
B. Coordinate any shelter design and locations with RTD. (S)
C. Identify locations and define easements for future shelters. (G)

2.2 Parking Lot Design

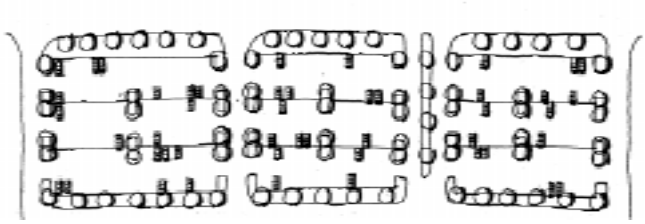
This Chapter provides standards and guidelines for the siting and layout of parking lots. Specific landscape standards for parking areas are included in Section 5.3, Parking Lot Landscaping.

2.2.1 Surface Parking Lots

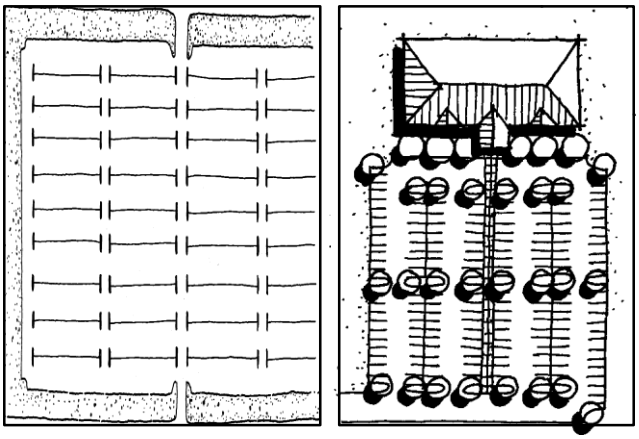
Policy:
Vehicle parking should be provided to meet the location and quantity requirements of specific uses without requiring overflow parking within a public right-of-way, or undermining the function of other modes of transportation.

Standards and Guidelines:

A. Design parking lots to avoid dead-end aisles. (G)
B. Where a dead-end aisle is authorized, adequate space for unimpeded turn-around must be provided. (S)
C. Avoid parking that creates hazardous backing movements into major drive aisles. (G)
D. Design parking areas that incorporate pedestrian walkways in a manner that links buildings to the street sidewalk system. (S)
E. Divide parking areas that accommodate more than 125 vehicles into a series of smaller, connected lots. (S)
F. Landscape and offset portions of the lot to reduce the visual impact of large parking areas. (G)
G. Avoid aligning all travel lanes in parking lots in long straight configurations. (G)
H. Provide cross-access easements between adjacent lots to facilitate the flow of traffic between complementary users. (G)



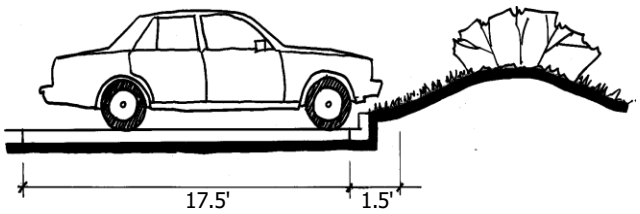
2.2.1.E - PARKING LOTS WITH 125 SPACES OR MORE MUST BE BROKEN UP INTO SMALLER LOTS WITH NO MORE THAN 125 CARS TOTAL



NO YES!

2.2.1.F

I. Each standard parking space located perpendicular to the access drive shall have a minimum width of 9-feet and a minimum depth of 19-feet. A 1.5-foot overhang is permitted for parking spaces adjacent to landscaped areas provided additional width is provided in the sidewalk or landscape area. (S)



2.2.1.I

J. An appropriate number of handicap spaces shall be provided on the building site as required by applicable code and regulations. Handicap parking shall be located in close proximity to building entrances as permitted by the overall design of the improvements. (S)

K. No compact parking spaces are allowed. (S)

L. Minimum Parking Ratios: The minimum number of parking spaces required per parcel is based on the following ratios (# Parking Spaces/Gross Building Floor Area) (S):

Office space	4 spaces/1000 SF (1:250)
Manufacturing and Research and Development space	2 spaces/1000 SF (1:500)
Warehouse space	1 space/1000 SF (1:1000)
Showroom space	4.5 spaces/1000 SF (1:225)

M. 'Flex' buildings shall plan for total parking at a ratio ranging between 4 and 5 spaces/1000 SF and will be authorized for any permitted Industrial building occupancy. (S) For sites/ buildings with parking ratios lower than 4:1000, minimum parking requirements will be reviewed on a tenant finish building permit basis, relative to the average parking ratio provided on the site. All sites shall provide a minimum parking ratio of 2.0 spaces/1000 SF, except that some parking may be deferred when the total parking demand of the intended occupant falls below that ratio. (S)

N. Public on-street parking may not be used to satisfy all or part of a building's required off-street parking. (S)

O. For specific users, additional off-street parking may be necessary to satisfy unusual occupant requirements exceeding the above noted criteria. (G)

P. Locate special parking spaces for vanpool and car pool parking close to building entrances. (G)

Q. Use curbed landscaped islands to designate a change in direction of parking stalls and aisles. (S)
R. Provide landscaped islands at the ends of all rows of parking. (S)
S. Parking bumpers in surface lots are prohibited. (S)

3. PEDESTRIAN & BICYCLE CIRCULATION

Goal:
Pedestrian and bicycle systems should be incorporated into all developments and designed to be sate and invite walking and bicycling throughout the project. Individual parcels and sites {within larger projects} should be integrated with adjacent properties designed to torm a comprehensive system and to provide convenient access to transit stops/ as well as to regional trail systems.

3.1 Overall Pedestrian and Bicycle Circulation

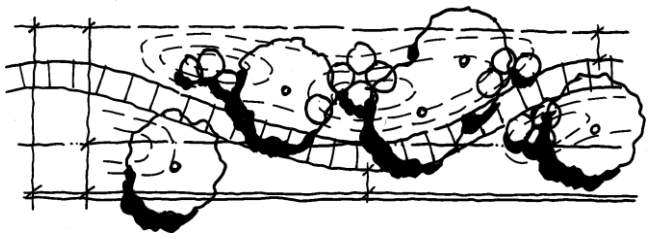
Policy:
Pedestrian spaces and routes should be designed to invite walking throughout and around each development. Routes should be integrated to form a comprehensive circulation system providing convenient, safe and visually attractive access to all destinations on the site. Ease of maintenance should be considered.

Standards and Guidelines:

A. Locate buildings and design on-site circulation to minimize pedestrian/vehicle conflicts. (G)
B. Separate pedestrian and vehicle movements with the use of landscaping, barriers or other appropriate design solutions. (G)
C. Differentiate areas of pedestrian and bicycle/ vehicle interface with accent pavement and signage to alert drivers to potential conflicts. (S)
D. Provide well-identified connections from the primary pedestrian and bicycle paths within the development to the perimeter sidewalks and bike paths. (S)
E. Locate pedestrian access and walkways away from the north sides of buildings. (G)
F. Sidewalks within the Colorado Technological Center, The Business Center at CTC, and The Park at CTC shall be constructed in accordance with the master sidewalk plan. (S)
G. Sidewalks shall be at least 5-feet wide and detached from all arterial, collector and local

public streets by a minimum 6-foot wide landscaped parkway, except at intersections where acceleration & deceleration lanes are provided. (S)

H. In cases where a meandering sidewalk is desired along an arterial street, provide adequate width within which to accommodate berming and landscaping that enhances the meander and defines the walkways. (G) If the appropriate width is not provided within the public right of way to meet this guideline, a sidewalk easement will be required. (S)



3.1.H

3.2 Bicycle Parking

Policy:

Functional and attractive bike parking shall be provided in convenient locations and in adequate numbers for employees.

Standards and Guidelines:

A. Locate bicycle parking spaces near employee building entrances. (S)
B. Do not position racks where they will obstruct building entrances or the flow of pedestrian traffic. (S)
C. Provide bicycle parking spaces in the following minimum ratio: One (1) bicycle space for every 20 required off-street automobile parking spaces up to a total maximum requirement of 21 bicycle parking spaces. (S) A minimum of 3 bicycle parking spaces shall be provided per parcel or building, regardless of building size. (S)
D. Providing protection from the elements for bicycle parking is encouraged. (G) Consider the use of shelters. (G) Coordinate the design of the bicycle shelter with adjacent buildings or other street furniture designs. (G)
E. Use bicycle racks that accommodate a range of bicycle types and a variety of security devices. (G)

4. ARCHITECTURAL DESIGN

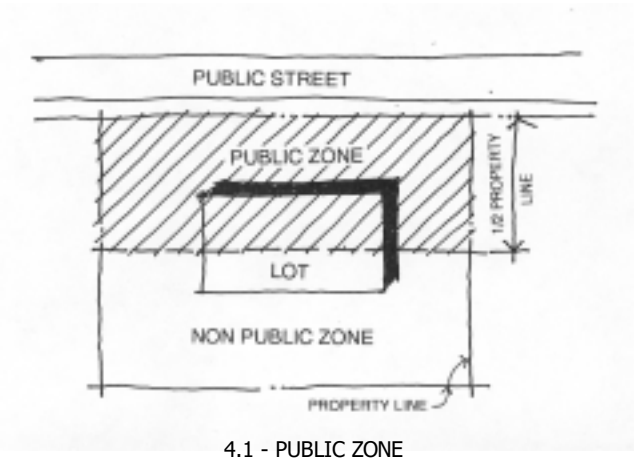
Goal:

Simple rectangular box-type structures, typically of masonry, or concrete 'tilt-up' materials characterize conventional industrial architecture. These relatively low profile, simple shapes comprise a strong element of continuity throughout a light industrial district such as the Colorado Technological Center in Louisville. Given this premise, it is the variations and fenestration details that provide the needed variety.

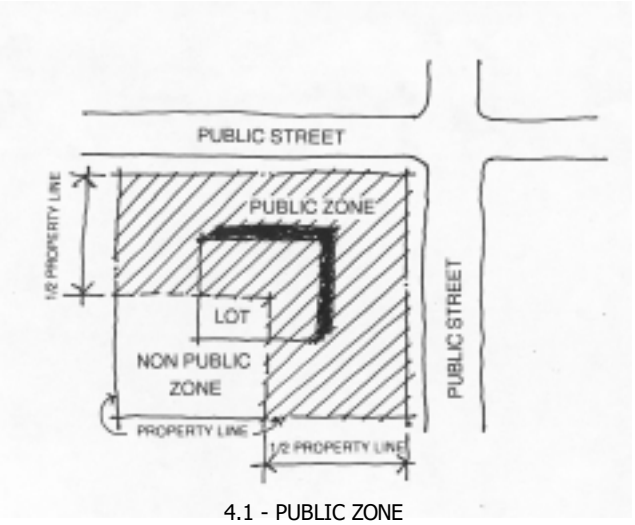
Architectural design should seek to add to community character, while providing flexibility to avoid rigid uniformity of design. While a wide variety of design techniques may be utilized, a basic harmony of architecture shall be developed to promote the quality and attractiveness of the business environment. All elements including the scale and mass of buildings, materials, colors, roof styles, door and window openings, and details should be responsive to functional architectural design and promote a cohesive design statement.

All buildings should be energy efficient to conserve natural resources.

Building masses should respond to a 'human scale' with materials and details that are proportionate to human height and provide visual interest at the street and sidewalk level. Buildings should be reduced in apparent mass or articulated to avoid large monolithic, box-like shapes.



4.1 - PUBLIC ZONE

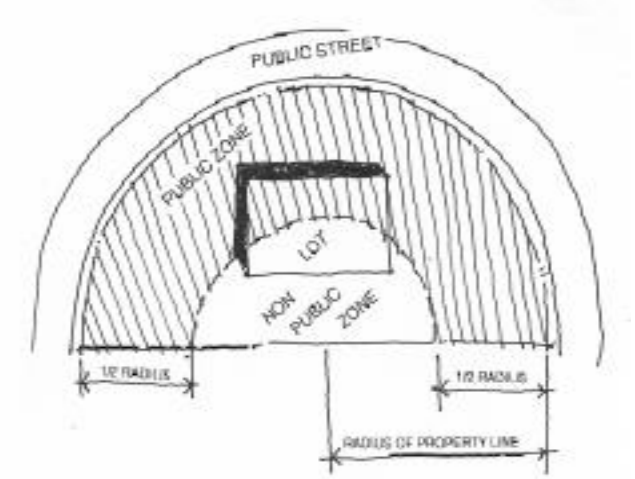


4.1 - PUBLIC ZONE

4.1 Building Relationships and Compatibility

Policy:

Building or portions of buildings within the 'Public Zone' should be oriented on a site to create a strong relationship to adjacent structures, providing visual continuity, and compatibility within the overall development.



4.1 - PUBLIC ZONE

Standards and Guidelines:

A. Building orientation to the site shall maximize from the adjoining public right-of-way identity of building user, primary building character.

entries and plaza areas and formal landscaped areas. (S)

B. Building location should optimize internal efficiencies, especially in multi-building developments, in screening service and loading areas from adjoining public streets, designation of regional facilities for stormwater detention, implementing cross access easements, and providing for common /functional employee recreational areas. (G)
C. Building location shall act to minimize from all adjoining public streets, view of truck parking and loading areas, outside storage areas, ground mounted mechanical equipment, as well as trash and service enclosures. (S)

4.2 Building Height

Policy:

Building heights should be not be out of scale with existing or planned development.

Standards and Guidelines:

A. The height of new development should be compatible with and transition from the height of adjacent development. (G)
B. The maximum building height is 40.0-feet to the top of the building parapet and 50.0-feet for architectural projections. (S)
C. Building height may exceed the 40.0-foot height limit up to 50.0-feet, when authorized through the PUD process for buildings/users that require specialized equipment. (G)

4.3 Building Massing, Forms, and Pedestrian Scale

Policy:

Buildings should relate to the terrain and each other in their massing and forms. Square 'box-like' structures with large, blank, unarticulated wall surfaces are not an acceptable form.

Buildings should respond to pedestrian scale in the immediate vicinities. Buildings should have features and patterns that provide visual interest at the scale of the pedestrian, which reduces apparent mass and that relate to local architectural character.

4.3.1 Public Zone

Standards and Guidelines:

A. Any wall within a Public Zone shall incorporate significant architectural features and treatments to diminish the building mass. (S) Use a combination of the techniques listed in the following sections 1-3 or other appropriate techniques to be reviewed through the PUD process. (S)
   1. Variations in facade elements can reduce perceived mass and scale. For example:
      i. Variations in color and/or texture should be used.
      ii. Step downs and step backs should follow the terrain and be tiered and reinforced by landscape elements.
      iii. Compositions that express rhythms and patterns of windows, columns, and other architectural features are encouraged.
   2. Avoid blank walls at ground-floor levels. (S) Use windows, trellises, wall articulation, arcades, material changes, awnings, canopies, clerestory, or other features. (G)
   3. Architectural features such as columns, pilasters, canopies, porticos, awnings, brackets or arches should be included. (G)

4.3.1.A - NOT DESIRABLE

4.3.2 Non-Public Zones

Standards and Guidelines:

A. All building materials shall comply with accepted materials under these standards and guidelines. (S)

4.4 Roof Forms and Materials

Policy:

Rooftops should contribute to the unified appearance of each development and should be considered as seen from: higher areas, ground level, other buildings and roadways.

Standards and Guidelines:

A. Avoid roof/parapet lines running in continuous planes absent variations in the building footprint. Building architecture may incorporate variation in parapet heights. (G)
B. All mechanical, electrical, optical and electronic equipment attached to or mounted on the building roof shall be set a minimum of a 20-feet from the building parapet. (S)
C. All roof-mounted equipment as described in section 4.4.B, shall be either (1) painted a color compatible with the dominant building color, if the equipment is self contained without exposed ductwork or process piping. (S) or (2) shall be screened if the equipment does not meet the criteria specified in C.1. Screen material shall be compatible with materials and colors utilized on the building and shall be specified with a detail on the PUD plans. (S)
D. Design roof forms to correspond to and denote building elements and functions such as entrances, arcades, and porches. (S)

4.4.A

4.4.A

4.5 Building Materials and Colors

Policy:

Exterior materials and colors should be aesthetically pleasing, of a high quality and compatible with materials and colors of nearby structures. Compatibility of building materials is desired throughout a development project consisting of multiple buildings.

4.4.C - RTU's NOT PROPERLY SET BACK FROM BUILDING EDGE

4.5.1 Building Materials

Standards and Guidelines:

A. Building exterior materials shall be factory finished, stained, integrally colored, or otherwise suitably treated. (S) Materials may include:
    1. split face or fluted concrete masonry unites (CMU)
    2. factory glazed concrete masonry units (CMU)
    3. face brick
    4. stone veneer,
    5. insulated glazing and framing systems

4.4.D

6. architectural pre-cast concrete
7. painted or stained site-cast concrete
8. architectural concrete
9. factory finished, standing seam metal roofing (for application to pitched roof systems only)
10. EIFS
11. architectural metal as building accent only

B. Highly reflective materials such as bright aluminum or metal are not permitted as the primary building material. (S)
C. Do not use glossy metal. (S)

4.5.1A - ACCEPTABLE MATERIAL

4.5.2 Building Colors

A. Do not use paints or other covering materials with unproven durability. (S) Do not use bright colors, (including bright white) that may streak, fade or generate glare. (S) While subdued or muted colors generally work best as a dominant, overall color, a brighter color can also be appropriate for accent elements, such as door and window frames, and architectural details. (G)
B. Choose color palettes for new buildings that are compatible with the colors of adjacent structures. (S)
C. Minimize the number of colors appearing on a structure's exterior. (G)
D. Paint architectural detailing to complement the facade and coordinate with adjacent buildings. (S)
E. Roof colors shall be muted and compatible with the dominant building color. (S)

4.5.1A - ACCEPTABLE MATERIAL

4.6 Building Entrances

Policy:
Primary building entrances should be easily identifiable and relate to human scale.

Standards and Guidelines:

A. Locate main entrances to be clearly identifiable from primary driveways and drop-offs. (S) For example:
   1. Design building entrances to contrast with the surrounding wall plane. (G)
   2. Consider tinted glass, painted doors, or

4.6.A

recessed features that will create a shaded effect. (G)
3. Create a frame around doorways, by changing materials from the primary facade material. (G)
4. Design primary entrances to be accessible to handicapped users without complex ramp systems. (G)

B. All building entrances shall be well-lit. (S) (see also Chapter 8: Exterior Site Lighting.)
C. Consider using building entranceways as a transition from the building to the ground. Incorporate walls, terraces, grading and plant materials to accomplish this transition. (G)

4.6.A

4.7 Energy Conservation Measures

Policy:

Buildings should be designed and sited to maximize the use of solar gain for energy savings, and respect the solar access requirements of adjacent (existing and proposed) buildings.

Standards and Guidelines:

4.6.A

A. Applicants are encouraged to consider energy conserving design concepts, including, but not limited to the following: (G)
1. Proper orientation and clustering of buildings to take advantage of the prevailing summer winds and to buffer against adverse winter wind conditions.
2. Types of material and their insulation characteristics.
3. The arrangement and design of windows and doors.
4. Direct solar or photovoltaic energy.
5. Day-lighting concepts.
6. Earth sheltering with creative land forming.
7. Natural ventilation of outdoor, indoor and attic spaces.

4.6.A

PUBLIC ZONE DESIGNS

4.3.1 - PUBLIC ZONE

4.3.1 - PUBLIC ZONE

4.3.1 - PUBLIC ZONE

4.3.1 - PUBLIC ZONE

4.3.1 - PUBLIC ZONE

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4.3.1 - PUBLIC ZONE

4.3.1 - PUBLIC ZONE

4.3.1 - PUBLIC ZONE

NON-PUBLIC ZONE DESIGNS

4.3.2 - NON-PUBLIC ZONE

4.3.2 - NON-PUBLIC ZONE

4.3.2 - NON-PUBLIC ZONE

4.3.2 - NON-PUBLIC ZONE

5. LANDSCAPE DESIGN

Goal:

Landscaping for industrial areas is provided within each building site to: 1) enhance the aesthetics of industrial developments; 2) create a pedestrian friendly environment; 3) break up the mass of industrial buildings; 4) soften architectural materials; 5) provide screening of service structures and loading areas; 6) enhance the streetscape/parkway environment; l) define building and parking area entrances; 8) provide shade and climate control; 9) control airborne particulates; 10) provide buffers between incompatible land uses or site areas; 11) filter drainage and stormwater runoff from parking areas and streets.

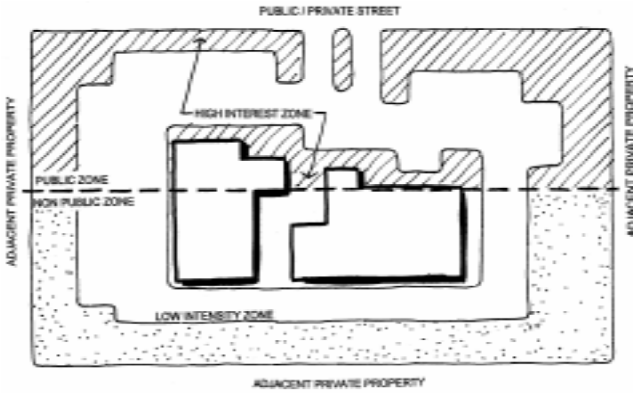
Drought tolerant plant species that are native to the region or suitable to this climate should be used.

This chapter addresses 4 distinct zones corresponding to the 4 major design influences on each industrial site:

1. *Perimeter Landscaping Adjacent to Public and Private Roads*
2. *Perimeter Landscaping Adjacent to Abutting Property*
3. *Parking Lot Landscaping*
4. *Individual Building and Loading and Service Area Landscaping*

Policy:

Water conservation concepts should be considered in all zones. Generally, the highest intensity of materials, including variety, concentration, and interest, is located along a public or private street and the front or entrance to a building, while the rear of a property not abutting a public or private street would be in a less intensive zone.



LANDSCAPE ZONES POLICY

5.1 Perimeter Landscaping Adjacent to Public and Private Roads

Policy:

The corridors along perimeter arterial streets and internal collectors should provide a visually cohesive open space system. Similar landscape treat-

ments should be used at all entrances and intersections. Plant materials, massing, spacing, and height characteristics should reinforce the hierarchy of roadways. Planting and grading should work together to create a variety of experiences along these roadways and to call attention to open space amenities. Perimeter edge treatments should establish identity for the project and convey a high-quality image while seeking to conserve water through appropriate Xeriscape planting selections.

Standards and Guidelines:

A. Include a combination of manicured and enhanced natural landscape areas. (G)
B. Place perennial flower beds at entries. (S)
C. Utility appurtenances should be softened with landscape materials, to the extent practicable. (G)
D. Streetscape Plantings:
    1. Vary street tree planting species in medians and parkways. (S) However, maintain the desired rhythm of plantings by selecting street trees with similar characteristics (i.e., height and branching patterns). (S)
    2. Provide a minimum quantity of 1 tree per 20 linear feet of street frontage within the streetscape landscape setback area. (S)
        i. In the street right of way, deciduous shade trees shall be provided at regular 40-foot intervals, along with fully irrigated ~~sod~~ grass that is native to Colorado or hybridized for arid conditions or other approved ground cover. (S) (These trees count toward the minimum quantity noted in E.2.)
    3. Shrub beds within the streetscape area are limited to 20% of the total area. (G)
    4. Provide a minimum of 6 shrubs per tree plus perennial flower beds, ground cover or ~~grass lawn~~ grass that is native to Colorado or hybridized for arid conditions within the streetscape landscape setback area. (S)
    5. Berming shall be incorporated into the streetscape landscape design. (S)
    6. Placement of plant materials in the right-of-way and in public utility easements

5.1.D - TYPICAL STREETSCAPE

adjacent to the right-of-way shall be subject to review and approval by the City. However, in the event of conflicts, minimum planting requirements shall still be maintained. (S)

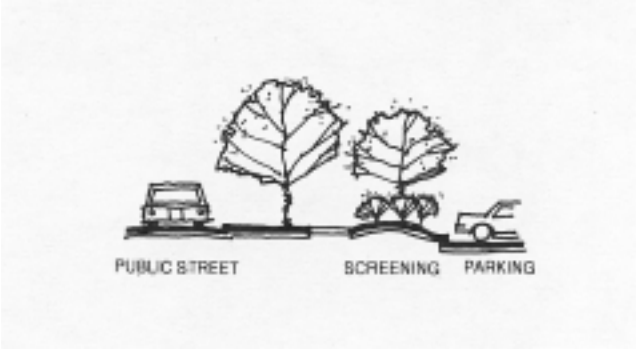
7. To prevent interference with motorist visibility, plant shrubs a minimum of 3-feet from the back of curb and choose shrubs that do not exceed 24-inches mature height. (S)
8. Street trees shall have their branches pruned up to a height of 8-feet to avoid conflict with motorist visibility. (S)

E. Visually buffer all parking lots adjacent to perimeter roadways with adequate screening within a planting strip between the public right of way and the edge of the parking lot pavement. (S) Provide adequate shrub plantings with a variety of seasonal colors to create a dense visual buffer between parking lots and perimeter roadways. (S) Whenever practical, incorporate berming with a maximum 4:1 slope within this planting strip. (G)

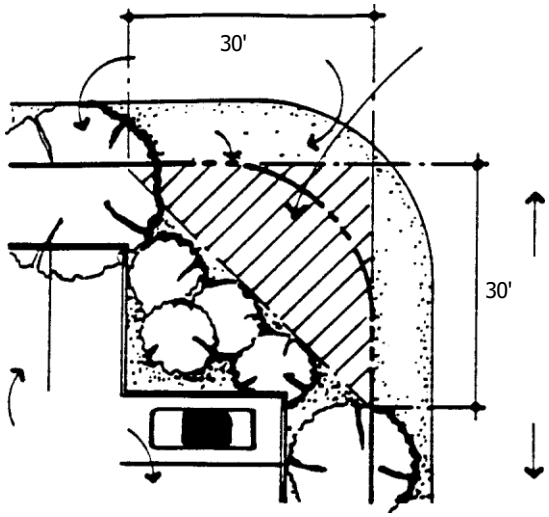
F. Sight Lines at Public Street Intersections and within Medians
   1. Provide adequate sight lines for an effective 30-foot sight triangle measured from the right of way. (S) Plants and signage are allowed within the sight triangle if: 1) plants do not exceed 30-inches in height at full maturity and 2) signs do not exceed 30-inches in height (measured from top of curb height) unless they are more than 80 percent open. (S)

G. Provide a diversity of landscaping materials at entry drives to development parcels. (S) Therefore:
   1. Provide a minimum of 3 levels of scale, including shade, evergreen, and/or ornamental trees, shrubs, annual and perennial flowers, and ground covers. (S)
   2. Plant clusters that appear as a cohesive visual element, and that complement the overall landscape theme and palette (G)
   3. Integrate the plant design with the entry sign. Plantings shall frame or provide a visual base for the signs. (S)

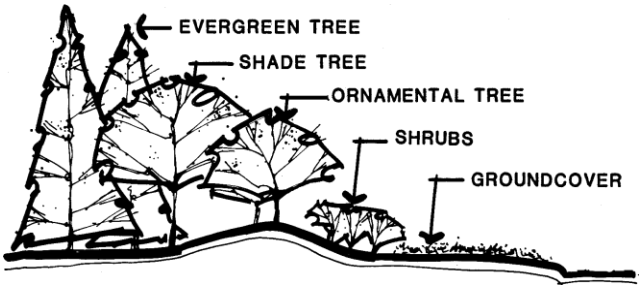
H. Deciduous trees shall be planted a minimum of 5-feet and evergreen trees a minimum of



5.1.E - PARKING LOT SCREENING



5.1.F - SITE VISIBILITY TRIANGLE



5.1.G - ENTRY LANDSCAPE CONCEPT

10-feet from public utilities and public sidewalks, unless modified by PUD street tree plans. (S)

5.2 Perimeter Landscaping Adjacent to Abutting Property

Policy:

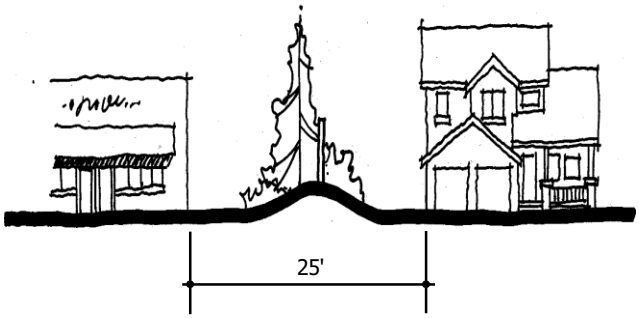
Visual buffers should be provided between similar land uses to accomplish transitions and to mitigate potential conflicts between dissimilar uses.

Standards and Guidelines:

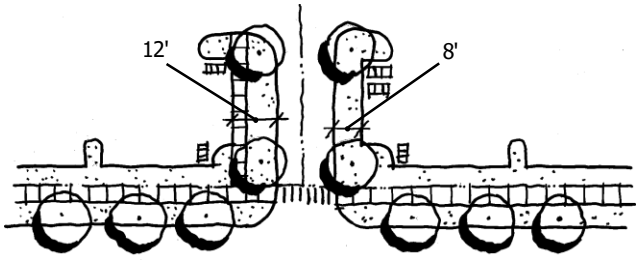
A. Between properties within the same zone district:
   1. Provide a minimum 10-foot wide buffer planting strip along internal side property lines. For the public zone portion of the side property line, provide 1 tree for every 30 linear feet of property line and appropriate shrubs, ground cover and/or ~~turf~~ native or hybridized grass areas. (S) This may not apply to internal property boundaries within a multiple-lot development to the extent the lots are developed under a single PUD Development Plan and achieve other site design policies of these guide- lines. (G)

B. Adjacent to residential and agricultural zoning districts, and/or open space:
   1. Provide a minimum 25-foot wide buffer planting strip incorporating an average 3-foot high berm containing a minimum of 1 tree for every 20 linear feet of property line and a screen hedge incorporating both deciduous and evergreen shrubs a minimum of 3-feet in height (at maturity) along a minimum of 75% of this perimeter area. (S)

C. Common/Shared Access Drives:
   1. Provide a minimum 8-foot wide buffer strip along both sides of a shared access drive when no sidewalk is included. (S)
   2. Provide a minimum 12-foot wide buffer strip along both sides of a shared access drive when a sidewalk is included. (S)



5.2.B - BUFFER PLANTING STRIP



5.2.C - COMMON/SHARED ACCESS DRIVES

5.3 Parking Lot Landscaping

Policy:

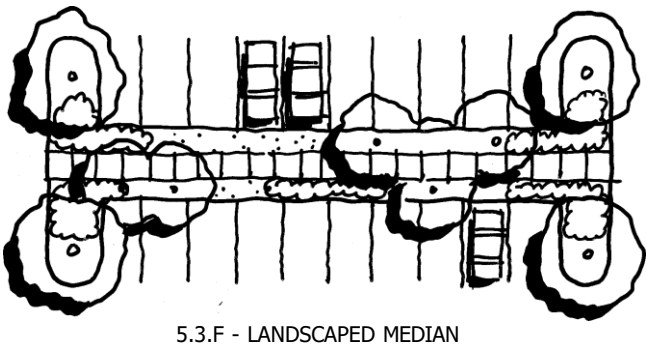
Parking lots are necessary features of building sites which, if not designed properly, can visually detract from the overall develop- ment character. Parking lots should be designed to blend with each building site's character using landscape plantings and grading, and should not be readily visible from public streets.

5.3.A - VISUALLY BUFFER PARKING AREAS

Standards and Guidelines:

A. Use low, opaque walls and/or flowering plants combined with berming and/or raised planting beds to create a visual buffer of parking areas from peripheral streets or frontages. (S)
B. Lower the grades of parking lots below existing street elevations to aid in obscuring views of automobiles, while promoting views of architectural elements of the structures beyond. (G)
C. A minimum of 1 canopy shade tree per 16 parking spaces is required in all parking lots, to be planted in islands, medians, and perimeter areas adjacent to lots (excluding streetscape tree plantings). (S) To be considered a parking lot shade tree, trees shall be located in a protected landscape area, which are bounded on at least 3 sides by parking area paving (unless the tree is located within a corner island). (S)
D. Utilize landscaped islands and medians to improve the definition of circulation patterns, provide shading for paved areas and break up continuous rows of parking. (G)
   E. Landscaped Islands
   1. Provide a minimum 6-foot wide land- scaped island at the end of every row of parking, equal in length to the parking space(s). (S)
   2. In addition to the trees, plant each island with a minimum of 8 shrubs, not exceed- ing 3 feet in height at maturity. (S)
   F. Landscaped Medians
   1. Place 12-foot wide landscape medians between every other parking bay in lots for more than 125 cars to visually break large parking lots into smaller modules. (S)
   2. Where walkways in medians will not be utilized, the medians may be reduced to a width of 8-feet. (G)

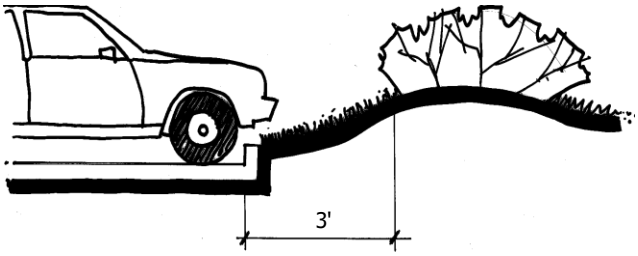
5.3.A - VISUALLY BUFFER PARKING AREAS



5.3.F - LANDSCAPED MEDIAN

3. Provide a minimum of 1 canopy shade tree and 8 shrubs for each 30 linear feet of median. (S)
4. The use of landscape medians is encouraged as a transition slope between parking bays on hillside parking lots (maximum slope of 4:1). (G)

G. Where head-in parking occurs, locate all shrubs a minimum of 3-feet from the edge of the parking lot curb. (S)



5.3.G - SHRUB SPACING

5.4 Building Site Landscaping

Policy:

The coordination of landscape design for individual building sites and larger, multi-parcel projects is essential for creating a consistent, high-quality character. A coordinated design unifies the various buildings and strengthens the cohesiveness of the development. Individual landscape treatments for building sites should compliment the roadway landscapes, create distinctive settings for buildings, reinforce the design of the open space systems, and provide amenities for pedestrians.

5.4.B - ENTRY LANDSCAPING

Standards and Guidelines:

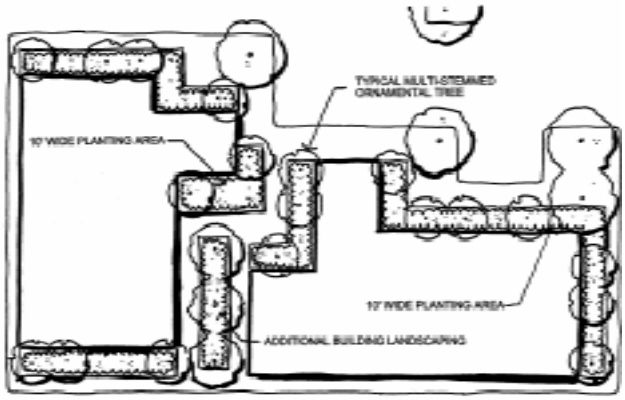
A. Use landscaping that is of appropriate scale relative to the proposed adjacent structures. (G)
B. Intensify landscaping at building entrances. (S)
C. Loading areas shall incorporate evergreen trees and shrubs for screening intermixed with deciduous shrubs for seasonal color. (S)
D. Provide a minimum planting width of 10-feet adjacent to a minimum of 50 percent of the building, with emphasis given to portions of the building visible to the street, or with public entries. These planting areas shall contain the following: deciduous trees at a ratio of one tree per 30 linear feet of building frontage, along with appropriate shrubs, perennial flowers, and ground cover. (S) Provide additional landscaping around the perimeter of buildings to soften the edge between sidewalks/parking lots and structures. (G)
E. Protect landscaping from vehicular and pedestrian encroachments with raised

5.4.C - LANDSCAPE SCREENING OF SERVICE AREAS

5.4.C - LANDSCAPE SCREENING OF SERVICE AREAS

planting surfaces, depressed walks, and/or curbs. (G)

F. Use flowering perennial plants to enhance employee break or other pedestrian gathering areas. (G)
G. Employee break areas or other pedestrian gathering areas shall include a heavy landscape treatment to provide interest, shelter from wind and summer sun, and highlight the area. (S)
H. Minimum Landscape coverage required within each building site and within the entire development shall be 25 percent. (S)
I. In stormwater detention areas, consider landscape materials that help remove debris and potentially toxic substances found in non-point source runoff. (G) Wetland plantings are appropriate in these areas. (G)
J. No organic mulch materials shall be located below the surface level of the 100-year storm detention level. (S)
K. Landscaping within Public Easements
    1. Landscaping within public easements is generally limited to shrubs, ground cover, and small ornamental trees. (G) No canopy/shade trees shall be planted within such easements. (S)
    2. Berming is generally acceptable within public easements in conjunction with plant material. (G) Berming is not to be used instead of plant material. (S)



5.4.D - BUILDING LANDSCAPING

5.4.D - ENTRY LANDSCAPING

5.5 Landscape Irrigation/Water Conservation

Policy:

A significant percentage of the City's treated water supply is used to irrigate plant materials and grasses. Every effort should be made to conserve water by utilizing alternative means for maintaining a suitable landscape environment.

Standards and Guidelines:

A. Low water use and water conservation concepts can be incorporated into the landscape design of each industrial development without compromising the intent to establish significant visual amenities through landscaping. For example:

5.4.G - EMPLOYEE BREAK AREA

1. Incorporate a 'zoned planting scheme' to reduce water demand by grouping plants with similar water requirements. (S)
2. Use drought tolerant plant species suitable to this climate that have minimum watering and pruning requirements. (G)
3. The use of water conserving grasses~~,~~ ~~such as fescue sods,~~ is preferred. Limit the use of blue grass to areas which function as recreation areas or have high foot traffic. (G)
4. Non-irrigated native grasses are encouraged in areas of low visibility from public and private streets. (G) As such grasses only experience short periods of growth, avoid mowing native grasses too low. (G)
5. Incorporate heavily mulched planting beds to aid in retaining moisture and to make planting areas easier to maintain. Improve the soil prior to planting for better water absorption and retention. (G)
6. Incorporate advanced irrigation measures and scheduling. Install an efficient automatic irrigation system that will incorporate water conservation measures. Spray heads are recommended for lawn and ground cover areas, with drip irrigation for shrubs and trees. (S)

5.6 Landscape Standards and Plant Material Selection

Policy:

For a strong visual impact, plants should be used in masses of the same species. Random spotting of many different types is not appropriate. Planting should reinforce the site planning concepts and complement architectural forms. Plant materials selections from the Recommended Plant Materials List (Appendix 'A') are encouraged. Contact the Planning Division for other Xeriscape planting guides.

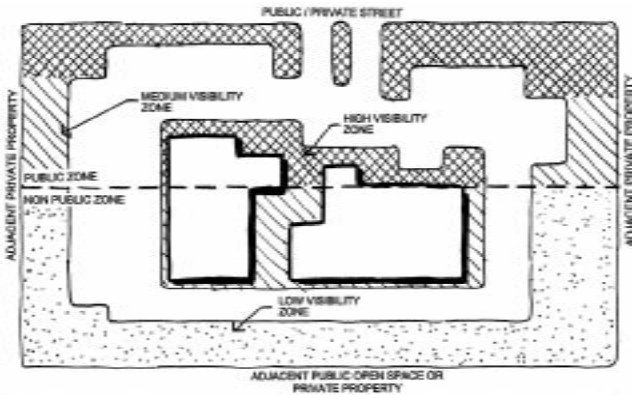
Standards and Guidelines:

A. *Landscape Zones*: Depending on the size and magnitude of an individual parcel, the project's landscape areas should be divided

into one or more of the following basic zones. (G)

1. *High Visibility Zone* (located at site and building entrances and pedestrian areas and within the streetscape planting area) This zone may include:
   i. Manicured ~~lawns~~ grass that is native to Colorado or hybridized for arid conditions that require weekly mowing and regular watering ~~(including blue grass/fescue mixes or other suitable grasses).~~
   ii. Formal plantings of trees and shrubs.
   iii. Perennial beds.
2. *Medium Visibility Zone* (located along side property lines and other interior areas of the site) This zone may include:
   i. Drought tolerant grasses which require less water and maintenance (but still provide a manicured green look during the growing season ~~- including fescue-type grasses~~)
   ii. Shrubs
   iii. Trees
   iv. Irrigated Seed
3. *Low Visibility Zone* (located in environmentally sensitive areas, along waterways; adjacent to public open spaces; and the balance of the site. These may include:
   i. Natural areas and native grasses (which require very low water and maintenance)
   ii. Existing vegetation
   iii. Drought resistant plant species
   iv. Meadow-like/open fields
   v. Wetlands areas

B. Selection of plant materials is encouraged from the *Recommended Plant Materials List* attached as Appendix A, (G), and in light of the following standards and guidelines:
   1. Select plant materials on the basis of suitability to climate, setting and compatibility with other development plantings, character and functions. (G)
   2. Select plant materials that are free of disease and harmful insect problems. (S)
   3. Tree species shall be varied to minimize the impact and spread of disease. (S) A



5.6.A.1,2,3 - VISIBILITY ZONES

given species shall not account for more than 30% of trees on a given site. (S)

4. The quality of plant material selected will follow the guidelines of the "American Standard for Nursing Stock" by the American Association of Nurserymen. (S)
5. Proper drainage is required for all major plantings to ensure the establishment of a good root system and healthy growth. (S)
6. The installation of all landscaping shall be done by an established landscape contractor who follows the procedures set forth by the American Association of Landscape Contractors and its local agencies (S).
7. In situations where installation of landscaping is deferred to after the issuance of the first Certificate of Occupancy, which may be approved, at the City's discretion, due to seasonal planting constraints, a performance guarantee for 125 percent of the value of the work, in a form acceptable to the City, is required to ensure completion of landscaping. (S)
8. Artificial plants of any type, size or color are not allowed as exterior landscaping within any development parcel. (S)

C. Encourage the use of water conserving landscapes by minimizing irrigated ~~sod~~ grass areas ~~(such as blue grass)~~ which require significant watering and maintenance. (G) In general, where grass lawn areas are used, choose a species that will require low maintenance in cutting and low ~~less~~ watering ~~than typical blue grass (fescue sods are preferred).~~ (G)
D. Choose plant materials that provide variety and year-round color and screening. Select materials which highlight each season (G) :
   1. Spring: Flowering plants
   2. Summer: Shade
   3. Fall: Leaf color
   4. Winter: Branch form and texture
E. Edging is required to separate grass areas from shrubs, ground cover and mulch. (S)
F. Utilize porous paving materials for paths, plazas, etc., such as patio bricks, interlocking pavers, concrete stepping stones and/or sandstone and crusher fines. (G)

G. Plant perennial flowerbeds in visible areas such as pedestrian plazas, building entries. (S)

H. Mulching:
   1. All planting beds should be mulched with wood or decorative rock to stabilize soils, control erosion, and conserve water use. (S)
   2. Where rock mulch is used, a minimum of 1 shrub per 25 square feet of mulch shall be provided except as required by an soils engineering report when used adjacent to a building foundation. (S)
   3. Rock mulch shall be varied in size and coloration. (S)
      i. Rock mulch size is restricted to the 1- to 3-inch range. (S)
      ii. Rock mulch shall only consist of river rock, crushed granite and/or Colorado sandstone varieties. (S)

I. Use landscape or weed barrier fabric within all shrub beds and mulched areas to control weeds. (S)

J. Deciduous to evergreen shrub ratio should approach 3:1 unless reduced by exceptional screening requirements. (G)

K. All Landscape Plans should be prepared by a qualified Landscape Architect. (S)

5.7 Planting Size Standards

Policy:

An immediate landscape impact is desired within all industrial developments, and to facilitate this, minimum plant-size standards are required. Larger sizes are encouraged.

Standards and Guidelines:

A. Provide landscaping according to the following minimum sizes*: (S)

Deciduous shade/canopy trees	2.5" caliper
Ornamental trees	2.0" caliper
Evergreen trees	6'-8' height (minimum 25% must be 8')
Multi-Stem Ornamentals	8'-10' height
Shrubs	5 gallon container
Vines	1 gallon container
Ground Cover/Perennials	2 ¼" pots

*Caliper measured by ANSI standard Z60.1.

5.8 Landscape Maintenance and Replacement

Policy:

The property owner is responsible for providing, protecting and maintaining all landscaping in a healthy and growing condition.

Standards and Guidelines:

The following requirements shall be noted on the PUD landscape plan:

A. The property owner shall remove and replace dead or diseased plant materials immediately with the same type, size and quantity of plant material as originally installed. (S)
B. Avoid replacing landscape materials during the dry winter months between December and February and in mid-summer. (G)
C. Contact the Planning Division for specific time requirements for landscape material replacement. (G)
D. Landscape materials located in the public right-of-way are to be maintained by the abutting property owner. (S)

5.9 Site Furniture and Features

Policy:

Site furnishings include benches, waste receptacles, planters, railings and bollards. Visual consistency of these elements is desired throughout each development. All components of outdoor site furniture should be low maintenance, highly durable and resistant to vandalism and theft.

6. FENCES & WALLS

Goal:

Fences and walls should be decorative and contribute to the visual quality of the profect and the overall development. Walls, fences, and landscape materials shall be used to screen service areas, loading areas, and outdoor storage areas. When not required for security, screening, or grade transitions, the size of walls and fences should be minimized. When required, however, fencing should be as inconspicuous as possible and walls should be low.

6.1 Wall and Fence Design and Materials

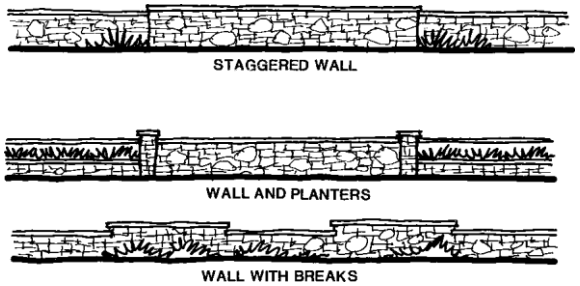
Policy:

Fencing and walls shall be constructed of materials that are compatible with the adjacent building architecture and their appearance softened with landscape materials.

Standards and Guidelines:

A. Avoid using retaining walls in excess of 30-inches in height (G). Where taller retaining walls are required, provide safety protection in the form of railings, fences or hedges, or create a terrace with two (2) shorter walls. (S)
B. Incorporate architectural treatment on both sides of perimeter walls. (S)
C. Provide landscaping in combination with walls and fences to soften their appearances. (G)
D. Chain-link fencing with or without wood slatting is not an acceptable screen material. (S)
E. Break up long expanses of fences or walls, with periodic columns, insets, landscape pockets or changes in materials. (S)
F. Construct walls and fences from durable materials such as stone, brick, or metal with dark finishes (wrought iron or similar), or a combination of these materials. (G)
    1. Wood fences are discouraged, however, if authorized, the following features must be included:
        i. Fence shall be stained. (S)

6.1.A - AVOID RETAINING WALLS IN EXCESS OF 30"



6.1.E

ii. Must include piers and/or pilasters a maximum distance of 15-feet on center that are faced with brick, stone or other appropriate heavy material. (S)
iii. The fence shall include a cap element. (S)

G. Concrete walls are permitted if faced with masonry or stone, or if the surface is scored or textured. (G)
H. Fence or wall runs greater than 50 linear feet shall be articulated with architectural offsets and incorporate landscape pockets. (S)
I. Bring berms up to the outside of a screening wall or reduce the grade on the inside to minimize its visibility. (G)

6.2.A - SCREEN LOADING AND SERVICE AREAS FROM STREET VIEW

6.2 Screening Requirements

Policy:

A project must include adequate screening of meters, transformers, storage and loading and service areas.

Standards and Guidelines:

A. Where located within a side yard, or visible from street view, screen loading docks and service areas with a minimum of 6-feet high screen wall constructed of the same materials and finishes as the main building. (S)
B. All authorized outside storage shall be screened using fencing, walls and/or landscape materials. (S)
C. Screen all utility equipment, including auxiliary power generators, from view with fencing, walls, and/or landscaping. (S)

7. SIGN DESIGN

Goal:
Signs should be consistent with overall project design but should be subordinate to architectural and landscape elements. Signs serve to identify, inform, direct, regulate and interpret. Each industrial building or group of industrial buildings should have a consistent and comprehensive sign program from project identification at the street through individual tenant suite identity. Placement, scale, and readability should be considered in developing a sign package.

TYPICAL MONUMENT SIGN

7.1 Sign Materials

Policy:
Design and construct signs of durable, high quality architectural materials.

Standards and Guidelines:

A. The sign package must utilize materials, colors, and designs that are compatible with the associated structures. (S)
B. Sign materials must be of proven durability. (S)

TYPICAL MONUMENT SIGN

7.2 Sign Number and Area

Policy:
The size of signs should be modest and afford businesses sufficient visibility and identification without becoming a dominant part of the landscape or interfering with vehicular movement along the public streets.

Standards and Guidelines:

A. Number of Signs
    1. The maximum number of flush-mounted signs allowed for freestanding buildings is one per individual tenant building frontage, not to exceed one sign per tenant, nor to exceed one per public entry door. Small informational signs not exceeding 5 square feet in area and 6-feet in height are permitted on rear man and loading door entrances. (S)
    2. One freestanding, ground-mounted,

TYPICAL MONUMENT SIGN

double-faced sign is permitted for each freestanding building. (S)
   i. Where a freestanding office building contains multiple tenants, or multiple accesses off a public right of way, an increase in the number of freestanding ground mounted signs may be permitted through the planned unit development plan process. (G)
3. Window signage is limited to the individual tenant name only. (S)

B. Area of Signs
1. Surface-mounted signs shall not exceed 15 square feet of surface area each, nor exceed 80 square feet total per building. (S)
2. Freestanding, ground-mounted signs shall not exceed 25 square feet per face. (S)
3. Window signage not exceeding 10 percent of the area of the window in which it is located is permitted. (S)

C. Character Height
1. Individual tenant sign characters shall not exceed 18-inches in height regardless of area. (S)
2. If a single building is occupied by a single tenant, the maximum character size may be increased to 24-inches, however, the building is then restricted to one sign per public street frontage. (S)
3. Regardless of area, character heights shall be uniform for each project. (S)

D. Sign Height
1. Monument signs shall not exceed 6-feet in height. (S)
2. Surface-mounted signs should be mounted at a height that helps identify tenant entries. (G) Surface-mounted signs shall not exceed 25-feet in height from grade immediately below the sign. (S)

TYPICAL MONUMENT SIGN

7.2.C.2 - SINGLE TENANT SIGN

7.3 Location/Placement/Visibility

Policy:

Signs should be located to be visible from streets and paths without conflicting with safe vehicular movement and visibility.

Standards and Guidelines:

A. Signs should be sufficiently visible from public streets so that site entrances can be readily identified by both pedestrians and persons in vehicles. (G)
B. Locate monument signs in a planter setting within a landscaped area. (S)
C. Signs shall be set back a minimum of 10-feet from the right of way. (S)
D. Locate signs outside vision clearance areas and easements. (S) (see also 5.1.F.1)
E. Signs on roofs are not allowed. Signs shall not exceed the height of the roof parapet. (S)
F. Signs facing or visible to gateway arterial roadways and off-street multi-use paths are prohibited. (S)

7.4 Sign Illumination

Policy:

In industrial areas, sign illumination should serve to identify individual developments only.

Standards and Guidelines:

A. Monument signs may be illuminated with a maximum of one, ground-mounted 100-watt metal halide fixture per face. (S)
B. Building mounted signs may not be illuminated either directly or indirectly. (S)
C. When external light sources are directed at the sign surface, conceal the light source from the 'lines of sight' of pedestrians and motorists. (S)
D. Window signage shall not be illuminated. (S)
E. Visible neon tubing is not allowed as a method of sign illumination nor shall it be used as an architectural treatment. (S)

7.5 Allowable Sign Types

Policy:

The type of sign used should reinforce the urban environment of industrial developments. Signs should be designed as a 'family', incorporating similar, compatible materials that reinforce the design and style of the project architecture. The following standards and guidelines apply with regard to the listed sign types.

Standards and Guidelines:

A. Monument Signs
   1. Project monument signs, if authorized, may be located at the street or primary entries to industrial developments to provide for overall project identity. (G) Such signs should contain the name of the project that it identifies or the building street number and may include the names of individual tenants, but shall not contain change panels or advertising. (S)
   2. Affix monument signs to the ground in a continuous connection. (S)
   3. All monument signs shall provide the address and street of the building served, with minimum 3-inch text. (S)
   4. For flexible space projects containing multiple tenants, project identity signage requires additional variables that must be considered. Conceptual designs for signs serving these types of facilities must be submitted to the Planning Department. (S)

B. Surface-mounted Signs on Buildings
   1. For multi-tenant buildings, locate wall-mounted signs at the first floor level only. (S) Wall signs shall identify the individual business, building or building complex by name or trademark only. (S)
   2. Wall-mounted signs may not project more than 8-inches from the face of the building and external raceways are not permitted. (S)

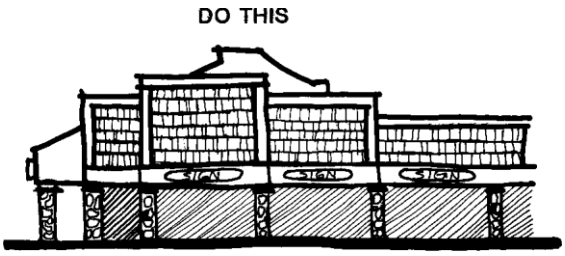
C. Projecting Signs
   1. Projecting signs are not permitted. (S)

D. Pole-mounted Signs
   1. Pole-mounted signs are allowed only as traffic regulation signs or to provide appropriate directions to loading and receiving areas, visitor parking, and other areas within each development site. (S)
   2. Pole-mounted signs shall not exceed 4 square feet in area and 6-feet in height measured from grade. (S)

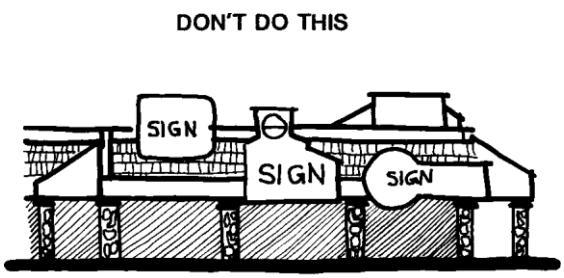
E. Flashing or moving signs are not permitted. (S)

TYPICAL WALL SIGN DESIGN AND LOCATION

TYPICAL WALL SIGN DESIGN AND LOCATION



EMPLOY A CONSISTENT SIGN PATTERN



INCONSISTENT SIGN PATTERNS CREATE CONFUSION. SIGNS WITHIN OR ABOVE ROOF AREA ARE PROHIBITED

8. EXTERIOR SITE LIGHTING

Goal:

Exterior lighting should be used to provide illumination for the security and safety of entry drives, parking, service and loading areas, pathways, courtyards and plazas, without intruding on adjacent properties. Site lighting shall be architecturally compatible and consistent in design between sites.

8.1 Fixture Design

Policy:

Exterior light fixtures should be compatible and relate to the architectural character of the buildings on a site. Site lighting should be provided at the minimum level to accommodate safe pedestrian and vehicle movements, without causing any off-site glare.

Standards and Guidelines:

A. Poles and fixtures should be designed to be architecturally compatible with structures and lighting on adjacent properties. (G)
B. Poles and fixtures shall be compatible with all other fixtures on site. (S)
C. Illuminate all intersections with perimeter public roads with similar poles and fixtures used internal to the development. (G)
D. Select and locate all lighting fixtures to shield or confine light spread within a site's boundaries. (S)
E. To facilitate security, specify lighting levels that are adequate for visibility, but not overly bright. All building entrances should be well-illuminated. (G)
F. Use metal halide or other white light fixtures. High-pressure sodium is not allowed in any application. (S)
G. Maximum height of all poles within landscaped and plaza areas is 20-feet, measured from grade. Pole pedestals (bases) are limited to a minmum of eight-inches in height. (S)
H. Decorative light fixtures, which are appropriately shielded, and provide visual interest, are allowed. (G)

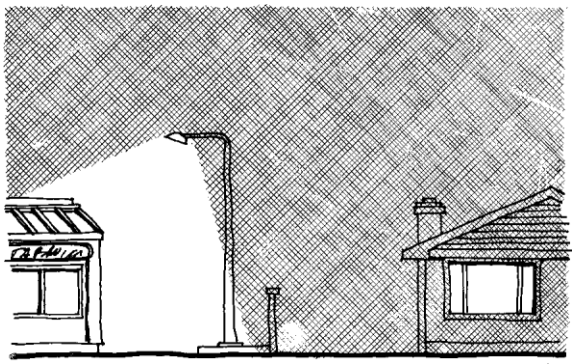
8.2 Parking Lot Lighting

Policy:

Parking lot lighting should be unobtrusive and provide safe light for orderly functions.

Standards and Guidelines:

A. Make all parking lot light fixtures similar in design for all surface parking areas. (S)
B. Select lighting with a concealed light source of the 'cut-off' variety to prevent glare and 'light trespass' onto adjacent buildings and sites. (S)
C. Provide separate, pedestrian scale lighting for all pedestrian ways through parking lots. (G)
D. Maximum height of parking lot poles is 24-feet measured from finish grade. (S)
E. Locate poles in medians wherever possible with a maximum base height of 2-feet. (G)
F. 'Wall packs' are permitted only in loading and service areas, and shall be down-lit and fully shielded from view. (S)



SELECT AND LOCATE LIGHT FIXTURES TO CONFINE LIGHT SPREAD

8.3 Pedestrian Area Lighting

Policy:

Walkway lighting should be scaled to the pedestrian and should provide for safe use of pathways and pedestrian areas. Walks should be lighted for the safe passage of pedestrians, as should areas that are dangerous if unlit, such as stairs, ramps, intersections, and underpasses.

Standards and Guidelines:

A. Bollard light fixtures or other low-level fixtures are encouraged to identify pedestrian walkways and drop-off areas at entrances to buildings. (G)
B. Emphasize pedestrian-to-vehicle intersections with low-level decorative streetlights. (G)
C. Illuminate all primary walkways, steps or ramps along pedestrian routes. (G)
D. Incandescent or metal halide lamps are strongly encouraged. (G)
E. Use building mounted fixtures for walkways and plazas near buildings. (G)

8.4 Site Security Lighting

Policy:
Security lighting may be necessary on some sites, but it should not negatively impact the site and building architecture or adjacent parcels.

Standards and Guidelines:

A. No light source (bulb) shall be directly visible from adjacent parcels. (S)
B. Provide only as much light/illumination as necessary to provide safety and security of the area. (G)

8.5 Light Intensity

Policy:
The light intensity levels within all areas should correspond to use and potential hazards.

Standards and Guidelines:

A. A photometric lighting plan is required for all proposed industrial developments to ensure adequate and appropriate light levels are provided for each site condition. (S)
B. The following levels of illumination should be maintained for each of the specific locations[1]: (G)

Building Entrances	5.0 footcandles	54 lumens/square meter
Sidewalks	2.0 footcandles	22 lumens/square meter
Bikeways	1.0 footcandles	11 lumens/square meter
Courts/Plazas/Terraces	1.5 footcandles	16 lumens/square meter
Ramps	5.0 footcandles	54 lumens/square meter
Stairways	5.0 footcandles	54 lumens/square meter
Underpasses	5.0 footcandles	54 lumens/square meter
Waiting Areas	1.0 footcandles	11 lumens/square meter
Parking Lots	1.0 footcandles	11 lumens/square meter
Roadways	1.5 footcandles	16 lumens/square meter

[1] Values given area in minimum average maintained horizontal, footcandles (lumens/square meter) which are measured at the average point of illumination between brightest and darkest areas, 4'-5' above the ground surface. (Source: IES Lighting Handbook - 4th Edition).

[2] Metric conversion is provided for convenience only. Photometric plans must be submitted using imperial measurement values.

C. Site lighting should provide consistent levels of illumination, avoiding pockets of very high or low levels of illumination. (G)
D. Maximum 400-watt fixtures are permitted for parking lot pole lighting. (S)
E. Wall packs of a full cut-off and fully shielded design shall not exceed a maximum of 70-watts for man doors and 175-watts in loading areas. (S)

{END)

APPENDIX A
RECOMMENDED PLANT MATERIALS LIST

DECIDUOUS TREES

Common Name	Botanical Name	Water Requirement	Maintenance Requirement	Street Tree	Remarks
Norway Maple	(Acer platanoides) (3)	M	L	Yes	Good fall color (yellow)
Red Maple	(Acer rubrum)	M	L	Yes	Good (yellow to red) fall color
Wier's Cutleaf Maple	(Acer saccharinum 'Wier')	M	H	No	Very susceptible to snow storm breakage
Sugar Maple	(Acer saccharum)	H	L	Yes	
Ohio Buckeye	(Aesculus glabra)	M	L	Yes	Poisonous seeds, good fall color
Native Riverbirch	(Betula fontinalis)	H	L	No	
Western Catalpa	(Catalpa speciosa)	M	M	No	Fruits can be messy
Western Hackberry	(Celtis occidentalis)	M	L	Yes	
Autumn Purple Ash	(Fraxinus americana 'Autumn Purple')	M	L	Yes	Good fall color (yellow to red)
Green Ash	(Fraxinus pennsylvanica lanceolata) (3)	M	L	Yes	Good fall color (yellow)
Honeylocust	(Gleditsia triacanthos inermis) (3)	M	L	Yes	
Lanceleaf Cottonwood	(Populus acuminata) (1)	M	H	No	Best used in parks, open space, & riparian areas
Narrowleaf Cottonwood	(Populus angustifolia) (1)	M	H	No	Best used in parks, open space, & riparian areas
Siouxland Cottonwood	(Populus deltoides) (1)	M	H	No	Best used in parks, open space, & riparian areas
Plains Cottonwood	(Populus sargentii) (1)	M	H	No	Best used in parks, open space, & riparian areas
Bur Oak	(Quercus macrocarpa)	M	L	Yes	
Pin Oak	(Quercus palustris)	M	L	Yes	Good fall color (bronze to red)
English Oak	(Quercus robur)	M	L	Yes	Good fall color
Northern Red Oak	(Quercus rubra borealis)	M	L	Yes	
Peachleaf Willow	(Salix amygdaloides) (1)	H	H	No	Best used in parks, open space, & riparian areas
Weeping Willow	(Salix elegantissima) (1)	H	H	No	Best used in parks, open space, & riparian areas
Niobe Weeping Willow	(Salix x blanda 'Niobe') (1)	H	H	No	Best used in parks, open space, & riparian areas
American Linden	(Tilia americana)	M	L	Yes	
Little Leaf Linden	(Tilia cordata)	M	L	Yes	
Redmond Linden	(Tilia euchlora 'Redmond')	M	L	Yes	

ORNAMENTAL TREES

Common Name	Botanical Name	Water Requirement	Maintenance Requirement	Street Tree	Remarks
Amur Maple	(Acer ginnala)	M	L	NA	Good fall color (orange to red)
Shadblow Serviceberry	(Amelanchier canadensis)	M	L	NA	Nice fall color (yellow to red)
Eastern Redbud	(Cercis canadensis)	M - H	L	NA	Showy flowers
Cornelian Dogwood	(Cornus mas)	M	L	NA	Showy flowers
Thornless Cockspur Hawthorn	(Crataegus crus-galli inermis)	L	L	NA	Thornless, good fall color (orange to red)
Cockspur Hawthorn	(Crataegus crus-galli)	L	L	NA	Thorns, good fall color (orange to red)
Downy Hawthorn	(Crataegus mollis)	L	L	NA	
Golden Raintree	(Koelreuteria paniculata)	M	L	NA	Showy flowers
Flowering Crab	(Malus varieties) (3)	L - M	M	NA	
Wild Plum	(Prunus americana)	L	M	NA	Suckers
Newport Purple Plum	(Prunus cerasifera 'Newport')	M	L	NA	Red-purple foliage
Shubert Chokecherry	(Prunus virginiana)	M	L	NA	Red-purple foliage
Bradford Pear	(Pyrus calleryana 'Bradford')	M	M	NA	Not too hearty in this region, showy flowers
Ussurian Pear	(Pyrus ussuriensis)	M	L	NA	Showy flowers
Peking Lilac	(Syringa pekinesis)	M	L	NA	Showy flowers
Japanese Tree Lilac	(Syringa reticulata)	L - M	L	NA	Showy flowers, good fall color (yellow)
Washington Hawthorn	Crataegus phaenopyrum)	M	L	NA	Good fall color, red

DECIDUOUS SHRUBS

Common Name	Botanical Name	Water Requirement	Maintenance Requirement	Street Tree	Remarks
Thin Leaf Alder	(Alnus tenuifolia)	M	L	NA	Nice fall color (yellow)
Serviceberry	(Amelanchier alnifolia)	L	L	NA	Nice fall color
Chokeberry	(Aronia melanocarpa)	H	M	NA	Suckers, good fall color (red)
Sagebrush	(Artemisia) (3)	L	L	NA	
Four Wing Saltbush	(Atriplex canescens)	L	M	NA	
Korean Barberry	(Berberis koreana)	M	M	NA	Thorns
Mentor Barberry	(Berberis mentorensis)	M	M	NA	Thorns, good fall color (yellow to red)
Redleaf Japanese Barberry	(Berberis thunbergii atropurpurea)	M	M	NA	Thorns
Green Japanese Barberry	(Berberis thunbergii)	M	M	NA	Thorns
Blue Mist Spirea	(Caryopteris x clandonensis)	L	L	NA	
Curlleaf Mountain Mahogany	(Cercocarpus ledifolius)	L	M	NA	
Mountain Mahogany	(Cercocarpus montanus)	L	M	NA	
Quince	(Chaenomeies spp.)	M	M	NA	Showy flowers
Rabbit Brush	(Chrysothamnus nauseousus)	L	M	NA	
Variegated Dogwood	(Cornus alba bariegata)	M - H	M	NA	
Colorado Redosier Dogwood	(Cornus sericea coloradense) (3)	M - H	M	NA	Colored twigs provide nice winter color
Yellowtwig Dogwood	(Cornus sericea flaviramea) (3)	M - H	M	NA	Colored twigs provide nice winter color
Kelsey Dwarf Dogwood	(Cornus sericea kelseyi)	M	M	NA	
Redtwig Dogwood	(Cornus stolonifera)	M - H	M	NA	Colored twigs provide nice winter color
Cranberry Cotoneaster	(Cotoneaster apiculata)	M	M	NA	
Spreading Cotoneaster	(Cotoneaster divaricata)	M	M	NA	
Rock Cotoneaster	(Cotoneaster horizontalis)	M	M	NA	
Silverberry	(Eleagnus commutata)	M	M	NA	
Burning Bush	(Euonymus alata) (3)	M	M	NA	Nice fall color (red)
New Mexico Privet	(Forestiera neomexicana)	M	M	NA	
Forsythia	(Forsythia intermedia)	M	M	NA	Showy flowers
Honeysuckle	(Lonicera) (3)	M	M	NA	
Mockorange	(Philadelphus) (3)	L - M	M	NA	
Mountain Ninebark	(Physocarpus monogynus)	M	M	NA	
Potentilla	(Potentilla fruticosa) (3)	M	M	NA	Showy flowers
Sandcherry	(Prunus besseyi)	M	M	NA	
Cistena Plum	(Prunus cistena)	M	M	NA	
Native Chokecherry	(Prunus virginiana melanocarpa)	L - M	M	NA	
Scrub Oak	(Quercus gambelii)	L	L	NA	

Tallhedge Buckthorn	(Rhamnus frangula columnaris)	M	M	NA	
Smooth Sumac	(Rhus glabra)	L	M	NA	Nice fall color (orange to red)
Threeleaf Sumac	(Rhus trilobata)	L	M	NA	Nice fall color (orange to red)
Staghorn Sumac	(Rhus typhina)	L	M	NA	
Alpine Currant	(Ribes alpinum)	L - M	M	NA	
Golden Currant	(Ribes aureum)	L - M	M	NA	
Rose	(Rosa) (3)	L - M	M	NA	
Coyote Willow	(Salix exigua)	M - H	M - H	NA	Best in moist areas
Bluestem Willow	(Salix irrorata)	M - H	M - H	NA	
Dwarf Willow	(Salix purpurea nana)	M - H	M - H	NA	
Arctic Willow	(Salix purpurea)	M - H	M - H	NA	
Elder	(Sambucus canadensis)	M - H	M	NA	
Buffaloberry	(Shepherdia argentea)	L	M	NA	
Spiraea	(Spiraea) (3)	M	M	NA	
Snowberry	(Symphoricarpos albus)	M	M	NA	
Lilac	(Syringa) (3)	M	M	NA	
Viburnum	(Viburnum) (3)	L - M	M	NA	Nice fall color (varies)
Privet	(Vulgare) (3)	M	M	NA	

EVERGREEN TRE (2)

Common Name	Botanical Name	Water Requirement	Maintenance Requirement	Street Tree	Remarks
White Fir	(Abies concolor)	M - H	L	No	
Oneseed Juniper	(Juniperus monosperma)	L	L	No	
Rocky Mountain Juniper	(Juniperus scopulorum 'Varieties')	L - M	L	No	
Red Cedar	(Juniperus virginiana 'Varieties')	M	L	No	
Black Hills Spruce	(Picea glauca densata)	M - H	L	No	
Colorado Blue Spruce	(Picea pungens 'Glauca')	M - H	L	No	
Colorado Green Spruce	(Picea pungens)	M	L	No	
Bristlecone Pine	(Pinus aristata)	L - M	L	No	
Pinon Pine	(Pinus edulis)	L - M	L	No	
Limber Pine	(Pinus flexilis)	L - M	L	No	
Swiss Mountain Pine	(Pinus mugo)	L - M	L	No	
Austrian Pine	(Pinus nigra)	L - M	L	No	
Ponderosa Pine	(Pinus ponderosa)	L	L	No	
Southwestern White Pine	(Pinus strobiformus)	L - M	L	No	
Scotch Pine	(Pinus sylvestris)	L - M	L	No	
Douglas Fir	(Pseudotsuga menziesii 'Taxifolia')	M	L	No	

EVERGREEN SHRUBS

Common Name	Botanical Name	Water Requirement	Maintenance Requirement	Street Tree	Remarks
Euonymus Sarcoxie	(Euonymus fortunei 'Sarcoxie')	M	M	NA	
Bigleaf Wintercreeper	(Euonymus fortunei vegeta)	M	M	NA	
Euonymus Manhattan	(Euonymus kiautschovicus 'Manhattan')	M	M	NA	
Juniper	(Juniperus sp.) (3)	L - M	L	NA	
Oregongrape	(Mahonia aquifolium)	M	M	NA	Nice fall colors (red to purple)
Creeping Hollygrape	(Mahonia repens)	M	M	NA	Nice fall/winter colors (red to purple)
Gnome Firethorn	(Pyracantha angustifolia 'Gnome')	M	M	NA	
Firethorn	(Pyracantha coccinea) (3)	M	M	NA	
Yew	(Taxus x media 'Hicksii')				

PERENNIALS, GROUND COVERS, AND ORNAMENTAL GRASSES

Due to the large quantity, variety, and changing availability of these plants, please consult your local nursery (preferably a C.N.A. Member). Height, color, texture, moisture, light requirement, and heartiness need to be considered when specifying these plants. Most local nurseries provide a yearly catalog of available plants and their descriptions.

Notes:

1. These plants are not recommended to be planted within 10' of any foundation, curb, road, walkway, or other site structure that may be damaged by their vigorous/shallow root systems.
2. Mature size of all evergreen trees must be considered when determining location for planting. They are not recommended within 8' of any roadway, walkway, entrance, or window as they will eventually obstruct passage or view. Evergreen trees shall not be placed within roadway site triangles. During winter, icy conditions often occur on the north side of evergreen trees. This must be considered for their placement.
3. These plants have numerous different species, varieties and/or cultivars. Consult a local nursery for current availability and proper selection.

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An Act

SENATE BILL 24-005

BY SENATOR(S) Roberts and Simpson, Bridges, Hinrichsen, Buckner, Cutter, Exum, Fields, Jaquez Lewis, Marchman, Michaelson Jenet, Priola, Winter F., Fenberg;
also REPRESENTATIVE(S) McCormick and McLachlan, Amabile, Bacon, Bird, Boesenecker, Brown, Daugherty, deGruy Kennedy, Duran, Epps, Froelich, Garcia, Herod, Jodeh, Joseph, Kipp, Lieder, Lindsay, Lukens, Mabrey, Martinez, Marvin, Mauro, Ortiz, Parenti, Rutinel, Sirota, Snyder, Story, Titone, Valdez, Velasco, Weissman, Willford, McCluskie.

CONCERNING THE CONSERVATION OF WATER IN THE STATE THROUGH THE PROHIBITION OF CERTAIN LANDSCAPING PRACTICES.

Be it enacted by the General Assembly of the State of Colorado:

SECTION 1. In Colorado Revised Statutes, **add** article 99 to title 37 as follows:

ARTICLE 99
Prohibition of Nonfunctional Turf, Artificial Turf, and Invasive Plant Species

37-99-101. Legislative declaration. (1) THE GENERAL ASSEMBLY

Capital letters or bold & italic numbers indicate new material added to existing law; dashes through words or numbers indicate deletions from existing law and such material is not part of the act.

FINDS THAT:

(a) AS COLORADO CONTINUES TO GRAPPLE WITH THE IMPACTS OF CLIMATE CHANGE, GREEN URBAN SPACES, SUCH AS URBAN TREE CANOPIES, ARE A VITAL ADAPTATION TOOL FOR MITIGATING THE IMPACTS OF CLIMATE CHANGE, ESPECIALLY FOR MITIGATING THE URBAN HEAT ISLAND EFFECT, WHICH CAN INCREASE ENERGY COSTS, AIR POLLUTION, AND HEAT-RELATED ILLNESSES AND DEATHS;

(b) HOWEVER, WATER SUPPLY IN THE WESTERN UNITED STATES IS UNDER INCREASING PRESSURE DUE TO CLIMATE CHANGE AND INCREASING DEMAND;

(c) MANY COMMUNITIES IN THE STATE OVERUSE NONNATIVE GRASS FOR LANDSCAPING PURPOSES, WHICH REQUIRES LARGE AMOUNTS OF WATER TO MAINTAIN;

(d) WHILE THERE ARE APPROPRIATE AND IMPORTANT USES FOR TURF, INCLUDING FOR CIVIC, COMMUNITY, OR RECREATIONAL PURPOSES SUCH AS USE IN PARKS, SPORTS FIELDS, AND PLAYGROUNDS, MUCH OF THE TURF IN THE STATE IS NONFUNCTIONAL, LOCATED IN AREAS THAT RECEIVE LITTLE, IF ANY, USE, AND COULD BE REPLACED WITH LANDSCAPING THAT ADHERES TO WATER-WISE LANDSCAPING PRINCIPLES WITHOUT ADVERSELY IMPACTING QUALITY OF LIFE OR LANDSCAPE FUNCTIONALITY;

(e) PROHIBITING THE INSTALLATION, PLANTING, OR PLACEMENT OF NONFUNCTIONAL TURF IN APPLICABLE PROPERTY IN THE STATE CAN HELP CONSERVE THE STATE'S WATER RESOURCES;

(f) INSTALLED VEGETATION THAT ADHERES TO WATER-WISE LANDSCAPING PRINCIPLES CAN HELP REDUCE OUTDOOR DEMAND OF WATER; AND

(g) ADDITIONALLY, ARTIFICIAL TURF CAN CAUSE NEGATIVE ENVIRONMENTAL IMPACTS, SUCH AS EXACERBATING HEAT ISLAND EFFECTS IN URBAN AREAS AND RELEASING HARMFUL CHEMICALS, INCLUDING PLASTICS, MICROPLASTICS, AND PERFLUOROALKYL AND POLYFLUOROALKYL CHEMICALS, INTO THE ENVIRONMENT AND WATERSHEDS.

(2) THE GENERAL ASSEMBLY THEREFORE DECLARES THAT

PREVENTING THE INSTALLATION, PLANTING, OR PLACEMENT OF NONFUNCTIONAL TURF, ARTIFICIAL TURF, AND INVASIVE PLANT SPECIES IN APPLICABLE PROPERTY IN THE STATE IS:

(a) A MATTER OF STATEWIDE CONCERN; AND

(b) IN THE PUBLIC INTEREST.

37-99-102. Definitions. AS USED IN THIS ARTICLE 99, UNLESS THE CONTEXT OTHERWISE REQUIRES:

(1) (a) "APPLICABLE PROPERTY" MEANS:

(I) COMMERCIAL, INSTITUTIONAL, OR INDUSTRIAL PROPERTY;

(II) COMMON INTEREST COMMUNITY PROPERTY; OR

(III) A STREET RIGHT-OF-WAY, PARKING LOT, MEDIAN, OR TRANSPORTATION CORRIDOR.

(b) "APPLICABLE PROPERTY" DOES NOT INCLUDE RESIDENTIAL PROPERTY.

(2) "ARTIFICIAL TURF" MEANS AN INSTALLATION OF SYNTHETIC MATERIALS DEVELOPED TO RESEMBLE NATURAL GRASS.

(3) "COMMERCIAL, INSTITUTIONAL, OR INDUSTRIAL" HAS THE MEANING SET FORTH IN SECTION 37-60-135 (2)(b).

(4) "COMMON INTEREST COMMUNITY" HAS THE MEANING SET FORTH IN SECTION 38-33.3-103 (8).

(5) "COMMON INTEREST COMMUNITY PROPERTY" MEANS PROPERTY WITHIN A COMMON INTEREST COMMUNITY THAT IS OWNED AND MAINTAINED BY A UNIT OWNERS' ASSOCIATION, SUCH AS ENTRYWAYS, PARKS, AND OTHER COMMON ELEMENTS AS DEFINED IN SECTION 38-33.3-103 (5).

(6) "DEPARTMENT" MEANS THE DEPARTMENT OF PERSONNEL CREATED IN SECTION 24-1-128 (1).

(7) "FUNCTIONAL TURF" MEANS TURF THAT IS LOCATED IN A RECREATIONAL USE AREA OR OTHER SPACE THAT IS REGULARLY USED FOR CIVIC, COMMUNITY, OR RECREATIONAL PURPOSES, WHICH MAY INCLUDE PLAYGROUNDS; SPORTS FIELDS; PICNIC GROUNDS; AMPHITHEATERS; PORTIONS OF PARKS; AND THE PLAYING AREAS OF GOLF COURSES, SUCH AS DRIVING RANGES, CHIPPING AND PUTTING GREENS, TEE BOXES, GREENS, FAIRWAYS, AND ROUGHS.

(8) "INVASIVE PLANT SPECIES" HAS THE MEANING SET FORTH IN SECTION 37-60-135 (2)(e).

(9) "LOCAL ENTITY" MEANS A:

(a) HOME RULE OR STATUTORY CITY, COUNTY, CITY AND COUNTY, TERRITORIAL CHARTER CITY, OR TOWN;

(b) SPECIAL DISTRICT; AND

(c) METROPOLITAN DISTRICT.

(10) "MAINTAIN" OR "MAINTAINING" MEANS AN ACTION TO PRESERVE THE EXISTING STATE OF NONFUNCTIONAL TURF, ARTIFICIAL TURF, OR AN INVASIVE PLANT SPECIES THAT HAS ALREADY BEEN INSTALLED, PLANTED, OR PLACED.

(11) "NATIVE PLANT" MEANS A PLANT SPECIES THAT IS INDIGENOUS TO THE STATE OF COLORADO.

(12) "NEW DEVELOPMENT PROJECT" MEANS A NEW CONSTRUCTION PROJECT THAT REQUIRES A BUILDING OR LANDSCAPING PERMIT, PLAN CHECK, OR DESIGN REVIEW.

(13) (a) "NONFUNCTIONAL TURF" MEANS TURF THAT IS NOT FUNCTIONAL TURF.

(b) "NONFUNCTIONAL TURF" INCLUDES TURF LOCATED IN A STREET RIGHT-OF-WAY, PARKING LOT, MEDIAN, OR TRANSPORTATION CORRIDOR.

(c) "NONFUNCTIONAL TURF" DOES NOT INCLUDE TURF THAT IS DESIGNATED TO BE PART OF A WATER QUALITY TREATMENT SOLUTION

REQUIRED FOR COMPLIANCE WITH FEDERAL, STATE, OR LOCAL AGENCY WATER QUALITY PERMITTING REQUIREMENTS THAT IS NOT IRRIGATED AND DOES NOT HAVE HERBICIDES APPLIED.

(14) "REDEVELOPMENT PROJECT" MEANS A CONSTRUCTION PROJECT THAT:

(a) REQUIRES A BUILDING OR LANDSCAPING PERMIT, PLAN CHECK, OR DESIGN REVIEW; AND

(b) RESULTS IN A DISTURBANCE OF MORE THAN FIFTY PERCENT OF THE AGGREGATE LANDSCAPE AREA.

(15) "SPECIAL DISTRICT" HAS THE MEANING SET FORTH IN SECTION 32-1-103 (20).

(16) "TRANSPORTATION CORRIDOR" MEANS A TRANSPORTATION SYSTEM THAT INCLUDES ALL MODES AND FACILITIES WITHIN A DESCRIBED GEOGRAPHIC AREA, HAVING LENGTH AND WIDTH.

(17) "TURF" HAS THE MEANING SET FORTH IN SECTION 37-60-135 (2)(i).

(18) "UNIT OWNERS' ASSOCIATION" HAS THE MEANING SET FORTH IN SECTION 38-33.3-103 (3).

(19) "WATER-WISE LANDSCAPING" HAS THE MEANING SET FORTH IN SECTION 37-60-135 (2)(l).

37-99-103. Prohibition of nonfunctional turf, artificial turf, and invasive plant species - local entities - construction or renovation of state facilities. (1) ON AND AFTER JANUARY 1, 2026, A LOCAL ENTITY SHALL NOT INSTALL, PLANT, OR PLACE, OR ALLOW ANY PERSON TO INSTALL, PLANT, OR PLACE, ANY NONFUNCTIONAL TURF, ARTIFICIAL TURF, OR INVASIVE PLANT SPECIES, AS PART OF A NEW DEVELOPMENT PROJECT OR REDEVELOPMENT PROJECT, ON ANY PORTION OF APPLICABLE PROPERTY WITHIN THE LOCAL ENTITY'S JURISDICTION.

(2) ON OR BEFORE JANUARY 1, 2026, A LOCAL ENTITY SHALL ENACT OR AMEND ORDINANCES, RESOLUTIONS, REGULATIONS, OR OTHER LAWS

REGULATING NEW DEVELOPMENT PROJECTS AND REDEVELOPMENT PROJECTS ON APPLICABLE PROPERTY IN ACCORDANCE WITH THE REQUIREMENTS OF THIS SECTION.

(3) THE DEPARTMENT SHALL NOT INSTALL, PLANT, OR PLACE, OR ALLOW ANY PERSON TO INSTALL, PLANT, OR PLACE, ANY NONFUNCTIONAL TURF, ARTIFICIAL TURF, OR INVASIVE PLANT SPECIES AS PART OF A PROJECT FOR THE CONSTRUCTION OR RENOVATION OF A STATE FACILITY, WHICH PROJECT DESIGN COMMENCES ON OR AFTER JANUARY 1, 2025.

(4) NOTHING IN THIS SECTION PROHIBITS:

(a) A LOCAL ENTITY FROM MAINTAINING, OR ALLOWING ANY PERSON TO MAINTAIN, ANY NONFUNCTIONAL TURF, ARTIFICIAL TURF, OR INVASIVE PLANT SPECIES INSTALLED, PLANTED, OR PLACED BEFORE JANUARY 1, 2026;

(b) THE DEPARTMENT FROM MAINTAINING, OR ALLOWING ANY PERSON TO MAINTAIN, ANY NONFUNCTIONAL TURF, ARTIFICIAL TURF, OR INVASIVE PLANT SPECIES INSTALLED, PLANTED, OR PLACED AT A STATE FACILITY BEFORE JANUARY 1, 2025;

(c) A LOCAL ENTITY OR THE DEPARTMENT FROM INSTALLING, OR ALLOWING ANY PERSON TO INSTALL, GRASS SEED OR SOD THAT IS A NATIVE PLANT OR HAS BEEN HYBRIDIZED FOR ARID CONDITIONS;

(d) A LOCAL ENTITY OR THE DEPARTMENT FROM ESTABLISHING PROHIBITIONS ON, OR REQUIREMENTS FOR, NONFUNCTIONAL TURF, ARTIFICIAL TURF, OR INVASIVE PLANT SPECIES THAT ARE MORE STRINGENT THAN THE REQUIREMENTS OF THIS SECTION; OR

(e) A LOCAL ENTITY OR THE DEPARTMENT FROM INSTALLING, OR ALLOWING ANY PERSON TO INSTALL, ARTIFICIAL TURF ON ATHLETIC FIELDS OF PLAY.

SECTION 2. Act subject to petition - effective date - applicability. (1) This act takes effect at 12:01 a.m. on the day following the expiration of the ninety-day period after final adjournment of the general assembly; except that, if a referendum petition is filed pursuant to section 1 (3) of article V of the state constitution against this act or an item, section, or part of this act within such period, then the act, item, section, or

part will not take effect unless approved by the people at the general election to be held in November 2024 and, in such case, will take effect on the date of the official declaration of the vote thereon by the governor.

(2) This act does not apply to projects approved by the department of personnel or a local entity before the effective date of this act.

Steve Fenberg
PRESIDENT OF
THE SENATE

Julie McCluskie
SPEAKER OF THE HOUSE
OF REPRESENTATIVES

Cindi L. Markwell
SECRETARY OF
THE SENATE

Robin Jones
CHIEF CLERK OF THE HOUSE
OF REPRESENTATIVES

APPROVED Friday March 15th 2024 at 2:15 pm
(Date and Time)

Jared S. Polis
GOVERNOR OF THE STATE OF COLORADO

An Act

HOUSE BILL 25-1113

BY REPRESENTATIVE(S) Smith and McCormick, Bacon, Boesenecker, Brown, Camacho, Duran, Froelich, Joseph, Lindsay, Martinez, Sirota, Stewart R., Titone, McCluskie;
also SENATOR(S) Roberts, Bridges, Cutter, Danielson, Daugherty, Hinrichsen, Jodeh, Kipp, Kolker, Marchman, Michaelson Jenet, Snyder, Wallace, Weissman, Winter F.

CONCERNING LIMITING THE USE OF CERTAIN LANDSCAPING PRACTICES IN NEW RESIDENTIAL DEVELOPMENT.

Be it enacted by the General Assembly of the State of Colorado:

SECTION 1. Legislative declaration. (1) The general assembly finds that:

(a) As Colorado continues to grapple with the impacts of climate change, green urban spaces, such as urban tree canopies, are a vital adaptation tool for mitigating the impacts of climate change, especially for mitigating the urban heat island effect, which can increase energy costs, air pollution, and heat-related illnesses and deaths;

(b) However, water supply in the western United States is

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increasingly scarce due to climate change and increasing demand;

(c) Many communities in the state overuse nonnative grass for landscaping purposes, which requires large amounts of water to maintain;

(d) While there are appropriate and important uses for turf, including for civic, community, or recreational purposes such as use in parks, sports fields, and playgrounds, much of the turf in the state is nonfunctional, located in areas that receive little, if any, use, and could be replaced with landscaping that adheres to water-wise landscaping principles without adversely impacting quality of life or landscape functionality;

(e) Prohibiting the installation, planting, or placement of nonfunctional turf in multifamily property in the state can help conserve the state's water resources;

(f) Requiring local governments to regulate turf in new residential properties can help preserve the limited water in our state;

(g) Many communities and developments develop in a water-wise manner already and are appreciated; and

(h) Installed vegetation that adheres to water-wise landscaping principles can help reduce outdoor demand for water while avoiding heat islands.

(2) The general assembly therefore declares that preventing the installation, planting, or placement of nonfunctional turf, artificial turf, and invasive plant species in applicable property in the state is:

(a) A matter of statewide concern; and

(b) In the public interest.

SECTION 2. In Colorado Revised Statutes, 37-99-102, **amend** (1)(a)(II), (1)(a)(III), (7), and (17); **repeal** (1)(b); and **add** (1)(a)(IV), (1.5), (6.5), (10.5), (12.5), (14.5), and (18.5) as follows:

37-99-102. Definitions. As used in this article 99, unless the context otherwise requires:

(1) (a) "Applicable property" means:

(II) Common interest community property; ~~or~~

(III) A street right-of-way, parking lot, median, or transportation corridor; OR

(IV) APPLICABLE RESIDENTIAL REAL PROPERTY.

(b) ~~"Applicable property" does not include residential property.~~

(1.5) "APPLICABLE RESIDENTIAL REAL PROPERTY" MEANS A MULTIFAMILY RESIDENTIAL HOUSING PREMISES PROPERTY THAT INCLUDES MORE THAN TWELVE DWELLING UNITS.

(6.5) "FUNCTIONAL ARTIFICIAL TURF" MEANS ARTIFICIAL TURF THAT IS:

(a) LOCATED IN A RECREATIONAL USE AREA OR OTHER SPACE THAT IS REGULARLY USED FOR CIVIC, COMMUNITY, OR RECREATIONAL PURPOSES, WHICH MAY INCLUDE A PLAYGROUND, A SPORTS FIELD, A PICNIC GROUND, AN AMPHITHEATER, A PORTION OF A PARK, AND THE PLAYING AREA OF A GOLF COURSE, SUCH AS A DRIVING RANGE, CHIPPING AND PUTTING GREEN, TEE BOX, GREEN, FAIRWAY, AND ROUGH; OR

(b) A COMPONENT OF A PRODUCT DESIGNED AND APPROVED BY A PROFESSIONAL ENGINEER FOR CIVIL INFRASTRUCTURE PROJECTS, INCLUDING BUT NOT LIMITED TO:

(I) COVERS FOR SOLID WASTE FACILITIES AND BROWNFIELD SITES; AND

(II) REVETMENTS FOR SLOPES, CHANNELS, LEVEES, AND DAMS.

(7) "Functional turf" means turf that is located in a recreational use area or other space that is regularly used for civic, community, or recreational purposes, which may include ~~playgrounds, sports fields, picnic grounds, amphitheaters, portions of parks, and the playing areas of golf courses, such as driving ranges, chipping and putting greens, tee boxes, greens, fairways, and roughs~~ A PLAYGROUND, A SPORTS FIELD, A PICNIC

GROUND, AN AMPHITHEATER, A PORTION OF A PARK, AND THE PLAYING AREA OF A GOLF COURSE, SUCH AS A DRIVING RANGE, CHIPPING AND PUTTING GREEN, TEE BOX, GREEN, FAIRWAY, AND ROUGH.

(10.5) "MULTIFAMILY RESIDENTIAL HOUSING PREMISES PROPERTY" MEANS COMMON INTEREST PROPERTY SUCH AS ENTRYWAYS, PARKS, AND OTHER COMMON ELEMENTS AS DEFINED IN SECTION 38-33.3-103 (5).

(12.5) "NONFUNCTIONAL ARTIFICIAL TURF" MEANS ARTIFICIAL TURF THAT IS NOT FUNCTIONAL ARTIFICIAL TURF.

(14.5) "RESIDENTIAL REAL PROPERTY" HAS THE MEANING SET FORTH IN SECTION 39-1-102 (14.5).

(17) "Turf" ~~has the meaning set forth in section 37-60-135 (2)(i)~~ MEANS CONTINUOUS PLANT COVERAGE CONSISTING OF NONNATIVE GRASSES OR GRASSES THAT HAVE NOT BEEN HYBRIDIZED FOR ARID CONDITIONS AND WHICH, WHEN REGULARLY MOWED, FORM A DENSE GROWTH OF LEAF BLADES AND ROOTS.

(18.5) "URBAN TREE" MEANS A PERENNIAL WOODY PLANT WITH A SINGLE OR MULTIPLE TRUNKS THAT SUPPORT A CANOPY OF BRANCHES AND LEAVES AND THAT PROVIDES ECOLOGICAL, SOCIAL, AND ECONOMIC BENEFITS WITHIN A BUILT ENVIRONMENT.

SECTION 3. In Colorado Revised Statutes, 37-99-103, **amend** (1), (3), (4)(a), (4)(b), (4)(d), and (4)(e); and **add** (4)(f) and (5) as follows:

37-99-103. Prohibition of nonfunctional turf, nonfunctional artificial turf, and invasive plant species - local entities - construction or renovation of state facilities. (1) On and after January 1, 2026, a local entity shall not install, plant, or place, or allow any person to install, plant, or place, any nonfunctional turf, NONFUNCTIONAL artificial turf, or invasive plant species, as part of a new development project or redevelopment project, on any portion of applicable property within the local entity's jurisdiction.

(3) The department shall not install, plant, or place, or allow any person to install, plant, or place, any nonfunctional turf, NONFUNCTIONAL artificial turf, or invasive plant species as part of a project for the

construction or renovation of a state facility, which project design commences on or after January 1, 2025.

(4) Nothing in this section prohibits:

(a) A local entity from maintaining, or allowing any person to maintain, any nonfunctional turf, NONFUNCTIONAL ARTIFICIAL TURF, artificial turf, or invasive plant species installed, planted, or placed before January 1, 2026;

(b) The department from maintaining, or allowing any person to maintain, any nonfunctional turf, NONFUNCTIONAL ARTIFICIAL TURF, artificial turf, or invasive plant species installed, planted, or placed at a state facility before January 1, 2025;

(d) A local entity or the department from establishing prohibitions on, or requirements for, nonfunctional turf, artificial turf, or invasive plant species that are more stringent than the requirements of this section; ~~or~~

(e) A local entity or the department from installing, or allowing ~~any~~ A person to install, artificial turf on athletic fields of play; OR

(f) A LOCAL ENTITY OR THE DEPARTMENT FROM INSTALLING OR PRESERVING URBAN TREES.

(5) (a) ON AND AFTER JANUARY 1, 2028, A LOCAL ENTITY SHALL NOT INSTALL, PLANT, OR PLACE, OR ALLOW A PERSON TO INSTALL, PLANT, OR PLACE, ANY NONFUNCTIONAL TURF, NONFUNCTIONAL ARTIFICIAL TURF, OR INVASIVE PLANT SPECIES, AS PART OF A NEW DEVELOPMENT PROJECT OR REDEVELOPMENT PROJECT, ON ANY PORTION OF APPLICABLE PROPERTIES THAT INCLUDE MULTIFAMILY RESIDENTIAL HOUSING PREMISES PROPERTY.

(b) NOTWITHSTANDING ANY PROVISION OF THIS SECTION TO THE CONTRARY, A LOCAL ENTITY OR THE DEPARTMENT SHALL NOT RESTRICT A PERSON FROM INSTALLING OR ALLOWING ANOTHER PERSON TO INSTALL GRASS SEED OR SOD THAT:

(I) IS A NATIVE PLANT;

(II) HAS BEEN HYBRIDIZED FOR ARID CONDITIONS; OR

(III) IS A LOW-WATER GRASS.

(c) ON OR BEFORE JANUARY 1, 2028, EACH LOCAL ENTITY WITH LAND USE PLANNING AND ZONING AUTHORITY SHALL ENACT OR AMEND ORDINANCES, RESOLUTIONS, REGULATIONS, OR OTHER LAWS REGULATING NEW DEVELOPMENT PROJECTS AND REDEVELOPMENT PROJECTS TO:

(I) REGULATE THE INSTALLATION OF NONFUNCTIONAL TURF IN ORDER TO REDUCE IRRIGATION WATER DEMAND ON APPLICABLE PROPERTY IN ACCORDANCE WITH THE REQUIREMENTS OF THIS SECTION; AND

(II) INCLUDE CONSIDERATION OF APPLICABLE RESIDENTIAL REAL PROPERTY.

SECTION 4. In Colorado Revised Statutes, **add** 37-99-104 as follows:

37-99-104. Regulation of turf in new residential property - local entities - exemptions. (1) ON OR BEFORE JANUARY 1, 2028, EACH LOCAL ENTITY WITH LAND USE PLANNING AND ZONING AUTHORITY SHALL ENACT OR AMEND ORDINANCES, RESOLUTIONS, REGULATIONS, OR OTHER LAWS REGULATING NEW DEVELOPMENT PROJECTS AND REDEVELOPMENT PROJECTS WITHIN THE LOCAL ENTITY'S JURISDICTION TO REGULATE THE INSTALLATION OF TURF TO REDUCE IRRIGATION WATER DEMAND FOR ALL RESIDENTIAL REAL PROPERTY THAT IS NOT APPLICABLE RESIDENTIAL REAL PROPERTY.

(2) ON AND AFTER JANUARY 1, 2028, WHEN ENACTING OR AMENDING ORDINANCES, RESOLUTIONS, REGULATIONS, OR OTHER LAWS REGULATING NEW DEVELOPMENT PROJECTS AND REDEVELOPMENT PROJECTS, EACH LOCAL ENTITY WITH LAND USE PLANNING AND ZONING AUTHORITY SHALL REGULATE THE INSTALLATION OF TURF TO REDUCE IRRIGATION WATER DEMAND FOR ALL RESIDENTIAL REAL PROPERTY THAT IS NOT APPLICABLE RESIDENTIAL REAL PROPERTY.

(3) EACH LOCAL ENTITY WITH LAND USE PLANNING AND ZONING AUTHORITY MAY CHOOSE THE STANDARD OR MECHANISM BY WHICH IT REGULATES TURF IN NEW DEVELOPMENT PROJECTS AND REDEVELOPMENT PROJECTS OF RESIDENTIAL REAL PROPERTY PURSUANT TO THIS SECTION.

(4) NOTWITHSTANDING ANY PROVISION OF THIS SECTION TO THE

CONTRARY, NEITHER A LOCAL ENTITY NOR THE DEPARTMENT SHALL RESTRICT A PERSON FROM INSTALLING OR ALLOWING ANOTHER PERSON TO INSTALL GRASS SEED OR SOD THAT:

(a) IS A NATIVE PLANT;

(b) HAS BEEN HYBRIDIZED FOR ARID CONDITIONS; OR

(c) IS A LOW-WATER GRASS.

SECTION 5. Act subject to petition - effective date. This act takes effect at 12:01 a.m. on the day following the expiration of the ninety-day period after final adjournment of the general assembly; except that, if a referendum petition is filed pursuant to section 1 (3) of article V of the state constitution against this act or an item, section, or part of this act within such period, then the act, item, section, or part will not take effect unless approved by the people at the general election to be held in

November 2026 and, in such case, will take effect on the date of the official declaration of the vote thereon by the governor.

Julie McCluskie
SPEAKER OF THE HOUSE
OF REPRESENTATIVES

James Rashad Coleman, Sr.
PRESIDENT OF
THE SENATE

Vanessa Reilly
CHIEF CLERK OF THE HOUSE
OF REPRESENTATIVES

Esther van Mourik
SECRETARY OF
THE SENATE

APPROVED Tuesday May 20th 2025 at 1:05 pm
(Date and Time)

Jared S. Polis
GOVERNOR OF THE STATE OF COLORADO

Information guide on Colorado's new landscape policy (HB25-1113)

Overview

In May, Governor Polis signed HB25-1113 into law, which clarifies the rules governing certain types of landscape in Colorado, more clearly defining language from a bill signed into law the year before.

The law does not prohibit artificial turf on a statewide level. It offers local municipalities the opportunity to set their own rules around landscaping choices.

What the law does: The law preserves the ability of local Colorado municipalities to permit the use of functional artificial turf. More specifically, the law:

- Creates definitions for functional and nonfunctional artificial turf, providing flexibility for local governments to determine functional uses of artificial turf when crafting regulations.
- Establishes the legality for the use of artificial turf in areas that serve a civic or community function. This includes, but is not limited to, areas such as parks, playgrounds, and golf courses.
- Classifies uses for artificial turf in brownfield sites and covers for solid waste facilities as a functional use.
- Clarifies that any prohibitions will not impact nonfunctional artificial turf that was installed before the implementation of SB24-005, and how it applies to local control issues.

Key Definitions (as written in the law)

Turf: Means continuous plant coverage consisting of nonnative grasses or grasses that have not been hybridized for arid conditions and which, when regularly mowed, form a dense growth of leaf blades and roots.

Functional Artificial Turf: Means artificial turf that is:

a. Located in a recreational use area or other space that is regularly used for civic, community, or recreational purposes, which may include a playground, a sports field, a picnic ground, an amphitheater, a portion of a park, and the playing area of a golf course, such as a driving range, chipping and putting green, tee box, green, fairway, and rough; or

b. A component of a product designed and approved by a professional engineer for civil infrastructure projects, including but not limited to:
    i. Covers for solid waste facilities and brownfield sites; and
    ii. Revetments for slopes, channels, levees, and dams.

Non-Functional Artificial Turf: Means artificial turf that is not functional artificial turf.

Benefits of synthetic turf

Note: While the statute refers to synthetic turf as "artificial turf", the remainder of this information guide will use "synthetic turf" language to maintain consistency with our industry's messaging. However, both terms refer to the same product, and can be used interchangeably.

Community Access

Synthetic turf is an essential tool for ensuring equity in access to play spaces in Colorado. When space is scarce and public recreation areas are in constant demand, synthetic turf systems expand access to outdoor activity for children and families, especially in neighborhoods where green space is limited or overused. Unlike high maintenance sod and grass, which can support only a limited amount of use, synthetic turf stays open and playable even after rain or during winter.

More play for children:
Synthetic turf provides play areas that ensure Colorado kids and families can safely stay active outdoors, rain or shine. A top concern for parents is too much screen time, too much time indoors, and not enough time for play. One challenge with high maintenance sod and grass is that when it rains, it can limit its use, sometimes for days, depending on the drains.

Synthetic turf provides a 24/7-accessible, safe, and consistent playing surface. Studies from both the U.S. Environmental Protection Agency and California's Office of Environmental Health Hazard Assessment reaffirm the environmental and health safety of synthetic turf.

Meanwhile, synthetic turf can quickly drain water while offering more playing time than high maintenance sod and grass. With synthetic turf, children can enjoy staying active in a reliable environment, giving parents confidence that their children are engaging in healthy outdoor play.

Synthetic turf is a reliable, high-impact health and wellness investment in Colorado communities that offers consistent access to clean, functional spaces.

Water Conservation

Synthetic turf plays an important role in conserving water by eliminating the need for regular irrigation associated with high maintenance sod and grass. This helps Colorado communities

preserve valuable water resources, making synthetic turf an especially beneficial choice for areas prone to drought or water restrictions.

Synthetic turf also reduces the need for treatment chemicals in Colorado. It has been proven to greatly reduce water use and water pollution compared to what is needed to support high maintenance sod and grass systems. As a landscape solution, synthetic turf significantly reduces water usage compared to grass, conserving a vital resource, particularly in drought-prone areas. It also eliminates the need for pesticides, fertilizers, and herbicides, reducing chemical runoff and supporting environmental health.

Water-use reductions:
A full-size synthetic turf sports field requires 0 gallons of water per year, whereas a sand-based grass field uses up to 2.7 million gallons annually, according to a 2024 report by the Vancouver Board of Parks and Recreation. Additionally, some schools in drought-prone areas estimate that converting to synthetic turf saves about 2 million gallons of water per field annually. Synthetic turf helps contribute to water conservation efforts across the country. The EPA states that of "the estimated 29 billion gallons of water used daily by households in the U.S., nearly 9 billion gallons, or 30 percent, is devoted to outdoor water use. In the hot summer months, or in dry climates, a household's outdoor water use can be as high as 70 percent."

Eliminates the need for pesticides or fertilizers:
With runoff from pesticides and fertilizers as a principal cause of water pollution, synthetic turf eliminates the need for pesticides, fertilizers, and herbicides, which are used to upkeep high maintenance sod and grass.

Pet turf:
Pet turf is a rapidly expanding sector of the synthetic turf landscape market. Engineered specifically for the needs of dogs, pet turf includes significant advances such as instantaneous drainage, simplification of waste removal, odor control, and more that makes it an especially versatile option.

Weather-Resilient Access to Play

Synthetic turf is unmatched in its ability to always provide a safe and consistent playing surface year-round, even in inclement weather, when properly maintained. In fact, a turf field can be used multiple times a day by different teams and sports groups without issue. This enables Colorado communities to have spaces to play with 24/7 access. These are critical qualities that are just not possible with a field of high maintenance grass.

While using any outdoor surface means contending with different weather conditions—such as precipitation for sod surfaces—synthetic turf provides more playing hours year-round compared to high maintenance sod surfaces.

Innovations in synthetic turf to address inclement Colorado weather:

Synthetic turf manufacturers are also consistently innovating to provide a cooler, more sustainable playing surface. Numerous cities and manufacturers are experimenting with next-generation synthetic turf technology that reduces turf temperature.

- Amsterdam introduced revolutionary turf technology to combat urban heat and enhance recreation. The city reported surface temperatures of 98°F on a hot June day, dramatically cooler than the 144°F observed on conventional synthetic turf.
- Hickory, NC installed new turf technology to cool fields during heat to maximize usage and increase sports tourism.

Recyclability

The synthetic turf industry is finding innovative solutions for turf at the end of its life. When it comes to recycling, there are several examples of the work STC members are doing to reuse or recycle turf to avoid landfilling. For example, Turf Recyclers USA is a Material Recovery Facility (MRF) outside of Boston that breaks down old turf into its original components, allowing it to be reused in the recycled materials market. BestPLUS's GreenBoard, a plastic lumber product, is made with 98% recycled plastic, at least 40% from recycled synthetic turf. Additionally, Shaw Sports Turf recycles old turf into performance shock pads for new turf fields. Finally, AstroTurf forged a strategic alliance with the Turf Recycling Plant (TRP) in Calhoun, Georgia to pioneer a sustainable solution for the recycling of end-of-life turf systems.

The synthetic turf industry is also working with our partners in the U.S. and Europe to develop innovative circular solutions for turf products at end-of-life. Product reuse is already an option in California and throughout the U.S., and there are several commercially viable processes for mechanically recycling turf products in the U.S. Other advanced recycling systems such as gasification and depolymerization may also prove to be viable options to avoid landfill disposal.

Environmental Safety

Beyond water conservation, synthetic turf provides significant environmental benefits by eliminating the need for treatment chemicals and supporting recycling efforts. Synthetic turf does not require any pesticides, fertilizers, and herbicides. By not using lawn chemicals, synthetic turf helps prevent runoff of those chemicals.

Landscape architect expert and advocate, Chris Huntress, stated that current topsoil at the existing high school grass field in Oak Bluffs, Martha's Vineyard has "10 to 12 times" more PFAS than a new synthetic turf field would.

Water Drainage

Correct installation of synthetic turf, following the installation best practices below, is crucial to ensure the synthetic turf effectively drains water. Synthetic turf is permeable and built for maximum water drainage. However, incorrect installation (such as lack of collector drains or insufficient compaction of base layers) can hinder synthetic turf's ability to properly drain.

Synthetic Turf Installation: Best Practices

STC has established best practices for installing synthetic turf systems to ensure long-term performance, safety, and environmental quality. Below is a summary of the key considerations and steps in a professional installation.

Installation by a certified professional using industry best practices is crucial for maximizing the appearance and function of synthetic turf. Every installation is different, from site locations to product selection, and from supply challenges to manufacturers. Because of this, it is difficult to pinpoint one specific installation method. However, there are specific similarities and shared characteristics that would be considered elements of a quality installation.

Planning and Site Preparation

- **Site Inspection:** Begin with a thorough evaluation of soils, drainage, irrigation, and existing features. A detailed site plan helps anticipate challenges and ensures the turf integrates well with its surroundings.
- **Drainage:** Turf should only be installed in areas where proper drainage is in place. In some cases, additional solutions may be needed to prevent pooling and ensure water is directed appropriately.
- **Irrigation:** Existing irrigation systems should be accounted for during planning. They may need to be capped, rerouted, or modified depending on the project design.
- **Removal of Organics:** All organic material must be removed from the installation area to prevent future settlement or instability.

Base Construction

- **Base Material:** A prepared base layer is essential to provide both stability and drainage. Using the right type of aggregate or base material ensures durability and proper water flow.
- **Compaction:** The base must be compacted sufficiently to create a firm, stable foundation and reduce the risk of future settling.
- **Borders and Edging:** Proper edging or borders contain the base material, secure turf edges, and protect against erosion or shifting.

Turf Layout and Seaming

- **Orientation:** Turf rolls should be laid in a consistent direction and oriented toward the primary viewing angle for the most natural appearance.
- **Seams:** Seams must be carefully aligned and joined to create a secure, even surface. Using professional-grade adhesives and techniques ensures long-lasting results.
- **Cutting and Shaping:** Turf should be trimmed neatly around trees, rocks, and structures. Plant wells or buffer areas are recommended to protect living vegetation.

Securing and Infill

- **Securing Turf:** Turf sections should be stretched to reduce wrinkling and firmly secured around the perimeter for a clean finish.
- **Infill Installation:** Infill stabilizes the turf, supports the fibers, and extends the life of the system. Even distribution and proper brushing are key to achieving a uniform look and feel.

Final Inspection and Maintenance

- **Inspection:** A professional installation includes a thorough walk-through to ensure seams are tight, infill is consistent, and edges are secure.
- **Clean-Up:** Installers should leave the site free of debris and provide owners with documentation such as warranties, diagrams, and maintenance guidance.
- **Maintenance Guidance:** Ongoing care, such as brushing, debris removal, and periodic inspections, helps maintain appearance and performance. Specialized infills can also address pet use or high-traffic areas.

HB25-1113: Frequently Asked Questions

How can using synthetic turf promote water conservation?
Synthetic turf has been proven to greatly reduce water use and water pollution compared to what's needed to support high maintenance grass systems.

- Using synthetic turf results in dramatic water savings, requiring zero gallons of water per year compared to up to 2.7 million gallons annually for an irrigated high maintenance grass field.
    - For example, schools in Henderson, Nevada, estimate that 2 million gallons of water are saved annually for each field that is converted to synthetic turf.
- Outdoor water use accounts for a significant portion of household water consumption. The EPA found that U.S. households use nearly 9 billion gallons of water daily for outdoor use—30% of total household water use, rising to 70% in hot or dry climates.
- By avoiding the need to use lawn chemicals to maintain synthetic turf, nearby water sources are protected from harmful runoff—unlike high maintenance sod, which requires pesticides, fertilizers, and herbicides.

Does Colorado have a statewide ban on synthetic turf?
No. HB25-1113 clarifies and reinforces the authority of local governments to regulate different types of landscapes within their communities. It does so by putting clearer definitions on the types of landscapes that can be installed by communities, creating flexibility in how "functional artificial turf" is defined (see below).

What is "functional artificial turf" as defined in the statute?
"Functional artificial turf" is broadly defined in the statute as any synthetic turf located in a recreational use area or other space that is regularly used for civic, community, or recreational

purposes, which can include anything from a playground or sports field to picnic areas or a golf course. It is not limited to these examples.

What is "nonfunctional artificial turf" as defined in the statute?
"Nonfunctional artificial turf" is defined as any synthetic turf that does not serve a functional purpose under HB25-1113.

How is "nonfunctional artificial turf" addressed in the latest version of the law?
The latest version of the law clarifies that any new prohibitions will not impact "nonfunctional artificial turf" that was installed before the law's implementation, which allows communities greater flexibility in preserving previous landscaping.

What benefits do recent changes provide?
By clarifying definitions of "functional artificial turf" and "nonfunctional artificial turf", the law will better align with its intent of water conservation.

What properties does the law apply to, and does it include single-family homes?
HB25-1113 does not apply to single-family homes. The new law only applies to common areas of multifamily buildings with 12 or more units.

Will I be required to remove any existing synthetic turf or "nonfunctional artificial turf"?
No. The bill explicitly states that nothing in the new law requires the removal of existing installations. So, if your "nonfunctional artificial turf" was already in place before January 1, 2026, you are allowed to maintain it.

When do the new requirements take effect?
Most regulations on installing "nonfunctional artificial turf" apply beginning January 1, 2026. However, for multifamily residential housing with more than 12 units, the requirements apply on January 1, 2028. Local governments are required to update their regulations by January 1, 2028, as well.

Synthetic Turf: Frequently Asked Questions

Why do people choose synthetic turf?
Communities, schools, businesses, and homeowners choose synthetic turf because it offers reliable, year-round green spaces with significantly reduced maintenance needs. It conserves water, eliminates the need for fertilizers and pesticides, and creates safe, durable areas for play, recreation, and gathering. Synthetic turf also provides consistent performance in all weather conditions, helps reduce long-term costs, and supports active, healthy lifestyles by keeping fields and landscapes usable more often.

Is synthetic turf environmentally friendly?
Yes. Synthetic turf saves water and reduces the need for treatment chemicals. Synthetic turf greatly reduces water use and water pollution compared to what's needed to support high

maintenance grass systems. In states where water conservation is vital, one full-size synthetic turf sports field can save millions of gallons of water each year, depending on local climate and usage.

Does synthetic turf enable 24/7/365 usability?
Yes. Synthetic turf allows families to enjoy its benefits and athletes to play 24 hours per day, seven days per week, year-round, even in drought-prone weather conditions, in contrast to high maintenance sod fields. This is particularly valuable in states where weather conditions and water scarcity can be extreme for significant periods of the year. Moreover, synthetic turf provides a space for multi-purpose competition, allowing multiple sports to be played on a single field.

Do STC members use PFAS-based raw materials in their manufacturing?
No. STC members are committed to maintaining the highest quality standards for synthetic turf systems. Our member manufacturers proactively engage with their component and raw material suppliers to ensure that their products contain no PFAS-based ingredients, including polymeric PFAS processing aids. Additionally, our members self-audit through voluntary testing processes that rely on EPA-approved methods for individual PFAS analytes and/or a total organic fluorine test to verify the absence of intentionally-added PFAS. These tests are widely used and provide verifiable, consistent data across different projects and regions. While PFAS are unfortunately present in our environment, STC members are committed to doing our part to ensure the absence of intentionally-added PFAS in our products.

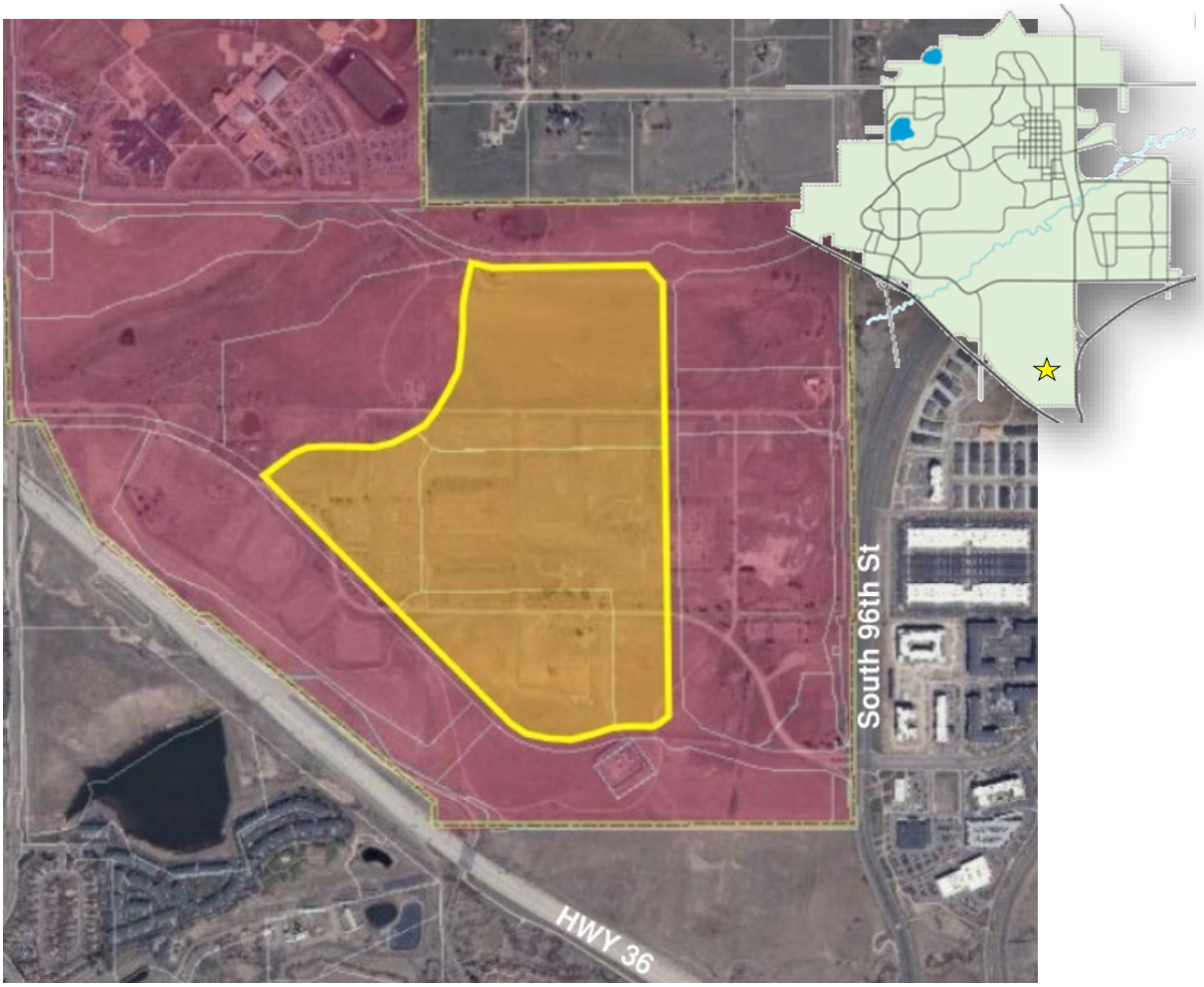
Is synthetic turf safe to use in areas/settings at risk for fires?
Yes. Synthetic turf provides industry-grade fire safety. Synthetic turf products are tested for flammability and many demonstrate self-extinguishing attributes under ASTM D2859 standards. In addition, many landscape systems use sand infill, which acts as a heat sink and oxygen barrier, further reducing ignition potential. For high-risk environments, there are turf products with enhanced fire-resistant ratings that meet NFPA classifications (ASTM E648 and ASTM E108).

Conclusion

Synthetic turf offers significant benefits for communities by conserving water, reducing reliance on chemicals, lowering long-term maintenance costs, and providing safe, year-round spaces for recreation and community activity. **As Colorado municipalities update their ordinances under HB25-1113, it is important that synthetic turf remains an available option to ensure families, schools, and businesses can continue to realize these advantages.** The Synthetic Turf Council is proud to have partnered with state lawmakers on this issue and stands ready to be a resource for local planning directors as policies are shaped that support both sustainability and community well-being.

ITEM:	ZON-000577-2025 – ConocoPhillips General Development Plan, 2nd Amendment
PLANNER:	Matt Post, AICP, Senior Planner
EXISTING ZONING:	PCZD-C – ConocoPhillips General Development Plan
LOCATION:	Lots 1, 2, 3, and 5, of Block 1 of Redtail Ridge, Filing No. 1
TOTAL SITE AREA:	111.5 Acres
REQUEST:	Approval of Resolution No. 20, Series 2025, recommending to the City Council approval with conditions of the ConocoPhillips Campus General Development Plan, 2nd Amendment

VICINITY MAP:



SUMMARY:
The applicant, Sterling Bay, is requesting approval of the ConocoPhillips General Development Plan, 2nd Amendment to allow the application of the Industrial Development Design Standards and Guidelines (IDDSG) and enhanced architectural design standards in place of the currently applicable Commercial Development Design Standards and Guidelines (CDDSG) on Lots 1, 2, 3, and 5, of Block 1 of Redtail Ridge, Filing No. 1.

BACKGROUND:
The subject property was part of the original 310-acre StorageTek corporate campus development, annexed into the City in 1978 and built out to approximately 1.6 million square feet. In 2008, ConocoPhillips acquired the property and subsequently demolished the existing campus to facilitate development of a new research facility. That same year, the company petitioned for annexation of an additional 80 acres and requested rezoning of the combined 390-acre site to Planned Community Zone District – Commercial (PCZD-C).

In 2010, the City approved the ConocoPhillips General Development Plan (GDP), Zoning Agreement, Preliminary Subdivision Plat, and Preliminary Planned Unit Development (PUD). The GDP established a 2.5-million-square-foot development cap, permitted land uses, setbacks, and a 12% minimum public land dedication, and mandated that development on the property abide by the Commercial Development Design Standards and Guidelines (CDDSG). The preliminary PUD included 38.9 acres of on-site public land dedication, an additional 20 acres of preserved land in Boulder County, and clustering of buildings to retain 222 acres of private open space. The PUD authorized building heights up to 65 feet, with one subarea allowing a 95-foot structure. The project was envisioned as a ConocoPhillips research campus but was never constructed following a corporate restructuring.

In 2021, City Council approved a revised GDP for the property known as Redtail Ridge, proposing up to 3 million square feet of commercial and industrial development. However, a referendum election held on April 19, 2022, overturned the Council's approval, reinstating the 2010 ConocoPhillips GDP as the effective governing plan for the property.

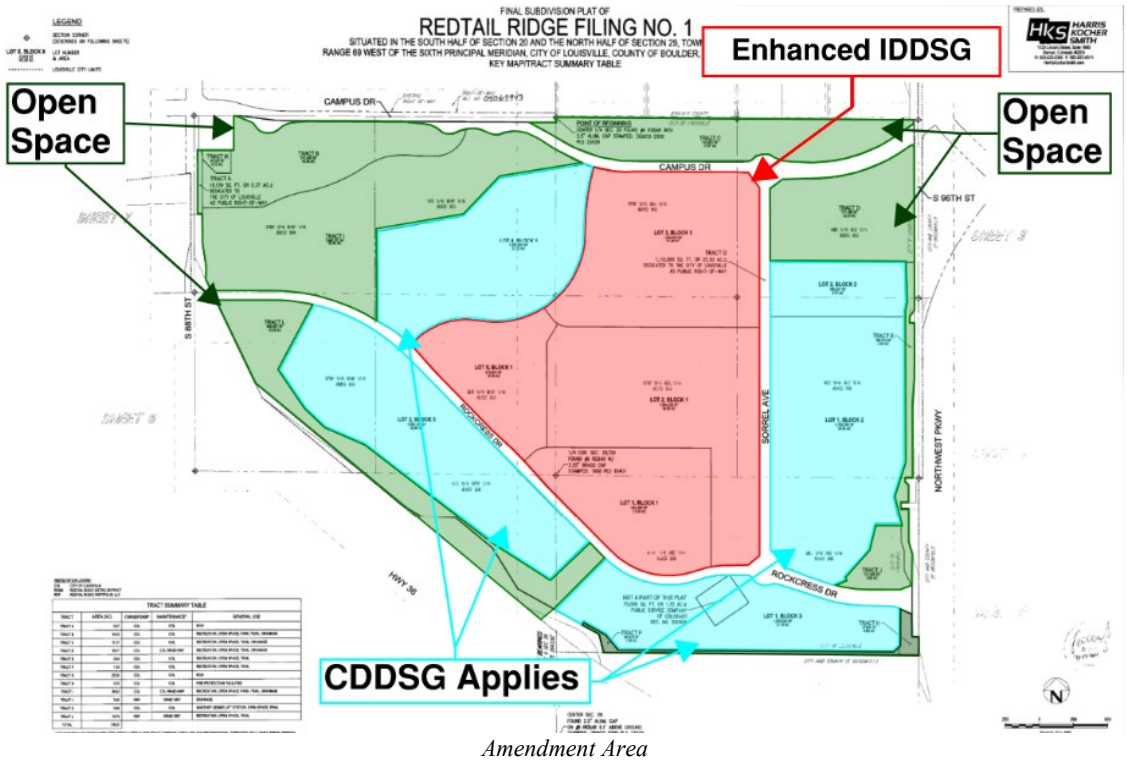
In 2024, City Council approved a Final Plat of the 389-acre property to enable development consistent with the ConocoPhillips Campus GDP approved in 2010. The plat established lots, tracts, rights-of-way, and easements to support future hospital, medical office, light industrial, commercial, and office uses.

In September of 2025, the City Council approved the 1st amendment to the ConocoPhillips Campus GDP to enable development of a new hospital campus on Lot 1, Block 2 of Redtail Ridge Filing No. 1. The amendment reallocated development area to the hospital site and established new height and massing standards to guide building scale and design.

In October 2025, City Council reviewed a Concept Plan proposing the use of the Industrial Development Design Standards and Guidelines (IDDSG) for the subject site and other centrally located parcels within the Redtail Ridge development area, in place of the currently applicable Commercial Development Design Standards and Guidelines (CDDSG). City Council expressed support for a hybrid design approach that would provide additional flexibility while maintaining key design expectations.

PROPOSAL:

As part of this proposal, the applicant is requesting an amendment to the ConocoPhillips Campus General Development Plan, 1st Amendment (GDP) to allow the Industrial Development Design Standards and Guidelines (IDDSG) to apply to Lots 1, 2, 3, and 5, of Block 1 of Redtail Ridge, Filing No. 1 within the Redtail Ridge development. These parcels are currently subject to the Commercial Development Design Standards and Guidelines (CDDSG), as required by the currently applicable GDP. In conjunction with this request, the applicant has agreed to incorporate a series of enhanced industrial design standards into the GDP to create a hybrid design requirement that elevates industrial design of the area while maintaining flexibility to accommodate a range of building and tenant needs. This hybrid model is intended to bridge the gap between traditional commercial and industrial design, ensuring buildings remain compatible with the vision for Redtail Ridge while supporting the functional requirements of light industrial users.



Amendment Area

The proposal does not alter the design standards for parcels located along the perimeter of the development area. Those parcels, and the AdventHealth Hospital parcel located on Lot 1, Block 2 of the ConocoPhillips Campus GDP, will continue to be governed by the CDDSG. The amendment applies only to the interior parcels where the applicant anticipates demand from light industrial, research, and technology-focused users.

The ConocoPhillips GDP currently allows uses that are generally consistent with light industrial activities, including manufacturing, fabrication, processing, and assembly of scientific or technical products, along with warehouse and storage facilities that support research and development uses. The applicant asserts that the application of commercial design standards to these interior parcels is not compatible with current market expectations for these user types and would likely limit the ability of the development to attract prospective tenants whose operational needs align with the GDP's permitted light industrial uses.

Following the City Council concept plan review in October 2025, staff collaborated with the applicant to develop measurable, repeatable, and enforceable enhanced design standards in the subject areas that would supplement the IDDSG. These standards introduce additional architectural requirements intended to promote articulation where appropriate, material variation, and pedestrian-oriented design features beyond what the baseline industrial standards require. The proposed enhanced standards applicable to the affected parcels will be included in this GDP Amendment, and are as follows:

Transparency Requirements

- For elevations that face a public or private street, 50% of the area between 2 – 10 feet above grade shall include transparency in the form of doors or windows. Windows must be evenly distributed.

- For elevations that face a public street on buildings taller than 18 feet, 18% of the area between 12 – 30 feet above grade shall include transparency that mimics a second-floor design.

Enhanced Entrance Features

- Primary building entrances shall be positioned in a manner that highlights the enhanced entrances best from a public or private street.

    - Where the long side of a building faces a public street, a minimum of one primary entrance shall be required.

    - If an entry feature is proposed on a building corner, the feature shall wrap the building on the building side facing a public or private street a minimum distance of 15 feet

- If the short side of a building faces a public or private street and no corner entry is proposed, the following standards apply:
    - Building height increase a minimum of 3’ 6” to extend a minimum of 15 feet along each adjoining façade.
    - A minimum of 50% of the area within 15 feet of the corner shall include glazing within the area 2-10 feet above grade.
    - A projecting architectural feature, such as an awning, portico, eyebrow, or similar feature shall extend a minimum of 15 feet along the adjoining façade.

- Building façades greater than 200 feet in length shall provide a minimum of 2 primary entry features. Façades greater than 400 feet in length shall include a minimum of 3 entry features. Wrapped corner features are encouraged where appropriate.

- Entry features shall include a glass vestibule or façade, metal canopy, portico, or other similar architectural feature proportional to the façade height.

- Entrances shall be articulated through recesses or projected elements such as canopies, awnings, belt courses or overhangs, or combination thereof that project at least 4 feet from the building face.

- Entry features shall incorporate a distinct accent material or texture, separate from the primary and secondary façade materials and textures, to clearly differentiate the building entries from the remainder of the façade.

- Entry features shall account for 20% of the total building façade length on which they are located, to be calculated in aggregate across the façade. Entry features shall be a minimum of 10 feet wide.

Material or Texture Variation

- At least two primary materials and one accent material shall be incorporated on façades visible from a public right-of-way. Textured, ribbed, or patterned concrete panels may be considered a separate material if they provide a clear textural and color contrast.

- No single texture or color shall cover more than 75% of any street-facing façade.

- Accent materials such as architectural metal panels, masonry veneer, architectural concrete finishes, or wood shall be used to emphasize entries, corners, horizontal or vertical divisions.

Example Façade that meets Enhanced Design Standards

Example Entry Features that meet Enhanced Design Standards

ANALYSIS:

The subject property will remain within the Planned Community Zone District (PCZD), regardless of any GDP amendment. Review of this GDP Amendment is therefore subject to the provisions of Louisville Municipal Code (LMC) Sec. 17.72, which governs

the PCZD. Amendments to a GDP are subject to the same process and requirements as the original approval. The purpose of the PCZD, as outlined in LMC Sec. 17.72.010, includes the following statements that are applicable to this application:

- *The purpose of the PCZD is to encourage, preserve and improve the health, safety and general welfare of the people of the city by encouraging the use of contemporary land planning principles and coordinated community design.*

- *The PCZD is created in recognition of the economic and cultural advantages that will accrue to the residents of an integrated, planned community development of sufficient size to provide related areas for various housing types, retail, service activities, recreation, schools and public facilities, and other uses of land.*

Section 17.72.030 includes the following applicability statement:

- *The PCZD may be applied only to such land as the city shall determine to be suitable for such a development.*

Design Considerations

The CDDSG are intended to ensure that commercial development reflects high-quality, enduring, and context-sensitive design. These standards protect the community's established character and quality of life through clearly defined goals, policies, and measurable expectations for site, architectural, and landscape design. They also support Louisville's long-term economic vitality by promoting visually attractive, durable, and well-crafted commercial development, while discouraging design approaches or materials that detract from the community's aesthetic standards.

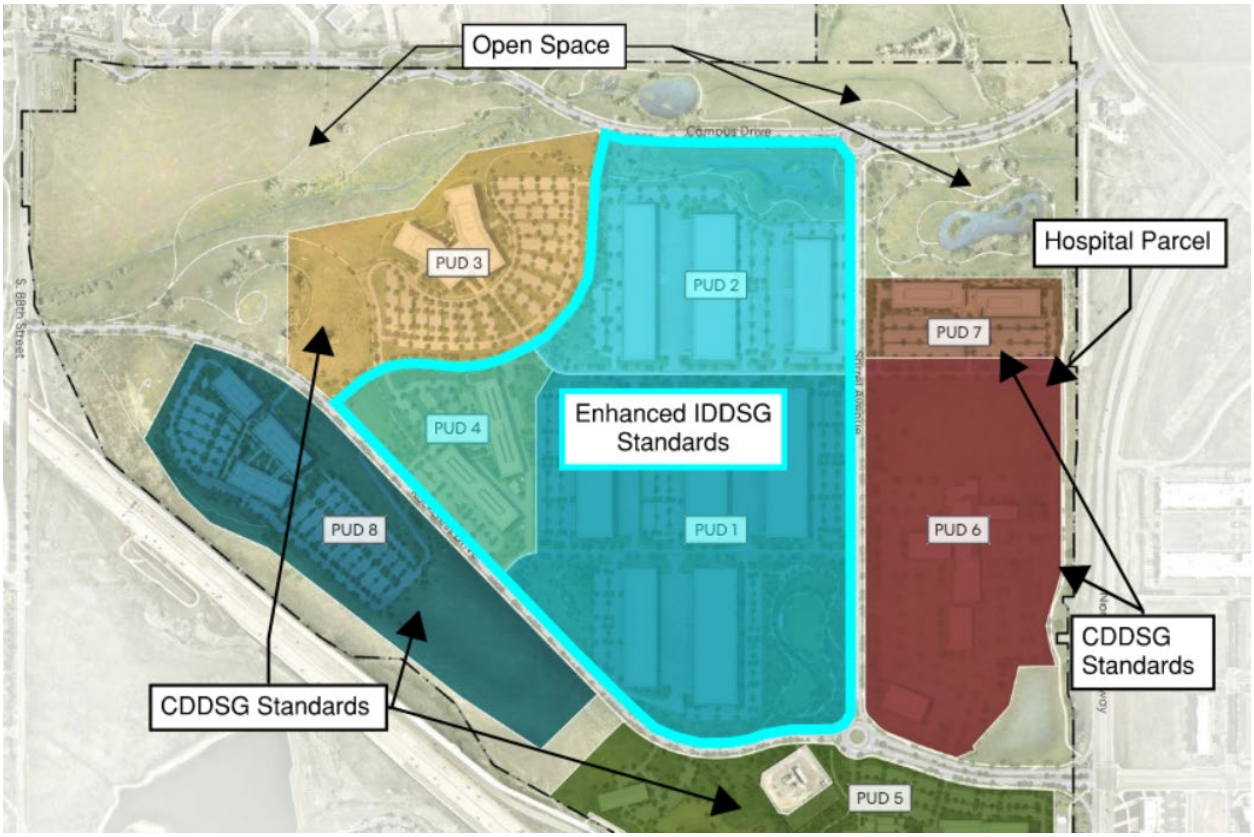
The IDDSG by contrast, apply to industrially zoned districts and include a combination of mandatory design standards and general guidelines. While compliance with the mandatory standards is required, the guidelines offer flexibility to support the functional needs of industrial users. The IDDSG are intentionally more permissive than the CDDSG because they serve different land use purposes. Commercial areas are designed to support the public realm and emphasize visibility, pedestrian activity, and architectural character, which necessitates more stringent standards. Industrial areas, however, are intended to accommodate employment-based uses that rely on functionality, efficiency, and operational flexibility. These developments often incorporate larger footprints, loading areas, outdoor storage, and high-bay structures that are essential to their operations.

Applying the IDDSG in place of the CDDSG would create a discernible shift in the design character of future development on the affected parcels. Development would place greater emphasis on operational efficiency, durability, and functional design rather than architectural detailing or pedestrian-oriented features. Buildings may have larger, more utilitarian forms, increased mechanical or service components, and façades that reflect industrial and research-based activities rather than the more refined commercial character anticipated under the CDDSG.

Given the use allowances of the ConocoPhillips GDP, which support light industrial activities such as research and development, fabrication, warehousing, and storage, the application of the IDDSG, supplemented by enhanced design standards, provides a more appropriate and context-sensitive framework for future development. The IDDSG accommodate the functional needs of these uses, including larger building footprints, high-bay spaces, service and loading areas, and flexible interior layouts. Incorporating enhanced standards tailored for Redtail Ridge further ensures that building forms and site designs align with industrial and research user types while achieving a higher level of architectural quality.

This approach allows development to reflect the practical realities of light industrial operations without imposing commercial-oriented standards that may be incompatible with these uses. The enhanced standards also improve visual cohesion, strengthen compatibility with surrounding open space and infrastructure, and elevate overall design character beyond what traditional industrial guidelines would require.

Further, the parcels where the enhanced IDDSG would apply are centrally located within the Redtail Ridge development. Surrounding perimeter parcels will remain subject to the CDDSG, meaning the public-facing edges of the project along 96th Street, Highway 36, and Campus Drive, will reflect commercial design characteristics when developed, or will be buffered by expansive open space areas. As a result, the



Conceptual Build-Out with Enhanced IDDSG Area Highlighted

application of the enhanced IDDSG is largely internal, and most buildings visible from major roadways will still be designed consistent with the commercial standards. Collectively, the enhanced industrial development standards are intended to create a high-quality, distinctive industrial district within Redtail Ridge that exceeds the expectations typically applied in comparable areas such as the Colorado Technology Center. They introduce greater material variety and pedestrian-oriented features, contributing to a durable, visually cohesive environment consistent with community expectations for this prominent employment area. By incorporating these standards, the City can support a campus setting that integrates with the extensive open space and trail network, creating an attractive environment for employees, visitors, and the broader community while supporting the core employment, research, and technology entitlements of the ConocoPhillips Campus GDP.

Applying the IDDSG in place of the CDDSG for this internal portion of the campus is consistent with the purpose of the PCZD. The IDDSG better aligns with the light industrial and research uses anticipated by the GDP and supports coordinated community design using contemporary planning principles. Because the area is centrally located and not prominent from public roadways, the IDDSG remains compatible with surrounding development. As such, the amendment satisfies the intent and applicability provisions of LMC Sec. 17.72.010 and 17.72.030

PUBLIC COMMENTS:
No public comments have been received as of the date of this application.

STAFF RECOMMENDATION:
Staff recommend approval of Resolution No. 20, Series 2025, recommending to the City Council approval ConocoPhillips Campus General Development Plan, 2nd Amendment with the following conditions:

- The applicant shall address all administrative, technical, and formatting staff comments in Attachment C, General Development Plan, 2nd Amendment. All required revisions shall be addressed prior to any City Council hearing on the application.

ATTACHMENTS:
- **A.** Resolution No. 20, Series 2025
- **B.** Application Materials
- **C.** ConocoPhillips General Development Plan, 2nd Amendment (including proposed conditions)
- **D.** ConocoPhillips General Development Plan, 1st Amendment

RESOLUTION NO. 20
SERIES 2025

A RESOLUTION RECOMMENDING TO THE CITY COUNCIL APPROVAL WITH CONDITIONS OF THE CONOCOPHILLIPS CAMPUS GENERAL DEVELOPMENT PLAN, 2ND AMENDMENT

WHEREAS, Sterling Bay has applied for an amendment to the ConocoPhillips General Development Plan, 1st Amendment to allow for the application of the Industrial Development Design Standards and Guidelines with enhanced design standards in place of the Commercial Development Design Standards and Guidelines on Lots 1, 2, 3, and 5 of Block 1 of Redtail Ridge Filing No. 1; and

WHEREAS, the Planning Commission finds that, with conditions, the proposed amendment is consistent with the purpose of the Planned Community Zone District and meets all standards for General Development Plans outlined and Chapter 17.72 of the Louisville Municipal Code; and

WHEREAS, the Planning Commission has considered the application at a duly noticed public hearing on December 11, 2025, where evidence and testimony were entered into the record, including the findings in the Louisville Planning Commission Staff Report dated December 11, 2025.

NOW THEREFORE, BE IT RESOLVED that the Planning Commission of the City of Louisville, Colorado does hereby recommend to the City Council approval with conditions of the ConocoPhillips Campus General Development Plan, 2nd Amendment.

PASSED AND ADOPTED this 11th day of December, 2025.

By: _____
Steve Brauneis, Chair
Planning Commission

Attest: _____
Cullen Choi, Secretary
Planning Commission

City of Louisville
COLORADO • SINCE 1878

Community Development Department

749 Main Street • Louisville CO 80027 • 303.335.4592 • www.louisvilleco.gov

Development Review Application Form

Please complete this form and include it with the submittal documents for your development review application. Applications will not be processed until all required information is provided to the satisfaction of the City of Louisville Planning Department.

Property Information

Common Address(es): N/A

Legal Description:

Lot 1, 2, 3, and 5 Block 1 Subdivision Redtail Ridge Filing No. 1

Lot Area: _____ Sq. Ft. or 111 Acres

LAND USE PROCESS (check all that apply)

- ☐ Annexation
- ☐ Concept Plan
- ☐ Easement Vacation
- ☐ Oil and Gas
- ■ General Development Plan (GDP)
  - ■ Amendment
  - ☐ New GDP
- ☐ Planned Unit Development (PUD)
  - ☐ Amendment
  - ☐ Preliminary
  - ☐ New PUD
- ☐ Rezoning
- ☐ Special Review Use (SRU)
  - ☐ Amendment
  - ☐ New SRU
- ☐ Subdivision
  - ☐ Final or Replat
  - ☐ Preliminary Plat
- ☐ Temporary Use Permit
- ☐ Variance
- ☐ Vested Property Right
- ☐ Wireless Facility
- ☐ Other: _____

PROJECT DESCRIPTION:

Amend the ConocoPhillips Campus General Development Plan, 1st Amendment, to allow the applicaiton of the IDDSG in place of CDDSG, including enhanced design standards.

Property Owner Information

Name: _____ Entity (if applicable) _____

Address: _____

Phone: _____ Email: _____

Application Representative Information

Name: _____ Entity (if applicable) _____

Address: _____

Phone: _____ Email: _____

Certification/Signature

I certify that the information I have submitted is true and correct to the best of my knowledge and in filing the application and submittal documents, I am acting as and/or with the knowledge and consent of those persons who are owners of the subject property or are parties to this application.

DocuSigned by:

_____ Marshall Wheel 11/20/2025

Signature Print Name Date

*If acting as a representative/agent of the owner, include written authorization from the owner that certifies the agent's right to submit this application

CONOCOPHILLIPS CAMPUS

GENERAL DEVELOPMENT PLAN AMENDMENT 1

A PART OF THE SOUTH HALF OF SECTION 20, THE NORTH HALF SECTION 29,
TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE 6TH P.M.
SHEET 1 OF 1

Add this note

Lots 1, 2, 3, and 5 of Block 1 of Redtail Ridge Filing No. 1 shall conform and be consistent with the Louisville Municipal Code, the Industrial Development Design Standards and Guidelines, and the enhanced design standards contained herein

Add this to note 1

GENERAL NOTES:

1. Unless otherwise noted, DEVELOPMENT SHALL CONFORM AND BE CONSISTENT WITH THE LOUISVILLE MUNICIPAL CODE AND THE COMMERICAL DEVELOPMENT DESIGN STANDARDS AND GUIDELINES UNLESS OTHERWISE WAIVED OR MODIFIED BY THE CITY COUNCIL THROUGH THE PUD DEVELOPMENT PLAN PROCESS.
2. THE CAMPUS SECURITY BOUNDARY WILL NOT EXTEND OUTSIDE THE SITE BOUNDARY.
3. TRAFFIC CIRCULATION PATTERNS DEPICTED WITHIN AND ACROSS LOT 4 REPRESENT INTERNAL PRIVATE DRIVES AND ARE CONCEPTUAL ONLY AND SUBJECT TO MODIFICATION.
4. EXISTING FREE STANDING CMRS FACILITIES WITHIN LOT A SHALL CONSITUTE A PERMISSIBLE NON-CONFORMING USE.
5. PUBLIC LAND DEDICATION OF AT LEAST 12% WILL COMPLY WITH SECTION 16.16.060.B OF THE LOUISVILLE MUNICIPAL CODE.

SITE INFORMATION

	Maximum
GROSS DEVELOPABLE AREA (PUD BOUNDARY):	391.719 ACRES (WHICH IS 0.15 F.A.R.) * TOPOLOGICAL DESCRIPTION SEES SURVEY AS SPECIFIED NO. TOPOLOGICAL 2010
ZONING:	PLANNED COMMUNITY ZONED DISTRICT (PCZD) - COMMERCIAL WITH PUD-C OVERLAY
PLANNED ACCESS:	NORTHWEST PARKWAY, CAMPUS DRIVE, SOUTH 88TH STREET

* THE F.A.R APPLIES TO THE GROSS AREA OF THE ENTIRE DEVELOPMENT AND IS NOT PARCEL-SPECIFIC. THIS GDP ACKNOWLEDGES AN ADDITIONAL 364,400 SF ALLOCATED TO THE HOSPITAL PARCEL, ON TOP OF THE ALLOCATED DEVELOPMENT SQUARE FOOTAGE. THE 364,400 SF IS IN CONSIDERATION WITH A DENSITY SWAP FROM HEALTH PARK 1.

PERMITTED USES

PERMITTED USE	COMMENTS / REMARKS	PARKING REQUIREMENTS
PROFESSIONAL, BUSINESS, AND ADMINISTRATIVE OFFICES	-	4 / 1,0
EDUCATIONAL AND TRAINING FACILITIES	MEETING ROOMS AND SOCIAL SPACE FOR EMPLOYEES AND VISITORS	0.5/
PRIVATE SHORT TERM LODGING FOR CONOCOPHILLIPS EMPLOYEES AND GUESTS	OVERNIGHT ACCOMMODATIONS FOR EMPLOYEES/VISITORS	0.5 /
PEDESTRIAN PLAZAS AND PEDESTRIAN WAYS	-	
PRIVATE, NONCOMMERCIAL, RECREATIONAL AND SOCIAL FACILITIES	-	1 / 1,0
PARKING LOTS AND PARKING BUILDINGS	SURFACE AND STRUCTURED PARKING	
CAMPUS ORIENTED CHILDCARE CENTER	PRIVATE CHILDCARE FOR EMPLOYEES	1.5 SPACES PER TEAC PER ADMINISTR
RESEARCH/OFFICE AND CORPORATE USES AND FACILITIES FOR THE RESEARCH, DEVELOPMENT, MANUFACTURING, FABRICATION, PROCESSING, OR ASSEMBLY OF SCIENTIFIC OR TECHNICAL PRODUCTS, OR OTHER PRODUCTS	-	1.25 / 1
BUILDING MOUNTED CMRS FACILITIES	-	
CAMPUS ORIENTED FOOD SERVICE	RESTAURANTS CAFETERIAS, OR CAFES FOR USE BY EMPLOYEES/VISITORS INTEGRATED THROUGHOUT THE CAMPUS	
COMMERCIAL USES, INCLUDING BUT NOT LIMITED TO BUILDING CONTRACTOR'S EQUIPMENT YARDS, TRANSPORTATION CENTERS AND SERVICED, WAREHOUSES AND STORAGE FACILITIES	STORAGE OF MATERIALS IN SUPPORT OF THE CAMPUS RESEARCH AND DEVELOPMENT FACILITY, HELIPAD (SPECIAL REVIEW USE), HOSPITAL, MEDICAL OFFICE BUILDINGS	1 / 1,0
PRIVATE UTILITY USES	TO ALLOW THE EXISTING SANITARY LIFT STATION, POTENTIAL SUBSURFACE GEO EXCHANGE FIELD, SOLAR PANELS, BUILDING MOUNTED WIND POWERED ELECTRICAL GENERATION FACILITIES, AND CENTRAL MECHANICAL, ELECTRICAL, AND PLUMBING FACILITY	
OTHER USES AS ESTABLISHED BY THE CITY COUNCIL AS FOUND TO BE SPECIFICALLY COMPATIBLE FOR COMMERCIAL AND OFFICE PLANNING AREAS	-	

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(FOR BUILDING FOOTPRINTS LESS THAN OR EQUAL TO 30,000 GROSS SQUARE FEET)

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- COLLECTOR STREET 20 FT.
- INTERNAL/PRIVATE DRIVE 10 FT.

(FOR BUILDING FOOTPRINTS GREATER THAN OR EQUAL TO 30,000 GROSS SQUARE FEET)

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MINIMUM PARKING SETBACKS
(FROM ALL PERIMETER PROPERTY LINE OR RIGHTS-OF-WAYS)

- PROPERTY LINES ADJACENT TO U.S. 36 40 FT.
- ARTERIAL STREET R.O.W. 25 FT.
- COLLECTOR STREET R.O.W. 15 FT.
- INTERNAL/COMMON PROPERTY BOUNDARY 10 FT.

HOSPITAL PARCEL
FOR THE HOSPITAL PARCEL (LOT 1, BLOCK 1) BUILDING HEIGHTS ARE EXPECTED TO RANGE FROM THREE TO FIVE OCCUPIABLE STORIES, RANGING UNOCCUPIED MECHANICAL SCREENING OF UP TO 20' WOULD BE ABOVE THE 5 STORIES. THE HOSPITAL PARCEL WILL BE ZONED TO SUPPORT LOW TOWARDS THE NORTH, EAST, AND WEST PROPERTY BOUNDARIES CONCENTRATING THE 5-STORY STRUCTURES CENTRALLY WITHIN THE SITE. R HEIGHT ZONES

BUILDING HEIGHT ZONING:
THREE STORY ZONE:
- 45'-0" MAXIMUM BUILDING HEIGHT
- 52'-0" PARAPET HEIGHT
- 65'-0" MECHANICAL PENTHOUSE HEIGHT*

FOUR STORY ZONE:
- 60'-0" MAXIMUM BUILDING HEIGHT
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BUILDING MASSING DESIGN PARAMETERS:
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- ANY ROOFTOP ENCLOSURE (E.G., MECHANICAL PENTHOUSES) MUST BE SET BACK A MINIMUM OF 10 FEET FROM THE EDGE OF THE BUILD ARCHITECTURALLY INTEGRATED INTO THE OVERALL DESIGN OF THE BUILDING.
- EXCEPTION: A DEFINING ARCHITECTURAL ELEMENT OR DISTINCT BUILDING FORM WITH A TOTAL WIDTH OF LESS THAN 100 FEET IS EXEM RELIEF REQUIREMENTS. A MINIMUM 2-FOOT DEPTH VARIATION FROM THE ADJACENT PRIMARY FACADE PLANE MUST STILL BE PROVIDED

DEFINING ARCHITECTURAL ELEMENTS MAY INCLUDE, BUT ARE NOT LIMITED TO:
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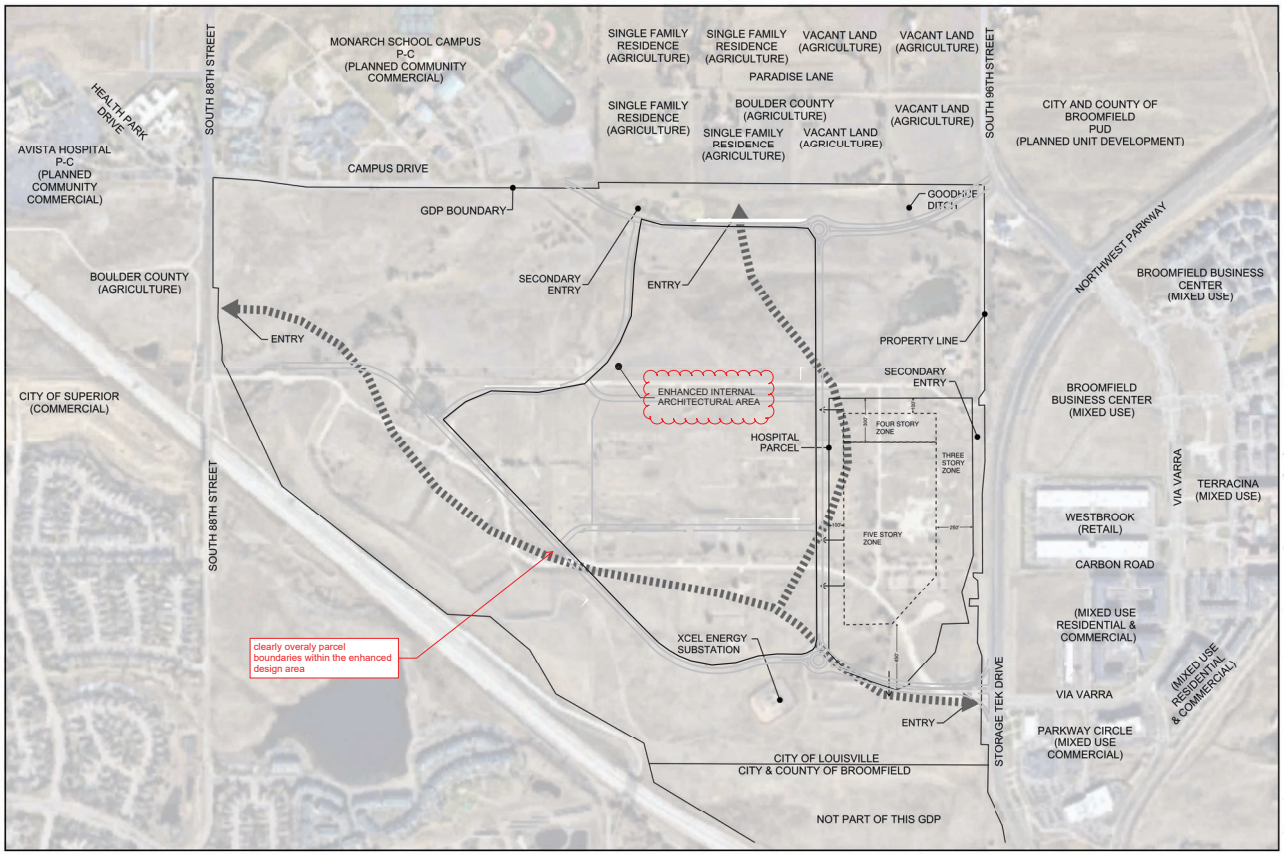
- ENTRY PAVILIONS OR LOBBIES
- ARCHITECTURAL EYEBROWS OR ROOF OVERHANGS
- BRANDED OR SCULPTURAL FACADE FEATURES
- CORNER ELEMENTS OR TURRETS
- ATRIUM VOLUMES OR LIGHT WELLS
- DISTINCTIVE ROOF FORMS



clearly overaly parcel boundaries within the enhanced design area

GENERAL DEVELOPMENT PLAN

400 200 0 400 800

SCALE: 1" = 400'

N

RECEPTION NUMBER

CERTIFICATIONS/SIGNATURE BLOCKS

CITY COUNCIL CERTIFICATION:

APPROVED THIS ____ DAY OF _____, 20___ BY THE CITY COUNCIL OF THE CITY OF LOUISVILLE, COLORADO.

RESOLUTION NO. _____, SERIES _____.

