

Planning Commission

Agenda

October 12, 2023
City Hall, Council Chambers
749 Main Street
6:30 PM

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

- 1) **You can call in to +1 253 215 8782 or +1 346 248 7799 Webinar ID # 823 1948 7837 Passcode 773858**
- 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 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 – August (September minutes available at November meeting)
5. Public Comment on Items Not on the Agenda
6. Continued Business – Public Hearing Items
 - a. **East Street Village Preliminary Plat and Preliminary PUD.** Adoption of Resolution 18, Series 2023 recommending approval of a preliminary Planned Unit Development (PUD) and preliminary plat for a residential development with 15 single-family detached units and 21 townhome units on 3 acres of land.
CONTINUED FROM SEPTEMBER 14, 2023
 - i. Case Planner: Ellie Hassan, Planner II
 - ii. Owner: East Street LLC
 - iii. Applicant: Design Practice INC

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.

7. Planning Commission Comments
8. Staff Comments
 - a. Housing Plan Informational Update
9. Items Tentatively Scheduled For Future Meetings
 - a. None at this time
10. Adjourn

Planning Commission

Meeting Minutes

**August 10, 2023
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
Jeff Moline, Vice Chair
Keaton Howe, Secretary
Tamar Krantz
Debra Baskett

Commission Members Absent: Allison Osterman
Cullen Choi

Staff Members Present: Amelia Brackett Hogstad, Planner II
Jeff Hirt, Planning Manager
Rob Zuccaro, Community Development
Director
Claire Kreycik, Secretary

Approval of Agenda

The agenda was approved by all members.

Approval of Minutes

Howe moved and **Krantz** seconded a motion to approve the July 13, 2023 regular meeting minutes. Motion passed unanimously by a voice vote. Krantz and Moline abstained

Public Comments on Items not on the Agenda

None is heard.

Public Hearing Items - New Business

- A. 301 Spruce Minor Subdivision** Louisville Heights Replat B – Consideration of Resolution 15, Series 2023, recommending conditional approval of a minor subdivision.

Applicant: Susannah Pels and Peter Stewart

Case Planner: Amelia Brackett Hogstad, Planner

Brauneis opened the public hearing. All notice was met as required and there is no commissioner conflict of interest.

Staff Presentation:

Brackett Hogstad presented background about the application, describing that it is subject to Old Town Overlay Zoning District. The house on the lot was built in 1908; and the Historic Preservation Commission has recommended landmarking. The City Council will review the subdivision and landmark applications concurrently at their September 5 meeting. The proposal is to divide the parcel into two, with three modifications requested to allow a smaller lot size and lot width, and to allow a minimum lot area of 6,755 square feet (sf) for Lot 2 (where the zoning district standard is 7,000 sf). Staff finds that it conforms with all other requirements of LMC Title 16, other than the three modifications. Staff presented that the subdivision will maintain density and character of the neighborhood, as it is relatively in line with the lot sizes and widths surrounding. The existing historic home will be able to remain with the proposed subdivision.

Staff Recommendation:

Staff recommended approval of the minor subdivision, with modifications as lined out in the staff report.

Commissioner Questions of Staff:

Howe asked if the applicants will be able to meet Old Town Overlay Zoning District side yard setbacks; **Brackett Hogstad** said yes.

Krantz asked questions regarding lot coverage, and whether or not it will be challenging to meet the lot coverage requirements especially if they intend to keep the existing garage. **Brackett Hogstad** brought up the site map and alleviated code concerns related to lot coverage, also noting that the existing garage has been there for many years. She noted that once landmarked, the applicants would be subject to the regulations specific to landmarked lots. She suggested that the commission may want to ask the applicant about their plans with the existing garage on Lot 2.

Applicant Presentation and Commissioner Questions of Applicant:

Susannah Pels, resident, spoke about the house at 301 Spruce St and its history in her family. Their goal was to keep it in the family and to build a modest house on the other half of the lot. Regarding a potential garage, she thinks that a garage would comply under the code for homes on the historic registry, but at the moment, they are not planning on building a garage. Peter Stewart, Project Representative and resident, reiterated that the lot coverage and floor area ratios standards are governed by the Old Town Overlay Zoning District and the landmark bonus regulations. He has gone through the calculations thoroughly with the owners and notes that the application complies with all relevant standards.

Krantz asked for clarification about code standards related to lot coverage. **Zuccaro** explains that the landmark bonus (of up to 40%) is a different subsection of 17.12.50. **Brauneis** asks about the average lot width of homes in the Old Town area (standard is 70'); **Brackett Hogstad** responds that most of them are around 50' as shown in the staff report. A lot of them are below 70'.

Public Comment:

Marilyn and Yvan Paitel, residents, are neighbors. Marilyn is sympathetic to the applicants due to the constraints of the Old Town Overlay Zoning District restrictions, but she thinks that a 16' difference is a significant deviation. She is worried that the setback deviation could lead to constraints that might impact the neighbors due to proximity to the alley. She is also worried about this decision and its potential cascading effect on future developments. Yvan Paitel is concerned about the effects of the application on the historical character of the neighborhood.

Applicant Response: Stewart addresses the Paitels' comments and argues that is not out of character with the neighborhood.

Commissioner Questions of Applicant:

None is heard.

Closing Statement by Staff:

Brackett Hogstad has no further comments.

Brauneis closes the public hearing.

Discussion by Commissioners:

City of Louisville

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Krantz loved the idea of preserving the historic home and liked the compromise struck by the applicant and the City. She acknowledged the public comments and asks staff to bring up the diagram of the site to alleviate concerns.

Baskett was not concerned with the width of the lot and expects that the applicant and architect will do something fitting with the neighborhood. She thinks infill housing development is needed and appropriate.

Moline echoes Baskett's comment, saying it is an opportunity to gain one housing unit. He is supportive of the application.

Howe both thinks it is beneficial to downtown and is sympathetic to the neighbors' concerns. Based on the site map, he thinks that it is reasonable given the layout of the adjacent homes as long as setbacks are conformed to. The property will be constrained by lot size so the new house will not be huge. He does not anticipate privacy being an issue. He is in support of the application.

Brauneis is in favor of the application and suggests that it is not all that inconsistent with the neighborhood. He thinks that the landmarking is significant.

Howe moved and **Moline** seconded a motion to approve Resolution 15, Series 2023. Motion passes unanimously by a roll call vote.

B. Louisville Municipal Code Amendment – Concept Plan Review Process –
Consideration of Resolution 16, Series 2023, amending Title 17 of the LMC
establishing a Concept Plan Review process the City of Louisville.

Applicant: City of Louisville

Case Planner: Rob Zuccaro, Community Development Director

Brauneis opened the public hearing. All notice was met as required and there is no commissioner conflict of interest.

Staff Presentation:

Zuccaro introduced the proposed code amendment, explaining that a concept plan review process is included on City Council work plan in 2023. He mentioned that one comment was received in the afternoon of this meeting. Zuccaro said that the idea is to add a new step prior to a receiving a full planning application, to provide the opportunity for an early review by City Council, so that the applicant can get clarity on City policies and receive direction from Council before making a full application. This is a way to identify areas of concern and interest, and it will not substitute for the development review process.

Zuccaro explained the intent is for this to be available to applicants of bigger, more complex projects, including General Development Plans, Planned Unit Developments, Special Review Uses, Comprehensive Plan Amendments specific to a certain property and Zoning Map Amendments specific to a certain property.

The idea is that this will be a 1–2-month process. Staff will not go into depth with code or policy compliance review with the Concept Plan. The applicant will provide preliminary information like project narrative, site data, etc. It would require public notice for the City Council meeting. City Council members would have an opportunity to give their preliminary comments and questions before the full application is heard.

Zuccaro thinks the process will be a benefit to both the applicant and Council. It will only be a hearing in front of the City Council (not Planning Commission), so as not to extend the process.

Staff Recommendation:

Staff recommended approval of the proposed code amendment.

Commissioner Questions of Staff:

Brauneis asked if this happens, would the Planning Commission be made aware of City Council discussions? Zuccaro says the idea is that the minutes would be available.

Baskett asked if there would be a video recording; Zuccaro said yes, and if the Planning Commission is interested in that, it could be included in the packet.

Moline asked why not require some kind of feedback from Council during concept review stage? Zuccaro said he does not want this review to be binding. He said other cities do not allow for a vote, so as not to pre-judge the application. It is just an opportunity for the City Council to provide individual comments.

Howe thought the code amendment is a good idea but asks if the process can be structured to ensure that the City Council's conversation is not binding. Zuccaro said it is an important point, will want to make sure that the City Council only weighs in on existing plans, policies, and ordinances and how the project might relate to those, conditions of surrounding properties, etc. Again, they should refrain from prejudging the application.

Howe asked how staff will ensure that applications are not prejudged; Zuccaro said the City Attorney will help explain guidelines and parameters and will help with redirection when needed.

Howe asked what some of the outcomes could be, for instance if the applicant might read into and use summary statements made by City Council. Zuccaro said that this is something to be aware of.

Moline asked why not reinstitute a sketch plan process with the Planning Commission. He worries that adding a City Council preliminary review could be interpreted as extending an already-lengthy process. Zuccaro explained that sketch plan and concept plan are the same concept, just at the City Council level. Zuccaro said staff could consider adding it at the Planning Commission level but thinks there is some value in going straight to City Council since they are deciding body. He noted that the cities of Boulder, Arvada and Broomfield all have a two-step process for concept plan review, Planning Commission and City Council.

Baskett asked about staff will be involved. Zuccaro explained the pre-app process with staff and affected agencies and describes how it is always possible to meet prior to the pre-app informally. During the concept plan process, staff will provide documentation like relevant code sections and policies but will conduct no in-depth analysis.

Baskett asked when the pre-app would happen in light of the concept plan process. Zuccaro says he can see it happen either before or after the staff pre-app. Also, there would be no requirement to have the concept plan review.

Krantz said it will add a burden on the City Council and staff, though it could be beneficial to the applicants to streamline the process. She questioned whether it will actually streamline the process. Zuccaro said the concept plan review process is intended to be streamlined, and theoretically it could make the Development Review process faster, but we do not know yet. Zuccaro said it might limit continuations, and back and forth between applicants and staff.

Krantz asked if staff considered making it required for certain types of applications. Zuccaro says staff spent significant time interviewing architects and developers, whose feedback was that they would prefer it not to be required as it might extend the timeline.

Howe asked when development proposals will have citizen outreach in light of the concept plan, and if Council members would be able to attend as citizens. Zuccaro said typically not, due to quasi-judicial restrictions.

Krantz asked how the staff feels about the change. Zuccaro says staff have been talking to the City Council about this concept for 4 or 5 years, and think it makes sense.

Brauneis asked staff for recommendations about how to add new public comments received into the public record for both Concept Plan and Dark Sky. Brackett Hogstad recommended that this is done with one motion to approve packet addenda 1-5.

Brauneis moves and **Howe** seconds a motion to enter addenda 1-5 into the public record.

Public Comment:

Sherry Sommer, resident, can see the reason for doing this but does not quite understand how this would achieve the goal. She wondered if it would be more relevant

to have a Planning Commission review rather than a City Council review, especially since the Planning Commission is more technical and able to take public comments. She is concerned that development could be persuaded. If the public does not give feedback at this point, she does not know how it would help. She cares about public input.

Josh Cooperman, resident, is very supportive in general. He thinks the concept plan would be best if feedback from the public is heard.

Stephanie Schlategger, non-resident, thinks this is a great concept. She mentions her experience with working with city staff. She thinks this will be very beneficial for developments both large and small. However, adding a month is difficult since time is of the essence. Finally, City Council input may be helpful to streamline projects.

Commissioner Questions of Applicant:

Brauneis asked for clarification on public comment availability, in light of comments made. Zuccaro says there would be an opportunity just like at Planning Commission public hearings.

Brauneis closed the public hearing.

Discussion by Commissioners:

Howe opened by mentioning that a summary might be too simplified, thinks minutes/video would be helpful. His biggest concern is that concept plan comments might overshadow or influence the quasi-judicial process. He expects that it might have some influence. Though he acknowledges that getting questions answered early would be good for streamlining projects.

Moline is generally in support of the proposal but is mixed about the value proposition. He cannot anticipate how much value it will provide, though he sees no real downsides.

Baskett thinks it is good that it is optional, thinks it is business friendly, and will be in support.

Krantz finds herself in support of the proposed amendment but shares Howe's concerns. She wants to make sure that nothing that City Council says at that stage will be binding. She thinks it might be good to have this be a requirement for very large projects, so that there is opportunity for community to provide comments to the developers.

Brauneis responded to Krantz saying that he does not think that it should be required. He thinks adding politics to development review is messy. It will provide an opportunity to air out issues early in the process.

Krantz asked if there is a way to make it a strong recommendation (in lieu of a requirement) for large projects, citing a recent project where there were misunderstandings between developers and Council.

Brauneis said it is hard to enforce a strong recommendation. **Howe** thinks it would be difficult to measure impact and thinks optional is good. **Baskett** would be concerned that if Planning Commission recommends mandating the concept plan, they could be perceived as putting more burden on the development, which she does not want. **Moline** would rather not see it being a requirement. **Krantz** agreed this makes sense.

Brauneis moved and **Howe** seconded a motion to approve Resolution 16, Series 2023. The motion passes unanimously by a roll call vote.

C. Louisville Municipal Code Amendment – Dark Sky Lighting Ordinance –
Consideration of Resolution 14, Series 2023, amending Title 17 of the LMC establishing a Concept Plan Review process the City of Louisville.

Applicant: City of Louisville

Case Planner: Amelia Brackett Hogstad, Planner

Brauneis opened the public hearing and noted that this was a continued item from last month's hearing. All notice was met as required and there is no commissioner conflict of interest. It is noted that **Moline** and **Krantz** were absent last time but have reviewed materials.

Staff Presentation:

Brackett Hogstad gave a presentation focusing on the updates to Option 2. Staff has come back with additional changes:

1. Change the definition of substantial addition to capture total square footage, not just footprint.
2. Revise the commercial and residential alteration threshold to 25% from 50%.
3. Revise the commercial addition trigger to 25% for site wide compliance.
4. Any residential additions would require site-wide compliance.

Brackett Hogstad stated that the reason for these updates was to try to achieve a balance between cost and impact and burden. Staff has asked the Building Permit team for data to inform triggers and based on the data pulled: there have been 155 residential additions and around 20 commercial additions from 2018 to today. Thus, revising the threshold from 50% to 25% will capture more properties.

Brackett Hogstad provided some information requested at the July 13 meeting by commissioners. An estimate for residential lighting upgrades is \$750-1,000, on the high end (assuming 3-4 lights). Also, 25% of residents may already comply with downlighting

regulations. A full retrofit of a commercial parking lot with up to 100 parking spots might be \$76,000. A full retrofit of 28,000 sf office building exterior lights along with a parking lot might be \$119,000. A smaller strip mall might cost \$8,000 for partial retrofit, not including labor cost. Brackett Hogstad also provided an estimated breakdown by lighting type: \$50/soffit, \$300/wall pack, \$770/parking lot fixture.

Brackett Hogstad discussed rebate options. She has spoken to PACE but did not hear back from Xcel. PACE rebates covered 50% of a \$16,000 project, and they cap rebates at \$20,000.

Brackett Hogstad described the compliance and education options that would go along with adopting Option 2 – mailers, store partnerships, programs, webpage, and verification of lighting for all permits. She mentioned that a lighting review is not currently required for residential permits, but a verification process on the permit could help capture more lighting. Finally, Brackett Hogstad mentioned that creating and enforcing a field compliance protocol would be difficult given the lack of comprehensive mechanisms for measuring compliance in the field.

Staff Recommendation:

Staff recommends Option 2, with changes presented today. Brackett Hogstad said that this would allow for some properties to come into compliance over time, and that it would be easier to administer and enforce. The proposed ordinance would be rolled out more slowly, is relatively straightforward, and is tied into the building permit review process. The option strikes a balance between potential cost and scale of development. Brackett Hogstad says that all options will require new processes; though Option 2 would be easier to enforce. Residents will need education no matter the option. Regarding Option 3, Brackett Hogstad said that this does not capture community feedback.

Commissioner Questions of Staff:

Krantz asked for clarification about requirements and the use of deadlines; Brackett Hogstad does not think a deadline for compliance will solve the problem of uptake based on her review of other jurisdictions' use of amortization.

Howe asked if staff estimated the cost for the city to become compliant. Brackett Hogstad responded that the City would need an outside consultant to create a specific estimate for lighting on City properties. She has spoken with Facilities staff and thinks there are quite a few lights already in compliance.

Krantz asked if streetlights are compliant except for spacing and pole height. Brackett Hogstad does not know if they are compliant for this exact code and reminds the

Planning Commission that streetlights do not need to comply with the proposed regulations.

Krantz asked about the cost of the ballfield retrofit for lighting. Zuccaro says \$250,000 and this includes lights and lighting systems.

Baskett recalled the original options and wonders where the other cities fell in relation to our proposal. Brackett Hogstad says that other jurisdictions mostly employ use changes, or development type as their compliance trigger.

Howe asked for clarity on the downtown exemption. Brackett Hogstad says the downtown area is subject to brightness and color regulations and has tighter restrictions on brightness but is exempt from trespass requirements. Brackett Hogstad mentions it is difficult to identify the offending light in an area like downtown. The lower lumen max is intended to help address the lack of trespass regulation.

Baskett is more comfortable with the downtown exemption with more understanding.

Public Comment:

Cindy Bedell, resident, commented that the Option 2 changes are a step in the right direction, yet still thinks that there should be a requirement for existing homes. Residential light trespass should be included in her opinion. Some of the new homes south of Harper Lake have egregious lighting. Some modifications could be very simple, motion detectors next to homes only and not on backlots, no use of flood lights overnight. She thinks education will be important. She encourages the city to investigate providing discounts and samples at local hardware stores.

Josh Cooperman, resident, is strong supporter of Dark Sky. He appreciates the work staff has put into this. Responding to other public comments, he thinks that security concerns are valid, but that has nothing to do with Dark Sky compliance. He thinks the Ordinance will have little impact due to overall sky glow from surrounding communities, but that it is still worthwhile. He thinks Louisville could set a positive example and that creative ideas could be used. He makes one more plug for correlated color temperature of the lighting. He mentions that Dark Sky International certifies lights up to 3,000 kelvins. Dark Sky International would prefer under 2,200, but it is difficult to find such lighting. He thinks 2,700 kelvins would be a good maximum, with a waiver option up to 3,000K, as a standard of 3,000K does not accomplish enough. Finally, regarding compliance, the original intention at City Council was to pursue amortization on a timeline of less than 10 years. That said, the Ordinance should reflect the community's desires. He still prefers amortization because it is more stringent, but he supports Option 2 as well.

John Webb, resident, spoke on behalf of the Bee City Committee and the insects. He read a memo about the role night flyers play in pollination. Worldwide insect population

and species diversity is threatened. Nighttime outdoor lighting only increases threats to insects.

Sherry Sommer, resident, advocated for better compliance choices, not just amortization versus new construction only. At the last meeting, less expensive options for compliance were brought up, especially by Commissioner Choi. Motion sensors and timers can be a good idea. She discusses other ways to make property safer, for instance not having bushes next to doors. Overall, it would be a win if more people added sensors and timers.

Cathern Smith, resident, thanked the staff and Commission for their efforts. She advocates for the darkest possible skies. She wondered if the Ordinance is merely symbolic and not substantive. She is curious about cost estimates: at Home Depot it costs under \$30 for a solar-powered light. Hardwired lights on Amazon range from \$30-\$130. So, it is not very expensive for residents to upgrade, and for those who are cost-burdened, perhaps the City can support subsidies and tax incentives to support people with financial constraints come up to code. Circadian rhythms and sunlight are very important to humans, animals, and plants. Health effects could include heart disease and diabetes. Anything we can do to incrementally reduce the impact of humans on the environment is important. Regarding enforcement, the Ordinance does not have to be 100% enforceable to be useful. She suggests that staff look to ways to make it more fun.

M. Christiansen, resident, spoke through a sign language interpreter. She appreciated Commissioner Howe's comments at the last meeting. She prefers Option 1, although it does seem punitive. She thinks a longer time frame for amortization strategy would be good. She encourages the City to work with the small business community to help them implement lighting solutions and strategies to put safety first. She says that looking at the specifics of the building and the lighting location (e.g., under the eaves or not) is important. She wishes to see more compliance over time. She thinks safety is of upmost concern for parking lots and wonders if requiring Dark Sky compliance is perhaps a little punitive. She suggests finding ways to reduce the burden on businesses. As far as 25% improvement on property or lot is concerned, she thinks that there should be an option for homeowners and businesses to sit down with City staff to discuss a lighting plan, when they are formulating their building plans. She thinks the City should partner more heavily with Xcel, and look to other municipalities' experiences with working with Xcel.

Commissioner Final Questions of Staff:

Howe asked about the public comment on incentives. Did PACE and Xcel summarize everything? Brackett Hogstad says yes.

Krantz asked if the ordinance needs to cover incentives; Brackett Hogstad says she would not recommend putting specifics regarding incentives into the proposed ordinance.

Krantz showed a sample DIY shield to put over other lights, without any rewiring. Especially when used with smaller bulbs, this might be a helpful DIY solution.

Closing Comment from Staff:

Brackett Hogstad thanked the community for coming out and providing comments. Staff have thought about and integrated the feedback. She notes that motion sensing and dimming lights are not recommended by the Police Department. On-off lighting destroys night vision and people can hide in the shadows surrounding a motion-sensing light. Brackett Hogstad said that staff had heard requests previously to look at regulating lighting by specific property or by low-hanging fruit but that those concepts run into issues with equity, fairness, and legal ability to enforce. She mentioned Commissioner Krantz's DIY shield device would not work for every light, and that LED packs upgrades are hard to do without replacing the whole fixture. These issues mean that people in the same situation compliance-wise may have very different costs to bear. She reiterates that all costs are estimates.

Howe moves and **Baskett** seconds to put Commissioner Krantz's DIY shield into the public record. The motion passes unanimously by voice vote.

Brauneis closed the public hearing.

Discussion by Commissioners:

Howe thinks that with the changes to 25%, Option 2 is appropriate. He thinks amortization gets convoluted, so Option 2 is better. Balancing cost and value will be important. **Howe** is sympathetic to concerns about safety and wonders how this will impact the safety of some of these commercial buildings. He says if we do this well we can be a role model for other communities.

Moline said he is generally in support of this as well. He appreciates the time and efforts made by the community. He says outreach has been strong. One of the things Moline feels strongly about is right sizing the regulations and he thinks the current regulations strike the right balance. He wonders if artificial intelligence can help us in the future to minimize lighting impacts.

Baskett is in strong support of a Dark Sky ordinance. She notes that presentation slides need updating. She is concerned about the burden on business of the 25% threshold, after interviewing community members.

Howe asked what she might recommend. **Baskett** suggests a percentage greater than 25% and less than 50%, maybe 30%. More discussion ensued about thresholds.

Brauneis wonders if lighting could make alterations cost prohibitive.

Krantz suggested 25% does not and notes that PACE discounts are significant. She is in favor of the code amendment.

Moline asked if a waiver request is available, other Commissioners say yes.

Brauneis asks **Baskett** if a waiver would address her concerns. She said a waiver allows for flexibility but creates more ambiguity for staff to work through.

Howe asks if the Dark Sky ordinance disincentivizes commercial renovations.

Brauneis asks for closing thoughts.

Krantz wanted to see this happen in a faster timeframe for residential.

Brauneis is excited by this, and it is a good first step. He suggests that the Commission remember what “Dark Sky” entails; safe lighting will always be necessary, and it is also not the goal to set lighting curfews. He is comfortable with the ordinance as currently proposed and is encouraged by the availability of the waiver allowance.

Krantz mentioned one more change she would like is for the exception for string/party lights to be omitted. She mentioned that there are adapters to make them less bright. Commissioners discussed where that change might be needed in the proposed ordinance.

Brackett Hogstad said string lighting is not fully accepted. Such lights (up to a certain lumen limited as defined in the report) would be subject to a curfew of 11pm and are only permitted around human activity areas.

Brauneis is comfortable with it as written, especially given the 11pm curfew and only human activity area.

Moline moved and **Howe** seconded a motion to approve Resolution 14, Series 2023 Option 2 as presented on August 10, 2023. The motion passed unanimously.

Commissioner Comments

Chair Brauneis recognizes Jeff Hirt, new Planning Manager, and recognizes the sign language interpretation, which is a first for the Commission.

Staff Comments

The next meeting will be on September 14. No other comments.

Items Tentatively Scheduled for the Meeting on September 14, 2023

- TBD

Adjourn

City of Louisville

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Howe moved and **Moline** seconded a motion to adjourn. Motion passes unanimously by a voice vote. Meeting adjourned at 9:17 PM.

ITEM: PUPL-000427-2022, East Street Village Preliminary Subdivision Plat and Preliminary Planned Unit Development

PLANNER: Ellie Hassan, Planner II

REPRESENTATIVE: Paul Norquist, Design Practice Inc.

EXISTING ZONING: Residential Medium Density (R-M)

LOCATION: 565, 533, and 421 East St

TOTAL SITE AREA: 3.6 Acres (160,736 SF)

REQUEST: Approval of Resolution No. 17, Series 2023, recommending approval of a preliminary subdivision plat and planned unit development (PUD) for 15 single family and 21 townhome units on a 3.6-acre parcel.

VICINITY MAP:



SUMMARY:

The applicant, Design Practice INC, representing East Street, LLC, requests approval of a preliminary planned unit development (PUD) and preliminary subdivision plat to create 36 residential lots. The lots will contain a mix of 15 single-family detached units and 21 townhomes with vehicular access off a private road. The residential-medium density (R-M) zoning district allows the proposed use. The applicant is requesting waivers for the yard and bulk standards as well as subdivision modifications.

BACKGROUND:

The properties are accessed along East Street. They are bound to the north by the Pine Street Plaza commercial area, zoned commercial community (C-C), to the west by the BNSF railroad right-of-way, and to the south by single-family detached homes which are zoned residential medium-density (R-M).

The subject properties are not platted and contain 10 single-family detached units with accessory structures originally built or relocated to the site between the 1900's and the 1960's. The City's Historic Preservation Commission approved the demolition of all structures at 421 East St on July 17, 2023 and 533 East St on July 24, 2023.

This item was presented at the September 14, 2023 Planning Commission meeting and continued to the October 12, 2023 in order to allow time for commissioner discussion. All other sections of this report are unchanged.

PROPOSALS:**Preliminary Subdivision Plat Proposal**

The applicants propose to create a subdivision of 36 lots and 8 outlots (Outlots A-H). The lots range from 1,805 square-feet to 3,698 square-feet. The outlots total 1.35 acres and are established for private roads and alleyways, parking, common open space, utilities, and drainage. They will be maintained by an HOA and owned by East St, LLC. The maintenance and improvement agreements for such areas would be part of the final plat approval process.

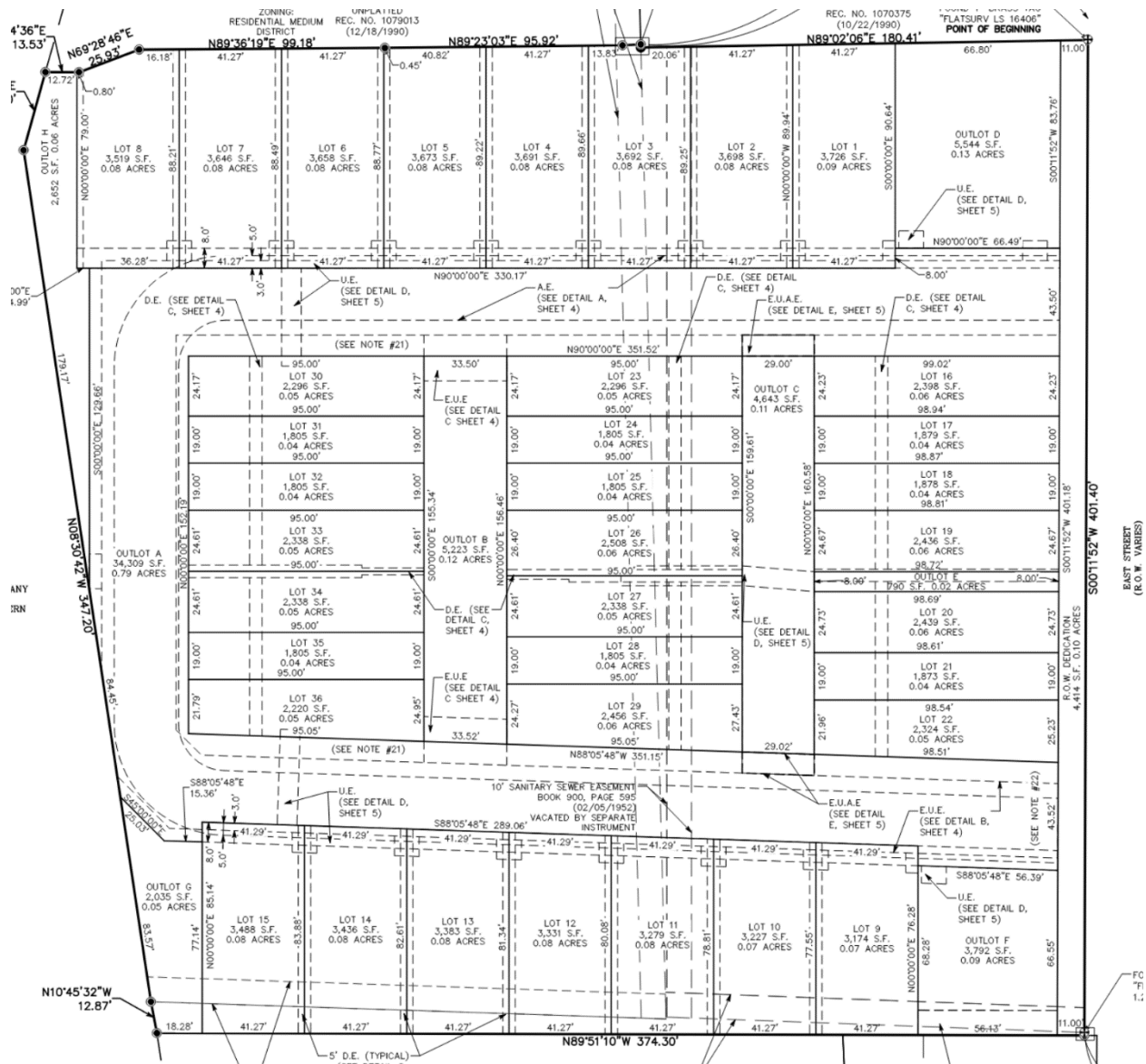


Figure 1 East Street Village Preliminary Plat

The easternmost side of the plat has a 4,414 square-foot (0.1 acre) right-of-way dedication adjacent to East Street. The 15% public land dedication required under The Louisville Municipal Code (LMC) Sec.16.16.060 is proposed as fee-in-lieu per Subsection B2.

There is a 10-foot sanitary sewer easement for the Louisville Sanitation District near the western boundary of the 421 East St parcel. The City is a successor to this easement, and it will require an easement vacation through an ordinance either concurrently or prior to approval of a final plat.

Drainage, access, and utility easements are proposed in Outlot A and C, as well as the front and rear of the single-family lots. Details of the proposed easements can be found on sheets 4 and 5 of the preliminary plat (attachment 2).

The preliminary plat complies with all design standards in the LMC Ch. 16.16, except as noted in the table below. The applicant requests the following subdivision modifications as part of this plat in order to accommodate the proposed residential units:

Table 1: Subdivision Modifications Requested		
<u>Requirement</u>	<u>Subdivision Standard</u>	<u>Requested Value</u>
Block length Sec. 16.16.040(B)	400 ft. between street intersections	193 ft.
Lot Depth Sec. 16.16.050(C)	Depth of residential lots shall not exceed 2.5 times the width (2.5:1)	Up to 5.2:1
Lot Frontage Sec. 16.16.050(D)	50 ft. front lot line	19 ft.

Preliminary Planned Unit Development (PUD) Proposal

The preliminary PUD proposes a mix of 15 single-family detached units and 21 townhome units, totaling 36 residential dwelling units. The single-family homes are located on the south and north edges of the property with the townhome units in the middle. All units have a fenced-in private yard space. An additional 6 ft. cedar perimeter fence helps visually buffer the property from the railroad to the west and the commercial development to the north at Pine Street Plaza. A 26 ft. wide private street creates a “U” shape around the site and connects with East St on either end. Ten head-in parking spaces and 14 parallel parking spaces are provided along the private drive at various intervals through the site. Each unit contains either an attached or detached garage with an additional 2 parking spaces. A 23 ft. wide alleyway on Outlot C connects to the private drive and provides access to the alley-loaded garages on 12 of the townhomes.

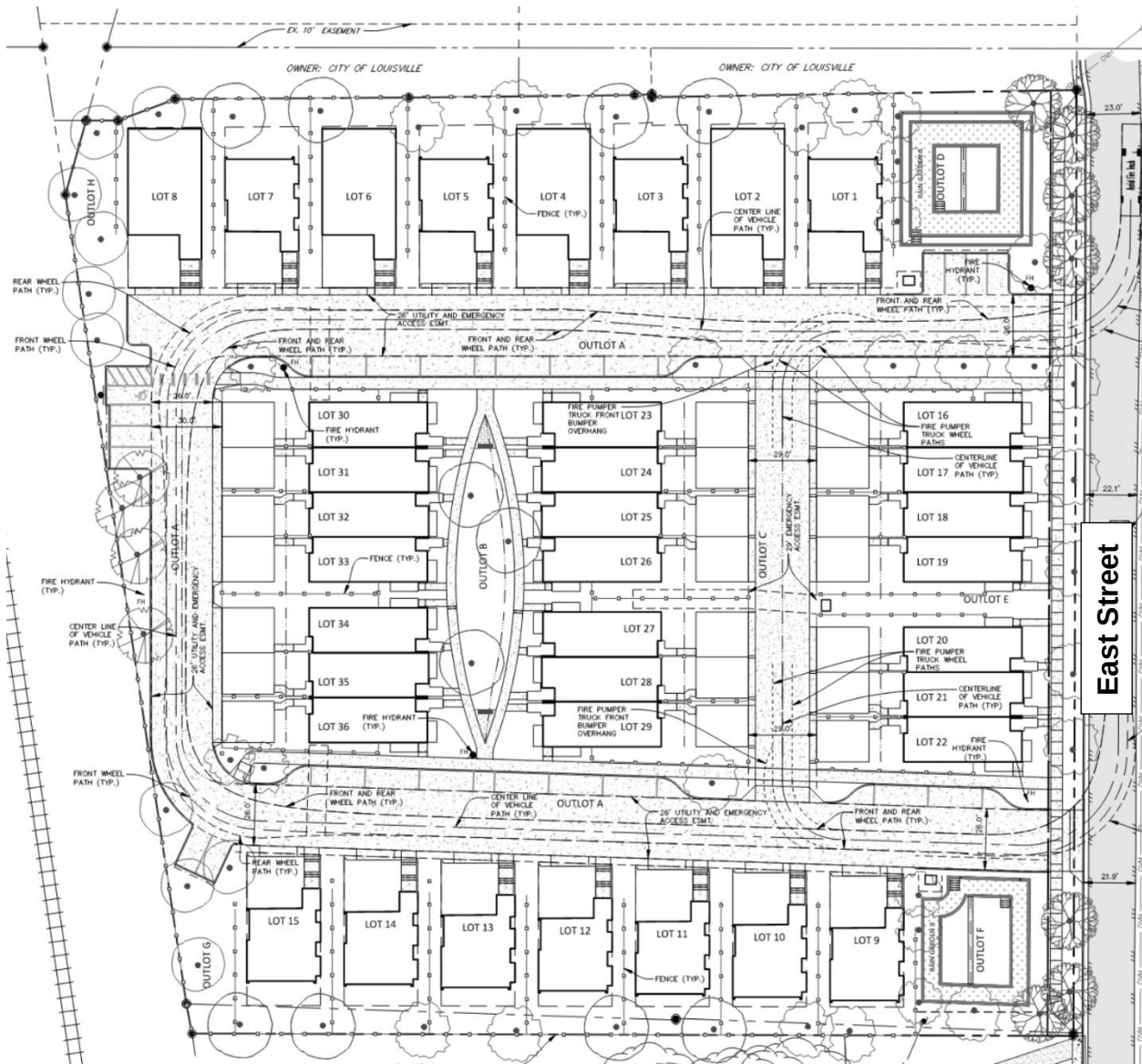


Figure 2 Site Plan of East Street Village

A 5,223 square-foot common open space area is provided on Outlot B, and 12 of the townhomes have front yards that abut this space.

A 5 ft. wide sidewalk is provided along both sides of the private drive and connects to the sidewalk along East St and the common open space area in Outlot B.

Landscaping provides various shrubs, grasses, perennials, and trees in common areas and in the unfenced front yards of the residential units. A variety of trees and rock mulch is provided in private yard spaces. The site is surrounded by a 6 ft. tall privacy fence, which is located along the west, south, and north perimeter, and each lot will have fencing around the private yards.

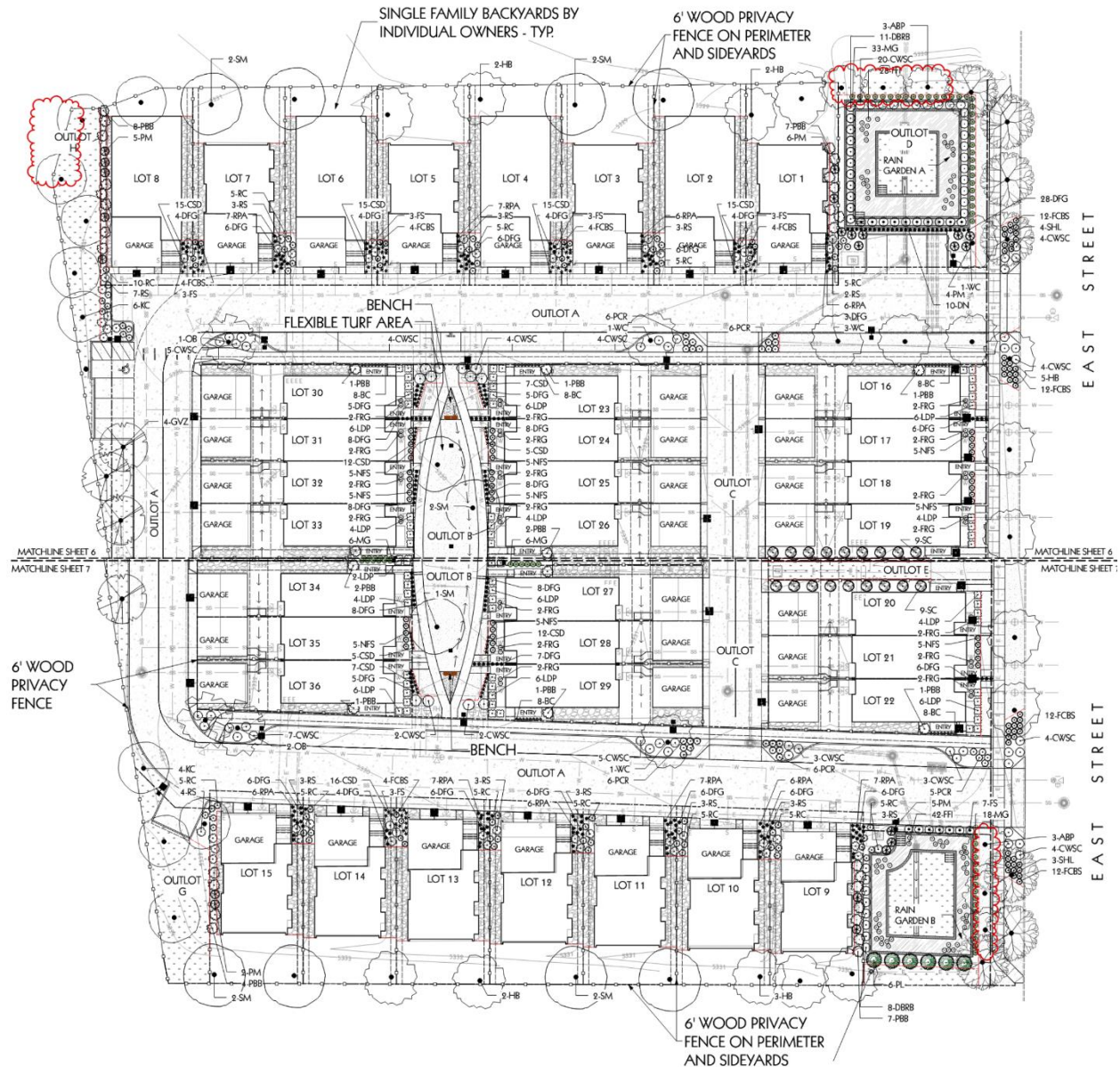


Figure 3 East Street Village Landscape Plan

Outlots D and F on the northeast and southeastern corners of the site contain drainage detention ponds with rain gardens and terraced 1-4 ft. tall retaining walls. The two upper terraces have a variety of shrubs, ending in a bottom layer of low grow and rain garden seed mix.

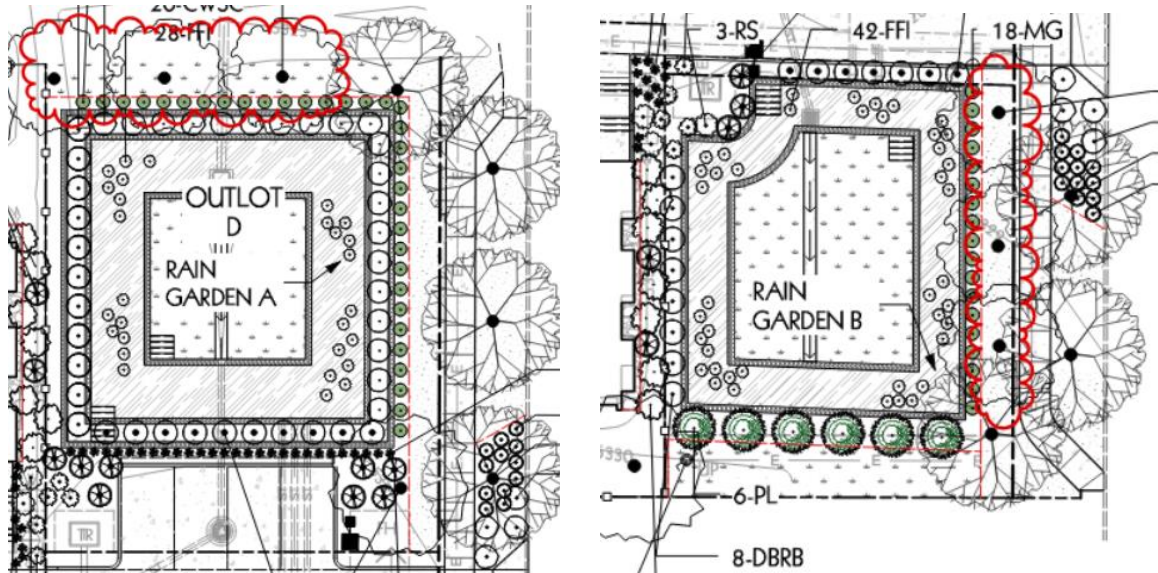


Figure 4 Rain Gardens in Outlot D (left) and Outlot F (right)

Lots 1-15 include single-family detached homes with two proposed home models. The “Type 1” models have a 1,500 square-foot footprint and 3,366 square-feet of total livable space over two stories and a basement. Three material palettes are proposed and detailed in sheet 14 of the PUD Exhibit (attachment 4). Materials include a wood and cementitious shingle, cementitious siding, vertical or horizontal wood-textured steel plank siding, standing seam metal roofs, and black trimmed windows and garage doors. This model is proposed on lots 1, 3, 5, 7, and 9-15. The maximum height proposed for this model is 34 ft. 1 5/8 inches.

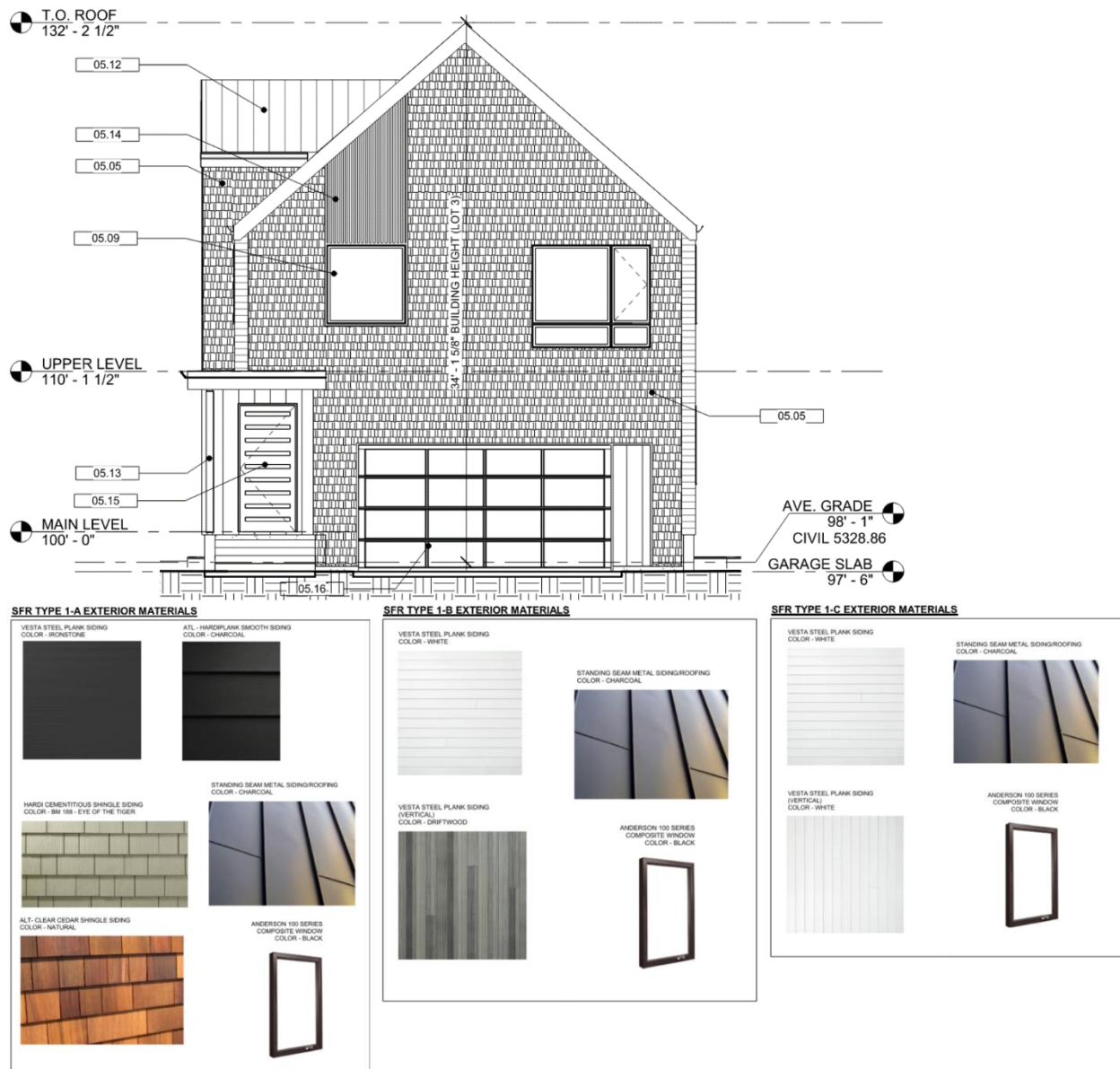


Figure 5 Single-Family Detached Type 1 elevation with materials

The “Type 2” single-family detached model has a 1,978 square-foot footprint and 3,825 square-feet of total livable space over two stories and a basement. Materials include cedar, steel plank, and cementitious siding, standing seam metal roofs, and black trimmed windows and garage doors. The models are proposed on lots 2, 4, 6, and 8. The maximum height proposed is 28 ft. 11 7/8 inches.

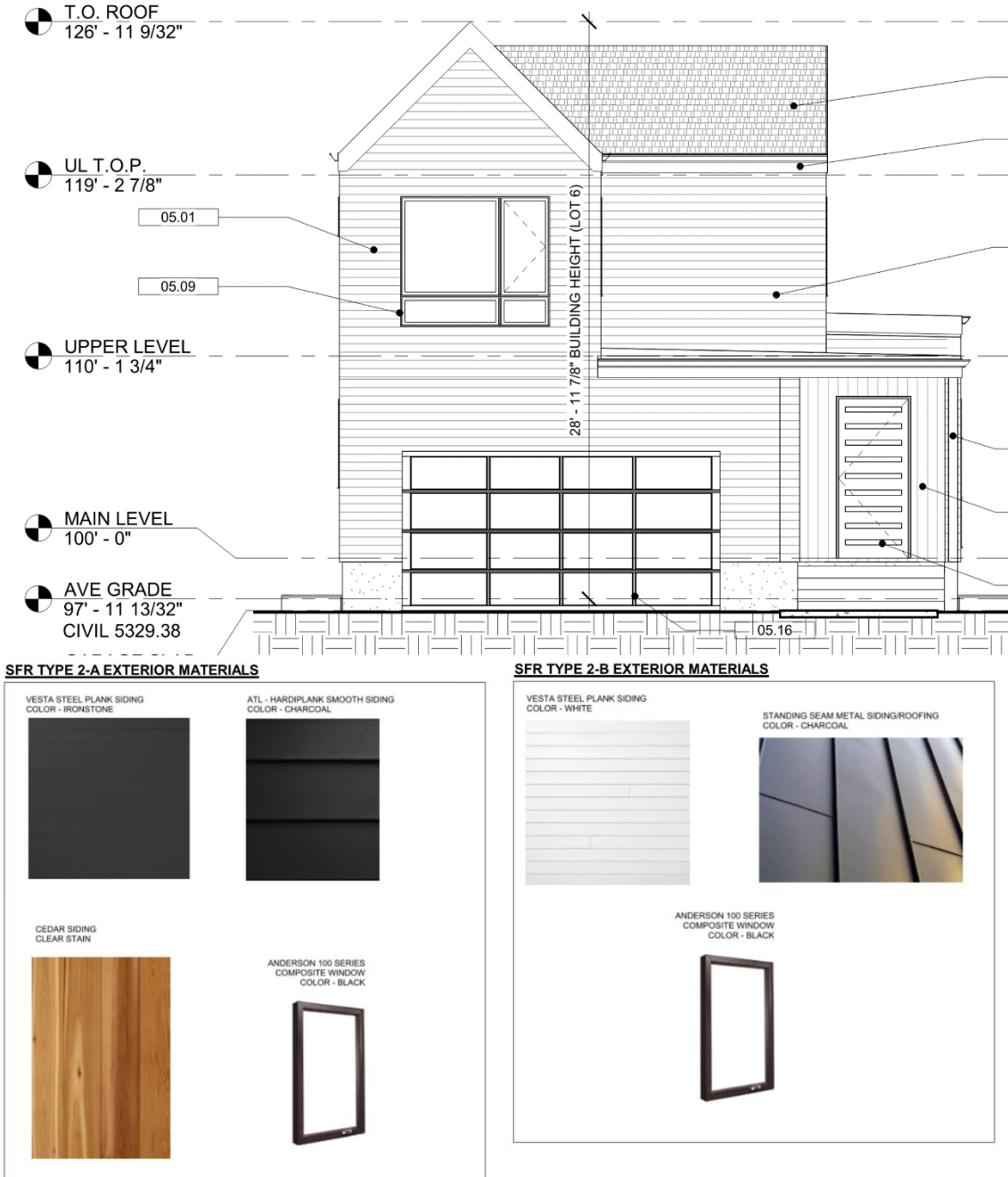


Figure 6 Single-Family Detached Type 2 elevation and materials

The townhomes are alley-loaded with detached garages that connect to the private drive and alleyway. The townhomes are a mix of triplex and quadplex units, with an end unit “Type A” design and interior unit “Type B” design. The units are three stories with a garden level basement space and rooftop decks. Type A units have a relatively simple form with a gable roof. Type B units are also simple forms with a flat roof. The massing has recessed portions above the entry and in the rear to break up the form. Garages are also simple forms with flat roofs and parapets. Materials include cedar, steel plank, and cementitious siding, standing seam metal roofs, and black trimmed windows and garage doors. Type A units are up to 38 ft. 7 3/8 inches in tall and Type B units are up to 35 ft. 10 3/8 inches tall. Both unit types require height waivers.



Figure 7 Townhome unit types A (sides) and type B (middle) elevation with materials

The photometric plan on the site shows brighter footcandles along the drive aisles, common open space, and residential entries. All fixtures will be full cut-off and 3000K temperature. These specifications meet the pending Dark Sky Ordinance being considered by City Council at the time of this report. Staff will re-evaluate conformance with the adopted ordinance at final PUD.

A traffic impact study was submitted for the development. A 2025 traffic conditions table shows that, at full expected buildout, the intersections near the development will maintain a level of service of C or better.

Year 2025 Traffic Conditions

Intersection	Control	Background		Total - Scenario 1		Total - Scenario 2	
		Morning	Evening	Morning	Evening	Morning	Evening
1 - SH 42 / Pine Street	Signalized	B	C	B	C	B	C
2 - SH 42 / 96th Street / Lock Street	Signalized	C	C	C	C	C	C
3 - Pine Street / East Street	Side-Street Stop	B	B	B	B	B	B
4 - East Street / North Access	Side-Street Stop	—		A	A	A	A
5 - East Street / South Access	Side-Street Stop	—		A	A	A	A

Overall, the report found that the proposed units in East Street Village will have minimal impact to the nearby intersections. The full report is included as attachment 5.

The applicants are proposing waivers to the yard and bulk requirements in the Residential-Medium Density zone district. A full list of requested waivers is in the analysis section of this report.

ANALYSIS:

Preliminary Plat

Section 16.12.075 of the LMC establishes the following criteria for consideration of final plats by Planning Commission and City Council:

- Whether the plat conforms to all of the requirements of Title 16 (Subdivisions);*
 - The applicant requests three modifications from Title 16 that staff are recommending approval of. An analysis of the modification criteria are provided below. The plat conforms to all other requirements of Title 16.
- Whether approval of the plat will be consistent with the city's comprehensive plan, applicable zoning requirements, and other applicable federal, state and city laws;*
 - The application is consistent with the City's Comprehensive Plan. The area lies within an urban neighborhood designation in the plan, which is characterized by smaller blocks, smaller parcels, and lots with a street orientation. The plat provides a design that supports this urban development pattern.

3. *Whether the proposed subdivision will promote the purposes set forth in Section 16.04.020 of this Code and comply with the standards set forth in Chapter 16.16 of this Code and this title.*

- Staff finds the proposal promotes the purposes set forth in the LMC, including the assurance that public services are available, that character and economic stability of the city is protected, that there is safe and efficient circulation of traffic, and that the plat provides appropriate regulation of the use of land in the city. The private road provides access to the residential lots for pedestrians and vehicular traffic. Easements will be established for utility service, and the site was reviewed for emergency access by the Fire Protection District. The plat allows for a residential land use and meets permitted densities for the net site area.

In granting a modification of a subdivision plat processed concurrently with a planned unit development, the following requirements must be satisfied per LMC Sec. 16.24.030.B (modifications for subdivisions process concurrently with a PUD):

1. *The modification, if granted, will not alter the essential character of the neighborhood or district in which the property is located, nor substantially or permanently impair the appropriate use or development of adjacent property;*

- The modifications result in a development with similar street patterns and lot shapes to nearby residential developments along East Street. The modifications would allow for narrower, deeper lots, which mimic development patterns in the surrounding area. The reduced distance between street intersections allows for greater site circulation by creating a private drive to loop through the site and matches the existing character of the surrounding area. East Street is a frontage road and other existing developments along this road have intersections closer than 400 ft. from one another. Staff finds this criteria is satisfied.

2. *The modification is necessary to meet the purposes set forth in section 17.28.010 (purpose statement for PUDs);*

- The modifications help provide a greater variety and choice of design for urban living. The narrow, deep lots provide a mix of housing types that would otherwise not be possible at the proposed density. Larger lots would likely need a cul-de-sac or similar turnaround design or fewer overall lots, resulting in less density than is currently proposed. The modifications provide flexibility over conventional land-control regulations by allowing smaller lots that provide a more contemporary housing product. Staff finds this criteria is satisfied.

3. *The modification is warranted by the design and amenities incorporated in the development plan, and the needs of residents for usable or functional open space and buffer areas can be met;*

- The modifications are warranted by the narrow, tall designs of the proposed housing units. This design allows for functional open space with private yards and common private green space for residents. Staff finds this criteria is satisfied.
4. *There are no reasonable design alternatives that would remove the need for the requested modification or would reduce the amount of the modification required;*
- The intersection distance reduction is needed to create site circulation with the proposed lot configurations. Alternatives would result in a single entry drive for the site, which creates greater congestion and would severely alter the site layout. The narrow, deep lots are necessary to provide the proposed residential units. Fewer units would be able to be constructed if standard lot depth and frontages are applied, which contradicts the R-M zoning's density allowance for the site. Staff finds this criteria is satisfied.
5. *No additional dwelling units shall result from approval of the modification beyond what the underlying zoning would otherwise allow;*
- The proposal results in 36 dwelling units, which is less than the maximum 37 dwelling unit allowance for the net lot area in the R-M zone district. Staff finds this criteria is satisfied.

The applicant is requesting a fee-in-lieu for the required 15% public use land dedication in Section 16.16.060 of the LMC. Staff recommends approval of this option due to the overall size of the development, and the proximity of existing parks and public uses relative to the site. Each residential lot contains a private yard space and Outlot B functions as a common open space area for residents. The site has several parks and trails in a 1-mile distance such as Miner's Field, Memory Square Park, the Coal Creek Trail network, and Louisville Community Park. The site is also within a quarter mile of Downtown Louisville, which provides walkable amenities for residents.

Preliminary Planned Unit Development

The site design is regulated by Chapter 17.28 of the LMC, the yard and bulk requirements in the Residential-Medium Density zone district, and the 2013 Comprehensive Plan.

Inclusionary Housing

The applicant is proposing the fee in lieu option to satisfy requirements in the Inclusionary Housing chapter of the Municipal Code. The fee amount is calculated through Section 17.76.050(B) and will be paid for each market-rate unit as a prerequisite to receive each unit's building permit. City Council approval is required to utilize the fee in lieu option in accordance with LMC Sec. 17.76.050(H).

Staff recommends approval of the fee in lieu option for this development. The project provides a variety of housing types, including townhome units and mid-sized single family detached units that are more attainable than typical single-family detached housing. The City can leverage the fees through other funding sources and partnerships

to achieve more affordable units in an off site development compared to constructing affordable units on site.

2013 Comprehensive Plan

The subject property has an “Urban” designation in the Comprehensive Plan’s future land use framework (p. 24) and is consistent with several Plan policies. Specifically, the proposal fits many characteristics of the Plan’s urban pattern areas (p. 19) through alley/rear loaded properties, smaller blocks/parcels, street oriented buildings, and formal landscaping. The proposal also fits the neighborhood development type, which includes a range of densities up to multi-family communities, adjacent public spaces, and well defined edges through fencing and building layout/ architectural style (p. 22).

The proposal is consistent with policies in the Comprehensive Plan’s Neighborhoods and Housing framework, including:

- PRINCIPLE NH-4. The character and identity of existing residential neighborhoods should be maintained while allowing for evolution and reinvestment (p. 38)
- PRINCIPLE NH-5. There should be a mix of housing types and pricing to meet changing economic, social, and multi-generational needs of those who reside, and would like to reside, in Louisville. (p. 38)

The proposal is consistent with the policies in the Neighborhoods and Housing framework because:

- It is compatible with existing residential developments such as Clementine Commons and Sunnyside Place;
- The housing is less than a quarter mile distance to downtown, making it walkable for most residents. The resulting customer base supports vibrant retail and commercial centers downtown that serves local residents;
- The proposed housing ensures a variety of housing types to meet changing social needs of current and future residents; and
- The housing would meet the needs of multiple types of residents by providing a variety of floor plans for different needs.

PUD Waiver Compliance with LMC Sec. 17.28.110

LMC Section 17.28.110 sets forth the PUD waiver process and criteria. The applicant requests zoning waivers from the Residential Medium (R-M) zoning requirements as set forth below. All lots require waivers from the minimum lot area, lot coverage, front setbacks, and side interior setbacks. Certain lots meet rear setback and height requirements. The exact setbacks of each lot can be found on Sheet EX-17 of the exhibit in attachment 4. Specific lots requiring height waivers are listed in table 3 below.

Table 2: PUD Waivers Requested		
<u>Yard/Bulk Requirement</u> <u>(Sec. 17.12.040)</u>	<u>R-M Standard</u>	<u>Requested Value</u>
Minimum Lot Area	7,000 sq. ft.	Min. 1,805 sq. ft.
Lot Coverage	35% per lot	Up to 73.5% per lot
Front Yard Setback	25 ft.	Min. 7 ft. 4 in.
Side Interior Setback	7ft	0 ft.
Rear Setback	25 ft.	0ft.
Structure Height	35 ft.	Up to 39 ft. 1/8 in

Table 3: Height Waivers Requested

HEIGHT WAIVER REQUESTS BY LOT (ABOVE 35' ALLOWABLE)

LOT #	WAIVER REQUEST	LOT #	WAIVER REQUEST	LOT #	WAIVER REQUEST
16	3'-5 3/4"	23	3'-2 3/4"	30	3'-7 3/8"
17	0'-8 5/8"	24	0'-5 5/8"	31	0'-10 1/8"
18	0'-8 5/8"	25	0'-5 5/8"	32	0'-10 1/8"
19	3'-5 3/4"	26	3'-2 3/4"	33	3'-7 3/8"
20	2'-11 1/2"	27	4'-0 1/8"	34	4'-0 1/8"
21	0'-2 3/8"	28	1'-3"	35	1'-3"
22	2'-11 1/2"	29	4'-0 1/8"	36	4'-0 1/8"

The elevations for the tallest units is shown below. The height waiver allows a gabled roof style that is consistent with Clementine Commons and Sunnyside Place and staff support the height waiver.



Figure 9 An elevation of several units with proposed height waivers. The dashed line shows the 35 ft. height limit in the R-M district. Lot 29 has the tallest proposed height.



Figure 8 Sunnyside Place residential units contain a similar gabled roof form



Figure 10 Clementine commons has a similar height waiver for the gabled roof forms on 3-story townhome units

A strict adherence to the R-M yard and bulk standards would limit the amount of development on the site and result in larger and fewer residential units on the site. The zone district allows for one unit per 3,500 square-feet of net lot area, equating to 37 units by-right. This configuration is not possible without waivers for smaller lots with reduced setbacks, unless other compromises were made that would result in a site design with less common area and private yard space, or reduced circulation.

Compliance with 17.28.120 – Criteria for Development Plan

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. Overall, staff finds that the development meets the PUD criteria. The residential uses are appropriate for the R-M zoning and provides diversity of housing types that are architecturally compatible with other residential areas along East Street. The site design has a private road and 5-foot wide sidewalk network that provides access to the residential lots for pedestrians and vehicles. The buildings are sited to provide seven street-oriented townhomes and visual relief through the building spacing and landscaped outlots. Water-efficient landscaping and fencing provides privacy and screening from adjacent sites such as the BNSF railroad to the west.

Full analysis and staff's recommended finding of each criterion is provided in the Appendix at the end of the report.

PUBLIC COMMENTS:

Public comment received to date are included as an attachment.

STAFF RECOMMENDATION:

Staff recommends approval of Resolution No. 17, Series 2023 recommending approval of a preliminary subdivision plat and preliminary planned unit development (PUD) for 15 single family and 21 townhome units on a 3.6 acre parcel located at 421, 533, and 565 East Street.

ATTACHMENTS:

1. Resolution No. 17, Series 2023
2. Proposed Preliminary Plat
3. Proposed Preliminary PUD
4. Application Materials
5. Traffic Impact Study
6. Public Comments

APPENDIX: PUD Criteria Analysis – East St Village

Criteria 17.28.120 (A)	Finding	Narrative
1. An appropriate relationship to the surrounding area.	Compliant	The uses are appropriate for the area and permitted in the R-M zone district. The site design is consistent with the context of the surrounding neighborhoods along East St.
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. Sidewalks are provided parallel to the main private drive and parking spaces are located to have adequate visibility when maneuvering in and out of spaces.
3. Consideration and provision for low and moderate-income housing	Compliant	The project provides more diversity of housing types that contribute to housing options for the City and neighborhood. A fee in lieu is proposed in order to help construct affordable housing off-site
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	There are no significant natural features that staff found needed to be preserved.
5. Variety in terms of housing types, densities, facilities and open space	Compliant	The project provides a variety of housing in the through the construction of 3-bedroom townhomes and 3 to 4 bedroom detached single-family homes.

Criteria 17.28.120 (A)	Finding	Narrative
6. Privacy in terms of the needs of individuals, families and neighbors	Compliant	A 6-foot privacy fence will be constructed along the perimeter of the site, which provides privacy for residents and neighboring properties. Trees are proposed in the rear yards of the single-family homes, providing additional screening. The rooftop decks are oriented east-west and are screened between townhome units through pergola designs and parapets. The rooftop decks are adequately spaced from adjacent buildings.
7. Pedestrian and bicycle traffic in terms of safety, separation, convenience, access points of destination and attractiveness	Compliant	The project proposes internal walkways for pedestrians and bikes and has access to on site amenities such as the common open space in Outlot B. The sidewalks connect to East St and provide access to downtown, City parks, and trails.
8. Building types in terms of appropriateness to density, site relationship and bulk	Compliant	Proposed housing meets the allowed density for R-M zoned properties. The housing units vary in size and larger units are proposed towards the middle of the site with less bulk facing out to adjacent properties on the edges.
9. Building design in terms of orientation, spacing, materials, color, texture, storage, signs and lighting	Compliant	Buildings are oriented towards the street and townhomes are alley-loaded with entrances facing pedestrian areas. Materials are compatible with neighboring properties through horizontal siding and similar high-sloped gabled roof forms. Houses are adequately spaced for each housing type, with zero-lot lines on townhome sides and rear alley-facing garages. Lighting is shielded and a lower light temperature.

Criteria 17.28.120 (A)	Finding	Narrative
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	Proposed trees help screen the single-family homes from adjacent properties in the rear. Entrances to each unit have a mix of landscaping materials. The rain gardens in the east help screen the neighborhood and provide entry landscaping adjacent to the private drive.
11. Compliance with all applicable development design standards and guidelines and all applicable regulations pertaining to matters of state interest, as specified in <u>chapter 17.32</u>	Not applicable	Per Sec. 17.32.060 subsection C and D, this section does not apply to this development.
12. None of the standards for annexation specified in chapter <u>16.32</u> have been violated	Not applicable	The property has been part of the City since at least 1910.
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	Not applicable	Development agreements will be prepared for the final development plan.
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, with waivers	Developers are requesting waivers to have narrower, deeper lots than permitted in Title 17, along with height for narrower but taller townhome units. The waivers help meet the elements of urban neighborhood development in the 2013 Comprehensive Plan.
2. No structures in a planned unit development shall encroach upon the floodplain. Existing bodies of water and existing stream courses shall not be channelized or altered in a planned unit development plan.	Compliant	The property is not located in a floodplain.
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 severe subsidence on the property.

Criteria 17.28.120 (A)	Finding	Narrative
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	Existing trees proposed for removal are considered undesirable by the City Forester. The property is not considered a significant historical site or landmark - the Historical Preservation Commission has reviewed the existing structures and approved a demolition permit for the properties.
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	Corridors of visual relief are provided through the side interior setbacks of the single-family detached homes, as well as outlots facing east-west through the townhomes. Shorter buildings are placed on the edges of the site with taller townhome buildings towards the middle.
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 common space on the site is accessible through the main sidewalk network, which connects to East St and to the residential unit entrances.
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 streets, including parking lots, shall aid the order and aesthetic quality of the development.	Compliant	The development has a single private drive that loops around the neighborhood, creating circulation that is not conducive to through-traffic since there are no additional destinations. Sidewalks are 5-foot wide and streets and alleyways are an adequate width. Parking lots are subdued on the site and screened from East St.

Criteria 17.28.120 (A)	Finding	Narrative
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	Sidewalks are provided parallel to the main private drive and provide access to downtown, City parks, and trail networks.
9. The project and development should attempt to incorporate features which reduce the demand for water usage.	Compliant	Rock mulch is used in lieu of turf grass on much of the private yard space. Plantings are generally low to medium water use.
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	Trees are placed on site in locations that provide shade to the detached single-family units.
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 development is buffered from East St by the location of the rain garden and detention ponds in Outlots D and F, along with the median and sidewalks along East St.
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	Many buildings in the development are oriented north-south and have roof areas that could be utilized for solar energy in the future.
13. The overall PUD shall provide a variety of housing types.	Compliant	The PUD Amendment provides triplex, quadplex, and single-family detached housing units.
14. Neighborhoods within a PUD shall provide a range of housing size.	Compliant	The PUD Amendment provides a mix of detached and attached single-family housing ranging from 2,889 square-feet to 3,825 square-feet.

Criteria 17.28.120 (A)	Finding	Narrative
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 Amendment proposes architecture that is compatible in size and architecture with surrounding neighborhoods on East St. The larger townhomes are situated towards the middle of the site with two-story homes on the edges to act as a transition space with surrounding single-family areas in Old Town.

**RESOLUTION NO. 17
SERIES 2023**

**A RESOLUTION RECOMMENDING APPROVAL OF A PRELIMINARY SUBDIVISION
PLAT AND PRELIMINARY PLANNED UNIT DEVELOPMENT (PUD) FOR 15 SINGLE
FAMILY AND 21 TOWNHOME UNITS ON A 3.6 ACRE PARCEL LOCATED AT 421,
533, AND 565 EAST STREET**

WHEREAS, there has been submitted to the Louisville Planning Commission an application for a preliminary plat and preliminary planned unit development (PUD) for 15 single family detached and 21 townhome units on a series of unplatted properties at Tract 704 and 704-A in the City of Louisville (421, 533, and 565 East Street); and

WHEREAS, the City staff has reviewed the information submitted and found that the application complies with the Louisville zoning regulations and other applicable sections of the Louisville Municipal Code; and

WHEREAS, the Planning Commission has considered the application at duly noticed public hearings on September 14, 2023 and October 12, 2023, where evidence and testimony were entered into the record.

NOW THEREFORE, BE IT RESOLVED that the Planning Commission of the City of Louisville, Colorado does hereby recommend approval of a preliminary plat and preliminary planned unit development (PUD) for 15 single family detached and 21 townhome units on a series of unplatted properties at Tract 704 and 704-A in the City of Louisville (421, 533, and 565 East Street)

PASSED AND ADOPTED this 12th Day of October, 2023.

By: _____
Steve Brauneis, Chair
Planning Commission

Attest: _____
Jeff Moline, Secretary
Planning Commission

SHEET 2 OF 5

SHEET 2 OF 5

A SUBDIVISION OF TRACT 704 (533 EAST STREET) AND TRACT 704-A (421 AND 565 EAST STREET)
LOCATED IN THE SOUTHEAST QUARTER OF SECTION 8, TOWNSHIP 1 SOUTH,
RANGE 69 WEST OF THE 6TH P.M.,
CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO

SHEET 3 OF 5

Legend

	FOUND ALIQUOT MONUMENT AS DESCRIBED
	FOUND MONUMENT AS DESCRIBED
	FOUND BRASS TAG AS DESCRIBED
	SET 16" NO. 5 REBAR WITH 1-1/2" ALUMINUM CAP, STAMPED "PLATINUS SURV 29038"
U.E.	UTILITY EASEMENT
D.E.	DRAINAGE EASEMENT
E.U.E.	EXCLUSIVE UTILITY EASEMENT
A.E.	ACCESS EASEMENT
E.U.A.E.	EXCLUSIVE UTILITY AND ACCESS EASEMENT

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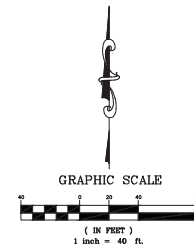
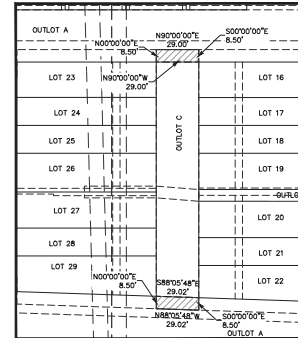
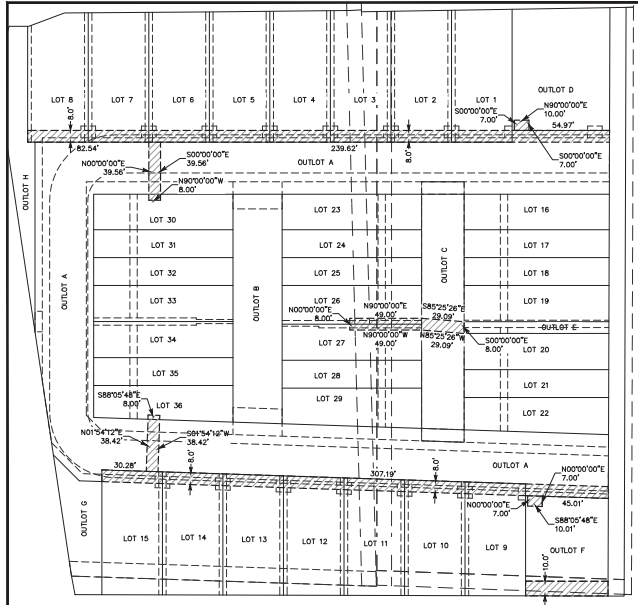
OB NUMBER:
2-78,982
DATE:
8-11-2023
DRAWN BY:
VOYLES
CHECKED BY:
ZG/JJK

Boundary Information

SHEET 4 OF 5

44

A SUBDIVISION OF TRACT 704 (533 EAST STREET) AND TRACT 704-A (421 AND 565 EAST STREET)
LOCATED IN THE SOUTHEAST QUARTER OF SECTION 8, TOWNSHIP 1 SOUTH,
RANGE 69 WEST OF THE 6TH P.M.,
CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO
SHEET 5 OF 5



- FOUND ALIQUOT MONUMENT AS DESCRIBED
 - FOUND MONUMENT AS DESCRIBED
 - FOUND BRASS TAG AS DESCRIBED
 - SET 18" NO. 5 REBAR WITH 1-1/2" ALUMINUM CAP, STAMPED "FLATRONS SURV 29038"
- U.E. UTILITY EASEMENT
- D.E. DRAINAGE EASEMENT
- E.U.E. EXCLUSIVE UTILITY EASEMENT
- A.E. ACCESS EASEMENT
- E.U.A.E. EXCLUSIVE UTILITY AND ACCESS EASEMENT

REVISION	DATE
1	
2	
3	
4	
5	
6	
7	
8	
9	

**EAST STREET VILLAGE
PRELIMINARY PLAT**

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Flatirons, Inc.
Land Surveying Services

655 FOURTH AVE
LONGMONT, CO 80501
PH: (303) 776-1733
FAX: (303) 776-4355



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AND SIGNATURE

JOB NUMBER:
22-78,982
DATE:
08-11-2023
DRAWN BY:
M. VOYLES
CHECKED BY:
JZG/JJK

SHEET 5 OF 5

Easement Details

EAST ST VILLAGE

421-533 EAST ST - PRELIMINARY PLANNED UNIT DEVELOPMENT
CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO
CASE #PUPL-0427-2022

DESIGN
PRACTICE INC
2842 W 44th
Denver CO 80211
www.designpracticecolorado.com
info@designpracticecolorado.com
PHONE: 303 561 3000

SIGNATURES

OWNERSHIP SIGNATURE BLOCK

THE UNDERSIGNED, AS THE OWNER OF THE LANDS DESCRIBED HEREIN, HEREBY AGREES ON BEHALF OF ITSELF, AND ITS HEIRS, SUCCESSORS AND ASSIGNS TO DEVELOP AND MAINTAIN THE PROPERTY DESCRIBED HEREON IN ACCORDANCE AND COMPLIANCE WITH THIS APPROVED PLAN AND THE LOUISVILLE MUNICIPAL CODE.

EAST ST LLC

WITNESS MY/OUR HAND(S) SEAL(S) THIS _____ DAY OF _____, 20____

BY: _____
BOBBY STIER - MANAGER

STATE OF _____
COUNTY OF _____

SIGNED BEFORE ME ON _____, 20____

BY: _____

(NOTARY'S OFFICIAL SIGNATURE)
NOTARY STAMP

(TITLE OF OFFICE)

(COMMISSION EXPIRATION)

CITY COUNCIL CERTIFICATE

APPROVED THIS _____ DAY OF _____, 20____

BY THE CITY COUNCIL OF THE CITY OF LOUISVILLE, COLORADO

RESOLUTION NO. _____ SERIES _____

MAYOR _____ CITY CLERK _____

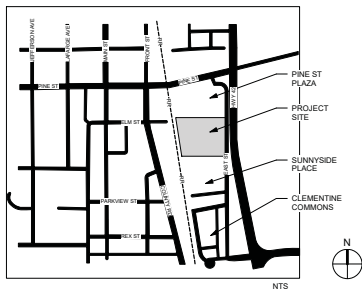
PLANNING COMMISSION CERTIFICATE:

RECOMMENDED APPROVAL THIS _____ DAY OF _____, 20____

BY THE PLANNING COMMISSION OF THE CITY OF LOUISVILLE, COLORADO

RESOLUTION NO. _____ SERIES _____

VICINITY MAP



HOA NOTES

1. ALL COMMON AREAS, OUTLOTS, DRIVES, SIDEWALKS, LANDSCAPING, AND OTHER COMMON IMPROVEMENTS WITHIN THE SUBDIVISION SHALL BE PROVIDED AS SHOWN ON THIS PUD BY THE DEVELOPER, AND SUCH IMPROVEMENTS SHALL BE MAINTAINED IN PERPETUITY BY THE HOA FOR THE SUBDIVISION.
2. THE HOA SHALL BE RESPONSIBLE FOR REPAIRS TO SURFACE IMPROVEMENTS WITHIN THE EXCLUSIVE UTILITY EASEMENTS DAMAGED BY THE CITY OPERATION MAINTENANCE/ REPAIR/ REPLACEMENT OF CITY FACILITIES

PROJECT TEAM

OWNER INFO

Name: EAST ST LLC
Contact: JESSE TRUMAN
Address: 5507 PARADISE LANE
BROOMFIELD, CO 80020
Phone: 303-915-7203
E-Mail: JESSETRUMAN@GMAIL.COM

CIVIL ENGINEER

Name: THE SANITAS GROUP
Contact: LESLIE EWY
Address: 901 FRONT ST, STE 350
LOUISVILLE, CO 80027
Phone: 303-481-2710
E-Mail: LEWY@THESANITASGROUP.COM

ARCHITECT

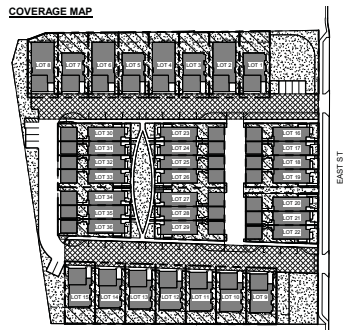
Name: DESIGN PRACTICE INC
Contact: PAUL NORQUIST
Address: 2842 W 44TH AVE
DENVER, CO 80211
Phone: 303-561-3000
E-Mail: PNORQUIST@DESIGNPRACTICECOLORADO.COM

LANDSCAPE ARCHITECT

Name: OUTSIDE LA
Contact: SANDI GIBSON
Address: 2623 BURGESS CREEK RD
STEAMBOAT SPRINGS, CO 80487
Phone: 303-417-8058
E-Mail: OSLA@ME.COM

SITE COVERAGE

COVERAGE MAP



COVERAGE LEGEND



COVERAGE TABLE

	AREA (SF)	AREA (ACRES)
GROSS SITE AREA	156,458 SF	3.60
PRIVATE STREETS	25,295 SF	0.58
NET SITE AREA	131,163 SF	3.02
BUILDING COVERAGE	52,440 SF	1.20
HARDSCAPE AREA	48,374 SF	1.11
SUBTOTAL (IMPERVIOUS)	100,814 SF	2.31
LANDSCAPE AREA	49,610 SF	1.14
DETENTION AREA	6,247 SF	0.14

PROJECT DATA

PROJECT LOCATION: 421-533 EAST ST
LEGAL DESCRIPTION: A REPLAT OF TRACT 704-A LESS THE EAST 30' AND LESS THE NORTHERLY 20' SOUTHEAST QUATER OF SECTION 8, TOWNSHIP 1 SOUTH, RANGE 69 WEST OF THE 6TH P.M.
PROJECT DESCRIPTION: THE PRELIMINARY PUD INCLUDES REDEVELOPMENT OF APPROXIMATELY 3.6 ACRES. NEW CONSTRUCTION INCLUDES 15 SINGLE FAMILY HOMES AND 21 TOWNHOME UNITS WITH DETACHED GARAGES.
ZONING: RM (RESIDENTIAL MEDIUM DENSITY)
PROPOSED USE: SINGLE FAMILY DETACHED AND SINGLE FAMILY ATTACHED
LAND AREA AND DENSITY
GROSS LAND AREA: 156,458 SF (3.60 ACRES) AFTER DEDICATION OF R.O.W.
PRIVATE STREETS: 25,295 SF
NET LAND AREA: 131,163 SF
131,163 NSF = 3,029 SF/D.U. = 37.47 DWELLING UNITS ALLOWED
PROJECT PROPOSAL = 36 DWELLING UNITS
MAXIMUM BUILDING COVERAGE FOR SUBDIVISION:
ALLOWED: 156,458 x 35% = 54,760 SF
PROPOSED: 52,440 SF = 33.5%
TOTAL OPEN SPACE OF SUBDIVISION: 20,393 SF = 15.5% OF NET LAND AREA
OPEN SPACE OF COMMON AREAS: 20,393 SF
PRIVATE YARDS: 33,060 SF
(DOES NOT INCLUDE BUILDING COVERAGE, DRIVES, PRIVATE STREETS OR PUBLIC AND PRIVATE SIDEWALKS)

WAIVER REQUESTS

WAIVERS (FROM LOUISVILLE MUNICIPAL CODE)		
CODE SECTION	REQUIREMENT	PROPOSED CONDITION
01 16.16.040 - BLOCKS SUBSECTION B.	BLOCKS SHALL BE AT LEAST 400 FEET IN LENGTH	180 FEET BETWEEN PRIVATE STREET ENTRANCES
02 16.16.050 - LOTS SUBSECTION C.	THE MAXIMUM DEPTH OF ALL RESIDENTIAL LOTS SHALL NOT EXCEED 2 1/2 TIMES THE WIDTH THEREOF.	TOWNHOME UNIT LOTS EXCEED THE RATIO
03 16.16.060 - LOTS SUBSECTION D.	THE MINIMUM LOT FRONTAGE, AS MEASURED ALONG THE FRONT LOT LINES SHALL BE 50 FEET.	ALL LOT WIDTHS WITHIN THE PROJECT ARE LESS THAN 50 FEET IN WIDTH
04 17.12.040 - YARD AND BULK REQUIREMENTS ITEM 1 - MIN LOT AREA	MINIMUM LOT AREA SINGLE FAMILY - 7,000 SF	LOT AREAS RANGE FROM 3174 SF - 3728 SF
05 17.12.040 - YARD AND BULK REQUIREMENTS ITEM 3 - MIN LOT AREA PER D.U.	MINIMUM LOT AREA PER D.U. (TOWNHOMES): 3,500 SF	TOWNHOME LOTS RANGE FROM 2456 SF - 1805 SF (INTERNAL UNITS)
06 17.12.040 - YARD AND BULK REQUIREMENTS ITEM 4 - MAX LOT COVERAGE	MAXIMUM LOT COVERAGE - 35%	ON THE INDIVIDUAL LOTS, ALL UNITS EXCEED THE 35% ALLOWABLE LOT COVERAGE. OVERALL BUILDING COVERAGE FOR THE SITE IS < 35%
07 17.12.040 - YARD AND BULK REQUIREMENTS ITEM 5 - FRONT SETBACK	FRONT YARD SETBACK - 25 FEET	ALL UNITS ARE CLOSER THAN 25' AT THE FRONT YARD SETBACK
08 17.12.040 - YARD AND BULK REQUIREMENTS ITEM 7 - SIDE INTERIOR SETBACK	SIDE INTERIOR SETBACK - 7 FEET SINGLE FAMILY LOTS	SINGLE FAMILY UNITS ARE DESIGNED WITH A 9' SIDE SETBACK.
09 17.12.040 - YARD AND BULK REQUIREMENTS ITEM 7 - SIDE INTERIOR SETBACK	SIDE INTERIOR SETBACK - 7 FEET TOWNHOME LOTS	ATTACHED TOWNHOME UNITS WITH SHARED WALL HAVE 0' SETBACK AT SHARED WALL CONDITION
10 17.12.040 - YARD AND BULK REQUIREMENTS ITEM 8 - REAR SETBACK	REAR SETBACK - 25 FEET	SINGLE FAMILY UNITS REAR SETBACKS RANGE FROM 5'-1 7/8" TO 28'-3 3/4"
11 17.12.040 - YARD AND BULK REQUIREMENTS ITEM 9 - MAX HEIGHT	MAXIMUM HEIGHT - 35 FEET	TOWNHOME UNITS EXCEED THE 35' MAXIMUM HEIGHT (SEE HEIGHT WAIVER TABLE)

HEIGHT WAIVER REQUESTS BY LOT (ABOVE 35' ALLOWABLE)

LOT #	WAIVER REQUEST	LOT #	WAIVER REQUEST	LOT #	WAIVER REQUEST
16	3'-5 3/4"	23	3'-2 3/4"	30	3'-7 3/8"
17	0'-8 5/8"	24	0'-5 5/8"	31	0'-10 1/8"
18	0'-8 5/8"	25	0'-5 5/8"	32	0'-10 1/8"
19	3'-5 3/4"	26	3'-2 3/4"	33	3'-7 3/8"
20	2'-11 1/2"	27	4'-0 1/8"	34	4'-0 1/8"
21	0'-2 3/8"	28	1'-3"	35	1'-3"
22	2'-11 1/2"	29	4'-0 1/8"	36	4'-0 1/8"

SHEET INDEX

NO.	SHEET TITLE	NO.	SHEET TITLE
1	COVER SHEET	9	SITE PHOTOMETRIC PLAN
2	DEVELOPMENT PLAN	10	ILLUMINANCE CUT SHEETS
3	UTILITY CONNECTION PLAN	11	TH TYPE 1 ELEVATIONS
4	GRADING AND DRAINAGE PLAN	12	TH TYPE 1 ELEVATIONS
5	LANDSCAPE PLAN - NORTH	13	TH TYPE 2 ELEVATIONS
6	LANDSCAPE PLAN - SOUTH	14	TH TYPE 2 ELEVATIONS
7	LANDSCAPE NOTES & DETAILS	15	SFR TYPE 1 ELEVATIONS
8	LIGHTING COVER & DETAILS	16	SFR TYPE 2 ELEVATIONS

PROJECT DESCRIPTION

THE PUD PROPOSAL IS FOR A RESIDENTIAL DEVELOPMENT WITH A MIX OF FEE-SIMPLE RESIDENTIAL PRODUCT TYPES WITHIN THE SITE. THE PROPOSAL CALLS FOR 15 STAND-ALONE SINGLE FAMILY UNITS AND 21 TOWNHOME UNITS WITH DETACHED GARAGES. THE UNITS ARE DESIGNED TO FILL A GAP IN HOUSING TYPE AVAILABILITY IN OLD-TOWN LOUISVILLE. SMALLER LOTS ALLOW FOR AN INCREASE IN DENSITY WHICH HELPS KEEP THE COST DOWN WHILE INCREASING THE NUMBER OF HOUSEHOLDS IN WALKABLE PROXIMITY TO OLD-TOWN. THE TOWNHOME DESIGNS PROVIDE AFFORDABILITY WHILE DETACHING THE GARAGES ALLOWS FOR PRIVATE OUTDOOR SPACE TO THE OWNERS. 4 OF THE SINGLE FAMILY HOMES ARE DESIGNED WITH MAIN FLOOR PRIMARY SUITES TO APPEAL TO AN OLDER DEMOGRAPHIC WHILE THE REMAINING SINGLE FAMILY HOMES MAINTAIN A MODEST FOOTPRINT BY TODAY'S NEW CONSTRUCTION STANDARDS TO KEEP THE PRICE-POINT ATTAINABLE WHILE STILL PROVIDING SMALL OUTDOOR PRIVATE SPACES FOR THE RESIDENTS.