MAYOR SIGNATURE

PLANNING COMMISSION CERTIFICATION:

APPROVED THIS _____ DAY OF _____, 20___ BY THE PLANNING COMMISSION OF THE CITY OF LOUISVILLE, COLORADO.

RESOLUTION NO. _____, SERIES _____.

OWNERSHIP SIGNATURE BLOCK:

BY SIGNING THIS GDP, THE OWNER ACKNOWLEDGES AND ACCEPTS ALL THE REQUIREMENTS AND INTENT SET FORTH IN THIS GDP. WITNESS OUT HANDS AND SEALS

THIS ____ DAY OF _____, 20____.

OWNER
PORTERCARE ADVENTIST HEALTH SYSTEM,
A COLORADO NONPROFIT CORPORATION

BY: SIGNATURE _____ TITLE _____

NOTARY NAME AND SIGNATURE

MY COMMISSION EXPIRES _____

ENHANCED DESIGN STANDARDS APPLICABLE TO INTERNAL PARCELS INCLUDING LOT 1, BLOCK 1, LOT 2, BLOCK 1, LOT 3, BLOCK 1, LOT 5, BLOCK 1:

Transparency Requirements

•For elevations that face a public or private street, 50% of the area between 2 – 10 feet above grade shall include transparency in the form of doors or windows. Windows must be evenly distributed.

•For elevations that face a public street on buildings taller than 18 feet, 18% of the area between 12 – 30 feet above grade shall include transparency that mimics a second-floor design.

Enhanced Entrance Features

•Primary building entrances shall be positioned in a manner that highlights the enhanced entrances best from a public or private street.

oWhere the long side of a building faces a public street, a minimum of one primary entrance shall be required.

olf an entry feature is proposed on a building corner, the feature shall wrap the building on the building side facing a public or private street a minimum distance of 15 feet olf the short side of a building faces a public or private street and no corner entry is proposed, the following standards apply:

•Building height increase a minimum of 3' 6" to extend a minimum of 15 feet along each adjoining façade.

•A minimum of 50% of the area within 15 feet of the corner shall include glazing within the area 2-10 feet above grade.

•A projecting architectural feature, such as an awning, portico, eyebrow, or similar feature shall extend a minimum of 15 feet along the adjoining façade.

•Building façades greater than 200 feet in length shall provide a minimum of 2 primary entry features. Façades greater than 400 feet in length shall include a minimum of 3 entry features. Wrapped corner features are encouraged where appropriate.

•Entry features shall include a glass vestibule or façade, metal canopy, portico, or other similar architectural feature proportional to the façade height.

•Entrances shall be articulated through recesses or projected elements such as canopies, awnings, belt courses or overhangs, or combination thereof that project at least 4 feet from the building face.

•Entry features shall incorporate a distinct accent material or texture, separate from the primary and secondary façade materials and textures, to clearly differentiate the building entries from the remainder of the façade.

•Entry features shall account for 20% of the total building façade length on which they are located, to be calculated in aggregate across the façade. Entry features shall be a minimum of 10 feet wide.

Material or Texture Variation

•At least two primary materials and one accent material shall be incorporated on façades visible from a public right-of-way. Textured, ribbed, or patterned concrete panels may be considered a separate material if they provide a clear textural and color contrast.

•No single texture or color shall cover more than 75% of any street-facing façade.

•Accent materials such as architectural metal panels, masonry veneer, architectural concrete finishes, or wood shall be used to emphasize entries, corners, horizontal or vertical divisions.

CONOCOPHILLIPS CAMPUS

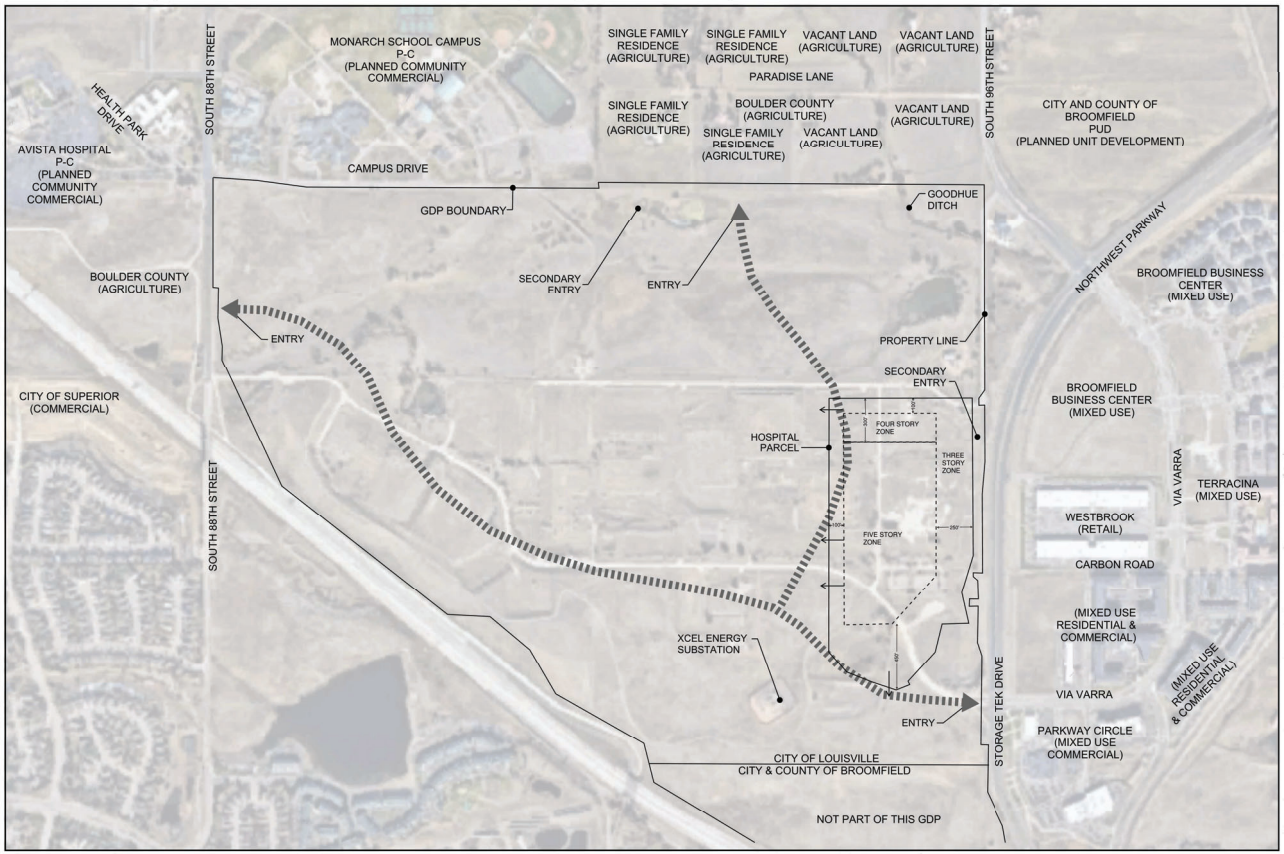
GENERAL DEVELOPMENT PLAN AMENDMENT 1

A PART OF THE SOUTH HALF OF SECTION 20, THE NORTH HALF SECTION 29,
TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE 6TH P.M.
SHEET 1 OF 1

AMENDMENT CHANGES

THE PURPOSE OF THIS AMENDMENT IS SPECIFICALLY FOR THE HOSPITAL PARCEL AND THE REST OF THE REDTAIL DEVELOPMENT REMAINS UNCHANGED.

1)Additional note for the allowable square footage transfer from the Avista Adventist Hospital 2002 GDP.
2)Addition of hospital and medical office building uses to the "Permitted Uses" for better clarity on specifc uses.
3)Updated yard and bulk requirements to include the allowable height for the hospital parcel only.
4)Updated aerial graphic
5)Added Hospital Parcel and density zoning to graphic
6) Added Hospital Parcel building massing design parameters



GENERAL DEVELOPMENT PLAN

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OWNER
PORTERCARE ADVENTIST HEALTH SYSTEM,
A CO ORADO NONPROFIT CORPORATION

BY: SIGNATURE

TITLE

NOTARY NAME AND SIGNATURE

MY COMMISSION EXPIRES _____

GENERAL NOTES:

1. DEVELOPMENT SHALL CONFORM AND BE CONSISTENT WITH THE LOUISVILLE MUNICIPAL CODE AND THE COMMERICAL DEVELOPMENT DESIGN STANDARDS AND GUIDELINES UNLESS OTHERWISE WAIVED OR MODIFIED BY THE CITY COUNCIL THROUGH THE PUD DEVELOPMENT PLAN PROCESS.
2. THE CAMPUS SECURITY BOUNDARY WILL NOT EXTEND OUTSIDE THE SITE BOUNDARY.
3. TRAFFIC CIRCULATION PATTERNS DEPICTED WITHIN AND ACROSS LOT 4 REPRESENT INTERNAL PRIVATE DRIVES AND ARE CONCEPTUAL ONLY AND SUBJECT TO MODIFICATION.
4. EXISTING FREE STANDING CMRS FACITIES WITHIN LOT A SHALL CONSITUTE A PERMISSIBLE NON-CONFORMING USE.
5. PUBLIC LAND DEDICATION OF AT LEAST 12% WILL COMPLY WITH SECTION 16.16.060.B OF THE LOUISVILLE MUNICIPAL CODE.

SITE INFORMATION

GROSS DEVELOPABLE AREA (PUD BOUNDARY):	391.719 ACRES (MINIMUM 0.15 F.A.R.) * TOPOLOGIC DESCRIPTION SEE EXHIBIT A OF GRADING NO. 1309 SERIES 2010
ZONING:	PLANNED COMMUNITY ZONED DISTRICT (PCZD) - COMMERCIAL WITH PUD-C OVERLAY
PLANNED ACCESS:	NORTHWEST PARKWAY, CAMPUS DRIVE, SOUTH 88TH STREET

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PERMITTED USES

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PRIVATE SHORT TERM LODGING FOR CONOCOPHILLIPS EMPLOYEES AND GUESTS	OVERNIGHT ACCOMMODATIONS FOR EMPLOYEES/VISITORS	0.5 / ROOM
PEDESTRIAN PLAZAS AND PEDESTRIAN WAYS	-	-
PRIVATE, NONCOMMERCIAL, RECREATIONAL AND SOCIAL FACILITIES	-	1 / 1,000 S.F.
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CAMPUS ORIENTED FOOD SERVICE	RESTAURANTS CAFETERIAS, OR CAFES FOR USE BY EMPLOYEES/VISITORS INTEGRATED THROUGHOUT THE CAMPUS	-
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PRIVATE UTILITY USES	TO ALLOW THE EXISTING SANITARY LIFT STATION, POTENTIAL SUBSURFACE GEO EXCHANGE FIELD, SOLAR PANELS, BUILDING MOUNTED WIND POWERED ELECTRICAL GENERATION FACILITIES, AND CENTRAL MECHANICAL, ELECTRICAL, AND PLUMBING FACILITY	-
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THREE STORY ZONE:
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- 65'-0" MECHANICAL PENTHOUSE HEIGHT*

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SMITHGROUP
1675 LOGAN ST.
SUITE 500
DENVER, COLORADO 80202
303.832.3272
smithgroup.com

Kimley»Horn
1125 17TH ST
SUITE 1400
DENVER, CO 80202
303.228.2300
kimley-horn.com

ISSUE / REVISION	DATE
GDP CITY RESPONSE #1	7/18/2025
GDP AMENDMENT	9/2/2025

CONOCOPHILLIPS CAMPUS
2270 SO 88TH STREET
LOUISVILLE, CO

GENERAL DEVELOPMENT PLAN

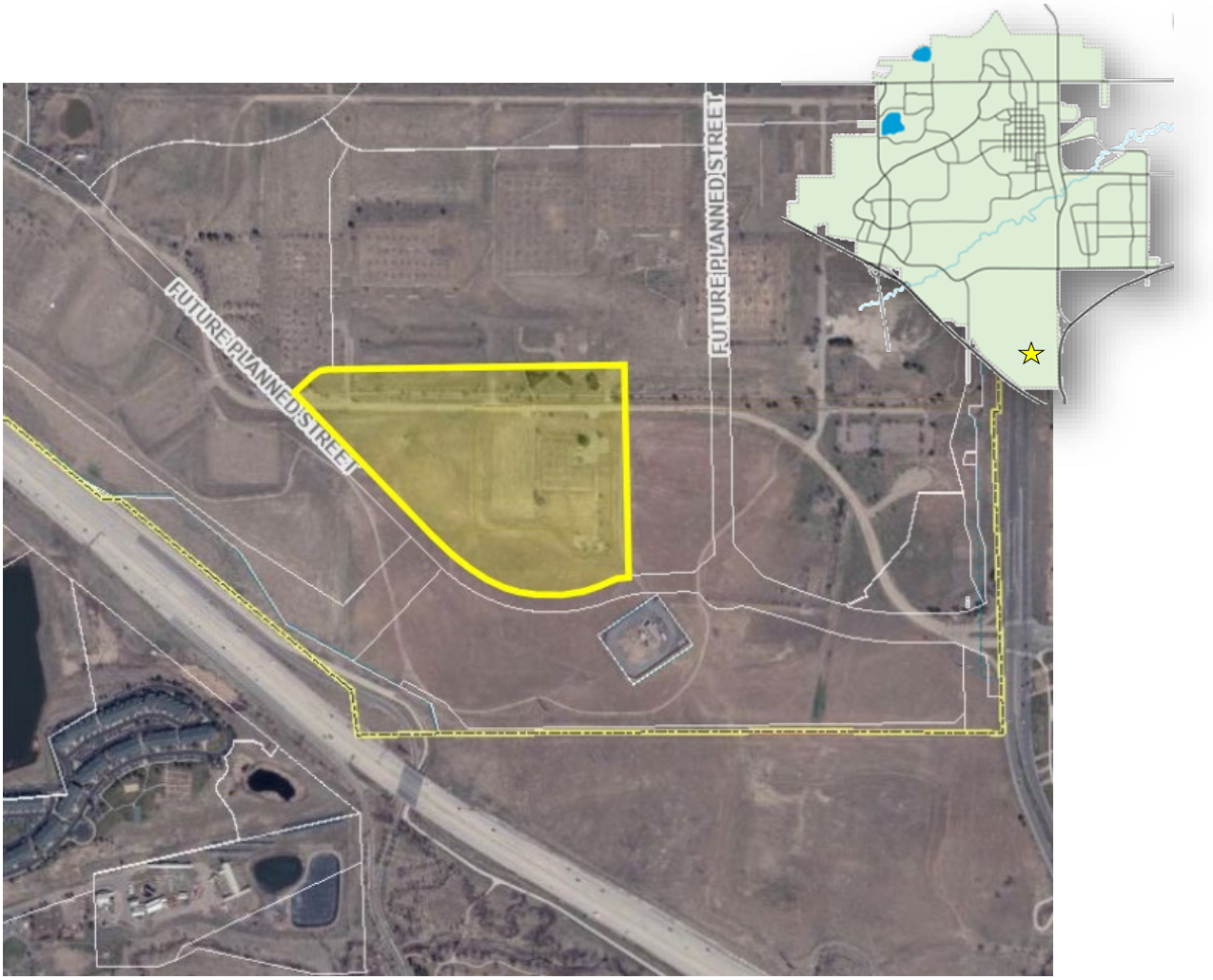
DRAWN	TEAM
CHK	TEAM
PRJ #	

SHEET NUMBER:

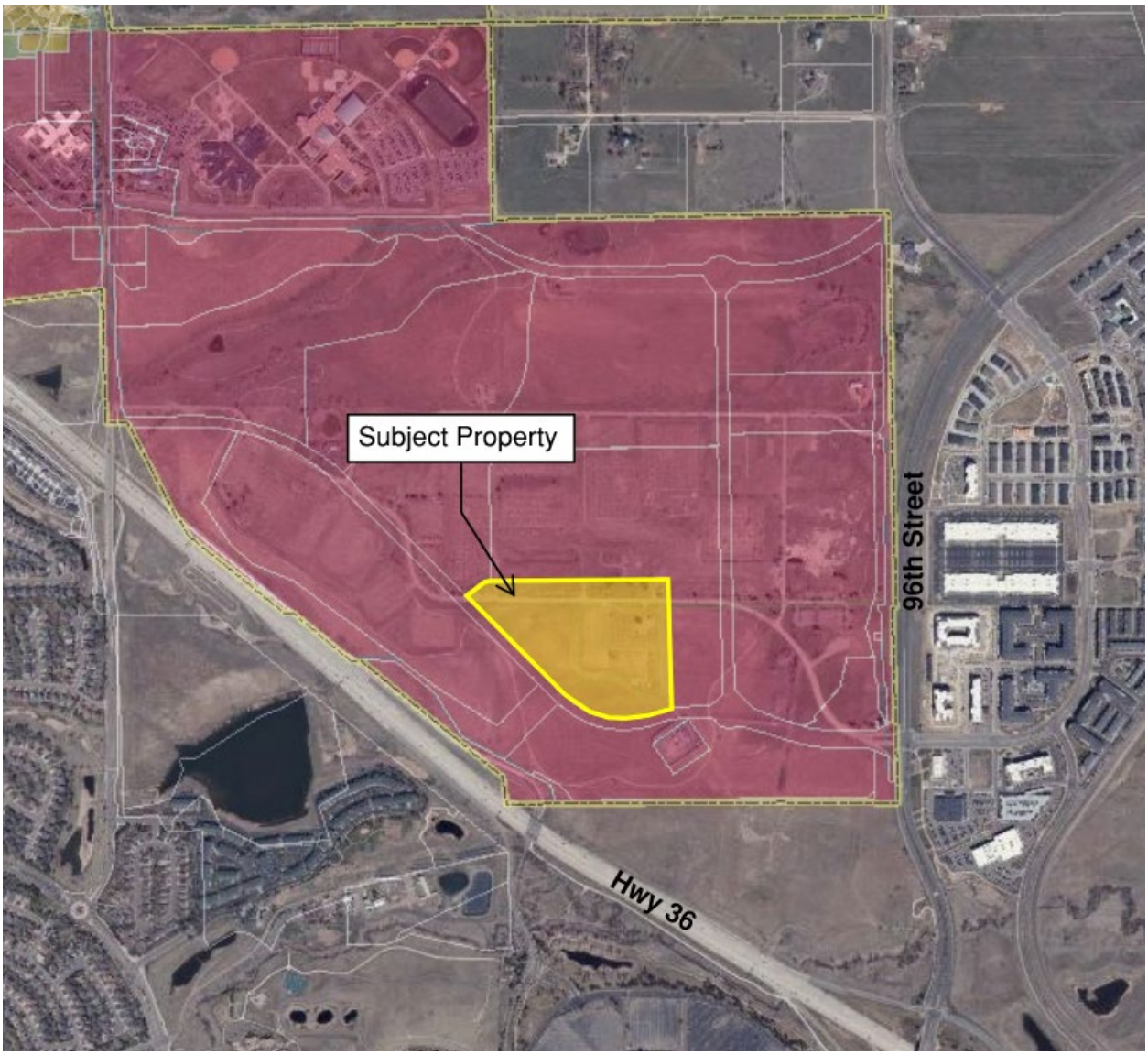
1 OF 1

ITEM:	PUD-000547-2025 – Redtail Ridge Planned Unit Development No. 1 South
PLANNER:	Matt Post, AICP, Senior Planner
EXISTING ZONING:	PCZD-C – ConocoPhillips General Development Plan
LOCATION:	Lot 1, Block 1 of Redtail Ridge, Filing No. 1
TOTAL SITE AREA:	21.68 Acres
REQUEST:	Approval of Resolution No. 21, Series 2025, recommending to the City Council approval with conditions of the Redtail Ridge Planned Unit Development No. 1 South to allow 236,993 SF industrial buildings and associated site development.

VICINITY MAP:



SUMMARY:
The applicant, Sterling Bay, is requesting approval of the Redtail Ridge Planned Unit Development No. 1 South to allow for the development of two light industrial buildings totaling 236,993 square feet and associated site development on 21.68 acres located at Lot 1, Block 1 of Redtail Ridge, Filing No. 1.



Vicinity Map

BACKGROUND:
The subject property was part of the original 310-acre StorageTek corporate campus development, annexed into the City in 1978 and built out to approximately 1.6 million square feet. In 2008, ConocoPhillips acquired the property and subsequently demolished the existing campus to facilitate development of a new research facility. That same year, the company petitioned for annexation of an additional 80 acres and

requested rezoning of the combined 390-acre site to Planned Community Zone District – Commercial (PCZD-C).

In 2010, the City approved the ConocoPhillips General Development Plan (GDP), Zoning Agreement, Preliminary Subdivision Plat, and Preliminary Planned Unit Development (PUD). The GDP established a 2.5-million-square-foot development cap, permitted land uses, setbacks, and a 12% minimum public land dedication, and mandated that development on the property abide by the Commercial Development Design Standards and Guidelines (CDDSG). The preliminary PUD included 38.9 acres of on-site public land dedication, an additional 20 acres of preserved land in Boulder County, and clustering of buildings to retain 222 acres of private open space. The PUD authorized building heights up to 65 feet, with one subarea allowing a 95-foot structure. The project was envisioned as a ConocoPhillips research campus but was never constructed following a corporate restructuring.

In 2021, City Council approved a revised GDP for the property known as Redtail Ridge, proposing up to 3 million square feet of commercial and industrial development. However, a referendum election held on April 19, 2022, overturned the Council's approval, reinstating the 2010 ConocoPhillips GDP as the effective governing plan for the property.

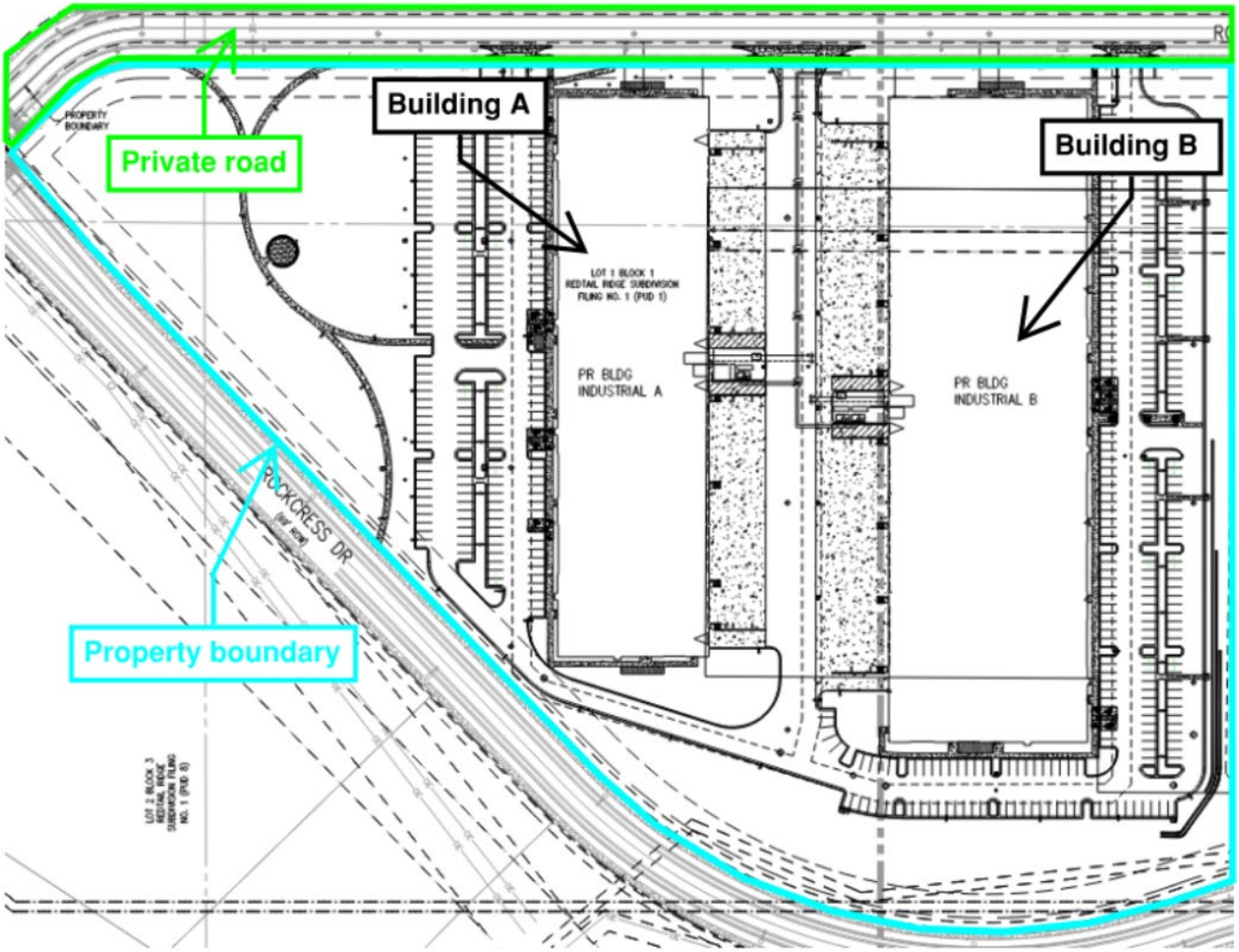
In 2024, City Council approved a Final Plat of the 389-acre property to enable development consistent with the ConocoPhillips Campus GDP approved in 2010. The plat established lots, tracts, rights-of-way, and easements to support future hospital, medical office, light industrial, commercial, and office uses.

In September of 2025, the City Council approved the 1st amendment to the ConocoPhillips Campus GDP to enable development of a new hospital campus (AdventHealth) on Lot 1, Block 2 of Redtail Ridge Filing No. 1. The amendment reallocated development area to the hospital site and established new height and massing standards to guide building scale and design on the affected parcel.

In October 2025, City Council reviewed a Concept Plan proposing the use of the Industrial Development Design Standards and Guidelines (IDDSG) for this site and other centrally located parcels within the Redtail Ridge development area, in place of the currently applicable Commercial Development Design Standards and Guidelines (CDDSG). City Council expressed support for a hybrid design approach that would provide additional flexibility while maintaining key design expectations. Concurrent with this PUD application, an amendment to the ConocoPhillips Campus GDP is also being considered to formally authorize the application of the IDDSG with specified design enhancements.

PROPOSAL:
The applicant is requesting approval of a Planned Unit Development to construct two industrial buildings totaling 236,993 square feet on a 21.68 acre property, platted as part of the Redtail Ridge Filing No. 1 subdivision plat approved in 2024. Proposed site

development includes associated parking for both buildings and approximately 8.28 acres of private landscaped area, featuring a large private open space with trails and an enhanced pedestrian plaza central to the west side open space area. The property is bounded on the south by the Rockcress Road right-of-way, which is currently under construction, and on the north by a future private road that will provide three vehicular access points to the site.



Proposed Planned Unit Development

The easternmost building (building B) is the larger of the two structures, proposed at 142,658 square feet and a height of 39 feet, 6 inches, which is below the 40-foot height limit under consideration for this application. The westernmost building (building A) is proposed at 94,335 square feet with a height of 38 feet, 6 inches, maintaining a compatible scale between the two buildings.

Together, the two buildings will provide a total of 555 parking spaces and 40 bicycle parking spaces. Of these, Building B will be served by 264 vehicle spaces and 20 bicycle spaces, while Building A will include 191 vehicle spaces and 20 bicycle spaces. Parking areas are arranged to support efficient access to each building while incorporating landscaped islands and walkways for improved on-site circulation.

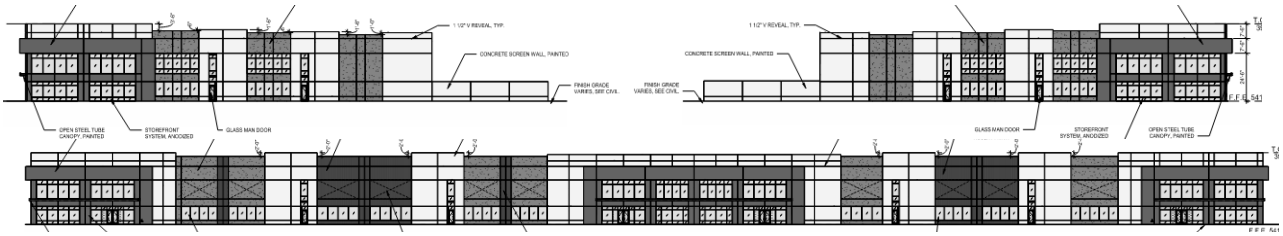
As part of this proposal, a total of 34 electric vehicle (EV) charging stations will be installed, with 14 serving building A and 20 serving building B. In addition, the development includes 36 EV-ready spaces, 45 EV-capable spaces, and 45 EV-capable (light) spaces across the two parking areas. The proposed EV infrastructure meets the minimum requirements of LMC Sec. 17.20.170 and supports the applicant's broader commitment to achieving Fitwel Campus Certification, specifically the program's green vehicle objectives

Both buildings incorporate outdoor plaza areas on their north and south sides, designed with seating and patterned concrete to create identifiable and functional pedestrian spaces. These areas provide opportunities for outdoor use and help break up the building massing with visually distinct site elements.

Additional pedestrian walkways and paths are proposed on the western portion of the site, creating continuous connections from the parking areas to the building entrances and linking into the broader on-site sidewalk system. These walkways are intended to improve internal circulation, provide direct routes for employees and visitors, and reinforce a pedestrian network throughout the development. Although the large open space area on the west side of the property will remain privately owned, the applicant has indicated that the internal paths and the associated seating area will remain publicly accessible, offering opportunities for passive use and enhancing the overall pedestrian experience within the larger site.

Building B is designed with its primary façade oriented to the east, facing the adjacent public right-of-way and a planned open space area. This façade incorporates the enhanced design standards proposed with the accompanying GDP Amendment, including three primary entrances featuring accent materials and articulated entry design. Similarly, the west elevation of Building A incorporates the same set of enhanced façade and entry standards, also visible from a public street.

Both buildings include enhanced architectural treatments on their north and south elevations, reflecting their visibility from public and private streets. These elevations incorporate the enhanced transparency, materials variation, and entry elements required under the proposed design standards, ensuring a consistent and high-quality design character on all publicly visible façades.



Street Facing Elevations

Enhanced Entry Design Facing a Street with this PUD Proposal

The landscape plan includes more than 3,000 low-water shrubs, grasses, and perennials distributed throughout the site and around both buildings. A total of 317 trees of varying species are proposed within the internal landscape areas, parking lots, and building perimeters. Street trees and perennial plantings along Rockcress Road and the private street are addressed in a separate landscape plan reviewed and approved with the 2024 final plat civil construction documents. That plan requires an additional 40 trees and more than 300 shrubs and grasses along the site's perimeter, which will be installed as a condition of final construction acceptance. Remaining landscape areas will be seeded with a native shortgrass prairie mix and low-water buffalo grass to ensure long-term water efficiency and compatibility with the surrounding natural landscape

As part of the 2024 subdivision, a Subdivision Improvement Agreement (SIA) was executed and recorded requiring that all development within the ConocoPhillips Campus GDP meet the following commitments:

- All buildings must achieve a minimum of LEED Silver Certification
- Solar power generation must be provided at a rate of 1 watt per building square foot, with a minimum of 2.54 MW campus-wide.
- The project must obtain Fitwel Campus Certification.

The applicant has indicated that the proposed buildings will meet LEED Silver requirements and that the solar commitments will be satisfied, with final confirmation occurring during the building permit review process. These commitments are noted on the PUD cover sheet. Components of Fitwel Campus Certification are incorporated into this PUD, including solar power, LEED Silver design, electric vehicle charging infrastructure, bicycle facilities, low-water landscaping, pedestrian networks, and other site and building features that support occupant health and well-being. A Fitwel scorecard will be submitted to document compliance with the campus-wide certification requirements.

As part of the 2024 subdivision application, a Transportation Demand Management (TDM) Plan was adopted for the entire Redtail Ridge development area. Under this plan, each PUD must demonstrate how the proposed development meets the applicable minimum TDM commitments and how it will achieve the relevant TDM goals. The City and property owner may also agree to alternative methods based on best available technology and industry best practices, provided the original intent and commitments of the TDM are maintained. A memorandum was provided as part of this application indicating how the proposed development satisfies these minimum standards (Attachment E).

ANALYSIS:
Development of the site is regulated by the ConocoPhillips Campus GDP, 1st Amendment. The applicant has submitted a concurrent application to amend the GDP (ConocoPhillips Campus GDP, 2nd Amendment) to allow the Industrial Development

Design Standards and Guidelines (IDDSG) to apply in place of the currently applicable Commercial Development Design Standards and Guidelines (CDDSG). In addition to applying the IDDSG, the proposed GDP Amendment would establish enhanced building design standards requiring all future development within the affected areas of the ConocoPhillips Campus GDP, 2nd Amendment to incorporate architectural elements that exceed baseline industrial design expectations.

Because the PUD and GDP Amendment are being processed concurrently, and at the applicant's request, staff has reviewed this project under the IDDSG and the enhanced design standards proposed in the GDP Amendment. Staff's analysis and recommendations are therefore based on the assumption that the GDP Amendment will be approved as proposed.

ConocoPhillips Campus General Development Plan

The ConocoPhillips Campus GDP establishes use restrictions, key bulk standards, such as setbacks and height, parking requirements, and a sitewide floor area ratio (FAR) limitation, which regulates the total buildable floor area relative to the size of the property.

The GDP currently establishes a maximum FAR of 0.15 for all development areas subject to the plan, with the exception of the AdventHealth hospital parcel on Lot 1, Block 2 of the Redtail Ridge Filing No. 1 Subdivision Plat, which received an additional 364,400 square feet of gross floor area through a recent density swap. Based on the total GDP area of approximately 389.1 acres (16.9 million square feet), the maximum allowable gross floor area across the ConocoPhillips Campus is approximately 2.5 million square feet. With 236,993 square feet proposed as part of this PUD application, the development remains well within the overall FAR limitation imposed by the GDP. Accounting for the AdventHealth hospital project currently under review on Lot 1, Block 2 of Redtail Ridge Filing No. 1, including the additional floor area allocated to that parcel, the remaining available gross floor area within the ConocoPhillips Campus GDP area is approximately 1.8 million square feet, providing substantial capacity for future development under the GDP.

The GDP also establishes applicable use restrictions. It permits facilities for the research, development, manufacturing, fabrication, processing, or assembly of scientific or technical products, and allows associated warehouse and storage uses. The applicant has indicated that the proposed development will operate as a light industrial facility focused on manufacturing and warehousing in support of that use.

Setbacks, height limits, and parking requirements are also established by the GDP. The proposed development meets all applicable setback standards for both buildings and parking areas. While current height limits reference the CDDSG, the applicant is seeking application of the IDDSG through the concurrent GDP Amendment. Under the IDDSG, the maximum permitted building height is 40 feet. The proposed building heights, 38 feet, 6 inches for Building A and 39 feet, 6 inches for Building B, conform to this standard and remain below the maximum allowed height. Parking shall be provided

at a rate of 1.25 spaces per 1,000 square feet of manufacturing space. At 236,993 square feet proposed, 296 parking spaces are required. The applicant is exceeding the total number of spaces 555 parking spaces proposed. There is no maximum parking restriction.

Enhanced Design Standards

The proposed development meets the intent of the enhanced design standards under consideration with the concurrent GDP Amendment application. Street-facing elevations incorporate a substantial amount of glazing at the pedestrian level, with window placement and transparency patterns consistent with the guideline to provide visual interest and improved street activation. Upper-level transparency is also included where appropriate to break up building mass and mimic a multi-story building.

Primary building entrances are prominently located and designed to be clearly visible from the public right-of-way. The building façades incorporate well-defined entry features that provide articulation through projected elements and the use of canopies and glazing that matches the height of the building.

The façades include variation in textures and colors consistent with the goal of the enhanced standards. Multiple materials are incorporated along the street-facing elevations, including accent elements placed strategically at entries and corners. These treatments collectively contribute to a more nuanced and visually engaging building design that aligns with the enhanced design objectives.

IDDSG Analysis

IDDSG: 1. Site Planning

This application complies with all applicable site development standards, including site orientation, coverage, and overall layout. The project exceeds the minimum landscape coverage requirement, providing 38 percent of the site in landscaped area. Loading docks and service areas are positioned internal to the site on the non-street-facing sides of the buildings, ensuring these functions are screened from public view. Trash enclosures are similarly located behind screening walls and are not visible from adjacent streets or pedestrian areas. The proposal also meets the grading and drainage standards contained in the IDDSG, with site improvements designed to ensure proper stormwater management and compatibility with surrounding development.

IDDSG: 2. Vehicular Circulation and Parking

Access to the site is provided through three separate driveways from a private street that will be constructed along the north side of the development. Two of these access points serve the individual parking areas for each building, while a centrally located access point provides direct entry to the shared loading and service areas situated between the buildings. The internal circulation system is designed to be robust, accommodating fire apparatus and other service vehicles throughout the site. The parking layout meets all applicable industrial design requirements and incorporates additional pedestrian connections to improve movement between parking areas, building entrances, and on-site walkways.

IDDSG: 3. Pedestrian and Bicycle Circulation
The applicant has incorporated internal pedestrian paths with a minimum unobstructed width of 5 feet, providing direct connections to the trail system to the west and to the broader Redtail Ridge sidewalk network, which will ultimately tie into the larger trail system at full buildout. Bicycle parking is provided at the primary entrances of both buildings, and the associated plaza spaces are integrated into the overall pedestrian network to support safe and convenient multimodal access throughout the site.

IDDSG: 4. Architectural Design
The building layouts include primary, storefront-style entries with enhanced features conforming to the proposed enhanced design guidelines. Service entries and loading areas are internal the site, as is mechanical equipment associated with the buildings.

IDDSG: 5. Landscape Design
The proposed landscape plan meets applicable landscape standards by providing more than 3,000 low-water shrubs, grasses, and perennials throughout the site, along with 317 trees distributed within parking areas, internal landscape zones, and around building perimeters. Right-of-way landscaping for Rockcress Road and the private street was previously reviewed and approved with the 2024 final plat civil construction documents, through which the applicant agreed to install an additional 40 trees and more than 300 shrubs and grasses along the site perimeter as a condition of final construction acceptance. Remaining landscape areas will be seeded with a native shortgrass prairie mix and low-water buffalo grass, ensuring consistency with water-efficient design requirements and the surrounding natural landscape.

IDDSG: 6. Fences and Walls
The application includes a retaining wall system associated with existing grading on the southeast side of the site. The walls are terraced to reduce the height of each individual segment and will be constructed of decorative block. Due to the overall length of the retaining system, additional design treatments are incorporated, including vertical breaks and staggered wall heights to provide visual interest and reduce the appearance of mass. The retaining walls, as proposed, meet the applicable IDDSG design standards.

IDDSG: 8. Exterior Site Lighting
The application includes wall-mounted LED fixtures and freestanding light poles throughout the site. All lighting is full cut-off and shielded, with warm color temperatures of 3000K, and is consistent with the IDDSG lighting standards as well as prior commitments made by the applicant, including requirements associated with FitWel Campus Certification.

Compliance with 17.28.120
Section 17.28.120 of the Louisville Municipal Code lists 28 criteria for PUDs that must be satisfied or found not applicable in order to approve a PUD. Analysis and staff's recommended finding of each criterion is provided in the attached appendix.

Subdivision Improvement Agreement Commitments

The 2024 Subdivision Improvement Agreement (SIA) established three campus-wide development requirements: (1) achievement of LEED Silver Certification for all buildings, (2) provision of solar power generation equal to 1 watt per building square foot with a minimum of 2.54 MW campus-wide, and (3) attainment of Fitwel Campus Certification. The proposed PUD satisfies these requirements. The applicant has confirmed that all buildings are designed to meet or exceed LEED Silver standards, and the solar generation commitment will be fulfilled, with detailed verification occurring at the time of building permit review. These commitments are documented on the PUD cover sheet. Additionally, the PUD incorporates the key elements necessary to support Fitwel Campus Certification, including on-site solar power generation, LEED-aligned building features, electric vehicle charging infrastructure, bicycle accommodations, low-water landscaping, and an interconnected pedestrian network. A Fitwel scorecard will be provided with permit applications to demonstrate compliance with the campus-wide certification framework.

A traffic conformance review was completed for this application to confirm consistency with the Master Transportation Study (MTS) and the adopted Transportation Demand Management (TDM) Plan. The analysis finds that the proposed industrial uses are consistent with the MTS Phase 1 assumptions and that the modest increase in square footage results in only a slight increase in peak-hour trips, well within the roadway capacity analyzed in the MTS. Importantly, several key TDM strategies identified in the master plan will be implemented as part of this application. These include construction of pedestrian connections linking the buildings to surrounding streets, internal parks, and multimodal facilities, improved access to shuttle stops, and supporting infrastructure for bicycle commuters, such as paths and connections to showers and changing facilities. These improvements are intended to reduce single-occupant vehicle trips and support non-auto travel, consistent with the TDM goals for the Redtail Ridge development. The memo concludes that the planned roadway network can accommodate projected traffic volumes and that this application effectively advances the TDM commitments established for the overall campus.

Staff finds that all Planned Unit Development criteria have been satisfied, including the requirements of the ConocoPhillips Campus General Development Plan and its amendments, as well as the amendment under concurrent consideration. Furthermore, the application complies with all applicable standards of the Louisville Municipal Code and the Industrial Development Design Standards and Guidelines.

PUBLIC COMMENTS:

No public comments have been received as of the date of this report.

STAFF RECOMMENDATION:
Approval of Resolution No. 21, Series 2025, recommending to the City Council approval of the Redtail Ridge Planned Unit Development No. 1 South to allow 236,993 SF industrial buildings and associated site development with the following condition:

- The applicant shall resolve all outstanding technical and administrative comments related to the PUD documents, the associated Development Agreement, the Transportation Demand Management (TDM) memorandum, the Utility Conformance Report, and drainage conformance report. Final revisions addressing these items shall be completed to the satisfaction of the City prior to a City Council hearing for final consideration (Attachment G).

ATTACHMENTS:

A. Resolution No. 21, Series 2025
B. Application Materials
C. Redtail Ridge Planned Unit Development, No. 1 South
D. Drainage Report
E. Transportation Demand Management Memorandum
F. ConocoPhillips Campus General Development Plan, 1st Amendment
G. Conditional Materials

APPENDIX: PUD Criteria Analysis – Redtail Ridge PUD #1 South

Criteria 17.28.120 (A)	Finding	Narrative
1. An appropriate relationship to the surrounding area.	Compliant	The use is appropriate for the area and permitted in the ConocoPhillips Campus GDP. Robust open space and landscaping is proposed, providing a appropriate relationship to the surrounding area.
2. Circulation in terms of the internal street circulation system, designed for the type of traffic generated, safety, separation from living areas, convenience, access, and noise and exhaust control. Proper circulation in parking areas in terms of safety, convenience, separation and screening.	Compliant	The application provides for adequate and safe internal circulation.
3. Consideration and provision for low and moderate-income housing	Not applicable	Zoned PCZD-C; residential uses are not allowed.
4. Functional open space in terms of optimum preservation of natural features, including trees and drainage areas, recreation, views, density relief and convenience of function	Compliant	The PUD complies with landscape requirements in Chapter 5 of the IDDSG, and includes a large number of native grasses, including over 300 hundred new trees.
5. Variety in terms of housing types, densities, facilities and open space	Not applicable	Zoned PCZD-C; residential uses are not allowed.
6. Privacy in terms of the needs of individuals, families and neighbors	Compliant	The PUD complies with site planning provisions in the IDDSG and the GDP, assuring appropriate privacy of neighboring properties.
7. Pedestrian and bicycle traffic in terms of safety, separation, convenience, access points of destination and attractiveness	Compliant	The PUD complies with pedestrian and bicycle requirements in the IDDSG, ensuring adequate pedestrian and bicycle access.

8. Building types in terms of appropriateness to density, site relationship and bulk	Compliant	The PUD complies with site planning and building height requirements in the GDP, ensuring an appropriate bulk for buildings and relationship to other developments in the area.
9. Building design in terms of orientation, spacing, materials, color, texture, storage, signs and lighting	Compliant	The PUD complies with the architectural design and site planning requirements in the IDDSG and the GDP. The enhanced design incorporates adequate articulation, building materials, and site configuration.
10. Landscaping of total site in terms of purpose, such as screening, ornamental types used, and materials used, if any; and maintenance, suitability and effect on the neighborhood	Compliant	The PUD complies with landscape requirements in Chapter 5 of the IDDSG. Over 3,000 shrubs, native grass seed, and over 300 trees are proposed.
11. Compliance with all applicable development design standards and guidelines and all applicable regulations pertaining to matters of state interest, as specified in chapter 17.32	Compliant	The PUD complies with all applicable development design standards and guidelines.
12. None of the standards for annexation specified in chapter 16.32 have been violated	Not applicable	No annexation.
13. Services including utilities, fire and police protection, and other such services are available or can be made available to adequately serve the development specified in the final development plan	Compliant	The Public Works Department and Louisville Fire District reviewed the PUD and it meets their requirements. Other key utility providers are available to serve the development.

Criteria 17.28.120 (B)	Finding	Narrative
1. Development shall be in accordance with the adopted elements of the comprehensive development plan of the city, and in accordance with any adopted development design standards and guidelines.	Compliant	The PUD complies with the adopted elements of the comprehensive plan, and the adopted development design standards and guidelines.
2. No structures in a planned unit development shall encroach upon the floodplain. Existing bodies of	Compliant	The property is neither located in a floodplain nor are there any bodies of water in the area.

water and existing stream courses shall not be channelized or altered in a planned unit development plan.		
3. No occupied structure shall be located on ground showing severe subsidence potential without adequate design and study approved specifically by the city.	Compliant	There is no known subsidence on the property.
4. The proposal should utilize and preserve existing vegetation, land forms, waterways, and historical or archeological sites in the best manner possible. Steep slopes and important natural drainage systems shall not be disrupted. How the proposal meets this provision, including an inventory of how existing vegetation is included in the proposal, shall be set forth on the landscape plan submitted to the city.	Compliant	The PUD is appropriate for the context of the existing conditions of the property.
5. Visual relief and variety of visual sitings shall be located within a development in the overall site plan. Such relief shall be accomplished by building placements, shortened or interrupted street vistas, visual access to open space and other methods of design.	Compliant	The PUD complies with site planning requirements in the IDDSG and the GSP, ensuring proper building placement, vistas, and access to open space.
6. Open space within the project shall be located in such a manner as to facilitate pedestrian use and to create an area that is usable and accessible to residents of surrounding developments.	Compliant	The PUD complies with requirements in the IDDSG and GDP.
7. Street design should minimize through traffic passing residential units. Suggested standards with respect to paving widths, housing setbacks and landscaping are set forth in public works standards of the city and applicable development design standards and guidelines. The system of	Compliant	The PUD complies with requirements in the IDDSG and GDP, ensuring properly designed landscaping adjacent to public streets.

streets, including parking lots, shall aid the order and aesthetic quality of the development.		
8. There shall exist an internal pedestrian circulation system separate from the vehicular system such that allows access to adjacent parcels as well as to parks, open space or recreation facilities within the development. Pedestrian links to trail systems of the city shall be provided.	Compliant	The PUD complies with bicycle and pedestrian requirements in the IDDSG, ensuring adequate pedestrian and bicycle access.
9. The project and development should attempt to incorporate features which reduce the demand for water usage.	Compliant	The PUD proposes water use consistent with expectations for Redtail Ridge. Low-water plantings and native grass seeds are proposed throughout the site.
10. Landscape plans shall attempt to reduce heating and cooling demands of buildings through the selection and placement of landscape materials, paving, vegetation, earth forms, walls, fences, or other materials.	Compliant, with condition	The PUD complies with landscape requirements in the IDDSG.
11. Proposed developments shall be buffered from collector and arterial streets. Such buffering may be accomplished by earthen berms, landscaping, leafing patterns, and other materials. Entrance islands defining traffic patterns along with landscaping shall be incorporated into entrances to developments.	Compliant	The PUD complies with the requirements of the IDDSG and the GDP and includes adequate landscaping and buffering from adjacent streets and properties of the same or similar uses.
12. There shall be encouraged the siting of lot arrangement, building orientation and roof orientation in developments so as to obtain the maximum use of solar energy for heating.	Compliant	The PUD has committed to achieving the solar requirements as outlined in the associated Subdivision Improvement Agreement.
13. The overall PUD shall provide a variety of housing types.	Not applicable	Zoned PCZD-C; residential uses are not allowed.
14. Neighborhoods within a PUD shall provide a range of housing size.	Not applicable	Zoned PCZD-C; residential uses are not allowed.

15. Architectural design of buildings shall be compatible in design with the contours of the site, compatible with surrounding designs and neighborhoods, shall promote harmonious transitions and scale in character in areas of different planned uses, and shall contribute to a mix of styles within the city.	Compliant	The PUD proposes architecture that is compatible in design with the contours of the site, with surrounding buildings, and neighborhoods.

RESOLUTION NO. 21
SERIES 2025

A RESOLUTION RECOMMENDING APPROVAL WITH CONDITIONS OF THE REDTAIL RIDGE PLANNED UNIT DEVELOPMENT NO. 1 SOUTH TO ALLOW 236,993 SF OF INDUSTRIAL DEVELOPMENT AND ASSOCIATED SITE IMPROVEMENTS ON LOT 1, BLOCK 1 OF REDTAIL RIDGE, FILING NO. 1

WHEREAS, there has been submitted to the Louisville Planning Commission an application for a planned unit development to allow two industrial buildings totaling 236,933 square feet of industrial development and associated site improvements on Lot 1, Block 1 of Redtail Ridge Filing No. 1.

WHEREAS, City staff has reviewed the information submitted and found that, with conditions, the application complies with the ConocoPhillips Campus General Development Plan and its amendments, and applicable sections of the Louisville Municipal Code; and

WHEREAS, the Planning Commission has considered the application at a duly noticed public hearing on December 11, 2025, where evidence and testimony were entered into the record, including the findings in the Louisville Planning Commission Staff Report dated December 11, 2025.

NOW THEREFORE, BE IT RESOLVED that the Planning Commission of the City of Louisville, Colorado does hereby recommend approval with conditions of a planned unit development to allow development of two industrial buildings totaling 236,933 square feet of industrial development and associated site improvements on Lot 1, Block 1 of Redtail Ridge Filing No. 1.

PASSED AND ADOPTED this 11th day of December, 2025

By: _____
Steve Brauneis, Chair
Planning Commission

Attest: _____
Cullen Choi, Secretary
Planning Commission

City of Louisville
COLORADO • SINCE 1878

Community Development

749 Main Street • Louisville CO 80027 • 303.335.4592 • www.louisvilleco.gov

ELECTRONIC LAND USE HEARING REQUEST CASE NO. _____

APPLICANT INFORMATION

Firm: Sterling Bay

Contact: Evan Pesonen

Address: [redacted]

Mailing Address: (see above)

Telephone: [redacted]

Fax: _____

Email: [redacted]

OWNER INFORMATION

Firm: Sterling Bay

Contact: Evan Pesonen

Address: [redacted]

Mailing Address: (see above)

Telephone: [redacted]

Fax: _____

Email: [redacted]

REPRESENTATIVE INFORMATION

Firm: Harris Kocher Smith

Contact: Jarrett Grant

Address: [redacted]

Mailing Address: (see above)

Telephone: [redacted]

Fax: _____

Email: [redacted]

PROPERTY INFORMATION

Common Address: N/A

Legal Description: Lot 1 Blk 1

Subdivision Redtail Ridge Filing No. 1

Area: _____ Sq. Ft.

TYPE (S) OF APPLICATION

- ☐ Annexation
- ☐ Zoning
- ☐ Preliminary Subdivision Plat
- ☐ Final Subdivision Plat
- ☐ Minor Subdivision Plat
- ☐ Preliminary Planned Unit Development (PUD)
- ■ Final PUD
- ☐ Amended PUD
- ☐ Administrative PUD Amendment
- ☐ Special Review Use (SRU)
- ☐ SRU Amendment
- ☐ SRU Administrative Review
- ☐ Temporary Use Permit: _____
- ☐ CMRS Facility: _____
- ☐ Other: (easement / right-of-way; floodplain; variance; vested right; 1041 permit; oil / gas production permit)

I hereby request the public hearing(s) on this application be scheduled to be conducted by Electronic Participation in accordance with the attached Resolution No. 30, Series 2020, as adopted by the City Council on April 7, 2020, and in accordance with Resolution No. 38, Series 2020, as adopted by City Council on June 2, 2020 if such hearing(s) can be scheduled during a time period when in-person meetings are not being held due to a health epidemic or pandemic. I acknowledge that holding a quasi-judicial hearing by Electronic Participation may present certain legal risks and involves an area of legal uncertainty, and that having this application heard at a meeting held by Electronic Participation is optional and undertaken at my own risk. I also understand that in-person meetings are preferred for quasi-judicial hearings, and that even if electronic hearing(s) are scheduled, this application will be heard at an in-person meeting if in person meetings have resumed by the scheduled hearing date(s). I further agree to defend and indemnify the City of Louisville in any action that may arise out of, or in connection with, conducting the hearing by Electronic Participation.

SIGNATURES & DATE

Applicant: _____

Print: _____

Owner: _____

Print: _____

Representative: _____

Print: _____

CITY STAFF USE ONLY

- ☐ Electronic Hearing Approved: _____
- ☐ Date(s) of Hearing(s): _____

WARE MALCOMB

ARCHITECTURE
PLANNING
INTERIORS

CIVIL ENGINEERING
BRANDING
BUILDING MEASUREMENT

March 14, 2025

Attention: Rob Zuccaro
Director of Planning and Building Safety
City of Louisville
749 Main Street
Louisville, Colorado 880027

Re: Redtail Ridge PUD-1 South – Project Narrative

Dear Mr. Zuccaro,

Sterling Bay (Developer/Applicant) is proposing to develop PUD-1 South of the greater Redtail Ridge Property into two Class A Industrial/ Warehouse Buildings. This PUD is proposed to include Industrial Building A at approximately 95,377sf and Industrial Building B at approximately 143,705 sf.

Both Buildings will have a clear height of 28' from finish floor to bottom of structure and be constructed using tilt up concrete with punched openings for aluminum storefront windows, and steel framed accent framing identifying future tenant entries. The colors and finishes are designed to work cohesively with other buildings in the Redtail Ridge Development. Variations and articulation in the form and finish of the concrete wall panels is provided with a variety of colors and finishes including clear coat raw concrete and corrugated concrete form liner. Large expanses of glass and varied materials set these buildings apart from similar developments in the surrounding area. The purpose and use of the buildings is to support storage, office and manufacturing needs for national and regional users. This PUD will also include pedestrian connections and outdoor amenity patios for future tenant use. We are also referencing this PUD as PUD-1 South in our master plan.

It is proposed to comply with the Redtail Ridge Subdivision Improvements and Development Agreement (SIA).

SIA Exhibit H - Sustainability

We request that the sustainability reports be provided at building permit submission and not part of the PUD submission, the current design is only at a schematic level and MEP systems are still in design, so it is too early to be providing a full sustainability report, as we are currently designed at a cold shell and core level.

We appreciate your time and effort in reviewing our PUD package and we look forward to discussing the project with you further.

Sincerely,

Isaac Sawatzky
Project Manager, Ware Malcomb

REDTAIL RIDGE FILING NO. 1

PLANNED UNIT DEVELOPMENT

LOT 1 BLOCK 1

SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29, TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN

CASE #: PUD-00547-2025

BASIS OF BEARINGS:

BEARINGS ARE PLATTED BEARINGS BASED ON THE WEST LINE OF THE NORTHEAST QUARTER OF SECTION 29, TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE 6TH PRINCIPAL MERIDIAN AS BEARING SOUTH 00°08'41" EAST PER REDTAIL RIDGE FILING NO. 1, SAID LINE BEING MONUMENTED AT THE NORTH QUARTER CORNER OF SAID SECTION BY A #6 REBAR WITH A 3.25" BRASS CAP STAMPED "1998 PLS 16401", AND BEING MONUMENTED AT THE CENTER QUARTER CORNER BY A #6 REBAR WITH A 2.5" ALUMINUM CAP STAMPED "DB&CO 2000 PLS 23529".

BENCHMARK:

THE SITE VERTICAL BENCHMARK IS GPS CONTROL POINT FC-1 OF THE CITY AND COUNTY OF BROOMFIELD. FC-1 IS LOCATED AT THE SOUTHWEST END OF THE STORAGE TEK DRIVE BRIDGE, 64.3' NORTH OF THE US 36 EXIT RAMP. THE 3" ROUND CAP DESCRIBED IN THE CITY AND COUNTY OF BROOMFIELD SURVEY SHEET WAS MISSING AT THE TIME OF THIS SURVEY, BUT A MAG NAIL WAS FOUND IN ITS PLACE IN A COUNTERSINK HOLE IN THE SIDEWALK. THE NAIL WAS USED IN PLACE OF THE ORIGINAL MONUMENT, AND ASSIGNED AN ELEVATION OF 5392.57, NAVD 88.

LEGAL DESCRIPTION:

A PARCEL OF LAND BEING ALL OF LOTS 1 AND 2, BLOCK 1, REDTAIL RIDGE FILING NO. 1, SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29, TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN, CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTH QUARTER CORNER OF SAID SECTION 29;

THENCE NORTH 68°17'36" WEST, A DISTANCE OF 258.22 FEET TO THE WEST CORNER OF SAID LOT 1 AND THE POINT OF BEGINNING;

THENCE ALONG THE PERIMETER OF SAID LOTS 1 AND 2 THE FOLLOWING FIFTEEN (15) COURSES:

1) NORTH 45°51'00" EAST, A DISTANCE OF 99.89 FEET TO A POINT OF NON-TANGENT CURVATURE;
2) ALONG THE ARC OF SAID CURVE TO THE RIGHT AN ARC LENGTH OF 112.57 FEET, SAID CURVE HAVING A RADIUS OF 150.00 FEET, A CENTRAL ANGLE OF 43°00'00", AND A CHORD WHICH BEARS NORTH 68°30'00" EAST A CHORD DISTANCE OF 109.95 FEET;
3) NORTH 00°00'00" EAST, A DISTANCE OF 774.30 FEET;
4) NORTH 31°01'09" EAST, A DISTANCE OF 160.32 FEET TO A POINT OF NON-TANGENT CURVATURE;
5) ALONG THE ARC OF SAID CURVE TO THE LEFT AN ARC LENGTH OF 81.21 FEET, SAID CURVE HAVING A RADIUS OF 150.00 FEET, A CENTRAL ANGLE OF 31°01'09", AND A CHORD WHICH BEARS SOUTH 74°29'25" EAST A CHORD DISTANCE OF 80.22 FEET;
6) NORTH 90°00'00" EAST, A DISTANCE OF 1,399.99 FEET;
7) SOUTH 00°00'00" EAST, A DISTANCE OF 1,693.86 FEET TO A POINT OF CURVATURE;
8) ALONG THE ARC OF SAID CURVE TO THE RIGHT AN ARC LENGTH OF 40.02 FEET, SAID CURVE HAVING A RADIUS OF 43.50 FEET, A CENTRAL ANGLE OF 52°42'39", AND A CHORD WHICH BEARS SOUTH 26°21'19" WEST A CHORD DISTANCE OF 38.62 FEET TO A POINT OF REVERSE CURVATURE;
9) ALONG THE ARC OF SAID CURVE TO THE LEFT AN ARC LENGTH OF 15.24 FEET, SAID CURVE HAVING A RADIUS OF 93.50 FEET, A CENTRAL ANGLE OF 09°20'23", AND A CHORD WHICH BEARS SOUTH 48°02'27" WEST A CHORD DISTANCE OF 15.22 FEET TO A POINT OF REVERSE CURVATURE;
10) ALONG THE ARC OF SAID CURVE TO THE RIGHT AN ARC LENGTH OF 65.18 FEET, SAID CURVE HAVING A RADIUS OF 83.50 FEET, A CENTRAL ANGLE OF 44°43'21", AND A CHORD WHICH BEARS SOUTH 65°43'56" WEST A CHORD DISTANCE OF 63.53 FEET;
11) SOUTH 88°15'36" WEST, A DISTANCE OF 91.79 FEET;
12) SOUTH 89°59'42" WEST, A DISTANCE OF 61.57 FEET TO A POINT OF CURVATURE;
13) ALONG THE ARC OF SAID CURVE TO THE LEFT AN ARC LENGTH OF 229.54 FEET, SAID CURVE HAVING A RADIUS OF 659.50 FEET, A CENTRAL ANGLE OF 19°56'31", AND A CHORD WHICH BEARS SOUTH 80°01'26" WEST A CHORD DISTANCE OF 228.38 FEET TO A POINT OF REVERSE CURVATURE;
14) ALONG THE ARC OF SAID CURVE TO THE RIGHT AN ARC LENGTH OF 678.11 FEET, SAID CURVE HAVING A RADIUS OF 590.50 FEET, A CENTRAL ANGLE OF 65°47'49", AND A CHORD WHICH BEARS NORTH 77°02'55" WEST A CHORD DISTANCE OF 641.46 FEET;
15) NORTH 44°09'00" WEST, A DISTANCE OF 924.72 FEET TO THE POINT OF BEGINNING.

SAID PARCEL CONTAINS 2,641,330 SQUARE FEET OR 60.64 ACRES, MORE OR LESS.

SITE DATA TABLE

GENERAL SITE INFORMATION		
	REQUIRED	PROPOSED
TOTAL SITE AREA		944,460 SF
SITE COVERAGE	70% MAX.	58.9%
BUILDING (INDUSTRIAL A)		94,335 SF
BUILDING (INDUSTRIAL B)		142,658 SF
TOTAL LANDSCAPE AREA	661,122 SF	555,802 SF
TOTAL LANDSCAPE COVERAGE	100% / SF	100% SF
LANDSCAPE AREA PH1		360,907 SF
LANDSCAPE COVERAGE PH1	30% MIN / SQFT	38.2%
HARDSCAPE AREA		29,067 SF
BUILDING INFORMATION		
BUILDING HEIGHT	42' MAX.	39'-6"
BUILDING SETBACKS		
NORTH	10' MIN.	35'-0"
WEST	40' MIN.	147'
EAST	10' MIN.	54'
SOUTH	40' MIN.	205'
PARKING SUMMARY		
INDUSTRIAL A		
	REQUIRED	PROPOSED
TOTAL SPACES (WAREHOUSE)	118*	191
ACCESSIBLE	6 MIN.	6
EV INSTALLED	2% (4)	14
EV READY	8% (15)	15
EV CAPABLE	10% (19)	19
EV CAPABLE (LIGHT)	10% (19)	19
BICYCLE	20 MIN.	20
INDUSTRIAL B		
	REQUIRED	PROPOSED
TOTAL SPACES	179*	262
ACCESSIBLE	7 MIN.	7
EV INSTALLED	2% (5)	20
EV READY	8% (21)	21
EV CAPABLE	10% (26)	26
EV CAPABLE (LIGHT)	10% (26)	26
BICYCLE	20 MIN.	20
PARKING SETBACK		
NORTH	15' MIN.	43.5'
WEST	15' MIN.	18.9
EAST	15' MIN.	65.9'
SOUTH	15' MIN.	26.5'

* 1.25 SPACES/1000 SF ARE REQUIRED FOR OFFICES AND RESEARCH PER CONOCO PHILLIPS GDP (CDDSG)

OWNERSHIP SIGNATURE BLOCK:

BY SIGNING THIS PUD, _____ ACKNOWLEDGES ALL THE REQUIREMENTS AND INTENT SET FORTH IN THIS PUD.

WITNESS MY / OUR HAND(S) SEAL(S) THIS _____ DAY OF _____, 20_____

_____
OWNER SIGNATURE

_____
NOTARY NAME

_____
NOTARY SIGNATURE

MY COMMISSION EXPIRES _____

CITY COUNCIL CERTIFICATE:

APPROVED THIS _____ DAY OF _____, 20_____

BY THE CITY OF LOUISVILLE, COLORADO

BY _____
MAYOR

BY _____
CITY CLERK

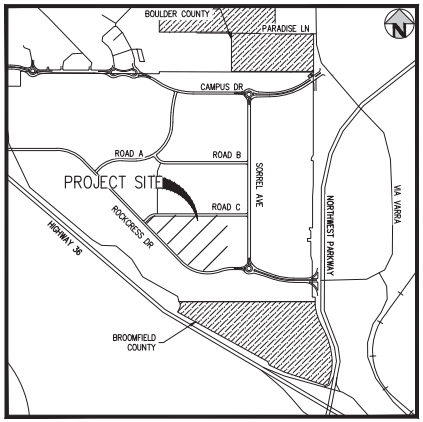
ORDINANCE FROM RESOLUTION NO. _____, SERIES _____

PLANNING COMMISSION CERTIFICATE:

APPROVED THIS _____ DAY OF _____, 20_____

BY THE PLANNING COMMISSION OF THE CITY OF LOUISVILLE, COLORADO

RESOLUTION NO. _____
SERIES 20_____



VICINITY MAP
SCALE: 1" = 800'

SHEET INDEX

Sheet Number	Sheet Title
1	COVER
2	OVERALL SITE PLAN
3	SITE PLAN
4	SITE PLAN
5	ARCHITECTURAL ELEVATIONS
6	ARCHITECTURAL ELEVATIONS
7	OVERALL GRADING PLAN
8	GRADING PLAN
9	GRADING PLAN
10	OVERALL UTILITY PLAN
11	UTILITY PLAN
12	UTILITY PLAN
13	OVERALL LANDSCAPE PLAN
14	MATERIAL AND PLANTING PLAN - A
15	MATERIAL AND PLANTING PLAN - B
16	MATERIAL AND PLANTING PLAN - C
17	MATERIAL AND PLANTING PLAN - D
18	MATERIAL AND PLANTING PLAN - E
19	MATERIAL AND PLANTING PLAN - F, G & H
20	SITE FURNISHING DETAILS
21	PLANTING DETAILS
22	PLANTING SCHEDULE
23	PHOTOMETRIC PLAN
24	PHOTOMETRIC DETAILS

PROJECT DESCRIPTION

THIS SITE INCLUDES THE CONSTRUCTION OF TWO INDUSTRIAL BUILDINGS, AND ASSOCIATED UTILITIES. THE BUILDINGS WILL HAVE A COMBINED SQUARE FOOTAGE OF 236,992 SF. OPEN SPACE IMPROVEMENTS, INCLUDING PEDESTRIAN AND BICYCLE NETWORK EXPANSION, WILL ALSO BE REVIEWED WITH THIS PUD. THIS PROJECT, AS PART OF THE GREATER REDTAIL RIDGE PROJECT, WILL BE SERVED BY PRIVATE ROADS CONSTRUCTED BY THE MASTER DEVELOPMENT. STORM, SANITARY, WATER, ELECTRICAL, AND GAS UTILITIES WILL BE CONSTRUCTED TO SUPPORT THE DEVELOPMENT OF THIS SITE AND WILL BE CONNECTING TO UTILITIES CONSTRUCTED BY THE MASTER DEVELOPMENT. THIS PROJECT IS ZONED PLANNED COMMUNITY COMMERCIAL. THE CITY OF LOUISVILLE COMMERCIAL DEVELOPMENT DESIGN STANDARDS AND GUIDELINES WAS USED IN THE DESIGN OF THIS PROJECT.

NOTES

1. THE CITY OF LOUISVILLE IS NOT RESPONSIBLE FOR DAMAGE TO, OR REPAIR OF, MONUMENT SIGNS, PAVEMENT SURFACES, OR LANDSCAPING CAUSED DURING REPAIR OR MAINTENANCE OF UTILITIES LOCATED WITHIN PUBLIC UTILITY EASEMENTS.
2. DEVELOPER WILL ACHIEVE CAMPUS FITWELL PURSUANT TO SIA INCORPORATED ELEMENTS WITHIN THIS PUD INCLUDE HEAT ISLAND MITIGATION, WALKING TRAILS, LIGHT POLLUTION MITIGATION, AND OTHERS IN EXHIBIT H OF THE SIA.
3. AT TENANT OCCUPANCY, DEVELOPER WILL SUBMIT COMPLIANCE DOCUMENTATION PRIOR TO ACCEPTANCE.
4. DEVELOPMENT WILL ACHIEVE 1 WATT PV / SF OF BUILDING PER SIA. FINAL DESIGN WILL BE DEFERRED APPROVAL TO THE CITY OF LOUISVILLE.

WAIVER REQUESTS

1. 4.2.C - BUILDING HEIGHTS
   - 1.1. STANDARD: THE MAXIMUM HEIGHT OF ALL COMMERCIAL BUILDINGS (AS MEASURED PURSUANT TO THE LOUISVILLE MUNICIPAL CODE) IS 35.0', AND 42.0' TO THE TOP OF THE ROOFTOP MECHANICAL SCREEN.
   - 1.2. PROPOSED: THE MAXIMUM HEIGHT OF BUILDING A IS 39'-0" AND THE MAXIMUM HEIGHT OF BUILDING B IS 40'-0". ROOF MOUNTED MECHANICAL SCREENS SHALL NOT EXCEED 50' ABOVE THE NATURAL GRADE.
2. LANDSCAPE WAIVER
   - 2.1. REQUIRED TREES AND SHRUBS HAVE BEEN PLACED WITHIN 50' OF THE PROPERTY LINE TO MAKE SURE THE PLANTING SERVE A MORE NATURAL BUFFER RATHER THAN A DENSE ROW. THIS APPROACH GIVES AN OPEN PRAIRIE CHARACTER TO THE SITE.

SUSTAINABILITY COMMITMENTS

1. DEVELOPMENT SHALL ACHIEVE LEED SILVER MINIMUM. LEED SCORECARD AND PROOF OF SUBMITTAL TO USGBC SHALL BE SUBMITTED TO CITY OF LOUISVILLE PRIOR TO CERTIFICATE OF OCCUPANCY.
2. DEVELOPMENT SHALL CONTRIBUTE MINIMUM 1 WATT PER SQUARE FOOT OF BUILDING AREA TOWARD A TOTAL OF 2.54 MW OF ON SITE SOLAR POWER GENERATION IN ACCORDANCE WITH SIA. FINAL SOLAR DESIGN SHALL BE DEFERRED SUBMITTAL TO CITY OF LOUISVILLE.
3. DEVELOPMENT SHALL CONTRIBUTE TOWARDS OVERALL CAMPUS FITWELL CERTIFICATION.

DEVELOPER
Sterling Bay
333 N. Green Street,
Chicago, IL 60607
P: 312.466.4100

ARCHITECT
Ware Malcomb
900 S. Broadway, Suite 320
Denver, CO 80209
P: 720.488.2626

LANDSCAPE ARCHITECT
Perkins&Will
475 Lincoln Street, Suite 100
Denver, CO 80203
P: 303.308.0200

CIVIL ENGINEER
Harris Kocher Smith
1290 Broadway, Suite 800
Denver, Colorado 80203
P: 303.623.6300 F: 303.623.6311
HarrisKocherSmith.com

ISSUE DATE: 03-14-2025	PROJECT #: 221236
DATE	REVISION COMMENTS
11-26-2025	PER CITY COMMENTS

PROJECT # 221236

COVER

REVISION DATE: 11-26-2025 ISSUE DATE: 03-14-2025 SHEET 1 OF 24

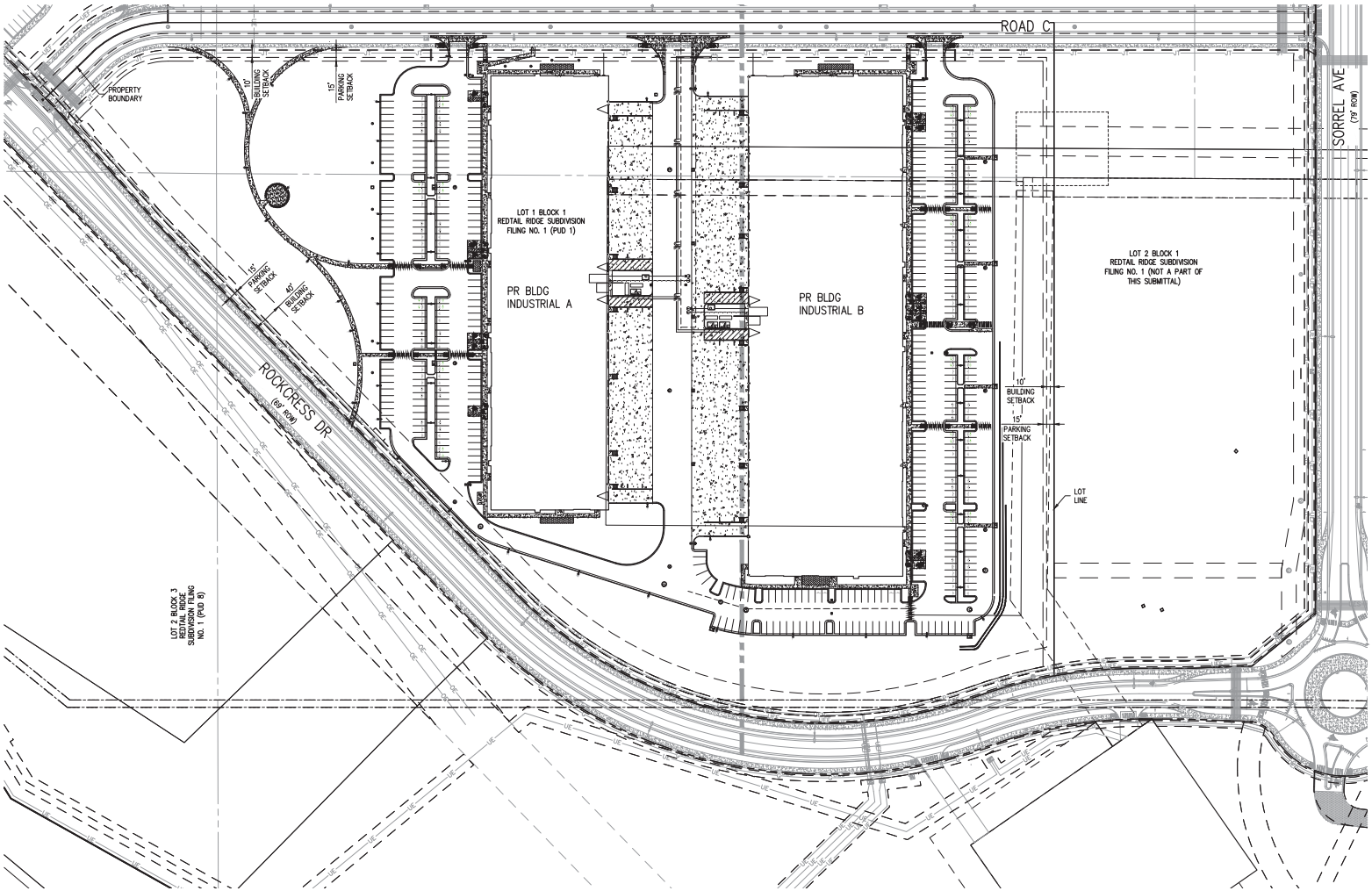
REDTAIL RIDGE PUD1 SOUTH

NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH

REDTAIL RIDGE FILING NO. 1

PLANNED UNIT DEVELOPMENT

LOT 1 BLOCK 1



LEGEND:

- PROPERTY BOUNDARY
- RIGHT-OF-WAY
- EXISTING STM SEWER W/MH AND INLET
- EXISTING SANITARY SEWER W/MH
- EXISTING WATER LINE W/ VALVE
- EXISTING GAS LINE
- EXISTING UNDERGROUND ELECTRIC
- EXISTING JOINT TRENCH
- EXISTING STREET LIGHT
- EXISTING TELEPHONE POLE
- EXISTING FIRE HYDRANT
- PROPOSED SANITARY SEWER W/MH
- PROPOSED SANITARY SERVICE W/CLEAN OUT
- PROPOSED STORM SEWER W/ MH AND INLET
- PROPOSED LANDSCAPE DRAIN W/ INLET
- PROPOSED FIRE HYDRANT
- PROPOSED 8" WATER MAIN W/ BENDS, VALVE, AND TEE
- PROPOSED WATER SERVICE W/METER
- PROPOSED FIRE SERVICE
- PROPOSED STREET LIGHT
- PROPOSED PEDESTRIAN LIGHT
- PROPOSED BUILDING ENTRANCE
- PROPOSED TRANSFORMER AND GENERATOR
- ABANDON EXISTING UTILITY LINE
- PROPOSED CONCRETE
- PROPOSED CONCRETE PAVERS
- PROPOSED PORCELAIN PAVERS
- PROPOSED CRUSHER FINES

ABBREVIATIONS

BLDG	BUILDING
C&G	CURB & GUTTER
CONC	CONCRETE
DS	DOWNSPOUT
DUE	DRY UTILITY EASEMENT
ELEC	ELECTRIC
ESMT	EASEMENT
EX	EXISTING
FF	FINISHED FLOOR
FH	FIRE HYDRANT
FL	FLOW LINE
GV	GATE VALVE
HT	HEIGHT
MH	MANHOLE
N	NORTH, NORTHING
PED	PEDESTRIAN
PL	PROPERTY LINE
PR	PROPOSED
ROW	RIGHT-OF-WAY
SME	SURFACE MAINTENANCE EASEMENT
SS	SANITARY SEWER
STM	STORM
TYP	TYPICAL
UG	UNDERGROUND
WAT	WATER

70 0 70 140

SCALE: 1" = 70'

PROJECT # 221256

OVERALL SITE PLAN

REVISION DATE: # ISSUE DATE: 03-14-2025 SHEET 2 OF 24

REDTAIL RIDGE PUD1 SOUTH

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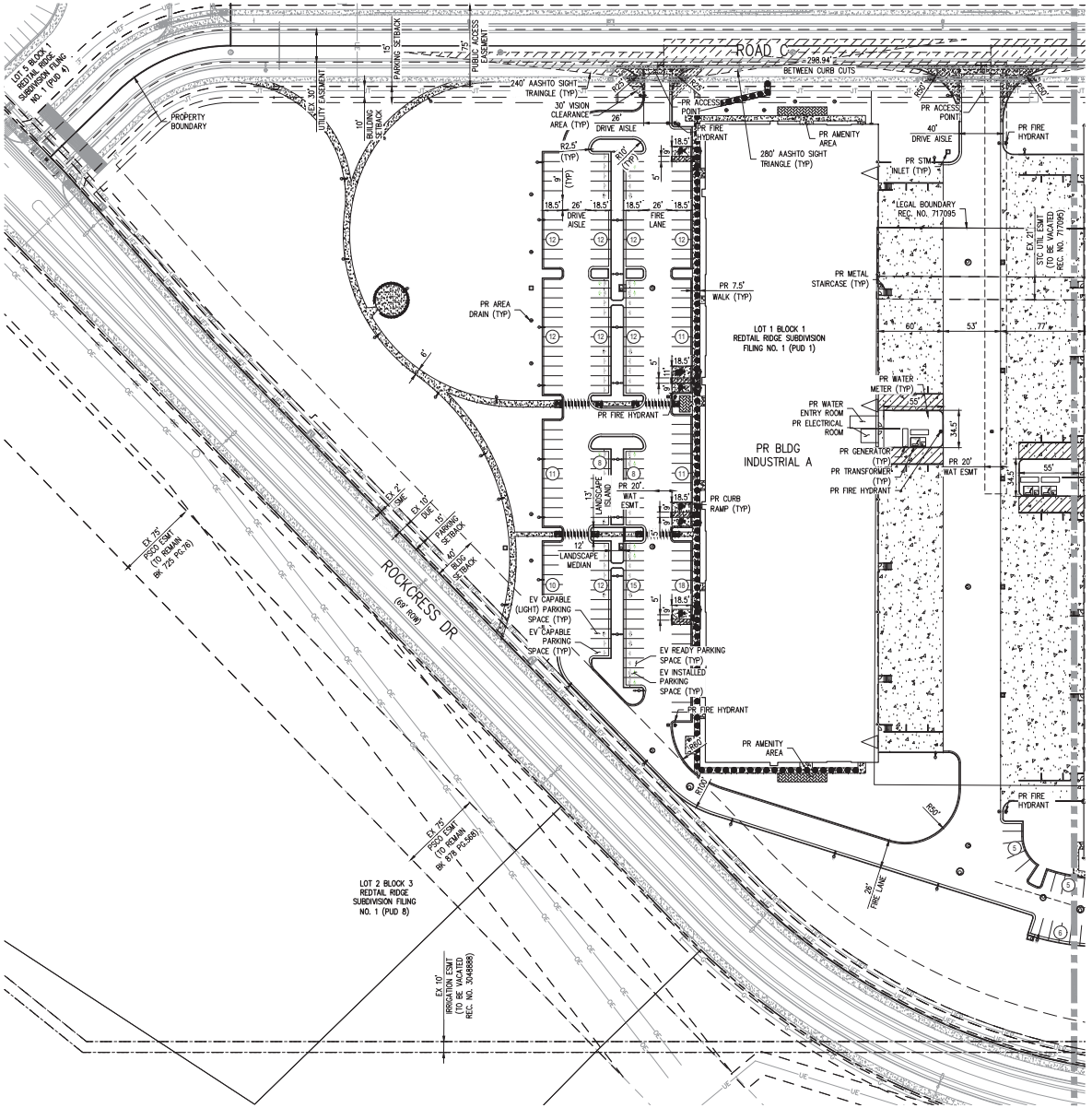
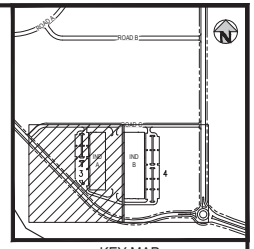
REDTAIL RIDGE FILING NO. 1

PLANNED UNIT DEVELOPMENT

LOT 1 BLOCK 1





KEY MAP

SCALE: 1" = 600'

LEGEND:

- PROPERTY BOUNDARY
- RIGHT-OF-WAY
- EXISTING STM SEWER W/MH AND INLET
- EXISTING SANITARY SEWER W/MH
- EXISTING WATER LINE W/ VALVE
- EXISTING GAS LINE
- EXISTING UNDERGROUND ELECTRIC
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- EXISTING STREET LIGHT
- EXISTING TELEPHONE POLE
- EXISTING FIRE HYDRANT
- PROPOSED SANITARY SEWER W/MH
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- PROPOSED PEDESTRIAN LIGHT
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- PROPOSED TRANSFORMER AND GENERATOR
- ABANDON EXISTING UTILITY LINE
- PROPOSED CONCRETE
- PROPOSED CONCRETE PAVERS
- PROPOSED PORCELAIN PAVERS
- PROPOSED CRUSHER FINES
- ACCESSIBLE ROUTE
- PARKING COUNT (12)

ABBREVIATIONS

BLDG	BUILDING
C&G	CURB & GUTTER
CONC	CONCRETE
DS	DOWNSPOUT
DUE	DRY UTILITY EASEMENT
ELEC	ELECTRIC
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FF	FINISHED FLOOR
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FL	FLOW LINE
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SME	SURFACE MAINTENANCE EASEMENT
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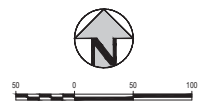

SCALE: 1" = 50'

PROJECT # 231256

REVISION DATE: #

ISSUE DATE: 03-14-2025

SHEET 3 OF 24

SITE PLAN

REDTAIL RIDGE PUD1 SOUTH

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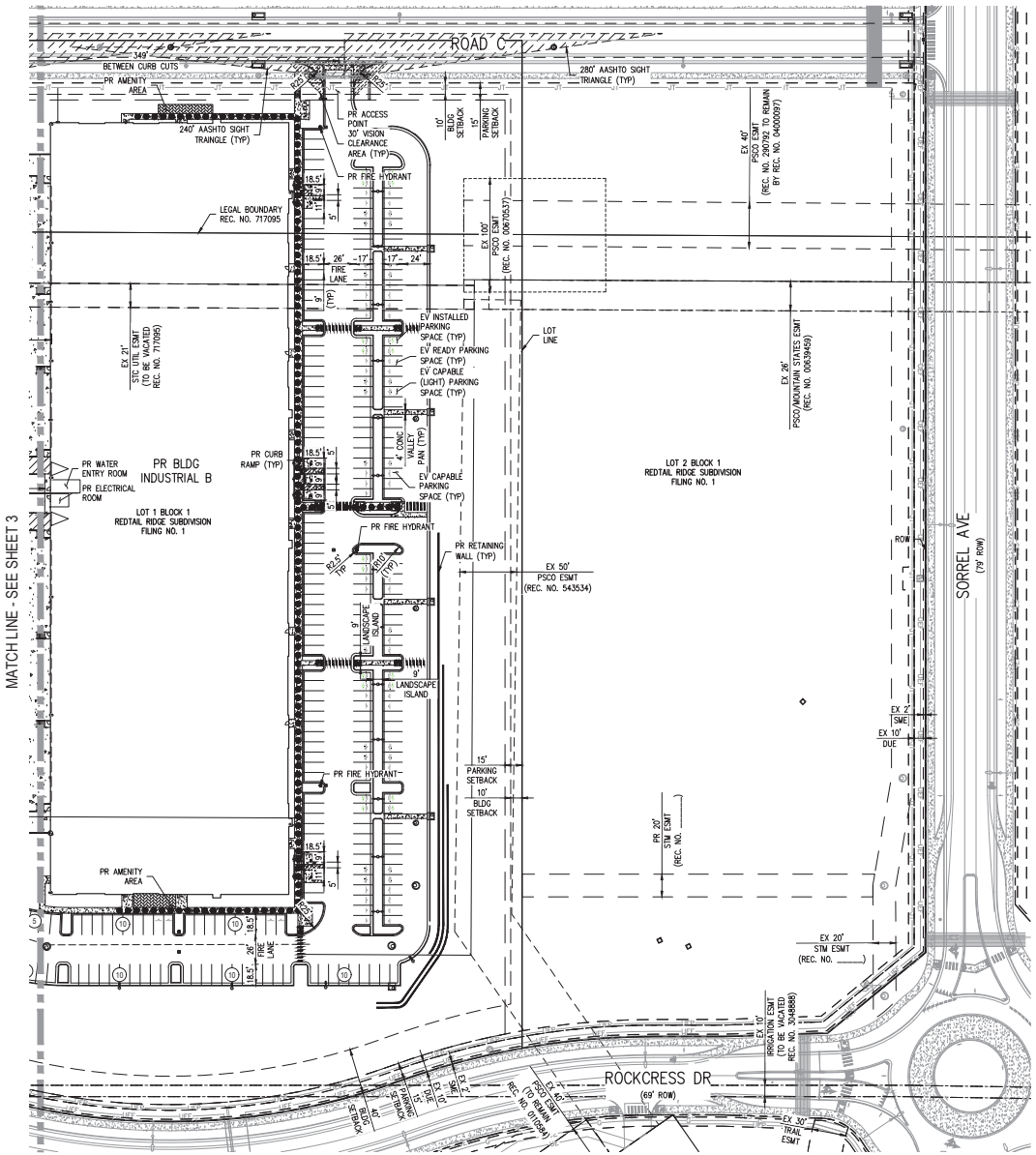
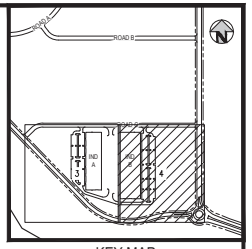
REDTAIL RIDGE FILING NO. 1

PLANNED UNIT DEVELOPMENT

LOT 1 BLOCK 1





KEY MAP

SCALE: 1" = 600'

LEGEND:

- PROPERTY BOUNDARY
- RIGHT-OF-WAY
- EXISTING STM SEWER W/MH AND INLET
- EXISTING SANITARY SEWER W/MH
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SS	SANITARY SEWER
STM	STORM
TYP	TYPICAL
UG	UNDERGROUND
WAT	WATER

50 0 50 100

SCALE: 1" = 50'

PROJECT # 231295

SITE PLAN

REVISION DATE: # ISSUE DATE: 03-14-2025 SHEET 4 OF 24

REDTAIL RIDGE PUD1 SOUTH

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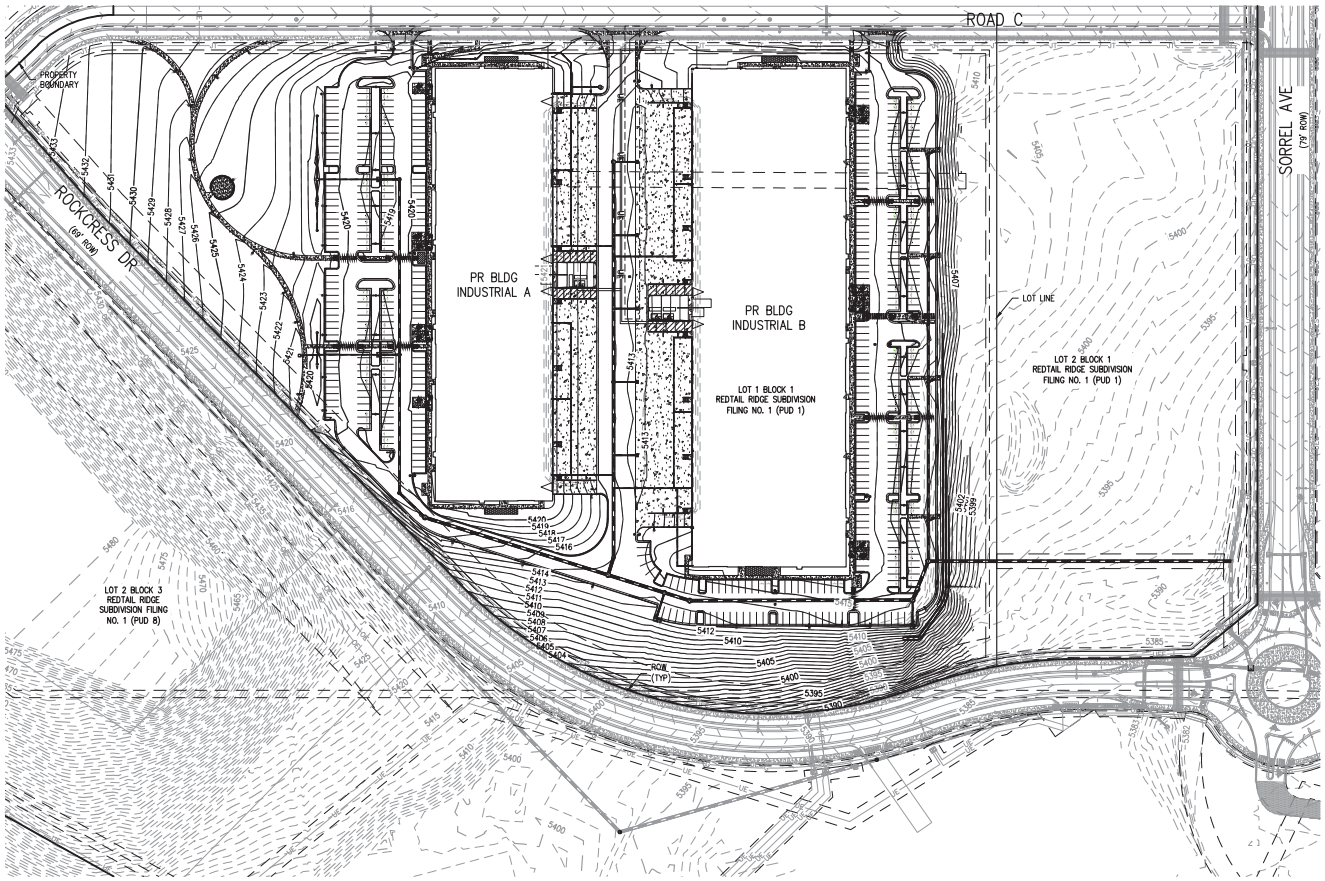
REDTAIL RIDGE FILING NO. 1

PLANNED UNIT DEVELOPMENT

LOT 1 BLOCK 1



LEGEND:

- PROPERTY BOUNDARY
- RIGHT-OF-WAY
- EXISTING STM SEWER W/MH AND INLET
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- EXISTING WATER LINE W/ VALVE
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- EXISTING JOINT TRENCH
- EXISTING STREET LIGHT
- EXISTING TELEPHONE POLE
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- PROPOSED SANITARY SEWER W/MH
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- PROPOSED STORM SEWER W/ MH AND INLET
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SS	SANITARY SEWER
STM	STORM
TYP	TYPICAL
UG	UNDERGROUND
WAT	WATER

N

80 0 80 160

SCALE: 1" = 80'

PROJECT # 221295

OVERALL GRADING PLAN

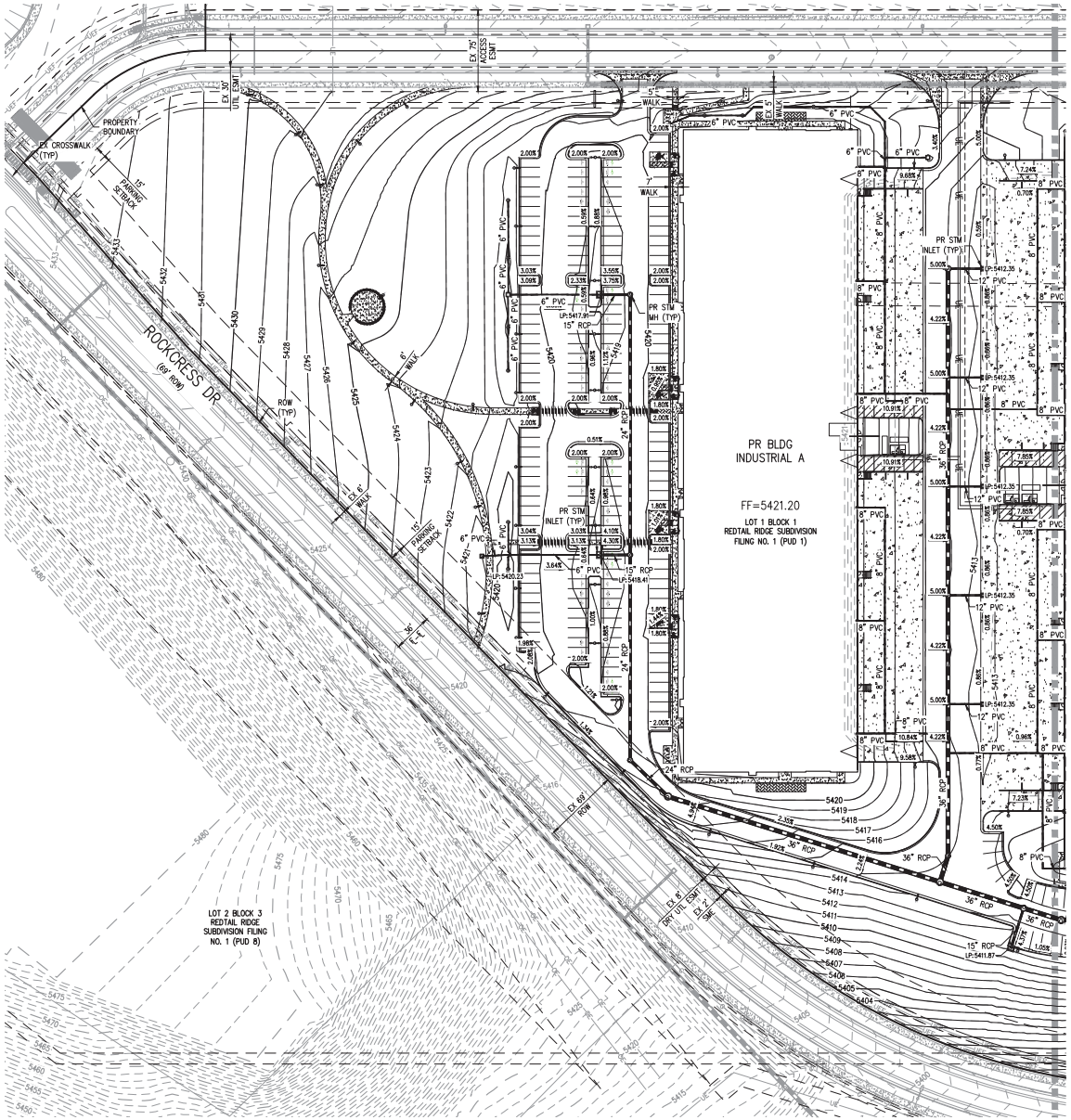
REVISION DATE: ISSUE DATE: 03-14-2025 SHEET 7 OF 24

REDTAIL RIDGE PUD1 SOUTH

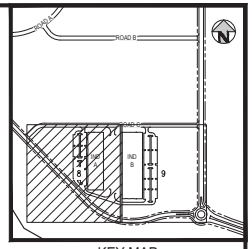
REDTAIL RIDGE FILING NO. 1

PLANNED UNIT DEVELOPMENT

LOT 1 BLOCK 1



MATCH LINE - SEE SHEET 9



KEY MAP

SCALE: 1" = 600'

LEGEND:

- PROPERTY BOUNDARY
- RIGHT-OF-WAY
- EXISTING STM SEWER W/MH AND INLET
- EXISTING SANITARY SEWER W/MH
- EXISTING WATER LINE W/ VALVE
- EXISTING GAS LINE
- EXISTING UNDERGROUND ELECTRIC
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- ABANDON EXISTING UTILITY LINE
- PROPOSED CONCRETE
- PROPOSED CONCRETE PAVERS
- PROPOSED PORCELAIN PAVERS
- PROPOSED CRUSHER FINES

NOTES:

1. ALL ACCESSIBLE PARKING SPACES SHALL BE GRADED AT 2% MAXIMUM IN ALL DIRECTIONS.
2. THE ACCESSIBLE ROUTES TO BUILDINGS SHALL HAVE A MAXIMUM CROSS SLOPE OF 2% AND A MAXIMUM LONGITUDINAL SLOPE OF 5%.
3. ALL PROPOSED PIPING IS PRIVATELY OWNED AND MAINTAINED UNLESS OTHERWISE NOTED.

ABBREVIATIONS

BLDG	BUILDING
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CONC	CONCRETE
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DUE	DRY UTILITY EASEMENT
ELEC	ELECTRIC
ESMT	EASEMENT
EX	EXISTING
FF	FINISHED FLOOR
FH	FIRE HYDRANT
FL	FLOW LINE
GV	GATE VALVE
HT	HEIGHT
MH	MANHOLE
N	NORTH, NORTHING
PED	PEDESTRIAN
PL	PROPERTY LINE
PR	PROPOSED
ROW	RIGHT-OF-WAY
SME	SURFACE MAINTENANCE EASEMENT
SS	SANITARY SEWER
STM	STORM
TYP	TYPICAL
UG	UNDERGROUND
WAT	WATER

SCALE: 1" = 50'

PROJECT # 231256

GRADING PLAN

REVISION DATE: ISSUE DATE: 03-14-2025 SHEET 8 OF 24

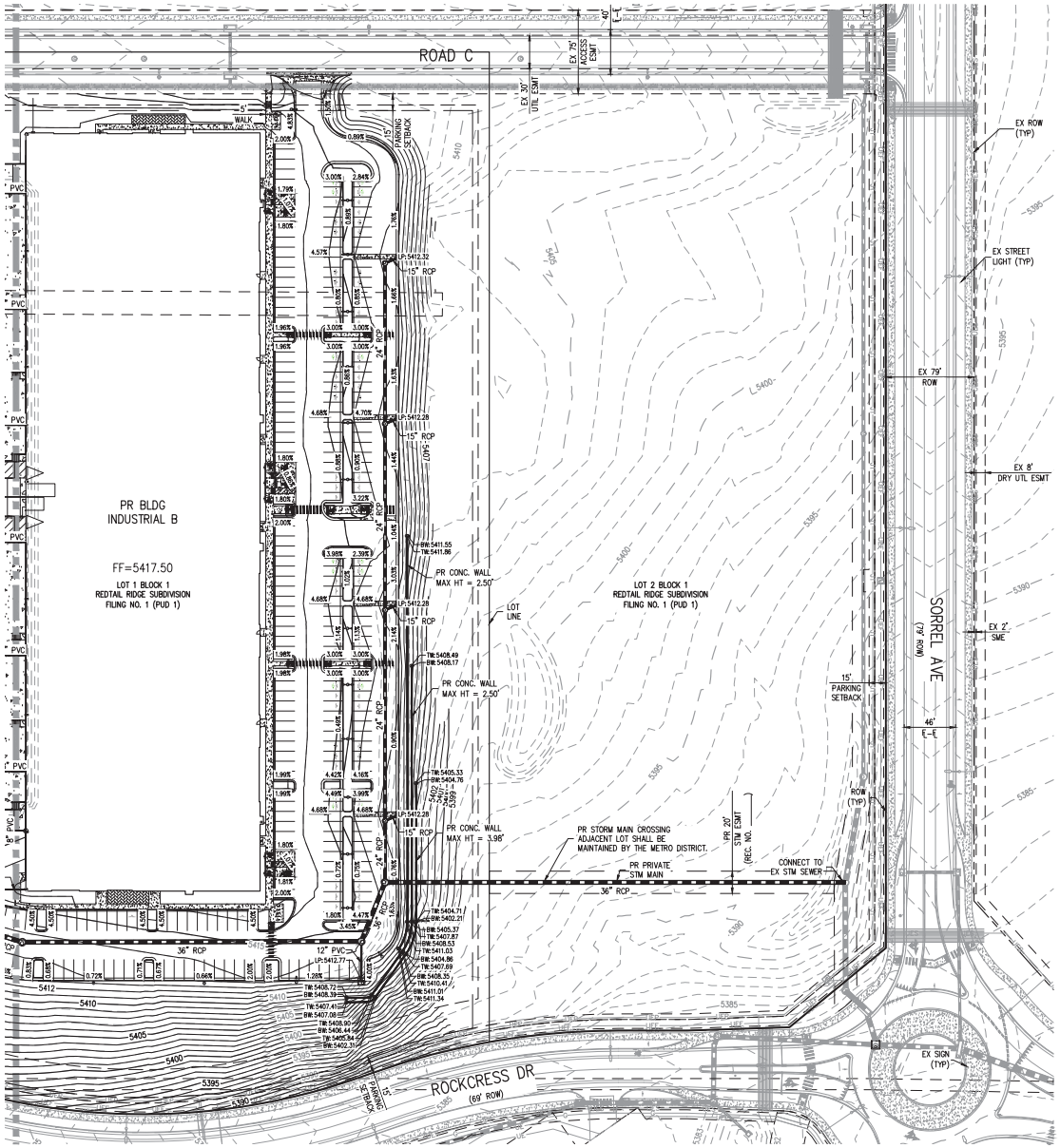
REDTAIL RIDGE PUD1 SOUTH

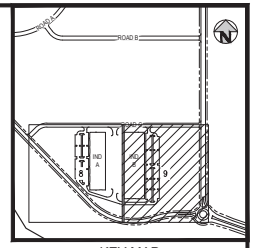
NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH

REDTAIL RIDGE FILING NO. 1

PLANNED UNIT DEVELOPMENT

LOT 1 BLOCK 1





KEY MAP

SCALE: 1" = 600'

LEGEND:

- PROPERTY BOUNDARY
- RIGHT-OF-WAY
- EXISTING STM SEWER W/MH AND INLET
- EXISTING SANITARY SEWER W/MH
- EXISTING WATER LINE W/ VALVE
- EXISTING GAS LINE
- EXISTING UNDERGROUND ELECTRIC
- EXISTING JOINT TRENCH
- EXISTING STREET LIGHT
- EXISTING TELEPHONE POLE
- EXISTING FIRE HYDRANT
- PROPOSED SANITARY SEWER W/MH
- PROPOSED SANITARY SERVICE W/CLEAN OUT
- PROPOSED STORM SEWER W/ MH AND INLET
- PROPOSED LANDSCAPE DRAIN W/ INLET
- PROPOSED FIRE HYDRANT
- PROPOSED 8" WATER MAIN W/ BENDS, VALVE, AND TEE
- PROPOSED WATER SERVICE W/METER
- PROPOSED FIRE SERVICE
- PROPOSED STREET LIGHT
- PROPOSED PEDESTRIAN LIGHT
- PROPOSED BUILDING ENTRANCE
- PROPOSED TRANSFORMER AND GENERATOR
- ABANDON EXISTING UTILITY LINE
- PROPOSED CONCRETE
- PROPOSED CONCRETE PAVERS
- PROPOSED PORCELAIN PAVERS
- PROPOSED CRUSHER FINES

NOTES:

1. ALL ACCESSIBLE PARKING SPACES SHALL BE GRADED AT 2% MAXIMUM IN ALL DIRECTIONS.
2. THE ACCESSIBLE ROUTES TO BUILDINGS SHALL HAVE A MAXIMUM CROSS SLOPE OF 2% AND A MAXIMUM LONGITUDINAL SLOPE OF 5%.
3. ALL PROPOSED PIPING IS PRIVATELY OWNED AND MAINTAINED UNLESS OTHERWISE NOTED.

ABBREVIATIONS

BLDG	BUILDING
C&G	CURB & GUTTER
CONC	CONCRETE
DS	DOWNSPOUT
DUE	DRY UTILITY EASEMENT
ELEC	ELECTRIC
ESMT	EASEMENT
EX	EXISTING
FF	FINISHED FLOOR
FH	FIRE HYDRANT
FL	FLOW LINE
GV	GATE VALVE
HT	HEIGHT
MH	MANHOLE
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SS	SANITARY SEWER
STM	STORM
TYP	TYPICAL
UG	UNDERGROUND
WAT	WATER

SCALE: 1" = 50'

PROJECT # 221295

REVISION DATE:

ISSUE DATE: 03-14-2025

GRADING PLAN

SHEET 9 OF 24

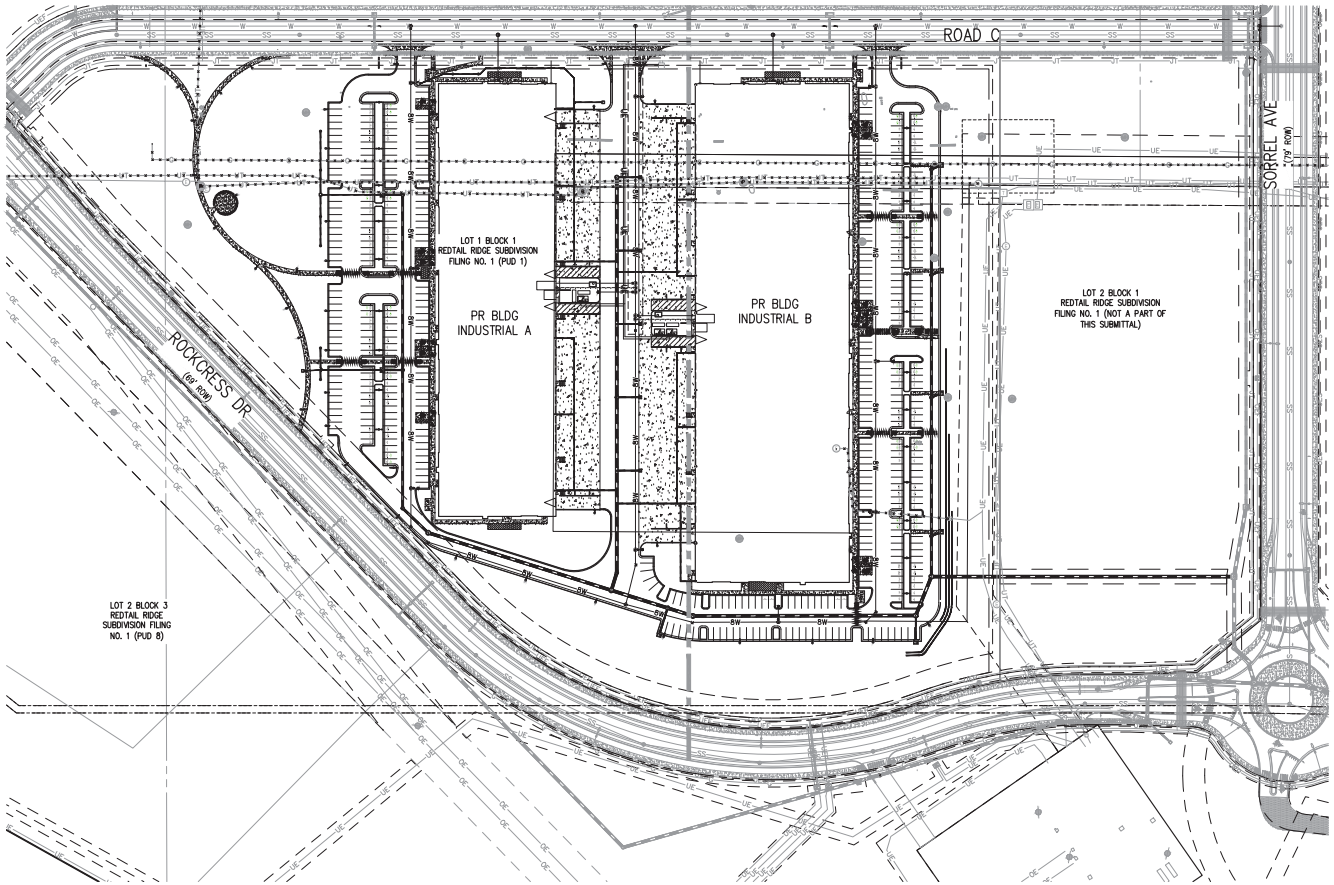
REDTAIL RIDGE PUD1 SOUTH

NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH

REDTAIL RIDGE FILING NO. 1

PLANNED UNIT DEVELOPMENT

LOT 1 BLOCK 1



INDUSTRIAL A FIRE FLOW DATA:

THE TOTAL FIRE FLOW REQUIRED FOR THIS SITE IS 2,125 GPM MINIMUM @ 20 PSI RESIDUAL PRESSURE.
THIS FLOW MUST BE PROVIDED FROM A MINIMUM OF 2 FIRE HYDRANTS.
EACH FIRE HYDRANT MUST SUPPLY A MINIMUM OF 2,125 GPM @ 20 PSI RESIDUAL PRESSURE AT THE HYDRANT OUTLET TO BE ACCEPTABLE.
CODE USED FOR ANALYSIS: 2018 IFC AND 2018 AMENDMENTS.
CONSTRUCTION TYPE: III-A
FIRE FLOW CALCULATION AREA: 83,200 SF
THIS BUILDING IS FULLY SPRINKLERED

INDUSTRIAL B FIRE FLOW DATA:

THE TOTAL FIRE FLOW REQUIRED FOR THIS SITE IS 2,875 GPM MINIMUM @ 20 PSI RESIDUAL PRESSURE.
THIS FLOW MUST BE PROVIDED FROM A MINIMUM OF 3 FIRE HYDRANTS.
EACH FIRE HYDRANT MUST SUPPLY A MINIMUM OF 2,875 GPM @ 20 PSI RESIDUAL PRESSURE AT THE HYDRANT OUTLET TO BE ACCEPTABLE.
CODE USED FOR ANALYSIS: 2018 IFC AND 2018 AMENDMENTS.
CONSTRUCTION TYPE: III-A
FIRE FLOW CALCULATION AREA: 154,350 SF
THIS BUILDING IS FULLY SPRINKLERED

LEGEND:

- PROPERTY BOUNDARY
- RIGHT-OF-WAY
- EXISTING STM SEWER W/MH AND INLET
- EXISTING SANITARY SEWER W/MH
- EXISTING WATER LINE W/ VALVE
- EXISTING GAS LINE
- EXISTING UNDERGROUND ELECTRIC
- EXISTING JOINT TRENCH
- EXISTING STREET LIGHT
- EXISTING TELEPHONE POLE
- EXISTING FIRE HYDRANT
- PROPOSED SANITARY SEWER W/MH
- PROPOSED SANITARY SERVICE W/CLEAN OUT
- PROPOSED STORM SEWER W/ MH AND INLET
- PROPOSED LANDSCAPE DRAIN W/ INLET
- PROPOSED FIRE HYDRANT
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- PROPOSED WATER SERVICE W/METER
- PROPOSED FIRE SERVICE
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SS	SANITARY SEWER
STM	STORM
TYP	TYPICAL
UG	UNDERGROUND
WAT	WATER

N

80 0 80 160

SCALE: 1" = 80'

OVERALL UTILITY PLAN

REVISION DATE: # ISSUE DATE: 03-14-2025 SHEET 10 OF 24

REDTAIL RIDGE PUD1 SOUTH

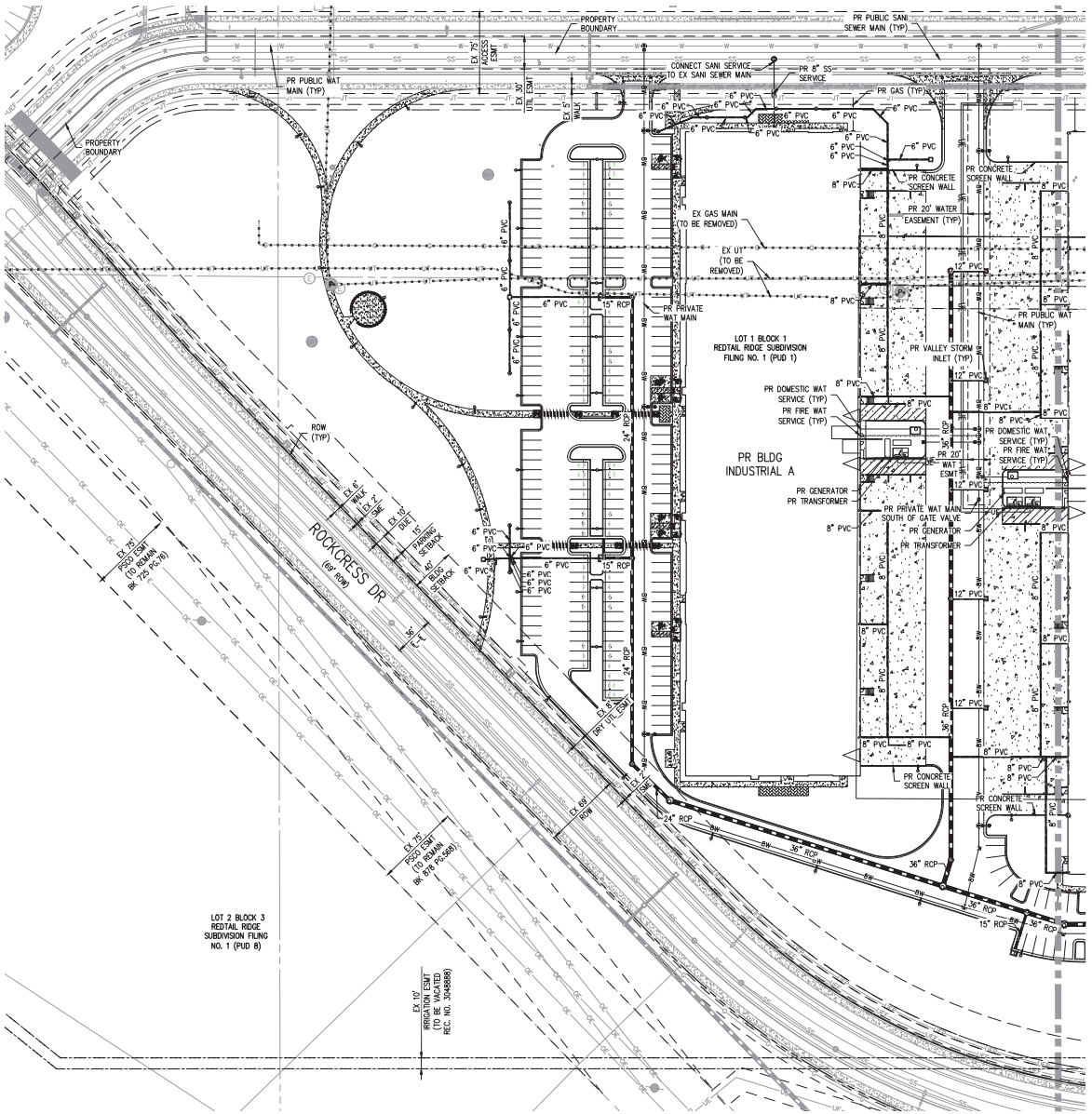
PROJECT # 251295

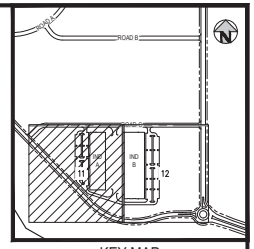
NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH

REDTAIL RIDGE FILING NO. 1

PLANNED UNIT DEVELOPMENT

LOT 1 BLOCK 1





KEY MAP

SCALE: 1" = 600'

LEGEND:

- PROPERTY BOUNDARY
- RIGHT-OF-WAY
- EXISTING STM SEWER W/MH AND INLET
- EXISTING SANITARY SEWER W/MH
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- EXISTING STREET LIGHT
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SS	SANITARY SEWER
STM	STORM
TYP	TYPICAL
UG	UNDERGROUND
WAT	WATER

50 0 50 100

SCALE: 1" = 50'

PROJECT # 231295

UTILITY PLAN

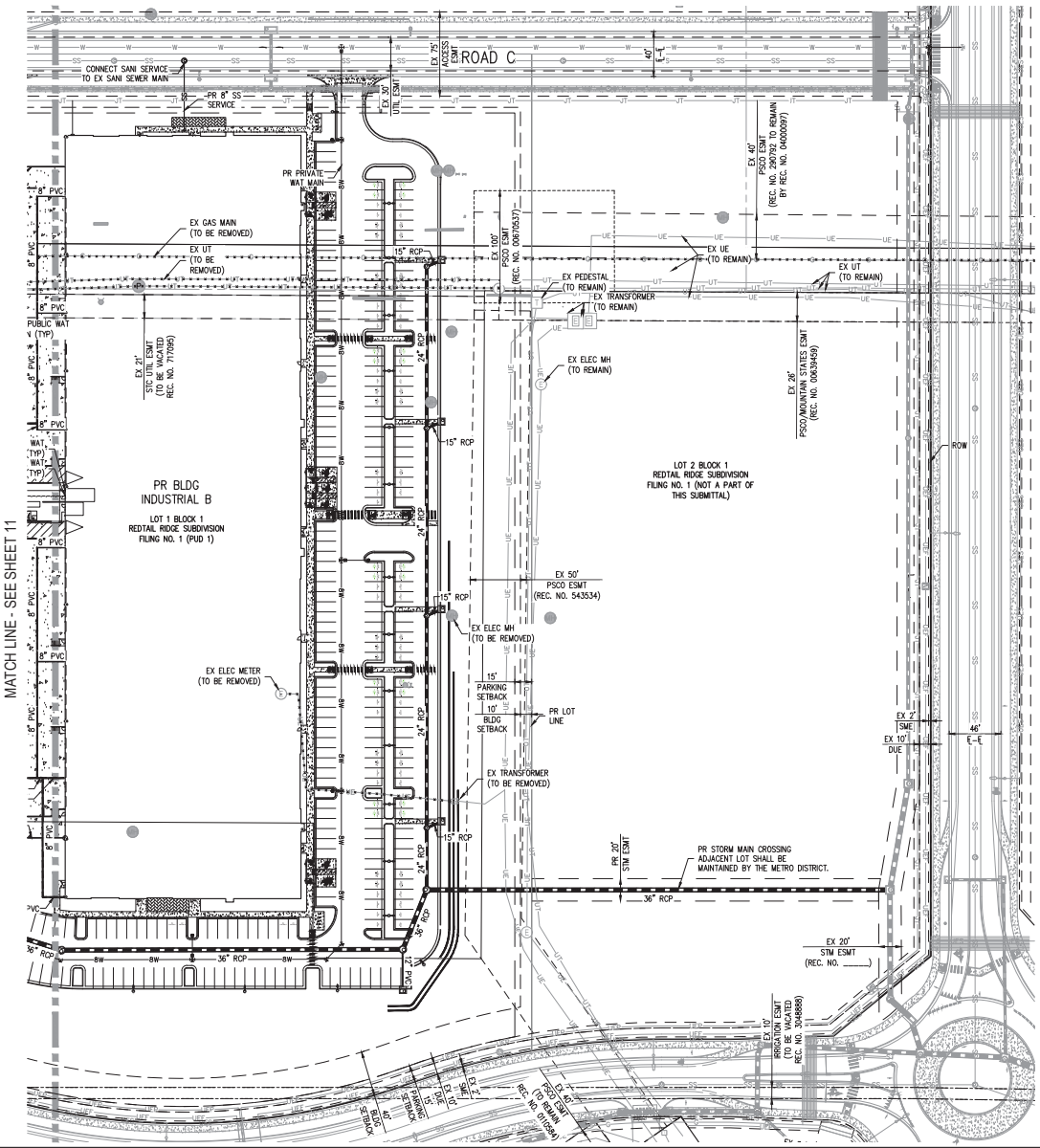
REVISION DATE: # ISSUE DATE: 03-14-2025 SHEET 11 OF 24

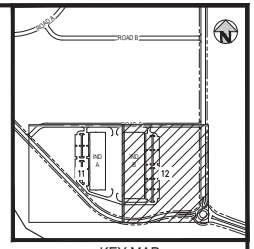
REDTAIL RIDGE PUD1 SOUTH

REDTAIL RIDGE FILING NO. 1

PLANNED UNIT DEVELOPMENT

LOT 1 BLOCK 1





KEY MAP

SCALE: 1" = 600'

LEGEND:

- PROPERTY BOUNDARY
- RIGHT-OF-WAY
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SS	SANITARY SEWER
STM	STORM
TYP	TYPICAL
UG	UNDERGROUND
WAT	WATER

50 0 50 100

SCALE: 1" = 50'

PROJECT # 221256

UTILITY PLAN

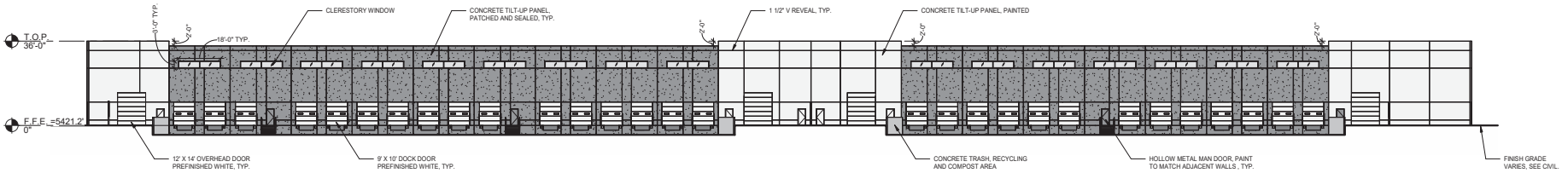
REVISION DATE: # ISSUE DATE: 03-14-2025 SHEET 12 OF 24

REDTAIL RIDGE PUD1 SOUTH

REDTAIL RIDGE FILING NO. 1

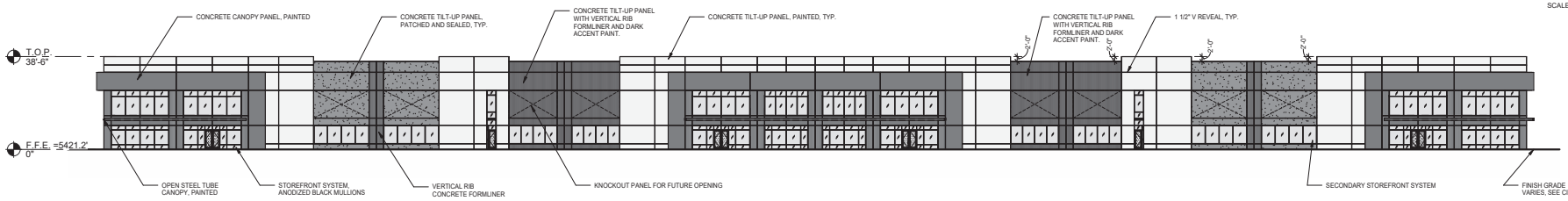
PLANNED UNIT DEVELOPMENT

LOT 1 BLOCK 1



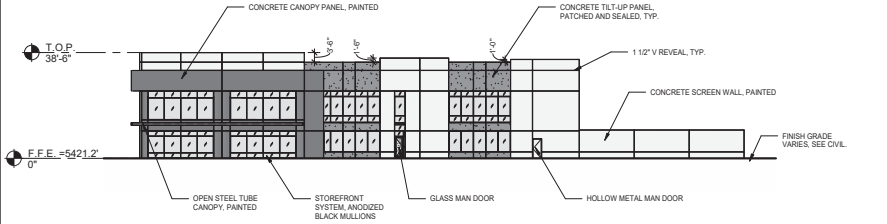
INDUSTRIAL A - EAST EXTERIOR ELEVATION 1

SCALE: 3/64" = 1'-0"



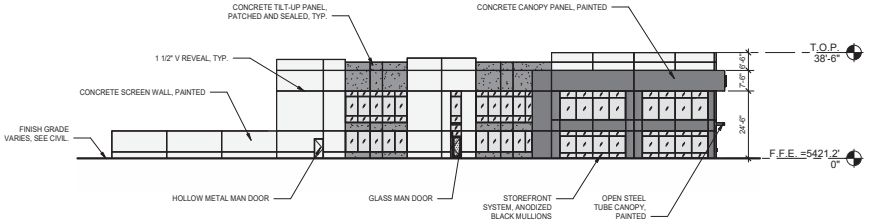
INDUSTRIAL A - WEST EXTERIOR ELEVATION 2

SCALE: 3/64" = 1'-0"



INDUSTRIAL A - SOUTH EXTERIOR ELEVATION 4

SCALE: 3/64" = 1'-0"



INDUSTRIAL A - NORTH EXTERIOR ELEVATION 3

SCALE: 3/64" = 1'-0"

LEGEND

COLORS:

- BASE COLOR: PURE WHITE SW 7005
- SECONDARY COLOR: SEALED CONCRETE FINISH
- ACCENT COLOR: GRIZZLE GREY SW 7068
- CORRUGATED FORMLINER ACCENT COLOR: WOVEN WICKER SW 9104

GLASS:

GREY TINT

- VISION GLASS
- SPANDREL GLASS
- TEMPERED GLASS

ABBREVIATIONS:

T.O.P. - TOP OF PANEL

F.F.E. - FINISH FLOOR ELEVATION

PROJECT #: EENG2.0057.01

ARCHITECTURAL ELEVATIONS

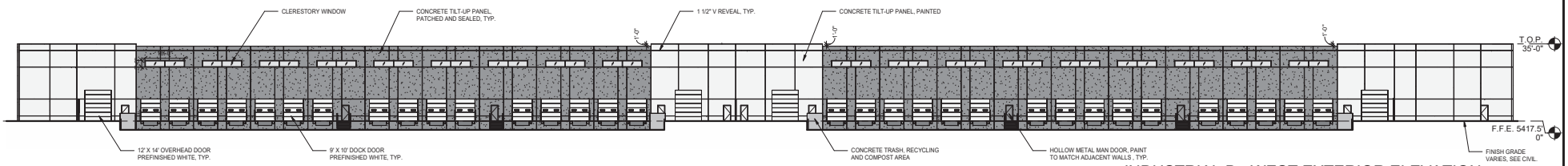
REVISION DATE: 11/25/2025 ISSUE DATE: 03/14/2025 SHEET 5 OF 24

REDTAIL RIDGE PUD1 SOUTH

REDTAIL RIDGE FILING NO. 1

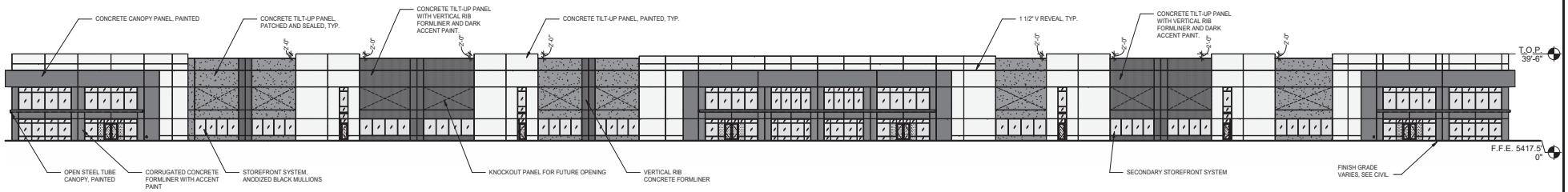
PLANNED UNIT DEVELOPMENT

LOT 1 BLOCK 1



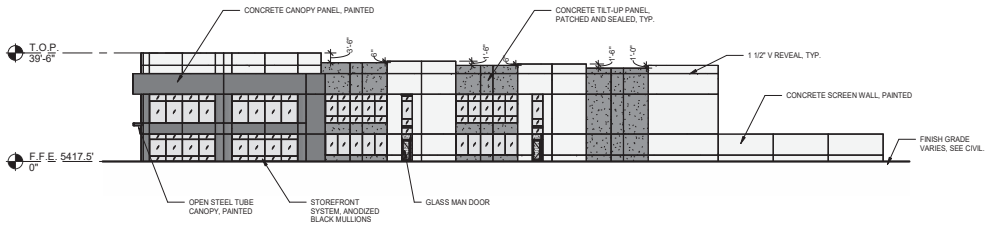
INDUSTRIAL B - WEST EXTERIOR ELEVATION (1)

SCALE: 3/64" = 1'-0"



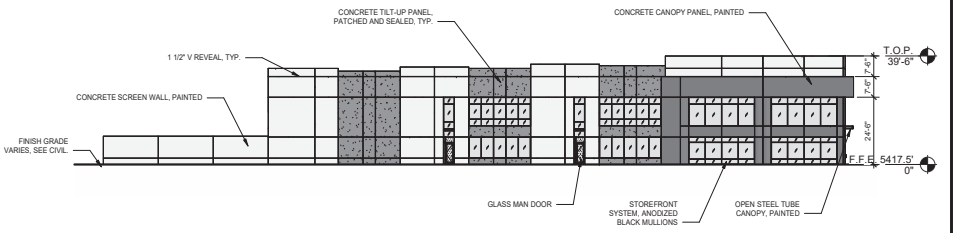
INDUSTRIAL B - EAST EXTERIOR ELEVATION (2)

SCALE: 3/64" = 1'-0"



INDUSTRIAL B - NORTH EXTERIOR ELEVATION (4)

SCALE: 3/64" = 1'-0"



INDUSTRIAL B - SOUTH EXTERIOR ELEVATION (3)

SCALE: 3/64" = 1'-0"

LEGEND

COLORS:

- BASE COLOR: PURE WHITE SW 7005
- SECONDARY COLOR: SEALED CONCRETE FINISH
- ACCENT COLOR: GRIZZLE GREY SW 7068
- CORRUGATED FORMLINER ACCENT COLOR: WOVEN WICKER SW 9104

GLASS:

GREY TINT

- VISION GLASS
- SPANDREL GLASS
- TEMPERED GLASS

ABBREVIATIONS:

T.O.P. - TOP OF PANEL

F.F.E. - FINISH FLOOR ELEVATION

PROJECT #: EENG2.0057.01

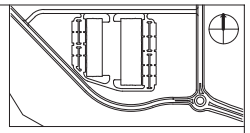
ARCHITECTURAL ELEVATIONS

REVISION DATE: 11/25/2025 ISSUE DATE: 03/14/2025 SHEET 6 OF 24

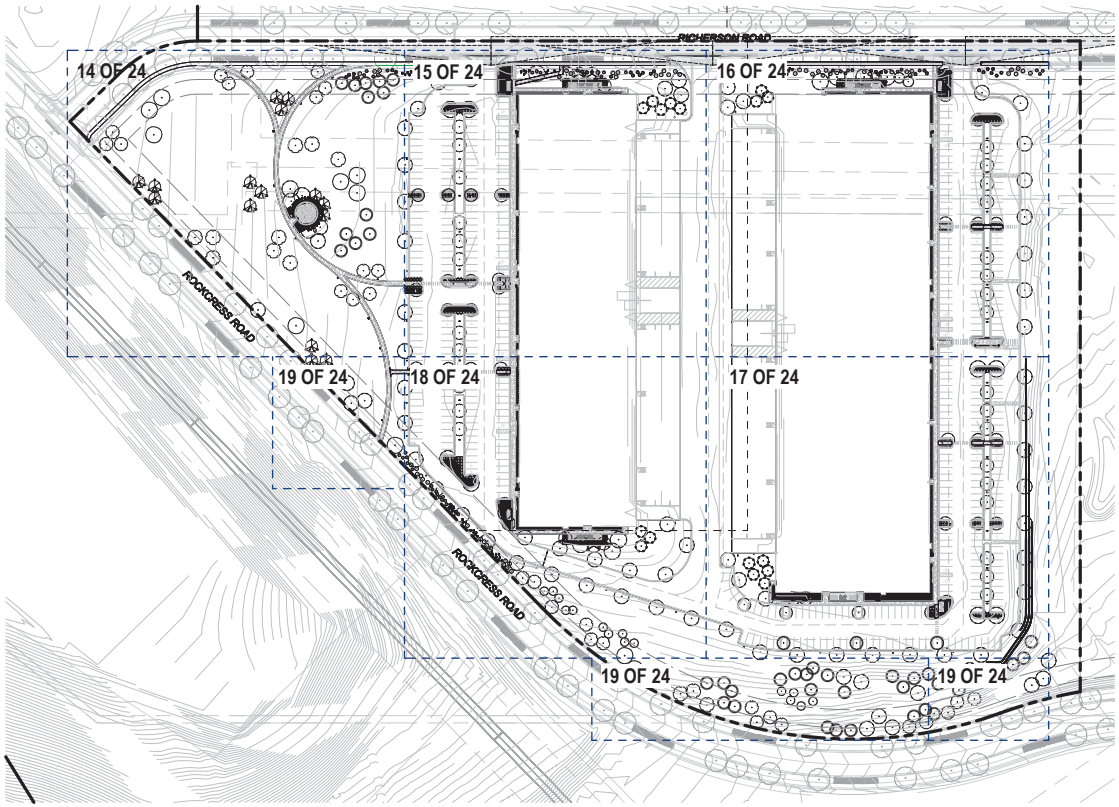
REDTAIL RIDGE FILING NO.1

PLANNED UNIT DEVELOPMENT, LOT 1 BLOCK 1 & LOT 2 BLOCK 1
SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29,
TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
CASE #: PUPL-XXXX-2023

Sheet Index	
SHEET NUMBER	**SHEET NAME**
03-LANDSCAPE	
13 OF 24	OVERALL LANDSCAPE PLAN
14 OF 24	MATERIAL AND PLANTING PLAN - A
15 OF 24	MATERIAL AND PLANTING PLAN - B
16 OF 24	MATERIAL AND PLANTING PLAN - C
17 OF 24	MATERIAL AND PLANTING PLAN - D
18 OF 24	MATERIAL AND PLANTING PLAN - E
19 OF 24	MATERIAL AND PLANTING PLAN - F, G & H
20 OF 24	SITE FURNISHING DETAILS
21 OF 24	PLANTING DETAILS
22 OF 24	PLANTING SCHEDULE



KEY MAP
1" = 600'



1 OVERALLLANDSCAPE PLAN
1" = 80'-0"

ABBREVIATIONS LEGEND

ABBREVIATIONS WHEN USED IN COMPOSITION MAY INCLUDE PERIODS FOR CLARIFICATION

AFF	ABOVE FINISHED FLOOR
ADJ	ADJACENT
ADA	AMERICANS WITH DISABILITIES ACT
APPROX	APPROXIMATE
ARCH	ARCHITECTURAL
AD	AREA DRAIN
BJ	BOTTOM OF
CB	CATCH BASIN
CL	CENTERLINE
C/C	CENTER TO CENTER
CO	CLEANOUT
COL	COLUMN
COMM	COMMUNICATION*
CONC	CONCRETE
CMU	CONCRETE MASONRY UNIT
CONT	CONTINUOUS
CJ	CONTROL JOINT
CU	CUBIC
DEG	DEGREE
DEMO	DEMOLISH, DEMOLITION
DEPT	DEPARTMENT DEPT*
DIAG	DIAGONAL
DIA	DIAMETER
DIM	DIMENSION
DS	DOWNSPOUT
DF	DRINKING FOUNTAIN
EA	EACH
ELEC	ELECTRIC(AL)
ELE/ELEV	ELEVATION
ENCL	ENCLOSURE
EQ	EQUAL
EQUIP	EQUIPMENT
EXIST	EXISTING
EJ	EXPANSION JOINT
EXP	EXPOSED
EXT	EXTERIOR
F/	FACE OF
FT	FEET, FOOT
FIN	FINISH(ED)
FDC	FIRE DEPARTMENT CONNECTION
FH	FIRE HYDRANT
FTG	FOOTING
FDTN	FOUNDATION
FURN	FURNISH, FURNITURE
GA	GAUGE
GALV	GALVANIZED
GEN	GENERAL
GL	GLASS
HVAC	HEATING, VENTILATION, AIR CONDITIONING
HP	HIGH POINT
HORIZ	HORIZONTAL
HB	HOSE BIBB
INCL	INCLUDE(D), INCLUDING
ID	INSIDE DIAMETER
INT	INTERIOR
LTG	LIGHTING
LF	LINEAR FOOT, (LINEAR FEET)
LP	LOW POINT
MAINT	MAINTENANCE*
MH	MANHOLE
MFR	MANUFACTURER
MATL	MATERIAL
MAX	MAXIMUM
MECH	MECHANICAL
MTL	METAL
MIN	MINIMUM
MISC	MISCELLANEOUS
NOM	NOMINAL
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
OC	ON CENTER
OPP	OPPOSITE
OD	OUTSIDE DIAMETER
PERP	PERPENDICULAR
PSI	POUNDS PER SQUARE INCH
PRELIM	PRELIMINARY
PROP	PROPERTY
R	RADIUS
REF	REFERENCE
REIN	REINFORCE, REINFORCING
REQ	REQUIRED
REV	REVISION/REVISED
ROW	RIGHT OF WAY
RM	ROOM
SIM	SIMILAR
SF	SQUARE FOOT (SQUARE FEET)
SST	STAINLESS STEEL
STRUCT	STRUCTURE, STRUCTURAL
SYS	SYSTEM
TEL	TELEPHONE
TEMP	TEMPORARY
T/	TOP OF
TOPO	TOPOGRAPHY, TOPOGRAPHIC
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
VIF	VERIFY IN FIELD
VERT	VERTICAL
W/	WITH
W/O	WITHOUT
WP	WORKING POINT

GENERAL NOTES

1. NOTES APPEAR ON VARIOUS DRAWINGS FOR DIFFERENT SYSTEMS AND MATERIALS. REVIEW ALL SHEETS AND APPLY NOTES TO RELATED BUILDING COMPONENTS.
2. REFER TO COMPLETE SET OF ISSUED CONTRACT DOCUMENTS FOR OTHER APPLICABLE NOTES, ABBREVIATIONS, AND SYMBOLS.
3. WHERE MATERIALS ARE APPLIED TO, OR ARE IN DIRECT CONTACT WITH WORK INSTALLED BY ANOTHER SUBCONTRACTOR, COMMENCEMENT OF WORK IMPLIES ACCEPTANCE OF THE SUBSTRATE AS SUITABLE FOR THE APPLICATION INTENDED.
4. ISOLATE DISSIMILAR METALS TO PREVENT GALVANIC CORROSION.
5. DO NOT SCALE THE DRAWINGS.
6. FIELD MEASURE AND CONFIRM DIMENSIONS FOR OWNER PROVIDED EQUIPMENT AND FURNISHINGS.
7. EXCAVATION OF 4 FEET AND TESTING POF COMPACTED SOILS AT PEDESTRIAN PAVEMENTS
8. BEFORE SPREADING PLANTING SOIL OVER THE SITE, PERFORM SOIL COMPACTION TESTING BY CHECKING SOIL COMPACTION USING A TENSIOMETER (PENTOMETER) ON A 50 FOOT BY 50 FOOT GRID ON ALL GRADED SUBSOIL AREAS TO BE PLANTED GREATER THAN ONE ACRE OR A 30 FOOT BY 30 FOOT GRID FOR AREAS LESS THAN ONE ACRE. IF MORE THAN 10 PERCENT OF THE READINGS IN A GIVEN PLANTING AREA ARE GREATER THAN 300 PSI, THEN THE SITE SHALL UNDERGO SITE SUBGRADE MITIGATION MEASURES DESCRIBED BELOW. IMMEDIATELY PRIOR TO PLACING PLANTING SOIL, THE ENTIRE SUBGRADE SHALL BE LOOSENED TO A MINIMUM DEPTH OF 6-INCHES USING THE TEETH OF A BACKHOE OR OTHER SUITABLE EQUIPMENT, THEN RE-COMPACTED WITH THE TRACKS OF SMALL CONSTRUCTION EQUIPMENT, THE BUCKET OF A BACKHOE, OR OTHER APPROVED EQUIPMENT. VIBRATORY COMPACTION OF SUBGRADE IN PLANTED AREAS IS PROHIBITED. AFTER THE SUBGRADE SOILS HAVE BEEN LOOSENED, RE-COMPRESSED AND INSPECTED, PLANTING SOIL MAY BE SPREAD BY USING A WIDE TRACK BULLDOZER SIZE D-5 OR SMALLER OR MAY BE DUMPED AND SPREAD WITH THE BUCKET OF A BACKHOE FROM THE EDGE OF THE LOOSENED AREA. NO RUBBER-TIRED EQUIPMENT OR HEAVY EQUIPMENT EXCEPT FOR A SMALL BULLDOZER SHALL PASS OVER THE SUBSOILS (SUBGRADE) AFTER THEY HAVE BEEN LOOSENED AND RECOMPRESSED

LANDSCAPE REQUIREMENTS	
TOTAL LOT SIZE	945,775.48
TOTAL AREA COVERED BY BUILDING,OR VEHICULAR PAVEMENT AREA	555,801.49
TOTAL LANDSCAPE AREA (38%)	360,907.16
TOTAL PEDESTRIAN HARDSCAPE AREA	29,066.35

	REQUIRED	PROPOSED
ROCKCRESS ROAD NUMBER OF PERIMETER TREES	41	41
ROCKCRESS ROAD NUMBER OF PERIMETER SHRUBS	327	327
RICHERSON ROAD NUMBER OF PERIMETER TREES	34	34
RICHERSON ROAD NUMBER OF PERIMETER SHRUBS	270	270
TOTAL NUMBER OF PARKING LOT TREES	57	72
TOTAL NUMBER OF PARKING LOT SHRUBS	264	360

0' 50' 100' 200' 400'

N

OVERALL LANDSCAPE PLAN

PROJECT # 272536

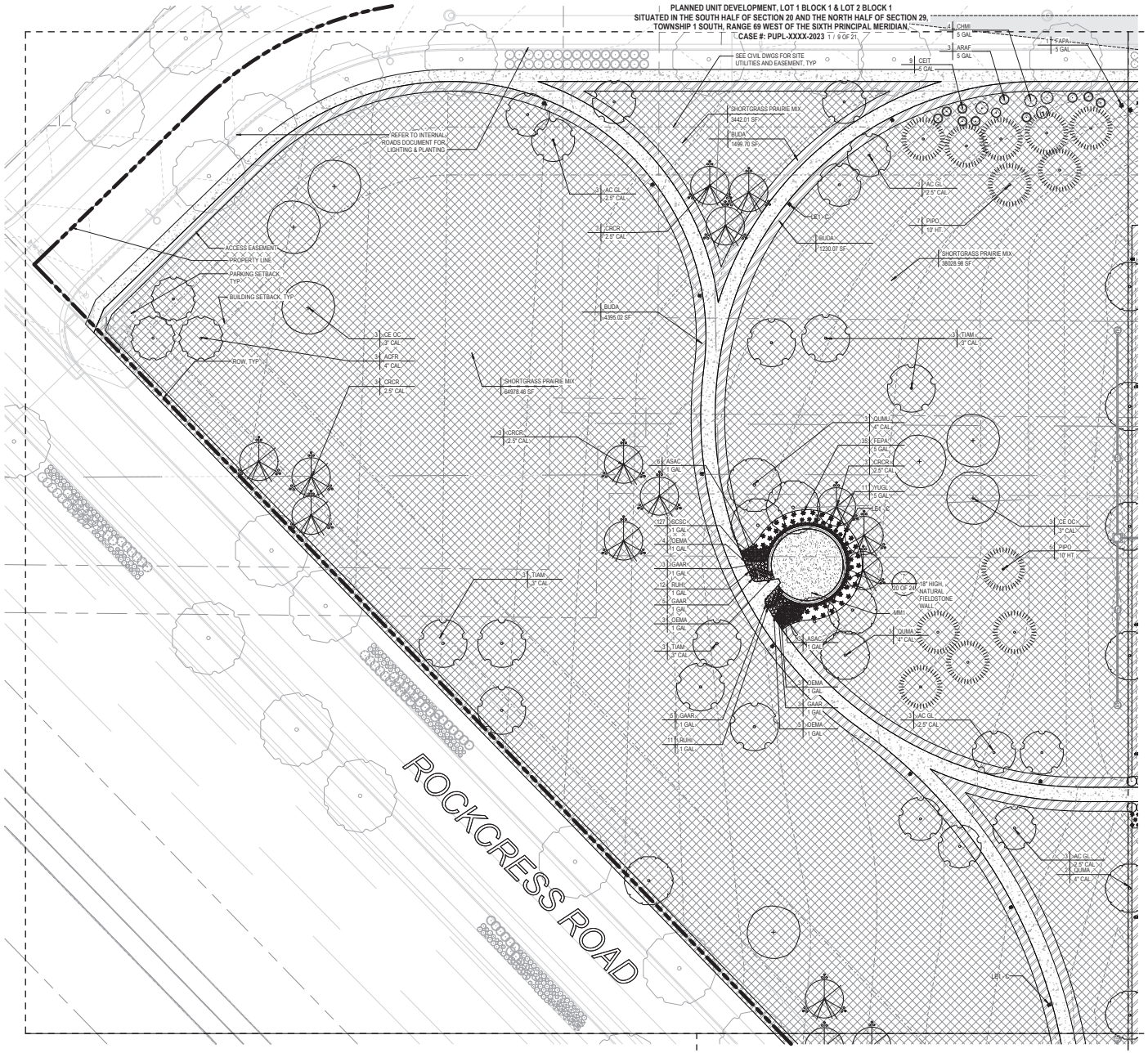
REVISION DATE: **ISSUE DATE:** 09/10/2025 **SHEET** 13 OF 24

REDTAIL RIDGE PUD1 SOUTH

9/10/2025 12:13:28 PM Autodesk Docs://Redtail Ridge Overall Vision/RTR_PUD-1.rvt

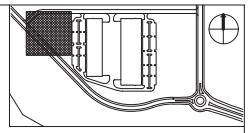
REDTAIL RIDGE FILING NO.1

PLANNED UNIT DEVELOPMENT, LOT 1 BLOCK 1 & LOT 2 BLOCK 1
SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29,
TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
CASE #: PUPL-XXXX-2023 T / 9 OF 21



MATERIAL LEGEND		
LEGEND	TAG	MATERIAL
	DP2	CONCRETE PAVERS
	MM1	DECOMPOSED GRANITE
	PV1	PEDESTRIAN RATED CIP CONCRETE

SITE FURNITURE & LIGHTING LEGEND		
LEGEND	TAG	TYPE
	FA3	LITTER RECEPTACLE
	FS1 - A	BENCH
	FS2 - B	PICNIC TABLE SET 2
	FS3	DINING TABLE
	FS4 - A	LOUNGE CHAIR
	FS4 - B	DINING CHAIR
	FS5	BIKE RACK
	LE1 - A	SINGLE SIDED VEHICULAR POLE LIGHT
	LE1 - B	DOUBLE SIDED VEHICULAR POLE LIGHT
	LE1 - C	PEDESTRIAN POLE LIGHT



KEY MAP
1" = 600'

0' 10' 20' 40' 80'

REVISION DATE:

ISSUE DATE: 09/10/2025

MATERIAL AND PLANTING PLAN - A

SHEET 14 OF 24

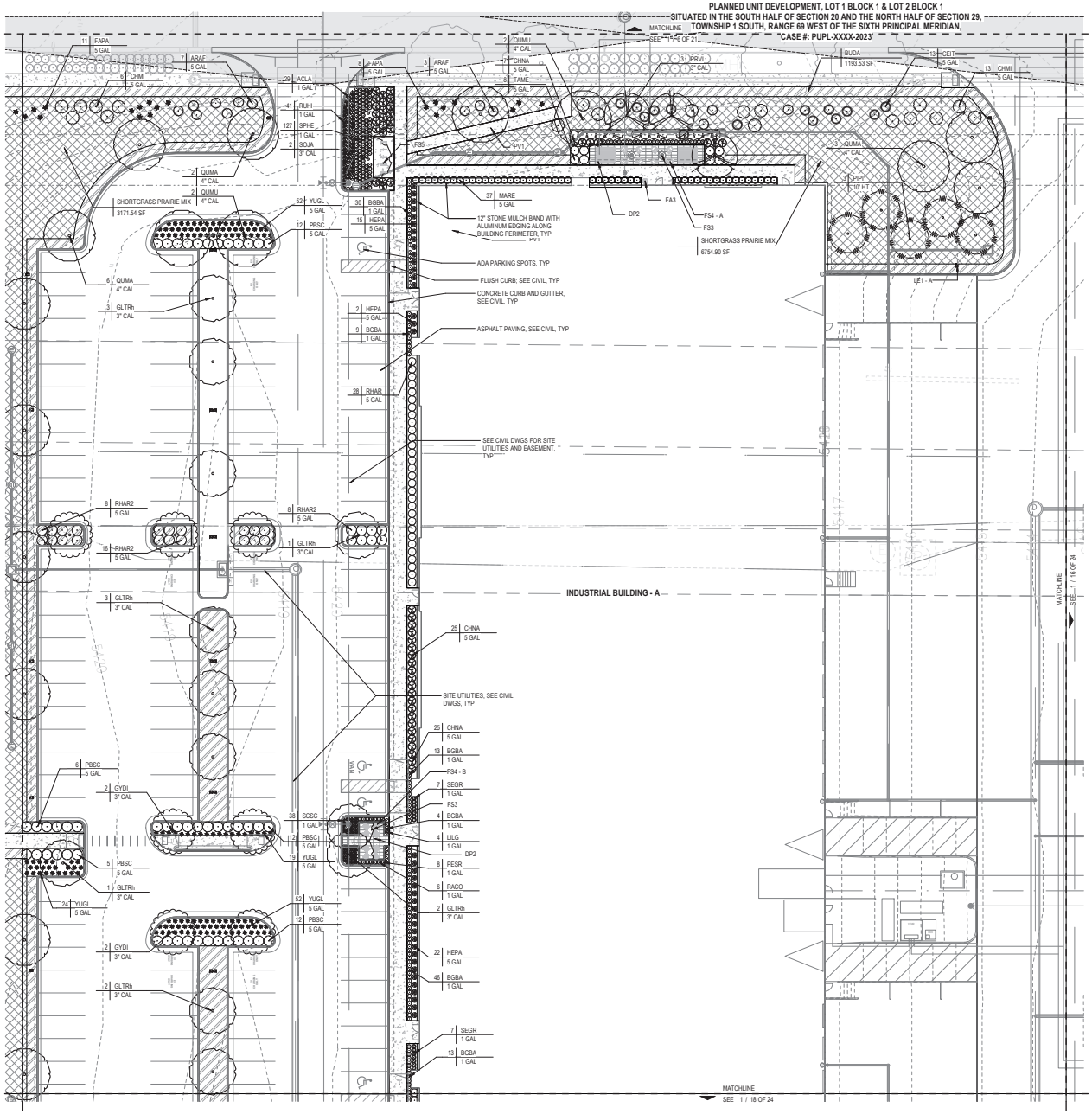
PROJECT # 272356

9/10/2025 12:13:35 PM Autodesk Docs://Redtail Ridge Overall Vision/RTR_PUD-1.rvt

REDTAIL RIDGE PUD1 SOUTH

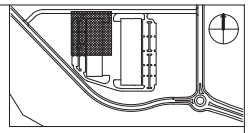
REDTAIL RIDGE FILING NO.1

PLANNED UNIT DEVELOPMENT, LOT 1 BLOCK 1 & LOT 2 BLOCK 1
SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29,
TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
"CASE #: PUPL-XXXX-2023"



MATERIAL LEGEND		
LEGEND	TAG	MATERIAL
	DP2	CONCRETE PAVERS
	MM1	DECOMPOSED GRANITE
	PV1	PEDESTRIAN RATED CIP CONCRETE

SITE FURNITURE & LIGHTING LEGEND		
LEGEND	TAG	TYPE
	FA3	LITTER RECEPTACLE
	FS1 - A	BENCH
	FS2 - B	PICNIC TABLE SET 2
	FS3	DINING TABLE
	FS4 - A	LOUNGE CHAIR
	FS4 - B	DINING CHAIR
	FS5	BIKE RACK
	LE1 - A	SINGLE SIDED VEHICULAR POLE LIGHT
	LE1 - B	DOUBLE SIDED VEHICULAR POLE LIGHT
	LE1 - C	PEDESTRIAN POLE LIGHT



KEY MAP
1" = 600'

0' 10' 20' 40' 80'

REVISION DATE:

ISSUE DATE: 09/10/2025

SHEET 15 OF 24

MATERIAL AND PLANTING PLAN - B

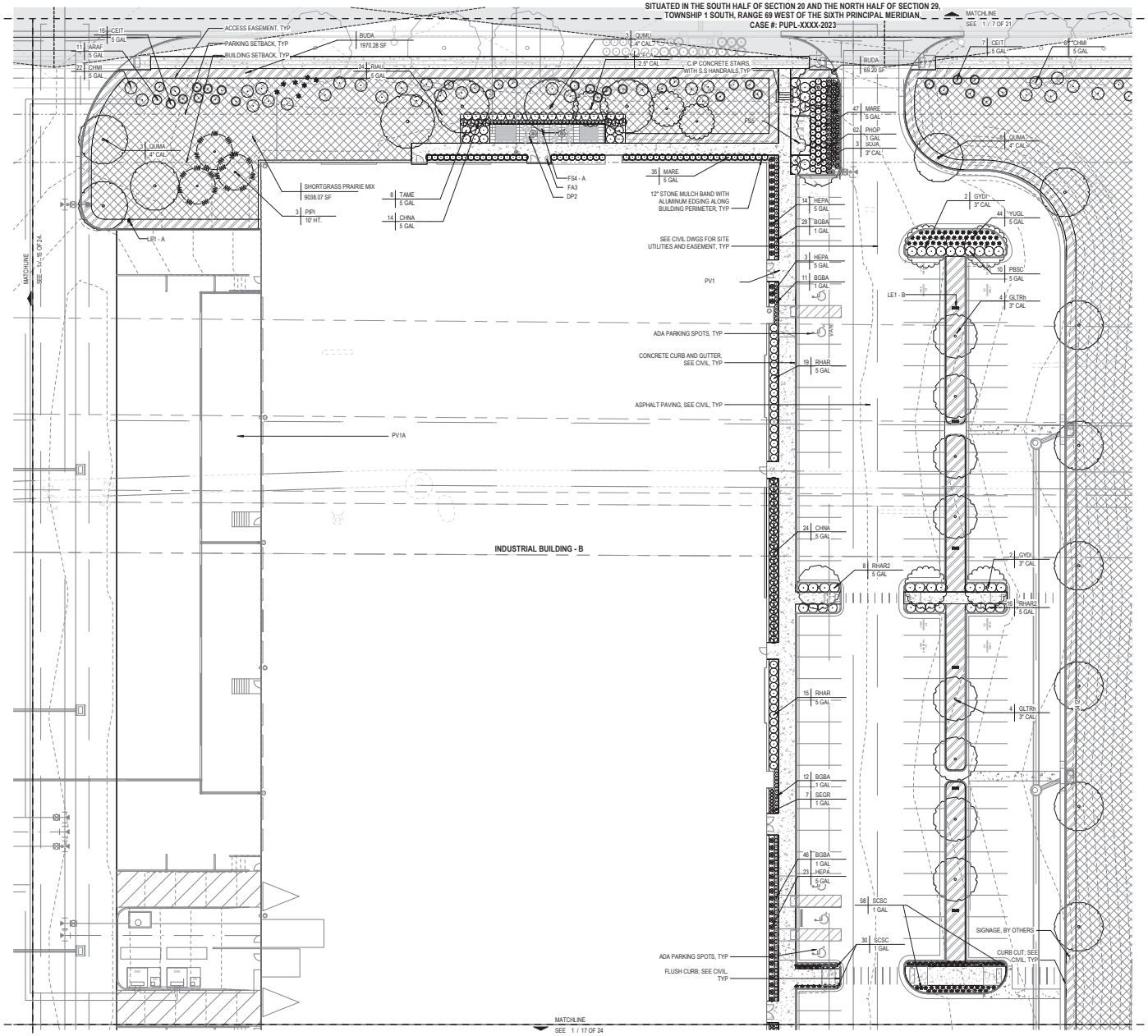
PROJECT # 221230

9/10/2025 12:13:40 PM Autodesk Docs://Redtail Ridge Overall Vision/RTR_PUD_1.rvt

REDTAIL RIDGE PUD1 SOUTH

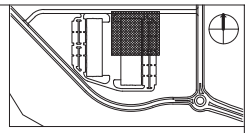
REDTAIL RIDGE FILING NO.1

PLANNED UNIT DEVELOPMENT, LOT 1 BLOCK 1 & LOT 2 BLOCK 1
SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29,
TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MEIDIAN,
CASE #: PUPL-XXXX-2023



MATERIAL LEGEND		
LEGEND	TAG	MATERIAL
	DP2	CONCRETE PAVERS
	MM1	DECOMPOSED GRANITE
	PV1	PEDESTRIAN RATED CIP CONCRETE

SITE FURNITURE & LIGHTING LEGEND		
LEGEND	TAG	TYPE
	FA3	LITTER RECEPTACLE
	FS1 - A	BENCH
	FS2 - B	PICNIC TABLE SET 2
	FS3	DINING TABLE
	FS4 - A	LOUNGE CHAIR
	FS4 - B	DINING CHAIR
	FS5	BIKE RACK
	LE1 - A	SINGLE SIDED VEHICULAR POLE LIGHT
	LE1 - B	DOUBLE SIDED VEHICULAR POLE LIGHT
	LE1 - C	PEDESTRIAN POLE LIGHT



KEY MAP
1" = 600'

0' 10' 20' 40' 80'

MATERIAL AND PLANTING PLAN - C

REVISION DATE:

ISSUE DATE: 09/10/2025

SHEET 16 OF 24

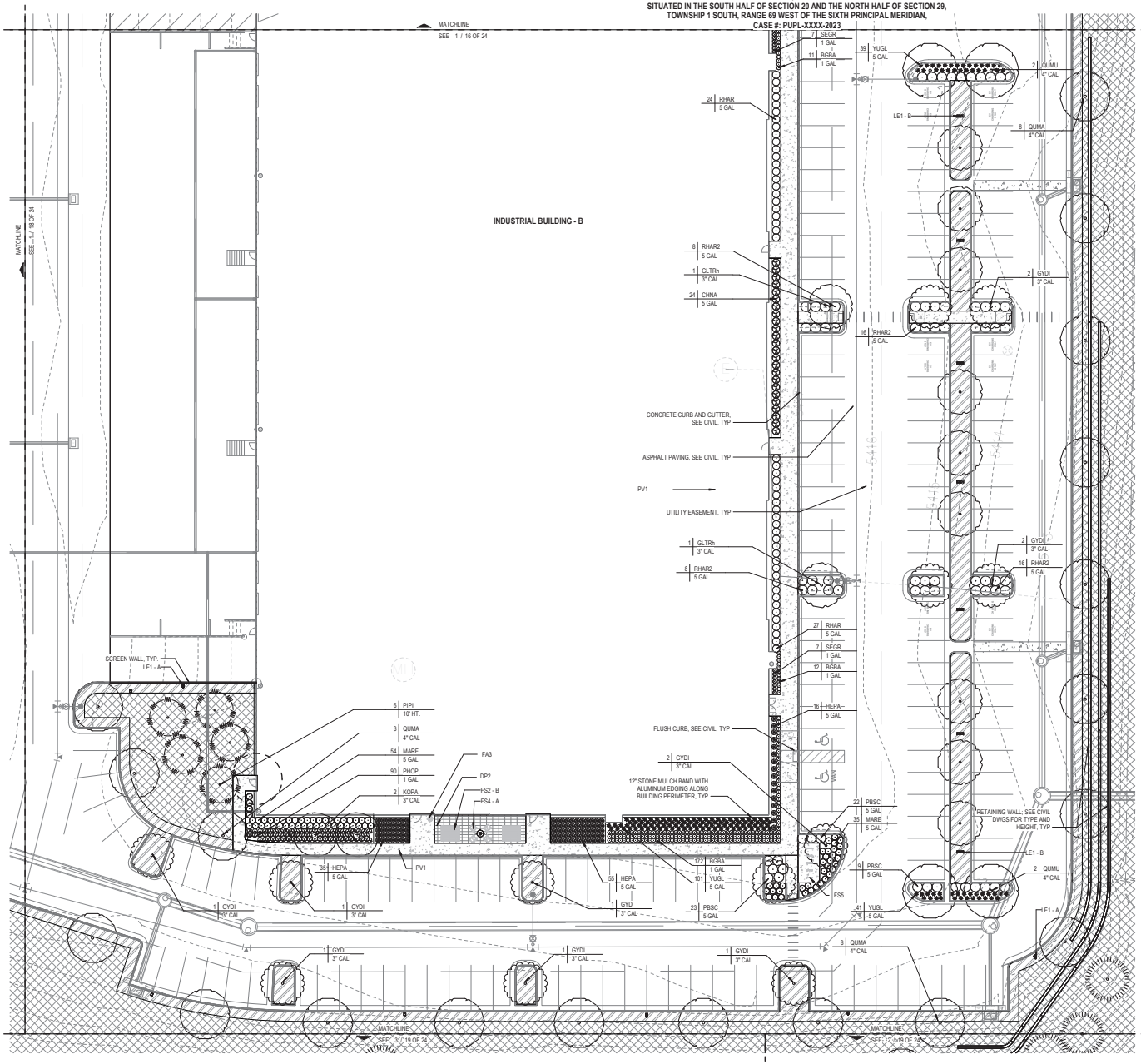
PROJECT # 221236

9/10/2025 12:13:46 PM Autodesk Docs://Redtail Ridge Overall Vision/RTR_PUD-1.rvt

REDTAIL RIDGE PUD1 SOUTH

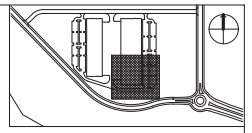
REDTAIL RIDGE FILING NO.1

PLANNED UNIT DEVELOPMENT, LOT 1 BLOCK 1 & LOT 2 BLOCK 1
SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29,
TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
CASE #: PUPL-XXXX-2023



MATERIAL LEGEND		
LEGEND	TAG	MATERIAL
	DP2	CONCRETE PAVERS
	MM1	DECOMPOSED GRANITE
	PV1	PEDESTRIAN RATED CIP CONCRETE

SITE FURNITURE & LIGHTING LEGEND		
LEGEND	TAG	TYPE
	FA3	LITTER RECEPTACLE
	FS1 - A	BENCH
	FS2 - B	PICNIC TABLE SET 2
	FS3	DINING TABLE
	FS4 - A	LOUNGE CHAIR
	FS4 - B	DINING CHAIR
	FS5	BIKE RACK
	LE1 - A	SINGLE SIDED VEHICULAR POLE LIGHT
	LE1 - B	DOUBLE SIDED VEHICULAR POLE LIGHT
	LE1 - C	PEDESTRIAN POLE LIGHT



KEY MAP
1" = 600'

0' 10' 20' 40' 80'

MATERIAL AND PLANTING PLAN - D

REVISION DATE:

ISSUE DATE: 09/10/2025

SHEET 17 OF 24

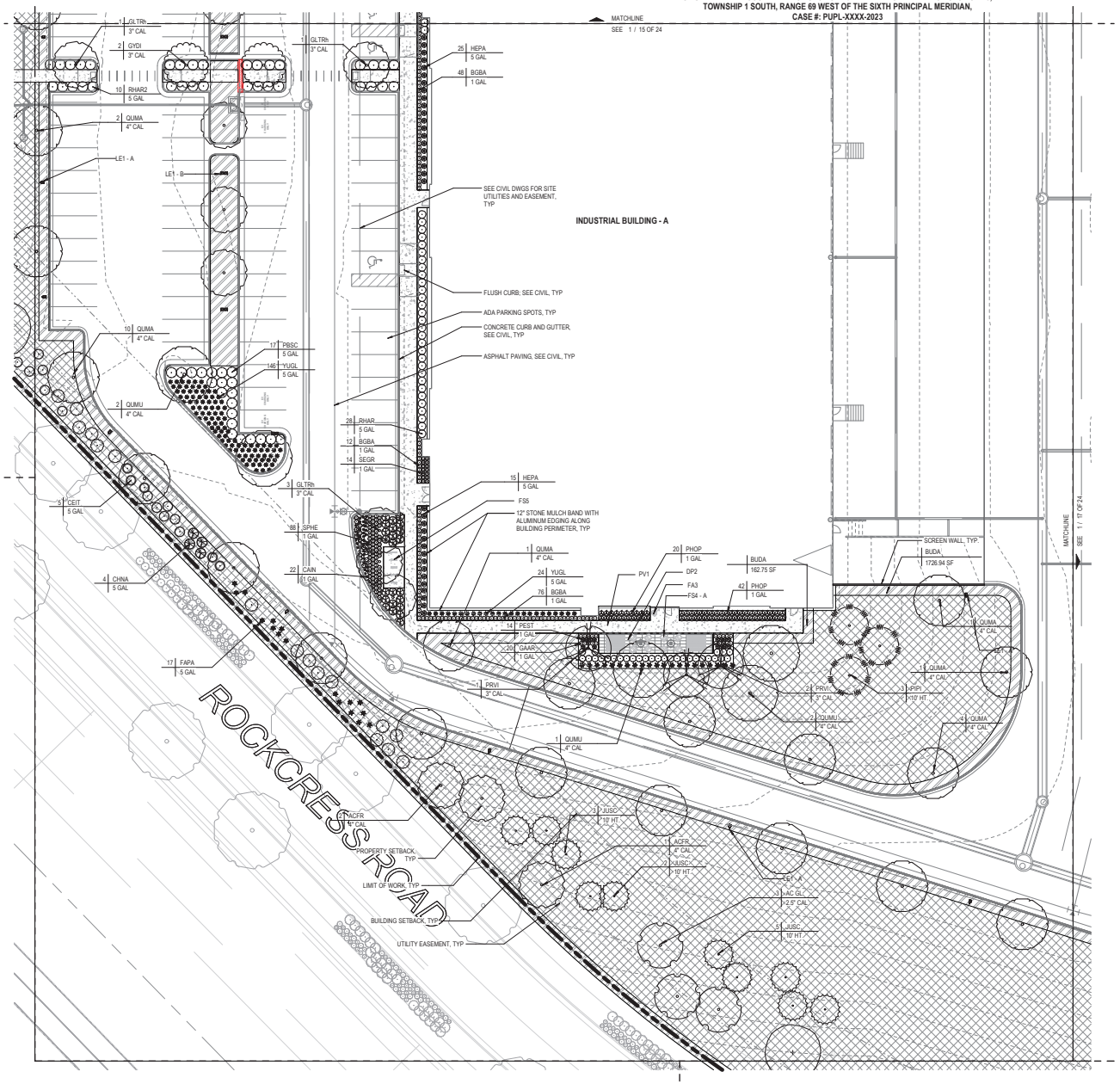
PROJECT # 272126

9/10/2025 12:13:48 PM Autodesk Docs://Redtail Ridge Overall Vision/RTR_PUD-1.rvt

REDTAIL RIDGE PUD1 SOUTH

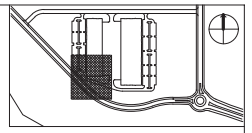
REDTAIL RIDGE FILING NO.1

PLANNED UNIT DEVELOPMENT, LOT 1 BLOCK 1 & LOT 2 BLOCK 1
SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29,
TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
CASE #: PUPL-XXXX-2023



MATERIAL LEGEND		
LEGEND	TAG	MATERIAL
	DP2	CONCRETE PAVERS
	MM1	DECOMPOSED GRANITE
	PV1	PEDESTRIAN RATED CIP CONCRETE

SITE FURNITURE & LIGHTING LEGEND		
LEGEND	TAG	TYPE
	FA3	LITTER RECEPTACLE
	FS1 - A	BENCH
	FS2 - B	PICNIC TABLE SET 2
	FS3	DINING TABLE
	FS4 - A	LOUNGE CHAIR
	FS4 - B	DINING CHAIR
	FS5	BIKE RACK
	LE1 - A	SINGLE SIDED VEHICULAR POLE LIGHT
	LE1 - B	DOUBLE SIDED VEHICULAR POLE LIGHT
	LE1 - C	PEDESTRIAN POLE LIGHT



KEY MAP
1" = 600'

0' 10' 20' 40' 80'

REVISION DATE:

ISSUE DATE: 09/10/2025

SHEET 18 OF 24

MATERIAL AND PLANTING PLAN - E

PROJECT # 272536

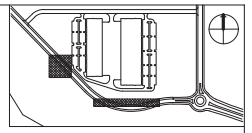
9/10/2025 12:13:55 PM Autodesk Docs://Redtail Ridge Overall Vision/RTR_PUD_1.rvt

REDTAIL RIDGE PUD1 SOUTH

REDTAIL RIDGE FILING NO.1

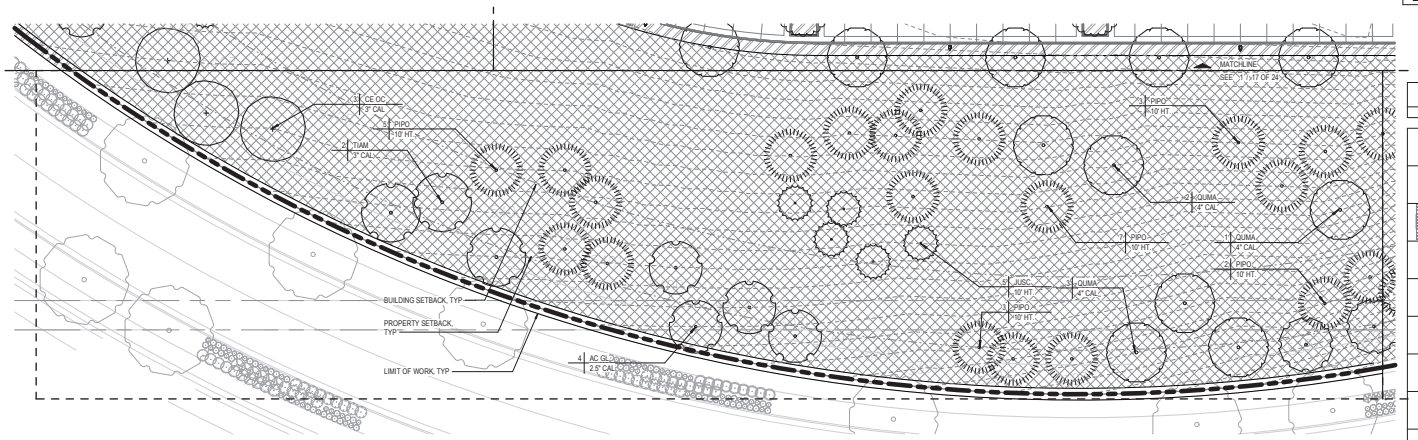
PLANNED UNIT DEVELOPMENT, LOT 1 BLOCK 1 & LOT 2 BLOCK 1
SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29,
TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
CASE #: PUPL-XXXX-2023

MATERIAL LEGEND		
LEGEND	TAG	MATERIAL
	DP2	CONCRETE PAVERS
	MM1	DECOMPOSED GRANITE
	PV1	PEDESTRIAN RATED CIP CONCRETE

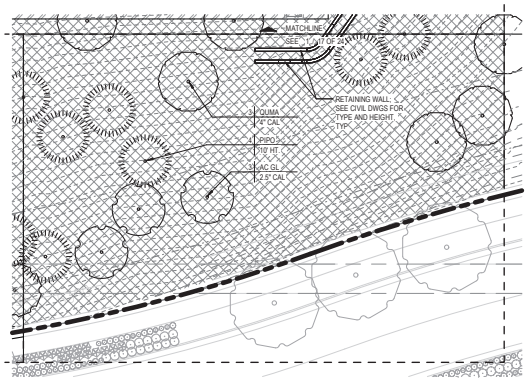


KEY MAP
1" = 600'

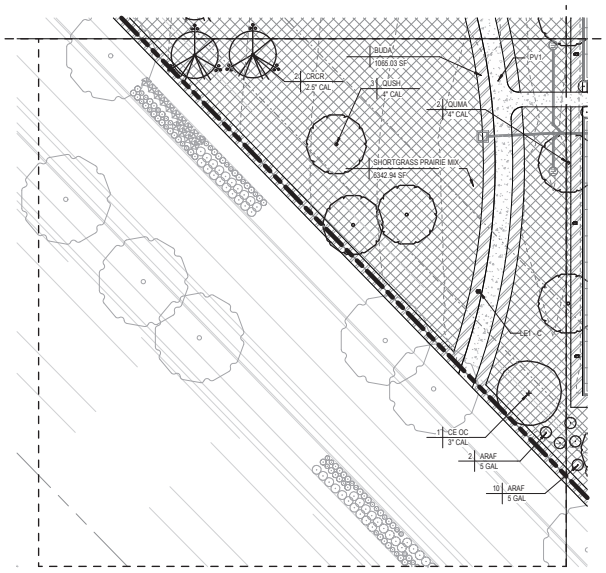
SITE FURNITURE & LIGHTING LEGEND		
LEGEND	TAG	TYPE
	FA3	LITTER RECEPTACLE
	FS1 - A	BENCH
	FS2 - B	PICNIC TABLE SET 2
	FS3	DINING TABLE
	FS4 - A	LOUNGE CHAIR
	FS4 - B	DINING CHAIR
	FS5	BIKE RACK
	LE1 - A	SINGLE SIDED VEHICULAR POLE LIGHT
	LE1 - B	DOUBLE SIDED VEHICULAR POLE LIGHT
	LE1 - C	PEDESTRIAN POLE LIGHT



3 MATERIAL AND PLANTING PLAN - G
1" = 20'-0"



2 MATERIAL AND PLANTING PLAN - H
1" = 20'-0"



1 MATERIAL AND PLANTING PLAN - F
1" = 20'-0"

0' 10' 20' 40' 80'

REVISION DATE:

ISSUE DATE: 09/10/2025

MATERIAL AND PLANTING PLAN - F, G & H

SHEET 19 OF 24

PROJECT # 272536

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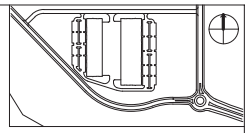
REDTAIL RIDGE PUD1 SOUTH

REDTAIL RIDGE FILING NO.1

PLANNED UNIT DEVELOPMENT, LOT 1 BLOCK 1 & LOT 2 BLOCK 1
SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29,
TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
CASE #: PUPL-XXXX-2023

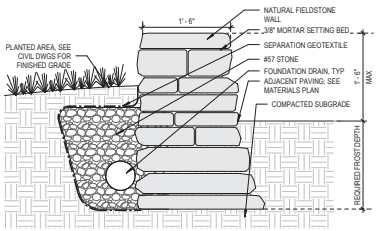
SITE FURNITURE & LIGHTING SCHEDULE			
	QUANTITY	TAG	TYPE
	5	FA3	LITTER RECEPTACLE
	1	FS1 - A	BENCH
	9	FS2 - B	PICNIC TABLE SET 2
	9	FS3	DINING TABLE
	29	FS4 - A	LOUNGE CHAIR
	34	FS4 - B	DINING CHAIR
	21	FS5	BIKE RACK
	27	LE1 - A	SINGLE SIDED VEHICULAR POLE LIGHT
	24	LE1 - B	DOUBLE SIDED VEHICULAR POLE LIGHT
	15	LE1 - C	PEDESTRIAN POLE LIGHT



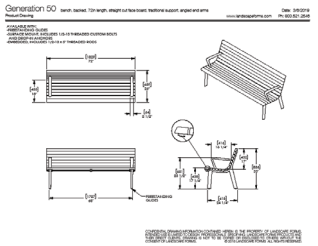
KEY MAP
1" = 600'

9 COUNCIL RING RENDERING
NTS

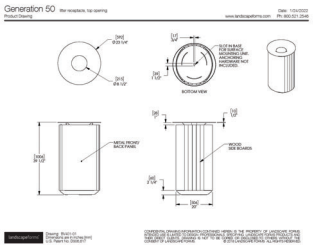
8 SE RETAINING WALLS
NTS



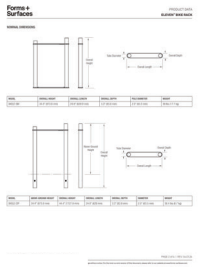
7 NATURAL FIELDSTONE SEAT WALL
1" = 1'-0"



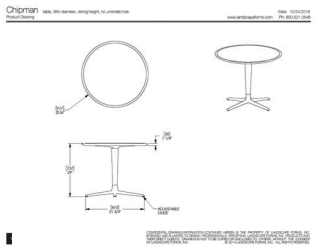
6 BENCH - FS1 - A
1/2" = 1'-0"



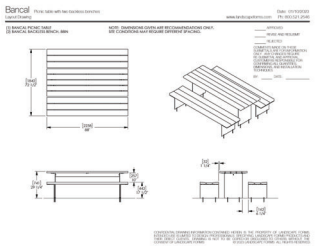
5 LITTER RECEPTACLE - FA3
1/2" = 1'-0"



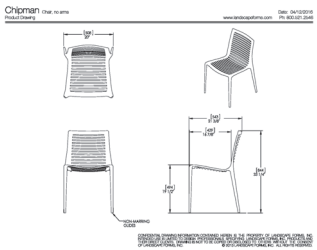
4 BIKE RACK - FS5
1/2" = 1'-0"



3 DINING TABLE - FS3
1/2" = 1'-0"



2 PICNIC TABLE SET 2 - FS2 - B
1/2" = 1'-0"



1 DINING CHAIR - FS4 - B
1/2" = 1'-0"

SITE FURNISHING DETAILS

REVISION DATE: **ISSUE DATE:** 09/10/2025 **SHEET** 20 OF 24

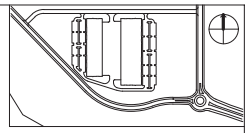
PROJECT # 272536

REDTAIL RIDGE PUD1 SOUTH

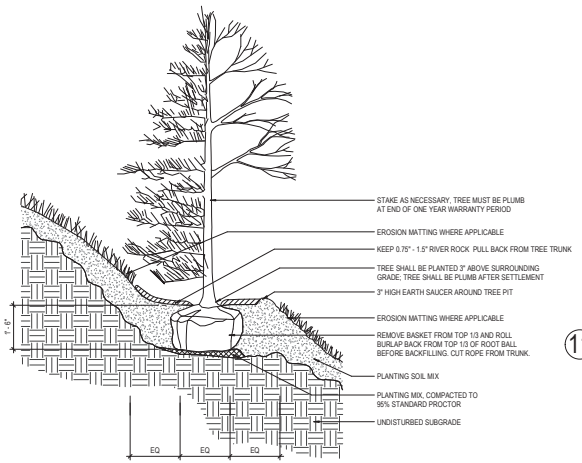
9/10/2025 12:14:04 PM Autodesk Docs://Redtail Ridge Overall Vision/RTR_PUD-1.rvt

REDTAIL RIDGE FILING NO.1

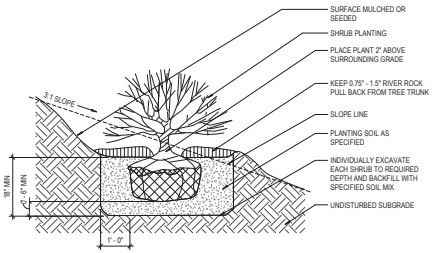
PLANNED UNIT DEVELOPMENT, LOT 1 BLOCK 1 & LOT 2 BLOCK 1
SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29,
TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
CASE #: PUPL-XXXX-2023



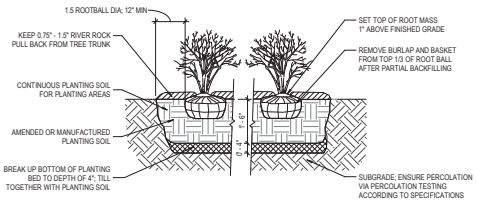
KEY MAP
1" = 600'



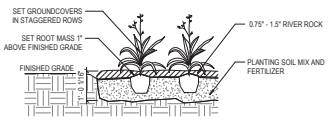
7 TREE PLANTING ON SLOPE
1/2" = 1'-0"



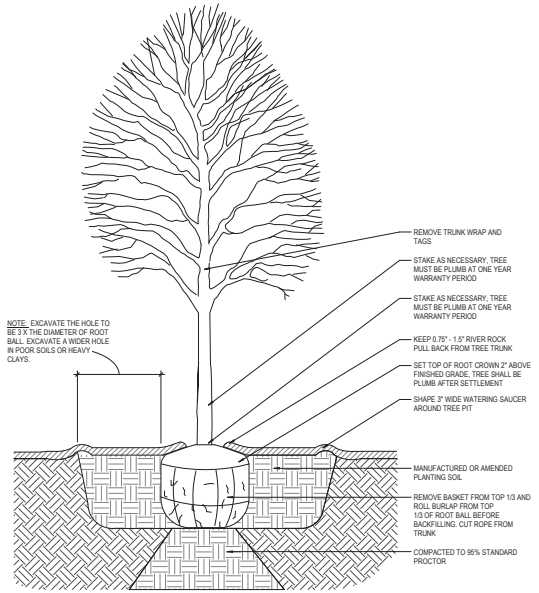
11 SHRUB PLANTING ON SLOPE
1/2" = 1'-0"



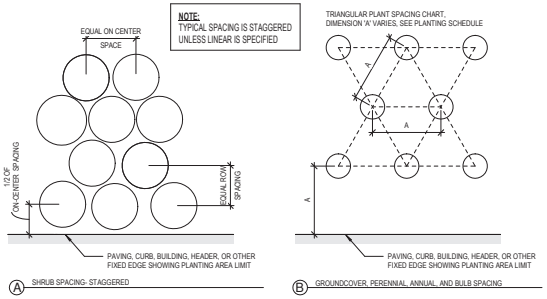
9 TYPICAL SHRUB PLANTING AT GRADE
1/2" = 1'-0"



8 TYPICAL GROUNDCOVER PLANTING
1/2" = 1'-0"



10 TYPICAL TREE PLANTING AT GRADE
1/2" = 1'-0"



1 PLANT SPACING
1/2" = 1'-0"

CLEAN AND MULCH NOTES:

1. THE CONTRACTOR SHALL CLEAR AND GRUB ALL WEEDS, DEAD TREES, TREES ONE (1) INCH CALIPER OR LESS AND OTHER SELECT TREES UP TO FOUR (4) INCH CALIPER AS DETERMINED IN THE FIELD IN THE TREE SAVE AREAS INDICATED ON THE DRAWINGS.
2. A THREE (3) INCH MINIMUM LAYER OF MULCH SHALL BE SPREAD OVER THE ENTIRE CLEARED AREA.
3. THE CONTRACTOR WILL NOTIFY THE ARCHITECT PRIOR TO START OF THE CLEAN AND MULCH WORK.
4. THE ARCHITECT WILL VERIFY SCOPE OF WORK IN FIELD WITH THE CONTRACTOR PRIOR TO THE START OF WORK.
5. THE CONTRACTOR IS RESPONSIBLE FOR THE REMOVAL AND LEGAL DISPOSAL OF ALL DEBRIS FROM CLEAN-UP OPERATIONS FROM THE SITE.

GENERAL PLANTING NOTES:

1. ALL PLANTS MUST BE HEALTHY, VIGOROUS MATERIAL; FREE OF PESTS & DISEASES.
2. ALL PLANTS MUST BE CONTAINER-GROWN (CONT.) OR BALLED AND BURLAPPED (B&B) AS INDICATED IN PLANT LIST.
3. ALL TREES MUST BE STRAIGHT TRUNKED, FULL HEADED, & MEET ALL REQUIREMENTS SPECIFIED.
4. ALL PLANTS ARE SUBJECT TO THE APPROVAL OF THE ARCHITECT & THE OWNER BEFORE, DURING, & AFTER INSTALLATION.
5. ALL TREES MUST BE GUYED OR STAKED AS SHOWN IN THE DETAILS.
6. ALL PLANTS AND PLANTING AREAS MUST BE COMPLETELY MULCHED AS SPECIFIED.
7. PRIOR TO CONSTRUCTION, THE LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UNDERGROUND UTILITIES & SHALL AVOID DAMAGE TO ALL UTILITIES DURING THE COURSE OF THE WORK. THE LANDSCAPE CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY & ALL DAMAGE TO UTILITIES, STRUCTURES, SITE APPURTENCES, ETC. WHICH OCCUR AS A RESULT OF THE LANDSCAPE CONSTRUCTION.
8. THE LANDSCAPE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL QUANTITIES SHOWN ON THESE PLANS BEFORE PRICING THE WORK.
9. THE LANDSCAPE CONTRACTOR IS RESPONSIBLE FOR FULLY MAINTAINING ALL PLANTING (INCLUDED BUT NOT LIMITED TO: WATERING, SPRAYING, MULCHING, FERTILIZING, ETC...) OF ALL PLANTING AND LAWN AREAS UNTIL THE WORK IS ACCEPTED IN TOTAL BY THE ARCHITECT AND OWNER.
10. THE LANDSCAPE CONTRACTOR SHALL COMPLETELY GUARANTEE ALL PLANT MATERIAL FOR A PERIOD OF ONE (1) YEAR BEGINNING AT THE DATE OF SUBSTANTIAL COMPLETION. THE LANDSCAPE CONTRACTOR SHALL PROMPTLY MAKE ALL REPLACEMENTS BEFORE OR AT THE END GUARANTEE PERIOD (AS DIRECTED BY THE OWNER).
11. THE ARCHITECT WILL APPROVE THE STAKED LOCATION OF ALL PLANT MATERIAL PRIOR TO INSTALLATION.

N

PLANTING DETAILS

PROJECT # 272536

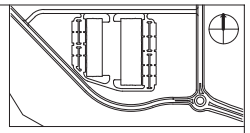
REVISION DATE: **ISSUE DATE:** 09/10/2025 **SHEET** 21 OF 24

REDTAIL RIDGE PUD1 SOUTH

9/10/2025 12:14:05 PM Autodesk Docs://Redtail Ridge Overall Vision/RTR_PUD_1.rvt

REDTAIL RIDGE FILING NO.1

PLANNED UNIT DEVELOPMENT, LOT 1 BLOCK 1 & LOT 2 BLOCK 1
SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29,
TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
CASE #: PUPL-XXXX-2023



KEY MAP
1" = 600'

TREE & SHRUB PLANTING SCHEDULE

QTY	CODE	SCIENTIFIC NAME	COMMON NAME	SIZE	ROOT	SPACING	COMMENTS
SHRUB							
28	ACLA	ACHILLEA LANULOSA	MOUNTAIN YARROW	1 GAL	B&B	18"	FULL, WELL BRANCHED
43	ARAF	ARTEMESIA FILLIFOLIA	SAND SAGE	5 GAL	B&B	48"	FULL, WELL BRANCHED
10	ASAC	ASTER ASCENDENS	WESTERN ASTER	1 GAL	B&B	18"	FULL, WELL BRANCHED
18	ASTU	ASCLEPIA TUBEROSA	BUTTERFLY WEED	1 GAL	B&B	18"	FULL, WELL BRANCHED
541	BGBA	BOUTELOUA GRACILIS 'BLOND AMBITION BLUE'	GRAMA GRASS	1 GAL	B&B	18"	FULL, WELL BRANCHED
21	CAIN	CALLIRHOE INVOLUCRATA	POPPY MALLOW	1 GAL	B&B	18"	FULL, WELL BRANCHED
50	CEIT	CERCOCARPUS ITRICATA	LITTLELEAF MOUNTAIN MAHOGANY	5 GAL	B&B	48"	
69	CHMI	CHAMAEBATIARIA MILLEFOLIUM	FERNBUSH	5 GAL	B&B	5'	FULL, WELL BRANCHED
133	CHNA	CHRYSOTHAMNUS NAUSEOSUS VAR NAUSEOSUS	DWARF RABBITBRUSH	5 GAL	B&B	<varies>	<varies>
16	ENPE	ENGELLMANIA PERSISTENA	ENGELLMAN DAISY	1 GAL	B&B	18"	FULL, WELL BRANCHED
44	FAPA	FALLUGIA PARADOXA	APACHE PLUME	5 GAL	B&B	36"	
57	FEPA	FELLUGIA PARADOXA	APACHE PLUME	5 GAL	B&B	36"	FULL, WELL BRANCHED
37	GAAR	GAILLARDIA ARISTATA	BLANKET FLOWER	1 GAL	B&B	18"	FULL, WELL BRANCHED
221	HEPA	HESPERALOE PARVIFLORA	RED YUCCA	5 GAL	B&B	36"	FULL, WELL BRANCHED
5	LILG	LIATRIS LIGULISTYLUS	ROCKY MOUNTAIN GAYFEATHER	1 GAL	B&B	18"	FULL, WELL BRANCHED
224	MARE	MAHONIA REPENS	CREEPING GRAPE HOLLY	5 GAL	B&B	30"	FULL, WELL BRANCHED
30	MURE	MUHLENBERGIA REVERCHONII 'UNDAUNTED'	UNDAUNTED RUBY MUHLY GRASS	3 GAL	B&B	30"	FULL, WELL BRANCHED
16	OEMA	OENOTHERA MACROCARPA	EVENING PRIMROSE	1 GAL	B&B	18"	FULL, WELL BRANCHED
118	PBSC	PRUNUS BESSEYI 'PAWNEE BUTTES'	PAWNEE BUTTES SAND CHERRY	5 GAL	B&B	48"	FULL, WELL BRANCHED
9	PESR	PENSTEMON STRICTUS	ROCKY MOUNTAIN PENSTEMON	1 GAL	B&B	18"	FULL, WELL BRANCHED
15	PEST	PENSTEMON BARBARATUS	SCARLET BUGLAR	1 GAL	B&B	18"	FULL, WELL BRANCHED
188	PHOP	PHYSOCARPUS OPULIFOLIUS 'NANA'	DWARF NINEBARK	1 GAL	B&B	24"	FULL, WELL BRANCHED
7	RACO	RATIBIDA COLUMNIFERA	PRAIRIE CONEFLOWER	1 GAL	B&B	18"	FULL, WELL BRANCHED
147	RHAR	RHUS AROMATICA 'GRO-LOW'	GRO-LOW SUMAC	5 GAL	B&B	36"	FULL, WELL BRANCHED
132	RHAR2	RHUS AROMATICA 'GRO-LOW'	GRO-LOW SUMAC	5 GAL	B&B	48"	FULL, WELL BRANCHED
35	RIAU	RIBES AUREUM	GOLDEN CURRANT	5 GAL	B&B	42"	FULL, WELL BRANCHED
66	RUHI	RUDBECKIA HIRTA	BLACK EYED SUSAN	1 GAL	B&B	18"	FULL, WELL BRANCHED
247	SCSC	SCHIZACYRIUM SCOPARIUM 'THE BLUES'	THE BLUES LITTLE BLUESTEM GRASS	1 GAL	B&B	18"	FULL, WELL BRANCHED
50	SEGR	SALVIA GREGGI 'FURMAN'S RED'	AUTUMN SAGE	1 GAL	B&B	18"	FULL, WELL BRANCHED
263	SPHE	SPOROBOLUS HETEROLEPSIS	PRAIRIE DROPSEED	1 GAL	B&B	18"	FULL, WELL BRANCHED
1	SPHE2	SPOROBOLUS HETEROLEPSIS	PRAIRIE DROPSEED	1 GAL	B&B	24"	FULL, WELL BRANCHED
18	TAME	TAXUS X MEDIA ' DENSIFORMIS'	DENSIFORMIS YEW	5 GAL	B&B	42"	FULL, WELL BRANCHED
486	YUGL	YUCCA GLAUCA	SOAPWEED	5 GAL	B&B	30"	FULL, WELL BRANCHED
TREE							
21	AC GL	ACER GLABRUM	ROCKY MOUNTAIN MAPLE	2.5" CAL	B&B	AS SHOWN	FULL, WELL BRANCHED
8	ACFR	ACER FREMANII 'AUTUMN BLAZE'	AUTUMN BLAZE MAPLE	4" CAL	B&B	AS SHOWN	FULL, WELL BRANCHED
11	CE OC	CELTIS OCCIDENTALIS 'PRAIRIE PRIDE'	PRAIRIE PRIDE HACKBERRY	3" CAL	B&B	AS SHOWN	FULL, WELL BRANCHED
3	CECA	CERCIS CANADENSIS	REDBUD	2.5" CAL	B&B	AS SHOWN	FULL, WELL BRANCHED
15	CRCR	CRATAEGUS CRUS-GALLI 'INERMIS'	INERMIS COCKSPUR HAWTHORN	2.5" CAL	B&B	AS SHOWN	FULL, WELL BRANCHED, MIN. 4' CLEAR TRUNK
40	GLTRh	GLEDITSIA TRIACANTHOS INERMIS 'HARVEST TM'	NORTHERN ACCLAIM HONEYLOCUST	3" CAL	B&B	AS SHOWN	FULL, WELL BRANCHED
25	GYDI	GYMNOCLADUS DIOICUS	KENTUCKY COFFEE TREE	3" CAL	B&B	AS SHOWN	FULL, WELL BRANCHED
15	JUSC	JUNIPERUS SCOPULORUM	ROCKY MOUNTAIN JUNIPER	10' HT.	B&B	AS SHOWN	FULL, WELL BRANCHED
2	KOPA	KOELREUTERIA PANICULATA	GOLDEN RAIN TREE	3" CAL	B&B	AS SHOWN	FULL, WELL BRANCHED
16	PIPI	PINUS EDULIS	PINION PINE	10' HT.	B&B	AS SHOWN	FULL, WELL BRANCHED
40	PIPO	PINUS PONDEROSA	PONDEROSA PINE	10' HT.	B&B	AS SHOWN	FULL, WELL BRANCHED
6	PRVI	PRUNUS VIRGINIANA	CHOKECHERRY	3" CAL	B&B	AS SHOWN	FULL, WELL BRANCHED
74	QUMA	QUERCUS MACROCARPA	BURR OAK	4" CAL	B&B	AS SHOWN	FULL, WELL BRANCHED
20	QUMU	QUERCUS MUEHLENBERGII	CHINKAPIN OAK	4" CAL	B&B	AS SHOWN	FULL, WELL BRANCHED
4	QUSH	QUERCUS SHUMARDII	SHUMARD OAK	4" CAL	B&B	AS SHOWN	FULL, WELL BRANCHED
5	SOJA	SOPHORA JAPONICA	JAPANESE PAGODA TREE	3" CAL	B&B	AS SHOWN	FULL, WELL BRANCHED, 5' CLEAR TRUNK
12	TIAM	TILIA AMERICANA	BASSWOOD	3" CAL	B&B	AS SHOWN	FULL, WELL BRANCHED

SHRUB & GROUNDCOVER PLANTING SCHEDULE

Area	CODE	SCIENTIFIC NAME	COMMON NAME	COMMENTS
GRASS/FORB				
203653.55 SF	BUDA	BUCHLOE DACTYLOIDES	BUFFALOGRASS	SOD
17902.27 SF	SHORTGRASS PRAIRIE MIX	BUCHLOE DACTYLOIDES	BUFFALOGRASS	SOD
2454.80 SF	BUDA			
505317.28 SF	SHORTGRASS PRAIRIE MIX			<varies>
15855.74 SF	SHRUBS			

PLANTING LEGEND

SHORTGRASS PRAIRIE MIX

BUFFALO GRASS

PLANTING SCHEDULE

PROJECT # 272250

REVISION DATE:

ISSUE DATE: 09/10/2025

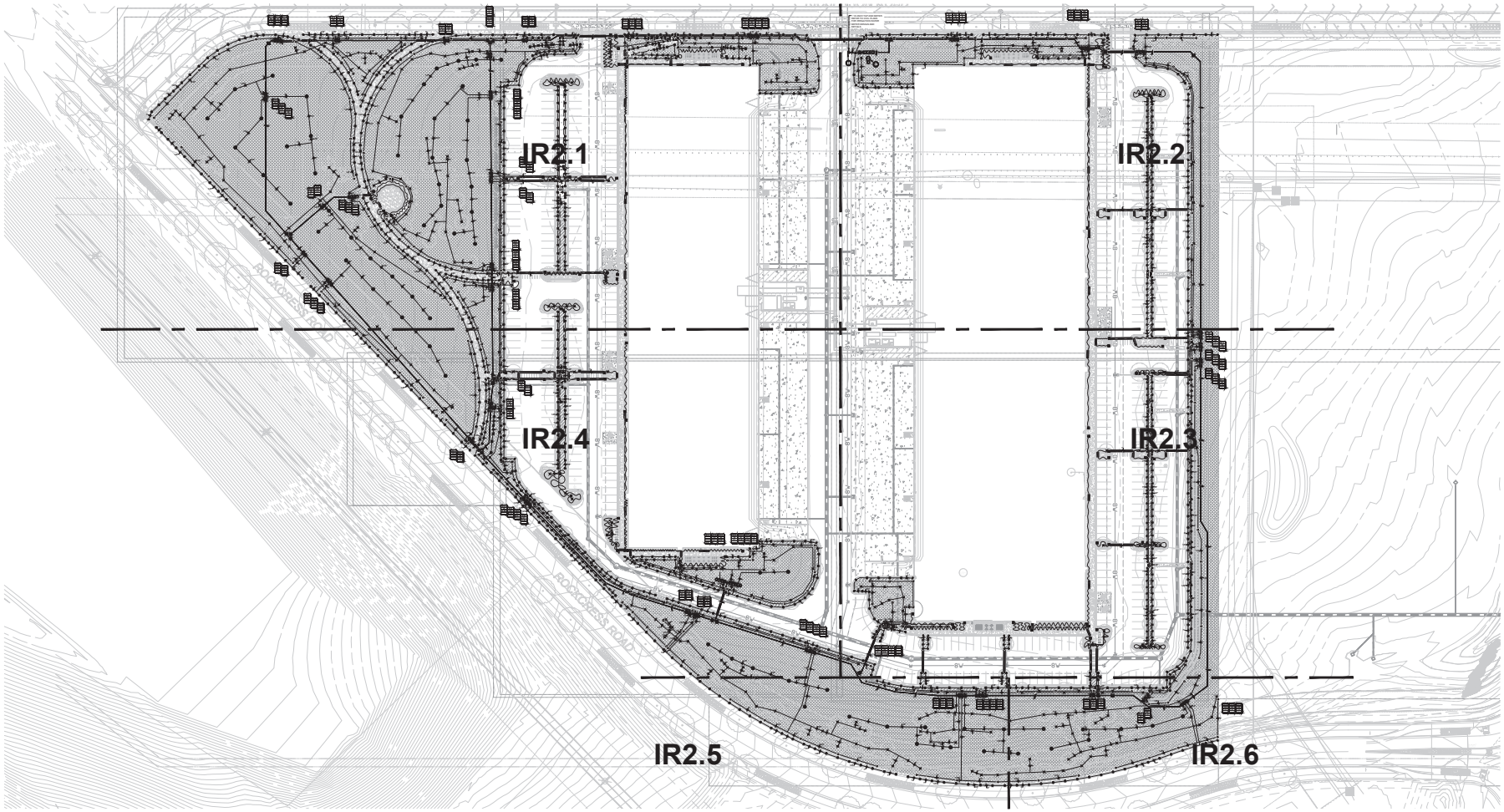
SHEET 22 OF 24

REDTAIL RIDGE PUD1 SOUTH

9/10/2025 12:14:07 PM Autodesk Docs://Redtail Ridge Overall Vision/RTR_PUD-1.rvt

REDTAIL RIDGE FILING NO. 1

PLANNED UNIT DEVELOPMENT
LOT 1 BLOCK 1
SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29, TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
CASE #: PUD-00547-2025



90% PRELIMINARY DESIGN
NOT FOR CONSTRUCTION

0' 30' 60' 120' 180'
1" = 60'

IRRIGATION PLAN OVERVIEW

REVISION DATE: ######## ISSUE DATE: 11/26/2025 SHEET # OF ##

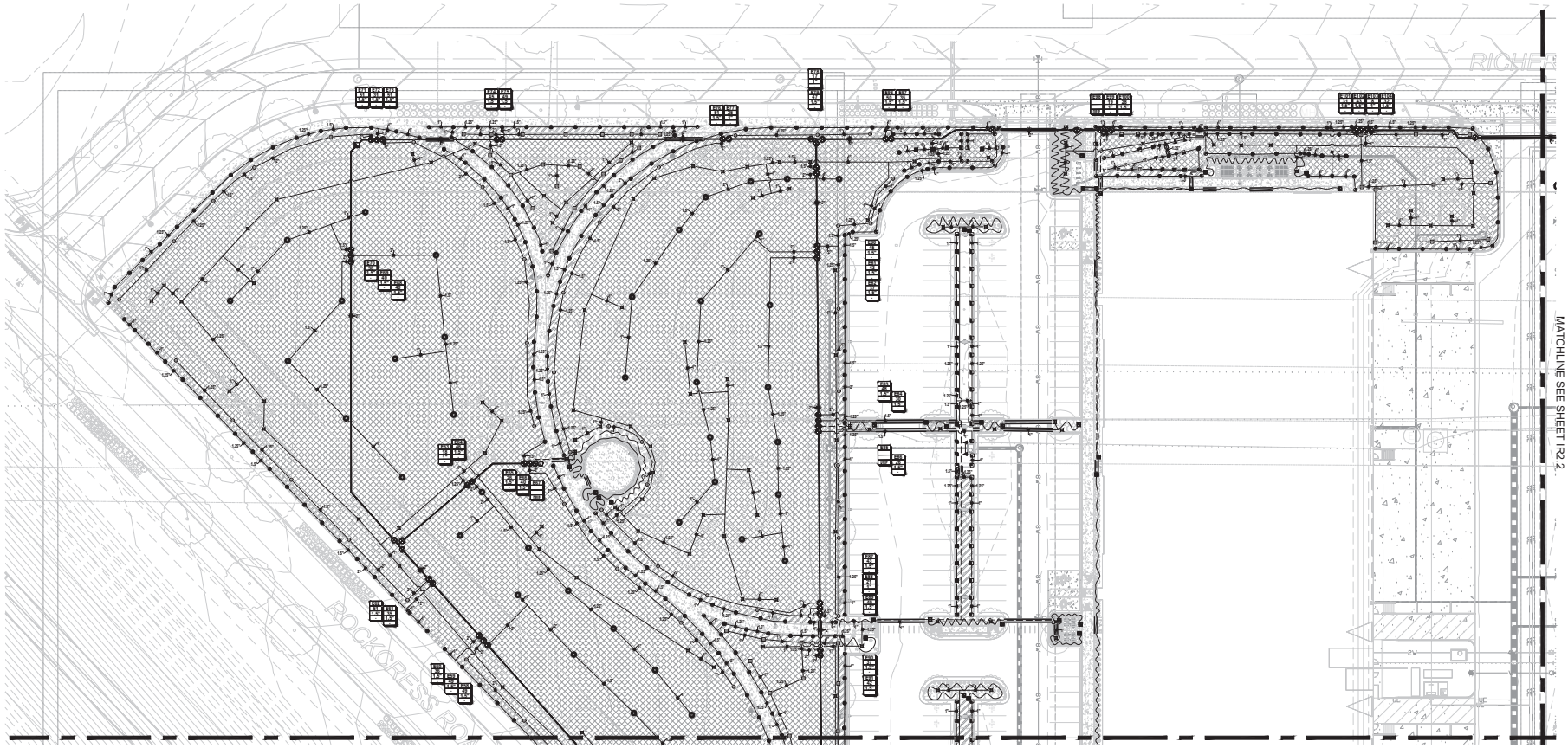
REDTAIL RIDGE PUD1 SOUTH

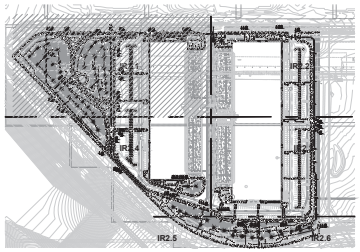
PROJECT #: 21126

Plotted: TUE 11/25/25 2:26:09P By: LeslieBerger

REDTAIL RIDGE FILING NO. 1

PLANNED UNIT DEVELOPMENT
LOT 1 BLOCK 1
SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29, TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
CASE #: PUD-00547-2025





KEYMAP
N.T.S.

90% PRELIMINARY DESIGN
NOT FOR CONSTRUCTION

N

0' 15' 30' 60' 90'
1" = 30'

IRRIGATION PLAN IR2.1

REVISION DATE: ######## ISSUE DATE: 11/26/2025 SHEET # OF ##

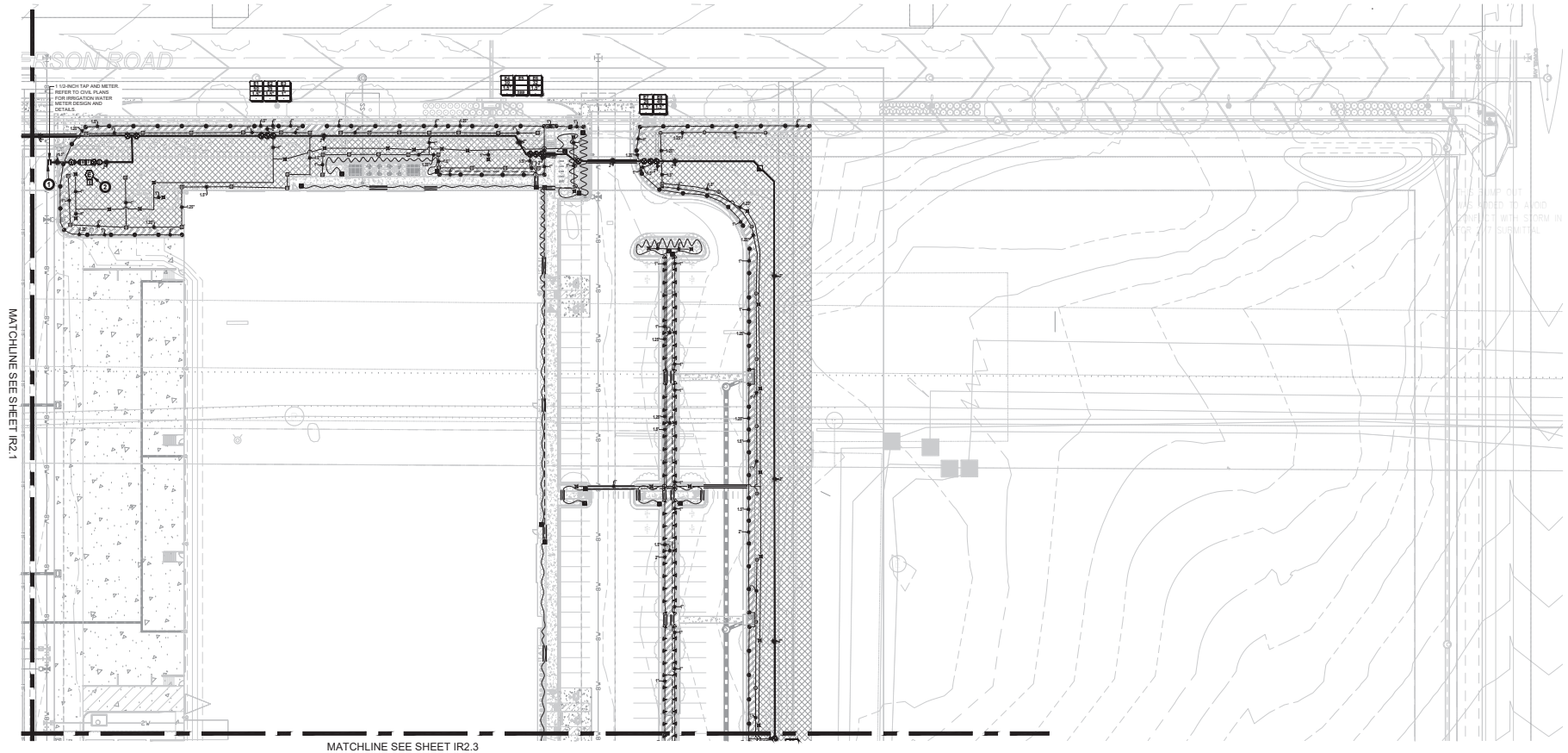
REDTAIL RIDGE PUD1 SOUTH

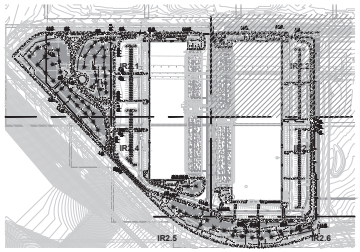
PROJECT #: 21126

Filepath: O:\HIS\REDTAIL RIDGE\PUD_1\REDTAIL_RIDGE PUD_1.DWG Layout: IR2.1
Plotted: TUE 11/25/25 2:28 3AP By: Leslie Berger

REDTAIL RIDGE FILING NO. 1

PLANNED UNIT DEVELOPMENT
LOT 1 BLOCK 1
SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29, TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
CASE #: PUD-00547-2025





KEYMAP
N.T.S.

90% PRELIMINARY DESIGN
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1" = 30'

IRRIGATION PLAN IR2.2

REVISION DATE: ######## ISSUE DATE: 11/26/2025 SHEET # OF ##

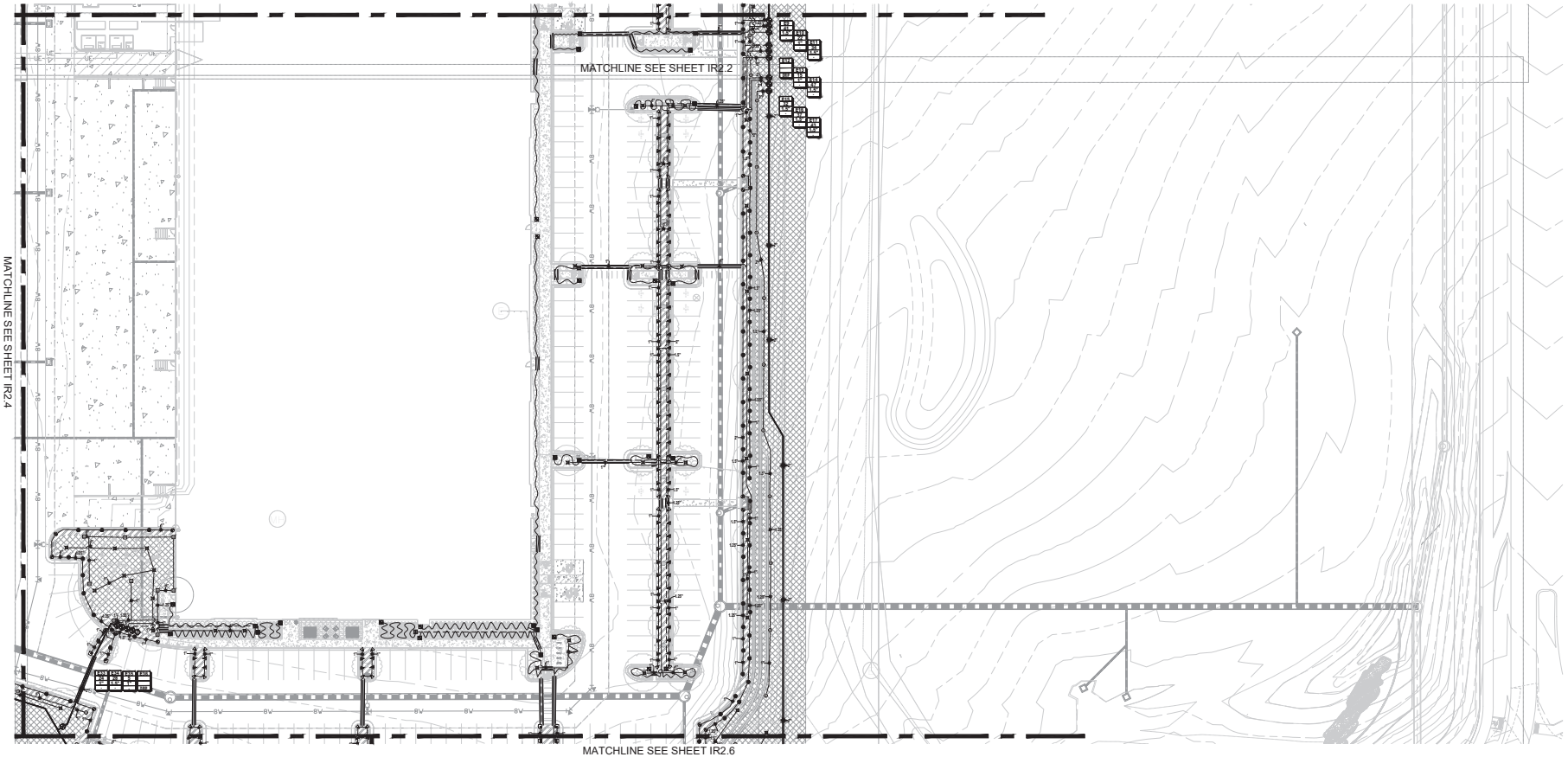
REDTAIL RIDGE PUD1 SOUTH

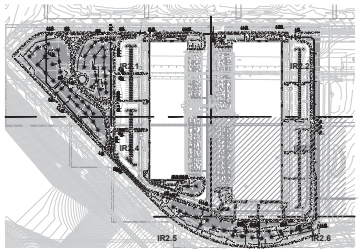
PROJECT #: 21126

Plotted: TUE 11/25/25 2:29:08P By: Leslie Berger

REDTAIL RIDGE FILING NO. 1

PLANNED UNIT DEVELOPMENT
LOT 1 BLOCK 1
SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29, TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
CASE #: PUD-00547-2025





KEYMAP
N.T.S.

90% PRELIMINARY DESIGN
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0' 15' 30' 60' 90'
1" = 30'

IRRIGATION PLAN IR2.3

REVISION DATE: ######## ISSUE DATE: 11/26/2025 SHEET # OF ##

REDTAIL RIDGE PUD1 SOUTH

PROJECT #: 21126

Filepath: O:\HIS\REDTAIL-RIDGE\PUD_1\REDTAIL_RIDGE PUD_1.DWG Layout: IR2.3
Plotted: TUE 11/25/25 2:29 4:5P By: Leah Berger

REDTAIL RIDGE FILING NO. 1

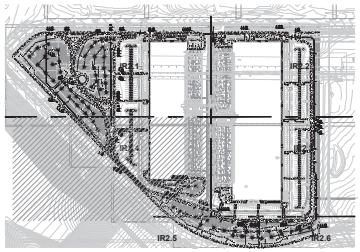
PLANNED UNIT DEVELOPMENT

LOT 1 BLOCK 1

SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29, TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN,

CASE #: PUD-00547-2025

MATCHLINE SEE SHEET IR2.1



KEYMAP
N.T.S.

90% PRELIMINARY DESIGN
NOT FOR CONSTRUCTION

0' 15' 30' 60' 90'
1" = 30'

IRRIGATION PLAN IR2.4

REVISION DATE: ######## ISSUE DATE: 11/26/2025 SHEET # OF ##

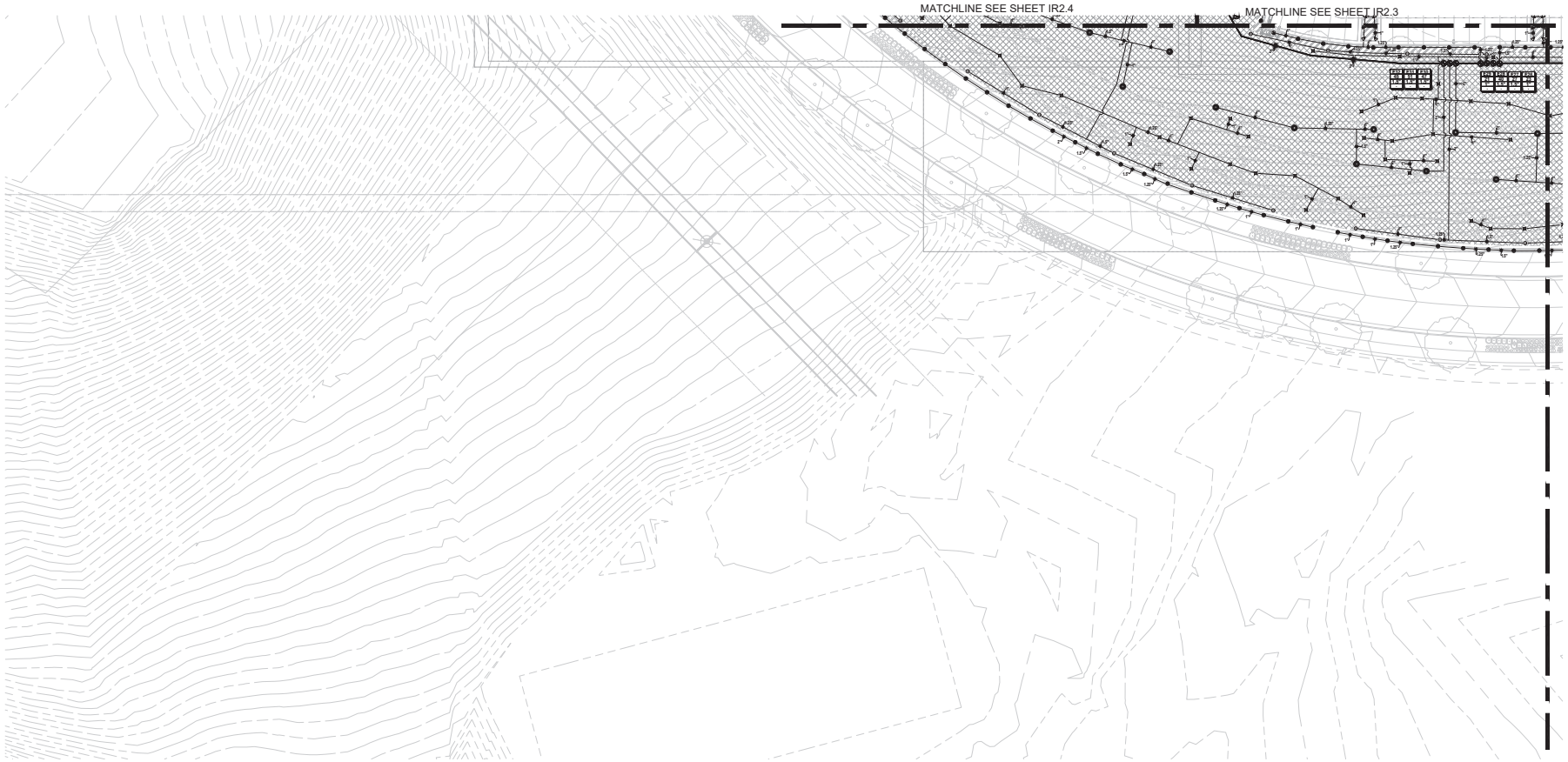
REDTAIL RIDGE PUD1 SOUTH

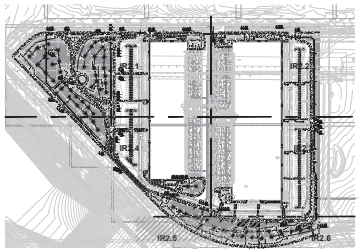
PROJECT #: 21126

Plotted: TUE 11/25/25 2:53:39P By: Leah Berger

REDTAIL RIDGE FILING NO. 1

PLANNED UNIT DEVELOPMENT
LOT 1 BLOCK 1
SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29, TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
CASE #: PUD-00547-2025





KEYMAP
N.T.S.

90% PRELIMINARY DESIGN
NOT FOR CONSTRUCTION

0' 15' 30' 60' 90'
1" = 30'

IRRIGATION PLAN IR2.5

REVISION DATE: ######## ISSUE DATE: 11/26/2025 SHEET # OF ##

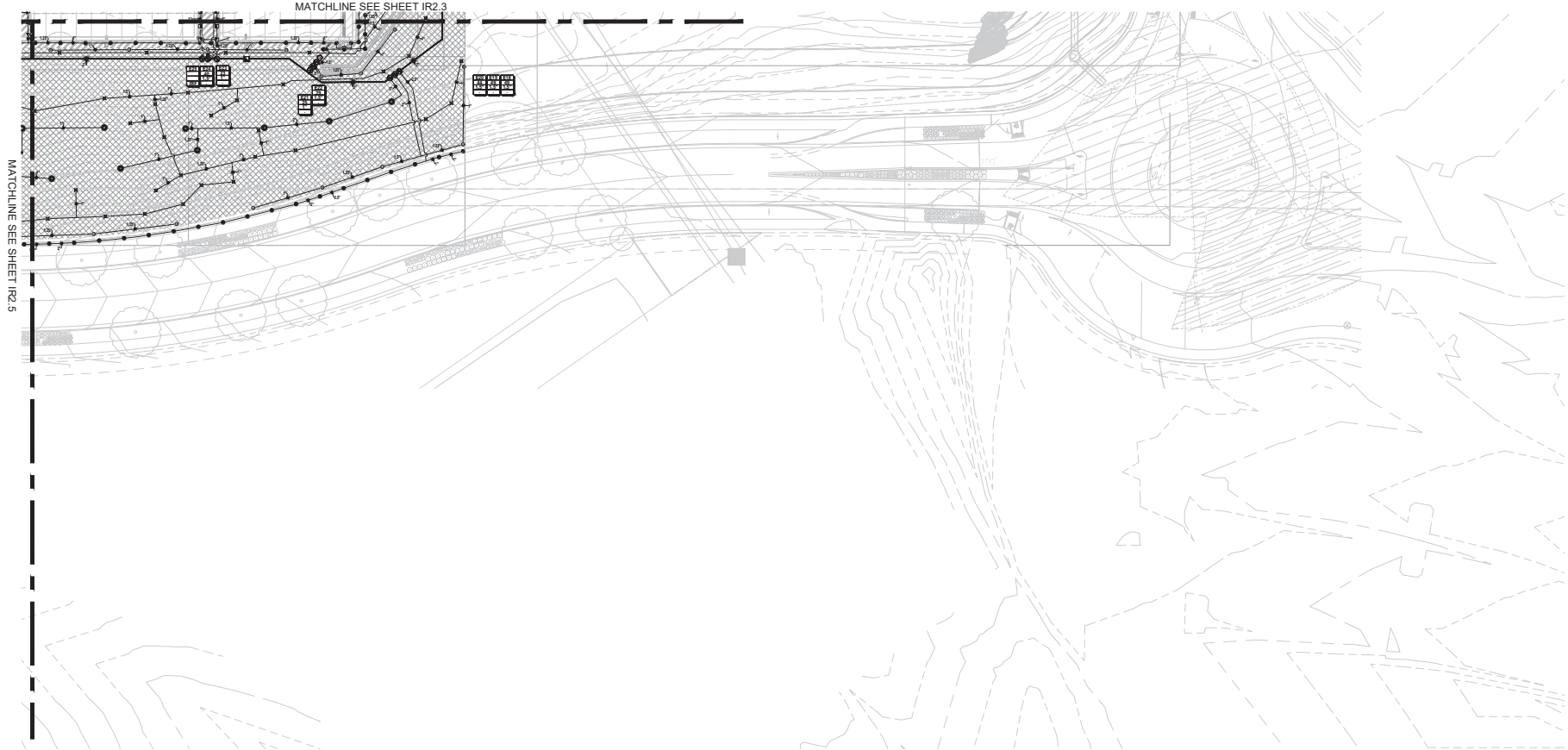
REDTAIL RIDGE PUD1 SOUTH

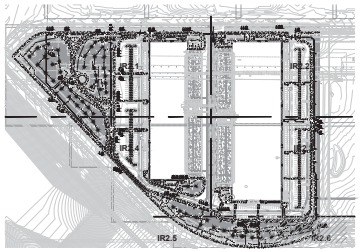
PROJECT #: 21126

Plotted: TUE 11/25/25 2:29:34P By: Leah Berger

REDTAIL RIDGE FILING NO. 1

PLANNED UNIT DEVELOPMENT
LOT 1 BLOCK 1
SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29, TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
CASE #: PUD-00547-2025





KEYMAP
N.T.S.

90% PRELIMINARY DESIGN
NOT FOR CONSTRUCTION

0' 15' 30' 60' 90'
1" = 30'

IRRIGATION PLAN IR2.6

REVISION DATE: ######## ISSUE DATE: 11/26/2025 SHEET # OF ##

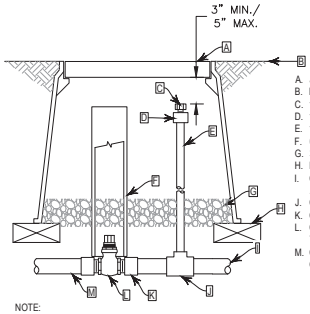
REDTAIL RIDGE PUD1 SOUTH

PROJECT #: 21126

Plotted: TUE 11/25/25 2:31:39P By: LeahBerger
Filepath: O:\HIS\REDTAIL-RIDGE\PUD_1\FIRED\TAIL_RIDGE PUD_1.DWG Layout: IR2.6

REDTAIL RIDGE FILING NO. 1

PLANNED UNIT DEVELOPMENT
LOT 1 BLOCK 1
SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29, TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
CASE #: PUD-00547-2025

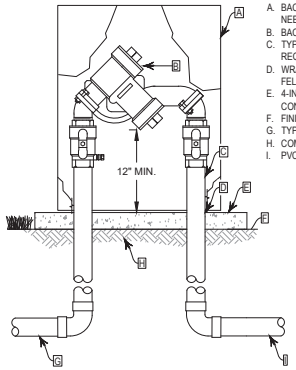


A. JUMBO VALVE BOX WITH COVER
B. FINISH GRADE/TOP OF MULCH
C. 1/4" THREADED BRASS CAP
D. 1/2" REDUCING MALE ADAPTER
E. 1/2" COPPER TYPE K (LENGTH AS REQUIRED)
F. 6" PVC CL 200 PIPE (LENGTH AS REQUIRED)
G. 3" MINIMUM DEPTH OF 3/4" WASHED GRAVEL
H. BRICK (1 OF 4)
I. COPPER PIPE TO BACKFLOW PREVENTION ASSEMBLY (LENGTH AS REQUIRED)
J. COPPER TEE
K. COPPER MALE ADAPTER (1 OF 2)
L. CURB STOP VALVE WITH COPPER SERVICE, THREAD BOTH ENDS
M. COPPER PIPE TO EXISTING COPPER PIPE OUTSIDE EXISTING WATER METER

NOTE:
1. FURNISH NOMINAL PIPE AND FITTING SIZES IDENTICAL WITH NOMINAL TAP SIZE UNLESS OTHERWISE NOTED.
2. THIS ASSEMBLY IS INTENDED TO BE USED FOR WINTERIZATION OF BACKFLOW PREVENTION ASSEMBLY, FLOW SENSOR, HYDROMETER AND MASTER VALVE ONLY.

1 WINTERIZATION ASSEMBLY

N.T.S.

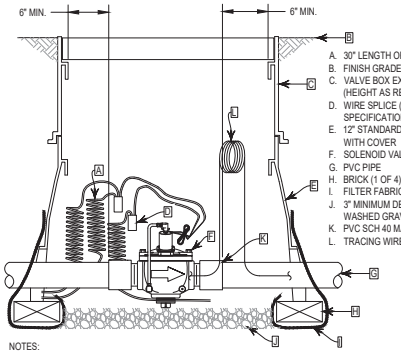


A. BACKFLOW PREVENTER ENCLOSURE (SIZE AS NEEDED)
B. BACKFLOW PREVENTION DEVICE
C. TYPE K COPPER PIPE (TYPICAL) (LENGTH AS REQUIRED)
D. WRAP PIPE AT PENETRATION WITH 1/4-INCH FELT OR SLEEVE WITH CLASS 200 PVC
E. 4-INCH CONCRETE BASE (USE 3000 PSI CONCRETE)
F. FINISH GRADE/TOP OF MULCH
G. TYPE K COPPER PIPE
H. COMPACTED SUBGRADE
I. PVC MAINLINE

NOTE:
1. FURNISH FITTINGS AND PIPING SIZED IDENTICALLY WITH NOMINAL BACKFLOW PREVENTION DEVICE.

2 BACKFLOW PREVENTION ASSEMBLY

N.T.S.

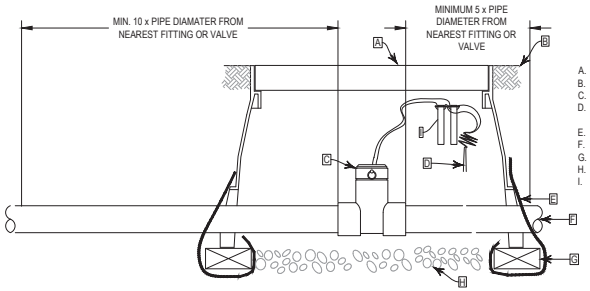


A. 30" LENGTH OF COILED WIRE
B. FINISH GRADE
C. VALVE BOX EXTENSION (HEIGHT AS REQUIRED)
D. WIRE SPLICE (REFER TO SPECIFICATIONS
E. 12" STANDARD VALVE BOX WITH COVER
F. SOLENOID VALVE
G. PVC PIPE
H. BRICK (1 OF 4)
I. FILTER FABRIC
J. 3" MINIMUM DEPTH OF 3/4" WASHED GRAVEL
K. PVC SCH 40 MALE ADAPTER
L. TRACING WIRE

NOTES:
1. USE VALVE BOX EXTENSION AS NECESSARY TO ACHIEVE MINIMUM DIMENSIONS ABOVE ASSEMBLY.
2. NOMINAL SIZE OF ALL COMPONENTS ARE TO BE THE SAME NOMINAL SIZE AS THE SOLENOID VALVE (SIZED AS SHOWN).
3. INSTALL FILTER FABRIC AROUND EXTERIOR OF VALVE BOX. USE DUCT TAPE TO SECURE FABRIC TO PIPE AND VALVE BOX.
4. DO NOT CUT OUT ENDS OF VALVE BOX UNNECESSARILY.
5. POSITION VALVE BOX OVER VALVE TO ALLOW ACCESS TO SOLENOID.
6. INSTALL SO THAT GRAVEL IS ONLY IN CONTACT WITH BOTTOM OF VALVE ASSEMBLY.

3 MASTER VALVE ASSEMBLY

N.T.S.

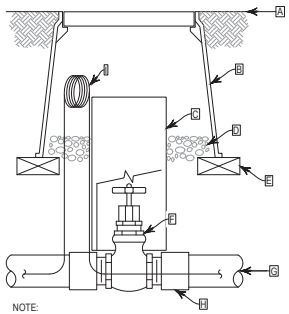


A. 12" VALVE BOX WITH COVER
B. FINISH GRADE/TOP OF MULCH
C. FLOW SENSOR
D. SHIELDED PE-39 COMMUNICATION CABLE TO CONTROLLER
E. FILTER FABRIC
F. MAINLINE PIPE
G. BRICK (1 OF 4)
H. 3" MINIMUM DEPTH OF 3/4" WASHED GRAVEL
I. WIRE SPLICE (REFER TO SPECIFICATIONS)

NOTES:
1. ALLOW 10 PIPE DIAMETERS UPSTREAM AND 5 PIPE DIAMETERS DOWNSTREAM OF STRAIGHT RUN OF PIPE TO ACHIEVE PROPER FLOW REGIME.
2. INSTALL FILTER FABRIC AROUND EXTERIOR OF VALVE BOX. USE DUCT TAPE TO SECURE FABRIC TO PIPE AND VALVE BOX.
3. DO NOT CUT OUT ENDS OF VALVE BOX UNNECESSARILY.
4. INSTALL SO THAT GRAVEL IS ONLY IN CONTACT WITH BOTTOM OF SENSOR ASSEMBLY.

4 FLOW SENSOR ASSEMBLY

N.T.S.



A. FINISH GRADE/TOP OF MULCH
B. 10" ROUND VALVE BOX WITH COVER
C. 6" PVC CL 200 PIPE (LENGTH AS REQUIRED)
D. 3" MINIMUM DEPTH OF 3/4" WASHED GRAVEL
E. BRICK (1 OF 2)
F. THREADED BRONZE GATE VALVE WITH SOLID WEDGE, NON-RISING STEM
G. PVC MAINLINE
H. PVC SCH 40 MALE ADAPTER (1 OF 2)
I. TRACING WIRE

NOTE:
1. NOMINAL SIZE OF GATE VALVE TO MATCH NOMINAL MAINLINE SIZE.

5 ISOLATION GATE VALVE ASSEMBLY

N.T.S.

90% PRELIMINARY DESIGN
NOT FOR CONSTRUCTION

IRRIGATION DETAILS

REVISION DATE: ######## ISSUE DATE: 11/26/2025 SHEET # OF ##

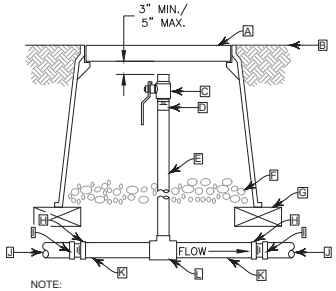
REDTAIL RIDGE PUD1 SOUTH

PROJECT #: 21126

Flepath: O:\HB\REDTAIL-RIDGE\PUD_1\PREDTAIL_RIDGE PUD_1.DWG Layout: R33
Plotted: TUE 11/25/25 2:31:39P By: Leslie Berger

REDTAIL RIDGE FILING NO. 1

PLANNED UNIT DEVELOPMENT
LOT 1 BLOCK 1
SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29, TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
CASE #: PUD-00547-2025

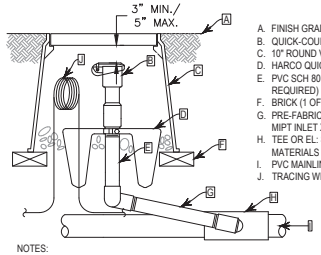


A. 12" STANDARD VALVE BOX WITH COVER
B. FINISH GRADE/TOP OF MULCH
C. 1" BRONZE BALL VALVE FEMALE THREADED ENDS
D. 1" COPPER MALE ADAPTER
E. 1" COPPER PIPE (LENGTH AS REQUIRED)
F. 3" MIN. DEPTH OF 3/4" WASHED GRAVEL
G. BRICK (1 OF 4)
H. COPPER FEMALE THREADED ADAPTER
I. SCH. 40 PVC MALE THREADED ADAPTER
J. PVC MAINLINE
K. COPPER PIPE
L. COPPER TEE

NOTE:
1. FURNISH NOMINAL PIPE AND FITTING SIZES IDENTICAL WITH NOMINAL TAP SIZE UNLESS OTHERWISE NOTED.

1 BLOW OUT ASSEMBLY

N.T.S.

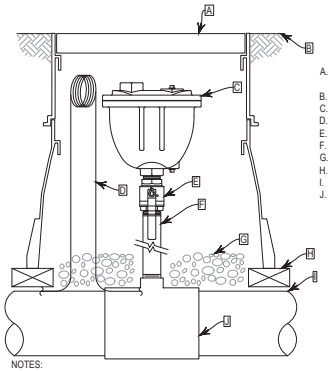


A. FINISH GRADE/TOP OF MULCH
B. QUICK-COUPLING VALVE
C. 10" ROUND VALVE BOX WITH COVER
D. HARCO QUICK COUPLER ANCHOR
E. PVC SCH 80 TOE NIPPLE (LENGTH AS REQUIRED)
F. BRICK (1 OF 2)
G. PRE-FABRICATED UNITIZED SWING JOINT 1" MIPT INLET X SOC OUTLET
H. TEE OR EL: SEE SPECIFICATIONS FOR MATERIALS
I. PVC MAINLINE PIPE
J. TRACING WIRE

NOTES:
1. FURNISH FITTINGS AND PIPING NOMINALLY SIZED IDENTICAL TO NOMINAL QUICK COUPLING VALVE INLET SIZE.
2. INSTALLATION HEIGHT OF QUICK COUPLER VALVE IN VALVE BOX MUST ASSURE PROPER OPERATION OF QUICK COUPLER KEY.
3. INSTALL SWING JOINT LAY ARM BETWEEN 30" AND 45" OF LATERAL PIPE IN ORDER TO ABSORB DOWNWARD IMPACT.

2 QUICK COUPLING VALVE ASSEMBLY

N.T.S.

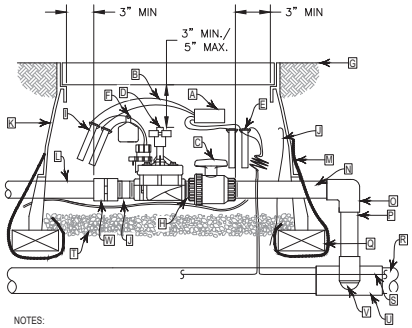


A. JUMBO VALVE BOX WITH EXTENSION AND COVER (HEIGHT AS REQUIRED)
B. FINISH GRADE/TOP OF MULCH
C. AIR VACUUM RELIEF VALVE
D. TRACING WIRE
E. BRASS BALL VALVE (SIZE 2")
F. PVC SCH 80 NIPPLE (LENGTH AS REQUIRED)
G. 3" MINIMUM DEPTH OF 3/4" WASHED GRAVEL
H. BRICK (1 OF 4)
I. PVC MAINLINE PIPE
J. TEE OR EL: SEE SPECIFICATIONS FOR MATERIALS

NOTES:
1. OPEN BALL VALVE IN ASSEMBLY 1/4 TURN UNTIL IRRIGATION SYSTEM IS FULLY CHARGED WITH WATER.
2. CLOSE VALVE DURING WINTERIZATION AND OPEN 1/2 TURN AFTER WINTERIZATION OF SYSTEM TO PROTECT VALVE DURING FREEZING WEATHER.

3 AIR\VACUUM RELIEF VALVE ASSEMBLY

N.T.S.

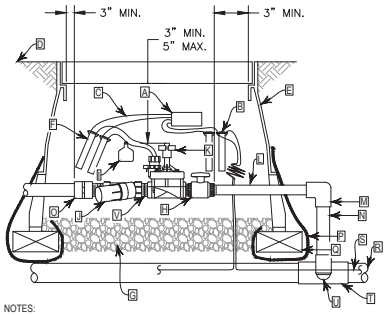


A. DECODER
B. WIRE FROM DECODER TO VALVE SEE SPECIFICATIONS
C. PVC BALL VALVE
D. REMOTE CONTROL VALVE
E. WIRE SPLICE FROM TWO-WIRE CABLE TO DECODER (1 OF 2, REFER TO SPECIFICATIONS)
F. CHRISTY ID TAG
G. FINISH GRADE
H. PVC SCH 80 CLOSE NIPPLE
I. WIRE CONNECTOR FROM DECODER TO SOLENOID VALVE (1 OF 2)
J. PVC SCH 80 NIPPLE
K. 12" STANDARD VALVE BOX WITH COVER
L. PVC LATERAL PIPE
M. FILTER FABRIC
N. PVC SCH 80 TOE NIPPLE (LENGTH AS REQUIRED)
O. PVC SCH 40 EL
P. PVC SCH 40 PIPE (LENGTH AS REQUIRED)
Q. BRICK (1 OF 4)
R. PVC MAINLINE
S. TWO-WIRE CABLE
T. 3" MINIMUM DEPTH OF 3/4" WASHED GRAVEL
U. TEE OR EL: SEE SPECIFICATIONS FOR MATERIALS
V. PVC SCH 80 TOE NIPPLE (LENGTH AS REQUIRED, HIDDEN) AND PVC SCH 40 EL
W. PVC SCH40 FEMAIL ADAPTER

NOTES:
1. USE VALVE BOX EXTENSION AS NECESSARY TO ACHIEVE MINIMUM DIMENSIONS ABOVE ASSEMBLY.
2. NOMINAL SIZE OF ALL COMPONENTS ARE TO BE THE SAME NOMINAL SIZE AS THE SOLENOID VALVE (SIZED AS SHOWN).
3. INSTALL FILTER FABRIC AROUND EXTERIOR OF VALVE BOX. USE DUCT TAPE TO SECURE FABRIC TO PIPE AND VALVE BOX.
4. TRANSITION TO PROPER LATERAL PIPE BURIAL DEPTH USING 45° ELBOW FITTINGS DOWNSTREAM OF REMOTE CONTROL VALVE ASSEMBLY.
5. DO NOT CUT OUT ENDS OF VALVE BOX UNNECESSARILY.
6. POSITION VALVE BOX OVER VALVE TO ALLOW ACCESS TO SOLENOID AND PROPER OPERATION OF BALL VALVE.
7. COIL 3-FEET OF WIRE FOR EACH DECODER FOR SERVICE PURPOSES.

4 REMOTE CONTROL VALVE ASSEMBLY

N.T.S.



A. DECODER
B. WIRE CONNECTOR FROM TWO-WIRE CABLE TO DECODER (1 OF 2)
C. WIRE FROM DECODER TO VALVE SEE SPECIFICATIONS
D. FINISH GRADE/TOP OF MULCH
E. JUMBO VALVE BOX WITH COVER
F. WIRE SPLICE FROM DECODER TO SOLENOID VALVE (1 OF 2, REFER TO SPECIFICATIONS)
G. 3" MINIMUM DEPTH OF 3/4" WASHED GRAVEL
H. PVC BALL VALVE
I. CHRISTY I.D. TAG
J. FILTRATION AND PRESSURE REGULATING DEVICE
K. REMOTE CONTROL VALVE
L. PVC SCH 80 TOE NIPPLE
M. PVC SCH 40 EL
N. PVC SCH 40 PIPE (TYPICAL) (LENGTH AS REQUIRED)
O. PVC SCH 40 FEMALE ADAPTER
P. FILTER FABRIC
Q. BRICK (1 OF 4)
R. PVC MAINLINE
S. TWO-WIRE CABLE
T. TEE OR EL: SEE SPECIFICATIONS FOR MATERIALS
U. PVC SCH 80 TOE NIPPLE (LENGTH AS REQUIRED, HIDDEN) AND PVC SCH 40 EL
V. PVC SCH 80 NIPPLE (1 OF 2)

NOTES:
1. USE VALVE BOX EXTENSION AS NECESSARY TO ACHIEVE MINIMUM DIMENSIONS ABOVE ASSEMBLY.
2. NOMINAL SIZE OF ALL COMPONENTS ARE TO BE THE SAME NOMINAL SIZE AS THE SOLENOID VALVE (SIZED AS SHOWN).
3. INSTALL FILTER FABRIC AROUND EXTERIOR OF VALVE BOX. USE DUCT TAPE TO SECURE FABRIC TO PIPE AND VALVE BOX.
4. TRANSITION TO PROPER LATERAL PIPE BURIAL DEPTH USING 45° ELBOW FITTINGS DOWNSTREAM OF REMOTE CONTROL VALVE ASSEMBLY.
5. DO NOT CUT OUT ENDS OF VALVE BOX UNNECESSARILY.
6. POSITION VALVE BOX OVER VALVE TO ALLOW ACCESS TO SOLENOID, AND PROPER OPERATION OF BALL VALVE.
7. COIL 3-FEET OF WIRE FOR EACH DECODER FOR SERVICE PURPOSES.

5 DRIP REMOTE CONTROL VALVE ASSEMBLY

N.T.S.

90% PRELIMINARY DESIGN
NOT FOR CONSTRUCTION

IRRIGATION DETAILS

REVISION DATE: ######## ISSUE DATE: 11/26/2025 SHEET # OF ##

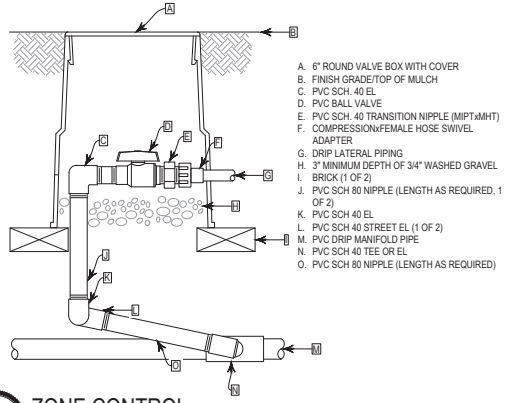
REDTAIL RIDGE PUD1 SOUTH

PROJECT #: 21126

Filepath: O:\HB\REDTAIL_RIDGE\PUD_1\REDTAIL_RIDGE PUD_1.DWG Layout: R11
Plotted: TUE 11/25/25 2:31:39P By: Leslie Berger

REDTAIL RIDGE FILING NO. 1

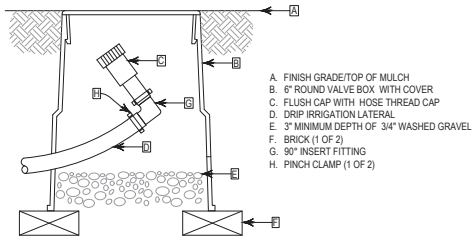
PLANNED UNIT DEVELOPMENT
LOT 1 BLOCK 1
SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29, TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
CASE #: PUD-00547-2025



A. 6" ROUND VALVE BOX WITH COVER
B. FINISH GRADE/TOP OF MULCH
C. PVC SCH. 40 EL
D. PVC BALL VALVE
E. PVC SCH. 40 TRANSITION NIPPLE (MIPTxMHT)
F. COMPRESSIONxFEMALE HOSE SWIVEL ADAPTER
G. DRIP LATERAL PIPING
H. 3" MINIMUM DEPTH OF 3/4" WASHED GRAVEL
I. BRICK (1 OF 2)
J. PVC SCH 80 NIPPLE (LENGTH AS REQUIRED, 1 OF 2)
K. PVC SCH 40 EL
L. PVC SCH 40 STREET EL (1 OF 2)
M. PVC DRIP MANIFOLD PIPE
N. PVC SCH 40 TEE OR EL
O. PVC SCH 80 NIPPLE (LENGTH AS REQUIRED)

1 ZONE CONTROL VALVE ASSEMBLY

N.T.S.

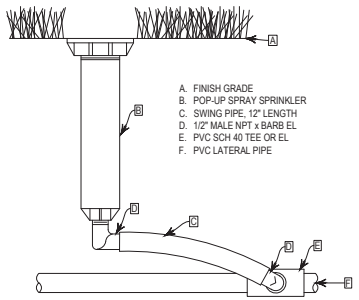


A. FINISH GRADE/TOP OF MULCH
B. 6" ROUND VALVE BOX WITH COVER
C. FLUSH CAP WITH HOSE THREAD CAP
D. DRIP IRRIGATION LATERAL
E. 3" MINIMUM DEPTH OF 3/4" WASHED GRAVEL
F. BRICK (1 OF 2)
G. 90° INSERT FITTING
H. PINCH CLAMP (1 OF 2)

NOTE:
1. INSTALL FLUSH CAP ASSEMBLY AT THE END OF EACH DRIP LATERAL SEGMENT.

2 FLUSH CAP ASSEMBLY

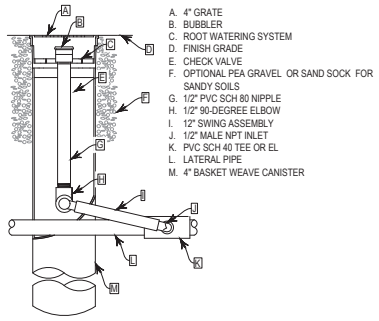
N.T.S.



A. FINISH GRADE
B. POP-UP SPRAY SPRINKLER
C. SWING PIPE, 12" LENGTH
D. 1/2" MALE NPT x BARB EL
E. PVC SCH 40 TEE OR EL
F. PVC LATERAL PIPE

3 POP-UP SPRAY SPRINKLER ASSEMBLY

N.T.S.

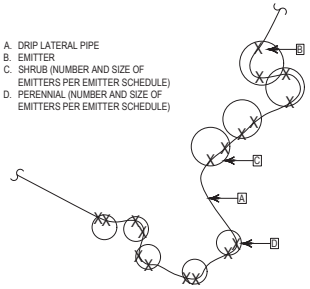


A. 4" GRATE
B. BUBBLER
C. ROOT WATERING SYSTEM
D. FINISH GRADE
E. CHECK VALVE
F. OPTIONAL PEA GRAVEL OR SAND SOCK FOR SANDY SOILS
G. 1/2" PVC SCH 80 NIPPLE
H. 1/2" 90-DEGREE ELBOW
I. 12" SWING ASSEMBLY
J. 1/2" MALE NPT INLET
K. PVC SCH 40 TEE OR EL
L. LATERAL PIPE
M. 4" BASKET WEAVE CANISTER

NOTE:
1. INSTALL ASSEMBLY ON OUTER BOUNDARY OF PLANT (IE. TREE OR SHRUB) ROOT BALL.

4 TREE ROOT WATERING SYSTEM DETAIL

N.T.S.



A. DRIP LATERAL PIPE
B. EMITTER
C. SHRUB (NUMBER AND SIZE OF EMITTERS PER EMITTER SCHEDULE)
D. PERENNIAL (NUMBER AND SIZE OF EMITTERS PER EMITTER SCHEDULE)

EMITTER SCHEDULE

PLANT TYPE	EMITTERS PER PLANT	GPH PER OUTLET	TOTAL GPH PER PLANT
5 GAL. LOW SHRUBS	2 SINGLE	1 GPH	2 GPH
1 GAL. LOW SHRUBS	2 SINGLE	1/2 GPH	1 GPH
1 GAL. LOW GROUND COVER/PERENNIAL	2 SINGLE	1/2 GPH	1 GPH
5 GAL. MEDIUM SHRUBS	2 SINGLE	2 GPH	4 GPH
1 GAL. MEDIUM SHRUBS	2 SINGLE	1 GPH	2 GPH
1 GAL. MEDIUM GROUND COVER/PERENNIAL	2 SINGLE	1 GPH	2 GPH

NOTE:
1. ALL EMISSION POINTS TO BE LOCATED ON THE UPHILL SIDE OF PLANT MATERIAL.
2. PLACE EMITTERS AT A LOCATION TO NOT SATURATE PLANT ROOTS, LOCATE EMITTERS JUST OFF THE EDGE OF THE ROOT BALL.
3. REVIEW PLANT MATERIAL HEALTH 1 MONTH AFTER INSTALLATION AND ADJUST EMITTER SIZE AND QUANTITY PER CITY FORESTRY DIRECTION.

5 EMITTER PLACEMENT DETAIL

N.T.S.

90% PRELIMINARY DESIGN
NOT FOR CONSTRUCTION

IRRIGATION DETAILS

REVISION DATE: ######## ISSUE DATE: 11/26/2025 SHEET # OF ##

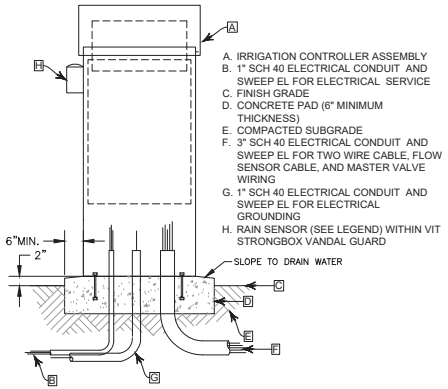
REDTAIL RIDGE PUD1 SOUTH

PROJECT #: 21126

Filepath: O:\HIS\REDTAIL-RIDGE\PUD_1\REDTAIL_RIDGE PUD_1.DWG Layout: R22
Plotted: TUE 11/25/25 2:31:39P By: LeahBerger

REDTAIL RIDGE FILING NO. 1

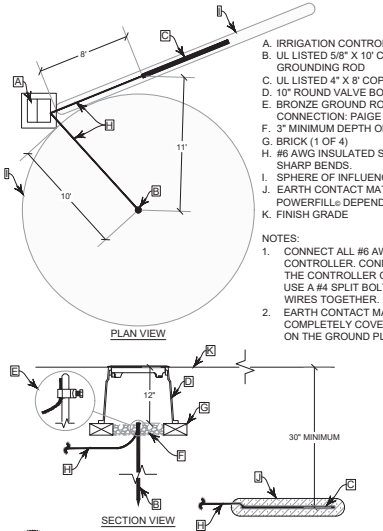
PLANNED UNIT DEVELOPMENT
LOT 1 BLOCK 1
SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29, TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
CASE #: PUD-00547-2025



A. IRRIGATION CONTROLLER ASSEMBLY
B. 1" SCH 40 ELECTRICAL CONDUIT AND SWEEP EL FOR ELECTRICAL SERVICE
C. FINISH GRADE
D. CONCRETE PAD (6" MINIMUM THICKNESS)
E. COMPACTED SUBGRADE
F. 3" SCH 40 ELECTRICAL CONDUIT AND SWEEP EL FOR TWO WIRE CABLE, FLOW SENSOR CABLE, AND MASTER VALVE WIRING
G. 1" SCH 40 ELECTRICAL CONDUIT AND SWEEP EL FOR ELECTRICAL GROUNDING
H. RAIN SENSOR (SEE LEGEND) WITHIN VIT STRONGBOX VANDAL GUARD

1 IRRIGATION CONTROLLER ASSEMBLY

N.T.S.



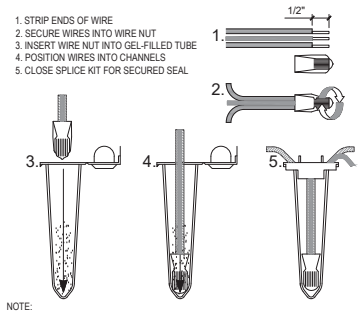
A. IRRIGATION CONTROLLER ASSEMBLY
B. UL LISTED 5/8" X 10' COPPER-CLAD GROUNDING ROD
C. UL LISTED 4" X 8' COPPER GROUNDING PLATE
D. 10" ROUND VALVE BOX WITH COVER
E. BRONZE GROUND ROD CLAMP OR CADWELD CONNECTION: PAIGE ELECTRIC
F. 3" MINIMUM DEPTH OF 3/4" WASHED GRAVEL
G. BRICK (1 OF 4)
H. #6 AWG INSULATED SOLID COPPER WIRE. NO SHARP BENDS.
I. SPHERE OF INFLUENCE
J. EARTH CONTACT MATERIAL, POWERSET© OR POWERFILL© DEPENDING ON SOIL CONDITIONS
K. FINISH GRADE

NOTES:
1. CONNECT ALL #6 AWG WIRES INSIDE THE CONTROLLER. CONNECT ONE WIRE TO THE CONTROLLER GROUND LUG AND USE A #4 SPLIT BOLT TO CONNECT ALL WIRES TOGETHER.
2. EARTH CONTACT MATERIAL MUST COMPLETELY COVER THE WELD JOINT ON THE GROUND PLATE.

2 CONTROLLER GROUNDING SCHEMATIC

N.T.S.

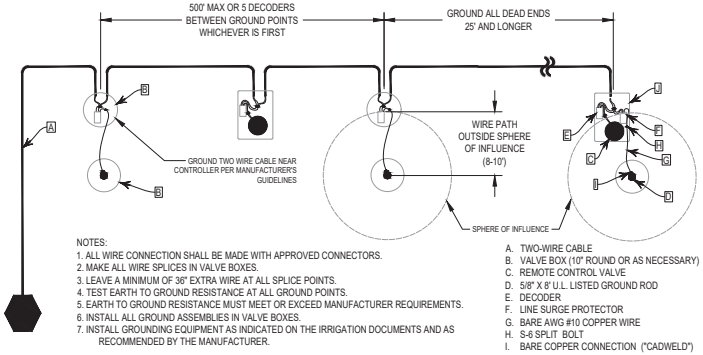
1. STRIP ENDS OF WIRE
2. SECURE WIRES INTO WIRE NUT
3. INSERT WIRE NUT INTO GEL-FILLED TUBE
4. POSITION WIRES INTO CHANNELS
5. CLOSE SPLICE KIT FOR SECURED SEAL



NOTE:
1. VISUALLY CHECK THAT CONNECTOR IS BELOW LOCKING "FINGERS".

3 WIRE SPLICE DETAIL

N.T.S.

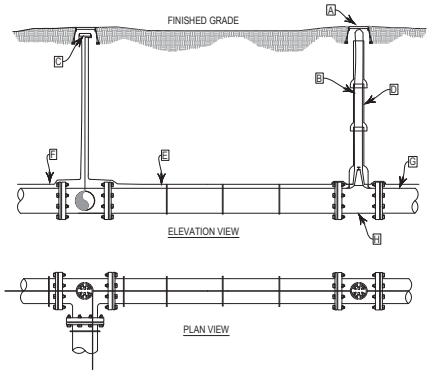


NOTES:
1. ALL WIRE CONNECTION SHALL BE MADE WITH APPROVED CONNECTORS.
2. MAKE ALL WIRE SPLICES IN VALVE BOXES.
3. LEAVE A MINIMUM OF 36" EXTRA WIRE AT ALL SPLICE POINTS.
4. TEST EARTH TO GROUND RESISTANCE AT ALL GROUND POINTS.
5. EARTH TO GROUND RESISTANCE MUST MEET OR EXCEED MANUFACTURER REQUIREMENTS.
6. INSTALL ALL GROUND ASSEMBLIES IN VALVE BOXES.
7. INSTALL GROUNDING EQUIPMENT AS INDICATED ON THE IRRIGATION DOCUMENTS AND AS RECOMMENDED BY THE MANUFACTURER.

A. TWO-WIRE CABLE
B. VALVE BOX (10" ROUND OR AS NECESSARY)
C. REMOTE CONTROL VALVE
D. 5/8" X 8' U.L. LISTED GROUND ROD
E. DECODER
F. LINE SURGE PROTECTOR
G. BARE AWG #10 COPPER WIRE
H. S-6 SPLIT BOLT
I. BARE COPPER CONNECTION ("CADWELD")
J. REMOTE CONTROL VALVE ASSEMBLY

4 TWO WIRE GROUNDING DETAIL

N.T.S.



A. 10" ROUND VALVE BOX (ONE OF TWO)
B. INSTALL TRACING WIRE TO THE TOP OF VALVE BOX
C. WATER PROOF CONNECTION (SEE SPECIFICATIONS)
D. PIPE SLEEVE SEE VALVE DETAIL
E. TAPE COPPER WIRE TO TOP OF PIPE EVERY 10 FT.
F. CONTINUOUS LOOP COPPER TRACING WIRE (SEE SPECIFICATIONS)
G. PVC PIPE
H. TYP. VALVE

NOTES:
1. COPPER TRACING WIRE WILL START AT THE MASTER VALVE AND WILL BE ROUTED WITH ALL MAINLINE PIPE.
2. SPLICE TRACING WIRE IN IRRIGATION MAINLINE COMPONENT VALVE BOXES WHEN POSSIBLE, OTHERWISE, PLACE SPLICE IN SEPARATE VALVE BOX.

5 TRACING WIRE DETAIL

N.T.S.

90% PRELIMINARY DESIGN
NOT FOR CONSTRUCTION

IRRIGATION DETAILS

REVISION DATE: ######## ISSUE DATE: 11/26/2025 SHEET # OF ##

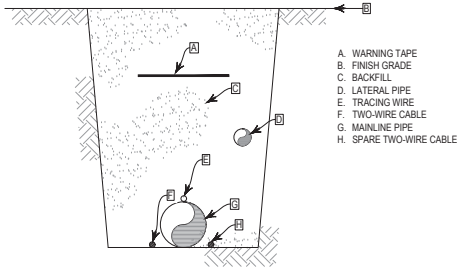
REDTAIL RIDGE PUD1 SOUTH

PROJECT #: 21126

Plotted: TUE 11/25/25 2:31:31P By: LaurenBerger
Filepath: O:\HB\REDTAIL-RIDGE\PUD_1\PHASE1\ALL_RIDGE PUD_1.DWG Layout: R33

REDTAIL RIDGE FILING NO. 1

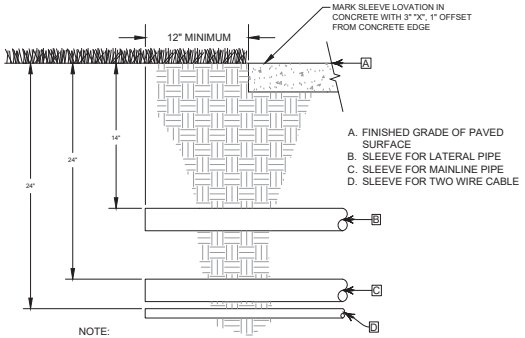
PLANNED UNIT DEVELOPMENT
LOT 1 BLOCK 1
SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29, TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
CASE #: PUD-00547-2025



A. WARNING TAPE
B. FINISH GRADE
C. BACKFILL
D. LATERAL PIPE
E. TRACING WIRE
F. TWO-WIRE CABLE
G. MAINLINE PIPE
H. SPARE TWO-WIRE CABLE

NOTE:
1. REFER TO IRRIGATION SPECIFICATIONS FOR COVERAGE DEPTH TO BURIED PIPE AND WIRE.

1 TRENCHING DETAIL N.T.S.



A. FINISHED GRADE OF PAVED SURFACE
B. SLEEVE FOR LATERAL PIPE
C. SLEEVE FOR MAINLINE PIPE
D. SLEEVE FOR TWO WIRE CABLE

NOTE:
1. INSTALL SLEEVE SO THAT ITS LOWEST ELEVATION OCCURS AT ONE OR BOTH ENDS - NOT ALONG ITS LENGTH.

2 SLEEVING DETAIL N.T.S.

90% PRELIMINARY DESIGN
NOT FOR CONSTRUCTION

IRRIGATION DETAILS

REVISION DATE: ######## ISSUE DATE: 11/26/2025 SHEET # OF ##

REDTAIL RIDGE PUD1 SOUTH

PROJECT #: 21126

Plotted: TUE 11/25/25 2:31:31P By: LeahBerger
Filepath: O:\HB\REDTAIL-RIDGE\PUD_1\PHASE\TAIL_RIDGE PUD_1.DWG Layout: RG4

REDTAIL RIDGE FILING NO. 1

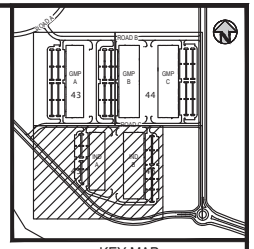
PLANNED UNIT DEVELOPMENT

LOT 1 BLOCK 1

SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29, TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN,

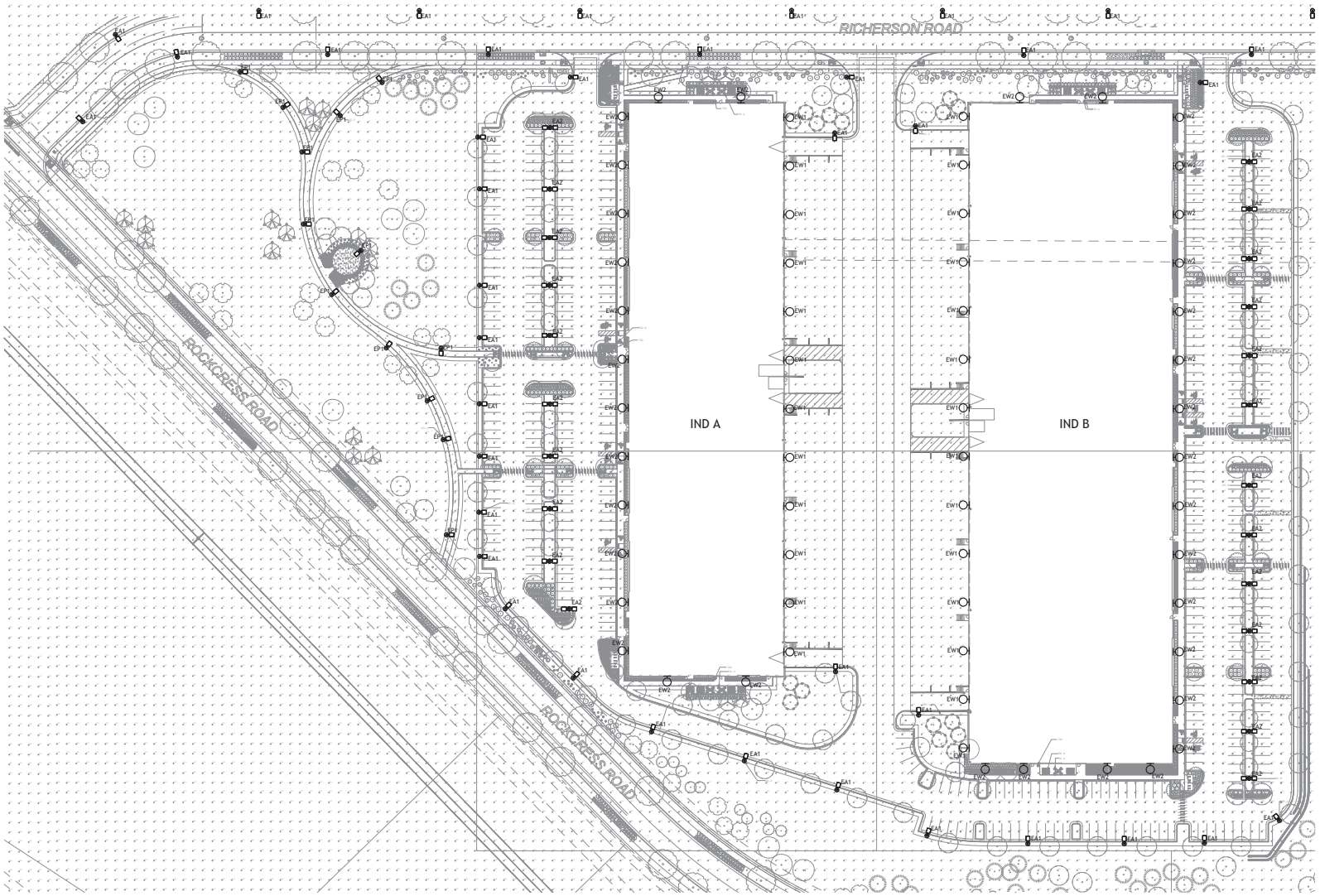
CASE #: PUPL-XXXX-2023

AE DESIGN
Integrated Lighting and Electrical Solutions
1900 Wazee Street #205 | Denver, CO 80202 | 303.296.3034
aedesign-inc.com
Project #:6077.00



KEY MAP

SCALE: 1" = 600'



1 | PHOTOMETRIC PLAN – SOUTHWEST

45 | SCALE: 1" = 50'-0"

GENERAL NOTES

A. ALL SITE LIGHTING RELATED TO WORK AND MATERIALS SHALL COMPLY WITH CITY, COUNTY AND OTHER APPLICABLE GOVERNING AUTHORITY REQUIREMENTS.

B. PER LOUISVILLE MUNICIPAL CODE ALL STREET LIGHTS SHALL NOT EXCEED 20'-0" TOTAL POLE HEIGHT.

C. ALL BUILDING-MOUNTED AND POLE-MOUNTED LIGHTING SHALL BE DIRECTED DOWNWARD AND IS FULL CUTOFF. ALL LIGHT SOURCES SHALL BE FULLY SHIELDED SO THE LIGHT SOURCE IS NOT VISIBLE FROM ADJACENT PROPERTIES AND PUBLIC RIGHTS-OF-WAY, AND TO PREVENT GLARE. ALL LIGHT FIXTURES ARE DARK SKY COMPLIANT AND MEET LEED BUG RATING REQUIREMENT AS DEFINED IN IES TM-15-11 OF NO MORE THAN B2-U2-G2.

D. REFER TO LIGHTING FIXTURE SCHEDULE FOR ADDITIONAL LIGHTING FIXTURE MOUNTING HEIGHTS AND OVERALL FIXTURE HEIGHTS.

E. PER IES HANDBOOK STREET LIGHTING DESIGN CRITERIA THIS SITE IS CONSIDERED A LOCAL STREET WITH LOW PEDESTRIAN ACTIVITY.

F. IN LOCAL, LOW ACTIVITY THE LIGHTING SHALL PROVIDE AT LEAST A 0.3 FC AVG LUMINANCE PER THE IES HANDBOOK FOR STREET LIGHTING.

G. PER LOUISVILLE MUNICIPAL CODE PARKING LOTS SHALL HAVE A MAX LIGHT LEVEL OF 4.5 FOOT-CANDLES.

H. PER LOUISVILLE MUNICIPAL CODE PEDESTRIAN WALKWAYS SHALL HAVE A MAX LIGHT LEVEL OF 3.0 FOOT-CANDLES.

I. PER LOUISVILLE MUNICIPAL CODE DRIVES SHALL HAVE A MAX LIGHT LEVEL OF 5 FOOT-CANDLES.

LIGHTING FIXTURES

WALL MOUNTED LUMINAIRE

EXTERIOR AREA LIGHT

Statistics

Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min
IND A PARKING LOT	+	1.7 fc	3.2 fc	0.6 fc	5.3:1	2.8:1
IND B PARKING LOT	+	1.4 fc	3.2 fc	0.2 fc	16.0:1	7.5:1
INTERNAL ROAD B	+	1.1 fc	1.7 fc	0.3 fc	5.7:1	3.7:1
COUNCIL RING PATHWAY	+	1.4fc	2.8 fc	0.4 fc	6.5:1	3.5:1

50 0 50 100

SCALE: 1" = 50'

PROJECT # 22236

PHOTOMETRIC PLAN

SHEET 23 OF 24

REVISION DATE: 11/25/2025 ISSUE DATE: 03/14/2025

REDTAIL RIDGE PUD1 SOUTH

Plotted: TUE 11/25/25 12:58:08P By: Christine Mach
File path: J:\6077.00 - REDTAIL RIDGE\ELEC\SITE PHOTOMETRIC\6077.00 - SITE PHOTOMETRIC_PUD1 SOUTH.DWG Layout: 23

REDTAIL RIDGE FILING NO. 1

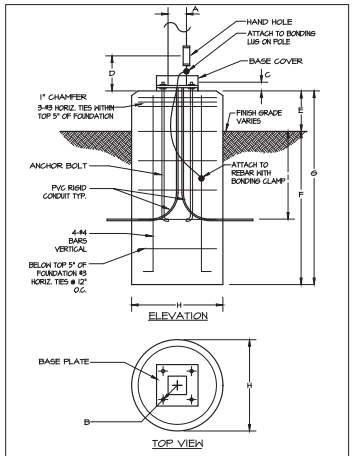
PLANNED UNIT DEVELOPMENT

LOT 1 BLOCK 1

SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29, TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN,

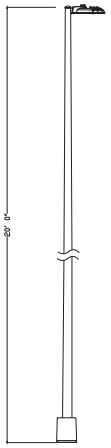
CASE #: PUPL-XXXX-2023

AE DESIGN
Integrated Lighting and Electrical Solutions
1900 Wazee Street #205 | Denver, CO 80202 | 303.296.3034
aedesign-inc.com
Project #:AE077.00



POLE KEY	OVERALL HEIGHT	A	ANCHOR BOLT DATA B	SIZE	C	D	E	F	G	H	I
EA1	20'0"	4"	PER MANUFACTURER			0'4"	8'0"	8'4"	24"	36"	
EA2	20'0"	4"	PER MANUFACTURER			0'4"	8'0"	8'4"	24"	36"	
EP1	14'9"	4"	PER MANUFACTURER			0'4"	6'0"	8'4"	24"	36"	

5 | POLE BASE DETAIL
SCALE: NONE



1 | POLE ELEVATION
24 | SCALE: 1/8" = 1'-0"

LIGHTING FIXTURE SCHEDULE

TYPE	DESCRIPTION	MANUFACTURER	CATALOG NUMBER	VOLTAGE	SOURCE LAMP	WATT	TYPE	CCT/CRI	MAX WATTS	LUMEN OUTPUT	IESNA CUTOFF	BUG RATING	FIXTURE FINISH	MOUNTING LOCATION	INFORMATION BOF/RFD/OFH	TOTAL QUANTITY
EA1	20'-0" LED DOUBLE HEAD POLE TOP TYPE III DISTRIBUTION	EXO	ASL1-80L-39-3K7-3-UNV-A	277	2	76	LED	3000k	76	9000	FULL CUTOFF	2-0-2	BLACK	EXTERIOR POLE	20'-0" POLE HEIGHT	42
EA2	20'-0" LED SINGLE HEAD POLE TOP TYPE III DISTRIBUTION	EXO	ASL1-80L-39-3K7-3-UNV-A	277	1	38	LED	3000k	38	4500	FULL CUTOFF	2-0-2	BLACK	EXTERIOR POLE	20'-0" POLE HEIGHT	23
EP1	20'-0" LED SINGLE HEAD POLE TOP TYPE III DISTRIBUTION AT PEDESTRIAN LEVEL POLE HEIGHT	EXO	ASL1-80L-25-3K7-3-UNV-A	277	1	38	LED	3000k	38	4500	FULL CUTOFF	2-0-2	BLACK	EXTERIOR WALL	14.75' AFF	12
EW1	WALL MOUNTED AREA LED WITH ASYMMETRIC FLAT BEAM LIGHT DISTRIBUTION	ILP	VWM-14L-U-30-T4	277	1	100	LED	3000k	100	14000	FULL CUTOFF	3-0-2	BLACK	EXTERIOR WALL	20'-0" AFF	26
EW2	WALL MOUNTED AREA LED WITH ASYMMETRIC FLAT BEAM LIGHT DISTRIBUTION	ILP	VWM-5L-U-30-T3	277	1	40	LED	3000k	40	5000	FULL CUTOFF	1-0-1	BLACK	EXTERIOR WALL	14.75' AFF	36

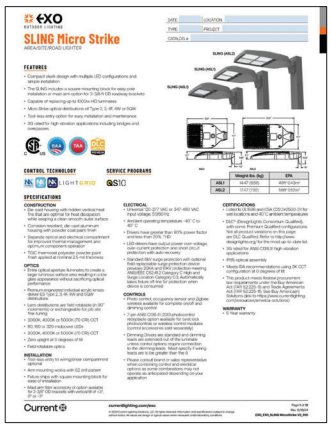
ABBREVIATIONS: BOF - BOTTOM OF FIXTURE, RFD - RECESSED FIXTURE DEPTH, OFH - OVERALL FIXTURE HEIGHT, AFF(AFG) - ABOVE FINISHED FLOOR (GRADE), WFD - WALL FIXTURE DEPTH

GENERAL NOTES:

A. ALL LED LAMPS AND/OR FIXTURES SHALL BE 3000K COLOR TEMPERATURE AND A MINIMUM OF 82CRI, UON.
B. ALL REFLECTOR LAMPS SHALL BE PROVIDED AS WIDE FLOOD DISTRIBUTION, UON.
C. PROVIDE LUMINAIRES SHOWN AS SHADED WITH FACTORY INSTALLED 90 MINUTE EMERGENCY BATTERY OR OTHER REMOTE POWER SOURCE, UON. EMERGENCY LUMINAIRES SHALL SENSE UN-SWITCHED POWER TO THE SPACE AND OPERATE AUTOMATICALLY UPON LOSS OF NORMAL POWER. ALL EMERGENCY LUMINAIRES SHALL HAVE AN INTEGRAL TEST SWITCH AND VISIBLE INDICATOR LIGHT. CONNECT THE EMERGENCY BATTERY TO THE UN-SWITCHED LEG OF THE LIGHTING CIRCUIT INDICATED.
D. LUMENS LISTED ARE DELIVERED LUMENS, NOT INITIAL.
E. FOR ALL SPECIFIED LUMINAIRES, THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL MOUNTING HARDWARE, ACCESSORIES, COMPONENTS, LEADER/JUMPER CABLES, WIRE FEED, CONNECTORS, END CAPS, REMOTE POWER SUPPLIES, AND ANY OTHER NECESSARY COMPONENT AS REQUIRED FOR INSTALLING A SECURE AND FULLY FUNCTIONAL SYSTEM.
F. THE CONTRACTOR SHALL VERIFY THE CEILING TYPE BEFORE ORDERING LIGHT FIXTURES TO ENSURE COMPATIBILITY WITH SPECIFIED FIXTURES. NOTIFY SPECIFIER OF ANY DISCREPANCIES.
G. ALL FINISH SELECTIONS SHALL BE VERIFIED BE ARCHITECT/INTERIOR DESIGNER/OWNER AS PART OF THE SUBMITTAL PROCESS. UNLESS OTHERWISE NOTED, EC SHALL ASSUME STANDARD LUMINAIRE FINISH OPTION FOR PRICING.
H. EC SHALL VERIFY ALL FIXTURE MOUNTING HEIGHTS WITH ARCHITECTURAL ELEVATIONS PRIOR TO ANY ROUGH-IN.
I. TYPICAL FOR ALL LIGHT FIXTURES WITH DESIGNATION STARTING WITH 'M': FIXTURES ARE SHOWN FOR REFERENCE ONLY. FIXTURE SELECTIONS AND SPECIFICATIONS SHALL BE PROVIDED BY THE ARCHITECT AND/OR INTERIOR DESIGNER. EC SHALL COORDINATE EXACT MOUNTING LOCATION, MOUNTING HEIGHT, WATTAGE, AND DIMMING PROTOCOL WITH ARCHITECT / INTERIOR DESIGNER, LIGHTING CONSULTANT, AND/OR ELECTRICAL ENGINEER PRIOR TO INSTALL.
J. REMOTE DRIVER(S)/TRANSFORMER(S) SHALL BE LOCATED IN A CONCEALED, ACCESSIBLE, AND VENTILATED LOCATION AS PROPOSED BY THE EC AND APPROVED BY THE ARCHITECT. REFER TO THE MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR MINIMUM REQUIRED CLEARANCES FROM ADJACENT MATERIALS, AND WIRING REQUIREMENTS TO PREVENT VOLTAGE DROP. DO NOT EXCEED MANUFACTURER'S RECOMMENDATIONS REGARDING WIRE GAGE AND MAXIMUM WIRE RUN LENGTHS.
K. FOR LUMINAIRES SPECIFIED WITH 0-10V DIMMING, 0-10V DIMMING DRIVER(S) REQUIRE ADDITIONAL LOW VOLTAGE CONTROL WIRES IN ADDITION TO STANDARD WIRING FOR POWER.
L. EXTERIOR LUMINAIRES SHALL BE COLD WEATHER RATED FOR 0 DEG. F / -18 DEG. C., AND RATED FOR OUTDOOR USE.

SPECIFIC NOTES:

1.



2 | TYPE EA1 / EA2 / EP1
SCALE: NTS

3 | TYPE EW1
SCALE: NTS

PHOTOMETRIC DETAILS

REVISION DATE: 11/25/2025 **ISSUE DATE:** 03/14/2025 **SHEET** 24 **OF** 24

REDTAIL RIDGE PUD1 SOUTH

PROJECT # 22236

Plotted: TUE 11/25/25 12:58:14P By: Christine Reich
Filepath: J:\077.00 - REDTAIL RIDGE\BLEED\SITE PHOTOMETRIC PLOT\ 1 SOUTH DWG Layout 24

Drainage Report:
Redtail Ridge PUD 1 South

Address:
Lot 1 Block 1, Redtail Ridge Filing No. 1
Louisville, CO 80020

Prepared:
November 25, 2025

Prepared for:
Sterling Bay
5910 Pacific Center Blvd,
Suite 200,
San Diego, CA 92121
858.736.7114

Prepared by:
Jarrett Grant, PE
Harris Kocher Smith
303.623.6300

Harris Kocher Smith Project No. 221236
City of Louisville No. PUD-00547-2025

Harris Kocher Smith
1290 Broadway, Ste. 800
Denver, CO 80203
P: 303.623.6300
F: 303.623.6311

www.HarrisKocherSmith.com

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B. Site Description 2

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I. CERTIFICATION STATEMENT

I hereby certify that this report [plan] for the preliminary drainage design of Redtail Ridge PUD1 South was prepared by me (or under my direct supervision) in accordance with the provisions of City of Louisville Storm Drainage Design and Technical Criteria for the owners thereof.

By: Jarrett C. Grant, P.E.

Licensed Professional Engineer

State of Colorado

No. 59839

On behalf of Harris Kocher Smith

II. GENERAL LOCATION AND DESCRIPTION

A. Site Location

Redtail Ridge PUD 1 South (Site) is located in the City of Louisville, County of Boulder, State of Colorado. The Site is located in Section 29, Township 1 South, Range 69 West. PUD 1 is part of the Redtail Ridge Master Drainage Plan, included in Appendix D, and includes lots 1 and 2 of block 1, Redtail Ridge Filing No. 1. PUD 1 has been split into "PUD 1 South" and "PUD 1 North", PUD 1 South lies within lot 1 block 1 and in Basin B-2 of the Redtail Ridge Master Drainage Plan. A portion of PUD 1 North (within lot 2 block 1) is included in the calculations and conformance letter due to its connection to the proposed storm system in PUD 1 South. The PUD 1 North conformance letter will need to confirm against this letter.

B. Site Description

The sub-basins for PUD 1 South (18.93 acres) and PUD1 North (8.41 acres) included in this letter total 27.34 acres, all 27.34 acres are included in the drainage analyses of Basins B-1 and B-2 apart of the Master Drainage Plan. The Site will be overlot graded with the master development of the Redtail Ridge. The groundcover currently consists of grass, some trees, roadway, and building pads which will all be removed during the master development grading. The soils on Site are Hydrologic Soil Group Type C and D. There are no existing major drainage channels on site. The Site generally flows from the east to the southwest and has a total fall of 48.85' at an average slope of 3.2%.

III. HISTORIC DRAINAGE

A. Major Basin Description

Basin B-2 in the Redtail Ridge Master Drainage Plan is 30.37 acres, which includes all of PUD1 South, south of Road C and the portion of PUD1 North south of Road C. Per the Redtail Ridge Master Drainage Plan, Basin B-2 is proposed to have a watershed imperviousness of 85.00%. Flows from Basin B-2 will be conveyed southeast by on-site stormwater infrastructure to Pond C-2 (see Pond C-2 location on Master Drainage Plan in Appendix F).

B. Sub-Basin Description

Please see the attached exhibit which shows the basin delineation between the Master Drainage Plan and PUD 1 South (see Appendix D). In the overlot grading condition, runoff from PUD 1 South is collected by storm infrastructure within adjacent roadways and then conveyed in storm mains surrounding the site, which discharge to a regional water quality and detention pond C-2 as is described in the Master Drainage Plan. B-2 is anticipated to have a 2-year storm runoff of 33.22 CFS, a 10-year storm runoff rate of 59.73 CFS, and a 100-year storm runoff rate of 123.28 CFS.

IV. DRAINAGE DESIGN CRITERIA

A. Regulations

The Site will comply with the City's and Mile High Flood District's requirements. The Site will comply with current City and MHFD criteria, including runoff reduction, water quality capture volume, stabilizing drainageways and source control BMPs, as applicable. The Site will also comply with the Louisville OSP as it relates to the extents of the Site.

B. Development Criteria Reference and Constraints

The development of the Site follows the design that was outlined in the Redtail Ridge Final Master Drainage Report. The existing basins, as detailed in the Redtail Ridge Final Master Drainage Report, encompass the entirety of the Site and represent the previous drainage study the Site will be conforming to. The Master Drainage Report accounted for development of this Site by an assumed imperviousness percentage. The Master Drainage Report ensures conveyance, water quality treatment, and detention capacity for flows from the proposed Site. See Appendix D for the Master Drainage Plans.

C. Hydrological Criteria

All hydrological design criteria for the Site aligns with the Master Drainage Report. The design rainfall data is from the NOAA Atlas 14, Volume 8, Version 2. The 5-year storm and the 100-year storm 1-hour rainfall are 1.08 inches and 2.49 inches respectively. The minor storm is the 5-year storm and the major storm is the 100-year storm. Runoff rates for the Site were calculated using the rational method. The Site is not proposing any detention or water quality treatment ponds; volumes and discharge rates of the detention and water quality ponds have been outlined in the Redtail Ridge Final Master Drainage Report.

D. Hydraulic Criteria

All hydraulic design criteria for the Site aligns with the Master Drainage Report. Storm sewer pipes and inlets were sized for the 100-year storm. Pipes were sized for the 100-year storm by utilizing StormCAD and ensuring that flows will be at least 1-foot below grade. The detention and water quality outlet has been designed by the Master Drainage Report.

V. DRAINAGE FACILITY DESIGN

A. General Concept

The Site generally flows to inlets onsite that will be conveyed to the east where they will discharge into the south flowing storm sewer adjacent to Sorrel Ave. Flows will then be routed west in Rockcress Drive where they will then outfall into Pond C-2 of the Redtail Ridge master drainage report. There are not anticipated to be offsite flows onto the Site. Hydrological plans and calculations can be found in Appendix B. Hydraulic plans and calculations can be found in Appendix C.

B. Specific Details

Please see the attached exhibit which shows the basin delineation between the Master Drainage Plan and PUD 1 South (see Appendix B). Runoff from PUD 1 South is collected on-site by private storm infrastructure and then conveyed to storm mains in the roadways surrounding the site, which discharge to a regional water quality and detention pond. PUD 1 South development is compliant with the current submitted Master Drainage Report. PUD 1 South will not contribute any additional runoff that has not been accounted for to the existing off-site water quality and detention facilities. The basins analyzed in this conformance letter have a total effective imperviousness of 46.11%. Basin B-2 has an effective watershed imperviousness of 65.70%, Basin B-1 has an effective watershed imperviousness of 13.85% and are both in compliance with the Master Drainage Report (Refer to Summary tables below).

PUD1 South (Pond C-2)

Basin O (0.25 acres, 15.97% impervious) consists of landscaping. The peak runoff from basin O is 0.07 cfs for the minor storm event and 0.43 cfs for the major storm event. Basin O will drain to landscape drains

where it will be conveyed by storm sewer where it will be routed to Pond C-2 in the Master Drainage Report.

Basin P (0.31 acres, 12.84% impervious) consists of landscaping. The peak runoff from basin P is 0.06 cfs for the minor storm event and 0.48 cfs for the major storm event. Basin P will drain overland to Road C where it will be conveyed by curb and gutter into a Type R storm inlet located at the south half of Road C and be routed to Pond C-2 in the Master Drainage Report.

Basin Q (2.17 acres, 90.00% impervious) consists of roofs. The peak runoff from basin Q is 5.05 cfs for the minor storm event and 12.57 cfs for the major storm event. Basin Q will drain via downspouts to an on-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin R (3.28 acres, 90.00% impervious) consists of roofs. The peak runoff from basin R is 7.63 cfs for the minor storm event and 18.99 cfs for the major storm event. Basin R will drain via downspouts to an on-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin S1 (1.24 acres, 8.99% impervious) consists of landscaping and walks. The peak runoff from basin S1 is 0.12 cfs for the minor storm event and 1.26 cfs for the major storm event. Basin S1 will drain to landscape drains and a Type C inlet where it will be conveyed by an on-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin S2 (0.97 acres, 77.72% impervious) consists of parking areas, landscaping, and walks. The peak runoff from basin S2 is 1.86 cfs for the minor storm event and 4.93 cfs for the major storm event. Basin S2 will drain to a Type R inlet within the parking lot where it will be conveyed by an on-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin S3 (0.90 acres, 77.25% impervious) consists of parking areas, landscaping, and walks. The peak runoff from basin S3 is 1.72 cfs for the minor storm event and 4.56 cfs for the major storm event. Basin S3 will drain to a Type R inlet within the parking lot where it will be conveyed by an on-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin S4 (1.84 acres, 3.48% impervious) consists of landscaping and walks. The peak runoff from basin S4 is 0.06 cfs for the minor storm event and 1.48 cfs for the major storm event. Basin S4 will drain to landscape drains and a Type C inlet where it will be conveyed by an on-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin T1 (0.71 acres, 90.00% impervious) consists of drives and loading areas. The peak runoff from basin T1 is 1.63 cfs for the minor storm event and 4.06 cfs for the major storm event. Basin T1 will drain to inlets within the drive aisle where it will be conveyed by an on-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin T2 (0.44 acres, 87.52% impervious) consists of drives and loading areas. The peak runoff from basin T2 is 1.02 cfs for the minor storm event and 2.58 cfs for the major storm event. Basin T2 will drain to inlets within the drive aisle where it will be conveyed by an on-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin T3 (0.44 acres, 76.38% impervious) consists of drives and loading areas. The peak runoff from basin T3 is 0.83 cfs for the minor storm event and 2.21 cfs for the major storm event. Basin T3 will drain to inlets within the drive aisle where it will be conveyed by an on-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin T4 (0.44 acres, 90.00% impervious) consists of drives and loading areas. The peak runoff from basin T4 is 1.14 cfs for the minor storm event and 2.85 cfs for the major storm event. Basin T4 will drain to inlets

within the drive aisle where it will be conveyed by an on-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin T5 (0.80 acres, 73.31% impervious) consists of drives and loading areas. The peak runoff from basin T5 is 1.49 cfs for the minor storm event and 4.05 cfs for the major storm event. Basin T5 will drain to inlets within the drive aisle where it will be conveyed by an on-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin U1 (0.52 acres, 80.63% impervious) consists of parking areas, landscaping, and walks. The peak runoff from basin U1 is 1.02 cfs for the minor storm event and 2.66 cfs for the major storm event. Basin U1 will drain to a Type R inlet within the parking lot where it will be conveyed by an on-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin U2 (0.55 acres, 80.77% impervious) consists of parking areas, landscaping, and walks. The peak runoff from basin U2 is 1.12 cfs for the minor storm event and 2.93 cfs for the major storm event. Basin U2 will drain to a Type R inlet within the parking lot where it will be conveyed by an on-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin U3 (0.30 acres, 78.28% impervious) consists of parking areas, landscaping, and walks. The peak runoff from basin U3 is 0.61 cfs for the minor storm event and 1.61 cfs for the major storm event. Basin U3 will drain to a Type R inlet within the parking lot where it will be conveyed by an on-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin U4 (0.59 acres, 79.52% impervious) consists of parking areas, landscaping, and walks. The peak runoff from basin U4 is 1.23 cfs for the minor storm event and 3.23 cfs for the major storm event. Basin U4 will drain to a Type R inlet within the parking lot where it will be conveyed by an on-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin V1 (1.59 acres, 7.38% impervious) consists of landscaping and walks. The peak runoff from basin V1 is 0.13 cfs for the minor storm event and 1.58 cfs for the major storm event. Basin V1 will drain to a Type C inlet where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin V2 (1.07 acres, 18.86% impervious) consists of landscaping and walks. The peak runoff from basin V2 is 0.27 cfs for the minor storm event and 1.56 cfs for the major storm event. Basin V2 will drain to a Type C inlet where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin V3 (2.03 acres, 12.95% impervious) consists of landscaping and walks. The peak runoff from basin V3 is 0.32 cfs for the minor storm event and 2.47 cfs for the major storm event. Basin V3 will drain to a Type C inlet where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin V4 (0.10 acres, 2.00% impervious) consists of landscaping and walks. The peak runoff from basin V4 is 0.002 cfs for the minor storm event and 0.08 cfs for the major storm event. Basin V4 will drain overland into an off-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin V5 (2.73 acres, 18.17% impervious) consists of landscaping and walks. The peak runoff from basin V5 is 0.67 cfs for the minor storm event and 3.98 cfs for the major storm event. Basin V5 will drain overland into an off-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin V6 (0.90 acres, 9.58% impervious) consists of landscaping and walks. The peak runoff from basin V6 is 0.11 cfs for the minor storm event and 1.07 cfs for the major storm event. Basin V6 will drain overland into an off-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin W1 (1.07 acres, 67.69% impervious) consists of parking areas, landscaping, and walks. The peak runoff from basin W1 is 1.36 cfs for the minor storm event and 3.83 cfs for the major storm event. Basin

W1 will drain to a Type R inlet within the parking lot where it will be conveyed by an on-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin W2 (0.19 acres, 78.42% impervious) consists of parking areas, landscaping, and walks. The peak runoff from basin W2 is 0.41 cfs for the minor storm event and 1.09 cfs for the major storm event. Basin W2 will drain to a Type R inlet within the parking lot where it will be conveyed by an on-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin X (1.93 acres, 3.25% impervious) consists of landscaping. The peak runoff from basin X is 0.06 cfs for the minor storm event and 1.77 cfs for the major storm event. Basin X will drain overland into an off-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

VI. CONCLUSIONS

A. Compliance with Standards

Design of the Site complies with all applicable design standards including but not limited to the Storm Drainage Design and Technical Criteria Manual, the Basinwide Major Drainageway Planning Study, the Lafayette-Louisville Boundary Outfall System Plan, the City of Louisville Subdivision Regulations, the Urban Storm Drainage Criteria Manual, and the Redtail Ridge Master Drainage Report. The intent of this Drainage Report is to act as a drainage report in compliance with the Final Master Drainage Report.

B. Drainage Concept

All stormwater runoff from PUD 1 South will be conveyed by the storm sewer system proposed in the Redtail Ridge Master Drainage plan and is in conformance with the City of Louisville Wastewater standards and Mile High Flood District criteria. All flows from the site will be routed to Pond C-2 of the Redtail Master Drainage Report which has been designed to detain and release flows in the rates required by the City of Louisville and the MHFD. Sterling Bay - West will be responsible for maintaining the storm infrastructure that is part of PUD 1 South.

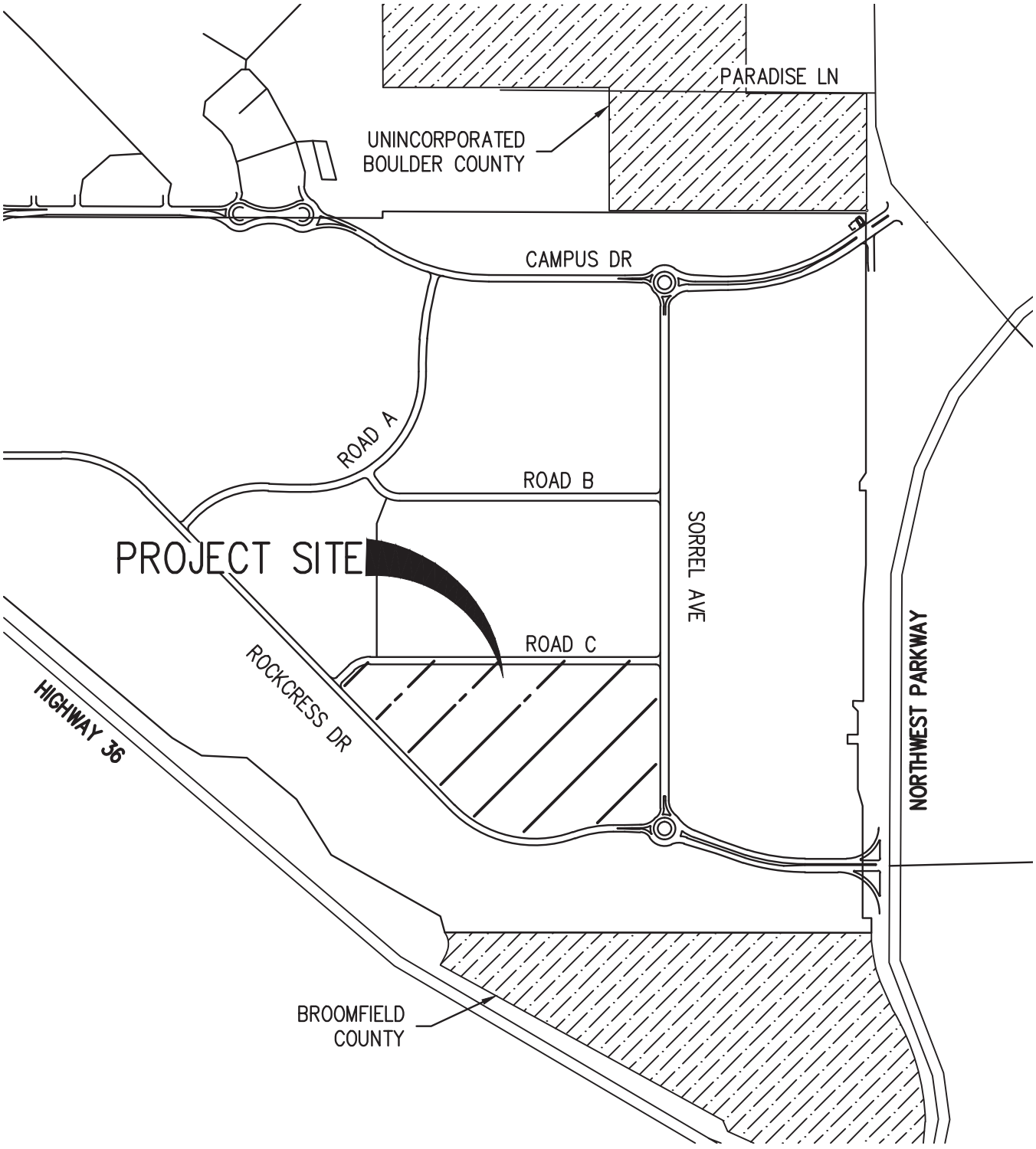
VII. LIST OF REFERENCES

References

1. Urban Storm Drainage Criteria Manual, Vol. 1, 2 and 3, January, 2016, Urban Drainage and Flood Control District.
2. Storm Drainage Design & Technical Criteria Manual, City of Louisville, August 2013
3. Redtail Ridge Final Master Drainage Report, July, 2024, Harris Kocher Smith
4. Phase I Environmental Site Assessment Former Conoco Philips Site, February 2019, CTL|Thompson

VIII. APPENDICES

APPENDIX A – VICINITY MAP, FIRM MAP, AND NRCS SOILS REPORT



REDTAIL RIDGE - PUD 1 SOUTH VICINITY MAP

SCALE: 1"=800'

HARRIS KOCHER SMITH
1120 Lincoln Street, Suite 1000
Denver, Colorado 80203
P: 303.623.6300 F: 303.623.6311
HarrisKocherSmith.com

800 0 800 1600

SCALE: 1" = 800'

Plotted: FRI 03/07/25 12:07:09P By: Owen Van Lehman Filepath: p:\2022\221236\engineering\drainage\vicinity map-south.dwg Layout: layout1

National Flood Hazard Layer FIRMette

FEMA

105°8'25"W 39°56'51"N

105°7'48"W 39°56'23"N

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

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

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

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

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

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

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

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

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 9/16/2025 at 7:07 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Boulder County Area, Colorado

September 16, 2025

Custom Soil Resource Report
Soil Map

Map Scale: 1:2,570 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 35 70 140 210

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Boulder County Area, Colorado
Survey Area Data: Version 21, Sep 6, 2024

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 1, 2020—Jul 2, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

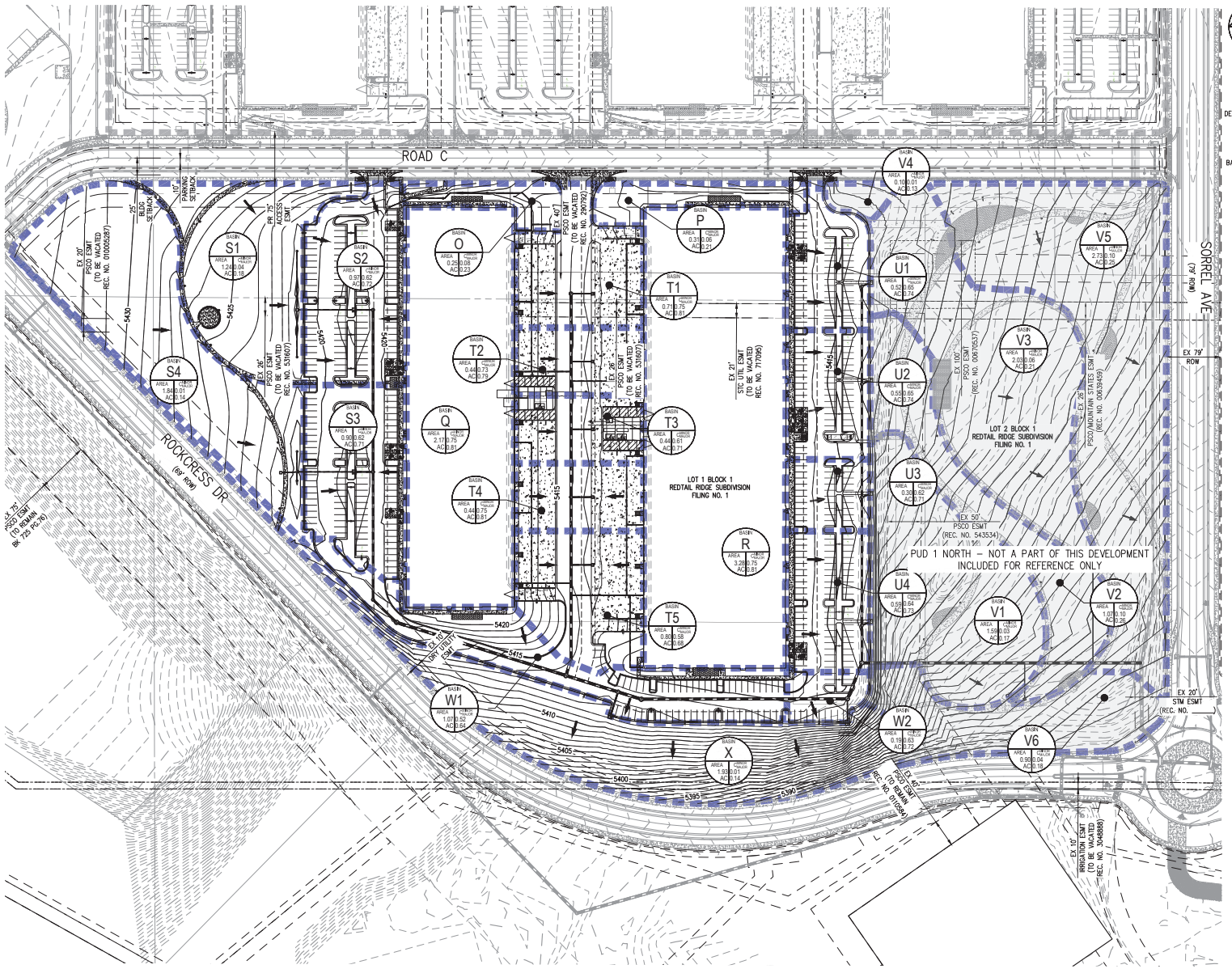
Absence of an entry indicates that the data were not estimated. The asterisk '*' denotes the representative texture; other possible textures follow the dash. The criteria for determining the hydrologic soil group for individual soil components is found in the National Engineering Handbook, Chapter 7 issued May 2007(http://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=17757.wba). Three values are provided to identify the expected Low (L), Representative Value (R), and High (H).

Engineering Properties–Boulder County Area, Colorado														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*
CoC—Colby silty clay loam, 3 to 5 percent slopes														
Colby	90	C	0-12	Silty clay loam	ML	A-4, A-6, A-7	0- 0- 0	0- 0- 0	100-100-100	100-100-100	95-98-100	85-90-95	30-38-45	5-10-15
			12-43	Silty clay loam	ML	A-4, A-6, A-7	0- 0- 0	0- 0- 0	100-100-100	100-100-100	95-98-100	85-90-95	30-38-45	5-10-15
			43-60	Clay loam	CL	A-6	0- 0- 0	0- 0- 0	100-100-100	100-100-100	90-95-100	70-75-80	30-33-35	10-13-15
KuD—Kutch clay loam, 3 to 9 percent slopes														
Kutch	85	D	0-7	Clay loam	CL	A-6	0- 0- 0	0- 0- 0	100-100-100	100-100-100	90-95-100	70-75-80	30-35-40	10-15-20
			7-22	Clay	CL	A-7	0- 0- 0	0- 0- 0	100-100-100	100-100-100	90-95-100	75-85-95	40-45-50	20-23-25
			22-30	Clay	CL	A-7	0- 0- 0	0- 0- 0	100-100-100	100-100-100	90-95-100	75-85-95	40-45-50	15-20-25
			30-34	Unweathered bedrock	—	—	—	—	—	—	—	—	—	—

Engineering Properties–Boulder County Area, Colorado														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*
NuB—Nunn clay loam, 1 to 3 percent slopes														
Nunn	85	C	0-9	Clay loam	CL	A-7-6	0- 0- 0	0- 0- 0	100-100-100	100-100-100	91-94-98	62-68-74	39-44-52	18-21-27
			9-13	Clay loam, clay	CH	A-7-6	0- 0- 0	0- 0- 0	100-100-100	100-100-100	90-95-100	69-76-82	47-51-59	24-27-33
			13-25	Clay loam, clay	CL	A-7-6	0- 0- 0	0- 0- 0	100-100-100	100-100-100	90-95-100	69-76-82	45-49-57	24-27-33
			25-38	Sandy clay loam, loam, clay loam	CL	A-6	0- 0- 0	0- 0- 0	100-100-100	100-100-100	86-94-100	57-69-85	29-39-44	12-19-23
			38-80	Sandy clay loam, sandy loam, loam, clay loam	CL	A-6	0- 0- 0	0- 0- 0	100-100-100	100-100-100	84-94-100	53-69-77	25-40-44	9-20-23
NuC—Nunn clay loam, 3 to 5 percent slopes														
Nunn	90	C	0-6	Clay loam	CL	A-7-6	0- 0- 0	0- 0- 0	100-100-100	100-100-100	91-94-98	62-68-74	39-44-52	18-21-27
			6-18	Clay loam, clay	CH	A-7-6	0- 0- 0	0- 0- 0	100-100-100	100-100-100	90-96-100	69-78-84	47-54-59	24-29-33
			18-30	Clay loam, clay	CH	A-7-6	0- 0- 0	0- 0- 0	100-100-100	100-100-100	90-96-100	69-78-84	45-53-57	24-30-33
			30-47	Sandy clay loam, loam, clay loam	CL	A-6	0- 0- 0	0- 0- 0	100-100-100	100-100-100	86-94-100	57-69-85	29-39-44	12-19-23
			47-80	Sandy clay loam, sandy loam, loam, clay loam	CL	A-6	0- 0- 0	0- 0- 0	100-100-100	100-100-100	84-94-100	53-69-77	25-40-44	9-20-23

Engineering Properties–Boulder County Area, Colorado														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Pct Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*	*L-R-H*
VcC—Valmont cobbly clay loam, 1 to 5 percent slopes														
Valmont	100	C	0-8	Cobbly clay loam	CL	A-6	0- 0- 0	15-20-25	75-83-90	70-78-85	65-75-85	50-60-70	30-35-40	10-15-20
			8-22	Clay, clay loam	CL	A-6, A-7	0- 0- 0	0- 3- 5	85-93-100	80-90-100	75-88-100	60-78-95	35-43-50	15-20-25
			22-60	Very gravelly loam, very gravelly sandy loam	GW-GM, GM, GC-GM, GC	A-1, A-2, A-4	0- 3- 5	10-13-15	35-45-55	30-40-50	20-35-50	10-25-40	20-25-30	NP-5-10

APPENDIX B – HYDROLOGIC PLANS AND COMPUTATIONS



LEGEND

- RIGHT-OF-WAY
- PROPERTY BOUNDARY
- EX CONTOUR
- PR CONTOUR
- EX STORM SEWER
- PR LANDSCAPE DRAIN
- DRAINAGE BASIN BOUNDARY
- DESIGN POINT
- FLOW ARROW

PUD 1 - SOUTH RUNOFF SUMMARY TABLE

MAJOR BASIN	SUB-BASIN	AREA (AC)	Q5 (CFS)	Q100 (CFS)
B-2 (POND C-2)	O	0.25	0.07	0.43
	P	0.31	0.06	0.48
	Q	2.17	5.05	12.57
	R	3.28	7.63	18.99
	S1	1.24	0.12	1.26
	S2	0.97	1.86	4.93
	S3	0.90	1.72	4.56
	S4	1.84	0.06	1.48
	T1	0.71	1.63	4.06
	T2	0.44	1.02	2.58
	T3	0.44	0.83	2.21
	T4	0.44	1.14	2.85
	T5	0.80	1.49	4.05
	U1	0.52	1.02	2.66
	U2	0.55	1.12	2.93
	U3	0.30	0.61	1.61
	U4	0.59	1.23	3.23
	V1	1.59	0.13	1.58
	V2	1.07	0.27	1.56
	V3	2.03	0.32	2.47
	V4	0.10	0.002	0.08
	V5	2.73	0.67	3.98
	V6	0.90	0.11	1.07
	W1	1.07	1.36	3.83
	W2	0.19	0.41	1.09
	X	1.93	0.06	1.77

Know what's below. Call before you dig.

SCALE: 1" = 70'

DESIGNED BY: TJS
CHECKED BY: TJS
DRAWN BY: ODV

ISSUE DATE: ##########	
DATE	REVISION COMMENTS
#	#
#	#
#	#
#	#
#	#
#	#

HARRIS KOCHER SMITH
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Denver, Colorado 80203
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HarrisKocherSmith.com

STERLING BAY

REDTAIL RIDGE PUD1
DRAINAGE PLAN

PRELIMINARY NOT FOR CONSTRUCTION

PROJECT #: 221236
SHEET NUMBER
ST23
27 OF 57

NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH

FILEPATH: P:\2022\221236\ENGINEERING\DRAINAGE\DRAINAGE PLAN-PUD1-SOUTH.DWG LAYOUT: 1 (2)
17 XREFs: [U] ol - storm, e-bse-[U], e-legal, e-utl[U], p-base-f1, p-base-f2, p-base-mnt, p-base-pud1-north, p-base-pud1-south, p-base-pud2, p-base-pud3, p-legal-f1, p-legal-mnt, p-legal-pud1, pud1-mnt, p-utl-pud1
PLOTTED: Fri 09/14/25 12:48P BY OWEN VAN LEHMAN

Project Name: Redtail Ridge - PUD1

Composite C-Value Computations

Post-Development

Project No: 221236

Date: 03/03/25

Revised:

Design by: ODV

Checked by: TJS

Hydrologic Soil Group: C

BASIN	TOTAL AREA (ACRES)	ROOFS (90%)	SINGLE FAMILY LOTS (45%)	DRIVES & WALKS (90%)	GARAGE & STREETS (100%)	LANDSCAPE AREA (2%)	PERCENT IMPERVIOUS	C_2=	C_5=	C_{10}=	C_{100}=
O	0.25	0.00	0.00	0.04	0.00	0.21	15.97%	0.08	0.08	0.09	0.23
P	0.31	0.00	0.00	0.04	0.00	0.27	12.84%	0.06	0.06	0.07	0.21
Q	2.17	2.17	0.00	0.00	0.00	0.00	90.00%	0.73	0.75	0.76	0.81
R	3.28	3.28	0.00	0.00	0.00	0.00	90.00%	0.73	0.75	0.76	0.81
S1	1.24	0.00	0.00	0.10	0.00	1.14	8.99%	0.04	0.04	0.04	0.18
S2	0.97	0.00	0.00	0.83	0.00	0.14	77.72%	0.60	0.62	0.64	0.72
S3	0.90	0.00	0.00	0.77	0.00	0.13	77.25%	0.60	0.62	0.63	0.71
S4	1.84	0.00	0.00	0.03	0.00	1.81	3.48%	0.01	0.01	0.01	0.14
T1	0.71	0.00	0.00	0.71	0.00	0.00	90.00%	0.73	0.75	0.76	0.81
T2	0.44	0.00	0.00	0.42	0.00	0.01	87.52%	0.71	0.73	0.74	0.79
T3	0.44	0.00	0.00	0.37	0.00	0.07	76.38%	0.59	0.61	0.62	0.71
T4	0.44	0.00	0.00	0.44	0.00	0.00	90.00%	0.73	0.75	0.76	0.81
T5	0.80	0.00	0.00	0.65	0.00	0.15	73.31%	0.56	0.58	0.59	0.68
U1	0.52	0.00	0.00	0.46	0.00	0.05	80.63%	0.63	0.65	0.67	0.74
U2	0.55	0.00	0.00	0.49	0.00	0.06	80.77%	0.64	0.65	0.67	0.74
U3	0.30	0.00	0.00	0.26	0.00	0.04	77.28%	0.60	0.62	0.63	0.71
U4	0.59	0.00	0.00	0.52	0.00	0.07	79.52%	0.62	0.64	0.66	0.73
V1	1.59	0.00	0.00	0.10	0.00	1.49	7.38%	0.03	0.03	0.04	0.17
V2	1.07	0.00	0.00	0.20	0.00	0.86	18.86%	0.10	0.10	0.11	0.26
V3	2.03	0.05	0.00	0.21	0.00	1.78	12.95%	0.06	0.06	0.07	0.21
V4	0.10	0.00	0.00	0.00	0.00	0.10	2.00%	0.01	0.01	0.01	0.13
V5	2.73	0.00	0.00	0.50	0.00	2.22	18.17%	0.09	0.10	0.11	0.25
V6	0.90	0.00	0.00	0.08	0.00	0.82	9.58%	0.04	0.04	0.05	0.18
W1	1.07	0.00	0.00	0.80	0.00	0.27	67.69%	0.51	0.52	0.54	0.64
W2	0.19	0.00	0.00	0.17	0.00	0.03	78.42%	0.61	0.63	0.64	0.72
X	1.93	0.00	0.00	0.03	0.00	1.91	3.25%	0.01	0.01	0.01	0.14
Pond C-2 (Basin B-2)	27.34	5.50	0.00	8.21	0.00	13.64	46.11%				

Project Name: Redtail Ridge - PUD1
Project No: 221236
Date: 3/3/2025

Revised:

STANDARD FORM SF-2
TIME OF CONCENTRATION

Designed By: ODV
Checked By: TJS

SUB-BASIN DATA			INITIAL/OVERLAND TIME (T_i)			TRAVEL TIME (T_t)					Tc CHECK (URBANIZED BASINS)			FINAL	REMARKS
BASIN	AREA (AC)	C_5	LENGTH (FT)	SLOPE %	Ti (MIN)	LENGTH (FT)	SLOPE %	C_v	VELOCITY (FPS)	Tt (MIN)	COMPOS. Tc (MIN)	TOTAL LENGTH	Tc = (L/180) + 10 (MIN)	T_c (MIN)	
O	0.25	0.08	50	5.00	7.71	0	2.00	15.00	2.12	0.00	7.71	50	10.28	7.71	
P	0.31	0.06	50	5.00	7.86	0	2.00	15.00	2.12	0.00	7.86	50	10.28	7.86	
Q	2.17	0.75	250	2.00	8.01	100	2.00	20.00	2.83	0.59	8.60	350	11.94	8.60	
R	3.28	0.75	250	2.00	8.01	100	2.00	20.00	2.83	0.59	8.60	350	11.94	8.60	
S1	1.24	0.04	400	3.00	26.96	525	2.00	15.00	2.12	4.12	31.08	925	15.14	15.14	
S2	0.97	0.62	100	3.00	6.06	450	2.00	20.00	2.83	2.65	8.71	550	13.06	8.71	
S3	0.90	0.62	150	3.00	7.49	200	2.00	20.00	2.83	1.18	8.67	350	11.94	8.67	
S4	1.84	0.01	400	3.00	27.67	300	2.00	15.00	2.12	2.36	30.02	700	13.89	13.89	
T1	0.71	0.75	150	3.00	5.42	575	2.00	20.00	2.83	3.39	8.81	725	14.03	8.81	
T2	0.44	0.73	100	3.00	4.76	475	2.00	20.00	2.83	2.80	7.56	575	13.19	7.56	
T3	0.44	0.61	100	3.00	6.23	375	2.00	20.00	2.83	2.21	8.44	475	12.64	8.44	
T4	0.44	0.75	100	3.00	4.43	265	2.00	20.00	2.83	1.56	5.99	365	12.03	5.99	
T5	0.80	0.58	100	3.00	6.63	175	2.00	20.00	2.83	1.03	7.66	275	11.53	7.66	
U1	0.52	0.65	100	3.00	5.68	575	2.00	20.00	2.83	3.39	9.07	675	13.75	9.07	
U2	0.55	0.65	100	3.00	5.66	430	2.00	20.00	2.83	2.53	8.19	530	12.94	8.19	
U3	0.30	0.62	100	3.00	6.11	260	2.00	20.00	2.83	1.53	7.65	360	12.00	7.65	
U4	0.59	0.64	150	3.00	7.13	75	2.00	20.00	2.83	0.44	7.57	225	11.25	7.57	
V1	1.59	0.03	400	4.00	24.70	225	5.00	15.00	3.35	1.12	25.81	625	13.47	13.47	
V2	1.07	0.10	625	4.00	28.81	225	5.00	15.00	3.35	1.12	29.92	850	14.72	14.72	
V3	2.03	0.06	575	4.00	28.71	230	6.00	15.00	3.67	1.04	29.75	805	14.47	14.47	
V4	0.10	0.01	100	4.00	12.64	0	2.00	15.00	2.12	0.00	12.64	100	10.56	10.56	
V5	2.73	0.10	750	4.00	31.71	0	2.00	15.00	2.12	0.00	31.71	750	14.17	14.17	
V6	0.90	0.04	200	4.00	17.26	0	2.00	15.00	2.12	0.00	17.26	200	11.11	11.11	
W1	1.07	0.52	500	3.00	16.41	450	2.00	20.00	2.83	2.65	19.06	950	15.28	15.28	
W2	0.19	0.63	100	3.00	5.97	95	2.00	20.00	2.83	0.56	6.53	195	11.08	6.53	
X	1.93	0.01	150	15.00	9.92	0	2.00	15.00	2.12	0.00	9.92	150	10.83	9.92	

1-HR Rainfall

Return Interval (YR)	1-hour Rainfall
WQ	0.6
2	0.801
5	1.08
10	1.35
100	2.49

tc	WQ	2yr	5yr	5yr	100yr
5	2.0351	2.717	3.663	4.579	8.446
6	1.934	2.582	3.482	4.353	8.028
7	1.844	2.462	3.320	4.150	7.654
8	1.763	2.354	3.174	3.968	7.318
9	1.690	2.256	3.042	3.803	7.014
10	1.623	2.167	2.922	3.652	6.737
11	1.562	2.086	2.812	3.515	6.483
12	1.506	2.011	2.711	3.389	6.250
13	1.454	1.942	2.618	3.272	6.036
14	1.407	1.878	2.532	3.165	5.837
15	1.362	1.818	2.452	3.065	5.653
16	1.321	1.763	2.377	2.972	5.481
17	1.282	1.712	2.308	2.885	5.321
18	1.246	1.663	2.243	2.804	5.171
19	1.212	1.618	2.182	2.727	5.030
20	1.180	1.576	2.124	2.656	4.898

Project Name: Redtail Ridge - PUD1
Project No: 221236
Date: 03/03/25
Revised: 01/00/00

STANDARD FORM SF-2
Post-Development
Rational Method Procedure

Designed By: ODV
Checked By: TJS
Design Storm: 5 YR

		DIRECT RUNOFF						TOTAL RUNOFF				STREET/INLET					
BASIN (s)	DESIGN POINT	AREA (AC)	RUNOFF COEFF	T_c (min)	C x A (AC)	I (IN/HR)	DIRECT RUNOFF, Q (CFS)	T_c (MAX)	Σ(C x A) (AC)	I (IN/HR)	TOTAL RUNOFF, Q (CFS)	SLOPE (%)	STREET FLOW (CFS)	INLET DESIGN FLOW (CFS)	STREET OR INLET INTERCEPTION (CFS)	CARRYOVER (CFS)	REMARKS
O	-	0.25	0.08	7.71	0.02	3.21	0.07										
P	-	0.31	0.06	7.86	0.02	3.19	0.06										
Q	-	2.17	0.75	8.60	1.63	3.09	5.047										
R	2	3.28	0.75	8.60	2.47	3.09	7.63										
S1	4	1.24	0.04	15.14	0.05	2.44	0.12										
S2	4	0.97	0.62	8.71	0.60	3.08	1.86										
S3	-	0.90	0.62	8.67	0.56	3.08	1.72										
S4	1	1.84	0.01	13.89	0.02	2.54	0.06										
T1	1	0.71	0.75	8.81	0.53	3.07	1.63										
T2	1	0.44	0.73	7.56	0.32	3.24	1.02										
T3	1	0.44	0.61	8.44	0.27	3.11	0.83										
T4	2	0.44	0.75	5.99	0.33	3.48	1.14										
T5	2	0.80	0.58	7.66	0.46	3.22	1.49										
U1	2	0.52	0.65	9.07	0.34	3.03	1.02										
U2	2	0.55	0.65	8.19	0.36	3.15	1.12										
U3	3	0.30	0.62	7.65	0.19	3.22	0.61										
U4	3	0.59	0.64	7.57	0.38	3.23	1.23										
V1	3	1.59	0.03	13.47	0.05	2.58	0.13										
V2	3	1.07	0.10	14.72	0.11	2.47	0.27										
V3	3	2.03	0.06	14.47	0.13	2.49	0.32										
V4	4	0.10	0.01	10.56	0.00	2.86	0.00										
V5	4	2.73	0.10	14.17	0.27	2.52	0.67										
V6	4	0.90	0.04	11.11	0.04	2.80	0.11										
W1	4	1.07	0.52	15.28	0.56	2.43	1.36										
W2	4	0.19	0.63	6.53	0.12	3.39	0.41										
X	4	1.93	0.01	9.92	0.02	2.93	0.06										

Project Name: Redtail Ridge - PUD1
Project No: 221236
Date: 03/03/25
Revised: 01/00/00

STANDARD FORM SF-2
Post-Development
Rational Method Procedure

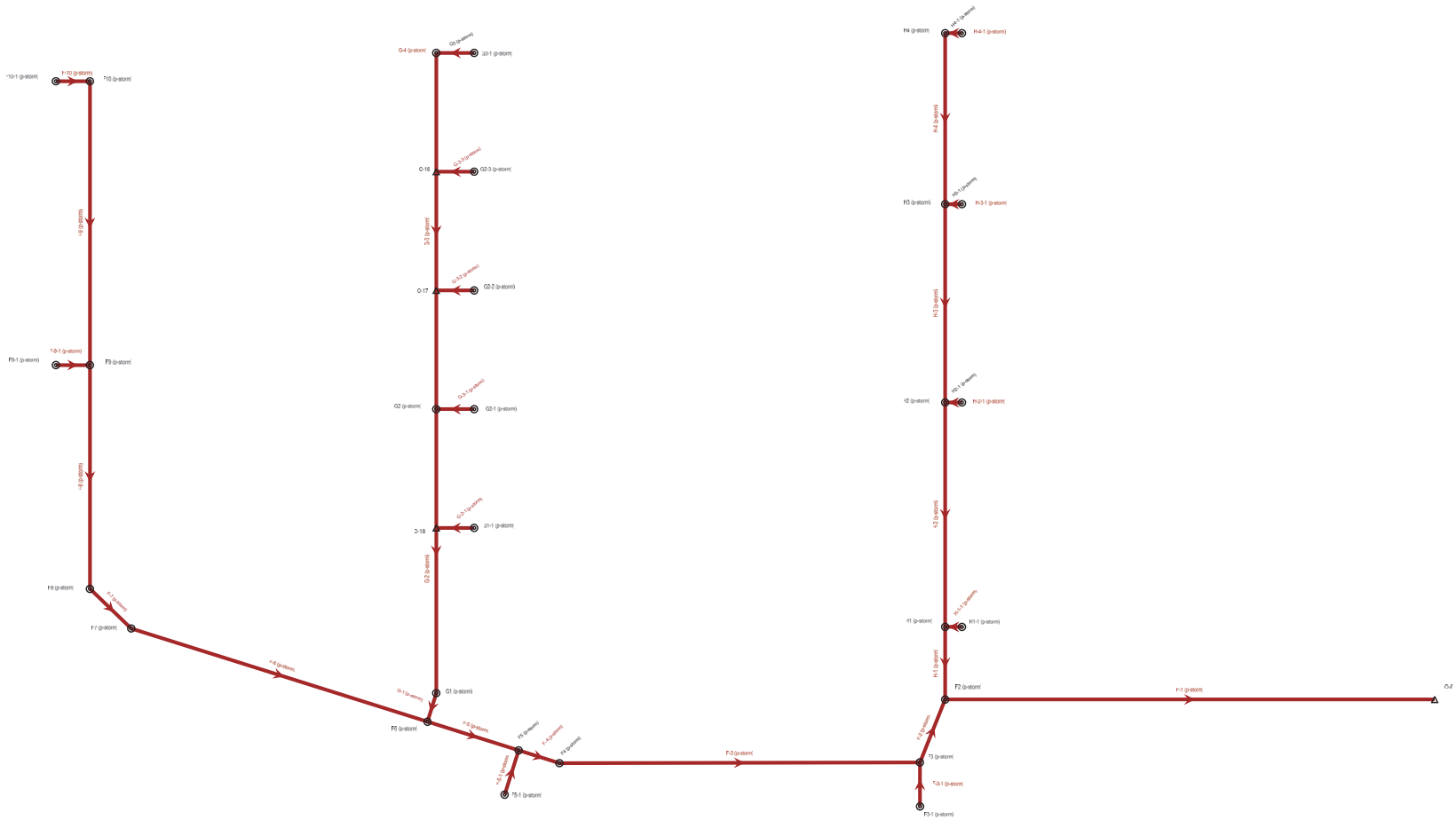
Designed By: ODV
Checked By: TJS
Design Storm: 100 YR

		DIRECT RUNOFF						TOTAL RUNOFF				STREET/INLET					
BASIN (s)	DESIGN POINT	AREA (AC)	RUNOFF COEFF	T_c (min)	C x A (AC)	I (IN/HR)	DIRECT RUNOFF, Q (CFS)	T_c (MAX)	Σ(C x A) (AC)	I (IN/HR)	TOTAL RUNOFF, Q (CFS)	SLOPE (%)	STREET FLOW (CFS)	INLET DESIGN FLOW (CFS)	STREET OR INLET INTERCEPTION (CFS)	CARRYOVER (CFS)	REMARKS
O	-	0.25	0.23	7.71	0.06	7.41	0.43										
P	-	0.31	0.21	7.86	0.07	7.36	0.48										
Q	-	2.17	0.81	8.60	1.76	7.13	12.57										
R	2	3.28	0.81	8.60	2.66	7.13	18.99										
S1	4	1.24	0.18	15.14	0.22	5.63	1.26										
S2	4	0.97	0.72	8.71	0.69	7.10	4.93										
S3	-	0.90	0.71	8.67	0.64	7.11	4.56										
S4	1	1.84	0.14	13.89	0.25	5.86	1.48										
T1	1	0.71	0.81	8.81	0.57	7.07	4.06										
T2	1	0.44	0.79	7.56	0.35	7.46	2.58										
T3	1	0.44	0.71	8.44	0.31	7.18	2.21										
T4	2	0.44	0.81	5.99	0.35	8.03	2.85										
T5	2	0.80	0.68	7.66	0.54	7.43	4.05										
U1	2	0.52	0.74	9.07	0.38	6.99	2.66										
U2	2	0.55	0.74	8.19	0.40	7.26	2.93										
U3	3	0.30	0.71	7.65	0.22	7.43	1.61										
U4	3	0.59	0.73	7.57	0.43	7.46	3.23										
V1	3	1.59	0.17	13.47	0.27	5.94	1.58										
V2	3	1.07	0.26	14.72	0.27	5.70	1.56										
V3	3	2.03	0.21	14.47	0.43	5.75	2.47										
V4	4	0.10	0.13	10.56	0.01	6.59	0.08										
V5	4	2.73	0.25	14.17	0.69	5.81	3.98										
V6	4	0.90	0.18	11.11	0.17	6.46	1.07										
W1	4	1.07	0.64	15.28	0.68	5.60	3.83										
W2	4	0.19	0.72	6.53	0.14	7.83	1.09										
X	4	1.93	0.14	9.92	0.26	6.76	1.77										

RUNOFF SUMMARY TABLE			
BASIN	**AREA (AC)**	**Q5 (CFS)**	**Q100 (CFS)**
O	0.25	0.07	0.43
P	0.31	0.06	0.48
Q	2.17	5.05	12.57
R	3.28	7.63	18.99
S1	1.24	0.12	1.26
S2	0.97	1.86	4.93
S3	0.90	1.72	4.56
S4	1.84	0.06	1.48
T1	0.71	1.63	4.06
T2	0.44	1.02	2.58
T3	0.44	0.83	2.21
T4	0.44	1.14	2.85
T5	0.80	1.49	4.05
U1	0.52	1.02	2.66
U2	0.55	1.12	2.93
U3	0.30	0.61	1.61
U4	0.59	1.23	3.23
V1	1.59	0.13	1.58
V2	1.07	0.27	1.56
V3	2.03	0.32	2.47
V4	0.10	0.00	0.08
V5	2.73	0.67	3.98
V6	0.90	0.11	1.07
W1	1.07	1.36	3.83
W2	0.19	0.41	1.09
X	1.93	0.06	1.77

APPENDIX C – HYDRAULIC PLANS AND COMPUTATIONS

Scenario: 100-YR



FlexTable: Conduit Table

Label	Start Node	Stop Node	Length (User Defined) (ft)	Diameter (in)	Manning's n	Invert (Start) (ft)	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Velocity (ft/s)	System Known Flow (cfs)	Capacity (Full Flow) (cfs)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)
F-1 (p-storm)	F2 (p-storm)	O-6	413.0	36.0	0.013	5,392.51	5,374.15	0.044	15.68	29.09	140.62	5,394.26	5,375.08
F-2 (p-storm)	F3 (p-storm)	F2 (p-storm)	57.1	36.0	0.013	5,399.57	5,397.51	0.036	13.84	24.38	126.63	5,401.16	5,398.49
F-3 (p-storm)	F4 (p-storm)	F3 (p-storm)	303.9	36.0	0.013	5,404.33	5,399.77	0.015	10.04	23.97	81.69	5,405.91	5,400.88
F-3-1 (p-storm)	F3-1 (p-storm)	F3 (p-storm)	37.1	12.0	0.013	5,407.04	5,406.67	0.010	3.02	0.41	3.56	5,407.30	5,406.90
F-4 (p-storm)	F5 (p-storm)	F4 (p-storm)	36.1	36.0	0.013	5,404.71	5,404.53	0.005	6.69	23.97	47.10	5,406.29	5,406.05
F-5 (p-storm)	F6 (p-storm)	F5 (p-storm)	80.5	36.0	0.013	5,405.31	5,404.91	0.005	6.59	22.61	47.02	5,406.84	5,406.38
F-5-1 (p-storm)	F5-1 (p-storm)	F5 (p-storm)	39.1	15.0	0.013	5,408.20	5,407.44	0.019	5.29	1.36	9.01	5,408.66	5,407.77
F-6 (p-storm)	F7 (p-storm)	F6 (p-storm)	261.8	36.0	0.013	5,411.28	5,405.51	0.022	6.72	3.75	99.01	5,411.88	5,406.85
F-7 (p-storm)	F8 (p-storm)	F7 (p-storm)	48.3	24.0	0.013	5,412.52	5,412.28	0.005	4.15	3.75	15.95	5,413.20	5,412.94
F-8 (p-storm)	F9 (p-storm)	F8 (p-storm)	188.4	24.0	0.013	5,413.20	5,412.62	0.003	3.49	3.75	12.55	5,413.95	5,413.30
F-9 (p-storm)	F10 (p-storm)	F9 (p-storm)	239.0	24.0	0.013	5,414.49	5,413.30	0.005	3.46	1.98	15.96	5,414.98	5,413.95
F-9-1 (p-storm)	F9-1 (p-storm)	F9 (p-storm)	28.7	12.0	0.013	5,415.32	5,415.03	0.010	4.55	1.77	3.58	5,415.89	5,415.53
F-10 (p-storm)	F10-1 (p-storm)	F10 (p-storm)	28.7	12.0	0.013	5,415.17	5,415.03	0.005	3.52	1.98	2.49	5,415.84	5,415.63
G-1 (p-storm)	G1 (p-storm)	F6 (p-storm)	25.1	36.0	0.013	5,405.54	5,405.41	0.005	6.38	18.86	47.98	5,406.93	5,406.88
G-2 (p-storm)	G2 (p-storm)	G1 (p-storm)	239.2	36.0	0.013	5,406.84	5,405.64	0.005	6.31	18.86	47.24	5,408.23	5,406.96
G-2-1 (p-storm)	G1-1 (p-storm)	O-18	32.0	12.0	0.013	5,408.21	5,408.06	0.005	3.26	1.49	2.44	5,408.77	5,408.58
G-3 (p-storm)	G3 (p-storm)	G2 (p-storm)	300.0	36.0	0.013	5,408.63	5,407.13	0.005	6.05	16.23	47.16	5,409.92	5,408.34
G-3-1 (p-storm)	G2-1 (p-storm)	G2 (p-storm)	32.0	12.0	0.013	5,409.51	5,408.86	0.020	5.21	1.14	5.08	5,409.96	5,409.18
G-3-2 (p-storm)	G2-2 (p-storm)	O-17	32.0	12.0	0.013	5,409.68	5,409.04	0.020	4.74	0.83	5.04	5,410.06	5,409.31
G-3-3 (p-storm)	G2-3 (p-storm)	O-16	32.0	12.0	0.013	5,410.04	5,409.52	0.016	4.66	1.02	4.54	5,410.46	5,409.84
G-4 (p-storm)	G3-1 (p-storm)	G3 (p-storm)	32.0	12.0	0.013	5,409.95	5,409.79	0.005	3.41	1.63	2.52	5,410.54	5,410.33
H-1 (p-storm)	H1 (p-storm)	F2 (p-storm)	61.1	24.0	0.013	5,402.60	5,402.01	0.010	5.35	3.98	22.22	5,403.30	5,402.58
H-1-1 (p-storm)	H1-1 (p-storm)	H1 (p-storm)	14.2	12.0	0.013	5,408.78	5,408.64	0.010	4.10	1.23	3.54	5,409.25	5,409.05
H-2 (p-storm)	H2 (p-storm)	H1 (p-storm)	189.0	24.0	0.013	5,404.43	5,402.60	0.010	4.82	2.75	22.26	5,405.01	5,403.30
H-2-1 (p-storm)	H2-1 (p-storm)	H2 (p-storm)	14.2	12.0	0.013	5,408.75	5,408.61	0.010	3.37	0.61	3.54	5,409.07	5,408.89
H-3 (p-storm)	H3 (p-storm)	H2 (p-storm)	167.0	24.0	0.013	5,406.05	5,404.43	0.010	4.48	2.14	22.28	5,406.56	5,405.01
H-3-1 (p-storm)	H3-1 (p-storm)	H3 (p-storm)	14.2	12.0	0.013	5,408.76	5,408.62	0.010	4.00	1.12	3.54	5,409.21	5,409.01
H-4 (p-storm)	H4 (p-storm)	H3 (p-storm)	144.0	24.0	0.013	5,407.45	5,406.05	0.010	3.60	1.02	22.30	5,407.80	5,406.56
H-4-1 (p-storm)	H4-1 (p-storm)	H4 (p-storm)	14.2	12.0	0.013	5,408.76	5,408.62	0.010	3.89	1.02	3.54	5,409.18	5,408.99

FlexTable: Manhole Table

Label	Elevation (Ground) (ft)	Elevation (Rim) (ft)	Elevation (Invert) (ft)	Flow (Known) (cfs)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)	Flow (Total Out) (cfs)	Depth (Out) (ft)
F2 (p-storm)	5,413.63	5,413.63	5,392.51	29.09	5,394.31	5,394.26	5,396.63	5,394.98	29.09	1.75
F3 (p-storm)	5,414.01	5,414.01	5,399.57	0.00	5,401.19	5,401.16	5,402.75	5,401.80	24.38	1.59
F3-1 (p-storm)	5,412.74	5,412.74	5,407.04	0.41	5,407.42	5,407.30	5,407.52	5,407.40	0.41	0.26
F4 (p-storm)	5,413.60	5,413.60	5,404.33	0.00	5,405.93	5,405.91	5,406.62	5,406.54	23.97	1.58
F5 (p-storm)	5,413.61	5,413.61	5,404.71	0.00	5,406.29	5,406.29	5,406.97	5,406.92	23.97	1.58
F5-1 (p-storm)	5,412.17	5,412.17	5,408.20	1.36	5,408.87	5,408.66	5,409.04	5,408.83	1.36	0.46
F6 (p-storm)	5,413.78	5,413.78	5,405.31	0.00	5,406.85	5,406.84	5,406.88	5,407.44	22.61	1.53
F7 (p-storm)	5,418.08	5,418.08	5,411.28	0.00	5,411.89	5,411.88	5,412.16	5,412.10	3.75	0.60
F8 (p-storm)	5,418.56	5,418.56	5,412.52	0.00	5,413.21	5,413.20	5,413.46	5,413.45	3.75	0.68
F9 (p-storm)	5,419.23	5,419.23	5,413.20	0.00	5,413.95	5,413.95	5,414.03	5,414.14	3.75	0.75
F9-1 (p-storm)	5,418.51	5,418.51	5,415.32	1.77	5,415.89	5,415.89	5,416.12	5,416.12	1.77	0.57
F10 (p-storm)	5,419.25	5,419.25	5,414.49	0.00	5,414.99	5,414.98	5,415.24	5,415.15	1.98	0.49
F10-1 (p-storm)	5,418.51	5,418.51	5,415.17	1.98	5,415.84	5,415.84	5,416.03	5,416.03	1.98	0.67
G1 (p-storm)	5,414.02	5,414.02	5,405.54	0.00	5,406.95	5,406.93	5,407.56	5,407.47	18.86	1.39
G1-1 (p-storm)	5,412.36	5,412.36	5,408.21	1.49	5,408.98	5,408.77	5,409.15	5,408.94	1.49	0.56
G2 (p-storm)	5,413.96	5,413.96	5,406.84	18.86	5,408.24	5,408.23	5,408.81	5,408.77	18.86	1.39
G2-1 (p-storm)	5,412.36	5,412.36	5,409.51	1.14	5,410.17	5,409.96	5,410.35	5,410.13	1.14	0.45
G2-2 (p-storm)	5,412.36	5,412.36	5,409.68	0.83	5,410.24	5,410.06	5,410.38	5,410.20	0.83	0.38
G2-3 (p-storm)	5,412.36	5,412.36	5,410.04	1.02	5,410.67	5,410.46	5,410.83	5,410.62	1.02	0.42
G3 (p-storm)	5,414.80	5,414.80	5,408.63	16.23	5,409.95	5,409.92	5,410.17	5,410.40	16.23	1.29
G3-1 (p-storm)	5,412.36	5,412.36	5,409.95	1.63	5,410.76	5,410.54	5,410.94	5,410.72	1.63	0.59
H1 (p-storm)	5,412.74	5,412.74	5,402.60	0.00	5,403.30	5,403.30	5,403.42	5,403.56	3.98	0.70
H1-1 (p-storm)	5,412.39	5,412.39	5,408.78	1.23	5,409.47	5,409.25	5,409.66	5,409.43	1.23	0.47
H2 (p-storm)	5,412.74	5,412.74	5,404.43	0.00	5,405.01	5,405.01	5,405.13	5,405.22	2.75	0.58
H2-1 (p-storm)	5,412.39	5,412.39	5,408.75	0.61	5,409.22	5,409.07	5,409.34	5,409.19	0.61	0.32
H3 (p-storm)	5,412.74	5,412.74	5,406.05	0.00	5,406.56	5,406.56	5,406.60	5,406.74	2.14	0.51
H3-1 (p-storm)	5,412.17	5,412.17	5,408.76	1.12	5,409.42	5,409.21	5,409.59	5,409.38	1.12	0.45
H4 (p-storm)	5,412.78	5,412.78	5,407.45	0.00	5,407.80	5,407.80	5,408.03	5,407.92	1.02	0.35
H4-1 (p-storm)	5,412.47	5,412.47	5,408.76	1.02	5,409.39	5,409.18	5,409.55	5,409.34	1.02	0.42

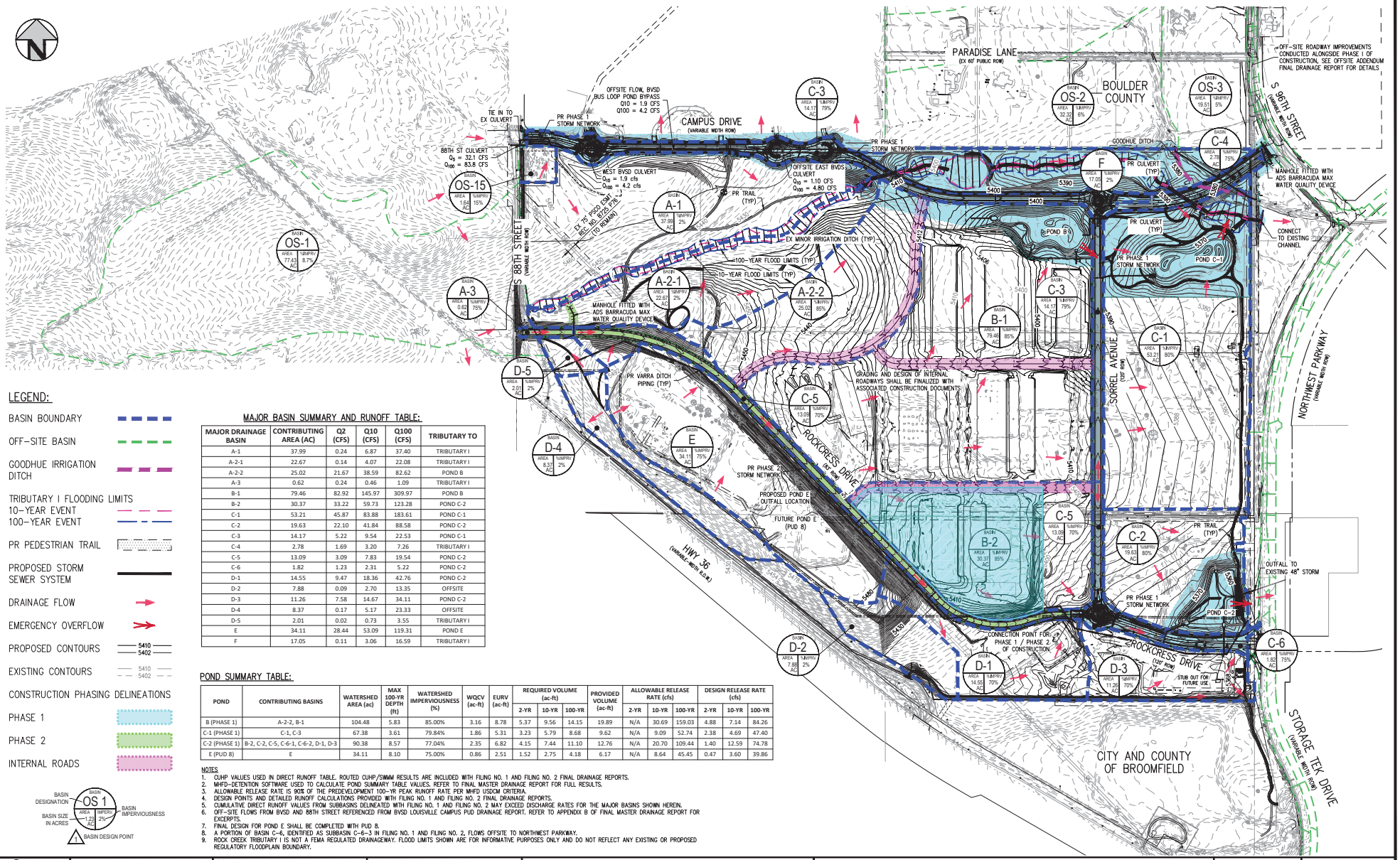
FlexTable: Conduit Table

Label	Start Node	Stop Node	Length (User Defined) (ft)	Diameter (in)	Manning's n	Invert (Start) (ft)	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Velocity (ft/s)	System Known Flow (cfs)	Capacity (Full Flow) (cfs)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)
F-1 (p-storm)	F2 (p-storm)	O-6	413.0	36.0	0.013	5,392.51	5,374.15	0.044	20.59	80.93	140.62	5,395.29	5,375.78
F-2 (p-storm)	F3 (p-storm)	F2 (p-storm)	57.1	36.0	0.013	5,399.57	5,397.51	0.036	18.02	64.89	126.63	5,402.15	5,399.28
F-3 (p-storm)	F4 (p-storm)	F3 (p-storm)	303.9	36.0	0.013	5,404.33	5,399.77	0.015	12.78	63.80	81.69	5,406.90	5,402.37
F-3-1 (p-storm)	F3-1 (p-storm)	F3 (p-storm)	37.1	12.0	0.013	5,407.04	5,406.67	0.010	3.99	1.09	3.56	5,407.48	5,407.05
F-4 (p-storm)	F5 (p-storm)	F4 (p-storm)	36.1	36.0	0.013	5,404.71	5,404.53	0.005	9.03	63.80	47.10	5,407.63	5,407.10
F-5 (p-storm)	F6 (p-storm)	F5 (p-storm)	80.5	36.0	0.013	5,405.31	5,404.91	0.005	8.48	59.97	47.02	5,408.33	5,407.64
F-5-1 (p-storm)	F5-1 (p-storm)	F5 (p-storm)	39.1	15.0	0.013	5,408.20	5,407.44	0.019	7.04	3.83	9.01	5,408.99	5,408.02
F-6 (p-storm)	F7 (p-storm)	F6 (p-storm)	261.8	36.0	0.013	5,411.28	5,405.51	0.022	9.52	12.23	99.01	5,412.39	5,408.37
F-7 (p-storm)	F8 (p-storm)	F7 (p-storm)	48.3	24.0	0.013	5,412.52	5,412.28	0.005	5.60	12.23	15.95	5,413.83	5,413.54
F-8 (p-storm)	F9 (p-storm)	F8 (p-storm)	188.4	24.0	0.013	5,413.20	5,412.62	0.003	4.55	12.23	12.55	5,414.76	5,413.88
F-9 (p-storm)	F10 (p-storm)	F9 (p-storm)	239.0	24.0	0.013	5,414.49	5,413.30	0.005	4.76	6.19	15.96	5,415.37	5,414.76
F-9-1 (p-storm)	F9-1 (p-storm)	F9 (p-storm)	28.7	12.0	0.013	5,415.32	5,415.03	0.010	7.69	6.04	3.58	5,416.84	5,415.99
F-10 (p-storm)	F10-1 (p-storm)	F10 (p-storm)	28.7	12.0	0.013	5,415.17	5,415.03	0.005	7.88	6.19	2.49	5,416.88	5,415.99
G-1 (p-storm)	G1 (p-storm)	F6 (p-storm)	25.1	36.0	0.013	5,405.54	5,405.41	0.005	6.75	47.74	47.98	5,408.56	5,408.43
G-2 (p-storm)	G2 (p-storm)	G1 (p-storm)	239.2	36.0	0.013	5,406.84	5,405.64	0.005	7.62	47.74	47.24	5,409.61	5,408.58
G-2-1 (p-storm)	G1-1 (p-storm)	O-18	32.0	12.0	0.013	5,408.21	5,408.06	0.005	5.16	4.05	2.44	5,409.91	5,409.50
G-3 (p-storm)	G3 (p-storm)	G2 (p-storm)	300.0	36.0	0.013	5,408.63	5,407.13	0.005	7.51	40.85	47.16	5,410.79	5,409.62
G-3-1 (p-storm)	G2-1 (p-storm)	G2 (p-storm)	32.0	12.0	0.013	5,409.51	5,408.86	0.020	6.65	2.85	5.08	5,410.23	5,409.69
G-3-2 (p-storm)	G2-2 (p-storm)	O-17	32.0	12.0	0.013	5,409.68	5,409.04	0.020	6.21	2.21	5.04	5,410.32	5,410.20
G-3-3 (p-storm)	G2-3 (p-storm)	O-16	32.0	12.0	0.013	5,410.04	5,409.52	0.016	5.97	2.58	4.54	5,410.73	5,410.50
G-4 (p-storm)	G3-1 (p-storm)	G3 (p-storm)	32.0	12.0	0.013	5,409.95	5,409.79	0.005	5.17	4.06	2.52	5,411.28	5,410.87
H-1 (p-storm)	H1 (p-storm)	F2 (p-storm)	61.1	24.0	0.013	5,402.60	5,402.01	0.010	6.96	10.43	22.22	5,403.76	5,402.98
H-1-1 (p-storm)	H1-1 (p-storm)	H1 (p-storm)	14.2	12.0	0.013	5,408.78	5,408.64	0.010	5.11	3.23	3.54	5,409.55	5,409.39
H-2 (p-storm)	H2 (p-storm)	H1 (p-storm)	189.0	24.0	0.013	5,404.43	5,402.60	0.010	6.32	7.20	22.26	5,405.38	5,403.77
H-2-1 (p-storm)	H2-1 (p-storm)	H2 (p-storm)	14.2	12.0	0.013	5,408.75	5,408.61	0.010	4.40	1.61	3.54	5,409.29	5,409.09
H-3 (p-storm)	H3 (p-storm)	H2 (p-storm)	167.0	24.0	0.013	5,406.05	5,404.43	0.010	5.90	5.59	22.28	5,406.88	5,405.39
H-3-1 (p-storm)	H3-1 (p-storm)	H3 (p-storm)	14.2	12.0	0.013	5,408.76	5,408.62	0.010	5.04	2.93	3.54	5,409.49	5,409.31
H-4 (p-storm)	H4 (p-storm)	H3 (p-storm)	144.0	24.0	0.013	5,407.45	5,406.05	0.010	4.78	2.66	22.30	5,408.02	5,406.89
H-4-1 (p-storm)	H4-1 (p-storm)	H4 (p-storm)	14.2	12.0	0.013	5,408.76	5,408.62	0.010	4.95	2.66	3.54	5,409.46	5,409.27

FlexTable: Manhole Table

Label	Elevation (Ground) (ft)	Elevation (Rim) (ft)	Elevation (Invert) (ft)	Flow (Known) (cfs)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)	Flow (Total Out) (cfs)	Depth (Out) (ft)
F2 (p-storm)	5,413.63	5,413.63	5,392.51	80.93	5,395.52	5,395.29	5,399.00	5,397.47	80.93	2.78
F3 (p-storm)	5,414.01	5,414.01	5,399.57	0.00	5,402.23	5,402.15	5,403.72	5,403.71	64.89	2.58
F3-1 (p-storm)	5,412.74	5,412.74	5,407.04	1.09	5,407.69	5,407.48	5,407.86	5,407.65	1.09	0.44
F4 (p-storm)	5,413.60	5,413.60	5,404.33	0.00	5,406.96	5,406.90	5,408.49	5,408.42	63.80	2.57
F5 (p-storm)	5,413.61	5,413.61	5,404.71	0.00	5,407.64	5,407.63	5,408.87	5,408.91	63.80	2.91
F5-1 (p-storm)	5,412.17	5,412.17	5,408.20	3.83	5,409.42	5,408.99	5,409.76	5,409.33	3.83	0.79
F6 (p-storm)	5,413.78	5,413.78	5,405.31	0.00	5,408.37	5,408.33	5,408.41	5,409.45	59.97	3.02
F7 (p-storm)	5,418.08	5,418.08	5,411.28	0.00	5,412.40	5,412.39	5,412.94	5,412.80	12.23	1.11
F8 (p-storm)	5,418.56	5,418.56	5,412.52	0.00	5,413.87	5,413.83	5,414.40	5,414.32	12.23	1.31
F9 (p-storm)	5,419.23	5,419.23	5,413.20	0.00	5,414.76	5,414.76	5,414.86	5,415.09	12.23	1.56
F9-1 (p-storm)	5,418.51	5,418.51	5,415.32	6.04	5,416.84	5,416.84	5,417.76	5,417.76	6.04	1.52
F10 (p-storm)	5,419.25	5,419.25	5,414.49	0.00	5,415.39	5,415.37	5,416.39	5,415.71	6.19	0.88
F10-1 (p-storm)	5,418.51	5,418.51	5,415.17	6.19	5,416.88	5,416.88	5,417.85	5,417.85	6.19	1.71
G1 (p-storm)	5,414.02	5,414.02	5,405.54	0.00	5,408.58	5,408.56	5,409.30	5,409.26	47.74	3.02
G1-1 (p-storm)	5,412.36	5,412.36	5,408.21	4.05	5,410.43	5,409.91	5,410.84	5,410.33	4.05	1.70
G2 (p-storm)	5,413.96	5,413.96	5,406.84	47.74	5,409.62	5,409.61	5,410.28	5,410.37	47.74	2.77
G2-1 (p-storm)	5,412.36	5,412.36	5,409.51	2.85	5,410.66	5,410.23	5,411.00	5,410.57	2.85	0.72
G2-2 (p-storm)	5,412.36	5,412.36	5,409.68	2.21	5,410.66	5,410.32	5,410.93	5,410.59	2.21	0.64
G2-3 (p-storm)	5,412.36	5,412.36	5,410.04	2.58	5,411.12	5,410.73	5,411.43	5,411.04	2.58	0.69
G3 (p-storm)	5,414.80	5,414.80	5,408.63	40.85	5,410.87	5,410.79	5,411.28	5,411.66	40.85	2.16
G3-1 (p-storm)	5,412.36	5,412.36	5,409.95	4.06	5,411.80	5,411.28	5,412.22	5,411.70	4.06	1.33
H1 (p-storm)	5,412.74	5,412.74	5,402.60	0.00	5,403.77	5,403.76	5,403.99	5,404.23	10.43	1.16
H1-1 (p-storm)	5,412.39	5,412.39	5,408.78	3.23	5,410.03	5,409.55	5,410.42	5,409.93	3.23	0.77
H2 (p-storm)	5,412.74	5,412.74	5,404.43	0.00	5,405.39	5,405.38	5,405.61	5,405.75	7.20	0.95
H2-1 (p-storm)	5,412.39	5,412.39	5,408.75	1.61	5,409.56	5,409.29	5,409.78	5,409.51	1.61	0.54
H3 (p-storm)	5,412.74	5,412.74	5,406.05	0.00	5,406.89	5,406.88	5,406.96	5,407.20	5.59	0.83
H3-1 (p-storm)	5,412.17	5,412.17	5,408.76	2.93	5,409.93	5,409.49	5,410.28	5,409.84	2.93	0.73
H4 (p-storm)	5,412.78	5,412.78	5,407.45	0.00	5,408.03	5,408.02	5,408.41	5,408.22	2.66	0.57
H4-1 (p-storm)	5,412.47	5,412.47	5,408.76	2.66	5,409.86	5,409.46	5,410.18	5,409.78	2.66	0.70

APPENDIX D – EXCERPTS FROM PREVIOUSLY ACCEPTED DRAINAGE STUDIES



LEGEND:

- BASIN BOUNDARY
- OFF-SITE BASIN
- GOODHUE IRRIGATION DITCH
- TRIBUTARY I FLOODING LIMITS
  - 10-YEAR EVENT
  - 100-YEAR EVENT
- PR PEDESTRIAN TRAIL
- PROPOSED STORM SEWER SYSTEM
- DRAINAGE FLOW
- EMERGENCY OVERFLOW
- PROPOSED CONTOURS 5410 / 5402
- EXISTING CONTOURS 5410 / 5402
- CONSTRUCTION PHASING DELINEATIONS
  - PHASE 1
  - PHASE 2
  - INTERNAL ROADS

BASIN DESIGNATION — OS 1 — BASIN IMPERVIOUSNESS
BASIN SIZE IN ACRES — AREA 1.23 AC — IMPERV. 2%
1 BASIN DESIGN POINT

MAJOR BASIN SUMMARY AND RUNOFF TABLE:

MAJOR DRAINAGE BASIN	CONTRIBUTING AREA (AC)	Q2 (CFS)	Q10 (CFS)	Q100 (CFS)	TRIBUTARY TO
A-1	37.99	0.24	6.87	37.40	TRIBUTARY I
A-2-1	22.67	0.14	4.07	22.08	TRIBUTARY I
A-2-2	25.02	21.67	38.59	82.62	POND B
A-3	0.62	0.24	0.46	1.09	TRIBUTARY I
B-1	79.46	82.92	145.97	309.97	POND B
B-2	30.37	33.22	59.73	123.28	POND C-2
C-1	53.21	45.87	83.88	183.61	POND C-1
C-2	19.63	22.10	41.84	88.58	POND C-2
C-3	14.17	5.22	9.54	22.53	POND C-1
C-4	2.78	1.69	3.20	7.26	TRIBUTARY I
C-5	13.09	3.09	7.83	19.54	POND C-2
C-6	1.82	1.23	2.31	5.22	POND C-2
D-1	14.55	9.47	18.36	42.76	POND C-2
D-2	7.88	0.09	2.70	13.35	OFFSITE
D-3	11.26	7.58	14.67	34.11	POND C-2
D-4	8.37	0.17	5.17	23.33	OFFSITE
D-5	2.01	0.02	0.73	3.55	TRIBUTARY I
E	34.11	28.44	53.09	119.31	POND E
F	17.05	0.11	3.06	16.59	TRIBUTARY I

POND SUMMARY TABLE:

POND	CONTRIBUTING BASINS	WATERSHED AREA (ac)	MAX 100-YR DEPTH (ft)	WATERSHED IMPERVIOUSNESS (%)	WQCV (ac-ft)	EURV (ac-ft)	REQUIRED VOLUME (ac-ft)			PROVIDED VOLUME (ac-ft)	ALLOWABLE RELEASE RATE (cfs)			DESIGN RELEASE RATE (cfs)		
							2-YR	10-YR	100-YR		2-YR	10-YR	100-YR	2-YR	10-YR	100-YR
B (PHASE 1)	A-2-2, B-1	104.48	5.83	85.00%	3.16	8.78	5.37	9.56	14.15	19.89	N/A	30.69	159.03	4.88	7.14	84.26
C-1 (PHASE 1)	C-1, C-3	67.38	3.61	79.84%	1.86	5.31	3.23	5.79	8.68	9.62	N/A	9.09	52.74	2.38	4.69	47.40
C-2 (PHASE 1)	B-2, C-2, C-5, C-6-1, C-6-2, D-1, D-3	90.38	8.57	77.04%	2.35	6.82	4.15	7.44	11.10	12.76	N/A	20.70	109.44	1.40	12.59	74.78
E (PUD 8)	E	34.11	8.10	75.00%	0.86	2.51	1.52	2.75	4.18	6.17	N/A	8.64	45.45	0.47	3.60	39.86

NOTES
1. CUHP VALUES USED IN DIRECT RUNOFF TABLE. ROUTED CUHP/SWMM RESULTS ARE INCLUDED WITH FILING NO. 1 AND FILING NO. 2 FINAL DRAINAGE REPORTS.
2. MHFD-DETENTION SOFTWARE USED TO CALCULATE POND SUMMARY TABLE VALUES. REFER TO FINAL MASTER DRAINAGE REPORT FOR FULL RESULTS.
3. ALLOWABLE RELEASE RATE IS 90% OF THE PREDEVELOPMENT 100-YR PEAK RUNOFF RATE PER MHFD USDCM CRITERIA.
4. DESIGN POINTS AND DETAILED RUNOFF CALCULATIONS PROVIDED WITH FILING NO. 1 AND FILING NO. 2 FINAL DRAINAGE REPORTS.
5. CUMULATIVE DIRECT RUNOFF VALUES FROM SUBBASINS DELINEATED WITH FILING NO. 1 AND FILING NO. 2 MAY EXCEED DISCHARGE RATES FOR THE MAJOR BASINS SHOWN HEREIN.
6. OFF-SITE FLOWS FROM BVSD AND 88TH STREET REFERENCED FROM BVSD LOUISVILLE CAMPUS PUD DRAINAGE REPORT. REFER TO APPENDIX B OF FINAL MASTER DRAINAGE REPORT FOR EXCERPTS.
7. FINAL DESIGN FOR POND E SHALL BE COMPLETED WITH PUD 8.
8. A PORTION OF BASIN C-6, IDENTIFIED AS SUBBASIN C-6-3 IN FILING NO. 1 AND FILING NO. 2, FLOWS OFFSITE TO NORTHWEST PARKWAY.
9. ROCK CREEK TRIBUTARY I IS NOT A FEMA REGULATED DRAINAGEWAY. FLOOD LIMITS SHOWN ARE FOR INFORMATIVE PURPOSES ONLY AND DO NOT REFLECT ANY EXISTING OR PROPOSED REGULATORY FLOODPLAIN BOUNDARY.

811 Know what's below. Call before you dig.

SCALE: 1" = 300'

DESIGNED BY: SDM
CHECKED BY: MAW
DRAWN BY: SDM

ISSUE DATE: 11-15-2019

DATE	REVISION COMMENTS
04-17-2020	SECOND SUBMITTAL PER CITY COMMENTS
04-05-2021	FIRST SUBMITTAL NEW PROGRAM
10-22-2021	SECOND SUBMITTAL NEW PROGRAM PER CITY COMMENTS
09-21-2022	THIRD SUBMITTAL NEW PROGRAM
02-07-2024	RESUBMITTAL POST PRELIMINARY PLAT

HARRIS KOCHER SMITH
1120 Lincoln Street, Suite 1000
Denver, Colorado 80203
P: 303.623.6300 F: 303.623.6311
HarrisKocherSmith.com

STERLING BAY

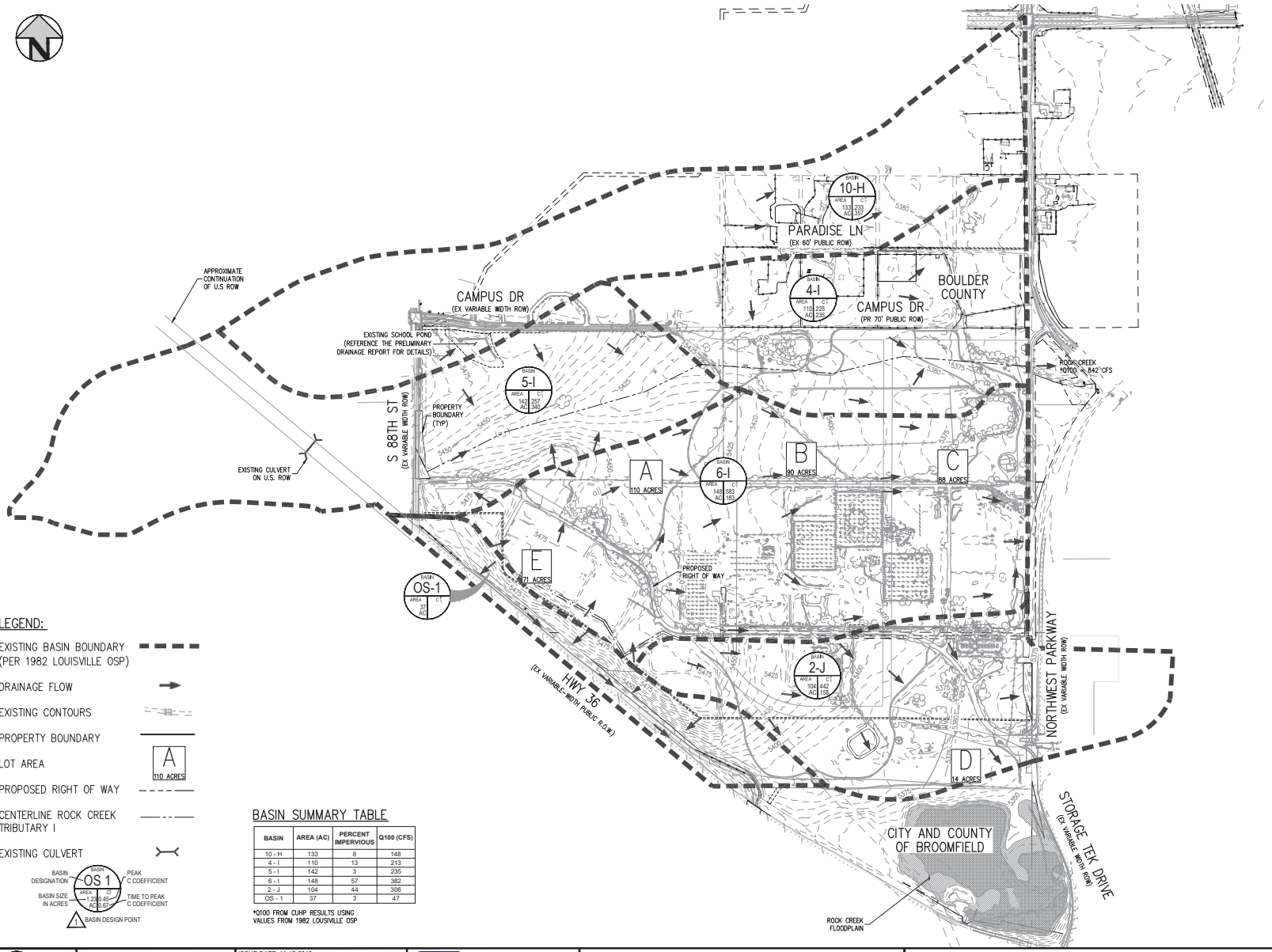
REDTAIL RIDGE
MASTER DRAINAGE PLAN

PRELIMINARY NOT FOR CONSTRUCTION

PROJECT #: 190108
SHEET NUMBER 1
1 OF 2

NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH

FILEPATH: P:\2019\190108\ENGINEERING\DRAINAGE\2024 MASTER DRAINAGE PLAN - MASTERDWG LAYOUT: OVERALL DP MASTER
10 XREFs: a-base, a-legal, e-util, p-base-f1, p-base-f2, p-comp, p-legal-f1, p-legal-f2, stamp - storm, storm - ft, - stamp
PLOTTED: WED 06/26/24 8:55:01 PM BY STERLING MARVIN



LEGEND:

- EXISTING BASIN BOUNDARY (PER 1982 LOUISVILLE OSP)
- DRAINAGE FLOW
- EXISTING CONTOURS
- PROPERTY BOUNDARY
- LOT AREA (A, 110 ACRES)
- PROPOSED RIGHT OF WAY
- CENTERLINE ROCK CREEK TRIBUTARY I
- EXISTING CULVERT
- BASIN DESIGNATION, BASIN SIZE IN ACRES, PEAK C COEFFICIENT, TIME TO PEAK C COEFFICIENT, BASIN DESIGN POINT

BASIN SUMMARY TABLE

BASIN	AREA (AC)	PERCENT IMPERVIOUS	Q100 (CFS)
10 - H	133	8	148
4 - I	110	13	213
5 - I	142	3	235
6 - I	148	57	382
2 - J	104	44	306
OS - 1	37	3	47

*Q100 FROM CUHP. RESULTS USING VALUES FROM 1982 LOUISVILLE OSP

Know what's below. Call before you dig.

400 0 400 800
SCALE: 1" = 400'

DESIGNED BY: TMW
CHECKED BY: MAW
DRAWN BY: TMW

ISSUE DATE: 11-15-2019

DATE	REVISION COMMENTS
04-17-2020	SECOND SUBMITTAL PER CITY COMMENTS
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STERLING BAY

REDTAIL RIDGE
EXISTING DRAINAGE PLAN

PRELIMINARY NOT FOR CONSTRUCTION

PROJECT #: 190108
SHEET NUMBER
2
2 OF 2

NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH

FILEPATH: P:\2019\190108\ENGINEERING\DRAINAGE\EXISTING DRAINAGE PLAN\DWG LAYOUT, EXIST DP
6 XREFs: e-base, e-legal, topo, e-basin[1], e-legal[1], e-topo[1], stamp - storm
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basins. Minor subbasins for each major basin will be described in full detail with the Filing No. 1 and Filing No. 2 drainage reports.

Calculations for all proposed Ponds as well as their respective outlet structure design can also be found in Appendix C.

Basin A (86.3 acres, 26% imperviousness) is in the northwest corner of the Site located to the north of Rockcress Drive, to the east of South 88th Street, and to the south of Campus Drive. Tributary I splits the parcel, carrying historic flows from southwest to northeast. The basin consists of four sub-basins: A-1, A-2-1, A-2-2, and A-3. Approximately 60 acres are proposed as open or undeveloped space with the remainder being mixed-use development and roadway infrastructure. Runoff from Basin A shall be conveyed to Tributary I, with water quality treatment provided as necessary for any hardscaping or impervious areas.

In the pre-developed condition, the Health Park subdivision and the S. 88th Street roadway west of Basin A contribute 84 cfs to the School Pond at the northwest corner of Basin A. The School Pond then releases up to a maximum of 56 cfs north into the school site through a 30-inch RCP storm sewer pipe north to the Bus Loop Pond, as shown on the BVSD Drainage plan provided in Appendix B. With the development of Campus Drive, the school pond will be removed, and these flows are proposed to be captured at the 88th and Campus Drive intersection and will then route to the proposed storm sewer in Campus Drive. A 30-inch RCP will outlet from a manhole in the proposed Campus Drive storm sewer and release flows at an equivalent rate as the existing culvert into the Bus Loop Pond. The balance of flow not released to the Bus Loop Pond will overtop the 30-inch RCP in the manhole and continue east through the proposed Campus Drive storm sewer system to Pond C-1.

In the existing condition, flows from the offsite School Site Basin contribute 1.9 cfs in the 10-year event and 4.2 cfs in the 100-year event to Sub-Basin A-1. The School Site Detention Pond D releases 1.1 cfs in the 10-year event and 4.8 cfs in the 100-year event into subbasin A-1 as well. With the construction of Campus Drive, these flows will be collected by the proposed storm sewer main in Campus Drive. These flows will be routed to the storm sewer in Campus drive beginning at the existing flared end section at the northwest corner of the parcel and be released into Pond C-1.

Basin B (109.83 acres, 85% imperviousness) is in the central portion of the Site located to the north of Rockcress Drive, to the east of Basin A, to the south of Campus Drive, and to the west of Sorrel Avenue. A natural ridge in the southern portion of the parcel splits the basin into two sub-basins, B-1 and B-2. Runoff associated with Sub-Basin B will be conveyed to full-spectrum detention facility, Pond B. Flows from Sub-Basin B-2 are conveyed to Pond C-2.

Basin C (104.7 acres, 78% imperviousness) is generally in the eastern portion of the Site, lying east of Sorrel Avenue and west of S. 96th Street. It consists of roadways

Basin OS-3 (19.51 acres, 5% imperviousness) is located north of the intersection of Campus Drive and S 96th Street consisting of open space, roadways, and residential land. Basin OS-3 will be unchanged to drain as it historically has from west to east. Runoff is to be captured by a proposed 53" x 34" HERCP culvert running south under the east section of Campus Drive where it is outlet into Tributary I.

Basins OS-4-1, OS-4-2, OS-7-1, OS-7-2, OS-7-3, and OS-7-4 are located northeast of the Site, within S. 96th Ave. These basins represent improvements to be completed off-site to that roadway in conjunction with the Project. Full details on these basins may be found in the Redtail Ridge Off-Site Roadway Improvements documents, submitted separately.

Basin OS-15 (1.64 acres, 15% imperviousness) is a portion of developable land at the southeast corner of Campus Drive and South 88th Street. Runoff currently shallow flows to the northeast. A swale is proposed which will convey runoff in the interim condition, outfalling to Tributary I. Once developed this basin will outfall into the Campus Drive sewer system, however no site plan was available at the time this report was completed, thus no stub is able to be provided.

Table 1 below summarizes the basin and direct runoff information for both Phase 1 and Phase 2.

Table 1: Basin and Direct Runoff Summary Table

MAJOR DRAINAGE BASIN	CONTRIBUTING AREA (AC)	IMPERV	Q2 (CFS)	Q10 (CFS)	Q100 (CFS)	TRIBUTARY TO
A-1	37.99	2%	0.24	6.87	37.40	TRIBUTARY I
A-2-1	22.67	2%	0.14	4.07	22.08	TRIBUTARY I
A-2-2	25.02	85%	21.67	38.59	82.62	POND B
A-3	0.62	75%	0.24	0.46	1.09	TRIBUTARY I
B-1	79.46	85%	82.92	145.97	309.97	POND B
B-2	30.37	85%	33.22	59.73	123.28	POND C-2
C-1	53.21	80%	45.87	83.88	183.61	POND C-1
C-2	19.63	80%	22.10	41.84	88.58	POND C-2
C-3	14.17	79%	5.22	9.54	22.53	POND C-1
C-4	2.78	75%	1.69	3.20	7.26	TRIBUTARY I
C-5	13.09	70%	3.09	7.83	19.54	POND C-2
C-6	1.82	75%	1.23	2.31	5.22	POND C-2
D-1	14.55	70%	9.47	18.36	42.76	POND C-2
D-2	7.88	2%	0.09	2.70	13.35	OFFSITE
D-3	11.26	70%	7.58	14.67	34.11	POND C-2
D-4	8.37	2%	0.17	5.17	23.33	OFFSITE
D-5	2.01	2%	0.02	0.73	3.55	TRIBUTARY I
E	34.11	75%	28.44	53.09	119.31	POND E

includes the 88th Street Culvert, West BVSD Culvert, and the BVSD Pond Bypass. Refer to the Off-Site Flows section of this report for more information pertaining to the BVSD and 88th Street culvert flows. An impervious value of 79.84% was calculated for the 67.38 acres of contributing area as design parameters for Pond C-1. Aqua Engineering performed hydrologic calculations estimating the peak summertime evaporation rates and the required flowrate to replenish the pond to the permanent water surface elevations within a given time frame. In addition to designing the domestic water tap system detailing the tap size, system function, and how the shutoff functioning operates. For detailed information about the domestic water tap system to replenish Pond B, refer to the Aqua Engineering Report. Pond C-1 will outfall through a storm sewer to Tributary I, just upstream of the location of the proposed culvert under S. 96th Street. The emergency spillway is located at the northeast end of the detention pond where any volume greater than the 100-year runoff will discharge into Tributary I.

Pond C-2 is designed as a full spectrum EDB per the Criteria of the District Manual Volume 3. Pond C-2 will capture runoff from Basins B-2 (PUD 1), C-2, C-5, C-6-1, C-6-2, and D-1. Conservative estimates were made in the design process for Pond C-2, assuming 80% imperviousness for the 87.99 acres of contributing area to ensure the pond provides adequate storage while PUD 1's design is finalized. Pond C-2 will outfall through an existing 48" HDPE storm sewer under Northwest Parkway that flows to the Via Varra subdivision east of the Site. The emergency spillway is located at the east side of the detention pond where any volume greater than the 100-year runoff will discharge towards Northwest Parkway.

Pond E is designed as a full spectrum EDB per the Criteria of the District Manual Volume 3. Pond E will capture runoff from Basin E. Design for Pond E will be finalized with PUD 8. Conservative estimates were made in the design process for Pond E, assuming 75% imperviousness for the 34.11 acres of contributing area to ensure the pond provides adequate storage while PUD 8's design is finalized. Pond E will outlet into the storm sewer within Rockcress Drive that is proposed to be constructed in Phase 2. The runoff from Pond E ultimately travels to Pond C-2 where it is detained before discharging into an existing 48" HDPE under Northwest Parkway to outlet into the Via Varra subdivision east of the Site. The design for Pond E will be finalized with the submittal of the PUD-8 Conformance Drainage Report.

Tables 2 below summarizes the contributing basins and the release rates from each pond. Per MHFD USDCM, the allowable release was set at 90% of the predeveloped runoff rate. Note that since the MHFD USDCM defines full spectrum detention between the 5-year and the 100-year event, the 2-year predeveloped rate was not considered. Table 3 below summarizes the volumes provided by each facility.

Table 2: Site Detention Release Rate Summary

POND	TRIBUTARY BASINS	CONTRIBUTING AREA (AC)	IMPERV	RELEASE RATES (CFS)					
				ALLOWABLE			DESIGN		
				2-YR	10-YR	100-YR	2-YR	10-YR	100-YR
B	A-2-2, B-1	104.48	85.00%	N/A	30.69	159.03	4.88	7.14	84.26
C-1	C-1, C-3	67.38	79.84%	N/A	9.09	52.74	2.38	4.69	47.40
C-2	B-2, C-2, C-5, C-6-1, C-6-2, D-1, D-3	90.38	77.04%	N/A	20.70	109.44	1.40	12.59	74.78
E	E	34.11	75.00%	N/A	8.64	45.45	0.47	3.60	39.86

Table 3: Site Detention Volume Summary

POND	MAX 100-YR DEPTH (FT)	WQCV (AC-FT)	EURV (AC-FT)	REQUIRED VOLUME			PROVIDED VOLUME (AC-FT)
				2-YR	10-YR	100-YR	
B	5.83	3.16	8.78	5.37	9.56	14.15	19.89
C-1	3.61	1.86	5.31	3.23	5.79	8.68	9.62
C-2	8.57	2.35	6.82	4.15	7.44	11.10	12.76
E	8.10	0.86	2.51	1.52	2.75	4.18	6.17

There are a total of two proposed ADS Barracuda water quality devices to provide water quality treatment for surface runoff that is not routed to a detention facility prior to releasing into Tributary I. Design details will be provided for each system in the Filing No. 1 and Filing No. 2 final Drainage Reports.

To further the MHFD goal of watershed level runoff control, this Final Master Drainage Report encourages the implementation of Low Impact Development practices and alternative water quality features per the District Manual Volume 3, Chapter 4, for development within the Site parcels.

The WQCV treatment system and release rate will be designed in accordance with Volume 3 of the District Manual and Chapter 6 of Louisville Criteria. The Full Spectrum Detention Facilities are designed as permanent, post-construction Best Management Practice (BMP) to treat the WQCV in accordance with Louisville Criteria for each of the facilities' tributary areas. An Operations and Maintenance (O&M) manual for the facilities is included in Appendix F.

Off-site Flows

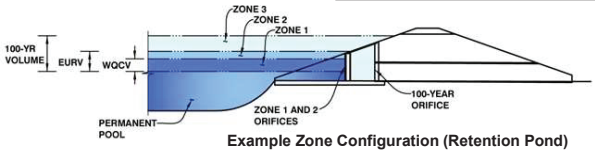
Runoff from developed or otherwise improved areas on-site is either routed to a detention facility or treated for water quality within an ADS Barracuda Hydrodynamic Separator unit. The only exception is Sub-Basin C-6-3, a small portion of street which discharges to an existing 36" HDPE sewer, which ultimately outfalling to Via Varra Road.

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.05 (January 2022)

Project: Redtail Ridge - On-Site Improvements

Basin ID: Pond C-2



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	4.08	2.340	Orifice Plate
Zone 2 (EURV)	6.36	4.479	Orifice Plate
Zone 3 (100-year)	8.21	4.277	Weir&Pipe (Restrict)
Total (all zones)		11.096	

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

			Calculated Parameters for Underdrain		
Underdrain Orifice Invert Depth =	N/A	ft (distance below the filtration media surface)	Underdrain Orifice Area =	N/A	ft^2
Underdrain Orifice Diameter =	N/A	inches	Underdrain Orifice Centroid =	N/A	feet

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

			Calculated Parameters for Plate		
Centroid of Lowest Orifice =	0.00	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	5.910E-02	ft^2
Depth at top of Zone using Orifice Plate =	6.32	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	25.08	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	8.51	sq. inches (use rectangular openings)	Elliptical Slot Area =	N/A	ft^2

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	2.10	4.20					
Orifice Area (sq. inches)	8.51	8.51	8.51					

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected		Calculated Parameters for Vertical Orifice	Not Selected	Not Selected	
Invert of Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =	N/A	N/A	ft^2
Depth at top of Zone using Vertical Orifice =	N/A	N/A	ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =	N/A	N/A	feet
Vertical Orifice Diameter =	N/A	N/A	inches				

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir and No Outlet Pipe)

	Zone 3 Weir	Not Selected		Calculated Parameters for Overflow Weir	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	6.32	N/A	ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	6.32	N/A	feet
Overflow Weir Front Edge Length =	8.00	N/A	feet	Overflow Weir Slope Length =	8.00	N/A	feet
Overflow Weir Grate Slope =	0.00	N/A	H:V	Grate Open Area / 100-yr Orifice Area =	8.91	N/A	
Horiz. Length of Weir Sides =	8.00	N/A	feet	Overflow Grate Open Area w/o Debris =	50.62	N/A	ft^2
Overflow Grate Type =	Close Mesh Grate	N/A		Overflow Grate Open Area w/ Debris =	25.31	N/A	ft^2
Debris Clogging % =	50%	N/A	%				

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 3 Restrictor	Not Selected		Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate	Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	0.04	N/A	ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	5.68	N/A	ft^2
Outlet Pipe Diameter =	42.00	N/A	inches	Outlet Orifice Centroid =	1.14	N/A	feet
Restrictor Plate Height Above Pipe Invert =	24.00		inches	Half-Central Angle of Restrictor Plate on Pipe =	1.71	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

			Calculated Parameters for Spillway		
Spillway Invert Stage=	8.86	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.52	feet
Spillway Crest Length =	265.00	feet	Stage at Top of Freeboard =	10.38	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	2.58	acres
Freeboard above Max Water Surface =	1.00	feet	Basin Volume at Top of Freeboard =	12.76	acre-ft

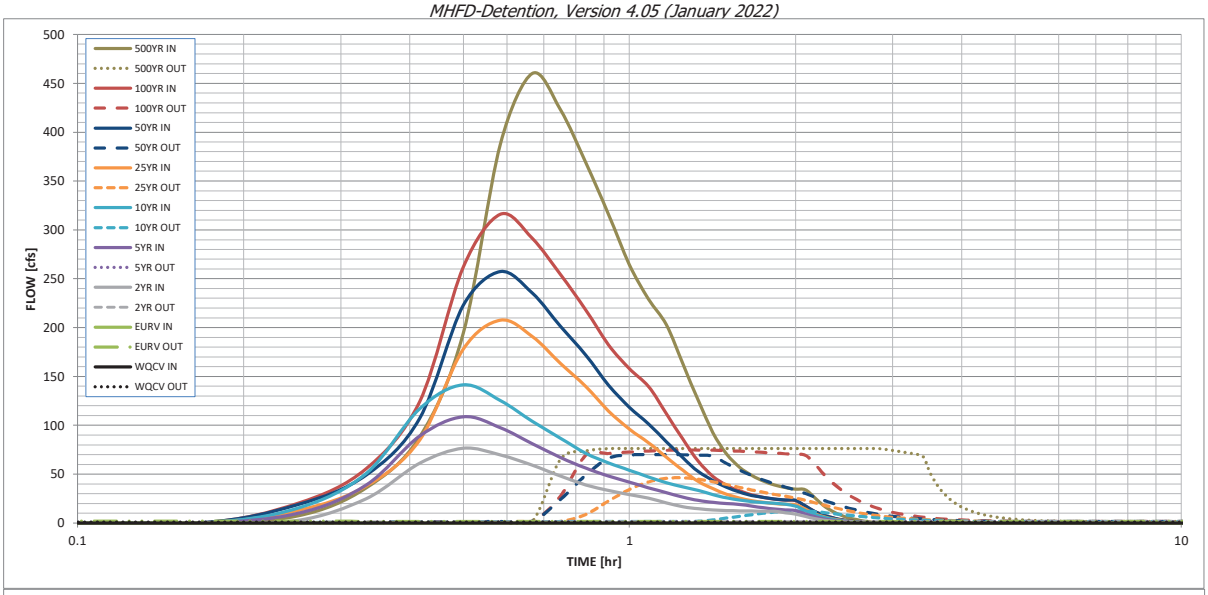
Routed Hydrograph Results

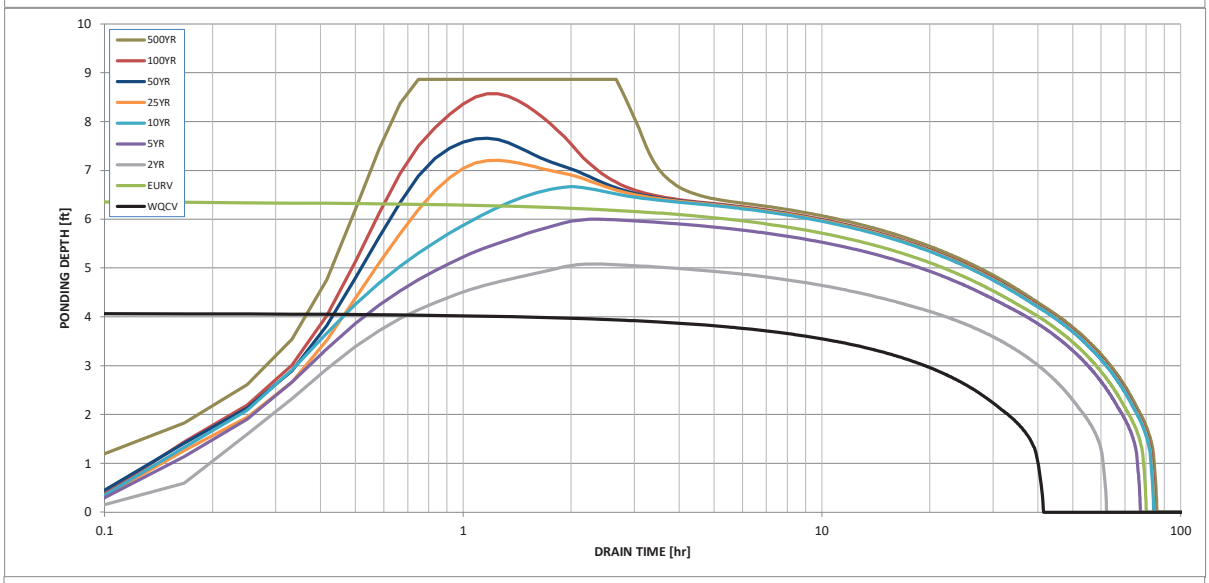
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

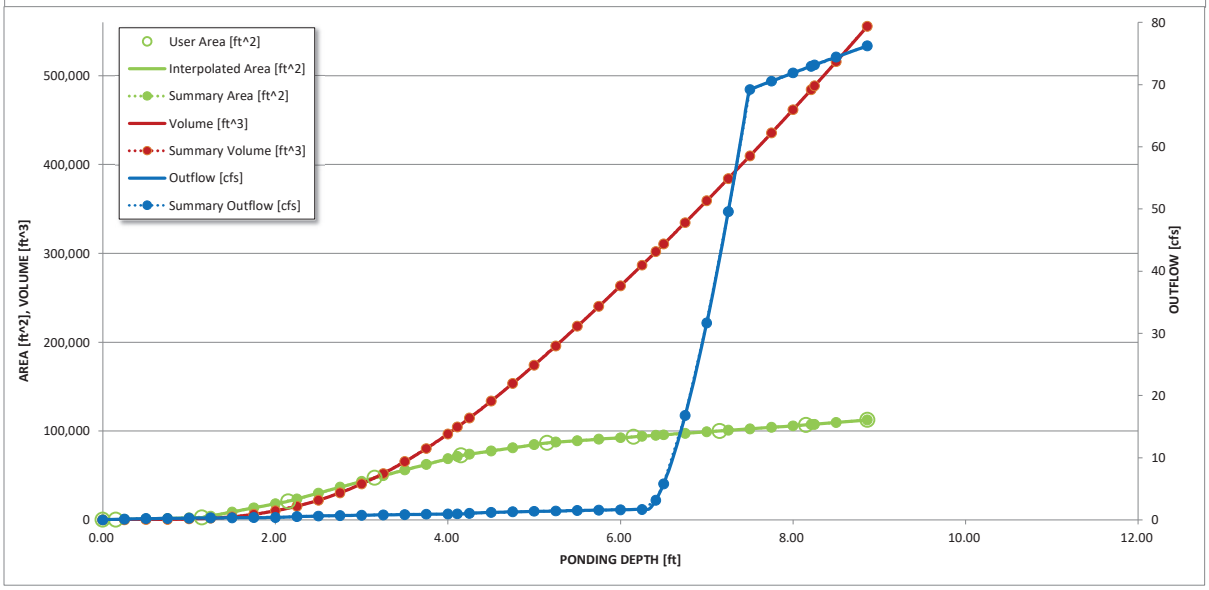
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	N/A	N/A	0.80	1.08	1.34	1.76	2.11	2.49	3.52
CUHP Runoff Volume (acre-ft) =	2.340	6.819	4.377	6.307	8.275	11.750	14.572	17.762	26.146
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	4.377	6.307	8.275	11.750	14.572	17.762	26.146
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	0.82	7.0	23.0	62.7	89.0	121.6	199.7
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A							
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.01	0.08	0.25	0.69	0.98	1.35	2.21
Peak Inflow Q (cfs) =	N/A	N/A	76.5	108.8	141.5	207.6	257.3	316.0	460.2
Peak Outflow Q (cfs) =	0.974	2.082	1.399	1.640	12.592	46.263	70.067	74.779	76.218
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.2	0.5	0.7	0.8	0.6	0.4
Structure Controlling Flow =	Plate	Overflow Weir 1	Plate	Plate	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Outlet Plate 1	N/A
Max Velocity through Grate 1 (fps) =	N/A	0.01	N/A	N/A	0.2	0.9	1.3	1.4	1.5
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	38	73	57	70	75	73	71	70	66
Time to Drain 99% of Inflow Volume (hours) =	**40**	77	60	74	81	80	79	78	77
Maximum Ponding Depth (ft) =	4.08	6.36	5.08	6.00	6.67	7.21	7.66	8.57	8.86
Area at Maximum Ponding Depth (acres) =	1.63	2.18	1.97	2.12	2.23	2.31	2.38	2.53	2.58
Maximum Volume Stored (acre-ft) =	2.351	6.821	4.138	6.026	7.482	8.706	9.761	11.990	12.758

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.05 (January 2022)







S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

MEMORANDUM

To: City of Louisville, Public Works Department

From: Cassie Slade, P.E., PTOE

Date: August 29, 2025

Project: Redtail Ridge

Subject: PUD 1 South Traffic Conformance Letter

The Fox Tuttle Transportation Group has prepared this traffic conformance letter for the proposed development of industrial use located in the Industrial District of the Redtail Ridge development in Louisville, Colorado. The site is located northwest of the intersection of Rockcress Drive and Sorrel Avenue, as shown on **Figure 1** at the end of this memorandum. PUD 1 South of Redtail Ridge plans to include two (2) industrial buildings for a total of 239,082 square feet (sf) of industrial space. Concurrent with PUD 1 South, Rockcress Drive will be built from Northwest Parkway west to Road C, as well as Sorrel Avenue north to Road B, and Road C west from Sorrel Avenue to Rockcress Drive. It is understood that there will be three (3) full movement accesses on Road C to support mobility and accessibility to PUD 1 South buildings.

The purpose of this "traffic conformance letter" is to determine if the proposed use of PUD 1 South is significantly different than the trip generation assumptions for this site as analyzed in the "Master" study and to identify if additional traffic analysis is necessary.

Comparison to Master Traffic Study

A "Master" Transportation Study[1] (MTS) was previously prepared for the entire Redtail Ridge development that will include a mix of industrial, GMP, life science, office, research and development, retail, hospital and medical office uses. The two (2) buildings within PUD 1 South were assumed to be industrial uses in the MTS. Development staging in the MTS was done in phases by horizon years rather than specific PUD lots, and PUD 1 South was included within Phase 1 of the MTS. Phase 1 of the MTS assumed a total development of 509,260 sf of industrial, 300,000 sf of life science and

[1] *Redtail Ridge Traffic and Mobility Study*. Fox Tuttle Transportation Group, LLC. July 2024 (updated).

598,940 sf of GMP space by Year 2025. The proposed PUD 1 South uses are consistent with uses assumed in Phase 1 of the MTS with additional development anticipated beyond PUD 1 South in Phase 1. **The plan for PUD 1 South is consistent with the land uses and roadway needs in the MTS.**

Trip Generation

To establish the volume of trips associated with the proposed project, the data contained in the *Institute of Transportation Engineers (ITE) Trip Generation Manual*[2] for the appropriate uses was applied. The proposed land use is estimated to mostly be new trips, known as 'primary trips', which is discussed below:

Primary Trips. These trips are made specifically to visit the site and are considered "new" trips. Primary trips would not have been made if the proposed project did not exist. Therefore, this is the only trip type that increases the number of trips made on a regional basis.

Non-Auto Trips. These trips are those that are completed by walking, biking, or transit. The existing transit service will provide employees the opportunity to travel to/from work by bus rather than a personal vehicle. The planned bicycle network throughout Redtail Ridge will provide high-comfort bicycle connections to bicycle facilities near the site. The development plans to use transportation demand management (TDM) to encourage carpooling and other modes to reduce the number of single-occupant vehicle (SOV) commute trips. A non-SOV reduction of 12% was applied for all uses within Redtail Ridge.

Multi-Use (Internal) Trips. These trips are internal from one land use or building to another within the site boundaries. For example, an office patron may also use a retail store or restaurant in one vehicle trip to the site. Multi-use or multi-purpose trips typically do not affect the exterior site access points, nor add any additional traffic volumes to the adjacent street network. For this project it is projected that the small retail uses on the site will be focused on serving the office and industrial employees of the project and most (75% estimated) of the trips accessing them will be on-site or internal trips. The other end of these internal trips were attributed to the office and industrial employees and resulted in a 3% reduction for those uses. Based on this approach, the multi-use factors applied for this project were assumed to be 3% for industrial and office uses and 75% for the retail uses.

Table 1 summarizes and compares the trip generation estimated for these buildings of the MTS and the PUD 1 South site plan for weekday daily, weekday AM and weekday PM peak periods.

[2] *Trip Generation Manual*. 11th Edition. Institute of Transportation Engineers. Washington, DC. 2021.

Table 1. Trip Generation Summary and Comparison for PUD 1 South Site

	Land Use	Size	Unit	Non-SOV	Internal Capture	Net Reduction Factor	Average Weekday Trips Rate	Average Weekday Trips Total	Weekday AM Peak Hour Trips Rate	Weekday AM Peak Hour Trips Total	Weekday AM Peak Hour Trips In	Weekday AM Peak Hour Trips Out	Weekday PM Peak Hour Trips Rate	Weekday PM Peak Hour Trips Total	Weekday PM Peak Hour Trips In	Weekday PM Peak Hour Trips Out
MTS	#130 Industrial Park	198.00	KSF	12%	3%	85%	*	1,143	0.4	68	55	13	0.4	68	14	54
		198.00	**KSF**			**Subtotal**		**1,143**		**68**	**55**	**13**		**68**	**14**	**54**
PUD 1 South	#130 Industrial Park	237.2	KSF	12%	3%	85%	*	1,256	0.4	81	66	15	0.4	81	17	64
		237.20	**KSF**			**Subtotal**		**1,256**		**81**	**66**	**15**		**81**	**17**	**64**
	Difference in Trips (PUD 1 vs. MTS)							**113**		**13**	**11**	**2**		**13**	**3**	**10**

* ITE Equation: EXP(0.52*LN(X)+4.45)

PUD 1 South is estimated to generate slightly more trips for that space as expected in the MTS, with an increase of 13 trips in the AM and PM peak hours. Land uses and trip generation of PUD 1 South are aligned with the assumed use in the MTS, with an increase in square footage (19.8% difference) for these two buildings. It should be noted that the overall square footage in Phase 1 under the current proposal is actually slightly less than shown in the MTS. The capacity analysis in the MTS indicated the study intersections would operate acceptably (LOS D or better) with the full Phase 1 development and associated roadway improvements. The updated PUD 1 South volume adds 9 or fewer trips to any individual movement, so therefore it is expected that the study intersections will operate acceptably with the PUD 1 South trips.

A comparison of total trips for all of Redtail Ridge as planned in the MTS and revised for known PUDs (PUD 1 and PUD 5) is shown in **Table 2**. The increase in trips from PUD 1 is a less than 2% increase in Phase 1 trips in the MTS and approximately 0.5% increase in total trips in the MTS.

Table 2. Overall Trip Generation Summary and Comparison

	Average Weekday Trips	Weekday AM Peak Hour Trips			Weekday PM Peak Hour Trips		
		Total	In	Out	Total	In	Out
MTS	20,902	1,908	1,523	385	2,149	525	1,624
PUD 1 Difference	**113 +0.5%**	**13 +0.7%**	**11 +0.7%**	**2 +0.5%**	**13 +0.6%**	**3 +0.6%**	**10 +0.6%**
PUD 5 Difference	198 +0.9%	15 +0.8%	12 +0.0.8%	3 +0.8%	15 +0.7%	7 +1.3%	8 +0.5%
Total Difference	311 +1.5%	28 +1.5%	23 +1.5%	5 +1.3%	28 +1.3%	10 +1.9%	18 +1.1%

Proposed Access

With the construction of PUD 1 South, internal roadways will be constructed as planned for Phase 1 of the MTS:

- Rockcress Drive: built west from Northwest Parkway to Road A.
- Sorrel Avenue: built from Rockcress Drive to Campus Drive.
- Road C: built from Rockcress Drive to Sorrel Avenue.
- Road B: built from Road A to Sorrel Avenue.
- Road A: built from Rockcress Drive to Campus Drive.

Access from the PUD 1 South buildings will be provided exclusively to Road C. Three (3) full movement side-street stop-controlled access intersections are planned on Road C. The proposed site plan including access locations is shown in **Figure 2** at the end of this memorandum.

An estimate of traffic entering and exiting the accesses was performed, based on the site plan, truck and vehicle distribution was assigned to an access point based on the building use and square footage accessible from each access. Vehicle distribution through the street network used the same distribution assumption for external trip origins and destinations that were used in the MTS.

The added trips generated by PUD 1 South at public street intersections are shown in **Figure 3**. The trips generated by PUD 1 South in the MTS are shown in **Figure 4**. Comparing **Figure 3** and **Figure 4**, PUD 1 South is expected to generate slightly more trips as are expected from that space in the MTS. The trips generated by PUD 1 South are fewer than the trips generated by the total expected in Phase 1, and therefore are expected to be accommodated by the planned roadway network found to function acceptably with the complete traffic volume anticipated for Phase 1.

Travel Demand Management

Some physical infrastructure components of the project travel demand management (TDM) are being implemented with PUD 1 South. Pedestrian connections will be built to PUD 1 South from the surrounding roadways and facilities, including paths to internal parks both east and west of the two industrial buildings in PUD 1 South. This network will provide a comfortable connection between the PUD 1 South buildings and multimodal amenities such as the circulator shuttle stops and showers and changing facilities for bicycle commuters.

Conclusions

The plan for PUD 1 South of Redtail Ridge is consistent with the land use assumptions of the MTS for the parcel with a 19.8% increase in industrial use. PUD 1 South is expected to generate 113 more daily trips and 13 more trips in the AM and PM peak hours as expected from that space in the MTS. This reflects an increase of less than 2% in total Phase 1 trips and approximately 0.5% in total trips from the MTS. Access points to PUD 1 South are similar to the planned roadways and access in the MTS and are expected to distribute traffic to public streets consistent with the assumptions in the MTS. **It is anticipated that the planned roadway network and intersections can accommodate PUD 1 South trips without the need for additional analysis or mitigation measures since it is consistent with the MTS.**

Hopefully the contents of this memorandum are helpful. If you have any questions, please give me a call.

Sincerely,

FOX TUTTLE TRANSPORTATION GROUP, LLC

Cassie Slade

Cassie Slade, P.E.,PTOE
Principal

PUD 1 Area

LIFE SCIENCE DISTRICT WEST

Tot. Life Sciences Building Area (SF)	274,135
Total Parking Stalls	825
Avg. Parking Ratio per 1K GSF	3

GMP / INDUSTRIAL DISTRICT

GMP Building Area (SF)	462,804
Industrial Building Area (SF)	612,400
Total District Building Area (SF)	1,075,204
Total Parking Stalls	2,220
Avg. Parking Ratio per 1K GSF	2.09

LIFE SCIENCE DISTRICT EAST

Tot. Life Sciences Building Area (SF)	165,000
Total Parking Stalls	492
Avg. Parking Ratio per 1K GSF	3

R&D DISTRICT

Tot. R&D Building Area (SF)	117,820
Total Parking Stalls	390
Avg. Parking Ratio per 1K GSF	3.3

OFFICE DISTRICT

Total Office Building Area (SF)	342,484
Total Parking Stalls	1,435
Avg. Parking Ratio per 1K GSF	4

AMENITY/ LIFE SCIENCES

Life Science Building Area (SF)	102,621
Amenity Building Area (SF)	15,540
Total District Building Area (SF)	118,161
Total Parking Stalls	398
Avg. Parking Ratio per 1K GSF	3.36

HOSPITAL

Total Building Area	435,600

TOTAL SITE DEVELOPMENT

Total Building Area (SF)	**2,542,387**

Perkins&Will TRYBA ARCHITECTS REDTAIL RIDGE

FOX TUTTLE TRANSPORTATION GROUP

REDTAIL RIDGE PUD 1 SOUTH CONFORMANCE

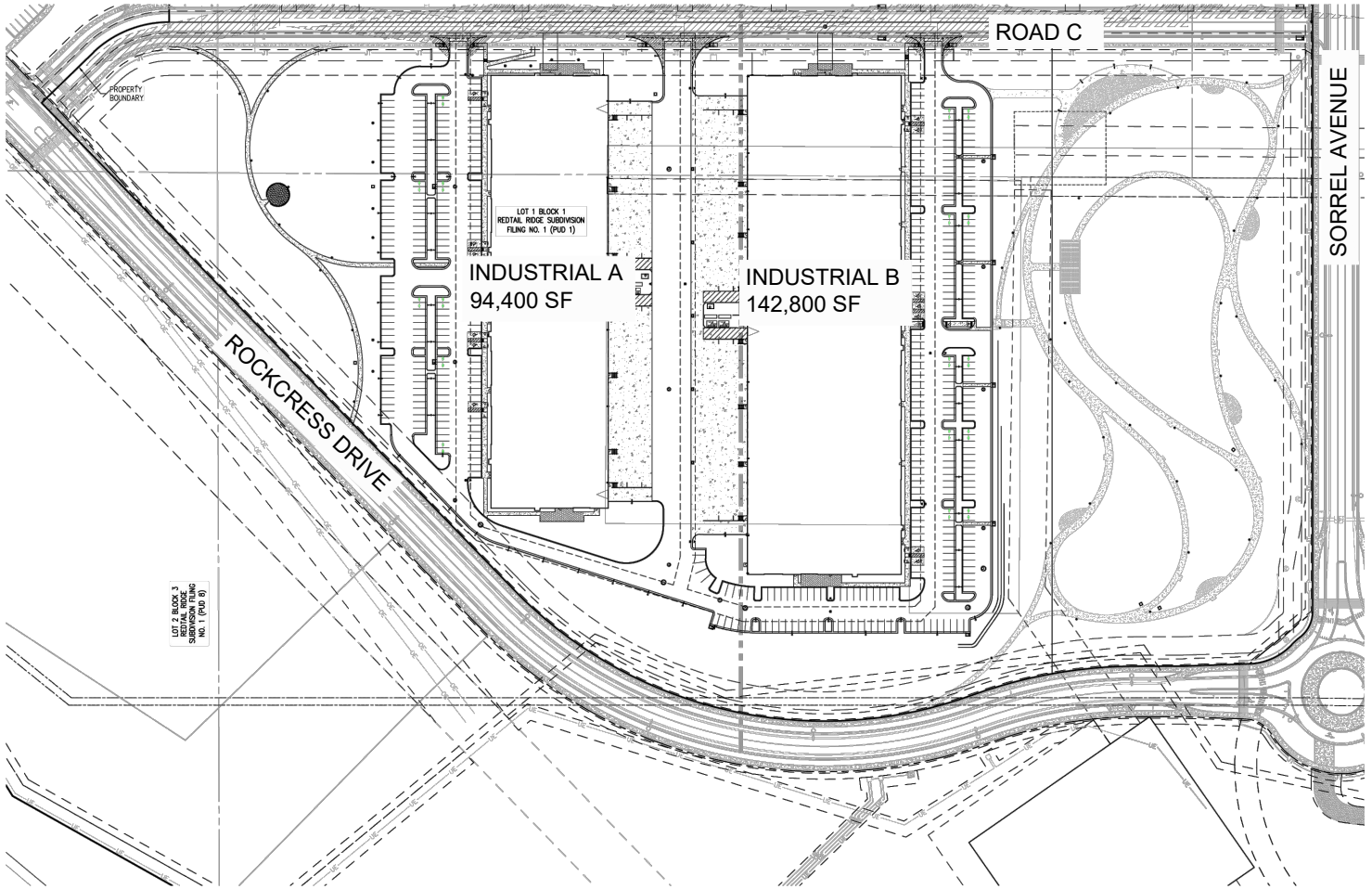
PUD 1 SOUTH AREA

FT Project #	19055	Original Scale	NTS	Date	3/13/2025	Drawn by	SKK	Figure #	1

REDTAIL RIDGE FILING NO. 1

PLANNED UNIT DEVELOPMENT

LOT 1 BLOCK 1 & LOT 2 BLOCK 1



LEGEND:

- PROPERTY BOUNDARY
- RIGHT-OF-WAY
- EXISTING STM SEWER W/MH AND INLET
- EXISTING SANITARY SEWER W/MH
- EXISTING WATER LINE W/ VALVE
- EXISTING GAS LINE
- EXISTING UNDERGROUND ELECTRIC
- EXISTING JOINT TRENCH
- EXISTING STREET LIGHT
- EXISTING TELEPHONE POLE
- EXISTING FIRE HYDRANT
- PROPOSED SANITARY SEWER W/MH
- PROPOSED SANITARY SERVICE W/CLEAN OUT
- PROPOSED STORM SEWER W/ MH AND INLET
- PROPOSED LANDSCAPE DRAIN W/ INLET
- PROPOSED FIRE HYDRANT
- PROPOSED 8" WATER MAIN W/ BENDS, VALVE, AND TEE
- PROPOSED WATER SERVICE W/METER
- PROPOSED FIRE SERVICE
- PROPOSED STREET LIGHT
- PROPOSED PEDESTRIAN LIGHT
- PROPOSED BUILDING ENTRANCE
- PROPOSED TRANSFORMER AND GENERATOR
- ABANDON EXISTING UTILITY LINE
- PROPOSED CONCRETE
- PROPOSED CONCRETE PAVERS
- PROPOSED PORCELAIN PAVERS
- PROPOSED CRUSHER FINES

ABBREVIATIONS	
BLDG	BUILDING
C&G	CURB & GUTTER
CONC	CONCRETE
DIS	DOWNSPOUT
DUE	DRY UTILITY EASEMENT
ELEC	ELECTRIC
ESMT	EASEMENT
EX	EXISTING
FF	FINISHED FLOOR
FH	FIRE HYDRANT
FL	FLOW LINE
GV	GATE VALVE
HT	HEIGHT
MH	MANHOLE
N	NORTH, NORTHING
PED	PEDESTRIAN
PL	PROPERTY LINE
PR	PROPOSED
ROW	RIGHT-OF-WAY
SME	SURFACE MAINTENANCE EASEMENT
SS	SANITARY SEWER
STM	STORM
TYP	TYPICAL
UG	UNDERGROUND
WAT	WATER

N

100 0 100 200

SCALE: 1" = 100'

PROJECT # 21236

OVERALL SITE PLAN

REVISION DATE: ISSUE DATE: ##-##-202# SHEET 2 OF 36

REDTAIL RIDGE PUD1 SOUTH

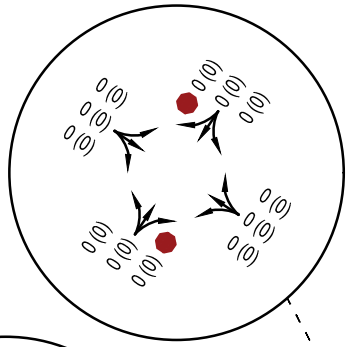
NO DRAWINGS ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HANNA KOCHER SMITH

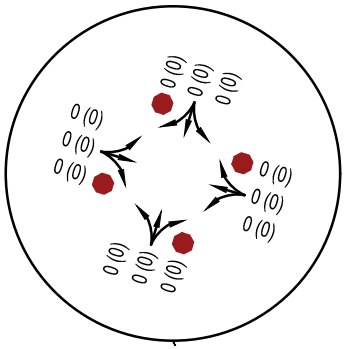
FOX TUTTLE TRANSPORTATION GROUP

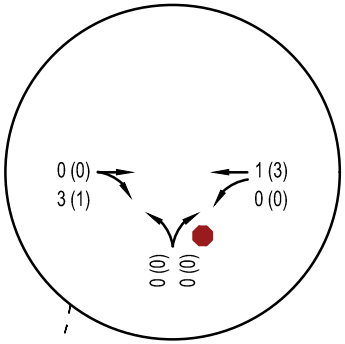
REDTAIL RIDGE PUD 1 SOUTH CONFORMANCE

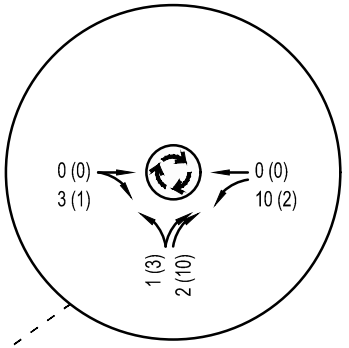
PUD 1 SOUTH SITE PLAN

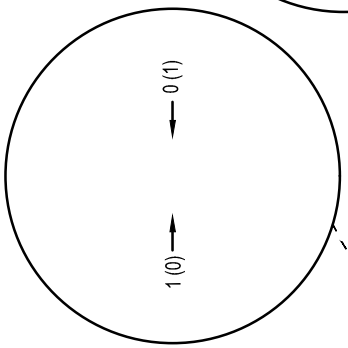
FT Project #	19055	Original Scale	NTS	Date	3/13/2025	Drawn by	SKK	Figure #	2

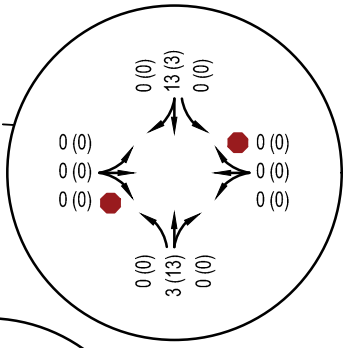


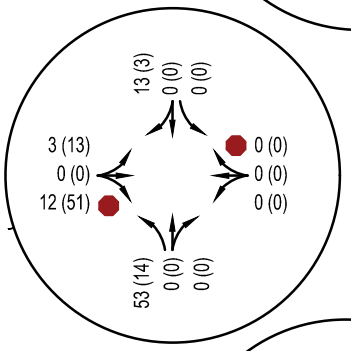


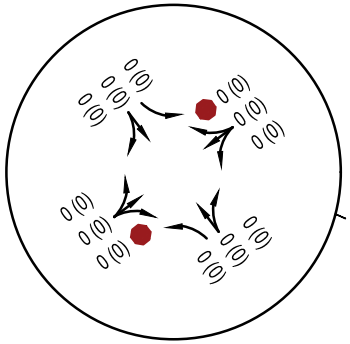


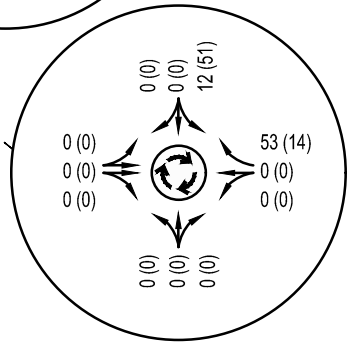












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KEY

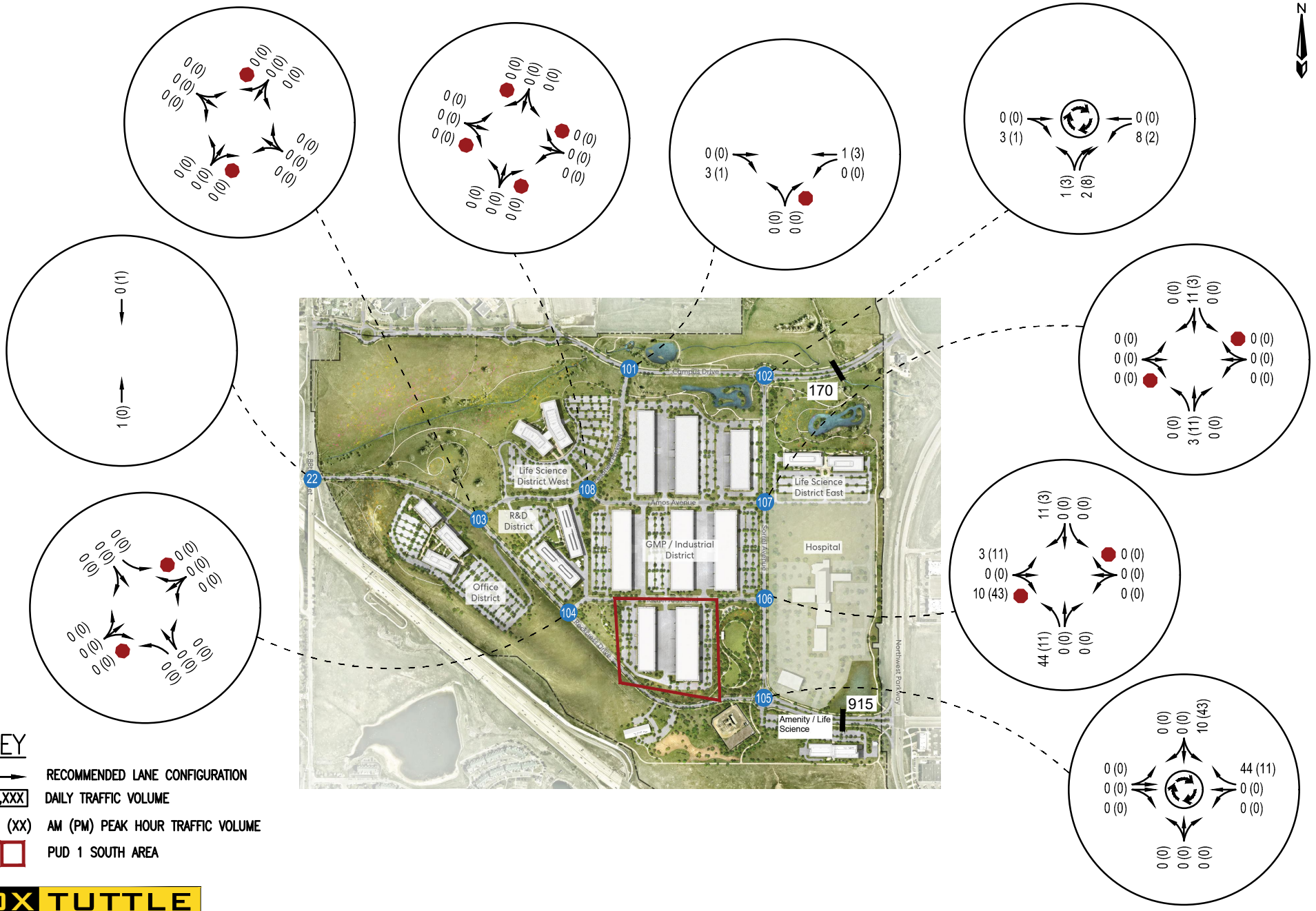
- RECOMMENDED LANE CONFIGURATION
- X,XXX DAILY TRAFFIC VOLUME
- XX (XX) AM (PM) PEAK HOUR TRAFFIC VOLUME
- PUD 1 SOUTH AREA

FOX TUTTLE TRANSPORTATION GROUP

REDTAIL RIDGE PUD 1 SOUTH CONFORMANCE

PUD 1 SOUTH GENERATED TRIPS

FT Project #	19055	Original Scale	NTS	Date	3/13/2025	Drawn by	SKK	Figure #	3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CONOCOPHILLIPS CAMPUS

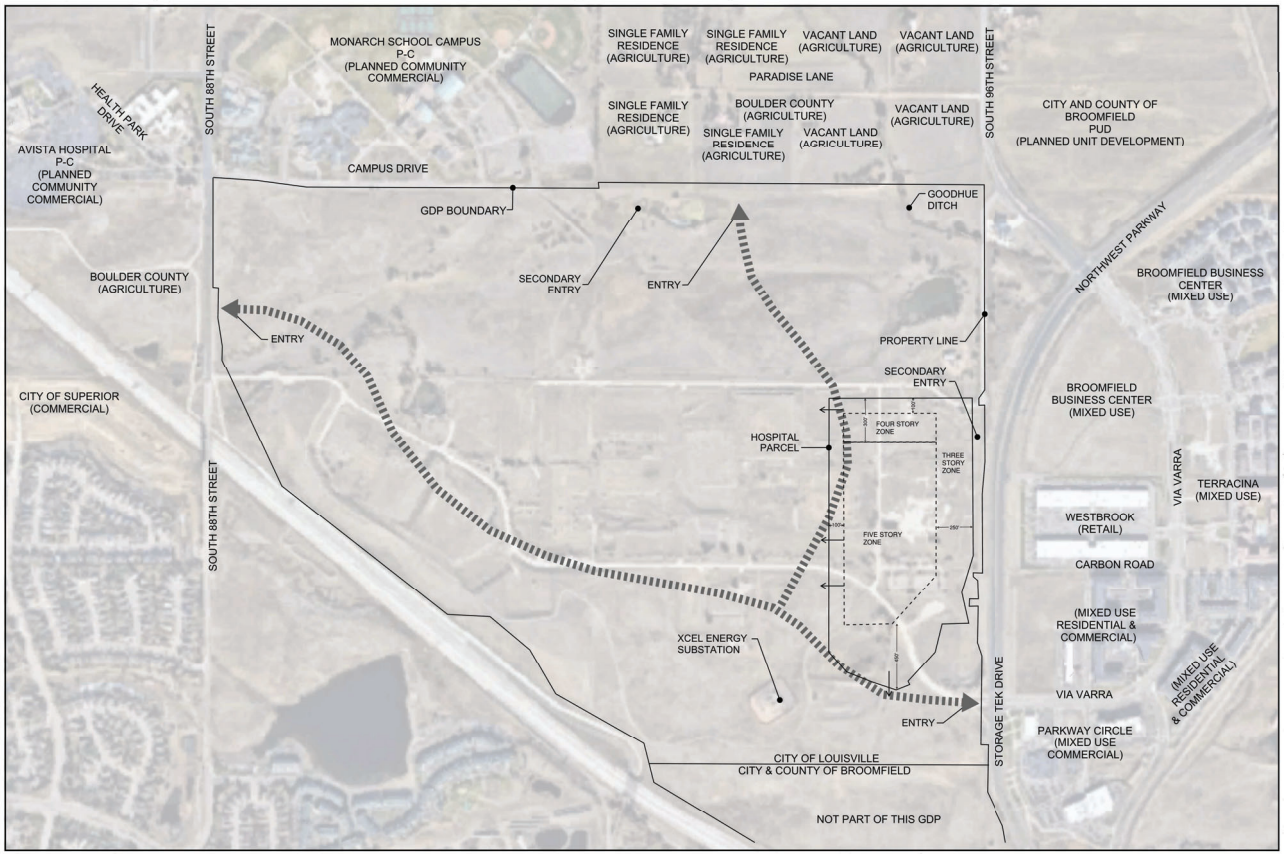
GENERAL DEVELOPMENT PLAN AMENDMENT 1

A PART OF THE SOUTH HALF OF SECTION 20, THE NORTH HALF SECTION 29,
TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE 6TH P.M.
SHEET 1 OF 1

AMENDMENT CHANGES

THE PURPOSE OF THIS AMENDMENT IS SPECIFICALLY FOR THE HOSPITAL PARCEL AND THE REST OF THE REDTAIL DEVELOPMENT REMAINS UNCHANGED.

1)Additional note for the allowable square footage transfer from the Avista Adventist Hospital 2002 GDP.
2)Addition of hospital and medical office building uses to the "Permitted Uses" for better clarity on specifc uses.
3)Updated yard and bulk requirements to include the allowable height for the hospital parcel only.
4)Updated aerial graphic
5)Added Hospital Parcel and density zoning to graphic
6) Added Hospital Parcel building massing design parameters



GENERAL DEVELOPMENT PLAN

400 200 0 400 800

SCALE: 1" = 400'

N

RECEPTION NUMBER

CERTIFICATIONS/SIGNATURE BLOCKS

CITY COUNCIL CERTIFICATION:

APPROVED THIS _____ DAY OF _____, 20___ BY THE CITY COUNCIL OF THE CITY OF LOUISVILLE, COLORADO.

RESOLUTION NO. _____, SERIES _____.

MAYOR SIGNATURE

PLANNING COMMISSION CERTIFICATION:

APPROVED THIS _____ DAY OF _____, 20___ BY THE PLANNING COMMISSION OF THE CITY OF LOUISVILLE, COLORADO.

RESOLUTION NO. _____, SERIES _____.

OWNERSHIP SIGNATURE BLOCK:

BY SIGNING THIS GDP, THE OWNER ACKNOWLEDGES AND ACCEPTS ALL THE REQUIREMENTS AND INTENT SET FORTH IN THIS GDP. WITNESS OUT HANDS AND SEALS

THIS ____ DAY OF _____, 20____.

OWNER
PORTERCARE ADVENTIST HEALTH SYSTEM,
A CO ORADO NONPROFIT CORPORATION

BY: SIGNATURE

TITLE

NOTARY NAME AND SIGNATURE

MY COMMISSION EXPIRES _____

GENERAL NOTES:

1. DEVELOPMENT SHALL CONFORM AND BE CONSISTENT WITH THE LOUISVILLE MUNICIPAL CODE AND THE COMMERICAL DEVELOPMENT DESIGN STANDARDS AND GUIDELINES UNLESS OTHERWISE WAIVED OR MODIFIED BY THE CITY COUNCIL THROUGH THE PUD DEVELOPMENT PLAN PROCESS.
2. THE CAMPUS SECURITY BOUNDARY WILL NOT EXTEND OUTSIDE THE SITE BOUNDARY.
3. TRAFFIC CIRCULATION PATTERNS DEPICTED WITHIN AND ACROSS LOT 4 REPRESENT INTERNAL PRIVATE DRIVES AND ARE CONCEPTUAL ONLY AND SUBJECT TO MODIFICATION.
4. EXISTING FREE STANDING CMRS FACITIES WITHIN LOT A SHALL CONSITUTE A PERMISSIBLE NON-CONFORMING USE.
5. PUBLIC LAND DEDICATION OF AT LEAST 12% WILL COMPLY WITH SECTION 16.16.060.B OF THE LOUISVILLE MUNICIPAL CODE.

SITE INFORMATION

GROSS DEVELOPABLE AREA (PUD BOUNDARY):	391.719 ACRES (MINIMUM 0.15 F.A.R.) * TOPOLOGIC DESCRIPTION SEE EXHIBIT A OF GRADING NO. 1309 SERIES 2010
ZONING:	PLANNED COMMUNITY ZONED DISTRICT (PCZD) - COMMERCIAL WITH PUD-C OVERLAY
PLANNED ACCESS:	NORTHWEST PARKWAY, CAMPUS DRIVE, SOUTH 88TH STREET

* THE F.A.R APPLIES TO THE GROSS AREA OF THE ENTIRE DEVELOPMENT AND IS NOT PARCEL-SPECIFIC. THIS GDP ACKNOWLEDGES AN ADDITIONAL 364,400 SF ALLOCATED TO THE HOSPITAL PARCEL, ON TOP OF THE ALLOCATED DEVELOPMENT SQUARE FOOTAGE.THE 364,400 SF IS IN CONSIDERATION WITH A DENSITY SWAP FROM HEALTH PARK 1.

PERMITTED USES

PERMITTED USE	COMMENTS / REMARKS	PARKING REQUIREMENTS
PROFESSIONAL, BUSINESS, AND ADMINISTRATIVE OFFICES	-	4 / 1,000 S.F.
EDUCATIONAL AND TRAINING FACILITIES	MEETING ROOMS AND SOCIAL SPACE FOR EMPLOYEES AND VISITORS	0.5/ 1,000 S.F.
PRIVATE SHORT TERM LODGING FOR CONOCOPHILLIPS EMPLOYEES AND GUESTS	OVERNIGHT ACCOMMODATIONS FOR EMPLOYEES/VISITORS	0.5 / ROOM
PEDESTRIAN PLAZAS AND PEDESTRIAN WAYS	-	-
PRIVATE, NONCOMMERCIAL, RECREATIONAL AND SOCIAL FACILITIES	-	1 / 1,000 S.F.
PARKING LOTS AND PARKING BUILDINGS	SURFACE AND STRUCTURED PARKING	-
CAMPUS ORIENTED CHILDCARE CENTER	PRIVATE CHILDCARE FOR EMPLOYEES	1.5 SPACES PER TEACHER PLUS ONE SPACE PER ADMINISTRATIVE EMPLOYEE
RESEARCH/OFFICE AND CORPORATE USES AND FACILITIES FOR THE RESEARCH, DEVELOPMENT, MANUFACTURING, FABRICATION, PROCESSING, OR ASSEMBLY OF SCIENTIFIC OR TECHNICAL PRODUCTS, OR OTHER PRODUCTS	-	1.25 / 1,000 S.F.
BUILDING MOUNTED CMRS FACILITIES	-	-
CAMPUS ORIENTED FOOD SERVICE	RESTAURANTS CAFETERIAS, OR CAFES FOR USE BY EMPLOYEES/VISITORS INTEGRATED THROUGHOUT THE CAMPUS	-
COMMERCIAL USES, INCLUDING BUT NOT LIMITED TO BUILDING CONTRACTOR'S EQUIPMENT YARDS, TRANSPORTATION CENTERS AND SERVICED, WAREHOUSES AND STORAGE FACILITIES	STORAGE OF MATERIALS IN SUPPORT OF THE CAMPUS RESEARCH AND DEVELOPMENT FACILITY, HELPAD (SPECIAL REVIEW USE), HOSPITAL, MEDICAL OFFICE BUILDINGS	1 / 1,000 S.F.
PRIVATE UTILITY USES	TO ALLOW THE EXISTING SANITARY LIFT STATION, POTENTIAL SUBSURFACE GEO EXCHANGE FIELD, SOLAR PANELS, BUILDING MOUNTED WIND POWERED ELECTRICAL GENERATION FACILITIES, AND CENTRAL MECHANICAL, ELECTRICAL, AND PLUMBING FACILITY	-
OTHER USES AS ESTABLISHED BY THE CITY COUNCIL AS FOUND TO BE SPECIFICALLY COMPATIBLE FOR COMMERCIAL AND OFFICE PLANNING AREAS	-	-

YARD AND BULK REQUIREMENTS

1. OTHER THAN FOR THE HOSPITAL PARCEL, MAXIMUM BUILDING HEIGHTS SHALL BE BASED ON THE CONOCOPHILIPS CAMPUS GDP (RECEPTION NO. 0308879), STANDARDS FOR THE HOSPITAL PARCEL ARE NOTED BELOW.

MINIMUM BUILDING SETBACKS
(FOR BUILDING FOOTPRINTS LESS THAN OR EQUAL TO 30,000 GROSS SQUARE FEET)

STREET R.O.W. LINE:
- ARTERIAL STREET 30 FT.
- COLLECTOR STREET 20 FT.
- INTERNAL/PRIVATE DRIVE 10 FT.

(FOR BUILDING FOOTPRINTS GREATER THAN OR EQUAL TO 30,000 GROSS SQUARE FEET)

STREET R.O.W. LINE:
- ARTERIAL STREET 50 FT.
- COLLECTOR STREET 40 FT.
- INTERNAL/PRIVATE DRIVE 10 FT.

MINIMUM PARKING SETBACKS
(FROM ALL PERIMETER PROPERTY LINE OR RIGHTS-OF-WAYS)

- PROPERTY LINES ADJACENT TO U.S. 36 40 FT.
- ARTERIAL STREET R.O.W. 25 FT.
- COLLECTOR STREET R.O.W. 15 FT.
- INTERNAL/COMMON PROPERTY BOUNDARY 10 FT.

HOSPITAL PARCEL
FOR THE HOSPITAL PARCEL (LOT 1, BLOCK 1) BUILDING HEIGHTS ARE EXPECTED TO RANGE FROM THREE TO FIVE OCCUPIABLE STORIES, RANGING IN HEIGHT FROM 50' TO 90'. UNOCCUPIED MECHANICAL SCREENING OF UP TO 20' WOULD BE ABOVE THE 5 STORIES. THE HOSPITAL PARCEL WILL BE ZONED TO SUPPORT LOWER THREE-STORY BUILDING HEIGHTS TOWARDS THE NORTH, EAST, AND WEST PROPERTY BOUNDARIES CONCENTRATING THE 5-STORY STRUCTURES CENTRALLY WITHIN THE SITE. REFER TO THE GRAPHIC FOR PARCEL HEIGHT ZONES

BUILDING HEIGHT ZONING:
THREE STORY ZONE:
- 45'-0" MAXIMUM BUILDING HEIGHT
- 50'-0" PARAPET HEIGHT
- 65'-0" MECHANICAL PENTHOUSE HEIGHT*

FOUR STORY ZONE:
- 60'-0" MAXIMUM BUILDING HEIGHT
- 65'-0" PARAPET HEIGHT
- 80'-0" MECHANICAL PENTHOUSE HEIGHT*

FIVE STORY ZONE:
- 85'-0" MAXIMUM BUILDING HEIGHT
- 90'-0" PARAPET HEIGHT
- 105'-0" MECHANICAL PENTHOUSE HEIGHT*

*ROOF ACCESS AND ELEVATOR OVERUN IS EXCLUDED FROM THE BUILDING HEIGHT

BUILDING MASSING DESIGN PARAMETERS:
FOR BUILDING FACADES EXCEEDING 100 FEET IN LENGTH AND MORE THAN 45 FT IN HEIGHT, A RELIEF IN THE BUILDING MASSING IS REQUIRED TO REDUCE VISUAL MONOTONY AND ENHANCE ARCHITECTURAL INTEREST:
- A MAXIMUM HEIGHT OF 45 FEET IS PERMITTED BEFORE A MINIMUM HORIZONTAL SETBACK OF 15 FEET IS REQUIRED FROM THE PRIMARY BUILDING FACE.
- A PROJECTED RELIEF ELEMENT MAY EXTEND OUTWARD FROM THE MAIN BUILDING MASS BY A MINIMUM OF 2 FEET, PROVIDED IT CONTRIBUTES TO THE OVERALL ARTICULATION AND DESIGN OF THE FACADE.
- THE FOOTPRINT OF EACH FLOOR ABOVE 45 FEET SHALL NOT EXCEED 50% OF THE FOOTPRINT OF THE BUILDING AT OR BELOW 45 FEET.
- ANY ROOFTOP ENCLOSURE (E.G., MECHANICAL PENTHOUSES) MUST BE SET BACK A MINIMUM OF 10 FEET FROM THE EDGE OF THE BUILDING MASS, UNLESS IT IS ARCHITECTURALLY INTEGRATED INTO THE OVERALL DESIGN OF THE BUILDING.
- EXCEPTION: A DEFINING ARCHITECTURAL ELEMENT OR DISTINCT BUILDING FORM WITH A TOTAL WIDTH OF LESS THAN 100 FEET IS EXEMPT FROM THE ABOVE SETBACK AND RELIEF REQUIREMENTS. A MINIMUM 2-FOOT DEPTH VARIATION FROM THE ADJACENT PRIMARY FACADE PLANE MUST STILL BE PROVIDED TO ENSURE VISUAL ARTICULATION.
  - DEFINING ARCHITECTURAL ELEMENTS MAY INCLUDE, BUT ARE NOT LIMITED TO:
  - VERTICAL CIRCULATION TOWERS (E.G., STAIR OR ELEVATOR JOPES)
  - ENTRY PAVILIONS OR LOBBIES
  - ARCHITECTURAL EYEBROWS OR ROOF OVERHANGS
  - BRANDED OR SCULPTURAL FACADE FEATURES
  - CORNER ELEMENTS OR TURRETS
  - ATRIUM VOLUMES OR LIGHT WELLS
  - DISTINCTIVE ROOF FORMS

SMITHGROUP
1675 LOGAN ST.
SUITE 500
DENVER, COLORADO 80202
303.832.3272
smithgroup.com

Kimley»Horn
1125 17TH ST
SUITE 1400
DENVER, CO 80202
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kimley-horn.com

ISSUE / REVISION	DATE
GDP CITY RESPONSE #1	7/18/2025
GDP AMENDMENT	9/2/2025

CONOCOPHILLIPS CAMPUS
2270 SO 88TH STREET
LOUISVILLE, CO

GENERAL DEVELOPMENT PLAN

DRAWN	TEAM
CHK	TEAM
PRJ #	

SHEET NUMBER:

1 OF 1

REDTAIL RIDGE FILING NO. 1

PLANNED UNIT DEVELOPMENT

LOT 1 BLOCK 1

SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29, TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN

CASE #: ~~PUPL-XXXX-2023~~ PUD-00547-2025

BASIS OF BEARINGS:

BEARINGS ARE PLATTED BEARINGS BASED ON THE WEST LINE OF THE NORTHEAST QUARTER OF SECTION 29, TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE 6TH PRINCIPAL MERIDIAN AS BEARING SOUTH 00°08'41" EAST PER REDTAIL RIDGE FILING NO. 1, SAID LINE BEING MONUMENTED AT THE NORTH QUARTER CORNER OF SAID SECTION BY A #6 REBAR WITH A 3.25" BRASS CAP STAMPED "1998 PLS 16401", AND BEING MONUMENTED AT THE CENTER QUARTER CORNER BY A #6 REBAR WITH A 2.5" ALUMINUM CAP STAMPED "DB&CO 2000 PLS 23529".

BENCHMARK:

THE SITE VERTICAL BENCHMARK IS GPS CONTROL POINT FC-1 OF THE CITY AND COUNTY OF BROOMFIELD. FC-1 IS LOCATED AT THE SOUTHWEST END OF THE STORAGE TEK DRIVE BRIDGE, 64.3' NORTH OF THE US 36 EXIT RAMP. THE 3" ROUND CAP DESCRIBED IN THE CITY AND COUNTY OF BROOMFIELD SURVEY SHEET WAS MISSING AT THE TIME OF THIS SURVEY, BUT A MAG NAIL WAS FOUND IN ITS PLACE IN A COUNTERSINK HOLE IN THE SIDEWALK. THE NAIL WAS USED IN PLACE OF THE ORIGINAL MONUMENT, AND ASSIGNED AN ELEVATION OF 5392.57, NAVD 88.

LEGAL DESCIPTION:

A PARCEL OF LAND BEING ALL OF LOTS 1 AND 2, BLOCK 1, REDTAIL RIDGE FILING NO. 1, SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29, TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN, CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTH QUARTER CORNER OF SAID SECTION 29;

THENCE NORTH 68°17'36" WEST, A DISTANCE OF 258.22 FEET TO THE WEST CORNER OF SAID LOT 1 AND THE POINT OF BEGINNING;

THENCE ALONG THE PERIMITER OF SAID LOTS 1 AND 2 THE FOLLOWING FIFTEEN (15) COURSES:

1) NORTH 45°51'00" EAST, A DISTANCE OF 99.89 FEET TO A POINT OF NON-TANGENT CURVATURE;
2) ALONG THE ARC OF SAID CURVE TO THE RIGHT AN ARC LENGTH OF 112.57 FEET, SAID CURVE HAVING A RADIUS OF 150.00 FEET, A CENTRAL ANGLE OF 43°00'00", AND A CHORD WHICH BEARS NORTH 68°30'00" EAST A CHORD DISTANCE OF 109.95 FEET;
3) NORTH 00°00'00" EAST, A DISTANCE OF 774.30 FEET;
4) NORTH 31°01'09" EAST, A DISTANCE OF 160.32 FEET TO A POINT OF NON-TANGENT CURVATURE;
5) ALONG THE ARC OF SAID CURVE TO THE LEFT AN ARC LENGTH OF 81.21 FEET, SAID CURVE HAVING A RADIUS OF 150.00 FEET, A CENTRAL ANGLE OF 31°01'09", AND A CHORD WHICH BEARS SOUTH 74°29'25" EAST A CHORD DISTANCE OF 80.22 FEET;
6) NORTH 90°00'00" EAST, A DISTANCE OF 1,399.99 FEET;
7) SOUTH 00°00'00" EAST, A DISTANCE OF 1,693.86 FEET TO A POINT OF CURVATURE;
8) ALONG THE ARC OF SAID CURVE TO THE RIGHT AN ARC LENGTH OF 40.02 FEET, SAID CURVE HAVING A RADIUS OF 43.50 FEET, A CENTRAL ANGLE OF 52°42'39", AND A CHORD WHICH BEARS SOUTH 26°21'19" WEST A CHORD DISTANCE OF 38.62 FEET TO A POINT OF REVERSE CURVATURE;
9) ALONG THE ARC OF SAID CURVE TO THE LEFT AN ARC LENGTH OF 15.24 FEET, SAID CURVE HAVING A RADIUS OF 93.50 FEET, A CENTRAL ANGLE OF 09°20'23", AND A CHORD WHICH BEARS SOUTH 48°02'27" WEST A CHORD DISTANCE OF 15.22 FEET TO A POINT OF REVERSE CURVATURE;
10) ALONG THE ARC OF SAID CURVE TO THE RIGHT AN ARC LENGTH OF 65.18 FEET, SAID CURVE HAVING A RADIUS OF 83.50 FEET, A CENTRAL ANGLE OF 44°43'21", AND A CHORD WHICH BEARS SOUTH 65°43'56" WEST A CHORD DISTANCE OF 63.53 FEET;
11) SOUTH 88°15'36" WEST, A DISTANCE OF 91.79 FEET;
12) SOUTH 89°59'42" WEST, A DISTANCE OF 61.57 FEET TO A POINT OF CURVATURE;
13) ALONG THE ARC OF SAID CURVE TO THE LEFT AN ARC LENGTH OF 229.54 FEET, SAID CURVE HAVING A RADIUS OF 659.50 FEET, A CENTRAL ANGLE OF 19°56'31", AND A CHORD WHICH BEARS SOUTH 80°01'26" WEST A CHORD DISTANCE OF 228.38 FEET TO A POINT OF REVERSE CURVATURE;
14) ALONG THE ARC OF SAID CURVE TO THE [illegible] 5.11 FEET, SAID CURVE HAVING A R[illegible] CENTRAL ANGLE OF 65°47'49", AND A CHORD WHICH BEARS NORTH 77°[illegible] OF 641.46 FEET;
15) NORTH 44°09'00" WEST, A DISTANCE OF [illegible] BEGINNING.

SAID PARCEL CONTAINS 2,641,330 SQUARE FEET OR 60.64 ACRES, MORE OR LESS.

SITE DATA

	REQUIRED	PROPOSED
Total Site Area		944,460 SF
Site Coverage	70% max.	58.9%
Building		236,992 SF
Parking		76,498 SF
Driveway		240,996 SF
Total:	661,122 SF	555,802 SF
Landscape Coverage	30% min / sq ft	38.2% / sq ft
Landscape Area		360,907 SF
Hardscape Area		29,067 SF
Total:	100% / SF	100% / SF
Building Height	42' Max.	39'-6"
Setbacks		
North	35' Min.	35'
West	35' Min.	147.8'
South	40' Min.	54.9'
East	40' Min.	205.5'
INDUSTRIAL A		
Parking Spaces	189*	191
Standard	183 Min.	185
Accessible	6 Min.	6
EV Installed	7%	
EV Ready	10%	
EV Capable	15%	
INDUSTRIAL B		
Parking Spaces	286*	264
Standard	279 Min.	257
Accessible	7 Min.	7
EV Installed	7%	
EV Ready	10%	
EV Capable	15%	
Bicycle	0 Min.	76
Parking Setbacks		
North	15' Min.	43.5'
West	15' Min.	18.9'
South	15' Min.	65.9'
East	15' Min.	26.5'

* 2 SPACES/1000 SF ARE REQUIRED FOR MANUFACTURING AND RESEARCH AND DEVELOPMENT PER CITY OF LOUISVILLE INDUSTRIAL DESIGN STANDARDS (IDDSG).

Breakout building A and building B

Feel free to revise the format of this data table for easier presentation of info.

Do these values incorporate a vacant Lot 2? If Lot 2 is included, I'd like to see a formal plan for Lot 2. Otherwise, breakout Lot 2 and show that Lot 1 meets the coverage and open space standards on it's own.

Correct to reflect GDP setbacks.

Based on the number of parking spaces proposed, 40 bicycle parking spaces are required and should be divided evenly between the buildings. See also Fitwel requirements for bike parking.

All development in Conoco Phillips GDP is subject to the CDDSG, not IDDSG. However, the Conoco Phillips Campus GDP requires parking for research/office uses in the amount of 1.25/1,000 sq ft. Please udpate the parking count to reflect this ratio under "required". There is not maximum parking ratio. 296 spaces are required.

Do you anticipate building out both buildings at the same time? Or does this PUD need to be phased?

Add CO and/or CC note?

OWNERSHIP SIGNATURE BLOCK:

BY SIGNING THIS PUD, _____ ACKNOWLEDGES ALL THE REQUIREMENTS AND INTENT SET FORTH IN THIS PUD.

[illegible]ND(S) SEAL(S) THIS _____ DAY OF _____, 20_____

_____

_____

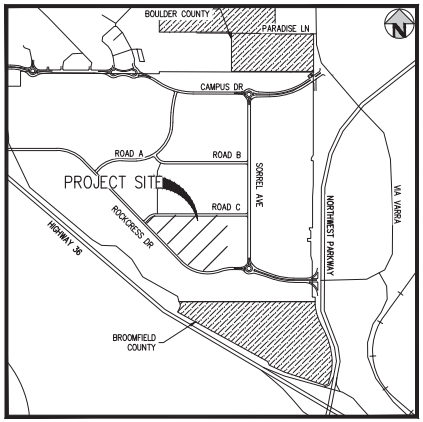
NOTARY NAME

Show all required EV parking. Follow the Colorado Model Electric and Solar Ready code for ready and capable space;

Table CVSQ2.1 EV Power Transfer Infrastructure Requirements

Building Type / Space Type	EVSE Installed Space	EV Ready Space	EV Capable Space	EV Capable Light Space
All commercial buildings, except for R-2 occupancies, with 10 or less parking spaces.	0	2 spaces	0	0
Commercial buildings, except for R-2 occupancies, with greater than 10 parking spaces.	2% of spaces	8% of spaces	10% of spaces	10% of spaces
R-2 occupancies with 10 or less parking spaces	0	18% of spaces	10% of spaces	10% of spaces
R-2 occupancies with greater than 10 parking spaces.	5% of spaces	15% of spaces	10% of spaces	30% of spaces

RESOLUTION NO. _____
SERIES 20_____



VICINITY MAP

SCALE: 1" = 800'

In accordance with the approved Subdivision Improvement Agreement, all buildings within the larger Redtail Ridge project area shall achieve LEED Silver Certification or better, in addition to 1W per building square footage for a minimum of 2.54MWof solar power generation, and Fitwel campus certification.

Compliance with the agreed-to performance commitments shall be verified at building permit and PUD approval stage where necessary and appropriate.

On the next submittal, please provide a report indicating how this proposed PUD will satisfy sustainability commitments as outlined in the SIA. Please also include a response to Exhibit H of the SIA indicating how the agreed upon commitments are to be satisfied, and show any improvements (as applicable) on this PUD.

Include a note indicating that both building on this PUD will achieve LEED Silver or better.

SHEET INDEX

Sheet Number	Sheet Title
1	COVER
2	OVERALL SITE PLAN
3	SITE PLAN
4	SITE PLAN
5	ARCHITECTURAL ELEVATIONS
6	ARCHITECTURAL ELEVATIONS
7	OVERALL GRADING PLAN
8	GRADING PLAN
9	GRADING PLAN
10	OVERALL UTILITY PLAN
11	UTILITY PLAN
12	UTILITY PLAN
13	OVERALL LANDSCAPE PLAN
14	MATERIAL AND PLANTING PLAN - A
15	MATERIAL AND PLANTING PLAN - B
16	MATERIAL AND PLANTING PLAN - C
17	MATERIAL AND PLANTING PLAN - D
18	MATERIAL AND PLANTING PLAN - E
19	MATERIAL AND PLANTING PLAN - F, G & H
20	SITE FURNISHING DETAILS
21	PLANTING DETAILS
22	PLANTING SCHEDULE
23	PHOTOMETRIC PLAN
24	PHOTOMETRIC DETAILS

PROJECT DESCRIPTION

~~THIS PROJECT IS PUD 1 OF 5 PLANNED PUD REVIEWS ASSOCIATED WITH THE REDTAIL RIDGE MASTER PROJECT (PUPL-XXXX-20XX.)~~ THIS SITE INCLUDES THE CONSTRUCTION OF TWO INDUSTRIAL BUILDINGS, AND ASSOCIATED UTILITIES. THE BUILDINGS WILL HAVE A COMBINED SQUARE FOOTAGE OF 236,992 SF. OPEN SPACE IMPROVEMENTS, INCLUDING PEDESTRIAN AND BICYCLE NETWORK EXPANSION, WILL ALSO BE REVIEWED WITH THIS PUD. THIS PROJECT, AS PART OF THE GREATER REDTAIL RIDGE PROJECT, WILL BE SERVED BY PRIVATE ROADS CONSTRUCTED BY THE MASTER DEVELOPMENT. STORM, SANITARY, WATER, ELECTRICAL, AND GAS UTILITIES WILL BE CONSTRUCTED TO SUPPORT THE DEVELOPMENT OF THIS SITE AND WILL BE CONNECTING TO UTILITIES CONSTRUCTED BY THE MASTER DEVELOPMENT. THIS PROJECT IS ZONED PLANNED COMMUNITY COMMERCIAL. THE CITY OF LOUISVILLE COMMERCIAL DEVELOPMENT DESIGN STANDARDS AND GUIDELINES WAS USED IN THE DESIGN OF THIS PROJECT.

NOTES

1. THE CITY OF LOUISVILLE IS NOT RESPONSIBLE FOR DAMAGE TO, OR REPAIR OF, MONUMENT SIGNS, PAVEMENT SURFACES, OR LANDSCAPING CAUSED DURING REPAIR OR MAINTENANCE OF UTILITIES LOCATED WITHIN PUBLIC UTILITY EASEMENTS.

WAIVER REQUESTS

Ensure that the codified rule of measurement for building height is utilized to determine the full extent of the requested height waiver. See elevation sheet comments. Further, this needs to include an exact measurement maximum for each building, not a range.

Required mechanical screening should be provided as part of this PUD application. Staff are not in position to consider unknown height waivers to mechanical screening requirements in the absence of details. More information is necessary.

Initial conversations with the applicant, including the staff response provided in the preapplicaiton letter dated December 21, 2023, indicated that the City will not support a waiver from the CDDSG design guidelines, specifically to allow a tilt-up product that includes painted concrete.

1. 4.2.C - BUILDING HEIGHTS
   - 1.1. STANDARD: THE MAXIMUM HEIGHT OF ALL COMMERCIAL BUILDINGS (AS MEASURED PURSUANT TO THE LOUISVILLE MUNICIPAL CODE) IS 35.0', AND 42.0' TO THE TOP OF THE ROOFTOP MECHANICAL SCREEN.
   - 1.2. PROPOSED: THE MAXIMUM HEIGHT OF BUILDINGS IN PUD-1 VARIES FROM 40'-6" TO 44'-0" BASED ON THE SIZE OF BUILDING AND SLOPE OF THE ROOF. THE HEIGHT IS MEASURED FROM THE AVERAGE OF THE NATURAL GRADE, IN THIS CASE THE FINISH FLOOR ELEVATION AS THE SITE IS GRADED TO MEET FFE. THIS PROPOSED BUILDING HEIGHT ALLOWS FOR THE FLEXIBILITY FOR FUTURE TENANTS TO UTILIZE A WIDER VARIETY OF EQUIPMENT, AND INTRODUCE FUTURE MEZZANINES OR 2ND FLOOR LEVELS IF REQUIRED. THE NEED FOR ROOF MOUNTED MECHANICAL SCREENS IS UNKNOWN BUT IT IS ANTICIPATED THAT, IF THEY ARE NECESSARY, THEY WOULD EXCEED THE MAXIMUM HEIGHT.
2. 4.5.1.H - BUILDING MATERIALS
   - 2.1. STANDARD: PAINTED METAL, PAINTED CONCRETE, PLAIN UNFINISHED CONCRETE BLOCK OR LARGE EXPANSES OF UNARTICULATED STUCCO ARE NOT ACCEPTABLE MATERIALS.
   - 2.2. PROPOSED: THE BUILDINGS ARE PROPOSED TO BE CONSTRUCTED USING CONCRETE WALL PANEL. THE MAIN FINISH MATERIAL ON THE CONCRETE WALL PANELS FOR THESE BUILDINGS IS A HIGH-QUALITY DURABLE PAINT. THE PROJECT IS ALSO PROPOSING TO USE A RAW CONCRETE LOOK ON SELECT ACCENT SECTIONS OF THE EXTERIOR CONCRETE WALL PANELS TO ~~[illegible]~~ [illegible]

3. IECC 2021 ENERGY CODE AMENDMENTS
   - 3.1. PROVISION: ENERGY CODES GENERALLY PROVIDE OPTIONS FOR DEMONSTRATING COMPLIANCE. FOR EXAMPLE, ASHRAE STANDARD 189.1 PRESCRIPTIVE PATH INCREASES THE MINIMUM PERFORMANCE REQUIREMENTS FOR ENCLOSURES AND EQUIPMENT. ITS PERFORMANCE PATH LISTS MORE AGGRESSIVE BUILDING PERFORMANCE FACTORS FOR USE IN SETTING THE PERFORMANCE COST INDEX TARGET PCIT.
   - 3.2. REQUEST: PROVIDE OPTIONS FOR DEMONSTRATED COMPLIANCE
4. IECC 2021 ENERGY CODE AMENDMENTS
   - 4.1. PROVISION: THE ENERGY CONSERVATION CODE OF THE CITY OF LOUISVILLE REMOVES THE OPTION TO DEMONSTRATE COMPLIANCE THROUGH ENERGY MODELING (C401.2.4). HOWEVER, FOR MULTIFAMILY, OFFICES, SCHOOLS, PARKING GARAGES, AND WAREHOUSES, PRESCRIPTIVE COMPLIANCE IS NOT PERMITTED, AND ENERGY MODELING IS MANDATORY (C401.2.1).
   - 4.2. REQUEST: ALLOW ALL PROJECT TYPES TO DEMONSTRATE CODE COMPLIANCE THROUGH ENERGY MODELING. THIS IS A BEST PRACTICE BECAUSE, AMONG OTHER REASONS, BUILDINGS VARY WIDELY IN PROCESS ENERGY USE. THIS HAS A DIRECT IMPACT ON BUILDING PERFORMANCE. FURTHER, THE PRESCRIPTIVE OPTIONS ARE OFTEN THE BEST FIT FOR SIMPLE PROJECTS BY ALLOWING TEAMS TO SAVE TIME AND COST ON MODELING, WHICH MAY ALSO INCREASE INCORRECT MODELING PRACTICE. IT IS POSSIBLE TO ALLOW TEAMS TO SELECT A COMPLIANCE PATH WHILE ALSO SETTING MORE RIGOROUS PERFORMANCE TARGETS (E.G. ASHRAE STANDARD 189.1).
5. IECC 2021 ENERGY CODE AMENDMENTS
   - 5.1. PROVISION: APPENDIX PT ESTABLISHES EUI CAPS FOR SOME BUILDING TYPES. ASHRAE-90.1-2019 PERFORMANCE RATING METHOD, APPENDIX G. HOWEVER, APPENDIX G USES PERFORMANCE COST INDEX AND GREENHOUSE GAS INDEX TO ESTABLISH COMPLIANCE, NOT EUI. APPENDIX PT ALSO REQUIRES THAT PROCESS LOADS BE EXCLUDED, HOWEVER THIS ENERGY CREATES HEAT AND IS IMPORTANT TO PROVIDING REASONABLE ESTIMATES OF BUILDING PERFORMANCE. PROCESS LOADS MUST BE INCLUDED PER APPENDIX G METHODOLOGY, WHICH APPLIES A BUILDING PERFORMANCE FACTOR TO THE REGULATED LOADS, BUT NOT THE UNREGULATED LOADS.
   - 5.2. REQUEST: REMOVE EUI CAPS AND INSTEAD CONSIDER ALTERNATIVE APPROACHES TO SETTING CLIMATE ACTION GOALS. FOR EXAMPLE, SOME AUTHORITIES ENACT ASHRAE STANDARD 189.1, WHICH IS DESIGNED TO ALIGN WITH AND EXPAND THE ENERGY SAVINGS PROVISIONS OF STANDARD 90.1. NEW YORK, BOSTON, AND SEATTLE HAVE ALSO REEVALUATED BUILDING COMPLIANCE BY ENACTING EMISSIONS INTENSITY THRESHOLDS FOR ALL BUILDINGS, WITH PENALTIES ASSOCIATED FOR EXCEEDANCES. THESE RULES ALSO HAVE BUILT-IN REDUCTIONS TO ALIGN WITH GOALS FOR ZERO-EMISSIONS IN 2050 PER THE PARIS ACCORD.
6. IECC 2021 ENERGY CODE AMENDMENTS
   - 6.1. PROVISION: BUILDINGS SUBJECT TO THE PRESCRIPTIVE PATH HAVE INCREASED ROOF INSULATION REQUIREMENTS (TABLE C402.1.3). LOW-SLOPE ROOF INSULATION IS INCREASED FROM R-30 TO R-49. THIS IS EQUAL TO ABOUT 3" OF THE MOST COMMON LOW-SLOPE ROOF INSULATION ABOVE DECK, POLYISOCYANURATE. FOR THE REDTAIL RIDGE DISTRICT WITH ABOUT 1.5M SF OF ROOF AREA, ADDING THIS INSULATION WILL INCREASE UP-FRONT GREENHOUSE GAS EMISSIONS BY 930 METRIC TONS CO2-EQUIVALENT. IT IS UNLIKELY THAT THIS INSULATION WILL SAVE A SIMILAR AMOUNT OF EMISSIONS IN OPERATION, ESPECIALLY ON A CLEAN GRID. FOR INDUSTRIAL BUILDINGS WITH HIGH PROCESS LOADS, THE ADDITIONAL COOLING NEEDED MAY OUTWEIGH THE SAVINGS IN HEATING.
   - 6.2. REQUEST: REVERT TO THE IECC-2021 PRESCRIPTIVE REQUIREMENTS FOR ROOFS WITH INSULATION ENTIRELY ABOVE DECK. ALTERNATIVELY, PROVIDE AND EXCEPTION TO USE IECC-2021 VALUES WHERE SUPPORTED BY LIFE CYCLE ASSESSMENT.
7. IECC 2021 ENERGY CODE AMENDMENTS
   - 7.1. PROVISION: FOR METAL-FRAMED WALLS, THE WALL INSULATION IS INCREASED FROM U-0.055 TO U-0.0476. THIS IS ROUGHLY EQUIVALENT TO AN INCREASE OF CONTINUOUS MINERAL WOOL INSULATION FROM 2.5" TO 3.5." FOR MASS WALLS, THE CONTINUOUS INSULATION IS INCREASED FROM R-11.4 TO R-21. THIS WOULD BE AN INCREASE FROM 3" TO ABOUT 5" OF CONTINUOUS MINERAL WOOL. BECAUSE MINIMAL SAVINGS ARE LIKELY FOR LARGE BUILDINGS WITH HIGH PROCESS LOADS, THIS LEVEL OF INSULATION WILL LIKELY HAVE A NET NEGATIVE IMPACT ON CLIMATE CHANGE.
   - 7.2. REQUEST: REVERT TO THE IECC-2021 PRESCRIPTIVE REQUIREMENTS FOR WALLS. IF LIFE CYCLE ASSESSMENT VALIDATES THE NET BENEFIT OF ADDITIONAL INSULATION, CONSIDER INCREASING PERFORMANCE BY A PERCENTAGE. FOR EXAMPLE, ASHRAE 189.1 IMPROVES ASSEMBLY THERMAL PERFORMANCE BY 10%.
8. IECC 2021 ENERGY CODE AMENDMENTS
   - 8.1. PROVISION: SECTION C402.4.1 STRIKES THE LIMIT ON FENESTRATION AND IMPOSES GLAZED AREA OF 8% OF FLOOR AREA. HOWEVER, FOR VERY LARGE BUILDINGS THIS CAN HAVE THE EFFECT OF DRAMATICALLY INCREASING THE WINDOW-TO-WALL RATIO, WELL ABOVE OPTIMAL TARGETS FOR ENERGY PERFORMANCE. THESE GLAZED AREAS WILL ALSO BE PROBLEMATIC FOR SOME BUILDING USES FOR REASONS OF DURABILITY, SECURITY, AND MAINTENANCE, IN ADDITION TO DECREASING ENERGY PERFORMANCE.
   - 8.2. REQUEST: REVERT TO THE FENESTRATION REQUIREMENTS LISTED IN IECC-2021.
9. IECC 2021 ENERGY CODE AMENDMENTS
   - 9.1. PROVISION: SECTION 403.2.4 LIMITS THE USE OF GAS FOR SPACE HEATING. HOWEVER, THE PROCESS AND CRITERIA FOR MEETING EXCEPTION 10 SPECIFIC CONDITIONS IS UNCLEAR. FOR INDUSTRIAL AND LABORATORY PLANNING, EARLY INFORMATION ON FUEL SOURCE IS CRITICAL AND MAY IMPACT TENANCY.
   - 9.2. REQUEST: CLARIFY THE CRITERIA FOR DETERMINING APPLICATION OF EXCEPTION 10. PROVIDE DETAIL ON THE PROCESS FOR ACHIEVING THIS EXCEPTION.
10. IECC 2021 ENERGY CODE AMENDMENTS
    - 10.1. PROVISION: SECTION C405.13 REQUIRES A MINIMUM NUMBER OF LEVEL 2 EV CHARGERS. IN SOME CASES LEVEL 3 DC FAST CHARGERS MAY BE MORE APPROPRIATE – FOR EXAMPLE AT RETAIL LOCATIONS.
    - 10.2. REQUEST: REVISE EV CHARGER REQUIREMENT TO ALLOW FEWER LEVEL 2 CHARGERS TO BE INSTALLED FOR EACH LEVEL THREE CHARGER. FOR EXAMPLE, AN EQUIVALENT INSTALLED KW COULD BE REQUIRED, OR A RATIO LIKE 15:1.

Waiver/appeals from the IECC may not be granted or considered through PUD process. Please remove this from the cover sheet.