SITE DATA TABLE

ZONE DISTRICT		MEDIUM DENSITY RESIDENTIAL		RM	
PROPOSED USE		15 SINGLE FAMILY HOMES AND 21 TOWNHOME UNITS			
LAND AREA & DENSITY		SQUARE FEET		ACRES	
GROSS SITE AREA		156,458 SF		3.60	
PRIVATE STREETS		25,295 SF		0.58	
NET SITE AREA		131,163 SF		3.02	
DWELLING UNITS		ALLOWABLE		PROPOSED	
ALLOWABLE DENSITY		37.0 UNITS		36 UNITS	

PUD YARD AND BULK REQUIREMENTS

LOT UNIT TYPE	REQUIRED	1-8 SINGLE FAMILY DETACHED	9-15 SINGLE FAMILY DETACHED	16-22 TOWNHOMES	23-29 TOWNHOMES	30-36 TOWNHOMES
MIN LOT AREA	7,000 SF	3510 SF	3174 SF	1873 SF	1805 SF	1805 SF
MIN LOT WIDTH	60'	41'-3 1/4"	41'-3 1/4"	19'-0"	19'-0"	19'-0"
UNIT FOOTPRINT	1978 SF	1514 SF	1441 SF	1441 SF	1441 SF	1441 SF
MAX LOT COVERAGE ¹	35%	56.2%	47.7%	76.9%	76.9%	76.9%
MAX HEIGHT	35'-0"	35'-0"	35'-0"	37'-11 3/4"	36'-11 1/8"	38'-8 3/4"
BUILDING SETBACK ²						
FRONT YARD						
PRIVATE DRIVE		7'-3 1/8"	8'-11 1/4"	N/A	N/A	N/A
COMMON SPACE		N/A	N/A	N/A	7'-3 1/2"	7'-3 1/2"
ABUTTING ROW		N/A	N/A	10'-10 3/4"	N/A	N/A
REAR YARD						
INTERNAL LOT LINE		5'-1 7/8" ²	13'-11 3/8"	N/A	N/A	N/A
SIDE YARD						
BETWEEN LOTS		5'-0"	5'-0"	0'-3"	0'-3"	0'-3"
INTERNAL LOT LINE		5'-0"	5'-0"	N/A	N/A	N/A
TO PRIVATE DRIVE		N/A	N/A	2'-10 3/8" ⁴	5'-0 3/4"	3'-2 1/4" ⁵

COVERAGE	ALLOWABLE	PROPOSED
BUILDING COVERAGE	54,760 SF	52,440 SF
BUILDING COVERAGE % (GROSS)	35.0%	33.5%
OPEN SPACE	SF	ACRES
COMMON AREAS	20,393 SF	0.47
ON PRIVATE LOTS	33,060 SF	0.76

PARKING REQUIREMENTS PER DWELLING UNIT

SPACES REQUIRED	2	2	2	2	2
SPACES PROVIDED	2	2	2	2	2
SITE PARKING ⁷					

FOOTNOTES:

- SEE ADJACENT HEIGHT WAIVER REQUEST TABLE
- AT LOT 8 (NORTH WEST CORNER), SITE ABUTS CITY OWNED OPEN SPACE TO THE NORTH.
- FEE SIMPLE LOTS ARE CREATED FOR THE INDIVIDUAL TOWNHOME UNITS. SEE WAIVER REQUEST TABLE FOR 0' INTERNAL LOT LINE SETBACK WAIVER FOR ATTACHED UNITS
- AT LOT 26, SOUTH WEST CORNER OF GARAGE TO LOT PROPERTY LINE.
- AT LOT 36, SOUTH WEST CORNER OF GARAGE TO LOT PROPERTY LINE.
- ON SITE OPEN SPACE IS A COMBINATION OF COMMON AREAS AND PRIVATE OPEN SPACE. OVERALL BUILDING COVERAGE FOR THIS SUBDIVISION SHALL NOT BE GREATER THAN 35%.
- THERE ARE 24 SURFACE PARKING SPACES PROVIDED WITHIN THE PROJECT.
- SETBACKS ARE TO THE MOST CONSTRAINED CONDITION OF EACH LOT GROUPING

ISSUED					
NO.	DESCRIPTION	DATE	NO.	DESCRIPTION	DATE
1	PRELIMINARY PUD	07-28-2022			
2	PRELIMINARY PUD	02-10-2023			
3	PRELIMINARY PUD	05-30-2023			
4	PRELIMINARY PUD	08-10-2023			

COVER SHEET

SCALE:

SHEET: 1

DATE: AUG 10 2023

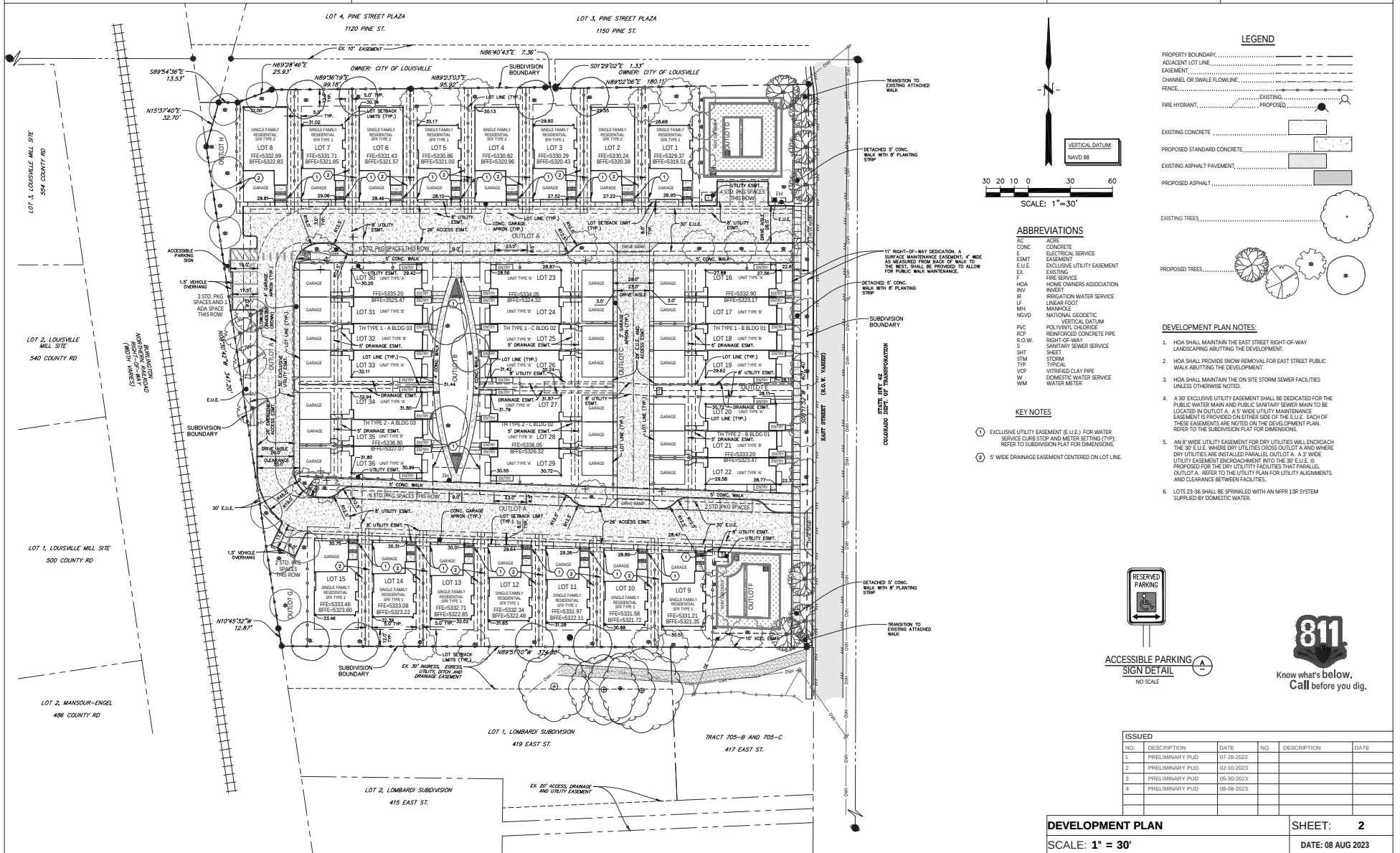
EAST ST VILLAGE

421-533 EAST ST - PRELIMINARY PLANNED UNIT DEVELOPMENT
CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO
CASE #PUPL-0427-2022



Sanitas Group
801 FRONT ST, SUITE 800
LOUISVILLE, CO 80002
303.361.9238

DESIGN PRACTICE, INC.
2842 W 48TH
DENVER CO 80211
www.designpracticecolorado.com
info@designpracticecolorado.com
PHONE: 303.561.3000



LEGEND

- PROPERTY BOUNDARY.....
- ADJACENT LOT LINE.....
- EASEMENT.....
- CHANNEL OR SWALE CROWN.....
- FENCE.....
- FIRE HYDRANT.....
- EXISTING.....
- PROPOSED.....
- EXISTING CONCRETE.....
- PROPOSED STANDARD CONCRETE.....
- EXISTING ASPHALT PAVEMENT.....
- PROPOSED ASPHALT.....
- EXISTING TREES.....
- PROPOSED TREES.....

ABBREVIATIONS

- AC ACRES
- CONC CONCRETE
- E EASEMENT
- E.U.E. EXCLUSIVE UTILITY EASEMENT
- EX EXISTING
- F FIRE SERVICE
- HOA HOME OWNERS ASSOCIATION
- INV INVERT
- IR IRRIGATION WATER SERVICE
- LF LINEAR FOOT
- MH MANHOLE
- NGVD NATIONAL GEODETIC
- PVC POLYVINYL CHLORIDE
- RCP REINFORCED CONCRETE PIPE
- R.O.W. RIGHT-OF-WAY
- S SANITARY SEWER SERVICE
- SHT SHEET
- STM STORM
- TYP TYPICAL
- VCP VITRIFIED CLAY PIPE
- W DOMESTIC WATER SERVICE
- WM WATER METER

KEY NOTES

- 1 EXCLUSIVE UTILITY EASEMENT (E.U.E.) FOR WATER SERVICE CURB STOP AND METER SETTING (TYP.) REFER TO SUBDIVISION PLAT FOR DIMENSIONS.
- 2 5' WIDE DRAINAGE EASEMENT CENTERED ON LOT LINE.

DEVELOPMENT PLAN NOTES:

1. HOA SHALL MAINTAIN THE EAST STREET RIGHT-OF-WAY LANDSCAPING ABUTTING THE DEVELOPMENT.
2. HOA SHALL PROVIDE SNOW REMOVAL FOR EAST STREET PUBLIC WALK ABUTTING THE DEVELOPMENT.
3. HOA SHALL MAINTAIN THE ON SITE STORM SEWER FACILITIES UNLESS OTHERWISE NOTED.
4. A 30' EXCLUSIVE UTILITY EASEMENT SHALL BE DEDICATED FOR THE PUBLIC WATER MAIN AND PUBLIC SANITARY SEWER MAIN TO BE LOCATED IN OUTLOT A. A 5' WIDE UTILITY MAINTENANCE EASEMENT IS PROVIDED ON EITHER SIDE OF THE E.U.E. EACH OF THESE EASEMENTS ARE NOTED ON THE DEVELOPMENT PLAN. REFER TO THE SUBDIVISION PLAT FOR DIMENSIONS.
5. AN 8' WIDE UTILITY EASEMENT FOR DRY UTILITIES WILL ENCLOSE THE 30' E.U.E. WHERE DRY UTILITIES CROSS OUTLOT A AND WHERE DRY UTILITIES ARE INSTALLED PARALLEL OUTLOT A. A 3' WIDE UTILITY EASEMENT ENCROACHMENT INTO THE 30' E.U.E. IS PROPOSED FOR THE DRY UTILITY FACILITIES THAT PARALLEL OUTLOT A. REFER TO THE UTILITY PLAN FOR UTILITY ALIGNMENTS AND CLEARANCE BETWEEN FACILITIES.
6. LOTS 23-36 SHALL BE SPRINKLED WITH AN NFPA 13R SYSTEM SUPPLIED BY DOMESTIC WATER.



ACCESSIBLE PARKING
SIGN DETAIL
NO SCALE



Know what's below.
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ISSUED				
NO.	DESCRIPTION	DATE	NO.	DESCRIPTION
1.	PRELIMINARY PUD	07-28-2022		
2.	PRELIMINARY PUD	02-10-2023		
3.	PRELIMINARY PUD	05-30-2023		
4.	PRELIMINARY PUD	08-08-2023		

DEVELOPMENT PLAN

SCALE: 1" = 30'

SHEET: 2

DATE: 08 AUG 2023

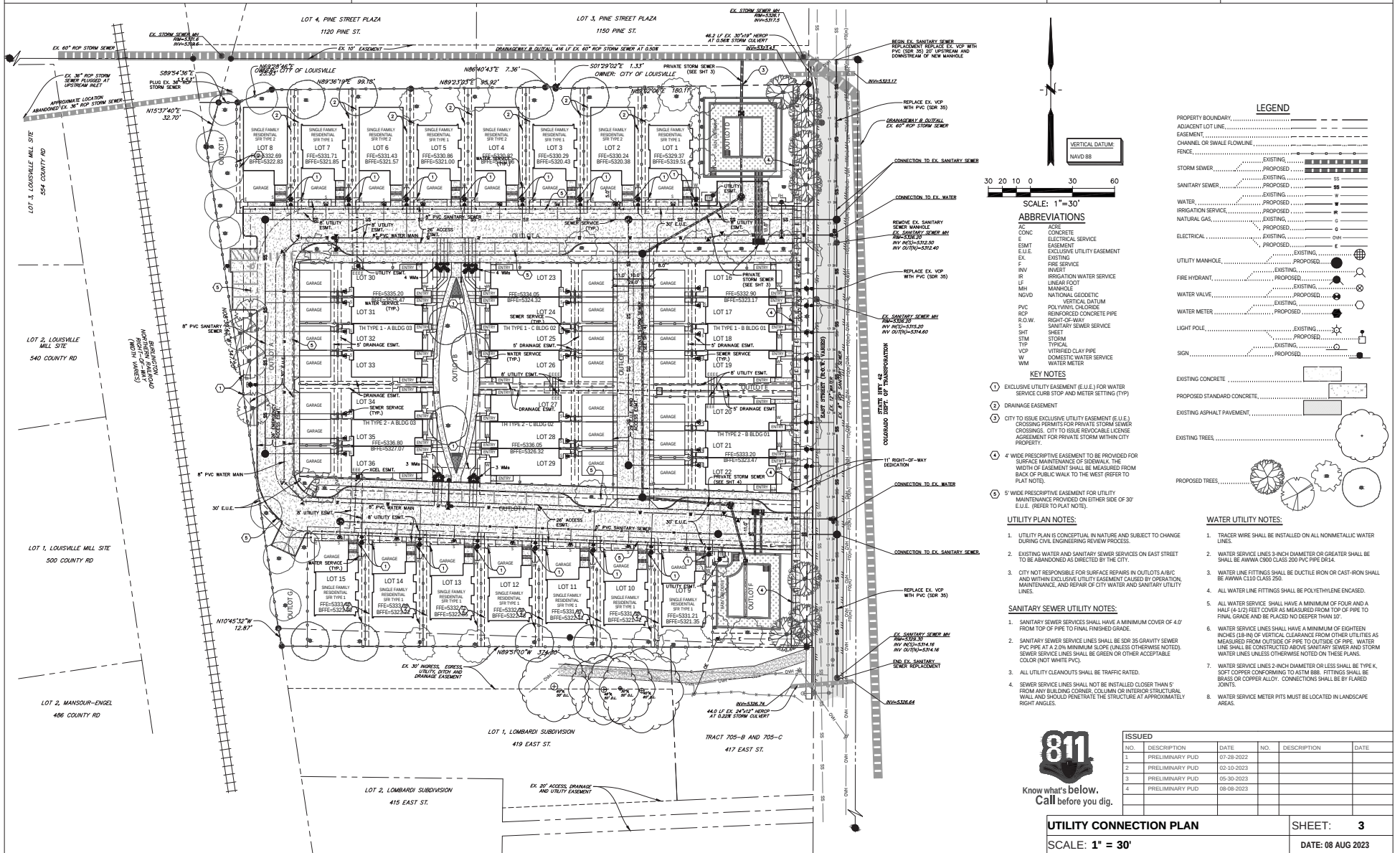
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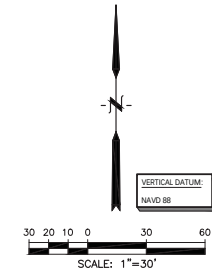
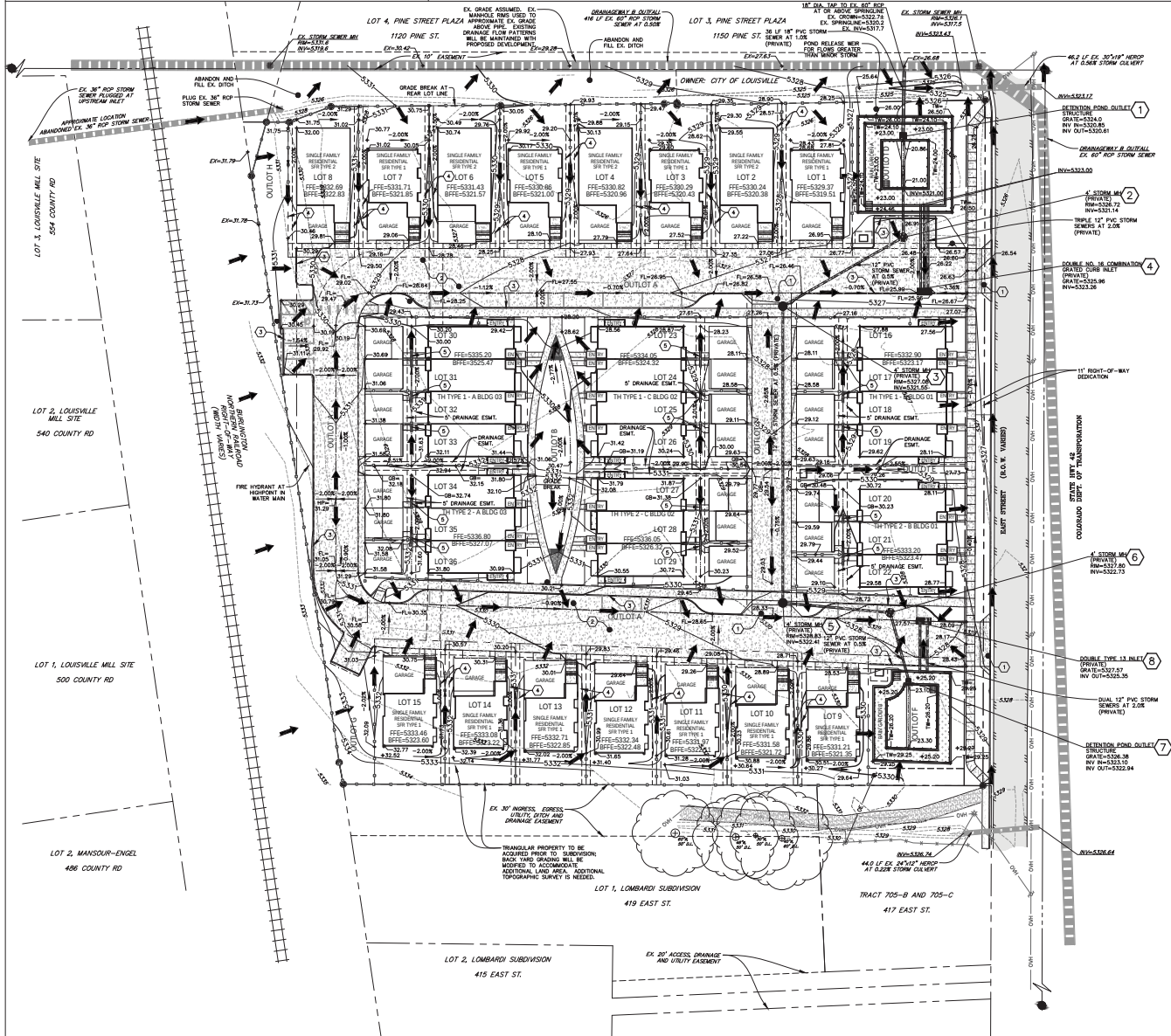
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KEY NOTES

- 1 CONCRETE DRIVE RAMP
- 2 REINFORCED CONCRETE PAVEMENT
- 3 CURB (NO GUTTER) WITH 6" REVEAL
- 4 DRAINAGE EASEMENT
- 5 CULVERT OR SIDEWALK CHASE

LEGEND

- PROPERTY BOUNDARY.....
- ADJACENT LOT LINE.....
- EASEMENT.....
- CHANNEL OF SWALE FLOWLINE.....
- FENCE.....
- STORM SEWER.....
- MAJOR CONTOUR.....
- MINOR CONTOUR.....
- SPOT ELEVATION.....
- ELECTRICAL (OVERHEAD).....
- UTILITY MANHOLE.....
- FIRE HYDRANT.....
- LIGHT POLE.....
- SIGN.....
- STORM STRUCTURE DESIGNATOR.....
- EXISTING CONCRETE.....
- PROPOSED STANDARD CONCRETE.....
- EXISTING ASPHALT PAVEMENT.....
- EXISTING TREES.....

PLAN NOTES

- REFER TO SHEET 3 FOR UNDERGROUND UTILITY LOCATIONS. THIS PLAN IS LIMITED TO SURFACE IMPROVEMENTS, ASSOCIATED GRADING AND UNDERGROUND STORM SEWER PIPING. REFER TO SHEETS 2 AND 3 FOR ALL OTHER EASEMENTS.
- THIS PLAN SHEET PRESENTS DRAINAGE EASEMENTS FOR EVALUATION OF SURFACE IMPROVEMENTS, ASSOCIATED GRADING AND UNDERGROUND STORM SEWER PIPE. REFER TO SHEETS 2 AND 3 FOR ALL OTHER EASEMENTS.

GRADING NOTES

- ALL SPOT ELEVATIONS ARE TO FLOWLINE OF CURB AND GUTTER. TOP OF PAVING OR FINISHED GRADE LANDSCAPE AREA UNLESS OTHERWISE NOTED.
- ALL PROPOSED CONTOURS ARE TO TOP OF FINISHED PAVING AND LANDSCAPED AREAS UNLESS OTHERWISE NOTED.
- ADD 5300 TO ALL PROPOSED SPOT ELEVATIONS TO REACH PROJECT VERTICAL DATUM.
- IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO MAINTAIN AND PROVIDE FOR ADEQUATE DRAINAGE THROUGHOUT THE SITE DURING THE PROCESS OF EXCAVATION, GRADING AND EMBANKMENT. THE GRADE SHALL BE MAINTAINED IN SUCH CONDITION THAT IT IS WELL DRAINED AT ALL TIMES.
- LANDSCAPE SLOPES SHALL BE 2% OR GREATER AND SHALL NOT EXCEED 4:1 (H:V) UNLESS OTHERWISE NOTED ON THESE PLANS AND APPROVED BY THE CITY INSPECTOR/ENGINEER.
- MATCH EXISTING GRADES AT LIMITS OF CONSTRUCTION.

RAIN GARDEN NOTES

- RAIN GARDENS A AND B ARE COMBINATION RAIN GARDEN AND DETENTION PONDS.
- INLETS COLLECT STORM DRAINAGE FROM THE PRIVATE DRIVES AND DISCHARGE THE DRAINAGE INTO THE RAIN GARDEN LEVEL OF THE DETENTION POND. ONCE THE WATER QUALITY CAPTURE VOLUME IS EXCEEDED, THE RAIN GARDENS SPILL INTO THE CENTRAL LOWER LEVEL OF THE DETENTION POND. REFER TO THE STORM DRAINAGE PATTERNS FOR THIS PROJECT.
- RAIN GARDEN B FLOWS TO RAIN GARDEN A BY A PRIVATE STORM SEWER.
- METAL ACCESS STAIRS ARE PROVIDED FOR ACCESS INTO EACH RAIN GARDEN AND DETENTION POND LEVELS. MAINTENANCE ACTIVITIES SHALL BE PERFORMED BY HAND (RAKING, SHOVELING, PLANT CARE, ETC.) VIA THESE METAL ACCESS STAIRS.
- RAIN GARDEN B OUTER PERIMETER WALL EXCEEDS 30". LANDSCAPING AND/OR HANDRAIL WILL BE PROVIDED FOR FALL PROTECTION.



GRADING AND DRAINAGE PLAN

SCALE: 1" = 30'

ISSUED				
NO.	DESCRIPTION	DATE	NO.	DESCRIPTION
1.	PRELIMINARY PUD	07-28-2022		
2.	PRELIMINARY PUD	02-10-2023		
3.	PRELIMINARY PUD	05-30-2023		
4.	PRELIMINARY PUD	08-08-2023		

SHEET: 4

DATE: 08 AUG 2023

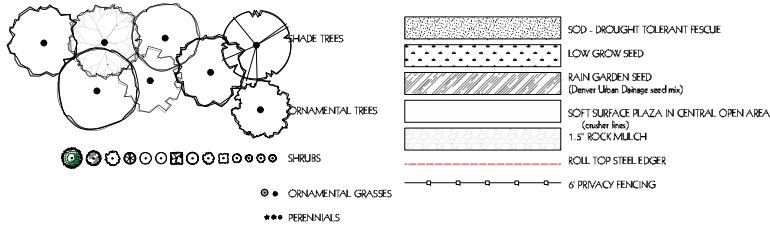
EAST ST VILLAGE

421-533 EAST ST - PRELIMINARY PLANNED UNIT DEVELOPMENT
CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO
CASE #PUPL-0427-2022



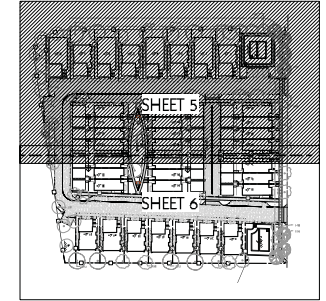
DESIGN
PRACTICE INC
2842 W 44th
Denver CO 80211
www.designpracticeinc.com
info@designpracticeinc.com
PHONE 303 961 3000

LEGEND:



LANDSCAPE REQUIREMENTS: 5/22/23

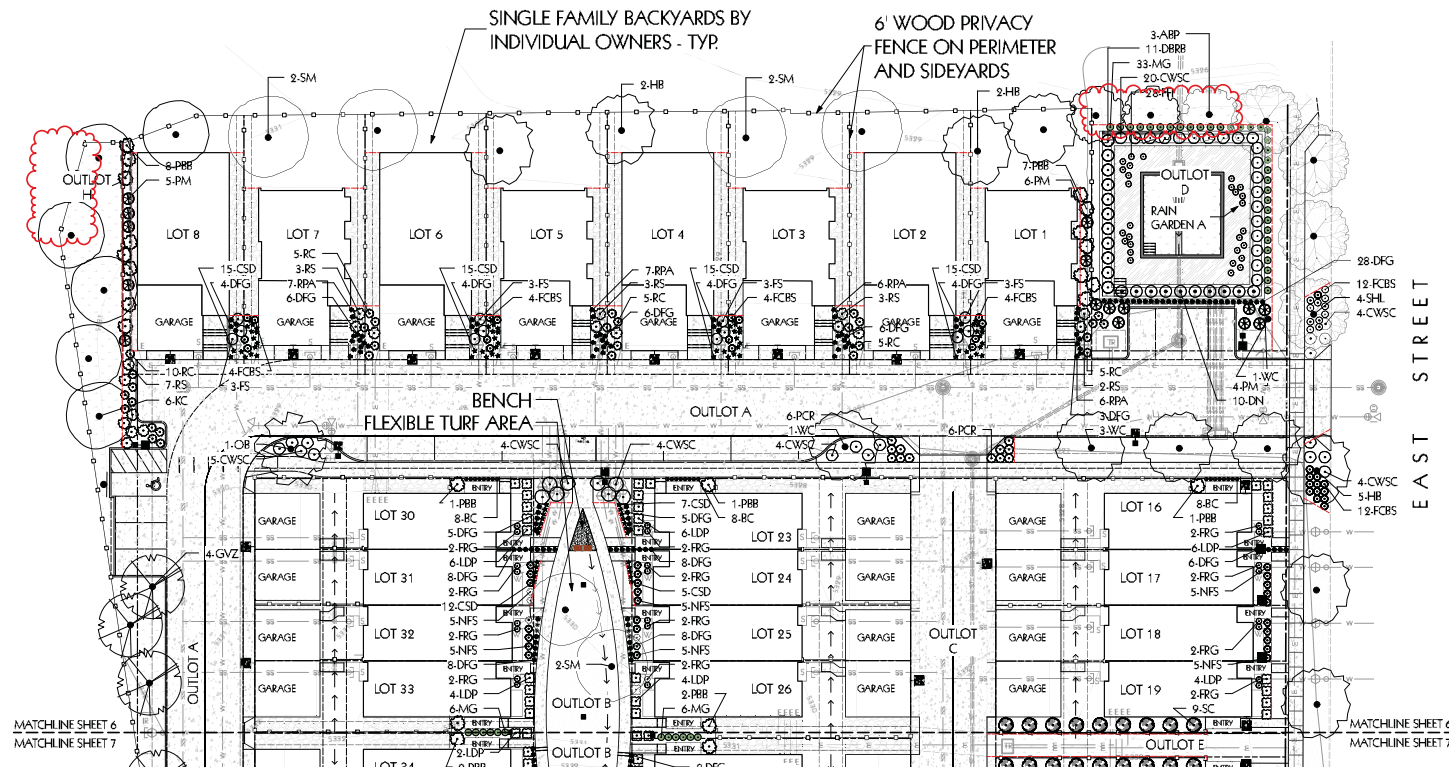
TOTAL LOT SIZE:	156,669
TOTAL AREA COVERED BY BUILDING, PARKING LOT OR PATIO	118,592
TOTAL LANDSCAPE AREA: (21%)	31,753
TOTAL HARDSCAPE AREA:	6,324
PROPOSED	
TOTAL NUMBER OF STREET TREES (all deciduous)	10
TOTAL NUMBER OF STREET SHRUBS	64
TOTAL NUMBER OF PERIMETER TREES	40
TOTAL NUMBER OF PERIMETER SHRUBS	50
TOTAL NUMBER OF PARKING LOT TREES	5
TOTAL NUMBER OF PARKING LOT SHRUBS	47



KEY MAP

GENERAL NOTES:

1. IRRIGATION SYSTEM OPERATION IN ROW REQUIRES PUBLIC WORKS INSPECTION AND APPROVAL PRIOR TO CONSTRUCTION ACCEPTANCE. NO OVERSPRAY ONTO PAVED SURFACES.
2. STREET TREES SHALL BE CENTERED WITHIN THE TREE LAWN. IN AREAS IRRIGATION IN THE TREE LAWN SHALL BE SUBSURFACE IN ALL AREAS. IRRIGATION IN THE TREE LAWN SHALL BE ON A CENTRAL SYSTEM CONTROLLED BY THE HOA.



MATCHLINE SHEET 6
MATCHLINE SHEET 7

MATCHLINE SHEET 6
MATCHLINE SHEET 7

LANDSCAPE PLAN - NORTH

SCALE: 1"=20'-0"

LANDSCAPE PLAN - NORTH

SCALE: 1"=20'-0"

SHEET: 5

DATE: AUG 10 2023

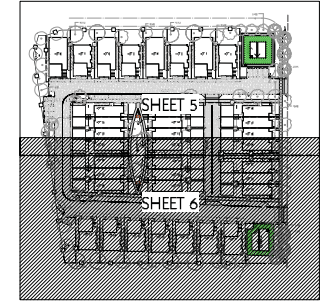
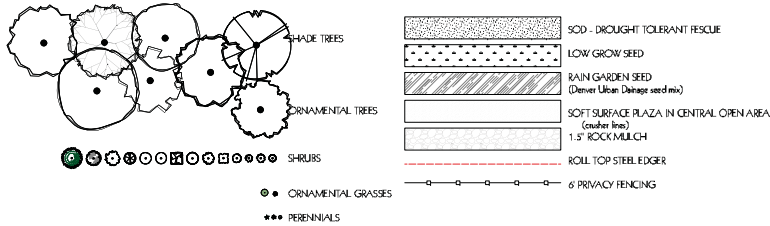
EAST ST VILLAGE

421-533 EAST ST - PRELIMINARY PLANNED UNIT DEVELOPMENT
CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO
CASE #PUPL-0427-2022

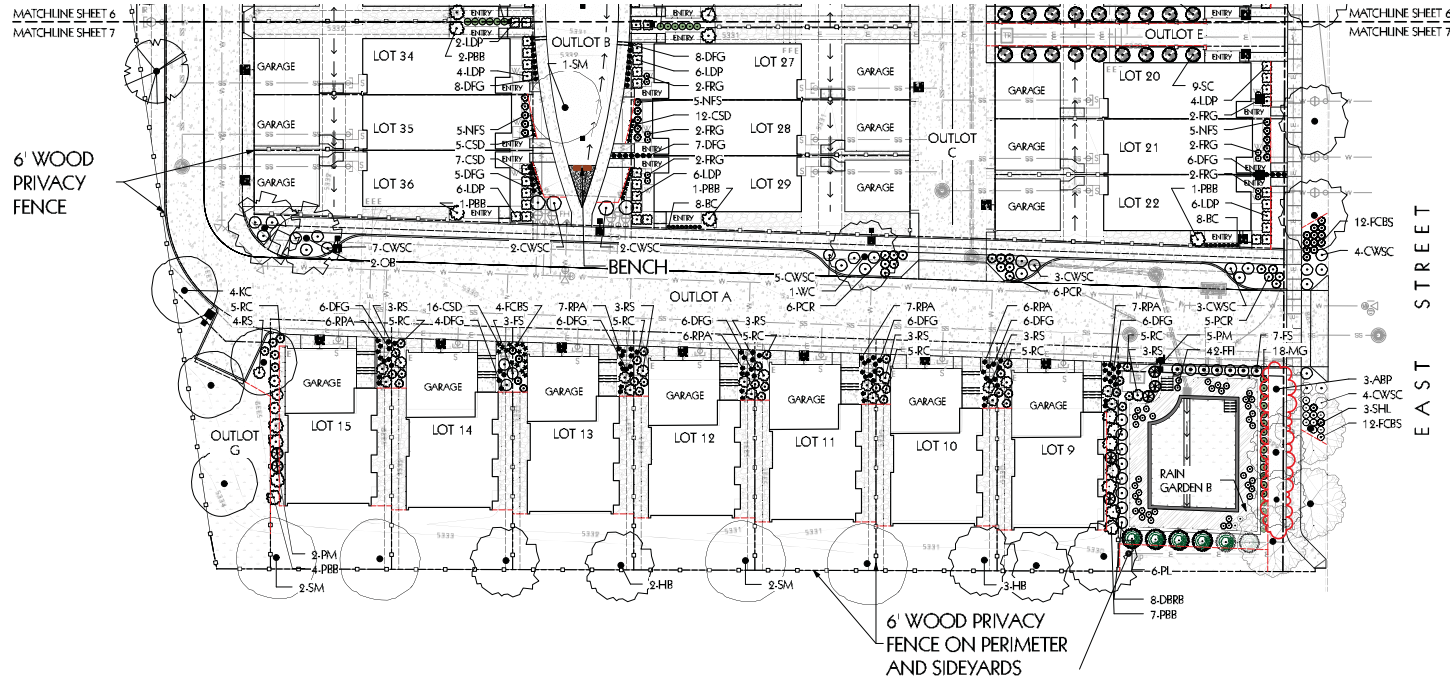


DESIGN
PRACTICE INC
2842 W 44th
Denver CO 80211
www.designpracticeinc.com
info@designpracticeinc.com
PHONE 303 961 3000

LEGEND:



KEY MAP



LANDSCAPE PLAN - SOUTH

0 20 40 FT

SCALE: 1"=20'-0"

GENERAL NOTES:

1. IRRIGATION SYSTEM OPERATION IN ROW REQUIRES PUBLIC WORKS INSPECTION AND APPROVAL PRIOR TO CONSTRUCTION ACCEPTANCE. NO OVERSPRAY ONTO PAVED SURFACES.
2. STREET TREES SHALL BE CENTERED WITHIN THE TREE LAWN. IN AREAS IRRIGATION IN THE TREE LAWNS SHALL BE SUBSURFACE IN ALL AREAS. IRRIGATION IN THE TREE LAWNS SHALL BE ON A CENTRAL SYSTEM CONTROLLED BY THE HOA.

ISSUED				
NO.	DESCRIPTION	DATE	NO.	DESCRIPTION
1	PRELIMINARY PUD	07-28-2022		
2	PRELIMINARY PUD	02-10-2023		
3	PRELIMINARY PUD	05-30-2023		
4	PRELIMINARY PUD	08-10-2023		

LANDSCAPE PLAN - NORTH

SCALE: 1"=20'-0"

SHEET: 5

DATE: AUG 10 2023

EAST ST VILLAGE

421-533 EAST ST - PRELIMINARY PLANNED UNIT DEVELOPMENT
CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO
CASE #PUPL-0427-2022



DESIGN
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PLANT SCHEDULE - 5/22/23

ABBREV.	SCIENTIFIC NAME	COMMON NAME	SIZE	QTY	MATURE HT.
CANOPY TREES:					
GVZ	Zelkova serrata 'Green Vase'	Green Vase Zelkova	2.5' cal.	4	50'
HB	Celtis occidentalis 'Chagoland'	Western Chagoland Hackberry	2.5' cal.	14	50'
KC	Gymnocladus dioica	Kentucky Coffeetree	2.5' cal.	10	55'
OR	Asterolula glabra	Ohio Buckeye	2.5' cal.	3	35'
SHL	Gleditsia triacanthos var. 'Inermis' Shademaster'	Shademaster Honeylocust	2.5' cal.	7	45'
SM	Acer saccharum 'Green Mountain'	Green Mountain Sugar Maple	2.5' cal.	11	45'
WC	Calagoga spicata	Northern Calagoga	2.5' cal.	6	50'
			TOTAL	55	
ORNAMENTAL TREES:					
ABP	Pyrus calleryana 'Autumn Blaze'	Autumn Blaze Pear	6' ft. Clump	6	25'
			TOTAL	6	
SHRUBS:					
CWSC	Prunus besseyi 'Pioneer Buttes'	Creeping Western Sand Cherry	5 gal.	75	2'
DBRB	Erigeron nauseosus nauseosus	Dwarf Blue Rabbitbrush	5 gal.	19	3'
DN	Physocarpus opulifolius 'Nanus'	Dwarf Ninesmile	5 gal.	10	4'
PCBS	Campylopusis dendroica 'First Choice'	First Choice Blue Spirea	5 gal.	68	2.5'
PI	Amorpha nana	Fragrant False Indigo	5 gal.	70	3'
FS	Spirea x bumalda 'Frederick'	Frederick Spirea	5 gal.	22	3.5'
LDP	Ligustrum vulgare 'Lodense'	Lodense Privet	5 gal.	64	3'
NFS	Spirea japonica 'Neon Flash'	Neon Flash Spirea	5 gal.	45	2.5'
PBB	Buddleia davidii 'nanaensis' 'Patio Plum'	Compact Purple Butterfly Bush	5 gal.	36	5'
PCR	Rosa x 'Meigold'	Carefree Delight™ Shrub Rose	5 gal.	29	3'
PL	Syringa x jeffreyi 'Royalty'	Royalty Lilac	5 gal.	6	8'
PM	Archtothryx x coloradensis 'Panchito'	Panchito Manzanita	5 gal.	22	2'
RC	Cotoneaster horizontalis	Rosa Cotoneaster	5 gal.	65	2.5'
RS	Penstemon alpinus 'Little Spire'	Little Spire Russian Sage	5 gal.	40	
SC	Cotoneaster divaricatus	Spreading Cotoneaster	5 gal.	18	5'
			TOTAL	589	
PERENNIALS, ORNAMENTAL GRASSES, VINES:					
BC	Clematis integrifolia	Bloody Crownbill	1 gal.	40	18"
CSD	Leucanthemum x superbum 'Silver Princess'	Compact Shasta Daisy	1 gal.	124	18"
DG	Pennisetum alpestrale 'Hallel'	Dwarf Fountain Grass	1 gal.	187	2'
FRG	Calamagrostis x australis 'Karl Foerster'	Foerster Feather Reed Grass	1 gal.	36	18"
MG	Miscanthus sinensis 'Morning Light'	Morning Light Maiden Grass	1 gal.	63	4'
			TOTAL	450	

PLANT NOTES:

- ALL PLANT MATERIAL SHALL MEET SPECIFICATIONS OF THE AMERICAN ASSOCIATION OF NURSERYMEN (AAN) FOR NUMBER ONE GRADE. ALL TREES SHALL BE BALLED AND BURLAPPED OR EQUIVALENT. ALL PLANT MATERIALS SHALL HAVE ALL WIRE, TWINE OR OTHER CONTAMINANT MATERIALS, EXCEPT FOR BURLAP, REMOVED FROM TRUNK AND ROOT BALL OF THE PLANT PRIOR TO PLANTING.
- TREES SHALL NOT BE PLANTED CLOSER 7 FEET TO ANY SEWER OR WATER LINE. TREE PLANTING SHALL BE COORDINATED WITH XCEL ENERGY COMPANY. LOCATIONS OF ALL UTILITIES SHALL BE VERIFIED IN THE FIELD PRIOR TO PLANTING. APPLICANT SHALL ADD ROOT BARRIER ADJACENT TO BACK OF PUBLIC WALK WHEN TREES ARE PLANTED WITHIN 5' OF WALK OR CURB.
- ALL SHRUBS SHALL BE PLANTED NO LESS THAN 2' FROM ANY SIDEWALK OR CURB.
- GRADES SHALL BE SET TO ALLOW FOR PROPER DRAINAGE AWAY FROM STRUCTURES. GRADES SHALL MAINTAIN SMOOTH PROFILES AND BE FREE OF SURFACE DEBRIS, BUMPS, AND DEPRESSIONS.
- DEVELOPERS SHALL ENSURE THAT THE LANDSCAPE PLAN IS COORDINATED WITH THE PLANS DONE BY OTHER CONSULTANTS SO THAT THE PROPOSED GRADING, STORM DRAINAGE, OR OTHER CONSTRUCTIONS DOES NOT CONFLICT NOR PRECLUDE INSTALLATION AND MAINTENANCE OF LANDSCAPE ELEMENTS ON THIS PLAN.
- ALL SHRUB AND PERENNIAL BEDS AREAS SHALL BE MULCHED WITH A 4" LAYER OF WOOD BARK MULCH. TREE BEDS PLANTED IN CRUSHER FINES AT FRONT ENTRY. NO FABRIC TO BE INSTALLED IN ANY OF THE BEDS. INSTALL 3" DEPTH OF 1.5" MIXTURE MAX GRANITE NEXT TO BUILDING FOUNDATIONS - NO FABRIC REQUIRED.
- PRIOR TO INSTALLATION OF PLANT MATERIALS, AREAS THAT HAVE BEEN COMPACTED OR DISTURBED BY CONSTRUCTION ACTIVITY SHALL BE THOROUGHLY LOOSENEED, ORGANIC SOIL AMENDMENTS SHALL BE INCORPORATED AT THE RATE OF AT LEAST FIVE (5) CUBIC YARDS PER 1000 SQUARE FEET OF LANDSCAPE AREA IN ALL TURF AND SHRUB BEDS.
- SOD TO BE DROUGHT TOLERANT RESCUE.
- ALL LANDSCAPE (PLANT MATERIALS AND GRASS) WILL BE IRRIGATED WITH AN AUTOMATIC SYSTEM. TURF AREAS WILL HAVE A SPRAY ZONE. PLANTS WITH LIKE WATER REQUIREMENTS ARE SHOWN TOGETHER IN ORDER TO HAVE AN EFFICIENT USE OF WATER.
- CONTRACTOR SHALL VERIFY ALL MATERIAL QUANTITIES PRIOR TO INSTALLATION. ACTUAL NUMBER OF PLANT SYMBOLS SHALL HAVE PRIORITY OVER THE QUANTITY DESIGNATED.
- REFER TO THE CITY OF LOUISVILLE DESIGN AND CONSTRUCTION STREETSCAPING STANDARDS FOR ALL WORK WITHIN PUBLIC AREAS, INCLUDING TREE PROTECTION STANDARDS. THE DEVELOPER WILL MAKE EVERY EFFORT POSSIBLE TO PROTECT TREES WITHIN THE SITE USING THE SAME STANDARDS.
- ALL PRIVATE & COMMON OR PUBLIC LANDSCAPING SHOWN SHALL BE PROVIDED BY DEVELOPER. THE HOA WILL BE RESPONSIBLE FOR MAINTAINING LANDSCAPING IN THE FRONT AND SIDES OF THE FEE SIMPLE LOTS. IN THE COMMON AREAS WHERE LANDSCAPING IS INDICATED ON THIS PLAN AS WELL AS THE ROW LANDSCAPE ALONG EAST STREET. THE HOA WILL ALSO BE RESPONSIBLE FOR SNOW REMOVAL OF PUBLIC WALK ALONG EAST STREET. MAINTENANCE REQUIREMENTS OF THE HOA MAY NOT BE TRANSFERRED OR ASSIGNED WITHOUT CITY COUNCIL APPROVAL OF A PUD AMENDMENT.

Native Seed Mix

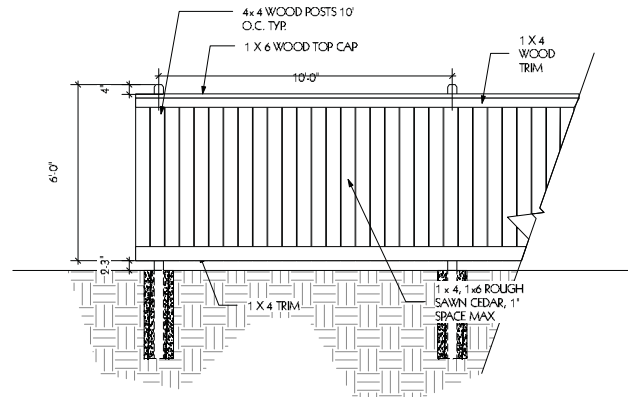
Common Name	Scientific Name	Lb/ac (PLS)*
Western wheatgrass	Pascopyrum smithii	3.5
Slender wheatgrass	Elymus trachycaulus	4
Sideoats grama	Bouteloua curtipendula	3
Blue grama	Bouteloua gracilis	1
Little bluestem	Schizachyrium scoparium	2
Needle and thread grass	Hesperostipa comata	2
Sand dropseed	Sporobolus cryptandrus	0.02
Total		15.52

* Please note that the pounds per acre are in PLS (Pure Live Seed) and must be ordered that way.

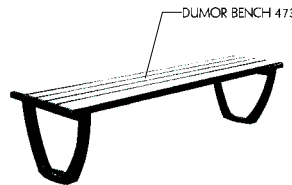
* This mix is based on 75 seeds/ square foot and is only calculated for one acre. This mix is based on the contractor using a drill seed application. Contractor is responsible for calculating the appropriate seed amounts to purchase. Mix should be doubled if hand applied.

RAIN GARDEN SEED MIX:

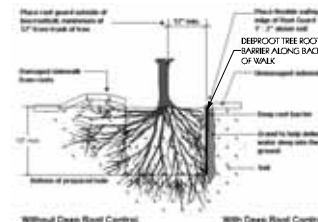
COMMON NAME	SCIENTIFIC NAME	% OF TOTAL	PLS PER ACRE
Prairie sandreed	Calamovilfa longifolia	25%	6 LBS.
Indian ricegrass	Oryzopsis hymenoides	20%	6 LBS.
Sand dropseed	Sporobolus cryptandrus	15%	6 LBS.
Western wheatgrass	Pascopyrum smithii	10%	6 LBS.
Blancet flower	Gaillardia aristata	5%	1 LBS.
Prairie coneflower	Ratibida columnifera	5%	1 LBS.
Purple prairie clover	Dalea purpurea Purple	5%	1 LBS.
White yarrow	Achillea lanulosa	5%	1 LBS.
Golden columbine	Aquilegia canadensis	5%	1 LBS.
Sulphur flower	Enicogonum umbellatum	5%	1 LBS.
TOTAL		100%	30 LBS



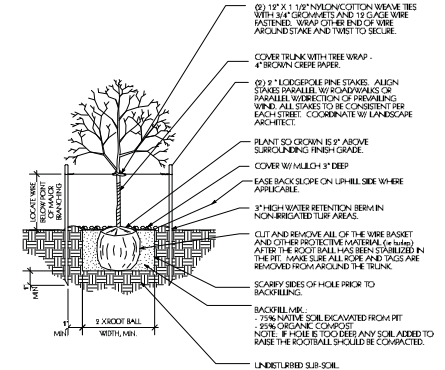
CEDAR FENCING - FRONT ELEVATION (finished side)
SCALE: 1/8"=1'-0"



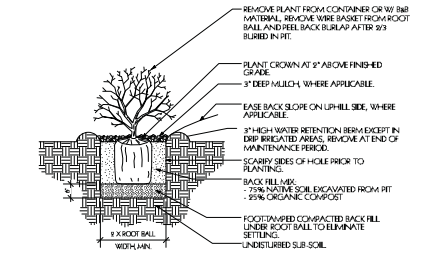
BENCH



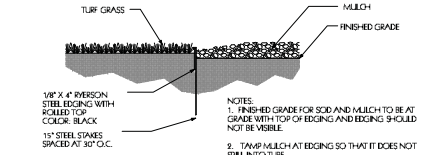
TREE ROOT BARRIER



DECIDUOUS TREE PLANTING & STAKING
SCALE: NTS



TYPICAL SHRUB PLANTING
SCALE: NTS



EDGING
SCALE: NTS

ISSUED	NO.	DESCRIPTION	DATE	NO.	DESCRIPTION	DATE
1	PRELIMINARY PUD	07-28-2022				
2	PRELIMINARY PUD	02-10-2023				
3	PRELIMINARY PUD	05-30-2023				
4	PRELIMINARY PUD	08-10-2023				

LANDSCAPE PLAN - NORTH

SCALE: 1"=20'-0"

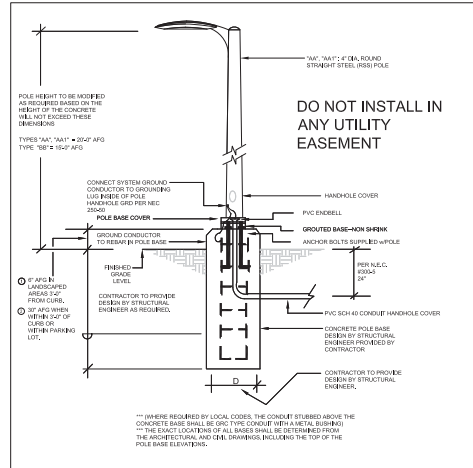
SHEET: 5

DATE: AUG 10 2023

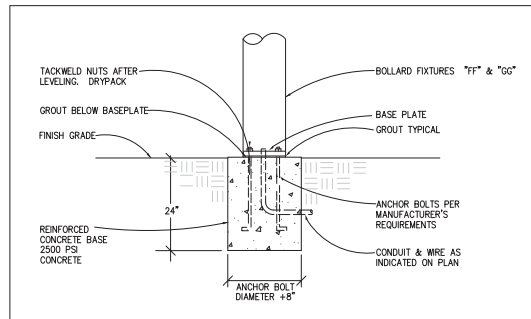
EAST ST VILLAGE

421-533 EAST ST - PRELIMINARY PLANNED UNIT DEVELOPMENT
CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO
CASE #PUPL-0427-2022

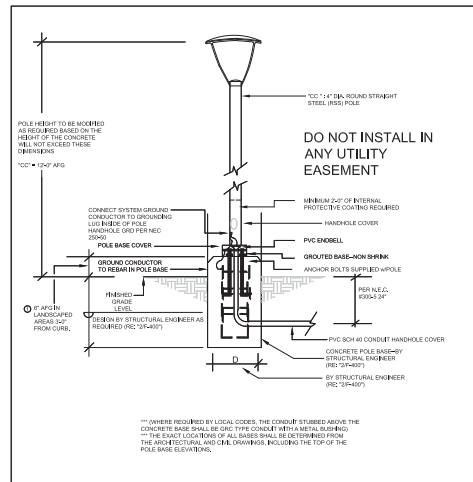
DESIGN
PRACTICE, INC.
2042 W 44th
Denver CO 80211
www.designpractice-denver.com
info@designpractice-denver.com
PHONE 303 561 3000



1 TYPES "AA, AA1, BB" POLE BASE DETAIL
SCALE: N.T.S.



2 TYPES "FF" & "GG" BOLLARD BASE DETAIL
SCALE: N.T.S.



3 TYPE "CC" POLE BASE DETAIL
SCALE: N.T.S.

LEGEND	
SYMBOL	DESCRIPTION
	ARM MOUNTED ROADWAY POLE
	GROUND MOUNTED BOLLARD
	POST TOP AREA LIGHT
	WALL MOUNTED AREA LIGHT

SHEET INDEX	
ISSUE	
23 MAY 2023 PRELIM PLANNED UNIT DEV.	
10 AUGUST 2023 PRELIM PLANNED UNIT DEV.	
SHEET NO.	SHEET DESCRIPTION
1	LIGHTING COVER SHEET & DETAILS
9	PHOTOMETRIC SITE PLAN
10	LUMINAIRE CUT SHEETS

CODES & DESIGN CRITERIA	
JURISDICTION:	CITY OF LOUISVILLE
ELECTRICAL CODE:	2020 N.E.C.
ENERGY CODE:	2021 I.E.C.C.

LUMINAIRE SCHEDULE

FIX. TYPE	MANUFACTURER	FINISH	LAMP DATA	LUMINAIRE WATTS	MOUNTING METHOD	MTG HEIGHT	MTG DEPTH	REMARKS	VOLTS
AA	LITHONIA RAD14LED4P3036P4TH HEAVYVOLT4PA 40BLXD	BLK	1-LED BY MFR		RE: 1 SHS: "F"	20'-0" AFG			120/277
AA1	LITHONIA RAD14LED4P3036KAYVOLT4PA 40BLXD	BLK	1-LED BY MFR		RE: 1 SHS: "F"	20'-0" AFG			120/277
BB	LITHONIA RAD14LED4P3036P4TH HEAVYVOLT4PA 40BLXD	BLK	1-LED BY MFR		RE: 1 SHS: "F"	10'-0" AFG			120/277
CC	LITHONIA RADPT4LED4P3036KAYVOLT4PA 40BLXD	BLK	1-LED BY MFR		RE: 3 SHS: "F"	12'-0" AFG			120/277
DD	LITHONIA WDG6LED4P3036B CR17MMVOLT4SPIN40BLXD	BLK	1-LED BY MFR		WALL	9'-0" AFG			120/277
EE	LITHONIA WDG6LED4P3036B CR17MMVOLT4SPIN40BLXD	BLK	1-LED BY MFR		WALL	9'-0" AFG			120/277
FF	LITHONIA RAD14LED4P3036KAYVOLT4PA40CC 40BLXD	BLK	1-LED BY MFR	19	RE:2 SHS: "F"	42"			120/277
GG	LITHONIA RAD14LED4P3036KAYVOLT4PA40CC 40BLXD	BLK	1-LED BY MFR	13	RE:2 SHS: "F"	42"			120/277

ISSUED				
NO.	DESCRIPTION	DATE	NO.	DESCRIPTION
1	PRELIMINARY PUD	07-28-2022		
2	PRELIMINARY PUD	02-10-2023		
3	PRELIMINARY PUD	05-30-2023		
4	PRELIMINARY PUD	08-10-2023		

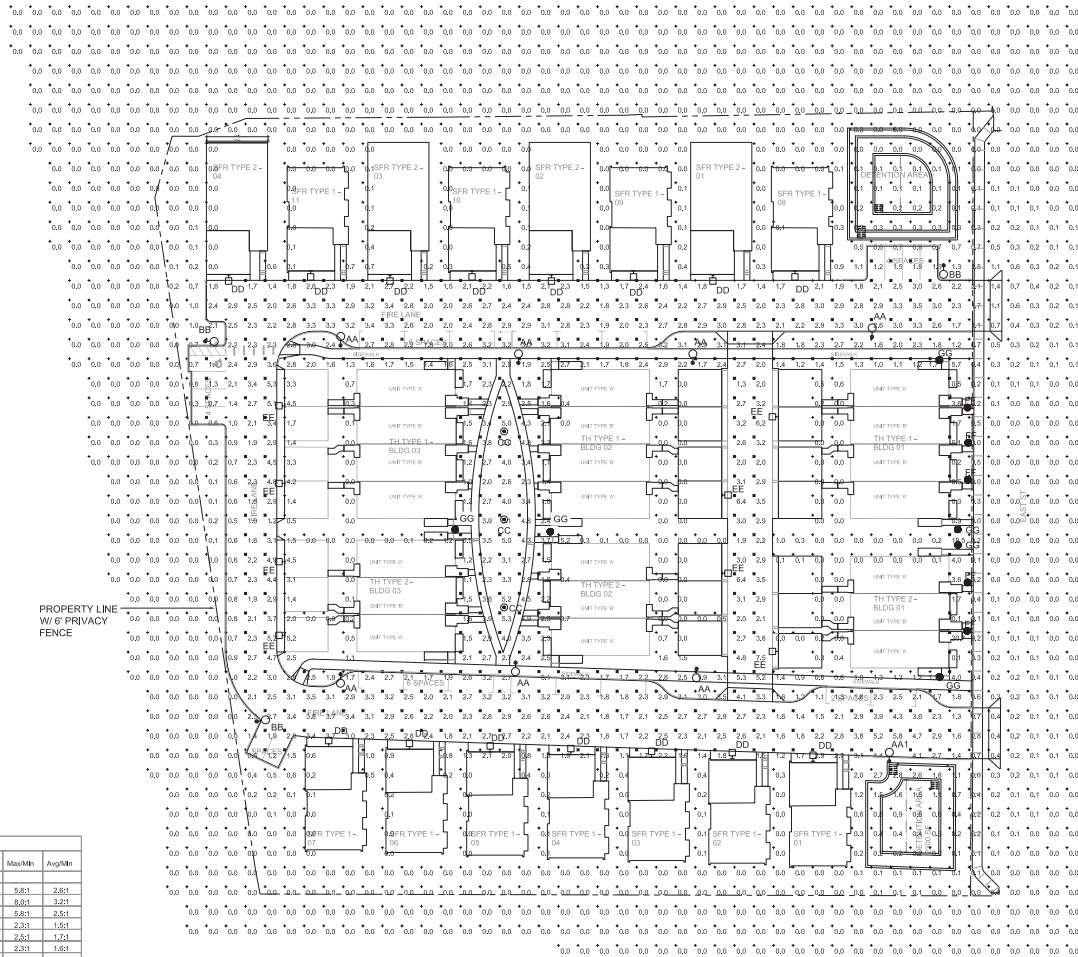
LIGHTING COVER SHEET AND DETAILS	SHEET: 8
SCALE: N.T.S.	DATE: AUG 10 2023



EAST ST VILLAGE

421-533 EAST ST - PRELIMINARY PLANNED UNIT DEVELOPMENT
CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO
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DESIGN
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Statistics						
Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min
drive line	X	2.6 fc	5.8 fc	1.0 fc	5.8:1	2.6:1
asset entries	X	6.4 fc	20.7 fc	2.6 fc	8:1	3:1
garage lane	X	3.3 fc	7.5 fc	1.3 fc	5.8:1	2.9:1
parking	X	0.9 fc	1.4 fc	0.6 fc	2.3:1	1.5:1
parking	X	2.0 fc	3.0 fc	1.2 fc	2.5:1	1.7:1
parking	X	1.8 fc	2.5 fc	1.1 fc	2.3:1	1.6:1
parking	X	2.6 fc	3.2 fc	1.8 fc	1.8:1	1.4:1
parking	X	1.5 fc	1.9 fc	1.2 fc	1.6:1	1.3:1
parking	X	2.6 fc	3.2 fc	1.8 fc	1.8:1	1.4:1
parking	X	2.9 fc	6.5 fc	1.0 fc	6.5:1	2.9:1
parking	X	2.1 fc	3.1 fc	1.3 fc	2.4:1	1.6:1
parking	X	1.7 fc	3.7 fc	1.0 fc	6.7:1	1.7:1
parking	X	1.8 fc	1.8 fc	1.7 fc	1.1:1	1.1:1
parking	X	2.4 fc	3.2 fc	1.7 fc	1.9:1	1.4:1

1 SITE PHOTOMETRIC PLAN

SCALE: 1"=30'-0"



PHOTOMETRIC SITE PLAN

SCALE: 1" = 30'-0"

SHEET: 9

DATE: AUG 10 2023

**DESIGN
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PHONE_303 561 3000

TYPE "FF & GG" (FULL CUT-OFF)



RADEAN Bolland

LED Site Luminaire






Part No.

Warranty

Color

Finish

"FF & GG"

Specifications

Dimensions

Height: 2.0m / 6'6"

Height: 2.5m / 8'2"

Height: 3.0m / 9'8"

Height: 3.5m / 11'4"

Height: 4.0m / 13'0"

Height: 4.5m / 14'8"

Height: 5.0m / 16'4"

Height: 5.5m / 18'1"

Height: 6.0m / 19'7"

Height: 6.5m / 21'3"

Height: 7.0m / 22'9"

Height: 7.5m / 24'6"

Height: 8.0m / 26'2"

Height: 8.5m / 27'9"

Height: 9.0m / 29'5"

Height: 9.5m / 31'2"

Height: 10.0m / 32'8"

Height: 10.5m / 34'5"

Height: 11.0m / 36'1"

Height: 11.5m / 37'8"

Height: 12.0m / 39'4"

Height: 12.5m / 41'1"

Height: 13.0m / 42'7"

Height: 13.5m / 44'4"

Height: 14.0m / 46'0"

Height: 14.5m / 47'7"

Height: 15.0m / 49'3"

Height: 15.5m / 51'0"

Height: 16.0m / 52'6"

Height: 16.5m / 54'3"

Height: 17.0m / 55'9"

Height: 17.5m / 57'6"

Height: 18.0m / 59'2"

Height: 18.5m / 60'9"

Height: 19.0m / 62'5"

Height: 19.5m / 64'2"

Height: 20.0m / 65'8"

Height: 20.5m / 67'5"

Height: 21.0m / 69'1"

Height: 21.5m / 70'8"

Height: 22.0m / 72'4"

Height: 22.5m / 74'1"

Height: 23.0m / 75'7"

Height: 23.5m / 77'4"

Height: 24.0m / 79'0"

Height: 24.5m / 80'7"

Height: 25.0m / 82'3"

Height: 25.5m / 84'0"

Height: 26.0m / 85'6"

Height: 26.5m / 87'3"

Height: 27.0m / 88'9"

Height: 27.5m / 90'6"

Height: 28.0m / 92'2"

Height: 28.5m / 93'9"

Height: 29.0m / 95'5"

Height: 29.5m / 97'2"

Height: 30.0m / 98'8"

Height: 30.5m / 100'5"

Height: 31.0m / 102'1"

Height: 31.5m / 103'8"

Height: 32.0m / 105'4"

Height: 32.5m / 107'1"

Height: 33.0m / 108'7"

Height: 33.5m / 110'4"

Height: 34.0m / 112'0"

Height: 34.5m / 113'7"

Height: 35.0m / 115'3"

Height: 35.5m / 117'0"

Height: 36.0m / 118'6"

Height: 36.5m / 120'3"

Height: 37.0m / 121'9"

Height: 37.5m / 123'6"

Height: 38.0m / 125'2"

Height: 38.5m / 126'9"

Height: 39.0m / 128'5"

Height: 39.5m / 130'2"

Height: 40.0m / 131'8"

Height: 40.5m / 133'5"

Height: 41.0m / 135'1"

Height: 41.5m / 136'8"

Height: 42.0m / 138'4"

Height: 42.5m / 140'1"

Height: 43.0m / 141'7"

Height: 43.5m / 143'4"

Height: 44.0m / 145'0"

Height: 44.5m / 146'7"

Height: 45.0m / 148'3"

Height: 45.5m / 150'0"

Height: 46.0m / 151'6"

Height: 46.5m / 153'3"

Height: 47.0m / 154'9"

Height: 47.5m / 156'6"

Height: 48.0m / 158'2"

Height: 48.5m / 159'9"

Height: 49.0m / 161'5"

Height: 49.5m / 163'2"

Height: 50.0m / 164'8"

Height: 50.5m / 166'5"

Height: 51.0m / 168'1"

Height: 51.5m / 169'8"

Height: 52.0m / 171'4"

Height: 52.5m / 173'1"

Height: 53.0m / 174'7"

Height: 53.5m / 176'4"

Height: 54.0m / 178'0"

Height: 54.5m / 179'7"

Height: 55.0m / 181'3"

Height: 55.5m / 183'0"

Height: 56.0m / 184'6"

Height: 56.5m / 186'3"

Height: 57.0m / 187'9"

Height: 57.5m / 189'6"

Height: 58.0m / 191'2"

Height: 58.5m / 192'9"

Height: 59.0m / 194'5"

Height: 59.5m / 196'2"

Height: 60.0m / 197'8"

Height: 60.5m / 199'5"

Height: 61.0m / 201'1"

Height: 61.5m / 202'8"

Height: 62.0m / 204'4"

Height: 62.5m / 206'1"

Height: 63.0m / 207'7"

Height: 63.5m / 209'4"

Height: 64.0m / 211'0"

Height: 64.5m / 212'7"

Height: 65.0m / 214'3"

Height: 65.5m / 216'0"

Height: 66.0m / 217'6"

Height: 66.5m / 219'3"

Height: 67.0m / 220'9"

Height: 67.5m / 222'6"

Height: 68.0m / 224'2"

Height: 68.5m / 225'9"

Height: 69.0m / 227'5"

Height: 69.5m / 229'2"

Height: 70.0m / 230'8"

Height: 70.5m / 232'5"

Height: 71.0m / 234'1"

Height: 71.5m / 235'8"

Height: 72.0m / 237'4"

Height: 72.5m / 239'1"

Height: 73.0m / 240'7"

Height: 73.5m / 242'4"

Height: 74.0m / 244'0"

Height: 74.5m / 245'7"

Height: 75.0m / 247'3"

Height: 75.5m / 249'0"

Height: 76.0m / 250'6"

Height: 76.5m / 252'3"

Height: 77.0m / 253'9"

Height: 77.5m / 255'6"

Height: 78.0m / 257'2"

Height: 78.5m / 258'9"

Height: 79.0m / 260'5"

Height: 79.5m / 262'2"

Height: 80.0m / 263'8"

Height: 80.5m / 265'5"

Height: 81.0m / 267'1"

Height: 81.5m / 268'8"

Height: 82.0m / 270'4"

Height: 82.5m / 272'1"

Height: 83.0m / 273'7"

Height: 83.5m / 275'4"

Height: 84.0m / 277'0"

Height: 84.5m / 278'7"

Height: 85.0m / 280'3"

Height: 85.5m / 282'0"

Height: 86.0m / 283'6"

Height: 86.5m / 285'3"

Height: 87.0m / 286'9"

Height: 87.5m / 288'6"

Height: 88.0m / 290'2"

Height: 88.5m / 291'9"

Height: 89.0m / 293'5"

Height: 89.5m / 295'2"

Height: 90.0m / 29

ISSUED					
NO.	DESCRIPTION	DATE	NO.	DESCRIPTION	DATE
1	PRELIMINARY PUD	07-26-2022			
2	PRELIMINARY PUD	02-10-2023			
3	PRELIMINARY PUD	05-30-2023			
4	PRELIMINARY PUD	08-10-2023			

DATE: AUG 10 2023



JCA
4100 Wadsworth Blvd
Wheat Ridge, CO 80033
p 303.985.3260

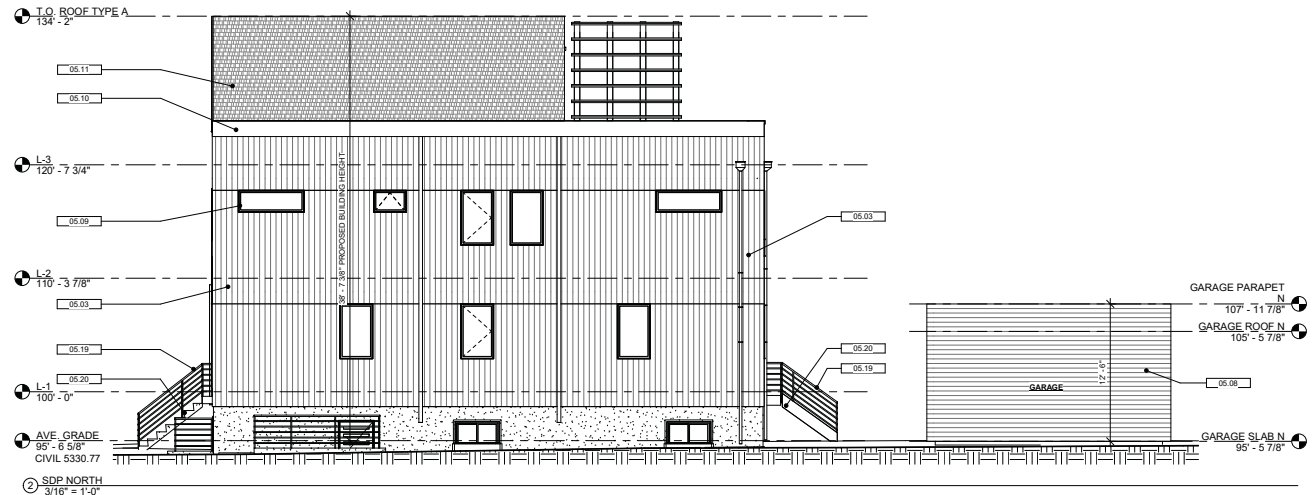
EAST ST VILLAGE

421-533 EAST ST - PRELIMINARY PLANNED UNIT DEVELOPMENT
CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO
CASE #PUPL-0427-2022

DESIGN
PRACTICE, INC
2842 W 44th
Denver CO 80211
www.designpracticeinc.com
info@designpracticeinc.com
PHONE: 303.561.3000

TH TYPE 1 MATERIAL PALETTE 'A'
SEE EXHIBIT SHEET 15 FOR ADDITIONAL
MATERIAL PAlettes OF THE TH TYPE 1
BUILDINGS.

PUD ELEVATION KEYNOTES	
Key Value	Keynote Text
05.01	VESTA 5" STEEL PLANK SIDING - HORIZ - IRONSTONE
05.03	VESTA 5" STEEL PLANK SIDING - VERT - WHITE
05.07	5" SHIP-LAP CEDAR SIDING - NATURAL STAIN
05.08	HARDPLANK SMOOTH LAP SIDING - WHITE
05.09	ANDERSON 100 SERIES COMPOSITE WINDOW - BLACK
05.10	METAL FASCIA - CHARCOAL
05.11	30 YR DIMENSIONAL SHINGLE - CHARCOAL
05.14	CEMENTITIOUS RAISED WALL DETAIL PTD. CHARCOAL
05.15	COMPOSITE ENTRY DOOR - PTD
05.19	POWDER COATED STEEL RAILING - BLACK
05.20	STEEL STAIR W/CONCRETE TREADS - BLACK
05.21	SKYLIGHT
05.26	VESTA DRIP CAP STARTER FLASHING - WHITE
05.27	VESTA DRIP CAP OVER UTILITY TRIM REVEAL - WHITE



ISSUED					
NO.	DESCRIPTION	DATE	NO.	DESCRIPTION	DATE
1	PRELIMINARY PUD	07-28-2022			
2	PRELIMINARY PUD	02-10-2023			
3	PRELIMINARY PUD	05-30-2023			
4	PRELIMINARY PUD	08-10-2023			

TH TYPE 1 - ELEVATIONS

SHEET: 11

SCALE:

DATE: AUG 10 2023

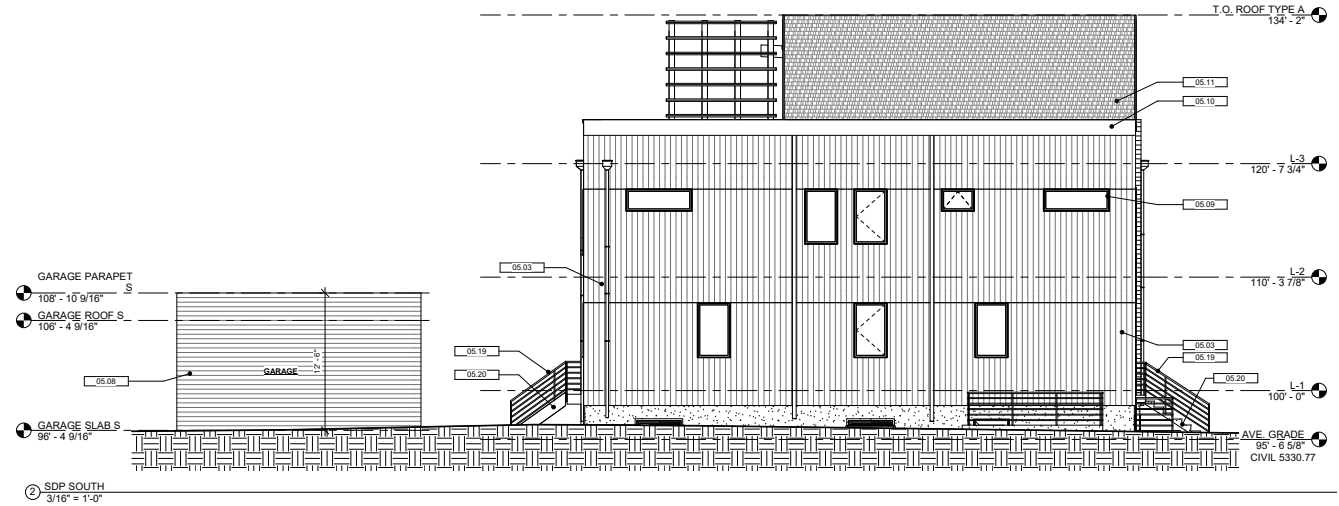
EAST ST VILLAGE

421-533 EAST ST - PRELIMINARY PLANNED UNIT DEVELOPMENT
CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO
CASE #PUPL-0427-2022

DESIGN
PRACTICE, INC
2842 W 44th
Denver CO 80211
www.designpracticecolorado.com
info@designpracticecolorado.com
PHONE: 303.661.3000

TH TYPE 1 MATERIAL PALETTE 'A'
SEE EXHIBIT SHEET 15 FOR ADDITIONAL
MATERIAL PALETTES OF THE TH TYPE 1
BUILDINGS.

PUD ELEVATION KEYNOTES	
Key Value	Keynote Text
05.01	VESTA 9" STEEL PLANK SIDING - HORIZ - IRONSTONE
05.03	VESTA 9" STEEL PLANK SIDING - VERT - WHITE
05.07	5" SHIPLAP CEDAR SIDING - NATURAL STAIN
05.08	HARDPLANK SMOOTH LAP SIDING - WHITE
05.09	ANDERSON 100 SERIES COMPOSITE WINDOW - BLACK
05.10	METAL FASCIA - CHARCOAL
05.11	30 YR DIMENSIONAL SHINGLE - CHARCOAL
05.14	CEMENTITIOUS RAISED WALL DETAIL PTD. CHARCOAL
05.15	COMPOSITE ENTRY DOOR - PTD
05.19	POWDER COATED STEEL RAILING - BLACK
05.20	STEEL STAR WOODCONCRETE TREADS - BLACK
05.21	SKYLIGHT
05.26	VESTA DRIP CAP STARTER FLASHING - WHITE
05.27	VESTA DRIP CAP OVER UTILITY TRIM REVEAL - WHITE



ISSUED					
NO.	DESCRIPTION	DATE	NO.	DESCRIPTION	DATE
1	PRELIMINARY PUD	07-28-2022			
2	PRELIMINARY PUD	02-10-2023			
3	PRELIMINARY PUD	05-30-2023			
4	PRELIMINARY PUD	08-10-2023			

TH TYPE 1 - ELEVATIONS

SHEET: 12

SCALE:

DATE: AUG 10 2023

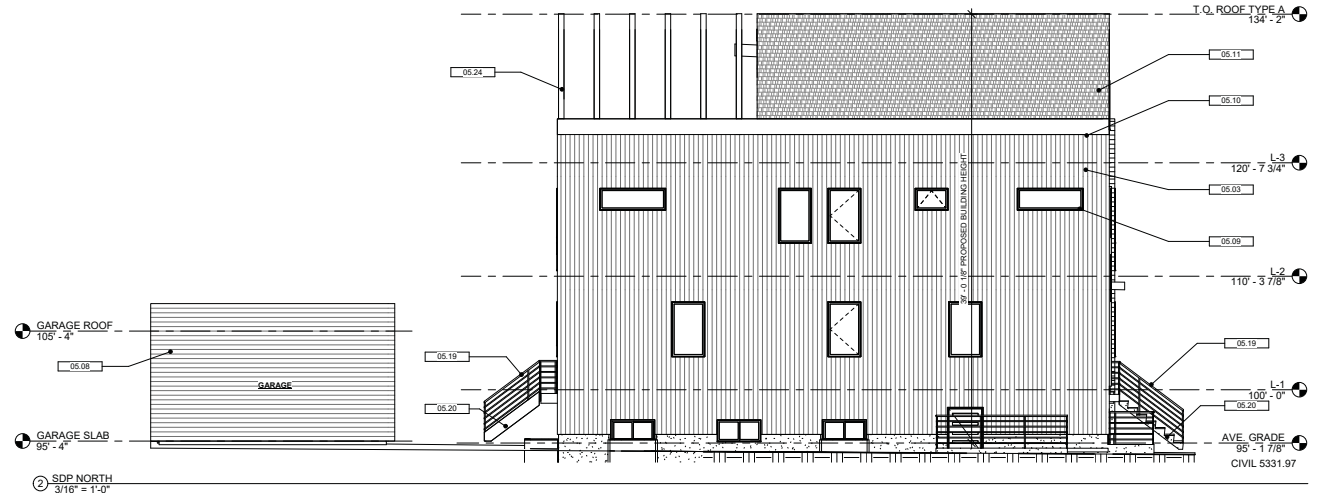
EAST ST VILLAGE

421-533 EAST ST - PRELIMINARY PLANNED UNIT DEVELOPMENT
CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO
CASE #PUPL-0427-2022

DESIGN
PRACTICE, INC
2842 W 44th
Denver CO 80211
www.designpracticeinc.com
info@designpracticeinc.com
PHONE 303 561 3000

TH TYPE 2 MATERIAL PALETTE 'A'
SEE EXHIBIT SHEET 15 FOR ADDITIONAL
MATERIAL PALETTES OF THE TH TYPE 1
BUILDINGS.