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475 Lincoln Street, Suite 100
Denver, CO 80203
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Harris Kocher Smith
1120 Lincoln Street, Suite 1000
Denver, Colorado 80203
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HarrisKocherSmith.com

ISSUE DATE: ##-##-202#	PROJECT #: 221236
DATE	REVISION COMMENTS

REVISION DATE: ISSUE DATE: 03-14-2025 SHEET 1 OF 24

COVER

REDTAIL RIDGE PUD1 SOUTH

PROJECT # 221236

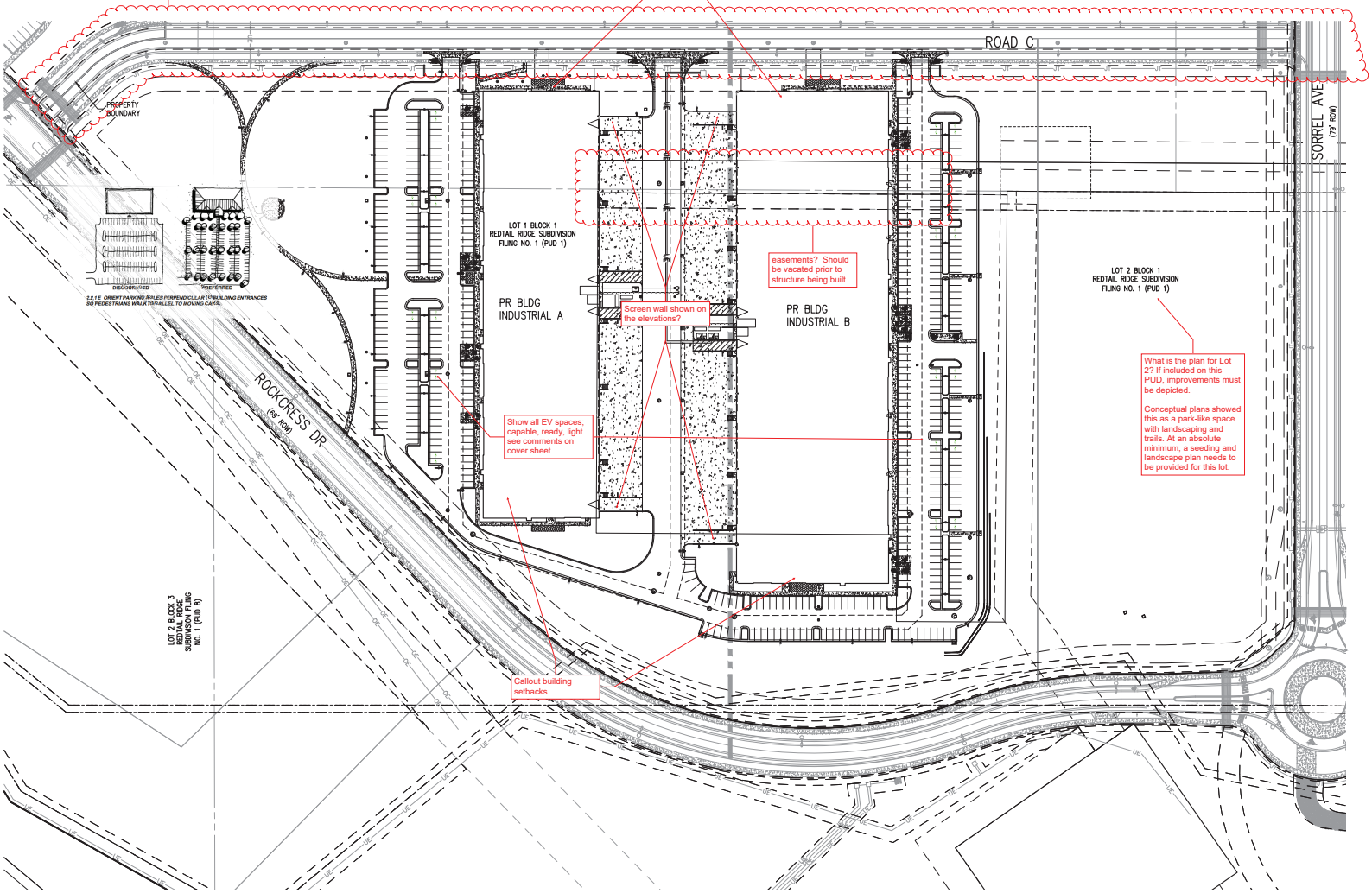
NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH

I:\Projects\2022\221236 Redtail Ridge Filing 1\Drawings\Sheets\PUD - COVER SHEET.dwg, Layout: COVER, 1/3/2025 3:15:57 PM, By: Owen Van Lennep, Xrefs: Plotted By: Owen Van Lennep

REDTAIL RIDGE FILING NO. 1

PLANNED UNIT DEVELOPMENT

LOT 1 BLOCK 1



LEGEND:

- PROPERTY BOUNDARY
- RIGHT-OF-WAY
- EXISTING STM SEWER W/MH AND INLET
- EXISTING SANITARY SEWER W/MH
- EXISTING WATER LINE W/ VALVE
- EXISTING GAS LINE
- EXISTING UNDERGROUND ELECTRIC
- EXISTING JOINT TRENCH
- EXISTING STREET LIGHT
- EXISTING TELEPHONE POLE
- EXISTING FIRE HYDRANT
- PROPOSED SANITARY SEWER W/MH
- PROPOSED SANITARY SERVICE W/CLEAN OUT
- PROPOSED STORM SEWER W/ MH AND INLET
- PROPOSED LANDSCAPE DRAIN W/ INLET
- PROPOSED FIRE HYDRANT
- PROPOSED 8" WATER MAIN W/ BENDS, VALVE, AND TEE
- PROPOSED WATER SERVICE W/METER
- PROPOSED FIRE SERVICE
- PROPOSED STREET LIGHT
- PROPOSED PEDESTRIAN LIGHT
- PROPOSED BUILDING ENTRANCE
- PROPOSED TRANSFORMER AND GENERATOR
- ABANDON EXISTING UTILITY LINE
- PROPOSED CONCRETE
- PROPOSED CONCRETE PAVERS
- PROPOSED PORCELAIN PAVERS
- PROPOSED CRUSHER FINES

ABBREVIATIONS

BLDG	BUILDING
C&G	CURB & GUTTER
CONC	CONCRETE
DS	DOWNSPOUT
DUE	DRY UTILITY EASEMENT
ELEC	ELECTRIC
ESMT	EASEMENT
EX	EXISTING
FF	FINISHED FLOOR
FH	FIRE HYDRANT
FL	FLOW LINE
GV	GATE VALVE
HT	HEIGHT
MH	MANHOLE
N	NORTH, NORTHING
PED	PEDESTRIAN
PL	PROPERTY LINE
PR	PROPOSED
ROW	RIGHT-OF-WAY
SME	SURFACE MAINTENANCE EASEMENT
SS	SANITARY SEWER
STM	STORM
TYP	TYPICAL
UG	UNDERGROUND
WAT	WATER

N

100 0 100 200

SCALE: 1" = 100'

PROJECT # 231256

OVERALL SITE PLAN

REVISION DATE: ISSUE DATE: 03-14-2025 SHEET 2 OF 24

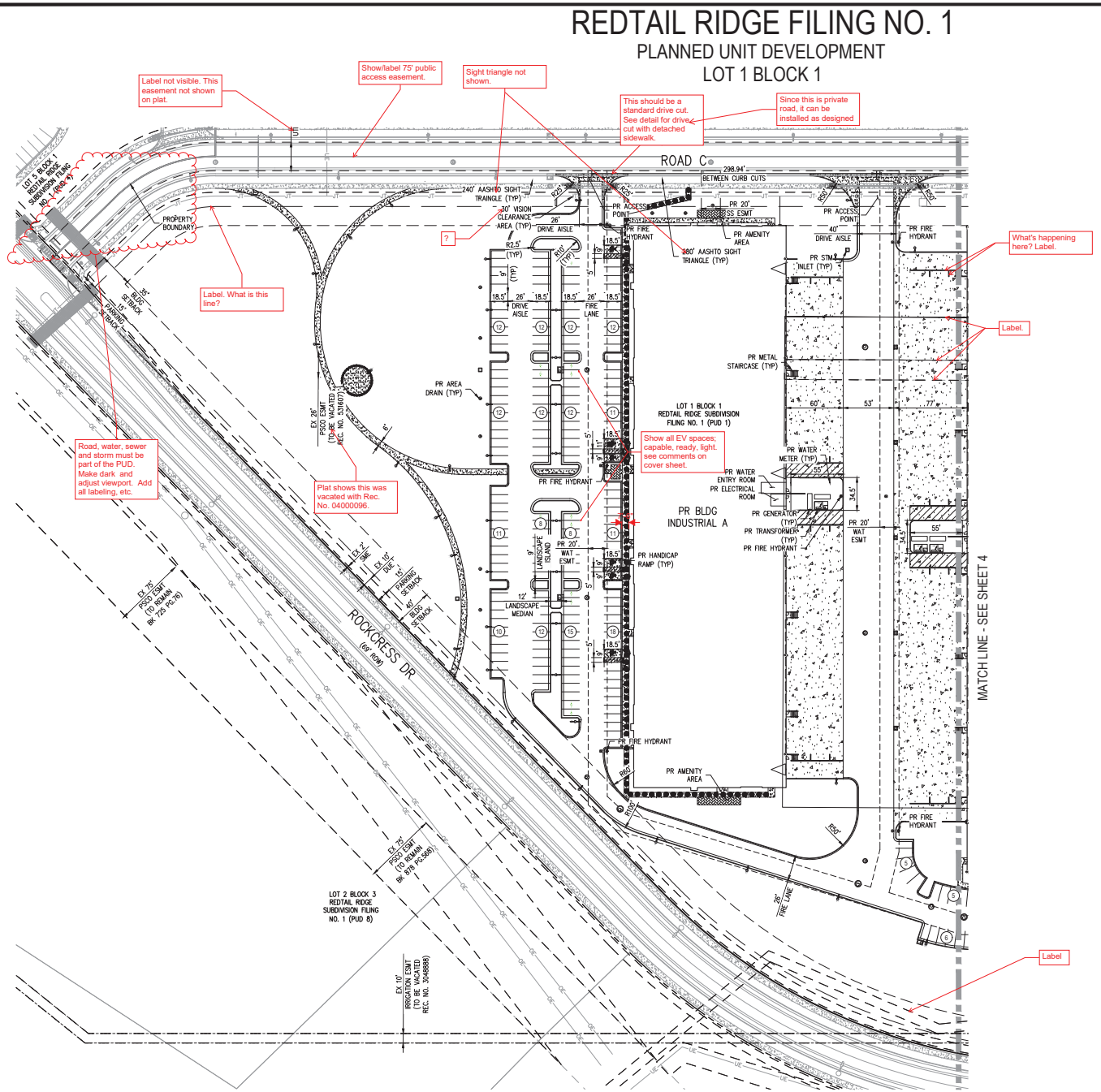
REDTAIL RIDGE PUD1 SOUTH

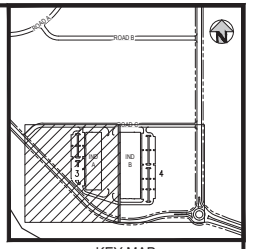
NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH

REDTAIL RIDGE FILING NO. 1

PLANNED UNIT DEVELOPMENT

LOT 1 BLOCK 1





KEY MAP

SCALE: 1" = 600'

LEGEND:

- PROPERTY BOUNDARY
- RIGHT-OF-WAY
- EXISTING STM SEWER W/MH AND INLET
- EXISTING SANITARY SEWER W/MH
- EXISTING WATER LINE W/ VALVE
- EXISTING GAS LINE
- EXISTING UNDERGROUND ELECTRIC
- EXISTING JOINT TRENCH
- EXISTING STREET LIGHT
- EXISTING TELEPHONE POLE
- EXISTING FIRE HYDRANT
- PROPOSED SANITARY SEWER W/MH
- PROPOSED SANITARY SERVICE W/CLEAN OUT
- PROPOSED STORM SEWER W/ MH AND INLET
- PROPOSED LANDSCAPE DRAIN W/ INLET
- PROPOSED FIRE HYDRANT
- PROPOSED 8" WATER MAIN W/ BENDS, VALVE, AND TEE
- PROPOSED WATER SERVICE W/METER
- PROPOSED FIRE SERVICE
- PROPOSED STREET LIGHT
- PROPOSED PEDESTRIAN LIGHT
- PROPOSED BUILDING ENTRANCE
- PROPOSED TRANSFORMER AND GENERATOR
- ABANDON EXISTING UTILITY LINE
- PROPOSED CONCRETE
- PROPOSED CONCRETE PAVERS
- PROPOSED PORCELAIN PAVERS
- PROPOSED CRUSHER FINES
- ACCESSIBLE ROUTE
- PARKING COUNT (12)

ABBREVIATIONS

BLDG	BUILDING
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DUE	DRY UTILITY EASEMENT
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SCALE: 1" = 50'

PROJECT # 231256

REVISION DATE:

ISSUE DATE: 03-14-2025

SHEET 3 OF 24

SITE PLAN

REDTAIL RIDGE PUD1 SOUTH

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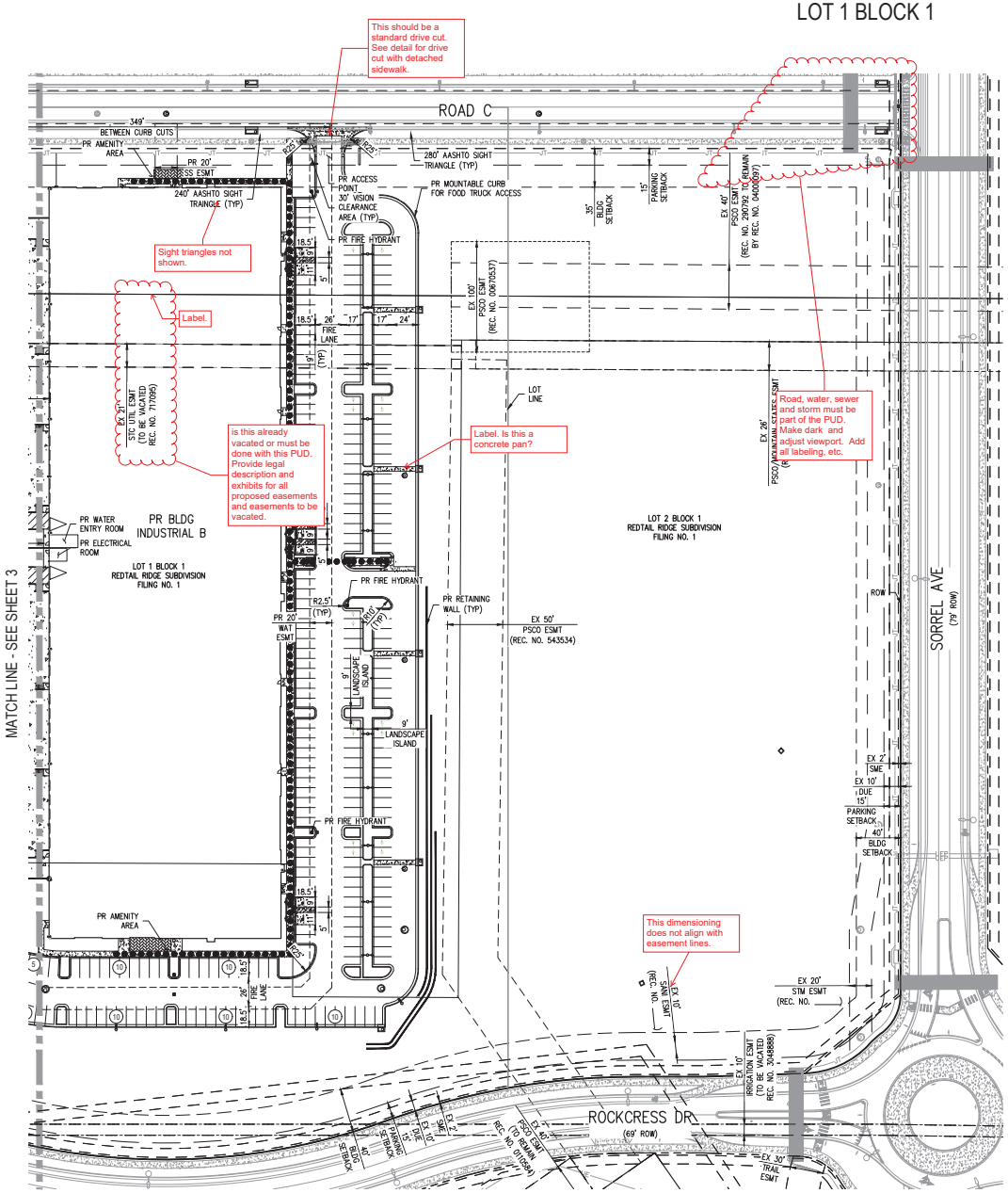
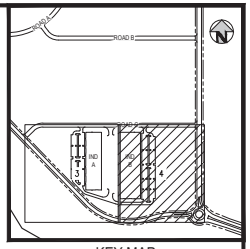
REDTAIL RIDGE FILING NO. 1

PLANNED UNIT DEVELOPMENT

LOT 1 BLOCK 1





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- EXISTING WATER LINE W/ VALVE
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REVISION DATE:

ISSUE DATE: 03-14-2025

SHEET 4 OF 24

SITE PLAN

REDTAIL RIDGE PUD1 SOUTH

PROJECT # 231295

NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH

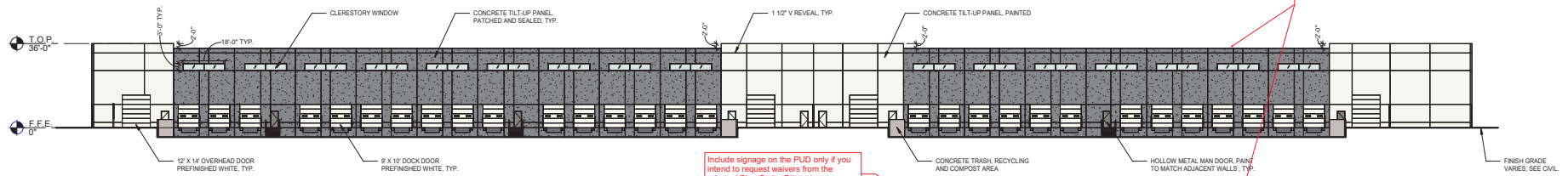
All elevations shall be in gray-scale. Include a separate attachment with color renderings.

Building height is measured from the average of the natural grade at the highest and lowest exterior corners of the structure. On the site plan or grading plan, provide the at-grade elevation at all four building corners (per the approved over-lot grading plan). Take the highest and lowest elevations and find the average. Show the average elevation as a line on building elevations and depict the building height from the line.

REDTAIL RIDGE FILING NO. 1

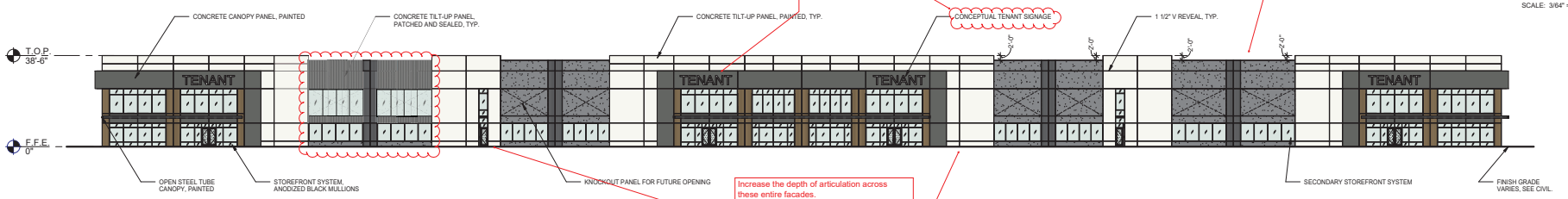
PLANNED UNIT DEVELOPMENT
LOT 1 BLOCK 1 & LOT 2 BLOCK 1
SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF
SECTION 29, TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
CASE #: PUPL-XXXX-2023

Show mechanical equipment or mechanical screens. All mechanical equipment shall be screened with an architecturally compatible screening material and is limited to 42 feet in height as measured from average grade.



INDUSTRIAL A - EAST EXTERIOR ELEVATION 1
SCALE: 3/64" = 1'-0"

Include signage on the PUD only if you intend to request waivers from the adopted Sign Code. Otherwise, remove all references to singnage.



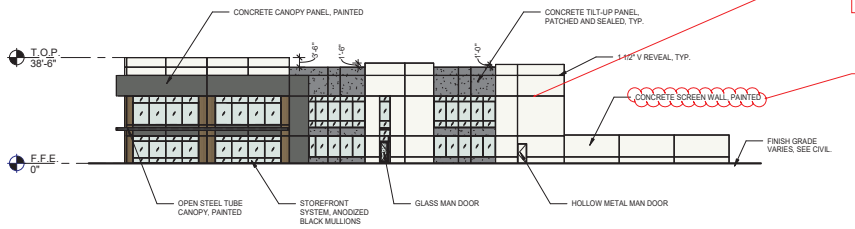
INDUSTRIAL A - WEST EXTERIOR ELEVATION 2
SCALE: 3/64" = 1'-0"

Increase the depth of articulation across these entire facades.

Add additional windows.

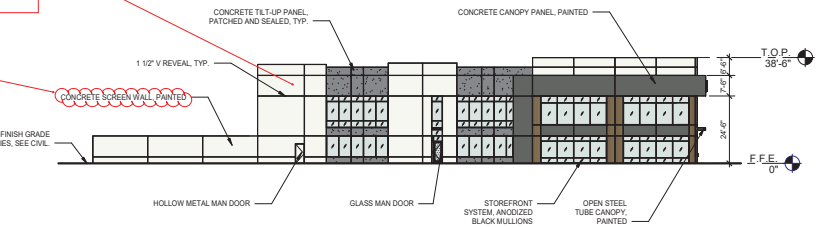
Add additional materials.

Roof variation is not sufficient.



INDUSTRIAL A - SOUTH EXTERIOR ELEVATION 4
SCALE: 3/64" = 1'-0"

Additional design consideration necessary.



INDUSTRIAL A - NORTH EXTERIOR ELEVATION 3
SCALE: 3/64" = 1'-0"

LEGEND

COLORS:

- BASE COLOR: PURE WHITE SW 7005
- SECONDARY COLOR: SEALED CONCRETE FINISH
- ACCENT COLOR: GRIZZLE GREY SW 7068
- CORRUGATED FORMLINER ACCENT COLOR: WOVEN WICKER SW 9104

GLASS:

GREY TINT

- VISION GLASS
- SPANDREL GLASS
- TEMPERED GLASS

ABBREVIATIONS:

T.O.P. - TOP OF PANEL
F.F.E. - FINISH FLOOR ELEVATION

PROJECT #: EEN22.0057.01

ARCHITECTURAL ELEVATIONS
REVISION DATE: - ISSUE DATE: 03/14/2025 SHEET 5 OF 24
REDTAIL RIDGE PUD1 SOUTH

All elevations shall be in gray-scale. Include a separate attachment with color renderings.

Building height is measured from the average of the natural grade at the highest and lowest exterior corners of the structure. On the site plan or grading plan, provide the at-grade elevation at all four building corners (per the approved over-lot grading plan). Take the highest and lowest elevations and find the average. Show the average elevation as a line on building elevations and depict the building height from the line.

REDTAIL RIDGE FILING NO. 1

PLANNED UNIT DEVELOPMENT
LOT 1 BLOCK 1 & LOT 2 BLOCK 1
SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF
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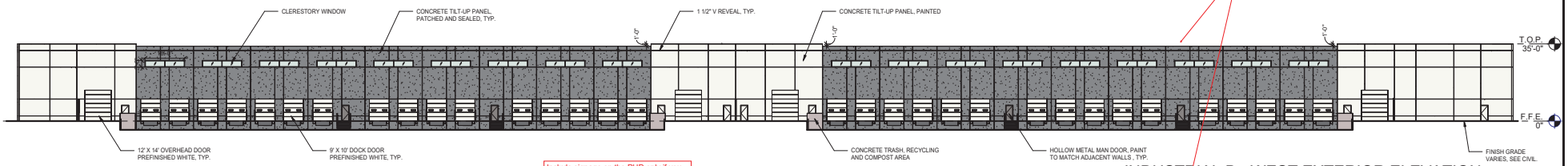
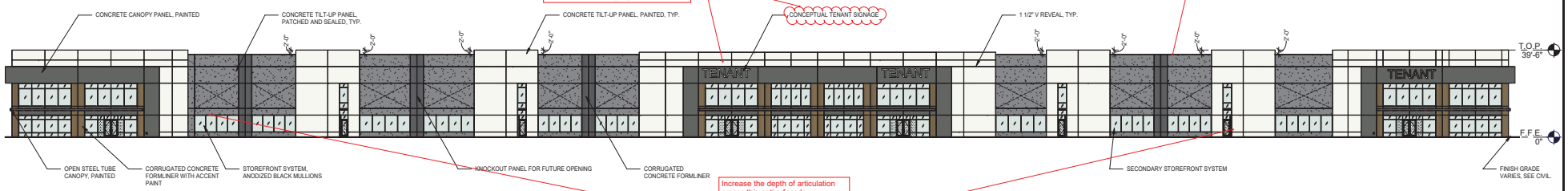
Show mechanical equipment. All mechanical equipment shall be screened with an architecturally compatible screening material and is limited to 42 feet in height as measured from average grade.



INDUSTRIAL B - WEST EXTERIOR ELEVATION (1)
SCALE: 3/64" = 1'-0"

Include signage on the PUD only if you intend to request waivers from the adopted Sign Code. Otherwise, remove all references to singnage.



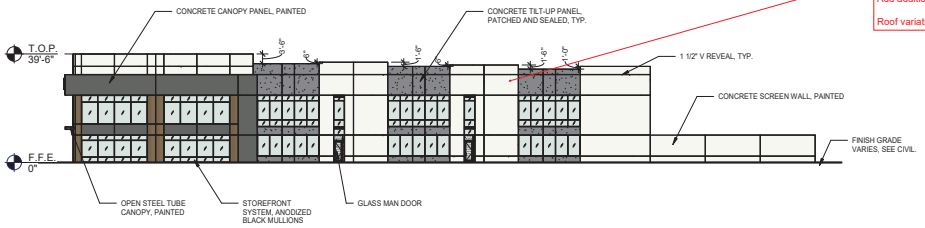
INDUSTRIAL B - EAST EXTERIOR ELEVATION (2)
SCALE: 3/64" = 1'-0"

Increase the depth of articulation across this entire facade.

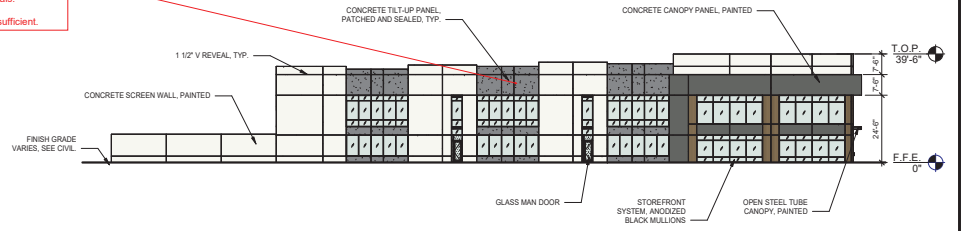
Add additional windows.

Add additional materials.

Roof variation is not sufficient.



INDUSTRIAL B - NORTH EXTERIOR ELEVATION (4)
SCALE: 3/64" = 1'-0"



INDUSTRIAL B - SOUTH EXTERIOR ELEVATION (3)
SCALE: 3/64" = 1'-0"

LEGEND

COLORS:

- BASE COLOR: PURE WHITE SW 7005
- SECONDARY COLOR: SEALED CONCRETE FINISH
- ACCENT COLOR: GRIZZLE GREY SW 7068
- CORRUGATED FORMLINER ACCENT COLOR: WOVEN WICKER SW 9104

GLASS:

GREY TINT

- VISION GLASS
- SPANDREL GLASS
- TEMPERED GLASS

ABBREVIATIONS:

T.O.P. - TOP OF PANEL

F.F.E. - FINISH FLOOR ELEVATION

PROJECT #: EENG2.0057.01

ARCHITECTURAL ELEVATIONS

REVISION DATE: - ISSUE DATE: 03/14/2025 SHEET 6 OF 24

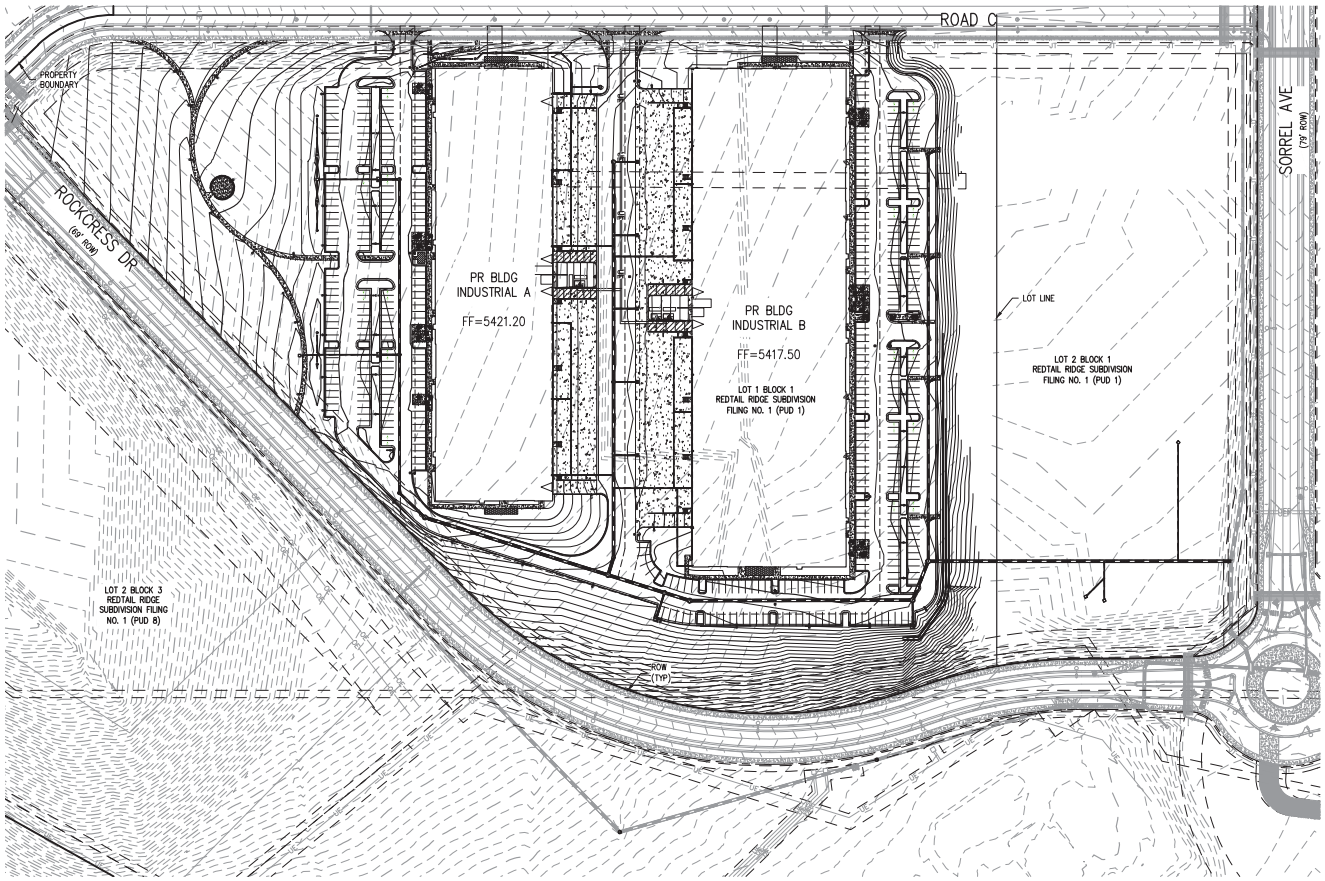
REDTAIL RIDGE PUD1 SOUTH

REDTAIL RIDGE FILING NO. 1

PLANNED UNIT DEVELOPMENT

LOT 1 BLOCK 1

Provide labels for existing and proposed contours, at least 5' increments.



LEGEND:

- PROPERTY BOUNDARY
- RIGHT-OF-WAY
- EXISTING STM SEWER W/MH AND INLET
- EXISTING SANITARY SEWER W/MH
- EXISTING WATER LINE W/ VALVE
- EXISTING GAS LINE
- EXISTING UNDERGROUND ELECTRIC
- EXISTING JOINT TRENCH
- EXISTING STREET LIGHT
- EXISTING TELEPHONE POLE
- EXISTING FIRE HYDRANT
- PROPOSED SANITARY SEWER W/MH
- PROPOSED SANITARY SERVICE W/CLEAN OUT
- PROPOSED STORM SEWER W/ MH AND INLET
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N

100 0 100 200

SCALE: 1" = 100'

OVERALL GRADING PLAN

REVISION DATE: ISSUE DATE: 03-14-2025 SHEET 7 OF 24

REDTAIL RIDGE PUD1 SOUTH

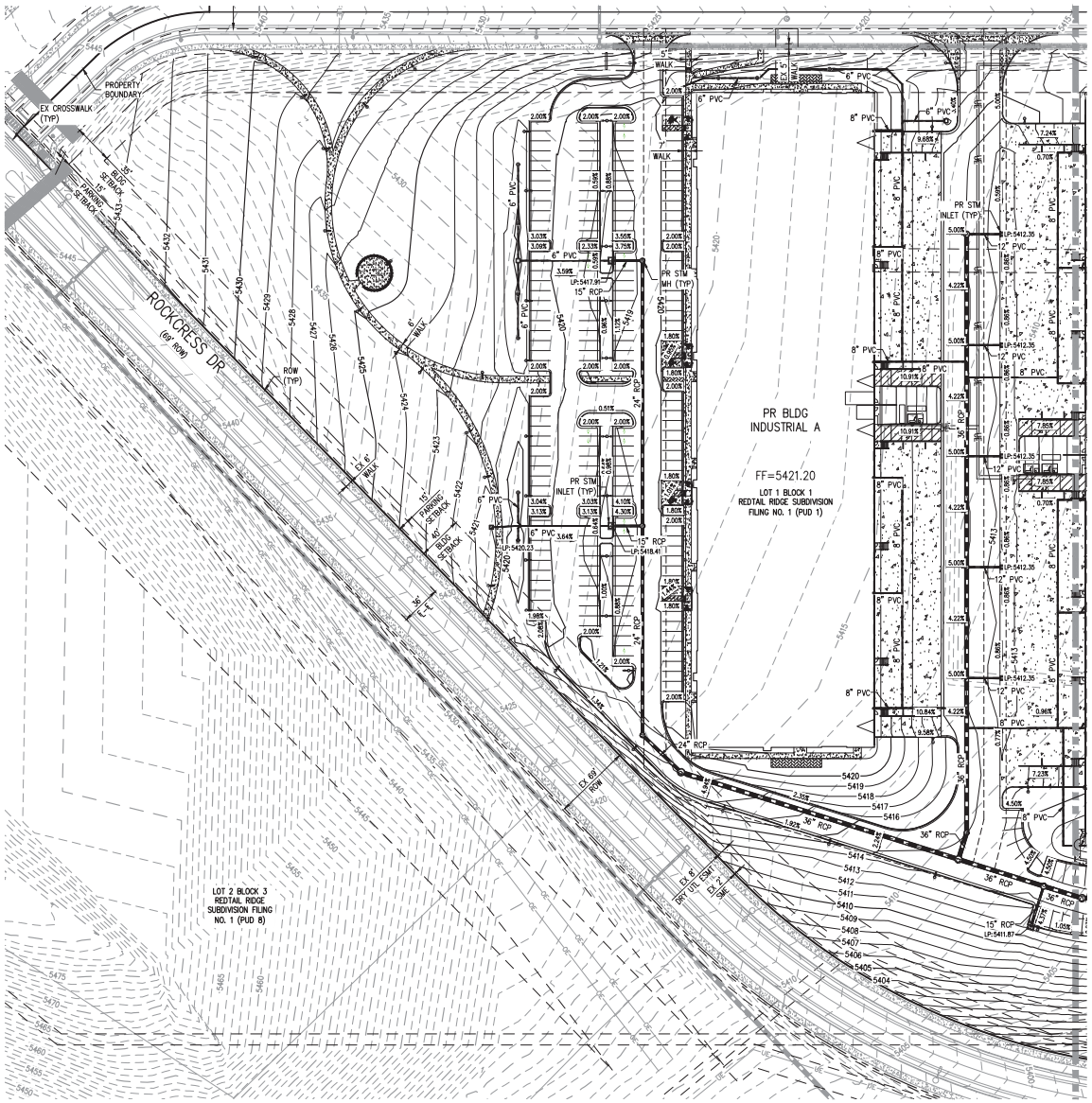
PROJECT # 221295

NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH

REDTAIL RIDGE FILING NO. 1

PLANNED UNIT DEVELOPMENT

LOT 1 BLOCK 1

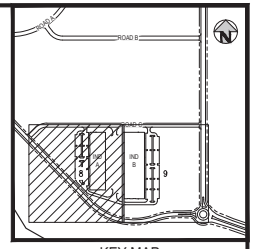


add notes

All accessible parking spaces shall be graded at 2% maximum n all directions.

The accessible routes to building shall have a maximum cross slope of 2% and maximum longitudinal slope of 5%

All proposed piping is privately owned and maintained unless otherwise noted.



KEY MAP

SCALE: 1" = 600'

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SCALE: 1" = 50'

PROJECT # 231256

REVISION DATE:

ISSUE DATE: 03-14-2025

GRADING PLAN

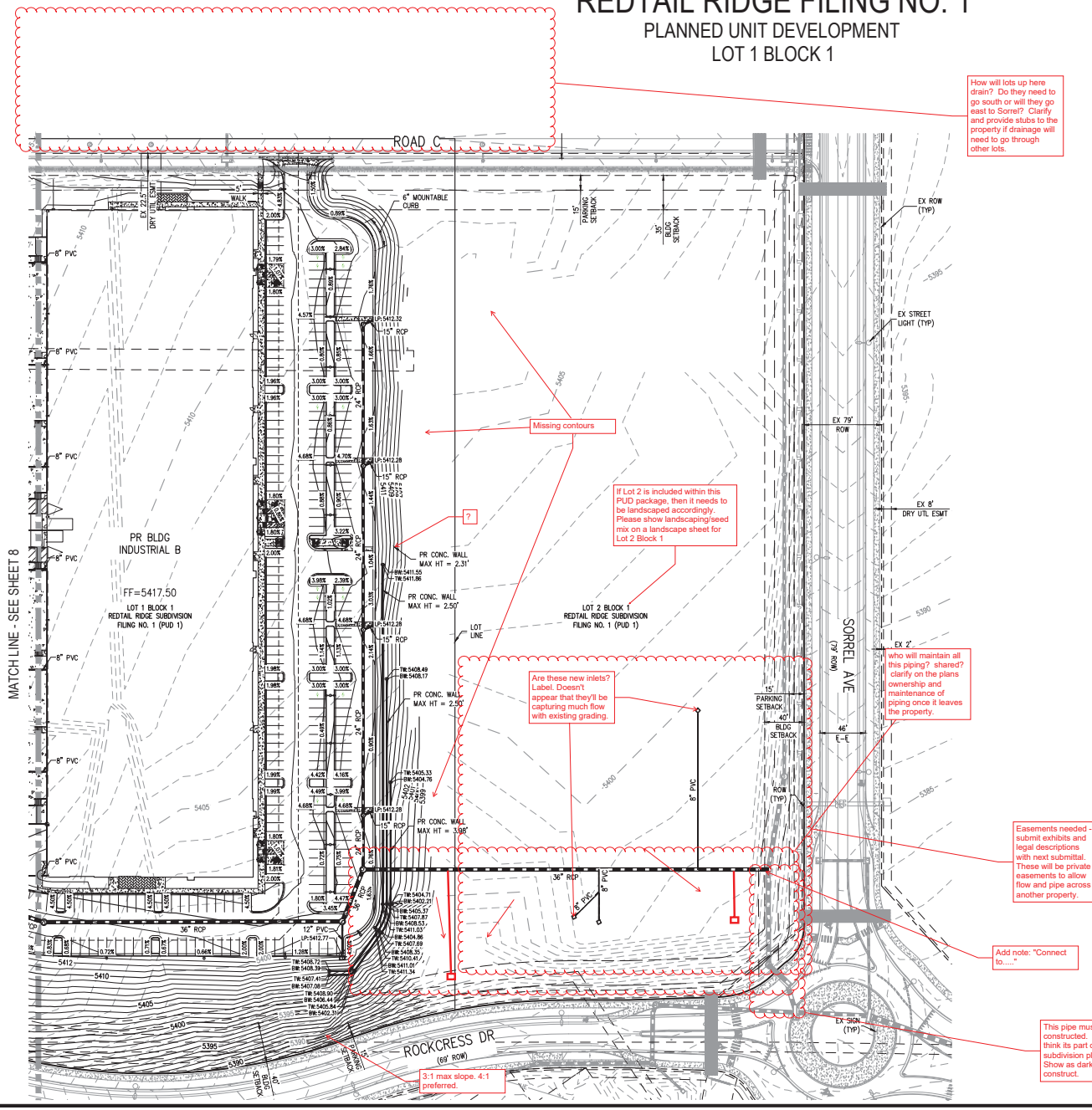
SHEET 8 OF 24

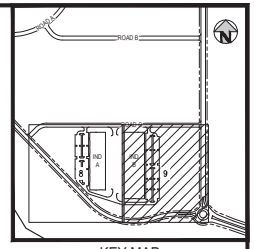
REDTAIL RIDGE PUD1 SOUTH

REDTAIL RIDGE FILING NO. 1

PLANNED UNIT DEVELOPMENT

LOT 1 BLOCK 1





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SCALE: 1" = 50'

PROJECT # 231295

REVISION DATE:

ISSUE DATE: 03-14-2025

SHEET 9 OF 24

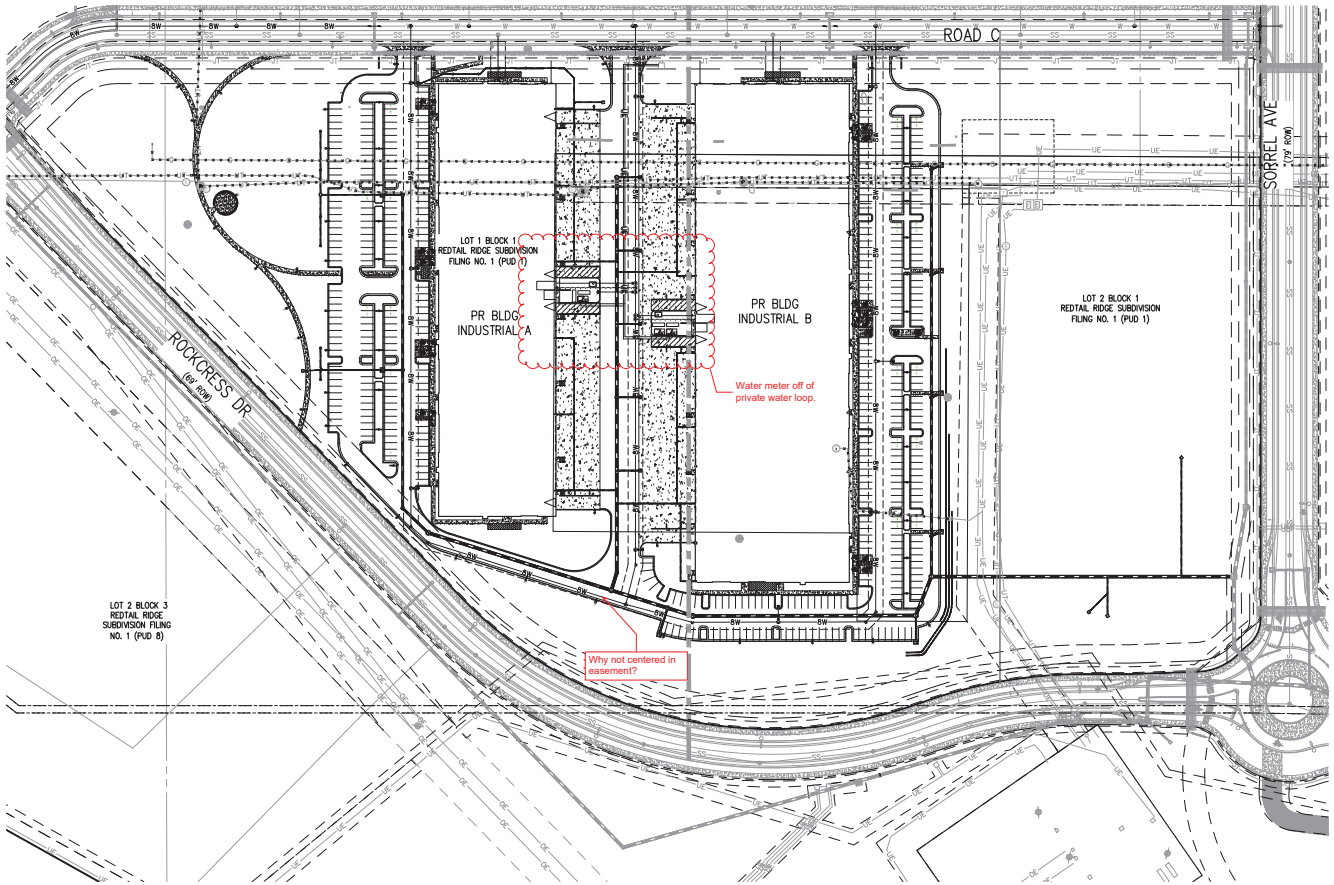
GRADING PLAN

REDTAIL RIDGE PUD1 SOUTH

REDTAIL RIDGE FILING NO. 1

PLANNED UNIT DEVELOPMENT

LOT 1 BLOCK 1



INDUSTRIAL A FIRE FLOW DATA:

THE TOTAL FIRE FLOW REQUIRED FOR THIS SITE IS 2,125 GPM MINIMUM @ 20 PSI RESIDUAL PRESSURE.
THIS FLOW MUST BE PROVIDED FROM A MINIMUM OF 2 FIRE HYDRANTS.
EACH FIRE HYDRANT MUST SUPPLY A MINIMUM OF 2,125 GPM @ 20 PSI RESIDUAL PRESSURE AT THE HYDRANT OUTLET TO BE ACCEPTABLE.
CODE USED FOR ANALYSIS: 2018 IFC AND 2018 AMENDMENTS.
CONSTRUCTION TYPE: III-A
FIRE FLOW CALCULATION AREA: 83,200 SF
THIS BUILDING IS FULLY SPRINKLERED

INDUSTRIAL B FIRE FLOW DATA:

THE TOTAL FIRE FLOW REQUIRED FOR THIS SITE IS 2,875 GPM MINIMUM @ 20 PSI RESIDUAL PRESSURE.
THIS FLOW MUST BE PROVIDED FROM A MINIMUM OF 3 FIRE HYDRANTS.
EACH FIRE HYDRANT MUST SUPPLY A MINIMUM OF 2,875 GPM @ 20 PSI RESIDUAL PRESSURE AT THE HYDRANT OUTLET TO BE ACCEPTABLE.
CODE USED FOR ANALYSIS: 2018 IFC AND 2018 AMENDMENTS.
CONSTRUCTION TYPE: III-A
FIRE FLOW CALCULATION AREA: 154,350 SF
THIS BUILDING IS FULLY SPRINKLERED

LEGEND:

- PROPERTY BOUNDARY
- RIGHT-OF-WAY
- EXISTING STM SEWER W/MH AND INLET
- EXISTING SANITARY SEWER W/MH
- EXISTING WATER LINE W/ VALVE
- EXISTING GAS LINE
- EXISTING UNDERGROUND ELECTRIC
- EXISTING JOINT TRENCH
- EXISTING STREET LIGHT
- EXISTING TELEPHONE POLE
- EXISTING FIRE HYDRANT
- PROPOSED SANITARY SEWER W/MH
- PROPOSED SANITARY SERVICE W/CLEAN OUT
- PROPOSED STORM SEWER W/ MH AND INLET
- PROPOSED LANDSCAPE DRAIN W/ INLET
- PROPOSED FIRE HYDRANT
- PROPOSED 8" WATER MAIN W/ BENDS, VALVE, AND TEE
- PROPOSED WATER SERVICE W/METER
- PROPOSED FIRE SERVICE
- PROPOSED STREET LIGHT
- PROPOSED PEDESTRIAN LIGHT
- PROPOSED BUILDING ENTRANCE
- PROPOSED TRANSFORMER AND GENERATOR
- ABANDON EXISTING UTILITY LINE
- PROPOSED CONCRETE
- PROPOSED CONCRETE PAVERS
- PROPOSED PORCELAIN PAVERS
- PROPOSED CRUSHER FINES

ABBREVIATIONS

BLDG	BUILDING
C&G	CURB & GUTTER
CONC	CONCRETE
DS	DOWNSPOUT
DUE	DRY UTILITY EASEMENT
ELEC	ELECTRIC
ESMT	EASEMENT
EX	EXISTING
FF	FINISHED FLOOR
FH	FIRE HYDRANT
FL	FLOW LINE
GV	GATE VALVE
HT	HEIGHT
MH	MANHOLE
N	NORTH, NORTHING
PED	PEDESTRIAN
PL	PROPERTY LINE
PR	PROPOSED
ROW	RIGHT-OF-WAY
SME	SURFACE MAINTENANCE EASEMENT
SS	SANITARY SEWER
STM	STORM
TYP	TYPICAL
UG	UNDERGROUND
WAT	WATER

N

100 0 100 200

SCALE: 1" = 100'

PROJECT # 221295

OVERALL UTILITY PLAN

REVISION DATE: ISSUE DATE: 03-14-2025 SHEET 10 OF 24

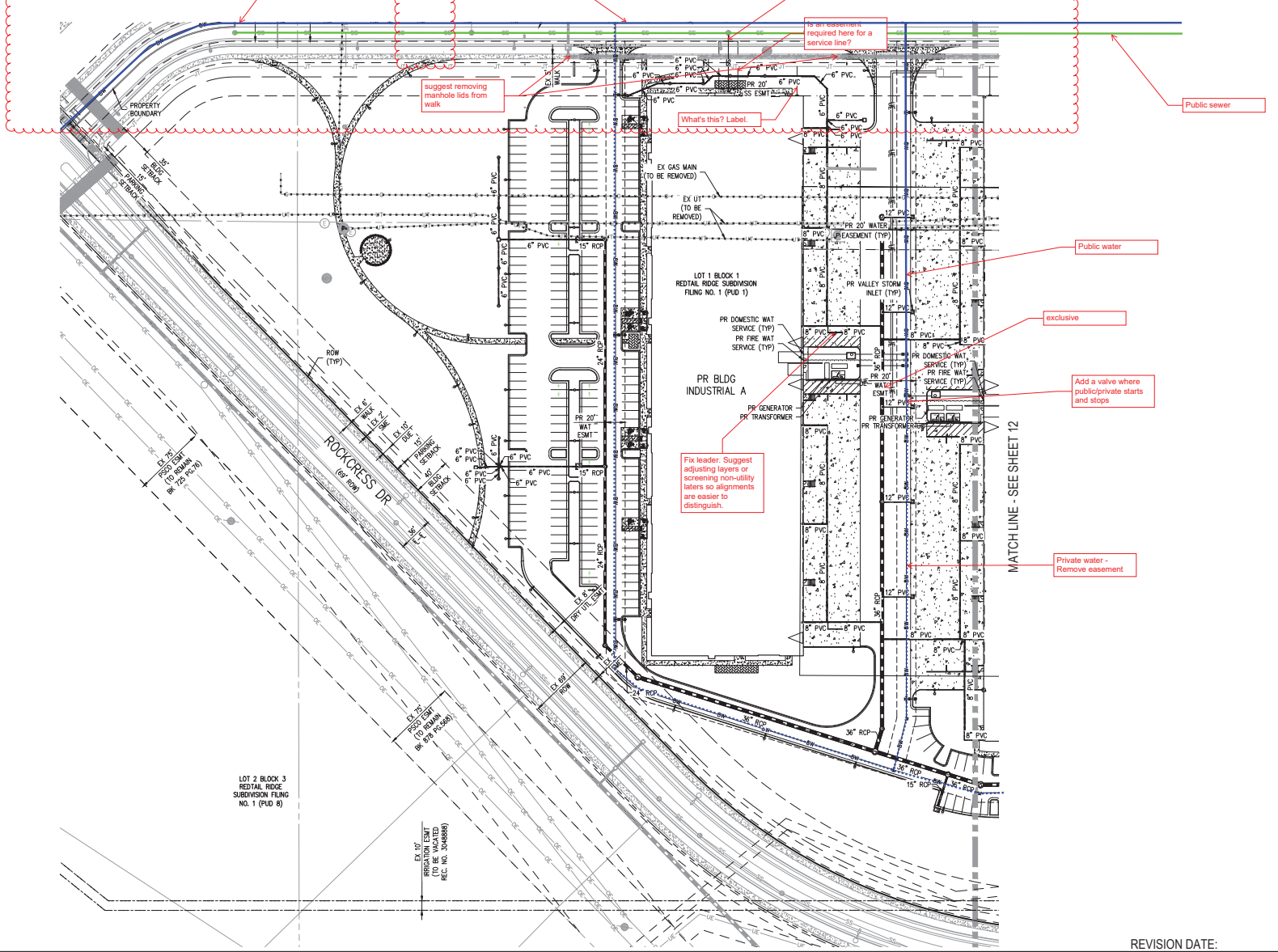
REDTAIL RIDGE PUD1 SOUTH

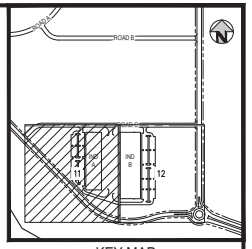
NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH

REDTAIL RIDGE FILING NO. 1

PLANNED UNIT DEVELOPMENT

LOT 1 BLOCK 1





KEY MAP

SCALE: 1" = 600'

LEGEND:

- PROPERTY BOUNDARY
- RIGHT-OF-WAY
- EXISTING STM SEWER W/MH AND INLET
- EXISTING SANITARY SEWER W/MH
- EXISTING WATER LINE W/ VALVE
- EXISTING GAS LINE
- EXISTING UNDERGROUND ELECTRIC
- EXISTING JOINT TRENCH
- EXISTING STREET LIGHT
- EXISTING TELEPHONE POLE
- EXISTING FIRE HYDRANT
- PROPOSED SANITARY SEWER W/MH
- PROPOSED SANITARY SERVICE W/CLEAN OUT
- PROPOSED STORM SEWER W/ MH AND INLET
- PROPOSED LANDSCAPE DRAIN W/ INLET
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ABBREVIATIONS

BLDG	BUILDING
C&G	CURB & GUTTER
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FL	FLOW LINE
GV	GATE VALVE
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N	NORTH, NORTHING
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PL	PROPERTY LINE
PR	PROPOSED
ROW	RIGHT-OF-WAY
SME	SURFACE MAINTENANCE EASEMENT
SS	SANITARY SEWER
STM	STORM
TYP	TYPICAL
UG	UNDERGROUND
WAT	WATER

PROJECT # 231295

UTILITY PLAN

REVISION DATE:

ISSUE DATE: 03-14-2025

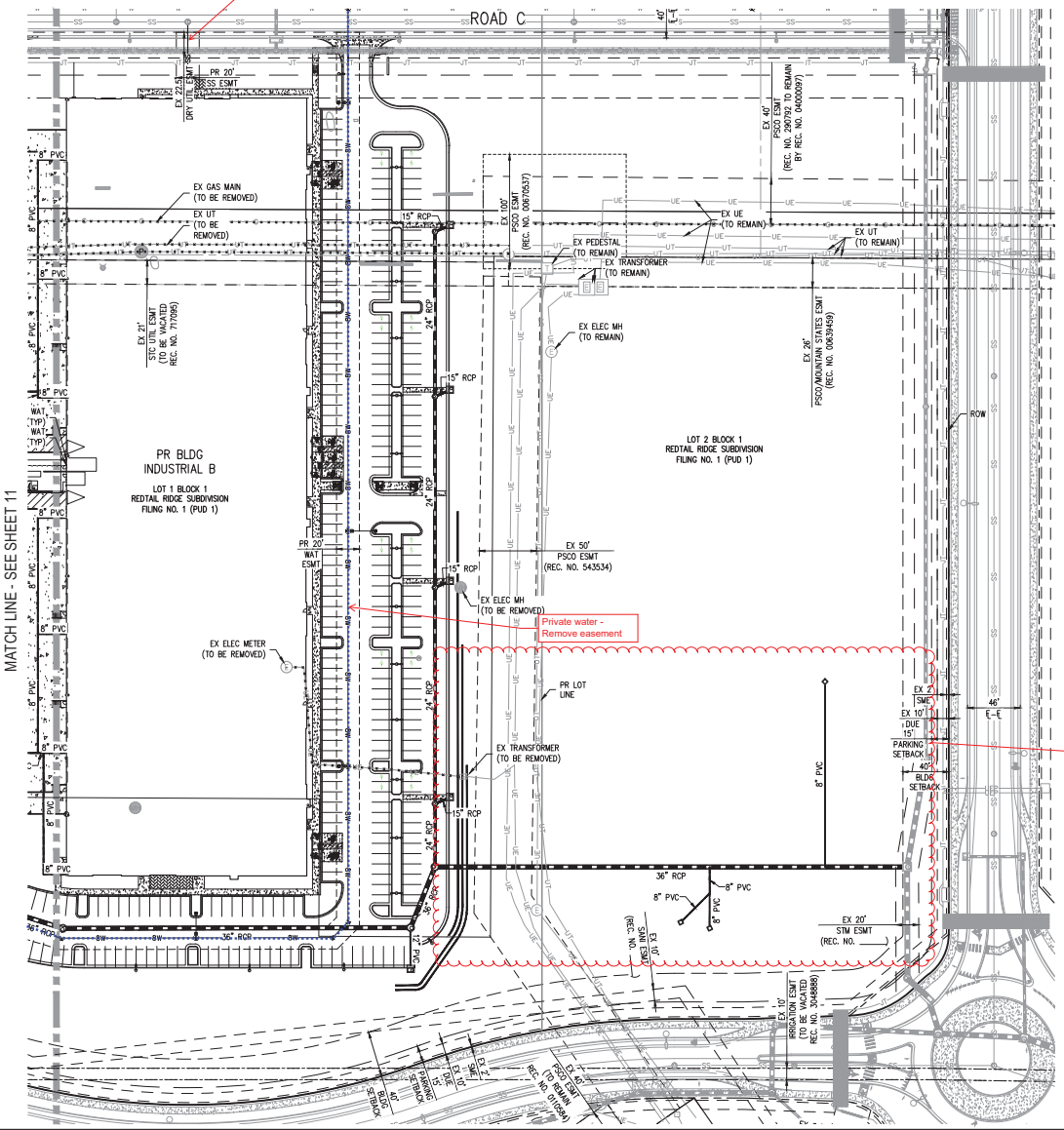
SHEET 11 OF 24

REDTAIL RIDGE PUD1 SOUTH

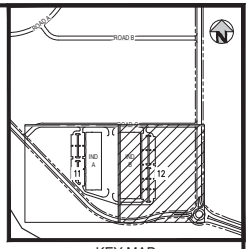
REDTAIL RIDGE FILING NO. 1

PLANNED UNIT DEVELOPMENT

LOT 1 BLOCK 1



easements required - identify maintenance and ownership responsibilities.



KEY MAP

SCALE: 1" = 600'

LEGEND:

- PROPERTY BOUNDARY
- RIGHT-OF-WAY
- EXISTING STM SEWER W/MH AND INLET
- EXISTING SANITARY SEWER W/MH
- EXISTING WATER LINE W/ VALVE
- EXISTING GAS LINE
- EXISTING UNDERGROUND ELECTRIC
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ROW	RIGHT-OF-WAY
SME	SURFACE MAINTENANCE EASEMENT
SS	SANITARY SEWER
STM	STORM
TYP	TYPICAL
UG	UNDERGROUND
WAT	WATER

SCALE: 1" = 50'

PROJECT # 221256

UTILITY PLAN

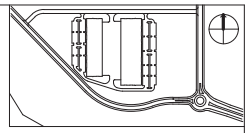
REVISION DATE: ISSUE DATE: 03-14-2025 SHEET 12 OF 24

REDTAIL RIDGE PUD1 SOUTH

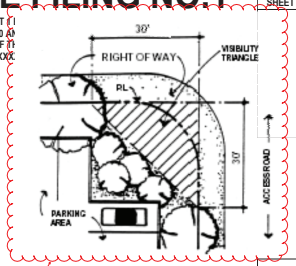
REDTAIL RIDGE FILING NO.1

PLANNED UNIT DEVELOPMENT, LOT 1
SITUATED IN THE SOUTH HALF OF SECTION 20 A
TOWNSHIP 1 SOUTH, RANGE 69 WEST OF T
CASE #: PUPL-XXX

Sheet Index	
SHEET NUMBER	SHEET NAME
PE	
	OVERALL LANDSCAPE PLAN
	MATERIAL AND PLANTING PLAN - A
	MATERIAL AND PLANTING PLAN - B
	MATERIAL AND PLANTING PLAN - C
	MATERIAL AND PLANTING PLAN - D
	MATERIAL AND PLANTING PLAN - E
	MATERIAL AND PLANTING PLAN - F, G & H
	SITE FURNISHING DETAILS
	PLANTING DETAILS
	PLANTING SCHEDULE

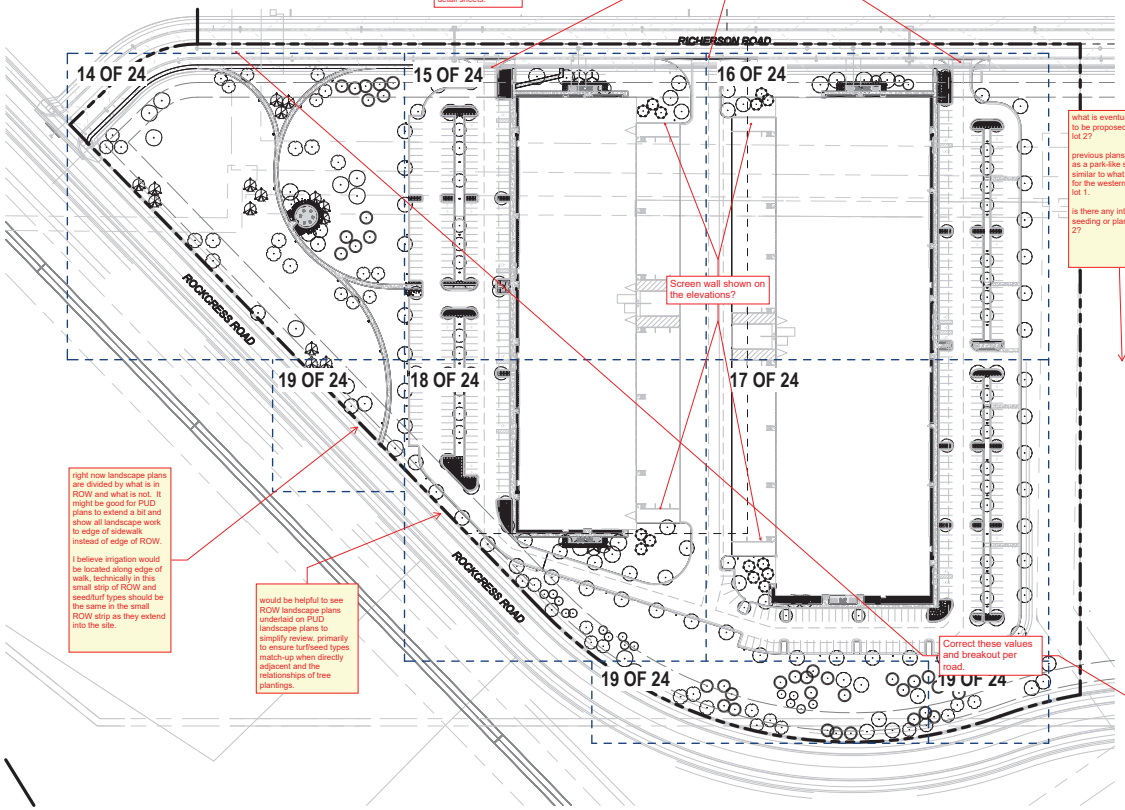


KEY MAP
1" = 600'



On the subsequent detail sheets, show 30-foot sight triangles at all entrances, on both sides. Ensure no plantings in the proposed site triangles exceed 30-inhes in height. Deciduous trees are ok.

New transformers? I don't see any on the detail sheets.



what is eventually going to be proposed here for lot 2?

previous plans showed it as a park-like space similar to what is shown for the western portion of lot 1.

is there any interim seeding or planting for lot 2?

Screen wall shown on the elevations?

right now landscape plans are divided by what is in ROW and what is not. It might be good for PUD plans to extend a bit and show all landscape work to edge of sidewalk instead of edge of ROW.

I believe irrigation would be located along edge of walk, technically in this small strip of ROW and seed/turf types should be the same in the small ROW strip as they extend into the site.

would be helpful to see ROW landscape plans undertaid on PUD landscape plans to simplify review, primarily to ensure turf/seed types match-up when directly adjacent and the relationships of tree plantings.

Correct these values and breakout per road.

ABBREVIATIONS LEGEND

ABBREVIATIONS WHEN USED IN COMPOSITION MAY INCLUDE PERIODS FOR CLARIFICATION

AFF	ABOVE FINISHED FLOOR	HP	HIGH POINT
ADJ	ADJACENT	HORIZ	HORIZONTAL
ADA	AMERICANS WITH DISABILITIES ACT	HB	HOSE BIBB
APPROX	APPROXIMATE	INCL	INCLUDE(D), INCLUDING
ARCH	ARCHITECTURAL	ID	INSIDE DIAMETER
AD	AREA DRAIN	INT	INTERIOR
BJ	BOTTOM OF	LTG	LIGHTING
CB	CATCH BASIN	LF	LINEAR FOOT, (LINEAR FEET)
CL	CENTERLINE	LP	LOW POINT
C/C	CENTER TO CENTER	MAINT	MAINTENANCE*
CO	CLEANOUT	MH	MANHOLE
COL	COLUMN	MFR	MANUFACTURER
COMM	COMMUNICATION*	MATL	MATERIAL
CONC	CONCRETE	MAX	MAXIMUM
CMU	CONCRETE MASONRY UNIT	MECH	MECHANICAL
CONT	CONTINUOUS	MTL	METAL
CJ	CONTROL JOINT	MIN	MINIMUM
CU	CUBIC	MISC	MISCELLANEOUS
DEG	DEGREE	NOM	NOMINAL
DEMO	DEMOLISH, DEMOLITION	NIC	NOT IN CONTRACT
DEPT	DEPARTMENT DEPT*	NTS	NOT TO SCALE
DIAG	DIAGONAL	OC	ON CENTER
DIA	DIAMETER	OPP	OPPOSITE
DIM	DIMENSION	OD	OUTSIDE DIAMETER
DS	DOWNSPOUT	PERP	PERPENDICULAR
DF	DRINKING FOUNTAIN	PSI	POUNDS PER SQUARE INCH
EA	EACH	PRELIM	PRELIMINARY
ELEC	ELECTRIC(AL)	PROP	PROPERTY
ELE/ELEV	ELEVATION	R	RADIUS
ENCL	ENCLOSURE	REF	REFERENCE
EQ	EQUAL	REIN	REINFORCE, REINFORCING
EQUIP	EQUIPMENT	REQ	REQUIRED
EXIST	EXISTING	REV	REVISION/REVISED
EJ	EXPANSION JOINT	ROW	RIGHT OF WAY
EXP	EXPOSED	RM	ROOM
EXT	EXTERIOR	SIM	SIMILAR
F/	FACE OF	SF	SQUARE FOOT (SQUARE FEET)
FT	FEET, FOOT	SST	STAINLESS STEEL
FIN	FINISH(ED)	STRUCT	STRUCTURE, STRUCTURAL
FDC	FIRE DEPARTMENT CONNECTION	SYS	SYSTEM
FH	FIRE HYDRANT	TEL	TELEPHONE
FTG	FOOTING	TEMP	TEMPORARY
FDTN	FOUNDATION	T/	TOP OF
FURN	FURNISH, FURNITURE	TOPO	TOPOGRAPHY, TOPOGRAPHIC
GA	GAUGE	TYP	TYPICAL
GALV	GALVANIZED	UNO	UNLESS NOTED OTHERWISE
GEN	GENERAL	VIF	VERIFY IN FIELD
GL	GLASS	VERT	VERTICAL
HVAC	HEATING, VENTILATION, AIR CONDITIONING	W/	WITH
		W/O	WITHOUT
		WP	WORKING POINT

GENERAL NOTES

1. NOTES APPEAR ON VARIOUS DRAWINGS FOR DIFFERENT SYSTEMS AND MATERIALS. REVIEW ALL SHEETS AND APPLY NOTES TO RELATED BUILDING COMPONENTS.
2. REFER TO COMPLETE SET OF ISSUED CONTRACT DOCUMENTS FOR OTHER APPLICABLE NOTES, ABBREVIATIONS, AND SYMBOLS.
3. WHERE MATERIALS ARE APPLIED TO, OR ARE IN DIRECT CONTACT WITH WORK INSTALLED BY ANOTHER SUBCONTRACTOR, COMMENCEMENT OF WORK IMPLIES ACCEPTANCE OF THE SUBSTRATE AS SUITABLE FOR THE APPLICATION INTENDED.
4. ISOLATE DISSIMILAR METALS TO PREVENT GALVANIC CORROSION.
5. DO NOT SCALE THE DRAWINGS.
6. FIELD MEASURE AND CONFIRM DIMENSIONS FOR OWNER PROVIDED EQUIPMENT AND FURNISHINGS.
7. EXCAVATION OF 4 FEET AND TESTING POF COMPACTED SOILS AT PEDESTRIAN PAVEMENTS
8. BEFORE SPREADING PLANTING SOIL OVER THE SITE, PERFORM SOIL COMPACTION TESTING BY CHECKING SOIL COMPACTION USING A TENSIOMETER (PENTOMETER) ON A 50 FOOT BY 50 FOOT GRID ON ALL GRADED SUBSOIL AREAS TO BE PLANTED GREATER THAN ONE ACRE OR A 30 FOOT BY 30 FOOT GRID FOR AREAS LESS THAN ONE ACRE. IF MORE THAN 10 PERCENT OF THE READINGS IN A GIVEN PLANTING AREA ARE GREATER THAN 300 PSI, THEN THE SITE SHALL UNDERGO SITE SUBGRADE MITIGATION MEASURES DESCRIBED BELOW. IMMEDIATELY PRIOR TO PLACING PLANTING SOIL, THE ENTIRE SUBGRADE SHALL BE LOOSENED TO A MINIMUM DEPTH OF 6-INCHES USING THE TEETH OF A BACKHOE OR OTHER SUITABLE EQUIPMENT, THEN RE-COMPACTED WITH THE TRACKS OF SMALL CONSTRUCTION EQUIPMENT, THE BUCKET OF A BACKHOE, OR OTHER APPROVED EQUIPMENT. VIBRATORY COMPACTION OF SUBGRADE IN PLANTED AREAS IS PROHIBITED. AFTER THE SUBGRADE SOILS HAVE BEEN LOOSENED, RE-COMPRESSED AND INSPECTED, PLANTING SOIL MAY BE SPREAD BY USING A WIDE TRACK BULLDOZER SIZE D-5 OR SMALLER OR MAY BE DUMPED AND SPREAD WITH THE BUCKET OF A BACKHOE FROM THE EDGE OF THE LOOSENED AREA. NO RUBBER-TIRED EQUIPMENT OR HEAVY EQUIPMENT EXCEPT FOR A SMALL BULLDOZER SHALL PASS OVER THE SUBSOILS (SUBGRADE) AFTER THEY HAVE BEEN LOOSENED AND RECOMPRESSED

LANDSCAPE REQUIREMENTS

TOTAL LOT SIZE	945,775.48
TOTAL AREA COVERED BY BUILDING,OR VEHICULAR PAVEMENT AREA	555,801.49
TOTAL LANDSCAPE AREA (38%)	360,907.16
TOTAL PEDESTRIAN HARDSCAPE AREA	29,066.35

	REQUIRED	PROPOSED
TOTAL NUMBER OF PERIMETER TREES	77	77
TOTAL NUMBER OF PERIMETER SHRUBS	0	0
TOTAL NUMBER OF PARKING LOT TREES	57	111
TOTAL NUMBER OF PARKING LOT SHRUBS	264	736

1 OVERALLLANDSCAPE PLAN
1" = 80'-0"

0' 50' 100' 200' 400'

REVISION DATE:

ISSUE DATE: 03/14/2025

SHEET 13 OF 24

OVERALL LANDSCAPE PLAN

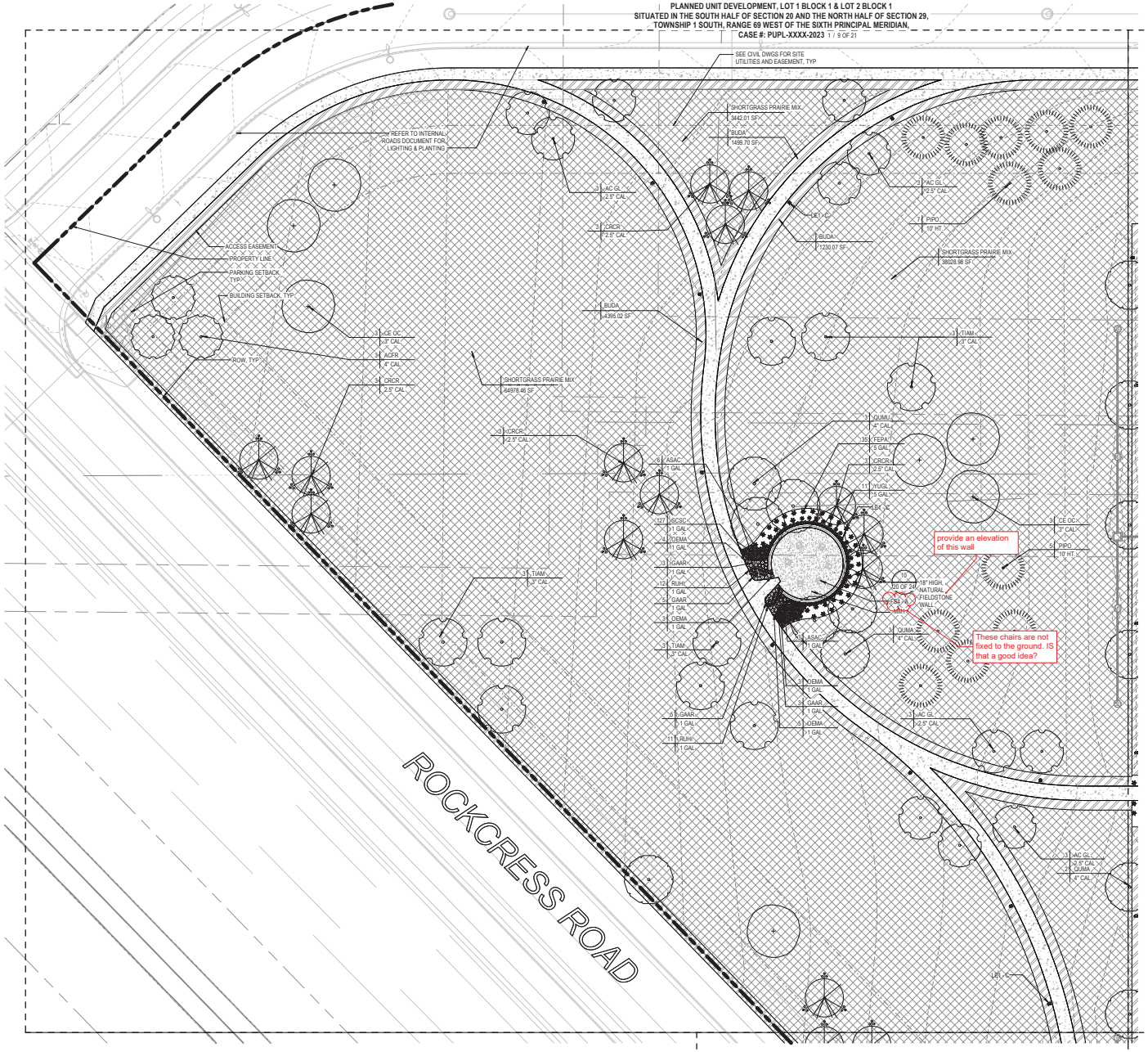
PROJECT # 27126

3/14/2025 3:00:44 PM Autodesk Docs://Redtail Ridge Overall Vision/RTR_PUD1.rvt

REDTAIL RIDGE PUD1 SOUTH

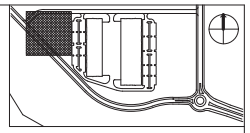
REDTAIL RIDGE FILING NO.1

PLANNED UNIT DEVELOPMENT, LOT 1 BLOCK 1 & LOT 2 BLOCK 1
SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29,
TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
CASE #: PUPL-XXXX-2023 1 / 9 OF 21



MATERIAL LEGEND		
LEGEND	TAG	MATERIAL
	DP2	CONCRETE PAVERS
	MM1	DECOMPOSED GRANITE
	PV1	PEDESTRIAN RATED CIP CONCRETE

SITE FURNITURE & LIGHTING LEGEND		
LEGEND	TAG	TYPE
	FA3	LITTER RECEPTACLE
	FS1 - A	BENCH
	FS2 - B	PICNIC TABLE SET 2
	FS3	DINING TABLE
	FS4 - A	LOUNGE CHAIR
	FS4 - B	DINING CHAIR
	LE1 - A	SINGLE SIDED VEHICULAR POLE LIGHT
	LE1 - B	DOUBLE SIDED VEHICULAR POLE LIGHT
	LE1 - C	PEDESTRIAN POLE LIGHT



KEY MAP
1" = 600'

0' 10' 20' 40' 80'

REVISION DATE:

ISSUE DATE: 03/14/2025

SHEET 14 OF 24

MATERIAL AND PLANTING PLAN - A

PROJECT # 272126

3/14/2025 3:00:38 PM Autodesk Docs://Redtail Ridge Overall_Vision/RTR_PUD1.rvt

REDTAIL RIDGE PUD1 SOUTH

REDTAIL RIDGE FILING NO.1

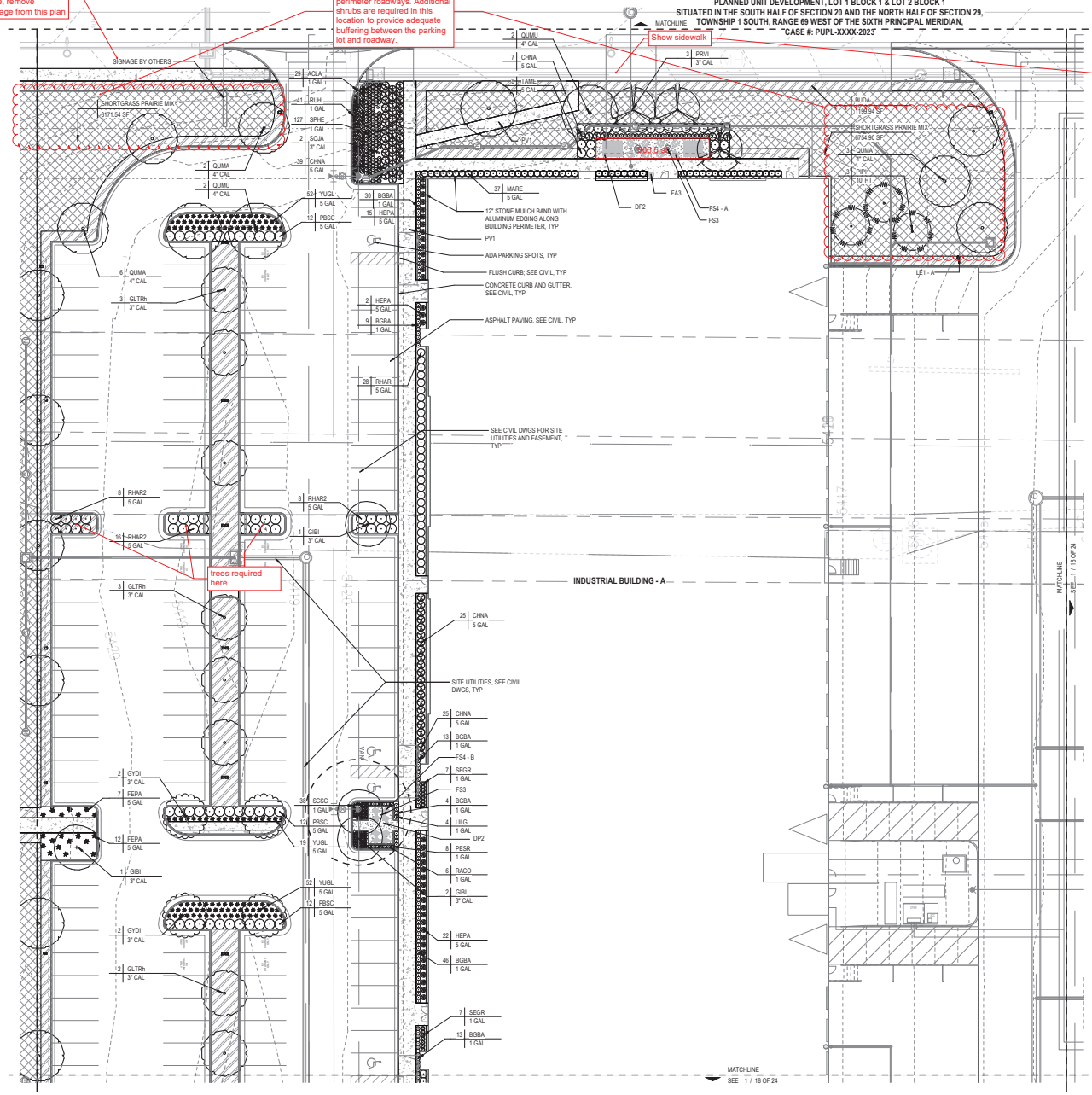
PLANNED UNIT DEVELOPMENT, LOT 1 BLOCK 1 & LOT 2 BLOCK 1
SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29,
TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
"CASE #: PUPL-XXXX-2023"

unless requesting waivers from the sign code, remove signage from this plan

All parking lots shall be visually buffered from perimeter roadways. Additional shrubs are required in this location to provide adequate buffering between the parking lot and roadway.

Show sidewalk

trees required here



MATERIAL LEGEND		
LEGEND	TAG	MATERIAL
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	MM1	DECOMPOSED GRANITE
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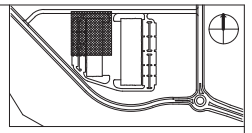
SITE FURNITURE & LIGHTING LEGEND		
LEGEND	TAG	TYPE
	FA3	LITTER RECEPTACLE
	FS1 - A	BENCH
	FS2 - B	PICNIC TABLE SET 2
	FS3	DINING TABLE
	FS4 - A	LOUNGE CHAIR
	FS4 - B	DINING CHAIR
	LE1 - A	SINGLE SIDED VEHICULAR POLE LIGHT
	LE1 - B	DOUBLE SIDED VEHICULAR POLE LIGHT
	LE1 - C	PEDESTRIAN POLE LIGHT



KEY MAP
1" = 600'

0' 10' 20' 40' 80'

REVISION DATE:

ISSUE DATE: 03/14/2025

SHEET 15 OF 24

MATERIAL AND PLANTING PLAN - B

PROJECT # 221236

3/14/2025 3:01:13 PM Autodesk Docs://Redtail Ridge Overall ViewRTR_PUD1.rvt

REDTAIL RIDGE PUD1 SOUTH

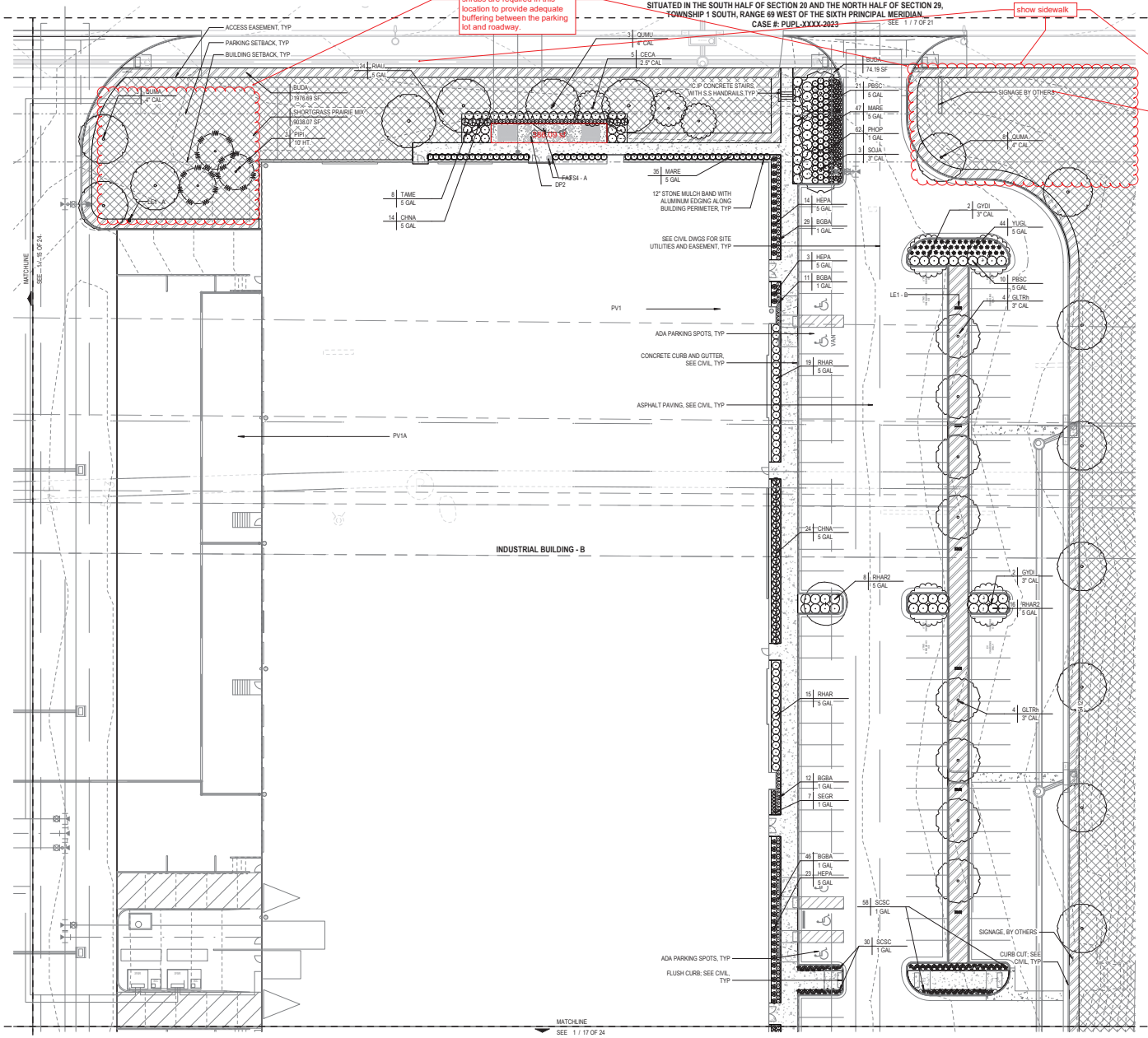
REDTAIL RIDGE FILING NO.1

PLANNED UNIT DEVELOPMENT, LOT 1 BLOCK 1 & LOT 2 BLOCK 1
SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29,
TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MEDIAN
CASE #: PUPL-XXXX-2023

All parking lots shall be visually buffered from perimeter roadways. Additional shrubs are required in this location to provide adequate buffering between the parking lot and roadway.

show sidewalk

unless requesting waivers from the sign code, remove signage from this plan



MATERIAL LEGEND		
LEGEND	TAG	MATERIAL
	DP2	CONCRETE PAVERS
	MM1	DECOMPOSED GRANITE
	PV1	PEDESTRIAN RATED CIP CONCRETE

SITE FURNITURE & LIGHTING LEGEND		
LEGEND	TAG	TYPE
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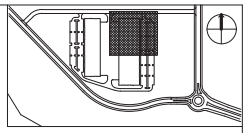
	FS1 - A	BENCH
	FS2 - B	PICNIC TABLE SET 2
	FS3	DINING TABLE
	FS4 - A	LOUNGE CHAIR
	FS4 - B	DINING CHAIR
	LE1 - A	SINGLE SIDED VEHICULAR POLE LIGHT
	LE1 - B	DOUBLE SIDED VEHICULAR POLE LIGHT
	LE1 - C	PEDESTRIAN POLE LIGHT



KEY MAP
1" = 600'

0' 10' 20' 40' 80'

MATERIAL AND PLANTING PLAN - C

REVISION DATE:

ISSUE DATE: 03/14/2025

SHEET 16 OF 24

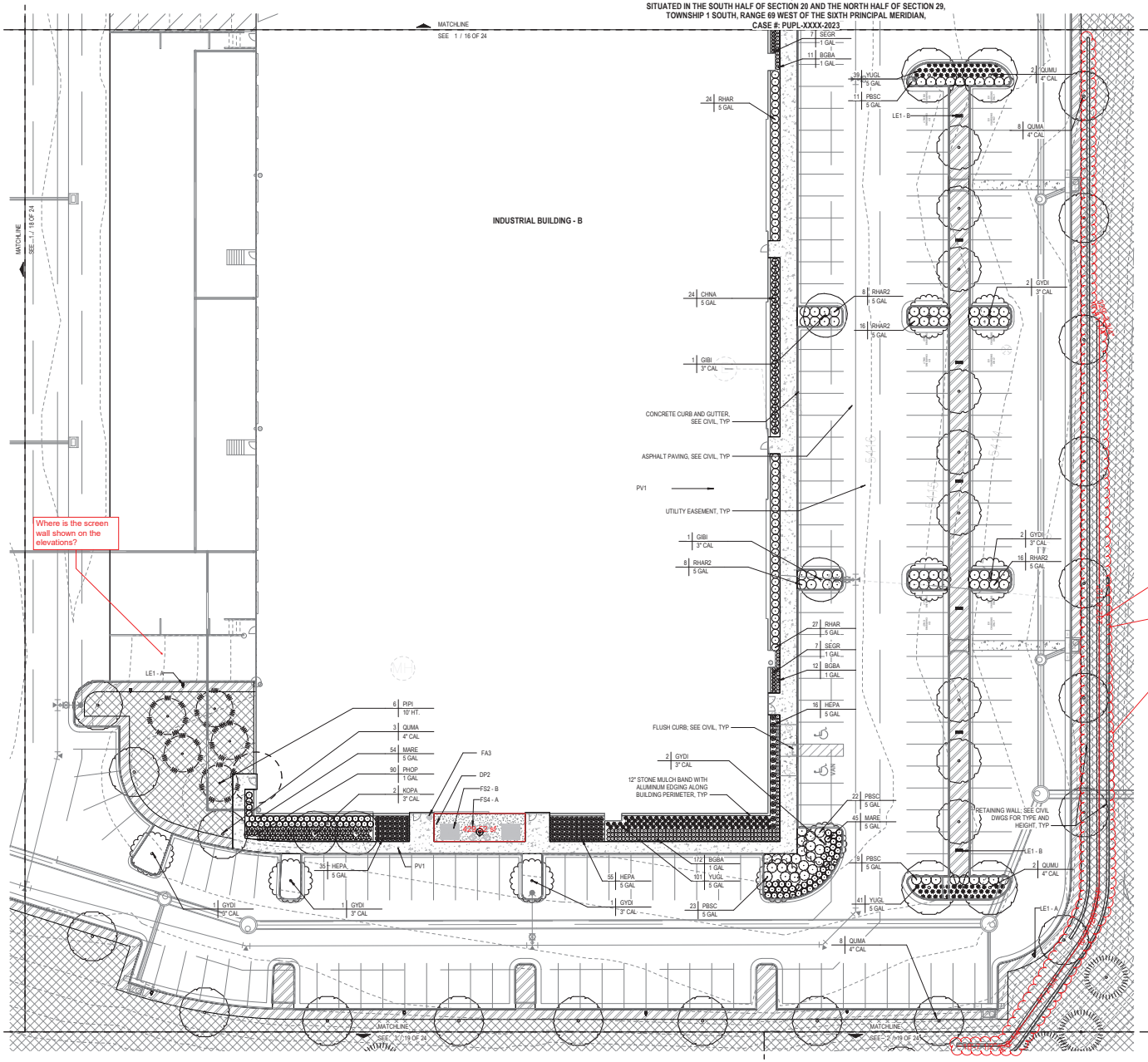
PROJECT # 221235

REDTAIL RIDGE PUD1 SOUTH

3/14/2025 3:01:24 PM Autodesk Docs://Redtail Ridge Overall Vision/RTR_PUD1.rvt

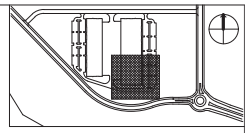
REDTAIL RIDGE FILING NO.1

PLANNED UNIT DEVELOPMENT, LOT 1 BLOCK 1 & LOT 2 BLOCK 1
SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29,
TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
CASE #: PUPL-XXXX-2023



MATERIAL LEGEND		
LEGEND	TAG	MATERIAL
	DP2	CONCRETE PAVERS
	MM1	DECOMPOSED GRANITE
	PV1	PEDESTRIAN RATED CIP CONCRETE

SITE FURNITURE & LIGHTING LEGEND		
LEGEND	TAG	TYPE
	FA3	LITTER RECEPTACLE
	FS1 - A	BENCH
	FS2 - B	PICNIC TABLE SET 2
	FS3	DINING TABLE
	FS4 - A	LOUNGE CHAIR
	FS4 - B	DINING CHAIR
	LE1 - A	SINGLE SIDED VEHICULAR POLE LIGHT
	LE1 - B	DOUBLE SIDED VEHICULAR POLE LIGHT
	LE1 - C	PEDESTRIAN POLE LIGHT

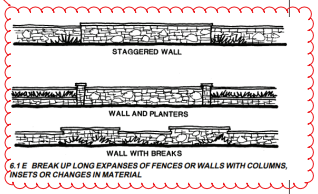


KEY MAP
1" = 600'

Landscaping should be incorporated within terraces to soften the appearance

Provide an elevation of the proposed wall material. walls shall be constructed of stone, brick, or metal.

Walls that are greater than 50 feet in length shall include structural offsets, insets, and landscape pockets at various points along the length of the wall to reduce monotony and increase visual interest.



6.1 E BREAK UP LONG EXPANSES OF FENCES OR WALLS WITH COLUMNS, INSETS OR CHANGES IN MATERIAL

5.1.D CREATE LANDSCAPE POCKETS IN LONG EXPANSES OF FENCES AND WALLS.

10'-0"
0' 10' 20' 40' 80'

MATERIAL AND PLANTING PLAN - D

REVISION DATE:

ISSUE DATE: 03/14/2025

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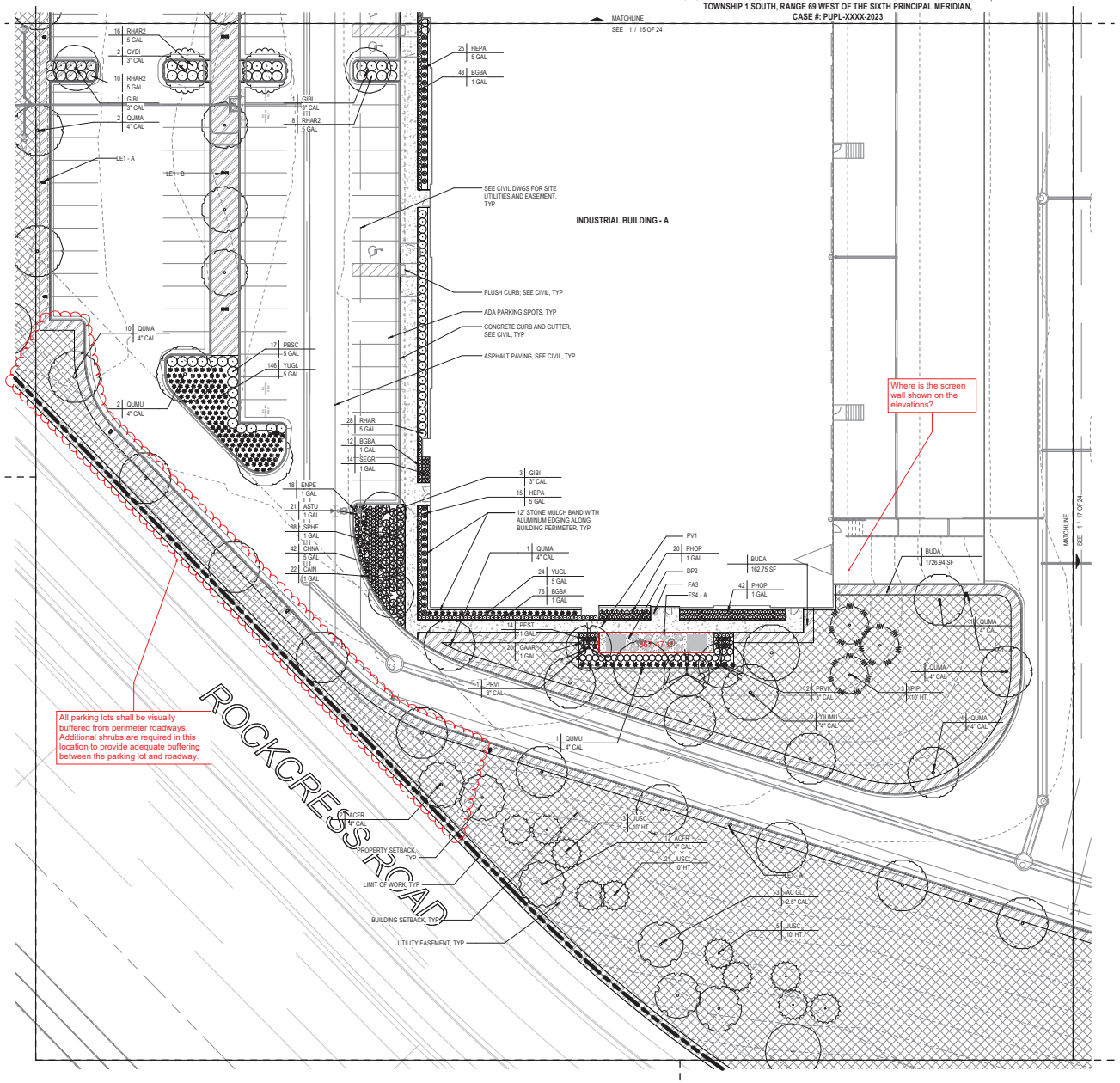
PROJECT # 221236

3/14/2025 3:01:36 PM Autodesk Docs://Redtail Ridge Overall Vision/RTR_PUD1.rvt

REDTAIL RIDGE PUD1 SOUTH

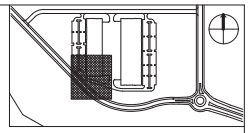
REDTAIL RIDGE FILING NO.1

PLANNED UNIT DEVELOPMENT, LOT 1 BLOCK 1 & LOT 2 BLOCK 1
SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29,
TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
CASE #: PUPL-XXXX-2023



MATERIAL LEGEND		
LEGEND	TAG	MATERIAL
	DP2	CONCRETE PAVERS
	MM1	DECOMPOSED GRANITE
	PV1	PEDESTRIAN RATED CIP CONCRETE

SITE FURNITURE & LIGHTING LEGEND		
LEGEND	TAG	TYPE
	FA3	LITTER RECEPTACLE
	FS1 - A	BENCH
	FS2 - B	PICNIC TABLE SET 2
	FS3	DINING TABLE
	FS4 - A	LOUNGE CHAIR
	FS4 - B	DINING CHAIR
	LE1 - A	SINGLE SIDED VEHICULAR POLE LIGHT
	LE1 - B	DOUBLE SIDED VEHICULAR POLE LIGHT
	LE1 - C	PEDESTRIAN POLE LIGHT



KEY MAP
1" = 600'

0' 10' 20' 40' 80'

MATERIAL AND PLANTING PLAN - E

REVISION DATE:

ISSUE DATE: 03/14/2025

SHEET 18 OF 24

PROJECT # 272126

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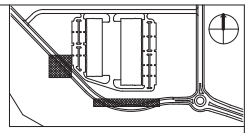
REDTAIL RIDGE PUD1 SOUTH

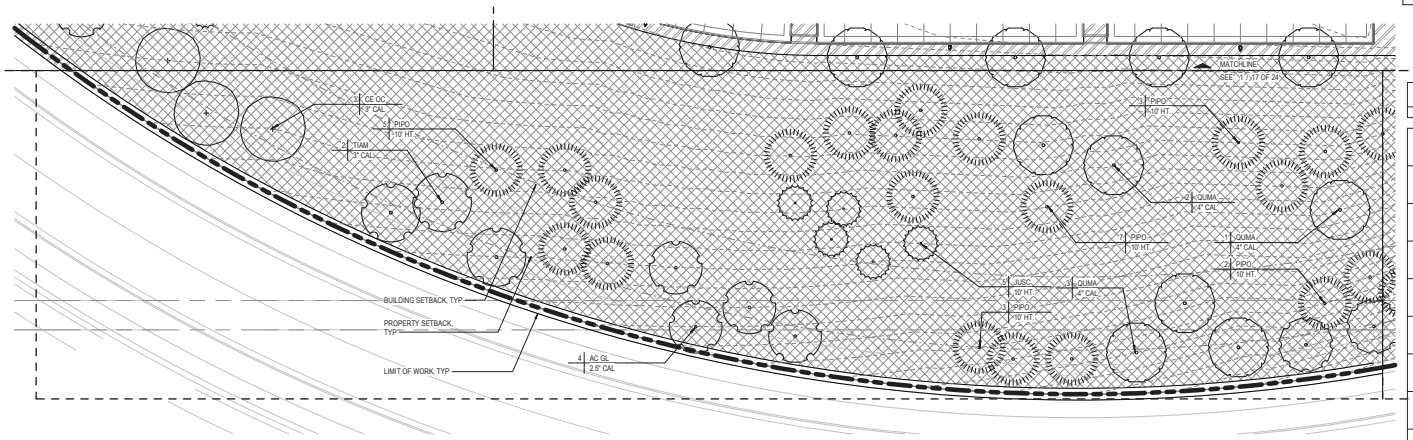
REDTAIL RIDGE FILING NO.1

PLANNED UNIT DEVELOPMENT, LOT 1 BLOCK 1 & LOT 2 BLOCK 1
SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29,
TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
CASE #: PUPL-XXXX-2023

MATERIAL LEGEND		
LEGEND	TAG	MATERIAL
	DP2	CONCRETE PAVERS
	MM1	DECOMPOSED GRANITE
	PV1	PEDESTRIAN RATED CIP CONCRETE

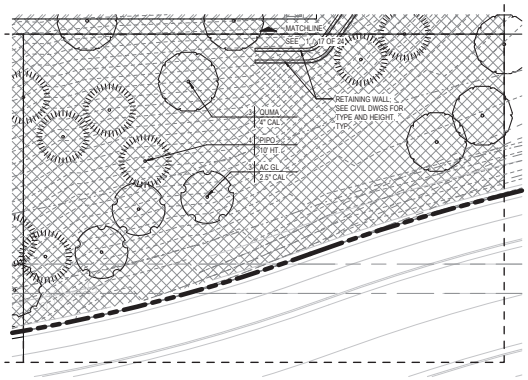


KEY MAP
1" = 600'

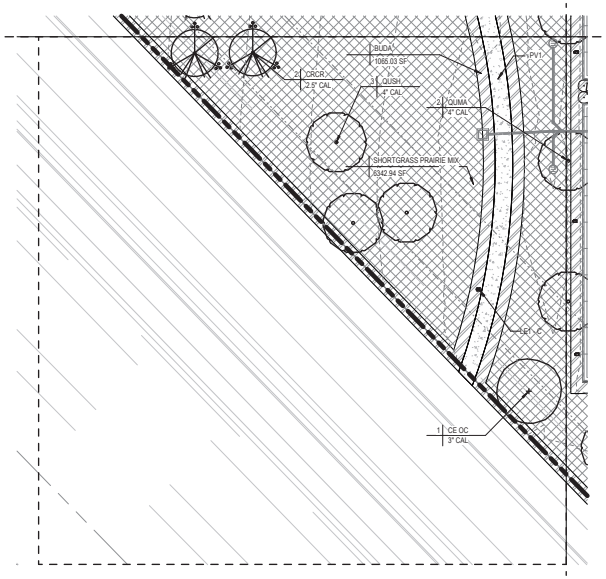


3 MATERIAL AND PLANTING PLAN - G
1" = 20'-0"

SITE FURNITURE & LIGHTING LEGEND		
LEGEND	TAG	TYPE
	FA3	LITTER RECEPTACLE
	FS1 - A	BENCH
	FS2 - B	PICNIC TABLE SET 2
	FS3	DINING TABLE
	FS4 - A	LOUNGE CHAIR
	FS4 - B	DINING CHAIR
	LE1 - A	SINGLE SIDED VEHICULAR POLE LIGHT
	LE1 - B	DOUBLE SIDED VEHICULAR POLE LIGHT
	LE1 - C	PEDESTRIAN POLE LIGHT



2 MATERIAL AND PLANTING PLAN - H
1" = 20'-0"



1 MATERIAL AND PLANTING PLAN - F
1" = 20'-0"

0' 10' 20' 40' 80'

REVISION DATE:

ISSUE DATE: 03/14/2025

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MATERIAL AND PLANTING PLAN - F, G & H

PROJECT # 221235

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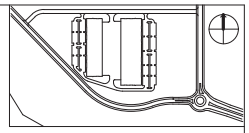
REDTAIL RIDGE PUD1 SOUTH

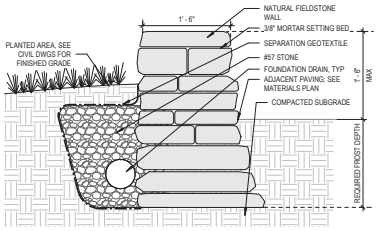
REDTAIL RIDGE FILING NO.1

PLANNED UNIT DEVELOPMENT, LOT 1 BLOCK 1 & LOT 2 BLOCK 1
SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29,
TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MEDIAN,
CASE #: PUPL-XXXX-2023

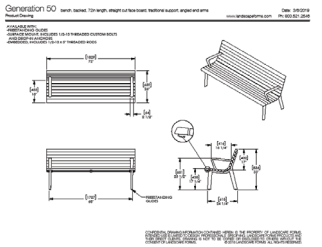
SITE FURNITURE & LIGHTING SCHEDULE			
LEGEND	QUANTITY	TAG	TYPE
	5	FA3	LITTER RECEPTACLE
	1	FS1 - A	BENCH
	9	FS2 - B	PICNIC TABLE SET 2
	9	FS3	DINING TABLE
	35	FS4 - A	LOUNGE CHAIR
	33	FS4 - B	DINING CHAIR
	26	LE1 - A	SINGLE SIDED VEHICULAR POLE LIGHT
	23	LE1 - B	DOUBLE SIDED VEHICULAR POLE LIGHT
	14	LE1 - C	PEDESTRIAN POLE LIGHT



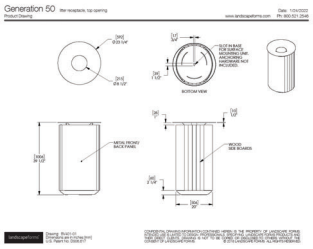
KEY MAP
1" = 600'



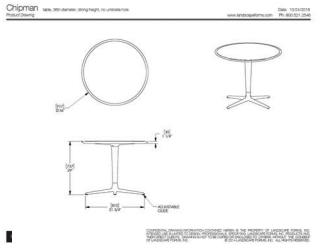
10 NATURAL FIELDSTONE SEAT WALL
1" = 1'-0"



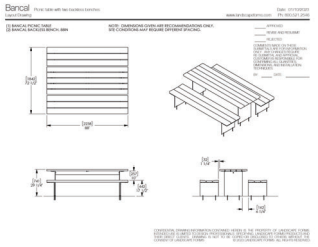
9 BENCH - FS1 - A
1/2" = 1'-0"



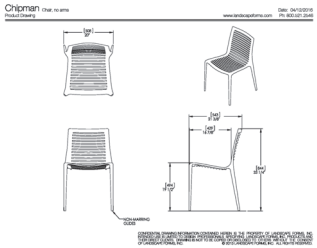
8 LITTER RECEPTACLE - FA3
1/2" = 1'-0"



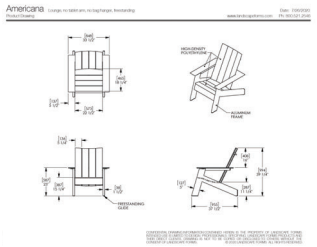
7 DINING TABLE - FS3
1/2" = 1'-0"



6 PICNIC TABLE SET 2 - FS2 - B
1/2" = 1'-0"



5 DINING CHAIR - FS4 - B
1/2" = 1'-0"



4 LOUNGE CHAIR - FS4 - A
1/2" = 1'-0"

3 PEDESTRIAN POLE LIGHT - LE1 - C
1/2" = 1'-0"

2 VEHICULAR POLE LIGHT - LE1 - B
1/2" = 1'-0"

1 VEHICULAR POLE LIGHT - LE1 - A
1/2" = 1'-0"

SITE FURNISHING DETAILS

PROJECT # 221226

REVISION DATE: **ISSUE DATE:** 03/14/2025 **SHEET** 20 OF 24

REDTAIL RIDGE PUD1 SOUTH

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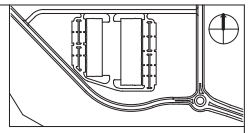
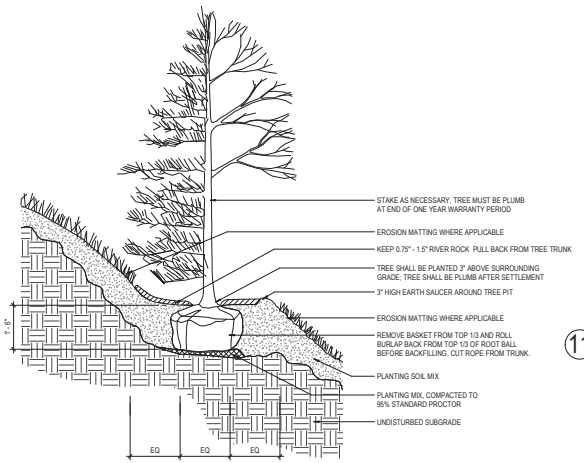
REDTAIL RIDGE FILING NO.1

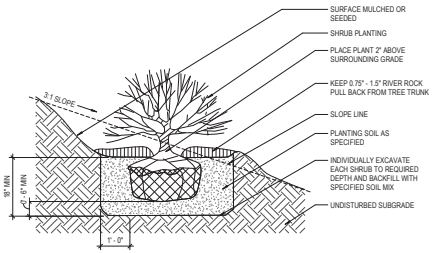
PLANNED UNIT DEVELOPMENT, LOT 1 BLOCK 1 & LOT 2 BLOCK 1
SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29,
TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
CASE #: PUPL-XXXX-2023



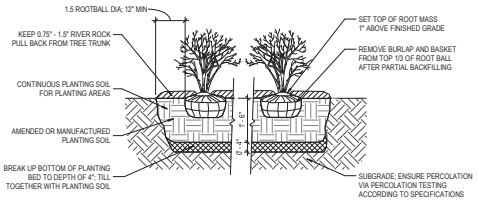
KEY MAP
1" = 600'



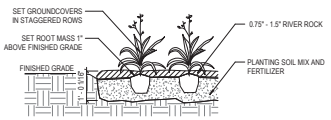
7 TREE PLANTING ON SLOPE
1/2" = 1'-0"



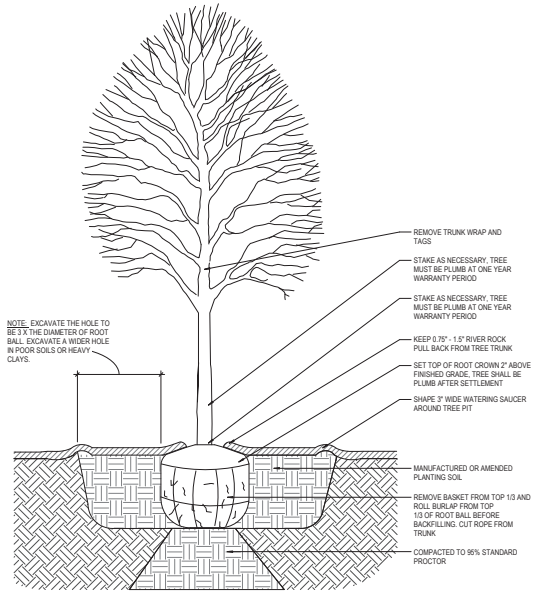
11 SHRUB PLANTING ON SLOPE
1/2" = 1'-0"



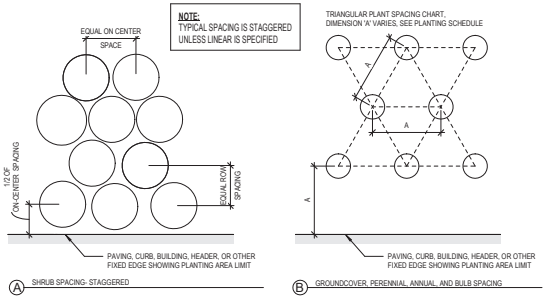
9 TYPICAL SHRUB PLANTING AT GRADE
1/2" = 1'-0"



8 TYPICAL GROUNDCOVER PLANTING
1/2" = 1'-0"



10 TYPICAL TREE PLANTING AT GRADE
1/2" = 1'-0"



1 PLANT SPACING
1/2" = 1'-0"

CLEAN AND MULCH NOTES:

1. THE CONTRACTOR SHALL CLEAR AND GRUB ALL WEEDS, DEAD TREES, TREES ONE (1) INCH CALIPER OR LESS AND OTHER SELECT TREES UP TO FOUR (4) INCH CALIPER AS DETERMINED IN THE FIELD IN THE TREE SAVE AREAS INDICATED ON THE DRAWINGS.
2. A THREE (3) INCH MINIMUM LAYER OF MULCH SHALL BE SPREAD OVER THE ENTIRE CLEARED AREA.
3. THE CONTRACTOR WILL NOTIFY THE ARCHITECT PRIOR TO START OF THE CLEAN AND MULCH WORK.
4. THE ARCHITECT WILL VERIFY SCOPE OF WORK IN FIELD WITH THE CONTRACTOR PRIOR TO THE START OF WORK.
5. THE CONTRACTOR IS RESPONSIBLE FOR THE REMOVAL AND LEGAL DISPOSAL OF ALL DEBRIS FROM CLEAN-UP OPERATIONS FROM THE SITE.

GENERAL PLANTING NOTES:

1. ALL PLANTS MUST BE HEALTHY, VIGOROUS MATERIAL; FREE OF PESTS & DISEASES.
2. ALL PLANTS MUST BE CONTAINER-GROWN (CONT.) OR BALLED AND BURLAPPED (B&B) AS INDICATED IN PLANT LIST.
3. ALL TREES MUST BE STRAIGHT TRUNKED, FULL HEADED, & MEET ALL REQUIREMENTS SPECIFIED.
4. ALL PLANTS ARE SUBJECT TO THE APPROVAL OF THE ARCHITECT & THE OWNER BEFORE, DURING, & AFTER INSTALLATION.
5. ALL TREES MUST BE GUYED OR STAKED AS SHOWN IN THE DETAILS.
6. ALL PLANTS AND PLANTING AREAS MUST BE COMPLETELY MULCHED AS SPECIFIED.
7. PRIOR TO CONSTRUCTION, THE LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UNDERGROUND UTILITIES & SHALL AVOID DAMAGE TO ALL UTILITIES DURING THE COURSE OF THE WORK. THE LANDSCAPE CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY & ALL DAMAGE TO UTILITIES, STRUCTURES, SITE APPURTENCES, ETC. WHICH OCCUR AS A RESULT OF THE LANDSCAPE CONSTRUCTION.
8. THE LANDSCAPE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL QUANTITIES SHOWN ON THESE PLANS BEFORE PRICING THE WORK.
9. THE LANDSCAPE CONTRACTOR IS RESPONSIBLE FOR FULLY MAINTAINING ALL PLANTING (INCLUDED BUT NOT LIMITED TO: WATERING, SPRAYING, MULCHING, FERTILIZING, ETC...) OF ALL PLANTING AND LAWN AREAS UNTIL THE WORK IS ACCEPTED IN TOTAL BY THE ARCHITECT AND OWNER.
10. THE LANDSCAPE CONTRACTOR SHALL COMPLETELY GUARANTEE ALL PLANT MATERIAL FOR A PERIOD OF ONE (1) YEAR BEGINNING AT THE DATE OF SUBSTANTIAL COMPLETION. THE LANDSCAPE CONTRACTOR SHALL PROMPTLY MAKE ALL REPLACEMENTS BEFORE OR AT THE END GUARANTEE PERIOD (AS DIRECTED BY THE OWNER).
11. THE ARCHITECT WILL APPROVE THE STAKED LOCATION OF ALL PLANT MATERIAL PRIOR TO INSTALLATION.

REVISION DATE:

ISSUE DATE: 03/14/2025

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PLANTING DETAILS

PROJECT # 27126

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REDTAIL RIDGE PUD1 SOUTH

REDTAIL RIDGE FILING NO.1

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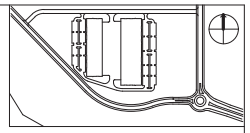
SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29,
TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
CASE #: PUPL-XXXX-2023



KEY MAP
1" = 600'

City Horticulture OK with list as submitted.

TREE & SHRUB PLANTING SCHEDULE

QTY	CODE	SCIENTIFIC NAME	COMMON NAME	SIZE	ROOT	SPACING	COMMENTS
SHRUB							
114	ACLA	ACHILLEA LANULOSA	MOUNTAIN YARROW	1 GAL	B&B	18"	FULL, WELL BRANCHED
25	ARAF	ARTEMESIA FILLIFOLIA	SAND SAGE	5 GAL	B&B	48"	FULL, WELL BRANCHED
10	ASAC	ASTER ASCENDENS	WESTERN ASTER	1 GAL	B&B	18"	FULL, WELL BRANCHED
165	ASTU	ASCLEPIA TUBEROSA	BUTTERFLY WEED	1 GAL	B&B	18"	FULL, WELL BRANCHED
1284	BGBA	BOUTELOUA GRACILIS 'BLOND AMBITION BLUE'	GRAMA GRASS	1 GAL	B&B	18"	FULL, WELL BRANCHED
187	CAIN	CALLIRHOE INVOLUCRATA	POPPY MALLOW	1 GAL	B&B	18"	FULL, WELL BRANCHED
31	CHMI	CHAMAEBATIARIA MILLEFOLIUM	FERNBUSH	5 GAL	B&B	5'	FULL, WELL BRANCHED
825	CHNA	CHRYSOTHAMNUS NAUSEOSUS VAR NAUSEOSUS	DWARF RABBITBRUSH	5 GAL	B&B	36"	FULL, WELL BRANCHED
225	ENPE	ENGELLMANIA PERSISTENA	ENGELLMAN DAISY	1 GAL	B&B	18"	FULL, WELL BRANCHED
199	FEPA	FELLUGIA PARADOXA	APACHE PLUME	5 GAL	B&B	36"	FULL, WELL BRANCHED
206	GAAR	GAILLARDIA ARISTATA	BLANKET FLOWER	1 GAL	B&B	18"	FULL, WELL BRANCHED
391	HEPA	HESPERALOE PARVIFLORA	RED YUCCA	5 GAL	B&B	36"	FULL, WELL BRANCHED
29	LILG	LIATRIS LIGULISTYLUS	ROCKY MOUNTAIN GAYFEATHER	1 GAL	B&B	18"	FULL, WELL BRANCHED
370	MARE	MAHONIA REPENS	CREEPING GRAPE HOLLY	5 GAL	B&B	30"	FULL, WELL BRANCHED
166	MURE	MUHLENBERGIA REVERCHONII 'UNDAUNTED'	UNDAUNTED RUBY MUHLY GRASS	3 GAL	B&B	30"	FULL, WELL BRANCHED
16	OEMA	OENOTHERA MACROCARPA	EVENING PRIMROSE	1 GAL	B&B	18"	FULL, WELL BRANCHED
423	PBSC	PRUNUS BESSEYI 'PAWNEE BUTTES'	PAWNEE BUTTES SAND CHERRY	5 GAL	B&B	48"	FULL, WELL BRANCHED
37	PESR	PENSTEMON STRICTUS	ROCKY MOUNTAIN PENSTEMON	1 GAL	B&B	18"	FULL, WELL BRANCHED
146	PEST	PENSTEMON BARBARATUS	SCARLET BUGLAR	1 GAL	B&B	18"	FULL, WELL BRANCHED
267	PHOP	PHYSOCARPUS OPULIFOLIUS 'NANA'	DWARF NINEBARK	1 GAL	B&B	24"	FULL, WELL BRANCHED
84	RACO	RATIBIDA COLUMNIFERA	PRAIRIE CONEFLOWER	1 GAL	B&B	18"	FULL, WELL BRANCHED
456	RHAR	RHUS AROMATICA 'GRO-LOW'	GRO-LOW SUMAC	5 GAL	B&B	36"	FULL, WELL BRANCHED
387	RHAR2	RHUS AROMATICA 'GRO-LOW'	GRO-LOW SUMAC	5 GAL	B&B	48"	FULL, WELL BRANCHED
113	RIAU	RIBES AUREUM	GOLDEN CURRANT	5 GAL	B&B	42"	FULL, WELL BRANCHED
221	RUHI	RUDBECKIA HIRTA	BLACK EYED SUSAN	1 GAL	B&B	18"	FULL, WELL BRANCHED
844	SCSC	SCHIZACYRIUM SCOPARIUM 'THE BLUES'	THE BLUES LITTLE BLUESTEM GRASS	1 GAL	B&B	18"	FULL, WELL BRANCHED
114	SEGR	SALVIA GREGGI 'FURMAN'S RED'	AUTUMN SAGE	1 GAL	B&B	18"	FULL, WELL BRANCHED
1389	SPHE	SPOROBOLUS HETEROLEPSIS	PRAIRIE DROPSEED	1 GAL	B&B	18"	FULL, WELL BRANCHED
61	SPHE2	SPOROBOLUS HETEROLEPSIS	PRAIRIE DROPSEED	1 GAL	B&B	24"	FULL, WELL BRANCHED
53	TAME	TAXUS X MEDIA ' DENSIFORMIS'	DENSIFORMIS YEW	5 GAL	B&B	42"	FULL, WELL BRANCHED
1491	YUGL	YUCCA GLAUCA	SOAPWEED	5 GAL	B&B	30"	FULL, WELL BRANCHED
TREE							
27	AC GL	ACER GLABRUM	ROCKY MOUNTAIN MAPLE	2.5" CAL	B&B	AS SHOWN	FULL, WELL BRANCHED
20	ACFR	ACER FREMANII 'AUTUMN BLAZE'	AUTUMN BLAZE MAPLE	4" CAL	B&B	AS SHOWN	FULL, WELL BRANCHED
17	AMGR	AMELANCHIER GRANDIFLORA X 'AUTUMN BRILLIANCE'	AUTUMN BRILLIANCE SERVICEBERRY	10' HT.	B&B	AS SHOWN	FULL, WELL BRANCHED
17	CE OC	CELTIS OCCIDENTALIS 'PRAIRIE PRIDE'	PRAIRIE PRIDE HACKBERRY	3" CAL	B&B	AS SHOWN	FULL, WELL BRANCHED
12	CECA	CERCIS CANADENSIS	REDBUD	2.5" CAL	B&B	AS SHOWN	FULL, WELL BRANCHED
57	CRCR	CRATAEGUS CRUS-GALLI 'INERMIS'	INERMIS COCKSPUR HAWTHORN	2.5" CAL	B&B	AS SHOWN	FULL, WELL BRANCHED, MIN. 4' CLEAR TRUNK
23	GIBI	GINKGO BILOBA 'PRINCETON SENTRY'	PRINCETON SENTRY MAIDENHAIR TREE	3" CAL	B&B	AS SHOWN	FULL, WELL BRANCHED
6	GLTR	GLEDITISIA TRIACANTHOSE	THORNLESS HONEY LOCUST	3" CAL	B&B	AS SHOWN	FULL, WELL BRANCHED
154	GLTRh	GLEDITSIA TRIACANTHOS INERMIS 'HARVEST TM'	NORTHERN ACCLAIM HONEYLOCUST	3" CAL	B&B	AS SHOWN	FULL, WELL BRANCHED
1	GLTRs	GLEDITSIA TRIACANTHOS F. INERMIS 'SKYLINE'	SKYLINE HONEYLOCUST	3" CAL	B&B	AS SHOWN	FULL, WELL BRANCHED
83	GYDI	GYMNOCLADUS DIOICUS	KENTUCKY COFFEE TREE	3" CAL	B&B	AS SHOWN	FULL, WELL BRANCHED
15	JUSC	JUNIPERUS SCOPULORUM	ROCKY MOUNTAIN JUNIPER	10' HT.	B&B	AS SHOWN	FULL, WELL BRANCHED
2	KOPA	KOELREUTERIA PANICULATA	GOLDEN RAIN TREE	3" CAL	B&B	AS SHOWN	FULL, WELL BRANCHED
34	PIPI	PINUS EDULIS	PINION PINE	10' HT.	B&B	AS SHOWN	FULL, WELL BRANCHED
52	PIPO	PINUS PONDEROSA	PONDEROSA PINE	10' HT.	B&B	AS SHOWN	FULL, WELL BRANCHED
9	PRVI	PRUNUS VIRGINIANA	CHOKECHERRY	3" CAL	B&B	AS SHOWN	FULL, WELL BRANCHED
7	QUBI	QUERCUS BICOLOR	SWAMP WHITE OAK	6" CAL	B&B	AS SHOWN	FULL, WELL BRANCHED
156	QUMA	QUERCUS MACROCARPA	BURR OAK	4" CAL	B&B	AS SHOWN	FULL, WELL BRANCHED
56	QUMU	QUERCUS MUEHLENBERGII	CHINKAPIN OAK	4" CAL	B&B	AS SHOWN	FULL, WELL BRANCHED
27	QUSH	QUERCUS SHUMARDII	SHUMARD OAK	4" CAL	B&B	AS SHOWN	FULL, WELL BRANCHED
3	QUSH- L	QUERCUS SHUMARDII	SHUMARD OAK	6" CAL	B&B	AS SHOWN	FULL, WELL BRANCHED
24	SOJA	SOPHORA JAPONICA	JAPANESE PAGODA TREE	3" CAL	B&B	AS SHOWN	FULL, WELL BRANCHED, 5' CLEAR TRUNK
23	TIAM	TILIA AMERICANA	BASSWOOD	3" CAL	B&B	AS SHOWN	FULL, WELL BRANCHED

City Forestry suggests replacement of these trees due to past challenges with them.

1115
4

what's this?

SHRUB & GROUNDCOVER PLANTING SCHEDULE

Area	CODE	SCIENTIFIC NAME	COMMON NAME	COMMENTS
GRASS/FORB				
204930.56 SF	BUDA	BUCHLOE DACTYLOIDES	BUFFALOGRASS	SOD
18850.83 SF	SHORTGRASS PRAIRIE MIX	BUCHLOE DACTYLOIDES	BUFFALOGRASS	SOD
2454.80 SF	BUDA			
505800.41 SF	SHORTGRASS PRAIRIE MIX			<varies>
16139.16 SF	SHRUBS			

PLANTING LEGEND

SHORTGRASS PRAIRIE MIX

BUFFALO GRASS

PLANTING SCHEDULE

REVISION DATE:

ISSUE DATE: 03/14/2025

SHEET 22 OF 24

PROJECT # 272126

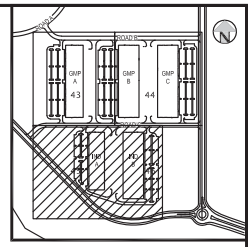
REDTAIL RIDGE PUD1 SOUTH

3/14/2025 3:02:12 PM Autodesk Docs://Redtail Ridge Overall Vision/RTR_PUD1.rvt

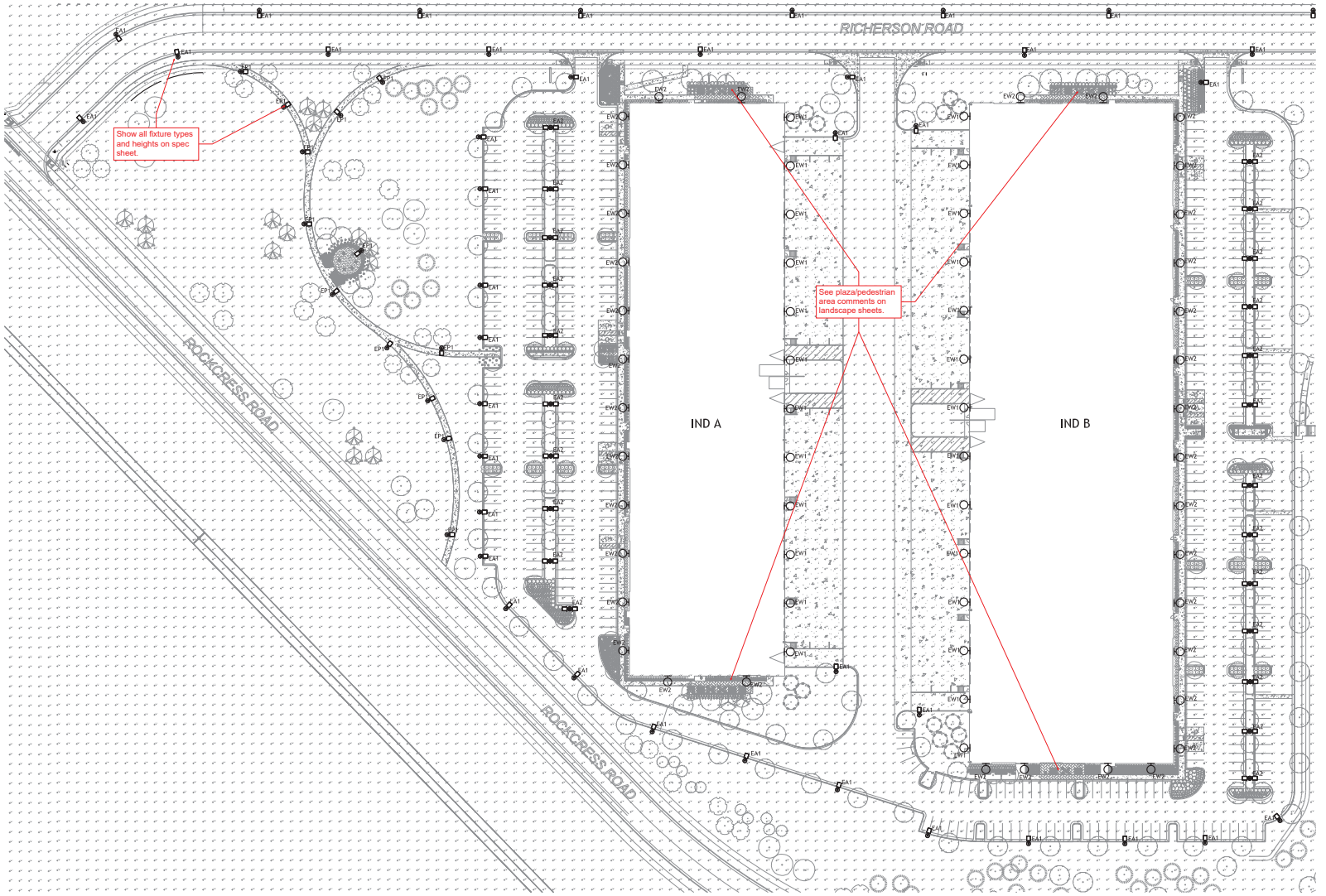
REDTAIL RIDGE FILING NO. 1

PLANNED UNIT DEVELOPMENT
LOT 1 BLOCK 1
SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29, TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
CASE #: PUPL-XXXX-2023

AE DESIGN
Integrated Lighting and Electrical Solutions
1900 Wazee Street #205 | Denver, CO 80202 | 303.296.3034
aedesign@wmc.com
Project: #:6077.00



KEY MAP
SCALE: 1" = 800'



1 | PHOTOMETRIC PLAN – SOUTHWEST
45 | SCALE: 1" = 50'-0"

GENERAL NOTES

A. ALL SITE LIGHTING RELATED TO WORK AND MATERIALS SHALL COMPLY WITH CITY, COUNTY AND OTHER APPLICABLE GOVERNING AUTHORITY REQUIREMENTS.

B. PER LOUISVILLE MUNICIPAL CODE ALL STREET LIGHTS SHALL NOT EXCEED 20'-0" TOTAL POLE HEIGHT.

C. ALL BUILDING-MOUNTED AND POLE-MOUNTED LIGHTING SHALL BE DIRECTED DOWNWARD AND IS FULL CUTOFF. ALL LIGHT SOURCES SHALL BE FULLY SHIELDED SO THE LIGHT SOURCE IS NOT VISIBLE FROM ADJACENT PROPERTIES AND PUBLIC RIGHTS-OF-WAY, AND TO PREVENT GLARE. ALL LIGHT FIXTURES ARE DARK SKY COMPLIANT AND MEET LEED BUG RATING REQUIREMENT AS DEFINED IN IES TM-15-11 OF NO MORE THAN B2-U2-G2.

D. REFER TO LIGHTING FIXTURE SCHEDULE FOR ADDITIONAL LIGHTING FIXTURE MOUNTING HEIGHTS AND OVERALL FIXTURE HEIGHTS.

E. PER IES HANDBOOK STREET LIGHTING DESIGN CRITERIA THIS SITE IS CONSIDERED A LOCAL STREET WITH LOW PEDESTRIAN ACTIVITY.

F. IN LOCAL, LOW ACTIVITY THE LIGHTING SHALL PROVIDE AT LEAST A 0.5 FC AVG LUMINANCE PER THE IES HANDBOOK FOR STREET LIGHTING.

G. PER LOUISVILLE MUNICIPAL CODE PARKING LOTS SHALL HAVE A MAX LIGHT LEVEL OF 4.5 FOOT-CANDLES.

H. PER LOUISVILLE MUNICIPAL CODE PEDESTRIAN WALKWAYS SHALL HAVE A MAX LIGHT LEVEL OF 3.0 FOOT-CANDLES.

I. PER LOUISVILLE MUNICIPAL CODE DRIVES SHALL HAVE A MAX LIGHT LEVEL OF 5 FOOT-CANDLES.

LIGHTING FIXTURES

WALL MOUNTED LUMINAIRE
EXTERIOR AREA LIGHT

Statistics

Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min
IND A PARKING LOT	+	1.7 fc	5.2 fc	0.6 fc	8.7:1	2.8:1
IND B PARKING LOT	+	1.6 fc	5.0 fc	0.6 fc	10.0:1	2.7:1
INTERNAL ROAD B	+	1.1 fc	1.7 fc	0.6 fc	2.7:1	1.7:1
COUNCIL RING PATHWAY	+	1.4fc	2.6 fc	0.6 fc	4.3:1	2.3:1

SCALE: 1" = 50'

PROJECT #: 22126

PHOTOMETRIC PLAN
SHEET 23 OF 24

REVISION DATE:

ISSUE DATE: 03/14/2025

REDTAIL RIDGE PUD1 SOUTH

Plotted: 6077.00 - REDTAIL RIDGE\ELECSITE PHOTOMETRICS\6077.00 - SITE PHOTOMETRIC_PUD 1 SOUTH.DWG Layout: 23
Plotted: 7/14/2025 4:05:43 PM By: Christine Mach

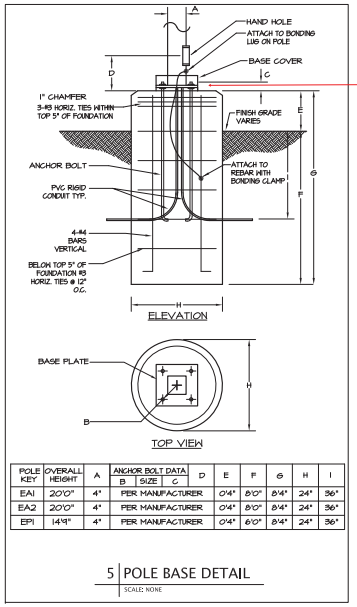
REDTAIL RIDGE FILING NO. 1

PLANNED UNIT DEVELOPMENT
LOT 1 BLOCK 1
SITUATED IN THE SOUTH HALF OF SECTION 20 AND THE NORTH HALF OF SECTION 29, TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE SIXTH PRINCIPAL MERIDIAN,
CASE #: PUPL-XXXX-2023

AE DESIGN
Integrated Lighting and Electrical Solutions
1900 Wazee Street #205 | Denver, CO 80202 | 303.296.3014
aedesign@wtc.com
Project: JE.6077.00

Ensure all types are shown

Update quantities



POLE KEY	OVERALL HEIGHT	A	ANCHOR BOLT DATA B	SIZE C	D	E	F	G	H	I
EA1	20'0"	4"	PER MANUFACTURER		0'4"	8'0"	8'4"	24"	36"	
EA2	20'0"	4"	PER MANUFACTURER		0'4"	8'0"	8'4"	24"	36"	
EP1	14'9"	4"	PER MANUFACTURER		0'4"	6'0"	8'4"	24"	36"	

5 | POLE BASE DETAIL
SCALE: NONE

LIGHTING FIXTURE SCHEDULE

TYPE	DESCRIPTION	MANUFACTURER	CATALOG NUMBER	VOLTAGE	SOURCE QTY	SOURCE WATT	SOURCE TYPE	SOURCE CCT/CRI	MAX WATTS	LUMEN OUTPUT	IESNA CUTOFF	FIXTURE FINISH	MOUNTING LOCATION	INFORMATION BOP/RFD/OPH	NOTES
EA1	20'-0" LED DOUBLE HEAD POLE TOP TYPE III DISTRIBUTION	EXO	ASLI-80L-3M-3KT-3-UNV-A	277	2	76	LED	3000k	76	9000	FULL CUTOFF	BLACK	EXTERIOR POLE	20'-0" POLE HEIGHT	
EA2	20'-0" LED SINGLE HEAD POLE TOP TYPE III DISTRIBUTION	EXO	ASLI-80L-3M-3KT-3-UNV-A	277	1	38	LED	3000k	38	4500	FULL CUTOFF	BLACK	EXTERIOR POLE	20'-0" POLE HEIGHT	
EP1	20'-0" LED SINGLE HEAD POLE TOP TYPE III DISTRIBUTION AT PEDESTRIAN LEVEL POLE HEIGHT	EXO	ASLI-80L-2S-3KT-3-UNV-A	277	1	38	LED	3000k	38	4500	FULL CUTOFF	BLACK	EXTERIOR WALL	14.75' APP	
EW1	WALL MOUNTED AREA LED WITH ASYMMETRIC FLAT BEAM LIGHT DISTRIBUTION	ILP	VMM-HL-U-30-T4	277	1	100	LED	3000k	100	14000	FULL CUTOFF	BLACK	EXTERIOR WALL	20'-0" APP	
EW2	WALL MOUNTED AREA LED WITH ASYMMETRIC FLAT BEAM LIGHT DISTRIBUTION	ILP	VMM-SL-U-30-T3	277	1	40	LED	3000k	40	5000	FULL CUTOFF	BLACK	EXTERIOR WALL	14.75' APP	

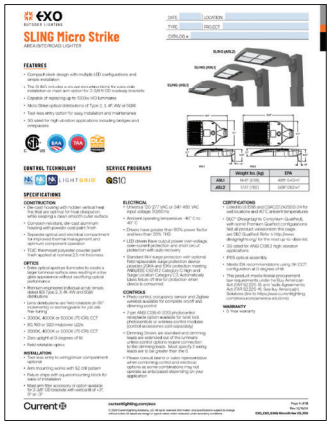
ABBREVIATIONS: BOP - BOTTOM OF FIXTURE, RFD - RECESSED FIXTURE DEPTH, OPH - OVERALL FIXTURE HEIGHT, APP(AFG) - ABOVE FINISHED FLOOR (@GRADE), HFD - WALL FIXTURE DEPTH

GENERAL NOTES:
A. ALL LED LAMPS AND/OR FIXTURES SHALL BE 3000K COLOR TEMPERATURE AND A MINIMUM OF 82CRI, UON.
B. ALL REFLECTOR LAMPS SHALL BE PROVIDED AS WIDE FLOOD DISTRIBUTION, UON.
C. PROVIDE LUMINAIRES SHOWN AS SHADED WITH FACTORY INSTALLED 90 MINUTE EMERGENCY BATTERY OR OTHER REMOTE POWER SOURCE, UON. EMERGENCY LUMINAIRES SHALL SENSE UN-SWITCHED POWER TO THE SPACE AND OPERATE AUTOMATICALLY UPON LOSS OF NORMAL POWER. ALL EMERGENCY LUMINAIRES SHALL HAVE AN INTEGRAL TEST SWITCH AND VISIBLE INDICATOR LIGHT. CONNECT THE EMERGENCY BATTERY TO THE UN-SWITCHED LEG OF THE LIGHTING CIRCUIT INDICATED.
D. LUMENS LISTED ARE DELIVERED LUMENS, NOT INITIAL.
E. FOR ALL SPECIFIED LUMINAIRES, THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL MOUNTING HARDWARE, ACCESSORIES, COMPONENTS, LEADER/LIMPER CABLES, WIRE FEED, CONNECTORS, END CAPS, REMOTE POWER SUPPLIES, AND ANY OTHER NECESSARY COMPONENT AS REQUIRED FOR INSTALLING A SECURE AND FULLY FUNCTIONAL SYSTEM.
F. THE CONTRACTOR SHALL VERIFY THE CEILING TYPE BEFORE ORDERING LIGHT FIXTURES TO ENSURE COMPATIBILITY WITH SPECIFIED FIXTURES. NOTIFY SPECIFIER OF ANY DISCREPANCIES.
G. ALL FINISH SELECTIONS SHALL BE VERIFIED BY ARCHITECT/INTERIOR DESIGNER/OWNER AS PART OF THE SUBMITTAL PROCESS. UNLESS OTHERWISE NOTED, EC SHALL ASSUME STANDARD LUMINAIRE FINISH OPTION FOR PRICING.
H. EC SHALL VERIFY ALL FIXTURE MOUNTING HEIGHTS WITH ARCHITECTURAL ELEVATIONS PRIOR TO ANY ROUGH-IN.
I. TYPICAL FOR ALL LIGHT FIXTURES WITH DESIGNATION STARTING WITH 'M'. FIXTURES ARE SHOWN FOR REFERENCE ONLY. FIXTURE SELECTIONS AND SPECIFICATIONS SHALL BE PROVIDED BY THE ARCHITECT AND/OR INTERIOR DESIGNER. EC SHALL COORDINATE EXACT MOUNTING LOCATION, MOUNTING HEIGHT, MATTAGE, AND DIMMING PROTOCOL WITH ARCHITECT / INTERIOR DESIGNER, LIGHTING CONSULTANT, AND/OR ELECTRICAL ENGINEER PRIOR TO INSTALL.
J. REMOTE DRIVER(S)/TRANSFORMER(S) SHALL BE LOCATED IN A CONCEALED, ACCESSIBLE AND VENTILATED LOCATION AS PROPOSED BY THE EC AND APPROVED BY THE ARCHITECT. REFER TO THE MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR MINIMUM REQUIRED CLEARANCES FROM ADJACENT MATERIALS, AND WIRING REQUIREMENTS TO PREVENT VOLTAGE DROP. DO NOT EXCEED MANUFACTURER'S RECOMMENDATIONS REGARDING WIRE GAGE AND MAXIMUM WIRE RUN LENGTHS.
K. FOR LUMINAIRES SPECIFIED WITH 0-10V DIMMING, 0-10V DIMMING DRIVER(S) REQUIRE ADDITIONAL LOW VOLTAGE CONTROL WIRES IN ADDITION TO STANDARD WIRING FOR POWER.
L. EXTERIOR LUMINAIRES SHALL BE GOLD WEATHER RATED FOR 0 DEG. F / -18 DEG. C., AND RATED FOR OUTDOOR USE.

SPECIFIC NOTES:
1.

Provide a full elevation of the pole heights as measured from grade. maximum base height is 2 feet and is inclusive of overall height limits: 24 feet from grade in all other areas

Dark sky lighting required per the approved SIA.



1 | TYPE EA1/EA2/EP1
SCALE: NTS

2 | TYPE EW1
SCALE: NTS

REVISION DATE:

ISSUE DATE: 03/14/2025 SHEET 24 OF 24

PHOTOMETRIC DETAILS

REDTAIL RIDGE PUD1 SOUTH

PROJECT #: 22126

Flash:=JE6077.00 - REDTAIL RIDGE\ELEC\SITE PHOTOMETRIC\6077.00 - SITE PHOTOMETRIC_2ND SOUTH.DWG Layout:24
Plotted: 7/14/2025 5:05:15 PM By: Christine Mach

HARRIS KOCHER SMITH
DENVER • DALLAS/FORT WORTH

March 14, 2025

Attention:
City of Louisville
Department of Public Works
Engineering Division
749 Main St.
Louisville, CO 80027

Redtail Ridge PUD 1 – South

Drainage Conformance Letter

HKS Project No. 221236,

To whom it may concern,

The purpose of this letter is to serve as a formal recognition of compliance with the Redtail Ridge Master Drainage Report dated March 24th, 2021. This report outlined the overall project stormwater and drainage characteristics of the proposed Redtail Ridge development. Applicable excerpts of the Final Master Drainage Report are included in **Appendix F**. This letter analyzes sub-basins within PUD1 and the compliance of watershed imperviousness and proposed runoff of PUD1 South to the Redtail Ridge Master Drainage Report.

PUD 1 is part of the Redtail Ridge Master Drainage Plan (see attached Master Drainage Report for Redtail Ridge) and includes lots 1 and 2 of block 1, Redtail Ridge Filing No. 1. PUD 1 has been split into "PUD 1 South" and "PUD 1 North", PUD 1 South lies within lot 1 block 1 and in Basin B-2 of the Redtail Ridge Master Drainage Plan. A portion of PUD 1 North (within lot 2 block 1) is included in the calculations and conformance letter due to its connection to the proposed storm system in PUD 1 South. The PUD 1 North conformance letter will need to confirm against this letter. The sub-basins for PUD 1 South (18.93 acres) and PUD1 North (8.41 acres) included in this letter total 27.34 acres, all 27.34 acres are included in the drainage analyses of Basins B-1 and B-2 apart of the Master Drainage Plan.

Basin B-2 in the Redtail Ridge Master Drainage Plan is 25.45 acres, which includes a most of PUD1 South, south of Road C. Per the Redtail Ridge Master Drainage Plan, Basin B-2 is proposed to have a watershed imperviousness of 85.00%. Flows from Basin B-2 will be conveyed southeast by on-site stormwater infrastructure to Pond C-2 (see Pond C-2 location on Master Drainage Plan in Appendix F).

Basin B-1 in the Redtail Ridge Master Drainage Plan is 71.01 acres, which includes a small portion of PUD 1 North and PUD 1 South, south of Road C. Per the Master Drainage Plan, Basin B-1 is proposed to have a watershed imperviousness of 85.00%. Flows from the small portion of Basin B-1 will be conveyed southeast by on-site stormwater infrastructure to Pond C-2 (see Pond C-2 location on Master Drainage Plan in Appendix F).

SUB-BASIN DESCRIPTION

PUD1 South (Pond C-2)

Basin O (0.25 acres, 15.97% impervious) consists of landscaping. The peak runoff from basin O is 0.07 cfs for the minor storm event and 0.43 cfs for the major storm event. Basin O will drain to landscape drains where it will be conveyed by storm sewer where it will be routed to Pond C-2 in the Master Drainage Report.

Basin P (0.31 acres, 12.84% impervious) consists of landscaping. The peak runoff from basin P is 0.06 cfs for the minor storm event and 0.48 cfs for the major storm event. Basin P will drain overland to Road C where it will be conveyed by curb and gutter into a Type R storm inlet located at the south half of Road C and be routed to Pond C-2 in the Master Drainage Report.

Basin Q (2.17 acres, 90.00% impervious) consists of roofs. The peak runoff from basin Q is 5.05 cfs for the minor storm event and 12.57 cfs for the major storm event. Basin Q will drain via downspouts to an on-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin R (3.28 acres, 90.00% impervious) consists of roofs. The peak runoff from basin R is 7.63 cfs for the minor storm event and 18.99 cfs for the major storm event. Basin R will drain via downspouts to an on-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin S1 (1.24 acres, 8.99% impervious) consists of landscaping and walks. The peak runoff from basin S1 is 0.12 cfs for the minor storm event and 1.26 cfs for the major storm event. Basin S1 will drain to landscape drains and a Type C inlet where it will be conveyed by an on-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin S2 (0.97 acres, 77.72% impervious) consists of parking areas, landscaping, and walks. The peak runoff from basin S2 is 1.86 cfs for the minor storm event and 4.93 cfs for the major storm event. Basin S2 will drain to a Type R inlet within the parking lot where it will be conveyed by an on-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin S3 (0.90 acres, 77.25% impervious) consists of parking areas, landscaping, and walks. The peak runoff from basin S3 is 1.72 cfs for the minor storm event and 4.56 cfs for the major storm event. Basin S3 will drain to a Type R inlet within the parking lot where it will be conveyed by an on-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin S4 (1.84 acres, 3.48% impervious) consists of landscaping and walks. The peak runoff from basin S4 is 0.06 cfs for the minor storm event and 1.48 cfs for the major storm event. Basin S4 will drain to landscape drains and a Type C inlet where it will be conveyed by an on-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin T1 (0.71 acres, 90.00% impervious) consists of drives and loading areas. The peak runoff from basin T1 is 1.63 cfs for the minor storm event and 4.06 cfs for the major storm event. Basin T1 will drain to inlets within the drive aisle where it will be conveyed by an on-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin T2 (0.44 acres, 87.52% impervious) consists of drives and loading areas. The peak runoff from basin T2 is 1.02 cfs for the minor storm event and 2.58 cfs for the major storm event. Basin T2 will drain to inlets within the drive aisle where it will be conveyed by an on-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin T3 (0.44 acres, 76.38% impervious) consists of drives and loading areas. The peak runoff from basin T3 is 0.83 cfs for the minor storm event and 2.21 cfs for the major storm event. Basin T3 will drain to inlets within the drive aisle where it will be conveyed by an on-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin T4 (0.44 acres, 90.00% impervious) consists of drives and loading areas. The peak runoff from basin T4 is 1.14 cfs for the minor storm event and 2.85 cfs for the major storm event. Basin T4 will drain to inlets within the drive aisle where it will be conveyed by an on-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin T5 (0.80 acres, 73.31% impervious) consists of drives and loading areas. The peak runoff from basin T5 is 1.49 cfs for the minor storm event and 4.05 cfs for the major storm event. Basin T5 will drain to inlets within the drive aisle where it will be conveyed by an on-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin U1 (0.52 acres, 80.63% impervious) consists of parking areas, landscaping, and walks. The peak runoff from basin U1 is 1.02 cfs for the minor storm event and 2.66 cfs for the major storm event. Basin U1 will drain to a Type R inlet within the parking lot where it will be conveyed by an on-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin U2 (0.55 acres, 80.77% impervious) consists of parking areas, landscaping, and walks. The peak runoff from basin U2 is 1.12 cfs for the minor storm event and 2.93 cfs for the major storm event. Basin U2 will drain to a Type R inlet within the parking lot where it will be conveyed by an on-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin U3 (0.30 acres, 78.28% impervious) consists of parking areas, landscaping, and walks. The peak runoff from basin U3 is 0.61 cfs for the minor storm event and 1.61 cfs for the major storm event. Basin U3 will drain to a Type R inlet within the parking lot where it will be conveyed by an on-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin U4 (0.59 acres, 79.52% impervious) consists of parking areas, landscaping, and walks. The peak runoff from basin U4 is 1.23 cfs for the minor storm event and 3.23 cfs for the major storm event. Basin U4 will drain to a Type R inlet within the parking lot where it will be conveyed by an on-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin V1 (1.59 acres, 7.38% impervious) consists of landscaping and walks. The peak runoff from basin V1 is 0.13 cfs for the minor storm event and 1.58 cfs for the major storm event. Basin V1 will drain to a Type C inlet where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin V2 (1.07 acres, 18.86% impervious) consists of landscaping and walks. The peak runoff from basin V2 is 0.27 cfs for the minor storm event and 1.56 cfs for the major storm event. Basin V2 will drain to a Type C inlet where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin V3 (2.03 acres, 12.95% impervious) consists of landscaping and walks. The peak runoff from basin V3 is 0.32 cfs for the minor storm event and 2.47 cfs for the major storm event. Basin V3 will drain to a Type C inlet where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin V4 (0.10 acres, 2.00% impervious) consists of landscaping and walks. The peak runoff from basin V4 is 0.002 cfs for the minor storm event and 0.08 cfs for the major storm event. Basin V4 will drain overland into an off-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin V5 (2.73 acres, 18.17% impervious) consists of landscaping and walks. The peak runoff from basin V5 is 0.67 cfs for the minor storm event and 3.98 cfs for the major storm event. Basin V5 will drain overland into an off-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin V6 (0.90 acres, 9.58% impervious) consists of landscaping and walks. The peak runoff from basin V6 is 0.11 cfs for the minor storm event and 1.07 cfs for the major storm event. Basin V6 will drain overland into an off-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin W1 (1.07 acres, 67.69% impervious) consists of parking areas, landscaping, and walks. The peak runoff from basin W1 is 1.36 cfs for the minor storm event and 3.83 cfs for the major storm event. Basin W1 will drain to a Type R inlet within the parking lot where it will be conveyed by an on-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin W2 (0.19 acres, 78.42% impervious) consists of parking areas, landscaping, and walks. The peak runoff from basin W2 is 0.41 cfs for the minor storm event and 1.09 cfs for the major storm event. Basin W2 will drain to a Type R inlet within the parking lot where it will be conveyed by an on-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Basin X (1.93 acres, 3.25% impervious) consists of landscaping. The peak runoff from basin X is 0.06 cfs for the minor storm event and 1.77 cfs for the major storm event. Basin X will drain overland into an off-site storm line where it will be conveyed to Pond C-2 in the Master Drainage Report.

Please see the attached exhibit which shows the basin delineation between the Master Drainage Plan and PUD 1 South (see Appendix D). Runoff from PUD 1 South is collected on-site by private storm infrastructure and then conveyed to storm mains in the roadways surrounding the site, which discharge to a regional water quality and detention pond. PUD 1 South development is compliant with the current submitted Master Drainage Report. PUD 1 South will not contribute any additional runoff that has not been accounted for to the existing off-site water quality and detention facilities. The basins analyzed in this conformance letter have a total effective imperviousness of 46.11%. Basin B-2 has an effective watershed imperviousness of 65.70%, Basin B-1 has an effective watershed imperviousness of 13.85% and are both in compliance with the Master Drainage Report (Refer to Summary tables below). All stormwater runoff from PUD 1 South will be conveyed by the storm sewer system proposed in the Redtail Ridge Master Drainage plan and is in conformance with the City of Louisville Wastewater standards and Mile High Flood District criteria. Sterling Bay - West will be responsible for maintaining the storm infrastructure apart of PUD 1 South.

Redtail Ridge PUD 1 - Pond C-2 Summary Table		
	B-2 (Master)	PUD 1 - South
Tributary Area (AC)	25.45	27.34
Imperviousness (%)	85.00	46.11
Q_{100} (CFS)	99.68	88.31

Please contact me if you have any questions or require additional information at jgrant@hkseng.com or 303-623-6300.