PUD ELEVATION KEYNOTES	
Key Value	Keynote Text
05.01	VESTA 5" STEEL PLANK SIDING - HORIZ - IRONSTONE
05.03	VESTA 5" STEEL PLANK SIDING - VERT - WHITE
05.07	5" SHIP LAP CEDAR SIDING - NATURAL STAIN
05.08	HARDPLANK SMOOTH LAP SIDING - WHITE
05.09	ANDERSON 100 SERIES COMPOSITE WINDOW - BLACK
05.10	METAL FASCIA - CHARCOAL
05.11	30 YR DIMENSIONAL SHINGLE - CHARCOAL
05.19	POWDER COATED STEEL RAILING - BLACK
05.20	STEEL STAR W/CONCRETE TREADS - BLACK
05.21	SKYLIGHT
05.24	STEEL PERGOLA STRUCTURE - BLACK
05.25	RAISED WINDOW ACCENT - BLACK



SDP EAST
3/16" = 1'-0"

ISSUED					
NO.	DESCRIPTION	DATE	NO.	DESCRIPTION	DATE
1	PRELIMINARY PUD	07-28-2022			
2	PRELIMINARY PUD	02-10-2023			
3	PRELIMINARY PUD	05-30-2023			
4	PRELIMINARY PUD	08-10-2023			

TH TYPE 2 - ELEVATIONS

SHEET: 13

SCALE:

DATE: AUG 10 2023

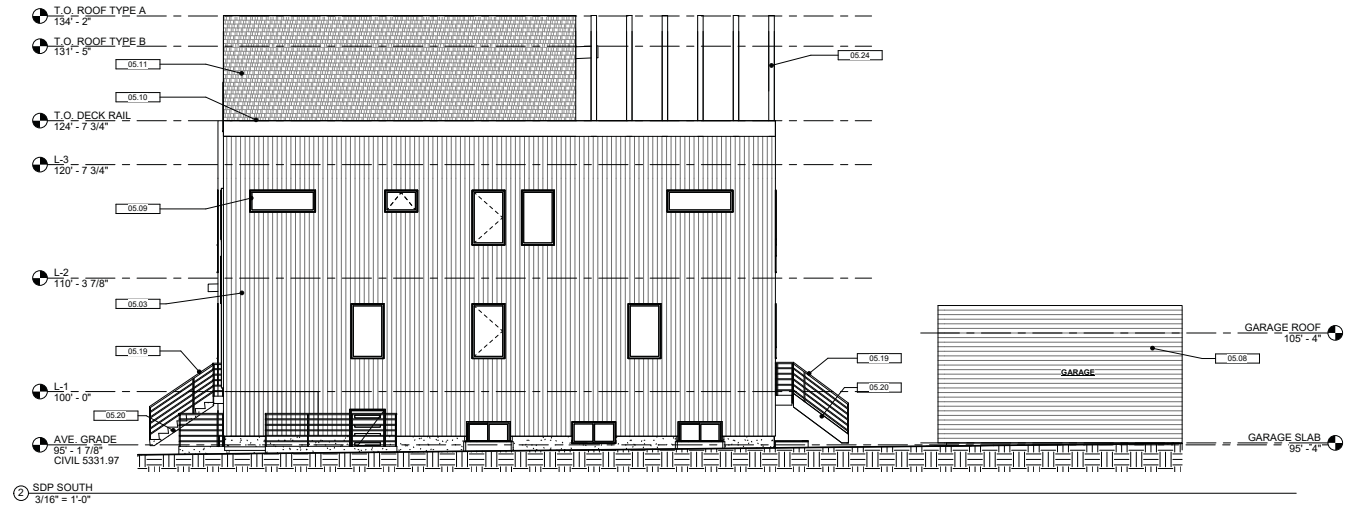
EAST ST VILLAGE

421-533 EAST ST - PRELIMINARY PLANNED UNIT DEVELOPMENT
CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO
CASE #PUPL-0427-2022

DESIGN
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info@designpracticeinc.com
PHONE: 303 561 3000

TH TYPE 1 MATERIAL PALETTE 'A'
SEE EXHIBIT SHEET 15 FOR ADDITIONAL
MATERIAL PAlettes OF THE TH TYPE 1
BUILDINGS.

Key Value	Keynote Text
05.01	VESTA 5" STEEL PLANK SIDING - HORIZ. - BRONSTONE
05.03	VESTA 5" STEEL PLANK SIDING - VERT - WHITE
05.07	5" SHIP LAP CEDAR SIDING - NATURAL STAIN
05.08	HANDS PLANK SMOOTH LAP SIDING - WHITE
05.09	ANDERSON 10 SERIES COMPOSITE WINDOW - BLACK
05.10	METAL FASCIA - CHARCOAL
05.11	30 YR DIMENSIONAL SHINGLE - CHARCOAL
05.15	COMPOSITE ENTRY DOOR - PID
05.19	POWDER COATED STEEL RAILING - BLACK
05.20	STEEL STAIR W/CONCRETE TREADS - BLACK
05.21	SKYLIGHT
05.24	STEEL PERGOLA STRUCTURE - BLACK



ISSUED					
NO.	DESCRIPTION	DATE	NO.	DESCRIPTION	DATE
1	PRELIMINARY PUD	07-28-2022			
2	PRELIMINARY PUD	02-10-2023			
3	PRELIMINARY PUD	05-30-2023			
4	PRELIMINARY PUD	08-10-2023			

TH TYPE 2 - ELEVATIONS

SHEET: 14

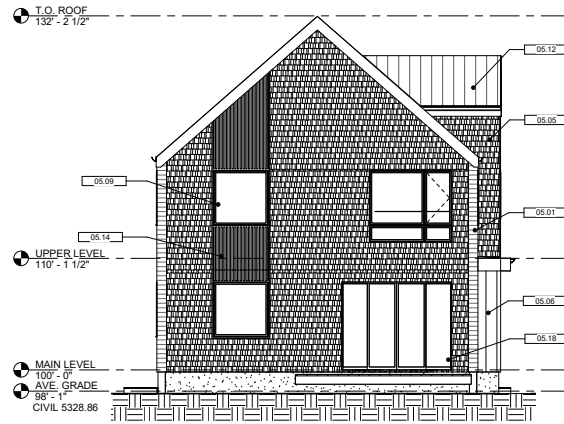
SCALE:

DATE: AUG 10 2023

EAST ST VILLAGE

421-533 EAST ST - PRELIMINARY PLANNED UNIT DEVELOPMENT
CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO
CASE #PUPL-0427-2022

DESIGN
PRACTICE, INC
2842 W 44th
Denver CO 80211
www.designpracticecolorado.com
info@designpracticecolorado.com
PHONE 303 561 3000



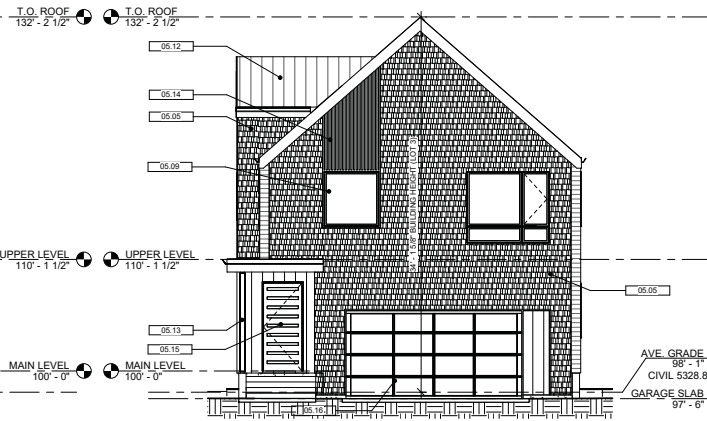
④ SDP - SOUTH ELEVATION
3/16" = 1'-0"



③ SDP - EAST ELEVATION
3/16" = 1'-0"



② SDP - WEST ELEVATION
3/16" = 1'-0"



① SDP - NORTH ELEVATION
3/16" = 1'-0"

SFR TYPE 1 MATERIAL PALETTE 'A'
SEE EXHIBIT SHEET 14 FOR ADDITIONAL
MATERIAL PALETTES OF THE SFR TYPE 1
UNITS.

PUD MATERIALS	
Key Value	Keynote Text
05.01	VESTA 5" STEEL PLANK SIDING - HORZ - IRONSTONE
05.05	CEMENTITIOUS SHINGLE SIDING - BM 188
05.06	12" SANDING SEAM METAL SIDING - CHARCOAL
05.09	ANDERSON 100 SERIES COMPOSITE WINDOW - BLACK
05.10	METAL FASCIA - CHARCOAL
05.11	30 YR DIMENSIONAL SHINGLE - CHARCOAL
05.12	12" STANDING SEAM METAL ROOFING - CHARCOAL
05.13	PTD WOOD SCREEN ENTRY SCREEN - CHARCOAL
05.14	CEMENTITIOUS RAISED WALL DETAIL PTD - CHARCOAL
05.15	COMPOSITE ENTRY DOOR - PTD
05.16	GLAZED OVERHEAD GARAGE DOOR - BLACK
05.18	COMPOSITE SLIDING DOOR - BLACK

ISSUED				
NO.	DESCRIPTION	DATE	NO.	DESCRIPTION
1	PRELIMINARY PUD	07-28-2022		
2	PRELIMINARY PUD	02-10-2023		
3	PRELIMINARY PUD	05-30-2023		
4	PRELIMINARY PUD	06-10-2023		

SFR TYPE 1 - ELEVATIONS

SCALE:

SHEET: 15

DATE: AUG 10 2023

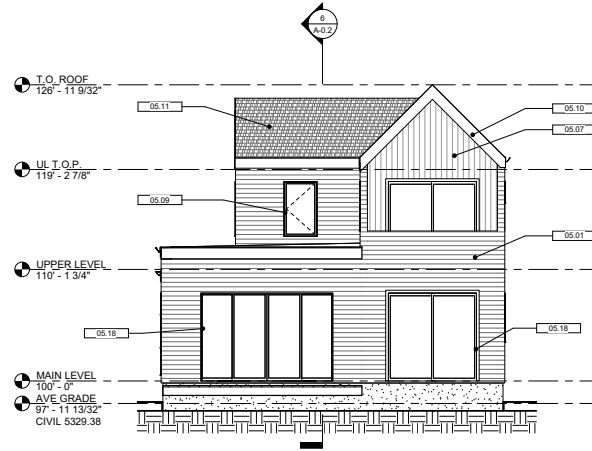
EAST ST VILLAGE

421-533 EAST ST - PRELIMINARY PLANNED UNIT DEVELOPMENT
CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO
CASE #PUPL-0427-2022

DESIGN
PRACTICE, INC
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PHONE 303 561 3000

SFR TYPE 1 MATERIAL PALETTE 'A'
SEE EXHIBIT SHEET 14 FOR ADDITIONAL
MATERIAL PAlettes OF THE SFR TYPE 1
UNITS.

PUD KEYNOTES	
Key Value	Keynote Text
05.01	VESTA 5" STEEL PLANK SIDING - HORZ - IRONSTONE
05.07	5" SHIPLAP CEDAR SIDING - NATURAL STAIN
05.09	ANDERSON 100 SERIES COMPOSITE WINDOW - BLACK
05.10	METAL FASCIA - CHARCOAL
05.11	30 YR DIMENSIONAL SHINGLE - CHARCOAL
05.13	PTD WOOD SCREEN ENTRY SCREEN - CHARCOAL
05.15	COMPOSITE ENTRY DOOR - PTD
05.16	GLAZED OVERHEAD GARAGE DOOR - BLACK
05.18	COMPOSITE SLIDING DOOR - BLACK



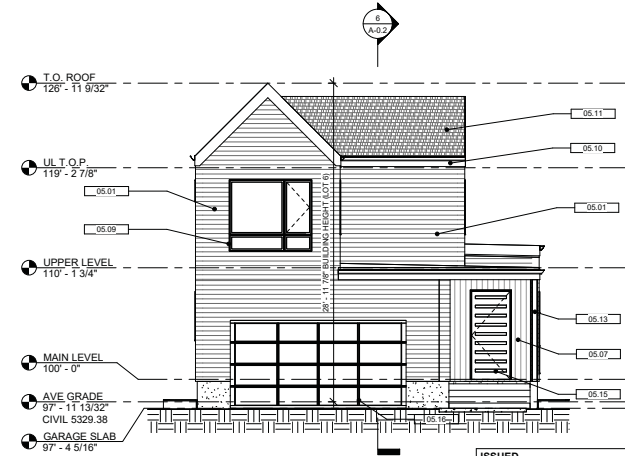
③ SDP - NORTH ELEVATION
3/16" = 1'-0"



④ SDP - WEST ELEVATION
3/16" = 1'-0"



② SDP - EAST ELEVATION
3/16" = 1'-0"



① SDP - SOUTH ELEVATION
3/16" = 1'-0"

ISSUED					
NO.	DESCRIPTION	DATE	NO.	DESCRIPTION	DATE
1	PRELIMINARY PUD	07-28-2022			
2	PRELIMINARY PUD	02-10-2023			
3	PRELIMINARY PUD	05-30-2023			
4	PRELIMINARY PUD	08-10-2023			

SFR TYPE 2 - ELEVATIONS

SHEET: 16

SCALE:

DATE: AUG 10 2023

August 10, 2023

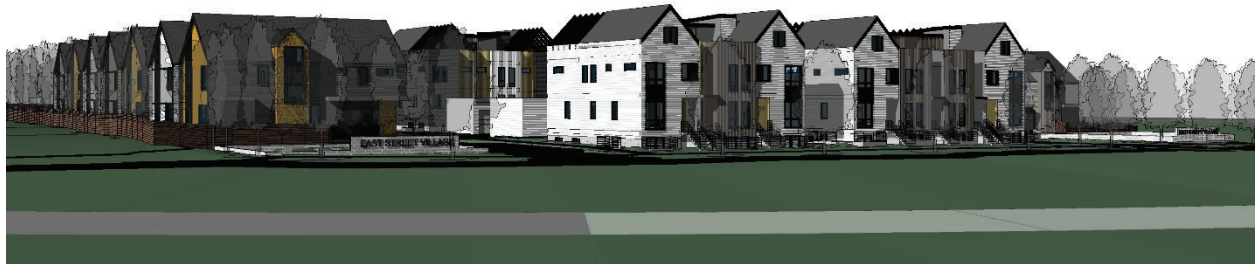
City of Louisville
Ellie Hassan

**Re: East St Village
421-533 Multi Family Development Proposal
Preliminary PUD Submittal 3**

Dear Ms. Hassan,

East St LLC is seeking a Planned Urban Development (PUD) for a multi-unit development on the lots currently addressed as 421-533 East St. The pre-application meeting for this project was held on March 30th 2021. The first Preliminary PUD was submitted on Aug 31st 2022 with comments received on October 12th 2022. The second Preliminary PUD was submitted on February 10th 2023 with comments received on April 17th 2023. Preliminary PUD 3 was submitted on June 6th 2023 with comments received on July 21st 2023.

The PUD proposal is for a residential only development with a mix of fee-simple residential product types within the site. There are 15 stand-alone single-family units, 9 middle Rowhome units, and 12 end Rowhome units. The proposed unit count is 36 market rate units.



Project View from SE

Existing Site Information:

Currently there are 10 structures on the East side of the parcel with a mixture of homes, detached garages, and storage buildings. The West half of the site is undeveloped at this time and sits adjacent to the railroad tracks. The topography of the site is a gentle slope down from SW to the NE with about 10' of fall across the entirety of the site.

The site comprises approximately 156,458 SF (3.6 acre) after dedication of R.O.W. for East St.

Waiver Requests/Comprehensive Plan Alignment:

The waivers we are requesting from the limitations of the RM zoning creates a development that better aligns with the goals of the 2013 Comprehensive Plan and allows for a development that is superior to what the RM zoning would allow. The lot size and setback requirements of the underlying zoning restricts the site in such a way that development would be inconsistent with the housing needs and walkability desires of the Comprehensive Plan. As noted in the 2013 Comprehensive Plan, and is even more so apparent today, the City of Louisville suffers from a lack of housing and a scarcity of developable land. While some progress has been made since 2013, the demand/desire for housing within the City has outpaced new development.

While the East St Village project is outside the boundary of the Downtown and the Highway 42 Revitalization District defined in the Comprehensive Plan, we see the project as an integral part of Downtown and an opportunity to provide an additional benefit to the Downtown core. The Project will bring much needed additional housing into the walkable core of Old Town Louisville. Market housing demands require different and new housing types from when the underlying zoning district was designed and implemented. By providing a mix of housing types and sizes, the Louisville community will benefit from the offering of a more diverse spectrum of household incomes.

The Waiver Requests necessary to elevate the development over the constraints of the underlying RM zoning include minimum lot sizes, setbacks, height and lot ratios. Waiver requests are required for both the Townhome product type and the proposed detached single-family units. By allowing for smaller lot sizes, shallower setbacks and a height exception for the townhome unit types, the waivers allow the project to provide a greater number of smaller units and a more diverse range of housing types and prices within walking distance to the downtown core.

Building Height Waiver:

We are asking for a waiver on overall building heights for the townhome units of this project. The maximum allowable building height in the underlying R-M district is 35'-0"

Refer to the Height Waiver Table on the cover sheet of the PUD submittal and Exhibit sheet EX-2 for details/dimensions of the request.

To minimize the impact on adjoining parcels, we have arranged the site so that the height compliant single-family units are located at the northern and southern boundaries of the site. The townhome units, where we are requesting a height waiver, are located in the middle portion of the site. This removes any direct adverse affect from the additional height requested on either of the parcels directly adjacent to our site. It is important to note that the northern border of our site abuts a City owned parcel that was previously a drainage ditch and creates a buffer from the Pine St Plaza property. The properties adjacent to our southern parcel line are encumbered by a 30' utility easement for the full East/West width of their parcels providing a buffer similar to the north side of the property. While the East St Village Development is near the Downtown area it is not a part of the Downtown Design Handbook and therefore not subject to the "Core" and "Transition" zones' height restrictions.

See the Site Height Exhibit included with this PUD submittal.

Lots Size/Setback Waivers:

We are requesting waivers that alter the Minimum Lot Area, Minimum Lot Width, Minimum Lot Area Per Dwelling (density) Maximum Lot Coverage, Minimum Front Yard Setback, Minimum Side Yard Setback from Interior Lot Line and Minimum Rear Yard Setback. As stated above, the limitation of the underlying RM zoning district would only allow for fewer and larger units on the site, which is inconsistent with the goals of the Comprehensive Plan.

Waiver table is included at the end of this document in addition to the Cover Sheet of the PUD.

Block Width Waiver:

We are asking for a waiver from section 16.16.040 for a minimum block width of 400' between the two entrances to the site. The proposed width between entrances is 192' – 7 3/8". This is necessary to create through access circulation on the site and enhanced emergency vehicle access.

Lot Depth to Width Ratio Waiver:

We are asking for a waiver from section 16.16.050 Subsection C for a maximum depth of a residential lot not to exceed 2 ½ times the lot width. The lots for the Townhome units, with their narrow form, all exceed this lot depth to width ratio. The long narrow lots are necessary to allow for the detached garages and private open space on these units.

Additional Zoning Related Items:**Parking:**

Each of the units includes an attached or detached 2-car garage, depending on the type of unit. The proposal accommodates 24 surface guest parking spaces within the site.

Open Space:

East St Village distributes open space almost equally in regards to public Open Space versus Private Yards. The nature of the detached single-family type and the townhome type, allows for each unit to have an individual private outdoor yard space. The public open space is located at the entries of the townhome units both at East St and in the common open space in the middle of the site. We see this common outdoor space as a more reflective space, with permanent seating at the north and south ends and a small tree covered grass space in the center. While there is additional open space in the landscaped rain gardens on the East St side of the project, we see these functioning as open space buffers from the street to the homes. The proximity of the site gives walkable access to multiple public open space options. The Coal Creek Trail access is less than ¼ mile to the South which provides easy access to Community Park, Miners Field is less than ½ mile north and the proposal for the Hwy 42 revitalization will bring a new pedestrian connection to the east side of East St. We also see an opportunity to create a pedestrian connection to downtown via Pine St Plaza with a multi-use path running in the city owned space between our project and Pine St Plaza and would love to work with the city on a possible pedestrian underpass under the railroad R.O.W. to connect to Elm St to the West.

See Open Space exhibit on sheet EX-16.

Land Dedication:

In reference to the Louisville Municipal Code, Section 16.16.060.3, our proposal is to provide housing types that allow for individual owners to each have private yard space. In doing so, we are able to provide smaller standalone single family units in proximity to both the downtown business district and the already established neighborhood parks in the area. Likewise, by separating the garages from the main structure of our townhome units, we are able to provide each townhome unit with a private outdoor yard. To make the project economically viable, we need to keep our unit count as proposed. With stormwater detention required to stay onsite, this then limits the amount of common outdoor space available within the project boundaries. Under this proposal, we propose paying a fee-in-lieu of the public land dedication.

Inclusionary Housing:

The project proposes paying the Fee in Lieu for inclusionary housing referenced in Section 17.76.050. of the Louisville Municipal Code. Constructing like-kind for-sale affordable housing is not economically viable for this project. With the allowable density under the RM zoning, the development requires a certain size, quality and price point be met. The project is designed to provide mid-size townhome units and small to mid-sized single family units at a price point that standard lot infill new construction could not attain. Yet these price points will still be well above what would be required by the income standards set forth by the city. To provide 12% of the units as affordable would mean 5 of the 36 units would be required to be deed restricted and sold at a significant loss to the construction cost of those units. The

project owners have looked at the proforma under this scenario with the conclusion that this would kill the project. The value of the fee in lieu dollars being used by an affordable housing developer will have a much larger impact than what could be provided on site for this project and is the smarter alternative for the owner and the city.

Adjacent Parcel Impact:

The layout of East St Village is designed to minimize the impact on neighboring properties. By placing our detached single family lots along the North and South property lines, we reduce the massing facing the adjacent parcels. The spacing between these units allows for more light to filter through the edges of the site, reducing the visual impact of the project and creating visual pathways both into and out of the site. A townhome building type along the north and south property lines would create a much larger massing, visually closing off the site from the adjacent parcels. See the diagrams below for the proposed “skyline” as viewed from the north and south.



View from N-NW



View from S-SW

Proposed Project Information

Unit Sizes:

The proposed unit sizes as currently shown are as follows:

Townhouse Unit Type ‘A’

- Townhouse – 913 SF (Garden Level)
- 2372 SF (Above Grade)
- 2-Car Detached Garage – 400 SF

Townhouse Unit Type ‘B’

- Townhouse – 919 SF (Garden Level)
- 1928 SF (Above Grade)
- 2-Car Detached Garage – 400 SF

Single Family Unit Type 1 – Detached Single Family

Basement – 909 SF

Above Grade – 2453 SF

Total Conditioned – 3366 SF

2-Car Attached Garage – 538 SF

Single Family Unit Type 2 – Detached Single Family

Basement (Unfinished) – 1384 SF

Above Grade – 2441 SF

Total Conditioned – 3825 SF

2-Car Attached Garage – 493 SF

Materials:

The siding material palette to be used on the project include horizontal and vertical Vesta Steel Plank siding, smooth face cementitious lap siding, cementitious shingle siding, select cedar wood accent siding, and standing seam metal accent siding. The windows will be a composite window system, Anderson 100 series or similar. Roofing material is to be a 30 year dimensional shingle product on pitched roofs and membrane roofing on low sloped roofs.

Refer to the material board Exhibit included with the PUD drawing package

Synopsis:

The East St Village Development is designed to provide a variety of housing types in close proximity to Downtown Louisville. Through the waivers from the underlying RM zoning, we see this as an opportunity to provide superior walkable living options and needed additional density within the city center. The benefits the community are multiple, including diversification in housing type, socio-economic diversity and reduced congestion. Our vision is that the East St Village project will bring a real benefit to the community of Louisville.

Sincerely,



**Paul Norquist
Design Practice Inc
303.561.3000**

LOT SIZE AND SETBACK WAIVERS

	LOT	1	2	3	4	5	6	7	8
Lot Area		3726	3698	3692	3691	3673	3658	3646	3519
Lot Width		41'-3 1/4"	41'-3 1/4"	41'-3 1/4"	41'-3 1/4"	41'-3 1/4"	41'-3 1/4"	41'-3 1/4"	41'-3 1/4"
Lot Coverage		40.6%	53.5%	41.0%	53.6%	41.2%	54.1%	41.5%	56.2%

PRIMARY BUILDING SETBACKS

Front									
To Front PL in Private Drive		7'-3 1/8"	8'-2 5/8"	7'-3 1/8"	8'-2 5/8"	7'-3 1/8"	8'-2 5/8"	7'-3 1/8"	8'-2 5/8"
To Common Open Space		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
To Public ROW		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Rear									
To North PL		N/A	13'-11"	N/A	13'-10 1/4"	N/A	13'-1 1/4"	N/A	5'-1 7/8"
To Private Drive		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Side									
Internal		5'	5'	5'	5'	5'	5'	5'	5'
Between Units		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

	LOT	9	10	11	12	13	14	15
Lot Area		3174	3227	3279	3331	3383	3436	3488
Lot Width		41'-3 1/4"	41'-3 1/4"	41'-3 1/4"	41'-3 1/4"	41'-3 1/4"	41'-3 1/4"	41'-3 1/4"
Lot Coverage		47.7%	46.9%	46.2%	45.5%	44.8%	44.1%	43.4%

PRIMARY BUILDING SETBACKS

Front								
To Private Drive		8'-11 1/4"	8'-11 1/4"	8'-11 1/4"	8'-11 1/4"	8'-11 1/4"	8'-11 1/4"	9'-0"
To Common Open Space		N/A	N/A	N/A	N/A	N/A	N/A	N/A
To Public ROW		N/A	N/A	N/A	N/A	N/A	N/A	N/A
Rear								
To South PL		13'-11 3/8"	15'-2 3/8"	16'-5 5/8"	17'-8 7/8"	19'-0 1/8"	20'-3 3/8"	21'-5 7/8"
To Private Drive		N/A	N/A	N/A	N/A	N/A	N/A	N/A
Side								
Internal		5'	5'	5'	5'	5'	5'	5'
Between Units		N/A	N/A	N/A	N/A	N/A	N/A	N/A

LOT SIZE AND SETBACK WAIVERS - ROWHOUSE LOTS

	LOT	16	17	18	19	20	21	22
Lot Area		2398	1879	1878	2436	2439	1873	2324
Lot Width		24'-2 3/4"	19'-0"	19'-0"	24'-8"	24'-8 3/4"	19'-0"	25'-7 1/8"
Lot Coverage		63.6%	76.7%	76.7%	62.6%	62.5%	76.9%	65.6%

PRIMARY BUILDING SETBACKS

Front

To Private Drive	N/A	N/A	N/A	N/A	N/A	N/A	N/A
To Common Open Space	N/A	N/A	N/A	N/A	N/A	N/A	N/A
To Public ROW	11'-9 1/2"	11'-2 1/2"	11'-1 3/4"	11'-6 7/8"	11'-5 5/8"	10'-10 3/4"	11'-3 3/4"

Rear

Unit To Private Alley	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Garage To Private Alley	0'	0'	0'	0'	0'	0'	0'

Side

Internal (Non Shared Wall)	5'-1 1/2"	N/A	N/A	5'-7 5/8"	5'-7 5/8"	N/A	4'-1 1/8"
Between Units (Shared Wall)	0'	0'	0'	0'	0'	0'	0'
Garage Internal	5'-1 1/2"	1'-6 3/4"	1'-6 3/4"	5'-7 5/8"	5'-7 3/8"	1'-6 1/8"	2'-10 3/8"

	LOT	23	24	25	26	27	28	29
Lot Area		2296	1805	1805	2508	2338	1805	2456
Lot Width		24'-1 7/8"	19'-0"	19'-0"	26'-4 7/8"	24'-7 1/2"	19'-0"	27'-5 1/8"
Lot Coverage		66.4%	79.8%	79.8%	60.8%	65.2%	79.8%	62.1%

PRIMARY BUILDING SETBACKS

Front

To Private Drive	N/A	N/A	N/A	N/A	N/A	N/A	N/A
To Common Open Space	7'-9 1/2"	7'-3 1/2"	7'-3 1/2"	7'-9 1/2"	7'-9 1/2"	7'-3 1/2"	7'-9 1/2"

Rear

Unit To Private Alley	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Garage To Private Alley	0'	0'	0'	0'	0'	0'	0'

Side

Internal (Non Shared Wall)	5'-0 3/4"	N/A	N/A	6'-4 7/8"	6'-4 7/8"	N/A	5'-11 1/8"
Between Units (Shared Wall)	0'	0'	0'	0'	0'	0'	0'
Garage Internal	5'-0 3/4"	1'-6 3/4"	1'-6 3/4"	6'-4 7/8"	6'-4 7/8"	1'-6"	8'-1"

	LOT	30	31	32	33	34	35	36
Lot Area		2296	1805	1805	2338	2338	1805	2220
Lot Width		24'-1 7/8"	19'-0"	19'-0"	24'-7 1/2"	24'-7 1/2"	19'-0"	24'-11 1/2"
Lot Coverage		66.4%	79.8%	79.8%	65.2%	65.2%	79.8%	68.7%

PRIMARY BUILDING SETBACKS

Front

To Private Drive	N/A	N/A	N/A	N/A	N/A	N/A	N/A
To Common Open Space	7'-9 1/2"	7'-3 1/2"	7'-3 1/2"	7'-9 1/2"	7'-9 1/2"	7'-3 1/2"	7'-9 1/2"

Rear

Unit To Private Alley	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Garage To Private Alley	3'-11 3/8"	3'-11 3/8"	3'-11 3/8"	3'-11 3/8"	3'-11 3/8"	3'-11 3/8"	3'-11 3/8"

Side

Internal (Non Shared Wall)	5'-0 3/4"	N/A	N/A	5'-6 1/8"	5'-6 1/8"	N/A	4'-5"
Between Units (Shared Wall)	0'	0'	0'	0'	0'	0'	0'
Garage Internal	5'-0 3/4"	1'-6 3/4"	1'-6 3/4"	5'-6 1/8"	5'-6 1/8"	1'-6"	3'-2 1/4"

Adjacent Property Owners List

417 East St
Jeffery and Emily Chiles
417 East St
Louisville CO 80027

415 East St
Definitely Dave Capital LLC
415 East St
Louisville CO 80027

1150 Pine St
Walter Rhoades American Legion
C/O Bob Ross
1150 Pine St
Louisville CO 80027

419 East St
Bernard Lombardi
419 East St
Louisville CO 80027

401 East St
Bould County Housing Authority
2525 13th St
Boulder CO 80304

1130 Pine – Pine St Plaza
Amterre Pine LLC
2318 Dennison Ln
Boulder CO 80305

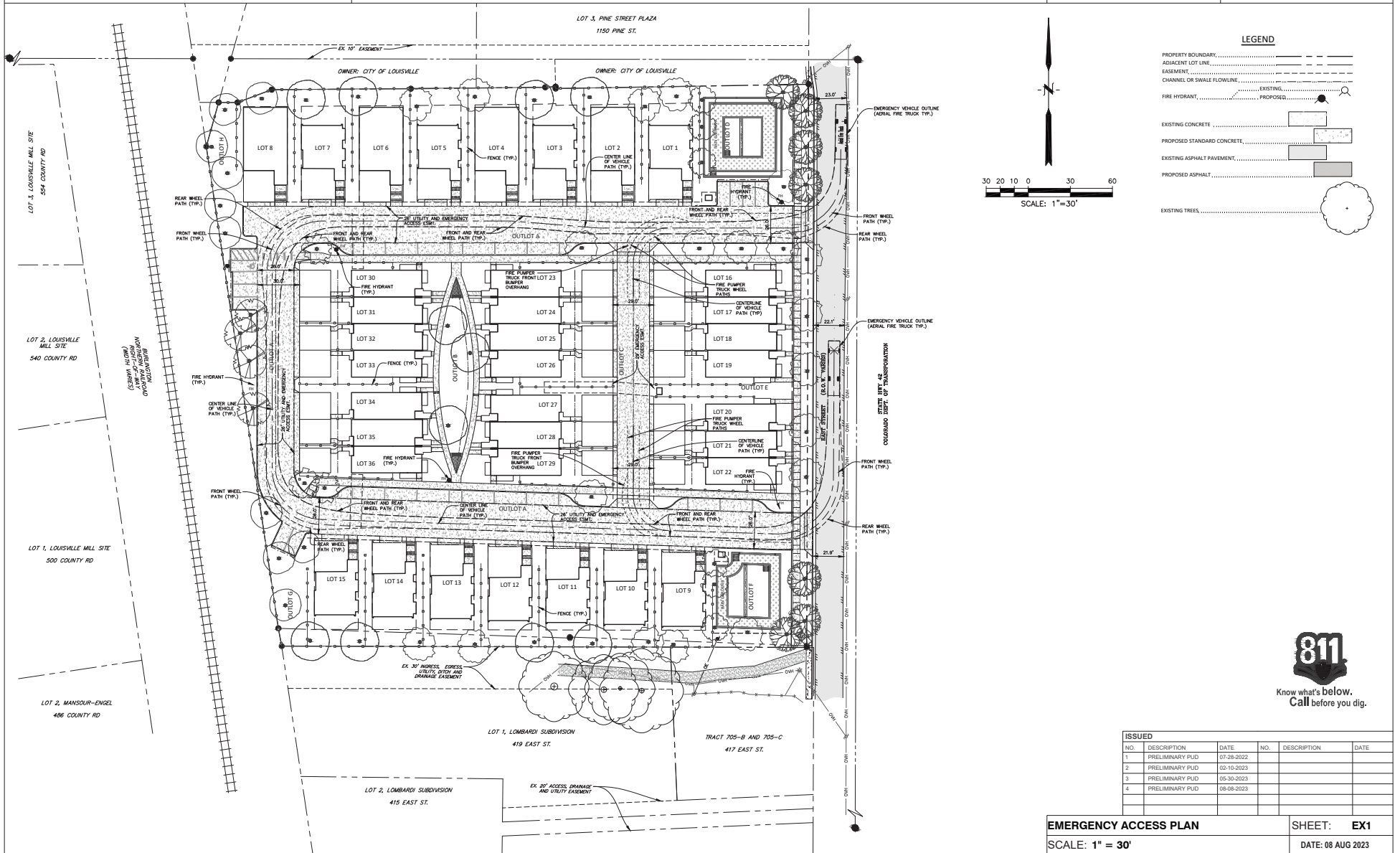
1120 Pine – Pine St Plaza
Amterre Pine LLC
2318 Dennison Ln
Boulder CO 80305

EAST ST VILLAGE

421-533 EAST ST - PRELIMINARY PLANNED UNIT DEVELOPMENT
CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO
CASE #PUPL-0427-2022



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PRACTICE, INC
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DENVER CO 80211
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info@designpracticecolorado.com
PHONE: 303.561.3000



EAST ST VILLAGE

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CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO
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AVERAGE GRADE CALCS

LOT #	FG HIGH POINT	FG LOW POINT	AVE. GRADE
01	5328.68	5326.95	5327.82
02	5329.55	5327.22	5328.39
03	5329.60	5327.52	5328.56
04	5330.13	5327.79	5328.96
05	5330.17	5328.10	5329.14
06	5330.74	5328.46	5329.60
07	5331.02	5329.06	5330.04
08	5332.00	5330.32	5331.16
09	5330.51	5328.47	5329.49
10	5330.88	5328.89	5329.89
11	5331.28	5329.26	5330.27
12	5331.65	5329.64	5330.65
13	5332.02	5330.01	5331.02
14	5332.39	5330.31	5331.35
15	5332.46	5330.75	5332.11
16-19	5329.62	5327.96	5328.59
20-22	5330.72	5328.11	5329.42
23-26	5331.42	5328.56	5329.99
27-29	5331.87	5330.55	5331.21
30-33	5332.11	5329.42	5330.77
34-36	5332.94	5330.99	5331.97



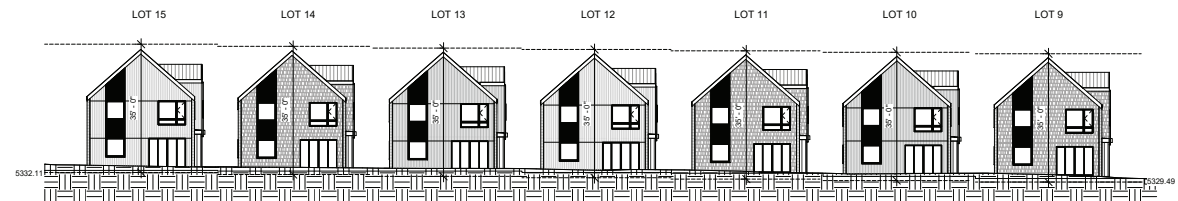
SITE - LOTS 30-36 EAST ELEVATION
⑤ HEIGHT EXHIBIT
1/16" = 1'-0"



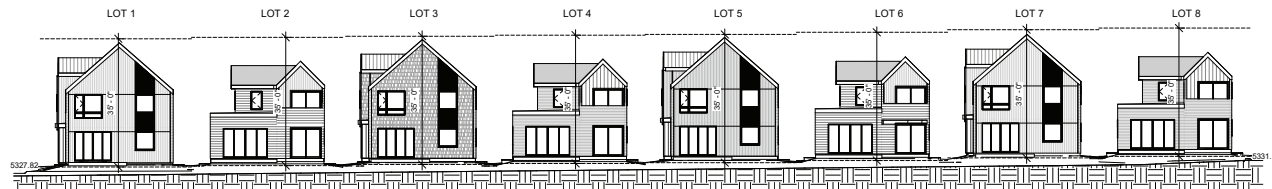
SITE - LOTS 23-29 WEST ELEVATION
④ HEIGHT EXHIBIT
1/16" = 1'-0"



SITE - LOTS 16-22 EAST ELEVATION
③ HEIGHT EXHIBIT
1/16" = 1'-0"



SITE - SOUTH ELEVATION HEIGHT
② EXHIBIT
1/16" = 1'-0"



SITE - NORTH ELEVATION HEIGHT
① EXHIBIT
1/16" = 1'-0"

ISSUED				
NO.	DESCRIPTION	DATE	NO.	DESCRIPTION
1	PRELIMINARY PUD	07-28-2022		
2	PRELIMINARY PUD	07-10-2023		
3	PRELIMINARY PUD	05-30-2023		
4	PRELIMINARY PUD	06-10-2023		

SITE ELEVATIONS HEIGHT EXHIBIT

SCALE:

SHEET: EX-2

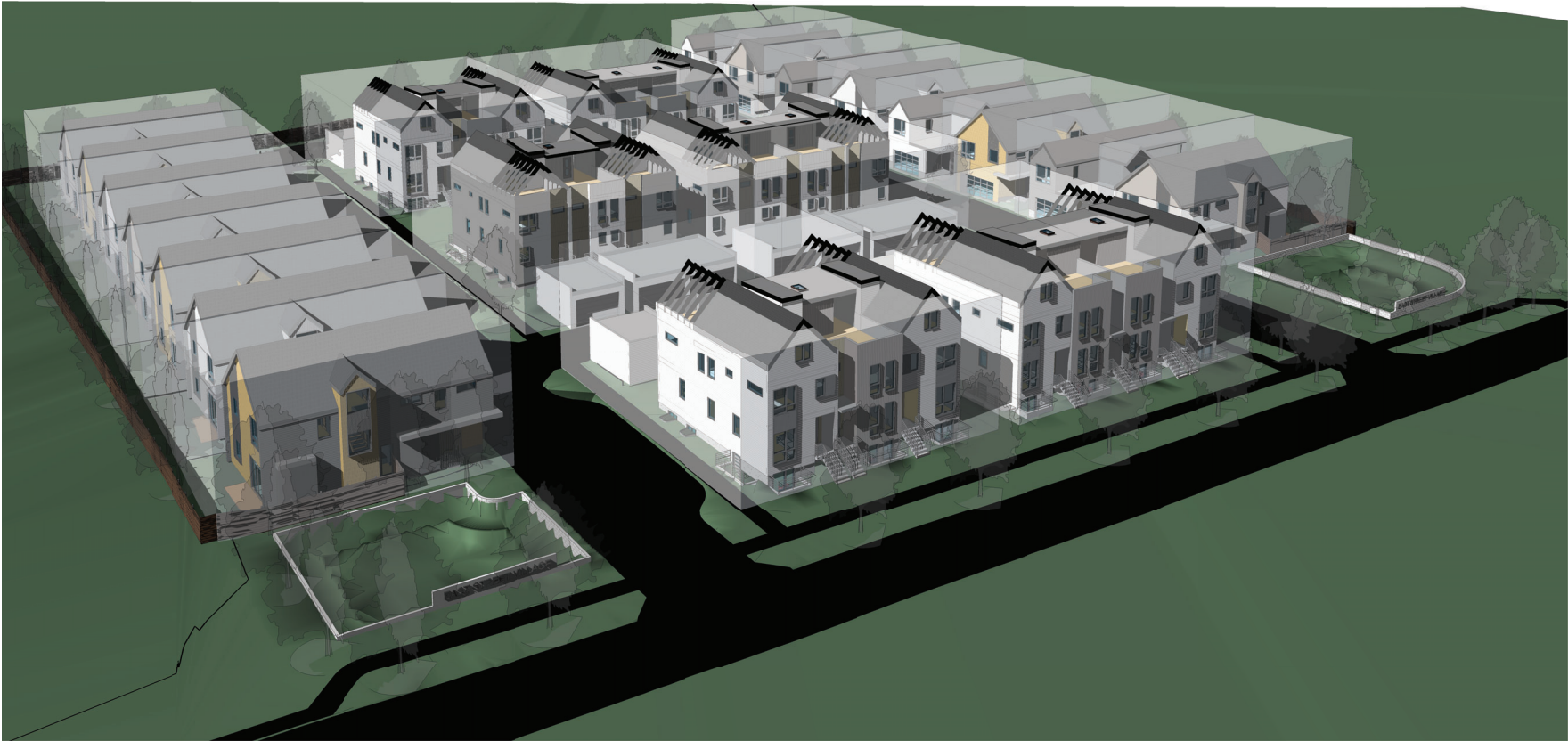
DATE: AUG 10 2023

EAST ST VILLAGE

421-533 EAST ST - PRELIMINARY PLANNED UNIT DEVELOPMENT
CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO
CASE #PUPL-0427-2022

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SHADED BOXES REPRESENT THE MAXIMUM BUILDABLE ENVELOPE UNDER RM ZONING FOR EACH OF THE PROPOSED LOTS/TOWNHOUSE BUILDINGS. THE SINGLE FAMILY HOMES AT THE SITE PERIMETER ARE ALL WITHIN THEIR RESPECTIVE ENVELOPES. THIS EXHIBIT SHOWS THE MINIMAL EXTENT TO WHICH THE TOWNHOUSE UNIT ROOFS EXTEND ABOVE THE ALLOWABLE HEIGHT TO BETTER CLARIFY THE WAIVER REQUEST.



ISSUED					
NO.	DESCRIPTION	DATE	NO.	DESCRIPTION	DATE
1	PRELIMINARY PUD	07-28-2022			
2	PRELIMINARY PUD	02-10-2023			
3	PRELIMINARY PUD	05-30-2023			
4	PRELIMINARY PUD	08-10-2023			

SITE HEIGHT 3-D EXHIBIT	SHEET: EX-3
SCALE:	DATE: AUG 10 2023

EAST ST VILLAGE

421-533 EAST ST - PRELIMINARY PLANNED UNIT DEVELOPMENT
CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO
CASE #PUPL-0427-2022

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TH UNIT TYPE 'A' - TOWNHOUSE END UNIT

ROWHOUSE - END UNIT
TWO AND ONE HALF LEVELS OVER BASEMENT
MAIN UNIT
3 BEDROOM 2 1/2 BATH
BASEMENT - 913 SF
MAIN LEVEL - 923 SF
LEVEL 2 - 950 SF
ROOF LEVEL - 499 SF
TOTAL ABOVE GRADE - 2372 SF
TOTAL INCLD BASEMENT - 3398 SF
GARAGE - 400 SF +/-

UNIT TYPE 'B' - TOWNHOUSE MIDDLE UNIT

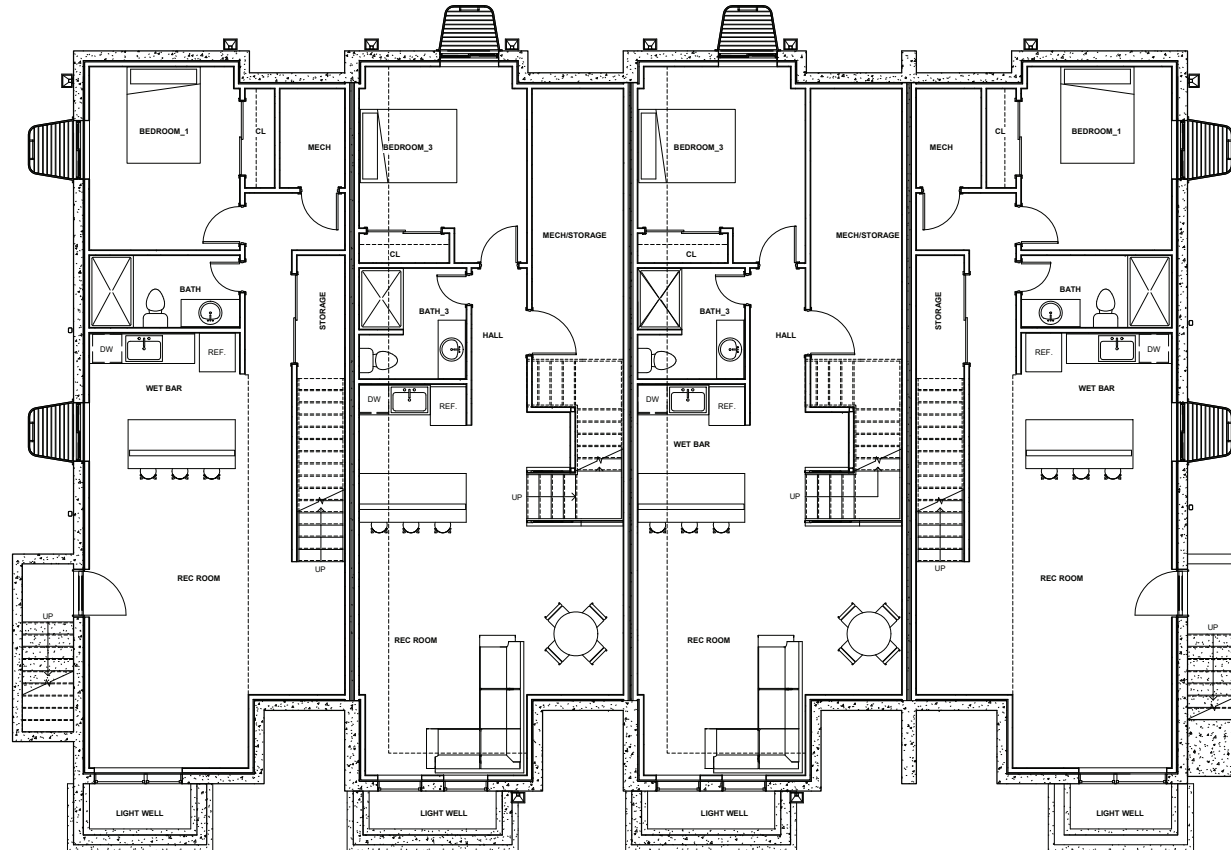
ROWHOUSE - MIDDLE UNIT
TWO LEVELS OVER BASEMENT
3 BEDROOM 3 1/2 BATH
BASEMENT LEVEL - 919 SF
MAIN LEVEL - 928 SF
LEVEL 2 - 928 SF
TOTAL ABOVE GRADE - 1928 SF
TOTAL INCLD BASEMENT - 2889 SF
GARAGE - 400 SF +/-

UNIT TYPE 'B' - TOWNHOUSE MIDDLE UNIT

ROWHOUSE - MIDDLE UNIT
TWO LEVELS OVER BASEMENT
3 BEDROOM 3 1/2 BATH
BASEMENT LEVEL - 919 SF
MAIN LEVEL - 928 SF
LEVEL 2 - 928 SF
TOTAL ABOVE GRADE - 1928 SF
TOTAL INCLD BASEMENT - 2889 SF
GARAGE - 400 SF +/-

UNIT TYPE 'A' - TOWNHOUSE END UNIT

ROWHOUSE - END UNIT
TWO AND ONE HALF LEVELS OVER BASEMENT
MAIN UNIT
3 BEDROOM 2 1/2 BATH
BASEMENT - 913 SF
MAIN LEVEL - 923 SF
LEVEL 2 - 950 SF
ROOF LEVEL - 499 SF
TOTAL ABOVE GRADE - 2372 SF
TOTAL INCLD BASEMENT - 3398 SF
GARAGE - 400 SF +/-



① GARDEN LEVEL PLAN
1/4" = 1'-0"

ISSUED					
NO.	DESCRIPTION	DATE	NO.	DESCRIPTION	DATE
1	PRELIMINARY PUD	07-28-2022			
2	PRELIMINARY PUD	02-10-2023			
3	PRELIMINARY PUD	05-30-2023			
4	PRELIMINARY PUD	08-10-2023			

GARDEN LEVEL PLAN

SHEET: EX-4

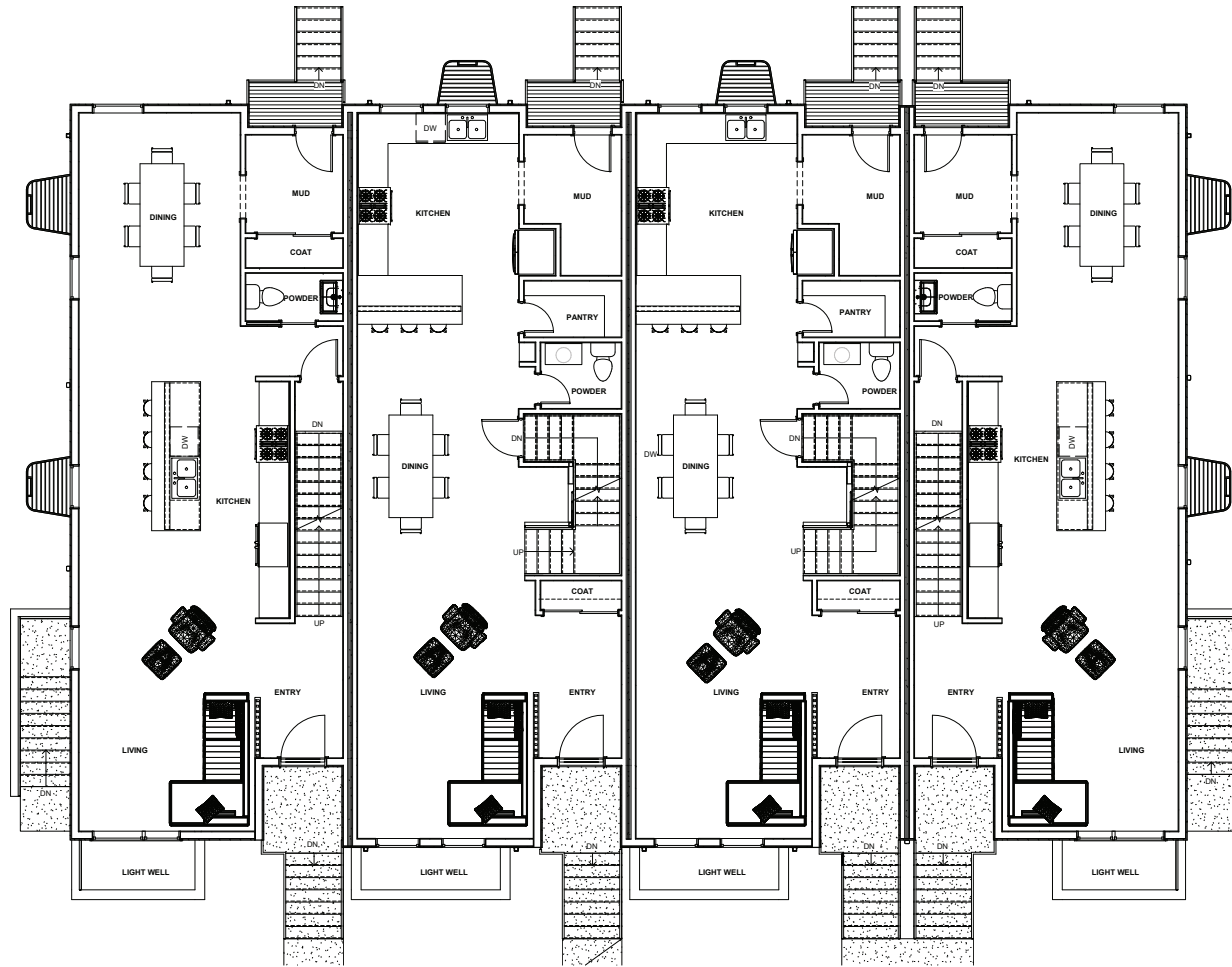
SCALE:

DATE: AUG 10 2023

EAST ST VILLAGE

421-533 EAST ST - PRELIMINARY PLANNED UNIT DEVELOPMENT
CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO
CASE #PUPL-0427-2022

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PHONE 303 561 3000



① LEVEL 1 PLAN
1/4" = 1'-0"

ISSUED					
NO.	DESCRIPTION	DATE	NO.	DESCRIPTION	DATE
1	PRELIMINARY PUD	07-28-2022			
2	PRELIMINARY PUD	02-10-2023			
3	PRELIMINARY PUD	05-30-2023			
4	PRELIMINARY PUD	08-10-2023			

LEVEL 1 FLOOR PLAN

SHEET: EX-5

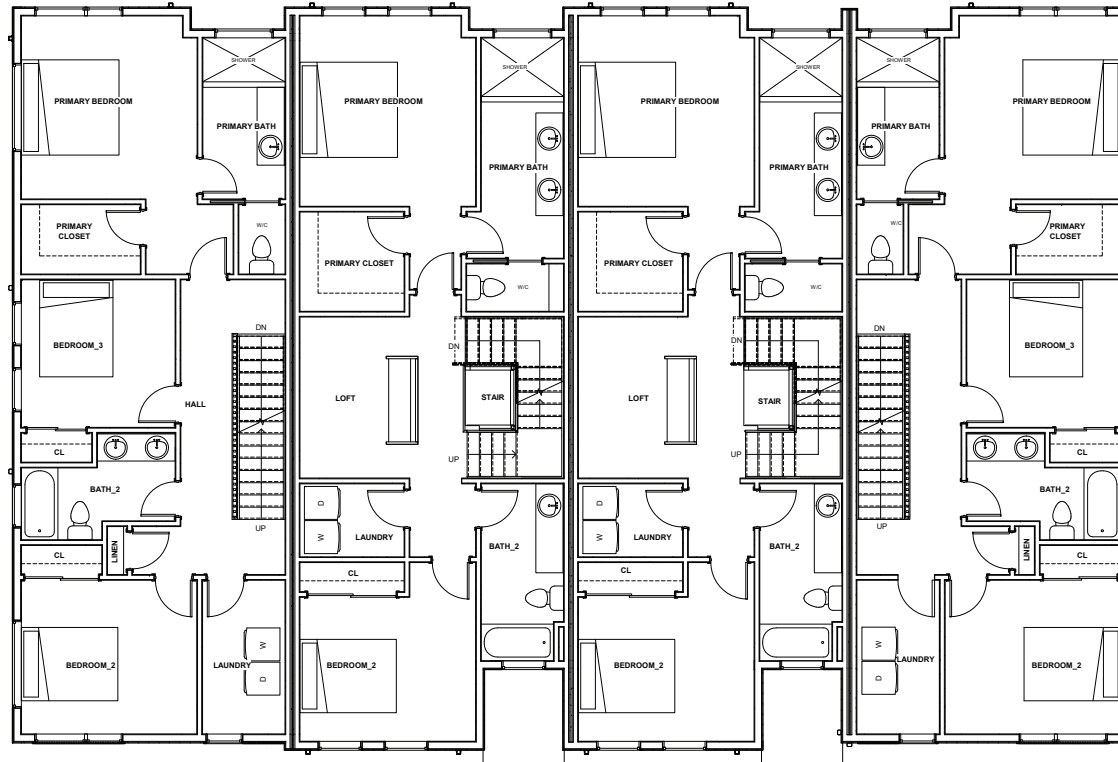
SCALE:

DATE: AUG 10 2023

EAST ST VILLAGE

421-533 EAST ST - PRELIMINARY PLANNED UNIT DEVELOPMENT
CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO
CASE #PUPL-0427-2022

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PHONE 303 561 3000



① LEVEL 2 PLAN
1/4" = 1'-0"

ISSUED					
NO.	DESCRIPTION	DATE	NO.	DESCRIPTION	DATE
1	PRELIMINARY PUD	07-28-2022			
2	PRELIMINARY PUD	02-10-2023			
3	PRELIMINARY PUD	05-30-2023			
4	PRELIMINARY PUD	08-10-2023			

LEVEL 2 FLOOR PLAN

SHEET: EX-6

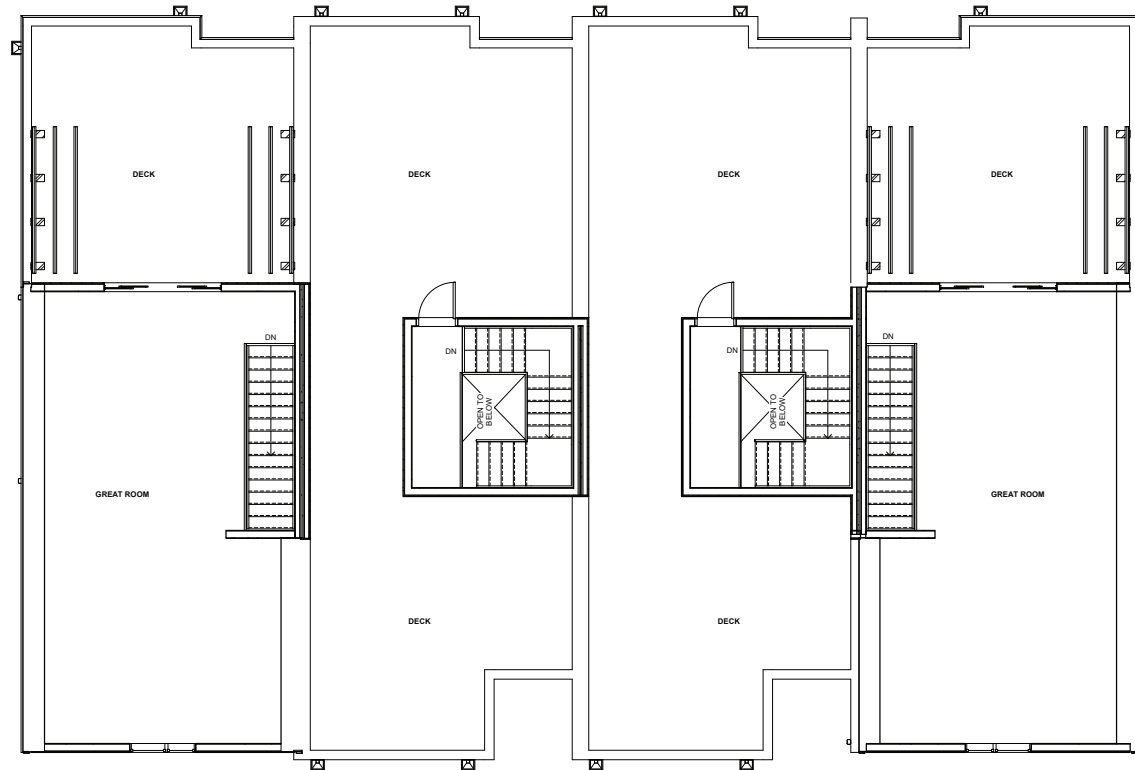
SCALE:

DATE: AUG 10 2023

EAST ST VILLAGE

421-533 EAST ST - PRELIMINARY PLANNED UNIT DEVELOPMENT
CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO
CASE #PUPL-0427-2022

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① ROOF DECK LEVEL PLAN
1/4" = 1'-0"

ISSUED					
NO.	DESCRIPTION	DATE	NO.	DESCRIPTION	DATE
1	PRELIMINARY PUD	07-28-2022			
2	PRELIMINARY PUD	02-10-2023			
3	PRELIMINARY PUD	05-30-2023			
4	PRELIMINARY PUD	08-10-2023			

LEVEL 3/ ROOF DECK PLAN

SHEET: EX-7

SCALE:

DATE: AUG 10 2023

EAST ST VILLAGE

421-533 EAST ST - PRELIMINARY PLANNED UNIT DEVELOPMENT
CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO
CASE #PUPL-0427-2022

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TH UNIT TYPE 'A' - TOWNHOUSE END UNIT

ROWHOUSE - END UNIT
TWO AND ONE HALF LEVELS OVER BASEMENT

MAIN UNIT
3 BEDROOM 2 1/2 BATH
BASEMENT - 913 SF
MAIN LEVEL - 923 SF
LEVEL 2 - 950 SF
ROOF LEVEL - 499 SF

TOTAL ABOVE GRADE - 2372 SF
TOTAL INCLD BASEMENT - 3398 SF
GARAGE - 400 SF +/-

UNIT TYPE 'B' - TOWNHOUSE MIDDLE UNIT

ROWHOUSE - MIDDLE UNIT
TWO LEVELS OVER BASEMENT

3 BEDROOM 3 1/2 BATH
BASEMENT LEVEL - 919 SF
MAIN LEVEL - 928 SF
LEVEL 2 - 950 SF
TOTAL ABOVE GRADE - 1928 SF
TOTAL INCLD BASEMENT - 2868 SF

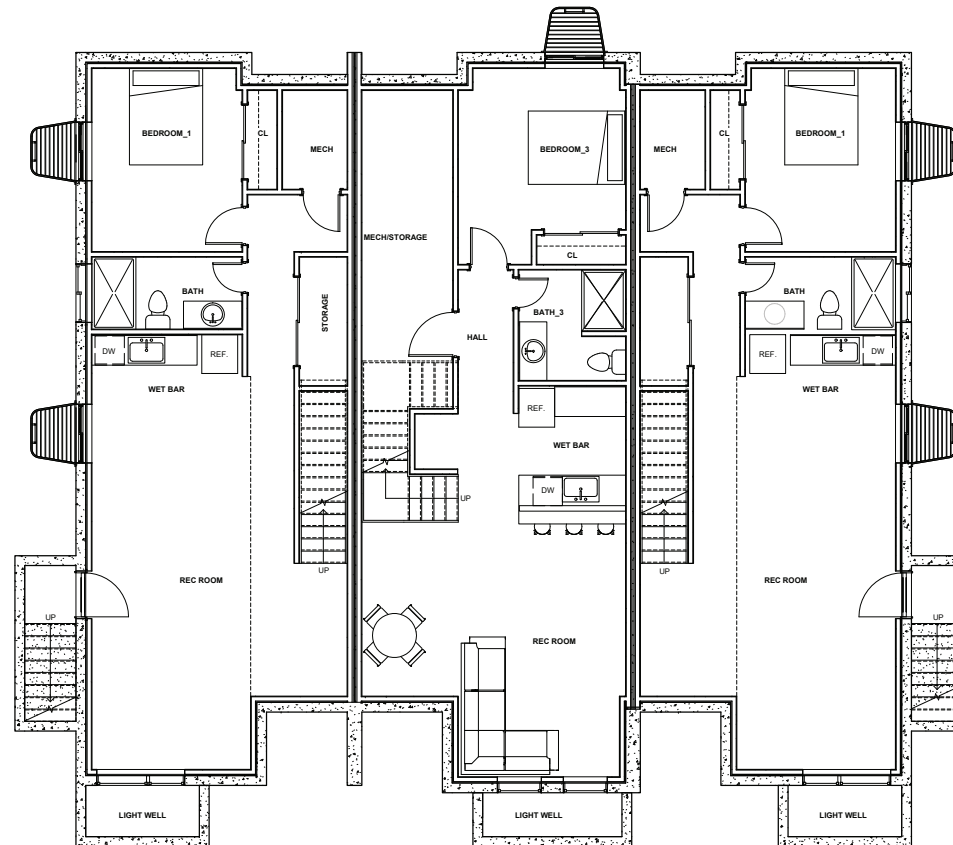
GARAGE - 400 SF

UNIT TYPE 'A' - TOWNHOUSE END UNIT

ROWHOUSE - END UNIT
TWO AND ONE HALF LEVELS OVER BASEMENT

MAIN UNIT
3 BEDROOM 2 1/2 BATH
BASEMENT - 913 SF
MAIN LEVEL - 923 SF
LEVEL 2 - 950 SF
ROOF LEVEL - 499 SF

TOTAL ABOVE GRADE - 2372 SF
TOTAL INCLD BASEMENT - 3398 SF
GARAGE - 400 SF +/-



① GARDEN LEVEL PLAN
1/4" = 1'-0"

ISSUED					
NO.	DESCRIPTION	DATE	NO.	DESCRIPTION	DATE
1	PRELIMINARY PUD	07-28-2022			
2	PRELIMINARY PUD	02-10-2023			
3	PRELIMINARY PUD	05-30-2023			
4	PRELIMINARY PUD	08-10-2023			

GARDEN LEVEL PLAN

SHEET: EX-8

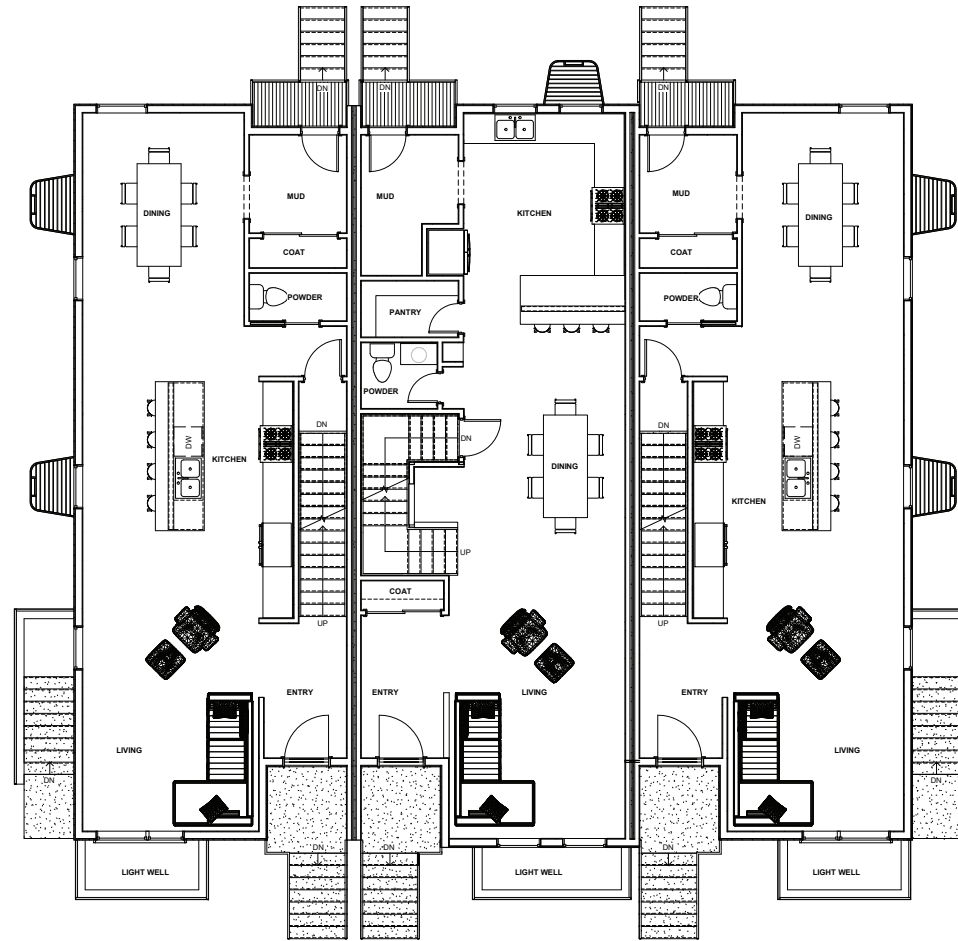
SCALE:

DATE: AUG 10 2023

EAST ST VILLAGE

421-533 EAST ST - PRELIMINARY PLANNED UNIT DEVELOPMENT
CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO
CASE #PUPL-0427-2022

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info@designpracticeinc.com
PHONE 303 661 3000



LEVEL 1 PLAN
1/4" = 1'-0"

ISSUED					
NO.	DESCRIPTION	DATE	NO.	DESCRIPTION	DATE
1	PRELIMINARY PUD	07-28-2022			
2	PRELIMINARY PUD	02-10-2023			
3	PRELIMINARY PUD	05-30-2023			
4	PRELIMINARY PUD	08-10-2023			

LEVEL 1 FLOOR PLAN

SHEET: EX-9

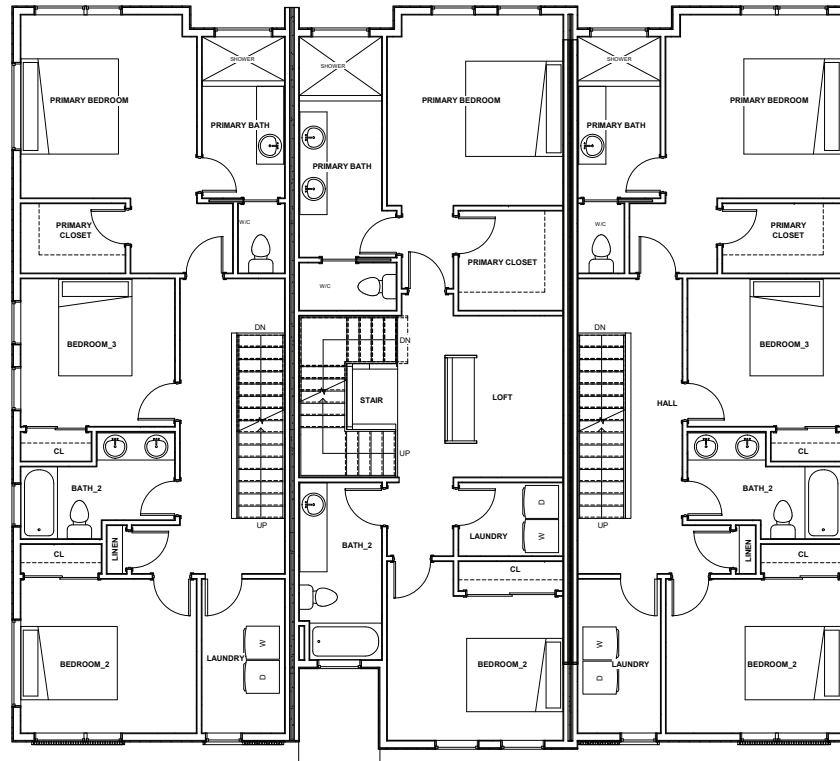
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DATE: AUG 10 2023

EAST ST VILLAGE

421-533 EAST ST - PRELIMINARY PLANNED UNIT DEVELOPMENT
CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO
CASE #PUPL-0427-2022

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info@designpracticecolorado.com
PHONE 303 661 3000



① LEVEL 2 PLAN
1/4" = 1'-0"

ISSUED					
NO.	DESCRIPTION	DATE	NO.	DESCRIPTION	DATE
1	PRELIMINARY PUD	07-28-2022			
2	PRELIMINARY PUD	02-10-2023			
3	PRELIMINARY PUD	05-30-2023			
4	PRELIMINARY PUD	08-10-2023			

LEVEL 2 FLOOR PLAN

SHEET: EX-10

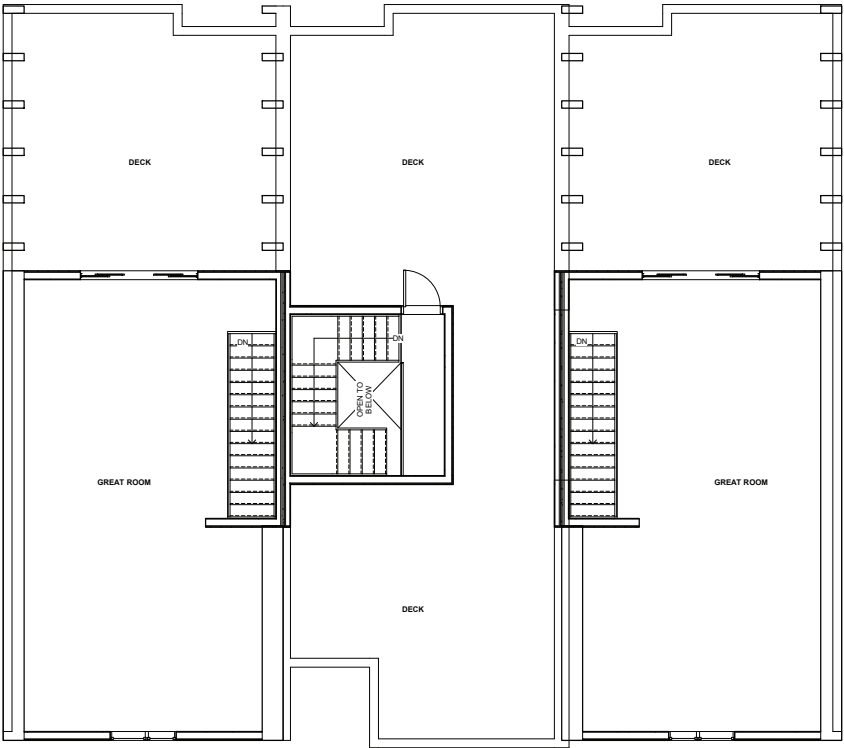
SCALE:

DATE: AUG 10 2023

EAST ST VILLAGE

421-533 EAST ST - PRELIMINARY PLANNED UNIT DEVELOPMENT
CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO
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PHONE 303 661 3000



① ROOF DECK LEVEL PLAN
1/4" = 1'-0"

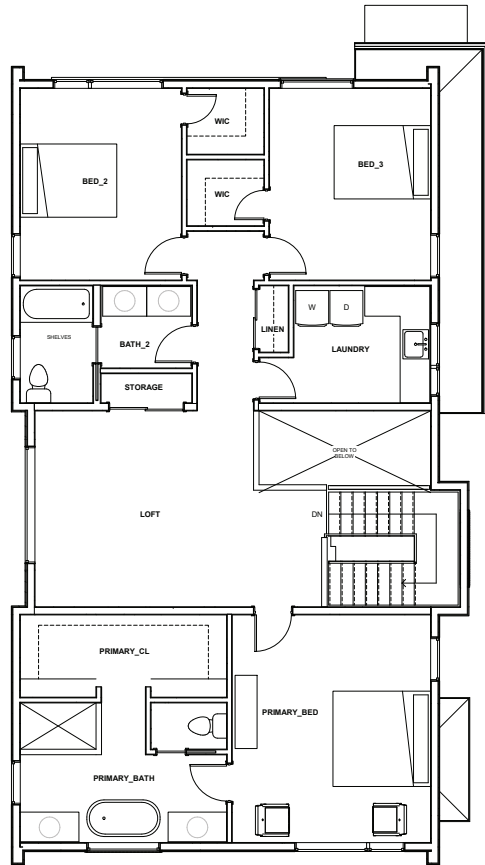
ISSUED					
NO.	DESCRIPTION	DATE	NO.	DESCRIPTION	DATE
1	PRELIMINARY PUD	07-28-2022			
2	PRELIMINARY PUD	02-10-2023			
3	PRELIMINARY PUD	05-30-2023			
4	PRELIMINARY PUD	08-10-2023			

LEVEL 3/ ROOF DECK PLAN	SHEET: EX-11
SCALE:	DATE: AUG 10 2023

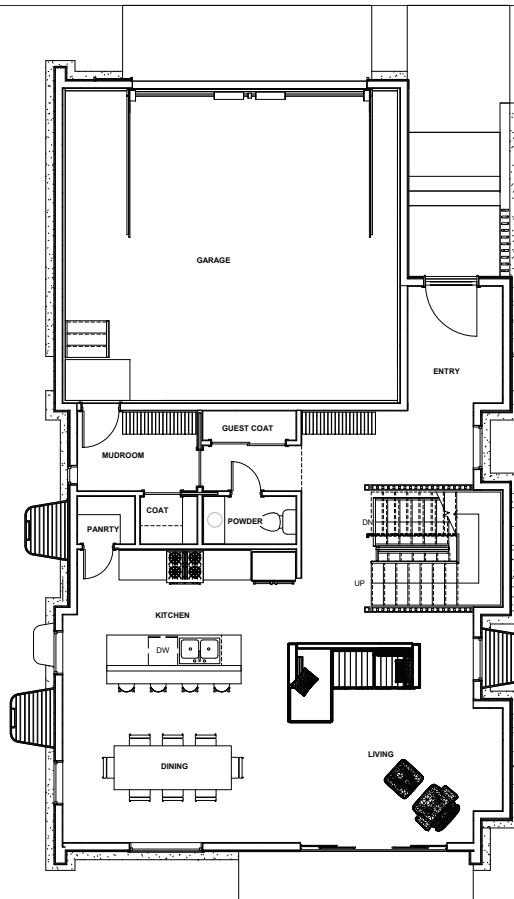
EAST ST VILLAGE

421-533 EAST ST - PRELIMINARY PLANNED UNIT DEVELOPMENT
CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO
CASE #PUPL-0427-2022

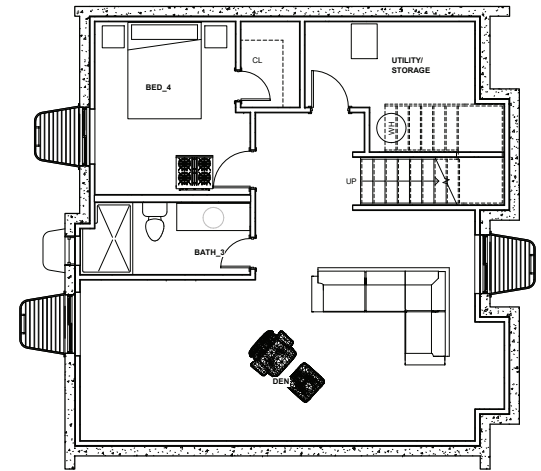
DESIGN
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③ SDP - UPPER LEVEL
1/4" = 1'-0"



② SDP - MAIN LEVEL
1/4" = 1'-0"



① SDP - LOWER LEVEL
1/4" = 1'-0"

SINGLE FAMILY TYPE 1
STAND-ALONE SINGLE FAMILY
TWO LEVELS OVER BASEMENT
4 BEDROOM 3 1/2 BATH
BASEMENT - 900 SF
MAIN LEVEL - 973 SF
LEVEL 2 - 1484 SF
TOTAL ABOVE GRADE - 2457 SF
TOTAL - 3356 SF
GARAGE - 538 SF

ISSUED					
NO.	DESCRIPTION	DATE	NO.	DESCRIPTION	DATE
1	PRELIMINARY PUD	07-28-2022			
2	PRELIMINARY PUD	02-10-2023			
3	PRELIMINARY PUD	05-30-2023			
4	PRELIMINARY PUD	08-10-2023			

SFR TYPE 1 - PLANS

SHEET: EX-12

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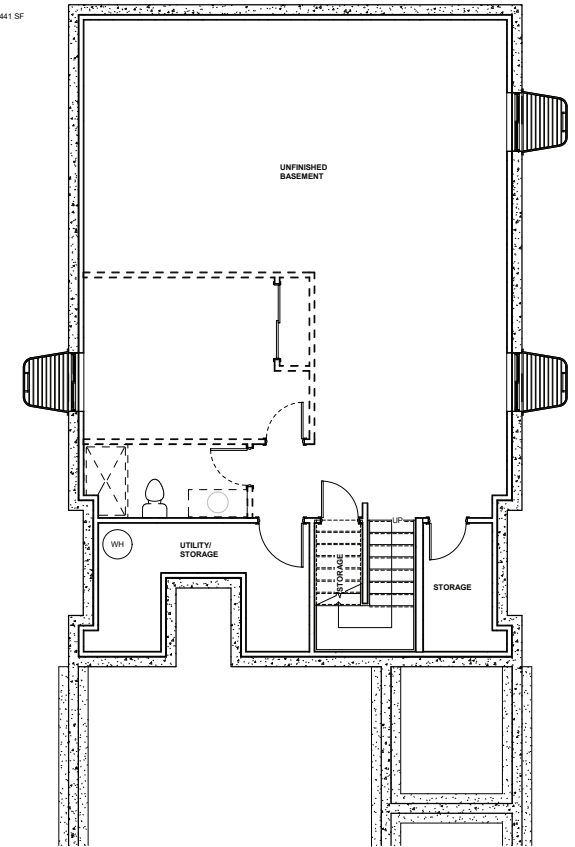
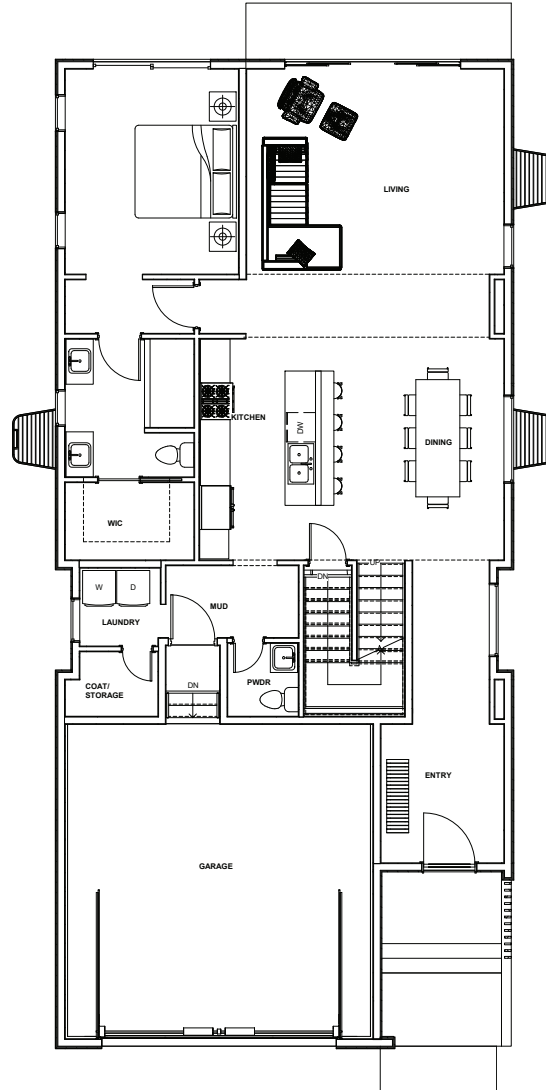
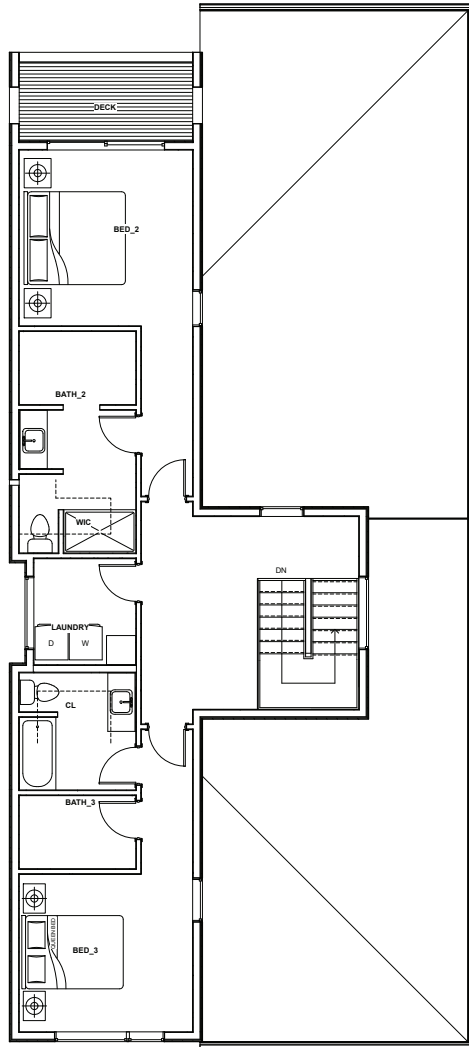
DATE: AUG 10 2023

EAST ST VILLAGE

421-533 EAST ST - PRELIMINARY PLANNED UNIT DEVELOPMENT
CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO
CASE #PUPL-0427-2022

DESIGN
PRACTICE, INC
2842 W 44th
Denver CO 80211
www.designpracticecolorado.com
info@designpracticecolorado.com
PHONE: 303.561.3000

SINGLE FAMILY TYPE 2
STAND-ALONE SINGLE FAMILY
TWO LEVELS OVER BASEMENT
3 BEDROOM 2 1/2 BATH
BASEMENT - 1384 SF (UNFINISHED)
MAIN LEVEL - 1485 SF
LEVEL 2 - 956 SF
TOTAL ABOVE GRADE - 2441 SF
TOTAL - 3825 SF
GARAGE - 493 SF



① SDP - LOWER LEVEL
1/4" = 1'-0"

③ SDP - UPPER LEVEL
1/4" = 1'-0"

② SDP - MAIN LEVEL
1/4" = 1'-0"

ISSUED					
NO.	DESCRIPTION	DATE	NO.	DESCRIPTION	DATE
1	PRELIMINARY PUD	07-28-2022			
2	PRELIMINARY PUD	02-10-2023			
3	PRELIMINARY PUD	05-30-2023			
4	PRELIMINARY PUD	08-10-2023			

SFR TYPE 2 - PLANS

SHEET: EX-13

SCALE:

DATE: AUG 10 2023

EAST ST VILLAGE

421-533 EAST ST - PRELIMINARY PLANNED UNIT DEVELOPMENT
CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO
CASE #PUPL-0427-2022

DESIGN
PRACTICE, INC
2642 W 44th
Denver CO 80211
www.designpracticecolorado.com
info@designpracticecolorado.com
PHONE 303 561 3000

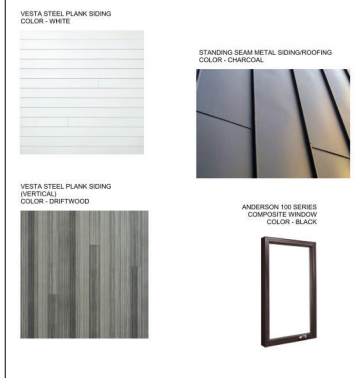
TYPE 1 SINGLE FAMILY (TYPE 1-A SHOWN)



SFR TYPE 1-A EXTERIOR MATERIALS



SFR TYPE 1-B EXTERIOR MATERIALS



SFR TYPE 1-C EXTERIOR MATERIALS



TYPE 2 SINGLE FAMILY (TYPE 2-A SHOWN)



SFR TYPE 2-A EXTERIOR MATERIALS



SFR TYPE 2-B EXTERIOR MATERIALS



ISSUED					
NO.	DESCRIPTION	DATE	NO.	DESCRIPTION	DATE
1	PRELIMINARY PUD	07-28-2022			
2	PRELIMINARY PUD	02-10-2023			
3	PRELIMINARY PUD	05-30-2023			
4	PRELIMINARY PUD	08-10-2023			

EXTERIOR MATERIALS

SHEET: EX-14

SCALE:

DATE: AUG 10 2023

EAST ST VILLAGE

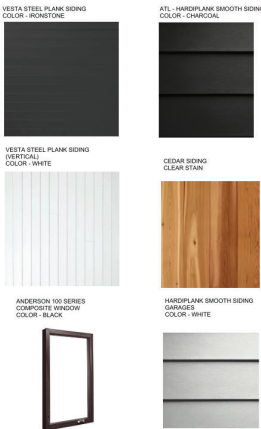
421-533 EAST ST - PRELIMINARY PLANNED UNIT DEVELOPMENT
CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO
CASE #PUPL-0427-2022

DESIGN
PRACTICE, INC
2842 W 44th
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www.designpracticeinc.com
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PHONE 303 661 3000

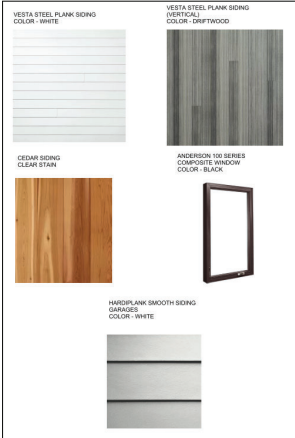
TYPE 1 & 2 ROWHOMES (TYPE 1-A SHOWN)



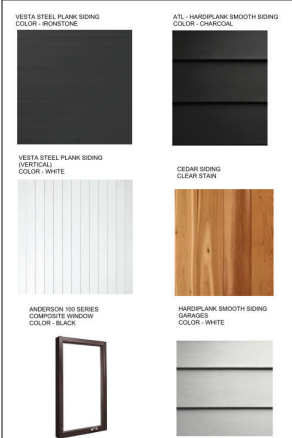
ROWHOUSE TYPE 1&2-A EXTERIOR MATERIALS



ROWHOUSE TYPE 1&2-B EXTERIOR MATERIALS



ROWHOUSE TYPE 1&2-C EXTERIOR MATERIALS

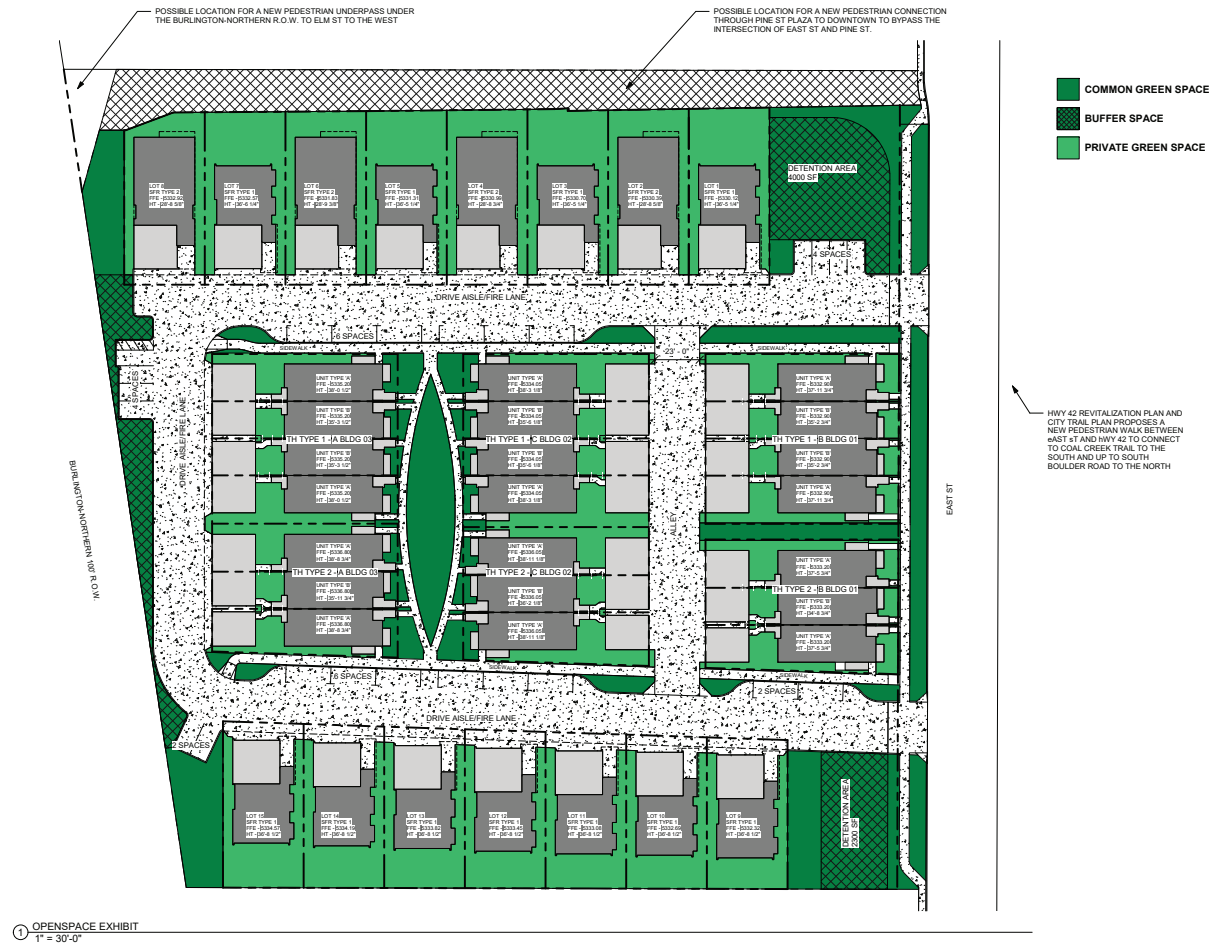


ISSUED					
NO.	DESCRIPTION	DATE	NO.	DESCRIPTION	DATE
1	PRELIMINARY PUD	07-28-2022			
2	PRELIMINARY PUD	02-10-2023			
3	PRELIMINARY PUD	05-30-2023			
4	PRELIMINARY PUD	08-10-2023			

EXTERIOR MATERIALS	SHEET: EX-15
SCALE:	DATE: AUG 10 2023

421-533 EAST ST - PRELIMINARY PLANNED UNIT DEVELOPMENT
CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO
CASE #PUPL-0427-2022

**DESIGN
PRACTICE, INC.**
2842 W 44th
Denver CO 80211
www.designpracticedenver.com
info@designpracticedenver.com
PHONE_303 561 3000



ISSUED					
NO.	DESCRIPTION	DATE	NO.	DESCRIPTION	DATE
1	PRELIMINARY PUD	07-28-2022			
2	PRELIMINARY PUD	02-10-2023			
3	PRELIMINARY PUD	05-30-2023			
4	PRELIMINARY PUD	08-10-2023			

OPEN SPACE EXHIBIT

SHEET: EX-16

SCALE:

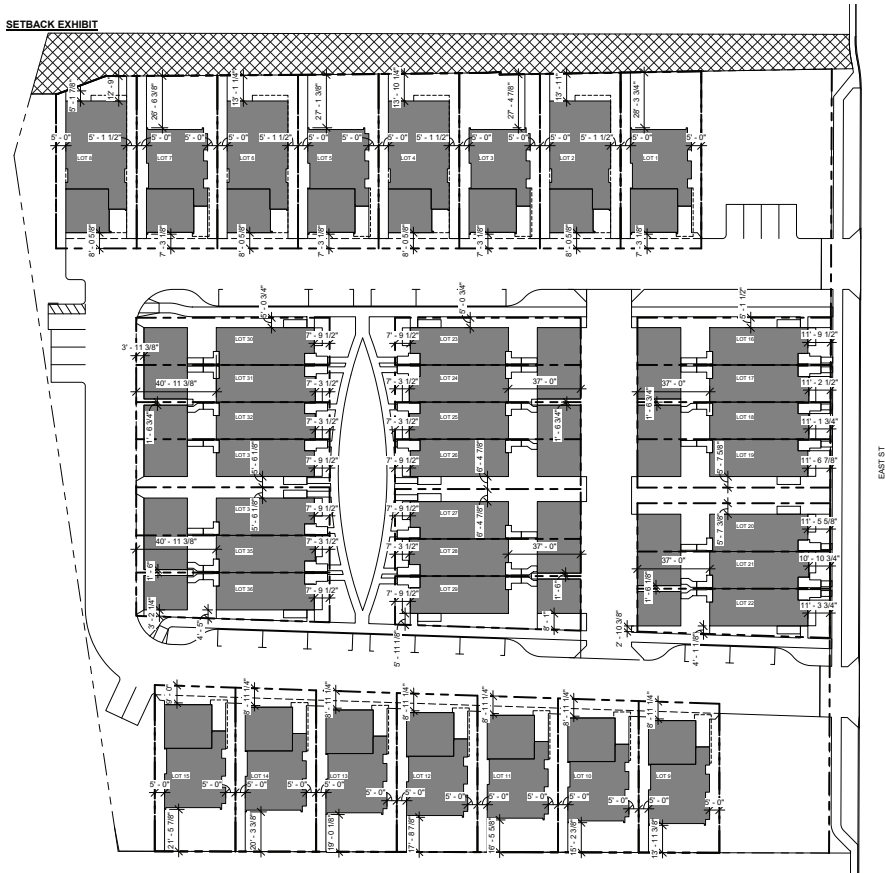
DATE: AUG 10 2023

EAST ST VILLAGE

421-533 EAST ST - PRELIMINARY PLANNED UNIT DEVELOPMENT
CITY OF LOUISVILLE, COUNTY OF BOULDER, STATE OF COLORADO
CASE #PUPL-0427-2022

DESIGN
PRACTICE, INC
2842 W 44th
Denver CO 80211
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info@designpracticeinc.com
PHONE 303 561 3000

SETBACK EXHIBIT



1 SETBACK SITE PLAN
1" = 30'-0"

ISSUED					
NO.	DESCRIPTION	DATE	NO.	DESCRIPTION	DATE
1	PRELIMINARY PUD	07-28-2022			
2	PRELIMINARY PUD	02-10-2023			
3	PRELIMINARY PUD	05-30-2023			
4	PRELIMINARY PUD	08-10-2023			

SETBACK SITE PLAN

SHEET: EX-17

SCALE:

DATE: AUG 10 2023

East Street Village

Traffic Impact Study

TSC Capital Partners

Louisville, Colorado

June 2, 2023

Prepared By:



Sustainable Traffic Solutions, Inc.

<http://www.sustainabletrafficsolutions.com/>

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Appendix D	VISTRO Analysis Results

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- Figure 25 – Year 2045 Total Traffic Volumes Scenario 2 Residential – Evening Peak Hour
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East Street Village

Traffic Impact Study

1.0 Introduction

TSC Capital Partners is proposing to develop two parcels on the west side of East Street between Pine Street and Lock Street. The development will include 15 single family dwelling units and 21 townhomes. It is possible that 12 of the townhomes will have a separate one bedroom apartment, so the traffic study analyzed the additional impact of the apartments. A vicinity map is contained in Figure 1 that shows the location of the site. Figure 2 contains a site plan for the development. Two full movement accesses are planned from East Street into the development.

A meeting was held with the City staff on February 3, 2023 to discuss the parameters of the traffic study. Email correspondence from the meeting is contained in Appendix A.

This study has been prepared in conformance with the Colorado DOT traffic impact study requirements¹.

2.0 Project Description

2.1 Study Area

The study area includes the following intersections.

- SH 42 / Pine Street
- SH 42 / 96th Street / Lock Street
- Pine Street / East Street

The existing laneage and traffic control are contained in Figure 3. The roadways that border the site are described as follows.

SH 42 is classified by CDOT as an NR-A roadway with a 45 MPH speed limit in the vicinity of the site.

Pine Street is a two-lane collector street that extends west from SH 42 and provides connections to downtown and the west side of Louisville.

Lock Street is a short local street that begins at SH 42 and provides access to development west of SH 42 and south of Pine Street.

East Street is a two-lane local street that runs between Pine Street and Lock Street.

¹ [State Highway Access Code](#). The Transportation Commission of Colorado. March 2002.

2.2 Study Assumptions

The following assumptions were utilized for this study.

Short-Term Study Horizon. Year 2025 is assumed to be the short-term horizon because all of the homes are expected to be completed and occupied by the end of that year.

Long-Term Study Horizon. Year 2045 will be the long-term horizon because it is 20 years following the completion of the development.

Future Development. A vacant lot exists north of the East Street Village that was assumed to be developed with a 7,000 ft² fast casual restaurant. Based on the correspondence with the City staff, a fast casual restaurant was assumed because it is expected to generate more traffic than other possible uses for that lot. Traffic from the fast casual restaurant was included in the long-term background traffic volume scenario.

Growth in Background Traffic. Annual growth rates for arterial roadways were determined utilizing data from the Year 2050 DRCOG regional plan. The following annual growth rates were used in the study.

- SH 42 / 96th Street corridor – 1.1%
- SH 42 east of the SH 42 / 96th Street corridor – 1.2%

The Year 2020 volumes and Year 2050 projections provided by DRCOG are contained in Appendix B. The DRCOG data can be found at the following location.

<https://drcog.org/services-and-resources/data-maps-and-modeling/travel-modeling>

Saturation Flow Rate. The saturation flow rate was assumed to be 1,900 passenger cars / hour / lane.

Future 42 Improvements. The recommended improvements discussed in Table 9 of the Future 42² traffic study were assumed to be implemented by the Year 2045. They include four through lanes on the SH 42 / 96th Street corridor, revised laneage on the eastbound Pine Street approach to SH 42, and a two lane roundabout at Lock Street.

Peak Hour Factor (PHF). For the existing and the short-term planning horizons, the PHF was based on the data collected for the traffic study. At new approaches, the PHF was assumed to be 0.85 for all movements in all of the planning horizons. In the long-term horizon, the PHF was assumed to be 0.92 unless the existing PHF is higher than 0.92. In that case, the existing PHF was used in the analysis of the long-term volumes.

Signal Timing on SH 42. The timing of the signals on SH 42 was obtained from CDOT and used in the analysis.

² Future 42 – Appendix 1. Traffic Study. Kimley Horn. December 2022.

Truck Percentage. A truck percentage of 2% was assumed for all movements.

3.0 Year 2023 Traffic Volumes

Traffic count data were collected for the project on Thursday, February 23, 2023 by All Traffic Data. The traffic count data and email correspondence are contained in Appendix C. The Year 2023 peak hour volumes are summarized in Figures 4 and 5. Existing and future daily volumes are summarized in Table 1.

3.1 Level of Service Analysis

To evaluate the performance of the intersections within the study area, the level of service (LOS) was calculated using PTV VISTRO software. This software package utilizes criteria described in the Highway Capacity Manual³. LOS is a measure used to describe operational conditions at an intersection. LOS categories ranging from A to F are assigned based on the predicted delay in seconds per vehicle for the intersection as a whole, as well as for individual turning movements. LOS A indicates very good operations, and LOS F indicates poor, congested operations. In urban areas, LOS D is considered the minimum intersection operation.

The following table summarizes the analysis of the Year 2023 conditions. It shows that all of the intersections are currently operating at LOS C, or better. The level of service for intersections with side-street stop-control is determined by the movement with the highest delay value. The detailed analysis results are summarized in Table 2 and the VISTRO analysis results are contained in Appendix D.

Year 2023 Traffic Conditions

Intersection	Control	Peak Hour	
		Morning	Evening
1 - SH 42 / Pine Street	Signalized	B	C
2 - SH 42 / 96th Street / Lock Street	Signalized	C	C
3 - Pine Street / East Street	Side-Street Stop	B	B

4.0 Site Generated Traffic

4.1 Trip Generation

In order to estimate the traffic impacts associated with the development of the East Street Village, the amount of traffic generated by the proposed development was estimated using rates contained in the Institute of Transportation Engineers Trip Generation manual⁴. Table 3 includes the trip generation for two scenarios including Scenario 1 that includes apartments in 12 of the 21 townhomes, and Scenario 2 that does not include the apartments. Table 4 contains the trip generation for the fast casual restaurant.

³ Highway Capacity Manual, 7th Edition. National Academy of Sciences, Engineering, and Medicine. 2022.

⁴ Trip Generation, 11th Edition. Institute of Transportation Engineers. September 2021.

A 10% multimodal trip reduction was assumed in the trip generation estimates. This is a very conservative estimate for the residential land uses considering the proximity to Old Town and the RTD station at US 36 / McCaslin Boulevard. The site is a short bike ride from the RTD station. Working from home would also be included in this trip reduction. The trip reduction was assumed for the fast casual restaurant because of its proximity to Old Town and the residences around downtown.

4.2 Trip Distribution and Assignment

The trip distribution for the development is contained in Figure 6. It was based on the proximity of the site to major roadways in the area. The peak hour trip assignments are contained in Figures 7 through 12.

5.0 Year 2025 Traffic Conditions

The development is expected to be completed and occupied in the Year 2025. Background traffic volumes were developed by inflating the Year 2023 volumes by the growth rate that was discussed in Section 2.2. The background traffic volume scenarios are contained in Figures 13 and 14. Total traffic volume scenarios were developed by adding the trip assignment to the background traffic volume scenarios (see Figures 15 through 18).

The results of the analysis of the background and total traffic volume scenarios are summarized in the following table. It shows that all of the intersections are expected to operate at LOS C, or better. The analysis shows that the apartments in Scenario 1 will have no impact on the level of service. Figure 19 contains the laneage and traffic control assumed in the analysis of the total traffic volume scenarios. The detailed analysis results are summarized in Table 2 and the VISTRO analysis results are contained in Appendix D.

Year 2025 Traffic Conditions

Intersection	Control	Background		Total - Scenario 1		Total - Scenario 2	
		Morning	Evening	Morning	Evening	Morning	Evening
1 - SH 42 / Pine Street	Signalized	B	C	B	C	B	C
2 - SH 42 / 96th Street / Lock Street	Signalized	C	C	C	C	C	C
3 - Pine Street / East Street	Side-Street Stop	B	B	B	B	B	B
4 - East Street / North Access	Side-Street Stop	---		A	A	A	A
5 - East Street / South Access	Side-Street Stop	---		A	A	A	A

6.0 Year 2045 Traffic Conditions

The Year 2045 background and total traffic volume scenarios were determined as discussed in Section 6.0. The background traffic volume scenarios are contained in Figures 20 and 21, and the total traffic volume scenarios are contained in Figures 22 through 25.

The results of the analysis of the background and total traffic volume scenarios are summarized in the following table. It shows that all of the intersections are expected to operate at LOS A or LOS B. The analysis shows that the apartments in Scenario 1 will have no impact on the level of service. Figure 26 contains the laneage and traffic control assumed in the analysis of the total traffic volume scenarios. The detailed analysis results are summarized in Table 2 and the VISTRO analysis results are contained in Appendix D.

Year 2048 Traffic Conditions

Intersection	Control	Background		Total - Scenario 1		Total - Scenario 2	
		Morning	Evening	Morning	Evening	Morning	Evening
1 - SH 42 / Pine Street	Signalized	B	B	B	B	B	B
2 - SH 42 / 96th Street / Lock Street	Roundabout	A	A	A	A	A	A
3 - Pine Street / East Street	Side-Street Stop	B	B	B	B	B	B
4 - East Street / North Access	Side-Street Stop	---		A	A	A	A
5 - East Street / South Access	Side-Street Stop	---		A	A	A	A

7.0 Conclusions

STS has drawn the following conclusion based on the analysis performed for this project.

Intersection Operation. All of the intersections in this study area currently operating at acceptable levels of service and are expected to continue to operate at acceptable levels of service through the Year 2045. Therefore, this project will have minimal impact on the study area intersections. Additionally, the traffic from the 12 apartments in the townhomes will not impact the level of service.

Tables

Table 1 – Existing and Projected Daily Volumes

Table 2 – Intersection Operational Summary

Table 3 – Trip Generation Estimate – East Street Village

Table 4 – Trip Generation Estimate – Fast Casual Restaurant

Table 1. Existing and Projected Daily Traffic Volumes

Link	Year 2023 Traffic ¹	East Street Village Traffic	Year 2025		Fast Casual Restaurant Traffic	Year 2045	
			Background	Total		Background	Total
SH 42 north of Pine Street	17,590	120	17,930	18,050	240	21,610	21,730
SH 42 between Pine Street and Lock Street	15,577	60	15,880	15,940	60	19,180	19,240
96th Street South of Lock Street	15,000	90	15,290	15,380	180	18,440	18,530
Pine Street west of SH 42	6,030	30	6,030	6,060	240	6,270	6,300
Pine Street west of East Street	5,670	30	5,670	5,700	60	5,730	5,760
East Street south of Pine Street	770	60	770	830	310	1,080	1,140
Lock Street west of SH 42 / 96th Street	380	250	380	630	310	690	940
SH 42 east of 96th Street	7,400	60	7,580	7,640	120	9,560	9,620

Note

1. The Year 2023 volumes collected for the study are highlighted in yellow. All other existing volumes were estimated based on the peak hour to daily ratio for the evening peak hour.

Table 2. Intersection Operational Summary

Signalized Intersections ¹	Year 2023				Year 2025 Background				Year 2025 Total - Scenario 1				Year 2025 Total - Scenario 2				Year 2045 Background				Year 2045 Total - Scenario 1				Year 2045 Total - Scenario 2			
	Morning		Evening		Morning		Evening		Morning		Evening		Morning		Evening		Morning		Evening		Morning		Evening		Morning		Evening	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1 - SH 42 / Pine Street	19.6	B	21.6	C	19.7	B	21.7	C	19.8	B	21.9	C	19.8	B	21.7	C	13.4	B	15.0	B	13.5	B	15.0	B	13.5	B	15.0	B
2 - SH 42 / 96th Street / Lock Street	30.5	C	31.8	C	31.1	C	32.7	C	30.9	C	31.5	C	30.5	C	31.3	C	---				---				---			
Stop-Controlled Intersections ¹	Year 2023				Year 2025 Background				Year 2025 Total - Scenario 1				Year 2025 Total - Scenario 2				Year 2045 Background				Year 2045 Total - Scenario 1				Year 2045 Total - Scenario 2			
	Morning		Evening		Morning		Evening		Morning		Evening		Morning		Evening		Morning		Evening		Morning		Evening		Morning		Evening	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
3 - Pine Street / East Street	12.30	B	12.70	B	12.30	B	12.70	B	12.40	B	12.90	B	12.40	B	12.80	B	12.40	B	13.50	B	12.50	B	13.70	B	12.40	B	13.70	B
	NBLT		NBLT		NBLT		NBLT		NBLT		NBLT		NBLT		NBLT		NBLT		NBLT		NBLT		NBLT		EBLT			
4 - East Street / North Access	---				---				8.70	A	9.10	A	8.70	A	9.00	A	---				8.80	A	9.30	A	8.70	A	9.30	A
									EBLT		EBLT		EBLT		EBLT													
									EBLT		EBLT		EBLT		EBLT													
5 - East Street / South Access	---				---				8.80	A	9.10	A	8.80	A	9.10	A	---				8.80	A	9.40	A	8.80	A	9.30	A
									EBLT		EBLT		EBLT		EBLT													
									EBLT		EBLT		EBLT		EBLT													
Roundabout ¹	Year 2023				Year 2025 Background				Year 2025 Total - Scenario 1				Year 2025 Total - Scenario 2				Year 2045 Background				Year 2045 Total - Scenario 1				Year 2045 Total - Scenario 2			
	Morning		Evening		Morning		Evening		Morning		Evening		Morning		Evening		Morning		Evening		Morning		Evening		Morning		Evening	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
2 - SH 42 / 96th Street / Lock Street	---				---				---				---				7.40	A	8.00	A	7.50	A	8.20	A	7.50	A	8.10	A

Notes

1. The level of service for intersections with side-street stop-control is determined by the movement with the highest delay value.
2. The level of service for signalized intersections and roundabouts is based on the delay for the entire intersection.

Table 3. Trip Generation Estimate - East Street Village

Scenario 1 - One Bedroom Apartments in 12 of the 21 Townhomes

Land Use ¹	ITE Code ²	Size	Unit	Average Daily Trips				Morning Peak Hour Trips				Evening Peak Hour Trips			
				Rate	Total	In	Out	Rate	Total	In	Out	Rate	Total	In	Out
Single Family Detached Housing	210	15	DU	9.43	142	71	71	0.70	11	3	8	0.94	14	9	5
Multifamily (Low-Rise) (Not Close to Transit)	220	21	DU	6.74	142	71	71	0.40	8	2	6	0.51	11	7	4
Patio Home (One Bedroom Apartment)	210	12	DU	5.35	64	32	32	0.26	3	1	2	0.47	6	4	2
10% Multimodal Trip Reduction	---	---	---	---	-36	-17	-17	---	-2	-1	-1	---	-3	-2	-1
Total	---	---	---	---	312	156	156	---	20	5	15	---	28	18	10

Scenario 2 - No Apartments in the Townhomes

Land Use ¹	ITE Code ²	Size	Unit	Average Daily Trips				Morning Peak Hour Trips				Evening Peak Hour Trips			
				Rate	Total	In	Out	Rate	Total	In	Out	Rate	Total	In	Out
Single Family Detached Housing	210	15	DU	9.43	142	71	71	0.70	11	3	8	0.94	14	9	5
Multifamily (Low-Rise) (Not Close to Transit)	220	21	DU	6.74	142	71	71	0.40	8	2	6	0.51	11	7	4
10% Multimodal Trip Reduction	---	---	---	---	-28	-14	-14	---	-2	-1	-1	---	-2	-2	-1
Total	---	---	---	---	256	128	128	---	17	4	13	---	22	14	8

Notes:

1. The assumed land uses were provided by Andy Johnson with DAJDESIGN.
2. The trip generation estimate is based on rates contained in [Trip Generation, 11th Edition](#) (Institute of Transportation Engineers, September 2021).
3. 12 of the townhomes will have a separate one bedroom apartment. The City agreed that the trip generation for a patio home was appropriate for this land use.

Table 4. Trip Generation Estimate - Fast Casual Restaurant

Land Use	ITE Code ¹	Size	Unit	Average Daily Trips				Morning Peak Hour Trips				Evening Peak Hour Trips			
				Rate	Total	In	Out	Rate	Total	In	Out	Rate	Total	In	Out
Single Family Detached Housing	210	7	1,000 ft ²	97.14	680	340	340	1.43	10	5	5	12.55	88	48	40
10% Multimodal Trip Reduction	---	---	---	---	-68	-34	-34	---	-2	-1	-1	---	-9	-5	-4
Total	---	---	---	---	612	306	306	---	8	4	4	---	79	43	36

Notes:

1. The trip generation estimate is based on rates contained in Trip Generation, 11th Edition (Institute of Transportation Engineers, September 2021).

Figures

Figure 1 – Vicinity Map

Figure 2 – Site Plan

Figure 3 – Laneage and Traffic Control – Existing

Figure 4 – Year 2023 Traffic Volumes – Morning Peak Hour

Figure 5 – Year 2023 Traffic Volumes – Evening Peak Hour

Figure 6 – Trip Distribution

Figure 7 – Scenario 1 Residential Trip Assignment – Morning Peak Hour

Figure 8 – Scenario 1 Residential Trip Assignment – Evening Peak Hour

Figure 9 – Scenario 2 Residential Trip Assignment – Morning Peak Hour

Figure 10 – Scenario 2 Residential Trip Assignment – Evening Peak Hour

Figure 11 – Fast Casual Restaurant Trip Assignment – Morning Peak Hour

Figure 12 – Fast Casual Restaurant Trip Assignment – Evening Peak Hour

Figure 13 – Year 2025 Background Traffic Volumes – Morning Peak Hour

Figure 14 – Year 2025 Background Traffic Volumes – Evening Peak Hour

Figure 15 – Year 2025 Total Traffic Volumes Scenario 1 Residential – Morning Peak Hour

Figure 16 – Year 2025 Total Traffic Volumes Scenario 1 Residential – Evening Peak Hour

Figure 17 – Year 2025 Total Traffic Volumes Scenario 2 Residential – Morning Peak Hour

Figure 18 – Year 2025 Total Traffic Volumes Scenario 2 Residential – Evening Peak Hour

Figure 19 – Laneage and Traffic Control – Year 2025

Figure 20 – Year 2045 Background Traffic Volumes – Morning Peak Hour

Figure 21 – Year 2045 Background Traffic Volumes – Evening Peak Hour

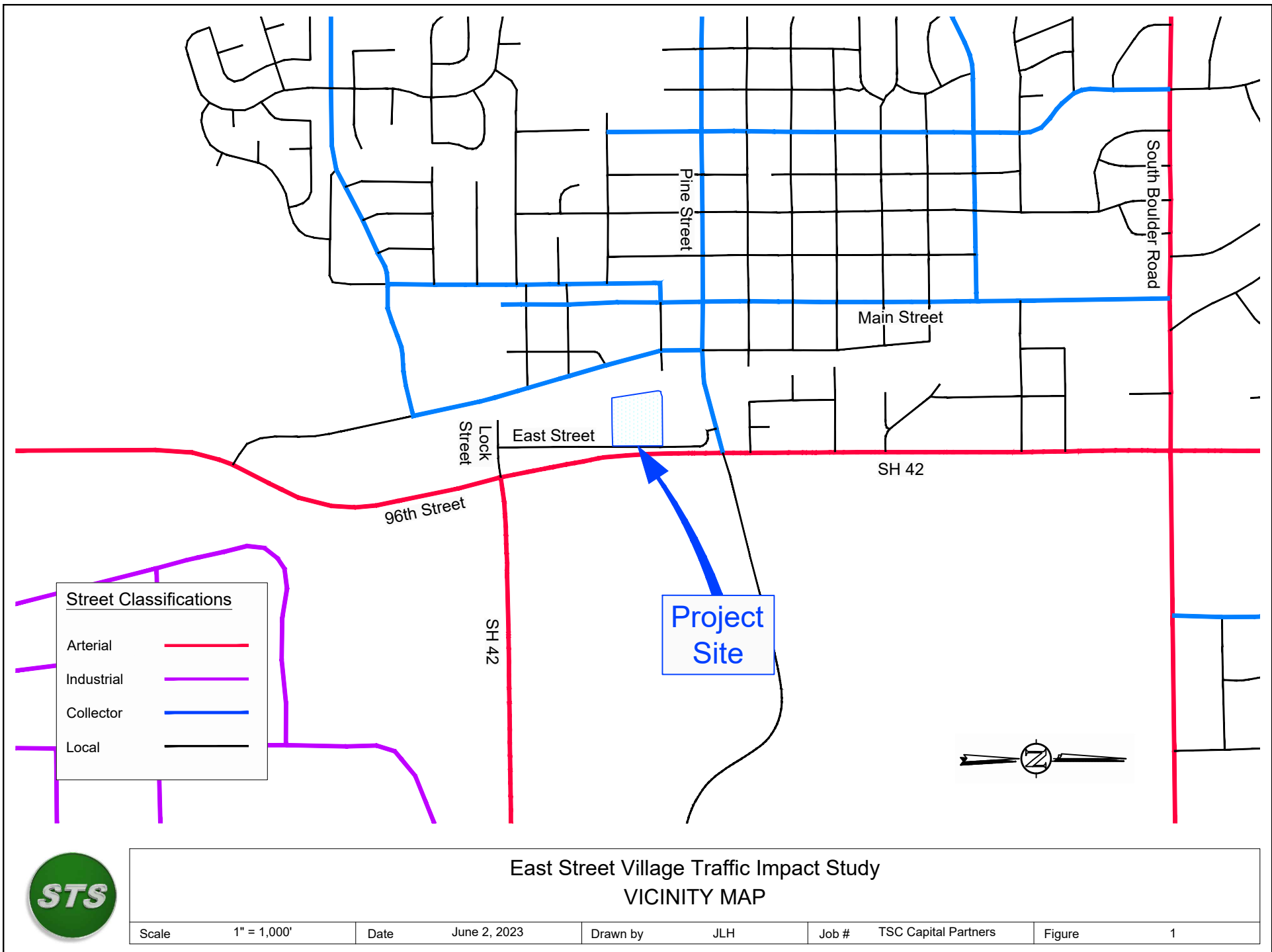
Figure 22 – Year 2045 Total Traffic Volumes Scenario 1 Residential – Morning Peak Hour

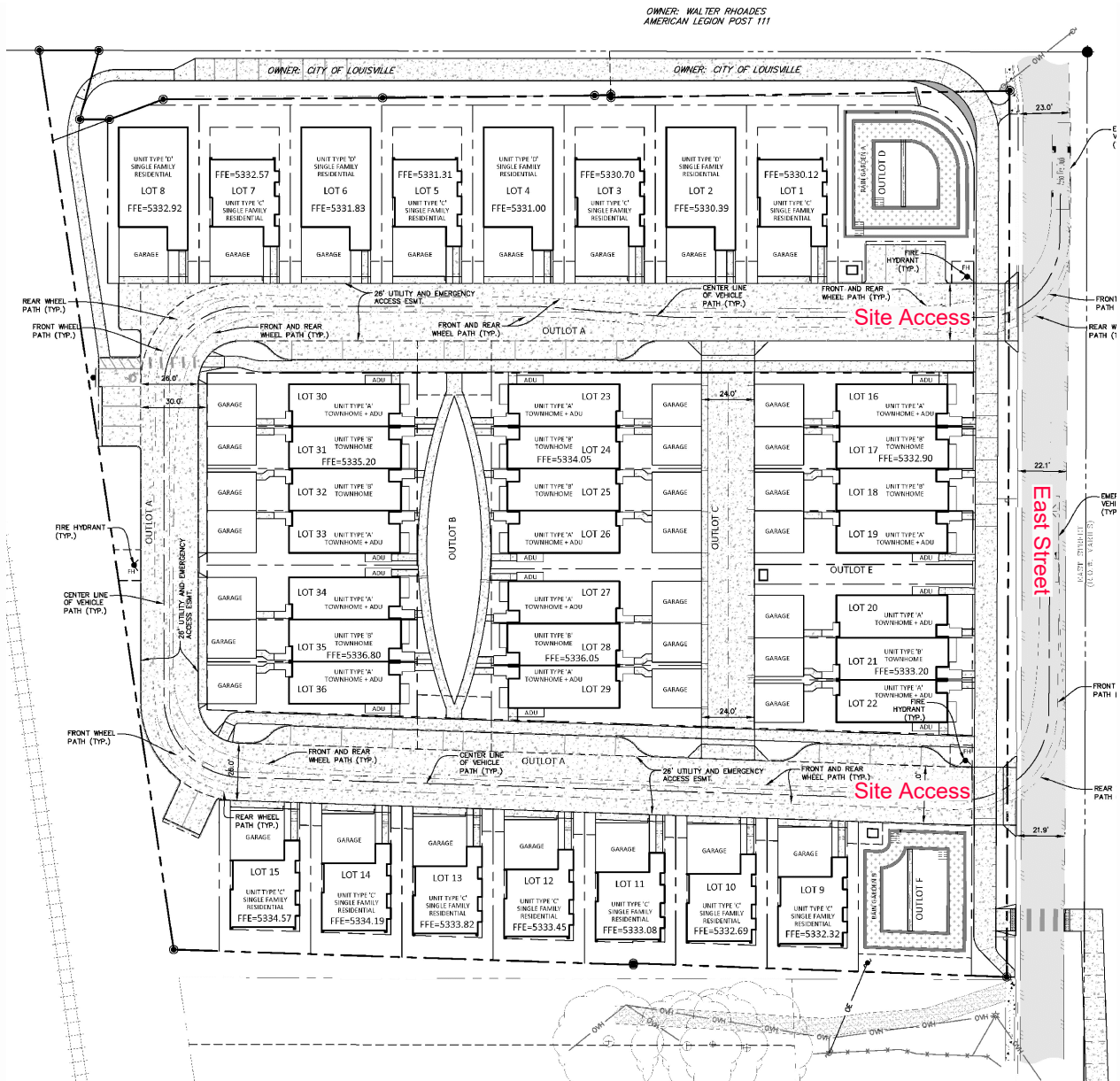
Figure 23 – Year 2045 Total Traffic Volumes Scenario 1 Residential – Evening Peak Hour

Figure 24 – Year 2045 Total Traffic Volumes Scenario 2 Residential – Morning Peak Hour

Figure 25 – Year 2045 Total Traffic Volumes Scenario 2 Residential – Evening Peak Hour

Figure 26 – Laneage and Traffic Control – Year 2045





East Street Village Traffic Impact Study SITE PLAN

Scale	NTS	Date	June 2, 2023	Drawn by	JLH	Job #	TSC Capital Partners	Figure	2
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Figure 3 – Laneage and Traffic Control – Existing

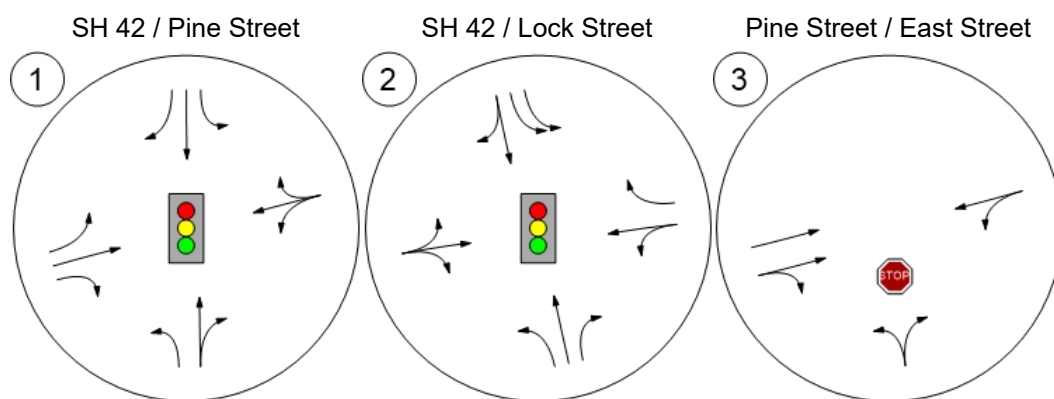


Figure 4 – Year 2023 Traffic Volumes – Morning Peak Hour

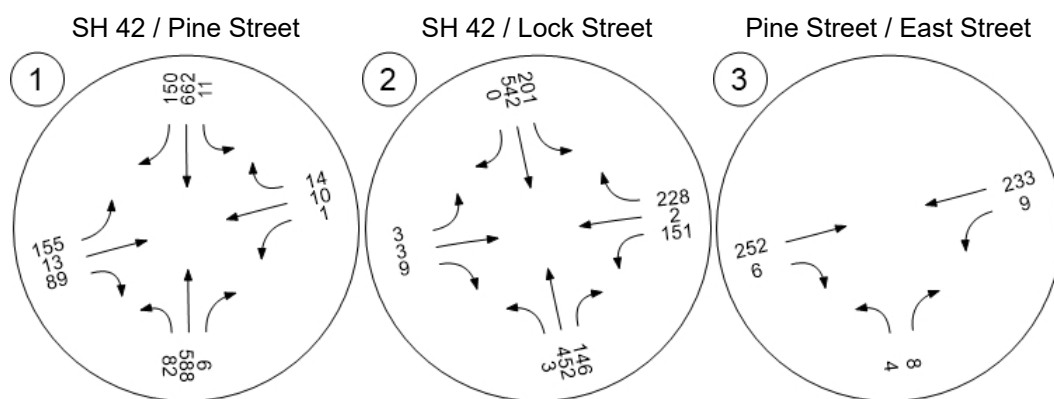
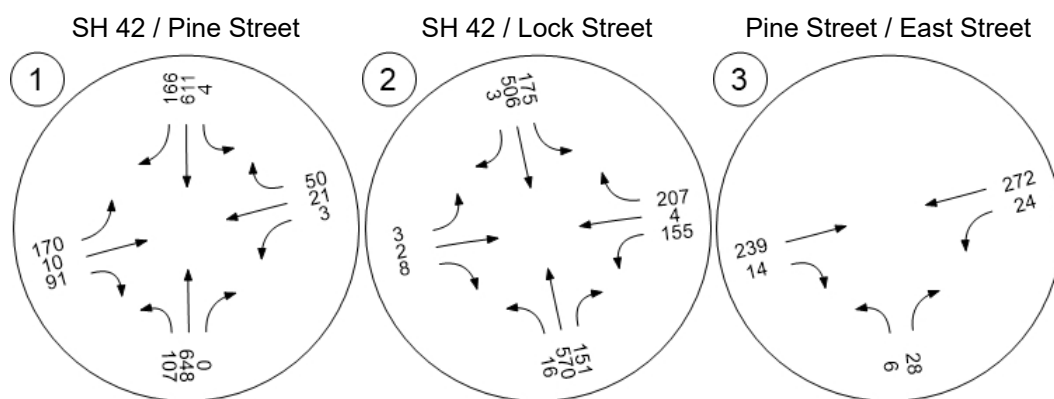
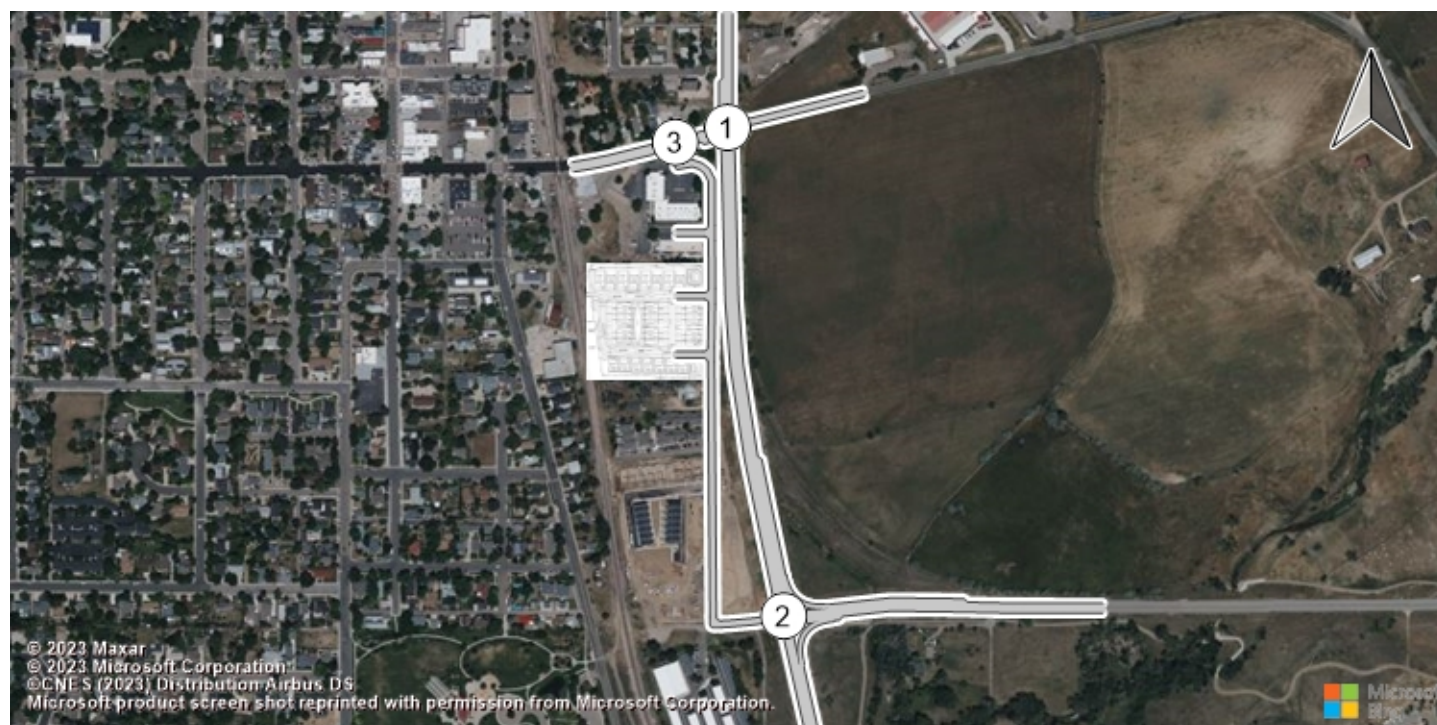


Figure 5 – Year 2023 Traffic Volumes – Evening Peak Hour



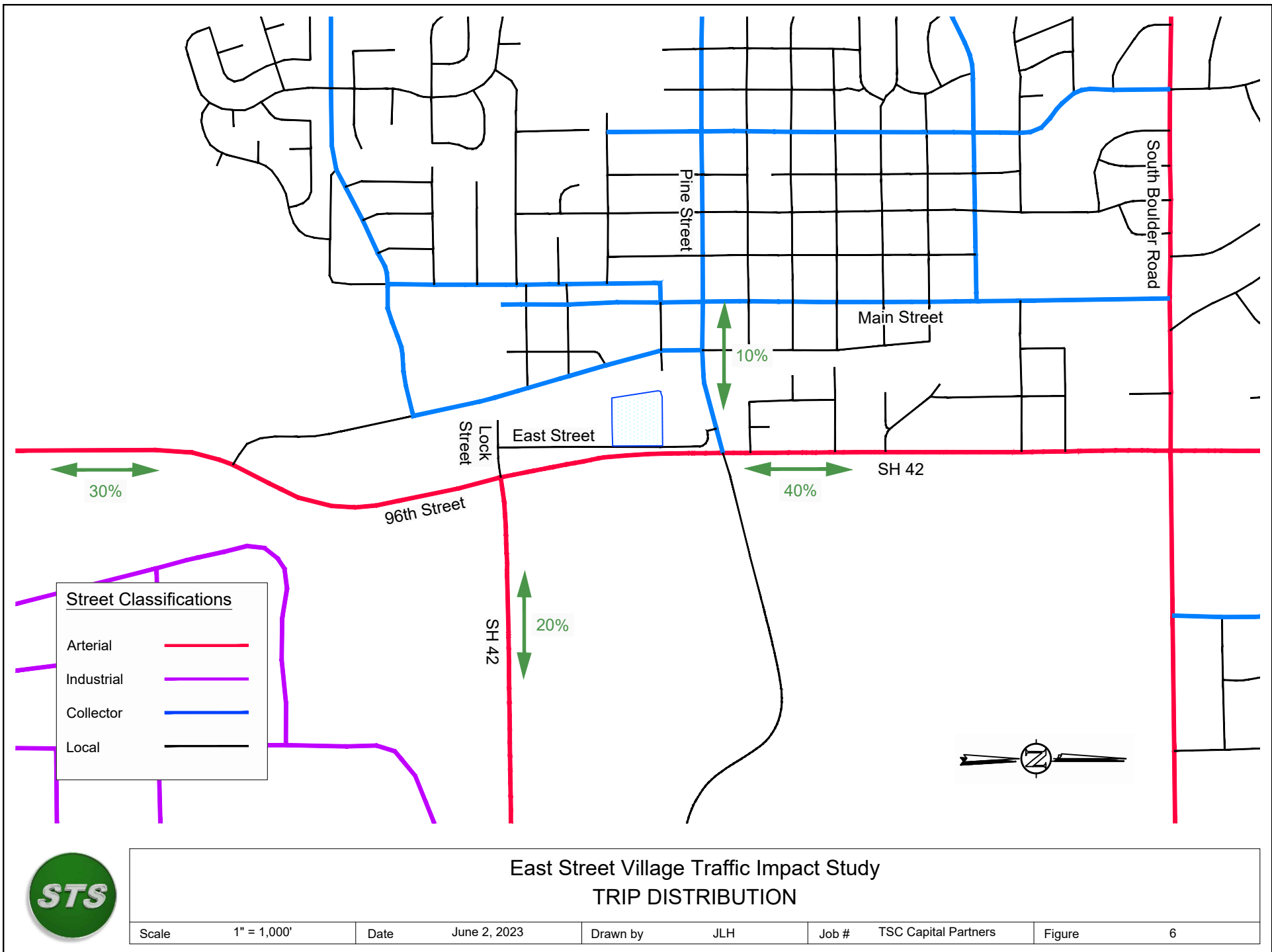


Figure 7 – Scenario 1 Residential Trip Assignment – Morning Peak Hour



Figure 8 – Scenario 1 Residential Trip Assignment – Evening Peak Hour



Figure 9 – Scenario 2 Residential Trip Assignment – Morning Peak Hour



Figure 10 – Scenario 2 Residential Trip Assignment – Evening Peak Hour



Figure 11 – Fast Casual Restaurant Trip Assignment – Morning Peak Hour



Figure 12 – Fast Casual Restaurant Trip Assignment – Evening Peak Hour

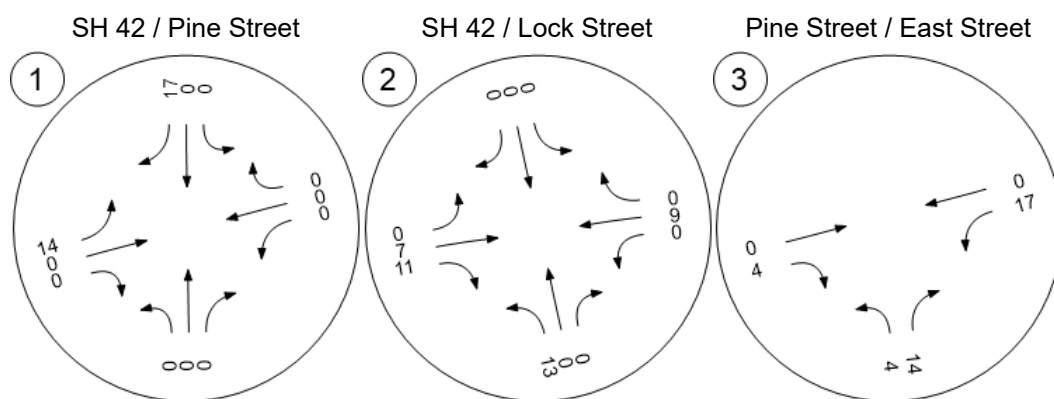


Figure 13 – Year 2025 Background Traffic Volumes – Morning Peak Hour

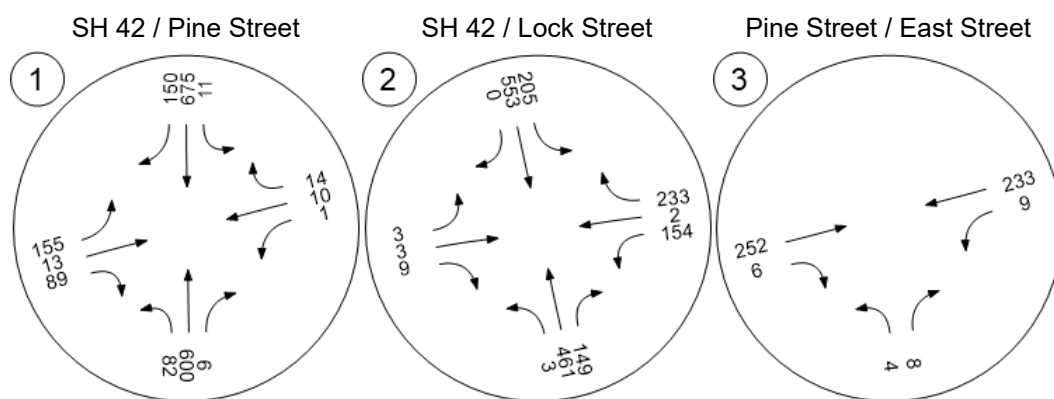


Figure 14 – Year 2025 Background Traffic Volumes – Evening Peak Hour

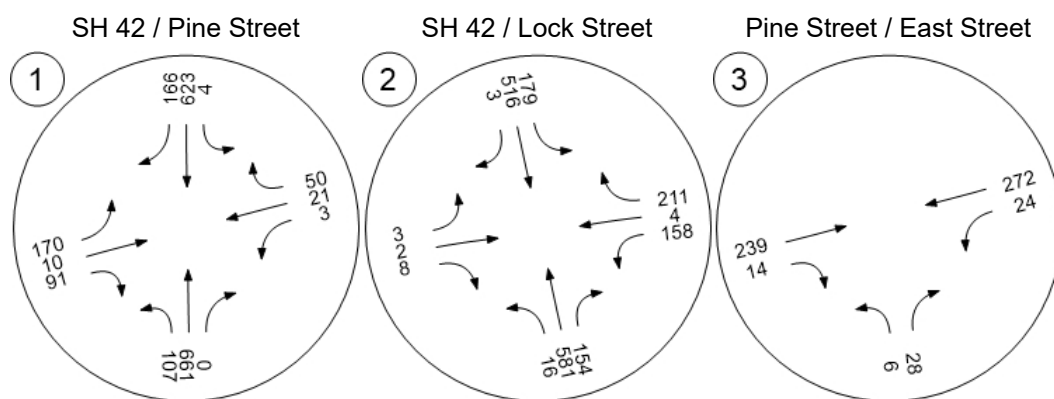


Figure 15 – Year 2025 Total Traffic Volumes Scenario 1 Residential – Morning Peak Hour



Figure 16 – Year 2025 Total Traffic Volumes Scenario 1 Residential – Evening Peak Hour



Figure 17 – Year 2025 Total Traffic Volumes Scenario 2 Residential – Morning Peak Hour



Figure 18 – Year 2025 Total Traffic Volumes Scenario 2 Residential – Evening Peak Hour



Figure 19 – Laneage and Traffic Control – Year 2025

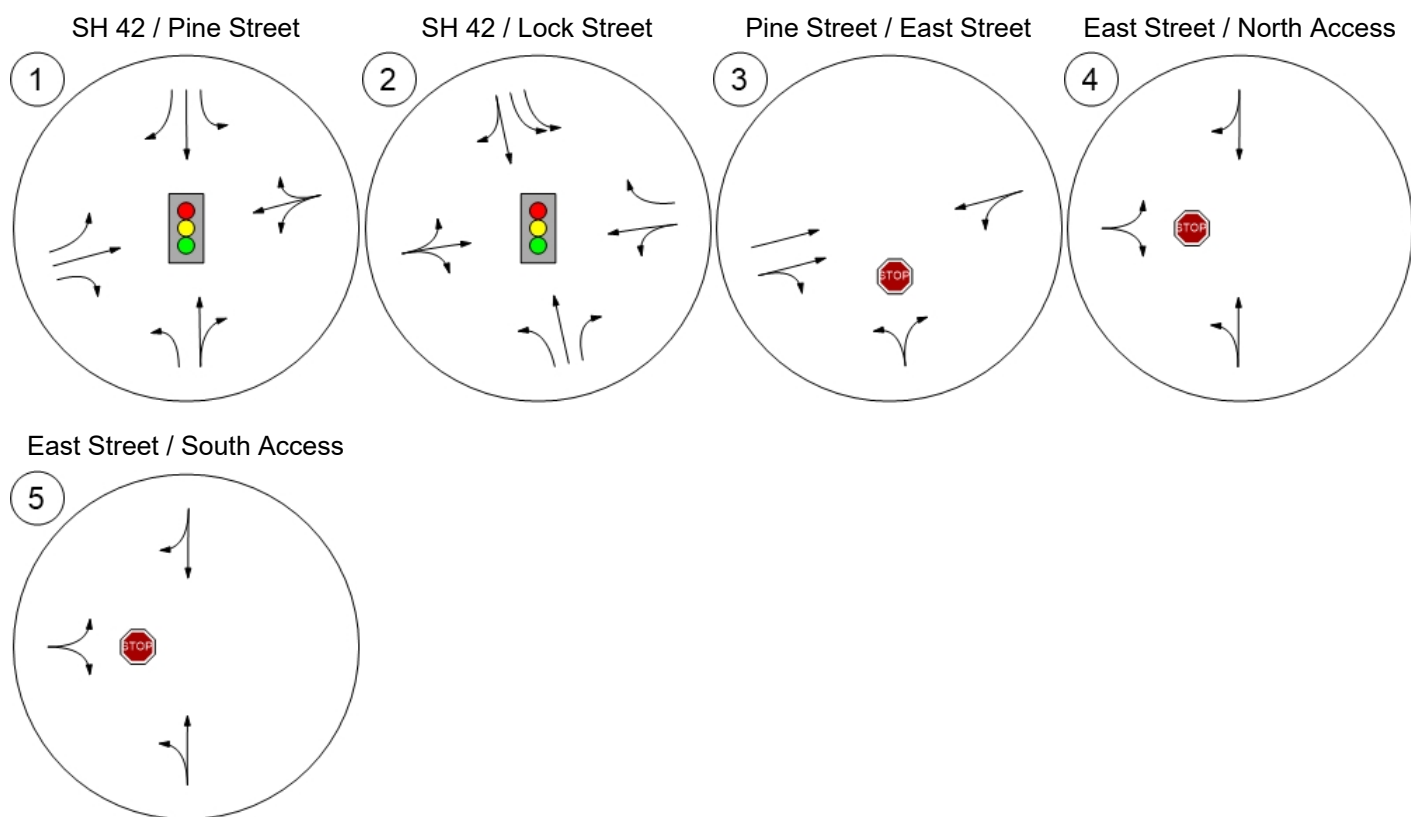


Figure 20 – Year 2045 Background Traffic Volumes – Morning Peak Hour



Figure 21 – Year 2045 Background Traffic Volumes – Evening Peak Hour

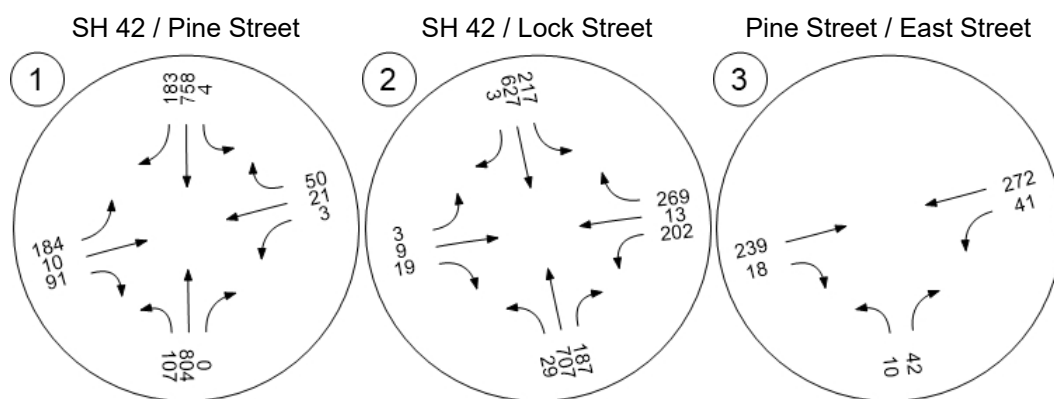


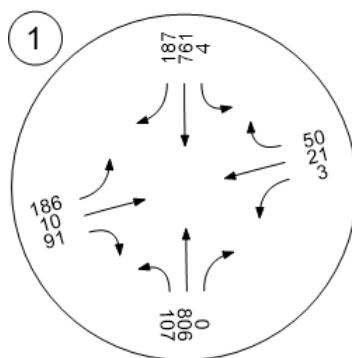
Figure 22 – Year 2045 Total Traffic Volumes Scenario 1 Residential – Morning Peak Hour



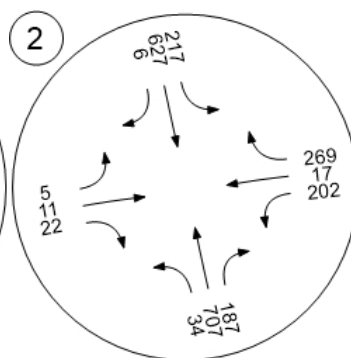
Figure 23 – Year 2045 Total Traffic Volumes Scenario 1 Residential – Evening Peak Hour



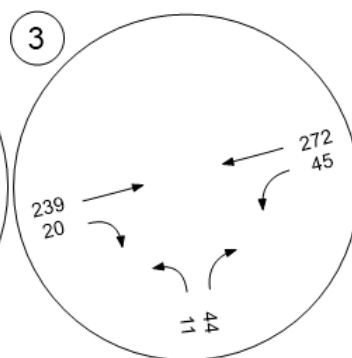
SH 42 / Pine Street



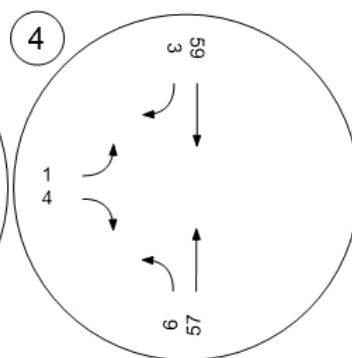
SH 42 / Lock Street



Pine Street / East Street



East Street / North Access



East Street / South Access

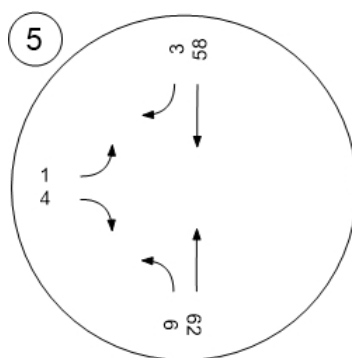


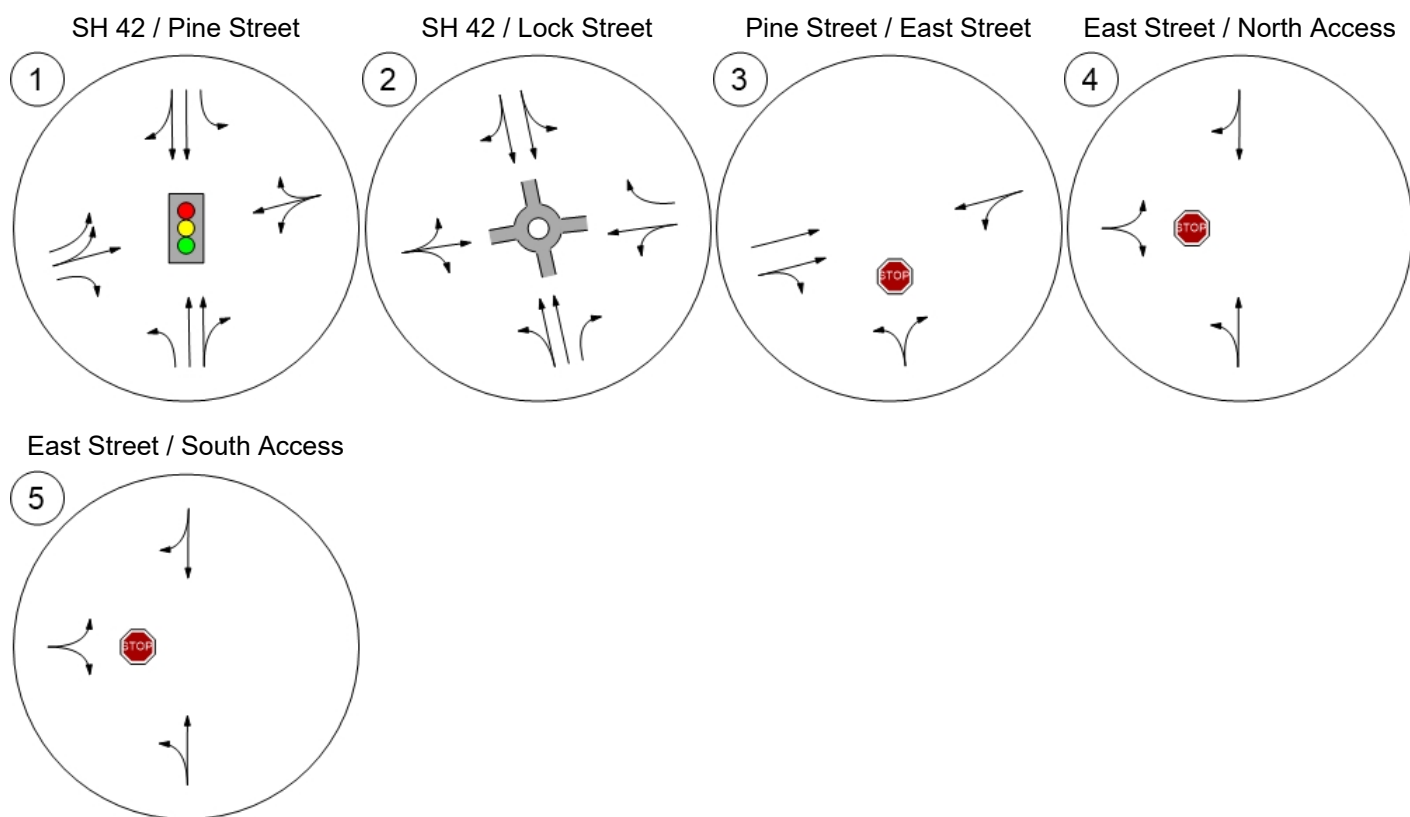
Figure 24 – Year 2045 Total Traffic Volumes Scenario 2 Residential – Morning Peak Hour



Figure 25 – Year 2045 Total Traffic Volumes Scenario 2 Residential – Evening Peak Hour



Figure 26 – Laneage and Traffic Control – Year 2045



Appendix A

Project Correspondence

Meeting Notes - East Street Village Traffic Impact Study

6 messages

Joe Henderson <joe@sustainabletrafficsolutions.com>

Tue, Feb 7, 2023 at 6:17 AM

To: Cameron Fowlkes <CameronF@louisvilleco.gov>, Craig Duffin <CraigD@louisvilleco.gov>, elizabethm@louisvilleco.gov

Cc: Andy Johnson <andy@dajdesign.com>

Friends,

These are my notes from our meeting last Friday. Please let me know if you have any changes or additions.

Intersections Included in the Study Area

- SH 42 / Pine Street
- Pine Street / East Street
- SH 42 / Lock Street
- Lock Street / East Street

Land Use Scenarios

- 15 single family dwelling units (SFDU trip generation)
- 21 townhomes
- Separate apartment in 12 of the townhomes (patio home trip generation rate for one bedroom apartments)
- The second scenario will be without the apartments

Future Development

- Assume 7,000 square feet future development behind the strip mall
- Land use will be retail or food service (choose the most restrictive)

Alternate Modes

- Assume none

--

Joseph L. Henderson, PE, PTOE

Principal

Sustainable Traffic Solutions, Inc.

823 West 124th Drive

Westminster, CO 80234

303.589.6875

joe@sustainabletrafficsolutions.com

sustainabletrafficsolutions.com

Licensed in CO, WY, and IA



Andy Johnson <andy@dajdesign.com>

Tue, Feb 7, 2023 at 7:03 AM

To: Sustainable Traffic Solutions <joe@sustainabletrafficsolutions.com>

Cc: Cameron Fowlkes <CameronF@louisvilleco.gov>, Craig Duffin <CraigD@louisvilleco.gov>, elizabethm@louisvilleco.gov

Hi Joe,

I believe that covers everything we discussed. Would alternate modes include pedestrian, cycling, and mass transit, or does it include other modes?

Thanks.

Andy Johnson, AIA

DAJDESIGN

w. 303.527.1100

m. 303.249.1624

[Quoted text hidden]

Joe Henderson <joe@sustainabletrafficsolutions.com>

Tue, Feb 7, 2023 at 9:44 AM

To: Andy Johnson <andy@dajdesign.com>

Cc: Cameron Fowlkes <CameronF@louisvilleco.gov>, Craig Duffin <CraigD@louisvilleco.gov>, elizabethm@louisvilleco.gov

Andy,

That's a great question. The response that I received about the path going by the development lead me to believe that there wouldn't be a significant number of people using the path to commute to downtown. However, the site is about a 10 minute bike ride to the RTD station at US 36 / McCaslin so there is potential that people could cycle to that station and get on a regional bus. Also, I think that working from home could be considered an alternate mode of transportation. While people aren't actually traveling, they are not commuting to work. Since the pandemic, I have a significant number of neighbors and friends who haven't gone back to the office or are only there part time. I would propose a 10% mode split for the traffic study. I actually think that this is a conservative number.

Joe

[Quoted text hidden]

Andy Johnson <andy@dajdesign.com>

Tue, Feb 7, 2023 at 12:49 PM

To: Joe Henderson <joe@sustainabletrafficsolutions.com>

Cc: Cameron Fowlkes <CameronF@louisvilleco.gov>, Craig Duffin <CraigD@louisvilleco.gov>, "elizabethm@louisvilleco.gov" <elizabethm@louisvilleco.gov>

Joe,

I think the work from home component is significant and more than 10% (more like 25-40%), but let's stay with the notion of being conservative and go with 10%. I do not believe folks will be driving from this development to downtown or up to DELO, but I do think that despite the relatively proximity they will be driving to King Soopers for groceries. When the multi-purpose path goes in it will likely encourage alternate modes of transportation, but sadly the reality is that it will still be somewhat low. I think the multi-purpose path will encourage recreation more than commuting, which is great but it probably won't influence the traffic study enough to matter. Just my two cents.

Craig, Cameron, Elizabeth, does staff want to weigh in on what you would like to see from the report around the topics being discussed? Also, can you please review Joe's scope of work outline and make sure it meets the needs of staff's request for the traffic study?

Thanks!

Andy

--

Andy Johnson, AIA

DAJDESIGN

w. 303.527.1100

m. 303.249.1624

[Quoted text hidden]

Craig Duffin <craigd@louisvilleco.gov>

Tue, Feb 7, 2023 at 5:39 PM

To: Andy Johnson <andy@dajdesign.com>, Joe Henderson <joe@sustainabletrafficsolutions.com>

Cc: Cameron Fowlkes <cfowlkes@louisvilleco.gov>, "elizabethm@louisvilleco.gov" <elizabethm@louisvilleco.gov>

Comments below in red.

From: Andy Johnson <andy@dajdesign.com>

Sent: Tuesday, February 7, 2023 12:50 PM

To: Joe Henderson <joe@sustainabletrafficsolutions.com>

Cc: Cameron Fowlkes <cfowlkes@louisvilleco.gov>; Craig Duffin <craigd@louisvilleco.gov>; elizabethm@louisvilleco.gov

Subject: RE: Meeting Notes - East Street Village Traffic Impact Study

Joe,

I think the work from home component is significant and more than 10% (more like 25-40%), but let's stay with the notion of being conservative and go with 10%. I do not believe folks will be driving from this development to downtown or up to DELO, but I do think that despite the relatively proximity they will be driving to King Soopers for groceries. When the multi-purpose path goes in it will likely encourage alternate modes of transportation, but sadly the reality is that it will still be somewhat low. I think the multi-purpose path will encourage recreation more than commuting, which is great but it probably won't influence the traffic study enough to matter. Just my two cents. **Andy, have no feel for the work from home component or other alternate modes, just be conservative. Joe, RTD bus route passes by Main at Pine. CD.**

[Quoted text hidden]

[Quoted text hidden]

[Quoted text hidden]

[Quoted text hidden]

[Quoted text hidden]

[Quoted text hidden]

[Quoted text hidden]

- Lock Street / East Street. **Joe, not concerned with this intersection. CD.**

Land Use Scenarios

- 15 single family dwelling units (SFDU trip generation)
- 21 townhomes
- Separate apartment in 12 of the townhomes (patio home trip generation rate for one bedroom apartments)
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Alternate Modes

- Assume none

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Joseph L. Henderson, PE, PTOE

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Licensed in CO, WY, and IA

[]

--

Joseph L. Henderson, PE, PTOE

Principal

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Westminster, CO 80234

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Andy Johnson <andy@dajdesign.com>

Tue, Feb 7, 2023 at 8:37 PM

To: Craig Duffin <craigd@louisvilleco.gov>

Cc: Joe Henderson <joe@sustainabletrafficsolutions.com>, Cameron Fowlkes <cfowlkes@louisvilleco.gov>, elizabethm@louisvilleco.gov

Craig, thanks.

Joe, looks like we can remove the intersection of Lock and East St based on Craigs comments. Thanks!