Sincerely,

HARRIS KOCHER SMITH

Jarrett Grant, PE
Project Manager

REFERENCES:

APPENDIX A – Vicinity Map

APPENDIX B – Hydrologic Computations

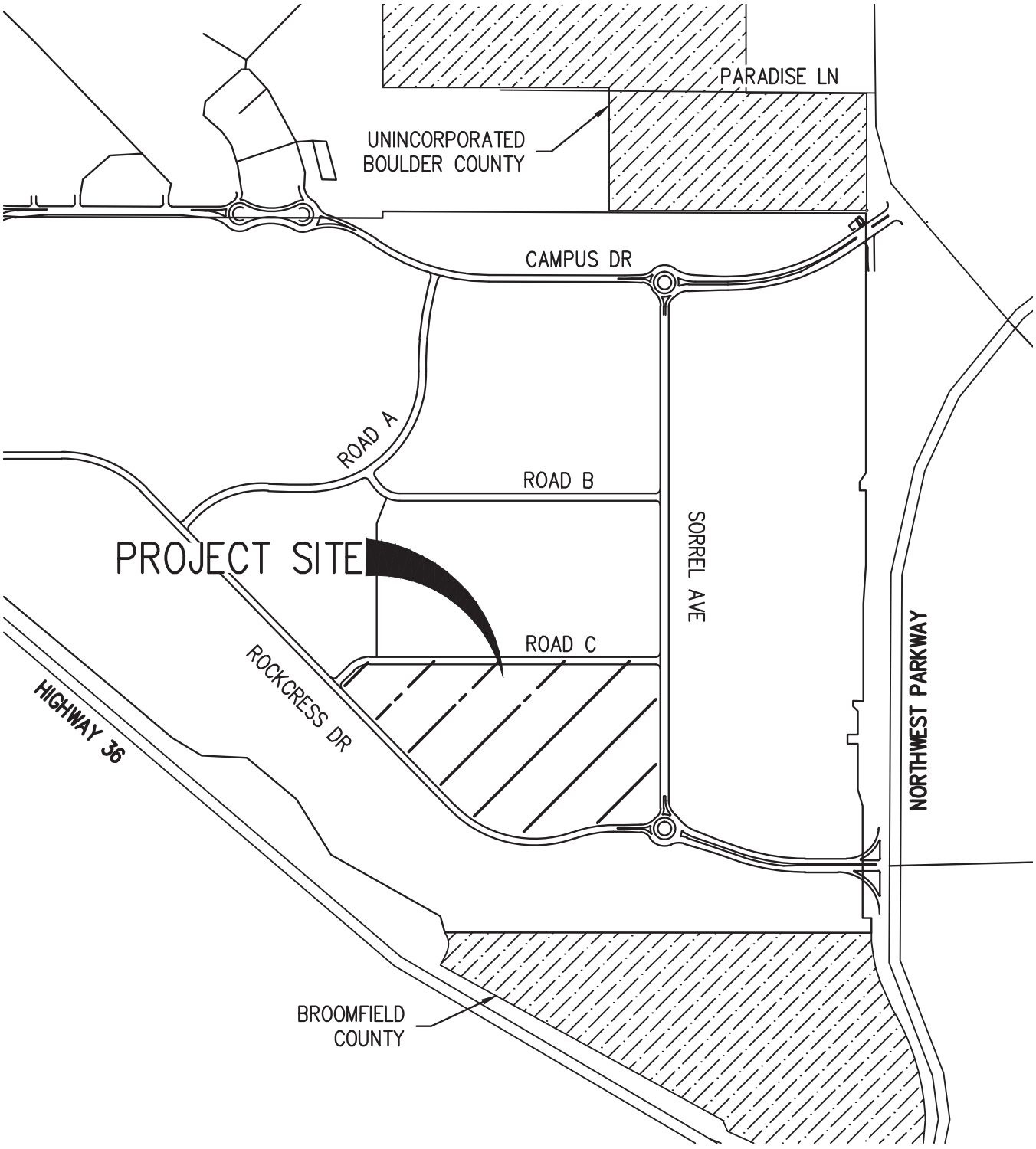
APPENDIX C – Hydraulic Computations

APPENDIX D – Final Drainage Plan

APPENDIX E – Master Drainage Report Plan Overlay

APPENDIX F – Master Drainage Report Documents

APPENDIX A – Vicinity Map



REDTAIL RIDGE - PUD 1 SOUTH VICINITY MAP

SCALE: 1"=800'

HARRIS KOCHER SMITH
1120 Lincoln Street, Suite 1000
Denver, Colorado 80203
P: 303.623.6300 F: 303.623.6311
HarrisKocherSmith.com

800 0 800 1600

SCALE: 1" = 800'

Plotted: FRI 03/07/25 12:07:09P By: Owen Van Lehman Filepath: p:\2022\221236\engineering\drainage\vicinity map-south.dwg Layout: layout1

APPENDIX B – Hydrologic Computations

Project Name: Redtail Ridge - PUD1

Composite C-Value Computations

Post-Development

Project No: 221236

Date: 03/03/25

Revised:

Design by: ODV

Checked by: TJS

Hydrologic Soil Group: C

BASIN	TOTAL AREA (ACRES)	ROOFS (90%)	SINGLE FAMILY LOTS (45%)	DRIVES & WALKS (90%)	GARAGE & STREETS (100%)	LANDSCAPE AREA (2%)	PERCENT IMPERVIOUS	C_2=	C_5=	C_{10}=	C_{100}=
O	0.25	0.00	0.00	0.04	0.00	0.21	15.97%	0.08	0.08	0.09	0.23
P	0.31	0.00	0.00	0.04	0.00	0.27	12.84%	0.06	0.06	0.07	0.21
Q	2.17	2.17	0.00	0.00	0.00	0.00	90.00%	0.73	0.75	0.76	0.81
R	3.28	3.28	0.00	0.00	0.00	0.00	90.00%	0.73	0.75	0.76	0.81
S1	1.24	0.00	0.00	0.10	0.00	1.14	8.99%	0.04	0.04	0.04	0.18
S2	0.97	0.00	0.00	0.83	0.00	0.14	77.72%	0.60	0.62	0.64	0.72
S3	0.90	0.00	0.00	0.77	0.00	0.13	77.25%	0.60	0.62	0.63	0.71
S4	1.84	0.00	0.00	0.03	0.00	1.81	3.48%	0.01	0.01	0.01	0.14
T1	0.71	0.00	0.00	0.71	0.00	0.00	90.00%	0.73	0.75	0.76	0.81
T2	0.44	0.00	0.00	0.42	0.00	0.01	87.52%	0.71	0.73	0.74	0.79
T3	0.44	0.00	0.00	0.37	0.00	0.07	76.38%	0.59	0.61	0.62	0.71
T4	0.44	0.00	0.00	0.44	0.00	0.00	90.00%	0.73	0.75	0.76	0.81
T5	0.80	0.00	0.00	0.65	0.00	0.15	73.31%	0.56	0.58	0.59	0.68
U1	0.52	0.00	0.00	0.46	0.00	0.05	80.63%	0.63	0.65	0.67	0.74
U2	0.55	0.00	0.00	0.49	0.00	0.06	80.77%	0.64	0.65	0.67	0.74
U3	0.30	0.00	0.00	0.26	0.00	0.04	77.28%	0.60	0.62	0.63	0.71
U4	0.59	0.00	0.00	0.52	0.00	0.07	79.52%	0.62	0.64	0.66	0.73
V1	1.59	0.00	0.00	0.10	0.00	1.49	7.38%	0.03	0.03	0.04	0.17
V2	1.07	0.00	0.00	0.20	0.00	0.86	18.86%	0.10	0.10	0.11	0.26
V3	2.03	0.05	0.00	0.21	0.00	1.78	12.95%	0.06	0.06	0.07	0.21
V4	0.10	0.00	0.00	0.00	0.00	0.10	2.00%	0.01	0.01	0.01	0.13
V5	2.73	0.00	0.00	0.50	0.00	2.22	18.17%	0.09	0.10	0.11	0.25
V6	0.90	0.00	0.00	0.08	0.00	0.82	9.58%	0.04	0.04	0.05	0.18
W1	1.07	0.00	0.00	0.80	0.00	0.27	67.69%	0.51	0.52	0.54	0.64
W2	0.19	0.00	0.00	0.17	0.00	0.03	78.42%	0.61	0.63	0.64	0.72
X	1.93	0.00	0.00	0.03	0.00	1.91	3.25%	0.01	0.01	0.01	0.14
Pond C-2 (Basin B-2)	27.34	5.50	0.00	8.21	0.00	13.64	46.11%				

Project Name: Redtail Ridge - PUD1
Project No: 221236
Date: 3/3/2025

Revised:

STANDARD FORM SF-2
TIME OF CONCENTRATION

Designed By: ODV
Checked By: TJS

SUB-BASIN DATA			INITIAL/OVERLAND TIME (T_i)			TRAVEL TIME (T_t)					Tc CHECK (URBANIZED BASINS)			FINAL	REMARKS
BASIN	AREA (AC)	C_5	LENGTH (FT)	SLOPE %	Ti (MIN)	LENGTH (FT)	SLOPE %	C_v	VELOCITY (FPS)	Tt (MIN)	COMPOS. Tc (MIN)	TOTAL LENGTH	Tc = (L/180) + 10 (MIN)	T_c (MIN)	
O	0.25	0.08	50	5.00	7.71	0	2.00	15.00	2.12	0.00	7.71	50	10.28	7.71	
P	0.31	0.06	50	5.00	7.86	0	2.00	15.00	2.12	0.00	7.86	50	10.28	7.86	
Q	2.17	0.75	250	2.00	8.01	100	2.00	20.00	2.83	0.59	8.60	350	11.94	8.60	
R	3.28	0.75	250	2.00	8.01	100	2.00	20.00	2.83	0.59	8.60	350	11.94	8.60	
S1	1.24	0.04	400	3.00	26.96	525	2.00	15.00	2.12	4.12	31.08	925	15.14	15.14	
S2	0.97	0.62	100	3.00	6.06	450	2.00	20.00	2.83	2.65	8.71	550	13.06	8.71	
S3	0.90	0.62	150	3.00	7.49	200	2.00	20.00	2.83	1.18	8.67	350	11.94	8.67	
S4	1.84	0.01	400	3.00	27.67	300	2.00	15.00	2.12	2.36	30.02	700	13.89	13.89	
T1	0.71	0.75	150	3.00	5.42	575	2.00	20.00	2.83	3.39	8.81	725	14.03	8.81	
T2	0.44	0.73	100	3.00	4.76	475	2.00	20.00	2.83	2.80	7.56	575	13.19	7.56	
T3	0.44	0.61	100	3.00	6.23	375	2.00	20.00	2.83	2.21	8.44	475	12.64	8.44	
T4	0.44	0.75	100	3.00	4.43	265	2.00	20.00	2.83	1.56	5.99	365	12.03	5.99	
T5	0.80	0.58	100	3.00	6.63	175	2.00	20.00	2.83	1.03	7.66	275	11.53	7.66	
U1	0.52	0.65	100	3.00	5.68	575	2.00	20.00	2.83	3.39	9.07	675	13.75	9.07	
U2	0.55	0.65	100	3.00	5.66	430	2.00	20.00	2.83	2.53	8.19	530	12.94	8.19	
U3	0.30	0.62	100	3.00	6.11	260	2.00	20.00	2.83	1.53	7.65	360	12.00	7.65	
U4	0.59	0.64	150	3.00	7.13	75	2.00	20.00	2.83	0.44	7.57	225	11.25	7.57	
V1	1.59	0.03	400	4.00	24.70	225	5.00	15.00	3.35	1.12	25.81	625	13.47	13.47	
V2	1.07	0.10	625	4.00	28.81	225	5.00	15.00	3.35	1.12	29.92	850	14.72	14.72	
V3	2.03	0.06	575	4.00	28.71	230	6.00	15.00	3.67	1.04	29.75	805	14.47	14.47	
V4	0.10	0.01	100	4.00	12.64	0	2.00	15.00	2.12	0.00	12.64	100	10.56	10.56	
V5	2.73	0.10	750	4.00	31.71	0	2.00	15.00	2.12	0.00	31.71	750	14.17	14.17	
V6	0.90	0.04	200	4.00	17.26	0	2.00	15.00	2.12	0.00	17.26	200	11.11	11.11	
W1	1.07	0.52	500	3.00	16.41	450	2.00	20.00	2.83	2.65	19.06	950	15.28	15.28	
W2	0.19	0.63	100	3.00	5.97	95	2.00	20.00	2.83	0.56	6.53	195	11.08	6.53	
X	1.93	0.01	150	15.00	9.92	0	2.00	15.00	2.12	0.00	9.92	150	10.83	9.92	

1-HR Rainfall

Return Interval (YR)	1-hour Rainfall
WQ	0.6
2	0.801
5	1.08
10	1.35
100	2.49

tc	WQ	2yr	5yr	5yr	100yr
5	2.0351	2.717	3.663	4.579	8.446
6	1.934	2.582	3.482	4.353	8.028
7	1.844	2.462	3.320	4.150	7.654
8	1.763	2.354	3.174	3.968	7.318
9	1.690	2.256	3.042	3.803	7.014
10	1.623	2.167	2.922	3.652	6.737
11	1.562	2.086	2.812	3.515	6.483
12	1.506	2.011	2.711	3.389	6.250
13	1.454	1.942	2.618	3.272	6.036
14	1.407	1.878	2.532	3.165	5.837
15	1.362	1.818	2.452	3.065	5.653
16	1.321	1.763	2.377	2.972	5.481
17	1.282	1.712	2.308	2.885	5.321
18	1.246	1.663	2.243	2.804	5.171
19	1.212	1.618	2.182	2.727	5.030
20	1.180	1.576	2.124	2.656	4.898

Project Name: Redtail Ridge - PUD1
Project No: 221236
Date: 03/03/25
Revised: 01/00/00

STANDARD FORM SF-2
Post-Development
Rational Method Procedure

Designed By: ODV
Checked By: TJS
Design Storm: 5 YR

		DIRECT RUNOFF						TOTAL RUNOFF				STREET/INLET					
BASIN (s)	DESIGN POINT	AREA (AC)	RUNOFF COEFF	T_c (min)	C x A (AC)	I (IN/HR)	DIRECT RUNOFF, Q (CFS)	T_c (MAX)	Σ(C x A) (AC)	I (IN/HR)	TOTAL RUNOFF, Q (CFS)	SLOPE (%)	STREET FLOW (CFS)	INLET DESIGN FLOW (CFS)	STREET OR INLET INTERCEPTION (CFS)	CARRYOVER (CFS)	REMARKS
O	-	0.25	0.08	7.71	0.02	3.21	0.07										
P	-	0.31	0.06	7.86	0.02	3.19	0.06										
Q	-	2.17	0.75	8.60	1.63	3.09	5.047										
R	2	3.28	0.75	8.60	2.47	3.09	7.63										
S1	4	1.24	0.04	15.14	0.05	2.44	0.12										
S2	4	0.97	0.62	8.71	0.60	3.08	1.86										
S3	-	0.90	0.62	8.67	0.56	3.08	1.72										
S4	1	1.84	0.01	13.89	0.02	2.54	0.06										
T1	1	0.71	0.75	8.81	0.53	3.07	1.63										
T2	1	0.44	0.73	7.56	0.32	3.24	1.02										
T3	1	0.44	0.61	8.44	0.27	3.11	0.83										
T4	2	0.44	0.75	5.99	0.33	3.48	1.14										
T5	2	0.80	0.58	7.66	0.46	3.22	1.49										
U1	2	0.52	0.65	9.07	0.34	3.03	1.02										
U2	2	0.55	0.65	8.19	0.36	3.15	1.12										
U3	3	0.30	0.62	7.65	0.19	3.22	0.61										
U4	3	0.59	0.64	7.57	0.38	3.23	1.23										
V1	3	1.59	0.03	13.47	0.05	2.58	0.13										
V2	3	1.07	0.10	14.72	0.11	2.47	0.27										
V3	3	2.03	0.06	14.47	0.13	2.49	0.32										
V4	4	0.10	0.01	10.56	0.00	2.86	0.00										
V5	4	2.73	0.10	14.17	0.27	2.52	0.67										
V6	4	0.90	0.04	11.11	0.04	2.80	0.11										
W1	4	1.07	0.52	15.28	0.56	2.43	1.36										
W2	4	0.19	0.63	6.53	0.12	3.39	0.41										
X	4	1.93	0.01	9.92	0.02	2.93	0.06										

Project Name: Redtail Ridge - PUD1
Project No: 221236
Date: 03/03/25
Revised: 01/00/00

STANDARD FORM SF-2
Post-Development
Rational Method Procedure

Designed By: ODV
Checked By: TJS
Design Storm: 100 YR

		DIRECT RUNOFF						TOTAL RUNOFF				STREET/INLET					
BASIN (s)	DESIGN POINT	AREA (AC)	RUNOFF COEFF	T_c (min)	C x A (AC)	I (IN/HR)	DIRECT RUNOFF, Q (CFS)	T_c (MAX)	Σ(C x A) (AC)	I (IN/HR)	TOTAL RUNOFF, Q (CFS)	SLOPE (%)	STREET FLOW (CFS)	INLET DESIGN FLOW (CFS)	STREET OR INLET INTERCEPTION (CFS)	CARRYOVER (CFS)	REMARKS
O	-	0.25	0.23	7.71	0.06	7.41	0.43										
P	-	0.31	0.21	7.86	0.07	7.36	0.48										
Q	-	2.17	0.81	8.60	1.76	7.13	12.57										
R	2	3.28	0.81	8.60	2.66	7.13	18.99										
S1	4	1.24	0.18	15.14	0.22	5.63	1.26										
S2	4	0.97	0.72	8.71	0.69	7.10	4.93										
S3	-	0.90	0.71	8.67	0.64	7.11	4.56										
S4	1	1.84	0.14	13.89	0.25	5.86	1.48										
T1	1	0.71	0.81	8.81	0.57	7.07	4.06										
T2	1	0.44	0.79	7.56	0.35	7.46	2.58										
T3	1	0.44	0.71	8.44	0.31	7.18	2.21										
T4	2	0.44	0.81	5.99	0.35	8.03	2.85										
T5	2	0.80	0.68	7.66	0.54	7.43	4.05										
U1	2	0.52	0.74	9.07	0.38	6.99	2.66										
U2	2	0.55	0.74	8.19	0.40	7.26	2.93										
U3	3	0.30	0.71	7.65	0.22	7.43	1.61										
U4	3	0.59	0.73	7.57	0.43	7.46	3.23										
V1	3	1.59	0.17	13.47	0.27	5.94	1.58										
V2	3	1.07	0.26	14.72	0.27	5.70	1.56										
V3	3	2.03	0.21	14.47	0.43	5.75	2.47										
V4	4	0.10	0.13	10.56	0.01	6.59	0.08										
V5	4	2.73	0.25	14.17	0.69	5.81	3.98										
V6	4	0.90	0.18	11.11	0.17	6.46	1.07										
W1	4	1.07	0.64	15.28	0.68	5.60	3.83										
W2	4	0.19	0.72	6.53	0.14	7.83	1.09										
X	4	1.93	0.14	9.92	0.26	6.76	1.77										

RUNOFF SUMMARY TABLE			
BASIN	**AREA (AC)**	**Q5 (CFS)**	**Q100 (CFS)**
O	0.25	0.07	0.43
P	0.31	0.06	0.48
Q	2.17	5.05	12.57
R	3.28	7.63	18.99
S1	1.24	0.12	1.26
S2	0.97	1.86	4.93
S3	0.90	1.72	4.56
S4	1.84	0.06	1.48
T1	0.71	1.63	4.06
T2	0.44	1.02	2.58
T3	0.44	0.83	2.21
T4	0.44	1.14	2.85
T5	0.80	1.49	4.05
U1	0.52	1.02	2.66
U2	0.55	1.12	2.93
U3	0.30	0.61	1.61
U4	0.59	1.23	3.23
V1	1.59	0.13	1.58
V2	1.07	0.27	1.56
V3	2.03	0.32	2.47
V4	0.10	0.00	0.08
V5	2.73	0.67	3.98
V6	0.90	0.11	1.07
W1	1.07	1.36	3.83
W2	0.19	0.41	1.09
X	1.93	0.06	1.77

APPENDIX C – Hydraulic Computations

FlexTable: Conduit Table

Label	Start Node	Stop Node	Length (User Defined) (ft)	Diameter (in)	Manning's n	Invert (Start) (ft)	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Velocity (ft/s)	System Known Flow (cfs)	Capacity (Full Flow) (cfs)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)
F-1 (p-storm)	F2 (p-storm)	O-6	413.0	36.0	0.013	5,392.51	5,374.15	0.044	15.68	29.09	140.62	5,394.26	5,375.08
F-2 (p-storm)	F3 (p-storm)	F2 (p-storm)	57.1	36.0	0.013	5,399.57	5,397.51	0.036	13.84	24.38	126.63	5,401.16	5,398.49
F-3 (p-storm)	F4 (p-storm)	F3 (p-storm)	303.9	36.0	0.013	5,404.33	5,399.77	0.015	10.04	23.97	81.69	5,405.91	5,400.88
F-3-1 (p-storm)	F3-1 (p-storm)	F3 (p-storm)	37.1	12.0	0.013	5,407.04	5,406.67	0.010	3.02	0.41	3.56	5,407.30	5,406.90
F-4 (p-storm)	F5 (p-storm)	F4 (p-storm)	36.1	36.0	0.013	5,404.71	5,404.53	0.005	6.69	23.97	47.10	5,406.29	5,406.05
F-5 (p-storm)	F6 (p-storm)	F5 (p-storm)	80.5	36.0	0.013	5,405.31	5,404.91	0.005	6.59	22.61	47.02	5,406.84	5,406.38
F-5-1 (p-storm)	F5-1 (p-storm)	F5 (p-storm)	39.1	15.0	0.013	5,408.20	5,407.44	0.019	5.29	1.36	9.01	5,408.66	5,407.77
F-6 (p-storm)	F7 (p-storm)	F6 (p-storm)	261.8	36.0	0.013	5,411.28	5,405.51	0.022	6.72	3.75	99.01	5,411.88	5,406.85
F-7 (p-storm)	F8 (p-storm)	F7 (p-storm)	48.3	24.0	0.013	5,412.52	5,412.28	0.005	4.15	3.75	15.95	5,413.20	5,412.94
F-8 (p-storm)	F9 (p-storm)	F8 (p-storm)	188.4	24.0	0.013	5,413.20	5,412.62	0.003	3.49	3.75	12.55	5,413.95	5,413.30
F-9 (p-storm)	F10 (p-storm)	F9 (p-storm)	239.0	24.0	0.013	5,414.49	5,413.30	0.005	3.46	1.98	15.96	5,414.98	5,413.95
F-9-1 (p-storm)	F9-1 (p-storm)	F9 (p-storm)	28.7	12.0	0.013	5,415.32	5,415.03	0.010	4.55	1.77	3.58	5,415.89	5,415.53
F-10 (p-storm)	F10-1 (p-storm)	F10 (p-storm)	28.7	12.0	0.013	5,415.17	5,415.03	0.005	3.52	1.98	2.49	5,415.84	5,415.63
G-1 (p-storm)	G1 (p-storm)	F6 (p-storm)	25.1	36.0	0.013	5,405.54	5,405.41	0.005	6.38	18.86	47.98	5,406.93	5,406.88
G-2 (p-storm)	G2 (p-storm)	G1 (p-storm)	239.2	36.0	0.013	5,406.84	5,405.64	0.005	6.31	18.86	47.24	5,408.23	5,406.96
G-2-1 (p-storm)	G1-1 (p-storm)	O-18	32.0	12.0	0.013	5,408.21	5,408.06	0.005	3.26	1.49	2.44	5,408.77	5,408.58
G-3 (p-storm)	G3 (p-storm)	G2 (p-storm)	300.0	36.0	0.013	5,408.63	5,407.13	0.005	6.05	16.23	47.16	5,409.92	5,408.34
G-3-1 (p-storm)	G2-1 (p-storm)	G2 (p-storm)	32.0	12.0	0.013	5,409.51	5,408.86	0.020	5.21	1.14	5.08	5,409.96	5,409.18
G-3-2 (p-storm)	G2-2 (p-storm)	O-17	32.0	12.0	0.013	5,409.68	5,409.04	0.020	4.74	0.83	5.04	5,410.06	5,409.31
G-3-3 (p-storm)	G2-3 (p-storm)	O-16	32.0	12.0	0.013	5,410.04	5,409.52	0.016	4.66	1.02	4.54	5,410.46	5,409.84
G-4 (p-storm)	G3-1 (p-storm)	G3 (p-storm)	32.0	12.0	0.013	5,409.95	5,409.79	0.005	3.41	1.63	2.52	5,410.54	5,410.33
H-1 (p-storm)	H1 (p-storm)	F2 (p-storm)	61.1	24.0	0.013	5,402.60	5,402.01	0.010	5.35	3.98	22.22	5,403.30	5,402.58
H-1-1 (p-storm)	H1-1 (p-storm)	H1 (p-storm)	14.2	12.0	0.013	5,408.78	5,408.64	0.010	4.10	1.23	3.54	5,409.25	5,409.05
H-2 (p-storm)	H2 (p-storm)	H1 (p-storm)	189.0	24.0	0.013	5,404.43	5,402.60	0.010	4.82	2.75	22.26	5,405.01	5,403.30
H-2-1 (p-storm)	H2-1 (p-storm)	H2 (p-storm)	14.2	12.0	0.013	5,408.75	5,408.61	0.010	3.37	0.61	3.54	5,409.07	5,408.89
H-3 (p-storm)	H3 (p-storm)	H2 (p-storm)	167.0	24.0	0.013	5,406.05	5,404.43	0.010	4.48	2.14	22.28	5,406.56	5,405.01
H-3-1 (p-storm)	H3-1 (p-storm)	H3 (p-storm)	14.2	12.0	0.013	5,408.76	5,408.62	0.010	4.00	1.12	3.54	5,409.21	5,409.01
H-4 (p-storm)	H4 (p-storm)	H3 (p-storm)	144.0	24.0	0.013	5,407.45	5,406.05	0.010	3.60	1.02	22.30	5,407.80	5,406.56
H-4-1 (p-storm)	H4-1 (p-storm)	H4 (p-storm)	14.2	12.0	0.013	5,408.76	5,408.62	0.010	3.89	1.02	3.54	5,409.18	5,408.99

FlexTable: Manhole Table

Label	Elevation (Ground) (ft)	Elevation (Rim) (ft)	Elevation (Invert) (ft)	Flow (Known) (cfs)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)	Flow (Total Out) (cfs)	Depth (Out) (ft)
F2 (p-storm)	5,413.63	5,413.63	5,392.51	29.09	5,394.31	5,394.26	5,396.63	5,394.98	29.09	1.75
F3 (p-storm)	5,414.01	5,414.01	5,399.57	0.00	5,401.19	5,401.16	5,402.75	5,401.80	24.38	1.59
F3-1 (p-storm)	5,412.74	5,412.74	5,407.04	0.41	5,407.42	5,407.30	5,407.52	5,407.40	0.41	0.26
F4 (p-storm)	5,413.60	5,413.60	5,404.33	0.00	5,405.93	5,405.91	5,406.62	5,406.54	23.97	1.58
F5 (p-storm)	5,413.61	5,413.61	5,404.71	0.00	5,406.29	5,406.29	5,406.97	5,406.92	23.97	1.58
F5-1 (p-storm)	5,412.17	5,412.17	5,408.20	1.36	5,408.87	5,408.66	5,409.04	5,408.83	1.36	0.46
F6 (p-storm)	5,413.78	5,413.78	5,405.31	0.00	5,406.85	5,406.84	5,406.88	5,407.44	22.61	1.53
F7 (p-storm)	5,418.08	5,418.08	5,411.28	0.00	5,411.89	5,411.88	5,412.16	5,412.10	3.75	0.60
F8 (p-storm)	5,418.56	5,418.56	5,412.52	0.00	5,413.21	5,413.20	5,413.46	5,413.45	3.75	0.68
F9 (p-storm)	5,419.23	5,419.23	5,413.20	0.00	5,413.95	5,413.95	5,414.03	5,414.14	3.75	0.75
F9-1 (p-storm)	5,418.51	5,418.51	5,415.32	1.77	5,415.89	5,415.89	5,416.12	5,416.12	1.77	0.57
F10 (p-storm)	5,419.25	5,419.25	5,414.49	0.00	5,414.99	5,414.98	5,415.24	5,415.15	1.98	0.49
F10-1 (p-storm)	5,418.51	5,418.51	5,415.17	1.98	5,415.84	5,415.84	5,416.03	5,416.03	1.98	0.67
G1 (p-storm)	5,414.02	5,414.02	5,405.54	0.00	5,406.95	5,406.93	5,407.56	5,407.47	18.86	1.39
G1-1 (p-storm)	5,412.36	5,412.36	5,408.21	1.49	5,408.98	5,408.77	5,409.15	5,408.94	1.49	0.56
G2 (p-storm)	5,413.96	5,413.96	5,406.84	18.86	5,408.24	5,408.23	5,408.81	5,408.77	18.86	1.39
G2-1 (p-storm)	5,412.36	5,412.36	5,409.51	1.14	5,410.17	5,409.96	5,410.35	5,410.13	1.14	0.45
G2-2 (p-storm)	5,412.36	5,412.36	5,409.68	0.83	5,410.24	5,410.06	5,410.38	5,410.20	0.83	0.38
G2-3 (p-storm)	5,412.36	5,412.36	5,410.04	1.02	5,410.67	5,410.46	5,410.83	5,410.62	1.02	0.42
G3 (p-storm)	5,414.80	5,414.80	5,408.63	16.23	5,409.95	5,409.92	5,410.17	5,410.40	16.23	1.29
G3-1 (p-storm)	5,412.36	5,412.36	5,409.95	1.63	5,410.76	5,410.54	5,410.94	5,410.72	1.63	0.59
H1 (p-storm)	5,412.74	5,412.74	5,402.60	0.00	5,403.30	5,403.30	5,403.42	5,403.56	3.98	0.70
H1-1 (p-storm)	5,412.39	5,412.39	5,408.78	1.23	5,409.47	5,409.25	5,409.66	5,409.43	1.23	0.47
H2 (p-storm)	5,412.74	5,412.74	5,404.43	0.00	5,405.01	5,405.01	5,405.13	5,405.22	2.75	0.58
H2-1 (p-storm)	5,412.39	5,412.39	5,408.75	0.61	5,409.22	5,409.07	5,409.34	5,409.19	0.61	0.32
H3 (p-storm)	5,412.74	5,412.74	5,406.05	0.00	5,406.56	5,406.56	5,406.60	5,406.74	2.14	0.51
H3-1 (p-storm)	5,412.17	5,412.17	5,408.76	1.12	5,409.42	5,409.21	5,409.59	5,409.38	1.12	0.45
H4 (p-storm)	5,412.78	5,412.78	5,407.45	0.00	5,407.80	5,407.80	5,408.03	5,407.92	1.02	0.35
H4-1 (p-storm)	5,412.47	5,412.47	5,408.76	1.02	5,409.39	5,409.18	5,409.55	5,409.34	1.02	0.42

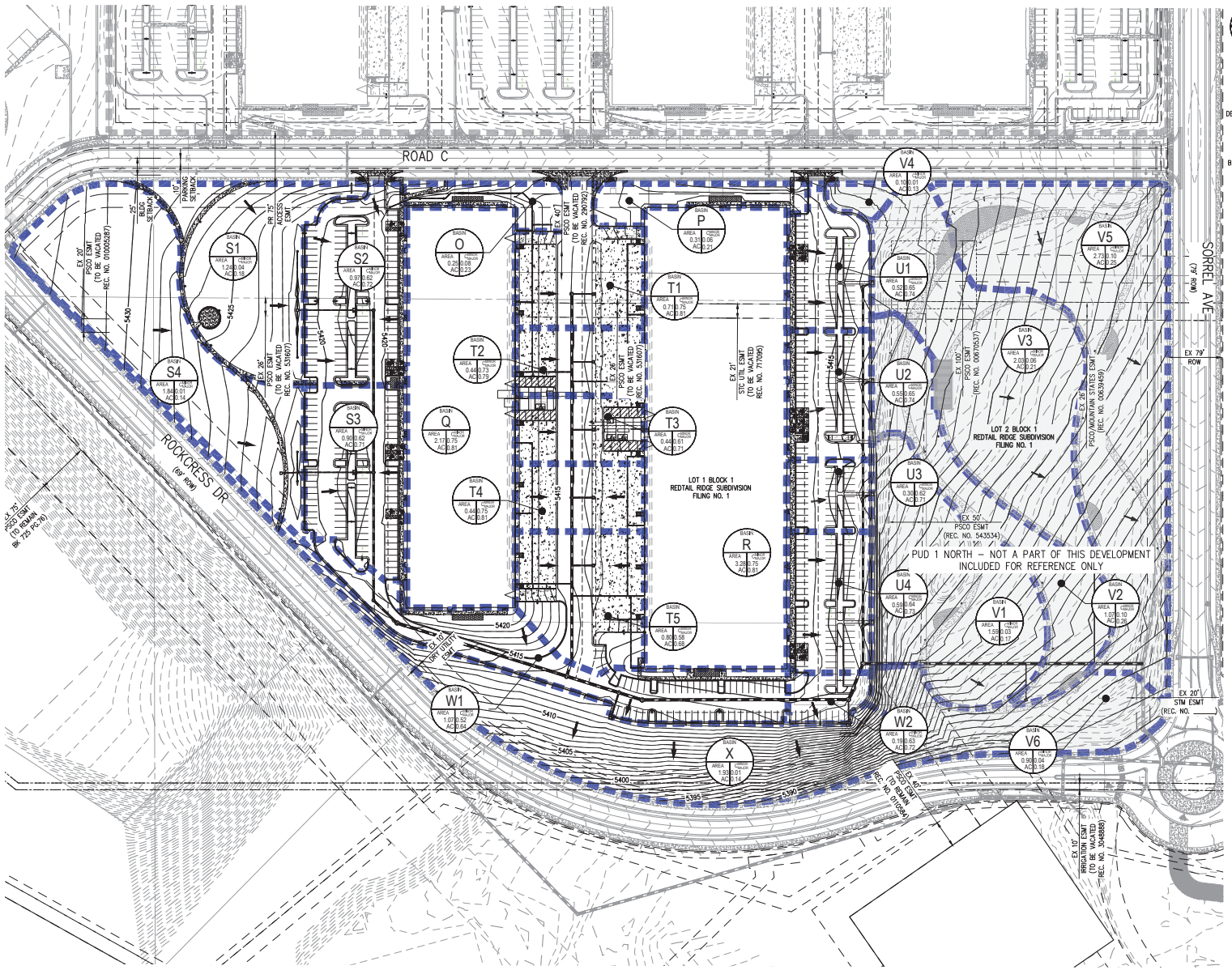
FlexTable: Conduit Table

Label	Start Node	Stop Node	Length (User Defined) (ft)	Diameter (in)	Manning's n	Invert (Start) (ft)	Invert (Stop) (ft)	Slope (Calculated) (ft/ft)	Velocity (ft/s)	System Known Flow (cfs)	Capacity (Full Flow) (cfs)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)
F-1 (p-storm)	F2 (p-storm)	O-6	413.0	36.0	0.013	5,392.51	5,374.15	0.044	20.59	80.93	140.62	5,395.29	5,375.78
F-2 (p-storm)	F3 (p-storm)	F2 (p-storm)	57.1	36.0	0.013	5,399.57	5,397.51	0.036	18.02	64.89	126.63	5,402.15	5,399.28
F-3 (p-storm)	F4 (p-storm)	F3 (p-storm)	303.9	36.0	0.013	5,404.33	5,399.77	0.015	12.78	63.80	81.69	5,406.90	5,402.37
F-3-1 (p-storm)	F3-1 (p-storm)	F3 (p-storm)	37.1	12.0	0.013	5,407.04	5,406.67	0.010	3.99	1.09	3.56	5,407.48	5,407.05
F-4 (p-storm)	F5 (p-storm)	F4 (p-storm)	36.1	36.0	0.013	5,404.71	5,404.53	0.005	9.03	63.80	47.10	5,407.63	5,407.10
F-5 (p-storm)	F6 (p-storm)	F5 (p-storm)	80.5	36.0	0.013	5,405.31	5,404.91	0.005	8.48	59.97	47.02	5,408.33	5,407.64
F-5-1 (p-storm)	F5-1 (p-storm)	F5 (p-storm)	39.1	15.0	0.013	5,408.20	5,407.44	0.019	7.04	3.83	9.01	5,408.99	5,408.02
F-6 (p-storm)	F7 (p-storm)	F6 (p-storm)	261.8	36.0	0.013	5,411.28	5,405.51	0.022	9.52	12.23	99.01	5,412.39	5,408.37
F-7 (p-storm)	F8 (p-storm)	F7 (p-storm)	48.3	24.0	0.013	5,412.52	5,412.28	0.005	5.60	12.23	15.95	5,413.83	5,413.54
F-8 (p-storm)	F9 (p-storm)	F8 (p-storm)	188.4	24.0	0.013	5,413.20	5,412.62	0.003	4.55	12.23	12.55	5,414.76	5,413.88
F-9 (p-storm)	F10 (p-storm)	F9 (p-storm)	239.0	24.0	0.013	5,414.49	5,413.30	0.005	4.76	6.19	15.96	5,415.37	5,414.76
F-9-1 (p-storm)	F9-1 (p-storm)	F9 (p-storm)	28.7	12.0	0.013	5,415.32	5,415.03	0.010	7.69	6.04	3.58	5,416.84	5,415.99
F-10 (p-storm)	F10-1 (p-storm)	F10 (p-storm)	28.7	12.0	0.013	5,415.17	5,415.03	0.005	7.88	6.19	2.49	5,416.88	5,415.99
G-1 (p-storm)	G1 (p-storm)	F6 (p-storm)	25.1	36.0	0.013	5,405.54	5,405.41	0.005	6.75	47.74	47.98	5,408.56	5,408.43
G-2 (p-storm)	G2 (p-storm)	G1 (p-storm)	239.2	36.0	0.013	5,406.84	5,405.64	0.005	7.62	47.74	47.24	5,409.61	5,408.58
G-2-1 (p-storm)	G1-1 (p-storm)	O-18	32.0	12.0	0.013	5,408.21	5,408.06	0.005	5.16	4.05	2.44	5,409.91	5,409.50
G-3 (p-storm)	G3 (p-storm)	G2 (p-storm)	300.0	36.0	0.013	5,408.63	5,407.13	0.005	7.51	40.85	47.16	5,410.79	5,409.62
G-3-1 (p-storm)	G2-1 (p-storm)	G2 (p-storm)	32.0	12.0	0.013	5,409.51	5,408.86	0.020	6.65	2.85	5.08	5,410.23	5,409.69
G-3-2 (p-storm)	G2-2 (p-storm)	O-17	32.0	12.0	0.013	5,409.68	5,409.04	0.020	6.21	2.21	5.04	5,410.32	5,410.20
G-3-3 (p-storm)	G2-3 (p-storm)	O-16	32.0	12.0	0.013	5,410.04	5,409.52	0.016	5.97	2.58	4.54	5,410.73	5,410.50
G-4 (p-storm)	G3-1 (p-storm)	G3 (p-storm)	32.0	12.0	0.013	5,409.95	5,409.79	0.005	5.17	4.06	2.52	5,411.28	5,410.87
H-1 (p-storm)	H1 (p-storm)	F2 (p-storm)	61.1	24.0	0.013	5,402.60	5,402.01	0.010	6.96	10.43	22.22	5,403.76	5,402.98
H-1-1 (p-storm)	H1-1 (p-storm)	H1 (p-storm)	14.2	12.0	0.013	5,408.78	5,408.64	0.010	5.11	3.23	3.54	5,409.55	5,409.39
H-2 (p-storm)	H2 (p-storm)	H1 (p-storm)	189.0	24.0	0.013	5,404.43	5,402.60	0.010	6.32	7.20	22.26	5,405.38	5,403.77
H-2-1 (p-storm)	H2-1 (p-storm)	H2 (p-storm)	14.2	12.0	0.013	5,408.75	5,408.61	0.010	4.40	1.61	3.54	5,409.29	5,409.09
H-3 (p-storm)	H3 (p-storm)	H2 (p-storm)	167.0	24.0	0.013	5,406.05	5,404.43	0.010	5.90	5.59	22.28	5,406.88	5,405.39
H-3-1 (p-storm)	H3-1 (p-storm)	H3 (p-storm)	14.2	12.0	0.013	5,408.76	5,408.62	0.010	5.04	2.93	3.54	5,409.49	5,409.31
H-4 (p-storm)	H4 (p-storm)	H3 (p-storm)	144.0	24.0	0.013	5,407.45	5,406.05	0.010	4.78	2.66	22.30	5,408.02	5,406.89
H-4-1 (p-storm)	H4-1 (p-storm)	H4 (p-storm)	14.2	12.0	0.013	5,408.76	5,408.62	0.010	4.95	2.66	3.54	5,409.46	5,409.27

FlexTable: Manhole Table

Label	Elevation (Ground) (ft)	Elevation (Rim) (ft)	Elevation (Invert) (ft)	Flow (Known) (cfs)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Energy Grade Line (In) (ft)	Energy Grade Line (Out) (ft)	Flow (Total Out) (cfs)	Depth (Out) (ft)
F2 (p-storm)	5,413.63	5,413.63	5,392.51	80.93	5,395.52	5,395.29	5,399.00	5,397.47	80.93	2.78
F3 (p-storm)	5,414.01	5,414.01	5,399.57	0.00	5,402.23	5,402.15	5,403.72	5,403.71	64.89	2.58
F3-1 (p-storm)	5,412.74	5,412.74	5,407.04	1.09	5,407.69	5,407.48	5,407.86	5,407.65	1.09	0.44
F4 (p-storm)	5,413.60	5,413.60	5,404.33	0.00	5,406.96	5,406.90	5,408.49	5,408.42	63.80	2.57
F5 (p-storm)	5,413.61	5,413.61	5,404.71	0.00	5,407.64	5,407.63	5,408.87	5,408.91	63.80	2.91
F5-1 (p-storm)	5,412.17	5,412.17	5,408.20	3.83	5,409.42	5,408.99	5,409.76	5,409.33	3.83	0.79
F6 (p-storm)	5,413.78	5,413.78	5,405.31	0.00	5,408.37	5,408.33	5,408.41	5,409.45	59.97	3.02
F7 (p-storm)	5,418.08	5,418.08	5,411.28	0.00	5,412.40	5,412.39	5,412.94	5,412.80	12.23	1.11
F8 (p-storm)	5,418.56	5,418.56	5,412.52	0.00	5,413.87	5,413.83	5,414.40	5,414.32	12.23	1.31
F9 (p-storm)	5,419.23	5,419.23	5,413.20	0.00	5,414.76	5,414.76	5,414.86	5,415.09	12.23	1.56
F9-1 (p-storm)	5,418.51	5,418.51	5,415.32	6.04	5,416.84	5,416.84	5,417.76	5,417.76	6.04	1.52
F10 (p-storm)	5,419.25	5,419.25	5,414.49	0.00	5,415.39	5,415.37	5,416.39	5,415.71	6.19	0.88
F10-1 (p-storm)	5,418.51	5,418.51	5,415.17	6.19	5,416.88	5,416.88	5,417.85	5,417.85	6.19	1.71
G1 (p-storm)	5,414.02	5,414.02	5,405.54	0.00	5,408.58	5,408.56	5,409.30	5,409.26	47.74	3.02
G1-1 (p-storm)	5,412.36	5,412.36	5,408.21	4.05	5,410.43	5,409.91	5,410.84	5,410.33	4.05	1.70
G2 (p-storm)	5,413.96	5,413.96	5,406.84	47.74	5,409.62	5,409.61	5,410.28	5,410.37	47.74	2.77
G2-1 (p-storm)	5,412.36	5,412.36	5,409.51	2.85	5,410.66	5,410.23	5,411.00	5,410.57	2.85	0.72
G2-2 (p-storm)	5,412.36	5,412.36	5,409.68	2.21	5,410.66	5,410.32	5,410.93	5,410.59	2.21	0.64
G2-3 (p-storm)	5,412.36	5,412.36	5,410.04	2.58	5,411.12	5,410.73	5,411.43	5,411.04	2.58	0.69
G3 (p-storm)	5,414.80	5,414.80	5,408.63	40.85	5,410.87	5,410.79	5,411.28	5,411.66	40.85	2.16
G3-1 (p-storm)	5,412.36	5,412.36	5,409.95	4.06	5,411.80	5,411.28	5,412.22	5,411.70	4.06	1.33
H1 (p-storm)	5,412.74	5,412.74	5,402.60	0.00	5,403.77	5,403.76	5,403.99	5,404.23	10.43	1.16
H1-1 (p-storm)	5,412.39	5,412.39	5,408.78	3.23	5,410.03	5,409.55	5,410.42	5,409.93	3.23	0.77
H2 (p-storm)	5,412.74	5,412.74	5,404.43	0.00	5,405.39	5,405.38	5,405.61	5,405.75	7.20	0.95
H2-1 (p-storm)	5,412.39	5,412.39	5,408.75	1.61	5,409.56	5,409.29	5,409.78	5,409.51	1.61	0.54
H3 (p-storm)	5,412.74	5,412.74	5,406.05	0.00	5,406.89	5,406.88	5,406.96	5,407.20	5.59	0.83
H3-1 (p-storm)	5,412.17	5,412.17	5,408.76	2.93	5,409.93	5,409.49	5,410.28	5,409.84	2.93	0.73
H4 (p-storm)	5,412.78	5,412.78	5,407.45	0.00	5,408.03	5,408.02	5,408.41	5,408.22	2.66	0.57
H4-1 (p-storm)	5,412.47	5,412.47	5,408.76	2.66	5,409.86	5,409.46	5,410.18	5,409.78	2.66	0.70

APPENDIX D – Final Drainage Plan



LEGEND

- RIGHT-OF-WAY
- PROPERTY BOUNDARY
- EX CONTOUR
- PR CONTOUR
- EX STORM SEWER
- PR LANDSCAPE DRAIN
- DRAINAGE BASIN BOUNDARY
- DESIGN POINT
- FLOW ARROW

BASIN DESIGNATION — BASIN A — AREA 1.0 0.53 AC 0.65 — BASIN AREA IN ACRES — C-VALUE MINOR / C-VALUE MAJOR

PUD 1 - SOUTH RUNOFF SUMMARY TABLE

MAJOR BASIN	SUB-BASIN	AREA (AC)	Q5 (CFS)	Q100 (CFS)
B-2 (POND C-2)	O	0.25	0.07	0.43
	P	0.31	0.06	0.48
	Q	2.17	5.05	12.57
	R	3.28	7.63	18.99
	S1	1.24	0.12	1.26
	S2	0.97	1.86	4.93
	S3	0.90	1.72	4.56
	S4	1.84	0.06	1.48
	T1	0.71	1.63	4.06
	T2	0.44	1.02	2.58
	T3	0.44	0.83	2.21
	T4	0.44	1.14	2.85
	T5	0.80	1.49	4.05
	U1	0.52	1.02	2.66
	U2	0.55	1.12	2.93
	U3	0.30	0.61	1.61
	U4	0.59	1.23	3.23
	V1	1.59	0.13	1.58
	V2	1.07	0.27	1.56
	V3	2.03	0.32	2.47
	V4	0.10	0.002	0.08
	V5	2.73	0.67	3.98
	V6	0.90	0.11	1.07
	W1	1.07	1.36	3.83
	W2	0.19	0.41	1.09
	X	1.93	0.06	1.77

Know what's below. Call before you dig.

70 0 70 140
SCALE: 1" = 70'

DESIGNED BY: TJS
CHECKED BY: TJS
DRAWN BY: ODV

ISSUE DATE: ##########

DATE	#	REVISION COMMENTS
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HARRIS KOCHER SMITH
1120 Lincoln Street, Suite 1000
Denver, Colorado 80203
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HarrisKocherSmith.com

STERLING BAY

REDTAIL RIDGE PUD1
DRAINAGE PLAN

PRELIMINARY NOT FOR CONSTRUCTION

PROJECT #: 221236
SHEET NUMBER
ST23
27 OF 57

NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH

FILEPATH: P:\2022\221236\ENGINEERING\DRAINAGE\DRAINAGE PLAN-PUD1-SOUTH.DWG LAYOUT: 1 (2)
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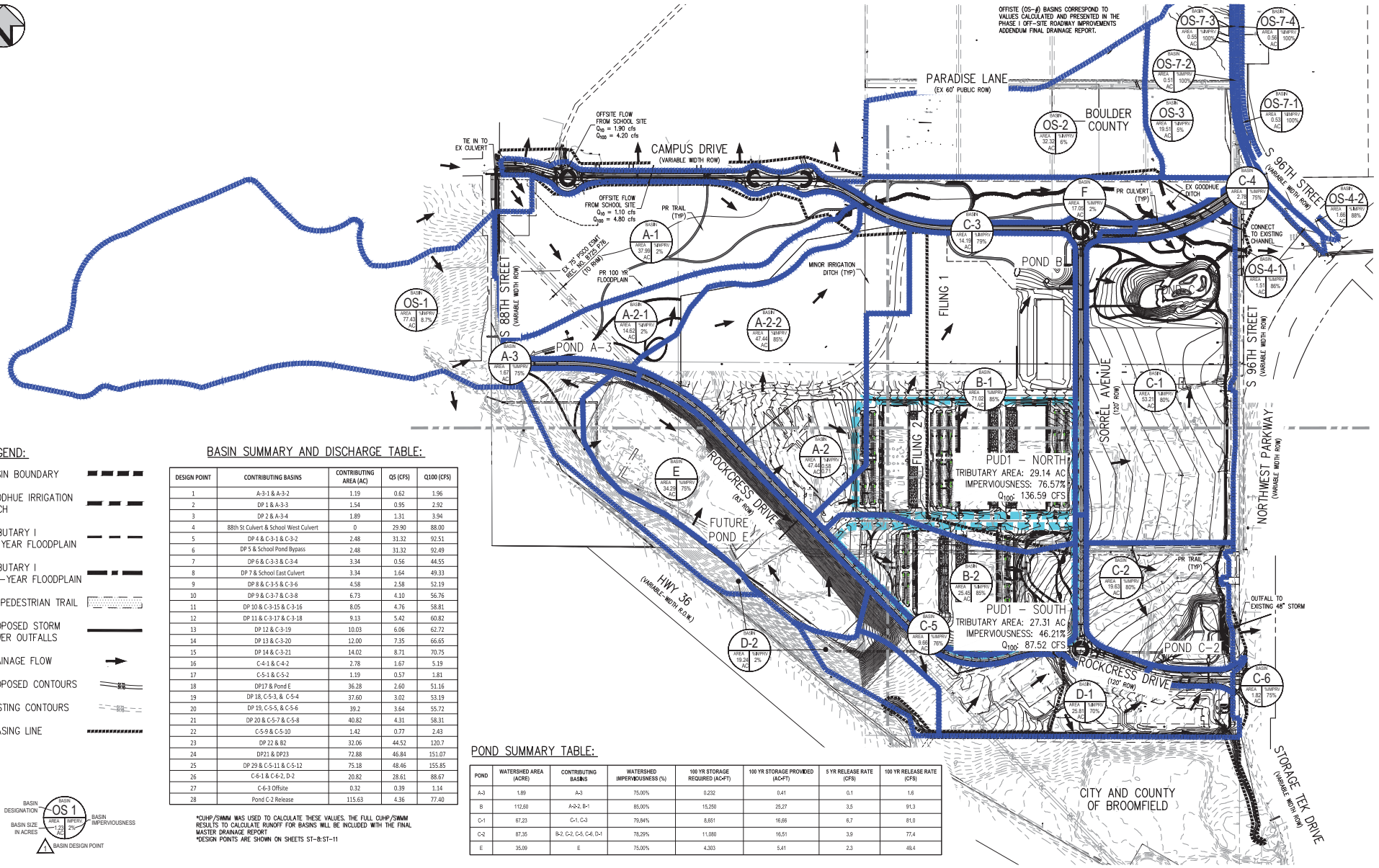
PLOTTED: FRI 09/1425 12:48P BY OWEN VAN LEHMAN

APPENDIX E – Master Drainage Plan Overlay



LEGEND:

- BASIN BOUNDARY
- GOODHUE IRRIGATION DITCH
- TRIBUTARY I 10-YEAR FLOODPLAIN
- TRIBUTARY I 100-YEAR FLOODPLAIN
- PR PEDESTRIAN TRAIL
- PROPOSED STORM SEWER OUTFALLS
- DRAINAGE FLOW
- PROPOSED CONTOURS
- EXISTING CONTOURS
- PHASING LINE

BASIN DESIGNATION — OS 1 — BASIN IMPERVIOUSNESS
BASIN SIZE IN ACRES — AREA 1.23 AC — IMPERV 2%
BASIN DESIGN POINT

BASIN SUMMARY AND DISCHARGE TABLE:

DESIGN POINT	CONTRIBUTING BASINS	CONTRIBUTING AREA (AC)	Q5 (CFS)	Q100 (CFS)
1	A-3-1 & A-3-2	1.19	0.62	1.96
2	DP 1 & A-3-3	1.54	0.95	2.92
3	DP 2 & A-3-4	1.89	1.31	3.94
4	88th St Culvert & School West Culvert	0	29.90	88.00
5	DP 4 & C-3-1 & C-3-2	2.48	31.32	92.51
6	DP 5 & School Pond Bypass	2.48	31.32	92.49
7	DP 6 & C-3-3 & C-3-4	3.34	0.56	44.55
8	DP 7 & School East Culvert	3.34	1.64	49.33
9	DP 8 & C-3-5 & C-3-6	4.58	2.58	52.19
10	DP 9 & C-3-7 & C-3-8	6.73	4.10	56.76
11	DP 10 & C-3-15 & C-3-16	8.05	4.76	58.81
12	DP 11 & C-3-17 & C-3-18	9.13	5.42	60.82
13	DP 12 & C-3-19	10.03	6.06	62.72
14	DP 13 & C-3-20	12.00	7.35	66.65
15	DP 14 & C-3-21	14.02	8.71	70.75
16	C-4-1 & C-4-2	2.78	1.67	5.19
17	C-5-1 & C-5-2	1.19	0.57	1.81
18	DP17 & Pond E	36.28	2.60	51.16
19	DP 18, C-5-3, & C-5-4	37.60	3.02	53.19
20	DP 19, C-5-5, & C-5-6	39.2	3.64	55.72
21	DP 20 & C-5-7 & C-5-8	40.82	4.31	58.31
22	C-5-9 & C-5-10	1.42	0.77	2.43
23	DP 22 & B2	32.06	44.52	120.7
24	DP21 & DP23	72.88	46.84	151.07
25	DP 29 & C-5-11 & C-5-12	75.18	48.46	155.85
26	C-6-1 & C-6-2, D-2	20.82	28.61	88.67
27	C-6-3 Offsite	0.32	0.39	1.14
28	Pond C-2 Release	115.63	4.36	77.40

*CUHP/SWMM WAS USED TO CALCULATE THESE VALUES. THE FULL CUHP/SWMM RESULTS TO CALCULATE RUNOFF FOR BASINS WILL BE INCLUDED WITH THE FINAL MASTER DRAINAGE REPORT
*DESIGN POINTS ARE SHOWN ON SHEETS ST-8:ST-11

POND SUMMARY TABLE:

POND	WATERSHED AREA (ACRE)	CONTRIBUTING BASINS	WATERSHED IMPERVIOUSNESS (%)	100 YR STORAGE REQUIRED (AC-FT)	100 YR STORAGE PROVIDED (AC-FT)	5 YR RELEASE RATE (CFS)	100 YR RELEASE RATE (CFS)
A-3	1.89	A-3	75.00%	0.232	0.41	0.1	1.6
B	112.60	A-2-2, B-1	85.00%	15.250	25.27	3.5	91.3
C-1	67.23	C-1, C-3	79.64%	8.651	16.66	6.7	81.0
C-2	87.35	B-2, C-2, C-5, C-6, D-1	78.29%	11.080	16.51	3.9	77.4
E	35.09	E	75.00%	4.303	5.41	2.3	48.4

PUD 1 OVERLAY - MASTER DRAINAGE PLAN
SCALE: 1"=300'

300 0 300 600
SCALE: 1" = 300'

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APPENDIX F – Master Drainage Report Documents

to the storm sewer in Campus drive beginning at the existing flared end section at the northwest corner of the parcel and be released into Pond C-1.

Basin B is in the central portion of the Site located to the north of Rockcress Drive, to the east of Basin A-1, to the south of Campus Drive, and to the west of Sorrel Avenue. A natural ridge in the southern portion of the parcel splits the basin into Sub-Basins B-1 draining north and B-2 draining south.

Sub-Basin B-1 will be developed to drain to a curb, gutter, inlet and storm sewer system that will release to a proposed Full Spectrum Detention Facility Pond B (hereinafter referred to as "Pond B") located at the northeast corner of Basin B. Pond B is planned to release north into Tributary I. Calculations for the design of Pond B as well as outlet structure design are included in Appendix C.

Sub-Basin B-2 drains south and is contributory to proposed Full Spectrum Detention Facility Pond C-2. A storm sewer outfall stub is provided to the southeast corner of Basin B2 to collect developed stormwater runoff from Basin B-2 and route to Pond C-2.

Basin C is in the eastern portion of the Site and generally lies east of Sorrel Avenue and west of S. 96th Street. A natural ridge in the south portion of the parcel splits the basin into Sub-Basins C-1 draining north and C-2 draining south. Basin C Sub-Basins include the portions of Campus Drive, Rockcress Drive, and Sorrel Avenue which are Tributary to Ponds C-1 and C-2.

Sub-Basin C-1 is in the northeastern portion of Basin C between Sorrel Avenue and S. 96th Street. This Sub-Basin is proposed to be developed at 80% Imperviousness. Sub-Basin C-1 contains the Full Spectrum Detention Facility Pond C-1 (hereinafter referred to as "Pond C-1"). Basin C-1 will be developed to drain to a curb, gutter, inlet and storm sewer system that will release to Pond C-1, located at the northeast corner of the basin. Pond C-1 is a planned permanent water surface facility with stormwater detention provided above the permanent water surface. This pond will follow state permit procedure for permanent water surface facilities. The outlet of Pond C-1 will release east into Tributary I.

Sub-Basin C-2 is the southeastern portion of Basin C between Sorrel Avenue and Northwest Parkway. This Sub-Basin is proposed to be developed at 80% Imperviousness. Runoff from Sub-Basin C-2 will be routed south through a proposed curb, gutter, inlet, and storm sewer system to Pond C-2 where it will be combined with flows from Sub-Basin C-5. The combined flows will then be detained for both the WQCV event and the major storm event. The outfall for Pond C-2 will be routed to the existing 48" RCP storm sewer releasing east under the Northwest Parkway.

Basin E is in the southwest portion of the Site and generally lies south of Basin A and west of Sub-Basin D-2. Stormwater runoff in Basin E is proposed to drain to a curb, gutter, inlet and storm sewer system that will release to a proposed Full Spectrum Detention Facility Pond E (hereinafter referred to as "Pond E") located in the downgradient portion of Basin E. Pond E is planned to release northeast into the proposed storm sewer for Rockcress Drive. Flows will then be routed through storm sewer to Pond C-2 where they will be detained for the WQCV event and then released to the existing 48" HDPE under the Northwest Parkway.

Basin F is in the northern portion of the Site and is existing open space and will drain as it does historically. Basin F is bound on the north by the property line and on the east, west, and south by Campus Drive. The historical flows for Basin F generally flow from the extents of the basin to the center where they meet Tributary I.

Basin OS-1 is located generally west of the Site and is existing open space and roadway areas. Basin OS-1 will drain as it does historically. The historical flows for Basin OS-1 generally flow east to S. 88th Street. Flows are conveyed under 88th St. to Tributary I in Basin A via an existing 36" RCP culvert and two 18" CMP.

Basin OS-2 is located generally north of the Site and is existing farm and residential land. Basin OS-2 will be left to drain as it does historically. The historical flows for Basin OS-2 generally flow southeast into Basin F and then Tributary I.

Basin OS-3 is located generally north of the Site, east of OS-2, and is existing farm and residential land. Basin OS-3 will also be left to drain as it does historically, into Basin F and then Tributary I.

Basins OS-4-1, OS-4-2, OS-7-1, OS-7-2, OS-7-3, and OS-7-4 are located northeast of the Site, within S 96th Ave. These basins represent improvements to be completed off-site to that roadway in conjunction with the Project. Full details on these basins may be found in the Off-Site Roadway Improvements Addendum to Redtail Ridge Subdivision Filing No. 1, submitted April 1, 2022.

TABLE 1: POND SUMMARY TABLE

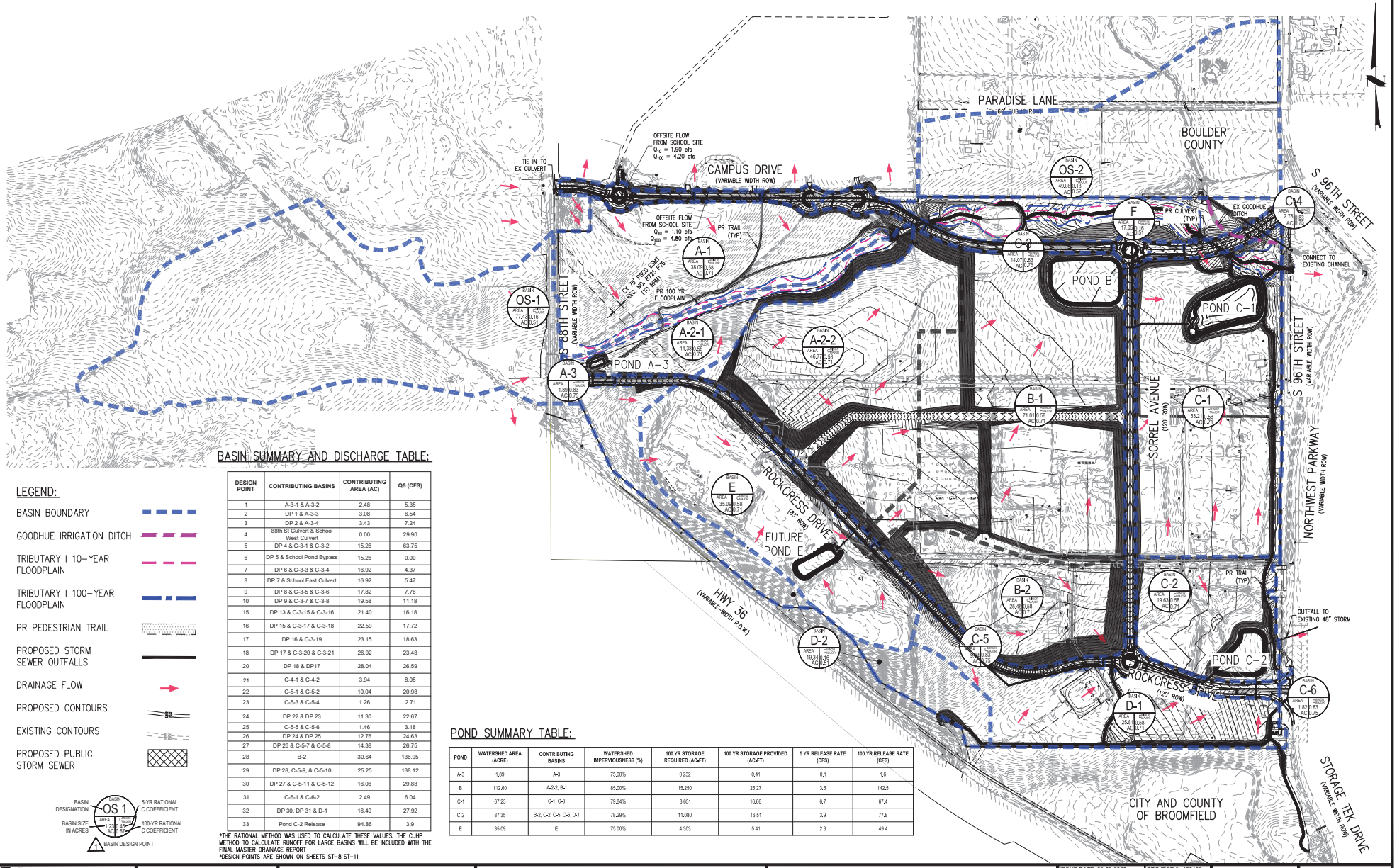
POND	WATERSHED AREA (ACRE)	CONTRIBUTING BASINS	WATERSHED IMPERVIOUSNESS (%)	100 YR STORAGE REQUIRED (AC-FT)	100 YR STORAGE PROVIDED (AC-FT)
A-3	1.67	A-3	75.0%	0.205	0.227
B	118.46	A-2-2, B-1	85.0%	16.043	17.515
C-1	67.40	C-1, C-3	79.8%	8.682	9.811
C-2	82.03	B-2, C-2, C-5, C-6, D-1	77.8%	10.357	12.446
E	34.29	E	75.0%	4.205	4.413

TABLE 2: Basin Summary Table

BASIN	AREA (AC)	IMPERVIOUSNESS (%)	Q5 (CFS)	Q100 (CFS)
A-1	37.99	2%	2.30	41.92
A-2-1	14.62	2%	0.69	13.14
A-2-2	47.44	85%	63.12	171.71
A-3	1.67	75%	1.28	3.86
B-1	71.02	85%	99.51	269.69
B-2	25.45	85%	36.89	99.68
C-1	53.21	80%	64.57	183.61
C-2	19.63	80%	31.60	88.58
C-3	14.19	79%	7.42	22.67
C-4	2.78	75%	2.42	7.26
C-5	9.66	76%	4.06	12.91
C-6	1.82	75%	1.75	5.22
D-1	25.81	70%	27.59	85.56
D-2	19.24	2%	0.98	18.34
E	34.29	75%	40.63	120.09
F	17.05	2%	0.90	16.59
OS-1	77.43	9%	8.78	99.62
OS-2	32.32	6%	1.49	40.72
OS-3	19.51	5%	1.33	44.68
OS-4-1	1.51	86%	0.98	2.83
OS-4-2	1.66	88%	1.12	3.18
OS-7-1	0.53	100%	0.35	0.93
OS-7-2	0.51	100%	0.34	0.89
OS-7-3	0.55	100%	0.35	0.92
OS-7-4	0.56	100%	0.36	0.95

C. Goodhue Ditch

The Ditch traverses the far northeast corner of the Site and is owned by the Ditch Company. The Ditch contains a defined bed and bank with fringe wetlands along portions of the banks. The Ditch is shown on the United States Geological Survey (USGS) Louisville topographic quadrangle and on the National Hydrography Dataset (NHD) as a canal/ditch and intermittent stream.



LEGEND:

- BASIN BOUNDARY
- GOODHUE IRRIGATION DITCH
- TRIBUTARY I 10-YEAR FLOODPLAIN
- TRIBUTARY I 100-YEAR FLOODPLAIN
- PR PEDESTRIAN TRAIL
- PROPOSED STORM SEWER OUTFALLS
- DRAINAGE FLOW
- PROPOSED CONTOURS
- EXISTING CONTOURS
- PROPOSED PUBLIC STORM SEWER

BASIN DESIGNATION — OS 1 — 5-YR RATIONAL C COEFFICIENT
BASIN SIZE IN ACRES — AREA 1.23 | 0.45 AC — 100-YR RATIONAL C COEFFICIENT
1 BASIN DESIGN POINT

BASIN SUMMARY AND DISCHARGE TABLE:

DESIGN POINT	CONTRIBUTING BASINS	CONTRIBUTING AREA (AC)	Q5 (CFS)
1	A-3-1 & A-3-2	2.48	5.35
2	DP 1 & A-3-3	3.08	6.54
3	DP 2 & A-3-4	3.43	7.24
4	88th St Culvert & School West Culvert	0.00	29.90
5	DP 4 & C-3-1 & C-3-2	15.26	63.75
6	DP 5 & School Pond Bypass	15.26	0.00
7	DP 6 & C-3-3 & C-3-4	16.92	4.37
8	DP 7 & School East Culvert	16.92	5.47
9	DP 8 & C-3-5 & C-3-6	17.82	7.76
10	DP 9 & C-3-7 & C-3-8	19.58	11.18
15	DP 13 & C-3-15 & C-3-16	21.40	16.18
16	DP 15 & C-3-17 & C-3-18	22.59	17.72
17	DP 16 & C-3-19	23.15	18.63
18	DP 17 & C-3-20 & C-3-21	26.02	23.48
20	DP 18 & DP17	28.04	26.59
21	C-4-1 & C-4-2	3.94	8.05
22	C-5-1 & C-5-2	10.04	20.98
23	C-5-3 & C-5-4	1.26	2.71
24	DP 22 & DP 23	11.30	22.67
25	C-5-5 & C-5-6	1.46	3.18
26	DP 24 & DP 25	12.76	24.63
27	DP 26 & C-5-7 & C-5-8	14.38	26.75
28	B-2	30.64	136.95
29	DP 28, C-5-9, & C-5-10	25.25	138.12
30	DP 27 & C-5-11 & C-5-12	16.06	29.88
31	C-6-1 & C-6-2	2.49	6.04
32	DP 30, DP 31 & D-1	16.40	27.92
33	Pond C-2 Release	94.86	3.9

*THE RATIONAL METHOD WAS USED TO CALCULATE THESE VALUES. THE CUHP METHOD TO CALCULATE RUNOFF FOR LARGE BASINS WILL BE INCLUDED WITH THE FINAL MASTER DRAINAGE REPORT
*DESIGN POINTS ARE SHOWN ON SHEETS ST-8:ST-11

POND SUMMARY TABLE:

POND	WATERSHED AREA (ACRE)	CONTRIBUTING BASINS	WATERSHED IMPERVIOUSNESS (%)	100 YR STORAGE REQUIRED (AC-FT)	100 YR STORAGE PROVIDED (AC-FT)	5 YR RELEASE RATE (CFS)	100 YR RELEASE RATE (CFS)
A-3	1.89	A-3	75.00%	0.232	0.41	0.1	1.6
B	112.80	A-2-2, B-1	85.00%	15.250	25.27	3.5	142.5
C-1	67.23	C-1, C-3	79.84%	8.651	16.66	6.7	67.4
C-2	87.35	B-2, C-2, C-5, C-6, D-1	78.29%	11.080	16.51	3.9	77.8
E	35.09	E	75.00%	4.303	5.41	2.3	49.4

811 Know what's below. Call before you dig.
CALL 3 BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.

300 0 300 600
SCALE: 1" = 300'

DESIGNED BY: TMW, JMR
CHECKED BY: MAW
DRAWN BY: TMW, JMR

HARRIS KOCHER SMITH
1120 Lincoln Street, Suite 1000
Denver, Colorado 80203
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HarrisKocherSmith.com

BRUE·BAUKOL CAPITAL PARTNERS

REDTAIL RIDGE - FILING NO. 1
FINAL DRAINAGE PLAN

ISSUE DATE: 03-03-2020	PROJECT #: 190108
DATE	REVISION COMMENTS
04-06-2020	SECOND SUBMITTAL PER CITY COMMENTS

SHEET NO.
ST - 7
ST - 7 OF ST - 43

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FILEPATH: P:\190108\ENGINEERING\DRAINAGE\2021 MASTER DRAINAGE PLAN.DWG, LAYOUT: OVERALL DRAINAGE PLAN
14 XREFs: d:\ref 190\...e-base, e-legal, e-util\...key map, p-base-f1, p-base-f2, p-dmp, p-land[1], p-legal-f1, p-hyd[1], p-util[1], stamp - storm, storm - f1 - stamp
PLOTTED: TUE 03/03/20 12:39:08 PM BY PAUL HEIDRICH

MEMORANDUM

To: City of Louisville, Public Works Department

From: Cassie Slade, P.E., PTOE

Date: March 13, 2025

Project: Redtail Ridge

Subject: PUD 1 South Traffic Conformance Letter

With increases in SF and minor traffic adjustments, will overall SF still be met within the development? This needs to be addressed here and all future developments, especially if each PUD is requesting to exceed SF from the approved GDP.

The Fox Tuttle Transportation Group has prepared this traffic conformance letter for the proposed development of industrial use located in the Industrial District of the Redtail Ridge development in Louisville, Colorado. The site is located northwest of the intersection of Rockcress Drive and Sorrel Avenue, as shown on **Figure 1** at the end of this memorandum. PUD 1 South of Redtail Ridge plans to include two (2) industrial buildings for a total of 239,082 square feet (sf) of industrial space. Concurrent with PUD 1 South, Rockcress Drive will be built from Northwest Parkway west to Road C, as well as Sorrel Avenue north to Road B, and Road C west from Sorrel Avenue to Rockcress Drive. It is understood that there will be three (3) full movement accesses on Road C to support mobility and accessibility to PUD 1 South buildings.

The purpose of this "traffic conformance letter" is to determine if the proposed use of PUD 1 South is significantly different than the trip generation assumptions for this site as analyzed in the "Master" study and to identify if additional traffic analysis is necessary.

Comparison to Master Traffic Study

A "Master" Transportation Study[1] (MTS) was previously prepared for the entire Redtail Ridge development that will include a mix of industrial, GMP, life science, office, research and development, retail, hospital and medical office uses. The two (2) buildings within PUD 1 South were assumed to be industrial uses in the MTS. Development staging in the MTS was done in phases by horizon years rather than specific PUD lots, and PUD 1 South was included within Phase 1 of the MTS. Phase 1 of the MTS assumed a total development of 509,260 sf of industrial, 300,000 sf of life science and

[1] *Redtail Ridge Traffic and Mobility Study*. Fox Tuttle Transportation Group, LLC. July 2024 (updated).

598,940 sf of GMP space by Year 2025. The proposed PUD 1 South uses are consistent with uses assumed in Phase 1 of the MTS with additional development anticipated beyond PUD 1 South in Phase 1. **The plan for PUD 1 South is consistent with the land uses and roadway needs in the MTS.**

Trip Generation

To establish the volume of trips associated with the proposed project, the data contained in the *Institute of Transportation Engineers (ITE) Trip Generation Manual*[2] for the appropriate uses was applied. The proposed land use is estimated to mostly be new trips, known as 'primary trips', which is discussed below:

Primary Trips. These trips are made specifically to visit the site and are considered "new" trips. Primary trips would not have been made if the proposed project did not exist. Therefore, this is the only trip type that increases the number of trips made on a regional basis.

Non-Auto Trips. These trips are those that are completed by walking, biking, or transit. The existing transit service will provide employees the opportunity to travel to/from work by bus rather than a personal vehicle. The planned bicycle network throughout Redtail Ridge will provide high-comfort bicycle connections to bicycle facilities near the site. The development plans to use transportation demand management (TDM) to encourage carpooling and other modes to reduce the number of single-occupant vehicle (SOV) commute trips. A non-SOV reduction of 12% was applied for all uses within Redtail Ridge.

Multi-Use (Internal) Trips. These trips are internal from one land use or building to another within the site boundaries. For example, an office patron may also use a retail store or restaurant in one vehicle trip to the site. Multi-use or multi-purpose trips typically do not affect the exterior site access points, nor add any additional traffic volumes to the adjacent street network. For this project it is projected that the small retail uses on the site will be focused on serving the office and industrial employees of the project and most (75% estimated) of the trips accessing them will be on-site or internal trips. The other end of these internal trips were attributed to the office and industrial employees and resulted in a 3% reduction for those uses. Based on this approach, the multi-use factors applied for this project were assumed to be 3% for industrial and office uses and 75% for the retail uses.

Table 1 summarizes and compares the trip generation estimated for these buildings of the MTS and the PUD 1 South site plan for weekday daily, weekday AM and weekday PM peak periods.

[2] *Trip Generation Manual*. 11th Edition. Institute of Transportation Engineers. Washington, DC. 2021.

Table 1. Trip Generation Summary and Comparison

	Land Use	Size	Unit	Non-SOV	Internal Capture	Net Reduction Factor	Average Weekday Trips Rate	Average Weekday Trips Total	Weekday AM Peak Hour Trips Rate	Weekday AM Peak Hour Trips Total	Weekday AM Peak Hour Trips In	Weekday AM Peak Hour Trips Out	Weekday PM Peak Hour Trips Rate	Weekday PM Peak Hour Trips Total	Weekday PM Peak Hour Trips In	Weekday PM Peak Hour Trips Out
MTS	#130 Industrial Park	198.00	KSF	12%	3%	85%	*	1,143	0.4	68	55	13	0.4	68	14	54
		198.00	**KSF**			**Subtotal**		**1,143**		**68**	**55**	**13**		**68**	**14**	**54**
PUD 1 South	#130 Industrial Park	237.2	KSF	12%	3%	85%	*	1,256	0.4	81	66	15	0.4	81	17	64
		237.20	**KSF**			**Subtotal**		**1,256**		**81**	**66**	**15**		**81**	**17**	**64**
	Difference in Trips (PUD 1 vs. MTS)							**113**		**13**	**11**	**2**		**13**	**3**	**10**

* ITE Equation: EXP(0.52*LN(X)+4.45)

PUD 1 South is estimated to generate slightly more trips for that space as expected in the MTS, with an increase of 13 trips in the AM and PM peak hours. Land uses and trip generation of PUD 1 South are aligned with the assumed use in the MTS, with an increase in square footage (19.8% difference) for these two buildings. It should be noted that the overall square footage in Phase 1 under the current proposal is actually slightly less than shown in the MTS. The capacity analysis in the MTS indicated the study intersections would operate acceptably (LOS D or better) with the full Phase 1 development and associated roadway improvements. The updated PUD 1 South volume adds 9 or fewer trips to any individual movement, so therefore it is expected that the study intersections will operate acceptably with the PUD 1 South trips.

Proposed Access

With the construction of PUD 1 South, internal roadways will be constructed as planned for Phase 1 of the MTS:

- Rockcress Drive: built west from Northwest Parkway to Road A.
- Sorrel Avenue: built from Rockcress Drive to Campus Drive.
- Road C: built from Rockcress Drive to Sorrel Avenue.
- Road B: built from Road A to Sorrel Avenue.
- Road A: built from Rockcress Drive to Campus Drive.

Access from the PUD 1 South buildings will be provided exclusively to Road C. Three (3) full movement side-street stop-controlled access intersections are planned on Road C. The proposed site plan including access locations is shown in **Figure 2** at the end of this memorandum.

An estimate of traffic entering and exiting the accesses was performed, based on the site plan, truck and vehicle distribution was assigned to an access point based on the building use and square footage accessible from each access. Vehicle distribution through the street network used the same distribution assumption for external trip origins and destinations that were used in the MTS.

The added trips generated by PUD 1 South at public street intersections are shown in **Figure 3**. The trips generated by PUD 1 South in the MTS are shown in **Figure 4**. Comparing **Figure 3** and **Figure 4**, PUD 1 South is expected to generate slightly more trips as are expected from that space in the MTS. The trips generated by PUD 1 South are fewer than the trips generated by the total expected in Phase 1, and therefore are expected to be accommodated by the planned roadway network found to function acceptably with the complete traffic volume anticipated for Phase 1.

Travel Demand Management

Some physical infrastructure components of the project travel demand management (TDM) are being implemented with PUD 1 South. Pedestrian connections will be built to PUD 1 South from the surrounding roadways and facilities, including paths to internal parks both east and west of the two industrial buildings in PUD 1 South. This network will provide a comfortable connection between the PUD 1 South buildings and multimodal amenities such as the circulator shuttle stops and showers and changing facilities for bicycle commuters.

Conclusions

The plan for PUD 1 South of Redtail Ridge is consistent with the land use assumptions of the MTS for the parcel with a slight increase in industrial use. PUD 1 South is expected to generate slightly more trips as expected in that space in the MTS. Access points to PUD 1 South are similar to the planned roadways and access in the MTS and are expected to distribute traffic to public streets consistent with the assumptions in the MTS. **It is anticipated that the planned roadway network and intersections can accommodate PUD 1 South trips without the need for additional analysis or mitigation measures since it is consistent with the MTS.**

Hopefully the contents of this memorandum are helpful. If you have any questions, please give me a call.

Sincerely,

FOX TUTTLE TRANSPORTATION GROUP, LLC

Cassie Slade

Cassie Slade, P.E.,PTOE
Principal

PUD 1 Area

LIFE SCIENCE DISTRICT WEST

Tot. Life Sciences Building Area (SF)	274,135
Total Parking Stalls	825
Avg. Parking Ratio per 1K GSF	3

GMP / INDUSTRIAL DISTRICT

GMP Building Area (SF)	462,804
Industrial Building Area (SF)	612,400
Total District Building Area (SF)	1,075,204
Total Parking Stalls	2,220
Avg. Parking Ratio per 1K GSF	2.09

LIFE SCIENCE DISTRICT EAST

Tot. Life Sciences Building Area (SF)	165,000
Total Parking Stalls	492
Avg. Parking Ratio per 1K GSF	3

R&D DISTRICT

Tot. R&D Building Area (SF)	117,820
Total Parking Stalls	390
Avg. Parking Ratio per 1K GSF	3.3

OFFICE DISTRICT

Total Office Building Area (SF)	342,484
Total Parking Stalls	1,435
Avg. Parking Ratio per 1K GSF	4

AMENITY/ LIFE SCIENCES

Life Science Building Area (SF)	102,621
Amenity Building Area (SF)	15,540
Total District Building Area (SF)	118,161
Total Parking Stalls	398
Avg. Parking Ratio per 1K GSF	3.36

HOSPITAL

Total Building Area	435,600

TOTAL SITE DEVELOPMENT

Total Building Area (SF)	**2,542,387**

Perkins&Will TRYBA ARCHITECTS REDTAIL RIDGE INNOVATION DISTRICT

FOX TUTTLE TRANSPORTATION GROUP

REDTAIL RIDGE PUD 1 SOUTH CONFORMANCE

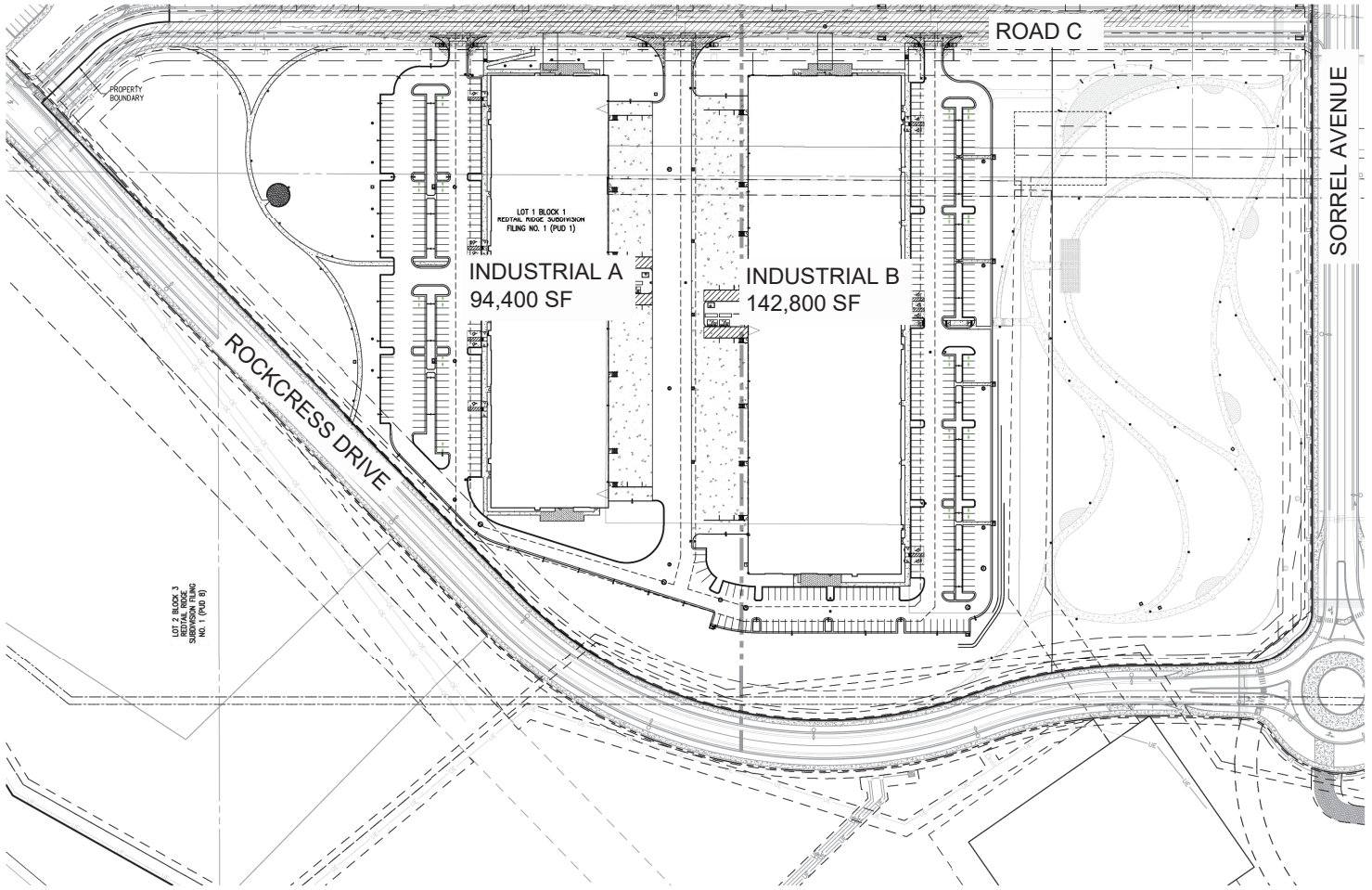
PUD 1 SOUTH AREA

FT Project #	19055	Original Scale	NTS	Date	3/13/2025	Drawn by	SKK	Figure #	1

REDTAIL RIDGE FILING NO. 1

PLANNED UNIT DEVELOPMENT

LOT 1 BLOCK 1 & LOT 2 BLOCK 1



LEGEND:

- PROPERTY BOUNDARY
- RIGHT-OF-WAY
- EXISTING STM SEWER W/MH AND INLET
- EXISTING SANITARY SEWER W/MH
- EXISTING WATER LINE W/ VALVE
- EXISTING GAS LINE
- EXISTING UNDERGROUND ELECTRIC
- EXISTING JOINT TRENCH
- EXISTING STREET LIGHT
- EXISTING TELEPHONE POLE
- EXISTING FIRE HYDRANT
- PROPOSED SANITARY SEWER W/MH
- PROPOSED SANITARY SERVICE W/CLEAN OUT
- PROPOSED STORM SEWER W/ MH AND INLET
- PROPOSED LANDSCAPE DRAIN W/ INLET
- PROPOSED FIRE HYDRANT
- PROPOSED 8" WATER MAIN W/ BENDS, VALVE, AND TEE
- PROPOSED WATER SERVICE W/METER
- PROPOSED FIRE SERVICE
- PROPOSED STREET LIGHT
- PROPOSED PEDESTRIAN LIGHT
- PROPOSED BUILDING ENTRANCE
- PROPOSED TRANSFORMER AND GENERATOR
- ABANDON EXISTING UTILITY LINE
- PROPOSED CONCRETE
- PROPOSED CONCRETE PAVERS
- PROPOSED PORCELAIN PAVERS
- PROPOSED CRUSHER FINES

ABBREVIATIONS	
BLDG	BUILDING
C&G	CURB & GUTTER
CONC	CONCRETE
DS	DOWNSPOUT
DUE	DRY UTILITY EASEMENT
ELEC	ELECTRIC
EMMT	EASEMENT
EX	EXISTING
FF	FINISHED FLOOR
FH	FIRE HYDRANT
FL	FLOW LINE
GV	GATE VALVE
HT	HEIGHT
MH	MANHOLE
N	NORTH, NORTHING
PED	PEDESTRIAN
PL	PROPERTY LINE
PR	PROPOSED
ROW	RIGHT-OF-WAY
SME	SURFACE MAINTENANCE EASEMENT
SS	SANITARY SEWER
STM	STORM
TYP	TYPICAL
UG	UNDERGROUND
WAT	WATER

N

100 0 100 200

SCALE: 1" = 100'

PROJECT # 22126

OVERALL SITE PLAN

SHEET 2 OF 36

REVISION DATE: ISSUE DATE: ##-##-202#

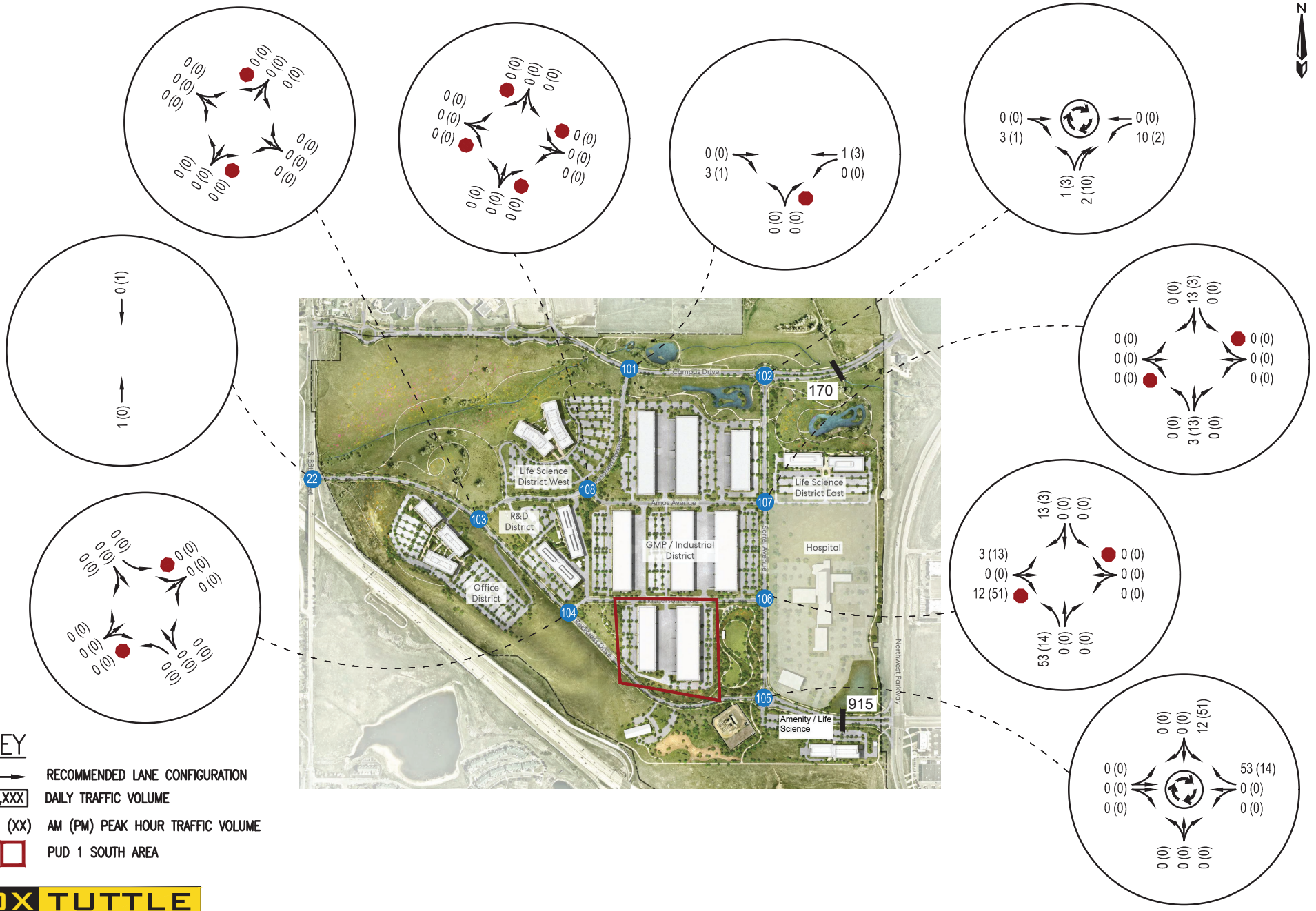
REDTAIL RIDGE PUD1 SOUTH

FOX TUTTLE TRANSPORTATION GROUP

REDTAIL RIDGE PUD 1 SOUTH CONFORMANCE

PUD 1 SOUTH SITE PLAN

FT Project #	19055	Original Scale	NTS	Date	3/13/2025	Drawn by	SKK	Figure #	2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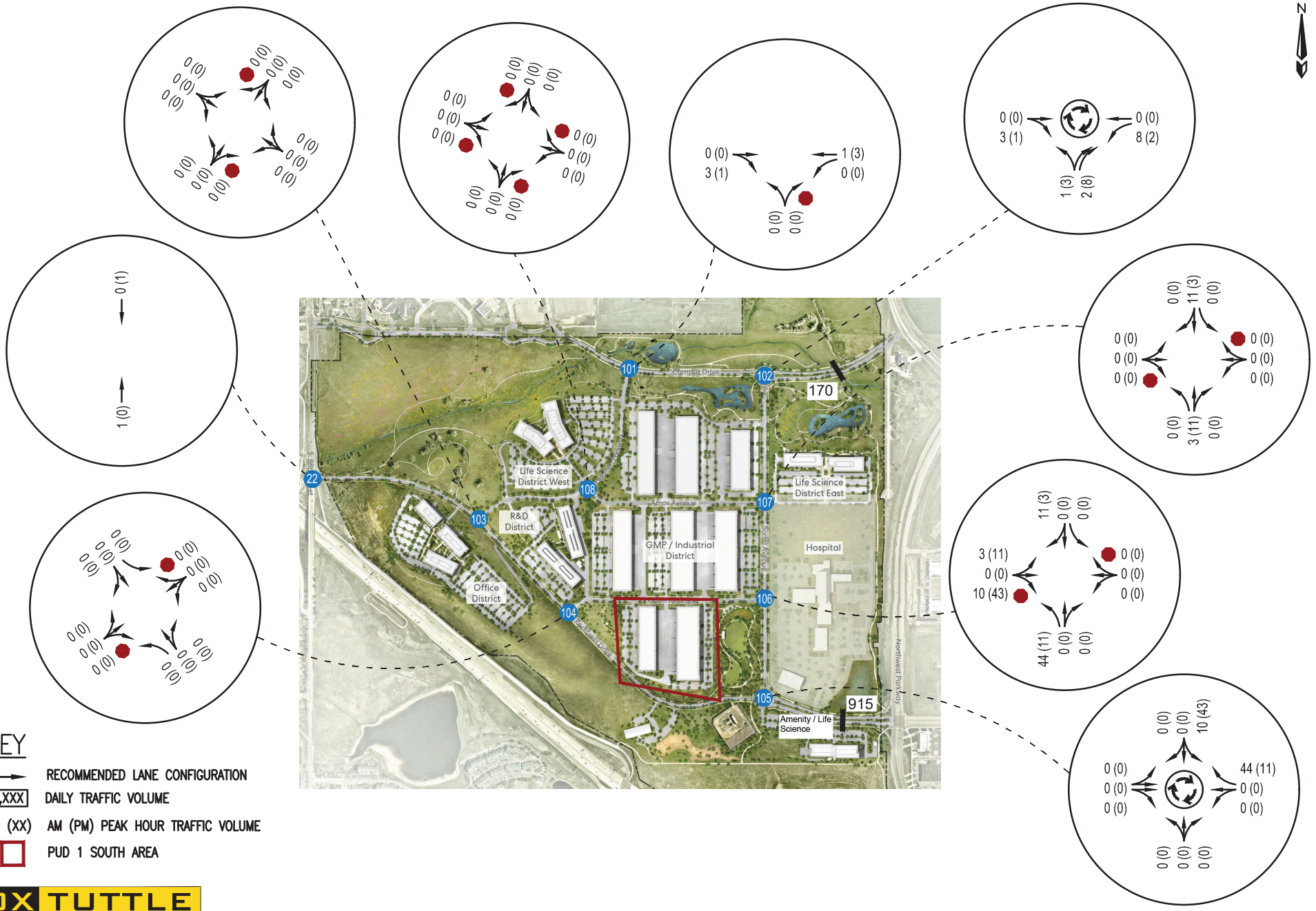
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HARRIS KOCHER SMITH
DENVER • DALLAS/FORT WORTH

March 14, 2025

Attention: Recipient Name
City of Louisville
749 Main Street
Louisville, CO 80027

Redtail Ridge PUD 1 – South

Utility Conformance Letter

HKS Project No. 221236

Add lift station sizing information to the report.

At this point, square footage increases must be done through a GDP amendment unless other PUDs will be reducing their SF to accommodate this increase in SF. Address this in all areas of the PUD submittal.

To whom it may concern,

The purpose of this letter is to serve as a formal recognition of PUD 1 South's compliance with the Redtail Ridge Final Master Utility Report dated January 27, 2021, revised March 3, 2023. This report analyzed water and sanitary sewer utilities to serve the Redtail Ridge development. A copy of the Final Master Utility Report has been included with this Utility Conformance Letter. The results below were calculated using assumptions provided by Dewberry that estimate sanitary sewer and water demands based on square footage of the proposed buildings. Water demands based on preliminary fixture counts for PUD 1, received from RTM Engineering, suggests that the flows based on square footage as they have been calculated in this letter and in the Final Master Utility Report, are higher than the PUD 1 site would require during operation. PUD 1 has been further subdivided since the Final Master Utility Report into PUD 1 North and PUD 1 South. For the purposes of ensuring compliance with the Final Master Utility Report, PUD 1 North and PUD 1 South are assumed be two parts of one PUD 1 utility planning area.

Proposed Sanitary Sewer System

The proposed Redtail Ridge PUD 1 South buildings will discharge into sanitary sewers constructed beneath the private road north of the site. The sanitary main will flow east and discharge into Sanitary Sewer Line A of the Redtail Ridge master project within Sorrel Avenue as is outlined in the Final Master Utility Report.

The Final Master Utility Report estimated that PUD 1 would have an area of 654,500 sq. ft with a peak flow of 223.8 GPM. At the time of writing this report, PUD 1 is expected to have a building area of 680,600 sq. ft with a peak flow of 231.3 GPM. Both peak flows are the high-density sanitary demands as outlined in the Final Master Utility Report. PUD 1 South will contribute 80.6 GPM at peak sanitary flow.

PUD 1 North and PUD 1 South are assumed to have the same peaking factor as the whole of PUD 1. Table 1 below shows the sanitary demand information published in the Redtail Ridge Final Master Utility Report and the sanitary demand using the current building information.

Table 1: Utility Report Sanitary Demand

PUD 1 - Industrial	Area (sq. ft)	Annual Average Daily Demand (GPD)	Average Daily Demand (GPM)	Average Daily Demand (CFS)	Peak Factor	Peak Flow (GPM)	Peak Flow (CFS)
PUD 1 North	443,400	61,324.8	42.6	0.095		150.7	0.336
PUD 1 South	237,200	32,806.1	22.8	0.051		80.6	0.180
PUD 1 Utility Conformance	680,600	94,131	65.4	0.146	3.54	231.3	0.515
Final Master Utility Report (PUD1)	654,500	90,521	62.9	0.140	3.56	223.8	0.499

The sanitary flows from PUD 1 are now higher than expected in the Final Master Utility Report. The sanitary system designed in the master project will have capacity to convey the slightly higher sanitary flows of PUD 1. The Final Master Utility Report anticipated that PUD 1-4, 6, 7 would "…be collected by Sanitary Line A at some point within Sorrel Avenue." Sanitary Line A, a 12" PVC sanitary main is designed with a minimum slope of 0.22% and can convey 2.172 CFS when flowing full at the minimum slope. The Final Master Utility Report anticipated that PUD 1-4, 6, 7 would generate a peak flow of 1.474 CFS; after the slight increase in sanitary demand, the peak flow for PUD 1-4, 6, 7 would be 1.490 CFS. Sanitary Line A will be flowing at 68.6% of the minimum slope pipe capacity.

Proposed Water System

PUD 1 South will construct water main loops through the parking lots from the 8" water mains constructed under the internal private roads on the north of PUD 1 South. The 8" water main north of PUD 1 South connects to 12" water mains in Sorrell Ave and Rockcress Dr. The 8" water main north of PUD 1 South will also connect to the future PUD 1 North.

Table 2, below, shows the water demands calculated in the Final Master Utility Report and the water demands based on the current square footage for PUD 1 North, PUD 1 South, and PUD 1 as a whole. The peaking factor for all is 2.68 as was requested by the City in the Final Master Utility Report.

Table 2: Utility Report Water Demand

PUD 1 - Industrial	Average Daily Demand (GPD)	Average Daily Demand (GPM)	Peak Day Demand (GPD)	Peak Day Demand (GPM)
PUD 1 North	71,831	49.9	192,507	133.7
PUD 1 South	38,426	26.7	102,983	71.5
PUD 1 Utility Conformance	110,257	76.6	295,489	205.2
Final Master Utility Report (PUD 1)	108,625	75.4	291,116	202.2

Fire flows for PUD1 South will be higher than the 2,500 G…er Utility Report. The largest building of PUD 1 South will have a required fi…cts of this higher fire flow have been evaluated. The model has been includ…

Address lift station and wastewater treatment facility implication in this report/

With the updated PUD 1 demand, the maximum day dem…es from 1.204 MGD to 1.206 MGD. Using the highest water demand for the City water system between 2012 and 2019 was 8.735 MGD. The total estimated peak demand for the City, including all of Redtail Ridge, will be 9.941 MGD. The water treatment plants have a treatment capacity of 13.0 MGD and a pumping capacity of 11 MGD. The demand for water will still be under the treatment and pumping capacity for the City.

Preliminary fixture counts have been completed by RTM Engineering which estimated a peak demand of 600 GPM. Dewberry has confirmed that Average Daily Demands are expected to be 1/10th of the peak demands, meaning PUD 1 would expect to have an Average Daily Demand of 60 GPM, which is in compliance with the Final Master Utility Report.

Conclusion

If calculated using the same method as the Final Master Utility Report, PUD 1 will have higher water and sanitary demands than were anticipated in the Final Master Utility Report but both the sanitary and water systems are under the capacity for the master utilities. If the preliminary fixture counts are utilized to estimate future flows, then both the sanitary and water systems proposed will have lower demands than was anticipated in the Final Master Utility Report.

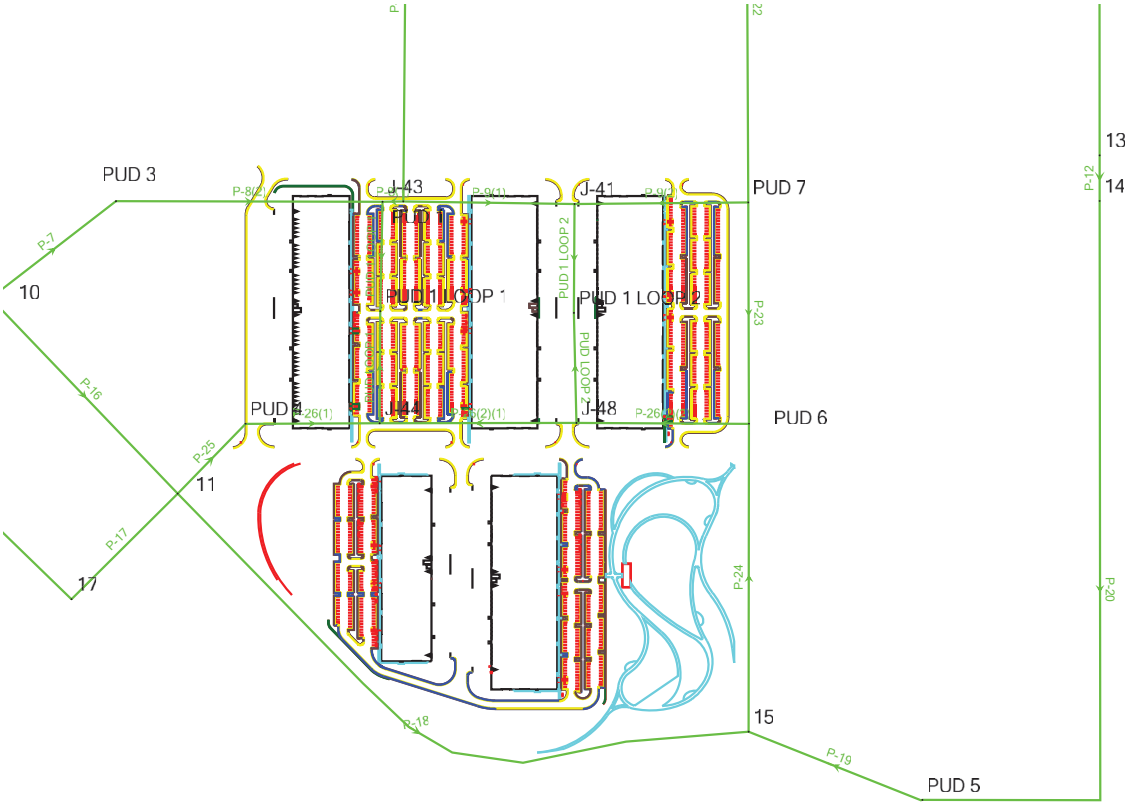
Please contact me if you have any questions or require additional information at jgrant@hkseng.com or 303-623-6300.

Sincerely,

HARRIS KOCHER SMITH

Jarrett Grant
Project Manager

Scenario: PUD 1 Fire



FlexTable: Pipe Table

Label	Length (Scaled) (ft)	Diameter (in)	Flow (gpm)	Material	Velocity (ft/s)	Headloss Gradient (ft/ft)
P-26(2)(1)	626	8.0	-60	PVC	0.38	0.000
P-18	2,159	12.0	211	PVC	0.60	0.000
P-9(1)	545	8.0	131	PVC	0.84	0.000
P-19	595	12.0	-310	PVC	0.88	0.000
P-24	980	12.0	-521	PVC	1.48	0.001
P-15	820	8.0	264	PVC	1.68	0.001
P-17	476	8.0	264	PVC	1.68	0.001
P-23	704	12.0	736	PVC	2.09	0.001
EX-7	1,414	8.0	-367	DIP	2.34	0.002
P-20	2,473	8.0	-367	PVC	2.34	0.002
P-12	145	8.0	-367	PVC	2.34	0.002
P-2(1)	556	12.0	825	PVC	2.34	0.001
P-2(2)	525	12.0	825	PVC	2.34	0.001
P-16	861	12.0	879	PVC	2.49	0.002
P-13	479	8.0	392	PVC	2.50	0.002
P-14	747	8.0	392	PVC	2.50	0.002
P-4	528	12.0	-905	PVC	2.57	0.002
P-3	663	12.0	-905	PVC	2.57	0.002
EX-11	1,761	8.0	-451	DIP	2.88	0.003
EX-10	185	8.0	-471	DIP	3.01	0.003
P-8(1)	66	8.0	488	PVC	3.11	0.004
EX-9	718	8.0	-490	DIP	3.13	0.004
EX-2	831	18.0	2,570	DIP	3.24	0.002
EX-8	284	8.0	-517	DIP	3.30	0.004
P-8(2)	848	8.0	-582	PVC	3.72	0.005
EX-1	39	18.0	3,088	DIP	3.89	0.002
EX-4	2,066	12.0	1,470	PVC	4.17	0.004
EX-3	166	12.0	1,477	PVC	4.19	0.004
P-6	697	12.0	1,604	PVC	4.55	0.005
P-7	504	8.0	-725	PVC	4.63	0.008
P-22	1,269	12.0	-1,730	PVC	4.91	0.005
P-1	960	12.0	1,921	PVC	5.45	0.007
P-26(1)	427	8.0	871	PVC	5.56	0.011
P-5	2,686	12.0	1,996	PVC	5.66	0.007
EX-12	118	8.0	903	DIP	5.76	0.012
P-21	1,281	8.0	906	PVC	5.78	0.012
PUD LOOP 1	357	8.0	-930	Ductile Iron	5.94	0.016
P-25	310	8.0	932	PVC	5.95	0.012
PUD LOOP 2	350	8.0	-933	Ductile Iron	5.95	0.016
P-9(2)	552	8.0	-936	PVC	5.97	0.012
P-26(2)(2)	549	8.0	-993	PVC	6.34	0.014
PUD 1 LOOP 2	347	8.0	1,067	Ductile Iron	6.81	0.021
PUD 1 LOOP 1	348	8.0	1,070	Ductile Iron	6.83	0.021
EX-5	481	8.0	-1,271	DIP	8.12	0.022
EX-6	252	8.0	-1,271	DIP	8.12	0.022

FlexTable: Junction Table

Label	Elevation (ft)	Demand (gpm)	Pressure (psi)
2	5,475.00	0	65
3	5,470.00	0	67
4	5,430.00	0	80
6	5,393.70	0	93
7	5,380.00	0	99
8	5,370.00	0	104
9	5,432.07	0	75
10	5,420.02	0	79
11	5,396.13	0	89
13	5,367.00	0	104
14	5,368.11	0	103
15	5,377.00	0	97
16	5,430.00	0	76
17	5,395.00	0	89
18	5,370.00	0	108
IFM	5,470.66	27	67
J-40	5,402.71	0	89
J-41	5,393.29	0	87
J-43	5,401.44	0	83
J-44	5,388.01	0	89
J-48	5,385.09	0	90
JVL	5,467.02	7	68
MHS	5,456.88	20	71
MK8	5,459.71	19	70
PUD 1	5,400.00	287	84
PUD 1 LOOP 1	5,394.81	2,000	83
PUD 1 LOOP 2	5,389.21	2,000	86
PUD 2	5,412.25	190	85
PUD 3	5,420.00	143	77
PUD 4	5,390.00	62	90
PUD 5	5,370.00	57	100
PUD 6	5,382.52	264	94
PUD 7	5,386.49	58	93
PUD 8	5,410.00	128	83

FINAL MASTER UTILITY REPORT

for

REDTAIL RIDGE

CITY OF LOUISVILLE
BOULDER COUNTY
STATE OF COLORADO

January 27, 2021
Revised: March 3, 2023

Prepared for:

STERLING BAY
333 North Green
Suite 1100
Chicago, Illinois 60607

Prepared by:

1120 Lincoln Street, Suite 1000
Denver, CO 80203
Ph: 303-623-6300, Fax: 303-623-6311

Contact: Tim Sayler, PE
Tim Hoffman, PE
Harris Kocher Smith Project No. 190108

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ENGINEER CERTIFICATION

“This report for the utility design of Redtail Ridge was prepared by me (or under my supervision) in accordance with the provisions of the City of Louisville Design and Construction Standards; and designed to comply with the provisions thereof. I understand that the City of Louisville does not, and will not, assume liability for water and sanitary sewer facilities designed by others.”

_____

Tim Sayler, P.E.
Licensed Professional Engineer
State of Colorado
No. 56955
On behalf of Harris Kocher Smith

1. INTRODUCTION

A. Site Location and Description

The proposed Redtail Ridge Site (hereinafter referred to as "Site") is situated in the City of Louisville (hereinafter referred to as "City"); specifically, the Northeast ½ and South ½ of Section 20, the North ½ of Section 29, and the Northwest ¼ of Section 28, Township 1 South, Range 69 West of the 6th P.M. Counties of Boulder and Broomfield, State of Colorado. The Site is generally located East of S. 88th Street, South of Campus Drive, West of S. 96th Street and Northwest Parkway, and Northeast of Highway 36. A Vicinity Map is included in Appendix A, for reference.

The Site is approximately 389.1 acres and was a formerly developed office campus with recreational facilities. The Site is currently covered with grass vegetation, remnants of building slabs, and several private roadways. The proposed uses for the Site include industrial, office, retail, public open space, trail open space, and private open space.

B. Existing Water and Sewer Infrastructure

Maps provided by the City show existing water lines adjacent to the Site. These existing water lines consist of an 18-inch Polyvinyl Chloride ("PVC") main that runs south within S. 88th Street and downsizes to 12-inch PVC at the intersection of S. 88th Street and Campus Drive. A 12-inch main continues east within Campus Drive and then the public main terminates at the east end of the existing Campus Drive right-of-way. There is also an existing 8-inch Ductile Iron Pipe ("DIP") main that runs south within S. 96th Street and terminates at the intersection of S. 96th Street and Disc Drive. Finally, there are existing private mains on-Site, not within any known easement, that connects to the 12-inch PVC at the terminus of the Campus Drive right-of-way and runs east and south throughout the Site, terminating at a facility on-Site near Disk Drive.

A conceptual drawing of the existing water and proposed water can be found in Appendix F, for reference. Copies of the Utility Maps provided by the City can be found in Appendix C, for reference.

There are two sanitary sewer mains near the Site, according to the maps provided by the City. The first main terminates at the intersection of S. 88th Street and Campus Drive. At this location, the sanitary sewer main is an 8-inch PVC main which continues north into existing development north of the Site. The second main is an existing force main originating from an existing lift station on-Site and continuing north from the Site to terminate at a sanitary sewer manhole located approximately 3,600 feet north of Dillon Road.

A conceptual drawing of the existing sanitary sewer and proposed sanitary sewer can be found in Appendix F, for reference. Copies of the Utility Maps provided by the City can be found in Appendix C, for reference.

There are also portions of two City utility atlases in Appendix C. The first atlas is from the 2018 utility map book Index and does not include the existing sanitary sewer force main mentioned above. The second atlas is from the 2007 utility atlas index and does include the existing sanitary sewer force main mentioned above.

C. Previous Utility Studies

The *City of Louisville's 2013 Comprehensive Plan*, (hereinafter referred to as "Plan") analyzes both the existing water and sewer systems for the City. According to the Plan, the water supply originates from the South Boulder Creek Project, the Northern Colorado Water Conservancy District Colorado Big Thompson Project, and the Windy Gap Project. Water from these projects is treated at the following two water treatment facilities: the Howard Berry Plant (hereinafter referred to as "HBWTP") and the North Water Treatment Plant (hereinafter referred to as "NWTP"). The Plan concludes that the water supply and treatment capacity for the City is enough to accommodate the expected 20-year built-out of the City. Reference the Plan located in Appendix B for details. As far as the sewer for the City is concerned, the Plan indicates that the current City of Louisville Wastewater Treatment Plant (hereinafter referred to as "Plant") is currently operating at a daily average of 2 million gallons per day ("MGD"), which is approximately 59% of its operational capacity. In 1999, the Plant was updated to carry a maximum permitted capacity of 3.4 MGD; however, the Plan notes that the Plant had reached the end of its useful life by 2013. As such, the Plant will require upgrades unrelated to the proposed development of the Site to comply with current regulatory water quality requirements. The anticipated plan to update the Plant are discussed in the *City of Louisville Wastewater Facility Plan* and summarized below. Excerpts from the Plan are included in Appendix B, for reference.

According to the *City of Louisville Water System Facilities Plan Final Report* (hereinafter referred to as "Water Plan") prepared by Hatch Mott MacDonald, dated July 2012, the water available to the Site is from the NWTP which supplies 8 MGD to the existing water system. Together with the HBWTP with a supply of 5 MGD, the City has a gross treatment capacity of 13 MGD. The NWTP's pump station was rebuilt and moved in 2018. As of the date of this report it is not known if the operations performed in 2018 increased pumping capacity. The NWTP supplies pressurized water to both the high-pressure and mid-pressure zone pressure areas and gravity feeds to the low-pressure zone. The HBWTP pumps water to the high-pressure zone and gravity feeds the mid-pressure zone. Water is also able to "download" from the high-pressure zone to the mid-pressure zone through pressure reducing valves and zone valves operated by City staff. The Site will connect to the existing mid-pressure zone water system within Campus Drive and S. 88th Street. The mid-pressure zone system is intended to store 3.5 Million Gallons ("MG") of the 8.5 MG stored in the City's water system. As stated within the Water Plan, the 8.5 MG of storage is acceptable, and the entire storage should be maintained. Excerpts from the Water Plan are included in Appendix B, for reference.

The *City of Louisville Wastewater Facility Plan* (hereinafter referred to as "The Sewer Plan" prepared by Dewberry, dated April 2013, indicates that the Plant has a rated

capacity of 3.4 MGD and receives wastewater from approximately 63 miles of sanitary sewer, ranging from 8-inch PVC to 27-inch PVC. The Sewer Plan predicts a full build-out of the City by 2034 that will produce an average daily maximum month influent flow of 2.45 MGD. That said, the Plant has enough capacity for the full build-out of the City as the Sewer Plan concludes that the current Plant's treatment facilities are out of date. Current regulations concerning water quality require stricter levels of regulation compared to when the Plant was upgraded in 1999. Given this information, the Plant needed to be upgraded to comply with current regulations in support of the proposed development of the City unrelated to the development of the Site. These upgrades to the Plant were completed in 2018 based on the recommendations within the Sewer Plan. Excerpts from Sewer Plan are included in Appendix B, for reference.

D. Design Criteria

The City of Louisville criteria (hereinafter referred to as "City Criteria") was used for this report and supplemented with historical data. Additionally, calculations and demands were also coordinated with Dewberry based on historical City data to ensure consistency and confidence in providing water and sewer service to the Site.

Technical memos prepared by Dewberry, discussing the proposed water demand, sanitary sewer flows, the proposed lift station design, and the proposed improvements to the Louisville Wastewater Treatment Plant. These memos, *Dewberry Technical Memo 1 City of Louisville and Redtail Ridge Development Flows and Loads*, *Dewberry Technical Memo 1 City of Louisville and Redtail Ridge Development Projected Water Demand, Dewberry Technical Memo 2 - Wastewater Treatment Infrastructure, and Technical Memo 3 City of Louisville WWTP Wastewater Infrastructure Improvement Triggers* (hereinafter referred to as "WWTP Memos"). The WWTP Memos describing the flows and infrastructure enhancements to the Plant contain tables listing the criteria used for these elements of the proposed sanitary sewer system.

E. Project Timeline

Reference *"Table 5: PUD Totals,"* on page 14, to view the development area associated with each PUD. Redtail Ridge will be built in two phases. Site utility construction will be performed with the first phase. Water lines, sanitary sewer, storm sewer and water quality facilities will be constructed to serve all the PUD areas. PUD areas 1-4 will be built with the first phase. Re remaining PUD's 5-8 will be built in a second phase. The final build-out will be evaluated, for sizing of the main public utilities in this report. A Utility Plan can be found in Appendix F, showing the location of the proposed utilities to be built. *"Table 5: PUD Totals,"* shown on page 14, details the anticipated use and square footage to be built with each PUD. As site-specific development applications are submitted to the City, each development will need to provide a compliance letter showing conformance with this Final Master Utility Report.

2. PROPOSED SANITARY SEWER SYSTEM

A. On-Site Layout and Connection Options to City of Louisville Sanitary Sewer System

The proposed sanitary sewer system on-Site will connect to the off-Site improvements at the intersection of Rockcress Drive (formally known as Tape Drive) and Northwest Parkway, near the southeast corner of the Site. This serves as the low point for the entire Site where all sanitary sewer flows can eventually reach by gravity flow. From this intersection, there will be proposed sanitary sewer mains running north and west to provide service to the different development parcels within the Site.

The proposed sanitary sewer line within Campus Drive (hereinafter referred to as "Line A") will begin on the north side of Rock Creek Tributary I within the eastern portion of the City Owned Parcel, from there it is routed south across the Rock Creek Tributary I and back into Campus Drive near the northeast corner of Parcel A. Line A will then run east to the intersection of Campus Drive and Sorrel Avenue, then south within Sorrel to Rockcress Drive. Line A runs east towards Northwest Parkway then turns south at the intersection of Rockcress Drive and Northwest Parkway and terminate at the proposed lift station in the southeast corner of the Site.

The proposed sanitary sewer line within Rockcress Drive, west of Sorrel Avenue (hereinafter referred to as "Line B"), will begin at the intersection of Rockcress Drive and Sorrel Avenue and run west within Rockcress Drive approximately 185 feet and will terminate with a manhole and provide a stub. Line B will be extended, as Line C approximately 3070-feet northwest within Rockcress Drive to serve developments south of Rockcress Drive.

B. Off-Site Layout and Connection Options to City of Louisville Sanitary Sewer System

The proposed sanitary sewer system off-Site will convey the Site's sanitary sewer anticipated peak hour flow of 1.067 MGD, or approximately 741.4 GPM (1.652 cfs), from the lift station at the southwest corner of the intersection of Rockcress Drive and Northwest Parkway and route the flows north approximately 2.6-miles to connect to an existing 21-inch main (hereinafter referred to as "the Connection Point"). The Connection Point is located near the intersection of County Road and Rex Street, east of Louisville Community Park.

Referencing city provided utility maps, all sanitary manholes downstream from the Connection Point that could be located were surveyed and invert information was collected. Pipes with unconfirmed inverts were not used in this analysis. Based on collected invert information; a 21" PVC main within the Railroad ROW downstream of the connection point was found to have a minimum pipe slope of 0.216%. This pipe is the most restrictive downstream of the connection point. All other surveyed pipes have a steeper slope or a larger diameter. The proposed lift station is being designed for a

maximum capacity of 1.5 MGD. At full build-out, the pipe downstream of the Connection Point is adequately sized to convey the existing peak day flows and the proposed full build-out peak day flows from the Site to the Plant. A conceptual drawing and the Utility Plan can be found in Appendix F, for reference.

The sanitary sewer force main (hereinafter referred to as “Line F”) conveys flows from the Site to the Connection Point. The Utility Plan identifies a location for a lift station in the southeast corner of the Site. On-Site sanitary flows will gravity drain to this lift station location, the lift station will then pipe the sanitary flows though Line F to the Connection Point, then on to the Plant within existing sewer mains. The Sewer Plan indicates that the Plant will need to be upgraded to comply with current regulations on water quality and to accommodate future flows. This analysis and design information is included in the WWTP Memos prepared by Dewberry.

C. Flow Calculations

The high-range sanitary sewer average day flow calculated by Dewberry for the Site is estimated in the WWTP Memos to be 0.376 MGD for the complete build-out condition of the Site. Coordinated demands with Dewberry were used to estimate the average daily sanitary demand for each parcel’s planned use. A range of demands for low, medium, and high density were provided by Dewberry in the WWTP Memos. *“Table 1: Full Build-Out Sanitary Demand by PUD,”* shown on page 7 below, shows the coordinated sanitary flows. *The Table 1 uses* the High range projected average flows for each PUD from the Dewberry WWTP Memos. For this analysis the “High” demand values were used by request of the City of Louisville to analyze sizing of the on-site gravity mains *Table 1* shown below on page 7, shows the high density demand flows for each parcel at full build out of development based on the densities in *“Table 5: PUD Totals”* on page 14.

The on-Site gravity sewer mains were then sized based on City Criteria. *“Table 1: Full Build-Out Sanitary demand by PUD.”* Outlines the demand by PUD at full build-out. The on-Site gravity mains were sized based on the final build-out peak day demand of each development PUD. Individual peaking factors were evaluated for each PUD to establish a peak flow. The average day demands were multiplied by their peaking factors. A peaking factor of 4.5 was used for PUD 6,this is a coordinated value with the applicant of PUD 6. Using the average flow for each PUD a Total peaking factor for the entire Redtail Site was calculated to be 2.83. Resulting in a peak flow of 1.652 cfs (1.067 MGD) for the full build-out of the Site. This peaking factor is close to the 2.49 peaking factor at the Connection Point. Peaking factors are typically larger when evaluating smaller areas as seen in Table 1 below. The factors for the individual PUD’s are larger than the peaking factor for the site overall. 9The lift station for the Site, according to the WWTP Memos will be designed to pump a peak hour capacity of 1.5 MGD. The proposed on-site gravity mains will utilize a mix of 8-inch PVC, 10-inch PVC, and 12-inch PVC (see Appendix F for proposed layout and pipe flow information). The force main will utilize (2) 8-inch PVC lines in parallel to be able to convey self-cleaning pipe velocities and to limit friction losses at full build-out.

Table 1: Full Build-Out Sanitary Demand by PUD

PUD	Use	Area	Annual Average Daily Demand (GPD)	Average Daily Demand (GPM)	Average Daily Demand (CFS)	Peak Factor	Peak Flow (GPM)	Peak Flow (CFS)
PUD - 1	Industrial	654,500 sq. ft	90,521	62.9	0.140	3.56	223.8	0.499
PUD - 2	Industrial	453,700 sq. ft	62,749	43.6	0.097	3.78	164.5	0.367
PUD - 3	Medical	300,000 sq. ft	41,492	28.8	0.064	4.03	116.2	0.259
PUD - 4	Medical	118,800 sq. ft	16,431	11.4	0.025	4.68	53.4	0.119
PUD - 5	Office/Retail	113,000 sq. ft	19,012	13.2	0.029	4.57	60.3	0.134
PUD - 6	Hospital	435,000 sq. ft	94,800	65.8	0.147	4.50	296.3	0.660
PUD - 7	Medical	165,000 sq. ft	22,820	15.8	0.035	4.44	70.4	0.157
PUD - 8	Office	360,000 sq. ft	28,800	20.0	0.045	4.28	85.5	0.191
SUM		**2,600,000 sq. ft**	376,626	261.5	0.583		1070.5	2.385
TOTAL			376,626	261.5	0.583	2.83	741.4	1.652

Note: GPM = Gallons Per Minute, CFS = Cubic Feet per Second, GPD = gallons per day

Flow data was collected over a 4-week period in November 2019 to evaluate the capacity of the Connection Point. Over the collection period the highest measured flow was 958.68 GPM or 2.134 cfs. The average flow was 383.89 GPM, with a standard deviation of 198.86 GPM. The Sewer Plan, Table 7-2, has a historical peak hour factor of 1.62 for the Annual Average Maximum Day Flows. Based on collected data, the peak hour factor at the Connection Point is 2.49. Giving a standard range of flows between 582.75 GPM and 185.03 GPM (average flow +/- the standard deviation). The Sewer Plan average influent flows in the winter months is approximately 80% of the average influent flows in the summer months. Utilizing this information, the summer average influent flow is then increased to approximately 479.86 GPM (1.069 cfs) with a peak flow of 1,194.85 GPM (2.662 cfs).

"Figure 1: Connection Point Flow Monitoring" below shows the 4-weeks of flow monitoring that was collected in GPM. The peak value seen during the collection period was 958.68 GPM (2.134 cfs), adjusted for summer months this increases to 1,194.85 GPM (2.662 cfs). This summer peak value, combined with the peak hour flows from the Site, 741.4 GPM (1.652 cfs), totals 1,936 GPM or 4.314 cfs. The Connection Point will have a flow depth of 0.96-feet and will be 56% full. It is important to note that the Site will have an average daily flow of 261.5GPM (from *"Table 1: Full Build-Out High Sanitary Demand by PUD"*) combined with the City's average flow of 383.89 GPM from monitoring, totals an estimated total daily average flow of 645.39 GPM (1.437 cfs). This average flow at the minimum slope (0.216%) within the 21-inch main will have a flow depth of 0.53-ft (6.36-inches) and will on average be 26% full at full build-out. City maps show no additional connections to the 21-inch line downstream of the Connection Point, until where the main upsizes to a 24-inch pipe just west of the Plant. At this location west

of the Plant there is an 18-inch pipe connection behind Empire Storage approximately 670-feet west of the Plant.

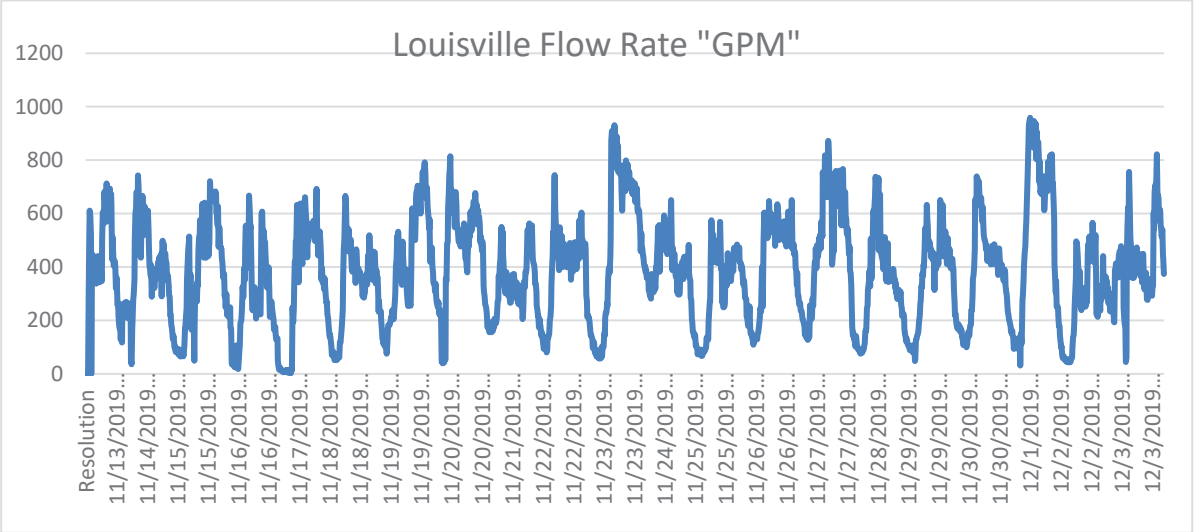


Figure 1: Connection Point Flow Monitoring

It is assumed that PUD areas 1 – 4, 6, 7 will all be collected by Sanitary Line A at some point within Sorrel Avenue. PUD area 8 will be served by Line C. Sanitary Line A between Sorrel Avenue and Northwest Parkway is assumed to convey the total peak sanitary flow from the Site to the Lift Station. Table 2 below outlines the possible peak flow combinations for PUD areas that could be served at private connection points to the Site sanitary sewer mains. Q full based is on full flow capacity of the constructed minimum slopes of Sanitary lines A-C in the Civil Construction Plans.

Table 2: PUD Sanitary Flow Combinations

PUD Area	Peak Flow (cfs)	Constructed Min. Slope (%)	Diameter (in)	Q Full (CFS)
PUD 2 & 3	0.626	0.4	8	0.994
PUD 2, 3 & 7	0.782	0.4	8	0.994
PUD 1 & 4	0.618	0.4	8	0.994
PUD 1 - 4, 6, 7	1.474	0.22	12	2.172
PUD 8	0.191	0.4	8	0.994
SITE TOTAL	**1.652**	**0.22**	**12**	2.172

PUD 2 & 3	0.626
PUD 2, 3 & 7	0.782
PUD 1 & 4	0.618

PUD 1-4, 6, 7	1.474
PUD 8	0.191
Site total	**1.652**

Sanitary Sewer line A utilizes the minimum allowable slope in 12" pipe sections at the south end of Sorrel Avenue. The total site flow projected at this point is 1.474 cfs. The pipe capacity is 2.172 cfs. Based on proposed constructed slopes. The sanitary sewer mains are sized to covey flows to the lift station. Future flow monitoring can be used for each PUD to show compliance with the peak flows projected from each PUD.

D. Available Downstream Capacity and Project Phasing

The WWTP Memos, in conjunction with the Sewer Plan, detail how much capacity the downstream sanitary sewer and Plant currently have available for new developments to add to the system. It is known that the Site sanitary sewer flows will cause a need to increase the capacity of the Plant through various enhancements, including accommodations to increase in sanitary loading on the Plant. The WWTP Memos submitted to the City of Lousiville from Dewberry detail the design and analysis of the Plant enhancements to accommodate the additional flows.

The Site phasing was broken out below such that the listed development parcel per Phase has listed the sanitary sewer improvements to be constructed during said Phase.

Redtail Ridge Subdivision Phase 1 – PUD 1-4, 6, 7

- Sanitary Sewer Line A constructed in its entirety, see Section 2A on page 4 and Appendix F Utility Plan to reference Line A's alignment.
- Sanitary Sewer Line B construction in its entirety, see Section 2A on page 4 and Appendix F Utility Plan to reference Line A's alignment.
- Sanitary Sewer Line C construction in its entirety, see Section 2A on page 4 and Appendix F Utility Plan to reference Line A's alignment.

Redtail Ridge Subdivision Phase 2 – PUD 5 & 8

- Sanitary Sewer Line D constructed in its entirety, on an as needed basis, see Section 2A on page 4 and Appendix F Utility Plan to reference Line A's alignment.
- Sanitary Sewer Line E construction in its entirety, see Section 2A on page 4 and Appendix F Utility Plan to reference Line A's alignment.

Refer to the WWTP Memos for when the enhancements to the Plant will be required.

Complete Build-Out Condition

The complete build-out condition specified in this report represents the condition where each PUD is all built-out and contributing sanitary sewer flow to the Plant. In this report,

this condition is represented by an estimated high-range sanitary sewer average day flow rate of 0.376 MGD per the WWTP Memos.

3. PROPOSED WATER SYSTEM

A. On-Site Layout and Connection Options to City of Louisville Water System

There will be several proposed water main segments needed within the Site. The first will be connecting to the existing 12-inch PVC main in Campus Drive, near the southeast corner of the Monarch School Campus, to the main in S. 96th Street at its future intersection with Campus Drive via the proposed Campus Drive extension. See Section 3.B of this report on page 10 for further pressure information. A second 12-inch PVC main is proposed to connect to the existing 18-inch DIP main at the intersection of Campus Drive and S. 88th Street and will continue south within S. 88th Street to the proposed intersection of Rockcress Drive and S. 88th Street. This 12-inch PVC main will then head south and east within Rockcress Drive to just west of the intersection of Rockcress Drive and Northwest Parkway. At this intersection, this 12-inch PVC main will downsize to an 8-inch PVC main and run north, within private property in an easement to be dedicated to the City along the eastern property line of the Site eventually connecting to the existing 8-inch DIP main within S. 96th Street. A portion of the existing line in S. 96th Street shall be replaced with the development of the Site. A third proposed 12-inch PVC water line will connect the water main in Campus Drive to the water main in Rockcress Drive within Sorrel Avenue. Per the City's request a Pressure Reducing Valve (PRV) shall be installed at the intersection of Dillion Road and S. 96th Street. This will rezone the pipelines in Paradise Lane, S. 96th Street, and Dillion Road south and west of the PRV to be part of the Mid-Pressure Water Zone.

No additional looping is anticipated to be part of this development. Specific water main loops for each parcel within the development will be provided with the PUD processes for each development parcel. As such, a single connection point was provided for each parcel and to a water main for the purposes of this report. A Utility Plan showing the existing and proposed water mains has been provided in Appendix F, for reference.

B. Available Pressure and Capacity

The Site lies within the City's Mid-Pressure Water Zone (hereinafter referred to as MPWZ) and adjacent to the Low-Pressure Water Zone (hereinafter referred to as LPWZ). The MPWZ has pumps from the NWTP and floating storage at HBWTP. The MPWZ is pressurized with pumps and maintains a pressure of 70-80 pounds per square inch ("psi"). The PRV will be installed on the water main within S. 96th Street north at Dillion Road and serve as the new boundary of the MPWZ to the LPWZ. PRV's will allow water to move to the LPWZ when system demand lowers pressure in the low zone and will prevent backflow from the LPWZ to MPWZ. The PRV's are proposed to be set at 60 psi to ensure that the LPWZ does not become pressurized by the MPWZ. The contractor installing the PRV shall follow City of Louisville construction standards during installation.

Pressure information provided by the City indicates the following: a pressure range of 70-80 psi for the 18-inch PVC main within S. 88th Street in the pressurized MPWZ, and a pressure range of 60-70 psi for the 8-inch PVC main within S. 96th Street and within the LPWZ. A hydrant flow test was provided by the City of Louisville Fire Protection District that resulted in a static pressure of 85 psi. The location of the hydrant tested was within Campus Drive, at the southeast corner of the Monarch School Campus, and is connected to the MPWZ. For modeling of the water system, a static pressure of 85 psi was converted to an elevation head of 196-feet for a reservoir at the upstream end of the water main. The tested hydrant was at an approximate elevation of 5,430-feet, thus resulting in an elevation head of 5,626-feet. With the use of PRV's, it was assumed that water from the LPWZ will not flow "backwards" through the PRV's and into the MPWZ. As mentioned above, the PRV's have a pressure setting of 60 psi to limit flow from the MPWZ to the LPWZ. This model assumed that there is sufficient water supply to the LPWZ and this zone is not included within the analysis.

C. Average and Peak Water Demand Calculations

The Average Day Demand for each PUD was calculated based on the demand assumptions provided by Dewberry. The high-density demands were used per the city's request. The peak day demand as calculated from the Water Plan was used in the model for the Site as requested by the City multiplying the max monthly flow (MMF) by a peaking factor of 2.68. *"Table 3: Assumed Water Demands"* below contains the assumed water demands by use.

Table 3: Assumed Water Demands

Commercial or Residential Unit Assumptions	Low	Medium	High
Office Space ft^2/person	350	300	250
Industrial (Domestic), ft^2/person	2,000	1,500	1,000
Industrial Water Demand, gal/ft^2	0.04	0.08	0.12

The City has a high-zone storage capacity of 2.0 MGD and mid-zone storage capacity of 3.5 MGD. The NWTP has a firm minimum pumping capacity of 3.0 MGD and the HBWTP has a firm minimum pumping capacity of 3.5 MGD. The two combined results in a 6.5 MGD firm minimum pumping capacity for both plants. Both plants combined have a total maximum pumping capacity of 11.0 MGD assuming both plants are fully operational.

Average demand values from the Water Plan indicated an average day demand of 3.385 MGD and a peak day demand of 8.420 MGD for all uses within the City. Using the High Assumed Water Demands and the city requested peaking factor of 2.68, "*Table 3: Water Demands by PUD"* shows the Average Daily and Peak Daily Demand per PUD area at project build-out.

Table 4: Full Build-out Water Demands by PUD

	Use	Average Daily Demand (GPD)	Average Daily Demand (GPM)	Peak Day Demand (ADD*2.68) (GPD)	Peak Day Demand (ADD*2.68) (GPM)
PUD - 1	Industrial	108625	75.4	291116	202.2
PUD - 2	Industrial	75299	52.3	201802	140.1
PUD - 3	Medical	49790	34.6	133437	92.7
PUD - 4	Medical	19717	13.7	52841	36.7
PUD - 5	Office/Retail	22871	15.9	61294	42.6
PUD - 6	Hospital	111200	77.2	298016	207.0
PUD - 7	Medical	27385	19.0	73391	51.0
PUD - 8	Office	34560	24.0	92621	64.3
	Total:	449447	312.1	1204517	836.5

Note: Max day demand is 1.204 MGD

Adding the 1.204 MGD Peak day demand (from "*Table 3: Full Build-out Water Demands by PUD"*) to the City's 8.420 MGD peak day demand from the Water Plan would increase the City's total peak day demand to 9.624 MGD at full build-out. These demand estimates are conservative and do not include irrigation for the proposed PUD areas.

The City of Louisville has provided water data from 2012-2019 for additional analysis. Each month was evaluated to find the highest and lowest demand of each month on any given day. Winter weather months (November – April) had a low average demand of 1.311 MGD and a high average demand of 2.309 MGD. At full build-out the winter months will increase the low range demand to 2.515 MGD and a high demand of 3.513 MGD. Hot weather months (June – October) had a low average demand of 2.966 MGD and a high average demand of 6.490 MGD. This increases the summer full build-out demand to4.170 MGD and 7.694 MGD, respectively. The highest demand seen was in August 2015 with a demand of 8.735 MGD. This highest demand along with the full build-out peak demand of the project of 1.204 MGD (from "*Table 3: Full Build-out Water Demands*

by PUD") results in a total estimated demand of 9.939. Given that the City has a total treatment capacity of 13.0 MGD between both water plants, it is not anticipated that the development will have any negative impacts on any water treatment facilities. It should be noted that this demand exceeds the firm pumping capacity but is less than the combined total pumping capacity of the two City water plants. For additional technical information on water system upgrades refer to Technical Memo 2.

D. Fire Flow Water Demand

The model was evaluated to quantify the maximum fire flow that the public mains can provide within the City's criteria at full build-out. It was determined the maximum fire flow that can be supported at full build-out is 2,000 GPM. The City's fire department provided a letter that approves a 50% reduction when an approved sprinkler system is used for fire suppression. This letter can be seen in Appendix E, for reference. Fire flows greater than 2,000 GPM will have to be evaluated by PUD to determine impacts to the proposed water system. For the purposes of this model, a 2,000 GPM fire flow requirement was utilized for the fire demand of each PUD along with the peak day demands.

E. Irrigation Water Demand

The WWTP Memos delineate the anticipated irrigation demand for the development of the Site. Table 4 below outlines the irrigation demand. For water modeling purposes the peak day irrigation demand was used and divided between the PUD areas. Further information about irrigation demand can be viewed in *Dewberry Tech Memo 1 City of Louisville and Redtail Ridge Development Projected Water Demands*.

Table 4. Redtail Ridge Irrigation Demand

Average Irrigation, MGD	Max Month Irrigation, MGD	Peak Day Irrigation, MGD
0.51	0.76	1.08

F. Water Modeling

In the analysis of the water system, this report models the full build-out Peak day + irrigation demands and Peak day + irrigation + fire flow demands. The Peak day demands using the requested peaking factor of 2.68 was analyzed in the model. The water pressures for the full build-out Peak day + irrigation demands were between 65 psi and 111 psi. The water pressures for the full build-out Peak day + irrigation + Fire Flow demands were between 65 psi and 109 psi with pipe velocities under 9.20 ft/s. Additionally the worst-case Peak day + fire flow demand model was determined to indicate a maximum allowable fire flow for the water system. This worst-case scenario estimates a maximum allowable fire flow of 2,000 GPM fire flow per City Criteria while also keeping pressures within City thresholds and pipe velocities under 10 ft/s. These

velocities are less than the City Criteria limit of 15 ft/s specified in Section 302 Main Size. Node pressures, node demands, and pipe velocities can be found in Appendix E, for reference.

Irrigation flows are included in the design scenarios because fire emergencies can happen at any time. Peak hour flows were not evaluated in the model because the peak day plus fire flow scenarios have a higher demand than a domestic peak hour scenario.

G. Project Phasing

The Site phasing was broken out below such that the listed development parcel per phase has listed the water system improvements to be constructed during said phase.

Redtail Ridge Subdivision Phase 1 – PUD 1-4, 6, 7

- The water main will connect to the existing water main near Disk Drive and S. 96th Street and continue south within an easement dedicated to the City to the intersection of Rockcress Avenue and Northwest Parkway. From this intersection it will turn west and run within Rockcress Drive to the intersection of Rockcress Drive and Sorrel Avenue, see Section 3A on page 9 and Appendix F Utility Plan to reference this alignment.
- The water main will be constructed from the round-a-bout of Rockcress Drive and Sorrel Avenue north within Sorrel Avenue to the round-a-bout at Sorrel Avenue and Campus Drive. See Section 3A on page 9 and Appendix F Utility Plan to reference this alignment.
- From the round-a-bout at Sorrel Avenue and Campus Drive, the water main will split to the west and east. To the west, it will continue within Campus Drive to where it connects to the existing water near the southeast corner of the Monarch School Campus. To the east, from the round-a-bout, the main will continue within Campus Drive to the intersection of Campus Drive and S. 96th Avenue where it will connect to the existing water main in S. 96th Street. See Section 3A on page 9 and Appendix F Utility Plan to reference this alignment.

Redtail Ridge Subdivision Phase 2 – PUD 5 & 8

- The water main will be constructed from the round-a-bout of Rockcress Drive and Sorrel Avenue northwest within Rockcress Drive to the intersection of Rockcress Drive and S. 88th Street. See Section 3A on page 9 and Appendix F Utility Plan to reference this alignment.
- The water main will continue within S. 88th Street north to connect to an existing main near Campus Drive and S. 88th Street. See Section 3A on page 9 and Appendix F Utility Plan to reference this alignment.

Complete Build-out Condition

The complete build-out condition specified in this report represents the condition where each PUD is complete and contributing demands to the water system. This report references PUD areas and their associated square footage that will be occupied by each

planning area. *"Table 5: PUD Totals"* below details the square footage used to determine demands for the water system.

Table 5: PUD Totals

PUD Area	Square Footage	Use
PUD - 1	654,500	Industrial
PUD - 2	453,700	Industrial
PUD - 3	300,000	Medical
PUD - 4	118,800	Medical
PUD - 5	113,000	Office/Retail
PUD - 6	435,000	Hospital
PUD - 7	165,000	Medical
PUD - 8	360,000	Office
Total:	2,600,000	

4. CONCLUSIONS

A. Analysis Summary

The proposed sanitary sewer for the Site will be designed to have capacity for the estimated 1.067 MGD peak day flow expected with the full build-out condition of the Site based on coordinated sanitary loads with Dewberry. This flow will be conveyed from the Site to the Plant through an off-Site force main (Line F) and from the lift station in the southeast corner of the Site. Line F will have the capacity needed to accommodate flows from the Site's development. At the Connection Point Line F will connect to existing sanitary sewer infrastructure and convey both existing and proposed flows to the Plant for treatment. Per the WWTP Memos, the Plant will undergo enhancements to accommodate the increase in flow and to comply with current regulatory water quality requirements.

Based on provided flow monitoring an existing winter peak flow of 2.134 cfs was observed at the Connection Point in November 2019. A summer peak flow was estimated to be 2.662 cfs based on the collected flow data and the City's historical data. The full build-out peak flow for the Site will be 1.652 cfs. This totals a summer peak flow of 4.314 cfs at the Connection Point, which results in a flow depth of 0.96-ft (11.52-inches) and

equates to approximately 56% full in a 21-in main at the calculated minimum slope of 0.216% and Manning's value of n=0.013. At the time this report was written, and with the data on the existing flows at the Connection Point, the Connection Point has enough capacity for existing peak flows and the anticipated peak flows at full build-out of the Site.

The on-Site gravity sanitary sewer mains are designed in accordance with City Criteria and will have capacity to convey the sanitary flows from the development parcels to the on-Site lift station.

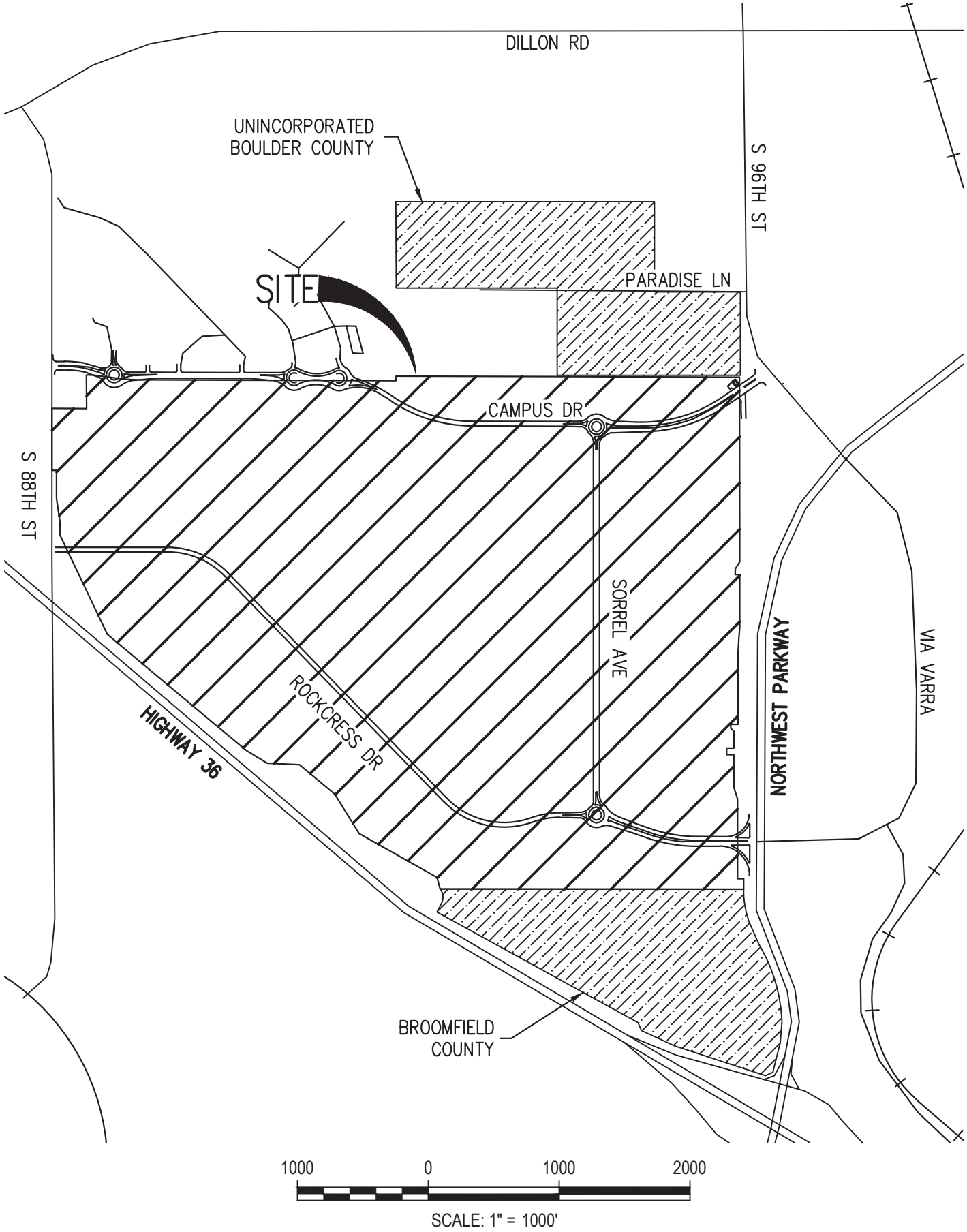
The analyzed water scenarios had pressure values between 65 psi and 111 psi with pipe velocities under 9.20 ft/s. Additionally the worst-case peak day + fire flow demand was determined to indicate a maximum allowable fire flow for the water system. This worst-case scenario estimates a maximum allowable fire flow of 2,000 GPM fire flow per City Criteria while also keeping pressures within City thresholds and pipe velocities under 10 ft/s.

At full build-out the proposed water mains are sufficient to supply peak hour demand as well as fire flow scenarios for the Site. As previously stated, the City has a current treatment capacity of 13.0 MGD, a total pump capacity of 11.0 MGD, a firm pumping capacity of 6.5 MGD, and a storage capacity of 8.5 MGD. The Site has an estimated full build-out peak day demand of 1.204 MGD, resulting in a City peak day demand of 9.624 MGD, which is still within the City's treatment capacity of 13.0 MGD. The City also had 5.5 MGD of storage between the HPWZ and MPWZ.

5. LIST OF REFERENCES

1. City of Louisville Comprehensive Plan, City of Louisville, May 2013
2. City of Louisville and Redtail Ridge Development Flows, Dewberry, February 2020
3. City of Louisville Department of Public Works Engineering Division Design and Construction Standards, City of Louisville, March 2015
4. *Wastewater Facility Plan,* City of Louisville, April 2013
5. Water System Facilities Plan, Final Report, City of Louisville, July 2012
6. Technical Memorandum 1: City of Louisville and Redtail Ridge Development Projected Water Demands, November 2022
7. Technical Memorandum 1: City of Louisville and Redtail Ridge Development Flows and Loads, October 2022
8. Technical Memorandum 2: Wastewater Treatment Infrastructure, January 2021
9. Technical Memorandum 3 City of Louisville WWTP Wastewater infrastructure Improvement Triggers, June 2022

APPENDIX A – Vicinity Map



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NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH.

ISSUE DATE: 06-06-2019	PROJECT #: 190108
DATE	REVISION COMMENTS

BRUE BAUKOL PARTNERS

REDTAIL RIDGE
VICINITY MAP

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HarrisKocherSmith.com

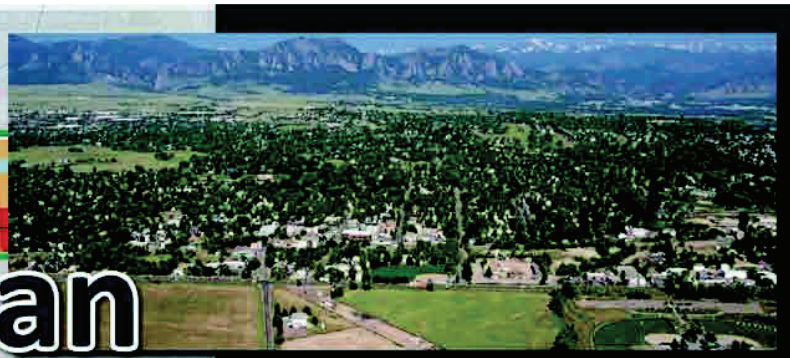
DSN'D BY: TJS
CHK'D BY: TJS
DRAWN BY: SJA

SHEET NO.
1
1 OF 1

APPENDIX B – Reference Material

City of Louisville

Comprehensive Plan



Suburban

South Boulder Road

Urban

Suburban

Rural

Urban

Marshall Road

Boulder Turnpike (US 36)

Rural

McCaslin Blvd

2013

City of Louisville
COLORADO • SINCE 1878

Adopted
May 7, 2013
Resolution 18, Series 2013

Block Pattern

The City's street network, or block pattern, is the skeleton of the community. The block pattern dictates the development flexibility and ultimately the physical character of the community. The block pattern establishes the street network and street hierarchy of the community, which in turn dictate the mass, scale, and orientation of buildings. Together, the streets and buildings determine the City's walkablility.

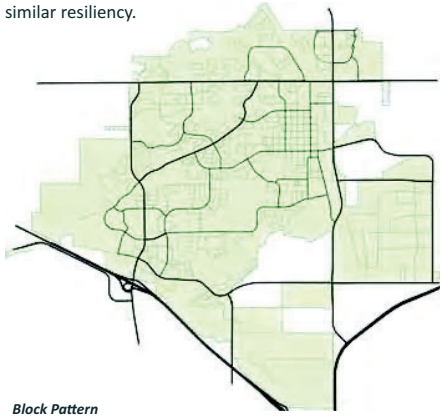
As existing streets are improved and new streets are proposed in the Comprehensive Plan, it is important to understand the block pattern that is envisioned will establish the character of development and redevelopment for years to come.

The City's existing block pattern creates three distinctive character zones within Louisville: *urban, suburban*, and *rural*. Downtown and Old Town (built before 1960) and the newer subdivisions of North End and Steel Ranch (built since 2008) have established interconnected streets with smaller block patterns and supporting alleys. The block structure in the northeastern portion of the City dictates smaller property parcels, interconnected smaller streets and a more walkable urban character.

Contrasting Downtown and Old Town are the suburban (less walkable) areas of the City along South Boulder Road and McCaslin Boulevard and everything built between 1961 and 2007. The character of these suburban and rural areas of town is influenced by their limited street networks and larger arterials, creating single purpose suburban retailing and employment environments.