Andy

Andy Johnson
DAJDESIGN
m. 303.249.1624
w. 303.527.1100

On Feb 7, 2023, at 5:39 PM, Craig Duffin <craigd@louisvilleco.gov> wrote:

[Quoted text hidden]

[Quoted text hidden]

[Quoted text hidden]

[Quoted text hidden]

[Quoted text hidden]

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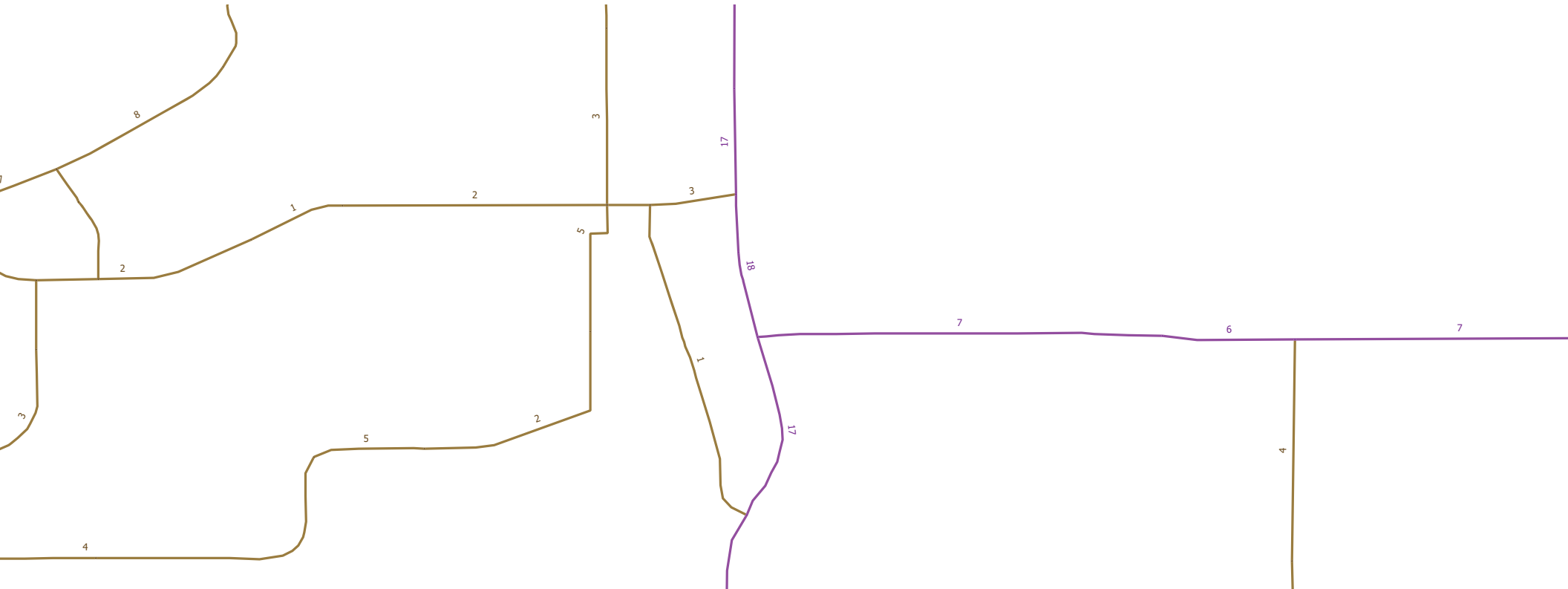
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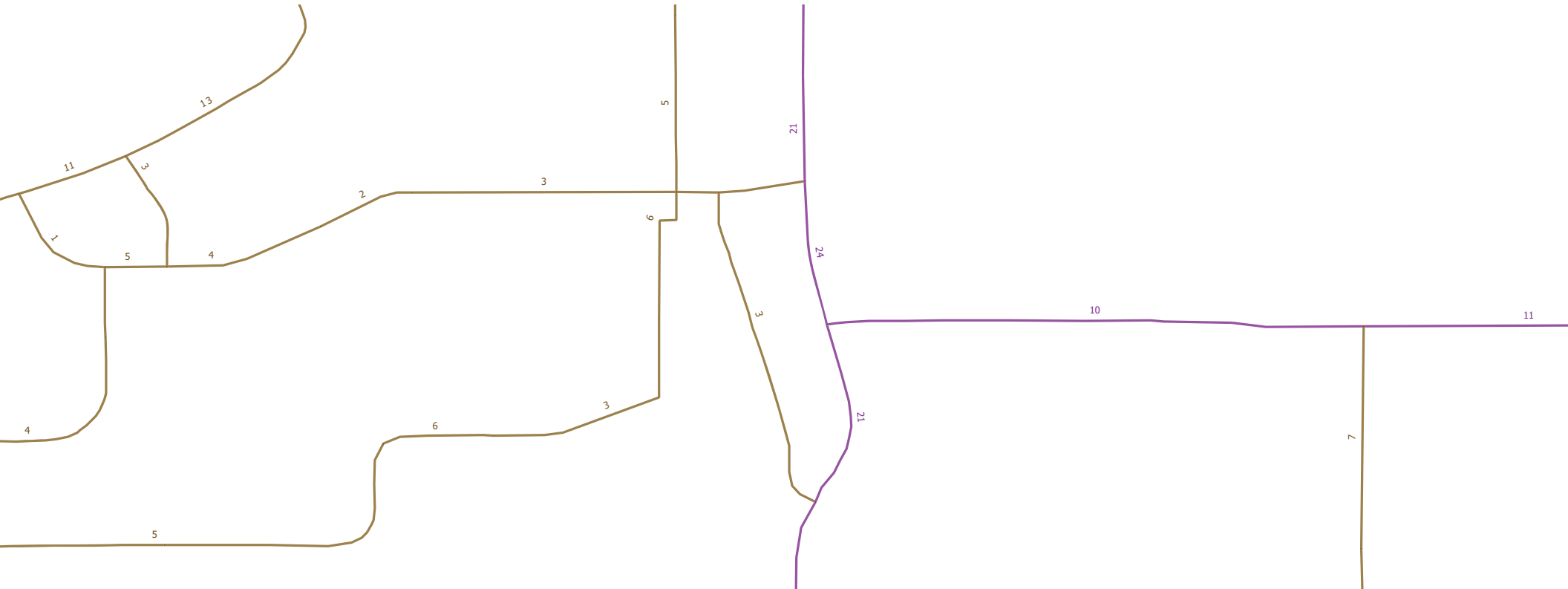
Appendix B

DRCOG Traffic Projections

Year 2020 Traffic Volumes



Year 2050 Traffic Volume Projections



Appendix C

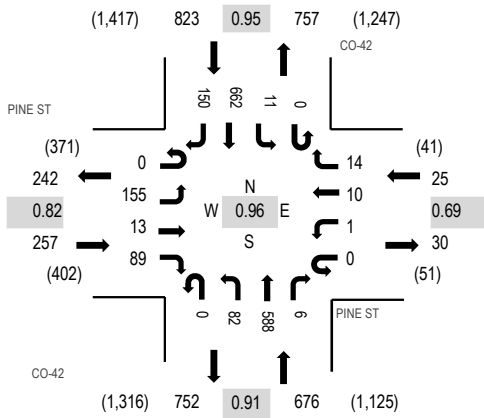
Traffic Count Data



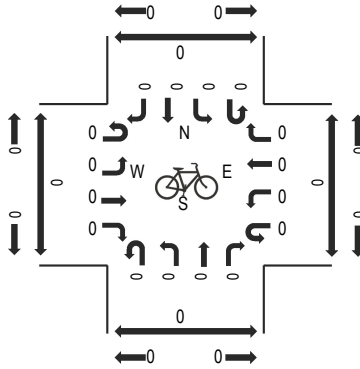
(303) 216-2439
www.alltrafficdata.net

Location: 1 CO-42 & PINE ST AM
Date: Thursday, February 23, 2023
Peak Hour: 07:45 AM - 08:45 AM
Peak 15-Minutes: 08:00 AM - 08:15 AM

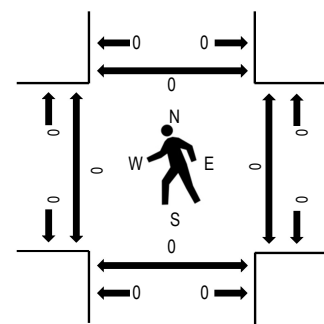
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

Traffic Counts - Motorized Vehicles

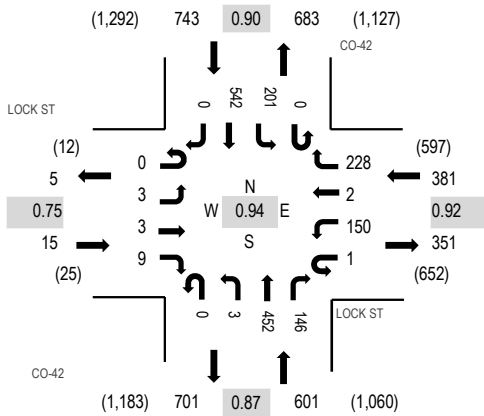
Interval Start Time	PINE ST Eastbound				PINE ST Westbound				CO-42 Northbound				CO-42 Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	9	0	7	0	0	1	0	0	8	64	3	0	0	96	9	197	1,268	0	0	0	0
7:15 AM	0	22	4	16	0	0	2	1	0	10	79	0	0	2	105	14	255	1,533	0	0	0	0
7:30 AM	0	24	1	8	0	0	3	2	0	6	122	0	0	2	164	31	363	1,723	0	0	0	0
7:45 AM	0	42	3	33	0	0	3	6	0	30	120	0	0	3	170	43	453	1,781	0	0	0	0
8:00 AM	0	50	2	19	0	0	2	2	0	18	163	3	0	4	164	35	462	1,717	0	0	0	0
8:15 AM	0	38	4	17	0	0	1	2	0	17	169	1	0	2	156	38	445		0	0	0	0
8:30 AM	0	25	4	20	0	1	4	4	0	17	136	2	0	2	172	34	421		0	0	0	0
8:45 AM	0	28	4	22	0	2	3	2	0	19	137	1	0	4	144	23	389		0	0	0	0
Count Total	0	238	22	142	0	3	19	19	0	125	990	10	0	19	1,171	227	2,985		0	0	0	0
Peak Hour	0	155	13	89	0	1	10	14	0	82	588	6	0	11	662	150	1,781		0	0	0	0



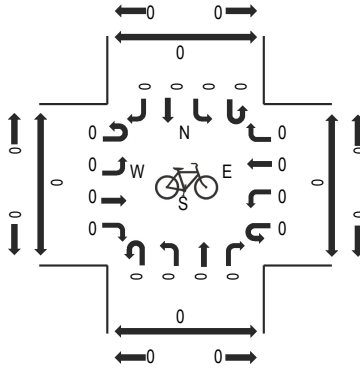
(303) 216-2439
www.alltrafficdata.net

Location: 2 CO-42 & LOCK ST AM
Date: Thursday, February 23, 2023
Peak Hour: 07:45 AM - 08:45 AM
Peak 15-Minutes: 08:00 AM - 08:15 AM

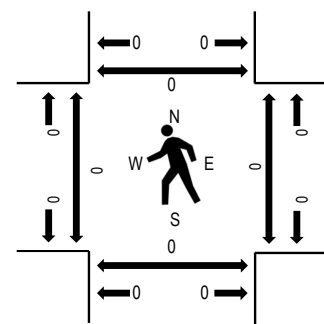
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

Traffic Counts - Motorized Vehicles

Interval Start Time	LOCK ST Eastbound				LOCK ST Westbound				CO-42 Northbound				CO-42 Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	1	1	1	0	14	1	16	0	1	57	25	0	27	69	1	214	1,290	0	0	0	0
7:15 AM	0	0	0	2	0	20	1	33	0	1	56	48	0	40	85	0	286	1,539	0	0	0	0
7:30 AM	0	0	0	4	0	23	0	37	0	1	95	37	0	34	123	0	354	1,686	0	0	0	0
7:45 AM	0	1	2	2	0	39	0	64	0	2	83	37	0	54	152	0	436	1,740	0	0	0	0
8:00 AM	0	1	0	5	0	42	0	58	0	0	128	50	0	49	130	0	463	1,684	0	0	0	0
8:15 AM	0	1	1	1	0	45	1	58	0	0	123	24	0	45	134	0	433		0	0	0	0
8:30 AM	0	0	0	1	1	24	1	48	0	1	118	35	0	53	126	0	408		0	0	0	0
8:45 AM	0	0	0	1	0	23	0	48	0	1	101	36	0	53	117	0	380		0	0	0	0
Count Total	0	4	4	17	1	230	4	362	0	7	761	292	0	355	936	1	2,974		0	0	0	0
Peak Hour	0	3	3	9	1	150	2	228	0	3	452	146	0	201	542	0	1,740		0	0	0	0



ALL TRAFFIC DATA SERVICES

(303) 216-2439

www.alltrafficdata.net

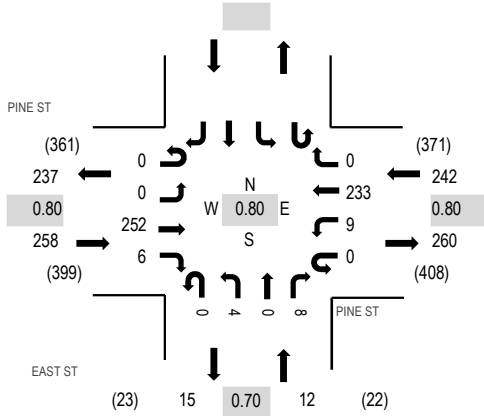
Location: 3 EAST ST & PINE ST AM

Date: Thursday, February 23, 2023

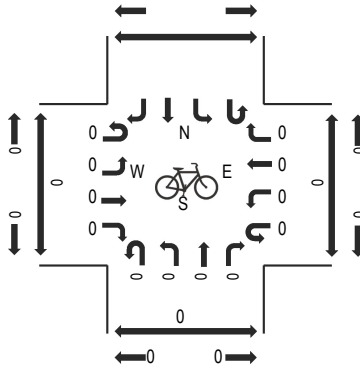
Peak Hour: 07:45 AM - 08:45 AM

Peak 15-Minutes: 07:45 AM - 08:00 AM

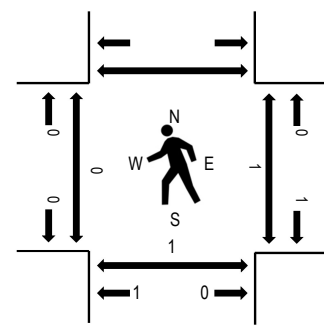
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

Traffic Counts - Motorized Vehicles

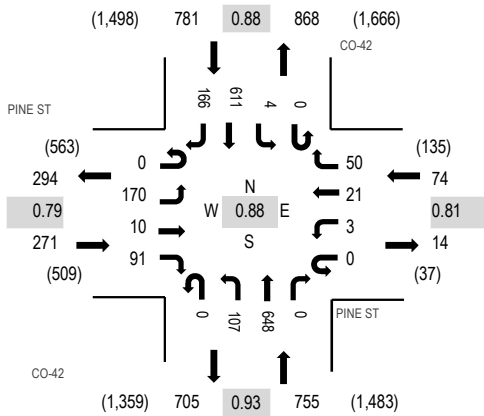
Interval Start Time	PINE ST Eastbound				PINE ST Westbound				EAST ST Northbound				Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
7:00 AM	0	0	20	0	0	1	17	0	0	2	0	1					41	344	0	0	0	
7:15 AM	0	0	41	0	0	0	26	0	0	0	0	1					68	435	0	0	0	
7:30 AM	0	0	33	0	0	3	38	0	0	0	0	1					75	477	0	0	0	
7:45 AM	0	0	80	1	0	0	76	0	0	2	0	1					160	512	0	0	0	
8:00 AM	0	0	71	3	0	3	52	0	0	0	0	3					132	448	0	0	0	
8:15 AM	0	0	49	1	0	3	54	0	0	1	0	2					110		0	0	0	
8:30 AM	0	0	52	1	0	3	51	0	0	1	0	2					110		0	1	1	
8:45 AM	0	0	46	1	0	3	41	0	0	0	0	5					96		0	0	0	
Count Total	0	0	392	7	0	16	355	0	0	6	0	16					792		0	1	1	
Peak Hour	0	0	252	6	0	9	233	0	0	4	0	8					512		0	1	1	



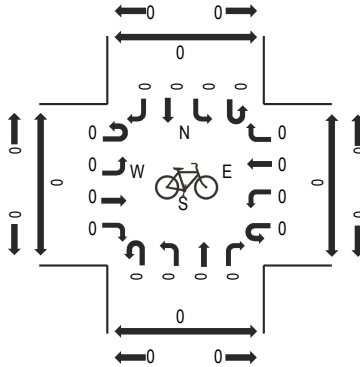
(303) 216-2439
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Location: 1 CO-42 & PINE ST PM
Date: Thursday, February 23, 2023
Peak Hour: 04:45 PM - 05:45 PM
Peak 15-Minutes: 05:00 PM - 05:15 PM

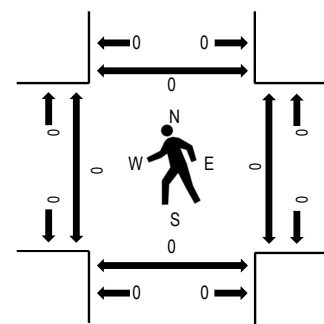
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

Traffic Counts - Motorized Vehicles

Interval Start Time	PINE ST Eastbound				PINE ST Westbound				CO-42 Northbound				CO-42 Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	43	2	29	0	1	4	13	0	23	173	2	0	1	154	52	497	1,816	0	0	0	0
4:15 PM	0	46	5	19	0	1	5	8	0	21	185	0	0	3	121	36	450	1,853	0	0	0	0
4:30 PM	0	20	2	27	0	1	5	14	0	28	134	2	0	2	154	30	419	1,848	0	0	0	0
4:45 PM	0	35	2	23	0	2	2	7	0	21	174	0	0	0	143	41	450	1,881	0	0	0	0
5:00 PM	0	56	4	26	0	1	5	17	0	36	167	0	0	2	178	42	534	1,809	0	0	0	0
5:15 PM	0	31	2	21	0	0	8	16	0	26	158	0	0	2	143	38	445		0	0	0	0
5:30 PM	0	48	2	21	0	0	6	10	0	24	149	0	0	0	147	45	452		0	0	0	0
5:45 PM	0	26	1	18	0	0	3	6	0	30	130	0	0	3	129	32	378		0	0	0	0
Count Total	0	305	20	184	0	6	38	91	0	209	1,270	4	0	13	1,169	316	3,625		0	0	0	0
Peak Hour	0	170	10	91	0	3	21	50	0	107	648	0	0	4	611	166	1,881		0	0	0	0



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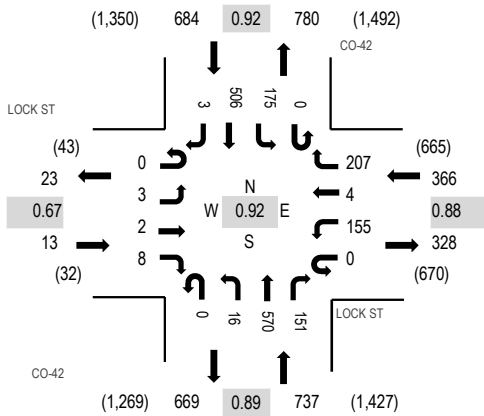
Location: 2 CO-42 & LOCK ST PM

Date: Thursday, February 23, 2023

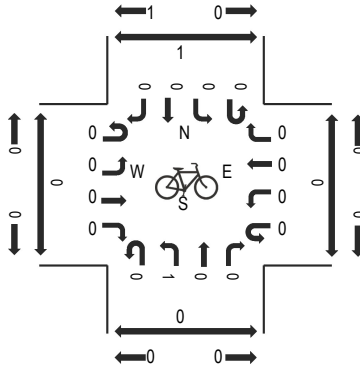
Peak Hour: 04:15 PM - 05:15 PM

Peak 15-Minutes: 05:00 PM - 05:15 PM

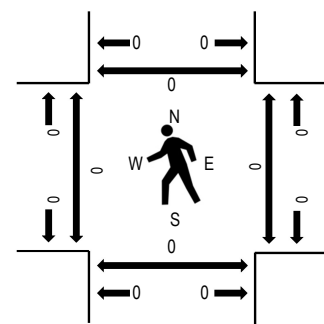
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

Traffic Counts - Motorized Vehicles

Interval Start Time	LOCK ST Eastbound				LOCK ST Westbound				CO-42 Northbound				CO-42 Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	0	2	4	0	32	3	53	0	2	143	38	0	54	129	3	463	1,774	0	1	0	1
4:15 PM	0	2	1	2	0	40	1	47	0	4	163	39	0	42	100	1	442	1,800	0	0	0	0
4:30 PM	0	0	0	2	0	48	1	44	0	4	118	39	0	41	127	0	424	1,784	0	0	0	0
4:45 PM	0	1	1	1	0	31	0	50	0	3	149	30	0	49	130	0	445	1,765	0	0	0	0
5:00 PM	0	0	0	3	0	36	2	66	0	5	140	43	0	43	149	2	489	1,700	0	0	0	0
5:15 PM	0	0	1	3	0	26	0	55	0	1	127	38	0	52	122	1	426		0	0	0	0
5:30 PM	0	0	0	5	0	34	3	36	0	1	136	41	0	28	120	1	405		0	0	0	0
5:45 PM	0	0	1	3	0	13	0	44	0	5	118	40	0	47	109	0	380		0	0	0	0
Count Total	0	3	6	23	0	260	10	395	0	25	1,094	308	0	356	986	8	3,474		0	1	0	1
Peak Hour	0	3	2	8	0	155	4	207	0	16	570	151	0	175	506	3	1,800		0	0	0	0



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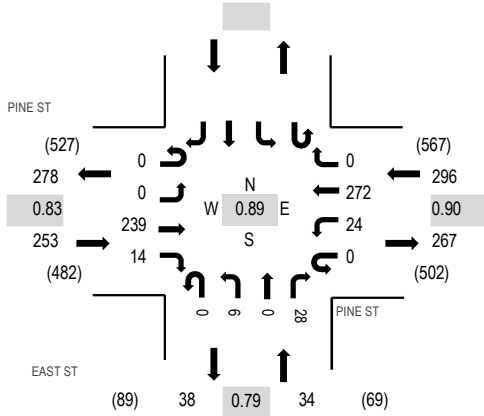
Location: 3 EAST ST & PINE ST PM

Date: Thursday, February 23, 2023

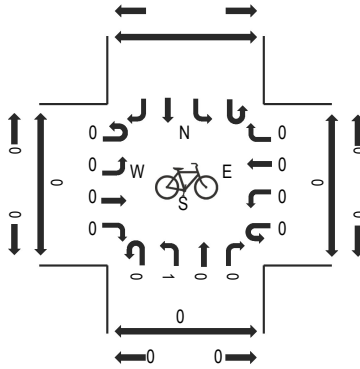
Peak Hour: 04:45 PM - 05:45 PM

Peak 15-Minutes: 05:00 PM - 05:15 PM

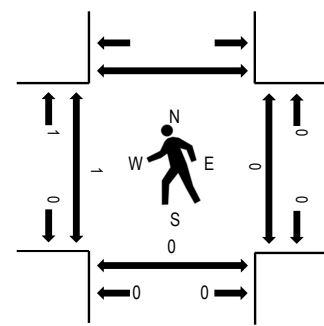
Peak Hour - Motorized Vehicles



Peak Hour - Bicycles



Peak Hour - Pedestrians



Note: Total study counts contained in parentheses.

Traffic Counts - Motorized Vehicles

Interval Start Time	PINE ST Eastbound				PINE ST Westbound				EAST ST Northbound				Southbound				Total	Rolling Hour	Pedestrian Crossings			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right			West	East	South	North
4:00 PM	0	0	60	6	0	14	66	0	0	3	0	10					159	552	0	0	0	0
4:15 PM	0	0	69	4	0	3	59	0	0	1	0	4					140	557	0	0	0	0
4:30 PM	0	0	42	3	0	11	53	0	0	1	0	4					114	548	0	0	0	0
4:45 PM	0	0	58	4	0	11	58	0	0	2	0	6					139	583	0	0	0	0
5:00 PM	0	0	71	6	0	4	78	0	0	1	0	4					164	566	0	0	0	0
5:15 PM	0	0	49	1	0	5	66	0	0	1	0	9					131		1	0	0	0
5:30 PM	0	0	61	3	0	4	70	0	0	2	0	9					149		0	0	0	0
5:45 PM	0	0	40	5	0	5	60	0	0	6	0	6					122		0	1	0	0
Count Total	0	0	450	32	0	57	510	0	0	17	0	52					1,118		1	1	0	0
Peak Hour	0	0	239	14	0	24	272	0	0	6	0	28					583		1	0	0	0

All Traffic Data Services

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Page 1

Site Code: 1
Station ID: 1
CO-42 S.O. Pine St

Start Time	23-Feb-23 Thu	NB	SB							Total
12:00 AM		13	15							28
01:00		16	15							31
02:00		17	17							34
03:00		17	19							36
04:00		29	35							64
05:00		48	121							169
06:00		143	253							396
07:00		441	599							1040
08:00		683	717							1400
09:00		459	474							933
10:00		391	452							843
11:00		464	465							929
12:00 PM		484	518							1002
01:00		463	505							968
02:00		542	509							1051
03:00		643	634							1277
04:00		763	675							1438
05:00		720	684							1404
06:00		439	455							894
07:00		304	294							598
08:00		240	246							486
09:00		164	138							302
10:00		100	76							176
11:00		39	39							78
Total		7622	7955							15577
Percent		48.9%	51.1%							
AM Peak	-	08:00	08:00	-	-	-	-	-	-	08:00
Vol.	-	683	717	-	-	-	-	-	-	1400
PM Peak	-	16:00	17:00	-	-	-	-	-	-	16:00
Vol.	-	763	684	-	-	-	-	-	-	1438
Grand Total		7622	7955							15577
Percent		48.9%	51.1%							
ADT		ADT 15,577	AADT 15,577							

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Appendix D

VISTRO Analysis Results

Year 2023 Traffic Volume Scenarios

East Street Village TIS

Vistro File: C:\...\AM.vistro
Report File: C:\...\2023 AM.pdf

Scenario 1 2023 AM
6/1/2023

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	SH 42 / Pine Street	Signalized	HCM 7th Edition	EB Left	0.512	19.6	B
2	SH 42 / Lock Street	Signalized	HCM 7th Edition	WB Left	0.577	30.5	C
3	Pine Street / East Street	Two-way stop	HCM 7th Edition	NB Left	0.012	12.3	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report

Intersection 1: SH 42 / Pine Street

Control Type: Signalized
 Analysis Method: HCM 7th Edition
 Analysis Period: 15 minutes

Delay (sec / veh): 19.6
 Level Of Service: B
 Volume to Capacity (v/c): 0.512

Intersection Setup

Name	SH 42			SH 42			Pine Street			Empire Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	0	0	1	0	0	0
Entry Pocket Length [ft]	300.00	100.00	100.00	100.00	100.00	135.00	100.00	100.00	50.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

Volumes

Name	SH 42			SH 42			Pine Street			Empire Road		
Base Volume Input [veh/h]	82	588	6	11	662	150	155	13	89	1	10	14
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	3	0	0	75	0	0	45	0	0	7
Total Hourly Volume [veh/h]	82	588	3	11	662	75	155	13	44	1	10	7
Peak Hour Factor	0.9100	0.9100	0.9100	0.9500	0.9500	0.9500	0.8200	0.8200	0.8200	0.6900	0.6900	0.6900
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	23	162	1	3	174	20	47	4	13	0	4	3
Total Analysis Volume [veh/h]	90	646	3	12	697	79	189	16	54	1	14	10
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	ProtPer	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	1	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	5	35	0	0	35	0	0	10	0	0	15	0
Maximum Green [s]	12	35	0	0	35	0	0	30	0	0	30	0
Amber [s]	3.0	4.0	0.0	0.0	4.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	17	85	0	0	68	0	0	20	0	0	15	0
Vehicle Extension [s]	3.0	6.0	0.0	0.0	6.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	3.0	0.0	0.0	3.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	Yes			Yes			No			No	
Maximum Recall	No	No			No			No			No	
Pedestrian Recall	No	No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	40.0	40.0	0.0	0.0	40.0	0.0	0.0	40.0	0.0	0.0	40.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	R	L	C	R	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	5.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	3.00	3.00	3.00	3.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	83	83	74	74	74	15	15	15	9
g / C, Green / Cycle	0.69	0.69	0.62	0.62	0.62	0.13	0.13	0.13	0.07
(v / s)_i Volume / Saturation Flow Rate	0.11	0.35	0.02	0.37	0.05	0.11	0.01	0.03	0.01
s, saturation flow rate [veh/h]	784	1868	782	1870	1589	1781	1870	1589	1743
c, Capacity [veh/h]	468	1294	397	1158	984	228	239	203	125
d1, Uniform Delay [s]	9.81	8.70	19.73	13.87	9.15	51.07	46.04	47.25	52.50
k, delay calibration	0.44	0.50	0.50	0.50	0.50	0.11	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.80	1.39	0.14	2.32	0.16	7.60	0.12	0.69	0.78
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.19	0.50	0.03	0.60	0.08	0.83	0.07	0.27	0.20
d, Delay for Lane Group [s/veh]	10.61	10.09	19.87	16.19	9.31	58.67	46.16	47.95	53.28
Lane Group LOS	B	B	B	B	A	E	D	D	D
Critical Lane Group	Yes	No	No	Yes	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.80	7.81	0.21	11.62	0.86	6.02	0.43	1.50	0.74
50th-Percentile Queue Length [ft/ln]	20.01	195.26	5.28	290.51	21.43	150.48	10.76	37.58	18.48
95th-Percentile Queue Length [veh/ln]	1.44	12.39	0.38	17.21	1.54	10.04	0.77	2.71	1.33
95th-Percentile Queue Length [ft/ln]	36.02	309.84	9.51	430.28	38.57	251.08	19.37	67.65	33.27

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	10.61	10.09	10.09	19.87	16.19	9.31	58.67	46.16	47.95	53.28	53.28	53.28
Movement LOS	B	B	B	B	B	A	E	D	D	D	D	D
d_A, Approach Delay [s/veh]	10.15			15.55			55.66			53.28		
Approach LOS	B			B			E			D		
d_I, Intersection Delay [s/veh]	19.61											
Intersection LOS	B											
Intersection V/C	0.512											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0			0.0			0.0			0.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	0.00			0.00			0.00			0.00		
I_p,int, Pedestrian LOS Score for Intersection	0.000			0.000			0.000			0.000		
Crosswalk LOS	F			F			F			F		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	1333			1050			267			250		
d_b, Bicycle Delay [s]	6.67			13.54			45.07			45.94		
I_b,int, Bicycle LOS Score for Intersection	2.784			2.984			2.061			1.612		
Bicycle LOS	C			C			B			A		

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 2: SH 42 / Lock Street

Control Type: Signalized
 Analysis Method: HCM 7th Edition
 Analysis Period: 15 minutes

Delay (sec / veh): 30.5
 Level Of Service: C
 Volume to Capacity (v/c): 0.577

Intersection Setup

Name	96th Street			SH 42			Lock Street			SH 42		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	2	0	0	0	0	0	0	0	1
Entry Pocket Length [ft]	100.00	100.00	400.00	540.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	600.00
No. of Lanes in Exit Pocket	0	0	0	0	0	1	0	0	0	0	0	1
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	540.00	0.00	0.00	0.00	0.00	0.00	150.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

Volumes

Name	96th Street			SH 42			Lock Street			SH 42		
Base Volume Input [veh/h]	3	452	146	201	542	0	3	3	9	151	2	228
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	73	0	0	0	0	0	5	0	0	114
Total Hourly Volume [veh/h]	3	452	73	201	542	0	3	3	4	151	2	114
Peak Hour Factor	0.8700	0.8700	0.8700	0.9000	0.9000	0.9000	0.7500	0.7500	0.7500	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	130	21	56	151	0	1	1	1	41	1	31
Total Analysis Volume [veh/h]	3	520	84	223	602	0	4	4	5	164	2	124
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	6	0	5	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	0	15	0	8	15	0	0	8	0	0	8	0
Maximum Green [s]	0	40	0	30	40	0	0	20	0	0	20	0
Amber [s]	0.0	4.0	0.0	3.0	4.0	0.0	0.0	4.0	0.0	0.0	4.0	0.0
All red [s]	0.0	2.0	0.0	1.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Split [s]	0	73	0	24	97	0	0	23	0	0	23	0
Vehicle Extension [s]	0.0	5.0	0.0	3.0	5.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	4.0	0.0	2.0	4.0	0.0	0.0	4.0	0.0	0.0	4.0	0.0
Minimum Recall		Yes		No	Yes			No			No	
Maximum Recall		No		No	No			No			No	
Pedestrian Recall		No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	40.0	0.0	40.0	40.0	0.0	0.0	40.0	0.0	0.0	40.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	6.00	6.00	6.00	4.00	6.00	6.00	6.00	6.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	4.00	4.00	4.00	2.00	4.00	4.00	4.00	4.00
g_i, Effective Green Time [s]	77	77	77	10	91	17	17	17
g / C, Green / Cycle	0.64	0.64	0.64	0.08	0.76	0.14	0.14	0.14
(v / s)_i Volume / Saturation Flow Rate	0.00	0.28	0.05	0.06	0.32	0.03	0.23	0.08
s, saturation flow rate [veh/h]	817	1870	1589	3459	1870	445	707	1589
c, Capacity [veh/h]	473	1196	1017	294	1418	102	160	225
d1, Uniform Delay [s]	14.75	10.78	8.22	53.66	5.17	45.18	54.66	47.91
k, delay calibration	0.50	0.50	0.50	0.11	0.50	0.11	0.50	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.02	1.15	0.16	3.98	0.93	0.55	81.53	2.09
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.01	0.43	0.08	0.76	0.42	0.13	1.04	0.55
d, Delay for Lane Group [s/veh]	14.78	11.93	8.38	57.64	6.11	45.73	136.20	50.00
Lane Group LOS	B	B	A	E	A	D	F	D
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.04	6.95	0.85	3.45	4.96	0.35	8.49	3.59
50th-Percentile Queue Length [ft/ln]	1.10	173.70	21.33	86.34	123.99	8.81	212.27	89.74
95th-Percentile Queue Length [veh/ln]	0.08	11.27	1.54	6.22	8.61	0.63	13.49	6.46
95th-Percentile Queue Length [ft/ln]	1.99	281.78	38.40	155.41	215.29	15.86	337.24	161.54

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	14.78	11.93	8.38	57.64	6.11	6.11	45.73	45.73	45.73	136.20	136.20	50.00
Movement LOS	B	B	A	E	A	A	D	D	D	F	F	D
d_A, Approach Delay [s/veh]	11.46			20.04			45.73			99.34		
Approach LOS	B			C			D			F		
d_I, Intersection Delay [s/veh]	30.48											
Intersection LOS	C											
Intersection V/C	0.577											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0			0.0			0.0			0.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	0.00			0.00			0.00			0.00		
I_p,int, Pedestrian LOS Score for Intersection	0.000			0.000			0.000			0.000		
Crosswalk LOS	F			F			F			F		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	1117			1517			283			283		
d_b, Bicycle Delay [s]	11.69			3.50			44.19			44.19		
I_b,int, Bicycle LOS Score for Intersection	2.682			2.921			1.589			2.226		
Bicycle LOS	B			C			A			B		

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Pine Street / East Street

Control Type:	Two-way stop	Delay (sec / veh):	12.3
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.012

Intersection Setup

Name	East Street		Pine Street		Pine Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	East Street		Pine Street		Pine Street	
Base Volume Input [veh/h]	4	8	252	6	9	233
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	4	8	252	6	9	233
Peak Hour Factor	0.7000	0.7000	0.8000	0.8000	0.8000	0.8000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	3	79	2	3	73
Total Analysis Volume [veh/h]	6	11	315	8	11	291
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.01	0.00	0.00	0.01	0.00
d_M, Delay for Movement [s/veh]	12.27	9.34	0.00	0.00	7.93	0.00
Movement LOS	B	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.08	0.08	0.00	0.00	0.02	0.02
95th-Percentile Queue Length [ft/ln]	1.90	1.90	0.00	0.00	0.46	0.46
d_A, Approach Delay [s/veh]	10.38		0.00		0.29	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	0.41					
Intersection LOS	B					

East Street Village TIS

Vistro File: C:\...\pm.vistro
Report File: C:\...\2023 PM.pdf

Scenario 1 1 2023 PM
6/1/2023

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	SH 42 / Pine Street	Signalized	HCM 7th Edition	EB Left	0.552	21.6	C
2	SH 42 / Lock Street	Signalized	HCM 7th Edition	WB Left	0.660	31.8	C
3	Pine Street / East Street	Two-way stop	HCM 7th Edition	NB Left	0.016	12.7	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report

Intersection 1: SH 42 / Pine Street

Control Type:	Signalized	Delay (sec / veh):	21.6
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.552

Intersection Setup

Name	SH 42			SH 42			Pine Street			Empire Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	0	0	1	0	0	0
Entry Pocket Length [ft]	300.00	100.00	100.00	100.00	100.00	135.00	100.00	100.00	50.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

Volumes

Name	SH 42			SH 42			Pine Street			Empire Road		
Base Volume Input [veh/h]	107	648	0	4	611	166	170	10	91	3	21	50
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	83	0	0	46	0	0	25
Total Hourly Volume [veh/h]	107	648	0	4	611	83	170	10	45	3	21	25
Peak Hour Factor	0.9300	0.9300	0.9300	0.8800	0.8800	0.8800	0.7900	0.7900	0.7900	0.8100	0.8100	0.8100
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	29	174	0	1	174	24	54	3	14	1	6	8
Total Analysis Volume [veh/h]	115	697	0	5	694	94	215	13	57	4	26	31
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	ProtPer	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	1	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	5	35	0	0	35	0	0	10	0	0	10	0
Maximum Green [s]	12	35	0	0	35	0	0	30	0	0	30	0
Amber [s]	3.0	4.0	0.0	0.0	4.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	20	76	0	0	56	0	0	29	0	0	15	0
Vehicle Extension [s]	3.0	6.0	0.0	0.0	6.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	3.0	0.0	0.0	3.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	Yes			Yes			No			No	
Maximum Recall	No	No			No			No			No	
Pedestrian Recall	No	No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	40.0	40.0	0.0	0.0	40.0	0.0	0.0	40.0	0.0	0.0	40.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	R	L	C	R	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	5.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	3.00	3.00	3.00	3.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	81	81	72	72	72	17	17	17	9
g / C, Green / Cycle	0.68	0.68	0.60	0.60	0.60	0.14	0.14	0.14	0.07
(v / s)_i Volume / Saturation Flow Rate	0.15	0.37	0.01	0.37	0.06	0.12	0.01	0.04	0.04
s, saturation flow rate [veh/h]	781	1870	748	1870	1589	1781	1870	1589	1711
c, Capacity [veh/h]	448	1263	346	1124	955	255	268	227	125
d1, Uniform Delay [s]	11.11	10.07	23.00	15.19	10.16	50.12	44.38	45.71	53.46
k, delay calibration	0.49	0.50	0.50	0.50	0.50	0.11	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.34	1.74	0.08	2.55	0.21	7.46	0.07	0.57	2.92
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.26	0.55	0.01	0.62	0.10	0.84	0.05	0.25	0.49
d, Delay for Lane Group [s/veh]	12.45	11.81	23.07	17.74	10.36	57.58	44.45	46.28	56.38
Lane Group LOS	B	B	C	B	B	E	D	D	E
Critical Lane Group	Yes	No	No	Yes	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh/ln]	1.14	9.41	0.10	12.27	1.09	6.81	0.34	1.55	1.87
50th-Percentile Queue Length [ft/ln]	28.51	235.22	2.41	306.69	27.33	170.22	8.54	38.87	46.86
95th-Percentile Queue Length [veh/ln]	2.05	14.44	0.17	18.01	1.97	11.09	0.62	2.80	3.37
95th-Percentile Queue Length [ft/ln]	51.32	360.98	4.33	450.30	49.19	277.20	15.38	69.96	84.34

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	12.45	11.81	11.81	23.07	17.74	10.36	57.58	44.45	46.28	56.38	56.38	56.38
Movement LOS	B	B	B	C	B	B	E	D	D	E	E	E
d_A, Approach Delay [s/veh]	11.90			16.90			54.72			56.38		
Approach LOS	B			B			D			E		
d_I, Intersection Delay [s/veh]	21.58											
Intersection LOS	C											
Intersection V/C	0.552											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0			0.0			0.0			0.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	0.00			0.00			0.00			0.00		
I_p,int, Pedestrian LOS Score for Intersection	0.000			0.000			0.000			0.000		
Crosswalk LOS	F			F			F			F		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	1183			850			417			183		
d_b, Bicycle Delay [s]	10.01			19.84			37.61			49.51		
I_b,int, Bicycle LOS Score for Intersection	2.899			3.005			2.106			1.702		
Bicycle LOS	C			C			B			A		

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: SH 42 / Lock Street

Control Type: Signalized
 Analysis Method: HCM 7th Edition
 Analysis Period: 15 minutes

Delay (sec / veh): 31.8
 Level Of Service: C
 Volume to Capacity (v/c): 0.660

Intersection Setup

Name	96th Street			SH 42			Lock Street			SH 42		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	2	0	0	0	0	0	0	0	1
Entry Pocket Length [ft]	100.00	100.00	400.00	540.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	600.00
No. of Lanes in Exit Pocket	0	0	0	0	0	1	0	0	0	0	0	1
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	540.00	0.00	0.00	0.00	0.00	0.00	150.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

Volumes

Name	96th Street			SH 42			Lock Street			SH 42		
Base Volume Input [veh/h]	16	570	151	175	506	3	3	2	8	155	4	207
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	76	0	0	2	0	0	4	0	0	104
Total Hourly Volume [veh/h]	16	570	75	175	506	1	3	2	4	155	4	103
Peak Hour Factor	0.8900	0.8900	0.8900	0.9200	0.9200	0.9200	0.6700	0.6700	0.6700	0.8800	0.8800	0.8800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	160	21	48	138	0	1	1	1	44	1	29
Total Analysis Volume [veh/h]	18	640	84	190	550	1	4	3	6	176	5	117
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	6	0	5	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	0	15	0	8	15	0	0	8	0	0	8	0
Maximum Green [s]	0	40	0	30	40	0	0	20	0	0	20	0
Amber [s]	0.0	4.0	0.0	3.0	4.0	0.0	0.0	4.0	0.0	0.0	4.0	0.0
All red [s]	0.0	2.0	0.0	1.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Split [s]	0	73	0	22	95	0	0	25	0	0	25	0
Vehicle Extension [s]	0.0	5.0	0.0	3.0	5.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	4.0	0.0	2.0	4.0	0.0	0.0	4.0	0.0	0.0	4.0	0.0
Minimum Recall		Yes		No	Yes			No			No	
Maximum Recall		No		No	No			No			No	
Pedestrian Recall		No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	40.0	0.0	40.0	40.0	0.0	0.0	40.0	0.0	0.0	40.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	6.00	6.00	6.00	4.00	6.00	6.00	6.00	6.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	4.00	4.00	4.00	2.00	4.00	4.00	4.00	4.00
g_i, Effective Green Time [s]	76	76	76	9	89	19	19	19
g / C, Green / Cycle	0.63	0.63	0.63	0.07	0.74	0.16	0.16	0.16
(v / s)_i Volume / Saturation Flow Rate	0.02	0.34	0.05	0.05	0.29	0.03	0.26	0.07
s, saturation flow rate [veh/h]	857	1870	1589	3459	1869	399	688	1589
c, Capacity [veh/h]	493	1185	1007	258	1386	102	168	252
d1, Uniform Delay [s]	14.95	12.24	8.50	54.34	5.68	43.70	53.85	45.86
k, delay calibration	0.50	0.50	0.50	0.11	0.50	0.11	0.50	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.14	1.77	0.16	4.06	0.85	0.55	91.24	1.33
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.04	0.54	0.08	0.74	0.40	0.13	1.08	0.46
d, Delay for Lane Group [s/veh]	15.09	14.01	8.66	58.40	6.53	44.25	145.09	47.19
Lane Group LOS	B	B	A	E	A	D	F	D
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.27	9.65	0.87	2.96	4.80	0.35	9.38	3.27
50th-Percentile Queue Length [ft/ln]	6.71	241.24	21.80	73.90	120.06	8.63	234.50	81.79
95th-Percentile Queue Length [veh/ln]	0.48	14.74	1.57	5.32	8.40	0.62	14.89	5.89
95th-Percentile Queue Length [ft/ln]	12.08	368.60	39.24	133.03	209.91	15.54	372.30	147.22

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	15.09	14.01	8.66	58.40	6.53	6.53	44.25	44.25	44.25	145.09	145.09	47.19
Movement LOS	B	B	A	E	A	A	D	D	D	F	F	D
d_A, Approach Delay [s/veh]	13.43			19.83			44.25			106.65		
Approach LOS	B			B			D			F		
d_I, Intersection Delay [s/veh]	31.78											
Intersection LOS	C											
Intersection V/C	0.660											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0			0.0			0.0			0.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	0.00			0.00			0.00			0.00		
I_p,int, Pedestrian LOS Score for Intersection	0.000			0.000			0.000			0.000		
Crosswalk LOS	F			F			F			F		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	1117			1484			317			317		
d_b, Bicycle Delay [s]	11.69			4.00			42.49			42.49		
I_b,int, Bicycle LOS Score for Intersection	2.909			2.786			1.588			2.223		
Bicycle LOS	C			C			A			B		

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Pine Street / East Street

Control Type:	Two-way stop	Delay (sec / veh):	12.7
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.016

Intersection Setup

Name	East Street		Pine Street		Pine Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	East Street		Pine Street		Pine Street	
Base Volume Input [veh/h]	6	28	239	14	24	272
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	6	28	239	14	24	272
Peak Hour Factor	0.7900	0.7900	0.8300	0.8300	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	9	72	4	7	76
Total Analysis Volume [veh/h]	8	35	288	17	27	302
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.04	0.00	0.00	0.02	0.00
d_M, Delay for Movement [s/veh]	12.69	9.44	0.00	0.00	7.90	0.00
Movement LOS	B	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.18	0.18	0.00	0.00	0.05	0.05
95th-Percentile Queue Length [ft/ln]	4.51	4.51	0.00	0.00	1.14	1.14
d_A, Approach Delay [s/veh]	10.05		0.00		0.65	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	0.95					
Intersection LOS	B					

Year 2025 Traffic Volume Scenarios

East Street Village TIS

Vistro File: C:\...\AM.vistro

Scenario 2 2025 Back AM

Report File: C:\...\2025 Back AM.pdf

6/1/2023

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	SH 42 / Pine Street	Signalized	HCM 7th Edition	EB Left	0.519	19.7	B
2	SH 42 / Lock Street	Signalized	HCM 7th Edition	WB Left	0.588	31.1	C
3	Pine Street / East Street	Two-way stop	HCM 7th Edition	NB Left	0.012	12.3	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: SH 42 / Pine Street

Control Type: Signalized
Analysis Method: HCM 7th Edition
Analysis Period: 15 minutes

Delay (sec / veh): 19.7
Level Of Service: B
Volume to Capacity (v/c): 0.519

Intersection Setup

Name	SH 42			SH 42			Pine Street			Empire Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	0	0	1	0	0	0
Entry Pocket Length [ft]	300.00	100.00	100.00	100.00	100.00	135.00	100.00	100.00	50.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

Volumes

Name	SH 42			SH 42			Pine Street			Empire Road		
Base Volume Input [veh/h]	82	588	6	11	662	150	155	13	89	1	10	14
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0200	1.0000	1.0000	1.0200	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	3	0	0	75	0	0	45	0	0	7
Total Hourly Volume [veh/h]	82	600	3	11	675	75	155	13	44	1	10	7
Peak Hour Factor	0.9100	0.9100	0.9100	0.9500	0.9500	0.9500	0.8200	0.8200	0.8200	0.6900	0.6900	0.6900
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	23	165	1	3	178	20	47	4	13	0	4	3
Total Analysis Volume [veh/h]	90	659	3	12	711	79	189	16	54	1	14	10
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	ProtPer	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	1	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	5	35	0	0	35	0	0	10	0	0	15	0
Maximum Green [s]	12	35	0	0	35	0	0	30	0	0	30	0
Amber [s]	3.0	4.0	0.0	0.0	4.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	17	85	0	0	68	0	0	20	0	0	15	0
Vehicle Extension [s]	3.0	6.0	0.0	0.0	6.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	3.0	0.0	0.0	3.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	Yes			Yes			No			No	
Maximum Recall	No	No			No			No			No	
Pedestrian Recall	No	No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	40.0	40.0	0.0	0.0	40.0	0.0	0.0	40.0	0.0	0.0	40.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	R	L	C	R	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	5.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	3.00	3.00	3.00	3.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	83	83	74	74	74	15	15	15	9
g / C, Green / Cycle	0.69	0.69	0.62	0.62	0.62	0.13	0.13	0.13	0.07
(v / s)_i Volume / Saturation Flow Rate	0.12	0.35	0.02	0.38	0.05	0.11	0.01	0.03	0.01
s, saturation flow rate [veh/h]	775	1868	773	1870	1589	1781	1870	1589	1743
c, Capacity [veh/h]	460	1294	389	1158	984	228	239	203	125
d1, Uniform Delay [s]	10.07	8.79	20.09	14.03	9.15	51.07	46.04	47.25	52.50
k, delay calibration	0.44	0.50	0.50	0.50	0.50	0.11	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.85	1.45	0.15	2.44	0.16	7.60	0.12	0.69	0.78
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.20	0.51	0.03	0.61	0.08	0.83	0.07	0.27	0.20
d, Delay for Lane Group [s/veh]	10.91	10.24	20.24	16.47	9.31	58.67	46.16	47.95	53.28
Lane Group LOS	B	B	C	B	A	E	D	D	D
Critical Lane Group	Yes	No	No	Yes	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.80	8.06	0.21	12.01	0.86	6.02	0.43	1.50	0.74
50th-Percentile Queue Length [ft/ln]	20.12	201.44	5.35	300.27	21.43	150.48	10.76	37.58	18.48
95th-Percentile Queue Length [veh/ln]	1.45	12.71	0.38	17.69	1.54	10.04	0.77	2.71	1.33
95th-Percentile Queue Length [ft/ln]	36.21	317.82	9.62	442.37	38.57	251.08	19.37	67.65	33.27

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	10.91	10.24	10.24	20.24	16.47	9.31	58.67	46.16	47.95	53.28	53.28	53.28
Movement LOS	B	B	B	C	B	A	E	D	D	D	D	D
d_A, Approach Delay [s/veh]	10.32			15.82			55.66			53.28		
Approach LOS	B			B			E			D		
d_I, Intersection Delay [s/veh]	19.69											
Intersection LOS	B											
Intersection V/C	0.519											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0			0.0			0.0			0.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	0.00			0.00			0.00			0.00		
I_p,int, Pedestrian LOS Score for Intersection	0.000			0.000			0.000			0.000		
Crosswalk LOS	F			F			F			F		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	1333			1050			267			250		
d_b, Bicycle Delay [s]	6.67			13.54			45.07			45.94		
I_b,int, Bicycle LOS Score for Intersection	2.805			3.007			2.061			1.612		
Bicycle LOS	C			C			B			A		

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: SH 42 / Lock Street

Control Type:	Signalized	Delay (sec / veh):	31.1
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.588

Intersection Setup

Name	96th Street			SH 42			Lock Street			SH 42		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	2	0	0	0	0	0	0	0	1
Entry Pocket Length [ft]	100.00	100.00	400.00	540.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	600.00
No. of Lanes in Exit Pocket	0	0	0	0	0	1	0	0	0	0	0	1
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	540.00	0.00	0.00	0.00	0.00	0.00	150.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

Volumes

Name	96th Street			SH 42			Lock Street			SH 42		
Base Volume Input [veh/h]	3	452	146	201	542	0	3	3	9	151	2	228
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0200	1.0200	1.0200	1.0200	1.0000	1.0000	1.0000	1.0000	1.0200	1.0000	1.0200
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	75	0	0	0	0	0	5	0	0	117
Total Hourly Volume [veh/h]	3	461	74	205	553	0	3	3	4	154	2	116
Peak Hour Factor	0.8700	0.8700	0.8700	0.9000	0.9000	0.9000	0.7500	0.7500	0.7500	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	132	21	57	154	0	1	1	1	42	1	32
Total Analysis Volume [veh/h]	3	530	85	228	614	0	4	4	5	167	2	126
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	6	0	5	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	0	15	0	8	15	0	0	8	0	0	8	0
Maximum Green [s]	0	40	0	30	40	0	0	20	0	0	20	0
Amber [s]	0.0	4.0	0.0	3.0	4.0	0.0	0.0	4.0	0.0	0.0	4.0	0.0
All red [s]	0.0	2.0	0.0	1.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Split [s]	0	73	0	24	97	0	0	23	0	0	23	0
Vehicle Extension [s]	0.0	5.0	0.0	3.0	5.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	4.0	0.0	2.0	4.0	0.0	0.0	4.0	0.0	0.0	4.0	0.0
Minimum Recall		Yes		No	Yes			No			No	
Maximum Recall		No		No	No			No			No	
Pedestrian Recall		No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	40.0	0.0	40.0	40.0	0.0	0.0	40.0	0.0	0.0	40.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	6.00	6.00	6.00	4.00	6.00	6.00	6.00	6.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	4.00	4.00	4.00	2.00	4.00	4.00	4.00	4.00
g_i, Effective Green Time [s]	77	77	77	10	91	17	17	17
g / C, Green / Cycle	0.64	0.64	0.64	0.09	0.76	0.14	0.14	0.14
(v / s)_i Volume / Saturation Flow Rate	0.00	0.28	0.05	0.07	0.33	0.03	0.24	0.08
s, saturation flow rate [veh/h]	808	1870	1589	3459	1870	445	707	1589
c, Capacity [veh/h]	464	1193	1014	300	1418	102	160	225
d1, Uniform Delay [s]	15.05	10.95	8.29	53.56	5.22	45.18	54.66	47.98
k, delay calibration	0.50	0.50	0.50	0.11	0.50	0.11	0.50	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.03	1.20	0.16	3.99	0.97	0.55	87.06	2.16
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.01	0.44	0.08	0.76	0.43	0.13	1.06	0.56
d, Delay for Lane Group [s/veh]	15.08	12.15	8.46	57.55	6.19	45.73	141.72	50.14
Lane Group LOS	B	B	A	E	A	D	F	D
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.04	7.18	0.87	3.53	5.11	0.35	8.74	3.66
50th-Percentile Queue Length [ft/ln]	1.12	179.41	21.72	88.24	127.72	8.81	218.38	91.38
95th-Percentile Queue Length [veh/ln]	0.08	11.57	1.56	6.35	8.82	0.63	13.92	6.58
95th-Percentile Queue Length [ft/ln]	2.01	289.24	39.09	158.82	220.39	15.86	347.88	164.48

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	15.08	12.15	8.46	57.55	6.19	6.19	45.73	45.73	45.73	141.72	141.72	50.14
Movement LOS	B	B	A	E	A	A	D	D	D	F	F	D
d_A, Approach Delay [s/veh]	11.66			20.10			45.73			102.61		
Approach LOS	B			C			D			F		
d_I, Intersection Delay [s/veh]	31.10											
Intersection LOS	C											
Intersection V/C	0.588											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0			0.0			0.0			0.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	0.00			0.00			0.00			0.00		
I_p,int, Pedestrian LOS Score for Intersection	0.000			0.000			0.000			0.000		
Crosswalk LOS	F			F			F			F		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	1117			1517			283			283		
d_b, Bicycle Delay [s]	11.69			3.50			44.19			44.19		
I_b,int, Bicycle LOS Score for Intersection	2.703			2.949			1.589			2.239		
Bicycle LOS	B			C			A			B		

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Pine Street / East Street

Control Type: Two-way stop
Analysis Method: HCM 7th Edition
Analysis Period: 15 minutes

Delay (sec / veh): 12.3
Level Of Service: B
Volume to Capacity (v/c): 0.012

Intersection Setup

Name	East Street		Pine Street		Pine Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	East Street		Pine Street		Pine Street	
Base Volume Input [veh/h]	4	8	252	6	9	233
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	4	8	252	6	9	233
Peak Hour Factor	0.7000	0.7000	0.8000	0.8000	0.8000	0.8000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	3	79	2	3	73
Total Analysis Volume [veh/h]	6	11	315	8	11	291
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.01	0.00	0.00	0.01	0.00
d_M, Delay for Movement [s/veh]	12.27	9.34	0.00	0.00	7.93	0.00
Movement LOS	B	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.08	0.08	0.00	0.00	0.02	0.02
95th-Percentile Queue Length [ft/ln]	1.90	1.90	0.00	0.00	0.46	0.46
d_A, Approach Delay [s/veh]	10.38		0.00		0.29	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	0.41					
Intersection LOS	B					

East Street Village TIS

Vistro File: C:\...\pm.vistro

Scenario 2 2025 Back PM

Report File: C:\...\2025 Back PM.pdf

6/1/2023

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	SH 42 / Pine Street	Signalized	HCM 7th Edition	EB Left	0.560	21.7	C
2	SH 42 / Lock Street	Signalized	HCM 7th Edition	WB Left	0.675	32.7	C
3	Pine Street / East Street	Two-way stop	HCM 7th Edition	NB Left	0.016	12.7	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: SH 42 / Pine Street

Control Type:	Signalized	Delay (sec / veh):	21.7
Analysis Method:	HCM 7th Edition	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.560

Intersection Setup

Name	SH 42			SH 42			Pine Street			Empire Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	0	0	1	0	0	0
Entry Pocket Length [ft]	300.00	100.00	100.00	100.00	100.00	135.00	100.00	100.00	50.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

Volumes

Name	SH 42			SH 42			Pine Street			Empire Road		
Base Volume Input [veh/h]	107	648	0	4	611	166	170	10	91	3	21	50
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0200	1.0000	1.0000	1.0200	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	83	0	0	46	0	0	25
Total Hourly Volume [veh/h]	107	661	0	4	623	83	170	10	45	3	21	25
Peak Hour Factor	0.9300	0.9300	0.9300	0.8800	0.8800	0.8800	0.7900	0.7900	0.7900	0.8100	0.8100	0.8100
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	29	178	0	1	177	24	54	3	14	1	6	8
Total Analysis Volume [veh/h]	115	711	0	5	708	94	215	13	57	4	26	31
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	ProtPer	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	1	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	5	35	0	0	35	0	0	10	0	0	10	0
Maximum Green [s]	12	35	0	0	35	0	0	30	0	0	30	0
Amber [s]	3.0	4.0	0.0	0.0	4.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	20	76	0	0	56	0	0	29	0	0	15	0
Vehicle Extension [s]	3.0	6.0	0.0	0.0	6.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	3.0	0.0	0.0	3.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	Yes			Yes			No			No	
Maximum Recall	No	No			No			No			No	
Pedestrian Recall	No	No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	40.0	40.0	0.0	0.0	40.0	0.0	0.0	40.0	0.0	0.0	40.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	R	L	C	R	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	5.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	3.00	3.00	3.00	3.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	81	81	72	72	72	17	17	17	9
g / C, Green / Cycle	0.68	0.68	0.60	0.60	0.60	0.14	0.14	0.14	0.07
(v / s)_i Volume / Saturation Flow Rate	0.15	0.38	0.01	0.38	0.06	0.12	0.01	0.04	0.04
s, saturation flow rate [veh/h]	773	1870	738	1870	1589	1781	1870	1589	1711
c, Capacity [veh/h]	440	1263	338	1124	955	255	268	227	125
d1, Uniform Delay [s]	11.40	10.20	23.48	15.38	10.16	50.12	44.38	45.71	53.46
k, delay calibration	0.49	0.50	0.50	0.50	0.50	0.11	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.43	1.82	0.08	2.68	0.21	7.46	0.07	0.57	2.92
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.26	0.56	0.01	0.63	0.10	0.84	0.05	0.25	0.49
d, Delay for Lane Group [s/veh]	12.83	12.01	23.56	18.06	10.36	57.58	44.45	46.28	56.38
Lane Group LOS	B	B	C	B	B	E	D	D	E
Critical Lane Group	Yes	No	No	Yes	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh/ln]	1.15	9.72	0.10	12.68	1.09	6.81	0.34	1.55	1.87
50th-Percentile Queue Length [ft/ln]	28.69	243.04	2.44	317.06	27.33	170.22	8.54	38.87	46.86
95th-Percentile Queue Length [veh/ln]	2.07	14.83	0.18	18.52	1.97	11.09	0.62	2.80	3.37
95th-Percentile Queue Length [ft/ln]	51.64	370.87	4.39	463.07	49.19	277.20	15.38	69.96	84.34

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	12.83	12.01	12.01	23.56	18.06	10.36	57.58	44.45	46.28	56.38	56.38	56.38
Movement LOS	B	B	B	C	B	B	E	D	D	E	E	E
d_A, Approach Delay [s/veh]	12.13			17.20			54.72			56.38		
Approach LOS	B			B			D			E		
d_I, Intersection Delay [s/veh]	21.69											
Intersection LOS	C											
Intersection V/C	0.560											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0			0.0			0.0			0.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	0.00			0.00			0.00			0.00		
I_p,int, Pedestrian LOS Score for Intersection	0.000			0.000			0.000			0.000		
Crosswalk LOS	F			F			F			F		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	1183			850			417			183		
d_b, Bicycle Delay [s]	10.01			19.84			37.61			49.51		
I_b,int, Bicycle LOS Score for Intersection	2.923			3.028			2.106			1.702		
Bicycle LOS	C			C			B			A		

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: SH 42 / Lock Street

Control Type: Signalized
Analysis Method: HCM 7th Edition
Analysis Period: 15 minutes

Delay (sec / veh): 32.7
Level Of Service: C
Volume to Capacity (v/c): 0.675

Intersection Setup

Name	96th Street			SH 42			Lock Street			SH 42		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	2	0	0	0	0	0	0	0	1
Entry Pocket Length [ft]	100.00	100.00	400.00	540.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	600.00
No. of Lanes in Exit Pocket	0	0	0	0	0	1	0	0	0	0	0	1
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	540.00	0.00	0.00	0.00	0.00	0.00	150.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

Volumes

Name	96th Street			SH 42			Lock Street			SH 42		
Base Volume Input [veh/h]	16	570	151	175	506	3	3	2	8	155	4	207
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0200	1.0200	1.0200	1.0200	1.0000	1.0000	1.0000	1.0000	1.0200	1.0000	1.0200
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	77	0	0	2	0	0	4	0	0	106
Total Hourly Volume [veh/h]	16	581	77	179	516	1	3	2	4	158	4	105
Peak Hour Factor	0.8900	0.8900	0.8900	0.9200	0.9200	0.9200	0.6700	0.6700	0.6700	0.8800	0.8800	0.8800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	163	22	49	140	0	1	1	1	45	1	30
Total Analysis Volume [veh/h]	18	653	87	195	561	1	4	3	6	180	5	119
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	6	0	5	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	0	15	0	8	15	0	0	8	0	0	8	0
Maximum Green [s]	0	40	0	30	40	0	0	20	0	0	20	0
Amber [s]	0.0	4.0	0.0	3.0	4.0	0.0	0.0	4.0	0.0	0.0	4.0	0.0
All red [s]	0.0	2.0	0.0	1.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Split [s]	0	73	0	22	95	0	0	25	0	0	25	0
Vehicle Extension [s]	0.0	5.0	0.0	3.0	5.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	4.0	0.0	2.0	4.0	0.0	0.0	4.0	0.0	0.0	4.0	0.0
Minimum Recall		Yes		No	Yes			No			No	
Maximum Recall		No		No	No			No			No	
Pedestrian Recall		No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	40.0	0.0	40.0	40.0	0.0	0.0	40.0	0.0	0.0	40.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	6.00	6.00	6.00	4.00	6.00	6.00	6.00	6.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	4.00	4.00	4.00	2.00	4.00	4.00	4.00	4.00
g_i, Effective Green Time [s]	76	76	76	9	89	19	19	19
g / C, Green / Cycle	0.63	0.63	0.63	0.08	0.74	0.16	0.16	0.16
(v / s)_i Volume / Saturation Flow Rate	0.02	0.35	0.05	0.06	0.30	0.03	0.27	0.07
s, saturation flow rate [veh/h]	848	1870	1589	3459	1869	399	688	1589
c, Capacity [veh/h]	485	1182	1005	263	1386	102	168	252
d1, Uniform Delay [s]	15.24	12.47	8.59	54.24	5.73	43.70	53.85	45.92
k, delay calibration	0.50	0.50	0.50	0.11	0.50	0.11	0.50	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.14	1.86	0.17	4.07	0.88	0.55	98.88	1.38
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.04	0.55	0.09	0.74	0.41	0.13	1.10	0.47
d, Delay for Lane Group [s/veh]	15.38	14.34	8.76	58.31	6.61	44.25	152.73	47.30
Lane Group LOS	B	B	A	E	A	D	F	D
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.27	10.01	0.91	3.03	4.94	0.35	9.73	3.33
50th-Percentile Queue Length [ft/ln]	6.79	250.32	22.74	75.81	123.53	8.63	243.35	83.33
95th-Percentile Queue Length [veh/ln]	0.49	15.20	1.64	5.46	8.59	0.62	15.50	6.00
95th-Percentile Queue Length [ft/ln]	12.23	380.05	40.94	136.47	214.67	15.54	387.58	149.99

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	15.38	14.34	8.76	58.31	6.61	6.61	44.25	44.25	44.25	152.73	152.73	47.30
Movement LOS	B	B	A	E	A	A	D	D	D	F	F	D
d_A, Approach Delay [s/veh]	13.72			19.93			44.25			111.46		
Approach LOS	B			B			D			F		
d_I, Intersection Delay [s/veh]	32.72											
Intersection LOS	C											
Intersection V/C	0.675											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0			0.0			0.0			0.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	0.00			0.00			0.00			0.00		
I_p,int, Pedestrian LOS Score for Intersection	0.000			0.000			0.000			0.000		
Crosswalk LOS	F			F			F			F		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	1117			1484			317			317		
d_b, Bicycle Delay [s]	11.69			4.00			42.49			42.49		
I_b,int, Bicycle LOS Score for Intersection	2.937			2.812			1.588			2.236		
Bicycle LOS	C			C			A			B		

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Pine Street / East Street

Control Type:	Two-way stop	Delay (sec / veh):	12.7
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.016

Intersection Setup

Name	East Street		Pine Street		Pine Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	East Street		Pine Street		Pine Street	
Base Volume Input [veh/h]	6	28	239	14	24	272
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	6	28	239	14	24	272
Peak Hour Factor	0.7900	0.7900	0.8300	0.8300	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	9	72	4	7	76
Total Analysis Volume [veh/h]	8	35	288	17	27	302
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.04	0.00	0.00	0.02	0.00
d_M, Delay for Movement [s/veh]	12.69	9.44	0.00	0.00	7.90	0.00
Movement LOS	B	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.18	0.18	0.00	0.00	0.05	0.05
95th-Percentile Queue Length [ft/ln]	4.51	4.51	0.00	0.00	1.14	1.14
d_A, Approach Delay [s/veh]	10.05		0.00		0.65	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	0.95					
Intersection LOS	B					

East Street Village TIS

Vistro File: C:\...\AM.vistro

Scenario 3 2025 Total AM - Scenario 1

Report File: C:\...\2025 Total AM - Scenario 1.pdf

6/1/2023

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	SH 42 / Pine Street	Signalized	HCM 7th Edition	EB Left	0.521	19.8	B
2	SH 42 / Lock Street	Signalized	HCM 7th Edition	WB Left	0.584	30.9	C
3	Pine Street / East Street	Two-way stop	HCM 7th Edition	NB Left	0.018	12.4	B
4	East Street / North Access	Two-way stop	HCM 7th Edition	EB Left	0.002	8.7	A
5	East Street / South Access	Two-way stop	HCM 7th Edition	EB Left	0.002	8.8	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: SH 42 / Pine Street

Control Type: Signalized
Analysis Method: HCM 7th Edition
Analysis Period: 15 minutes

Delay (sec / veh): 19.8
Level Of Service: B
Volume to Capacity (v/c): 0.521

Intersection Setup

Name	SH 42			SH 42			Pine Street			Empire Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	0	0	1	0	0	0
Entry Pocket Length [ft]	300.00	100.00	100.00	100.00	100.00	135.00	100.00	100.00	50.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

Volumes

Name	SH 42			SH 42			Pine Street			Empire Road		
Base Volume Input [veh/h]	82	588	6	11	662	150	155	13	89	1	10	14
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0200	1.0000	1.0000	1.0200	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	3	0	0	1	1	2	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	3	0	0	76	0	0	45	0	0	7
Total Hourly Volume [veh/h]	82	603	3	11	676	75	157	13	44	1	10	7
Peak Hour Factor	0.9100	0.9100	0.9100	0.9500	0.9500	0.9500	0.8200	0.8200	0.8200	0.6900	0.6900	0.6900
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	23	166	1	3	178	20	48	4	13	0	4	3
Total Analysis Volume [veh/h]	90	663	3	12	712	79	191	16	54	1	14	10
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	ProtPer	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	1	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	5	35	0	0	35	0	0	10	0	0	15	0
Maximum Green [s]	12	35	0	0	35	0	0	30	0	0	30	0
Amber [s]	3.0	4.0	0.0	0.0	4.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	17	85	0	0	68	0	0	20	0	0	15	0
Vehicle Extension [s]	3.0	6.0	0.0	0.0	6.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	3.0	0.0	0.0	3.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	Yes			Yes			No			No	
Maximum Recall	No	No			No			No			No	
Pedestrian Recall	No	No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	40.0	40.0	0.0	0.0	40.0	0.0	0.0	40.0	0.0	0.0	40.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	R	L	C	R	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	5.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	3.00	3.00	3.00	3.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	83	83	74	74	74	15	15	15	9
g / C, Green / Cycle	0.69	0.69	0.62	0.62	0.62	0.13	0.13	0.13	0.07
(v / s)_i Volume / Saturation Flow Rate	0.12	0.36	0.02	0.38	0.05	0.11	0.01	0.03	0.01
s, saturation flow rate [veh/h]	775	1868	770	1870	1589	1781	1870	1589	1743
c, Capacity [veh/h]	458	1292	385	1156	983	230	241	205	125
d1, Uniform Delay [s]	10.15	8.89	20.33	14.13	9.21	51.00	45.92	47.13	52.50
k, delay calibration	0.44	0.50	0.50	0.50	0.50	0.11	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.85	1.47	0.15	2.46	0.16	7.60	0.11	0.68	0.78
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.20	0.52	0.03	0.62	0.08	0.83	0.07	0.26	0.20
d, Delay for Lane Group [s/veh]	11.01	10.36	20.48	16.59	9.37	58.60	46.04	47.81	53.28
Lane Group LOS	B	B	C	B	A	E	D	D	D
Critical Lane Group	Yes	No	No	Yes	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.81	8.18	0.22	12.09	0.86	6.08	0.43	1.50	0.74
50th-Percentile Queue Length [ft/ln]	20.23	204.39	5.38	302.17	21.51	152.03	10.75	37.52	18.48
95th-Percentile Queue Length [veh/ln]	1.46	12.87	0.39	17.79	1.55	10.13	0.77	2.70	1.33
95th-Percentile Queue Length [ft/ln]	36.41	321.63	9.69	444.71	38.72	253.14	19.34	67.53	33.27

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	11.01	10.36	10.36	20.48	16.59	9.37	58.60	46.04	47.81	53.28	53.28	53.28
Movement LOS	B	B	B	C	B	A	E	D	D	D	D	D
d_A, Approach Delay [s/veh]	10.44			15.94			55.60			53.28		
Approach LOS	B			B			E			D		
d_I, Intersection Delay [s/veh]	19.80											
Intersection LOS	B											
Intersection V/C	0.521											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0			0.0			0.0			0.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	0.00			0.00			0.00			0.00		
I_p,int, Pedestrian LOS Score for Intersection	0.000			0.000			0.000			0.000		
Crosswalk LOS	F			F			F			F		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	1333			1050			267			250		
d_b, Bicycle Delay [s]	6.67			13.54			45.07			45.94		
I_b,int, Bicycle LOS Score for Intersection	2.812			3.010			2.065			1.612		
Bicycle LOS	C			C			B			A		

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: SH 42 / Lock Street

Control Type: Signalized
Analysis Method: HCM 7th Edition
Analysis Period: 15 minutes

Delay (sec / veh): 30.9
Level Of Service: C
Volume to Capacity (v/c): 0.584

Intersection Setup

Name	96th Street			SH 42			Lock Street			SH 42		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	2	0	0	0	0	0	0	0	1
Entry Pocket Length [ft]	100.00	100.00	400.00	540.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	600.00
No. of Lanes in Exit Pocket	0	0	0	0	0	1	0	0	0	0	0	1
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	540.00	0.00	0.00	0.00	0.00	0.00	150.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

Volumes

Name	96th Street			SH 42			Lock Street			SH 42		
Base Volume Input [veh/h]	3	452	146	201	542	0	3	3	9	151	2	228
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0200	1.0200	1.0200	1.0200	1.0000	1.0000	1.0000	1.0000	1.0200	1.0000	1.0200
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	2	0	0	0	0	1	3	3	5	0	1	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	75	0	0	1	0	0	7	0	0	117
Total Hourly Volume [veh/h]	5	461	74	205	553	0	6	6	7	154	3	116
Peak Hour Factor	0.8700	0.8700	0.8700	0.9000	0.9000	0.9000	0.7500	0.7500	0.7500	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	132	21	57	154	0	2	2	2	42	1	32
Total Analysis Volume [veh/h]	6	530	85	228	614	0	8	8	9	167	3	126
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	6	0	5	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	0	15	0	8	15	0	0	8	0	0	8	0
Maximum Green [s]	0	40	0	30	40	0	0	20	0	0	20	0
Amber [s]	0.0	4.0	0.0	3.0	4.0	0.0	0.0	4.0	0.0	0.0	4.0	0.0
All red [s]	0.0	2.0	0.0	1.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Split [s]	0	73	0	24	97	0	0	23	0	0	23	0
Vehicle Extension [s]	0.0	5.0	0.0	3.0	5.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	4.0	0.0	2.0	4.0	0.0	0.0	4.0	0.0	0.0	4.0	0.0
Minimum Recall		Yes		No	Yes			No			No	
Maximum Recall		No		No	No			No			No	
Pedestrian Recall		No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	40.0	0.0	40.0	40.0	0.0	0.0	40.0	0.0	0.0	40.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	6.00	6.00	6.00	4.00	6.00	6.00	6.00	6.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	4.00	4.00	4.00	2.00	4.00	4.00	4.00	4.00
g_i, Effective Green Time [s]	77	77	77	10	91	17	17	17
g / C, Green / Cycle	0.64	0.64	0.64	0.09	0.76	0.14	0.14	0.14
(v / s)_i Volume / Saturation Flow Rate	0.01	0.28	0.05	0.07	0.33	0.06	0.23	0.08
s, saturation flow rate [veh/h]	808	1870	1589	3459	1870	425	725	1589
c, Capacity [veh/h]	464	1193	1014	300	1418	100	162	225
d1, Uniform Delay [s]	15.11	10.95	8.29	53.56	5.22	45.50	54.61	47.98
k, delay calibration	0.50	0.50	0.50	0.11	0.50	0.11	0.50	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.05	1.20	0.16	3.99	0.97	1.30	83.82	2.16
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.01	0.44	0.08	0.76	0.43	0.25	1.05	0.56
d, Delay for Lane Group [s/veh]	15.16	12.15	8.46	57.55	6.19	46.80	138.43	50.14
Lane Group LOS	B	B	A	E	A	D	F	D
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.09	7.18	0.87	3.53	5.11	0.69	8.72	3.66
50th-Percentile Queue Length [ft/ln]	2.24	179.41	21.72	88.24	127.72	17.20	217.95	91.38
95th-Percentile Queue Length [veh/ln]	0.16	11.57	1.56	6.35	8.82	1.24	13.84	6.58
95th-Percentile Queue Length [ft/ln]	4.04	289.24	39.09	158.82	220.39	30.97	346.03	164.48

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	15.16	12.15	8.46	57.55	6.19	6.19	46.80	46.80	46.80	138.43	138.43	50.14
Movement LOS	B	B	A	E	A	A	D	D	D	F	F	D
d_A, Approach Delay [s/veh]	11.68			20.10			46.80			100.85		
Approach LOS	B			C			D			F		
d_I, Intersection Delay [s/veh]	30.94											
Intersection LOS	C											
Intersection V/C	0.584											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0			0.0			0.0			0.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	0.00			0.00			0.00			0.00		
I_p,int, Pedestrian LOS Score for Intersection	0.000			0.000			0.000			0.000		
Crosswalk LOS	F			F			F			F		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	1117			1517			283			283		
d_b, Bicycle Delay [s]	11.69			3.50			44.19			44.19		
I_b,int, Bicycle LOS Score for Intersection	2.708			2.951			1.612			2.241		
Bicycle LOS	B			C			A			B		

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Pine Street / East Street

Control Type: Two-way stop
Analysis Method: HCM 7th Edition
Analysis Period: 15 minutes

Delay (sec / veh): 12.4
Level Of Service: B
Volume to Capacity (v/c): 0.018

Intersection Setup

Name	East Street		Pine Street		Pine Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	East Street		Pine Street		Pine Street	
Base Volume Input [veh/h]	4	8	252	6	9	233
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	2	2	0	1	1	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	6	10	252	7	10	233
Peak Hour Factor	0.7000	0.7000	0.8000	0.8000	0.8000	0.8000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	4	79	2	3	73
Total Analysis Volume [veh/h]	9	14	315	9	13	291
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.02	0.00	0.00	0.01	0.00
d_M, Delay for Movement [s/veh]	12.39	9.41	0.00	0.00	7.94	0.00
Movement LOS	B	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.11	0.11	0.00	0.00	0.02	0.02
95th-Percentile Queue Length [ft/ln]	2.67	2.67	0.00	0.00	0.55	0.55
d_A, Approach Delay [s/veh]	10.57		0.00		0.34	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	0.53					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 4: East Street / North Access

Control Type:	Two-way stop	Delay (sec / veh):	8.7
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.002

Intersection Setup

Name	East Street		East Street		Site Access	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	East Street		East Street		Site Access	
Base Volume Input [veh/h]	0	12	15	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	2	2	1	1	2	6
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2	14	16	1	2	6
Peak Hour Factor	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	4	5	0	1	2
Total Analysis Volume [veh/h]	2	16	19	1	2	7
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.01
d_M, Delay for Movement [s/veh]	7.26	0.00	0.00	0.00	8.74	8.43
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.03	0.03
95th-Percentile Queue Length [ft/ln]	0.08	0.08	0.00	0.00	0.66	0.66
d_A, Approach Delay [s/veh]	0.81		0.00		8.50	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	1.94					
Intersection LOS	A					

Intersection Level Of Service Report
Intersection 5: East Street / South Access

Control Type:	Two-way stop	Delay (sec / veh):	8.8
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.002

Intersection Setup

Name	East Street		East Street		Site Access	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	East Street		East Street		Site Access	
Base Volume Input [veh/h]	0	12	15	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	2	2	6	1	2	6
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2	14	21	1	2	6
Peak Hour Factor	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	4	6	0	1	2
Total Analysis Volume [veh/h]	2	16	25	1	2	7
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.01
d_M, Delay for Movement [s/veh]	7.27	0.00	0.00	0.00	8.77	8.46
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.03	0.03
95th-Percentile Queue Length [ft/ln]	0.08	0.08	0.00	0.00	0.66	0.66
d_A, Approach Delay [s/veh]	0.81		0.00		8.53	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	1.72					
Intersection LOS	A					

East Street Village TIS

Vistro File: C:\...\pm.vistro

Scenario 3 3 2025 Total PM - Scenario 1

Report File: C:\...\2025 Total PM - Scenario 1.pdf

6/1/2023

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	SH 42 / Pine Street	Signalized	HCM 7th Edition	EB Left	0.563	21.9	C
2	SH 42 / Lock Street	Signalized	HCM 7th Edition	WB Left	0.656	31.5	C
3	Pine Street / East Street	Two-way stop	HCM 7th Edition	NB Left	0.019	12.9	B
4	East Street / North Access	Two-way stop	HCM 7th Edition	EB Left	0.001	9.1	A
5	East Street / South Access	Two-way stop	HCM 7th Edition	EB Left	0.001	9.1	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: SH 42 / Pine Street

Control Type: Signalized
Analysis Method: HCM 7th Edition
Analysis Period: 15 minutes

Delay (sec / veh): 21.9
Level Of Service: C
Volume to Capacity (v/c): 0.563

Intersection Setup

Name	SH 42			SH 42			Pine Street			Empire Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	0	0	1	0	0	0
Entry Pocket Length [ft]	300.00	100.00	100.00	100.00	100.00	135.00	100.00	100.00	50.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

Volumes

Name	SH 42			SH 42			Pine Street			Empire Road		
Base Volume Input [veh/h]	107	648	0	4	611	166	170	10	91	3	21	50
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0200	1.0000	1.0000	1.0200	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	2	0	0	3	4	2	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	85	0	0	46	0	0	25
Total Hourly Volume [veh/h]	107	663	0	4	626	85	172	10	45	3	21	25
Peak Hour Factor	0.9300	0.9300	0.9300	0.8800	0.8800	0.8800	0.7900	0.7900	0.7900	0.8100	0.8100	0.8100
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	29	178	0	1	178	24	54	3	14	1	6	8
Total Analysis Volume [veh/h]	115	713	0	5	711	97	218	13	57	4	26	31
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	ProtPer	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	1	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	5	35	0	0	35	0	0	10	0	0	10	0
Maximum Green [s]	12	35	0	0	35	0	0	30	0	0	30	0
Amber [s]	3.0	4.0	0.0	0.0	4.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	20	76	0	0	56	0	0	29	0	0	15	0
Vehicle Extension [s]	3.0	6.0	0.0	0.0	6.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	3.0	0.0	0.0	3.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	Yes			Yes			No			No	
Maximum Recall	No	No			No			No			No	
Pedestrian Recall	No	No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	40.0	40.0	0.0	0.0	40.0	0.0	0.0	40.0	0.0	0.0	40.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	R	L	C	R	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	5.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	3.00	3.00	3.00	3.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	81	81	72	72	72	17	17	17	9
g / C, Green / Cycle	0.67	0.67	0.60	0.60	0.60	0.14	0.14	0.14	0.07
(v / s)_i Volume / Saturation Flow Rate	0.15	0.38	0.01	0.38	0.06	0.12	0.01	0.04	0.04
s, saturation flow rate [veh/h]	770	1870	737	1870	1589	1781	1870	1589	1711
c, Capacity [veh/h]	435	1260	335	1121	952	258	271	230	125
d1, Uniform Delay [s]	11.58	10.32	23.76	15.55	10.26	50.01	44.20	45.52	53.46
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.47	1.84	0.08	2.74	0.21	7.46	0.07	0.56	2.92
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.26	0.57	0.01	0.63	0.10	0.85	0.05	0.25	0.49
d, Delay for Lane Group [s/veh]	13.05	12.17	23.84	18.29	10.48	57.47	44.27	46.08	56.38
Lane Group LOS	B	B	C	B	B	E	D	D	E
Critical Lane Group	Yes	No	No	Yes	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh/ln]	1.16	9.84	0.10	12.85	1.14	6.90	0.34	1.55	1.87
50th-Percentile Queue Length [ft/ln]	28.95	245.91	2.45	321.13	28.41	172.51	8.52	38.77	46.86
95th-Percentile Queue Length [veh/ln]	2.08	14.98	0.18	18.72	2.05	11.21	0.61	2.79	3.37
95th-Percentile Queue Length [ft/ln]	52.12	374.50	4.42	468.08	51.14	280.22	15.34	69.78	84.34

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	13.05	12.17	12.17	23.84	18.29	10.48	57.47	44.27	46.08	56.38	56.38	56.38
Movement LOS	B	B	B	C	B	B	E	D	D	E	E	E
d_A, Approach Delay [s/veh]	12.29			17.40			54.62			56.38		
Approach LOS	B			B			D			E		
d_I, Intersection Delay [s/veh]	21.85											
Intersection LOS	C											
Intersection V/C	0.563											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0			0.0			0.0			0.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	0.00			0.00			0.00			0.00		
I_p,int, Pedestrian LOS Score for Intersection	0.000			0.000			0.000			0.000		
Crosswalk LOS	F			F			F			F		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	1183			850			417			183		
d_b, Bicycle Delay [s]	10.01			19.84			37.61			49.51		
I_b,int, Bicycle LOS Score for Intersection	2.926			3.041			2.111			1.702		
Bicycle LOS	C			C			B			A		

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 2: SH 42 / Lock Street

Control Type: Signalized
 Analysis Method: HCM 7th Edition
 Analysis Period: 15 minutes

Delay (sec / veh): 31.5
 Level Of Service: C
 Volume to Capacity (v/c): 0.656

Intersection Setup

Name	96th Street			SH 42			Lock Street			SH 42		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	2	0	0	0	0	0	0	0	1
Entry Pocket Length [ft]	100.00	100.00	400.00	540.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	600.00
No. of Lanes in Exit Pocket	0	0	0	0	0	1	0	0	0	0	0	1
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	540.00	0.00	0.00	0.00	0.00	0.00	150.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

Volumes

Name	96th Street			SH 42			Lock Street			SH 42		
Base Volume Input [veh/h]	16	570	151	175	506	3	3	2	8	155	4	207
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0200	1.0200	1.0200	1.0200	1.0000	1.0000	1.0000	1.0000	1.0200	1.0000	1.0200
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	5	0	0	0	0	3	2	2	3	0	4	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	77	0	0	3	0	0	6	0	0	106
Total Hourly Volume [veh/h]	21	581	77	179	516	3	5	4	5	158	8	105
Peak Hour Factor	0.8900	0.8900	0.8900	0.9200	0.9200	0.9200	0.6700	0.6700	0.6700	0.8800	0.8800	0.8800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	163	22	49	140	1	2	1	2	45	2	30
Total Analysis Volume [veh/h]	24	653	87	195	561	3	7	6	7	180	9	119
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	6	0	5	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	0	15	0	8	15	0	0	8	0	0	8	0
Maximum Green [s]	0	40	0	30	40	0	0	20	0	0	20	0
Amber [s]	0.0	4.0	0.0	3.0	4.0	0.0	0.0	4.0	0.0	0.0	4.0	0.0
All red [s]	0.0	2.0	0.0	1.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Split [s]	0	73	0	22	95	0	0	25	0	0	25	0
Vehicle Extension [s]	0.0	5.0	0.0	3.0	5.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	4.0	0.0	2.0	4.0	0.0	0.0	4.0	0.0	0.0	4.0	0.0
Minimum Recall		Yes		No	Yes			No			No	
Maximum Recall		No		No	No			No			No	
Pedestrian Recall		No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	40.0	0.0	40.0	40.0	0.0	0.0	40.0	0.0	0.0	40.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	6.00	6.00	6.00	4.00	6.00	6.00	6.00	6.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	4.00	4.00	4.00	2.00	4.00	4.00	4.00	4.00
g_i, Effective Green Time [s]	76	76	76	9	89	19	19	19
g / C, Green / Cycle	0.63	0.63	0.63	0.08	0.74	0.16	0.16	0.16
(v / s)_i Volume / Saturation Flow Rate	0.03	0.35	0.05	0.06	0.30	0.06	0.25	0.07
s, saturation flow rate [veh/h]	846	1870	1589	3459	1868	340	755	1589
c, Capacity [veh/h]	484	1182	1005	263	1385	94	178	252
d1, Uniform Delay [s]	15.39	12.47	8.59	54.24	5.74	43.95	53.62	45.92
k, delay calibration	0.50	0.50	0.50	0.11	0.50	0.11	0.50	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.19	1.86	0.17	4.07	0.89	1.10	84.54	1.38
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.05	0.55	0.09	0.74	0.41	0.21	1.06	0.47
d, Delay for Lane Group [s/veh]	15.59	14.34	8.76	58.31	6.63	45.05	138.17	47.30
Lane Group LOS	B	B	A	E	A	D	F	D
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.37	10.01	0.91	3.03	4.97	0.54	9.61	3.33
50th-Percentile Queue Length [ft/ln]	9.14	250.32	22.74	75.81	124.21	13.45	240.14	83.33
95th-Percentile Queue Length [veh/ln]	0.66	15.20	1.64	5.46	8.62	0.97	15.09	6.00
95th-Percentile Queue Length [ft/ln]	16.46	380.06	40.94	136.47	215.60	24.21	377.36	149.99

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	15.59	14.34	8.76	58.31	6.63	6.63	45.05	45.05	45.05	138.17	138.17	47.30
Movement LOS	B	B	A	E	A	A	D	D	D	F	F	D
d_A, Approach Delay [s/veh]	13.74			19.90			45.05			103.06		
Approach LOS	B			B			D			F		
d_I, Intersection Delay [s/veh]	31.47											
Intersection LOS	C											
Intersection V/C	0.656											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0			0.0			0.0			0.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	0.00			0.00			0.00			0.00		
I_p,int, Pedestrian LOS Score for Intersection	0.000			0.000			0.000			0.000		
Crosswalk LOS	F			F			F			F		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	1117			1484			317			317		
d_b, Bicycle Delay [s]	11.69			4.00			42.49			42.49		
I_b,int, Bicycle LOS Score for Intersection	2.947			2.817			1.603			2.243		
Bicycle LOS	C			C			A			B		

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Pine Street / East Street

Control Type: Two-way stop
Analysis Method: HCM 7th Edition
Analysis Period: 15 minutes

Delay (sec / veh): 12.9
Level Of Service: B
Volume to Capacity (v/c): 0.019

Intersection Setup

Name	East Street		Pine Street		Pine Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	East Street		Pine Street		Pine Street	
Base Volume Input [veh/h]	6	28	239	14	24	272
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	1	2	0	2	4	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	7	30	239	16	28	272
Peak Hour Factor	0.7900	0.7900	0.8300	0.8300	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	9	72	5	8	76
Total Analysis Volume [veh/h]	9	38	288	19	31	302
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.04	0.00	0.00	0.02	0.00
d_M, Delay for Movement [s/veh]	12.86	9.48	0.00	0.00	7.91	0.00
Movement LOS	B	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.20	0.20	0.00	0.00	0.05	0.05
95th-Percentile Queue Length [ft/ln]	5.01	5.01	0.00	0.00	1.31	1.31
d_A, Approach Delay [s/veh]	10.13		0.00		0.74	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	1.05					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 4: East Street / North Access

Control Type:	Two-way stop	Delay (sec / veh):	9.1
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.001

Intersection Setup

Name	East Street		East Street		Site Access	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	East Street		East Street		Site Access	
Base Volume Input [veh/h]	0	34	38	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	6	1	3	3	1	4
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	6	35	41	3	1	4
Peak Hour Factor	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	10	12	1	0	1
Total Analysis Volume [veh/h]	7	41	48	4	1	5
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.32	0.00	0.00	0.00	9.07	8.56
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.01	0.01	0.00	0.00	0.02	0.02
95th-Percentile Queue Length [ft/ln]	0.29	0.29	0.00	0.00	0.46	0.46
d_A, Approach Delay [s/veh]	1.07		0.00		8.64	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.97					
Intersection LOS	A					

Intersection Level Of Service Report
Intersection 5: East Street / South Access

Control Type:	Two-way stop	Delay (sec / veh):	9.1
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.001

Intersection Setup

Name	East Street		East Street		Site Access	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	East Street		East Street		Site Access	
Base Volume Input [veh/h]	0	34	36	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	6	6	4	3	1	4
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	6	40	40	3	1	4
Peak Hour Factor	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	12	12	1	0	1
Total Analysis Volume [veh/h]	7	47	47	4	1	5
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.32	0.00	0.00	0.00	9.10	8.55
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.01	0.01	0.00	0.00	0.02	0.02
95th-Percentile Queue Length [ft/ln]	0.29	0.29	0.00	0.00	0.46	0.46
d_A, Approach Delay [s/veh]	0.95		0.00		8.64	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.93					
Intersection LOS	A					

East Street Village TIS

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Scenario 4 2025 Total AM - Scenatio 2

Report File: C:\...\2025 Total AM - Scenario 2.pdf

6/1/2023

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	SH 42 / Pine Street	Signalized	HCM 7th Edition	EB Left	0.521	19.8	B
2	SH 42 / Lock Street	Signalized	HCM 7th Edition	WB Left	0.578	30.5	C
3	Pine Street / East Street	Two-way stop	HCM 7th Edition	NB Left	0.014	12.4	B
4	East Street / North Access	Two-way stop	HCM 7th Edition	EB Left	0.002	8.7	A
5	East Street / South Access	Two-way stop	HCM 7th Edition	EB Left	0.002	8.7	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report

Intersection 1: SH 42 / Pine Street

Control Type: Signalized
 Analysis Method: HCM 7th Edition
 Analysis Period: 15 minutes

Delay (sec / veh): 19.8
 Level Of Service: B
 Volume to Capacity (v/c): 0.521

Intersection Setup

Name	SH 42			SH 42			Pine Street			Empire Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	0	0	1	0	0	0
Entry Pocket Length [ft]	300.00	100.00	100.00	100.00	100.00	135.00	100.00	100.00	50.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

Volumes

Name	SH 42			SH 42			Pine Street			Empire Road		
Base Volume Input [veh/h]	82	588	6	11	662	150	155	13	89	1	10	14
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0200	1.0000	1.0000	1.0200	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	3	0	0	1	1	2	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	3	0	0	76	0	0	45	0	0	7
Total Hourly Volume [veh/h]	82	603	3	11	676	75	157	13	44	1	10	7
Peak Hour Factor	0.9100	0.9100	0.9100	0.9500	0.9500	0.9500	0.8200	0.8200	0.8200	0.6900	0.6900	0.6900
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	23	166	1	3	178	20	48	4	13	0	4	3
Total Analysis Volume [veh/h]	90	663	3	12	712	79	191	16	54	1	14	10
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	ProtPer	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	1	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	5	35	0	0	35	0	0	10	0	0	15	0
Maximum Green [s]	12	35	0	0	35	0	0	30	0	0	30	0
Amber [s]	3.0	4.0	0.0	0.0	4.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	17	85	0	0	68	0	0	20	0	0	15	0
Vehicle Extension [s]	3.0	6.0	0.0	0.0	6.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	3.0	0.0	0.0	3.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	Yes			Yes			No			No	
Maximum Recall	No	No			No			No			No	
Pedestrian Recall	No	No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	40.0	40.0	0.0	0.0	40.0	0.0	0.0	40.0	0.0	0.0	40.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	R	L	C	R	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	5.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	3.00	3.00	3.00	3.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	83	83	74	74	74	15	15	15	9
g / C, Green / Cycle	0.69	0.69	0.62	0.62	0.62	0.13	0.13	0.13	0.07
(v / s)_i Volume / Saturation Flow Rate	0.12	0.36	0.02	0.38	0.05	0.11	0.01	0.03	0.01
s, saturation flow rate [veh/h]	775	1868	770	1870	1589	1781	1870	1589	1743
c, Capacity [veh/h]	458	1292	385	1156	983	230	241	205	125
d1, Uniform Delay [s]	10.15	8.89	20.33	14.13	9.21	51.00	45.92	47.13	52.50
k, delay calibration	0.44	0.50	0.50	0.50	0.50	0.11	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.85	1.47	0.15	2.46	0.16	7.60	0.11	0.68	0.78
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.20	0.52	0.03	0.62	0.08	0.83	0.07	0.26	0.20
d, Delay for Lane Group [s/veh]	11.01	10.36	20.48	16.59	9.37	58.60	46.04	47.81	53.28
Lane Group LOS	B	B	C	B	A	E	D	D	D
Critical Lane Group	Yes	No	No	Yes	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.81	8.18	0.22	12.09	0.86	6.08	0.43	1.50	0.74
50th-Percentile Queue Length [ft/ln]	20.23	204.39	5.38	302.17	21.51	152.03	10.75	37.52	18.48
95th-Percentile Queue Length [veh/ln]	1.46	12.87	0.39	17.79	1.55	10.13	0.77	2.70	1.33
95th-Percentile Queue Length [ft/ln]	36.41	321.63	9.69	444.71	38.72	253.14	19.34	67.53	33.27