A problem with suburban block patterns is that after 10 to 15 years, the retail centers built upon them are outperformed by newer competition. Significant public investment is then needed to reshape the blocks to accommodate a variety of retailing formats and land development patterns, allowing the retail centers to successfully compete again.

Block patterns and infrastructure inform an area's building inventory, development patterns, and land use types. It is important for the Comprehensive Plan to enable the development of more urban block patterns, building stock and community supported land uses. Urban block patterns, like that in Old Town and Downtown Louisville, have high resiliency and flexibility in accommodating development and redevelopment over time. Typical suburban block patterns have not demonstrated similar resiliency.



Block Pattern

Municipal Utilities and Infrastructure

Municipal utilities and infrastructure (water, sewer, and storm water) are critical in defining the economic vitality and physical character of the City. Their capacity defines the growth potential of the City. Their placement and design contribute to the physical character of the City.

Louisville's water supply originates from two primary sources: South Boulder Creek and the Northern Colorado Water Conservancy District consisting of the Colorado Big Thompson and Windy Gap projects.

The City is treating 4,000 acre-feet (AF) of water a year, with peak demands approaching 9.0 million gallons per day (mgd). Raw water from the City's established sources is treated and distributed to individual businesses and residences from the City's two water treatment facilities: *the Howard Berry Plant* and *the North Plant*. Currently, both plants operate at or under capacity.

Raw Water Sources

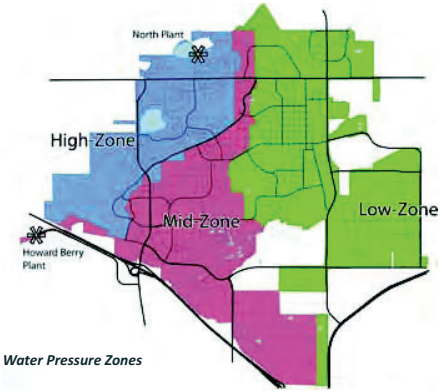
The two water treatment plants have a combined treatment capacity of 13 mgd. Together, the two facilities serve three pressure zones within the City. A water system capacity analysis examined both demand and location of the projected build-out of the City as well as the 20 year market forecast.

The existing water supply and treatment capacity are sufficient to accommodate the expected 20-year development absorption assumptions of the Framework.

However, it is important to note, the Howard Berry Plant may require additional capacity to serve the projected build-out of the mid and lower water pressure zones of the City. The primary driver of future water demand will be the office and industrial uses expected in the Centennial Valley, the Phillips 66 property, and the Colorado Technology Center (CTC).

The Wastewater Treatment Plant provides sanitary sewage treatment for the City of Louisville. There is a surplus of sanitary treatment capacity currently on-line to serve the projected demand of the City as reflected in the Framework.

The Sanitary Treatment Plant is currently operating at a daily average of 2 million gallons per day (mgd) or 59% of its capacity. Historically, the plant has seen flows as high as 2.8 mgd. Additional treatment capacity was added in 1999 giving the plant a maximum permitted capacity of 3.4 mgd.



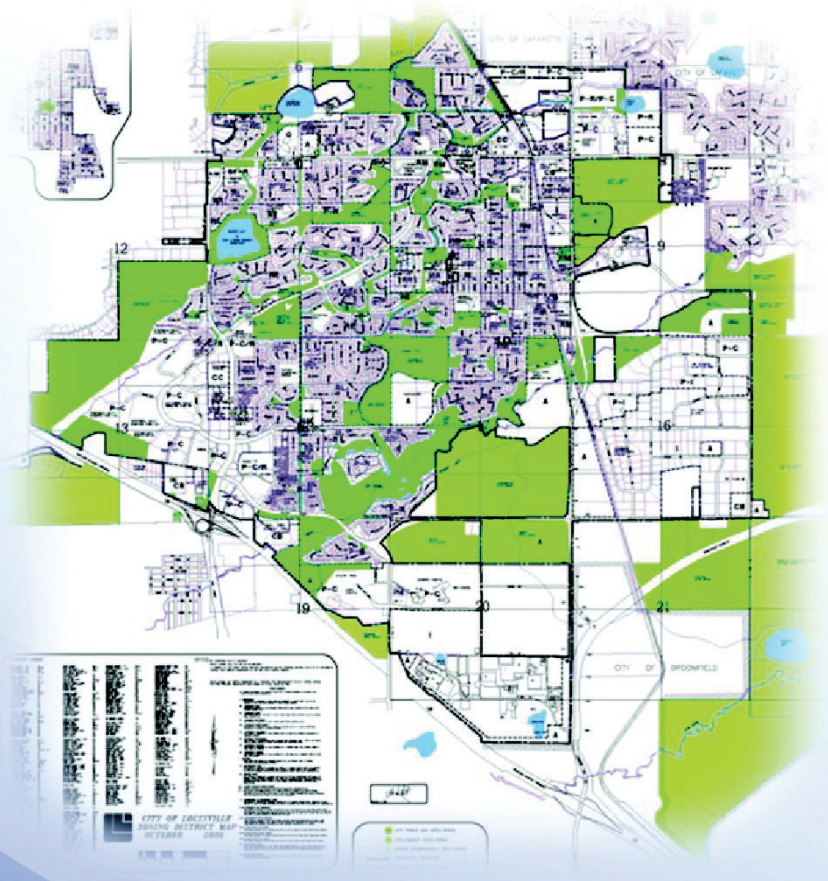
Water Pressure Zones

The Wastewater Treatment Plant has reached the end of its useful life based upon the age of the facility and upcoming regulatory water quality requirements.

Construction is currently being planned for the Wastewater Treatment Plant to meet regulatory and growth requirements. Improvements to transmission mains and lift stations will be needed with build out of the Colorado Technology Center and the Phillips 66 property.

There are also limitations in the sanitary sewer pipes located in the Downtown and Old Town areas. The pipes in this area are the original vitrified clay pipes, constructed in the mid 1900s. As the pipes have aged, they have begun to break down. The City annually replaces portions of these pipes with PVC pipes to maintain the integrity of the collection system.

Waste Water Treatment Plant Improvement Timelines



City of Louisville

Water System Facilities Plan
Final Report

July 2012

Hatch Mott MacDonald
www.hatchmott.com

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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

Background

The City of Louisville initiated the Water System Facilities Plan project to provide the City with a detailed Capital Management Plan for the City's water system. The Water System Facilities Plan addresses the raw water delivery system, water treatment facilities, pump stations and water storage tanks. The Capital Management Plan provides a roadmap for planning upgrades, maintenance projects, and expansions for the system.

The identified planning period for the project is buildout of the water system, which is expected to occur around 2035. The Water System Facilities Plan is also focused on larger capital projects in lieu of smaller maintenance and repair projects that are addressed in other City planning documents.

Project Development

The Water System Facilities Plan identifies major capital improvement projects based on the evaluation of six key elements:

- An evaluation of water demands and future water use trends
- An evaluation of the treatment plant capacities
- A review of current and future regulations
- A review of water system operability
- An evaluation of water system security
- An evaluation of water system redundancy

Louisville Reservoir

In addition to the evaluations, a public outreach program was performed to receive input from the public on their level of satisfaction with the water system, as well as to identify customer expectations for level of service. Major elements of the public outreach program included public announcements, a mailed survey and a public meeting.

Water System Facilities Plan Results

A total of 26 projects were identified as a result of the above mentioned evaluations. The projects range from relatively minor rehabilitation projects with capital costs of less than $100,000, to major expansions of water treatment facilities with capital costs of several million dollars. It is anticipated that additional projects will be added to the Capital Management Plan over time as additional system needs are identified.

The following documents were produced as part of the Water System Facilities Plan:

- The Water System Facilities Plan report
- A Capital Management Plan developed in an electronic spreadsheet format
- A Survey Summary Report that was produced as part of a Public Outreach Program
- Supporting spreadsheet documents including water treatment facility capacity evaluations and water demand projections

CHAPTER 1
Project Introduction

1.0 PROJECT INTRODUCTION

This chapter provides a discussion of the project background and goals, as well as the organization of the final project documents.

1.1 PROJECT BACKGROUND

A key to successful management and growth of a water system is careful and thoughtful planning. Identifying critical infrastructure needs and developing adequate budgeting for improvements within a cost effective framework is critical to the success of a water utility.

The City of Louisville initiated this Water System Facilities Plan project to provide the City with a detailed Capital Management Plan for the City's raw water supply system, water treatment facilities, pumping stations and water storage tanks. The Capital Management Plan will provide a roadmap for planning upgrades, maintenance projects, and expansions that will meet the needs and expectations of both the City's residents and staff.

This Water System Facilities Plan and the associated Capital Management Plan cumulates work and knowledge that comes from evaluations of key planning components and provides the City with a road map for future improvements. The Water System Facilities Plan incorporates evaluation and review of six key components that impact the water system planning, including:

- An evaluation of water demands
- An evaluation of the treatment plant capacities
- A review of current and future regulations
- A review of water system operability
- An evaluation of water system security
- An evaluation of water system redundancy

These various components of water system planning, and general concepts on how they impact the Water System Facilities Plan, are represented in Diagram 1-1. The evaluation of these six projects components, both individually and in combination, leads to the identification of specific projects which are recommended for the water system. These evaluations are discussed in this report. A public outreach program was also completed as part of the project to receive input from the citizens regarding the six identified components and as they pertain to expectations for the level of service.

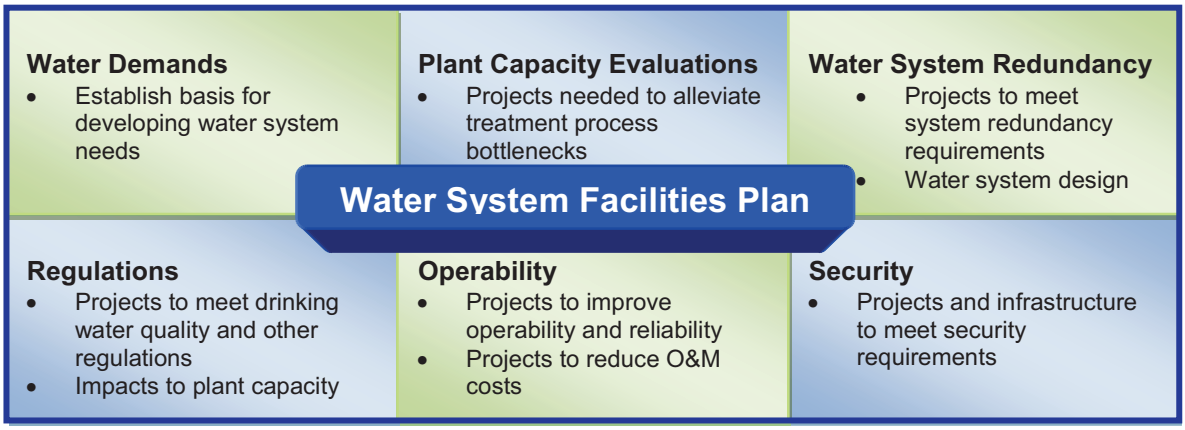


Diagram 1-1: Key Planning Components for the Water System Facilities Plan

Since this document contains information that may be considered sensitive, such as descriptions of the water system, discussions on systems redundancy and vulnerabilities, and facility security, this document should be handled carefully.

1.2 PROJECT SCOPE AND OBJECTIVES

The Water System Facilities Plan focuses on the raw water supply system, water treatment facilities, pumping stations and water storage tanks. Buried small diameter water distribution pipes and other "buried infrastructure" will be addressed in other planning documents.

In addition, the City maintains an updated and thorough maintenance program for all of their facilities, which includes replacement and rehab for most of the standard equipment inside of the facilities such as valves, pumps, compressors and chemical metering pumps. This type of equipment typically has predictable schedules for repair or replacement based on life expectancy, and is not impacted by the six evaluation components identified for the Water System Facilities Plan. This project is therefore focused on identifying either one time or otherwise unique projects that would not be captured in other City planning documents.

Two objectives for the project that were identified through workshops with City staff include:

Develop a Comprehensive and Well Developed List of Capital Improvements Projects. Developing a comprehensive list of capital improvements projects provides the foundation for developing the Capital Management Plan. Essential to this effort is establishing the scope of the identified projects, identifying the correct triggers for these projects, and developing reliable cost information for completing these projects.

Ability for the Planning Documents to Remain Relevant. One problem often encountered with planning documents is that they often become quickly dated, and end up collecting dust on a shelf. The reason for this is that all planning projects contain a number of assumptions and planning conditions that will inevitably change over time. In order to prevent this often encountered problem is to develop the planning tools so that they include decision trees and other items that allow modifications to be made with minimal work, thereby allowing changing conditions to be taken into account and the report recommendations to be updated.

1.3 PROJECT DOCUMENT ORGANIZATION

The Water System Facilities Plan consists of two primary documents, and several supporting documents, shown in Diagram 1-2. The two primary documents consist of:

- This Water System Facilities Report, which includes a description of the Capital Management Plan, and the overall work and evaluations that went into completing the project.
- The Capital Management Plan prepared in an electronic spreadsheet format.

Supporting documentation that was prepared as part of this Water System Facilities Plan includes the following:

- An electronic spreadsheet based Capacity Evaluation for each of the two water treatment facilities.
- A Summary Report prepared to summarize the Public Outreach Program, in particular the public survey.
- Individual Project Sheets describing each project.

A summary of the public outreach effort that was initiated in conjunction with this project is further discussed in Chapter 10.

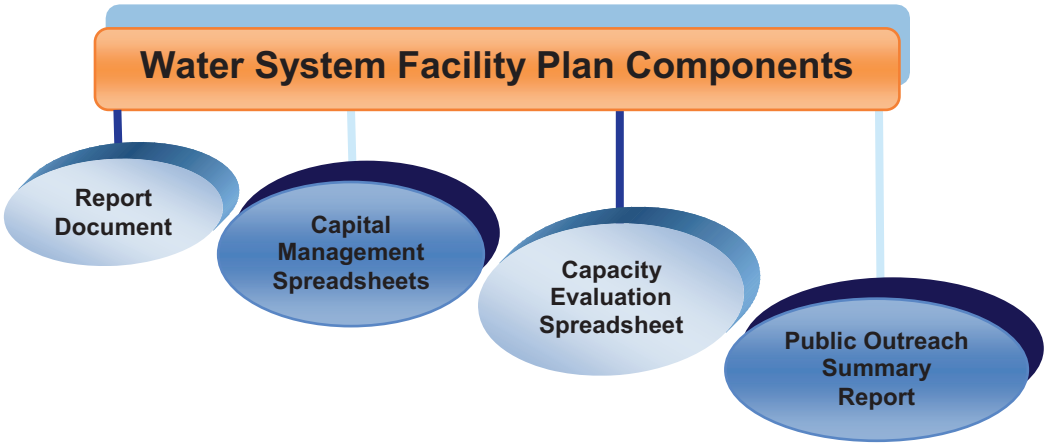


Diagram 1-2: Facilities Plan Documents

1.4 INFORMATION USED IN DEVELOPING THE WATER SYSTEM FACILITIES PLAN

A list of background documents that were reviewed and used in preparing this plan is included in Appendix A. Copies of reference articles are also included in the Appendix.

CHAPTER 2
Description of Water System

2.0 DESCRIPTION OF WATER SYSTEM

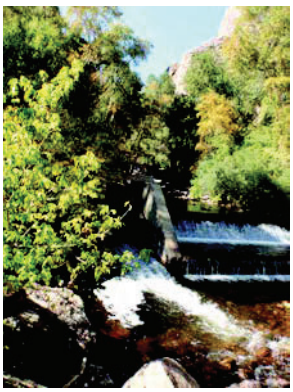
The following chapter provides a general description of the City of Louisville water system, including the raw water delivery system, water treatment facilities, distribution system and water storage tanks.

2.1 GENERAL DESCRIPTION

The City of Louisville receives raw water from South Boulder Creek near Eldorado Springs, Colorado Big Thompson and Windy Gap resources, and owns shares in the Farmers Reservoir and Irrigation Company (FRICO). A series of facilities and structures, including Louisville Reservoir, Marshall Lake and Harper Lake, are used to transmit and store these water sources. The City's raw water supply sources are partially inter-connected. The raw water is treated at two separate conventional dual-media water treatment plants that have a combined gross treatment capacity of 13 million gallons per day (mgd). The North Water Treatment Plant (NWTP) was constructed during the early 1980s, while the Howard Berry Water Treatment Facility (HBWTF) was constructed in 1993. Water is then delivered to the water distribution system, and stored in 8.5 million gallons (MG) of system storage. The water distribution system has three pressure zones; two feed by gravity and one is delivered by pump stations at either water treatment plant.

2.2 RAW WATER DELIVERY SYSTEM

The City of Louisville's raw water supply system consists of facilities that divert, convey, and store raw water supplies for delivery to the NWTP and the HBWTF. Historically, the community's water system was solely from the Louisville Reservoir, which was constructed in the late 1890's. Due to a drought in the 1950's, the Louisville Pipeline was constructed. Additional water rights have been acquired from South Boulder Creek due to growth. In the 1970s, as the community grew, additional efforts were taken to obtain and store water in Marshall Lake, a major reservoir in the Louisville area. Harper Lake Reservoir was constructed in 1985 to supplement the NWTP. The City is an allottee of the Northern Colorado Water Conservancy District and Municipal Sub District which provides the Colorado Big Thompson and Windy Gap water resources. Other resources include rights and storage on Coal Creek.

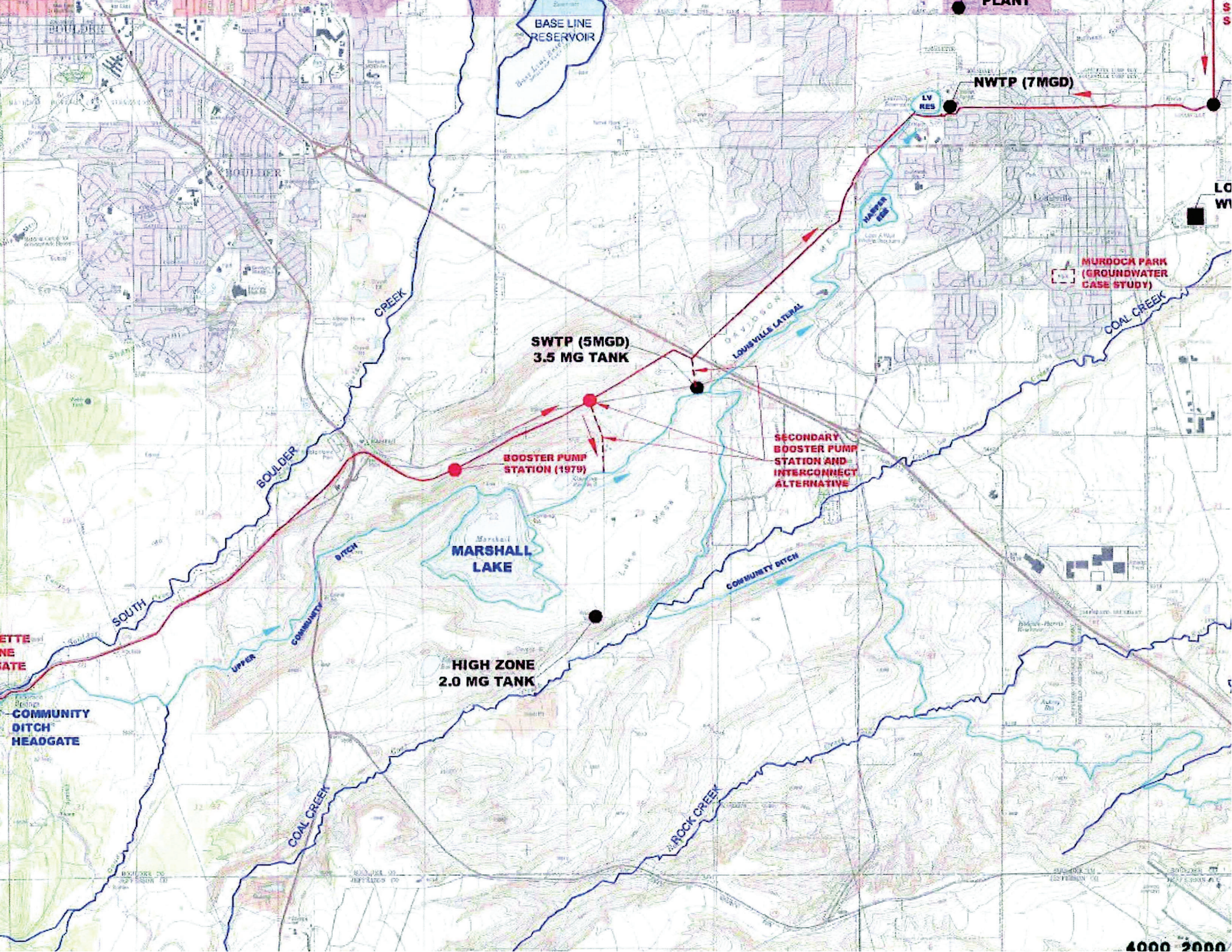


Water Diversion Structure in Eldorado Canyon

This raw water system includes 715 acre-feet in Harper Lake and 210 acre-feet in Louisville Reservoir. The City owns a portion of shares in FRICO's Marshall Lake division. The Southern Water Supply Pipeline carries CO-BT&WG water from Carter Lake to the Louisville Reservoir. The Louisville Pipeline transfers water from Eldorado Springs and it flows by gravity to the HBWTF, or to Harper Lake or Louisville Reservoir.

Water from Louisville Reservoir and Harper Lake are solely fed to the NWTP, while water stored in Marshall Lake feeds the HBWTF. Marshall Lake reserves can also flow through the Louisville Lateral to Harper Lake and Louisville Reservoir.

Key components of the water system are shown in the following map from the City's 2003 Raw Water Master Plan Update.


BASE LINE RESERVOIR
NWTP (7MGD)
LV RES
HARPER EE
MURDOCK PARK (GROUNDWATER CASE STUDY)
SWTP (5MGD)
3.5 MG TANK
LOUISVILLE LATERAL
COAL CREEK
BOOSTER PUMP STATION (1979)
SECONDARY BOOSTER PUMP STATION AND INTERCONNECT ALTERNATIVE
BOULDER
MARSHALL LAKE
COMMUNITY DITCH
SOUTH
UPPER
HIGH ZONE
2.0 MG TANK
COMMUNITY DITCH HEADGATE
ROCK CREEK
4000 2000

2.3 WATER TREATMENT PLANTS

The current NWTP treatment train was constructed in several phases during the early 1980s, while the HBWTF was constructed in 1993. The plants were constructed as conventional dual-media filtration plants, to treat surface water sources. The WTPs were planned and constructed during a time period when there were significantly less stringent requirements for finished water turbidity, regardless, both plants are able to achieve current turbidity standards. Both plants were designed by the same engineering firm and within relatively close time frames, thus the designs of the facilities (technology and equipment selections, general process sizing) are very similar.

The NWTP and HBWTF are conventional water treatment facilities utilizing the following treatment processes: pre-oxidation with chlorine dioxide, coagulation and flocculation, sedimentation, and filtration followed by chlorine disinfection, fluoride treatment, pH adjustment and corrosion control. The major treatment processes are discussed in further detail below.

Coagulation and Flocculation. Most colloidal material in water (suspended solids that are small enough to pass through a conventional dual-media filter) have a negative surface electrochemical charge. Most pathogenic materials in water demonstrate similar negative surface charges. These materials are removed from water by adding a coagulant such as alum that acts to destabilize the negative surface charge of the particle thereby causing the colloidal material to become charge neutral. This allows the colloidal and pathogenic materials to agglomerate into larger particles. The water containing the charge neutral particles is then passed through a flocculation process which consists of multiple stages of gentle stirring causing these particles to collide and form larger solids. These solids become large enough to either be settled or filtered out of the water. The primary coagulant chemicals currently used by Louisville are alum and polymer.

Sedimentation. Sedimentation (settling) is used to remove flocs by gravity and removing a large percentage of the solids loading from the water, thereby extending the filter run time. Both water treatment plants uses tube settlers to enhance the natural settling process.

Filtration. Filtration provides a positive barrier for pathogenic organisms and other suspended solids remaining in the water. Flocculated particles that do not settle out in the sedimentation process are strained out of the water in the filter. The City's filters have a media depth of approximately 28 inches (not including the underlying support layers).

Filtration provides a positive barrier for pathogenic organisms

Disinfection and Chemical Treatment. Following filtration water flows into the clearwell, or chlorine contact tank. The clearwell volume provides contact time for disinfection of the water. Gaseous chlorine is fed to disinfect the water and maintain a residual chlorine concentration in the distribution system in order to provide protection from pathogenic organisms. Fluoride is added in small amounts to assist in preventing tooth decay, the pH is adjusted for stability, and silicate is added for corrosion control in order to protect pipelines to protect the pipelines and prevent elevated concentrations of metals that can occur with corrosive water.

The NWTP has two flocculation and sedimentation trains, and four filters, with a gross production capacity of 8.0 mgd. The HBWTF has one flocculation and sedimentation train, and two filters, with a gross production capacity of 5.0 mgd.

2.4 DISTRIBUTION SYSTEM

There are three pressure zones throughout the City of Louisville as shown in Figure 2-1; the Low Zone, Mid Zone and High Zone. Water from the NWTP flows into the Low Zone by gravity, and can be pumped to the High Zone from the High Zone Pump Station located at the plant. Water from the HBWTF flows to the Mid Zone by gravity, and can also be pumped to the High Zone by a High Zone Pump Station located at that facility. Water can download from the High Zone to the Mid Zone, or from the Mid Zone to the Low Zone, through interconnecting PRVs in emergencies, or from zone valves operated by City staff. Flow of water into the various pressure zones is summarized in Table 2-1.

Table 2-1: Current Pressure Zone Configuration

Zone	NWTP	HBWTF
Low Zone	Gravity Fed	Gravity fed to Mid Zone and download to Low Zone
Mid Zone	Pumped to High Zone and download to Mid Zone	Gravity fed
High Zone	Pumped	Pumped

The City prefers to pump water from the HBWTF to the High Zone to reduce electrical demands by taking advantage of lower pumping heads. However, during times of the year the City may only operate one plant, and pumping to the High Zone and downloading to lower zones may be used as a water delivery strategy.

Total and firm pumping capacity from each plant to the High Zone is summarized in Table 2-2. Pumping capacity from the NWTP is limited by high velocities in the transmission line and distribution system. The firm pumping capacity of the HBWTF is based on the largest pump being out of service.

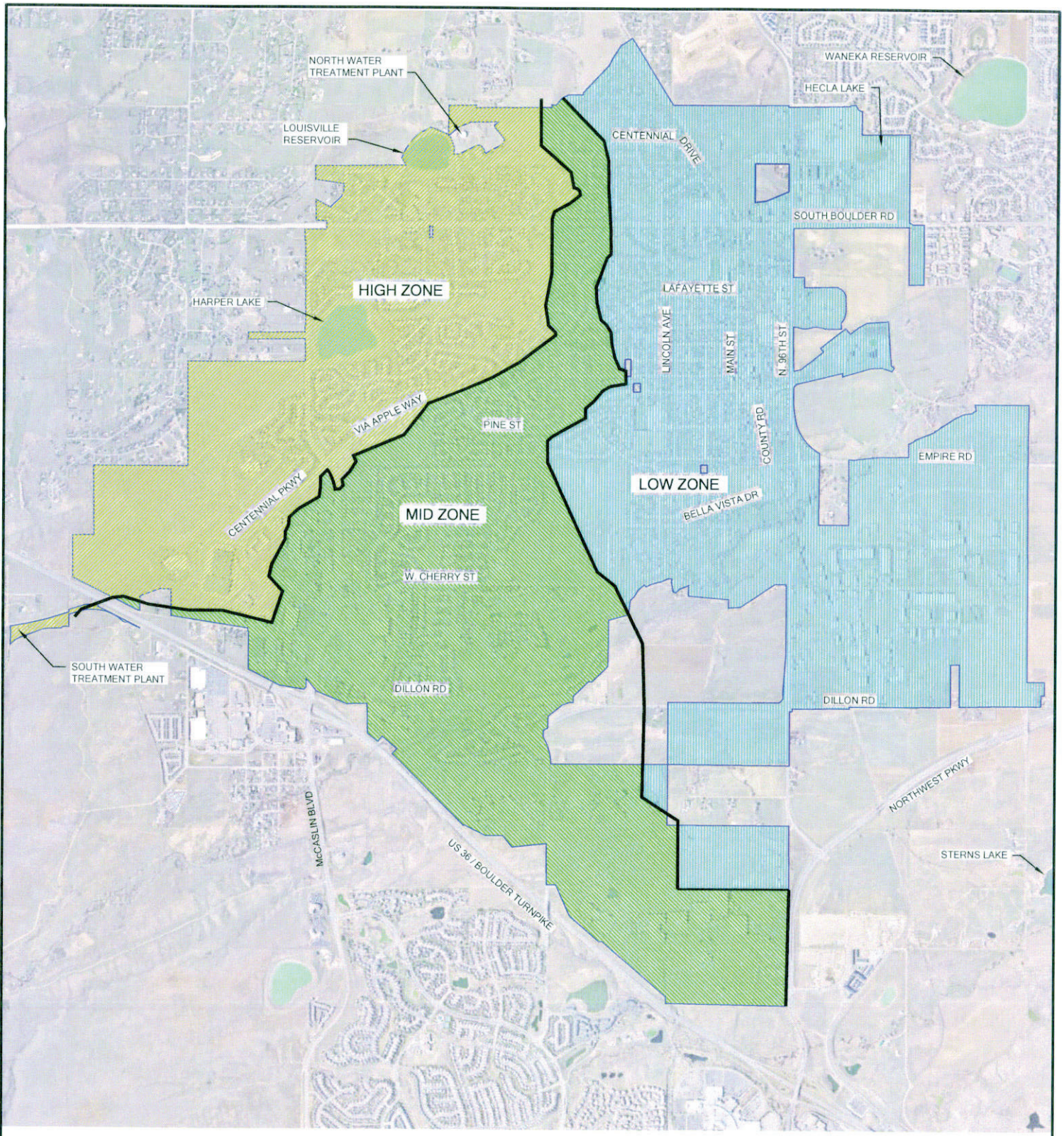
Table 2-2: High Zone Firm Pumping Capacity

Plant	Total Pumping Capacity	Firm Pumping Capacity
NWTP	5.0	3.0
HBWTF	6.0	3.5

2.5 WATER STORAGE

The industry standard is for water utilities to provide water treatment capacity to meet Peak Day Demands, while providing proper storage volume to meet emergency and fire storage needs as well as operational volume for daily flow variations. This approach generally provides the optimal balance between providing a durable system, controlling capital costs and managing water quality. Increasing water treatment capacity and offsetting storage volume is cost prohibitive, while decreasing treatment capacity and increasing storage can result in water quality problems as well as leave a community susceptible to water shortage when weather conditions result in sustained Peak Day Demands.

Various guidance documents such as AWWA Manuals of Practice, Colorado Department of Public Health and Environment (CDPHE) design criteria and Insurance Services Office (ISO)



INDICATED BOUNDARIES ARE APPROXIMATE LOCATION

LEGEND

- HIGH ZONE
- MID ZONE
- LOW ZONE

FIGURE 2-1

CITY OF LOUISVILLE - WATER FACILITY PLAN
LOUISVILLE WATER PRESSURE ZONES

Hatch Mott MacDonald

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guidelines can provide significantly different answers as to the amount of water storage that a water utility should provide. HMM's experience is that different water utilities across Colorado provide significantly different quantities of water storage as compared to their Peak Day Demands, and can be impacted by such things as water quality concerns, to the hydraulic condition of the distribution system.

While it was beyond the scope of this project to perform a storage evaluation, the issue of water storage is important in the evaluation of system needs and several identified projects, including evaluations of necessary water production capacity, pumping facilities and whether both the clearwell and 3 MG Tank at the NWTP should be maintained. Many water utilities in the Denver Metro area provide storage of approximately 70-80% of Peak Day Demand plus fire flow, although as noted there can be significant deviations from this rough guide. The City of Louisville stores approximately 8.5 million gallons of water, distributed as indicated in Table 2-3. An assessment of Table 2-3 shows that the City provides acceptable water storage, however may want to construct further storage in the Mid Zone in the future. The issue of storage volume will be reviewed by City staff through further planning. For the purposes of the Facilities Plan, it was decided that the 8.5 MG of storage is acceptable, but that the entire storage volume should be maintained.

Table 2-3: City of Louisville Water Storage

Pressure Zone	Water Storage Volume	Buildout Peak Day Demand
Low	3.0	3.0 – 3.5
Mid	3.5	4.7 – 5.9
High	2.0	2.7 – 2.8
Total	8.5	10.4 – 12.2

meeting water demands that actually occur in the system. If demand numbers are overly conservative, significant investment may be made in developing and maintaining unnecessary infrastructure. Based on the experience of HMM, a significant number of communities in the Colorado Front Range are currently revising Master Plan work completed either prior to or immediately following the drought of 2002, and are generally lowering water demands projections and revising Capital Investment Plans appropriately.

In order to address this problem in the Facilities Plan, both high and low water demand projections were developed to bracket a realistic range of future water demands. This methodology allows a reasonable range of demands to be considered when performing system planning.

In relation to the high end water demand projections shown in Table 4-4, average pre-drought water use projections were used in developing the demands. While this is not as conservative as using the highest demands from the highest year, the use of pre-drought demands does provide a reasonably conservative demand basis, considering that many items that result in water conservation such as low-flow fixtures are permanently in place. In addition, there is reason to believe that further water conservation measures will occur in future years further reducing customer water use, which provides an additional level of conservatism to the water demand projections. As an example, further legislation requiring even lower water usage for toilets and urinals has been in development, and most expect the legislation to be passed by legislation in upcoming years. While Louisville is currently at about 90% buildout, fixtures in existing homes and buildings will need to be replaced, and may be replaced with even more efficient fixtures.

Table 4-4: Average Day Demand Projection Summary

Year	Population [1][2]	Single Family Population [3][4]	Single Family Avg. Day Demand (MGD)		Multifamily Population [3][5]	Multifamily Avg. Day Demand (MGD)	Non-Residential Services [2][3][6]	Non-Residential Average Day Flow (MGD)		Total Demand Based on User Categories (MGD) [10]		Avg. Demand (MGD) [1]	
1998	18,177	15,158	1.959		3,019	0.227	387	1.148		3.996		4.033	
1999	18,062	15,306	1.865		2,756	0.225	482	1.129		3.859		3.973	
2000	19,051	15,306	2.108		3,745	0.234	482	1.306		4.373		4.454	
2001	19,088	15,306	1.993		3,782	0.236	482	1.216		4.129		4.253	
2002	18,747	15,306	1.567		3,441	0.196	482	0.720		2.976		3.089	
2003	18,419	15,296	1.691		3,123	0.204	496	0.989		3.457		3.408	
2004	18,574	15,330	1.486		3,244	0.194	519	0.915		3.111		2.996	
2005	18,427	15,337	1.658		3,090	0.229	522	1.061		3.534		3.496	
2006	18,723	15,345	1.842		3,378	0.239	530	1.307		4.061		3.855	
2007	18,989	No Data	No Data		No Data	No Data	No Data	No Data		No Data		3.72	
2008	19,461	No Data	No Data		No Data	No Data	No Data	No Data		No Data		3.716	
2009	19,656	No Data	No Data		No Data	No Data	No Data	No Data		No Data		3.251	
2010	18,376	15,319	1.585		3,057	0.226	549	1.014		3.385		3.37	
2011	18,410	15,415	No Data		2,995	No Data	550	No Data		No Data		No Data	
PROJECTED	**Population [2]**	**Single Family Population [2]**	**Single Family Avg. Day Demand (MGD)**		**Multifamily Population [2]**	**Multifamily Average Day Flow (MGD) [9]**	**Non-Residential Services [2][6]**	**Non-Residential Average Day Flow (MGD)**		**Total Demand Based on User Categories (MGD) [10]**		**Average Flow Based on Total Population(MGD)**	
			Low [7]	**High [8]**				**Low [7]**	**High [8]**	**Low**	**High**	**Low**	**High**
2012	18,497	15,855	1.893	2.057	3,248	0.229	552	1.338	1.454	4.146	4.483	3.757	4.083
2013	18,584	15,920	1.901	2.066	3,267	0.230	553	1.341	1.458	4.161	4.499	3.769	4.103
2014	18,671	15,985	1.908	2.074	3,286	0.231	555	1.344	1.461	4.176	4.515	3.784	4.122
2015	18,758	16,050	1.916	2.083	3,305	0.233	556	1.348	1.465	4.191	4.531	3.800	4.141
2019	19,123	16,141	1.927	2.094	3,540	0.249	559	1.354	1.472	4.232	4.574	3.865	4.222
2020	19,215	16,165	1.930	2.098	3,601	0.254	570	1.381	1.502	4.273	4.618	3.881	4.242
2025	20,162	16,401	1.958	2.128	4,215	0.297	576	1.395	1.517	4.375	4.725	4.049	4.451
2030	22,192	16,908	2.018	2.194	5,529	0.389	604	1.465	1.592	4.642	5.005	4.409	4.899
BUILDOUT	**23,000**	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	4.552	5.078

(1) Historical population values from PRJCTNS spreadsheet from City of Louisville.
(2) Population projections from Impact Fee Report dated 10 18 2011.
(3) Historical population from Meter Data Spreadsheet from City of Louisville. No data given for years 2007 - 2009.
(4) Single Family Units assumed to contain 2.6 people.
(5) Assumed 1.8 persons per unit based on previous data from 1998 - 2010 ex 2007-2009
(6) Non-residential services include irrigation, city, and commercial.
(7) Low single family use and low non-residential projections assumes no savings from programs. Low single family use projections assume 30% of future households conserve 14% of total use based on new fixture technology.
(8) High single family use and high non-residential projections assume 8% savings from 2 programs. High single family use projection assume 75% of future households conserve 21% of total use based on new fixture technology.
(9) Previous data for multifamily units showed no conservation, therefore no conservation was assumed for multifamily units.

4.3.4 Peaking Factor and System Peak Day Demands

Peak Day Demands are typically used to size water treatment facilities and other components of the water distribution system. The City has historically used a Peaking Factor of 2.64 for planning purposes. Previous flow data from 2003 through 2010 shows that the average peaking factor is 2.59. For the purposes of this study, a more conservative peaking factor was used to develop future Peak Day Demands in order to prevent underestimating future system demands. Therefore, the 75th percentile peaking factor of 2.68 was used in calculating Peak Day Demand projections.

The 75th percentile peaking factor was calculated using data from the post-drought years of 2003 – 2010, shown in Table 4-5. The 75th percentile value was considered appropriate considering that a conservative high and low based Average Day Demand are used in developing the projected Peak Day Demands.

Table 4-5: Historical Post Drought Peaking Factors

Year	Peak Day Demand	Average Day Demand	Peaking Factor
2003	9.717	3.408	2.85
2004	7.796	2.996	2.60
2005	9.473	3.496	2.71
2006	9.462	3.855	2.46
2007	8.923	3.720	2.40
2008	9.933	3.716	2.67
2009	7.880	3.251	2.42
2010	8.420	3.370	2.50
Average			2.59
75th Percentile			2.68

Figure 4-3 shows the resulting Peak Day Demand projection from the customer category projection, peak day demand projection, and total population projection. The graph includes the following:

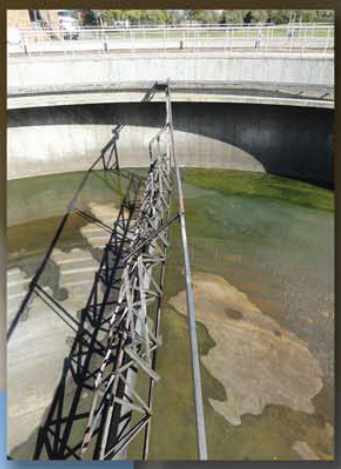
- The blue curve shows the historical Peak Day Demand in the City. The vertical red line in the year 2002 represents a marker for the drought year. A significant reduction in Peak Day Demands is indicated following the drought due to water conservation.

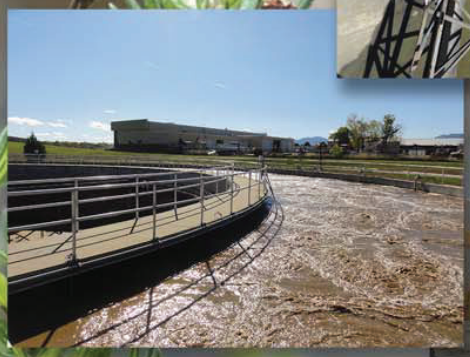
- A red bar in the year 2012 indicates the post-drought water use for the 2012 year. This bar captures a majority of Peak Day Demands following the drought. While recent years (2009 – 2011) show Peak Day Demands below this bar, using data from these years is not recommended, and is not considered conservative for water system planning. These recent years are likely impacted by economic downturn and higher summer month precipitation.

- The green and purple projection curves are the low and high demand projections, respectively, previously discussed in the chapter. These projections correspond well to the red bar indicating the expected range of "base" post drought Peak Day Demands. The high demand curve is a highly conservatively forecast based on pre-drought demand data. Water system planning typically requires a conservative approach as

City of Louisville

Wastewater Facility Plan





April 2013

Dewberry

SECTION 1
EXECUTIVE SUMMARY

This Wastewater Facility Plan provides the City of Louisville with an analysis of their existing wastewater treatment infrastructure, a summary of the current and projected regulatory requirements, projections of future wastewater flows and loads, an evaluation of treatment alternatives, and recommended improvements to their wastewater treatment infrastructure. This Plan provides a roadmap infrastructure needs required to meet future the demands of population growth, address facility deficiencies, and meet anticipated regulatory changes.

1.1 Summary of Existing Wastewater Treatment Plant (WWTP)

The Louisville WWTP utilizes preliminary and secondary treatment with disinfection to treat wastewater. The WWTP also has tertiary effluent filters for effluent reuse during the summer months. The original facility, constructed in 1952, and has since undergone five major and two minor upgrades. The plant currently has a rated capacity of 3.4 million gallons per day (MGD) and 7,089 pounds per day (ppd) of BOD_5. The WWTP currently consists of:

- A headworks with 2 mechanical bar screens (each with a 3 MGD capacity), one screenings washer, one manual bar screen, two gravity grit chambers, and two parshall flumes for influent flow measurement.
- One 2.2 million gallon aeration basin with two dedicated blowers and fine bubble diffusers.
- Two secondary clarifiers. One 120 ft diameter and one 80 ft diameter.
- UV disinfection rated for 5.8 million gallons per day (MGD) installed in one channel.
- One 2 MGD filtration system for producing reuse water for irrigation.
- A gaseous chlorine disinfection system for disinfecting reuse water. This system, with a gaseous sulfur dioxide system, also serves as a backup disinfection system to the existing UV system.
- Solids handling including a rotary drum thickener, one aerobic digester with two blowers, and one dewatering centrifuge.
- A composting facility.
- Ancillary process equipment including return activated sludge (RAS) pumps, waste activated sludge (WAS) pumps, scum pumps, electrical gear, and instrumentation.

The City's WWTP receives wastewater from approximately 63 miles of sanitary sewer ranging in size from 8 to 27-inch diameter buried pipe. The wastewater collection system currently includes three lift stations which will soon be expanded to four with the North End development.

1.2 Planning Criteria

The City of Louisville currently has an estimated population of 18,500 that produces approximately 1.7 MGD and 3,700 pounds per day of BOD_5. The City is planning for growth to a buildout population of 23,000 in 2034. The growth in population will also increase wastewater flows and loads to the WWTP. Planning criteria for the City of Louisville WWTP

are provided in **Table 1-1.** Maximum month conditions are utilized to determine plant capacity and planning criteria. Average daily influent wastewater flow during the maximum month is projected to increase to 2.45 MGD at buildout. The flow projections represent an almost 25 percent increase in flow from 2011 to buildout as a result of the population growth within the service area. Projected maximum months loads at buildout for BOD_5, TSS, and NH_3 are 5,515, 6,340, and 664 pounds per day (ppd), respectively.

Table 1-1 Planning Criteria for City of Louisville WWTP

Parameter	Year 2022			Year 2032			Year 2034		
	AA	MM	PH	AA	MM	PH	AA	MM	PH
Flow, mgd	1.79	2.15	3.88	2.07	2.48	4.49	2.11	2.53	4.58
BOD_5, ppd	3,819	4,697		4,404	5,417		4,483	5,515	
TSS, ppd	4,001	5,401		4,614	6,229		4,696	6,340	
NH_3, ppd	439	566		506	653		515	664	
TKN, ppd	654	844		754	973		767	989	
Phosphorus, ppd	77	91		88	104		90	106	

1.3 WWTP Discharge Permit and Regulatory Review

The WWTP operates under permit number CO0023078. The last permit renewal was issued August 16, 2011 and expires at midnight on September 30, 2016. The facility has a permitted hydraulic capacity of 3.4 million gallons per day (MGD) and an organic capacity of 7,089 pounds per day (ppd) of BOD_5. Current ammonia discharge limits vary by month and range from a low of 7.5 mg/L in November to a high of 12.0 mg/L in February. The permit includes a compliance schedule to meet new lower Ammonia discharge limits that are effective on August 1, 2017. The ammonia limits effective on August 1, 2017 are significantly lower; they range from a low of 1.7 mg/L for the months of July, August, and September to a high of 2.6 mg/L in January.

In 2012, the Colorado Department of Public Health and Environment (CDPHE) approved a revised Regulation 31 – The Basic Standards and Methodologies for Surface Water and new Regulation 85 – Nutrients Management Control Regulation. Regulation 31, an extension of the EPA's EcoRegion Concept, sets water quality goals and standards for total nitrogen and phosphorus in Colorado's streams and rivers. Regulation 85 sets wastewater treatment facility effluent limits on total inorganic nitrogen (TIN) and phosphorus at 7 and 0.7 mg/L, respectively, for plants larger than 1 MGD. The requirements for TIN and phosphorus are projected to become effective in 2022.

1.4 Treatment Performance and Evaluation

Louisville's WWTP treated an annual average daily flow of 1.67 MGD in 2011 and 3,548 ppd of BOD_5 in 2011. The aeration basin was originally designed to reduce BOD_5 and total suspended solids (TSS) in the effluent to less than 30 mg/L each. The treatment plant is designed to reduce carbonaceous BOD_5 and total suspended solids (TSS) in the effluent to less than 30 mg/L each. It was not designed to provide the nitrification (the biological oxidation of ammonia) required to achieve

SECTION 4
HISTORICAL AND PROJECTED WASTEWATER PRODUCTION

This section presents the historical and projected wastewater production rates based on a review of the service area, projected population growth, and historical per capital wastewater flows and loads. The capacity and specific treatment facilities required to provide sufficient treatment at the City's Wastewater Treatment Plant (WWTP) depend in part on future development of the service area, flow variations, and waste characteristics.

4.1 HISTORICAL WASTEWATER PRODUCTION

Historical wastewater characteristics for the City are presented in this section based on a five and one half year record of flows and waste strength from 2007 through mid-2012.

HISTORICAL WASTEWATER FLOWS

Wastewater flows for the City's WWTP are given in **Table 4-1.** The highest recorded annual average flow (AAF) was 1.82 MGD in 2007 and the lowest recorded AAF was 1.67 MGD in 2011. The AAF for 2012 is trending slightly lower than 2011 through June. The average day maximum month flow (MMF) of 2.19 MGD recorded in June 2009 represents 64 percent of the nominal capacity of 3.4 MGD. The ratio of MMF to AAF ranged from 1.02 to 1.22. The 95 percent confidence interval for max month flow over the 5.5 years of data is 1.16.

Table 4-1 Historical Influent Flows

Month	Influent Flow, MGD					
	2007	2008	2009	2010	2011	2012
Jan	1.77	1.63	1.59	1.62	1.51	1.64
Feb	1.81	1.61	1.58	1.62	1.55	1.67
Mar	1.76	1.60	1.64	1.76	1.49	1.63
Apr	1.84	1.64	1.92	1.91	1.54	1.63
May	2.01	1.68	2.04	2.07	1.79	1.63
Jun	2.02	1.83	2.19	2.12	1.91	1.59
Jul	1.84	1.82	1.91	1.97	1.96	--
Aug	1.84	1.79	1.77	1.82	1.79	--
Sep	1.84	1.82	1.81	1.66	1.69	--
Oct	1.80	1.70	1.66	1.64	1.61	--
Nov	1.65	1.62	1.76	1.60	1.59	--
Dec	1.62	1.62	1.67	1.49	1.61	--
AAF	1.82	1.70	1.80	1.77	1.67	1.63
MMF	2.02	1.83	2.19	2.12	1.96	1.67
MMF/AAF	1.11	1.08	1.22	1.20	1.18	1.02

Note: AAF = Average Annual Daily Flow, MMF = Average Daily Flow in the Maximum Month

WASTEWATER SYSTEM PEAKING FACTORS

Peaking factors are a used in the planning process to help predict maximum conditions that must be accounted for in the facility design. The peaking factors represent the maximum day and maximum month conditions when compared to the average annual condition. The MMPFs represent the average daily value during the maximum month for each parameter.

The historical maximum day and maximum month peaking factors (MMPFs) for the City's WWTP are summarized in **Table 4-17**. Historical peaking factors for influent flow, BOD_5, TSS, and NH_3 were determined by dividing the monthly average by the corresponding annual average for each year from 2007 through mid-2012. The maximum day and maximum month peaking factors were determined based on a statistical analysis of the 95th and 99th percentile frequency of the monthly peaking factors over the five and one-half year historical record. Utilizing the 95^{th} or 99^{th} percentile values helps eliminate outliers in the data set; this reduces the potential for over planning or designing systems.

Table 4-17 Historical Maximum Month Peaking Factors

Parameter	Peaking Factors			
	Maximum Day		Maximum Month	
	95^{th} percentile	99th percentile	95^{th} percentile	99th percentile
Flow	1.23	1.62	1.21	1.22
BOD_5			1.20	1.21
TSS			1.29	1.31
Ammonia			1.33	1.35

Table 4-17 summarizes MMPFs selected as the planning criteria for evaluation of treatment alternatives included in this Master Plan. Each peaking factor was rounded to two significant digits. At two significant digits, the difference between the 95^{th} and 99^{th} percentile for flow, BOD_5, and TSS differed by one percent. The difference between the 95^{th} and 99^{th} percentile for ammonia differed by two percent. The 95^{th} percentile MMPFs for flow, BOD_5, and NH_3 are values that are typical for communities in the Front Range of Colorado.

The City of Louisville is able to export flow information from the WWTP's Supervisory Control and Data Acquisition (SCADA) system. Flow information is collected at four minute intervals on a continuous basis. Flow data from the maximum flow days for 2009 and 2010 were exported therefore, allowing the peak hour flow to be determined from data. The peak flow day for 2009 occurred on April 18. Data for this day was not able as a result of a software problem that occurred while installing a new SCADA system. The next highest flow day for 2009 occurred on June 2 with a recorded flow of 2.549 MGD. The peak flow day for 2010 occurred on June 13 with a recorded flow of 2.396. **Table 4-18** provides a summary of the recorded peak daily flow, peak hour flow, and the calculated peaking factors.

Table 4-18 Calculated Wastewater Peaking Factors

Date	Recorded Daily Flow, MGD	Average Annual Daily Flow, MGD	Peak Hour Flow, MGD	Peak Hour Factor[1]
June 2, 2009	2.549	1.80	3.912	2.17
June 13, 2010	2.396	1.77	3.531	1.99

[1] Peak Hour Factor = Peak Hour Flow/Average Annual Daily Flow

The peak hour flow can also be estimated using an equation developed by the Denver Regional Council of Governments (DRCOG) for reviewing utility plans and for interceptor certification. The wastewater flow peaking factor used by DRCOG was established in the 1977 regional management plan, and subsequently confirmed through numerous planning processes. It is calculated by the following formula:

$$\text{Peaking Factor} = 3.65 / (\text{Average Total Flow MGD})^{0.167}$$

(The maximum peaking factor used in any assessment should be less than 5.0)

Typically, the average total flow is based on a monthly average. The maximum peaking factor of 5.0 generally applies to very small treatment works. Although no minimum peaking factor is recommended herein, a factor of less than 1.0 is not appropriate. Using this formula, the calculated average peak hour flow peaking factor for the Louisville WWTP is 3.33.

4.2 WASTEWATER FLOW AND LOAD PROJECTIONS

Flow and load projections for the City of Louisville were calculated by multiplying the population projections (provided by the City) by the historical per capita flow/load contribution given in **Table 4-16**. Projections of flow and load from commercial and industrial are not calculated separately because the flow and load from commercial and industrial sources is a relatively minor contributor to the City's total wastewater flow and load. The contribution from commercial/industrial sources are included in the calculated historical per capita flow and loads and, thus, are inherent in the wastewater flow and load projections. Currently, the City has approximately 33 residents per commercial/industrial connection and is projected to have 35 residents per commercial/industrial connection in Year 2030.

The max month peaking factors used for planning purposes utilize the 95th percent confidence interval. Using the 95th percent confidence interval eliminates outliers and reduces the potential of planning and design for conditions not likely to be observed.

FLOW PROJECTIONS

The projected influent wastewater flows for years 2012 to buildout at a population of 23,000 (shown as year 2034) are given in **Table 4-19**. It is estimated that the annual average daily wastewater flows will increase to 2.11 MGD a buildout (estimated to be 2034). Average daily influent wastewater flow during the maximum month is projected to increase to 2.45 MGD. The flow projections represent an almost 25 percent increase from current (2012) through buildout. The increased flows are the result of the population growth within the service area. The ultimate

5.1 WASTEWATER TREATMENT PLANT SITE

The WWTP is located about a mile west of downtown Louisville at 1601 Empire Drive, Louisville, Colorado. As shown in **Figure 5-2**, the WWTP is located in the northeast portion of Louisville and is bordered by Empire Drive to the south, N. 96th Street (Highway 42) to the west, and W. South Boulder Road to the north. The Public Land Survey System coordinates for the site are NW 1/4 and NE 1/4 of SW 1/4 & SW 1/4 and SE 1/4 of the NW 1/4 of Section 9, T1S, Range 69W. Latitude and longitude of the WWTP are 39°58'30" North and 105° 7'30" West, respectively. The most recent FEMA floodplain map shows the facility to be located either outside the 500 year flood plain or above the base floodplain elevations.

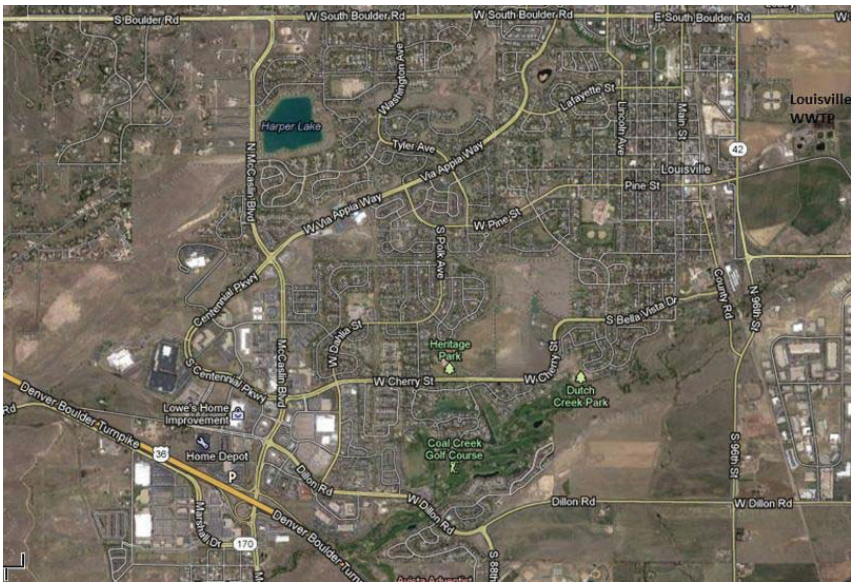


Figure 5-2 Location of the City of Louisville WWTP
(www.googlemaps.com, 2012)

5.2 WASTEWATER TREATMENT PLANT PERFORMANCE

The WWTP currently treats approximately 1.67 MGD and 3,548 ppd of BOD_5. The plant is currently rated for 3.4 MGD and 7,089 ppd of BOD_5. The treatment plant is designed to reduce carbonaceous BOD_5 and total suspended solids (TSS) in the effluent to less than 30 mg/L each. It was not designed for nitrification (the biological oxidation of ammonia) or for denitrification (the biological reduction of nitrate to nitrogen gas). The WWTP meets the current required ammonia discharge criteria through the efforts of Plant Operations Staff, who manage the biological processes to achieve nitrification and limited denitrification. This operations approach is currently possible because the WWTP is operating well below its rated capacity (underloaded). Historical performance of the facility in terms of BOD_5, TSS, and ammonia are presented in this section.

REDUCTION IN FIVE DAY BIOCHEMICAL OXYGEN DEMAND (BOD_5)

Monthly average influent and effluent BOD_5 for the WWTP are shown in **Figure 5-3** from January of 2007 through June of 2012. Influent BOD_5 concentrations range between a minimum of 137 mg/L and a maximum of 431 mg/L for data evaluated. The average influent BOD_5 concentration over this five and one-half year period was 250 mg/L. Between 2007 and 2012, the final effluent BOD_5 varied between a minimum of 0.4 mg/L to a maximum of 9 mg/L. The average effluent BOD_5 concentration over the five and one-half year period was 2.7 mg/L. Treatment efficiency averaged 99 percent removal, but varied between 99.5 and 97.8 percent

ELECTRICAL SYSTEMS

The electrical distribution equipment has been provided under numerous modification projects spanning a number of years at the WWTP. The Main Distribution Panel was provided in 1987, the standby generator was provided in 1999, and the Reclaimed Water System was added as recently as the mid 2000s. The equipment life for distribution equipment including switchboards/panelboards, switchgear, transformers, and motor control centers is typically 20-30 years. Moisture and dust are two of the main factors that decrease the life of the equipment. Most of the distribution equipment at the WWTP is located in dedicated electrical rooms and symptoms of moisture and dust on the equipment were not readily apparent. Electrical equipment that has not been exposed to moisture and dust can often stay in service much longer than its normal expected life. A NETA (International Electrical Testing Association) accredited acceptance testing firm should be hired to perform visual and mechanical inspection and testing of the equipment. An in depth assessment of the condition of major components can be performed after acceptance testing.

A thermographic survey was performed at the WWTP in October, 2011. The report noted a few items requiring attention, and the entity performing the survey tightened conductor connections. The thermographic survey report recommended monitoring of the equipment and did not indicate that any repairs were required.

The WWTP has a backup generator that provides power to essential plant equipment during a power failure. The connected loads to the generator exceed the rating of the generator which requires the Plant Operations Staff to monitor loads placed on the generator when it is in use.

ADMINISTRATION AND OPS BUILDINGS

The Administration and Ops Buildings at the Louisville WWTP appear to be in good condition, meet the building, electrical, and fire protection code that were applicable at time they were constructed, and no obvious safety concerns were noted. The existing Operations Lab is 25 years old could benefit from a new HVAC system and a new chemical hood. Additionally, there is currently minimal shop space available for Plant Operations Staff to perform maintenance of plant equipment, and to store tools and spare parts.

5.4 SUMMARY AND CONCLUSIONS

A majority of the facilities and equipment at the Louisville WWTP was constructed over 20 years ago and were designed to meet the effluent limits and regulatory requirements in place at the time. Effluent limits in the near future contain tighter limits on ammonia and, in less than 10 years, limits for both phosphorus and total inorganic nitrogen (TIN) are expected to be imposed. Additionally, regulatory requirements have become stricter and now require redundant process equipment and trains so that one train/piece of equipment can be out of service while treatment is maintained. The Louisville WWTP was not designed to meet the effluent limits for ammonia or TIN and redundant process trains/equipment are currently not provided for many of the processes. Below is a summary of the WWTP evaluation.

- The plant headworks will need to be replaced due to equipment age, structural condition, and operation and maintenance concerns. HVAC and electrical gear in the current headworks does not meet the current electrical and the current fire protection code (NFPA 820) and would need to be upgraded with any modifications to the facility.
- The secondary process lacks redundancy. Additional aeration basins will need to be constructed and capable of meeting the projected future regulatory criteria.
- For buildout conditions, the existing secondary process has capacity to meet the ammonia limits effective August 1, 2017; however, it cannot meet the phosphorus and TIN limits projected to be effective in 2022. The process cannot meet the new ammonia limits at its current rated capacity.
- It is possible to maintain the existing secondary process as part of the treatment process until the nutrient criteria (for phosphorus and TIN) become effective in 2022.
- Solids handling facilities at the WWTP have sufficient capacity to meet projected buildout conditions. Redundancy and equipment age/condition issues should be addressed.
- The UV system has sufficient capacity to meet the projected buildout conditions; however, the system lacks a redundant channel and is reaching its useful life and should be replaced. Currently, all the UV modules are located in one channel which makes it difficult to maintain. If two channels were utilized, one channel could be taken out of service for maintenance and cleaning while the other was in operation.
- Irrigation water for the WWTP site is currently taken from the chlorine contact chamber upstream of the UV disinfection system posing health concerns for staff. The irrigation system should be modified to use disinfected water from the Reclaimed Water System.
- Gaseous chlorine is a poisonous gas. It should be replaced with a less toxic compound such as sodium hypochlorite or an onsite generation system.
- Remodel existing Operations Lab and construct new 2,000 square foot Shop Building.

7.3 PROJECT PHASING

The recommended upgrades to the Louisville WWTP address equipment/structure age issues, City growth, redundancy requirements, and stricter effluent limits effective in 2017 and 2022. There is limited opportunity to construct the upgrades in phases to spread out the capital expenditures.

It is possible to construct two new secondary process trains now and utilize the existing secondary process as a redundant secondary process until the total inorganic nitrogen (TIN) and phosphorus limits become effective in 2022. In this scenario, the construction of the third new secondary process would be delayed by approximately five years. This approach was evaluated by Dewberry and City staff, and it was decided to construct the entire WWTP upgrades in one single phase based on the following:

1. Utilizing the existing secondary process until 2022 would require a new blower (to replace the unreliable high speed turbo blower), new 120 ft diameter clarifier mechanism, and structural repairs to the clarifier concrete. Estimated cost of these improvements is $1.2 million while the cost of the third secondary process train is estimated to be $3 million. It should be noted that these improvements would only delay the construction of the third process train and would not replace it, i.e., the upgraded equipment and structures would be decommissioned in 2022.
2. To improve plant hydraulics and minimize potential sewer backups, the hydraulic profile of the WWTP will be lowered. It would be extremely difficult to construct a new headworks to address the hydraulic issues in the influent sewer that would also fit the hydraulic profile of the existing secondary process and the new upgraded secondary process. Doing so would require compromises in the headworks design which would not be optimal for the new treatment processes. .
3. Phasing of the project would require two significant construction projects at the WWTP site in a span of seven years; phase one 2015-2017 and phase two 2020-2022. Construction generates traffic and noise and is disruptive to plant operations. Splitting the work into two phases would increase the amount and duration of construction activity and the associated impacts on City staff as well as surrounding residents.

7.4 REVISED CONSTRUCTION AND TOTAL PROJECT COSTS

The construction cost for the recommended upgrades presented in **Section 6** are refined in **Table 7-4**. The costs were refined to address wastewater data collected during the final planning stage of this plan, and several other issues identified by the project team. These issues are:

1. Upsizing the secondary process to accommodate the MMPFs listed in **Table 7-2** and the secondary process design criteria in **Table 7-3**.
2. Additional civil site work to address flood concerns related to the downtown Louisville stormwater issue.
3. Constructing a new building for the upgraded UV systems. The two proposed site layouts for the WWTP locate the new secondary process far from the existing UV

disinfection system and there is insufficient hydraulic elevation available l to accommodate reusing the existing system at its present location.

4. Additional site piping costs for constructing the influent sewer to the new headworks, located further east on the property.
5. Design and construct a new influent sewer from Highway 42 to the WWTP.
6. Design and construct a new 8" water line to the WWTP.
7. Repave all existing asphalt surface.

As shown **Table 7-4**, the total estimated construction cost for the recommended WWTP upgrades is $18.1 million and the estimated total project cost is $21.8 million. Detailed planning level cost estimates for the recommended upgrades are provided in **Appendix C**.

Table 7-4 Construction and Total Project Costs

Item	Cost
Headworks	1,978,000
Modified UCT Process	6,853,000
UV Disinfection	833,000
Aerobic Digestion	1,320,000
New Influent Sewer, new water line, Repave existing asphalt	492,000
Lab Remodel and New Shop Building	620,000
Subtotal	**12,096,000**
Contractor OH&P, Bonding, Mob/Demob	2,419,000
Contingency (25%)	3,629,000
Estimated Construction Cost	**18,144,000**
Legal, Permitting, Planning and Engineering (20%)	3,629,000
Total Project Cost	**21,773,000**

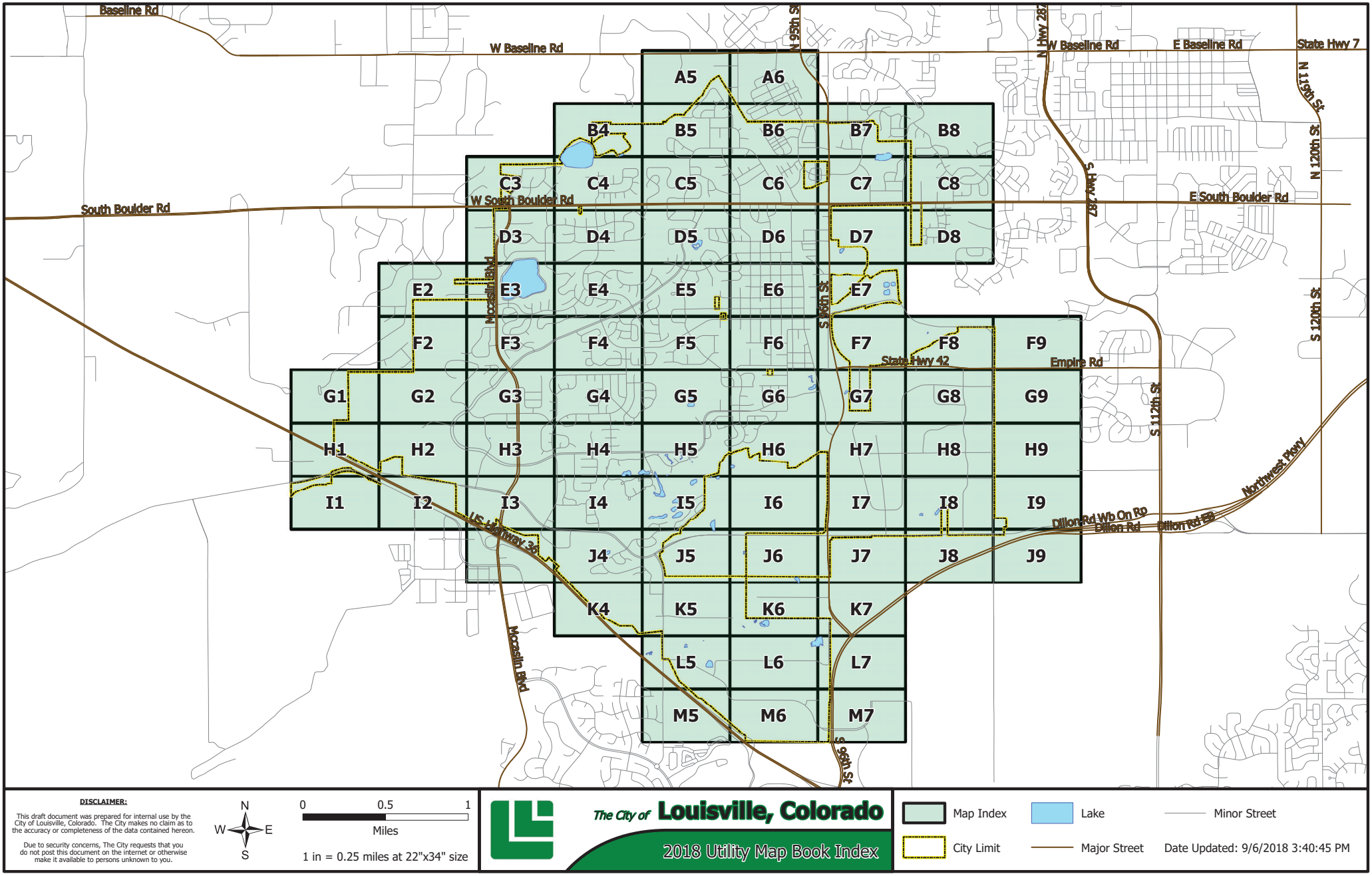
7.5 SCHEDULE

As shown in **Table 7-5,** design**,** bidding, and construction of the WWTP upgrades is estimated to have a duration of 46 months. This assumes 18 months for design, 20 months for construction, and 4 months for startup and commissioning. It is desirable to have the upgraded WWTP operational some period of time prior to effective date of the stricter limits on August 1, 2017 to give Plant Staff time to learn and optimize the new process. Incorporating two months into the schedule for Plant Staff increases the total project schedule to 4 years.

Table 7-5 Project Duration

Item	Duration
Design	18 months
PEL Development (part of design process)	2 months
CDPHE Review	2 months
Bidding Process	2 months
Construction	22 months
Startup and Commissioning	2 months
Total Project Duration	**46 months**

APPENDIX C – City of Louisville Utility Maps



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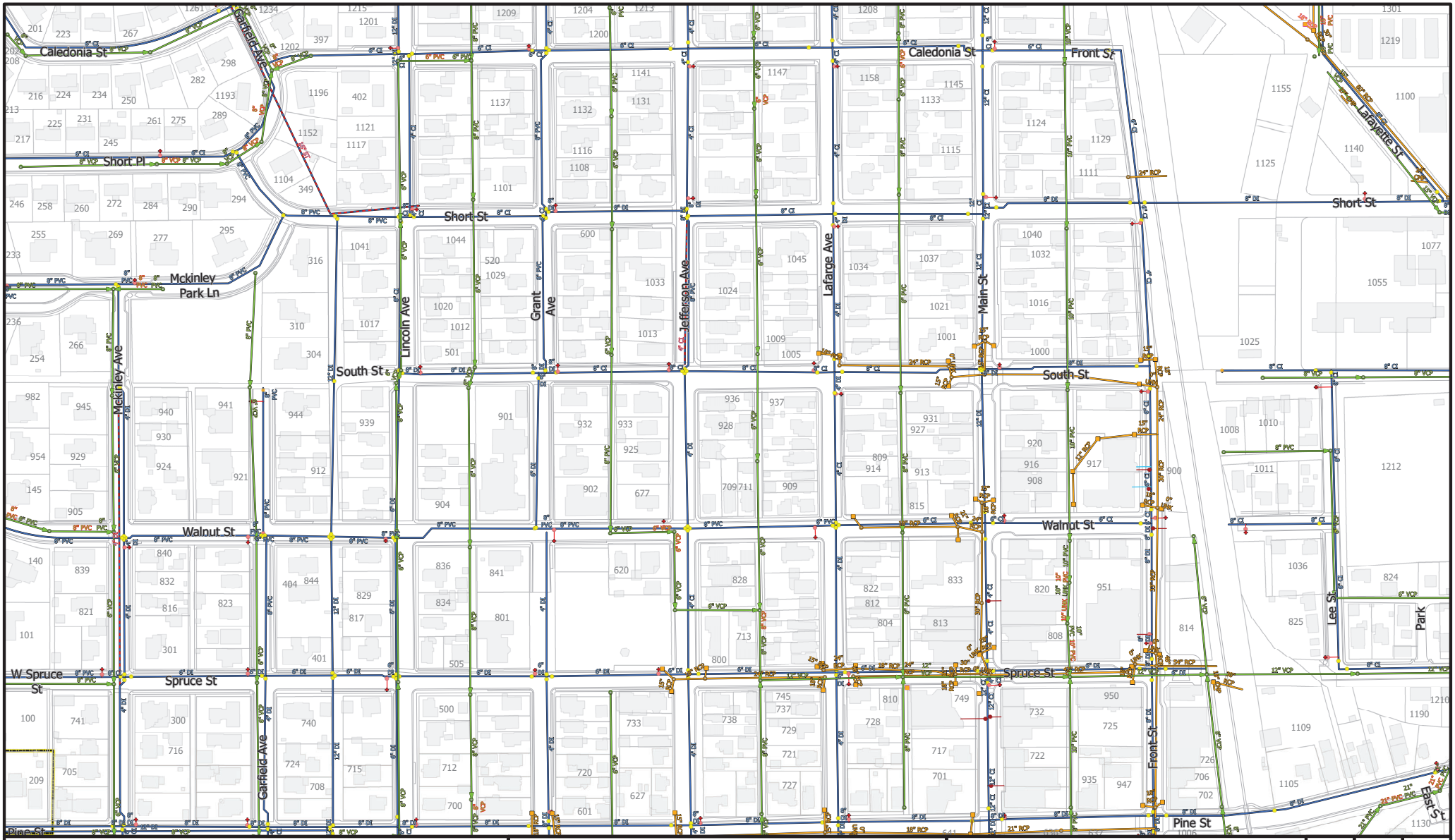

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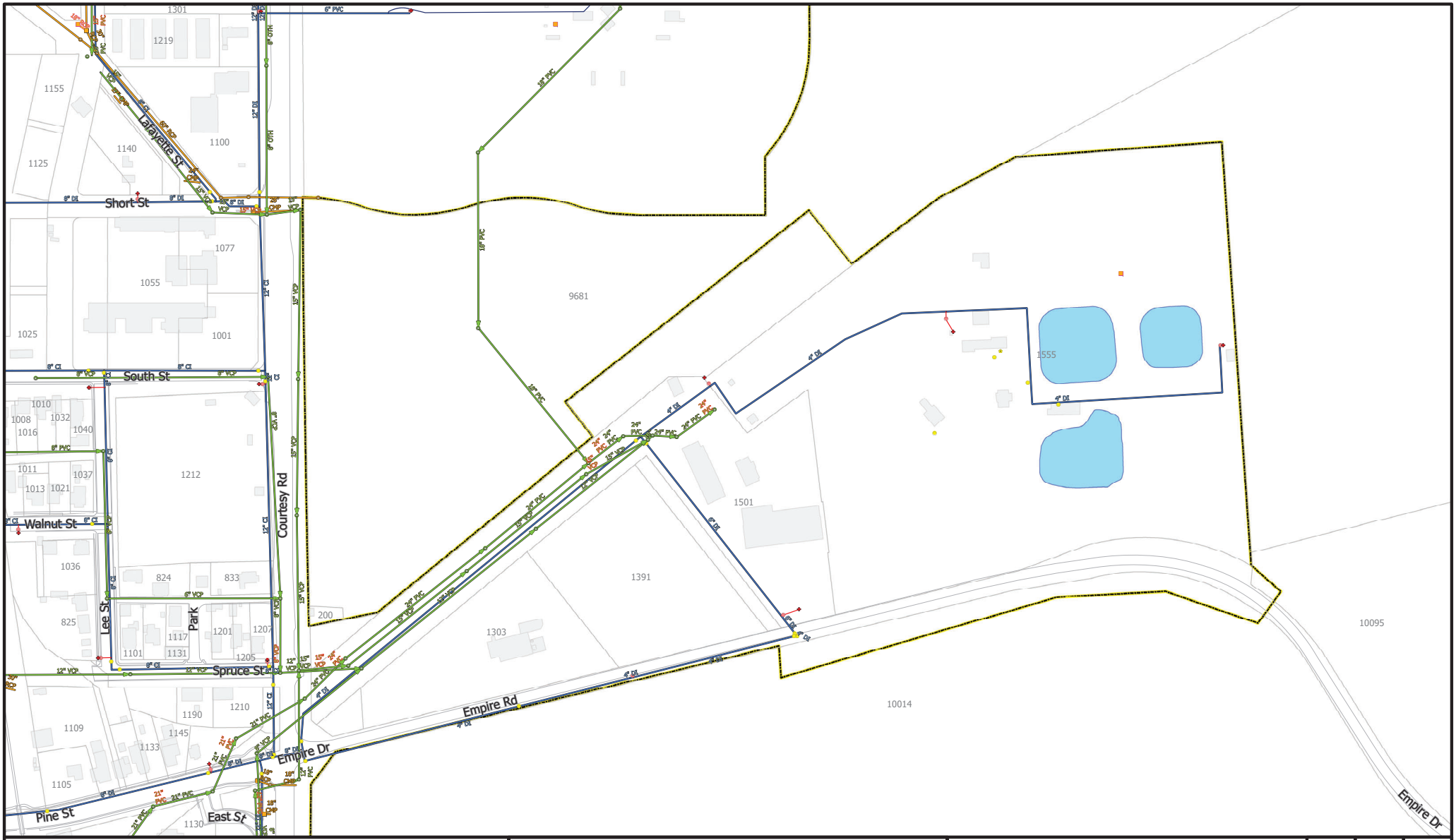

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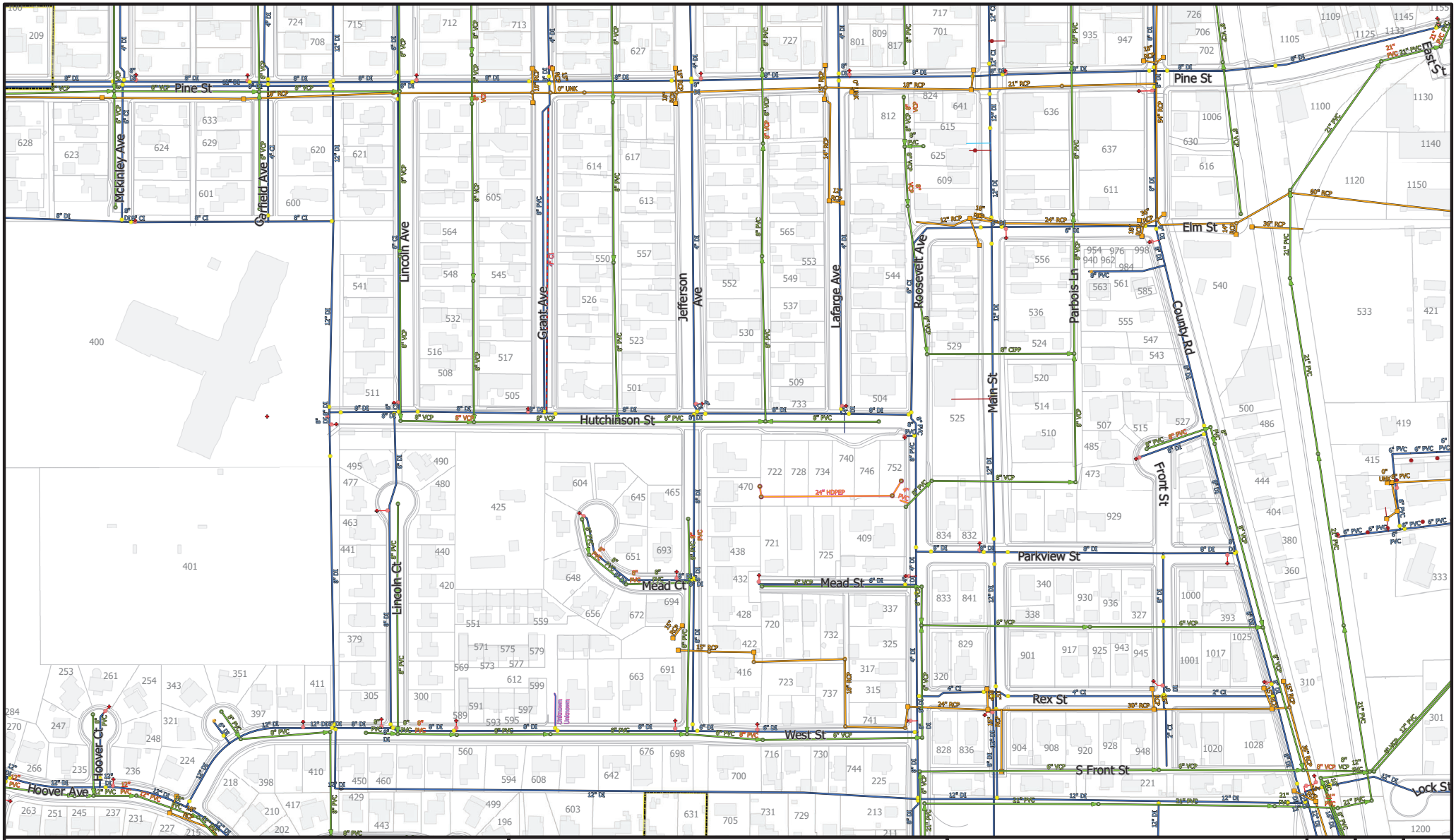

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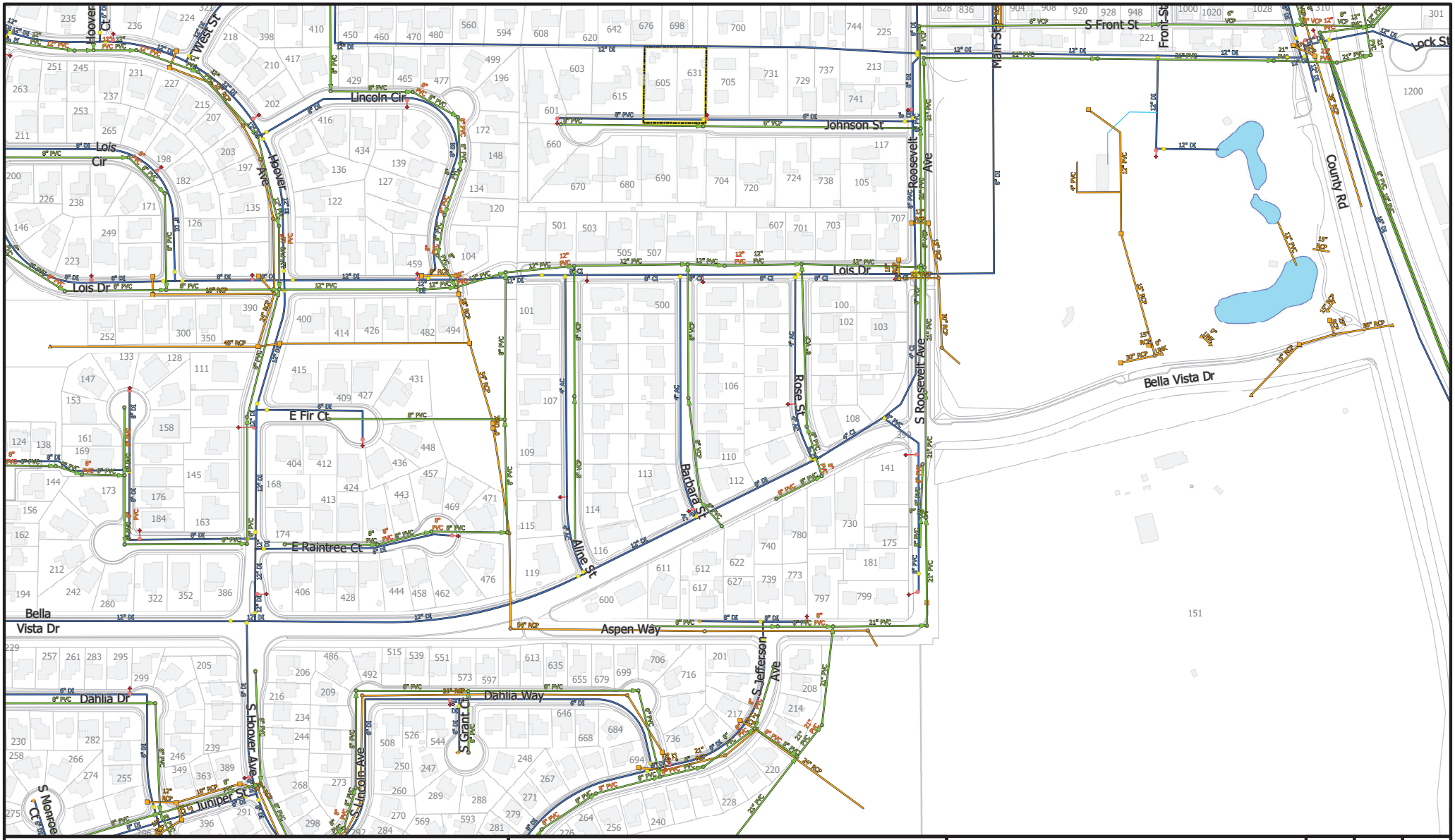

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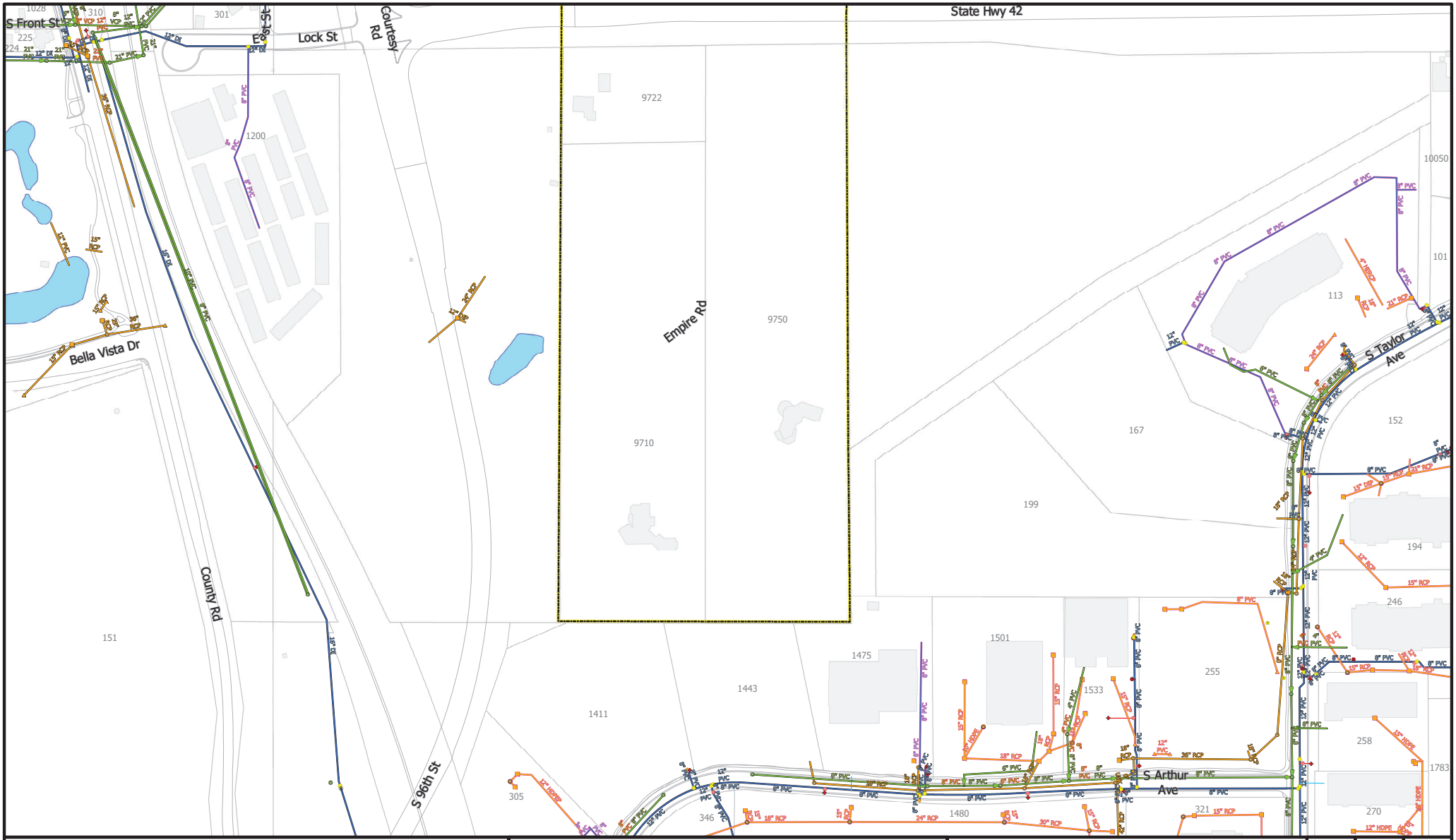

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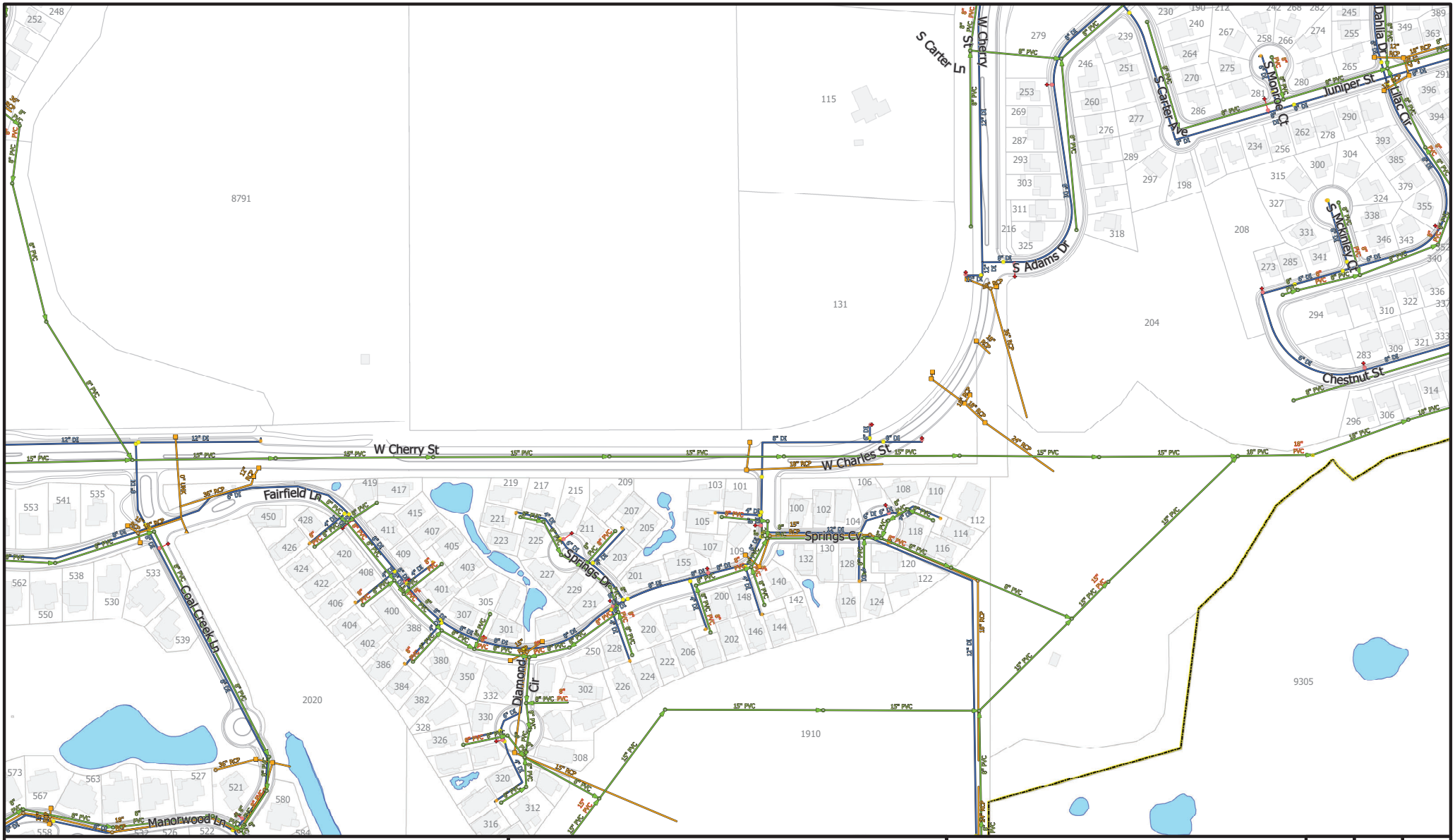

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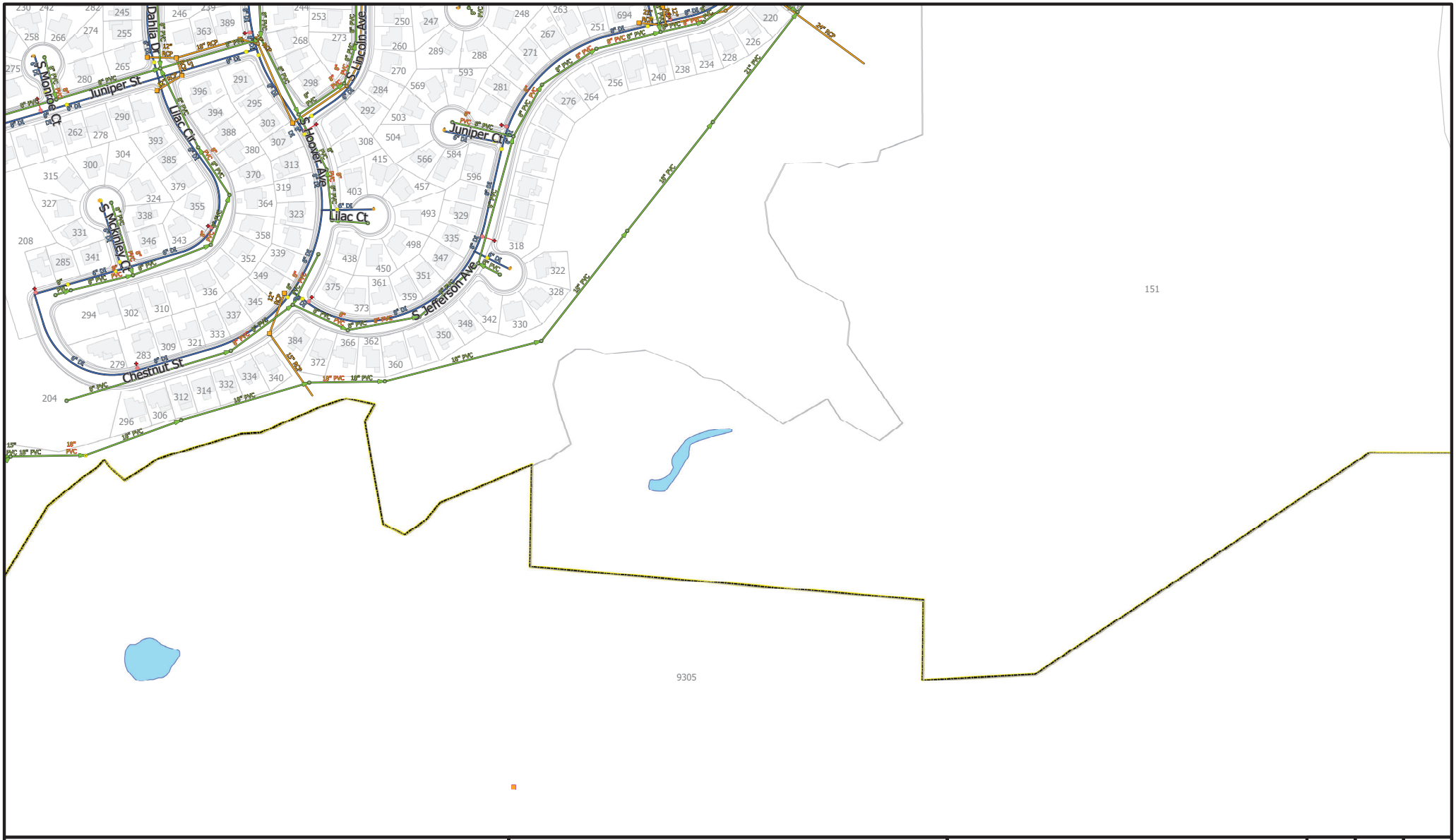

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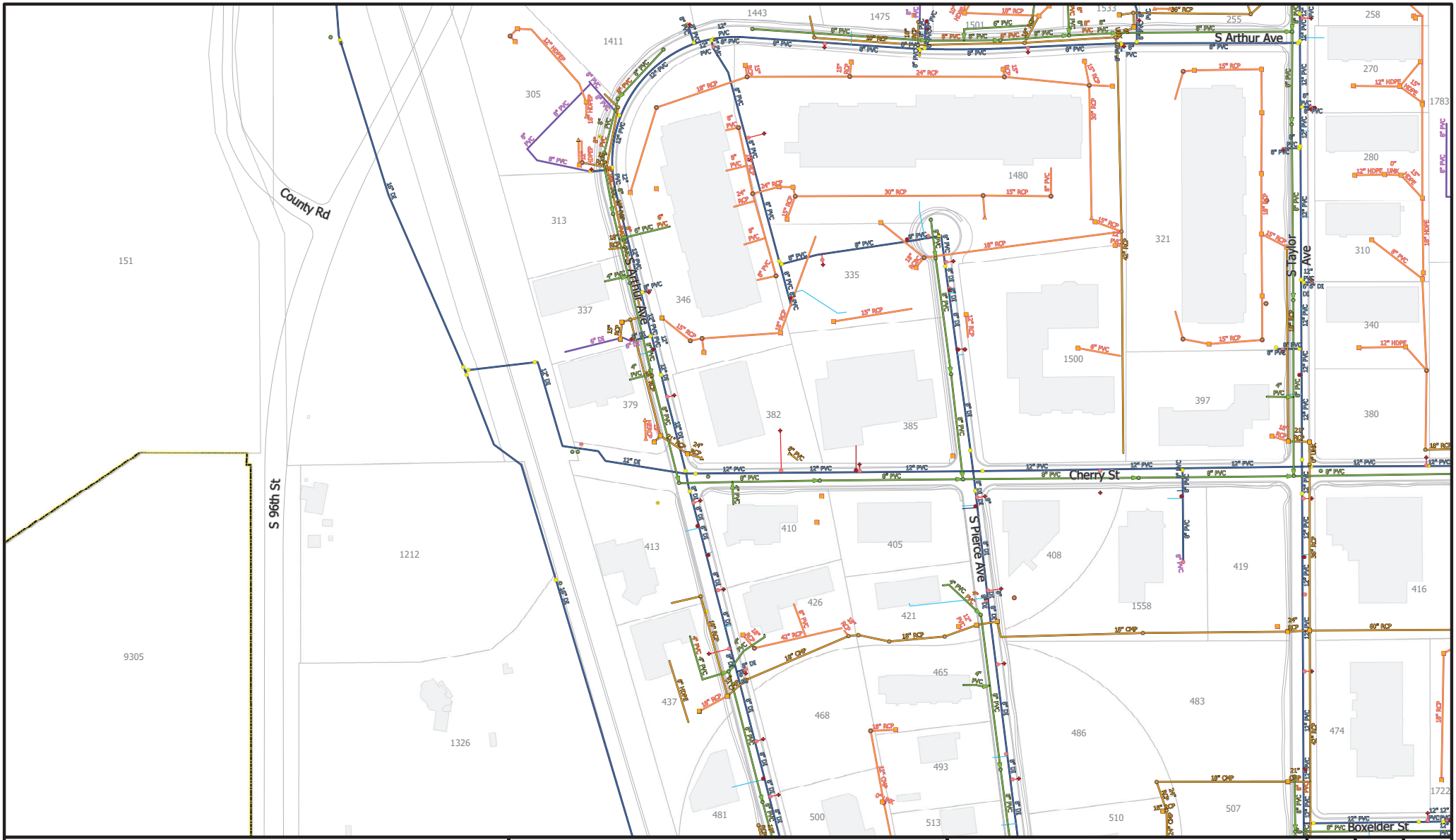

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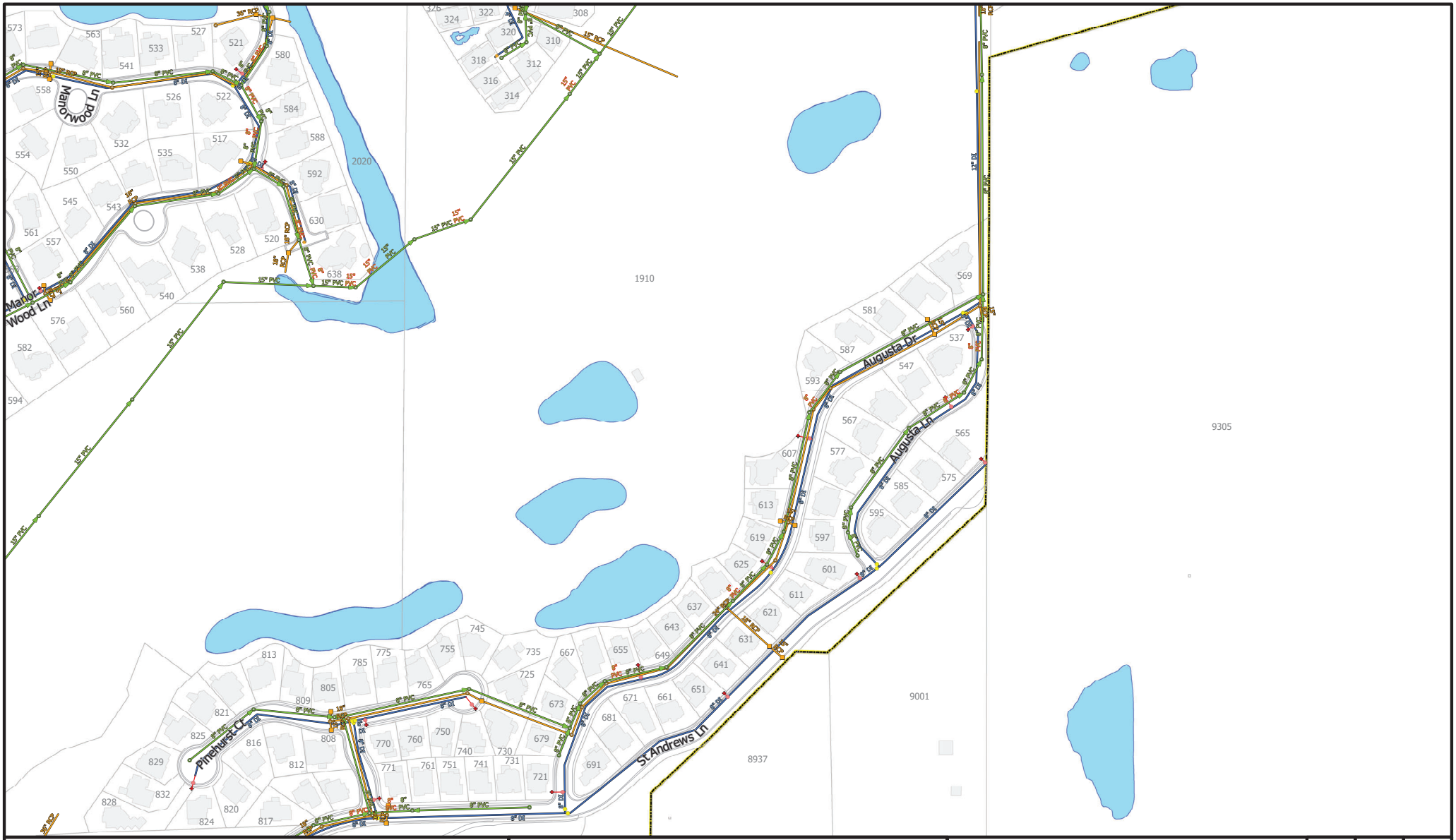

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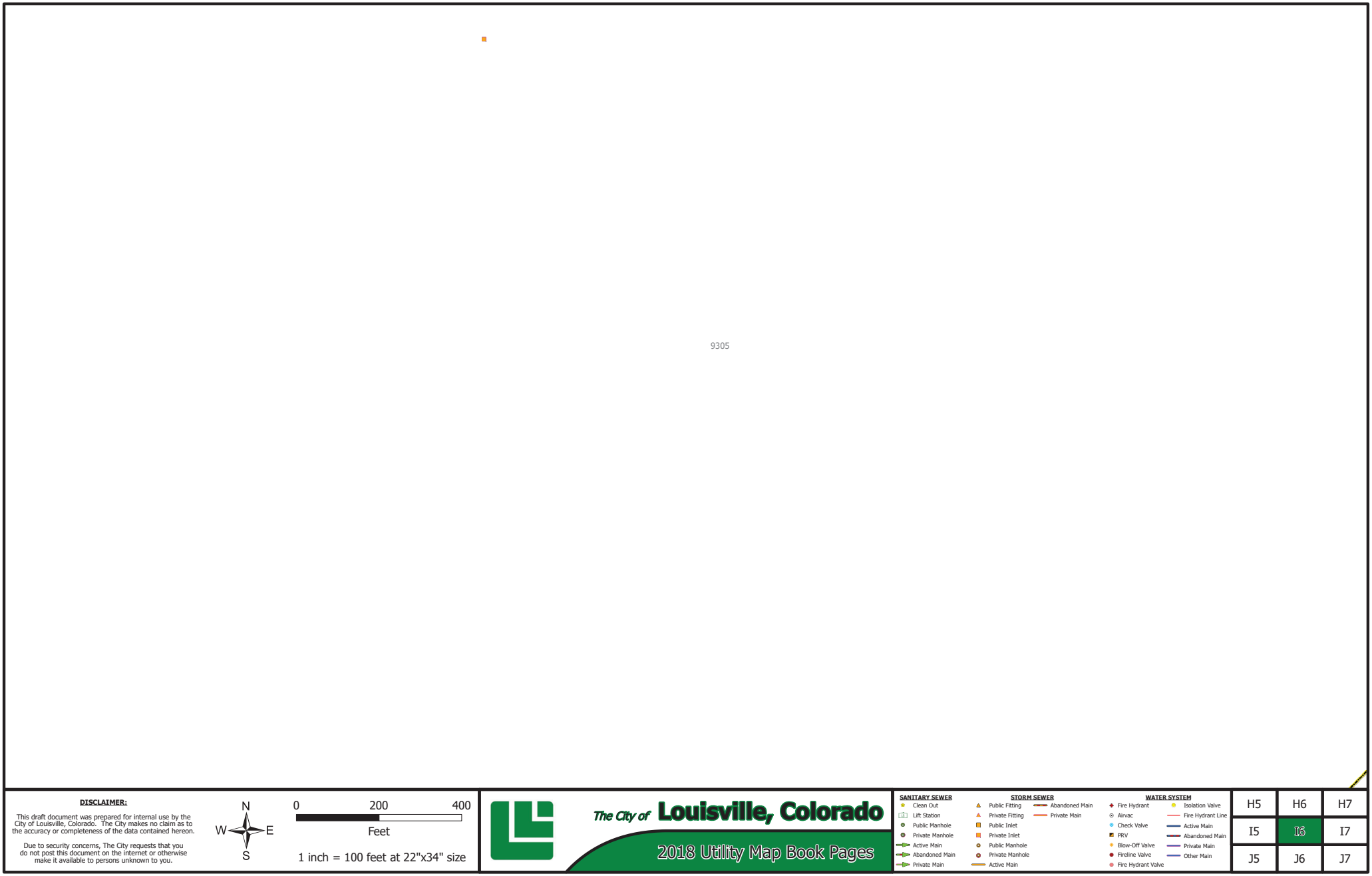

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H5	H6	H7
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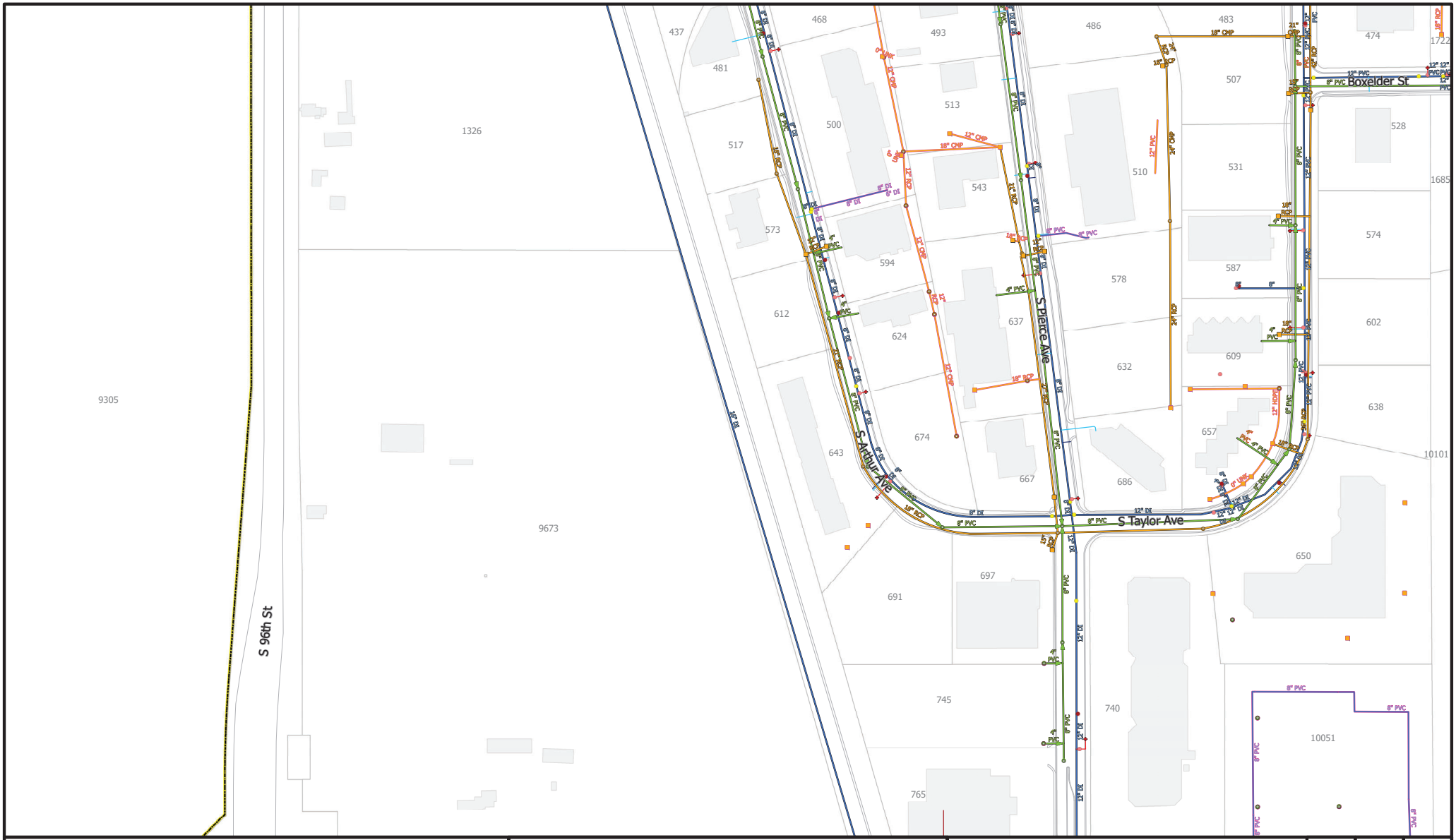
J5	J6	J7



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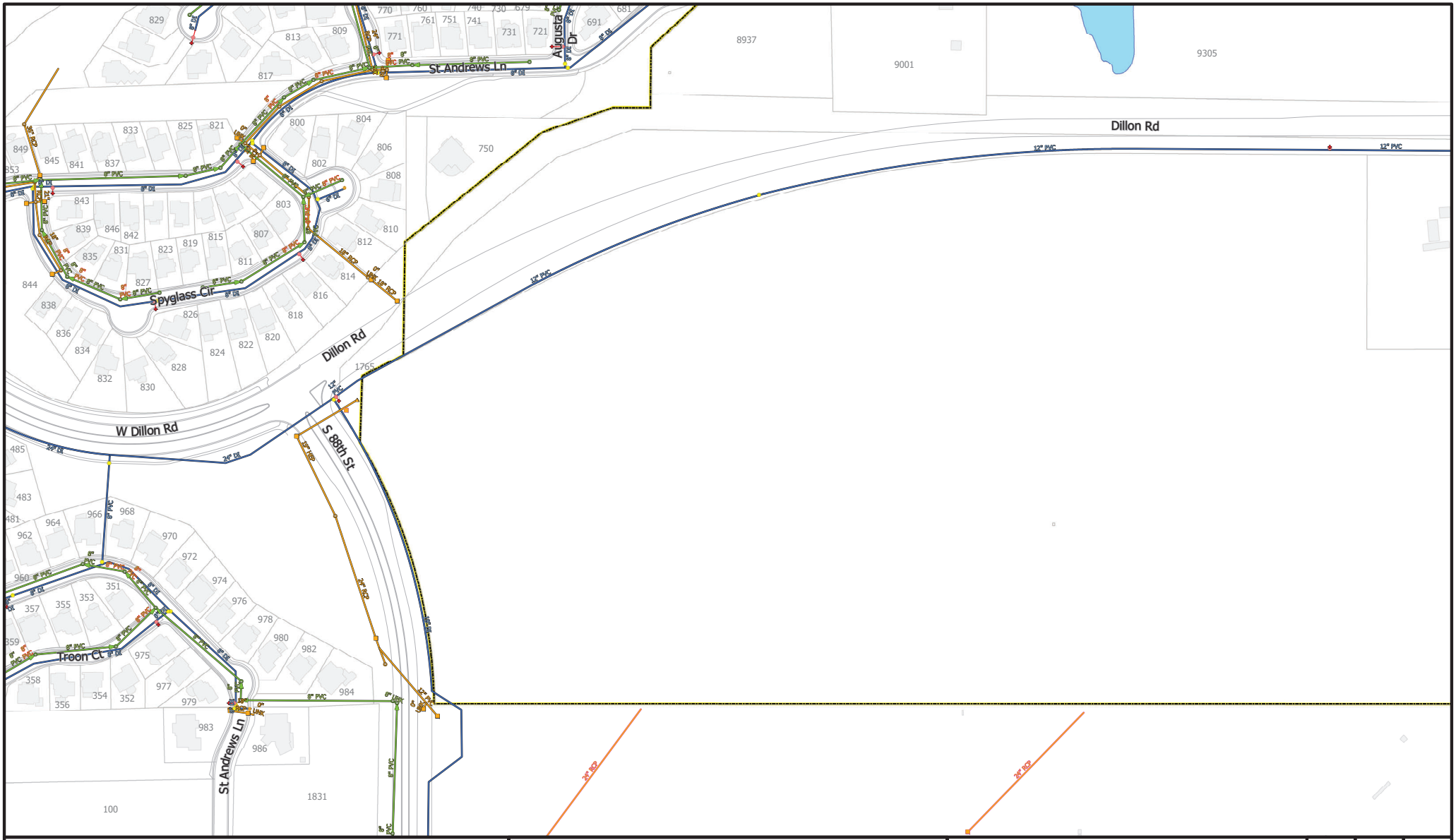
J6	J7	J8



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I4	I5	I6
J4	J5	J6
K4	K5	K6

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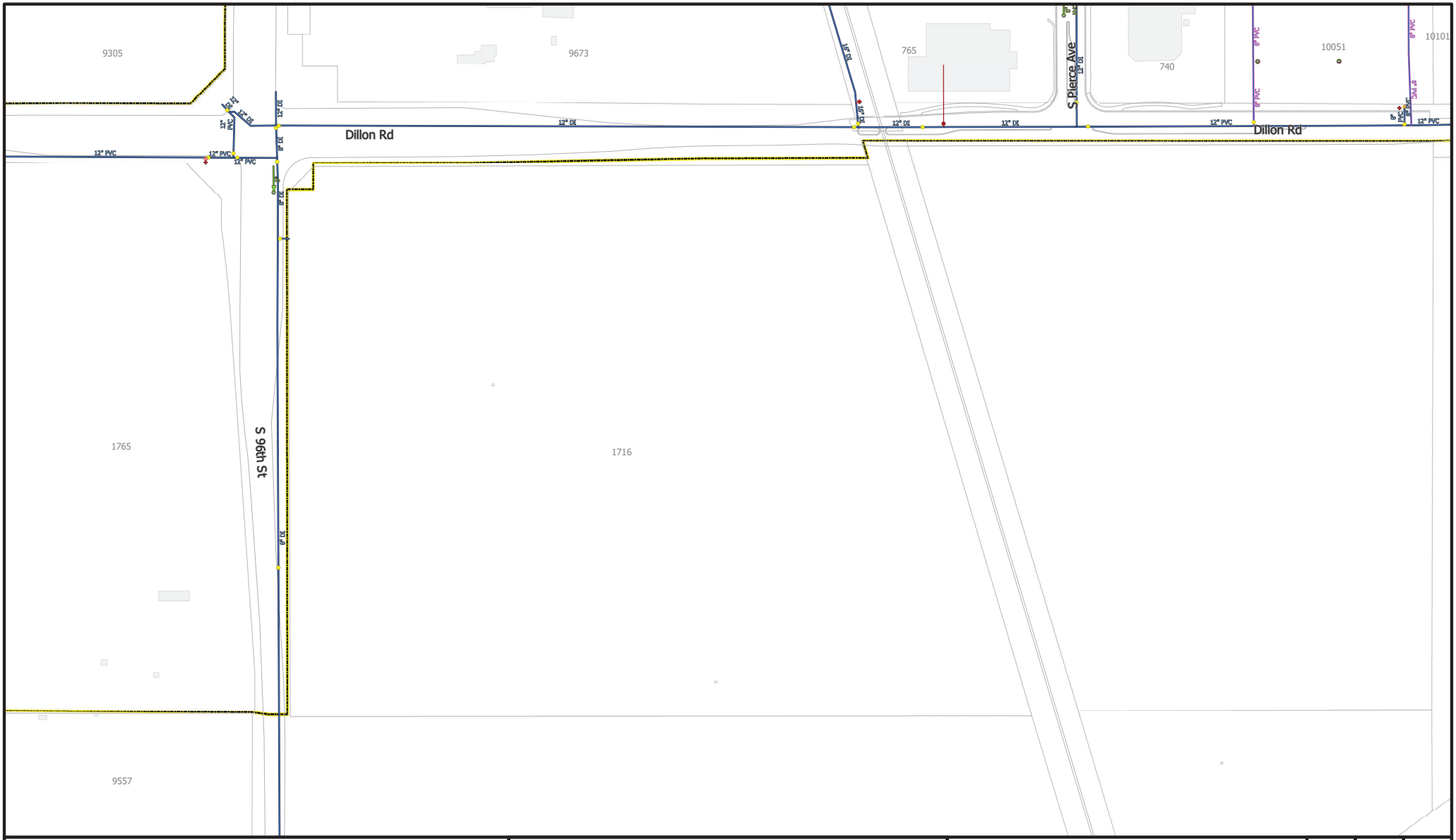
J5	J6	J7
K5	K6	K7



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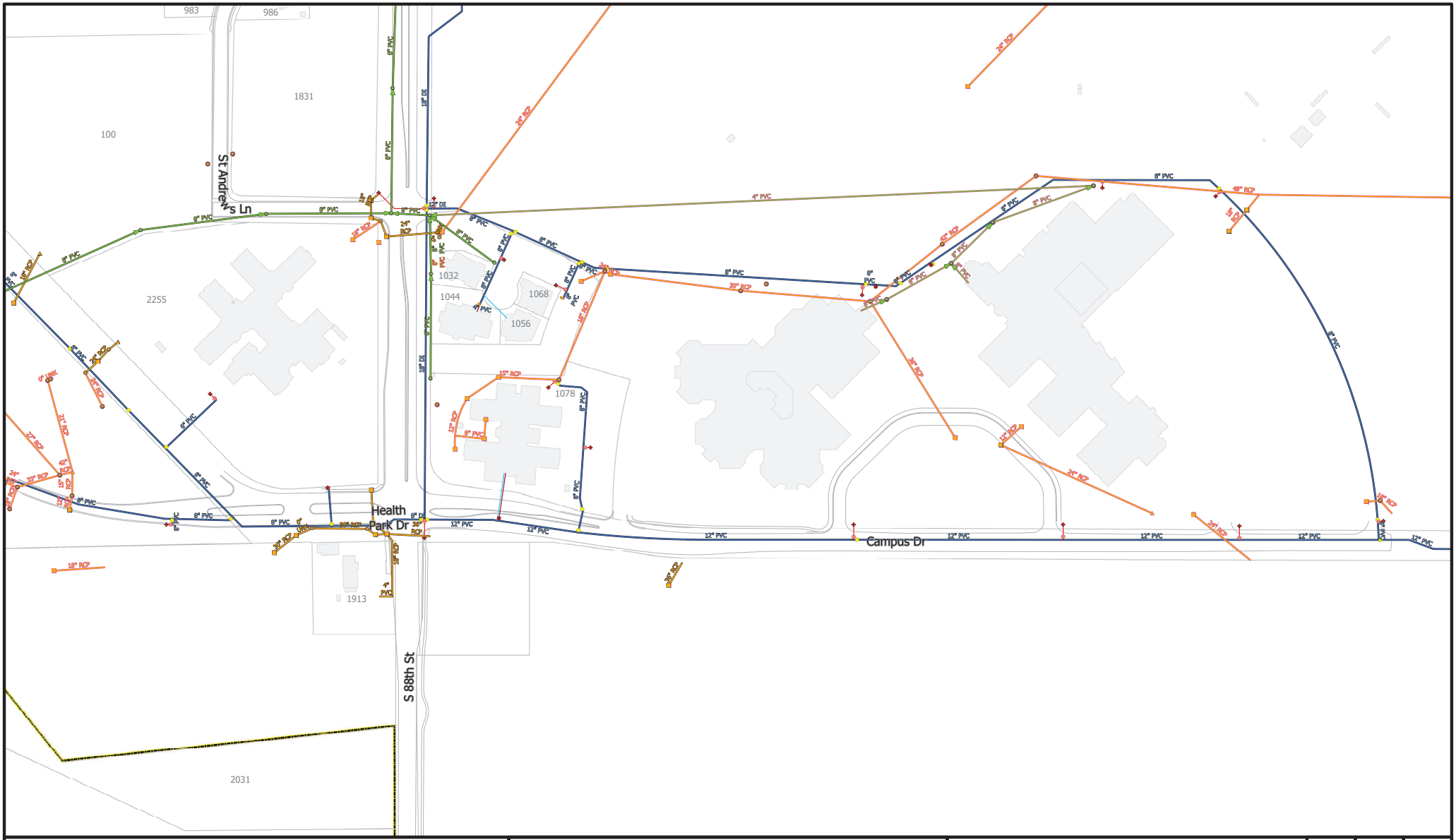
I6	I7	I8
J6	J7	J8
K6	K7	--



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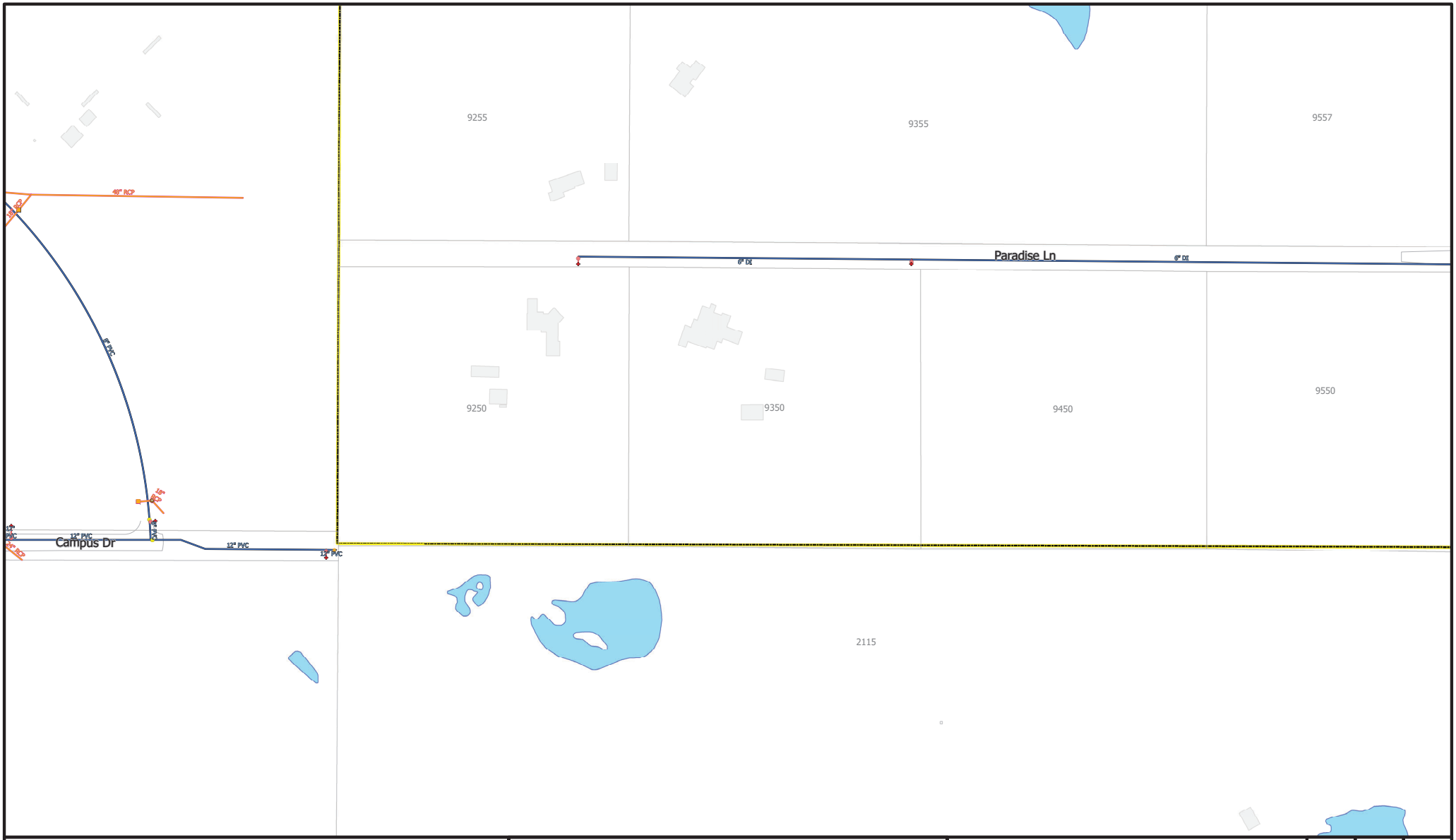
J4	J5	J6
K4	K5	K6
--	L5	L6



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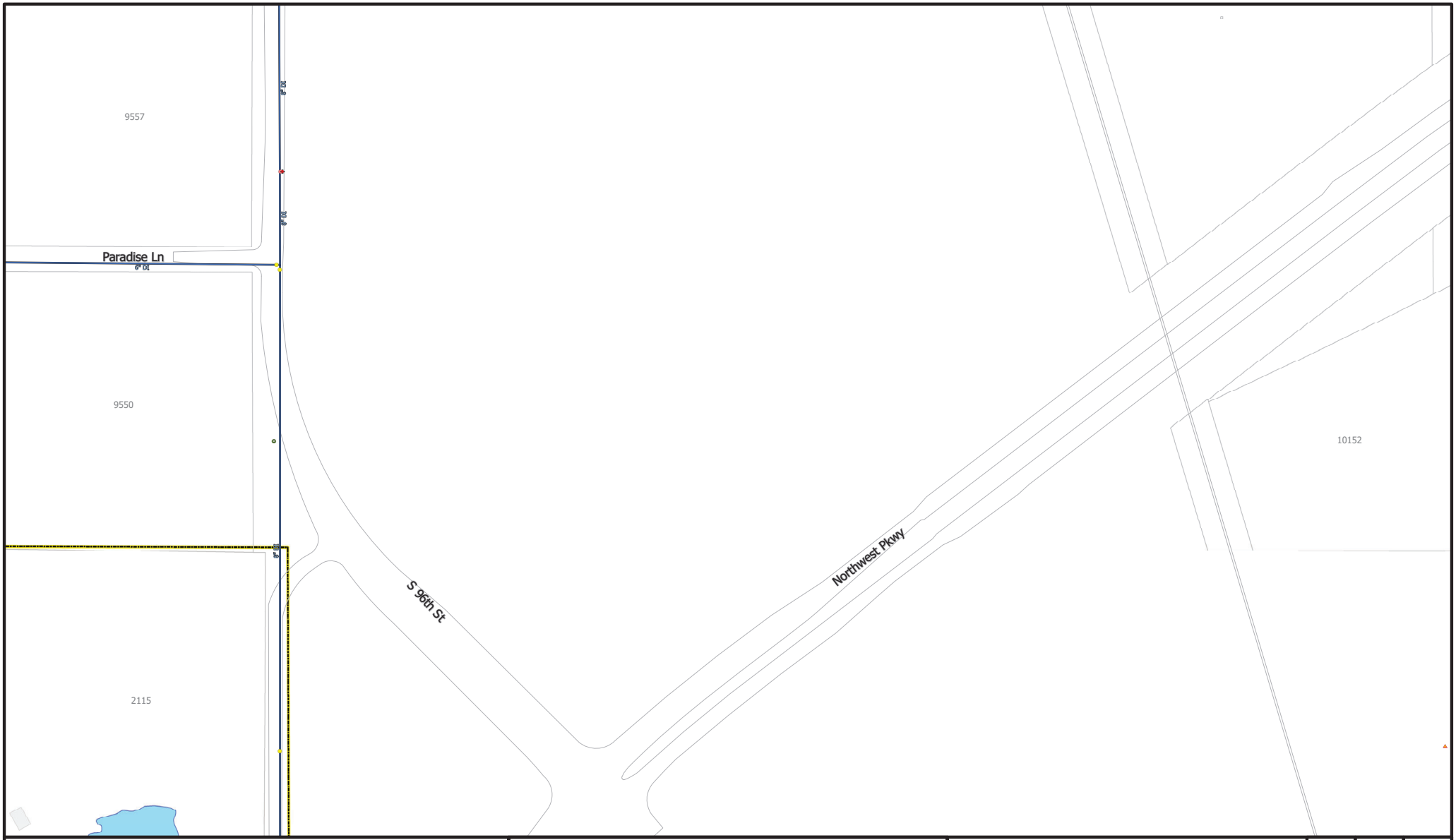
J5	J6	J7
K5	K6	K7
L5	L6	L7



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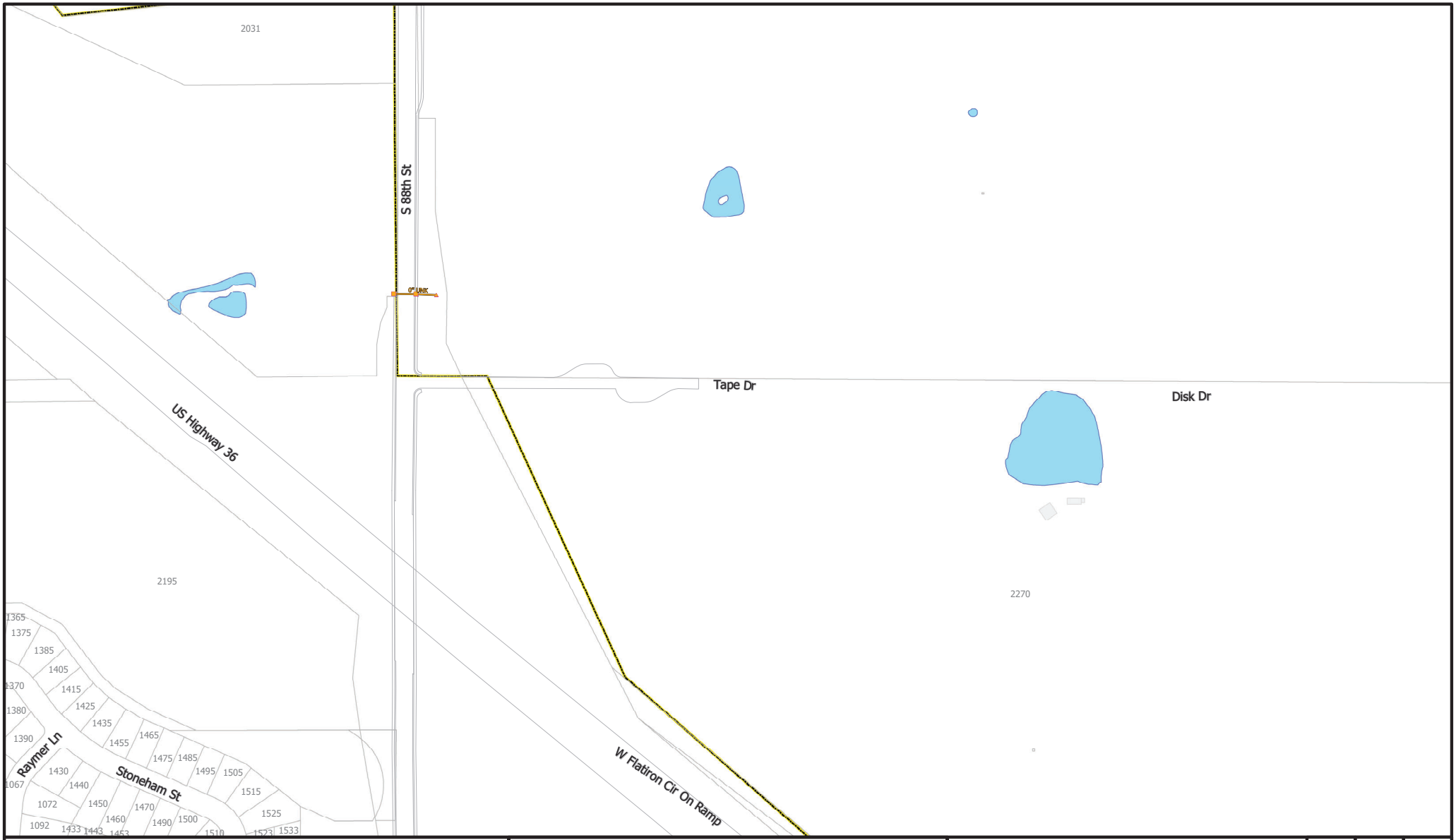

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K4	K5	K6
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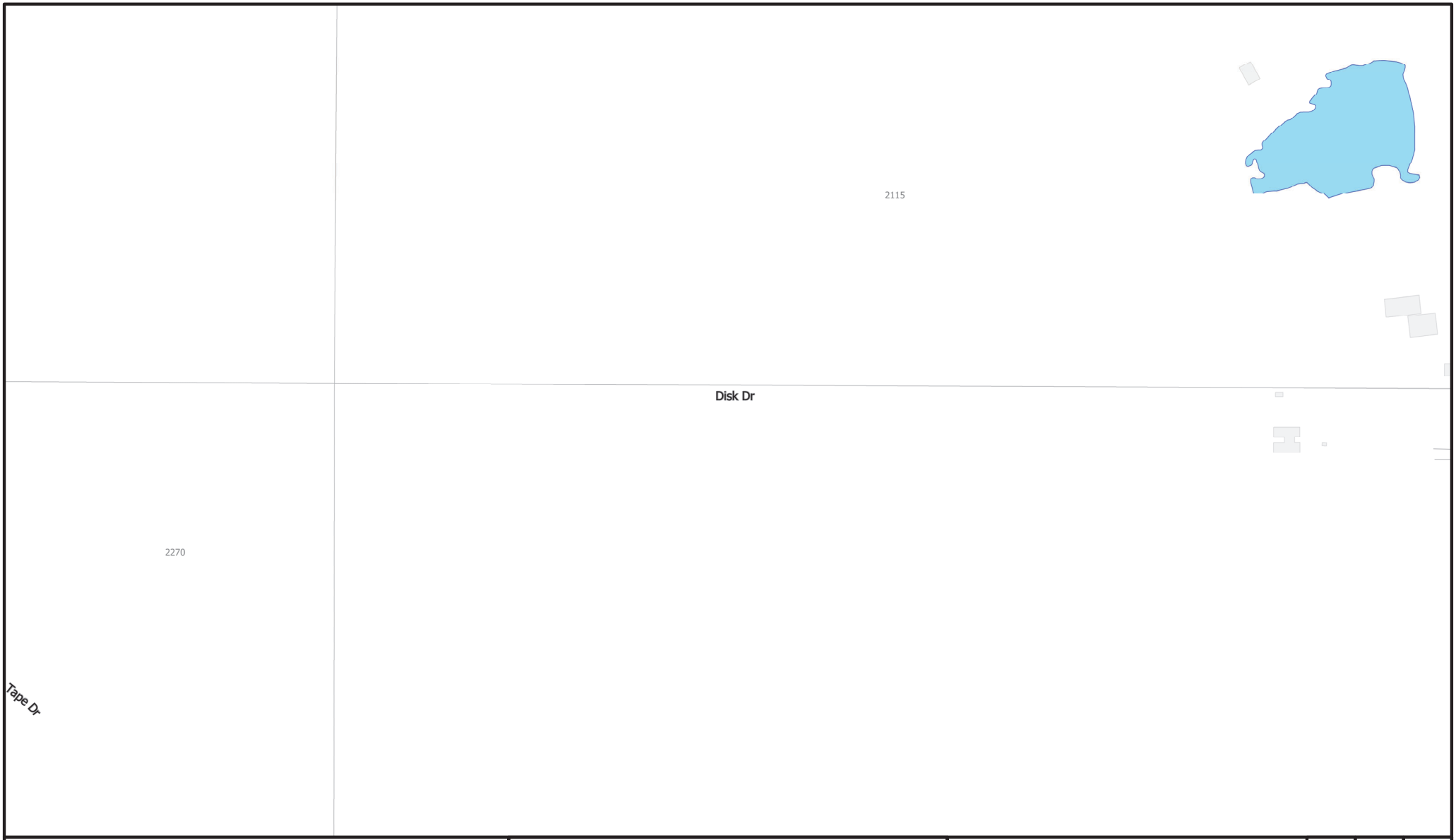

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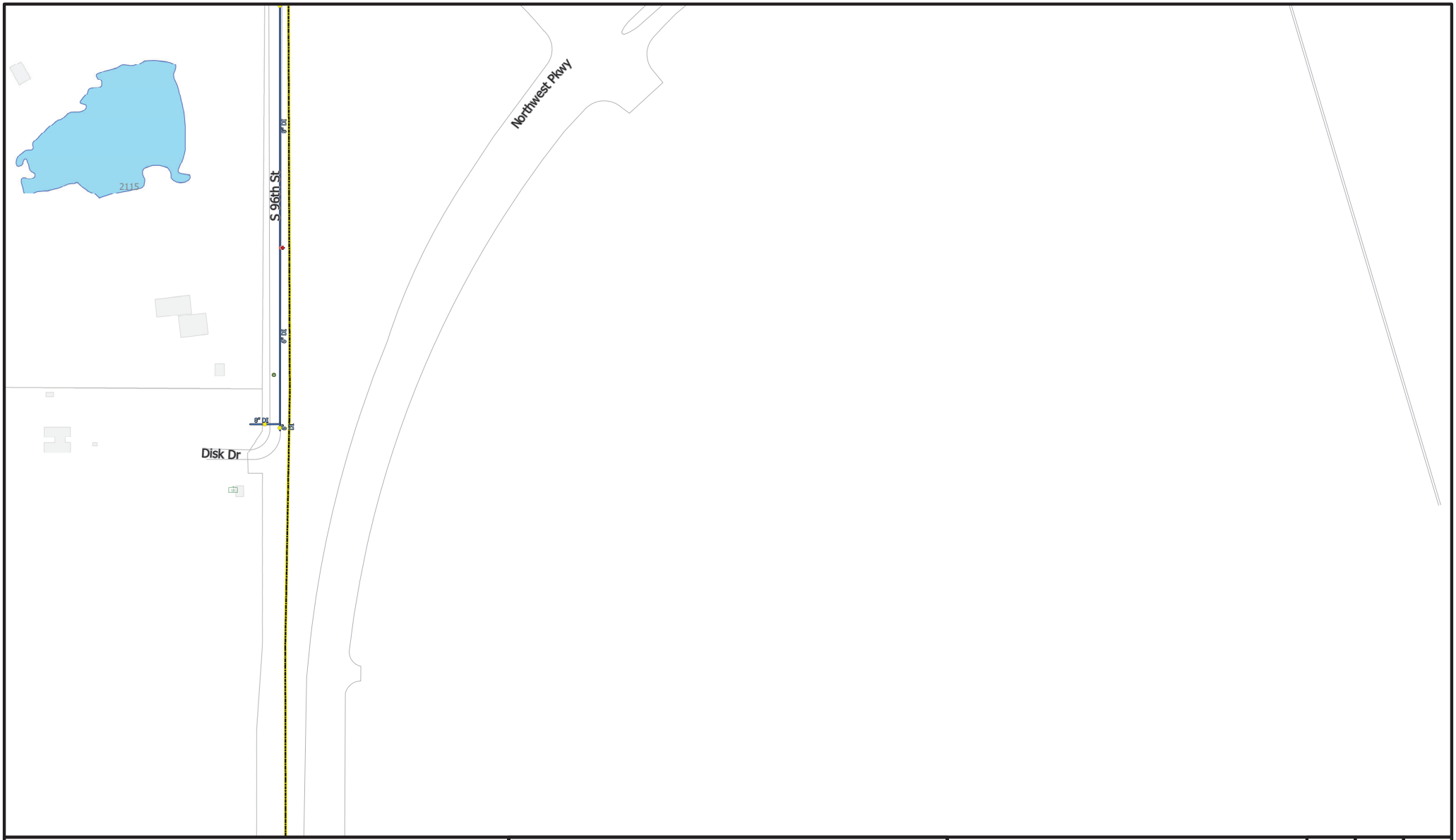
K5	K6	K7
L5	L6	L7
M5	M6	M7



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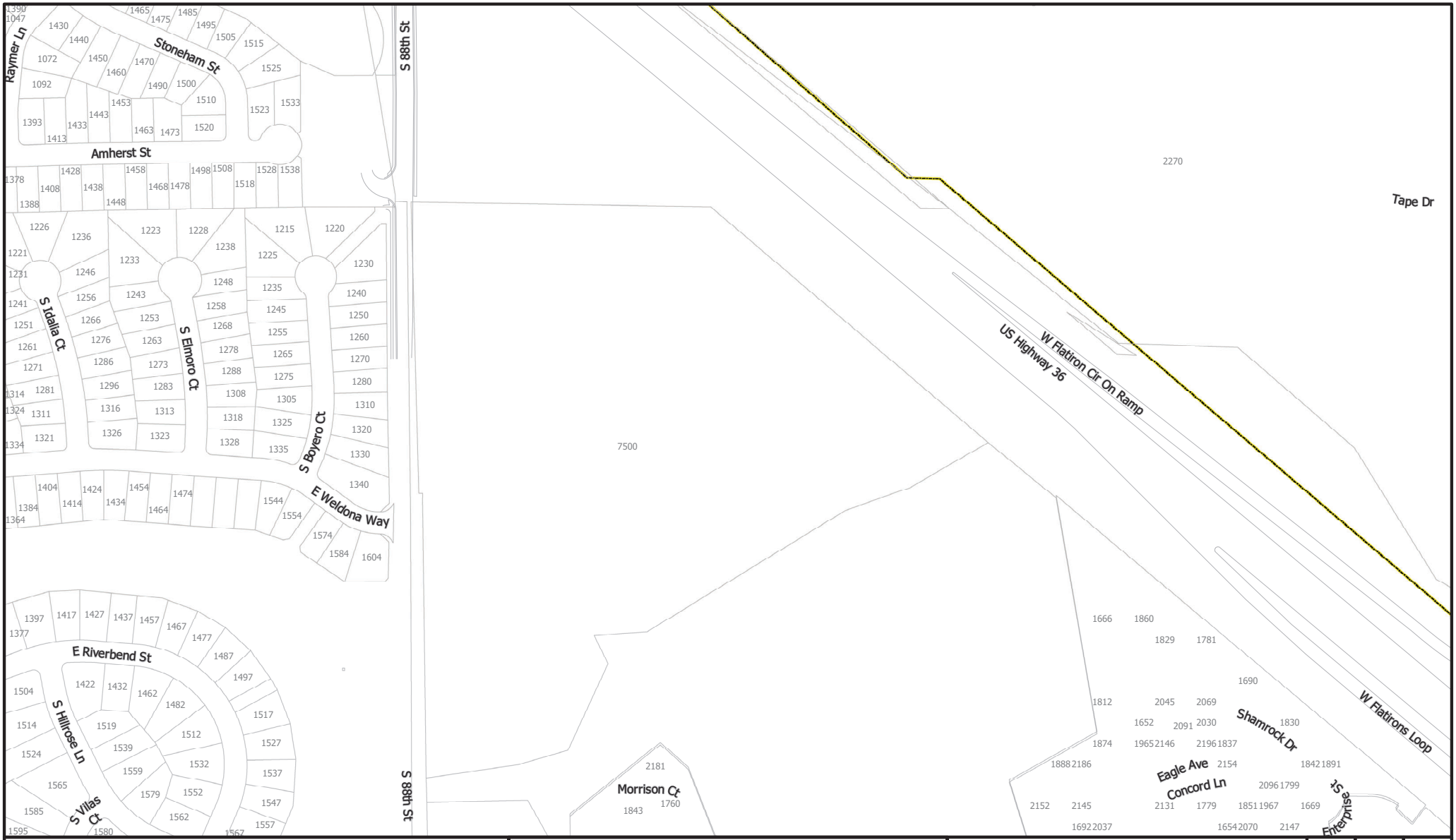

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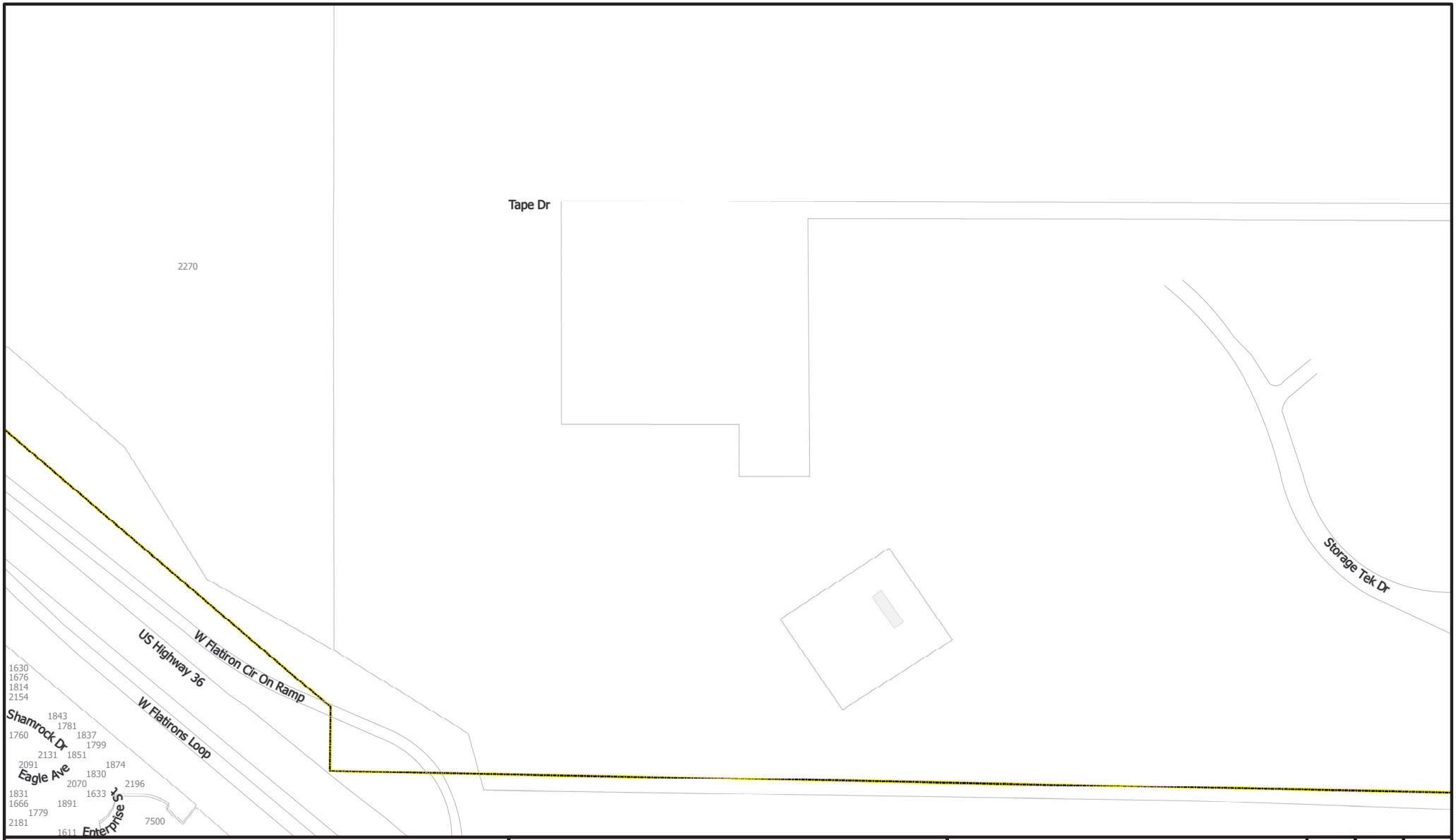

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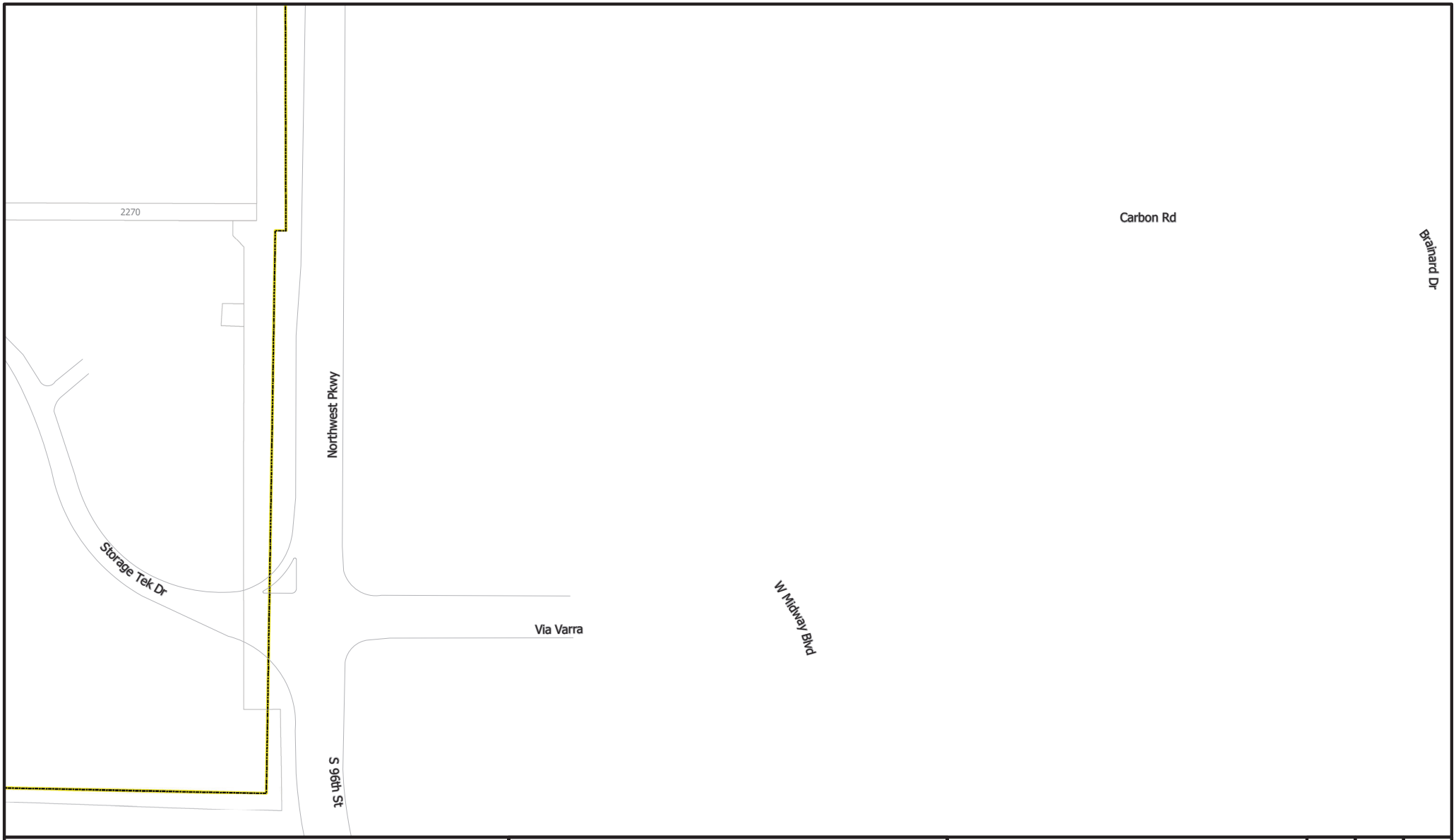

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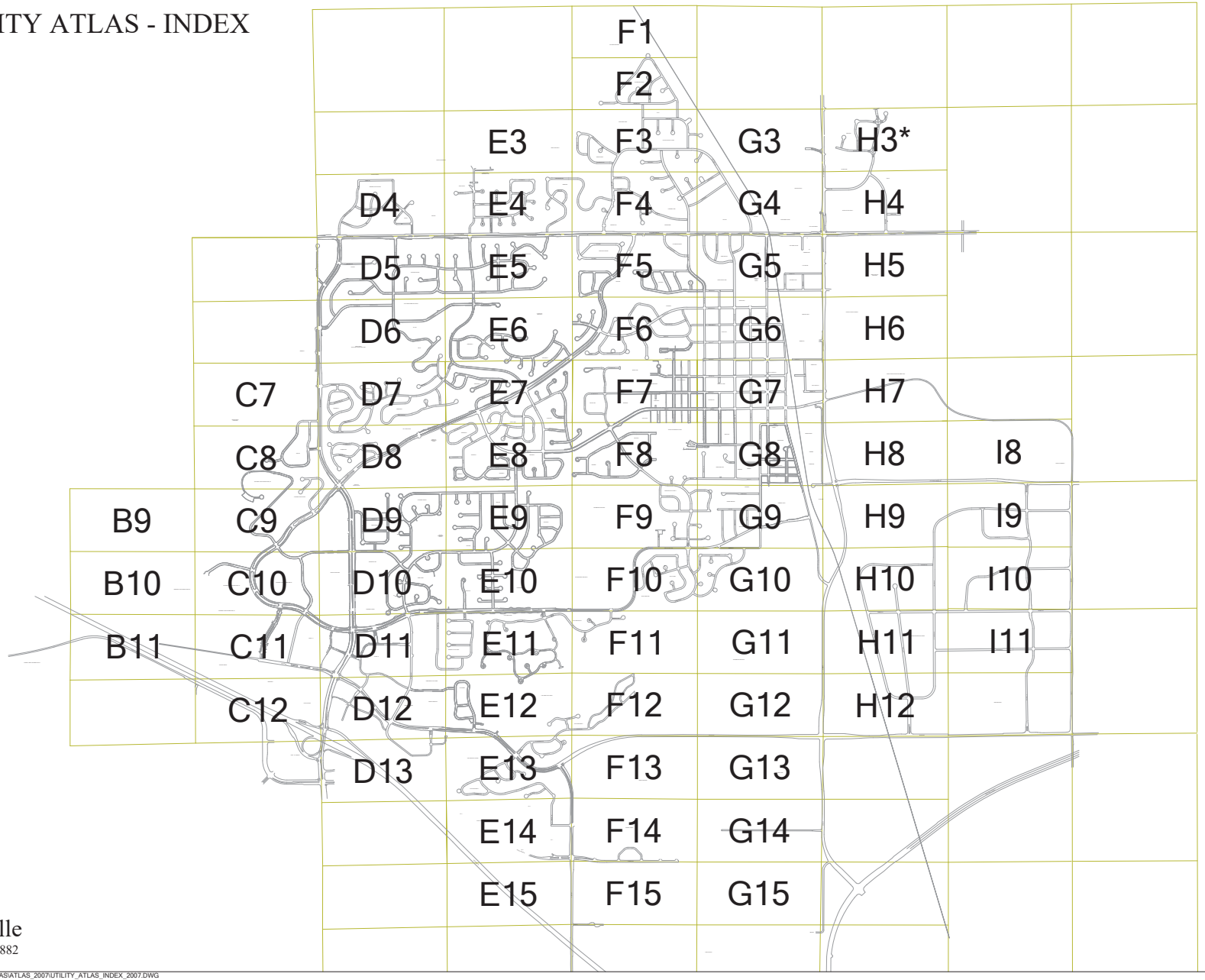

City of Louisville
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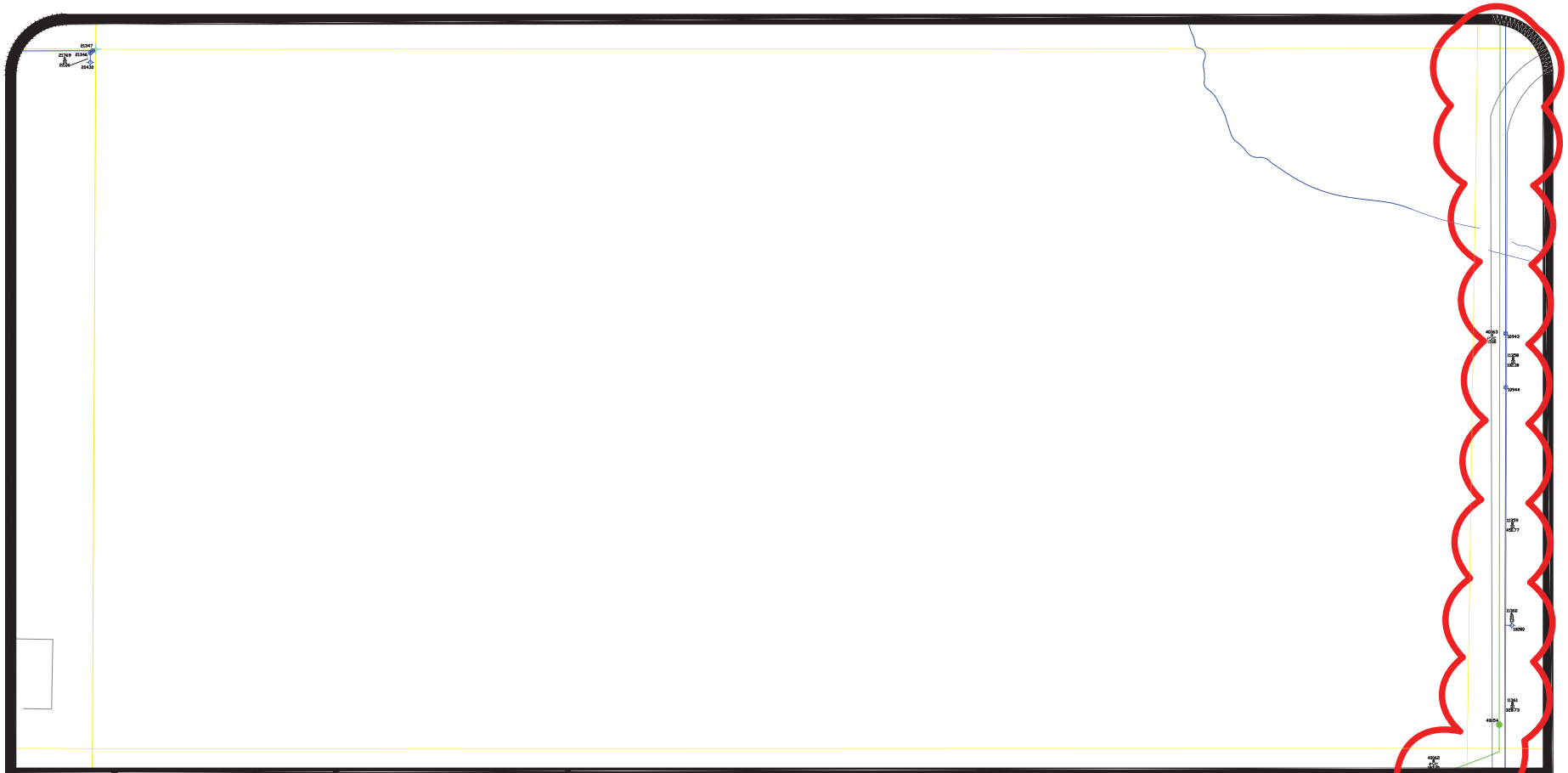

0' 50' 100' 150' 200'

SCALE 1" = 100'

REVISION DATE JUL - 10 - 06

- WATER LINE
- SEWER LINE
- STORM SEWER LINE
- RAW WATER LINE
- RECLAIM WATER LINE

CITY OF LOUISVILLE
UTILITY ATLAS

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F15 G15 N/A
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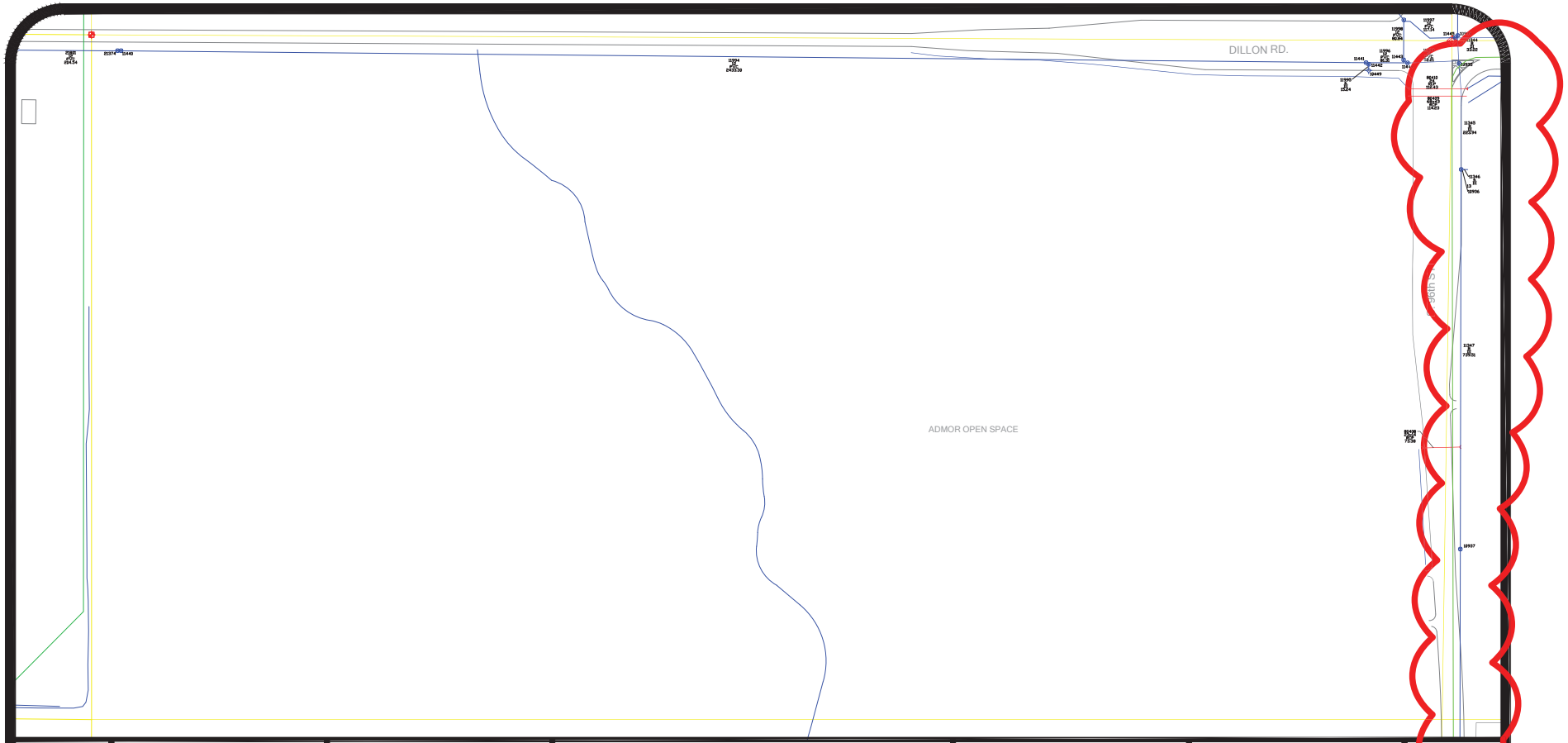

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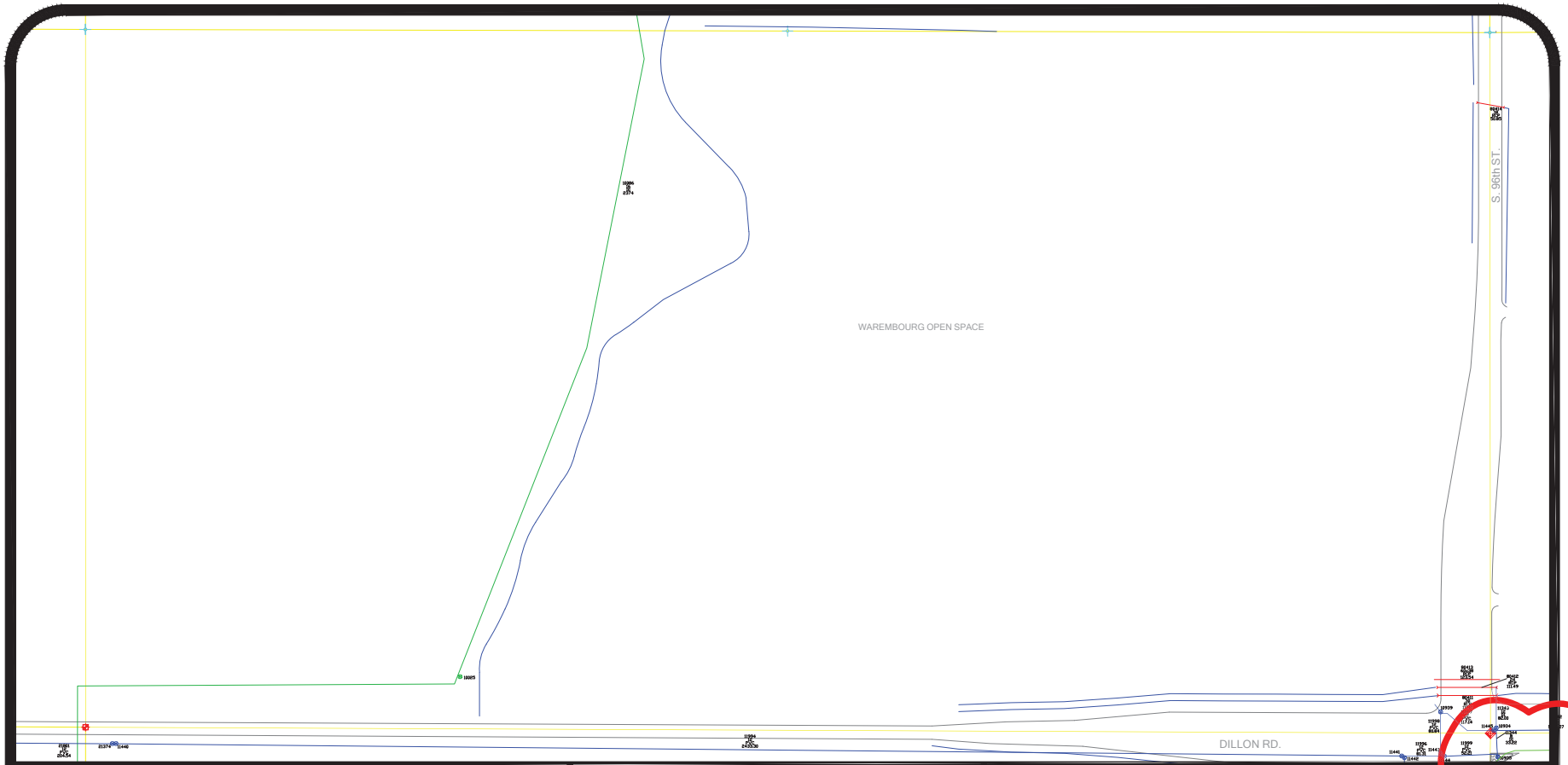

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F11 G11 H11
F12 G12 H12
F13 G13 N/A

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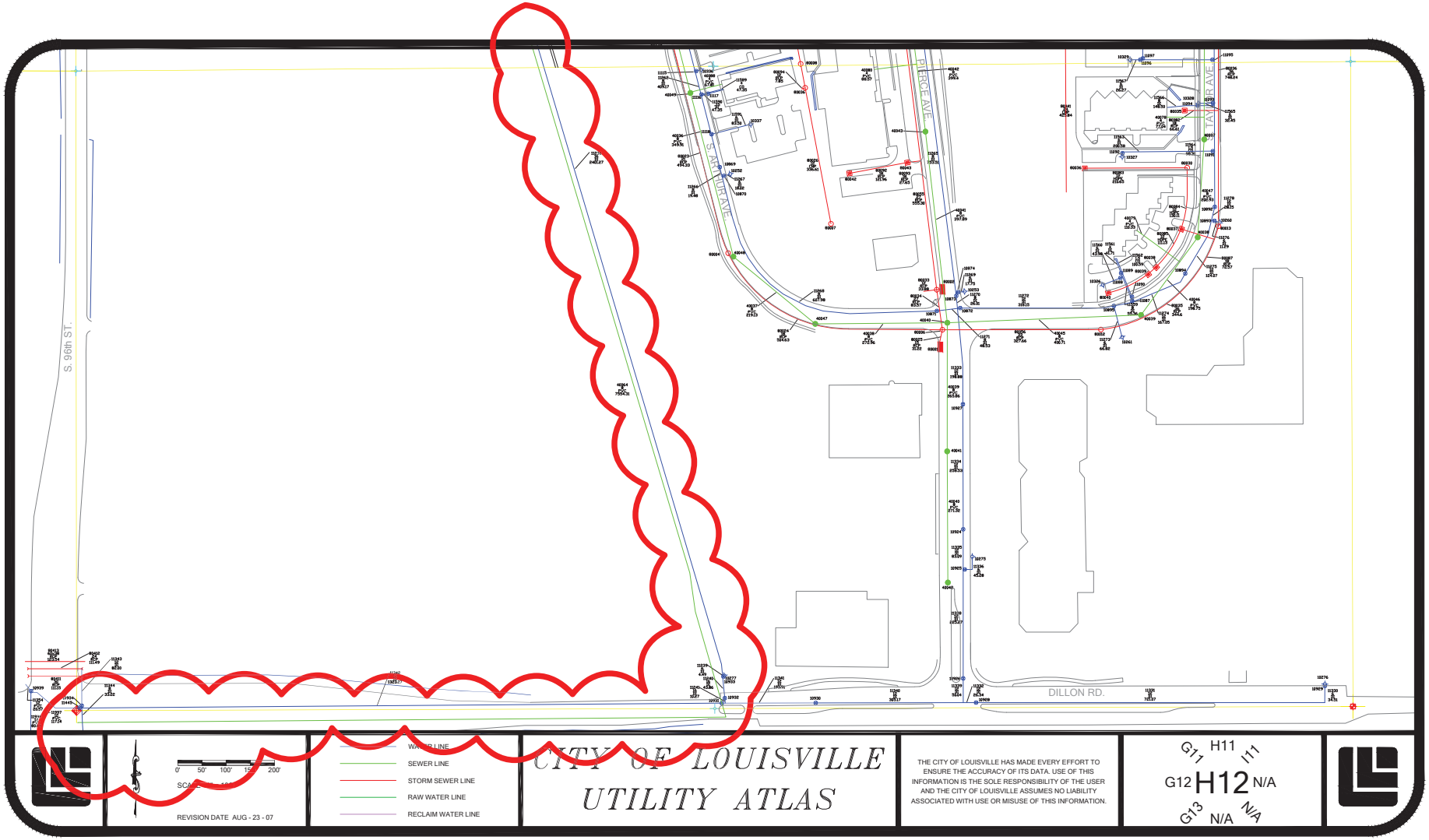


0' 50' 100' 150' 200'

SCALE

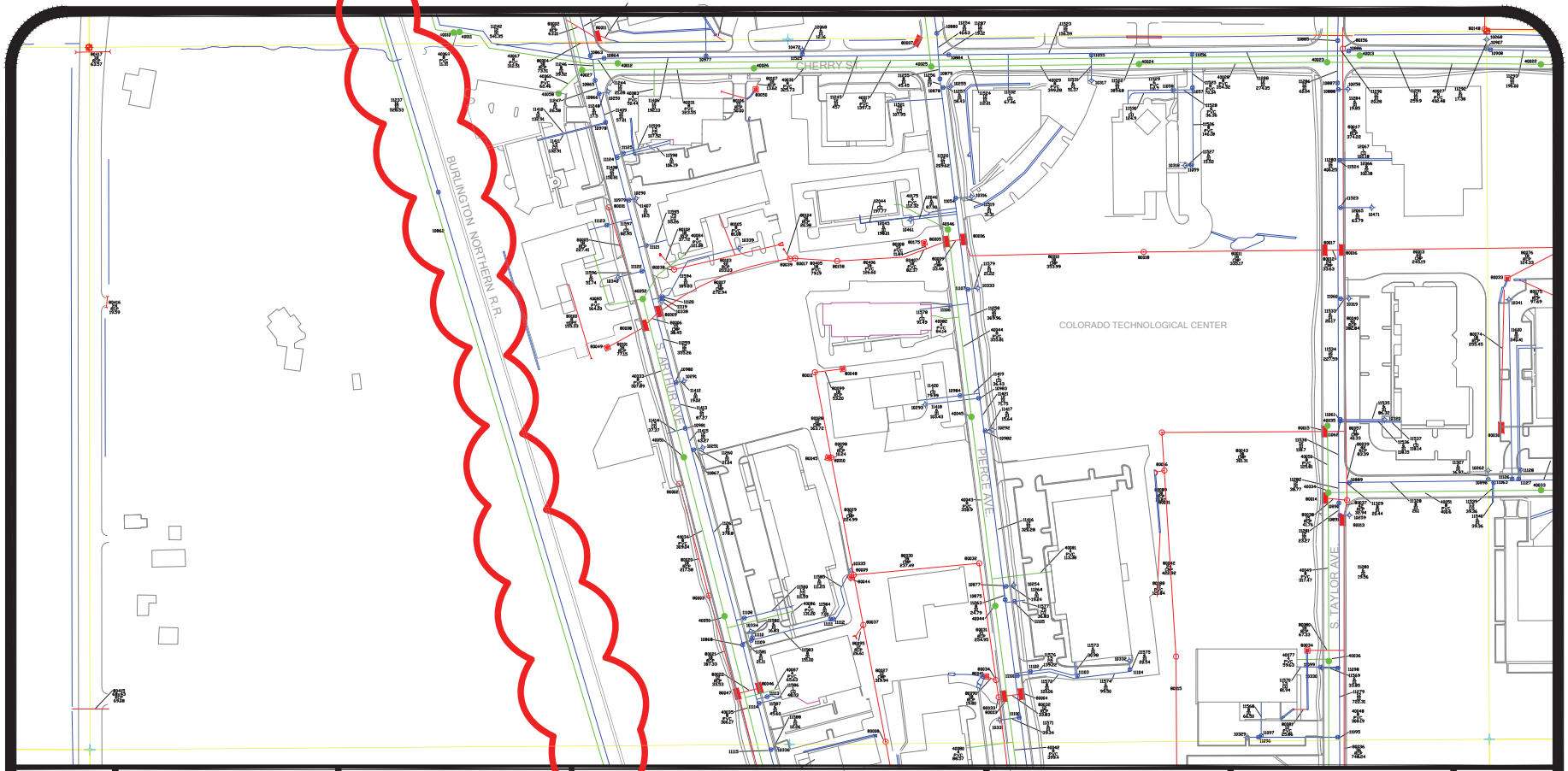
REVISION DATE AUG - 23 - 07

WATER LINE
SEWER LINE
STORM SEWER LINE
RAW WATER LINE
RECLAIM WATER LINE

CITY OF LOUISVILLE
UTILITY ATLAS

THE CITY OF LOUISVILLE HAS MADE EVERY EFFORT TO ENSURE THE ACCURACY OF ITS DATA. USE OF THIS INFORMATION IS THE SOLE RESPONSIBILITY OF THE USER AND THE CITY OF LOUISVILLE ASSUMES NO LIABILITY ASSOCIATED WITH USE OR MISUSE OF THIS INFORMATION.