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	11.01	10.36	10.36	20.48	16.59	9.37	58.60	46.04	47.81	53.28	53.28	53.28
Movement LOS	B	B	B	C	B	A	E	D	D	D	D	D
d_A, Approach Delay [s/veh]	10.44			15.94			55.60			53.28		
Approach LOS	B			B			E			D		
d_I, Intersection Delay [s/veh]	19.80											
Intersection LOS	B											
Intersection V/C	0.521											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0			0.0			0.0			0.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	0.00			0.00			0.00			0.00		
I_p,int, Pedestrian LOS Score for Intersectio	0.000			0.000			0.000			0.000		
Crosswalk LOS	F			F			F			F		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	1333			1050			267			250		
d_b, Bicycle Delay [s]	6.67			13.54			45.07			45.94		
I_b,int, Bicycle LOS Score for Intersection	2.812			3.010			2.065			1.612		
Bicycle LOS	C			C			B			A		

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: SH 42 / Lock Street

Control Type: Signalized
Analysis Method: HCM 7th Edition
Analysis Period: 15 minutes

Delay (sec / veh): 30.5
Level Of Service: C
Volume to Capacity (v/c): 0.578

Intersection Setup

Name	96th Street			SH 42			Lock Street			SH 42		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	2	0	0	0	0	0	0	0	1
Entry Pocket Length [ft]	100.00	100.00	400.00	540.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	600.00
No. of Lanes in Exit Pocket	0	0	0	0	0	1	0	0	0	0	0	1
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	540.00	0.00	0.00	0.00	0.00	0.00	150.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

Volumes

Name	96th Street			SH 42			Lock Street			SH 42		
Base Volume Input [veh/h]	3	452	146	201	542	0	3	3	9	151	2	228
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0200	1.0200	1.0200	1.0200	1.0000	1.0000	1.0000	1.0000	1.0200	1.0000	1.0200
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	1	0	0	0	0	1	3	3	4	0	1	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	75	0	0	1	0	0	7	0	0	117
Total Hourly Volume [veh/h]	4	461	74	205	553	0	6	6	6	154	3	116
Peak Hour Factor	0.8700	0.8700	0.8700	0.9000	0.9000	0.9000	0.7500	0.7500	0.7500	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	132	21	57	154	0	2	2	2	42	1	32
Total Analysis Volume [veh/h]	5	530	85	228	614	0	8	8	8	167	3	126
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	6	0	5	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	0	15	0	8	15	0	0	8	0	0	8	0
Maximum Green [s]	0	40	0	30	40	0	0	20	0	0	20	0
Amber [s]	0.0	4.0	0.0	3.0	4.0	0.0	0.0	4.0	0.0	0.0	4.0	0.0
All red [s]	0.0	2.0	0.0	1.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Split [s]	0	73	0	24	97	0	0	23	0	0	23	0
Vehicle Extension [s]	0.0	5.0	0.0	3.0	5.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	4.0	0.0	2.0	4.0	0.0	0.0	4.0	0.0	0.0	4.0	0.0
Minimum Recall		Yes		No	Yes			No			No	
Maximum Recall		No		No	No			No			No	
Pedestrian Recall		No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	40.0	0.0	40.0	40.0	0.0	0.0	40.0	0.0	0.0	40.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	6.00	6.00	6.00	4.00	6.00	6.00	6.00	6.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	4.00	4.00	4.00	2.00	4.00	4.00	4.00	4.00
g_i, Effective Green Time [s]	77	77	77	10	91	17	17	17
g / C, Green / Cycle	0.64	0.64	0.64	0.09	0.76	0.14	0.14	0.14
(v / s)_i Volume / Saturation Flow Rate	0.01	0.28	0.05	0.07	0.33	0.06	0.23	0.08
s, saturation flow rate [veh/h]	808	1870	1589	3459	1870	404	742	1589
c, Capacity [veh/h]	464	1193	1014	300	1418	97	165	225
d1, Uniform Delay [s]	15.09	10.95	8.29	53.56	5.22	45.50	54.56	47.98
k, delay calibration	0.50	0.50	0.50	0.11	0.50	0.11	0.50	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.04	1.20	0.16	3.99	0.97	1.30	78.85	2.16
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.01	0.44	0.08	0.76	0.43	0.25	1.03	0.56
d, Delay for Lane Group [s/veh]	15.13	12.15	8.46	57.55	6.19	46.80	133.41	50.14
Lane Group LOS	B	B	A	E	A	D	F	D
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.07	7.18	0.87	3.53	5.11	0.66	8.62	3.66
50th-Percentile Queue Length [ft/ln]	1.87	179.41	21.72	88.24	127.72	16.52	215.53	91.38
95th-Percentile Queue Length [veh/ln]	0.13	11.57	1.56	6.35	8.82	1.19	13.63	6.58
95th-Percentile Queue Length [ft/ln]	3.36	289.24	39.09	158.82	220.39	29.74	340.68	164.48

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	15.13	12.15	8.46	57.55	6.19	6.19	46.80	46.80	46.80	133.41	133.41	50.14
Movement LOS	B	B	A	E	A	A	D	D	D	F	F	D
d_A, Approach Delay [s/veh]	11.67			20.10			46.80			97.96		
Approach LOS	B			C			D			F		
d_I, Intersection Delay [s/veh]	30.46											
Intersection LOS	C											
Intersection V/C	0.578											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0			0.0			0.0			0.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	0.00			0.00			0.00			0.00		
I_p,int, Pedestrian LOS Score for Intersection	0.000			0.000			0.000			0.000		
Crosswalk LOS	F			F			F			F		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	1117			1517			283			283		
d_b, Bicycle Delay [s]	11.69			3.50			44.19			44.19		
I_b,int, Bicycle LOS Score for Intersection	2.706			2.951			1.611			2.241		
Bicycle LOS	B			C			A			B		

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Pine Street / East Street

Control Type: Two-way stop
 Analysis Method: HCM 7th Edition
 Analysis Period: 15 minutes

Delay (sec / veh): 12.4
 Level Of Service: B
 Volume to Capacity (v/c): 0.014

Intersection Setup

Name	East Street		Pine Street		Pine Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	East Street		Pine Street		Pine Street	
Base Volume Input [veh/h]	4	8	252	6	9	233
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	1	2	0	0	1	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	5	10	252	6	10	233
Peak Hour Factor	0.7000	0.7000	0.8000	0.8000	0.8000	0.8000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	4	79	2	3	73
Total Analysis Volume [veh/h]	7	14	315	8	13	291
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.02	0.00	0.00	0.01	0.00
d_M, Delay for Movement [s/veh]	12.35	9.37	0.00	0.00	7.93	0.00
Movement LOS	B	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.09	0.09	0.00	0.00	0.02	0.02
95th-Percentile Queue Length [ft/ln]	2.35	2.35	0.00	0.00	0.55	0.55
d_A, Approach Delay [s/veh]	10.37		0.00		0.34	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	0.50					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 4: East Street / North Access

Control Type:	Two-way stop	Delay (sec / veh):	8.7
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.002

Intersection Setup

Name	East Street		East Street		Site Access	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	East Street		East Street		Site Access	
Base Volume Input [veh/h]	0	12	15	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	1	2	1	1	2	5
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1	14	16	1	2	5
Peak Hour Factor	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	4	5	0	1	1
Total Analysis Volume [veh/h]	1	16	19	1	2	6
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.01
d_M, Delay for Movement [s/veh]	7.26	0.00	0.00	0.00	8.72	8.43
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.02	0.02
95th-Percentile Queue Length [ft/ln]	0.04	0.04	0.00	0.00	0.58	0.58
d_A, Approach Delay [s/veh]	0.43		0.00		8.50	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	1.67					
Intersection LOS	A					

Intersection Level Of Service Report
Intersection 5: East Street / South Access

Control Type:	Two-way stop	Delay (sec / veh):	8.7
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.002

Intersection Setup

Name	East Street		East Street		Site Access	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	East Street		East Street		Site Access	
Base Volume Input [veh/h]	0	12	15	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	1	1	5	1	2	5
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1	13	20	1	2	5
Peak Hour Factor	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	4	6	0	1	1
Total Analysis Volume [veh/h]	1	15	24	1	2	6
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.01
d_M, Delay for Movement [s/veh]	7.27	0.00	0.00	0.00	8.74	8.45
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.02	0.02
95th-Percentile Queue Length [ft/ln]	0.04	0.04	0.00	0.00	0.59	0.59
d_A, Approach Delay [s/veh]	0.45		0.00		8.52	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	1.54					
Intersection LOS	A					

East Street Village TIS

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Report File: C:\...\2025 Total PM - Scenario 2.pdf

6/1/2023

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	SH 42 / Pine Street	Signalized	HCM 7th Edition	EB Left	0.561	21.7	C
2	SH 42 / Lock Street	Signalized	HCM 7th Edition	WB Left	0.655	31.3	C
3	Pine Street / East Street	Two-way stop	HCM 7th Edition	NB Left	0.019	12.8	B
4	East Street / North Access	Two-way stop	HCM 7th Edition	EB Left	0.001	9.0	A
5	East Street / South Access	Two-way stop	HCM 7th Edition	EB Left	0.001	9.1	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: SH 42 / Pine Street

Control Type: Signalized
Analysis Method: HCM 7th Edition
Analysis Period: 15 minutes

Delay (sec / veh): 21.7
Level Of Service: C
Volume to Capacity (v/c): 0.561

Intersection Setup

Name	SH 42			SH 42			Pine Street			Empire Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	1	0	0	1	0	0	0
Entry Pocket Length [ft]	300.00	100.00	100.00	100.00	100.00	135.00	100.00	100.00	50.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

Volumes

Name	SH 42			SH 42			Pine Street			Empire Road		
Base Volume Input [veh/h]	107	648	0	4	611	166	170	10	91	3	21	50
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0200	1.0000	1.0000	1.0200	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	2	0	0	2	4	1	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	85	0	0	46	0	0	25
Total Hourly Volume [veh/h]	107	663	0	4	625	85	171	10	45	3	21	25
Peak Hour Factor	0.9300	0.9300	0.9300	0.8800	0.8800	0.8800	0.7900	0.7900	0.7900	0.8100	0.8100	0.8100
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	29	178	0	1	178	24	54	3	14	1	6	8
Total Analysis Volume [veh/h]	115	713	0	5	710	97	216	13	57	4	26	31
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	ProtPer	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	1	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	5	35	0	0	35	0	0	10	0	0	10	0
Maximum Green [s]	12	35	0	0	35	0	0	30	0	0	30	0
Amber [s]	3.0	4.0	0.0	0.0	4.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	20	76	0	0	56	0	0	29	0	0	15	0
Vehicle Extension [s]	3.0	6.0	0.0	0.0	6.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	3.0	0.0	0.0	3.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	Yes			Yes			No			No	
Maximum Recall	No	No			No			No			No	
Pedestrian Recall	No	No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	40.0	40.0	0.0	0.0	40.0	0.0	0.0	40.0	0.0	0.0	40.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	R	L	C	R	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	5.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	3.00	3.00	3.00	3.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	81	81	72	72	72	17	17	17	9
g / C, Green / Cycle	0.68	0.68	0.60	0.60	0.60	0.14	0.14	0.14	0.07
(v / s)_i Volume / Saturation Flow Rate	0.15	0.38	0.01	0.38	0.06	0.12	0.01	0.04	0.04
s, saturation flow rate [veh/h]	770	1870	737	1870	1589	1781	1870	1589	1711
c, Capacity [veh/h]	437	1262	336	1123	954	256	269	228	125
d1, Uniform Delay [s]	11.48	10.25	23.62	15.45	10.21	50.08	44.32	45.65	53.46
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.45	1.83	0.08	2.71	0.21	7.46	0.07	0.57	2.92
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.26	0.56	0.01	0.63	0.10	0.84	0.05	0.25	0.49
d, Delay for Lane Group [s/veh]	12.94	12.08	23.70	18.16	10.42	57.54	44.39	46.21	56.38
Lane Group LOS	B	B	C	B	B	E	D	D	E
Critical Lane Group	Yes	No	No	Yes	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh/ln]	1.15	9.79	0.10	12.77	1.13	6.84	0.34	1.55	1.87
50th-Percentile Queue Length [ft/ln]	28.81	244.75	2.45	319.17	28.31	170.98	8.54	38.83	46.86
95th-Percentile Queue Length [veh/ln]	2.07	14.92	0.18	18.63	2.04	11.13	0.61	2.80	3.37
95th-Percentile Queue Length [ft/ln]	51.86	373.04	4.40	465.66	50.96	278.21	15.37	69.90	84.34

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	12.94	12.08	12.08	23.70	18.16	10.42	57.54	44.39	46.21	56.38	56.38	56.38
Movement LOS	B	B	B	C	B	B	E	D	D	E	E	E
d_A, Approach Delay [s/veh]	12.20			17.27			54.69			56.38		
Approach LOS	B			B			D			E		
d_I, Intersection Delay [s/veh]	21.74											
Intersection LOS	C											
Intersection V/C	0.561											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0			0.0			0.0			0.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	0.00			0.00			0.00			0.00		
I_p,int, Pedestrian LOS Score for Intersectio	0.000			0.000			0.000			0.000		
Crosswalk LOS	F			F			F			F		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	1183			850			417			183		
d_b, Bicycle Delay [s]	10.01			19.84			37.61			49.51		
I_b,int, Bicycle LOS Score for Intersection	2.926			3.040			2.107			1.702		
Bicycle LOS	C			C			B			A		

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: SH 42 / Lock Street

Control Type: Signalized
Analysis Method: HCM 7th Edition
Analysis Period: 15 minutes

Delay (sec / veh): 31.3
Level Of Service: C
Volume to Capacity (v/c): 0.655

Intersection Setup

Name	96th Street			SH 42			Lock Street			SH 42		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	1	2	0	0	0	0	0	0	0	1
Entry Pocket Length [ft]	100.00	100.00	400.00	540.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	600.00
No. of Lanes in Exit Pocket	0	0	0	0	0	1	0	0	0	0	0	1
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	540.00	0.00	0.00	0.00	0.00	0.00	150.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

Volumes

Name	96th Street			SH 42			Lock Street			SH 42		
Base Volume Input [veh/h]	16	570	151	175	506	3	3	2	8	155	4	207
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.0200	1.0200	1.0200	1.0200	1.0000	1.0000	1.0000	1.0000	1.0200	1.0000	1.0200
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	4	0	0	0	0	2	2	2	2	0	3	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	77	0	0	3	0	0	5	0	0	106
Total Hourly Volume [veh/h]	20	581	77	179	516	2	5	4	5	158	7	105
Peak Hour Factor	0.8900	0.8900	0.8900	0.9200	0.9200	0.9200	0.6700	0.6700	0.6700	0.8800	0.8800	0.8800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	163	22	49	140	1	2	1	2	45	2	30
Total Analysis Volume [veh/h]	22	653	87	195	561	2	7	6	7	180	8	119
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	6	0	5	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	0	15	0	8	15	0	0	8	0	0	8	0
Maximum Green [s]	0	40	0	30	40	0	0	20	0	0	20	0
Amber [s]	0.0	4.0	0.0	3.0	4.0	0.0	0.0	4.0	0.0	0.0	4.0	0.0
All red [s]	0.0	2.0	0.0	1.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Split [s]	0	73	0	22	95	0	0	25	0	0	25	0
Vehicle Extension [s]	0.0	5.0	0.0	3.0	5.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	4.0	0.0	2.0	4.0	0.0	0.0	4.0	0.0	0.0	4.0	0.0
Minimum Recall		Yes		No	Yes			No			No	
Maximum Recall		No		No	No			No			No	
Pedestrian Recall		No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	40.0	0.0	40.0	40.0	0.0	0.0	40.0	0.0	0.0	40.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	C	R
C, Cycle Length [s]	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	6.00	6.00	6.00	4.00	6.00	6.00	6.00	6.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	4.00	4.00	4.00	2.00	4.00	4.00	4.00	4.00
g_i, Effective Green Time [s]	76	76	76	9	89	19	19	19
g / C, Green / Cycle	0.63	0.63	0.63	0.08	0.74	0.16	0.16	0.16
(v / s)_i Volume / Saturation Flow Rate	0.03	0.35	0.05	0.06	0.30	0.06	0.25	0.07
s, saturation flow rate [veh/h]	847	1870	1589	3459	1869	340	752	1589
c, Capacity [veh/h]	484	1182	1005	263	1386	94	178	252
d1, Uniform Delay [s]	15.33	12.47	8.59	54.24	5.73	43.95	53.63	45.92
k, delay calibration	0.50	0.50	0.50	0.11	0.50	0.11	0.50	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.18	1.86	0.17	4.07	0.89	1.10	83.30	1.38
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.05	0.55	0.09	0.74	0.41	0.21	1.06	0.47
d, Delay for Lane Group [s/veh]	15.51	14.34	8.76	58.31	6.62	45.05	136.94	47.30
Lane Group LOS	B	B	A	E	A	D	F	D
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh/ln]	0.33	10.01	0.91	3.03	4.95	0.54	9.53	3.33
50th-Percentile Queue Length [ft/ln]	8.35	250.32	22.74	75.81	123.87	13.45	238.30	83.33
95th-Percentile Queue Length [veh/ln]	0.60	15.20	1.64	5.46	8.61	0.97	14.97	6.00
95th-Percentile Queue Length [ft/ln]	15.03	380.06	40.94	136.47	215.14	24.21	374.29	149.99

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	15.51	14.34	8.76	58.31	6.62	6.62	45.05	45.05	45.05	136.94	136.94	47.30
Movement LOS	B	B	A	E	A	A	D	D	D	F	F	D
d_A, Approach Delay [s/veh]	13.73			19.92			45.05			102.19		
Approach LOS	B			B			D			F		
d_I, Intersection Delay [s/veh]	31.31											
Intersection LOS	C											
Intersection V/C	0.655											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0			0.0			0.0			0.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	0.00			0.00			0.00			0.00		
I_p,int, Pedestrian LOS Score for Intersectio	0.000			0.000			0.000			0.000		
Crosswalk LOS	F			F			F			F		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	1117			1484			317			317		
d_b, Bicycle Delay [s]	11.69			4.00			42.49			42.49		
I_b,int, Bicycle LOS Score for Intersection	2.944			2.815			1.601			2.241		
Bicycle LOS	C			C			A			B		

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Pine Street / East Street

Control Type:	Two-way stop	Delay (sec / veh):	12.8
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.019

Intersection Setup

Name	East Street		Pine Street		Pine Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	East Street		Pine Street		Pine Street	
Base Volume Input [veh/h]	6	28	239	14	24	272
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	1	1	0	1	4	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	7	29	239	15	28	272
Peak Hour Factor	0.7900	0.7900	0.8300	0.8300	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	9	72	5	8	76
Total Analysis Volume [veh/h]	9	37	288	18	31	302
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.04	0.00	0.00	0.02	0.00
d_M, Delay for Movement [s/veh]	12.84	9.47	0.00	0.00	7.91	0.00
Movement LOS	B	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.20	0.20	0.00	0.00	0.05	0.05
95th-Percentile Queue Length [ft/ln]	4.91	4.91	0.00	0.00	1.31	1.31
d_A, Approach Delay [s/veh]	10.13		0.00		0.74	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	1.04					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 4: East Street / North Access

Control Type:	Two-way stop	Delay (sec / veh):	9.0
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.001

Intersection Setup

Name	East Street		East Street		Site Access	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	East Street		East Street		Site Access	
Base Volume Input [veh/h]	0	34	38	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	5	1	2	2	1	3
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	5	35	40	2	1	3
Peak Hour Factor	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	10	12	1	0	1
Total Analysis Volume [veh/h]	6	41	47	2	1	4
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.32	0.00	0.00	0.00	9.05	8.54
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.01	0.01	0.00	0.00	0.02	0.02
95th-Percentile Queue Length [ft/ln]	0.25	0.25	0.00	0.00	0.38	0.38
d_A, Approach Delay [s/veh]	0.93		0.00		8.64	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.86					
Intersection LOS	A					

Intersection Level Of Service Report
Intersection 5: East Street / South Access

Control Type:	Two-way stop	Delay (sec / veh):	9.1
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.001

Intersection Setup

Name	East Street		East Street		Site Access	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	East Street		East Street		Site Access	
Base Volume Input [veh/h]	0	34	36	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	5	5	3	2	1	3
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	5	39	39	2	1	3
Peak Hour Factor	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	11	11	1	0	1
Total Analysis Volume [veh/h]	6	46	46	2	1	4
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.32	0.00	0.00	0.00	9.07	8.54
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.01	0.01	0.00	0.00	0.02	0.02
95th-Percentile Queue Length [ft/ln]	0.25	0.25	0.00	0.00	0.38	0.38
d_A, Approach Delay [s/veh]	0.84		0.00		8.65	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.83					
Intersection LOS	A					

Year 2045 Traffic Volume Scenarios

East Street Village TIS

Vistro File: C:\...\AM.vistro

Scenario 5 2045 Back AM

Report File: C:\...\2045 Back AM.pdf

6/1/2023

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	SH 42 / Pine Street	Signalized	HCM 7th Edition	EB Left	0.335	13.4	B
2	SH 42 / Lock Street	Roundabout	HCM 7th Edition	EB Right		7.4	A
3	Pine Street / East Street	Two-way stop	HCM 7th Edition	NB Left	0.012	12.4	B
4	East Street / North Access	Two-way stop	HCM 7th Edition	SB Thru	0.000	0.0	A
5	East Street / South Access	Two-way stop	HCM 7th Edition	SB Thru	0.000	0.0	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report

Intersection 1: SH 42 / Pine Street

Control Type: Signalized
 Analysis Method: HCM 7th Edition
 Analysis Period: 15 minutes

Delay (sec / veh): 13.4
 Level Of Service: B
 Volume to Capacity (v/c): 0.335

Intersection Setup

Name	SH 42			SH 42			Pine Street			Empire Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	300.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

Volumes

Name	SH 42			SH 42			Pine Street			Empire Road		
Base Volume Input [veh/h]	82	588	6	11	662	150	155	13	89	1	10	14
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.2400	1.0000	1.0000	1.2400	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	2	2	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	3	0	0	76	0	0	45	0	0	7
Total Hourly Volume [veh/h]	82	729	3	11	821	76	157	13	44	1	10	7
Peak Hour Factor	0.9200	0.9200	0.9200	0.9500	0.9500	0.9500	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	22	198	1	3	216	20	43	4	12	0	3	2
Total Analysis Volume [veh/h]	89	792	3	12	864	80	171	14	48	1	11	8
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	ProtPer	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	1	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	5	35	0	0	35	0	0	10	0	0	15	0
Maximum Green [s]	12	35	0	0	35	0	0	30	0	0	30	0
Amber [s]	3.0	4.0	0.0	0.0	4.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	17	85	0	0	68	0	0	20	0	0	15	0
Vehicle Extension [s]	3.0	6.0	0.0	0.0	6.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	3.0	0.0	0.0	3.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	Yes			Yes			No			No	
Maximum Recall	No	No			No			No			No	
Pedestrian Recall	No	No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	40.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	5.00	5.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	3.00	3.00	3.00	3.00	3.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	90	90	90	81	81	81	10	10	10	7
g / C, Green / Cycle	0.75	0.75	0.75	0.67	0.67	0.67	0.08	0.08	0.08	0.06
(v / s)_i Volume / Saturation Flow Rate	0.13	0.21	0.21	0.02	0.26	0.26	0.05	0.05	0.03	0.01
s, saturation flow rate [veh/h]	683	1870	1867	683	1870	1815	1781	1794	1589	1743
c, Capacity [veh/h]	530	1397	1395	459	1260	1223	149	150	133	107
d1, Uniform Delay [s]	5.02	4.88	4.88	10.55	8.58	8.58	53.14	53.14	51.96	53.50
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.68	0.51	0.51	0.11	0.87	0.90	4.15	4.10	1.64	0.84
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.17	0.28	0.28	0.03	0.38	0.38	0.62	0.62	0.36	0.19
d, Delay for Lane Group [s/veh]	5.71	5.40	5.40	10.65	9.45	9.48	57.29	57.24	53.60	54.34
Lane Group LOS	A	A	A	B	A	A	E	E	D	D
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.62	3.00	3.00	0.15	5.44	5.29	2.86	2.88	1.43	0.60
50th-Percentile Queue Length [ft/ln]	15.50	74.98	74.89	3.68	136.03	132.24	71.59	71.92	35.75	14.99
95th-Percentile Queue Length [veh/ln]	1.12	5.40	5.39	0.27	9.27	9.06	5.15	5.18	2.57	1.08
95th-Percentile Queue Length [ft/ln]	27.90	134.97	134.80	6.63	231.66	226.54	128.86	129.46	64.36	26.99

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	5.71	5.40	5.40	10.65	9.47	9.48	57.27	57.24	53.60	54.34	54.34	54.34
Movement LOS	A	A	A	B	A	A	E	E	D	D	D	D
d_A, Approach Delay [s/veh]	5.43			9.48			56.51			54.34		
Approach LOS	A			A			E			D		
d_I, Intersection Delay [s/veh]	13.43											
Intersection LOS	B											
Intersection V/C	0.335											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0			0.0			0.0			0.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	0.00			0.00			0.00			0.00		
I_p,int, Pedestrian LOS Score for Intersection	0.000			0.000			0.000			0.000		
Crosswalk LOS	F			F			F			F		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	1333			1050			267			250		
d_b, Bicycle Delay [s]	6.67			13.54			45.07			45.94		
I_b,int, Bicycle LOS Score for Intersection	2.291			2.411			2.018			1.604		
Bicycle LOS	B			B			B			A		

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: SH 42 / Lock Street

Control Type: Roundabout
Analysis Method: HCM 7th Edition
Analysis Period: 15 minutes

Delay (sec / veh): 7.4
Level Of Service: A

Intersection Setup

Name	96th Street			SH 42			Lock Street			SH 42		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0	0	0	0	0	0	1
Entry Pocket Length [ft]	100.00	100.00	400.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	600.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	96th Street			SH 42			Lock Street			SH 42		
Base Volume Input [veh/h]	3	452	146	201	542	0	3	3	9	151	2	228
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.2400	1.2400	1.2400	1.2400	1.0000	1.0000	1.0000	1.0000	1.3000	1.0000	1.3000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	1	0	0	0	0	0	0	1	1	0	1	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	4	560	181	249	672	0	3	4	10	196	3	296
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	152	49	68	183	0	1	1	3	53	1	80
Total Analysis Volume [veh/h]	4	609	197	271	730	0	3	4	11	213	3	322
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Number of Conflicting Circulating Lanes	1			1			1			1		
Circulating Flow Rate [veh/h]	284			224			1238			628		
Exiting Flow Rate [veh/h]	973			953			7			481		
Demand Flow Rate [veh/h]	4	560	181	249	672	0	3	4	10	196	3	296
Adjusted Demand Flow Rate [veh/h]	4	609	197	271	730	0	3	4	11	213	3	322

Lanes

Override Calculated Critical Headway	No	No	No	No	No	No	No	No
User-Defined Critical Headway [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Override Calculated Follow-Up Time	No	No	No	No	No	No	No	No
User-Defined Follow-Up Time [s]	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
A (intercept)	1420.00	1420.00	1420.00	1420.00	1420.00	1380.00	1420.00	1420.00
B (coefficient)	0.00091	0.00091	0.00091	0.00091	0.00091	0.00102	0.00091	0.00091
HV Adjustment Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Entry Flow Rate [veh/h]	313	313	201	480	542	19	221	329
Capacity of Entry and Bypass Lanes [veh/h]	1098	1098	1098	1158	1158	391	802	802
Pedestrian Impedance	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Capacity per Entry Lane [veh/h]	1076	1076	1076	1136	1136	383	786	786
X, volume / capacity	0.28	0.28	0.18	0.41	0.47	0.05	0.27	0.41

Movement, Approach, & Intersection Results

Lane LOS	A	A	A	A	A	B	A	A
95th-Percentile Queue Length [veh]	1.18	1.18	0.67	2.07	2.55	0.15	1.12	2.01
95th-Percentile Queue Length [ft]	29.53	29.53	16.72	51.80	63.68	3.69	27.99	50.31
Approach Delay [s/veh]	5.84			7.89		10.11	8.93	
Approach LOS	A			A		B	A	
Intersection Delay [s/veh]	7.44							
Intersection LOS	A							

Intersection Level Of Service Report
Intersection 3: Pine Street / East Street

Control Type:	Two-way stop	Delay (sec / veh):	12.4
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.012

Intersection Setup

Name	East Street		Pine Street		Pine Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	East Street		Pine Street		Pine Street	
Base Volume Input [veh/h]	4	8	252	6	9	233
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	2	0	0	2	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	4	10	252	6	11	233
Peak Hour Factor	0.7000	0.7000	0.8000	0.8000	0.8000	0.8000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	4	79	2	3	73
Total Analysis Volume [veh/h]	6	14	315	8	14	291
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.02	0.00	0.00	0.01	0.00
d_M, Delay for Movement [s/veh]	12.37	9.36	0.00	0.00	7.93	0.00
Movement LOS	B	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.09	0.09	0.00	0.00	0.02	0.02
95th-Percentile Queue Length [ft/ln]	2.19	2.19	0.00	0.00	0.59	0.59
d_A, Approach Delay [s/veh]	10.26		0.00		0.36	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	0.49					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 4: East Street / North Access

Control Type:	Two-way stop	Delay (sec / veh):	0.0
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.000

Intersection Setup

Name	East Street		East Street		Site Access	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	East Street		East Street		Site Access	
Base Volume Input [veh/h]	0	12	15	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	2	2	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	14	17	0	0	0
Peak Hour Factor	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	4	5	0	0	0
Total Analysis Volume [veh/h]	0	16	20	0	0	0
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.26	0.00	0.00	0.00	8.69	8.40
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	0.00		0.00		8.54	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.00					
Intersection LOS	A					

Intersection Level Of Service Report
Intersection 5: East Street / South Access

Control Type:	Two-way stop	Delay (sec / veh):	0.0
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.000

Intersection Setup

Name	East Street		East Street		Site Access	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	East Street		East Street		Site Access	
Base Volume Input [veh/h]	0	12	15	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	2	2	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	14	17	0	0	0
Peak Hour Factor	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	4	5	0	0	0
Total Analysis Volume [veh/h]	0	16	20	0	0	0
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.26	0.00	0.00	0.00	8.69	8.40
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.00	0.00
95th-Percentile Queue Length [ft/ln]	0.00	0.00	0.00	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	0.00		0.00		8.54	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.00					
Intersection LOS	A					

East Street Village TIS

Vistro File: C:\...\pm.vistro

Scenario 5 5 2045 Back PM

Report File: C:\...\2045 Back PM.pdf

6/1/2023

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	SH 42 / Pine Street	Signalized	HCM 7th Edition	EB Left	0.362	15.0	B
2	SH 42 / Lock Street	Roundabout	HCM 7th Edition	WB Right		8.0	A
3	Pine Street / East Street	Two-way stop	HCM 7th Edition	NB Left	0.029	13.5	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report

Intersection 1: SH 42 / Pine Street

Control Type: Signalized
 Analysis Method: HCM 7th Edition
 Analysis Period: 15 minutes

Delay (sec / veh): 15.0
 Level Of Service: B
 Volume to Capacity (v/c): 0.362

Intersection Setup

Name	SH 42			SH 42			Pine Street			Empire Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	300.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

Volumes

Name	SH 42			SH 42			Pine Street			Empire Road		
Base Volume Input [veh/h]	107	648	0	4	611	166	170	10	91	3	21	50
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.2400	1.0000	1.0000	1.2400	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	17	14	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	92	0	0	46	0	0	25
Total Hourly Volume [veh/h]	107	804	0	4	758	91	184	10	45	3	21	25
Peak Hour Factor	0.9300	0.9300	0.9300	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	29	216	0	1	206	25	50	3	12	1	6	7
Total Analysis Volume [veh/h]	115	865	0	4	824	99	200	11	49	3	23	27
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	ProtPer	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	1	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	5	35	0	0	35	0	0	10	0	0	10	0
Maximum Green [s]	12	35	0	0	35	0	0	30	0	0	30	0
Amber [s]	3.0	4.0	0.0	0.0	4.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	20	76	0	0	56	0	0	29	0	0	15	0
Vehicle Extension [s]	3.0	6.0	0.0	0.0	6.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	3.0	0.0	0.0	3.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	Yes			Yes			No			No	
Maximum Recall	No	No			No			No			No	
Pedestrian Recall	No	No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	40.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	5.00	5.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	3.00	3.00	3.00	3.00	3.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	89	89	89	80	80	80	10	10	10	8
g / C, Green / Cycle	0.74	0.74	0.74	0.66	0.66	0.66	0.08	0.08	0.08	0.07
(v / s)_i Volume / Saturation Flow Rate	0.16	0.23	0.23	0.01	0.25	0.25	0.06	0.06	0.03	0.03
s, saturation flow rate [veh/h]	697	1870	1870	639	1870	1801	1781	1790	1589	1711
c, Capacity [veh/h]	533	1381	1381	421	1242	1196	149	150	133	119
d1, Uniform Delay [s]	5.42	5.33	5.33	11.46	9.03	9.03	53.55	53.55	51.99	53.62
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.93	0.59	0.59	0.04	0.88	0.91	6.02	5.97	1.70	2.61
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.22	0.31	0.31	0.01	0.38	0.38	0.71	0.71	0.37	0.45
d, Delay for Lane Group [s/veh]	6.34	5.93	5.93	11.51	9.91	9.95	59.57	59.52	53.69	56.23
Lane Group LOS	A	A	A	B	A	A	E	E	D	E
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.85	3.50	3.50	0.05	5.51	5.32	3.35	3.36	1.46	1.63
50th-Percentile Queue Length [ft/ln]	21.31	87.53	87.53	1.29	137.80	132.97	83.63	83.92	36.54	40.63
95th-Percentile Queue Length [veh/ln]	1.53	6.30	6.30	0.09	9.36	9.10	6.02	6.04	2.63	2.93
95th-Percentile Queue Length [ft/ln]	38.36	157.56	157.56	2.32	234.06	227.53	150.54	151.05	65.77	73.13

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	6.34	5.93	5.93	11.51	9.93	9.95	59.55	59.52	53.69	56.23	56.23	56.23
Movement LOS	A	A	A	B	A	A	E	E	D	E	E	E
d_A, Approach Delay [s/veh]	5.98			9.94			58.44			56.23		
Approach LOS	A			A			E			E		
d_I, Intersection Delay [s/veh]	14.97											
Intersection LOS	B											
Intersection V/C	0.362											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0			0.0			0.0			0.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	0.00			0.00			0.00			0.00		
I_p,int, Pedestrian LOS Score for Intersection	0.000			0.000			0.000			0.000		
Crosswalk LOS	F			F			F			F		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	1183			850			417			183		
d_b, Bicycle Delay [s]	10.01			19.84			37.61			49.51		
I_b,int, Bicycle LOS Score for Intersection	2.368			2.400			2.065			1.688		
Bicycle LOS	B			B			B			A		

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: SH 42 / Lock Street

Control Type: Roundabout
Analysis Method: HCM 7th Edition
Analysis Period: 15 minutes

Delay (sec / veh): 8.0
Level Of Service: A

Intersection Setup

Name	96th Street			SH 42			Lock Street			SH 42		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0	0	0	0	0	0	1
Entry Pocket Length [ft]	100.00	100.00	400.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	600.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	96th Street			SH 42			Lock Street			SH 42		
Base Volume Input [veh/h]	16	570	151	175	506	3	3	2	8	155	4	207
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.2400	1.2400	1.2400	1.2400	1.0000	1.0000	1.0000	1.0000	1.3000	1.0000	1.3000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	13	0	0	0	0	0	0	7	11	0	9	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	29	707	187	217	627	3	3	9	19	202	13	269
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	192	51	59	170	1	1	2	5	55	4	73
Total Analysis Volume [veh/h]	32	768	203	236	682	3	3	10	21	220	14	292
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Number of Conflicting Circulating Lanes	1			1			1			1		
Circulating Flow Rate [veh/h]	254			271			1161			819		
Exiting Flow Rate [veh/h]	941			1084			50			458		
Demand Flow Rate [veh/h]	29	707	187	217	627	3	3	9	19	202	13	269
Adjusted Demand Flow Rate [veh/h]	32	768	203	236	682	3	3	10	21	220	14	292

Lanes

Override Calculated Critical Headway	No	No	No	No	No	No	No	No
User-Defined Critical Headway [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Override Calculated Follow-Up Time	No	No	No	No	No	No	No	No
User-Defined Follow-Up Time [s]	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
A (intercept)	1420.00	1420.00	1420.00	1420.00	1420.00	1380.00	1420.00	1420.00
B (coefficient)	0.00091	0.00091	0.00091	0.00091	0.00091	0.00102	0.00091	0.00091
HV Adjustment Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Entry Flow Rate [veh/h]	408	408	208	442	498	35	239	298
Capacity of Entry and Bypass Lanes [veh/h]	1127	1127	1127	1110	1110	423	674	674
Pedestrian Impedance	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Capacity per Entry Lane [veh/h]	1105	1105	1105	1088	1088	415	661	661
X, volume / capacity	0.36	0.36	0.18	0.40	0.45	0.08	0.35	0.44

Movement, Approach, & Intersection Results

Lane LOS	A	A	A	A	A	A	B	B
95th-Percentile Queue Length [veh]	1.67	1.67	0.67	1.94	2.37	0.27	1.60	2.26
95th-Percentile Queue Length [ft]	41.77	41.77	16.78	48.44	59.20	6.67	39.94	56.62
Approach Delay [s/veh]	6.50			7.87		9.88	11.14	
Approach LOS	A			A		A	B	
Intersection Delay [s/veh]	8.04							
Intersection LOS	A							

Intersection Level Of Service Report
Intersection 3: Pine Street / East Street

Control Type:	Two-way stop	Delay (sec / veh):	13.5
Analysis Method:	HCM 7th Edition	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.029

Intersection Setup

Name	East Street		Pine Street		Pine Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	East Street		Pine Street		Pine Street	
Base Volume Input [veh/h]	6	28	239	14	24	272
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	4	14	0	4	17	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	10	42	239	18	41	272
Peak Hour Factor	0.7900	0.7900	0.8300	0.8300	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	13	72	5	11	76
Total Analysis Volume [veh/h]	13	53	288	22	46	302
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.06	0.00	0.00	0.04	0.00
d_M, Delay for Movement [s/veh]	13.50	9.66	0.00	0.00	7.94	0.00
Movement LOS	B	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.30	0.30	0.00	0.00	0.08	0.08
95th-Percentile Queue Length [ft/ln]	7.42	7.42	0.00	0.00	1.97	1.97
d_A, Approach Delay [s/veh]	10.42		0.00		1.05	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	1.45					
Intersection LOS	B					

East Street Village TIS

Vistro File: C:\...\AM.vistro

Scenario 6 2045 Total AM - Scenario 1

Report File: C:\...\2045 Total AM - Scenario 1.pdf

6/1/2023

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	SH 42 / Pine Street	Signalized	HCM 7th Edition	EB Left	0.336	13.5	B
2	SH 42 / Lock Street	Roundabout	HCM 7th Edition	EB Right		7.5	A
3	Pine Street / East Street	Two-way stop	HCM 7th Edition	NB Left	0.018	12.5	B
4	East Street / North Access	Two-way stop	HCM 7th Edition	EB Left	0.002	8.8	A
5	East Street / South Access	Two-way stop	HCM 7th Edition	EB Left	0.002	8.8	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report

Intersection 1: SH 42 / Pine Street

Control Type: Signalized
 Analysis Method: HCM 7th Edition
 Analysis Period: 15 minutes

Delay (sec / veh): 13.5
 Level Of Service: B
 Volume to Capacity (v/c): 0.336

Intersection Setup

Name	SH 42			SH 42			Pine Street			Empire Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	300.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

Volumes

Name	SH 42			SH 42			Pine Street			Empire Road		
Base Volume Input [veh/h]	82	588	6	11	662	150	155	13	89	1	10	14
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.2400	1.0000	1.0000	1.2400	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	3	0	0	1	3	4	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	3	0	0	77	0	0	45	0	0	7
Total Hourly Volume [veh/h]	82	732	3	11	822	76	159	13	44	1	10	7
Peak Hour Factor	0.9200	0.9200	0.9200	0.9500	0.9500	0.9500	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	22	199	1	3	216	20	43	4	12	0	3	2
Total Analysis Volume [veh/h]	89	796	3	12	865	80	173	14	48	1	11	8
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	ProtPer	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	1	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	5	35	0	0	35	0	0	10	0	0	15	0
Maximum Green [s]	12	35	0	0	35	0	0	30	0	0	30	0
Amber [s]	3.0	4.0	0.0	0.0	4.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	17	85	0	0	68	0	0	20	0	0	15	0
Vehicle Extension [s]	3.0	6.0	0.0	0.0	6.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	3.0	0.0	0.0	3.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	Yes			Yes			No			No	
Maximum Recall	No	No			No			No			No	
Pedestrian Recall	No	No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	40.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	5.00	5.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	3.00	3.00	3.00	3.00	3.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	90	90	90	81	81	81	10	10	10	7
g / C, Green / Cycle	0.75	0.75	0.75	0.67	0.67	0.67	0.08	0.08	0.08	0.06
(v / s)_i Volume / Saturation Flow Rate	0.13	0.21	0.21	0.02	0.26	0.26	0.05	0.05	0.03	0.01
s, saturation flow rate [veh/h]	683	1870	1868	680	1870	1815	1781	1794	1589	1743
c, Capacity [veh/h]	530	1397	1395	457	1260	1223	149	150	133	107
d1, Uniform Delay [s]	5.03	4.89	4.89	10.57	8.58	8.58	53.17	53.17	51.96	53.50
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.68	0.52	0.52	0.11	0.87	0.90	4.27	4.22	1.64	0.84
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.17	0.29	0.29	0.03	0.38	0.38	0.63	0.63	0.36	0.19
d, Delay for Lane Group [s/veh]	5.71	5.41	5.41	10.68	9.46	9.48	57.44	57.38	53.60	54.34
Lane Group LOS	A	A	A	B	A	A	E	E	D	D
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.62	3.02	3.01	0.15	5.45	5.30	2.90	2.91	1.43	0.60
50th-Percentile Queue Length [ft/ln]	15.50	75.47	75.37	3.69	136.22	132.44	72.48	72.81	35.75	14.99
95th-Percentile Queue Length [veh/ln]	1.12	5.43	5.43	0.27	9.28	9.07	5.22	5.24	2.57	1.08
95th-Percentile Queue Length [ft/ln]	27.90	135.84	135.67	6.64	231.93	226.80	130.46	131.06	64.36	26.99

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	5.71	5.41	5.41	10.68	9.47	9.48	57.41	57.38	53.60	54.34	54.34	54.34
Movement LOS	A	A	A	B	A	A	E	E	D	D	D	D
d_A, Approach Delay [s/veh]	5.44			9.49			56.63			54.34		
Approach LOS	A			A			E			D		
d_I, Intersection Delay [s/veh]	13.48											
Intersection LOS	B											
Intersection V/C	0.336											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0			0.0			0.0			0.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	0.00			0.00			0.00			0.00		
I_p,int, Pedestrian LOS Score for Intersection	0.000			0.000			0.000			0.000		
Crosswalk LOS	F			F			F			F		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	1333			1050			267			250		
d_b, Bicycle Delay [s]	6.67			13.54			45.07			45.94		
I_b,int, Bicycle LOS Score for Intersection	2.295			2.413			2.022			1.604		
Bicycle LOS	B			B			B			A		

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: SH 42 / Lock Street

Control Type: Roundabout
Analysis Method: HCM 7th Edition
Analysis Period: 15 minutes

Delay (sec / veh): 7.5
Level Of Service: A

Intersection Setup

Name	96th Street			SH 42			Lock Street			SH 42		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0	0	0	0	0	0	1
Entry Pocket Length [ft]	100.00	100.00	400.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	600.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	96th Street			SH 42			Lock Street			SH 42		
Base Volume Input [veh/h]	3	452	146	201	542	0	3	3	9	151	2	228
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.2400	1.2400	1.2400	1.2400	1.0000	1.0000	1.0000	1.0000	1.3000	1.0000	1.3000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	3	0	0	0	0	1	3	4	6	0	2	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	6	560	181	249	672	1	6	7	15	196	4	296
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	152	49	68	183	0	2	2	4	53	1	80
Total Analysis Volume [veh/h]	7	609	197	271	730	1	7	8	16	213	4	322
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Number of Conflicting Circulating Lanes	1			1			1			1		
Circulating Flow Rate [veh/h]	292			228			1238			635		
Exiting Flow Rate [veh/h]	978			957			12			486		
Demand Flow Rate [veh/h]	6	560	181	249	672	1	6	7	15	196	4	296
Adjusted Demand Flow Rate [veh/h]	7	609	197	271	730	1	7	8	16	213	4	322

Lanes

Override Calculated Critical Headway	No	No	No	No	No	No	No	No
User-Defined Critical Headway [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Override Calculated Follow-Up Time	No	No	No	No	No	No	No	No
User-Defined Follow-Up Time [s]	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
A (intercept)	1420.00	1420.00	1420.00	1420.00	1420.00	1380.00	1420.00	1420.00
B (coefficient)	0.00091	0.00091	0.00091	0.00091	0.00091	0.00102	0.00091	0.00091
HV Adjustment Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Entry Flow Rate [veh/h]	315	315	201	481	542	32	222	329
Capacity of Entry and Bypass Lanes [veh/h]	1089	1089	1089	1154	1154	391	797	797
Pedestrian Impedance	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Capacity per Entry Lane [veh/h]	1068	1068	1068	1131	1131	383	781	781
X, volume / capacity	0.29	0.29	0.18	0.42	0.47	0.08	0.28	0.41

Movement, Approach, & Intersection Results

Lane LOS	A	A	A	A	A	B	A	A
95th-Percentile Queue Length [veh]	1.20	1.20	0.67	2.09	2.57	0.26	1.14	2.03
95th-Percentile Queue Length [ft]	30.03	30.03	16.87	52.20	64.21	6.57	28.41	50.83
Approach Delay [s/veh]	5.90			7.94		10.64	9.02	
Approach LOS	A			A		B	A	
Intersection Delay [s/veh]	7.53							
Intersection LOS	A							

Intersection Level Of Service Report
Intersection 3: Pine Street / East Street

Control Type: Two-way stop
Analysis Method: HCM 7th Edition
Analysis Period: 15 minutes

Delay (sec / veh): 12.5
Level Of Service: B
Volume to Capacity (v/c): 0.018

Intersection Setup

Name	East Street		Pine Street		Pine Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	East Street		Pine Street		Pine Street	
Base Volume Input [veh/h]	4	8	252	6	9	233
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	2	4	0	1	3	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	6	12	252	7	12	233
Peak Hour Factor	0.7000	0.7000	0.8000	0.8000	0.8000	0.8000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	4	79	2	4	73
Total Analysis Volume [veh/h]	9	17	315	9	15	291
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.02	0.00	0.00	0.01	0.00
d_M, Delay for Movement [s/veh]	12.46	9.42	0.00	0.00	7.94	0.00
Movement LOS	B	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.12	0.12	0.00	0.00	0.03	0.03
95th-Percentile Queue Length [ft/ln]	2.96	2.96	0.00	0.00	0.63	0.63
d_A, Approach Delay [s/veh]	10.47		0.00		0.39	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	0.60					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 4: East Street / North Access

Control Type:	Two-way stop	Delay (sec / veh):	8.8
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.002

Intersection Setup

Name	East Street		East Street		Site Access	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	East Street		East Street		Site Access	
Base Volume Input [veh/h]	0	12	15	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	2	4	3	1	2	6
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2	16	18	1	2	6
Peak Hour Factor	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	5	5	0	1	2
Total Analysis Volume [veh/h]	2	19	21	1	2	7
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.01
d_M, Delay for Movement [s/veh]	7.26	0.00	0.00	0.00	8.76	8.44
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.03	0.03
95th-Percentile Queue Length [ft/ln]	0.08	0.08	0.00	0.00	0.66	0.66
d_A, Approach Delay [s/veh]	0.69		0.00		8.51	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	1.75					
Intersection LOS	A					

Intersection Level Of Service Report
Intersection 5: East Street / South Access

Control Type:	Two-way stop	Delay (sec / veh):	8.8
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.002

Intersection Setup

Name	East Street		East Street		Site Access	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	East Street		East Street		Site Access	
Base Volume Input [veh/h]	0	12	15	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	2	4	8	1	2	6
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2	16	23	1	2	6
Peak Hour Factor	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	5	7	0	1	2
Total Analysis Volume [veh/h]	2	19	27	1	2	7
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.01
d_M, Delay for Movement [s/veh]	7.27	0.00	0.00	0.00	8.79	8.47
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.03	0.03
95th-Percentile Queue Length [ft/ln]	0.08	0.08	0.00	0.00	0.66	0.66
d_A, Approach Delay [s/veh]	0.69		0.00		8.54	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	1.58					
Intersection LOS	A					

East Street Village TIS

Vistro File: C:\...\pm.vistro

Scenario 6 2045 Total PM - Scenario 1

Report File: C:\...\2045 Total PM - Scenario 1.pdf

6/1/2023

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	SH 42 / Pine Street	Signalized	HCM 7th Edition	EB Left	0.364	15.0	B
2	SH 42 / Lock Street	Roundabout	HCM 7th Edition	WB Right		8.2	A
3	Pine Street / East Street	Two-way stop	HCM 7th Edition	NB Left	0.032	13.7	B
4	East Street / North Access	Two-way stop	HCM 7th Edition	EB Left	0.001	9.3	A
5	East Street / South Access	Two-way stop	HCM 7th Edition	EB Left	0.001	9.4	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: SH 42 / Pine Street

Control Type: Signalized
Analysis Method: HCM 7th Edition
Analysis Period: 15 minutes

Delay (sec / veh): 15.0
Level Of Service: B
Volume to Capacity (v/c): 0.364

Intersection Setup

Name	SH 42			SH 42			Pine Street			Empire Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	300.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

Volumes

Name	SH 42			SH 42			Pine Street			Empire Road		
Base Volume Input [veh/h]	107	648	0	4	611	166	170	10	91	3	21	50
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.2400	1.0000	1.0000	1.2400	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	2	0	0	3	21	16	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	94	0	0	46	0	0	25
Total Hourly Volume [veh/h]	107	806	0	4	761	93	186	10	45	3	21	25
Peak Hour Factor	0.9300	0.9300	0.9300	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	29	217	0	1	207	25	51	3	12	1	6	7
Total Analysis Volume [veh/h]	115	867	0	4	827	101	202	11	49	3	23	27
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	ProtPer	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	1	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	5	35	0	0	35	0	0	10	0	0	10	0
Maximum Green [s]	12	35	0	0	35	0	0	30	0	0	30	0
Amber [s]	3.0	4.0	0.0	0.0	4.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	20	76	0	0	56	0	0	29	0	0	15	0
Vehicle Extension [s]	3.0	6.0	0.0	0.0	6.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	3.0	0.0	0.0	3.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	Yes			Yes			No			No	
Maximum Recall	No	No			No			No			No	
Pedestrian Recall	No	No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	40.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	5.00	5.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	3.00	3.00	3.00	3.00	3.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	89	89	89	80	80	80	10	10	10	8
g / C, Green / Cycle	0.74	0.74	0.74	0.66	0.66	0.66	0.08	0.08	0.08	0.07
(v / s)_i Volume / Saturation Flow Rate	0.17	0.23	0.23	0.01	0.25	0.25	0.06	0.06	0.03	0.03
s, saturation flow rate [veh/h]	695	1870	1870	638	1870	1800	1781	1790	1589	1711
c, Capacity [veh/h]	531	1381	1381	420	1242	1195	149	150	133	119
d1, Uniform Delay [s]	5.43	5.34	5.34	11.48	9.05	9.05	53.58	53.58	51.99	53.62
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.93	0.60	0.60	0.04	0.89	0.92	6.21	6.16	1.70	2.61
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.22	0.31	0.31	0.01	0.38	0.38	0.71	0.71	0.37	0.45
d, Delay for Lane Group [s/veh]	6.37	5.93	5.93	11.52	9.94	9.97	59.79	59.74	53.69	56.23
Lane Group LOS	A	A	A	B	A	A	E	E	D	E
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.85	3.51	3.51	0.05	5.55	5.36	3.38	3.40	1.46	1.63
50th-Percentile Queue Length [ft/ln]	21.33	87.80	87.80	1.29	138.86	133.93	84.61	84.89	36.54	40.63
95th-Percentile Queue Length [veh/ln]	1.54	6.32	6.32	0.09	9.42	9.15	6.09	6.11	2.63	2.93
95th-Percentile Queue Length [ft/ln]	38.40	158.04	158.04	2.32	235.49	228.82	152.29	152.80	65.77	73.13

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	6.37	5.93	5.93	11.52	9.95	9.97	59.76	59.74	53.69	56.23	56.23	56.23
Movement LOS	A	A	A	B	A	A	E	E	D	E	E	E
d_A, Approach Delay [s/veh]	5.98			9.96			58.63			56.23		
Approach LOS	A			A			E			E		
d_I, Intersection Delay [s/veh]	15.03											
Intersection LOS	B											
Intersection V/C	0.364											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0			0.0			0.0			0.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	0.00			0.00			0.00			0.00		
I_p,int, Pedestrian LOS Score for Intersection	0.000			0.000			0.000			0.000		
Crosswalk LOS	F			F			F			F		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	1183			850			417			183		
d_b, Bicycle Delay [s]	10.01			19.84			37.61			49.51		
I_b,int, Bicycle LOS Score for Intersection	2.370			2.406			2.068			1.688		
Bicycle LOS	B			B			B			A		

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: SH 42 / Lock Street

Control Type: Roundabout
Analysis Method: HCM 7th Edition
Analysis Period: 15 minutes

Delay (sec / veh): 8.2
Level Of Service: A

Intersection Setup

Name	96th Street			SH 42			Lock Street			SH 42		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0	0	0	0	0	0	1
Entry Pocket Length [ft]	100.00	100.00	400.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	600.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	96th Street			SH 42			Lock Street			SH 42		
Base Volume Input [veh/h]	16	570	151	175	506	3	3	2	8	155	4	207
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.2400	1.2400	1.2400	1.2400	1.0000	1.0000	1.0000	1.0000	1.3000	1.0000	1.3000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	18	0	0	0	0	3	2	9	14	0	13	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	34	707	187	217	627	6	5	11	22	202	17	269
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	9	192	51	59	170	2	1	3	6	55	5	73
Total Analysis Volume [veh/h]	37	768	203	236	682	7	5	12	24	220	18	292
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Number of Conflicting Circulating Lanes	1			1			1			1		
Circulating Flow Rate [veh/h]	258			281			1161			826		
Exiting Flow Rate [veh/h]	945			1086			63			460		
Demand Flow Rate [veh/h]	34	707	187	217	627	6	5	11	22	202	17	269
Adjusted Demand Flow Rate [veh/h]	37	768	203	236	682	7	5	12	24	220	18	292

Lanes

Override Calculated Critical Headway	No	No	No	No	No	No	No	No
User-Defined Critical Headway [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Override Calculated Follow-Up Time	No	No	No	No	No	No	No	No
User-Defined Follow-Up Time [s]	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
A (intercept)	1420.00	1420.00	1420.00	1420.00	1420.00	1380.00	1420.00	1420.00
B (coefficient)	0.00091	0.00091	0.00091	0.00091	0.00091	0.00102	0.00091	0.00091
HV Adjustment Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Entry Flow Rate [veh/h]	411	411	208	444	501	42	243	298
Capacity of Entry and Bypass Lanes [veh/h]	1123	1123	1123	1101	1101	423	670	670
Pedestrian Impedance	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Capacity per Entry Lane [veh/h]	1101	1101	1101	1079	1079	415	657	657
X, volume / capacity	0.37	0.37	0.18	0.40	0.45	0.10	0.36	0.44

Movement, Approach, & Intersection Results

Lane LOS	A	A	A	A	A	B	B	B
95th-Percentile Queue Length [veh]	1.70	1.70	0.67	1.98	2.42	0.33	1.65	2.29
95th-Percentile Queue Length [ft]	42.41	42.41	16.86	49.43	60.51	8.18	41.35	57.22
Approach Delay [s/veh]	6.56			8.00		10.14	11.29	
Approach LOS	A			A		B	B	
Intersection Delay [s/veh]	8.15							
Intersection LOS	A							

Intersection Level Of Service Report
Intersection 3: Pine Street / East Street

Control Type: Two-way stop
Analysis Method: HCM 7th Edition
Analysis Period: 15 minutes

Delay (sec / veh): 13.7
Level Of Service: B
Volume to Capacity (v/c): 0.032

Intersection Setup

Name	East Street		Pine Street		Pine Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	East Street		Pine Street		Pine Street	
Base Volume Input [veh/h]	6	28	239	14	24	272
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	5	16	0	6	21	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	11	44	239	20	45	272
Peak Hour Factor	0.7900	0.7900	0.8300	0.8300	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	14	72	6	13	76
Total Analysis Volume [veh/h]	14	56	288	24	50	302
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.06	0.00	0.00	0.04	0.00
d_M, Delay for Movement [s/veh]	13.68	9.71	0.00	0.00	7.95	0.00
Movement LOS	B	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.32	0.32	0.00	0.00	0.09	0.09
95th-Percentile Queue Length [ft/ln]	7.99	7.99	0.00	0.00	2.14	2.14
d_A, Approach Delay [s/veh]	10.50		0.00		1.13	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	1.54					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 4: East Street / North Access

Control Type:	Two-way stop	Delay (sec / veh):	9.3
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.001

Intersection Setup

Name	East Street		East Street		Site Access	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	East Street		East Street		Site Access	
Base Volume Input [veh/h]	0	34	38	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	6	23	21	3	1	4
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	6	57	59	3	1	4
Peak Hour Factor	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	17	17	1	0	1
Total Analysis Volume [veh/h]	7	67	69	4	1	5
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.01
d_M, Delay for Movement [s/veh]	7.37	0.00	0.00	0.00	9.33	8.65
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.01	0.01	0.00	0.00	0.02	0.02
95th-Percentile Queue Length [ft/ln]	0.29	0.29	0.00	0.00	0.47	0.47
d_A, Approach Delay [s/veh]	0.70		0.00		8.77	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.68					
Intersection LOS	A					

Intersection Level Of Service Report
Intersection 5: East Street / South Access

Control Type:	Two-way stop	Delay (sec / veh):	9.4
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.001

Intersection Setup

Name	East Street		East Street		Site Access	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration	↰		↱		↻	
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	East Street		East Street		Site Access	
Base Volume Input [veh/h]	0	34	36	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	6	28	22	3	1	4
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	6	62	58	3	1	4
Peak Hour Factor	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	18	17	1	0	1
Total Analysis Volume [veh/h]	7	73	68	4	1	5
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.01
d_M, Delay for Movement [s/veh]	7.36	0.00	0.00	0.00	9.36	8.65
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.01	0.01	0.00	0.00	0.02	0.02
95th-Percentile Queue Length [ft/ln]	0.29	0.29	0.00	0.00	0.47	0.47
d_A, Approach Delay [s/veh]	0.64		0.00		8.77	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.66					
Intersection LOS	A					

East Street Village TIS

Vistro File: C:\...\AM.vistro

Scenario 7 2045 Total AM - Scenario 2

Report File: C:\...\2045 Total AM - Scenario 2.pdf

6/1/2023

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	SH 42 / Pine Street	Signalized	HCM 7th Edition	EB Left	0.336	13.5	B
2	SH 42 / Lock Street	Roundabout	HCM 7th Edition	EB Right		7.5	A
3	Pine Street / East Street	Two-way stop	HCM 7th Edition	NB Left	0.014	12.4	B
4	East Street / North Access	Two-way stop	HCM 7th Edition	EB Left	0.002	8.7	A
5	East Street / South Access	Two-way stop	HCM 7th Edition	EB Left	0.002	8.8	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report

Intersection 1: SH 42 / Pine Street

Control Type: Signalized
 Analysis Method: HCM 7th Edition
 Analysis Period: 15 minutes

Delay (sec / veh): 13.5
 Level Of Service: B
 Volume to Capacity (v/c): 0.336

Intersection Setup

Name	SH 42			SH 42			Pine Street			Empire Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	300.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

Volumes

Name	SH 42			SH 42			Pine Street			Empire Road		
Base Volume Input [veh/h]	82	588	6	11	662	150	155	13	89	1	10	14
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.2400	1.0000	1.0000	1.2400	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	3	0	0	1	3	4	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	3	0	0	77	0	0	45	0	0	7
Total Hourly Volume [veh/h]	82	732	3	11	822	76	159	13	44	1	10	7
Peak Hour Factor	0.9200	0.9200	0.9200	0.9500	0.9500	0.9500	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	22	199	1	3	216	20	43	4	12	0	3	2
Total Analysis Volume [veh/h]	89	796	3	12	865	80	173	14	48	1	11	8
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	ProtPer	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	1	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	5	35	0	0	35	0	0	10	0	0	15	0
Maximum Green [s]	12	35	0	0	35	0	0	30	0	0	30	0
Amber [s]	3.0	4.0	0.0	0.0	4.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	17	85	0	0	68	0	0	20	0	0	15	0
Vehicle Extension [s]	3.0	6.0	0.0	0.0	6.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	3.0	0.0	0.0	3.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	Yes			Yes			No			No	
Maximum Recall	No	No			No			No			No	
Pedestrian Recall	No	No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	40.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	5.00	5.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	3.00	3.00	3.00	3.00	3.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	90	90	90	81	81	81	10	10	10	7
g / C, Green / Cycle	0.75	0.75	0.75	0.67	0.67	0.67	0.08	0.08	0.08	0.06
(v / s)_i Volume / Saturation Flow Rate	0.13	0.21	0.21	0.02	0.26	0.26	0.05	0.05	0.03	0.01
s, saturation flow rate [veh/h]	683	1870	1868	680	1870	1815	1781	1794	1589	1743
c, Capacity [veh/h]	530	1397	1395	457	1260	1223	149	150	133	107
d1, Uniform Delay [s]	5.03	4.89	4.89	10.57	8.58	8.58	53.17	53.17	51.96	53.50
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.68	0.52	0.52	0.11	0.87	0.90	4.27	4.22	1.64	0.84
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.17	0.29	0.29	0.03	0.38	0.38	0.63	0.63	0.36	0.19
d, Delay for Lane Group [s/veh]	5.71	5.41	5.41	10.68	9.46	9.48	57.44	57.38	53.60	54.34
Lane Group LOS	A	A	A	B	A	A	E	E	D	D
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.62	3.02	3.01	0.15	5.45	5.30	2.90	2.91	1.43	0.60
50th-Percentile Queue Length [ft/ln]	15.50	75.47	75.37	3.69	136.22	132.44	72.48	72.81	35.75	14.99
95th-Percentile Queue Length [veh/ln]	1.12	5.43	5.43	0.27	9.28	9.07	5.22	5.24	2.57	1.08
95th-Percentile Queue Length [ft/ln]	27.90	135.84	135.67	6.64	231.93	226.80	130.46	131.06	64.36	26.99

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	5.71	5.41	5.41	10.68	9.47	9.48	57.41	57.38	53.60	54.34	54.34	54.34
Movement LOS	A	A	A	B	A	A	E	E	D	D	D	D
d_A, Approach Delay [s/veh]	5.44			9.49			56.63			54.34		
Approach LOS	A			A			E			D		
d_I, Intersection Delay [s/veh]	13.48											
Intersection LOS	B											
Intersection V/C	0.336											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0			0.0			0.0			0.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	0.00			0.00			0.00			0.00		
I_p,int, Pedestrian LOS Score for Intersectio	0.000			0.000			0.000			0.000		
Crosswalk LOS	F			F			F			F		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	1333			1050			267			250		
d_b, Bicycle Delay [s]	6.67			13.54			45.07			45.94		
I_b,int, Bicycle LOS Score for Intersection	2.295			2.413			2.022			1.604		
Bicycle LOS	B			B			B			A		

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: SH 42 / Lock Street

Control Type: Roundabout
Analysis Method: HCM 7th Edition
Analysis Period: 15 minutes

Delay (sec / veh): 7.5
Level Of Service: A

Intersection Setup

Name	96th Street			SH 42			Lock Street			SH 42		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0	0	0	0	0	0	1
Entry Pocket Length [ft]	100.00	100.00	400.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	600.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	96th Street			SH 42			Lock Street			SH 42		
Base Volume Input [veh/h]	3	452	146	201	542	0	3	3	9	151	2	228
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.2400	1.2400	1.2400	1.2400	1.0000	1.0000	1.0000	1.0000	1.3000	1.0000	1.3000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	2	0	0	0	0	1	3	4	5	0	2	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	5	560	181	249	672	1	6	7	14	196	4	296
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	152	49	68	183	0	2	2	4	53	1	80
Total Analysis Volume [veh/h]	5	609	197	271	730	1	7	8	15	213	4	322
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Number of Conflicting Circulating Lanes	1			1			1			1		
Circulating Flow Rate [veh/h]	292			226			1238			633		
Exiting Flow Rate [veh/h]	977			957			10			486		
Demand Flow Rate [veh/h]	5	560	181	249	672	1	6	7	14	196	4	296
Adjusted Demand Flow Rate [veh/h]	5	609	197	271	730	1	7	8	15	213	4	322

Lanes

Override Calculated Critical Headway	No	No	No	No	No	No	No	No
User-Defined Critical Headway [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Override Calculated Follow-Up Time	No	No	No	No	No	No	No	No
User-Defined Follow-Up Time [s]	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
A (intercept)	1420.00	1420.00	1420.00	1420.00	1420.00	1380.00	1420.00	1420.00
B (coefficient)	0.00091	0.00091	0.00091	0.00091	0.00091	0.00102	0.00091	0.00091
HV Adjustment Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Entry Flow Rate [veh/h]	314	314	201	481	542	31	222	329
Capacity of Entry and Bypass Lanes [veh/h]	1089	1089	1089	1156	1156	391	798	798
Pedestrian Impedance	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Capacity per Entry Lane [veh/h]	1068	1068	1068	1133	1133	383	783	783
X, volume / capacity	0.29	0.29	0.18	0.42	0.47	0.08	0.28	0.41

Movement, Approach, & Intersection Results

Lane LOS	A	A	A	A	A	B	A	A
95th-Percentile Queue Length [veh]	1.20	1.20	0.67	2.08	2.56	0.25	1.13	2.03
95th-Percentile Queue Length [ft]	29.90	29.90	16.87	52.05	64.00	6.34	28.34	50.68
Approach Delay [s/veh]	5.90			7.92		10.60	9.00	
Approach LOS	A			A		B	A	
Intersection Delay [s/veh]	7.51							
Intersection LOS	A							

Intersection Level Of Service Report
Intersection 3: Pine Street / East Street

Control Type: Two-way stop
Analysis Method: HCM 7th Edition
Analysis Period: 15 minutes

Delay (sec / veh): 12.4
Level Of Service: B
Volume to Capacity (v/c): 0.014

Intersection Setup

Name	East Street		Pine Street		Pine Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	East Street		Pine Street		Pine Street	
Base Volume Input [veh/h]	4	8	252	6	9	233
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	1	4	0	0	3	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	5	12	252	6	12	233
Peak Hour Factor	0.7000	0.7000	0.8000	0.8000	0.8000	0.8000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	4	79	2	4	73
Total Analysis Volume [veh/h]	7	17	315	8	15	291
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.02	0.00	0.00	0.01	0.00
d_M, Delay for Movement [s/veh]	12.43	9.39	0.00	0.00	7.94	0.00
Movement LOS	B	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.11	0.11	0.00	0.00	0.03	0.03
95th-Percentile Queue Length [ft/ln]	2.63	2.63	0.00	0.00	0.63	0.63
d_A, Approach Delay [s/veh]	10.28		0.00		0.39	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	0.56					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 4: East Street / North Access

Control Type:	Two-way stop	Delay (sec / veh):	8.7
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.002

Intersection Setup

Name	East Street		East Street		Site Access	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	East Street		East Street		Site Access	
Base Volume Input [veh/h]	0	12	15	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	1	4	3	1	2	5
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1	16	18	1	2	5
Peak Hour Factor	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	5	5	0	1	1
Total Analysis Volume [veh/h]	1	19	21	1	2	6
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.01
d_M, Delay for Movement [s/veh]	7.26	0.00	0.00	0.00	8.75	8.44
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.02	0.02
95th-Percentile Queue Length [ft/ln]	0.04	0.04	0.00	0.00	0.59	0.59
d_A, Approach Delay [s/veh]	0.36		0.00		8.51	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	1.51					
Intersection LOS	A					

Intersection Level Of Service Report
Intersection 5: East Street / South Access

Control Type:	Two-way stop	Delay (sec / veh):	8.8
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.002

Intersection Setup

Name	East Street		East Street		Site Access	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	East Street		East Street		Site Access	
Base Volume Input [veh/h]	0	12	15	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	1	3	7	1	2	5
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1	15	22	1	2	5
Peak Hour Factor	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	4	6	0	1	1
Total Analysis Volume [veh/h]	1	18	26	1	2	6
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.01
d_M, Delay for Movement [s/veh]	7.27	0.00	0.00	0.00	8.77	8.46
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.00	0.00	0.00	0.00	0.02	0.02
95th-Percentile Queue Length [ft/ln]	0.04	0.04	0.00	0.00	0.59	0.59
d_A, Approach Delay [s/veh]	0.38		0.00		8.54	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	1.40					
Intersection LOS	A					

East Street Village TIS

Vistro File: C:\...\pm.vistro

Scenario 7 2045 Total PM - Scenario 2

Report File: C:\...\2045 Total PM - Scenario 2.pdf

6/1/2023

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	SH 42 / Pine Street	Signalized	HCM 7th Edition	EB Left	0.364	15.0	B
2	SH 42 / Lock Street	Roundabout	HCM 7th Edition	WB Right		8.1	A
3	Pine Street / East Street	Two-way stop	HCM 7th Edition	NB Left	0.032	13.7	B
4	East Street / North Access	Two-way stop	HCM 7th Edition	EB Left	0.001	9.3	A
5	East Street / South Access	Two-way stop	HCM 7th Edition	EB Left	0.001	9.3	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report

Intersection 1: SH 42 / Pine Street

Control Type: Signalized
 Analysis Method: HCM 7th Edition
 Analysis Period: 15 minutes

Delay (sec / veh): 15.0
 Level Of Service: B
 Volume to Capacity (v/c): 0.364

Intersection Setup

Name	SH 42			SH 42			Pine Street			Empire Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Entry Pocket Length [ft]	300.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	No			No			No			No		

Volumes

Name	SH 42			SH 42			Pine Street			Empire Road		
Base Volume Input [veh/h]	107	648	0	4	611	166	170	10	91	3	21	50
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.2400	1.0000	1.0000	1.2400	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	2	0	0	2	21	15	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right Turn on Red Volume [veh/h]	0	0	0	0	0	94	0	0	46	0	0	25
Total Hourly Volume [veh/h]	107	806	0	4	760	93	185	10	45	3	21	25
Peak Hour Factor	0.9300	0.9300	0.9300	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	29	217	0	1	207	25	50	3	12	1	6	7
Total Analysis Volume [veh/h]	115	867	0	4	826	101	201	11	49	3	23	27
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	0			0			0			0		
v_di, Inbound Pedestrian Volume crossing m	0			0			0			0		
v_co, Outbound Pedestrian Volume crossing	0			0			0			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			0			0			0		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Active Pattern	Pattern 1
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	Lead Green - Beginning of First Green
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	ProtPer	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	1	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	5	35	0	0	35	0	0	10	0	0	10	0
Maximum Green [s]	12	35	0	0	35	0	0	30	0	0	30	0
Amber [s]	3.0	4.0	0.0	0.0	4.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	20	76	0	0	56	0	0	29	0	0	15	0
Vehicle Extension [s]	3.0	6.0	0.0	0.0	6.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
Delayed Vehicle Green [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	3.0	0.0	0.0	3.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	Yes			Yes			No			No	
Maximum Recall	No	No			No			No			No	
Pedestrian Recall	No	No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	40.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	C
C, Cycle Length [s]	120	120	120	120	120	120	120	120	120	120
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	5.00	5.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	3.00	3.00	3.00	3.00	3.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	89	89	89	80	80	80	10	10	10	8
g / C, Green / Cycle	0.74	0.74	0.74	0.66	0.66	0.66	0.08	0.08	0.08	0.07
(v / s)_i Volume / Saturation Flow Rate	0.17	0.23	0.23	0.01	0.25	0.25	0.06	0.06	0.03	0.03
s, saturation flow rate [veh/h]	695	1870	1870	638	1870	1799	1781	1790	1589	1711
c, Capacity [veh/h]	531	1381	1381	420	1242	1195	149	150	133	119
d1, Uniform Delay [s]	5.43	5.34	5.34	11.48	9.05	9.05	53.57	53.56	51.99	53.62
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.11	0.11
l, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.93	0.60	0.60	0.04	0.89	0.92	6.11	6.06	1.70	2.61
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.22	0.31	0.31	0.01	0.38	0.38	0.71	0.71	0.37	0.45
d, Delay for Lane Group [s/veh]	6.36	5.93	5.93	11.52	9.93	9.97	59.68	59.63	53.69	56.23
Lane Group LOS	A	A	A	B	A	A	E	E	D	E
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	Yes
50th-Percentile Queue Length [veh/ln]	0.85	3.51	3.51	0.05	5.55	5.35	3.36	3.38	1.46	1.63
50th-Percentile Queue Length [ft/ln]	21.33	87.80	87.80	1.29	138.66	133.73	84.12	84.40	36.54	40.63
95th-Percentile Queue Length [veh/ln]	1.54	6.32	6.32	0.09	9.41	9.14	6.06	6.08	2.63	2.93
95th-Percentile Queue Length [ft/ln]	38.39	158.04	158.04	2.32	235.22	228.56	151.41	151.92	65.77	73.13

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	6.36	5.93	5.93	11.52	9.95	9.97	59.66	59.63	53.69	56.23	56.23	56.23
Movement LOS	A	A	A	B	A	A	E	E	D	E	E	E
d_A, Approach Delay [s/veh]	5.98			9.96			58.53			56.23		
Approach LOS	A			A			E			E		
d_I, Intersection Delay [s/veh]	15.00											
Intersection LOS	B											
Intersection V/C	0.364											

Other Modes

g_Walk,mi, Effective Walk Time [s]	0.0			0.0			0.0			0.0		
M_corner, Corner Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
M_CW, Crosswalk Circulation Area [ft ² /ped]	0.00			0.00			0.00			0.00		
d_p, Pedestrian Delay [s]	0.00			0.00			0.00			0.00		
I_p,int, Pedestrian LOS Score for Intersection	0.000			0.000			0.000			0.000		
Crosswalk LOS	F			F			F			F		
s_b, Saturation Flow Rate of the bicycle lane	2000			2000			2000			2000		
c_b, Capacity of the bicycle lane [bicycles/h]	1183			850			417			183		
d_b, Bicycle Delay [s]	10.01			19.84			37.61			49.51		
I_b,int, Bicycle LOS Score for Intersection	2.370			2.405			2.066			1.688		
Bicycle LOS	B			B			B			A		

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: SH 42 / Lock Street

Control Type: Roundabout
Analysis Method: HCM 7th Edition
Analysis Period: 15 minutes

Delay (sec / veh): 8.1
Level Of Service: A

Intersection Setup

Name	96th Street			SH 42			Lock Street			SH 42		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	1	0	0	0	0	0	0	0	0	1
Entry Pocket Length [ft]	100.00	100.00	400.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	600.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name	96th Street			SH 42			Lock Street			SH 42		
Base Volume Input [veh/h]	16	570	151	175	506	3	3	2	8	155	4	207
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Proportion of CAVs [%]	0.00											
Growth Factor	1.0000	1.2400	1.2400	1.2400	1.2400	1.0000	1.0000	1.0000	1.0000	1.3000	1.0000	1.3000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	17	0	0	0	0	2	2	9	13	0	12	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	33	707	187	217	627	5	5	11	21	202	16	269
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	9	192	51	59	170	1	1	3	6	55	4	73
Total Analysis Volume [veh/h]	36	768	203	236	682	5	5	12	23	220	17	292
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Number of Conflicting Circulating Lanes	1			1			1			1		
Circulating Flow Rate [veh/h]	258			278			1161			825		
Exiting Flow Rate [veh/h]	944			1086			59			460		
Demand Flow Rate [veh/h]	33	707	187	217	627	5	5	11	21	202	16	269
Adjusted Demand Flow Rate [veh/h]	36	768	203	236	682	5	5	12	23	220	17	292

Lanes

Override Calculated Critical Headway	No	No	No	No	No	No	No	No
User-Defined Critical Headway [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Override Calculated Follow-Up Time	No	No	No	No	No	No	No	No
User-Defined Follow-Up Time [s]	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
A (intercept)	1420.00	1420.00	1420.00	1420.00	1420.00	1380.00	1420.00	1420.00
B (coefficient)	0.00091	0.00091	0.00091	0.00091	0.00091	0.00102	0.00091	0.00091
HV Adjustment Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Entry Flow Rate [veh/h]	411	411	208	443	499	41	242	298
Capacity of Entry and Bypass Lanes [veh/h]	1123	1123	1123	1103	1103	423	671	671
Pedestrian Impedance	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Capacity per Entry Lane [veh/h]	1101	1101	1101	1081	1081	415	658	658
X, volume / capacity	0.37	0.37	0.18	0.40	0.45	0.10	0.36	0.44

Movement, Approach, & Intersection Results

Lane LOS	A	A	A	A	A	B	B	B
95th-Percentile Queue Length [veh]	1.69	1.69	0.67	1.96	2.40	0.32	1.64	2.29
95th-Percentile Queue Length [ft]	42.33	42.33	16.86	49.11	60.09	7.97	41.04	57.14
Approach Delay [s/veh]	6.56			7.96		10.10	11.26	
Approach LOS	A			A		B	B	
Intersection Delay [s/veh]	8.13							
Intersection LOS	A							

Intersection Level Of Service Report
Intersection 3: Pine Street / East Street

Control Type: Two-way stop
Analysis Method: HCM 7th Edition
Analysis Period: 15 minutes

Delay (sec / veh): 13.7
Level Of Service: B
Volume to Capacity (v/c): 0.032

Intersection Setup

Name	East Street		Pine Street		Pine Street	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	East Street		Pine Street		Pine Street	
Base Volume Input [veh/h]	6	28	239	14	24	272
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	5	15	0	5	21	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	11	43	239	19	45	272
Peak Hour Factor	0.7900	0.7900	0.8300	0.8300	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	14	72	6	13	76
Total Analysis Volume [veh/h]	14	54	288	23	50	302
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Stop	Free	Free
Flared Lane	No		
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance	No		
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.06	0.00	0.00	0.04	0.00
d_M, Delay for Movement [s/veh]	13.66	9.69	0.00	0.00	7.95	0.00
Movement LOS	B	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.31	0.31	0.00	0.00	0.09	0.09
95th-Percentile Queue Length [ft/ln]	7.78	7.78	0.00	0.00	2.14	2.14
d_A, Approach Delay [s/veh]	10.51		0.00		1.13	
Approach LOS	B		A		A	
d_I, Intersection Delay [s/veh]	1.52					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 4: East Street / North Access

Control Type:	Two-way stop	Delay (sec / veh):	9.3
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.001

Intersection Setup

Name	East Street		East Street		Site Access	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	East Street		East Street		Site Access	
Base Volume Input [veh/h]	0	34	38	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	5	23	20	2	1	3
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	5	57	58	2	1	3
Peak Hour Factor	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	17	17	1	0	1
Total Analysis Volume [veh/h]	6	67	68	2	1	4
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.36	0.00	0.00	0.00	9.30	8.64
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.01	0.01	0.00	0.00	0.02	0.02
95th-Percentile Queue Length [ft/ln]	0.25	0.25	0.00	0.00	0.39	0.39
d_A, Approach Delay [s/veh]	0.60		0.00		8.77	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.59					
Intersection LOS	A					

Intersection Level Of Service Report
Intersection 5: East Street / South Access

Control Type:	Two-way stop	Delay (sec / veh):	9.3
Analysis Method:	HCM 7th Edition	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.001

Intersection Setup

Name	East Street		East Street		Site Access	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Entry Pocket	0	0	0	0	0	0
Entry Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
No. of Lanes in Exit Pocket	0	0	0	0	0	0
Exit Pocket Length [ft]	0.00	0.00	0.00	0.00	0.00	0.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

Volumes

Name	East Street		East Street		Site Access	
Base Volume Input [veh/h]	0	34	36	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	5	27	21	2	1	3
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	5	61	57	2	1	3
Peak Hour Factor	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	18	17	1	0	1
Total Analysis Volume [veh/h]	6	72	67	2	1	4
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.36	0.00	0.00	0.00	9.32	8.64
Movement LOS	A	A	A	A	A	A
95th-Percentile Queue Length [veh/ln]	0.01	0.01	0.00	0.00	0.02	0.02
95th-Percentile Queue Length [ft/ln]	0.25	0.25	0.00	0.00	0.39	0.39
d_A, Approach Delay [s/veh]	0.57		0.00		8.77	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	0.58					
Intersection LOS	A					

Ellie Hassan

From: Barbara Kish <barbara.kish@ymail.com>
Sent: Tuesday, September 5, 2023 1:36 PM
To: Planning
Subject: Comments: East Street Village, Case PUPL-000427-2022

You don't often get email from barbara.kish@ymail.com. [Learn why this is important](#)

Hello Planning Commission,

RE: Case PUPL-000427-2022 East Street Village

I'm writing to express my concerns related to the East Street Village development. As a owner/resident of 1133 Pine Street, my concern is safety related, specifically in regard to motor vehicle traffic at the intersection of Pine and East Street.

Since the addition of "The Trails at Clementine" condo complex on East Street, the East St and Pine intersection is very unsafe, especially at busy times of the day. The somewhat newly painted cross hatched area (suggesting cars do not block the intersection) is more dangerous than people blocking the intersection. In order to turn South on to East from westbound Pine, you need to cross two lanes of traffic, with no visibility to the farthest south lane. In addition, people stack up on westbound Pine, waiting to turn south on to East St. causes major traffic pile ups on Pine and County Road 42.

The same exists for people attempting to go West on Pine from East St.

It seems more straightforward to assume people access the area via Lock Street, off Country Road 42 where there is a light, however given the sizeable uptick of traffic, it doesn't appear the case. Lots of fender benders and near misses....

So, in general I do not oppose the addition of 26 new residences in the area, my concerns are with the additional traffic to an intersection that hat is already dangerous and congested.

Thank you,

Barb Kish

303-250-0300

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Ellie Hassan

From: Mike Kranzdorf <mike@amterre.com>
Sent: Monday, July 31, 2023 10:38 AM
To: Rob Zuccaro
Cc: Cameron Fowlkes; Ellie Hassan
Subject: Re: East St Village Preliminary Plat and PUD

Categories: Public Correspondence

Hi Rob, Ellie,

The American Legion and I have concerns about the proximity of East St Village residents to current and future commercial activity at Pine Street Plaza. Please bear with me if I am reading the code incorrectly or have some measurements wrong.

There is a 10' city easement on the southern boundary of Pine Street Plaza and while that restricts a structure within that area, it does not restrict uses such as a patio area. The American Legion and Gravity Brewing already have active patios within that easement. A city-owned parcel lies south of the easement and varies from 13' on the east (American Legion) to 20' for most of Lot 4. With the proposed setbacks, a house in East St Village would be about 23' from the American Legion / Gravity Brewing patios, 30' for a patio constructed on Lot 4, and 33' from the Legion building. People in the back yard of those houses would be 13' from these bar and brewery patios. A 35' high house will probably loom pretty high and cast shadows over the patios and maybe the buildings.

This configuration raises concerns about how residents will feel about being so close to these activities and the possibility for conflicts or complaints. Neither we nor the American Legion want to cause problems with the applicant or new residents so I raise these concerns out of an abundance of caution. Representatives from the American Legion and I met with the East St Village team following their first submittal and expressed our concerns. We have not been contacted by them regarding newer iterations.

Also of note is that Pine Street Plaza is currently zoned CC, so new construction on the vacant Lot 4 could have setbacks as little 5' for an accessory use or 10' for a principal use. Code Sec. 17.14.020 appears that it could trigger possible rezoning into MU-R or MU-R CC for a new building or redevelopment. This zoning would allow for 0' setbacks if the building faces east.

I have not heard back from Cameron about the status of the city-owned parcel. If there is an underground storm sewer I am curious about its location and why the city requires an easement to the north but not to the south. Presumably it runs along the north of the parcel. I would also like to know if the pipe is still needed considering the remediation that was done to remove downtown from the flood zone, or if the parcel or the easement may someday be available for development.

Thanks for asking!

Mike Kranzdorf
Amterre Property Group LLC
720-304-3200

On Jul 28, 2023, at 12:29 PM, Rob Zuccaro <rzuccaro@louisvilleco.gov> wrote:

Hi Mike,

Here is the latest PUD. Looks like it shows a 12' setback to the north. Ellie is going to be the case manager on this for Planning and is copied on the email. Do you have any concerns with the setback that you want to share?

Thanks,
Rob

Rob Zuccaro, AICP

Community Development Director

303-335-4590 (Office)

303-591-4901 (Cell)

<[image002.jpg](#)>

[Planning | City of Louisville, CO \(louisvilleco.gov\)](#)

[Building Safety | City of Louisville, CO \(louisvilleco.gov\)](#)

[Economic Vitality | City of Louisville, CO \(louisvilleco.gov\)](#)

From: Mike Kranzdorf <mike@amterre.com>

Sent: Thursday, July 27, 2023 10:39 AM

To: Cameron Fowlkes <cfowlkes@louisvilleco.gov>

Cc: Rob Zuccaro <rzuccaro@louisvilleco.gov>

Subject: Re: East St Village Preliminary Plat and PUD

Cameron, Rob,

This email to Elizabeth came back of course. Can you forward to the correct planner? Also welcome any comments from Cameron. Thanks,

Mike Kranzdorf
Amterre Property Group LLC
720-304-3200

On Jul 21, 2023, at 10:53 AM, Mike Kranzdorf <mike@amterre.com> wrote:

Hi Elizabeth, what setback waivers is East Street Village requesting from the north property line in their latest proposal? Is planning comfortable with them?

Cameron - what is the status of the city land between this and Pine Street Plaza? Is the ditch still in use? What's in the ground? I am wondering why the city does not need a similar easement on the south side and how permanent the city easement may be.

Thanks,

Mike Kranzdorf
Amterre Property Group LLC
720-304-3200

On Jan 24, 2023, at 11:41 AM, Elizabeth Kay Marchetti
<emarchetti@louisvilleco.gov> wrote:

Dear Mike,
Thanks for your patience.

Planning staff has only received and reviewed one iteration of the proposed PUD. We expect to see a somewhat revised plan when the applicant resubmits.

It's possible that the 10' setback condition could change. There are several components of the proposal that require a waiver and staff will evaluate each against the quality of the overall design/layout and common area being proposed. All of which is to say that staff hasn't yet reached a conclusion on the 10' setback condition.

I apologize I can't give you a simpler answer. Feel free to contact me with any further questions.

Regards,
Elizabeth Kay Marchetti, AICP
ekaymarchetti@louisvilleco.gov
Office Phone: 303-335-4593
Cell: 720-813-9142

From: Mike Kranzdorf <mike@amterre.com>
Sent: Tuesday, January 24, 2023 11:08 AM
To: Craig Duffin <craigd@louisvilleco.gov>
Cc: Elizabeth Kay Marchetti <emarchetti@louisvilleco.gov>; Rob Zuccaro <rzuccaro@louisvilleco.gov>; Lisa Ritchie <lritchie@louisvilleco.gov>
Subject: Re: East St Village Preliminary Plat and PUD

Craig,

Thanks for the info. If traffic is an issue, could you consider expanding the intersection at Pine to 3 lanes, one in and dedicated left and right out? Or would that not be helpful? We may have discussed this in the past. Please let me know what their report addendum says and if you have recommendations based on it. I am amenable to reconfiguration if there are good ideas.

Drainage sounds like it's not a concern for me.

For the setback, I guess I'm wondering if Planning staff is supportive.

Thanks again,

Mike

On Jan 23, 2023, at 5:15 PM, Craig Duffin
<craigd@louisvilleco.gov> wrote:

Mike,
Responded to last two items.
Craig

From: Mike Kranzdorf <mike@amterre.com>
Sent: Monday, January 23, 2023 3:59 PM
To: Elizabeth Kay Marchetti
<emarchetti@louisvilleco.gov>
Cc: Rob Zuccaro <rzuccaro@louisvilleco.gov>; Lisa
Ritchie <lritchie@louisvilleco.gov>; Craig Duffin
<craigd@louisvilleco.gov>
Subject: Re: East St Village Preliminary Plat and PUD

Hi Planners,

Can you provide any thoughts or reservations the planning department has on the East St Village development? I know they're about to or already have come in with round 2.

They are asking for a waiver to go from a 25' setback to a 10' setback from their northern property line. There's a city-owned piece of land between that and Pine Street Plaza's southern property line, but it's still a big change. I am concerned about disgruntled residents when I want (hypothetically but in discussions) to build a restaurant with a rooftop bar.

The Pine and East Street intersection is already difficult to navigate at times. East Street to the south is similarly problematic. Are you concerned about more traffic? Yes, impacts to Pine St intersection. Have you asked for study? We asked for an addendum to the report prepared for Clementine. Did anything ever come of the Highway 42 study regarding traffic? At this point, PW has a recent study that reviewed SH 42 corridor traffic (Arapahoe to Lock) and the Engineer's, Kimley-Horn, prepared recommendations for improvements to accommodate future traffic (road

width, laneage, bike lanes, multi use paths, intersection pedestrian crossing enhancements, etc.).

Andy is setting up a meeting for me with the civil engineer as I'm also curious about drainage impacts on the East Street outparcel that I maintain and also connects to a detention pond on my parcels. Any concerns on drainage? Site drainage from East St Village will be conveyed to 2 detention/rain gardens on site and released into existing Drainageway B Outfall pipe

Let me know if it might make more sense to come in to discuss. Thanks,

Mike Kranzdorf
Amterre Property Group LLC
720-304-3200

On Oct 31, 2022, at 12:50 PM,
Elizabeth Kay Marchetti
<emarchetti@louisvilleco.gov>
wrote:

Thanks for that, Mr. Kranzdorf.

Regards,
Elizabeth Kay Marchetti, AICP
ekaymarchetti@louisvilleco.gov
Office Phone: 303-335-4593
Cell: 720-813-9142

From: Mike Kranzdorf
<mike@amterre.com>
Sent: Monday, October 31, 2022 12:01 PM
To: Elizabeth Kay Marchetti
<emarchetti@louisvilleco.gov>
Cc: Rob Zuccaro
<rzuccaro@louisvilleco.gov>; Lisa Ritchie <lritchie@louisvilleco.gov>; Craig Duffin <craigd@louisvilleco.gov>
Subject: Re: East St Village Preliminary Plat and PUD

Hi Elizabeth,

Yes, feel free to share it with Jesse and his team. I considered including him but decided just to start with staff. Thanks,

Mike

On Oct 31, 2022, at 9:31 AM, Elizabeth Kay Marchetti <emarchetti@louisvilleco.gov> wrote:

Dear Mr. Kranzendorf:

Thank you very much for reaching out to the city and providing a thorough history of your's and your neighbor's land.

Staff has completed an initial review of the East Street Plat and Preliminary PUD and have asked the applicants to provide proof, with their 2nd submittal, of support by yourself and other relevant adjoining neighbors of the plans for sidewalk/trail connections that would occur along the northern border of their site.

Would you be amenable to me sharing your attachments and your email with the applicants? It may be

just the thing to inspire
the applicant to contact
you.

Again, thank you,
**Elizabeth Kay
Marchetti, AICP**
[ekaymarchetti@louisville
co.gov](mailto:ekaymarchetti@louisvilleco.gov)
Office Phone: 303-335-
4593
Cell: 720-813-9142

From: Mike Kranzdorf
<mike@amterre.com>
Sent: Monday, October
31, 2022 9:17 AM
To: Rob Zuccaro
<[rzuccaro@louisvilleco.
gov](mailto:rzuccaro@louisvilleco.gov)>; Elizabeth Kay
Marchetti
<[emarchetti@louisville
co.gov](mailto:emarchetti@louisvilleco.gov)>; Lisa Ritchie
<[lritchie@louisvilleco.g
ov](mailto:lritchie@louisvilleco.gov)>; Craig Duffin
<[craigd@louisvilleco.go
v](mailto:craigd@louisvilleco.gov)>
Subject: East St Village
Preliminary Plat and
PUD

<image001.jpg>

Hi all,

Looking at the
preliminary plans for
the East St Village
PUD, it appears that the
property owner thinks
they own the northwest
corner of land east of
the railroad right-of-
way and west of the
city-owned ditch at the
north boundary of the
parcel (screenshot
above). That piece is at
the south end of what
was formerly known as
the Abandoned BNSF
Right-of-Way that runs

between 1100 Pine Street and Lots 1 and 4 of Pine Street Plaza. In 2013, Amterre Pine II LLC obtained a default judgement in favor of title to the right-of-way which includes this piece of land.

The court action occurred following discussions with BNSF representatives about purchasing the ROW. BNSF determined that they did not have clear title to it and could neither sell nor quit-claim it to me. They suggested I go through an adverse possession / quiet title process to obtain it and they would not object. I included this southern piece of land along with a piece to the north in the city's right of way on East Street so that title would be clear during any redevelopment process I initiated. The City also did not object at the time.

I asked the Boulder County Assessor's Office to update their property records for the former ROW a couple of times and they have not gotten around to it. They have acknowledged that the court order is sufficient for title though. The court order is recorded so it should have shown up when the East Street owner had their survey completed. The Assessor's map still shows the ROW ownership as "Information

Unavailable” so it’s not clear why East St LLC would think it was theirs even if they didn’t know it was owned by Amterre. I expect the Planning Department is aware of this and I am curious about your current understanding.

Note that there is also a small triangle of land to the south of my property which was more appropriate for the Polluconi family to own. When I asked if they wanted me to include in my court action and deed it to them in exchange for whatever costs were incurred to separate it out, they were not interested. This piece is probably still in limbo but no one is going to claim it.

A survey and court order are attached.

I am sure we can resolve this matter to everyone’s satisfaction. Let’s begin with clarifying ownership of the land in question. I also understand there is interest in having my participation in a future trail but I have not been contacted in this regard.

Thank you,

Mike Kranzdorf
Amterre Property
Group LLC
720-304-3200

Ellie Hassan

From: Tammy <tfredhead@gmail.com>
Sent: Friday, June 30, 2023 7:43 AM
To: Planning
Subject: East Street Village development

Categories: Public Correspondence

You don't often get email from tfredhead@gmail.com. [Learn why this is important](#)

Hello -

I'm reaching out about the proposed East Street Development. While I understand that development of this area is inevitable, the proposed development seems short-sighted.

The plans show housing from corner to corner of the land. I see no proposed areas to promote community. Is there an open green space for children to play? A small park area? An area for a community garden? Picnic/sitting area? A sandbox for young children? I see one small space between 2 sets of buildings - but that's it. And it has nothing there other than a few trees.

Let's not overlook the value of places that promote community in neighborhoods!

Tammy Fredrickson
834 Lincoln Ave

A little nonsense now and then is relished by the wisest men.
Willy Wonka

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ITEM: Housing Plan – Housing Needs Assessment and Strategy Framework

STAFF: Rob Zuccaro, AICP, Community Development Director
Jeff Hirt, AICP, Planning Manager

SUMMARY:

In 2021, the City of Louisville was awarded a grant from the Colorado Department of Local Affairs (DOLA) to develop a Housing Plan (“Plan”). The Plan is an important step for the City to address housing affordability and choice in Louisville and aligns with advancing numerous City policies around environmental, social, and economic sustainability. City staff temporally paused the project until earlier this year to address the urgent needs from the Marshall Fire recovery.

The purpose of this agenda item is to share a project update with new information and an initial framework for what the Plan will recommend for Council’s consideration – specifically, to share the final Housing Needs Assessment and Strategy Matrix and Framework that will act as a foundation for drafting the Plan. City staff intend to bring the Plan to City Council for adoption by early 2024.

Planning Commission last discussed this project on June 22, 2023 where City staff introduced the project and initial data findings. At this meeting, Planning Commission provided feedback mostly on the types of analysis that should be included in the Housing Needs Assessment.

Housing Needs Assessment

Attachment 1 includes the Housing Needs Assessment (HNA). This technical document provides the factual basis for the Plan’s strategies. The Executive Summary provides a snapshot of Louisville’s current and future housing needs and key findings. The HNA quantifies Louisville’s anticipated housing affordability challenges and needs, based on State of Colorado population estimates (e.g., workforce housing, housing for different income groups, seniors, families, etc.).

Strategy Matrix and Framework

Attachment 2 includes the Strategy Matrix and Framework, which is the starting point for the detailed strategies and an action plan that will be included in the Plan. Attachment 2 provides a framework for discussing those strategies early in the community review and feedback process, and it does not capture the detailed analysis, refinement, or organization of the strategies that will be available in the Plan. The strategies are organized by type of action (incentives, policy changes, financial support, partnerships, and requiring further research). They stem from both the HNA and recent input from housing developers and community members. The strategies include topics ranging from zoning code changes to how the City can financially support affordable housing projects.

Next Steps

Feedback from community members, City Council, Planning Commission, and others is informing Plan drafting that is currently underway. City staff plan to bring the draft Housing Plan to Planning Commission for consideration as early as December 2023, with a City Council adoption goal in the first part of 2024.

RECOMMENDATION AND REQUEST FOR PLANNING COMMISSION FEEDBACK

City staff recommend that the attached Housing Needs Assessment and Strategy Matrix and Framework act as the foundation for drafting the Housing Plan. City staff are requesting specific feedback on strategies in Attachment 2; specifically:

- Are there any strategies missing?
- What additional information do you need to evaluate these strategies?
- What do you see as the highest priority strategies?

ATTACHMENTS

1. Housing Needs Assessment
2. Draft Strategy Matrix and Framework

City of Louisville

Housing Needs Assessment

August 2023

Prepared for: City of Louisville

Final Report

ECONorthwest

ECONOMICS • FINANCE • PLANNING

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Suite 1600
Portland, OR 97201
503-222-6060

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Executive Summary

The Boulder-Denver region has experienced a major influx of higher income earning households due in part to an increase in high-paying jobs at companies that have chosen to locate in and around Boulder and Denver. This trend has driven housing demand, and as cities across Colorado have fallen behind on housing development, affordability in many local communities has been compromised.

In 2021, the City of Louisville was awarded a grant through the HB 21-1271 Innovative Affordable Housing Strategies program by the Colorado Department of Local Affairs (DOLA). The City allocated the grant toward a Housing Plan to learn how these regional trends affect Louisville and to develop tailored strategies that enable affordable housing in the city. Once the Housing Plan is complete, it will play a crucial role in updating the citywide Comprehensive Plan, particularly related to the City's plans for housing and land use. The first step in creating a Housing Plan is a Housing Needs Assessment (HNA), which evaluates current and projected housing needs using a thorough analysis of the City's demographic and housing market trends. The insights from the assessment help to build a factual basis for the Housing Plan strategies.

This document is that first step. As an HNA, it helps answer questions about the current availability of different housing types, who lives and works in Louisville, and the range of housing needed to meet current and future housing needs. Answering these questions provides the foundation for a Housing Plan that not only meets the current and projected housing need for a growing population, but also facilitates the City's existing goals and policies to support an array of local businesses, create more stability and inclusivity for lower-income residents, and reduce the carbon footprint of residents and workers. Specifically, addressing housing affordability supports:

- The need to provide diverse housing opportunities, particularly for seniors, empty-nesters, disabled, renters, first-time homebuyers, and the support of retail and commercial centers serving local residents identified in the 2013 Comprehensive Plan;
- The effectiveness of multimodal (bike, walk, public transit) options and the availability of higher-density housing along corridors identified in the 2019 Transportation Mater Plan;
- The opportunity for homeowners to preserve existing housing stock by providing alternative development options identified in the 2015 Preservation Master Plan;
- The desire to preserve downtown as a pedestrian-oriented and mixed-use area identified in the 1999 Downtown Framework Plan;
- The expansion of housing options for diverse and low-income communities identified in the 2021 Equity, Diversity, and Inclusion (EDI) Task Force Report;
- The goal of 12% of housing to be permanently affordable identified in the 2017 Boulder County regional Housing Strategy; and

- The reduction of greenhouse gas emissions through increasing transportation options and reducing vehicular traffic identified in the 2020 Sustainability Action Plan and the 2019 Resolution Setting Clean Energy and Carbon Emission Reduction Goals.

A summary of existing and relevant goals and policies is included in the final section of this report. Along with the findings from this HNA, they will help guide the next stage of developing housing strategies.

A summary of the overall housing needs and data analysis findings from the HNA is provided below.

Summary of Housing Needs

In general, the city will need to prioritize diversifying its housing stock to adequately meet the needs of current and future residents and to support existing policy goals related to Equity, Diversity, and Inclusion (EDI), sustainability, support for workforce housing and local businesses, and housing for young families. Otherwise, the city will continue to become more unaffordable to the wide range of households necessary to maintain and strengthen a robust and resilient community.

Louisville's population is aging quickly compared to other cities and the city will need to prioritize safe and sustainable housing options for seniors. An aging population will need smaller units that meet accessibility standards, including single-story units or units with bedrooms located on the first level. Many seniors are also on fixed-incomes and as housing costs soar, seniors may struggle to afford housing within the communities they're connected to. Therefore, income-restricted housing for seniors will need to be a priority as well.

The HNA demonstrates a lack of housing opportunities for younger residents and families, including both rental and ownership options. Louisville has become less affordable for younger residents and families than in the past due to the sharp increase in housing costs throughout the region. To create more opportunities and meet their needs, the city will need to prioritize more multifamily rentals for young residents who either choose to live alone or for smaller households seeking more affordable rental options. Louisville will also need to plan for more attached and smaller detached units that are more affordable to first-time homebuyers and young families looking to locate in Louisville. More affordable homeownership opportunities could be created through stacked condominiums, plex development, townhomes, and small bungalows or cottages.

Income-restricted housing will be essential for creating and maintaining a more diverse and inclusive community. The housing market is less likely to deliver income-restricted housing given its inherent financial complexities and will require more direct support from the city than other housing types discussed. If income-restricted housing is not prioritized, lower income earners will likely continue to seek housing opportunities further away from Louisville as higher-income earners seek to locate in Louisville. Prioritizing income-restricted housing will

not only help the city meet its current and future housing needs, it will also help the city achieve established goals related to EDI and sustainability by creating more opportunity for a wider range of residents to live and work in the same place.

Louisville will need to plan for housing to support both the current and future workforce and a more vibrant commercial sector. Much of the housing needs identified in this section will help meet the needs of a diverse and growing local workforce. It's important to acknowledge the critical need to ensure there are enough housing options for workers employed by local businesses and to retain and attract essential employees, such as teachers, healthcare professionals, and public servants, who contribute significantly to the community's well-being. Creating more housing near job opportunities can also greatly ease commute times and traffic congestion that can help advance the City's sustainability goals.

Louisville will need to identify housing strategies to address current unmet housing needs along with future housing needed for the next several decades.

- The results of the housing needs assessment show a gap at around 2,483 new housing units needed to address current housing underproduction and accommodate future population growth assumed to reach approximately 24,614 persons by 2047. On an annual basis this means an average of 96 housing units added per year through 2047.¹ This estimate helps to provide a general target for the number of housing units needed to meet existing and future demand for the next two decades. It is important to note that this HNA is not intended to establish desired growth targets, but rather it is to study the issue objectively based on recent and projected population trends.
- 1,171 of those housing units are needed for households earning below 100% of the Area Median Income (AMI).
- 409 units are needed to address current housing underproduction. ECONorthwest accounts for housing underproduction in the analysis of housing needs, which uses a ratio of 1.1 housing units per one household since healthy housing markets allow for a reasonable level of housing vacancy and absorption and second/vacation homes.
- For Louisville's comprehensive planning horizon, the city will need to plan for an additional 1,100 units over the next 10 years to track towards housing needs.²

Housing needs in this analysis are based on assumed population growth, however future need is more nuanced and will continue to evolve as the city makes land use and housing policy decisions, including through the upcoming comprehensive plan update.

¹ Beginning in 2021.

² Including 2021 and 2022.

Data Analysis Key Findings

Community Demographics

Louisville grew at a moderate rate compared to other jurisdictions in Boulder County.

- The city grew by 13% between 2011-2021, just ahead of Boulder and Superior which are the two slowest growing cities in Boulder County. However, population estimates from the State Department of Local Affairs showed that Louisville's population plateaued and began to decrease between 2018 and 2019 as housing growth slowed. This decrease has been exacerbated with the loss of 550 homes in the Marshall Fire at the end of 2021.
- Assuming Louisville maintains the current percentage of Boulder County's population (6.3%) as it grows, Louisville is expected to grow by 20% from 2023 to 2047, or by 4,115 residents.

Louisville has the highest median age when looking across comparison geographies in Boulder County and is aging faster than the County overall.

- The median age in Louisville is 43 years old, an increase of 4 years over the last 10 years.
- Residents 65 and older is the only age bracket that increased over the past decade in Louisville. All other age brackets declined.

Louisville is increasingly losing younger residents and families with children.

- The city experienced a decline in residents under the age of 44, including those under the age of 19.
- School enrollment has decreased for both elementary and middle schools in Louisville, indicating a decrease in younger families in the area.
- The number of couple households with children decreased by 3%, while the number of couple households without children increased by 2%.
- Overall, fewer younger individuals are moving into or staying in Louisville and rising housing costs are likely a major contributing factor.

Homeownership rates have fallen across Boulder County.

- In Louisville, the homeownership rate dropped by 5%, the second highest decrease behind Superior (10%)
- Homeownership rates for households between the ages of 15-34 decreased by 4% and by 7% for households between the ages 35-64.
- The number of family homeowner households decreased alongside an increase in family rental households. This could indicate that households who might have previously been able to purchase a home upon forming a larger household (e.g., getting married or having children) or getting older are no longer able to.

Renter household trends indicate an inability to live alone and increased barriers to homeownership in Louisville.

- The share of both renter and homeowners aged 15 to 34 living alone decreased, as did the share of homeowners aged 35 to 64. The decline in young individuals living alone and the rise in two-person households within the City may suggest that younger people are struggling to afford living on their own. This could mean many opting to live together or moving back in with their parents.
- Household size has increased in Louisville, particularly for renter households. This relative increase in renter household size is likely a reflection of the increased cost of renting as a single person household, alongside increasing barriers to homeownership.
- The city experienced an increase in the number of family households that rent, which could indicate a lack of opportunity for homeownership for young families.

Louisville's saw the largest increase in median household income among comparison geographies over the last 10 years.

- Louisville is one of the highest earning cities in the county, with a median income of \$125,124.
- While all cities saw substantial increases in median income, Louisville saw the greatest increase with a 50% increase in median income.
- Louisville experienced a 17% increase in the share of households earning greater than \$200,000 annually. The influx of high earning households is most likely due to the immigration of wealthier households.
- The median income for homeowner households in Louisville is roughly twice the median income for renter households. Except for Boulder (which is likely impacted by the high share of university students), Louisville has the largest income gap between renter households and ownership households.
- The city experienced a decrease in the number of households earning \$75,000 annually, which could be caused by lower income households moving out of Louisville as housing and other living costs increase.

Employment and Commuting

Louisville could expect a 20% increase, or 3,963 jobs, over the next 10 years.³

- The manufacturing industry in Louisville increased by 8.4% between 2010-2020, while jobs in the information, administration, and finance industries (or more formal office-oriented jobs) declined, along with food service and retail.

Of comparison geographies, Louisville had the smallest share of workers who both live and work in the city.

³ Assuming the city maintains its current share of the total jobs in the Boulder Metropolitan Statistical Areas (MSAs).

- Approximately 64% of Louisville workers live outside of the city but commute into Louisville for work, while 32% of workers live in Louisville but commute to another location for work. Only 4% of workers both live and work in Louisville.
- The number of workers commuting *into* Louisville has increased by 58% over the past decade, which could indicate challenges for employees who work in Louisville to also live in Louisville.
- Of comparison geographies, workers commuting to Louisville for work the second longest commute (Boulder had the longest commute), with just over 15 miles. In general, long commutes can contribute to increased traffic congestion, leading to heightened fuel consumption and elevated greenhouse gas emissions. Additionally, longer commutes can also put additional financial pressure on households, as transportation is often the second highest household cost, behind housing.

Housing Stock and Market Trends

The housing stock has become more diverse since 2011 with an increase in multifamily housing units, but the majority of housing units in Louisville are single-family detached.

- The majority of housing in Louisville (67%) is detached single-family, the second highest share among comparison geographies, behind Erie (89%).

Housing production in Louisville slowed substantially over the last few years.

- Louisville is one of the slower growing geographies in the county, with an 11% growth of housing units from 2011 to 2021.
- The majority (70%) of housing permits issued in recent years have been for single family housing, primarily focused on rebuilding after the 2021 Marshall Fire.
- Residential development in Louisville declined substantially between 2018-2021. The sharp increase in units observed between 2022-2023 is almost entirely due to the permitted replacement units from the Marshall Fire.

Louisville has the second highest average home sale price among comparison geographies, as well as the second highest rate of home sale price increase.

- As of 2023, Louisville had an average home sales price of \$831,000, second highest behind Boulder. The average home price in Louisville is about \$150,000 higher than the County overall.
- Between 2012 and 2023, the average home sale price in Louisville increased by about \$473,000, or 132%.

Rents prices increased moderately compared to other geographies in Boulder County, but still increased substantially.

- Like home sales prices, rent rates rose significantly across all geographies over the past decade. Multifamily rents in Louisville increased by \$721, or 58%, from 2012 to 2023.

Housing Affordability

Recent home sale prices are out of reach for the majority of Louisville households.

- A household would need to earn around 145% of the MFI, or around \$209,000 to afford the average home sales price in Louisville.
- Only 26% of Louisville households earn more than \$200,000 annually, suggesting at least 74% of Louisville households would not be able to afford the current average home sales price, with a much greater affordability gap for Louisville renters.

The rates of cost-burdened households in Louisville decreased over the last decade, but it is likely due to fewer lower-income households living in the city.

- Around 41% of Louisville renters and 16% of Louisville homeowners currently spend more than 30% of household income on housing expenses.
- Given the dramatic increase in housing costs over the past decade, it is likely because households that were cost-burdened (especially severely cost burdened) in 2011 were eventually priced out of the area and moved to areas with a lower cost of living and higher-earning households have moved into the area.

1. Introduction

In 2021, the City of Louisville was awarded a grant through the HB 21-1271 Innovative Affordable Housing Strategies program by the Colorado Department of Local Affairs. However, the project was delayed due to the devastating Marshall Fire that occurred in late December 2021. The City has allocated the funding to develop a housing plan, which will play a crucial role in updating the City's Comprehensive Plan and provide context for its Land Use Element during the upcoming comprehensive plan update. The approach for developing a housing plan begins with a Housing Needs Assessment (HNA) which evaluates the current and projected housing needs by conducting a thorough analysis of the City's demographic and housing market trends.

With a countywide objective of achieving a 12% permanently affordable housing stock, an ongoing disaster recovery, and an impending comprehensive plan update, the findings of this Housing Needs Assessment will play a pivotal role in informing crucial land use and housing policy decisions that will shape Louisville's future.

Data Collection & Methodology

In this assessment we drew from a variety of data sources to compile a comprehensive understanding of Louisville's housing needs. One of the key sources for housing and household data is the US Census Bureau, specifically the 2021 American Community Survey 5-year

estimates. This assessment also leverages other publicly available data sources from federal, state, and local government resources as well as private sources such as Redfin and CoStar.

Trends identified in this report may be attributed to several factors, either individually or collectively. Where possible, this HNA identifies potential contributing factors to the trend.

Organization of this Report

The remainder of this document is organized into the following sections:

- **2. Community Profile** presents community demographic information, including population growth, demographic information, household characteristics, and income distribution that affect housing choice and needs in Louisville.
- **3. Housing Characteristics** presents the current mix of housing types, housing tenure, vacancy rates, and summarizes regional and local housing market trends affecting Louisville's housing market.
- **4. Marshall Fire Recovery** discusses the progress and ongoing efforts of rebuilding Louisville's housing stock destroyed in the 2021 Marshall Fire.
- **5. Housing Needs in Louisville** presents the forecast for housing growth in Louisville and the housing needed to accommodate future residents.
- **6. Summary of Existing Housing Goals and Policies** includes a summary of key housing goals and policies documented within the city's existing policy documents.

2. Community Profile

The purpose of this chapter is to understand the community demographic trends and factors that will affect housing demand and development in the City of Louisville. These demographic factors include:

- Population Growth
- Demographic Information
- Household Characteristics
- Employment and Commuting

This information informs how Louisville's existing housing stock and housing market is serving or not serving the City's households. In addition, City staff identified comparable geographies to use in our analysis to understand Louisville in a more regional context, including Boulder County, Boulder (City), Superior, Erie, Longmont, and Lafayette.

Population Growth and Forecast

Population growth and household formation are the major factors in understanding housing demand. The rate of population growth and household characteristics heavily influence the demand for specific housing types.

Population Growth

Louisville is the second smallest of comparison cities on a population basis. As of 2021, Louisville had 20,855 residents, representing 6.3% of Boulder County's overall population.

Exhibit 1: Population, Louisville and Comparison Geographies, 2021

Source: Colorado Department of Local Affairs

13,053	20,855	31,035	31,303	99,414	106,978	329,793
Superior	Louisville	Lafayette	Erie	Longmont	Boulder	Boulder County

Exhibit 2 shows the change in population from 2011 to 2021. Over the time period, Louisville grew by just under 2,500 residents, or 13%. Of comparison cities, Erie grew at the fastest rate (70%), and Superior grew by the slowest (4%).

Exhibit 2: Change in Population, Louisville and Comparison Geographies, 2010-2021

Source: Colorado Department of Local Affairs

	2011	2021	# Change	% Change
Erie	18,432	31,303	12,871	70%
Lafayette	24,545	31,035	6,490	26%
Longmont	86,526	99,414	12,888	15%
Louisville	18,406	20,855	2,449	13%
Boulder County	295,605	329,793	34,188	12%
Boulder	97,901	106,978	9,077	9%
Superior	12,497	13,053	556	4%

Note: The Colorado State Demography Office will release 2022 estimates in the coming months which will show a decrease in Louisville's population, likely due to the Marshall Fire. The estimate is expected to show Louisville falling below 20,000 residents.

Population Forecast

The Colorado Department of Local Affairs does not provide local population forecasts for cities and towns, only for counties. ECONorthwest developed a population forecast based on the Boulder County's population forecast of 389,233 residents. Assuming Louisville maintains the current percentage of Boulder County's population (6.3%) as it grows, Louisville is expected to grow by 20% from 2023 to 2047, a slightly higher rate than the County overall (17%).⁴

⁴ Due to data availability (DOLA only calculates forecasts at the county level), ECONorthwest calculated the Louisville's 2047 forecast using 2047 county population estimates and the Louisville's current share of the county population.

ECONorthwest's population projection for Louisville is show below in Exhibit 3, along with DOLA's population forecast for Boulder County.

Exhibit 3: Population Forecast, Louisville and Boulder County, 2023-2047

Source: Colorado Department of Local Affairs, ECONorthwest

	2023	2047	# Change	% Change
Louisville	20,499	24,614	4,115	20%
Boulder County	331,429	389,233	57,804	17%

Demographic Information

Demographic information can be an indicator of a city's overall population trends; in this report, ECONorthwest uses 2021 5-year American Community Survey (ACS) data, the most current data available. The analysis also often includes 2011 5-year ACS data to illustrate trends over time. Key findings include:

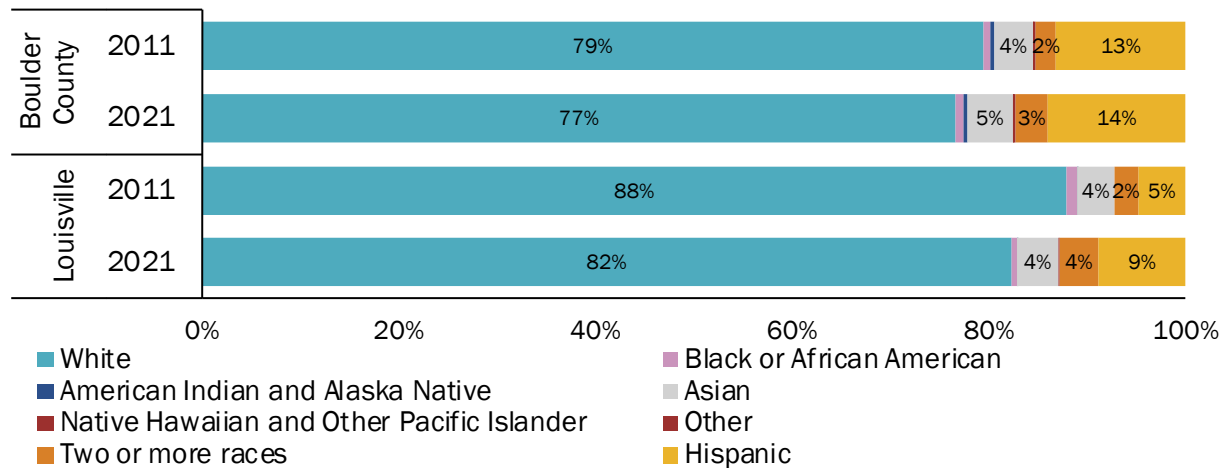
- Louisville has the highest median age when looking across comparison geographies and is aging faster than the County overall.
- Fewer younger individuals are moving into or staying in Louisville and rising housing costs are likely a major contributing factor.
- Residents 65 and older is the only age bracket that increased over the past decade in Louisville. All other age brackets declined. Older residents without affordable or suitable options for downsizing or aging in place can contribute to a limited housing stock, as more residents remain in their homes for longer periods of time. This can limit the ability for younger age groups to find suitable or affordable housing options if new opportunities are not created.
- School enrollment has decreased for both elementary and middle schools in Louisville, also indicating a decrease in younger families in the area.

Race and Ethnicity

Exhibit 4 shows the change in distribution of residents by race and ethnicity from 2011 to 2021. In both Louisville and Boulder County, most of the population is White, with 82% identifying as White in Louisville and 77% in the County overall. However, both jurisdictions became more racially and ethnically diverse between 2011 and 2021. Notably, Louisville saw a 4% increase in its Hispanic population over the time.

Exhibit 4: Race and Ethnicity Distribution, Louisville and Boulder County, 2011-2021

Source: ACS 5-Year Data Tables, 2007-2011, 2017-2021



Age

Households make different housing choices at different stages of life to fit their changing needs; for example, the type of housing needed for a 20-year-old college student or young worker differs from that of a 40-year-old parent with children, or an 80-year-old single adult. Below, Exhibit 5 shows the median age in 2021 for Louisville and comparison geographies. Of comparison cities, Louisville has the highest median age of 43, six years older than the County overall. With Boulder as the exception, all comparison geographies have a median age in either late thirties or early forties.

Exhibit 5: Median Age, Louisville and Comparison Geographies, 2021

Source: ACS 5-Year Data Tables, 2017-2021

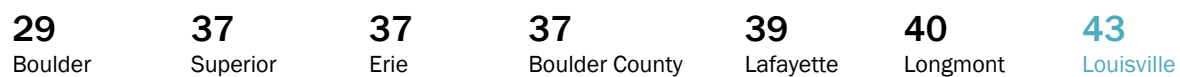


Exhibit 6 shows the change in median age from 2011 to 2021 for Louisville and comparison geographies. From 2011 to 2021, Louisville's median age increased by four years.

Exhibit 6: Change in Median Age, Louisville and Comparison Geographies, 2011-2021

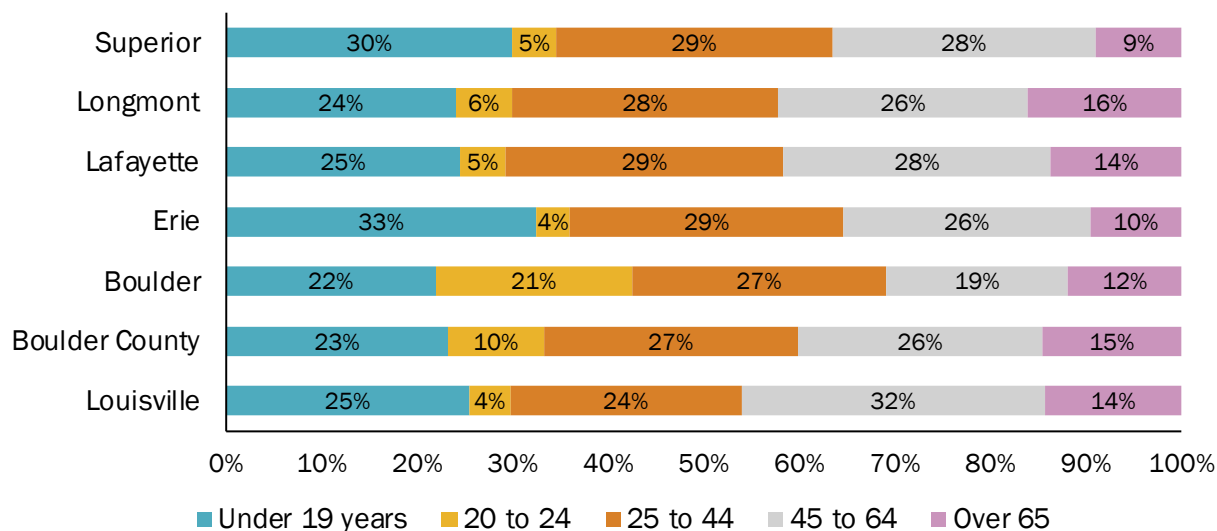
Source: ACS 5-Year Data Tables, 2007-2011, 2017-2021

	2011	2021	Change
Longmont	35	40	5 years
Louisville	39	43	4 years
Superior	33	37	4 years
Lafayette	37	39	2 years
Boulder County	36	37	1 year
Erie	36	37	1 year
Boulder	29	29	No change

Exhibit 7 shows the distribution of age groups. Louisville has the highest share of residents aged 45 to 64 years old (32% of the population), and the lowest share of residents aged 25 to 44 (24%) when looking at comparison geographies.

Exhibit 7: Age Distribution, Louisville and Comparison Geographies, 2021

Source: ACS 5-Year Data Tables, 2017-2021

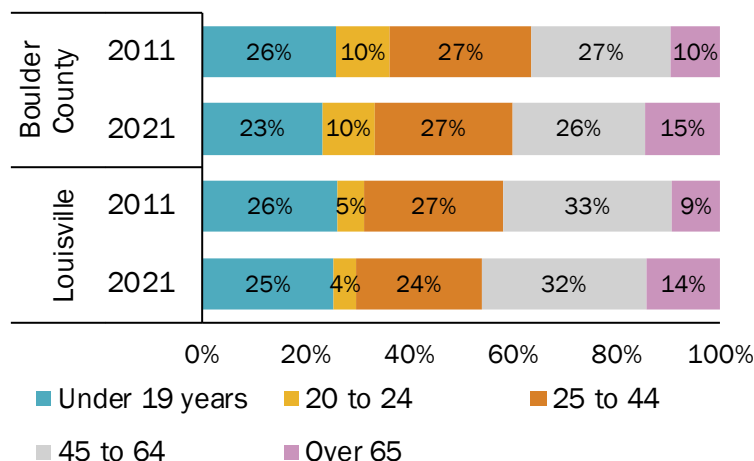


From 2011 to 2021, the share of all age groups under 65 years decreased in Louisville. Of these age groups, the share of residents aged 25 to 44 dropped the most, from 27% to 24% over the time period. Alternatively, the share of residents over the age of 65 increased by 5%.

Age distribution trends are similar for the County overall, with a slightly larger decrease in the number of children (3%) than in Louisville (1%).

Exhibit 8: Change in Age Distribution, Louisville and Boulder County, 2011-2021

Source: ACS 5-Year Data Tables, 2007-2011, 2017-2021



Louisville, like comparison geographies, still has numerous families or households with children residing in the city, as indicated by the number of residents under the age of 19. However, there seems to be a lower influx or retention of younger individuals in Louisville, which is evident in the decline of all age groups below 65. This trend can potentially be attributed to the increasing housing costs, making it more challenging for younger people to afford housing in Louisville. This pattern is also consistent in increasingly high-cost Western

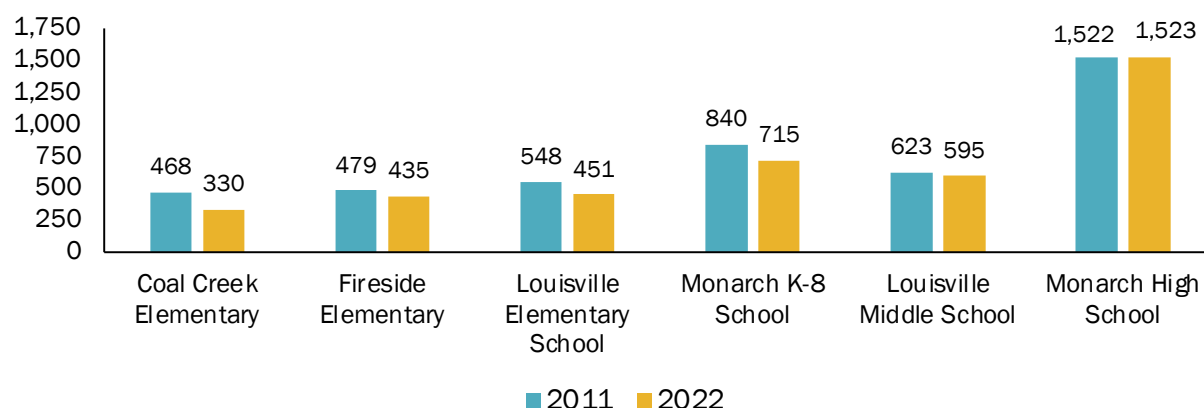
communities that have seen rapid regional population growth but have seen underproduction of housing at needed income levels.

School Enrollment

Exhibit 9 shows the number of students enrolled in Louisville schools for the 2011-2012 and 2022-2023 school years. Enrollment dropped for all schools except for Monarch High School, which also suggests that younger families with elementary aged children are less prevalent in the City. This trend may be attributed to several factors, including a decline in young families settling in Louisville, or a lower number of households choosing to have children.⁵ However, when looking across the demographic and affordability trends throughout the HNA, it's more than likely related to fewer younger families who are able to locate in Louisville and Boulder County overall.

Exhibit 9: School Enrollment for Louisville Schools, 2011-2022

Source: Colorado Department of Education



Household Characteristics

Household characteristics such as whether a household owns their home, average household size, and household living arrangement trends can highlight a city's changing housing needs. Key findings include:

- Homeownership rates have fallen across Boulder County, indicating limited new homeownership opportunities, particularly for young families.
- Household size has increased in Louisville, particularly for renter households. This relative increase in renter household size is likely a reflection of the increased cost of renting as a single person household, alongside increasing barriers to homeownership.

⁵ According to the [Colorado Fertility: Recent Trends and Expectations of Change \(DOLA, 2017\)](#) Colorado also has one of the strongest declines in fertility rates in the nation post-2007. A Colorado Department of Local Affairs (DOLA) report attributes the decline to a major investment into family planning services, high unemployment during the 2008 recession, and women delaying childbirth to pursue education.

- The number of family homeowner households decreased alongside an increase in family rental households. This could indicate that households who might have previously been able to purchase a home upon forming a larger household (e.g., getting married or having children) or getting older are no longer able to.

Tenure

Household tenure refers to whether a household rents or owns their home. In Louisville, the majority (68%) of households own their homes, a slightly higher rate than Boulder County overall (63% of households). Of comparison cities, Erie has the highest rate of homeownership (86%), and Boulder has the lowest (48%). While the majority of households own their homes in Louisville, there are still a large number of renter households in the City, with approximately 2,700 renter households and 5,700 homeowner households.

Exhibit 10: Housing Tenure, Louisville and Comparison Geographies, 2021

Source: ACS 5-Year Data Tables, 2017-2021

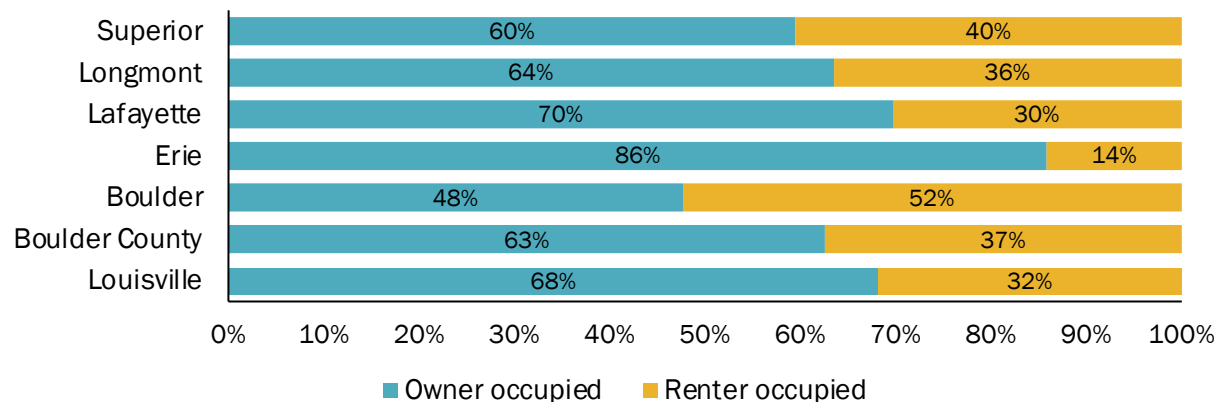


Exhibit 11 shows the change in household tenure from 2011 to 2021. Across all comparison geographies, homeownership rates only increased in Longmont. In Louisville, the homeownership rate dropped by 5% over the time period, the second highest decrease behind Superior (10%). In the County overall, the homeownership rate decreased by 1%.

Exhibit 11: Change in Household Tenure, Louisville and Comparison Geographies, 2011-2021

Source: ACS 5-Year Data Tables, 2007-2011, 2017-2021

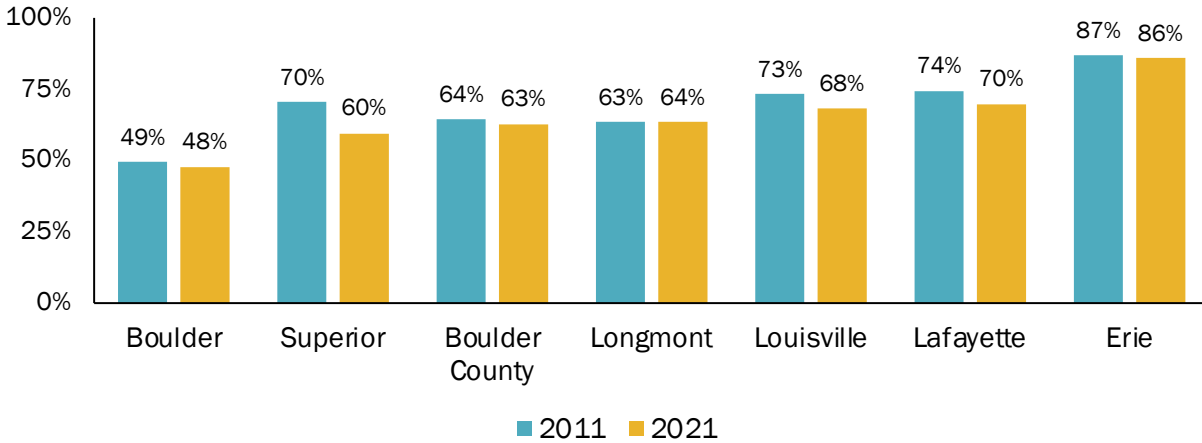
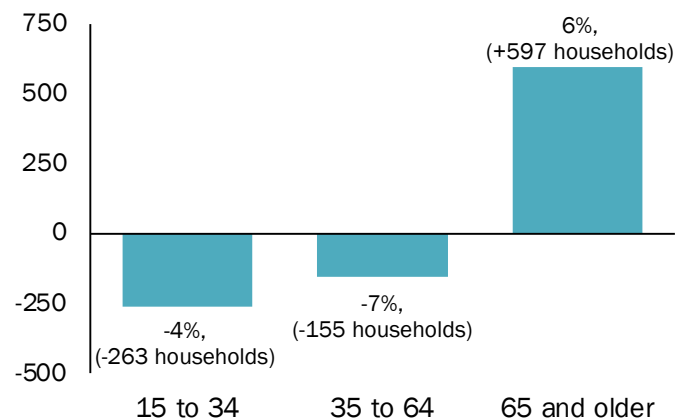


Exhibit 12 shows the change in homeownership rates by age group in Louisville. From 2011 to 2021, the share of households aged 15 to 34 that own a home decreased by 4%, the share of homeowners aged 35 to 64 decreased 7%, and the share of homeowners aged 65 and older increased 6%. This could indicate that those who purchased their homes many years ago are aging in place, and there are fewer new homeownership opportunities in the City.

Exhibit 12: Change in Homeownership Rate by Age, Louisville, 2011-2021

Source: ACS 5-Year Data Tables, 2007-2011, 2017-2021



Average Household Size

Household size is an important indicator for the types of housing needed in a region. Smaller households, such as those of younger or older adults, may prefer living in middle or multifamily housing given their small size and relative affordability, indicating a need for middle and multifamily housing, while larger households with children or extended families cohabitating may be more comfortable in larger single-family dwellings.

Exhibit 13 shows the average household size for Louisville and comparison geographies as of 2021. Louisville has an average household size of 2.5 members, a similar average household size as Longmont, and a slightly higher than that of the County.

Exhibit 13: Average Household Size, Boulder and Comparison Geographies, 2021

Source: ACS 5-Year Data Tables, 2017-2021

2.21 Boulder	2.41 Lafayette	2.41 Boulder County	2.50 Louisville	2.50 Longmont	2.85 Superior	2.97 Erie
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Exhibit 14 shows the change in average household size from 2011 to 2021. Over the time period, the average household size remained relatively stable in both Louisville and the County overall, but the average household size in Louisville did increase by 2.9%. Of comparison cities, Boulder City, Erie, and Superior experienced an increase in average household size, while Lafayette and Longmont experienced a decrease.

Exhibit 14: Change in Average Household Size, Louisville and Comparison Geographies, 2011-2021

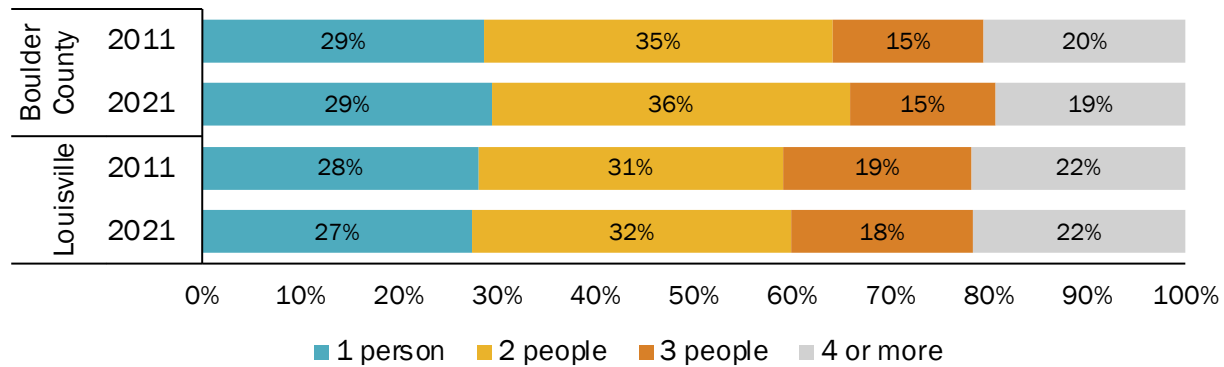
Source: ACS 5-Year Data Tables, 2007-2011, 2017-2021

	2011	2021	% Change
Superior	2.71	2.85	5.2%
Louisville	2.43	2.50	2.9%
Boulder	2.17	2.21	1.8%
Boulder County	2.39	2.41	0.8%
Erie	2.95	2.97	0.7%
Longmont	2.59	2.50	-3.5%
Lafayette	2.50	2.41	-3.6%

Exhibit 15 shows the change in household size distribution from 2011 to 2021 for Louisville and Boulder County. In both jurisdictions, the distribution is fairly evenly distributed and remained relatively stable over the time period. In both areas, the most common household size is two-member households (32% of Louisville households), followed by one-member households (27% of Louisville households).

Exhibit 15: Change in Household Size Distribution, Louisville and Boulder County, 2011-2021

Source: ACS 5-Year Data Tables, 2007-2011, 2017-2021



Household Size by Tenure

In Louisville, ownership households tend to be larger than renter households; the average ownership household size is 2.75 members, and the average renter household size is 1.95 members. From 2011 to 2021, the average renter household size increased by 0.24 members, whereas ownership households increased by only 0.07 members. Overall, the average household size increased by 2.9%.

Exhibit 16: Change in Household Size by Tenure, Louisville, 2011-2021

Source: ACS 5-Year Data Tables, 2017-2021

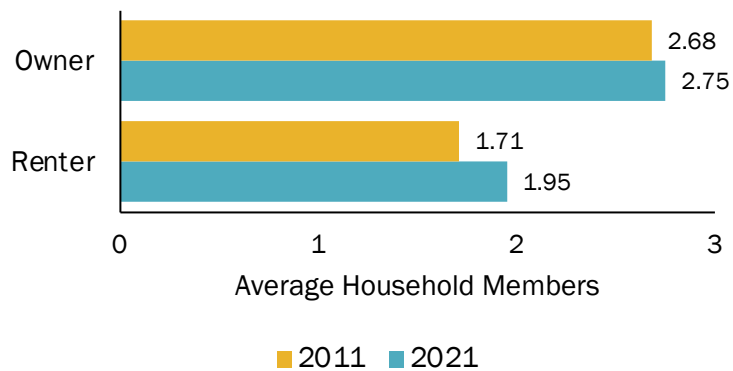
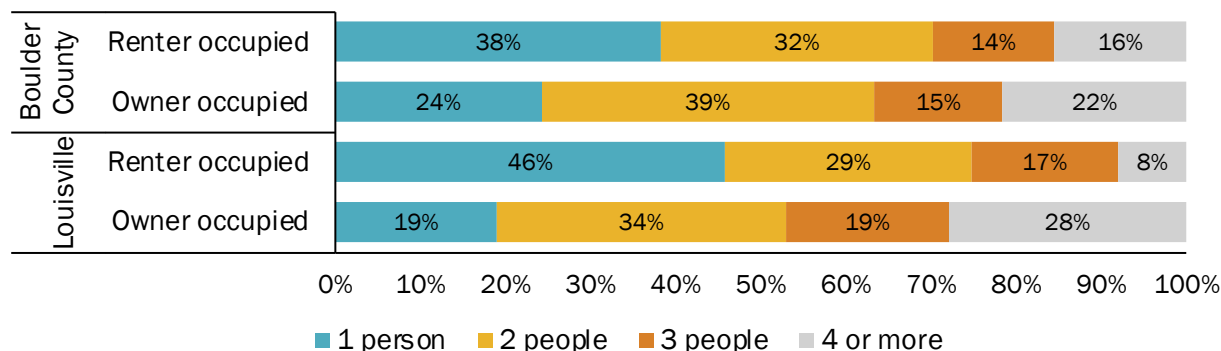


Exhibit 17 shows the distribution of household sizes by household tenure. Among renter households in Louisville, 46% of tenants live alone, and 29% are households with two members. Owner occupied housing is more evenly distributed, and 48% of households have at least three members.

Exhibit 17: Household Size by Tenure, Louisville and Boulder County, 2021

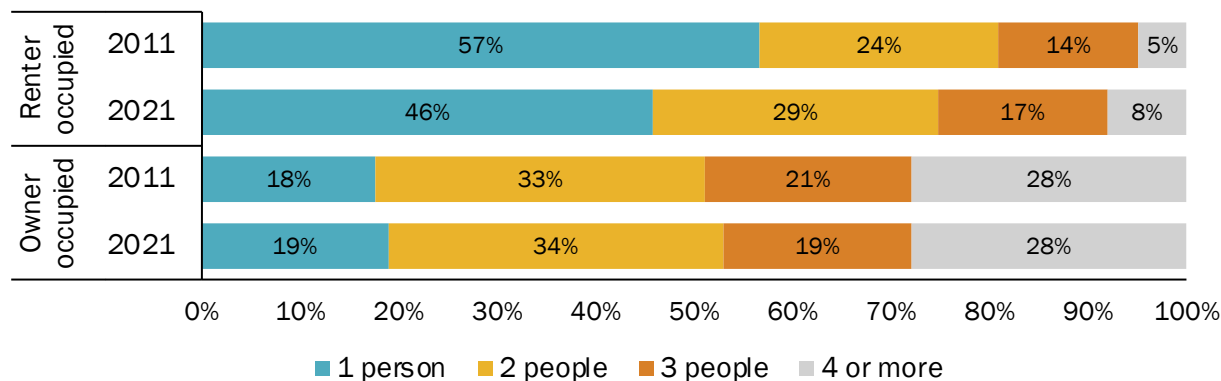
Source: ACS 5-Year Data Tables, 2017-2021



From 2011 to 2021, the share of renters in one-person households in Louisville decreased by 11%, whereas the share of renters in two-person households increased by 5% and the share of renters in three- and four-member-or-larger households increased by 3% each. In contrast, the distribution of household sizes among owner occupied households remained relatively stable over the time period. This relative increase in renter household size is likely because of the increased cost of renting as a single person household alongside increasing barriers to homeownership for newly formed households.

Exhibit 18: Change in Household Size by Tenure, Louisville, 2011-2021

Source: ACS 5-Year Data Tables, 2007-2011, 2017-2021



Living Arrangement

Exhibit 19 shows the distribution of living arrangements for households in Louisville and comparison geographies. The largest share of households are couples living without children (33% of households), likely empty nesters given the increase in the City's median age in recent years. Roughly 32% of households have children living with either one or two parents (25% of households are couples with children, and 7% are single parent households), a slightly higher share of households than the County overall. However, given declining school enrollment rates, it is likely that households with children have older teenage children, rather than elementary or middle school age.

Compared to other Boulder County cities, when looking at the distribution of living arrangements, Louisville is more similar to Longmont and Lafayette. Superior and Erie both have a higher share of couples with children, and a lower share of single-person households. Boulder City has a much higher share of householders living with roommates and householders living alone, likely due to students attending University of Colorado Boulder.

Exhibit 19: Living Arrangement, Louisville and Comparison Geographies, 2021

Source:

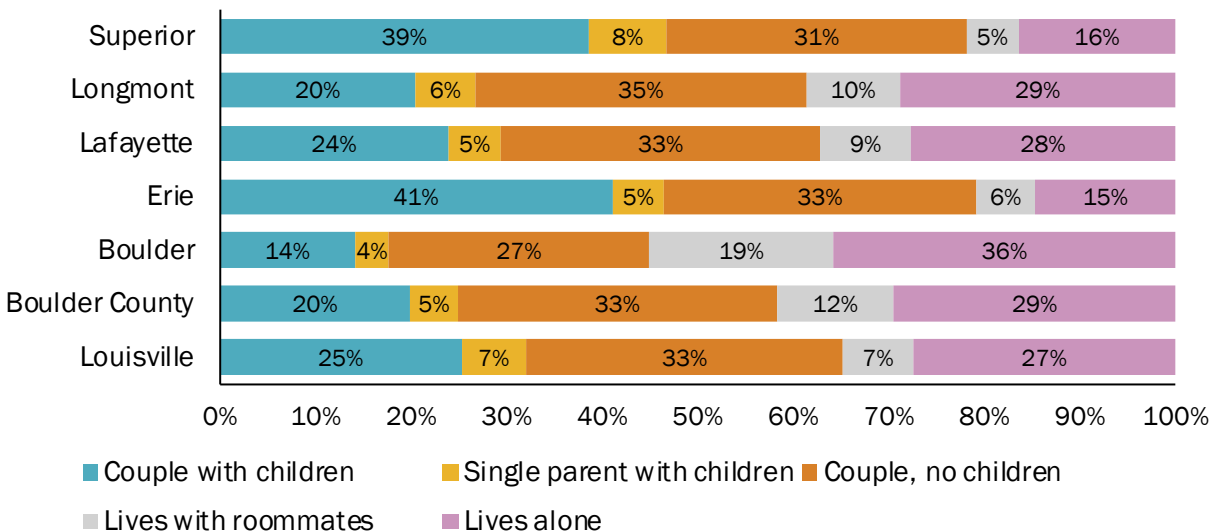
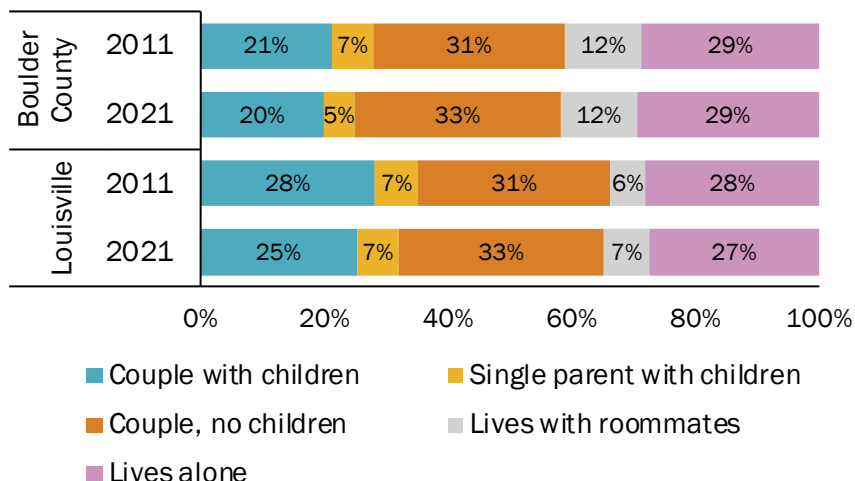


Exhibit 20 shows the change in the distribution of living arrangements from 2011 to 2021. In Louisville, the number of couple households with children decreased by 3%, while the number of couple households without children increased by 2%. Boulder County experienced a similar change over the time period.

Exhibit 20: Change in Living Arrangement Distribution, Louisville and Boulder County, 2011-2021

Source: ACS 5-Year Data Tables, 2007-2011, 2017-2021



Living Arrangement by Tenure and Age

Exhibit 21 shows the share of households by living arrangement and tenure for 2011 and 2021. Of ownership households, the largest change was a 6.4% decrease in the share of family homeowner households. This likely corresponds with the 5.9% increase in family renter households and could indicate homeownership attainability concerns for renters who may otherwise have been interested in purchasing a home prior to starting a family. Additionally, there was a small (1.4%) increase in homeowners living with roommates, which could indicate that young homeowners need additional income to support their mortgage payments. This could also indicate that adult children are either staying with or moving back in with their parents.

Exhibit 21: Living Arrangement by Tenure (Share of Total Households), Louisville, 2011-2021

Source: ACS 5-Year Data Tables, 2007-2011, 2017-2021

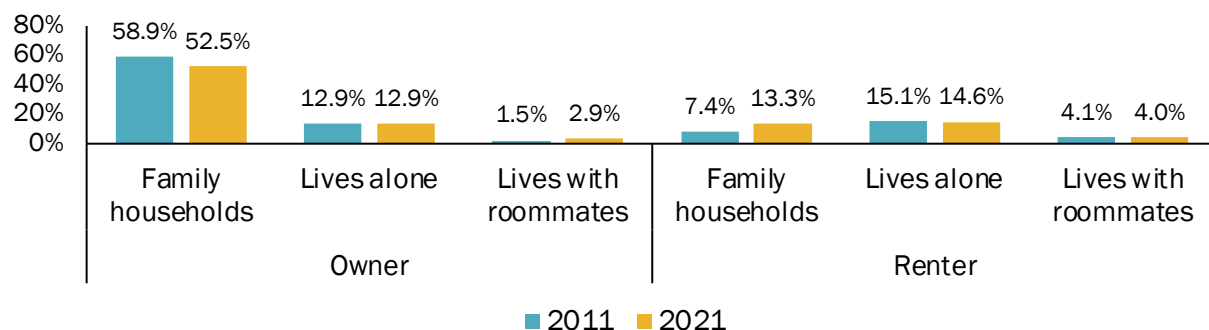
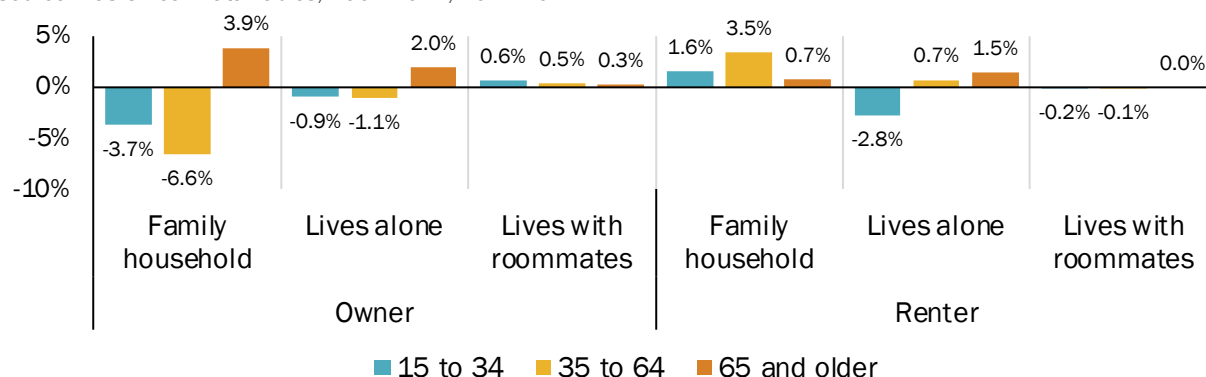


Exhibit 22 shows the change in the *share* of each group from 2011 to 2021 for the entire Louisville population. For example, the share of family households with a householder aged 15 to 34 years decreased from 6.5% of the population in 2011 to 2.8% of the population in 2021, a decrease of 3.7%. While there was a 3.9% increase in the share of homeowner families over 65, this is offset by a 3.7% decrease in homeowner families under 35, and a 6.6% decrease in homeowner families aged 35 to 64 (the total change in the share of homeowner families was a 6.4% decrease over the time period). Households aged 35 to 64 also made up most of the increase in family renter households, representing 3.5% of the overall 5.9% increase. Additionally, while the *overall* share of households living alone remained relatively constant, the share of both renter and homeowners aged 15 to 34 living alone decreased, as did the share of homeowners aged 35 to 64.

The increase in family households that rent could indicate a lack of opportunity for homeownership for young families. Additionally, the decline in young individuals living alone and the rise in two-person households within the City may suggest that younger people are struggling to afford to live on their own. This could mean many opting to live together or moving back in with their parents.

Exhibit 22: Change in Share of Living Arrangement by Tenure by Age of Householder (as a share of overall population), Louisville, 2011-2021

Source: ACS 5-Year Data Tables, 2007-2011, 2017-2021



Income Distribution

Income is an important determinant of housing choice, influencing both the type of housing a household chooses (e.g., single-family detached, duplex, or a larger multifamily property) and household tenure (e.g., rent or own). Key findings include:

- Louisville is one of the highest earning cities in the county and has experienced a 50% increase in median household incomes since 2011.
- The number of high earning households in Louisville has increased significantly since 2011. Louisville experienced a 17% increase in the share of households earning greater than \$200,000 annually. The influx of high earning households could be due to the immigration of wealthier households, or due to wage increases for Louisville residents. High homeowner incomes can contribute to rising home sale prices in a city, contributing to an increasingly competitive housing market.
- The median income for homeowner households in Louisville is roughly twice the median income for renter households.
- The reduction in households earning less than \$75,000 annually could be caused by lower income households moving out of Louisville as housing and other living costs increase.

Median Household Income

As shown in Exhibit 23, the median household income for Louisville is just over \$125,000 annually.⁶ Louisville's median income is lower than Erie and Superior, but higher than Boulder, Lafayette, and Longmont. Of comparison cities, Erie has the highest median income, and

⁶ The census defines income as, "income received on a regular basis (exclusive of certain money receipts such as capital gains) before payments for personal income taxes, social security, union dues, Medicare deductions, etc. Therefore, money income does not reflect the fact that some families receive part of their income in the form of noncash benefits, such as food stamps, health benefits, subsidized housing."

Boulder has the lowest. Louisville's median income is around \$33,000 higher than that of Boulder County overall.

Exhibit 23: Household Median Income, Louisville and Comparison Geographies, 2021

Source: ACS 5-Year Data Tables, 2017-2021

\$74,902	\$83,104	\$92,466	\$95,033	\$125,124	\$131,757	\$140,409
Boulder	Longmont	Boulder County	Lafayette	Louisville	Superior	Erie

Exhibit 24 shows the change in median household income from 2011 to 2021. While all cities saw substantial increases in median income, Louisville saw the greatest increase with a 50% increase in median income, while Boulder County overall saw an increase of 39%.

Exhibit 24: Change in Median Household Income, Louisville and Comparison Geographies, 2011-2021

Source: ACS 5-Year Data Tables, 2007-2011, 2017-2021

	2011	2021	% Change
Louisville	\$ 83,682	\$ 125,124	50%
Longmont	\$ 56,278	\$ 83,104	48%
Boulder County	\$ 66,479	\$ 92,466	39%
Boulder	\$ 54,051	\$ 74,902	39%
Lafayette	\$ 69,840	\$ 95,033	36%
Erie	\$ 103,698	\$ 140,409	35%
Superior	\$ 100,194	\$ 131,757	32%

Household Income Distribution

Exhibit 25 shows the distribution of household incomes in Louisville and Boulder County. Compared to the County, Louisville has a greater share of households in income categories greater than \$100,000 annually. In both jurisdictions, the largest share of households earns at least \$200,000 annually (26% of Louisville households and 17% in the County). However, while Louisville has a relatively high share of high earning households, 30% of Louisville households earn less than \$75,000 annually.

Exhibit 25: Median Household Income Distribution, Louisville and Boulder County, 2021

Source: ACS 5-Year Data Tables, 2017-2021

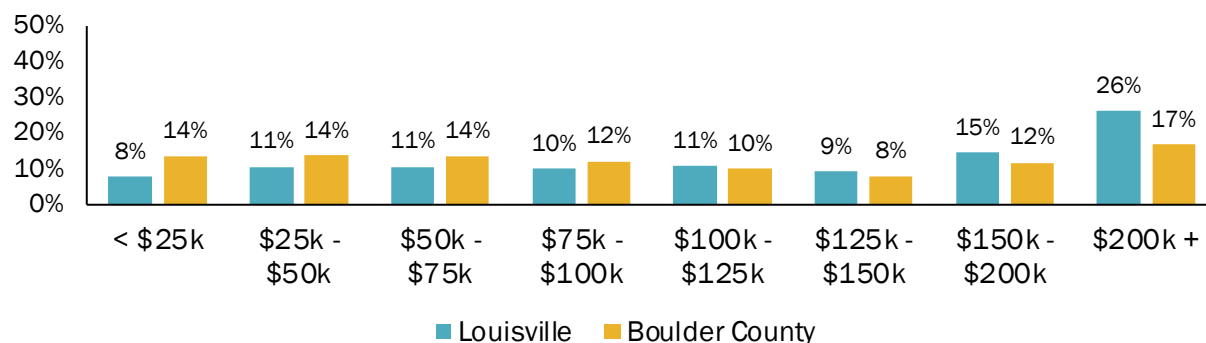
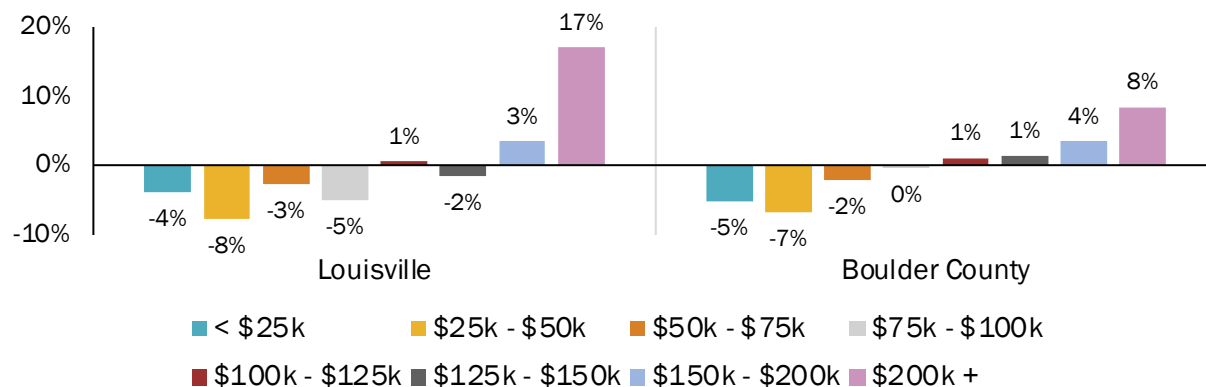


Exhibit 26 shows the change in the *share* of households in each income bracket from 2011 to 2021. For example, the share of Louisville households earning less than \$25,000 annually decreased by 4% between 2011 and 2021. Notably, Louisville experienced a substantial increase in the share of households earning greater than \$200,000 annually (a 17% increase). This income group also increased the most at the county level, with an 8% increase. At the same time, the number of households earning less than \$100,000 decreased by about 20% in Louisville.

Exhibit 26: Change in Median Household Income Distribution, Louisville and Boulder County, 2011-2021

Source: ACS 5-Year Data Tables, 2007-2011, 2017-2021

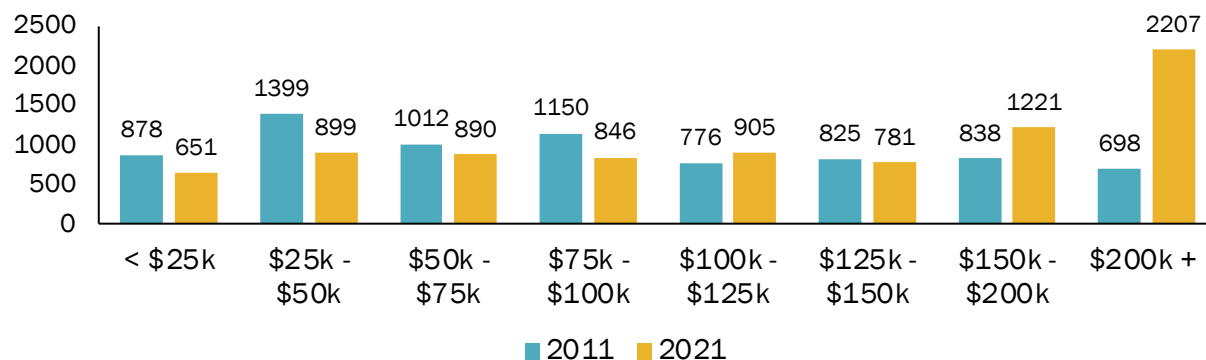


The influx of high earning households is most likely due to the in-migration of wealthier households. Exhibit 27 shows the nominal change in the number of households in each income category in Louisville from 2011 to 2021. As is also reflected in Exhibit 26 above, the number of households in all income groups under \$150,000 largely declined over the 10-year period, while the number of households earning more than \$200,000 annually increased by 1,509 households (or from 9% of households to 26%). There are a few possible explanations for this increase: first, wage increases, especially in response to an increased cost of living, increase in housing costs, and inflation, could have increased incomes for existing Louisville households. Second, it is possible that if adult children are moving back in with their parents, their incomes are contributing to higher household incomes. However, given the sharp increase in the number of very high-earning households, it is most likely that the main driver of this increase is wealthier households moving into Louisville. On the flipside, the reduction in households earning less than \$100,000 annually could be caused by lower income households moving out of Louisville

as housing and other living costs, such as transportation, increase. Louisville also experienced a decrease in cost-burdening (discussed in more detail in more detail below), among owner and renter households, which should not be looked at as an increase in affordability given the degree at which housing costs in Louisville have increased. Rather, the decrease in cost-burdening again points to more lower-income households leaving the area and being replaced by more financially stable and higher-earning households.

Exhibit 27: Change in Median Household Income Distribution, Louisville, 2021

Source: ACS 5-Year Data Tables, 2017-2021

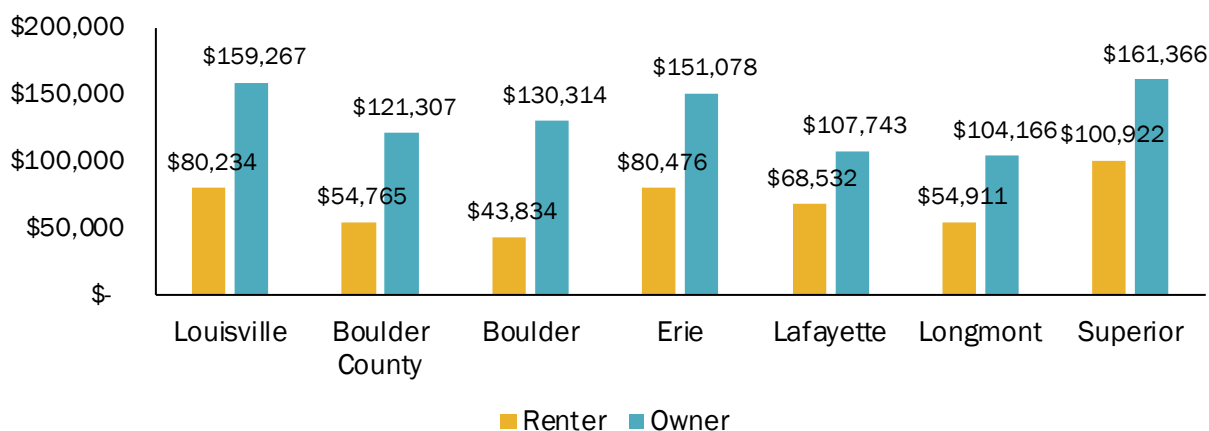


Household Income by Tenure

Across Boulder County, renter household incomes are significantly lower than ownership household incomes. In Louisville, the median homeowner income is roughly \$159,000 annually, nearly twice the renter median income of about \$80,000. With the exception of Boulder (which is likely impacted by the high share of university students), Louisville has the largest income gap between renter households and ownership households.

Exhibit 28: Median Household Incomes by Tenure, Louisville and Comparison Geographies, 2021

Source: ACS 5-Year Data Tables, 2017-2021



High homeowner incomes can contribute to rising home sale prices in a city, further increasing the homeownership attainability gap for renters who might be interested in purchasing a home but do not have the funds to do so. In addition, high homeowner incomes can contribute to an

increasingly competitive housing market. Even if renter households have the ability to qualify for a mortgage, they may risk being outbid by wealthier homebuyers who can pay in cash or offer over the asking price. In addition to renters experiencing more instability in where live, homeownership is an important pathway to wealth accumulation and financial stability in the United States. Homeowners may benefit from property appreciation, mortgage interest deductions, and the ability to build equity, while renters miss out on these advantages.

Household Wages

Exhibit 29 shows the aggregate sources of *all income* in Louisville and comparison geographies from 2012 to 2021. Sources in income have shifted in Louisville as the share of older adults has increased, reflected in the increase in retirement and social security income in the City. In addition, the share of income from interest, dividends and rent increased, likely a reflection of the increase in older or higher income households that are more likely to earn income through investments. Because the share of these forms of income increased relative to income earned through wages, these findings corroborate other data suggesting a decrease in younger wage earners in the City. These income trends are also true for Lafayette and Boulder; in Denver, the share of wages increased relative to other forms of income.

Exhibit 29: Sources of Household Income

Source: ACS 5-year, 2011, 2021



Employment and Commuting

Understanding employment trends and commuting patterns can provide insights on the housing needs of workers today and into the future. Employment plays an important role in where people live, and it can influence where people move. If the data shows that many people are commuting into the city for work, it could indicate that the city does not have enough

housing to accommodate its workforce or enough housing that meets their needs and affordability levels. Key findings include:

- Louisville could expect a 20% increase, or 3,963 jobs, over the next 10 years, assuming the city maintains its current share of the total jobs in the Boulder Metropolitan Statistical Areas (MSAs).
- The manufacturing industry in Louisville increased by 8.4% between 2010-2020, while jobs in the information, administration, and finance industries (or more formal office-oriented jobs) declined, along with food service and retail.
- Approximately 64% of Louisville workers live outside of the city but commute into Louisville for work, while 32% of workers live in Louisville but commute to another location for work. Only 4% of workers both live and work in Louisville.
- Of comparison geographies, Louisville had the smallest share of workers who both live and work in the city.
- The number of workers commuting *into* Louisville has increased by 58% over the past decade, which could indicate challenges for employees who work in Louisville to also live in Louisville.
- Of comparison geographies, workers commuting to Louisville for work the second longest commute (Boulder had the longest commute), with just over 15 miles.
- Affordability and/or available housing options in Louisville is likely a contributing factor to the increase in the number of workers commuting *into* the city, but not residing there, and in the longer commute times *to* Louisville compared to other geographies. Louisville workers commuting into the city may be struggling to find affordable or suitable options in the region in general, so they're forced to live further out where housing might be more affordable.
- In general, long commutes can contribute to increased traffic congestion, leading to heightened fuel consumption and elevated greenhouse gas emissions. Additionally, longer commutes can also put additional financial pressure on households, as transportation is often the second highest household cost, behind housing.

Employment Projections

The Colorado Department of Labor and Employment collects and publishes statewide occupation and wage data and for ten substate regions: seven Metropolitan Statistical Areas (MSAs) and three Balance of State (BOS) Areas. Louisville is included in the Boulder MSA.