G11 H11 I11
G12 H12 N/A
G13 N/A N/A



0' 50' 100' 150' 200'

SCALE 1" = 100'

REVISION DATE AUG - 23 - 07

WATER LINE
SEWER LINE
STORM SEWER LINE
RAW WATER LINE
RECLAIM WATER LINE

CITY OF LOUISVILLE
UTILITY ATLAS

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G10 H10 I10
G11 **H11** I11
G12 H12 N/A

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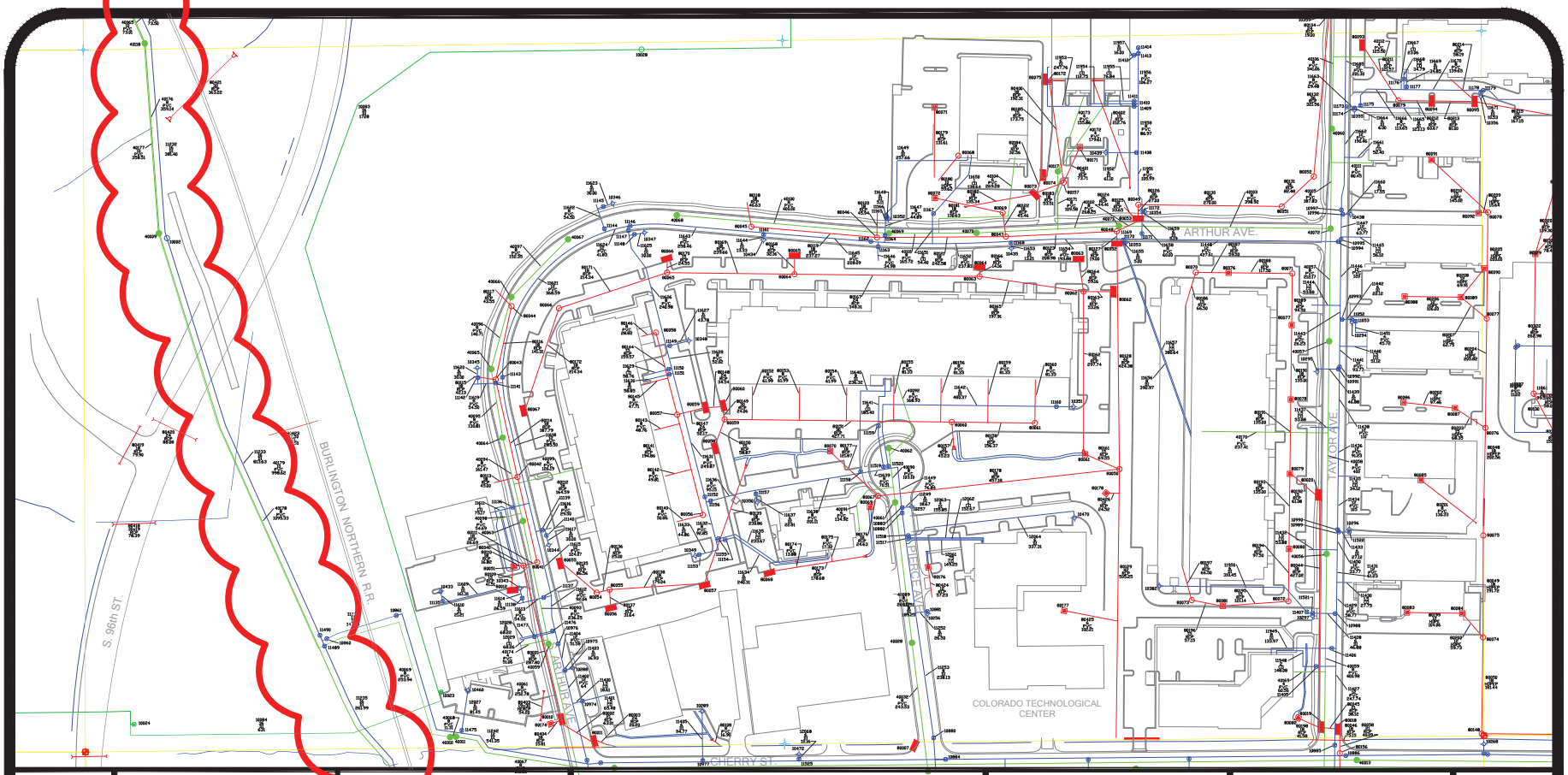

0' 50' 100' 150' 200'

SCALE 1" = 100'

REVISION DATE NOV - 20 - 07

WATER LINE
SEWER LINE
STORM SEWER LINE
RAW WATER LINE
RECLAIM WATER LINE

CITY OF LOUISVILLE
UTILITY ATLAS

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G9 H9 I9
G10 H10 I10
G11 H11 I11

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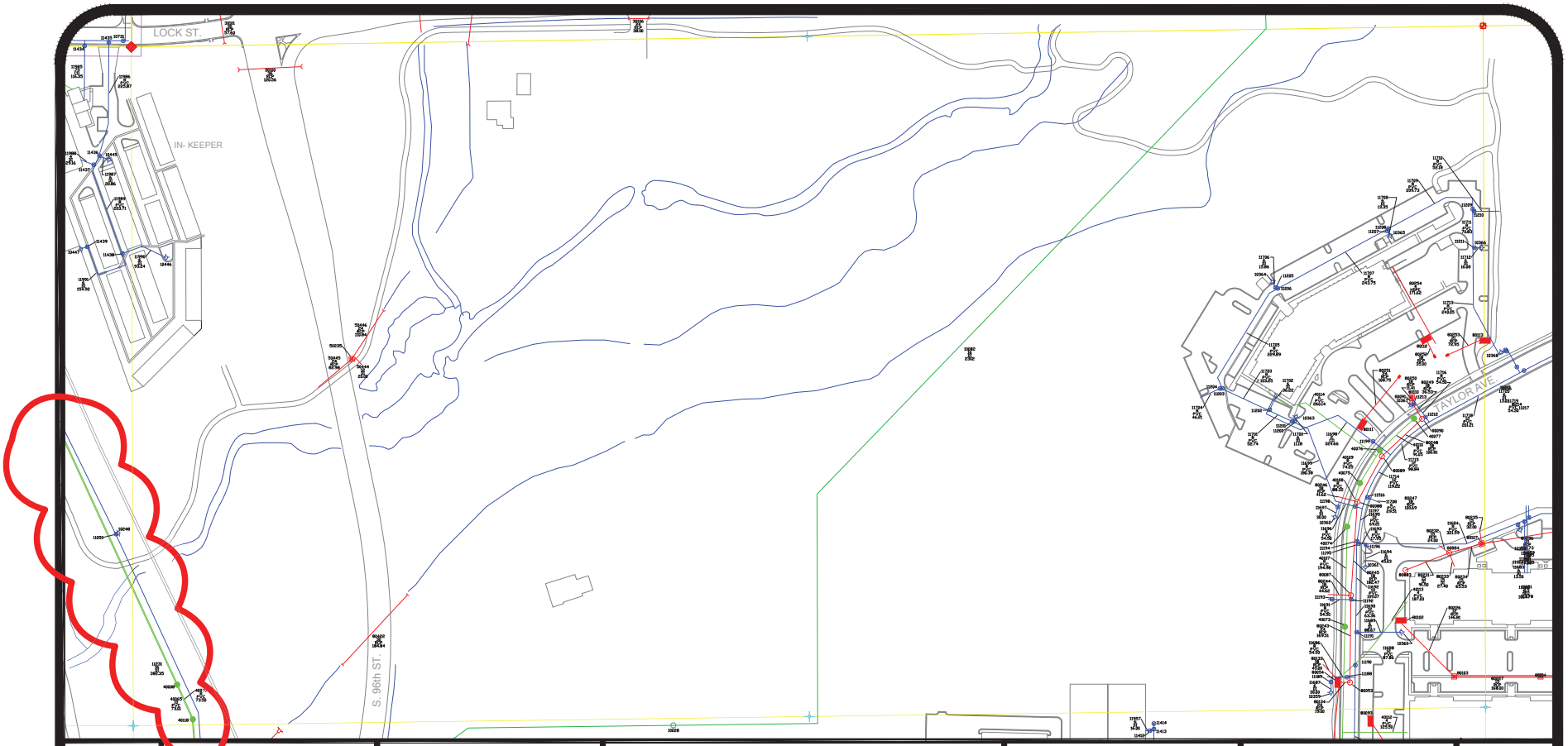

0' 50' 100' 150' 200'

SCALE 1" = 100'

REVISION DATE NOV - 20 - 07

WATER LINE
SEWER LINE
STORM SEWER LINE
RAW WATER LINE
RECLAIM WATER LINE

CITY OF LOUISVILLE
UTILITY ATLAS

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G8 H8 I8
G9 **H9** I9
G10 H10 I10

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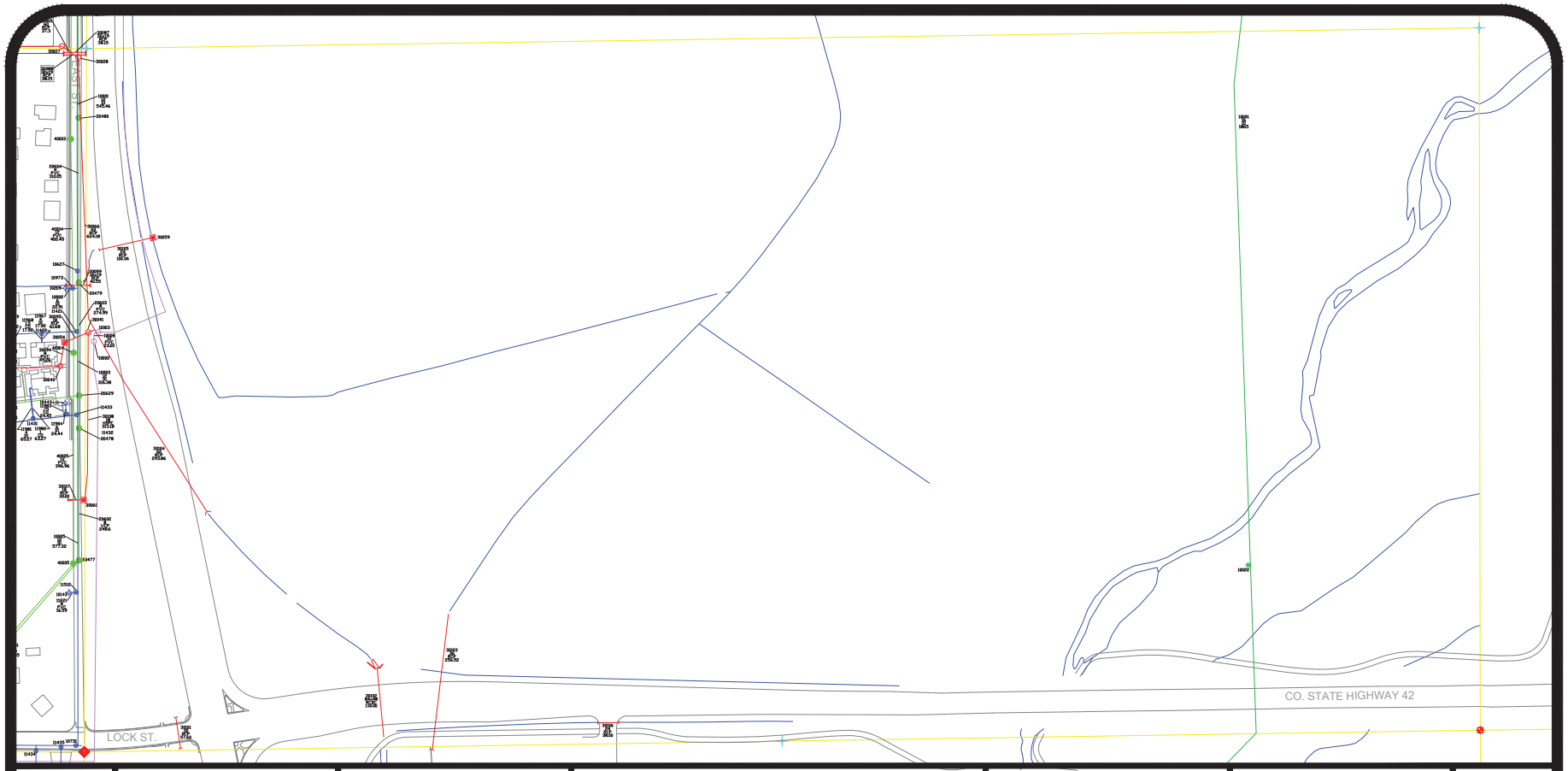

0' 50' 100' 150' 200'

SCALE 1" = 100'

REVISION DATE NOV - 19 - 07

WATER LINE
SEWER LINE
STORM SEWER LINE
RAW WATER LINE
RECLAIM WATER LINE

CITY OF LOUISVILLE
UTILITY ATLAS

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G7 H7 N/A
G8 H8 I8
G9 H9 I9

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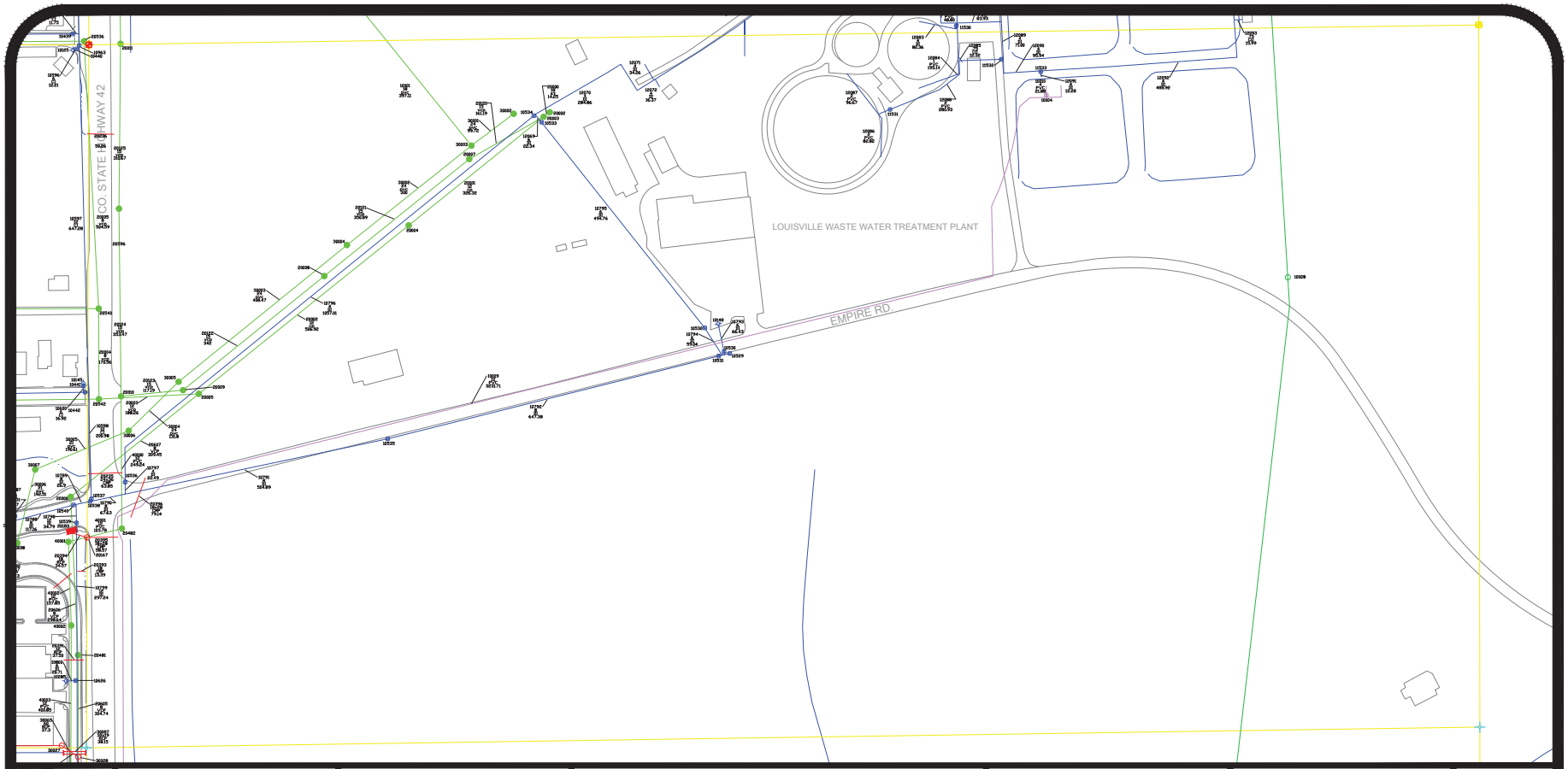

0' 50' 100' 150' 200'

SCALE 1" = 100'

REVISION DATE NOV - 19 - 07

WATER LINE
SEWER LINE
STORM SEWER LINE
RAW WATER LINE
RECLAIM WATER LINE

CITY OF LOUISVILLE
UTILITY ATLAS

THE CITY OF LOUISVILLE HAS MADE EVERY EFFORT TO ENSURE THE ACCURACY OF ITS DATA. USE OF THIS INFORMATION IS THE SOLE RESPONSIBILITY OF THE USER AND THE CITY OF LOUISVILLE ASSUMES NO LIABILITY ASSOCIATED WITH USE OR MISUSE OF THIS INFORMATION.

G6 H6 N/A
G7 H7 N/A
G8 H8 I8

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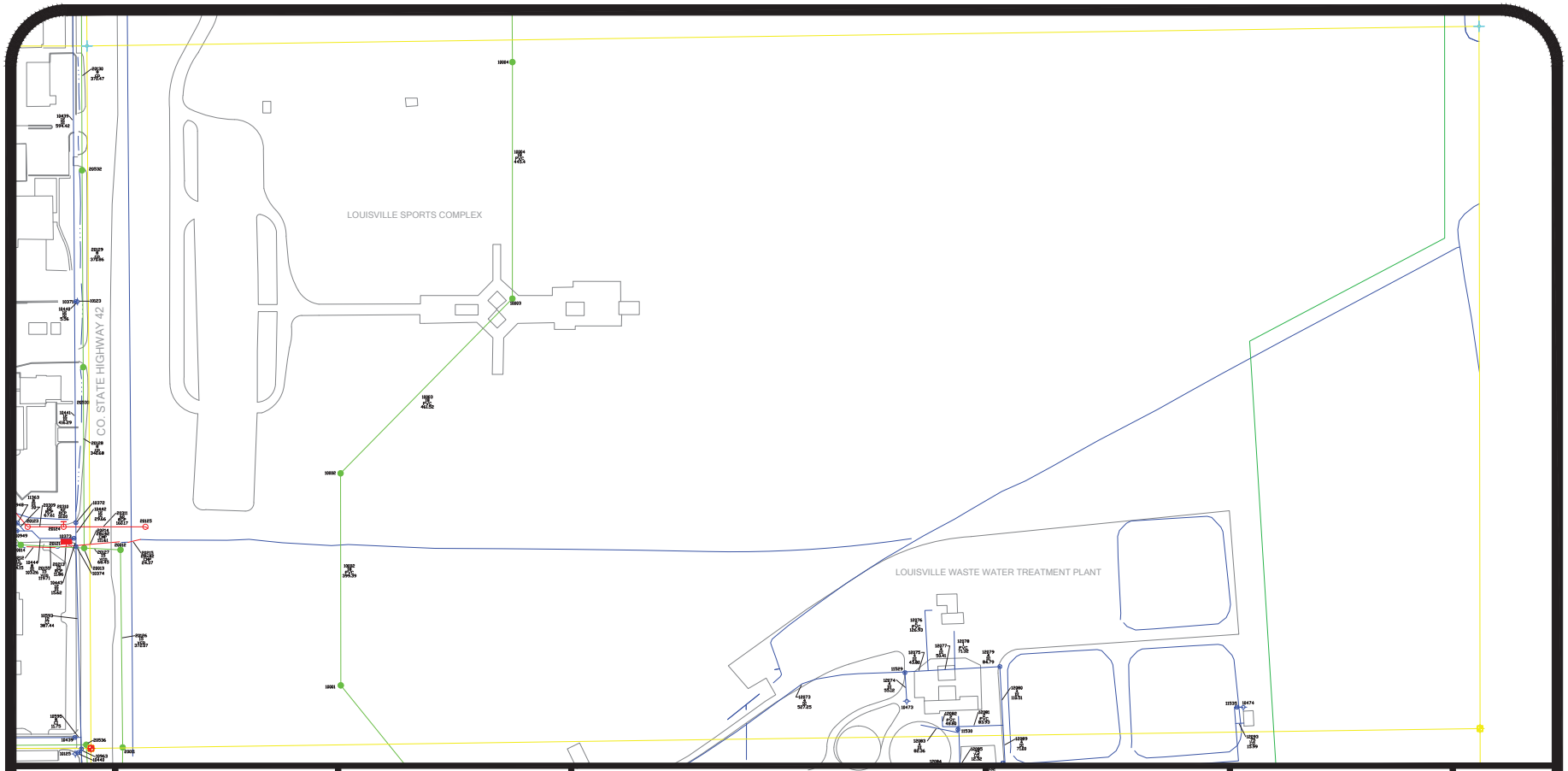


0' 50' 100' 150' 200'

SCALE 1" = 100'

REVISION DATE NOV - 19 - 07

WATER LINE
SEWER LINE
STORM SEWER LINE
RAW WATER LINE
RECLAIM WATER LINE

CITY OF LOUISVILLE UTILITY ATLAS

THE CITY OF LOUISVILLE HAS MADE EVERY EFFORT TO ENSURE THE ACCURACY OF ITS DATA. USE OF THIS INFORMATION IS THE SOLE RESPONSIBILITY OF THE USER AND THE CITY OF LOUISVILLE ASSUMES NO LIABILITY ASSOCIATED WITH USE OR MISUSE OF THIS INFORMATION.

G5 H5 N/A
G6 H6 N/A
G7 H7 N/A

G:\ATLASES & MAPS\UTILITIES\ATLAS\ATLAS_2007\UTILITY_ATLAS_H06_2007.DWG

APPENDIX D – Sanitary Sewer Capacity Calculations

On Site Sanitary Sewer Pipe Capacity (Known Depth)

Pipe Diameter (in)	Min Slope (%)	Max Flow Area (ft^2)	% Full	Flow (cfs)	Flow (MGD)	Velocity (fps)
8	0.40	0.35	100	0.83	0.54	2.42
10	0.28	0.54	100	1.22	0.79	2.29
12	0.22	0.79	100	1.76	1.14	2.26
15	0.15	1.23	100	2.50	1.62	2.04

.

Off Site Sanitary Sewer Pipe Capacity (Known Flow)

Pipe Diameter (in)	Min Slope (%)	Flow Area (ft^2)	% Full	Flow (cfs)	Flow (MGD)	Velocity (fps)
18	0.12	1.35	77	3.09	2.00	2.29
21	0.10	1.42	59	3.09	2.00	2.18
24	0.08	1.54	49	3.09	2.00	2.01

Assumptions:

Minimum pipe slopes per City of Louisville standards.

Mannings n-value = 0.013 per City of Louisville standards.

Note: The maximum buildout flow for the site is 2.0 MGD per the City of Louisville WWTP Expansion Redtail Ridge Report prepared by Dewberry.

Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Nov 9 2022

Sanitary Line A - PUD 3

Circular

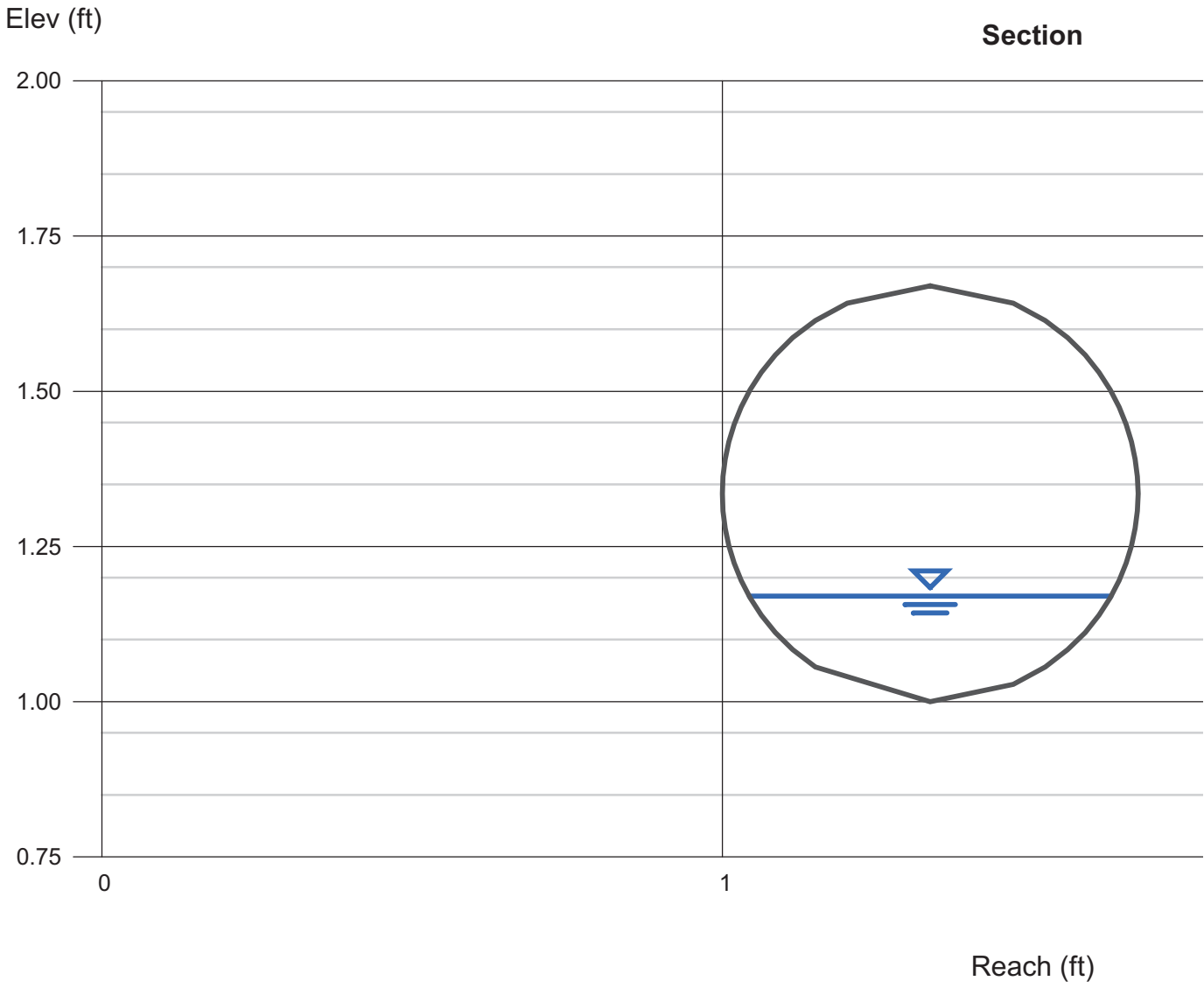
Diameter (ft)	= 0.67
Invert Elev (ft)	= 1.00
Slope (%)	= 0.40
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.10

Highlighted

Depth (ft)	= 0.17
Q (cfs)	= 0.104
Area (sqft)	= 0.07
Velocity (ft/s)	= 1.46
Wetted Perim (ft)	= 0.71
Crit Depth, Yc (ft)	= 0.15
Top Width (ft)	= 0.58
EGL (ft)	= 0.20



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Nov 9 2022

Sanitary Line A - PUD 1-4, 6, 7

Circular

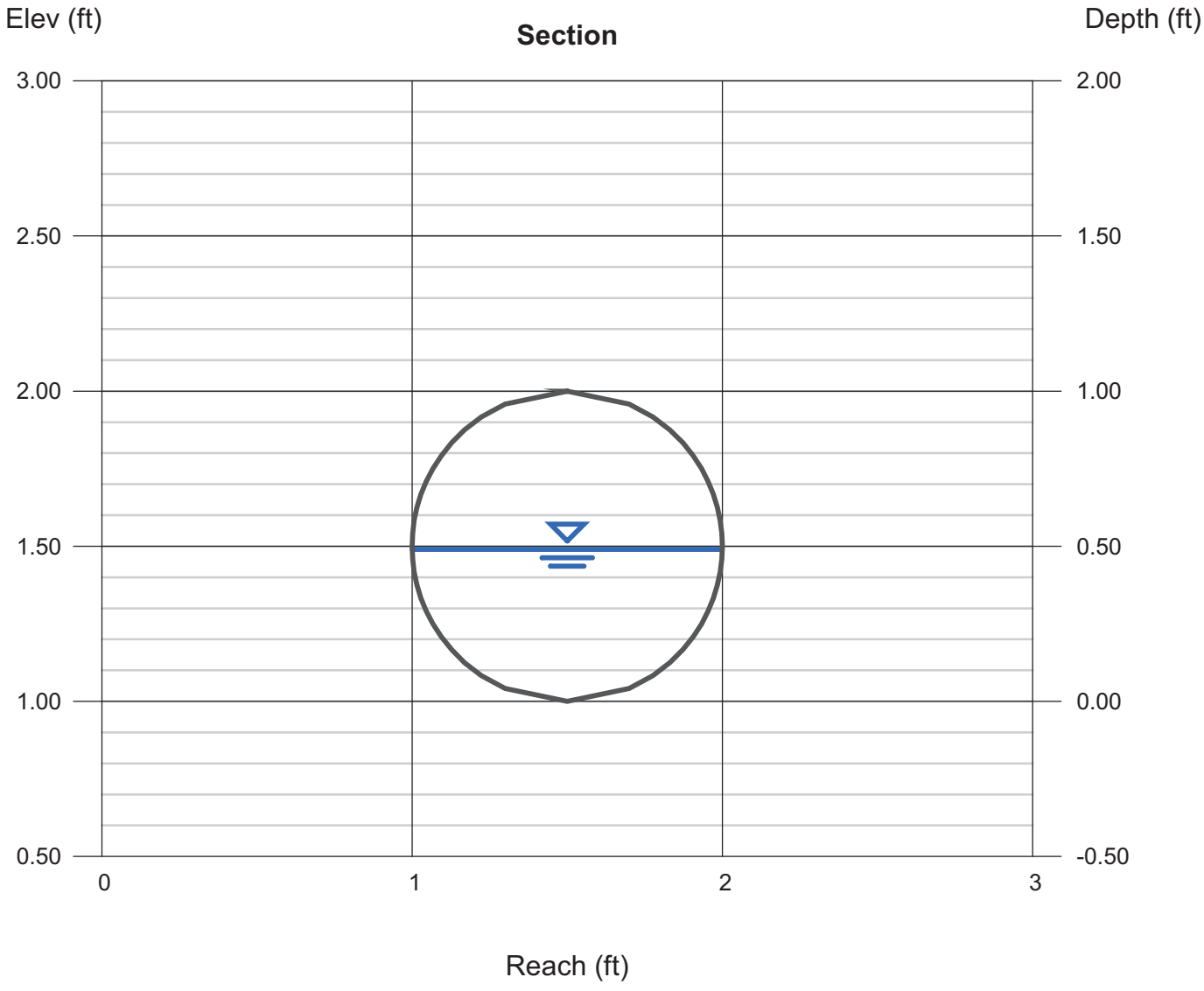
Diameter (ft)	= 1.00
Invert Elev (ft)	= 1.00
Slope (%)	= 0.22
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.79

Highlighted

Depth (ft)	= 0.49
Q (cfs)	= 0.790
Area (sqft)	= 0.38
Velocity (ft/s)	= 2.05
Wetted Perim (ft)	= 1.55
Crit Depth, Yc (ft)	= 0.38
Top Width (ft)	= 1.00
EGL (ft)	= 0.56



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Nov 9 2022

Sanitary Line A - PUD 1-8

Circular

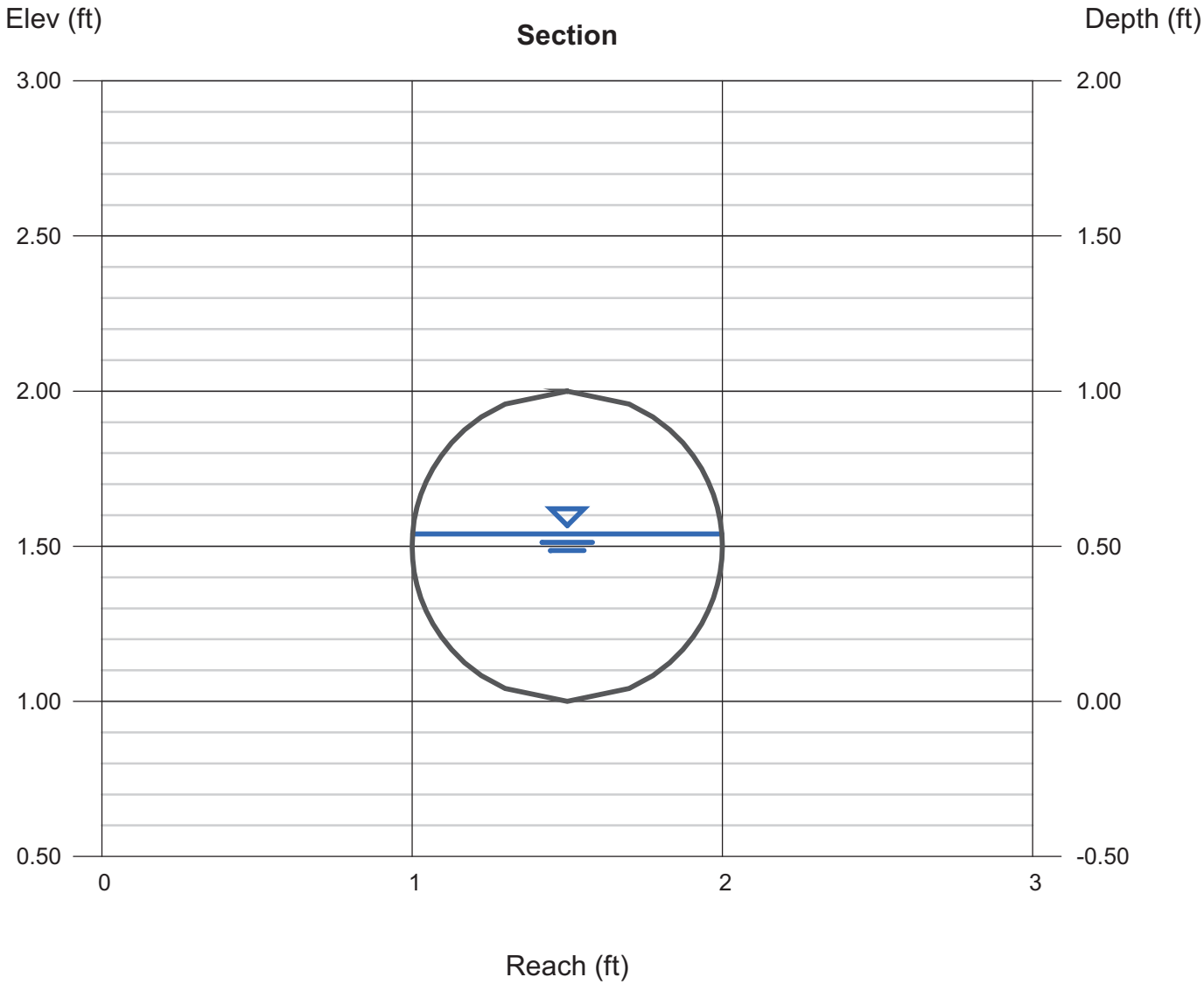
Diameter (ft)	= 1.00
Invert Elev (ft)	= 1.00
Slope (%)	= 0.22
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.93

Highlighted

Depth (ft)	= 0.54
Q (cfs)	= 0.932
Area (sqft)	= 0.43
Velocity (ft/s)	= 2.14
Wetted Perim (ft)	= 1.65
Crit Depth, Yc (ft)	= 0.41
Top Width (ft)	= 1.00
EGL (ft)	= 0.61



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Nov 9 2022

Sanitary Line B - PUD 5, 8

Circular

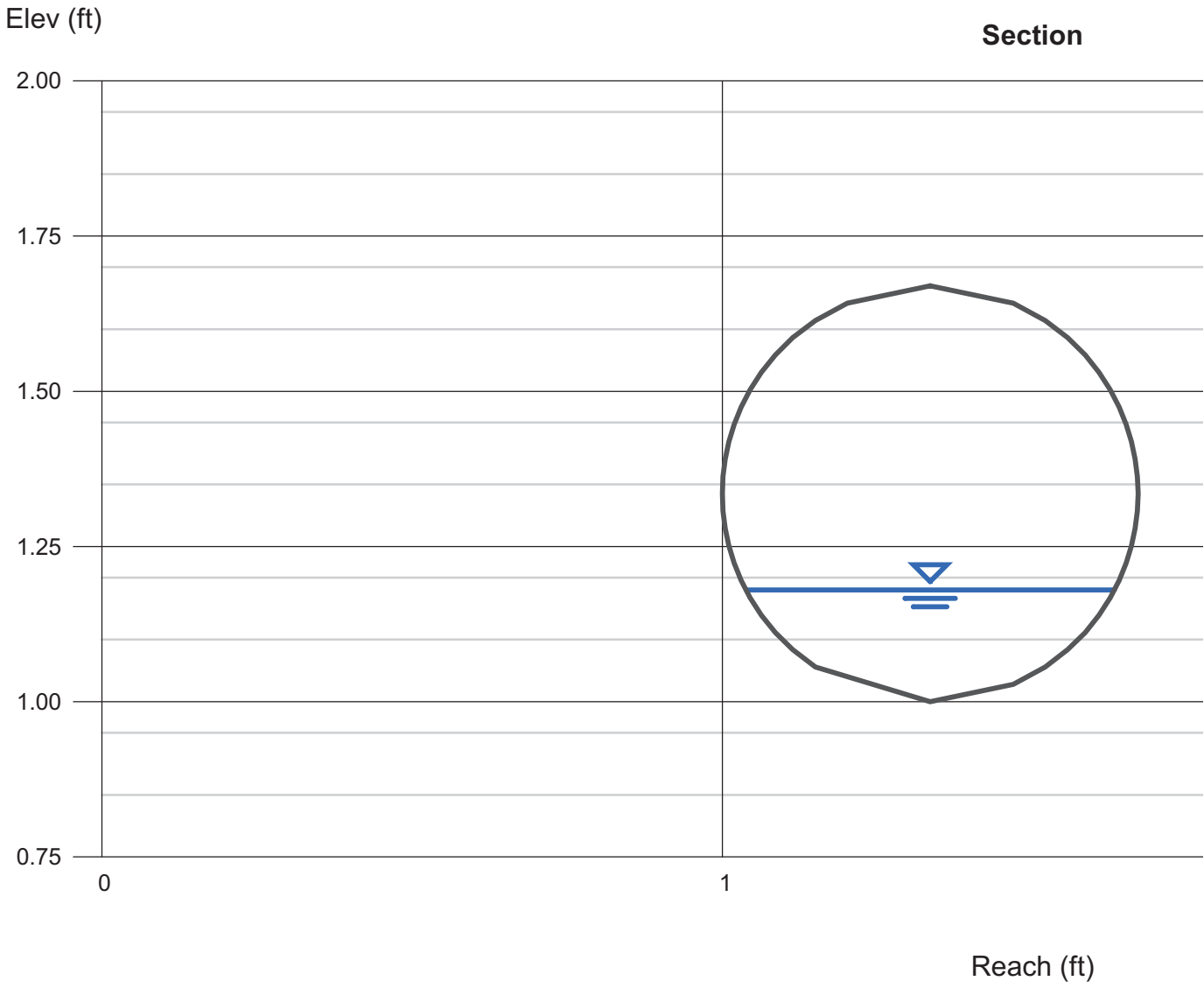
Diameter (ft)	= 0.67
Invert Elev (ft)	= 1.00
Slope (%)	= 0.40
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.12

Highlighted

Depth (ft)	= 0.18
Q (cfs)	= 0.120
Area (sqft)	= 0.08
Velocity (ft/s)	= 1.57
Wetted Perim (ft)	= 0.73
Crit Depth, Yc (ft)	= 0.16
Top Width (ft)	= 0.59
EGL (ft)	= 0.22



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Wednesday, Nov 9 2022

Sanitary Line C - PUD 8

Circular

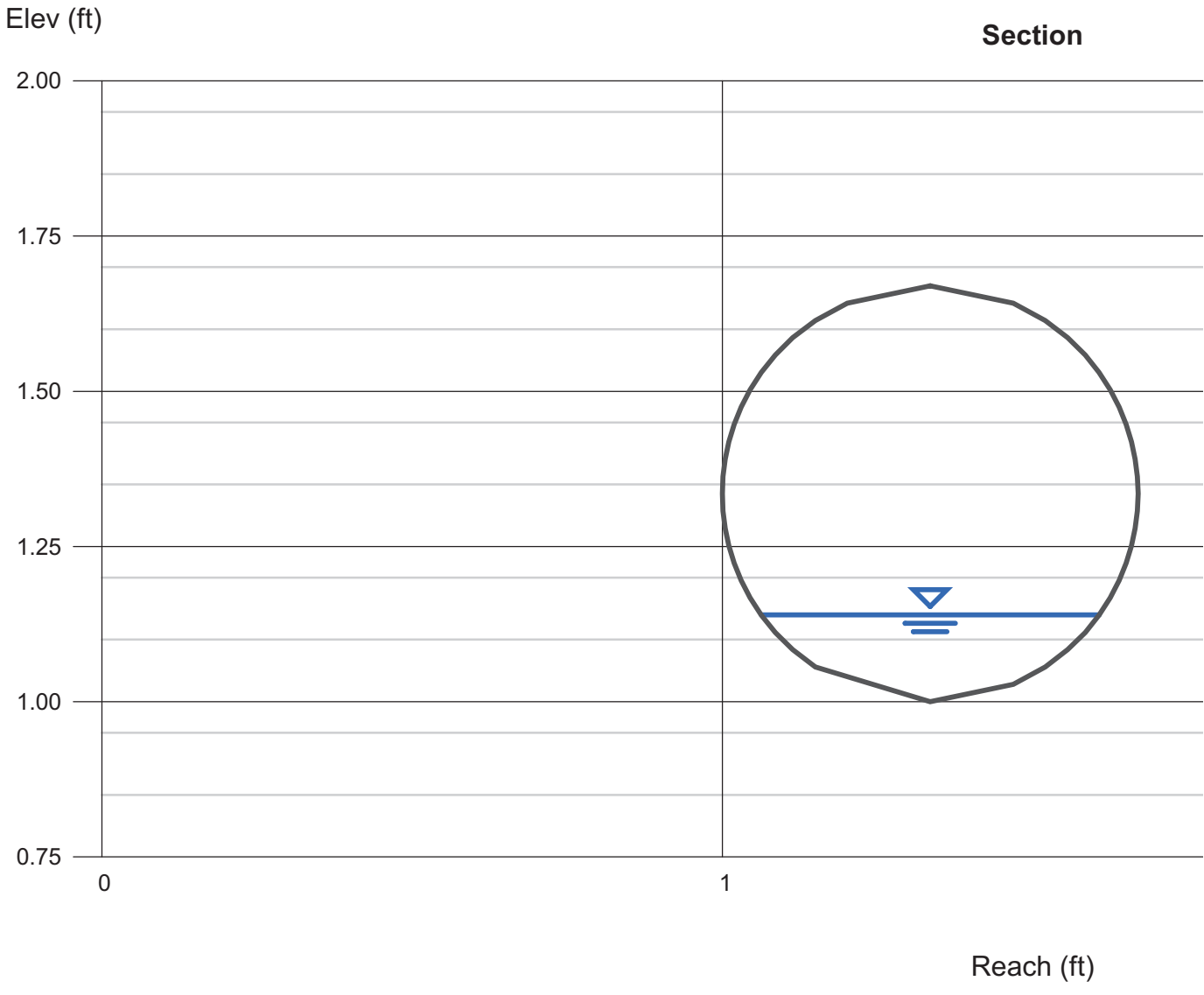
Diameter (ft)	= 0.67
Invert Elev (ft)	= 1.00
Slope (%)	= 0.40
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.07

Highlighted

Depth (ft)	= 0.14
Q (cfs)	= 0.072
Area (sqft)	= 0.05
Velocity (ft/s)	= 1.35
Wetted Perim (ft)	= 0.64
Crit Depth, Yc (ft)	= 0.13
Top Width (ft)	= 0.54
EGL (ft)	= 0.17



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, Feb 2 2023

21-inch Interceptor @ 0.216% Peak Flow = 4.314 cfs

Circular

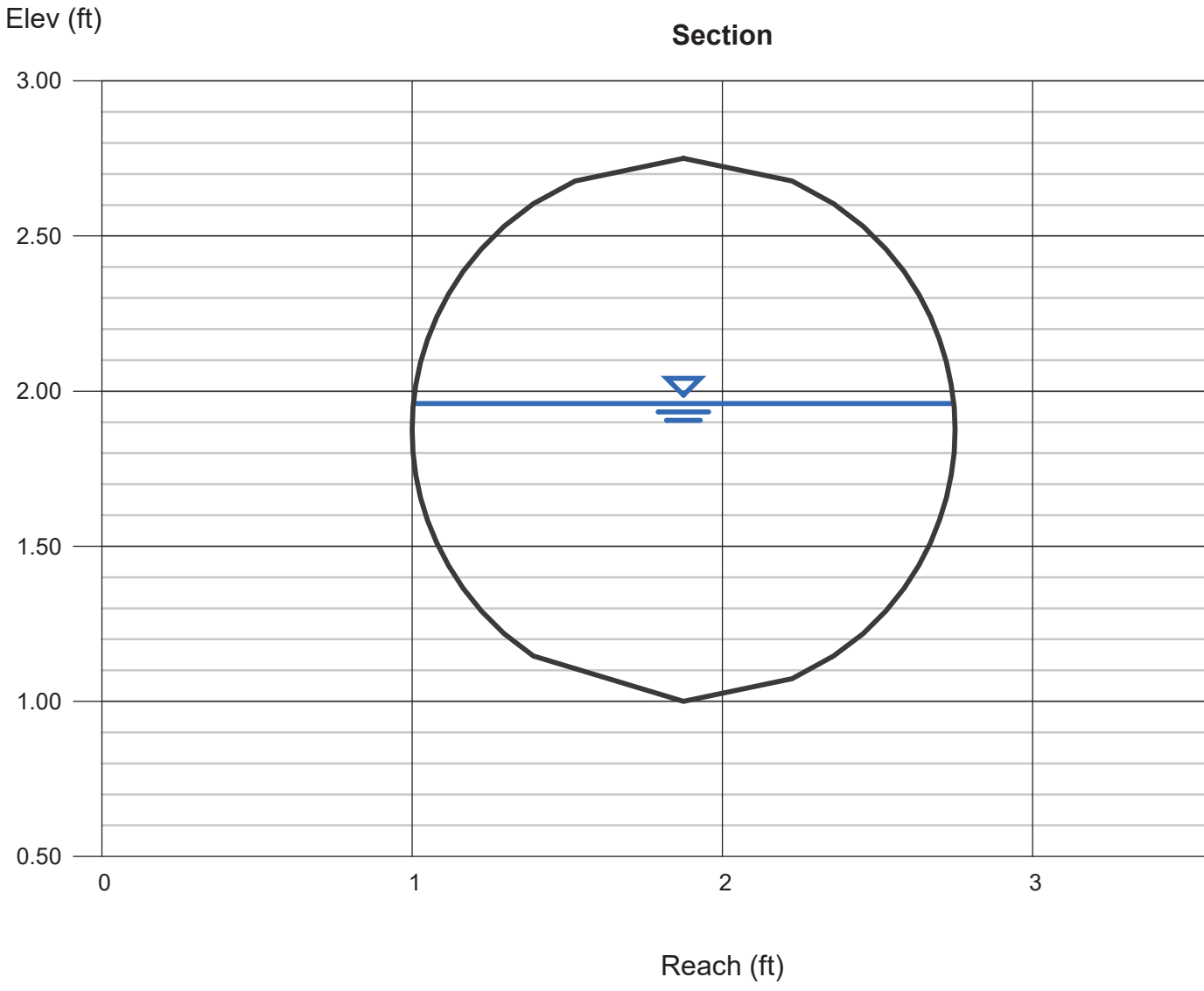
Diameter (ft)	= 1.75
Invert Elev (ft)	= 1.00
Slope (%)	= 0.22
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 4.31

Highlighted

Depth (ft)	= 0.96
Q (cfs)	= 4.314
Area (sqft)	= 1.35
Velocity (ft/s)	= 3.19
Wetted Perim (ft)	= 2.92
Crit Depth, Yc (ft)	= 0.76
Top Width (ft)	= 1.74
EGL (ft)	= 1.12



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, Feb 2 2023

21-inch Interceptor @ 0.216% Average Flow = 1.437 cfs

Circular

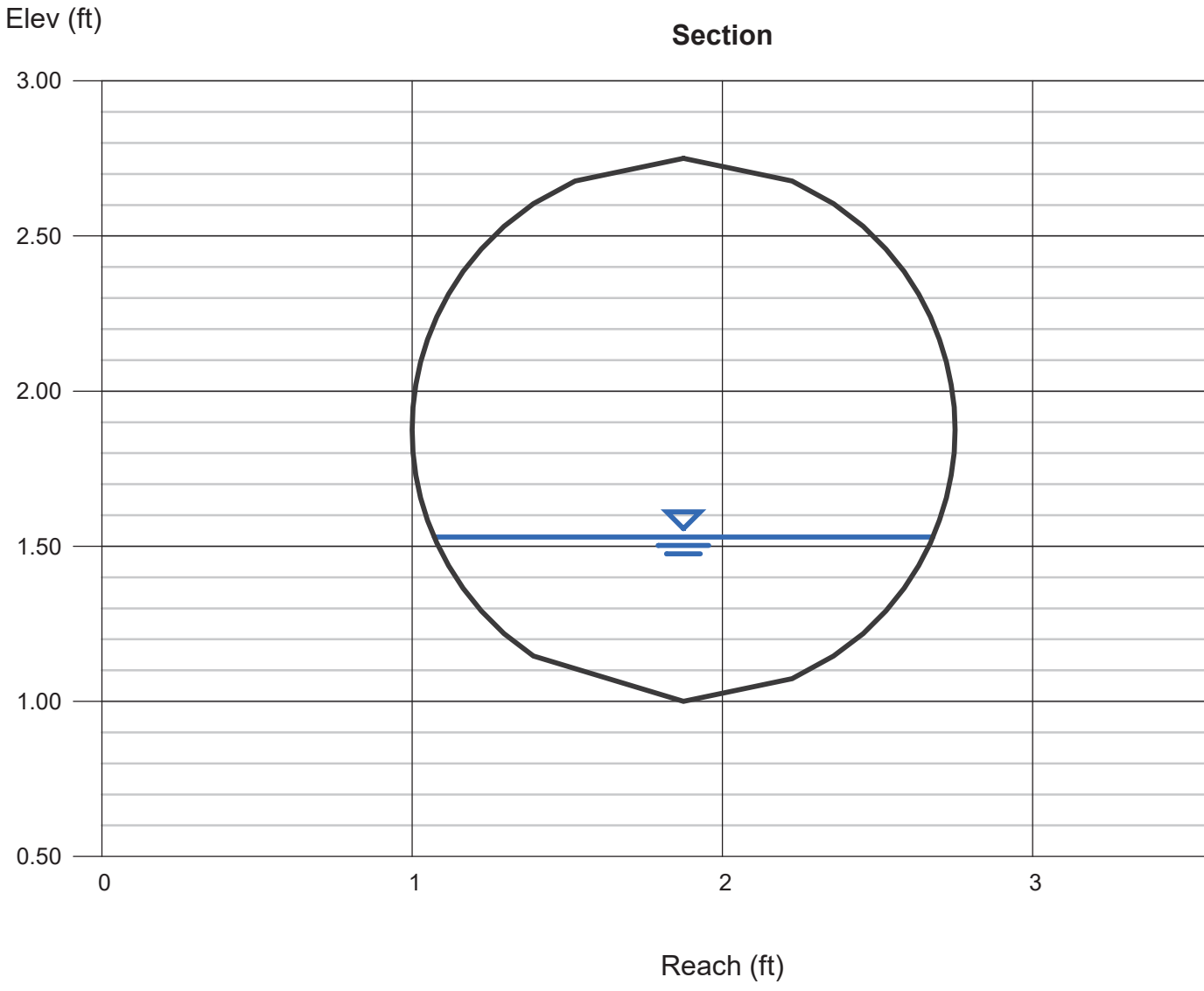
Diameter (ft)	= 1.75
Invert Elev (ft)	= 1.00
Slope (%)	= 0.22
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 1.44

Highlighted

Depth (ft)	= 0.53
Q (cfs)	= 1.439
Area (sqft)	= 0.62
Velocity (ft/s)	= 2.32
Wetted Perim (ft)	= 2.05
Crit Depth, Yc (ft)	= 0.43
Top Width (ft)	= 1.61
EGL (ft)	= 0.61



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, Feb 2 2023

Sanitary Line A - PUD 1-8

Circular

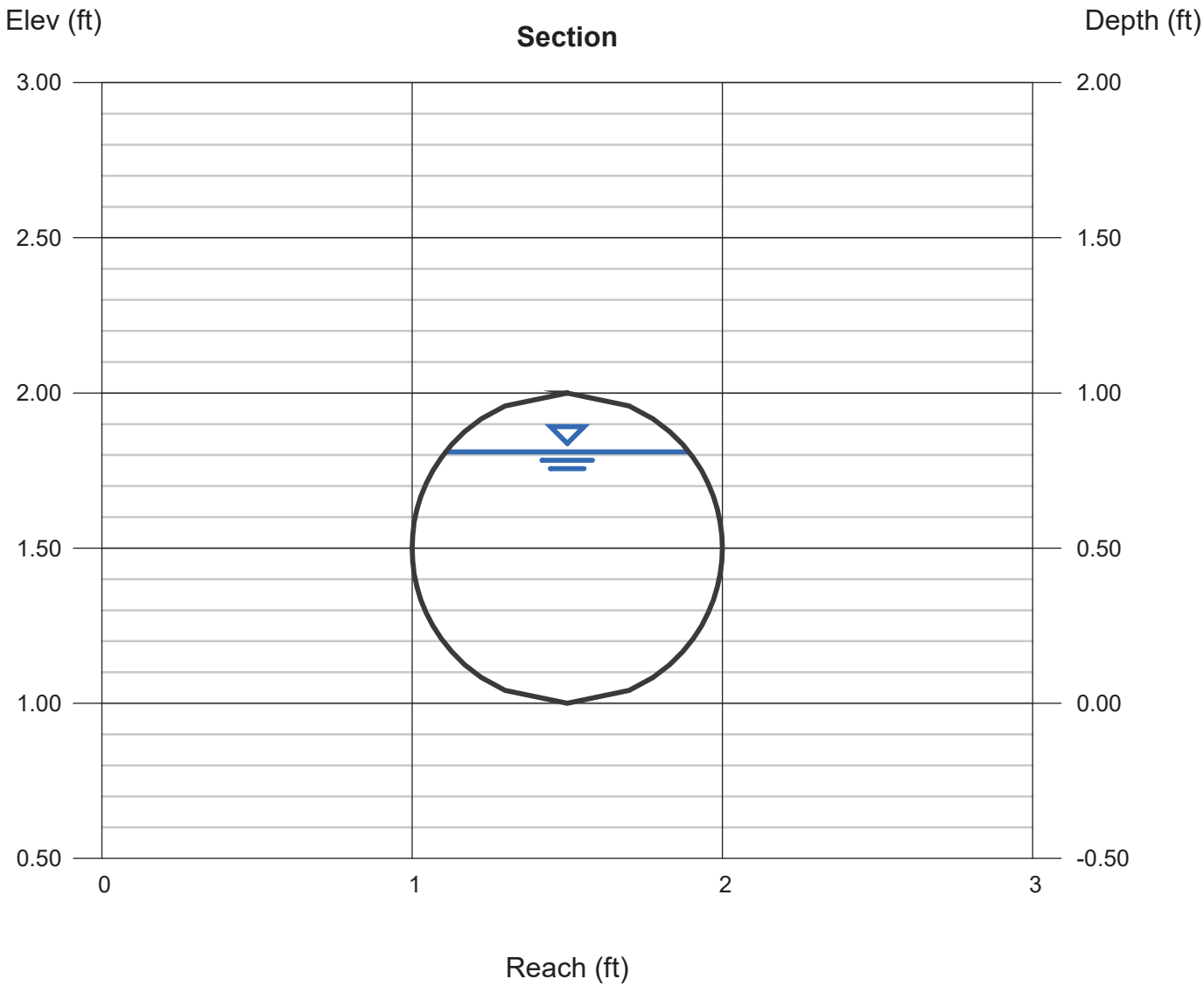
Diameter (ft)	= 1.00
Invert Elev (ft)	= 1.00
Slope (%)	= 0.22
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 1.65

Highlighted

Depth (ft)	= 0.81
Q (cfs)	= 1.652
Area (sqft)	= 0.68
Velocity (ft/s)	= 2.42
Wetted Perim (ft)	= 2.24
Crit Depth, Yc (ft)	= 0.55
Top Width (ft)	= 0.78
EGL (ft)	= 0.90



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, Feb 2 2023

Sanitary Line A - PUD 1-4, 6, 7

Circular

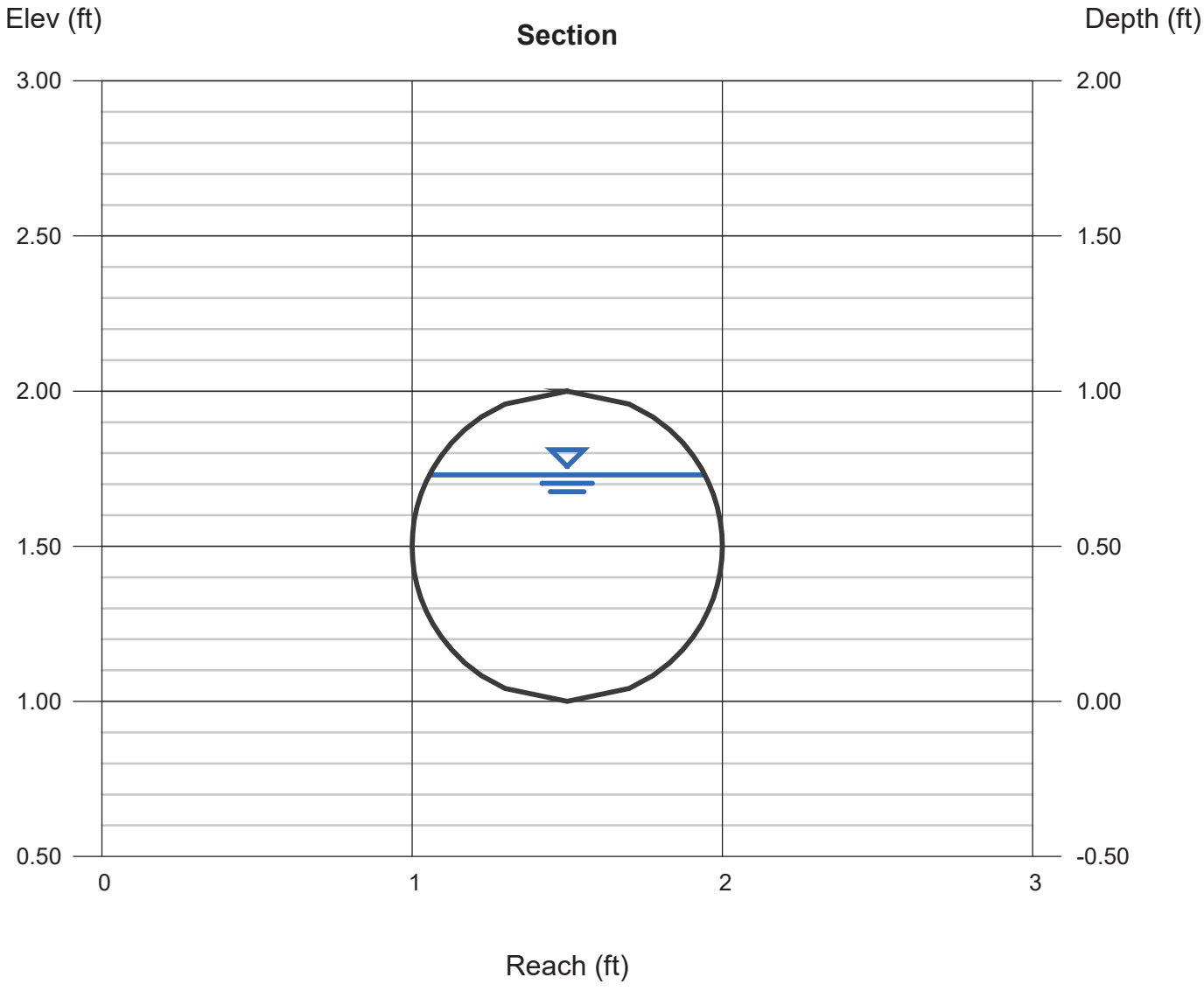
Diameter (ft)	= 1.00
Invert Elev (ft)	= 1.00
Slope (%)	= 0.22
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 1.47

Highlighted

Depth (ft)	= 0.73
Q (cfs)	= 1.470
Area (sqft)	= 0.61
Velocity (ft/s)	= 2.39
Wetted Perim (ft)	= 2.05
Crit Depth, Yc (ft)	= 0.52
Top Width (ft)	= 0.89
EGL (ft)	= 0.82



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, Feb 2 2023

Sanitary Line A - PUD 2 & 3

Circular

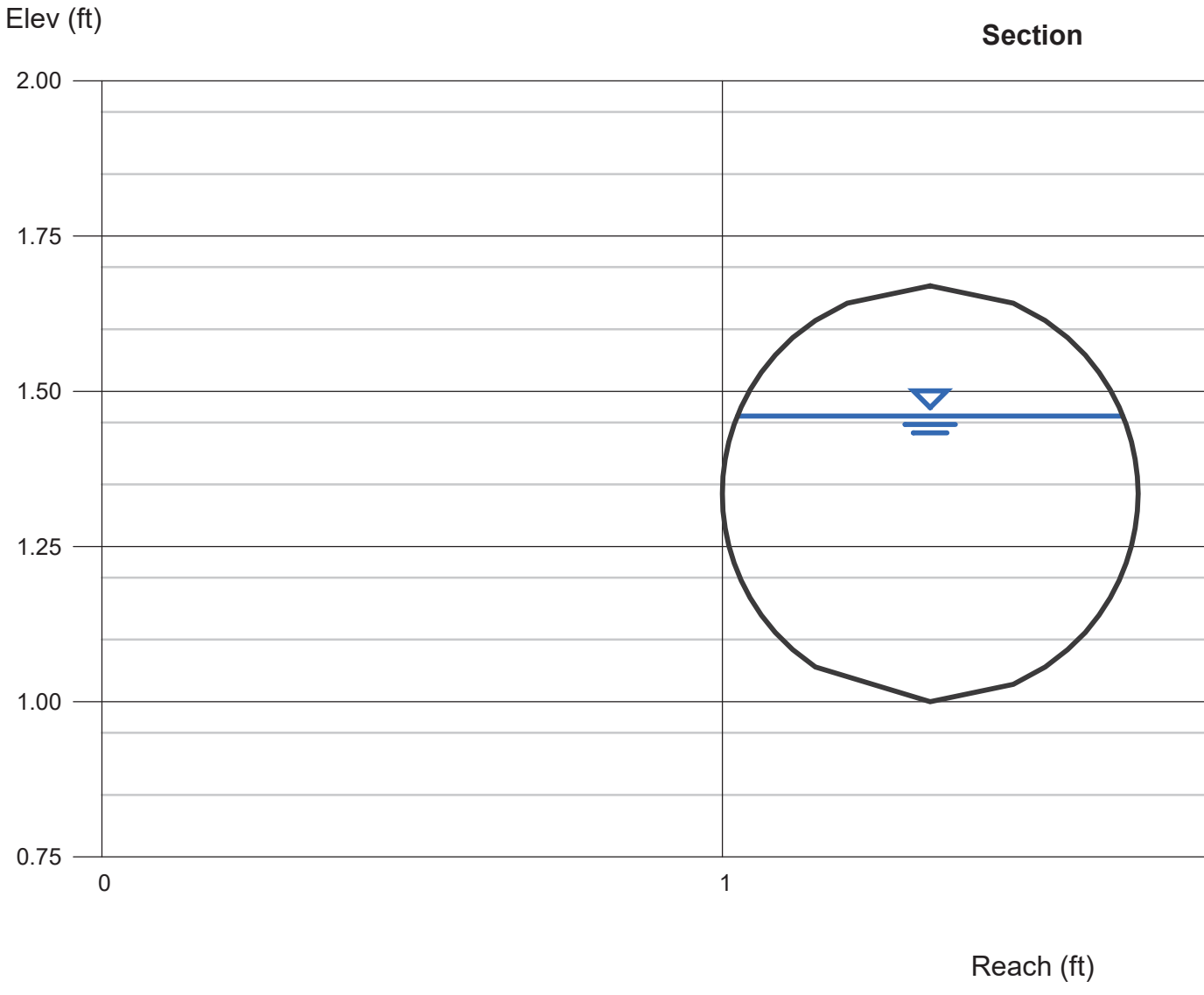
Diameter (ft)	= 0.67
Invert Elev (ft)	= 1.00
Slope (%)	= 0.40
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.63

Highlighted

Depth (ft)	= 0.46
Q (cfs)	= 0.626
Area (sqft)	= 0.26
Velocity (ft/s)	= 2.42
Wetted Perim (ft)	= 1.31
Crit Depth, Yc (ft)	= 0.38
Top Width (ft)	= 0.62
EGL (ft)	= 0.55



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, Feb 2 2023

Sanitary Line B - PUD 8

Circular

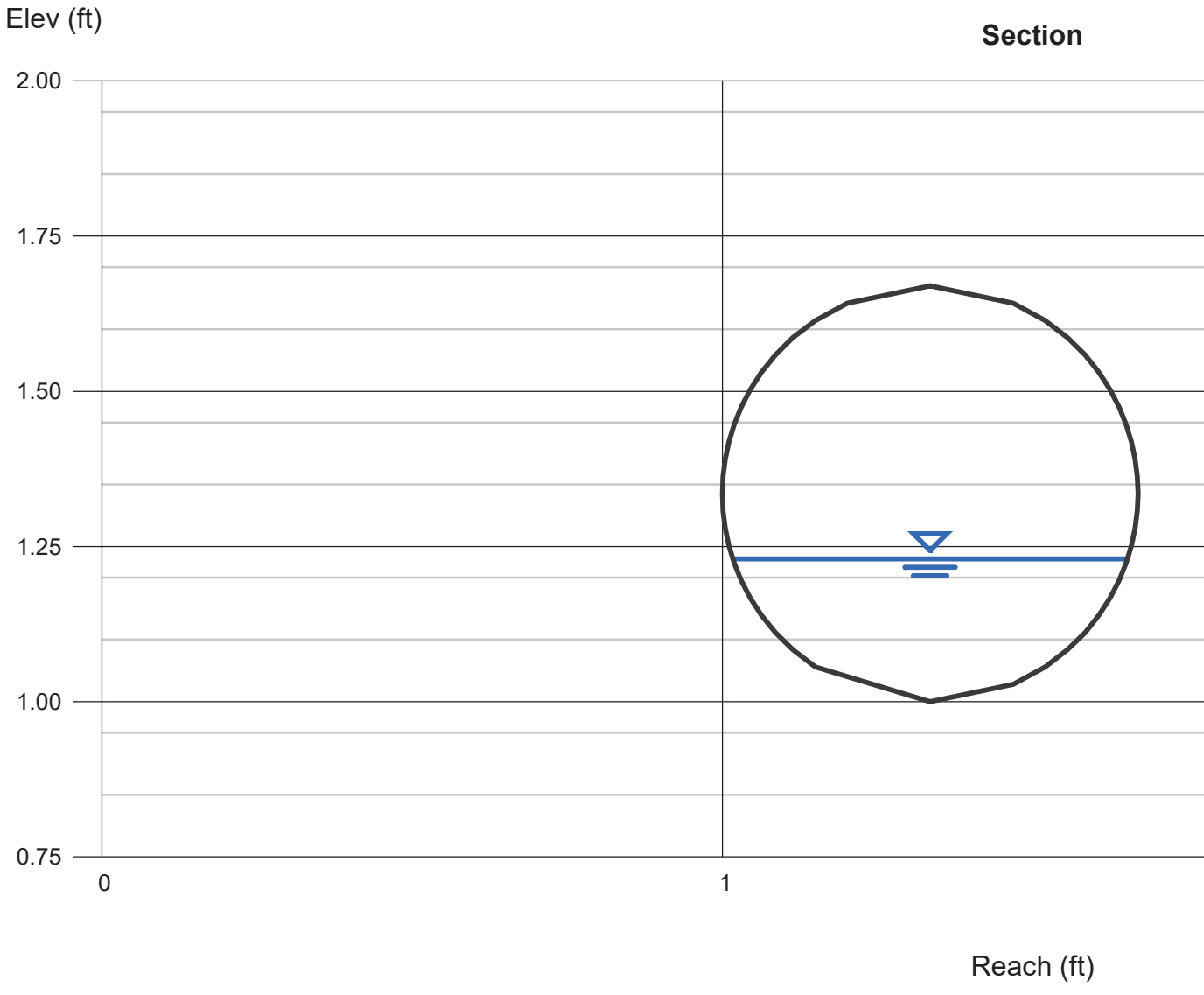
Diameter (ft)	= 0.67
Invert Elev (ft)	= 1.00
Slope (%)	= 0.40
N-Value	= 0.013

Calculations

Compute by:	Known Q
Known Q (cfs)	= 0.19

Highlighted

Depth (ft)	= 0.23
Q (cfs)	= 0.191
Area (sqft)	= 0.11
Velocity (ft/s)	= 1.77
Wetted Perim (ft)	= 0.84
Crit Depth, Yc (ft)	= 0.20
Top Width (ft)	= 0.64
EGL (ft)	= 0.28



Channel Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, Feb 2 2023

Sanitary Line B - PUD 5, 8

Circular

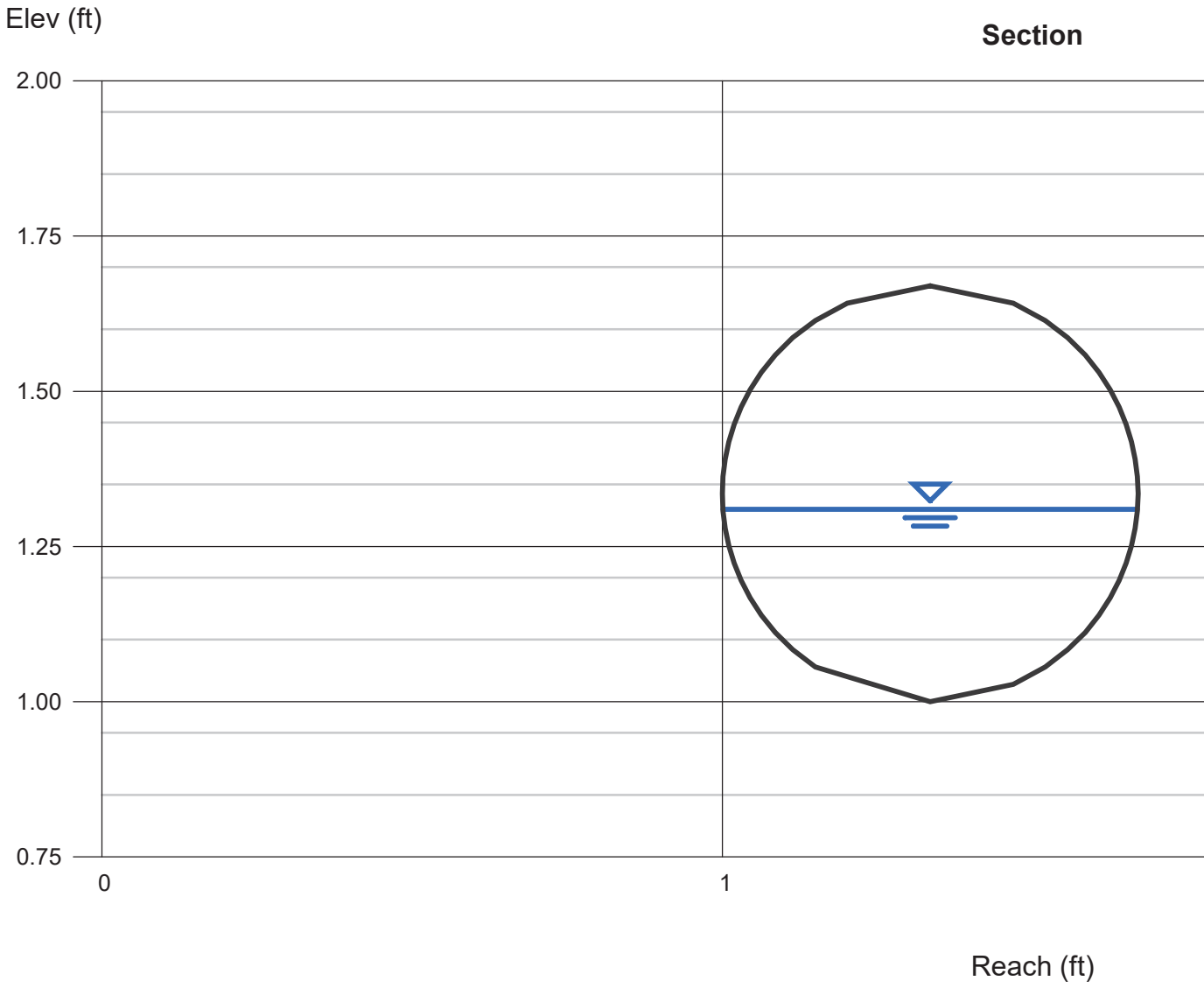
Diameter (ft)	= 0.67
Invert Elev (ft)	= 1.00
Slope (%)	= 0.40
N-Value	= 0.013

Calculations

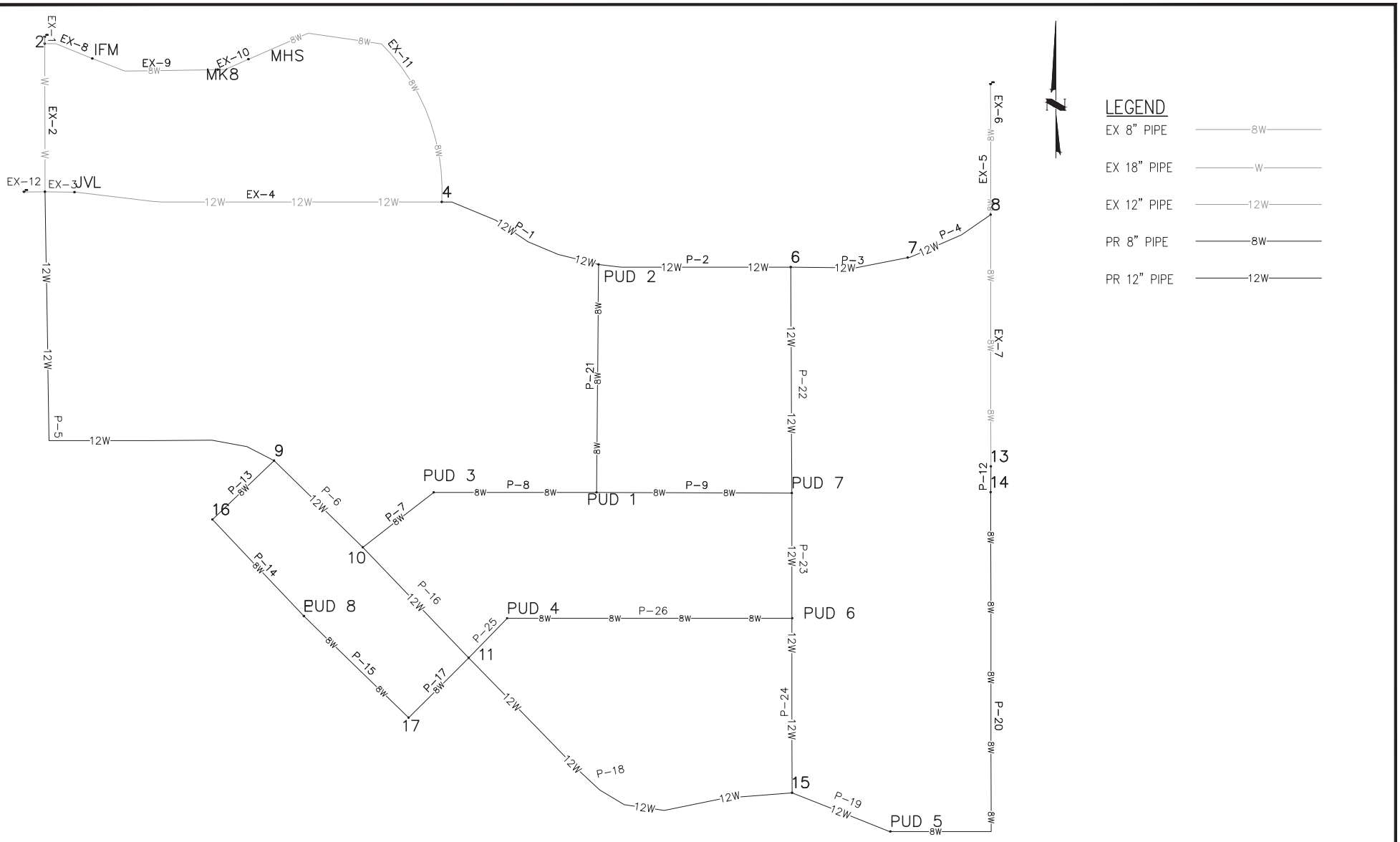
Compute by:	Known Q
Known Q (cfs)	= 0.33

Highlighted

Depth (ft)	= 0.31
Q (cfs)	= 0.325
Area (sqft)	= 0.16
Velocity (ft/s)	= 2.03
Wetted Perim (ft)	= 1.00
Crit Depth, Yc (ft)	= 0.27
Top Width (ft)	= 0.67
EGL (ft)	= 0.37



APPENDIX E – Water System Calculations and Model



NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH

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NO. XREFs
PLOTTED: THU 03/02/23 11:40:18A BY: TIM HOFFMAN

HARRIS KOCHER SMITH
1120 Lincoln Street, Suite 1000
Denver, Colorado 80203
P: 303.623.6300 F: 303.623.6311
HarrisKocherSmith.com

BRUE·BAUKOL CAPITAL PARTNERS

REDTAIL RIDGE
PROPOSED WATER NETWORK

ISSUE DATE: 06-19-2019	PROJECT #: 190108
DATE	REVISION COMMENTS
03-03-2023	PER CITY OF LOUISVILLE COMMENTS

DESIGNED BY: TEH
CHECKED BY: TEH
DRAWN BY: TEH

SHEET NO.
1
1 OF 1

Scenario: Peak Day
Current Time Step: 0.000 h
FlexTable: Pipe Table

Label	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
EX-1	18.0	DIP	150.0	758	0.96	0.000
EX-2	18.0	DIP	150.0	598	0.75	0.000
EX-3	12.0	PVC	150.0	364	1.03	0.000
EX-4	12.0	PVC	150.0	357	1.01	0.000
EX-5	8.0	DIP	150.0	-293	1.87	0.001
EX-6	8.0	DIP	150.0	-293	1.87	0.001
EX-7	8.0	DIP	150.0	-75	0.48	0.000
EX-8	8.0	DIP	150.0	-160	1.02	0.000
EX-9	8.0	DIP	150.0	-133	0.85	0.000
EX-10	8.0	DIP	150.0	-114	0.73	0.000
EX-11	8.0	DIP	150.0	-94	0.60	0.000
EX-12	8.0	DIP	150.0	211	1.34	0.001
P-1	12.0	PVC	150.0	451	1.28	0.000
P-2	12.0	PVC	150.0	106	0.30	0.000
P-3	12.0	PVC	150.0	-218	0.62	0.000
P-4	12.0	PVC	150.0	-218	0.62	0.000
P-5	12.0	PVC	150.0	445	1.26	0.000
P-6	12.0	PVC	150.0	340	0.96	0.000
P-7	8.0	PVC	150.0	-172	1.10	0.001
P-8	8.0	PVC	150.0	-29	0.19	0.000
P-9	8.0	PVC	150.0	-103	0.66	0.000
P-12	8.0	PVC	150.0	-75	0.48	0.000
P-13	8.0	PVC	150.0	105	0.67	0.000
P-14	8.0	PVC	150.0	105	0.67	0.000
P-15	8.0	PVC	150.0	-24	0.15	0.000
P-16	12.0	PVC	150.0	168	0.48	0.000
P-17	8.0	PVC	150.0	-24	0.15	0.000
P-18	12.0	PVC	150.0	67	0.19	0.000
P-19	12.0	PVC	150.0	-19	0.05	0.000
P-20	8.0	PVC	150.0	-75	0.48	0.000
P-21	8.0	PVC	150.0	155	0.99	0.000
P-22	12.0	PVC	150.0	-324	0.92	0.000
P-23	12.0	PVC	150.0	163	0.46	0.000
P-24	12.0	PVC	150.0	-86	0.24	0.000
P-25	8.0	PVC	150.0	77	0.49	0.000
P-26	8.0	PVC	150.0	16	0.10	0.000

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Scenario: Peak Day
Current Time Step: 0.000 h
FlexTable: Junction Table

ID	Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
32	2	5,475.00	0	5,625.99	65
40	3	5,470.00	0	5,625.91	67
45	4	5,430.00	0	5,625.26	84
95	6	5,393.70	0	5,624.80	100
147	7	5,380.00	0	5,624.88	106
37	8	5,370.00	0	5,624.94	110
72	9	5,432.07	0	5,624.74	83
190	10	5,420.02	0	5,624.56	88
75	11	5,396.13	0	5,624.50	99
34	13	5,367.00	0	5,624.78	112
184	14	5,368.11	0	5,624.76	111
43	15	5,377.00	0	5,624.47	107
200	16	5,430.00	0	5,624.64	84
204	17	5,395.00	0	5,624.49	99
220	18	5,370.00	0	5,625.64	111
157	IFM	5,470.66	27	5,625.86	67
167	JVL	5,467.02	7	5,625.86	69
164	MHS	5,456.88	20	5,625.57	73
161	MK8	5,459.71	19	5,625.62	72
173	PUD 1	5,400.00	287	5,624.27	97
170	PUD 2	5,412.25	190	5,624.84	92
188	PUD 3	5,420.00	143	5,624.29	88
207	PUD 4	5,390.00	62	5,624.46	101
146	PUD 5	5,370.00	57	5,624.47	110
209	PUD 6	5,382.52	264	5,624.45	105
175	PUD 7	5,386.49	58	5,624.50	103
202	PUD 8	5,410.00	128	5,624.48	93

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Scenario: PUD 1 Fire
Current Time Step: 0.000 h
FlexTable: Pipe Table

Label	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
EX-1	18.0	DIP	150.0	2,218	2.80	0.001
EX-2	18.0	DIP	150.0	1,822	2.30	0.001
EX-3	12.0	PVC	150.0	1,106	3.14	0.002
EX-4	12.0	PVC	150.0	1,099	3.12	0.002
EX-5	8.0	DIP	150.0	-903	5.76	0.012
EX-6	8.0	DIP	150.0	-903	5.76	0.012
EX-7	8.0	DIP	150.0	-211	1.35	0.001
EX-8	8.0	DIP	150.0	-396	2.53	0.003
EX-9	8.0	DIP	150.0	-370	2.36	0.002
EX-10	8.0	DIP	150.0	-350	2.24	0.002
EX-11	8.0	DIP	150.0	-330	2.11	0.002
EX-12	8.0	DIP	150.0	640	4.09	0.006
P-1	12.0	PVC	150.0	1,429	4.05	0.004
P-2	12.0	PVC	150.0	255	0.72	0.000
P-3	12.0	PVC	150.0	-692	1.96	0.001
P-4	12.0	PVC	150.0	-692	1.96	0.001
P-5	12.0	PVC	150.0	1,357	3.85	0.003
P-6	12.0	PVC	150.0	1,107	3.14	0.002
P-7	8.0	PVC	150.0	-960	6.13	0.013
P-8	8.0	PVC	150.0	-817	5.21	0.010
P-9	8.0	PVC	150.0	-987	6.30	0.014
P-12	8.0	PVC	150.0	-211	1.35	0.001
P-13	8.0	PVC	150.0	250	1.60	0.001
P-14	8.0	PVC	150.0	250	1.60	0.001
P-15	8.0	PVC	150.0	122	0.78	0.000
P-16	12.0	PVC	150.0	147	0.42	0.000
P-17	8.0	PVC	150.0	122	0.78	0.000
P-18	12.0	PVC	150.0	133	0.38	0.000
P-19	12.0	PVC	150.0	-154	0.44	0.000
P-20	8.0	PVC	150.0	-211	1.35	0.001
P-21	8.0	PVC	150.0	983	6.28	0.014
P-22	12.0	PVC	150.0	-947	2.69	0.002
P-23	12.0	PVC	150.0	-97	0.28	0.000
P-24	12.0	PVC	150.0	-287	0.81	0.000
P-25	8.0	PVC	150.0	136	0.87	0.000
P-26	8.0	PVC	150.0	74	0.47	0.000

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Scenario: PUD 1 Fire
Current Time Step: 0.000 h
FlexTable: Junction Table

ID	Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
32	2	5,475.00	0	5,625.95	65
40	3	5,470.00	0	5,625.27	67
45	4	5,430.00	0	5,620.10	82
95	6	5,393.70	0	5,616.32	96
147	7	5,380.00	0	5,616.97	103
37	8	5,370.00	0	5,617.49	107
72	9	5,432.07	0	5,616.08	80
190	10	5,420.02	0	5,614.44	84
75	11	5,396.13	0	5,614.40	94
34	13	5,367.00	0	5,616.38	108
184	14	5,368.11	0	5,616.27	107
43	15	5,377.00	0	5,614.30	103
200	16	5,430.00	0	5,615.56	80
204	17	5,395.00	0	5,614.53	95
220	18	5,370.00	0	5,623.08	109
157	IFM	5,470.66	27	5,625.24	67
167	JVL	5,467.02	7	5,624.88	68
164	MHS	5,456.88	20	5,623.27	72
161	MK8	5,459.71	19	5,623.65	71
173	PUD 1	5,400.00	2,787	5,599.08	86
170	PUD 2	5,412.25	190	5,616.49	88
188	PUD 3	5,420.00	143	5,607.90	81
207	PUD 4	5,390.00	62	5,614.29	97
146	PUD 5	5,370.00	57	5,614.33	106
209	PUD 6	5,382.52	264	5,614.11	100
175	PUD 7	5,386.49	58	5,614.09	98
202	PUD 8	5,410.00	128	5,614.76	89

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Scenario: PUD 2 Fire
Current Time Step: 0.000 h
FlexTable: Pipe Table

Label	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
EX-1	18.0	DIP	150.0	2,220	2.80	0.001
EX-2	18.0	DIP	150.0	1,780	2.24	0.001
EX-3	12.0	PVC	150.0	1,261	3.58	0.003
EX-4	12.0	PVC	150.0	1,254	3.56	0.003
EX-5	8.0	DIP	150.0	-915	5.84	0.012
EX-6	8.0	DIP	150.0	-915	5.84	0.012
EX-7	8.0	DIP	150.0	-110	0.70	0.000
EX-8	8.0	DIP	150.0	-439	2.80	0.003
EX-9	8.0	DIP	150.0	-413	2.63	0.003
EX-10	8.0	DIP	150.0	-393	2.51	0.002
EX-11	8.0	DIP	150.0	-373	2.38	0.002
EX-12	8.0	DIP	150.0	627	4.00	0.006
P-1	12.0	PVC	150.0	1,627	4.62	0.005
P-2	12.0	PVC	150.0	-873	2.48	0.002
P-3	12.0	PVC	150.0	-805	2.28	0.001
P-4	12.0	PVC	150.0	-805	2.28	0.001
P-5	12.0	PVC	150.0	1,146	3.25	0.003
P-6	12.0	PVC	150.0	904	2.56	0.002
P-7	8.0	PVC	150.0	-414	2.64	0.003
P-8	8.0	PVC	150.0	-272	1.73	0.001
P-9	8.0	PVC	150.0	-206	1.31	0.001
P-12	8.0	PVC	150.0	-110	0.70	0.000
P-13	8.0	PVC	150.0	242	1.55	0.001
P-14	8.0	PVC	150.0	242	1.55	0.001
P-15	8.0	PVC	150.0	114	0.73	0.000
P-16	12.0	PVC	150.0	489	1.39	0.001
P-17	8.0	PVC	150.0	114	0.73	0.000
P-18	12.0	PVC	150.0	376	1.07	0.000
P-19	12.0	PVC	150.0	-54	0.15	0.000
P-20	8.0	PVC	150.0	-110	0.70	0.000
P-21	8.0	PVC	150.0	-190	1.21	0.001
P-22	12.0	PVC	150.0	68	0.19	0.000
P-23	12.0	PVC	150.0	-331	0.94	0.000
P-24	12.0	PVC	150.0	-430	1.22	0.000
P-25	8.0	PVC	150.0	227	1.45	0.001
P-26	8.0	PVC	150.0	166	1.06	0.001

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Scenario: PUD 2 Fire
Current Time Step: 0.000 h
FlexTable: Junction Table

ID	Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
32	2	5,475.00	0	5,625.95	65
40	3	5,470.00	0	5,625.30	67
45	4	5,430.00	0	5,618.69	82
95	6	5,393.70	0	5,615.73	96
147	7	5,380.00	0	5,616.59	102
37	8	5,370.00	0	5,617.28	107
72	9	5,432.07	0	5,618.58	81
190	10	5,420.02	0	5,617.45	85
75	11	5,396.13	0	5,617.01	96
34	13	5,367.00	0	5,616.94	108
184	14	5,368.11	0	5,616.91	108
43	15	5,377.00	0	5,616.32	104
200	16	5,430.00	0	5,618.09	81
204	17	5,395.00	0	5,617.13	96
220	18	5,370.00	0	5,623.00	109
157	IFM	5,470.66	27	5,625.09	67
167	JVL	5,467.02	7	5,624.81	68
164	MHS	5,456.88	20	5,622.67	72
161	MK8	5,459.71	19	5,623.13	71
173	PUD 1	5,400.00	287	5,614.92	93
170	PUD 2	5,412.25	2,690	5,614.10	87
188	PUD 3	5,420.00	143	5,616.07	85
207	PUD 4	5,390.00	62	5,616.73	98
146	PUD 5	5,370.00	57	5,616.33	107
209	PUD 6	5,382.52	264	5,615.92	101
175	PUD 7	5,386.49	58	5,615.75	99
202	PUD 8	5,410.00	128	5,617.33	90

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Scenario: PUD 3 Fire
Current Time Step: 0.000 h
FlexTable: Pipe Table

Label	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
EX-1	18.0	DIP	150.0	2,112	2.66	0.001
EX-2	18.0	DIP	150.0	1,749	2.21	0.001
EX-3	12.0	PVC	150.0	991	2.81	0.002
EX-4	12.0	PVC	150.0	984	2.79	0.002
EX-5	8.0	DIP	150.0	-836	5.34	0.010
EX-6	8.0	DIP	150.0	-836	5.34	0.010
EX-7	8.0	DIP	150.0	-233	1.48	0.001
EX-8	8.0	DIP	150.0	-363	2.31	0.002
EX-9	8.0	DIP	150.0	-336	2.14	0.002
EX-10	8.0	DIP	150.0	-317	2.02	0.002
EX-11	8.0	DIP	150.0	-296	1.89	0.001
EX-12	8.0	DIP	150.0	614	3.92	0.006
P-1	12.0	PVC	150.0	1,280	3.63	0.003
P-2	12.0	PVC	150.0	433	1.23	0.000
P-3	12.0	PVC	150.0	-603	1.71	0.001
P-4	12.0	PVC	150.0	-603	1.71	0.001
P-5	12.0	PVC	150.0	1,373	3.89	0.003
P-6	12.0	PVC	150.0	1,139	3.23	0.002
P-7	8.0	PVC	150.0	-1,519	9.70	0.030
P-8	8.0	PVC	150.0	923	5.89	0.012
P-9	8.0	PVC	150.0	-554	3.54	0.005
P-12	8.0	PVC	150.0	-233	1.48	0.001
P-13	8.0	PVC	150.0	234	1.49	0.001
P-14	8.0	PVC	150.0	234	1.49	0.001
P-15	8.0	PVC	150.0	105	0.67	0.000
P-16	12.0	PVC	150.0	-380	1.08	0.000
P-17	8.0	PVC	150.0	105	0.67	0.000
P-18	12.0	PVC	150.0	-239	0.68	0.000
P-19	12.0	PVC	150.0	-176	0.50	0.000
P-20	8.0	PVC	150.0	-233	1.48	0.001
P-21	8.0	PVC	150.0	657	4.19	0.006
P-22	12.0	PVC	150.0	-1,037	2.94	0.002
P-23	12.0	PVC	150.0	425	1.20	0.000
P-24	12.0	PVC	150.0	63	0.18	0.000
P-25	8.0	PVC	150.0	-36	0.23	0.000
P-26	8.0	PVC	150.0	-97	0.62	0.000

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Scenario: PUD 3 Fire
Current Time Step: 0.000 h
FlexTable: Junction Table

ID	Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
32	2	5,475.00	0	5,625.96	65
40	3	5,470.00	0	5,625.33	67
45	4	5,430.00	0	5,621.11	83
95	6	5,393.70	0	5,617.72	97
147	7	5,380.00	0	5,618.22	103
37	8	5,370.00	0	5,618.63	108
72	9	5,432.07	0	5,615.94	80
190	10	5,420.02	0	5,614.21	84
75	11	5,396.13	0	5,614.49	94
34	13	5,367.00	0	5,617.30	108
184	14	5,368.11	0	5,617.16	108
43	15	5,377.00	0	5,614.79	103
200	16	5,430.00	0	5,615.48	80
204	17	5,395.00	0	5,614.59	95
220	18	5,370.00	0	5,623.46	110
157	IFM	5,470.66	27	5,625.35	67
167	JVL	5,467.02	7	5,625.01	68
164	MHS	5,456.88	20	5,623.71	72
161	MK8	5,459.71	19	5,624.02	71
173	PUD 1	5,400.00	287	5,609.93	91
170	PUD 2	5,412.25	190	5,618.16	89
188	PUD 3	5,420.00	2,443	5,598.88	77
207	PUD 4	5,390.00	62	5,614.50	97
146	PUD 5	5,370.00	57	5,614.83	106
209	PUD 6	5,382.52	264	5,614.80	100
175	PUD 7	5,386.49	58	5,615.08	99
202	PUD 8	5,410.00	128	5,614.77	89

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Scenario: PUD 4 Fire
Current Time Step: 0.000 h
FlexTable: Pipe Table

Label	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
EX-1	18.0	DIP	150.0	1,987	2.50	0.001
EX-2	18.0	DIP	150.0	1,649	2.08	0.001
EX-3	12.0	PVC	150.0	910	2.58	0.002
EX-4	12.0	PVC	150.0	903	2.56	0.002
EX-5	8.0	DIP	150.0	-796	5.08	0.009
EX-6	8.0	DIP	150.0	-796	5.08	0.009
EX-7	8.0	DIP	150.0	-270	1.72	0.001
EX-8	8.0	DIP	150.0	-338	2.16	0.002
EX-9	8.0	DIP	150.0	-311	1.98	0.002
EX-10	8.0	DIP	150.0	-292	1.86	0.001
EX-11	8.0	DIP	150.0	-272	1.73	0.001
EX-12	8.0	DIP	150.0	579	3.70	0.005
P-1	12.0	PVC	150.0	1,174	3.33	0.003
P-2	12.0	PVC	150.0	563	1.60	0.001
P-3	12.0	PVC	150.0	-526	1.49	0.001
P-4	12.0	PVC	150.0	-526	1.49	0.001
P-5	12.0	PVC	150.0	1,319	3.74	0.003
P-6	12.0	PVC	150.0	996	2.82	0.002
P-7	8.0	PVC	150.0	-2	0.01	0.000
P-8	8.0	PVC	150.0	141	0.90	0.000
P-9	8.0	PVC	150.0	-7	0.05	0.000
P-12	8.0	PVC	150.0	-270	1.72	0.001
P-13	8.0	PVC	150.0	323	2.06	0.002
P-14	8.0	PVC	150.0	323	2.06	0.002
P-15	8.0	PVC	150.0	195	1.24	0.001
P-16	12.0	PVC	150.0	994	2.82	0.002
P-17	8.0	PVC	150.0	195	1.24	0.001
P-18	12.0	PVC	150.0	-328	0.93	0.000
P-19	12.0	PVC	150.0	-213	0.60	0.000
P-20	8.0	PVC	150.0	-270	1.72	0.001
P-21	8.0	PVC	150.0	421	2.69	0.003
P-22	12.0	PVC	150.0	-1,089	3.09	0.002
P-23	12.0	PVC	150.0	1,024	2.90	0.002
P-24	12.0	PVC	150.0	115	0.33	0.000
P-25	8.0	PVC	150.0	1,517	9.68	0.030
P-26	8.0	PVC	150.0	-645	4.12	0.006

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Scenario: PUD 4 Fire
Current Time Step: 0.000 h
FlexTable: Junction Table

ID	Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
32	2	5,475.00	0	5,625.96	65
40	3	5,470.00	0	5,625.40	67
45	4	5,430.00	0	5,621.80	83
95	6	5,393.70	0	5,618.56	97
147	7	5,380.00	0	5,618.96	103
37	8	5,370.00	0	5,619.27	108
72	9	5,432.07	0	5,616.68	80
190	10	5,420.02	0	5,615.33	85
75	11	5,396.13	0	5,613.68	94
34	13	5,367.00	0	5,617.52	108
184	14	5,368.11	0	5,617.34	108
43	15	5,377.00	0	5,614.21	103
200	16	5,430.00	0	5,615.85	80
204	17	5,395.00	0	5,614.00	95
220	18	5,370.00	0	5,623.69	110
157	IFM	5,470.66	27	5,625.43	67
167	JVL	5,467.02	7	5,625.13	68
164	MHS	5,456.88	20	5,624.01	72
161	MK8	5,459.71	19	5,624.27	71
173	PUD 1	5,400.00	287	5,615.67	93
170	PUD 2	5,412.25	190	5,619.29	90
188	PUD 3	5,420.00	143	5,615.33	85
207	PUD 4	5,390.00	2,162	5,604.28	93
146	PUD 5	5,370.00	57	5,614.28	106
209	PUD 6	5,382.52	264	5,614.24	100
175	PUD 7	5,386.49	58	5,615.67	99
202	PUD 8	5,410.00	128	5,614.56	89

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Scenario: PUD 5 Fire
Current Time Step: 0.000 h
FlexTable: Pipe Table

Label	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
EX-1	18.0	DIP	150.0	2,193	2.77	0.001
EX-2	18.0	DIP	150.0	1,817	2.29	0.001
EX-3	12.0	PVC	150.0	1,034	2.93	0.002
EX-4	12.0	PVC	150.0	1,027	2.91	0.002
EX-5	8.0	DIP	150.0	-930	5.94	0.012
EX-6	8.0	DIP	150.0	-930	5.94	0.012
EX-7	8.0	DIP	150.0	-455	2.91	0.003
EX-8	8.0	DIP	150.0	-376	2.40	0.002
EX-9	8.0	DIP	150.0	-349	2.23	0.002
EX-10	8.0	DIP	150.0	-330	2.11	0.002
EX-11	8.0	DIP	150.0	-310	1.98	0.002
EX-12	8.0	DIP	150.0	638	4.07	0.006
P-1	12.0	PVC	150.0	1,337	3.79	0.003
P-2	12.0	PVC	150.0	702	1.99	0.001
P-3	12.0	PVC	150.0	-475	1.35	0.000
P-4	12.0	PVC	150.0	-475	1.35	0.000
P-5	12.0	PVC	150.0	1,421	4.03	0.004
P-6	12.0	PVC	150.0	1,091	3.09	0.002
P-7	8.0	PVC	150.0	-129	0.82	0.000
P-8	8.0	PVC	150.0	13	0.09	0.000
P-9	8.0	PVC	150.0	144	0.92	0.000
P-12	8.0	PVC	150.0	-455	2.91	0.003
P-13	8.0	PVC	150.0	330	2.11	0.002
P-14	8.0	PVC	150.0	330	2.11	0.002
P-15	8.0	PVC	150.0	202	1.29	0.001
P-16	12.0	PVC	150.0	962	2.73	0.002
P-17	8.0	PVC	150.0	202	1.29	0.001
P-18	12.0	PVC	150.0	932	2.64	0.002
P-19	12.0	PVC	150.0	2,101	5.96	0.008
P-20	8.0	PVC	150.0	-455	2.91	0.003
P-21	8.0	PVC	150.0	445	2.84	0.003
P-22	12.0	PVC	150.0	-1,177	3.34	0.003
P-23	12.0	PVC	150.0	1,263	3.58	0.003
P-24	12.0	PVC	150.0	1,170	3.32	0.003
P-25	8.0	PVC	150.0	232	1.48	0.001
P-26	8.0	PVC	150.0	170	1.09	0.001

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Scenario: PUD 5 Fire
Current Time Step: 0.000 h
FlexTable: Junction Table

ID	Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
32	2	5,475.00	0	5,625.96	65
40	3	5,470.00	0	5,625.28	67
45	4	5,430.00	0	5,620.71	83
95	6	5,393.70	0	5,616.43	96
147	7	5,380.00	0	5,616.75	102
37	8	5,370.00	0	5,617.01	107
72	9	5,432.07	0	5,615.26	79
190	10	5,420.02	0	5,613.67	84
75	11	5,396.13	0	5,612.11	93
34	13	5,367.00	0	5,612.39	106
184	14	5,368.11	0	5,611.92	105
43	15	5,377.00	0	5,608.43	100
200	16	5,430.00	0	5,614.40	80
204	17	5,395.00	0	5,612.46	94
220	18	5,370.00	0	5,622.91	109
157	IFM	5,470.66	27	5,625.30	67
167	JVL	5,467.02	7	5,624.93	68
164	MHS	5,456.88	20	5,623.54	72
161	MK8	5,459.71	19	5,623.87	71
173	PUD 1	5,400.00	287	5,613.51	92
170	PUD 2	5,412.25	190	5,617.52	89
188	PUD 3	5,420.00	143	5,613.51	84
207	PUD 4	5,390.00	62	5,611.82	96
146	PUD 5	5,370.00	2,557	5,603.85	101
209	PUD 6	5,382.52	264	5,610.98	99
175	PUD 7	5,386.49	58	5,613.09	98
202	PUD 8	5,410.00	128	5,613.05	88

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Scenario: PUD 6 Fire
Current Time Step: 0.000 h
FlexTable: Pipe Table

Label	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
EX-1	18.0	DIP	150.0	2,199	2.77	0.001
EX-2	18.0	DIP	150.0	1,818	2.29	0.001
EX-3	12.0	PVC	150.0	1,049	2.97	0.002
EX-4	12.0	PVC	150.0	1,042	2.95	0.002
EX-5	8.0	DIP	150.0	-924	5.90	0.012
EX-6	8.0	DIP	150.0	-924	5.90	0.012
EX-7	8.0	DIP	150.0	-309	1.97	0.002
EX-8	8.0	DIP	150.0	-380	2.43	0.002
EX-9	8.0	DIP	150.0	-354	2.26	0.002
EX-10	8.0	DIP	150.0	-334	2.13	0.002
EX-11	8.0	DIP	150.0	-314	2.01	0.002
EX-12	8.0	DIP	150.0	639	4.08	0.006
P-1	12.0	PVC	150.0	1,356	3.85	0.003
P-2	12.0	PVC	150.0	715	2.03	0.001
P-3	12.0	PVC	150.0	-615	1.74	0.001
P-4	12.0	PVC	150.0	-615	1.74	0.001
P-5	12.0	PVC	150.0	1,409	4.00	0.004
P-6	12.0	PVC	150.0	1,092	3.10	0.002
P-7	8.0	PVC	150.0	-232	1.48	0.001
P-8	8.0	PVC	150.0	-90	0.57	0.000
P-9	8.0	PVC	150.0	253	1.62	0.001
P-12	8.0	PVC	150.0	-309	1.97	0.002
P-13	8.0	PVC	150.0	316	2.02	0.002
P-14	8.0	PVC	150.0	316	2.02	0.002
P-15	8.0	PVC	150.0	188	1.20	0.001
P-16	12.0	PVC	150.0	860	2.44	0.001
P-17	8.0	PVC	150.0	188	1.20	0.001
P-18	12.0	PVC	150.0	661	1.87	0.001
P-19	12.0	PVC	150.0	-252	0.72	0.000
P-20	8.0	PVC	150.0	-309	1.97	0.002
P-21	8.0	PVC	150.0	451	2.88	0.003
P-22	12.0	PVC	150.0	-1,330	3.77	0.003
P-23	12.0	PVC	150.0	1,525	4.33	0.004
P-24	12.0	PVC	150.0	-913	2.59	0.002
P-25	8.0	PVC	150.0	387	2.47	0.002
P-26	8.0	PVC	150.0	326	2.08	0.002

Scenario: PUD 6 Fire
Current Time Step: 0.000 h
FlexTable: Junction Table

ID	Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
32	2	5,475.00	0	5,625.96	65
40	3	5,470.00	0	5,625.28	67
45	4	5,430.00	0	5,620.59	82
95	6	5,393.70	0	5,616.18	96
147	7	5,380.00	0	5,616.70	102
37	8	5,370.00	0	5,617.12	107
72	9	5,432.07	0	5,615.42	79
190	10	5,420.02	0	5,613.83	84
75	11	5,396.13	0	5,612.56	94
34	13	5,367.00	0	5,614.87	107
184	14	5,368.11	0	5,614.64	107
43	15	5,377.00	0	5,610.61	101
200	16	5,430.00	0	5,614.63	80
204	17	5,395.00	0	5,612.86	94
220	18	5,370.00	0	5,622.95	109
157	IFM	5,470.66	27	5,625.29	67
167	JVL	5,467.02	7	5,624.92	68
164	MHS	5,456.88	20	5,623.48	72
161	MK8	5,459.71	19	5,623.82	71
173	PUD 1	5,400.00	287	5,613.21	92
170	PUD 2	5,412.25	190	5,617.31	89
188	PUD 3	5,420.00	143	5,613.35	84
207	PUD 4	5,390.00	62	5,611.81	96
146	PUD 5	5,370.00	57	5,610.70	104
209	PUD 6	5,382.52	2,764	5,609.00	98
175	PUD 7	5,386.49	58	5,612.00	98
202	PUD 8	5,410.00	128	5,613.38	88

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Scenario: PUD 7 Fire
Current Time Step: 0.000 h
FlexTable: Pipe Table

Label	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
EX-1	18.0	DIP	150.0	1,902	2.40	0.001
EX-2	18.0	DIP	150.0	1,559	1.97	0.001
EX-3	12.0	PVC	150.0	936	2.66	0.002
EX-4	12.0	PVC	150.0	929	2.64	0.002
EX-5	8.0	DIP	150.0	-812	5.18	0.010
EX-6	8.0	DIP	150.0	-812	5.18	0.010
EX-7	8.0	DIP	150.0	-214	1.37	0.001
EX-8	8.0	DIP	150.0	-343	2.19	0.002
EX-9	8.0	DIP	150.0	-316	2.02	0.002
EX-10	8.0	DIP	150.0	-297	1.90	0.001
EX-11	8.0	DIP	150.0	-277	1.77	0.001
EX-12	8.0	DIP	150.0	548	3.50	0.005
P-1	12.0	PVC	150.0	1,206	3.42	0.003
P-2	12.0	PVC	150.0	630	1.79	0.001
P-3	12.0	PVC	150.0	-597	1.69	0.001
P-4	12.0	PVC	150.0	-597	1.69	0.001
P-5	12.0	PVC	150.0	1,171	3.32	0.003
P-6	12.0	PVC	150.0	914	2.59	0.002
P-7	8.0	PVC	150.0	-320	2.04	0.002
P-8	8.0	PVC	150.0	-177	1.13	0.001
P-9	8.0	PVC	150.0	276	1.76	0.001
P-12	8.0	PVC	150.0	-214	1.37	0.001
P-13	8.0	PVC	150.0	256	1.64	0.001
P-14	8.0	PVC	150.0	256	1.64	0.001
P-15	8.0	PVC	150.0	128	0.82	0.000
P-16	12.0	PVC	150.0	595	1.69	0.001
P-17	8.0	PVC	150.0	128	0.82	0.000
P-18	12.0	PVC	150.0	447	1.27	0.000
P-19	12.0	PVC	150.0	-157	0.45	0.000
P-20	8.0	PVC	150.0	-214	1.37	0.001
P-21	8.0	PVC	150.0	386	2.46	0.002
P-22	12.0	PVC	150.0	-1,227	3.48	0.003
P-23	12.0	PVC	150.0	-554	1.57	0.001
P-24	12.0	PVC	150.0	-604	1.71	0.001
P-25	8.0	PVC	150.0	276	1.76	0.001
P-26	8.0	PVC	150.0	214	1.37	0.001

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Scenario: PUD 7 Fire
Current Time Step: 0.000 h
FlexTable: Junction Table

ID	Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
32	2	5,475.00	0	5,625.97	65
40	3	5,470.00	0	5,625.46	67
45	4	5,430.00	0	5,621.66	83
95	6	5,393.70	0	5,618.13	97
147	7	5,380.00	0	5,618.62	103
37	8	5,370.00	0	5,619.02	108
72	9	5,432.07	0	5,618.46	81
190	10	5,420.02	0	5,617.31	85
75	11	5,396.13	0	5,616.67	95
34	13	5,367.00	0	5,617.88	109
184	14	5,368.11	0	5,617.76	108
43	15	5,377.00	0	5,615.73	103
200	16	5,430.00	0	5,617.92	81
204	17	5,395.00	0	5,616.82	96
220	18	5,370.00	0	5,623.60	110
157	IFM	5,470.66	27	5,625.42	67
167	JVL	5,467.02	7	5,625.17	68
164	MHS	5,456.88	20	5,623.95	72
161	MK8	5,459.71	19	5,624.22	71
173	PUD 1	5,400.00	287	5,615.94	93
170	PUD 2	5,412.25	190	5,619.02	89
188	PUD 3	5,420.00	143	5,616.46	85
207	PUD 4	5,390.00	62	5,616.27	98
146	PUD 5	5,370.00	57	5,615.77	106
209	PUD 6	5,382.52	264	5,614.98	101
175	PUD 7	5,386.49	2,058	5,614.52	99
202	PUD 8	5,410.00	128	5,617.08	90

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Scenario: PUD 8 Fire
Current Time Step: 0.000 h
FlexTable: Pipe Table

Label	Diameter (in)	Material	Hazen-Williams C	Flow (gpm)	Velocity (ft/s)	Headloss Gradient (ft/ft)
EX-1	18.0	DIP	150.0	2,260	2.85	0.001
EX-2	18.0	DIP	150.0	1,906	2.40	0.001
EX-3	12.0	PVC	150.0	945	2.68	0.002
EX-4	12.0	PVC	150.0	938	2.66	0.002
EX-5	8.0	DIP	150.0	-833	5.32	0.010
EX-6	8.0	DIP	150.0	-833	5.32	0.010
EX-7	8.0	DIP	150.0	-277	1.77	0.001
EX-8	8.0	DIP	150.0	-354	2.26	0.002
EX-9	8.0	DIP	150.0	-327	2.09	0.002
EX-10	8.0	DIP	150.0	-308	1.96	0.002
EX-11	8.0	DIP	150.0	-288	1.84	0.001
EX-12	8.0	DIP	150.0	669	4.27	0.007
P-1	12.0	PVC	150.0	1,225	3.48	0.003
P-2	12.0	PVC	150.0	570	1.62	0.001
P-3	12.0	PVC	150.0	-556	1.58	0.001
P-4	12.0	PVC	150.0	-556	1.58	0.001
P-5	12.0	PVC	150.0	1,631	4.63	0.005
P-6	12.0	PVC	150.0	290	0.82	0.000
P-7	8.0	PVC	150.0	200	1.28	0.001
P-8	8.0	PVC	150.0	343	2.19	0.002
P-9	8.0	PVC	150.0	-165	1.05	0.000
P-12	8.0	PVC	150.0	-277	1.77	0.001
P-13	8.0	PVC	150.0	1,341	8.56	0.024
P-14	8.0	PVC	150.0	1,341	8.56	0.024
P-15	8.0	PVC	150.0	-1,287	8.22	0.022
P-16	12.0	PVC	150.0	490	1.39	0.001
P-17	8.0	PVC	150.0	-1,287	8.22	0.022
P-18	12.0	PVC	150.0	-605	1.72	0.001
P-19	12.0	PVC	150.0	-220	0.62	0.000
P-20	8.0	PVC	150.0	-277	1.77	0.001
P-21	8.0	PVC	150.0	466	2.97	0.003
P-22	12.0	PVC	150.0	-1,125	3.19	0.002
P-23	12.0	PVC	150.0	903	2.56	0.002
P-24	12.0	PVC	150.0	385	1.09	0.000
P-25	8.0	PVC	150.0	-192	1.23	0.001
P-26	8.0	PVC	150.0	-254	1.62	0.001

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Scenario: PUD 8 Fire
Current Time Step: 0.000 h
FlexTable: Junction Table

ID	Label	Elevation (ft)	Demand (gpm)	Hydraulic Grade (ft)	Pressure (psi)
32	2	5,475.00	0	5,625.95	65
40	3	5,470.00	0	5,625.21	67
45	4	5,430.00	0	5,621.36	83
95	6	5,393.70	0	5,617.90	97
147	7	5,380.00	0	5,618.33	103
37	8	5,370.00	0	5,618.68	108
72	9	5,432.07	0	5,612.29	78
190	10	5,420.02	0	5,612.16	83
75	11	5,396.13	0	5,611.71	93
34	13	5,367.00	0	5,616.84	108
184	14	5,368.11	0	5,616.65	108
43	15	5,377.00	0	5,613.37	102
200	16	5,430.00	0	5,600.73	74
204	17	5,395.00	0	5,601.06	89
220	18	5,370.00	0	5,623.48	110
157	IFM	5,470.66	27	5,625.37	67
167	JVL	5,467.02	7	5,624.92	68
164	MHS	5,456.88	20	5,623.81	72
161	MK8	5,459.71	19	5,624.10	71
173	PUD 1	5,400.00	287	5,614.28	93
170	PUD 2	5,412.25	190	5,618.64	89
188	PUD 3	5,420.00	143	5,612.52	83
207	PUD 4	5,390.00	62	5,611.92	96
146	PUD 5	5,370.00	57	5,613.44	105
209	PUD 6	5,382.52	264	5,613.69	100
175	PUD 7	5,386.49	58	5,614.82	99
202	PUD 8	5,410.00	2,628	5,582.71	75

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LOUISVILLE FIRE
PROTECTION DISTRICT
"OUR FAMILY SERVING YOUR FAMILY"
895 W. VIA APPIA LOUISVILLE, CO 80027
HEADQUARTERS: 303.666.6595 | FAX: 303.666.7659
LOUISVILLEFIRE.COM

A TRADITION OF EXCELLENCE SINCE 1887

November 14, 2019

Mark Beal, Director of Construction
Ryan Companies US, Inc.
3900 East Camelback Road Suite 100
Phoenix, Arizona 85018

Subject: Medtronics (Fire Flow)

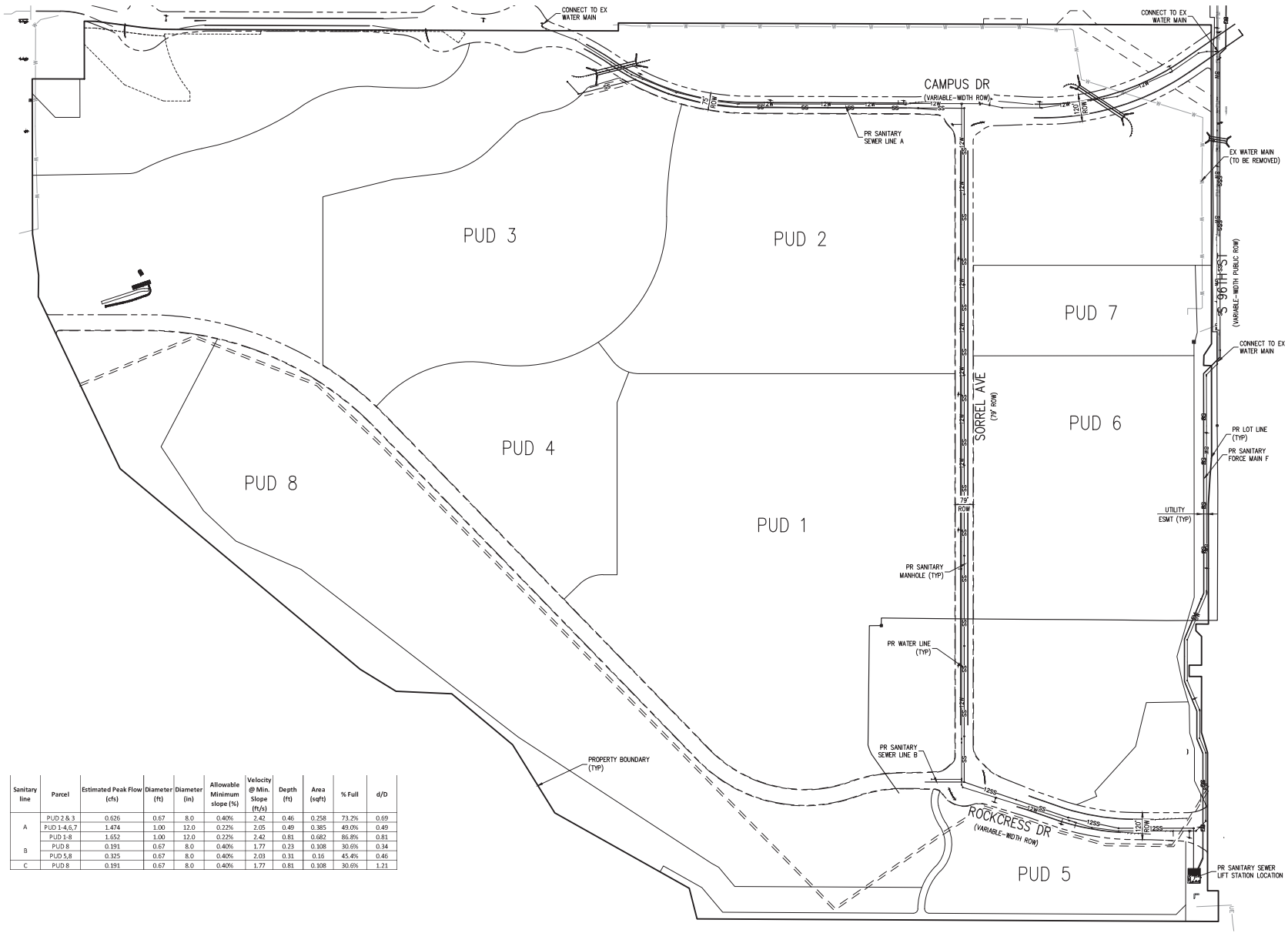
Dear Mr. Beal,

Per our discussion regarding fire flow requirements, it is my interpretation of Appendix B, Table B105.2 that a 75% reduction in fire flow is allowed in sprinkled buildings. With that said, I would like to see only a 50% reduction in fire flows verses the 75% the code allows. Please feel free to call me at 303-666-8809 or email me at cmestas@louisvillefire.com if you would like to discuss this further.

Sincerely,

Chris Mestas
Fire Marshal

APPENDIX F – Utility Plan, Conceptual Utility Layouts



Sanitary line	Parcel	Estimated Peak Flow (cfs)	Diameter (ft)	Diameter (in)	Allowable Minimum slope (%)	Velocity @ Min. Slope (ft/s)	Depth (ft)	Area (sqft)	% Full	d/D
A	PUD 2 & 3	0.626	0.67	8.0	0.40%	2.42	0.46	0.258	73.2%	0.69
	PUD 1-4,6,7	1.474	1.00	12.0	0.22%	2.05	0.49	0.385	49.0%	0.49
	PUD 1-8	1.652	1.00	12.0	0.22%	2.42	0.81	0.682	86.8%	0.81
B	PUD 8	0.191	0.67	8.0	0.40%	1.77	0.23	0.108	30.6%	0.34
	PUD 5,8	0.325	0.67	8.0	0.40%	2.03	0.31	0.16	45.4%	0.46
C	PUD 8	0.191	0.67	8.0	0.40%	1.77	0.81	0.108	30.6%	1.21

811 Know what's below. Call before you dig.

CALL 3 BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.

200 0 200 400
SCALE: 1" = 200'

DESIGNED BY: MJS
CHECKED BY: TEH
DRAWN BY: MJS

HARRIS KOCHER SMITH
1120 Lincoln Street, Suite 1000
Denver, Colorado 80203
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HarrisKocherSmith.com

BRUE·BAUKOL CAPITAL PARTNERS

REDTAIL RIDGE
PHASE 1 UTILITY PLAN

ISSUE DATE: 03/03/2020 PROJECT #: 190108

DATE	REVISION COMMENTS
02-12-2020	PER CITY OF LOUISVILLE COMMENTS
03-24-2021	PER CITY OF LOUISVILLE COMMENTS
11-09-2022	PER CITY OF LOUISVILLE COMMENTS

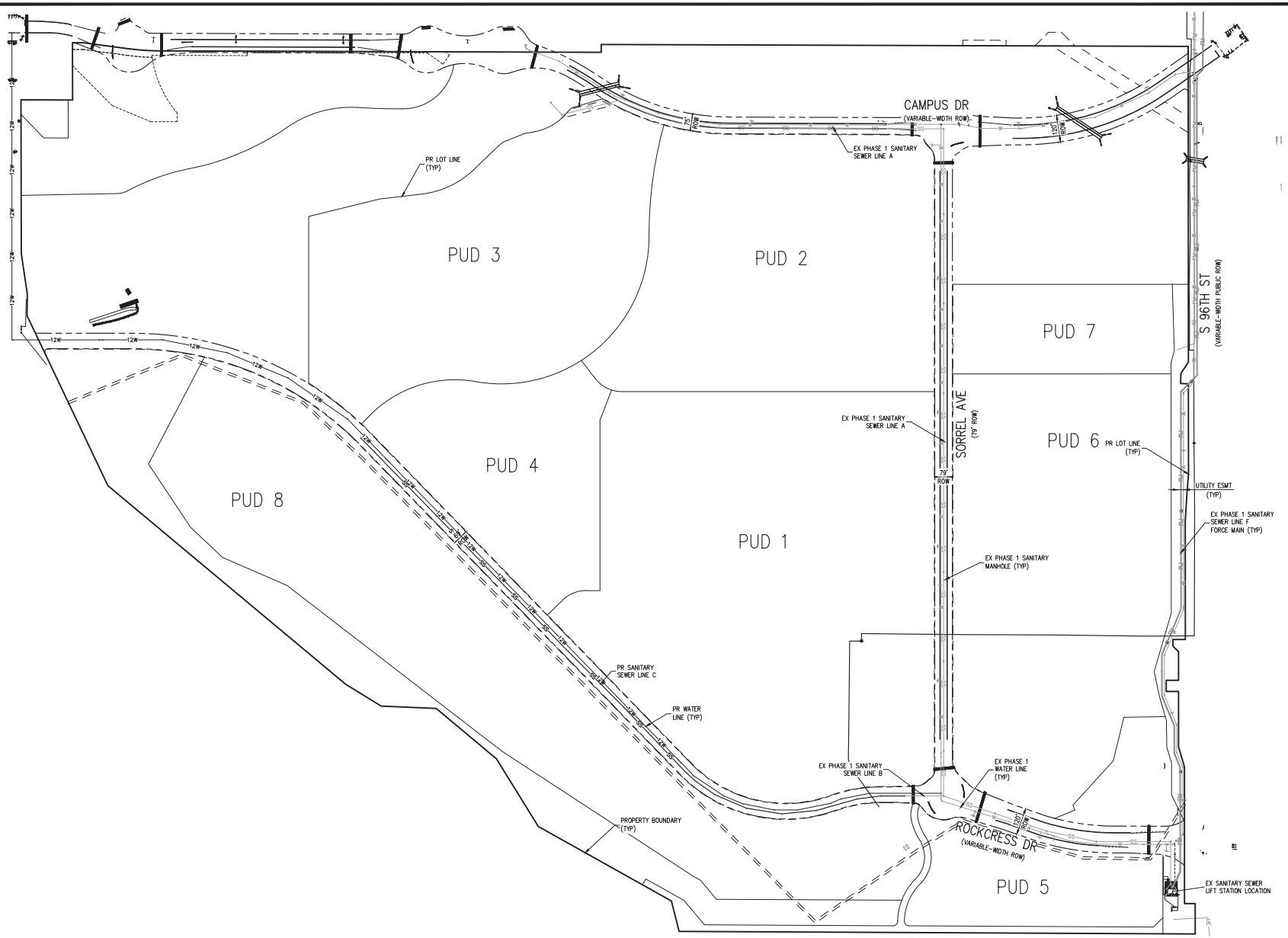
PRELIMINARY NOT FOR CONSTRUCTION

SHEET NO. 1

1 OF 2

NO CHANGES ARE TO BE MADE TO THIS DRAWING WITHOUT WRITTEN PERMISSION OF HARRIS KOCHER SMITH

FILEPATH: P:\190108\ENGINEERING\EXHIBIT\UTILITY FILING 1 PLAN.DWG LAYOUT: LAYOUT1
6 XREFs: client\logo, e-all, p-base-1, p-base-2, p-legal-1, p-legal-2[U]
PLOTTED: THU 03/02/23 12:12 PM BY: TIM HOPPMAN



Know what's below. Call before you dig.

CALL 3 BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.

200 0 200 400
SCALE: 1" = 200'

DESIGNED BY: MJS
CHECKED BY: TEH
DRAWN BY: MJS

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BRUE·BAUKOL CAPITAL PARTNERS

REDTAIL RIDGE
PHASE 2 UTILITY PLAN

ISSUE DATE: 03/03/2020	PROJECT #: 190108
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03-24-2021	PER CITY OF LOUISVILLE COMMENTS
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PRELIMINARY NOT FOR CONSTRUCTION

SHEET NO. 2

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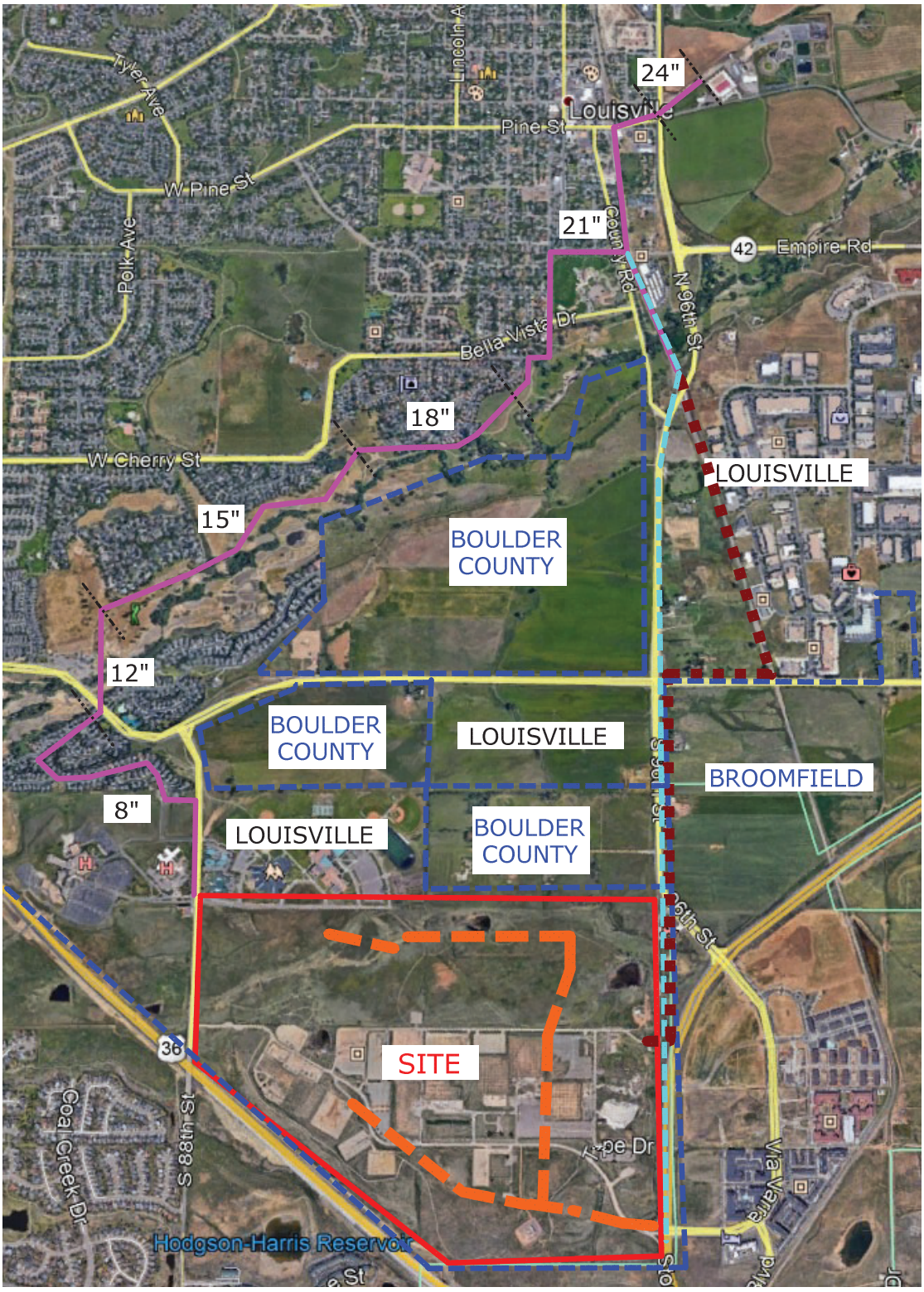
FILEPATH: P:\190108\ENGINEERING\EXHIBIT\UTILITY FILING 2 PLAN DWG | LAYOUT: LAYOUT2
8 XREFs: client\logo_e-ull, p-base=1, p-base=2, p-legal=1, p-legal=2(U), pull=1, p-all=2
PLOTTED: THU 03/02/23 - 10:50P BY: TIM HOFFMAN

EXISTING SANITARY MAIN UTILITY MAP



EX SANITARY SEWER

MUNICIPALITY BOUNDARY

PROPOSED SANITARY MAIN

PIPE DIAMETER CHANGE

EX SANITARY SEWER FORCE MAIN

PR SANITARY SEWER FORCE MAIN

EXISTING WATER MAIN UTILITY MAP

EXISTING WATER MAIN

MUNICIPALITY BOUNDARY

PROPOSED WATER MAIN

PIPE DIAMETER CHANGE