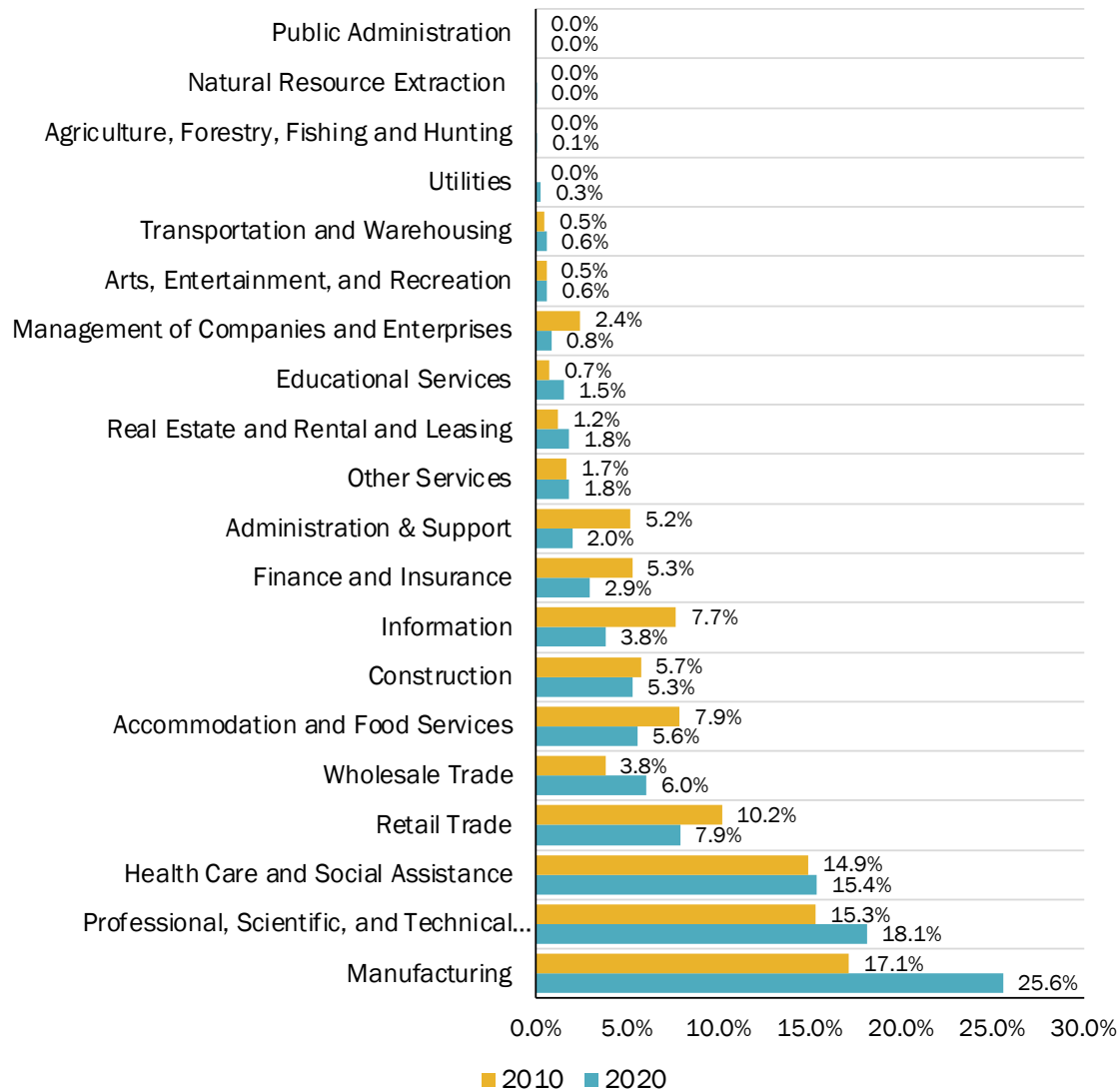
As of 2022, there were a total of 191,840 in the Boulder MSA. Louisville's share of employment within the Boulder MSA is about 9.9% or about 18,992 jobs. The labor department's most recent employment projection is through 2031, which assumes about 231,866 total jobs within the Boulder MSA, which represents an almost 21% increase over 10 years. Assuming Louisville maintains about 9.9% of total jobs in the MSA, the city is expected to have a total of about 22,955 jobs by 2031. This represents an increase of around 3,963 jobs, or a 20% increase.

Employment by Industry

Exhibit 30 shows the share of Louisville employees by industry from 2010 to 2020. Over the period, the share of employees in the Manufacturing industry increased by 8.4%, the largest change in any industry. The share of employees in the Professional, Scientific, and Technical Services industry and the Wholesale Trade industry also increased (2.8% and 2.3%, respectively). On the other hand, the share of employees decreased in the Information industry (-3.9%), Administration and Support (-3.2%), Finance and Insurance (-2.3%), Accommodation and Food Services (-2.3%), and Retail Trade industries (-2.3%). Manufacturing and wholesale trade industries often command larger amounts of land that results in low employment densities, relative to other more office or commercial uses. This will be an important factor to consider as Louisville envisions how it wants to grow during the comprehensive planning process.

Exhibit 30: Employment by Industry, Louisville, 2010-2020

Source: NAICS 2-digit employment; LODES; ECONorthwest

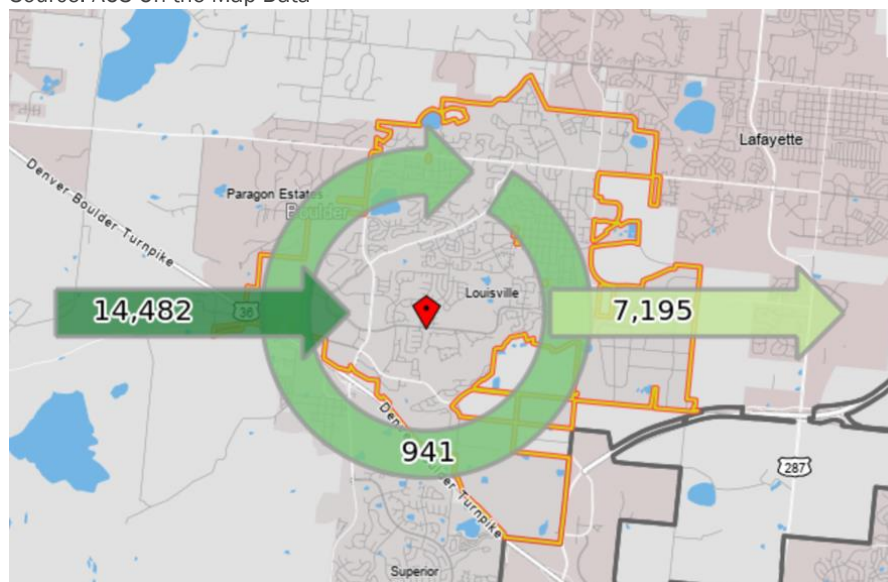


Commuting Patterns

According to ACS On the Map data, just under 14,500 workers live outside but commute into Louisville (64% of Louisville workers⁷). Just under 7,200, or 32% of workers, live in Louisville but commute to another location for work. Finally, 941 workers, or 4%, both live and work in Louisville.

Exhibit 31: Commuting Flows, Louisville, 2020

Source: ACS On the Map Data

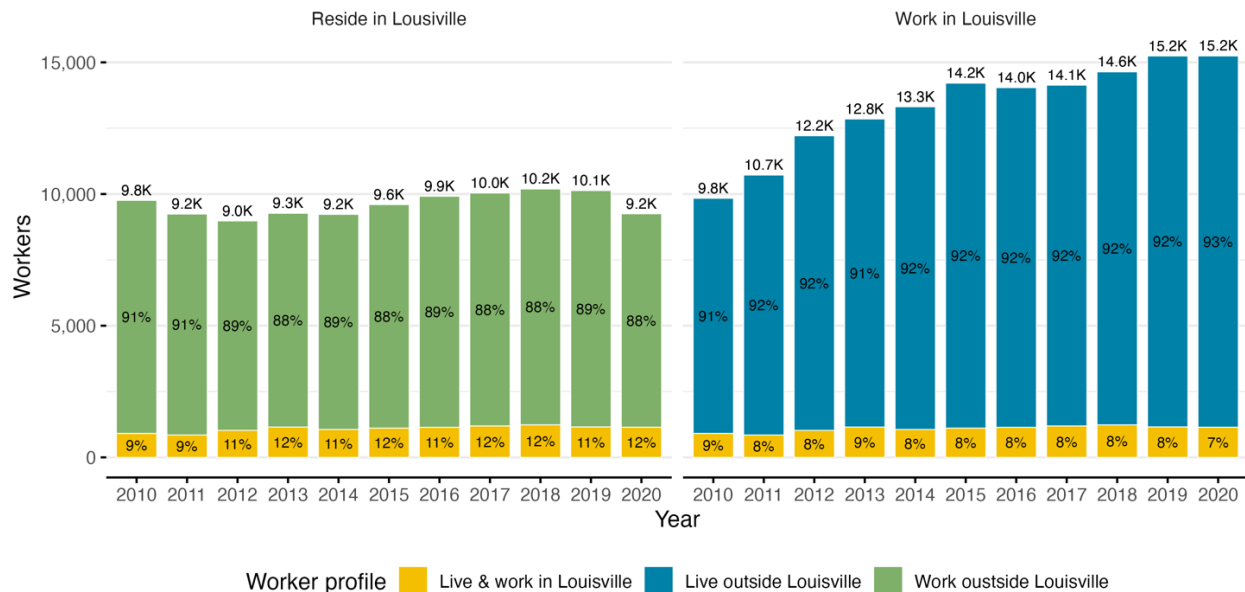


ECONorthwest also conducted additional research into commute flows over time for Louisville. According to ECONorthwest data, in 2020 approximately 8,100 workers live in Louisville but commute out, approximately 14,100 workers commute into Louisville, and roughly 1,100 workers both live and work in Louisville. Over time, the number of workers commuting out of Louisville has remained relatively stable, with a small drop of roughly 900 workers from 2019 to 2020 (around a 9% decrease). However, the number of workers commuting into Louisville has increased more substantially over the past decade, with an increase of roughly 5,200 commuters, or 58%, since 2010. Over the time period, the number of workers both living and working in Louisville increased by around 200 workers, or 25%.

⁷ Louisville workers” as referenced in this report refers to workers who commute into Louisville for work but live elsewhere, those that live in Louisville but work elsewhere, and those who both live and work in Louisville.

Exhibit 32: Trends in Commuting Flows, Louisville, 2010-2020

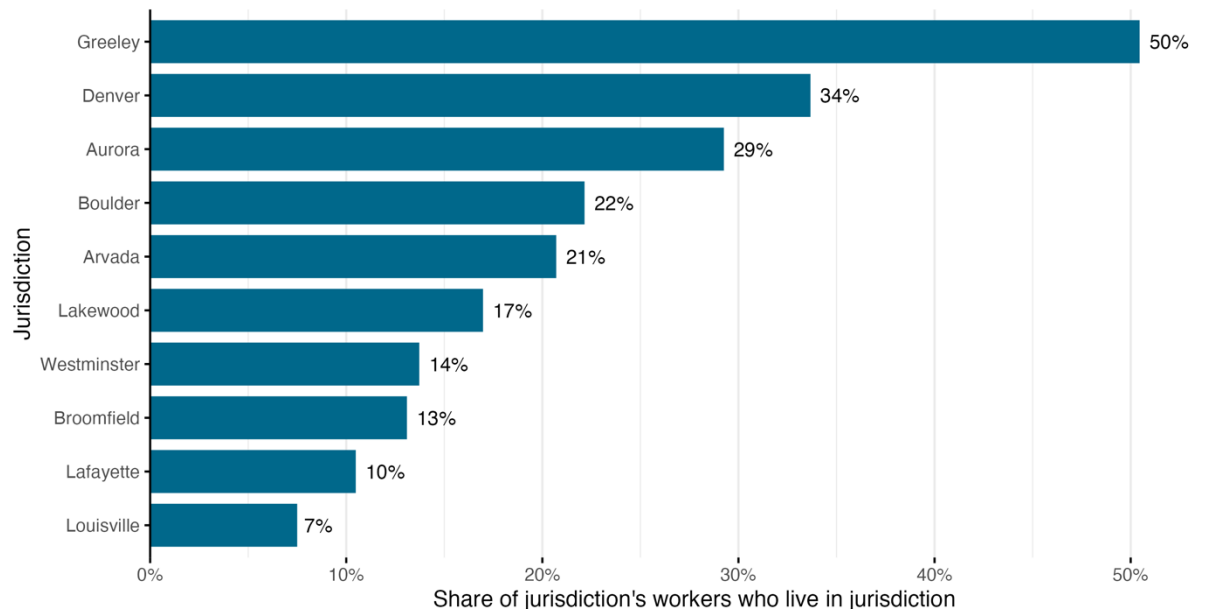
Source: LODS, 2010-2020



ECONorthwest also compared the share of workers who both live and work in a jurisdiction across Louisville and several other cities. Of comparison cities, Louisville had the smallest share of workers who both live and work in the City (7% of workers).

Exhibit 33: Share of Workers also Living in Jurisdiction, Louisville and Comparison Geographies, 2020

Source: LODS, 2010-2020

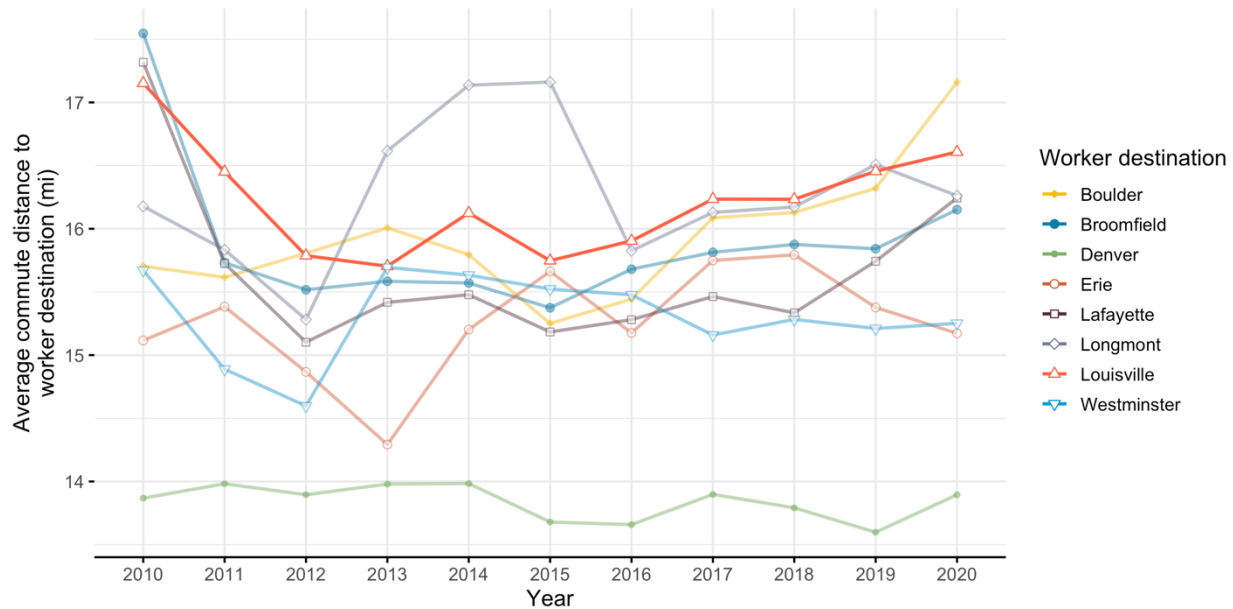


ECONorthwest also analyzed where workers are commuting to and from to get a sense of commute distances. For workers commuting into Louisville, the average commute distance was

just over 16.5 miles in 2020. Of analyzed cities, this is the second longest commute distance behind Boulder (just over 17 miles).⁸

Exhibit 34: Commute Distances, Workers Commuting to Louisville, Boulder, Denver, and Lafayette, 2010-2020

Source: LODS, 2010-2020



The presence of long commutes can indicate a lack of affordability within a city. When workers are unable to find affordable housing options near their workplace, they are forced to search for attainable housing farther away. This drives up the distance they need to travel daily, leading to longer commutes.

Long commutes can contribute to increased traffic congestion, leading to heightened fuel consumption and elevated greenhouse gas emissions. The constant flow of vehicles on congested roads can result in higher pollution levels and a greater carbon footprint. By reducing commute distances and providing attainable housing options near city centers, cities can effectively limit the need for extensive commuting, thus mitigating traffic congestion, reducing fuel consumption, and minimizing greenhouse gas emissions.

⁸ Commute distances shown are one-way. Commute *times* (time spent driving) can be difficult to accurately estimate because estimates are often based on local speed limits, which do not adequately capture variables like traffic congestion. Additionally, traffic congestion varies greatly by many variables as well like the time of year or time of day among other factors can greatly affect travel times and are difficult to pinpoint.

3. Housing Characteristics

This section provides an overview of housing trends in Louisville relative to Boulder County and other comparison geographies to better understand local market conditions and their implications. This section includes:

- An overview of existing housing stock, including total housing units, housing unit mix, vacancy rates, and affordable housing development.
- Residential development trends from City permit data.
- Housing market trends, including home sale and rental prices.
- Housing affordability trends, including financial attainability and cost burdening rates for renters and homeowners.

Existing Housing Stock

Key findings include:

- With the exception of Boulder, the majority of housing in Louisville and comparison geographies is single-family detached housing. However, the housing stock has become more diverse since 2011 with an increased in multifamily housing units.
- The majority of Louisville homeowners live in single-family detached units, while the majority of renters live in multifamily housing.
- From 2011 to 2021, the share of units labeled vacant due to being “for rent” increased by 58%, which could indicate that available rental stock is not attainable or appropriately sized for renter households in the area. The share of vacant units labeled as being vacant “for sale” dropped from 15% to zero, likely a reflection of a constrained housing market as median homeowner incomes increased over the time period.

Total Housing Units

As of 2021, Louisville had 8,665 housing units, representing just over 6% of total housing units in the County. Of comparison cities, Boulder has the highest number of housing units, representing roughly 33% of housing units in the County.

Exhibit 35: Total Housing Units, Louisville and Comparison Geographies, 2021

Source: ACS 5-Year Data Tables, 2017-2021

4,790	8,665	10,085	12,944	40,908	45,304	139,302
Superior	Louisville	Erie	Lafayette	Longmont	Boulder	Boulder County

Housing Unit Mix

As shown in Exhibit 36, the majority of housing in Louisville (67%) is detached single-family, the second highest share among comparison geographies, behind Erie (89%). Just above 20% of Louisville housing units are in a multifamily building with five or more units. Of comparison geographies, Erie has the lowest share of multifamily housing (1%) and Boulder has the highest (43%), likely due to the high concentration of students. Of remaining Louisville housing units, 9% are considered “plex housing”, referring to single family attached units up to fourplexes, and the remainder (2%) of housing units are mobile homes, manufactured housing, or “other” types of units. Of comparison geographies, Lafayette has the highest share of both plex housing units (22%), and of “mobile home or other” housing units (5%).

Exhibit 36: Housing Mix, Louisville and Comparison Geographies, 2021

Source: ACS 5-Year Data Tables, 2017-2021

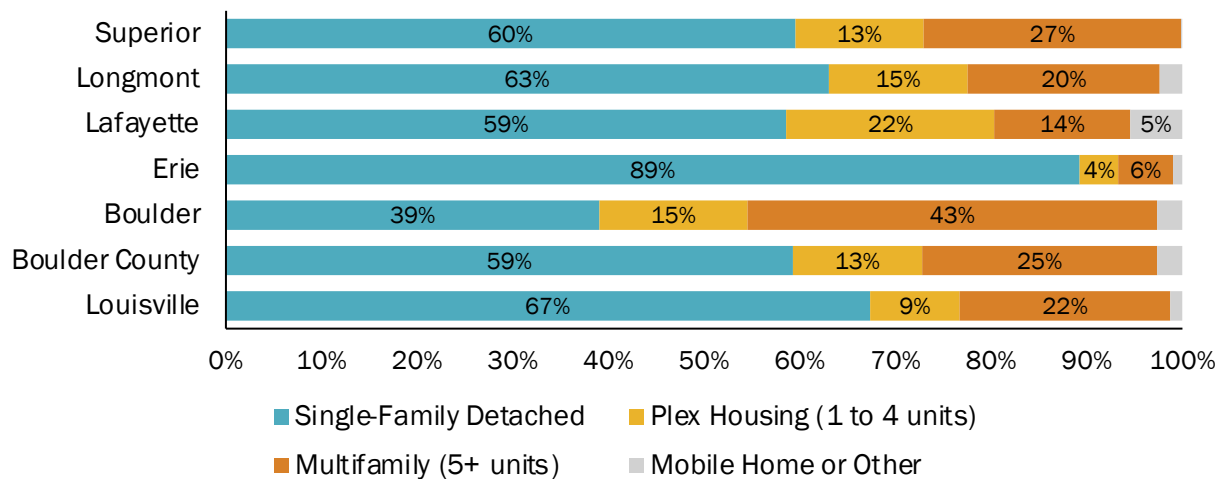


Exhibit 37 shows the change in housing mix distribution for the housing stock in Louisville and Boulder County. Between 2011 and 2021, both jurisdictions saw increases in the share of multifamily housing (from 18% to 22% in Louisville, and 22% to 25% in Boulder County), corresponding with a similar decrease in the share of single-detached units.

Exhibit 37: Change in Housing Mix, Louisville and Boulder County, 2011-2021

Source: ACS 5-Year Data Tables, 2007-2011, 2017-2021

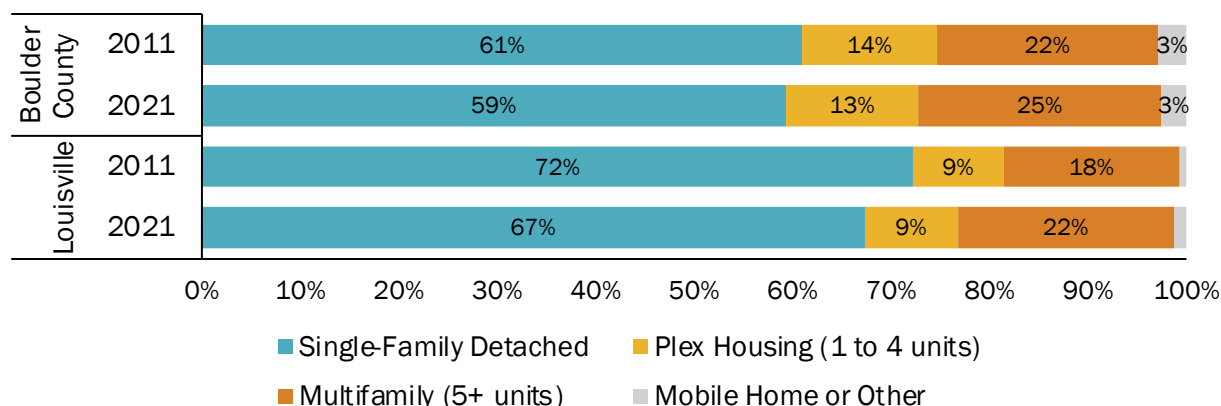


Exhibit 38 shows the nominal change in the number of each type of housing unit in Louisville over the time period. Multifamily housing added the greatest number of units, adding an additional 509 units, an increase of 37%.

Exhibit 38: Change in Housing Mix, Louisville, 2011-2021

Source: ACS 5-Year Data Tables, 2007-2011, 2017-2021

	2011	2021	# Change	% Change
Single-Family Detached	5,614	5,833	219	4%
Plex Housing (1 to 4 units)	712	820	108	15%
Multifamily (5+ units)	1,394	1,903	509	37%
Mobile Home or Other	53	109	56	106%

Housing Tenure by Unit Type

Exhibit 39 provides a breakdown of housing tenure based on housing type in both Louisville and the County. Overall, the distribution of housing types in Louisville is similar to that of the County, with a smaller proportion of renters and homeowners living in plex housing. In Louisville, most homeowners (88%) reside in single-family detached housing, while the majority of renters (57%) live in multifamily housing. Around 28% of renters in Louisville live in single-family units, which could indicate that renters who might otherwise purchase a single-family home (such as family renters) are unable to afford to do so. Additionally, only 7% of homeowners in Louisville live in plex housing, suggesting an opportunity to expand these types of housing to provide more affordable homeownership options in the city.

Exhibit 39: Housing Tenure by Housing Type, Louisville and Boulder County, 2021

Source: ACS 5-Year Data Tables, 2017-2021

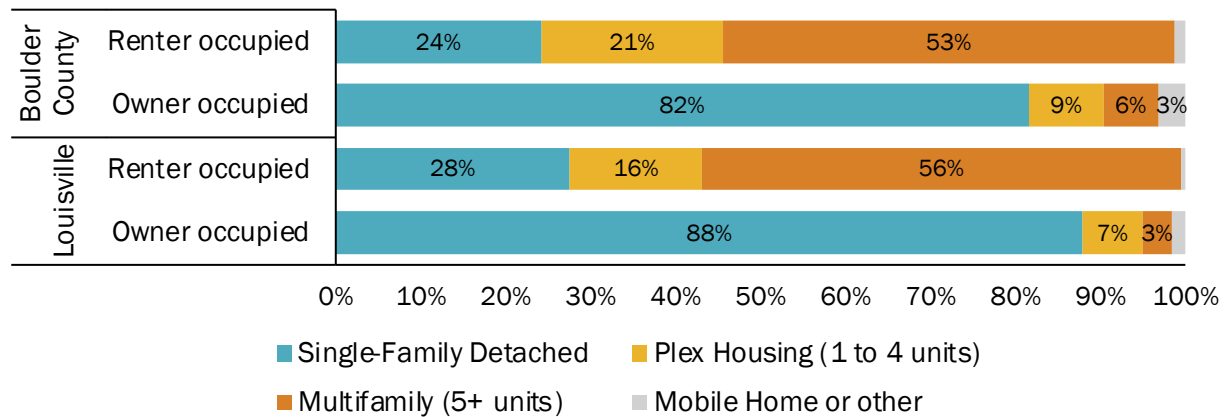
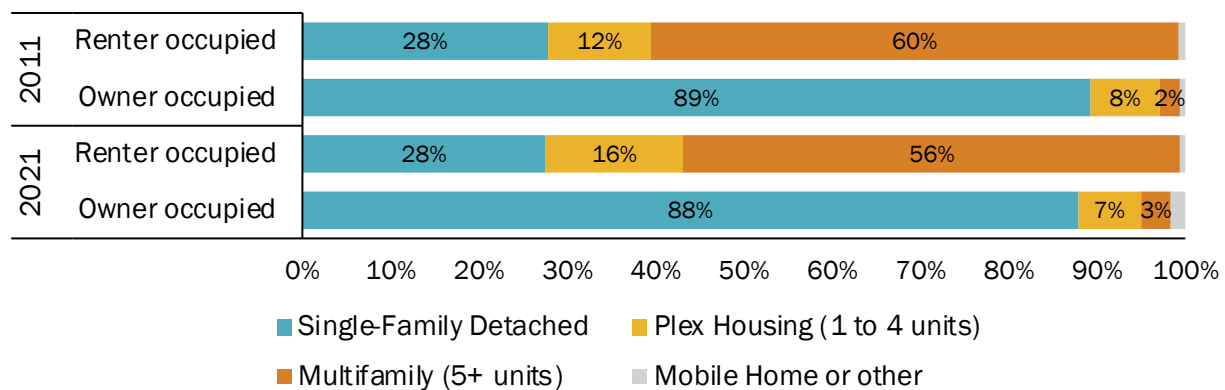


Exhibit 40 shows the change in household tenure by unit type for Louisville from 2011 to 2021. Tenure remained relatively consistent, with a slight increase (4%) in renters living in plex housing, matched by a similar decrease in renters living in multifamily housing.

Exhibit 40: Change in Household Tenure by Unit Type, Louisville, 2011-2021

Source: ACS 5-Year Data Tables, 2007-2011, 2017-2021

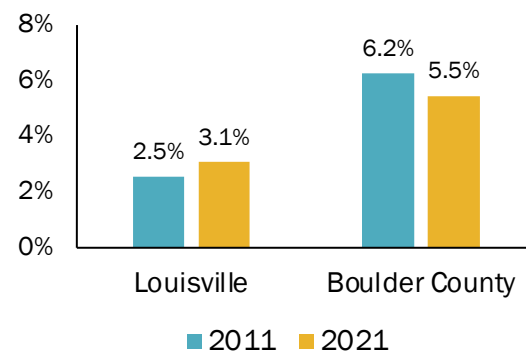


Vacancy Rates

The Census defines vacancy as "unoccupied housing units considered vacant". Vacancy status is determined by how the unit would likely be occupied, e.g., "for rent, for sale, or for seasonal use only." Vacancy rates are cyclical and represent the lag between demand and the market's response to demand for additional dwelling units. Vacancy rates for rental and multifamily units are typically higher than those for owner-occupied and single-family dwelling units. As of 2021, Louisville had 265 vacant housing units, representing 3.1% of the City's total housing stock.

Exhibit 41: Vacancy Rates, Louisville and Boulder County, 2011-2021

Source: ACS 5-Year Data Tables, 2007-2011, 2017-2021



From 2011 to 2021, the share of units labeled vacant due to being "for rent" increased by 58%. High vacancy rates for rental units could indicate that available rental stock is not attainable for renter households in the area; it could also be mismatched in other ways, such as not being large enough for growing renter households. Over the same period, the share of vacant units labeled as being vacant "for sale" dropped from 15% to zero, likely a reflection of a constrained housing market as median homeowner incomes increased over the time period.

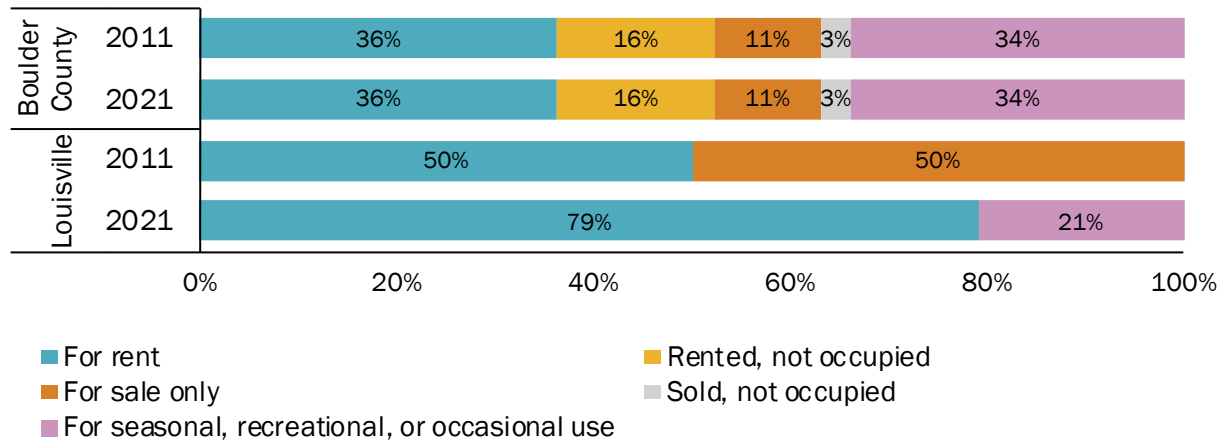
In 2021, of the vacant units reported, 19% of them were due to seasonal, recreational, or occasional use. While this data point is not comprehensive for understanding the intensity of short-term rentals or second and vacation homes, it can be used as an indicator for their presence in Louisville. Please note that while there were no units reported vacant for this reason in 2011, this is likely due to limited data availability rather than a reflection of the housing stock. Several smaller jurisdictions in the area (including Erie and Superior) reported zero vacant seasonal housing units until 2013, after which the share has remained relatively consistent.

Over the same time period, the share of vacant units labeled as "other vacant" in ACS data dropped by 63%. However, the Census changed how it collected its vacancy by reason data in 2012.⁹ Notably, it expanded its "other vacant" answer options in order to gather more detailed information, so it is possible that units marked "other vacant" in 2011 would have been classified differently in following years. For this reason, we have calculated the distribution of vacancy by reason in Exhibit 42 below excluding "other vacant" units.

⁹ <https://www.census.gov/housing/hvs/files/qtr113/PAA-poster.pdf>

Exhibit 42: Vacant Units by Reason (Excluding “Other Vacant”), Louisville and Boulder County, 2011-2021

Source: ACS 5-Year Data Tables, 2007-2011, 2017-2021



Income Restricted Housing Stock

An important component of any community’s housing inventory is the regulated affordable housing stock that is affordable to households earning lower incomes. Regulated affordable housing often has public funding that restricts the maximum income of the tenants or restricts the rents that can be charged to ensure that the housing is serving low-income households. This housing is sometimes referred to as government-assisted housing referencing the public funds for the property. These restrictions vary by the type of funding and the affordability level of the property, and typically have a limited duration, in which the property is affordable for a specified period of time. Louisville has 346 affordable units across several properties.

Exhibit 43: Affordable Housing Units, Louisville, 2023

Source: City of Louisville

Property Name	Affordable Units	Population Served	Affordability	Primary Funding Source
Acme Place	4		N/A	BCHA
Hillside Square	13		N/A	HUD PBV
Kestrel Mixed Age	129	Seniors	50% to 60% AMI	Tax Credit
Kestrel Senior Building	71	Seniors	50% to 60% AMI	Tax Credit
Lilac Place	12		N/A	BCHA
Lydia Morgan Senior Housing	30	Seniors	40% to 50% AMI	Tax Credit
Regal Court I	30		N/A	BCHA
Regal Court II	10		N/A	BCHA
Regal Square	30	Seniors	N/A	HUD MF
Sunnyside Place	17	Families	40% to 50% AMI	Tax Credit

Residential Development Trends

This section focuses on understanding trends in residential development over the last decade or so, using ACS data to look at the change in number of housing units compared to other geographies and city permit data to understand trends in the type of housing units developed.

Key findings include:

- Louisville is one of the slower growing geographies in the county, with an 11% growth of housing units from 2011 to 2021.
- The majority (70%) of housing permits issued in recent years have been for single family housing, primarily focused on rebuilding after the 2021 Marshall Fire.
- Residential development in Louisville declined substantially between 2018-2021. The sharp increase in units observed between 2022-2023 is almost entirely due to the permitted replacement units from the Marshall Fire.

Exhibit 44 shows the change in total housing units from 2011 to 2021. According to ACS data, Louisville experienced a similar rate of growth as the County overall, increasing its housing stock by about 11% over the ten-year period. While all comparison cities saw an increase in the total number of housing units over the same time, Erie experienced the most growth, with a 67% increase in housing units. Boulder and Superior saw the least amount of growth, at just a 4% increase each. Given the increase in the number of high-income households over the time, the limited amount of new housing is likely also contributing to high housing costs as wealthier households are able to outbid on limited stock.

Exhibit 44: Change in Total Housing Units, Louisville and Comparison Geographies, 2011-2021

Source: ACS 5-Year Data Tables, 2007-2011, 2017-2021

	2011	2021	# Change	% Change
Erie	6,049	10,085	4,036	67%
Lafayette	10,193	12,944	2,751	27%
Longmont	34,477	40,908	6,431	19%
Louisville	7,773	8,665	892	11%
Boulder County	126,444	139,302	12,858	10%
Boulder	43,631	45,304	1,673	4%
Superior	4,597	4,790	193	4%

ACS data is survey based and tends to lag in time, so to supplement housing development trends, ECONorthwest examined the City's building permit data from 2016 to 2023.¹⁰

¹⁰ City permit data collection changed in 2015, so we have only examined 2016-2023.

From 2015 to 2023, Louisville issued 488 residential building permits, of which 207 (42%) have been issued a Certificate of Occupancy.¹¹ In total, the City issued 328 permits (70% of total permits) for single-family detached homes, 108 permits (16%) for single-family attached housing (townhomes and plex development), and 31 permits (4%) for multifamily housing. Of permits *issued* from 2015 to 2023, 250 (54%) were permits for Marshall Fire recovery, for which all permits were for single-family detached homes.

Exhibit 47 shows the total amount of residential units permitted each year between 2016 and May 2023. Residential development in Louisville began to decline substantially between 2018-2021. The sharp increase in units between 2022-2023 is almost entirely due to the permitted replacement units from the Marshall Fire. 96% of units permitted between 2022-2023 were Marshall Fire - Single Family Detached units.

Exhibit 45: Louisville Permit Data by Housing Type and Stage of Completion, Louisville, August 2015 - May 2023

Source: City of Louisville

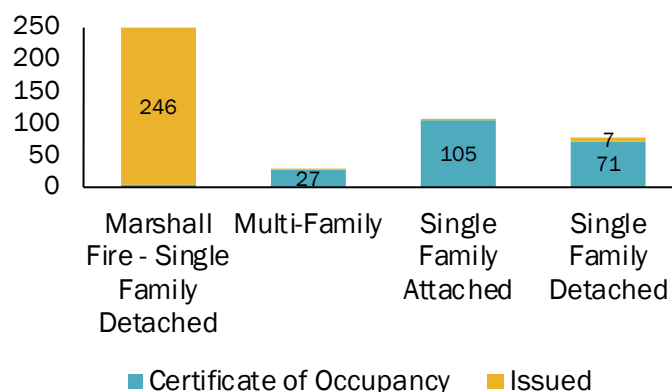
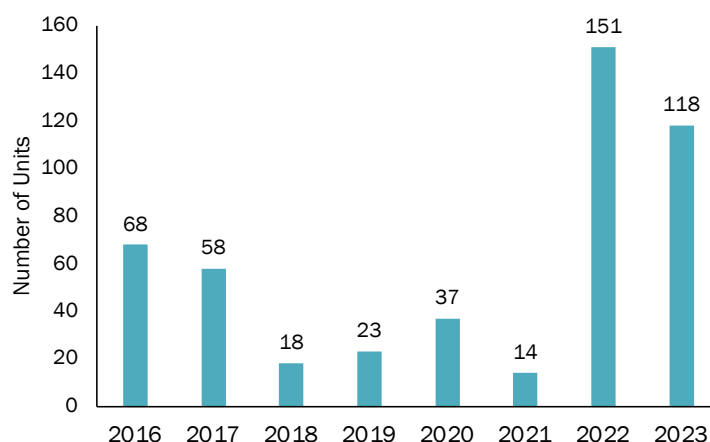


Exhibit 46: Louisville Annual Residential Permit Data by, Louisville, 2016 - May 2023

Source: City of Louisville



Housing Market Trends

Housing market cost data can provide insights into the attainability of existing housing stock in a city. Key findings include:

- Jurisdictions across Boulder County have experienced significant home price increases in recent years. Louisville has the second highest average home sale price among comparison geographies as well as the second highest rate of home sale price increase.
- Louisville also has the second highest rate of rent increases over the time period, and the third highest rent rates of comparison geographies.

¹¹ Certificates of Occupancy are granted for commercial, industrial, and multifamily projects. Occupancy is granted (via a completed inspection card) for single family and duplex development.

Ownership Housing

As of 2023, Louisville had an average home sales price of \$831,000, second highest behind Boulder. The average home price in Louisville is about \$150,000 higher than the County overall.

Exhibit 47: Average Home Sales Price, Louisville and Comparison Geographies, 2023

Source: Redfin

\$550K Longmont	\$580K Lafayette	\$681K Boulder County	685K Erie	\$754K Superior	\$831K Louisville	\$912K Boulder
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While home sales prices rose dramatically across all comparison jurisdictions in Boulder County from 2012 to 2023, Louisville experienced the second highest rate of increase behind Longmont.¹² Over the time, the average home price in Louisville increased by about \$473,000, or 132%.

Exhibit 48: Change in Average Home Sales Price, Louisville and Comparison Geographies, 2012-2023

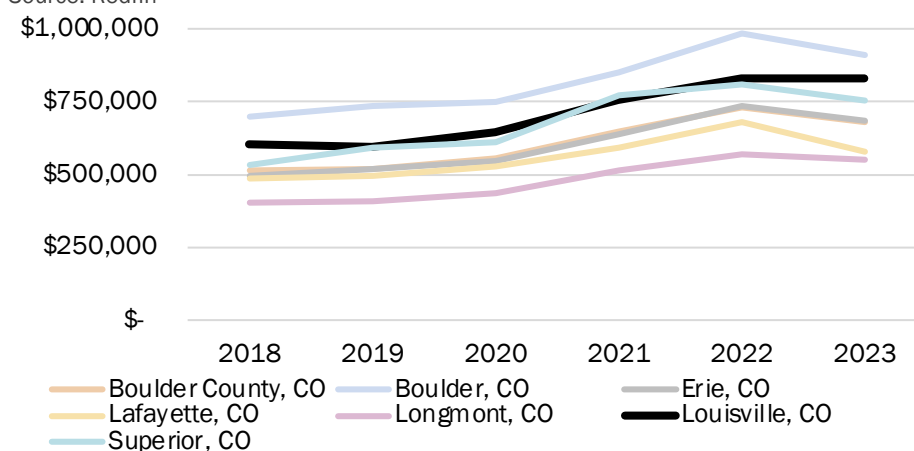
Source: Redfin

	2012	2023	\$ Change	% Change
Longmont	\$226,000	\$550,000	\$324,000	143%
Louisville	\$358,000	\$831,000	\$473,000	132%
Boulder	\$420,000	\$912,000	\$492,000	117%
Erie	\$315,000	\$685,000	\$370,000	117%
Boulder County	\$314,000	\$681,000	\$367,000	110%
Lafayette	\$281,000	\$580,000	\$299,000	107%
Superior	\$409,000	\$754,000	\$387,000	106%

While home prices in all other jurisdictions dropped from 2022 to 2023, Louisville home prices continued to grow, indicating a strong demand relative to other areas in the region.

Exhibit 49: Average Home Sales Price, Louisville and Comparison Geographies, 2018-2023

Source: Redfin



¹² Redfin began collecting housing data in 2012.

Rental Housing

According to ACS data, the median rent in Louisville was \$1,831 in 2021, around \$150 higher than Boulder County overall. Of comparison geographies, Longmont has the least expensive median rents, which may reflect its more remote position in the county. Erie has the most expensive rents in the County, as well as the lowest amount of rental housing stock.

Exhibit 50: Median Rents, Louisville and Comparison Geographies, 2021

Source: ACS 5-Year Data Tables, 2017-2021

\$1,538	\$1,694	\$1,711	\$1,733	\$1,831	\$2,162	\$2,564
Longmont	Boulder County	Boulder	Lafayette	Louisville	Superior	Erie

Because rents can often increase faster than ACS data is reported, we typically prefer to include an analysis of local rents from multiple data sources. According to CoStar data, the average *multifamily* unit rent in Louisville was \$1,715, slightly lower than reported by ACS data.¹³ As of 2023, CoStar reported the average rents in Louisville as \$1,961, just slightly higher than the County as a whole. Unlike home sales price trends (in which Boulder was the most expensive city), rent trends for comparison geographies more closely reflect median income trends for the respective geographies.

Exhibit 51: Average Multifamily Rents, Louisville and Comparison Geographies, 2023

Source: CoStar

\$1,665	\$1,867	\$1,917	\$1,961	\$2,078	\$2,406	\$2,442
Longmont	Lafayette	Boulder County	Louisville	Boulder	Superior	Erie

Like home sales prices, rent rates rose significantly across all geographies over the past decade. According to CoStar data, Louisville multifamily rents increased by \$721, or 58%, from 2012 to 2023.

Exhibit 52: Change in Average Multifamily Rents, Louisville and Comparison Geographies, 2012-2023

Source: CoStar

	2012	2023	\$ Change	% Change
Superior	\$1,507	\$2,406	\$899	60%
Louisville	\$1,240	\$1,961	\$721	58%
Longmont	\$1,107	\$1,665	\$558	50%
Boulder County	\$1,310	\$1,917	\$607	46%
Boulder	\$1,470	\$2,078	\$608	41%
Lafayette	\$1,330	\$1,867	\$537	40%

¹³ CoStar reports rents for multifamily rental units (properties with five or more units), whereas ACS includes all housing types in its median rent calculations. While 57% of Louisville renters live in multifamily housing, it is possible that differences in rent rates for single-family or plex housing is also contributing to rent data differences between the two sources.

Erie	\$1,931	\$2,442	\$511	26%
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Housing Attainability

Housing attainability examines the cost of housing relative to household incomes in the area.

Key findings include:

- At least 74% of Louisville residents would likely be unable to afford the current average home sales price, with a greater affordability gap for Louisville renters.
- While rates of household cost burden decreased from 2011 to 2021, around 41% of Louisville renters and 16% of Louisville homeowners currently spend more than 30% of household income on housing expenses. Given the dramatic increase in housing costs over the past decade, it is likely because households that were cost-burdened (especially severely cost burdened) in 2011 were eventually priced out of the area and moved to areas with a lower cost of living and higher-earning households have moved into the area.

Affordable Housing Income Limits

Aligning Housing Types with Incomes	
Household Income Level	Physical Type / Tenure of Housing (Building Focused)
100% AMI+ \$144k+	Multifamily rentals
	Multifamily ownership
	Middle housing ownership
	Single family ownership
80-100% AMI \$115k-144k	Multifamily rentals
	Multifamily ownership
	Middle housing (rent/own)
	Single family (rent/own)
50-80% AMI \$72k-115k	Multifamily (rent/own)
	Micro-unit rentals
	Middle housing (rent/own)
	Tiny homes (rent/own)
	Single family rentals
30-50% AMI \$43k-72k	Multifamily rentals
	Micro-unit rentals
	Mobile homes
0-30% AMI \$0-\$43k	Shelters
	Multifamily rentals
	Micro-unit rentals
	Mobile homes

Exhibit 53: AMI by Household Type

Source: ECONorthwest, Department of Housing and Urban Development

The Department of Housing and Urban Development (HUD) sets income limits each year to establish eligibility for its assisted housing programs and to define an area's Median Family Income (MFI). For these calculations, HUD includes Louisville as part of the Boulder metro area, which has a 2023 MFI of \$144,100 for a family of four. To compare this number to ACS data, 2021 Louisville median household incomes were slightly higher than the 2021 Boulder metro area MFI (\$125,124 to \$116,900). However, it is important to note that Median Household Income is not directly comparable to HUD's MFI. HUD's MFI calculation relies on underlying Census data related to family incomes, and the 100% median is set for families of four. Median *household* income is for all households – not just families – and households can have a wide range of compositions (e.g., roommates) compared to families.

Below, Exhibit 54 shows the assumptions of what households in the area can reasonably afford to pay on their housing costs without being cost-burdened, based on the 2023 Boulder metro area MFI.

Exhibit 54: Financially Attainable Housing by Median Family Income (MFI) for a Family of Four, Boulder Metro Area, 2023¹⁴

Source: US Department of Housing and Urban Development, Boulder Metro Area, 2023

If your household earns...				
\$43,230 <30 % AMI	\$72,050 50 % AMI	\$115,280 80 % AMI	\$144,100 100 % AMI	\$172,920 120 % AMI
Then you can afford...				
\$1,100 MONTHLY RENT	\$984 MONTHLY RENT	\$1,574 MONTHLY RENT	\$1,855 MONTHLY RENT	\$2,226 MONTHLY RENT
OR	OR	OR	OR	OR
\$130k–\$151k HOME SALES PRICE	\$216k–\$252k HOME SALES PRICE	\$346k–\$403k HOME SALES PRICE	\$432k–\$504k HOME SALES PRICE	\$519k–\$605k HOME SALES PRICE
And you might work as a...				
 Medical Assistant \$44,870	 Middle School Teacher \$72,120	 Mechanical Engineer \$113,610	 Aerospace Engineer \$138,770	 Software Developer \$169,750
 Cashier \$33,900	 Firefighter \$65,110	 Nurse Practitioner \$122,320	 Pharmacist \$140,860	 Dentist \$161,060

A household would need to earn 145% of the MFI, or around \$209,000 to afford the average home sales price in Louisville. Only 26% of Louisville households earn more than \$200,000 annually, suggesting at least 74% of Louisville households would not be able to afford the current average home sales price. In addition, Louisville renter incomes are significantly lower than Louisville homeowner incomes (see Exhibit 28). Based on 2021 ACS data, renter median incomes would fall at around 56% of the 2023 MFI (qualifying as just above “very low income” under HUD standards), while the homeowner median income would fall at roughly 111% of the 2023 MFI, indicating that homeownership is likely significantly more out of reach for households that do not already own a home.

Cost Burdened Households

Housing costs are typically the largest portion of a household budget, and typically include mortgage or rent payment, utilities, interest, and insurance. The Department of Housing and Urban Development’s guidelines indicate that households paying more than 30 percent of their income on housing experience “cost burden” and households paying more than 50 percent of their income on housing experience “severe cost burden.” Using cost burden as an indicator is

¹⁴ Home sales prices may vary with mortgage interest rate fluctuations, any homeowner association costs, or utility fee variations.

one method of determining how well a city is meeting its community need to provide housing that is affordable to all households in a community.

Housing cost burden can put low-income households in vulnerable situations and force them to make trade-offs between housing costs and other essentials like food, medicine, or transportation. This unstable condition can also lead to rental evictions, job instability, school instability for children, and homelessness. Cost burdening for owner-occupied households is less common because mortgage lenders typically ensure that a household can pay its debt obligations before signing off on a loan.

Exhibit 55 shows rates of cost burden by tenure for Louisville. In Louisville, 25% of households are cost burdened, with 14% of households spending greater than 30% of gross income on rent and 9% spending greater than 50%. Renters are much more likely to be cost burdened, with 41% of renter households experiencing cost burden, versus 16% of homeowners.

Exhibit 55: Cost Burden, Louisville, 2021

Source: ACS 5-Year Data Tables, 2017-2021

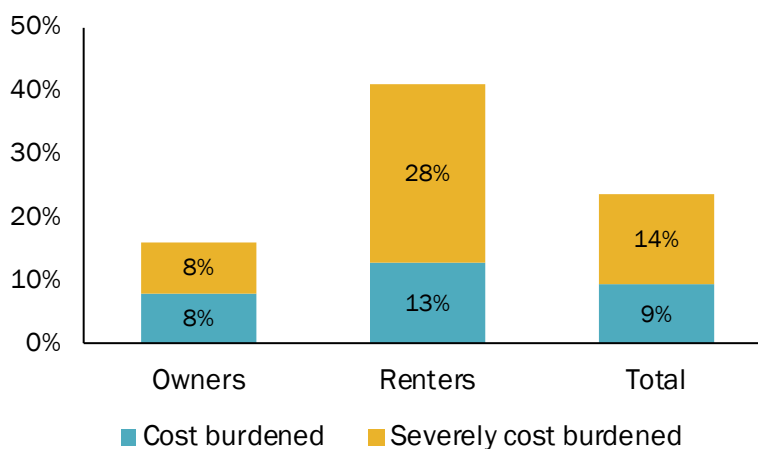


Exhibit 56 shows rates of cost burden for both Louisville and Boulder County. Louisville has slightly lower rates of cost burden compared to the County overall; in Boulder County, 57% of renters are cost burdened (versus 41% in Louisville), and 22% of homeowners are cost burdened (versus 16% of homeowners in Louisville).

Exhibit 56: Cost Burden Rates, Louisville and Boulder County, 2021

Source: ACS 5-Year Data Tables, 2017-2021

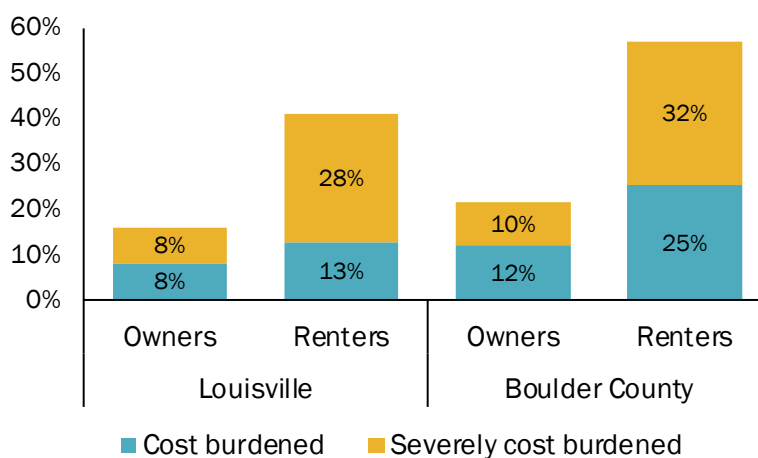
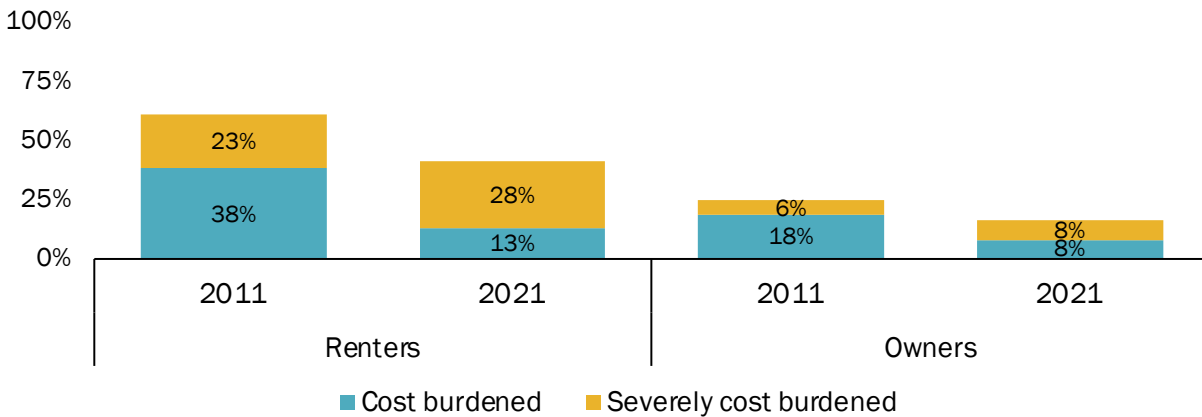


Exhibit 57 shows the change in cost burden rates in Louisville from 2011 to 2021. Rates of severe cost burden decreased significantly over the time period, with a 25% decrease for renters and a 10% decrease for homeowners. Rates of cost burden (spending greater than 30% but less than 50% of household income on rent) increased slightly, with a 5% increase for renters and a 2%

increase for homeowners. Overall, rates of cost burden decreased, from 34% to 25% of total households.

Exhibit 57: Change in Cost Burden, Louisville and Boulder County, 2011-2021

Source: ACS 5-Year Data Tables, 2007-2011, 2017-2021



However, given the dramatic increase in housing costs over the past decade, it is unlikely that the decrease in cost burden is due to an increase in housing affordability. Rather, it is much more likely that households experiencing cost burden (especially severe cost burden) in 2011 were eventually priced out of the area and moved to lower cost of living areas and higher-earning households have moved into the area.

Homelessness in Boulder County

Gathering accurate homelessness data is challenging due to several factors that contribute to its unreliability, including:

- **Transient Nature:** Homeless populations are often highly mobile, making it difficult to capture an accurate snapshot of the homeless population at any given time.
- **Lack of visibility:** Many individuals experiencing homelessness do not use official shelters or services, locating in certain places to avoid detection, further complicating data collection efforts.
- **Resource Limitations:** Conducting comprehensive homelessness counts requires significant resources, including personnel, funding, and time which can also affect the frequency of data collection.
- **Lack of Coordination:** Homelessness data collection often involves coordination between multiple agencies, local governments, and non-profit organizations. Lack of coordination can lead to incomplete or duplicated data.

These factors, individually and collectively, often result in the underreporting of the homeless population. Exhibit 58 below shows the number of people experiencing homelessness who were

entered into the Boulder County Coordinated Entry system in 2022. Of the 409 individuals entered, 11 of them were located in Louisville.

Exhibit 58: Homelessness by City, Boulder County, 2022

Source: Boulder County Coordinated Entry

City	Number of Houseless People	Percent of Total Houseless Population
Boulder	186	45.4%
Erie	1	0.2%
Lafayette	18	4.4%
Longmont	172	42.1%
Louisville	11	2.7%
Lyons	5	1.2%
Nederland	12	2.9%
Superior	3	0.7%
Other	1	0.2%
Total	409	100%

Coordinated Entry data will certainly undercount those experiencing homelessness, as those individuals reflected in the Coordinated Entry data are those that actively sought out services. The Metro Denver Homeless Initiative (MDHI) publishes the annual Point-in-Time (PIT) Count. In 2023, the count included 839 people in Boulder County experiencing homelessness on the night of January 30, 2023. Of those 839 people, 71% were sheltered and 29% were unsheltered.¹⁵

4. Marshall Fire Recovery

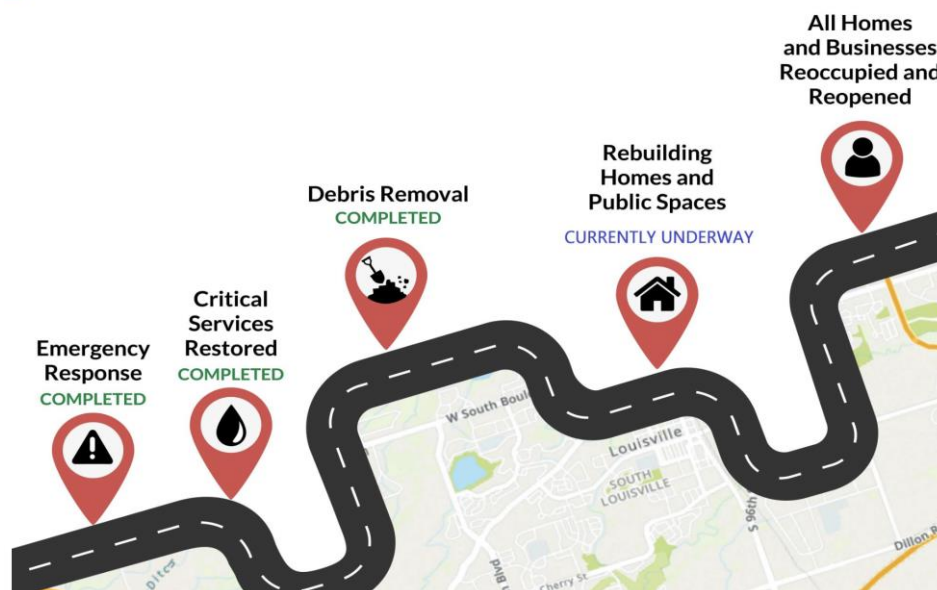
In late December 2021, the Marshall Fire destroyed 550 homes in Louisville, or roughly 6.3% of the City's housing stock at the time. In addition to the many negative environmental, economic, and physical and mental health impacts, the loss of housing exacerbated an already constrained and expensive housing market, particularly for lower income residents.

¹⁵ MDHI discourages trending PIT data year-over-year due to the snapshot nature on a single night that can be influenced by variables such as weather, count methods, volunteer engagement, among other factors. Therefore, additional years have not been included in the HNA.

In March of 2022, the City released their Recovery Plan for coordinating the recovery response. This plan established a Recovery Roadmap, which outlined major phases for rebuilding, shown here. The Roadmap is continuously updated online on the City's [Louisville Rebuilds](https://www.louisvilleco.gov/living-in-louisville/residents/louisville-rebuilds-marshall-fire-recovery/recovery-roadmap) website.

Exhibit 59: Louisville Recovery Roadmap

Source: <https://www.louisvilleco.gov/living-in-louisville/residents/louisville-rebuilds-marshall-fire-recovery/recovery-roadmap>



As of July 2023, 281 housing rebuild permits have been issued and another 35 housing permits are under review. So far, 21 households have been able to move back into their homes.

In March 2023, Louisville and Superior sponsored a Marshall Fire Recovery Advisory Panel by the Urban Land Institute (ULI). This panel provided feedback and recommendations for rebuilding housing and climate resilience, including:

- **Affordable homeownership options:** The Panel found that new construction in Louisville and Superior is priced above what many households in the area could afford and was exacerbated by the loss of housing in the fire. Particularly for “workforce” households, first time home buyers, and seniors, many new homeownership products (especially single-family detached homes) are unattainable. The Panel found that there are opportunities to develop out more “missing middle housing” to offer more attainable homeownership opportunities, including developing deed restricted housing, subdividing existing lots, and supporting the development of accessory dwelling units. In addition, the Panel recommended cities consider implementing developer incentives for missing middle housing, purchase sites for infill housing, and offer first time homeowner financial assistance.
- **Limited rental opportunities:** The Panel found that the loss of housing further constrained an already limited rental stock in the area, leading to rental price gouging. Particularly for lower income residents, there is inadequate attainable rental stock in the areas. To address renter housing needs, the Panel recommended cities implement developer incentives for building rental housing, as well as disaster-related rental housing voucher program for displaced renters.

- **Data availability:** The Panel found there is a lack of data on the socioeconomic characteristics of the displaced neighborhoods following the fire. The Panel recommended cities consult findings from the Marshall Fire Unified Survey Team to better understand the affected residents' needs and tailor rebuilding strategies accordingly.¹⁶

Initial findings from the Marshall Fire Unified Survey Team revealed disparities in insurance coverage and rebuilding progress across income levels.¹⁷ The survey team found that underinsurance was a significant obstacle for many affected households, with only a small percentage of respondents expected insurance coverage to fully meet their rebuilding costs. The extent of expected insurance coverage correlated with income levels, with higher-income households anticipating higher payouts. This correlation was also reflected in the progress of rebuilding, as those expecting higher insurance coverage were more likely to have received building permits after one year compared to those with lower coverage expectations. This inequity can exacerbate existing inequalities during the rebuilding process, and the survey team recommends the City prioritize programs that offer rebuilding assistance to households with fewer resources.

¹⁶ This survey effort is being led by a Colorado-based team of researchers based at the University of Colorado's Denver campuses. After the fire, this group of researchers came together out of a shared interest in learning from this event and its aftermath. Researchers around the country were interested in conducting a household survey in the fire-affected communities, so the Marshall Fire Unified Survey Research Team was convened to create one combined survey. The survey is ongoing but has released some initial findings (as of June 2023).

¹⁷ <https://www.urban.org/urban-wire/after-marshall-fire-households-fewer-financial-resources-are-falling-behind>

5. Housing Demand and Future Needs

The following section details ECONorthwest's calculations of housing need, underproduction, and affordability for Louisville.

Population Forecast Assumption

As documented in the Community Profile of the HNA, local population forecasts are only available at the county-level. In order to forecast future housing needs, an understanding or assumption of how the city *could* grow is needed to establish a baseline projection. ECONorthwest developed a population forecast for Louisville based on the Boulder County's population forecast from the Colorado Department of Local Affairs of 389,233 residents by 2047. The population forecast provided by ECONorthwest assumes that Louisville will maintain its current share of Boulder County's total population (6.3%), and would therefore increase its population to about 24,614 residents by 2047. This would mean the city would add another 4,115 residents to its 2023 population (see Exhibit 3).

Future Housing Needs

A key part of the HNA is to gain an understanding about the extent of total housing needed in Louisville and the quantity of new housing needed for different income levels over the next several decades. A significant challenge facing Louisville is to produce enough new housing units to accommodate potential population growth and to provide more affordable housing options that match the needs of current and future residents. ECONorthwest developed a method to help quantify existing and future housing needs for the next two decades that relies on the best available data provided by DOLA, the U.S. Department of Housing and Urban Development (HUD), and the U.S. Census Bureau (including PUMS data).

The method focuses on estimating housing needs based on future housing needed by 2047 and current needs based on housing underproduction.¹⁸ The inclusion of current housing underproduction helps to ensure housing needs targets address current unmet housing needs not provided for in the existing housing inventory.

Total Housing Needed by 2047

The following analysis estimates how much housing is needed based on a method combining current housing underproduction analysis with future housing needs analysis.

¹⁸ DOLA's latest county-level population forecast is for 2047.

Future Housing Need

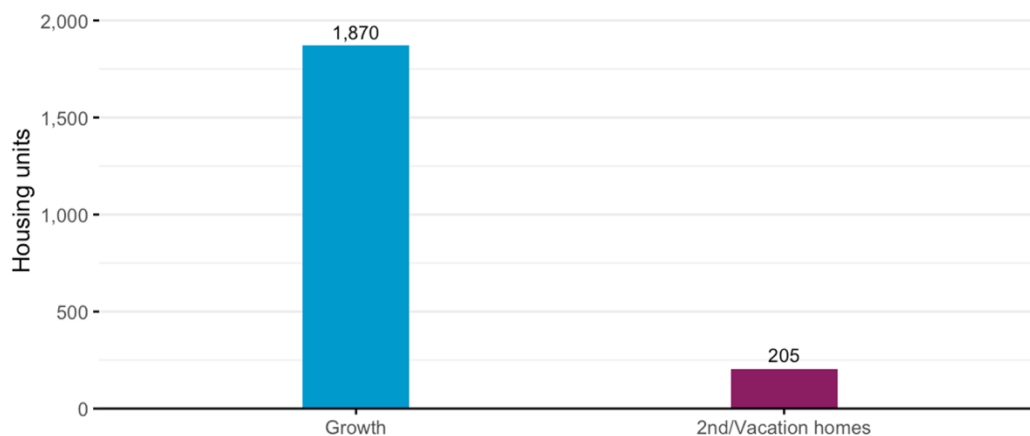
First, ECO identified the baseline number of future housing units needed by 2047. This estimate relies on the population forecast provided by ECO and discussed above. The estimate assumes a 2047 population forecast of 24,614, adding approximately 4,115 new people to Louisville by 2047. The quantity of future housing needed was estimated based on the following parameters:

- Total added population: 4,115 new people (based on the *assumed* population forecast for 2047).
- DOLA's household size estimate for Louisville is around 2.4 persons per household (slightly lower than ACS estimates), translates into approximately 1,700 additional households.
- This total was multiplied by a factor of 1.1 to bring the estimate of total housing needed by 2047 to 1,870 housing units needed. As note, this method uses a ratio of 1.1 housing units per one household since healthy housing markets allow for a reasonable level of housing vacancy and absorption and second/vacation homes.
- According to 5-year ACS data, between 2010 and 2020, the total number of second/vacation homes in Louisville increased by 125 (either through conversion or new construction), while 1,038 total housing units were added to the city.¹⁹ The ratio of second/vacation homes added to total housing units added over time (125 divided by 1,038) comes to 0.12. This ratio of was then multiplied by the number of expected households, arriving at 205 housing units expected to be lost to second/vacation homes. When combined with the previous growth-based needed housing units, this brings the total to 2,075 new homes needed by 2047.

¹⁹ Assumes 2010 and 2020 DOLA estimates for housing units rather than ACS housing units due to inaccuracies found in the 2020 Census.

Exhibit 60: Future Housing Need + 2nd/Vacation Homes, Louisville, 2047

Source: DOLA 2047 Boulder County Population, ACS 5-year 2017-2021, ECONorthwest



Housing Underproduction

ECO then determined the extent of current housing underproduction in Louisville. Underproduction was quantified based on the difference between the existing housing stock, minus existing second/vacation homes (U.S. Census ACS data and DOLA housing unit estimates) and 1.1 times the current number of households. This method uses a ratio of 1.1 housing units per one household since healthy housing markets allow for a reasonable level of housing vacancy and absorption and second/vacation homes.²⁰ Based on ECONorthwest's method, Louisville would need approximately 409 additional new housing units to address current housing underproduction.

Total Housing Need

Combining the current housing underproduction (409 housing units) with the future housing units needed brings the total to 2,483 new housing units needed by 2047 (see the exhibits below for more detail). On an annual basis this means an average of 96 housing units should be built per year.

Exhibit 61. Illustration of Housing Needs Calculation

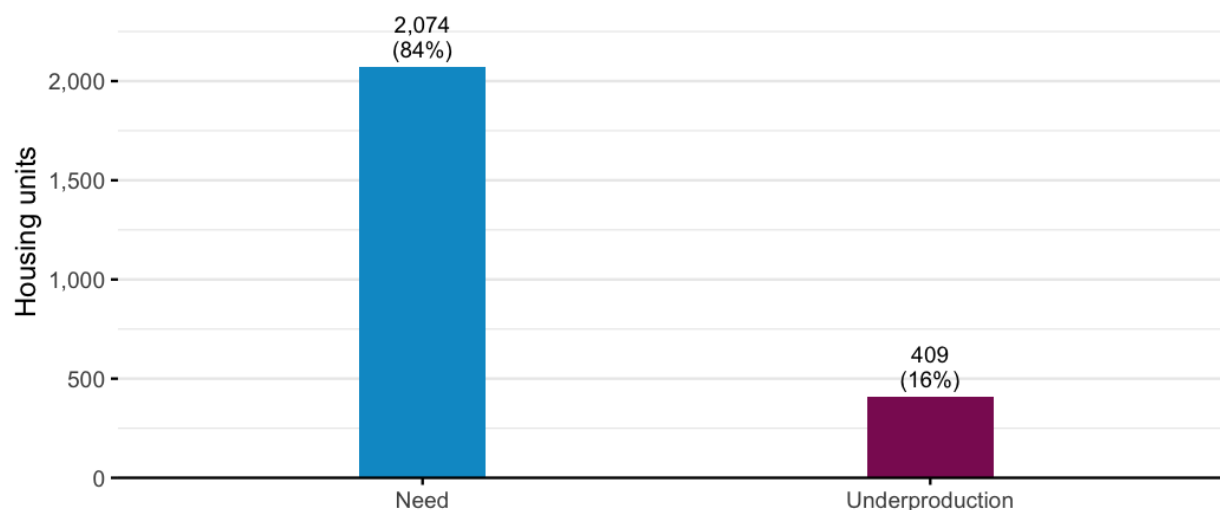
Sources: ECONorthwest.

²⁰ The ratio of 1.1 housing units to households is computed from the US Census estimate for the entire United States in 2019. The analysis uses 2019 as a reference year to avoid the unique nature of COVID-19 on housing production and household formation.



Exhibit 62: Future Housing Need + 2nd/Vacation Homes + Underproduction, Louisville, 2047

Source: DOLA 2047 Boulder County Population, ACS 5-year 2017-2021, ECONorthwest



The Housing Strategy will need to consider how the city can meet the total number of housing units that the assumed population growth with demand. Beyond that, prioritizing housing development can create more opportunities to support the city's workforce by meeting the demand created by employment growth, offer more stability for lower-income residents through affordable housing, meet sustainability and EDI goals (documented in the following chapter), generate a diverse range of households that can support local businesses and facilitate economic development, reduce commute times and even ease traffic congestion.

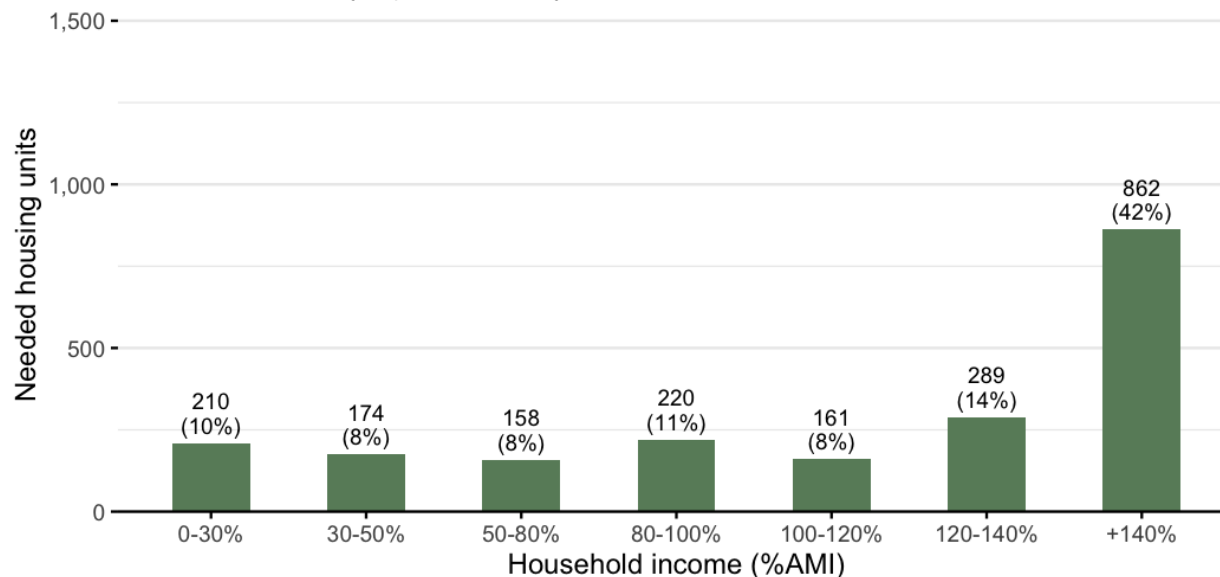
Housing Need by Income

While understanding the total number of housing needs required to meet the City's population forecast is an important step in planning for the future, it's also important to understand how the housing units should be distributed among income earners to ensure there are enough units attainable for each household. The housing need projections by income brackets shown in the exhibit below are derived using the most recent distribution of households by percent of AMI in Louisville. The analysis then accounts for current and future household sizes at the city level to better understand nuances of how housing need by income can shift over time as household sizes change and subsequent changes to housing affordability.

Exhibit 63 shows Louisville’s housing needs forecast by income, representing the number of housing units the city should plan to accommodate to meet the needs of each income group. Because forecasting incomes at the household level over time is challenging, this data evaluates housing need assuming current income distributions remain constant. The income breakdown shown below reflects a continued imbalance across income segments in Louisville. However, the forecast housing need by income category is likely to vary depending on future policy choices. If cities do not take meaningful action to increase housing production, and affordability worsens due to demand from higher-income households outpacing supply of total housing units, many low-income households will face displacement and the forecasted need for lower income households would likely be lower. The ultimate income distribution in 2047 will be the result of regional housing trends and policy decisions made at the local level.

Exhibit 63: Assumed Housing Need by Income Distribution, Louisville, 2047

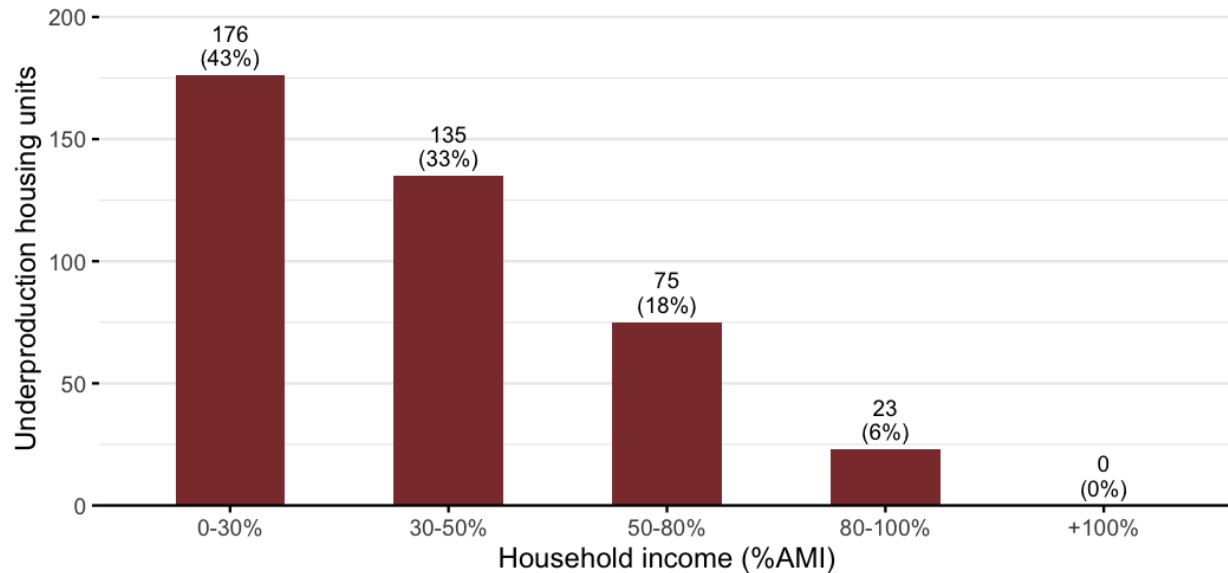
Source: DOLA 2047 Boulder County Population, ACS 5-year 2017-2021, CHAS 2015-2019, ECONorthwest



We then used a similar methodology seen in Exhibit 63 to combine income data and underproduction units to calculate underproduced units by income group to get a sense of what type of housing is needed in Louisville. For these units, the majority are needed for households earning less than 50% of the Area Median Income.

Exhibit 64: Louisville Estimated Underproduction Distributed by Income by 2047

Source: DOLA 2047 Boulder County Population, ACS 5-year 2017-2021, CHAS 2015-2019, ECONorthwest

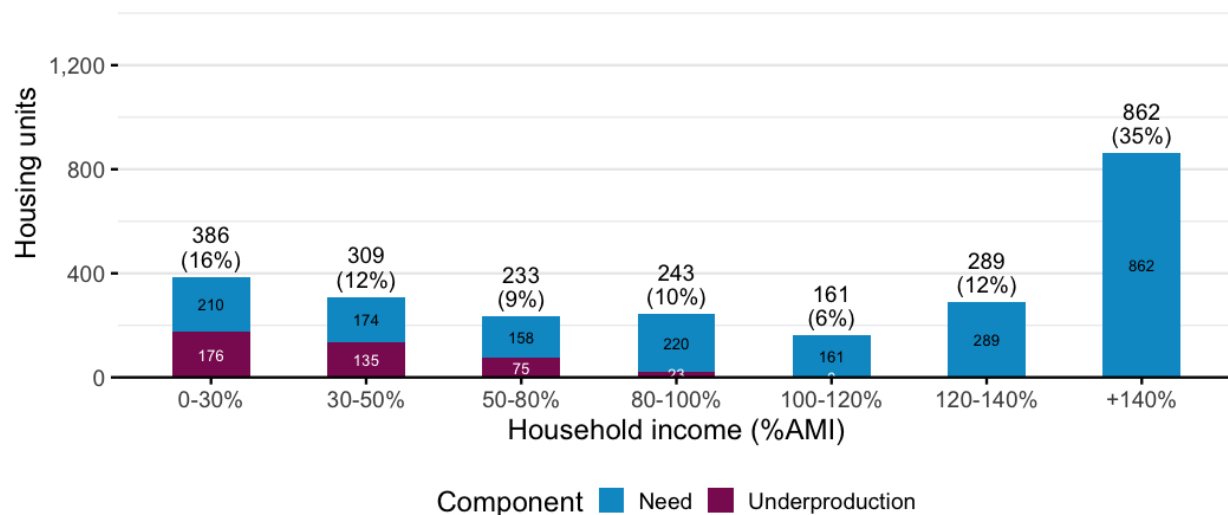


Source: ACS 5-year 2016-2020, CHAS 2015-2019

Exhibit 65 combines the results of calculated future housing needs and underproduction in Louisville. In total, Louisville will need to plan for 2,483 new homes by 2047 to meet its current and future housing needs. Given that the City is embarking on a comprehensive plan update that will have a 10-year planning horizon, the city will need to specifically plan for an additional 960 housing units over a 10-year period in order to stay on track with the projected 25-year demand assumption.

Exhibit 65: Total Units Needed by 2047, Louisville

Source: DOLA 2047 Boulder County Population, ACS 5-year 2017-2021, CHAS 2015-2019, ECONorthwest



6. Summary of Existing Housing Policies

Recognizing the guidance offered by relevant county and city plans within Louisville's planning context helps set the stage for the Housing Strategy and future policy development. A summary of the city's existing documentation on housing issues and policies is provided in this section. It includes a review of the following county and city plans:

- Comprehensive Plan
- Transportation Master Plan
- Preservation Master Plan
- Downtown Framework Plan
- Louisville EDI Task Force Final Report
- Boulder County Regional Housing Strategy
- Sustainability Action Plan
- Resolution 25, Series 2019: A Resolution Setting Clean Energy and Carbon Emission Reduction Goals

2013 Comprehensive Plan

Louisville is preparing to update its 2013 Comprehensive Plan and the Housing Strategy will play an important role in establishing a foundation for the city's approach to housing during the update. However, the 2013 Comprehensive Plan provides a framework for housing policy that is still very relevant today and reverberates much of what is document in the HNA and reflected in conversations during community outreach.

- **Planning Context.** The Comprehensive Plan's Planning Context documents how the city's residential housing market is constrained by a scarcity of developable land, largely due to existing zoning and development regulations for both greenfield and infill opportunities. It notes that the market assessment in the comprehensive plan indicates there is significant demand for residential units in Louisville, which has continued to grow since 2013 as documented in the HNA. It suggests that opening up additional areas for residential development, either through rezoning, or revised development regulations, would likely result in additional residential development.
- **Vision Statement and Core Community Values.** Calls on the city to accommodate the needs of all individuals in all stages of life through parks, trails, and roadway design, City services and regulations to ensure they provide an environment which accommodates individual mobility needs, quality of life goals, and housing options.

Comprehensive Plan Policies Related to Housing

The comprehensive plan outlines explicit policies related to housing in Louisville, which are documented throughout the plan. The most relevant policies are included in the table below.

Overarching Theme	Principle Policy Related to Housing	Specific Policies
Neighborhoods and Housing (NH). The Comprehensive Plan recommends creating plans for each neighborhood and initiating a housing policy conversation in the City to aid in addressing these and other issues.	NH-3. Neighborhood Plans shall be compatible with this Comprehensive Plan and other adopted goals and policies for the City.	Policy NH-3.4: Diverse housing opportunities shall be available for residents of varying income levels.
	NH-4. The character and identity of existing residential neighborhoods should be maintained while allowing for evolution and reinvestment.	Policy NH-4.7: Housing should support vibrant retail and commercial centers that serve local residents
	NH-5. There should be a mix of housing types and pricing to meet changing economic, social, and multi-generational needs of those who reside, and would like to reside, in Louisville.	Policy NH-5.1: Housing should meet the needs of seniors, empty-nesters, disabled, renters, first-time homebuyers and all others by ensuring a variety of housing types, prices, and styles are created and maintained. Policy NH-5.2: The City should continue to work with Boulder County Housing Authority and others to ensure an adequate supply of affordable housing is available in Louisville Policy NH-5.3: Higher density housing should be located primarily in the centers and corridors of the Framework. Policy NH-5.4: Potential measures to increase housing type and price diversity should be evaluated, including allowing accessory dwelling units in established neighborhoods only if the essential character of the neighborhood is can be preserved. Policy NH-5.6: New housing should address defined gaps in the housing market that exist today and into the future. Policy NH-5.7: The City should define standards for low income and affordable housing units, and consider reducing or waiving building permit and impact fees for all qualifying projects.
	NH-6. The City should define City-wide goals for affordable and low-income housing through a public process.	Policy NH-6.1: The City should determine to what extent it would like to allow, encourage, or incentivize affordable and low-income housing

		Policy NH-6.2: The City should develop specific and achievable actions to meet the defined goals.
Economic Development (ED) and Fiscal Health (FH). Notes the key role residential development plays in attracting new businesses and retaining existing businesses in the community and that a diverse housing base is a prominent criterion businesses use to evaluate a community. The plan maintains that the relationship between residential diversity, availability and business growth should continue to be fostered in future economic development efforts.	ED-2. The City should direct growth in an economically responsible way in order to maintain high quality amenities and high service levels for residents.	Policy ED-2.2: The City should work to maintain and improve community assets such as the educational, housing, recreational, retail and cultural opportunities that encourage local businesses to remain and expand in Louisville

2019 Transportation Master Plan

The city's Transportation Master Plan (TMP) looks comprehensively at transportation conditions and options throughout Louisville and region for all modes of transportation. The TMP represents a long-range planning effort that describes baseline conditions of the City's transportation network, establishes eight overarching transportation Goals, and specific transportation Policies, Programs and Projects.

The TMP makes policy connections to housing, particularly around the relationship between locating affordable housing near multimodal transit opportunities. Affordable housing with no transportation linkages will likely decrease the affordability of that housing while also making multimodal transportation less effective at reaching the people who need it the most. The availability of desirable, affordable housing along the transportation corridors identified in the plan would help the city achieve goals set forth in the TMP.

Housing Related Highlights in the TMP

- Higher density housing, like apartments and townhomes, can be complementary to transit stops and can help reduce reliance on automobiles for trips in areas that are walkable with a variety of uses in close proximity.
- City has recently endorsed the Boulder County Regional Housing Strategy to expand affordable housing options and the plan highlights that access to a vehicle is not always

possible for lower income households, so mobility choices and connections to transit and biking are important.

- Finding more ways to limit vehicle travel by providing convenient and viable multimodal alternatives has also been a priority for the City. Providing better access to non-vehicular options can help those who are not able to drive or do not have access to personal vehicles and can help reduce traffic congestion and vehicle emissions.
- Reduced household spending on transportation costs can offer lower-income households more financial stability.
- Under Policy 3: Transit-Oriented Development (TOD) Guidelines, the TMP recommends that as new development and redevelopment opportunities arise within proximity to transit, the City should consider implementing TOD principles. TOD principles encourage a mixture of uses in proximity, including housing.

2015 Preservation Master Plan

Louisville's Preservation Master Plan provides a framework for the City's voluntary Historic Preservation Program and serves as a guide for proactive decision-making over the next 20 years. The Plan recommends actions for integrating preservation practices into the City's policies and regulations. The geographic scope of the document is city-wide, providing recommendations for areas beyond Downtown and Old Town. Recommended housing-related Louisville Municipal Code modifications for zoning options to support preservation goals include:

- **Accessory Dwelling Units.** Allows for residential use of historic garages and outbuildings - Potential to maximize development of historic site without significant change to massing, scale, and number of buildings.
- **Live-Work Ordinance.** Re-establishes historic pattern of business owners living adjacent to their business and can provide economic incentive to preserve historic storefronts.

1999 Downtown Framework Plan

The Downtown Framework Plan (DFP) provides a description of the key organizational systems influencing downtown. The DFP includes strategies for implementing the overall goals for downtown. The Plan also discusses policies for circulation, land use, public and private parking, public facilities and public and private sector design. Highlights from the plan related to housing include the following:

- The plan includes a vision for downtown Louisville:
 - *That it will be a vital community center for pedestrian-oriented activity, including specialty retail, professional offices and housing that will occur in a manner that is compatible with the traditional scale and character of the area.*

- Identifies the historic mix of residential and commercial uses downtown and an interest in maintaining and promoting that mix of uses. This area of Louisville is desirable specifically due to that mix and the traditional scale and character of the area.
- Contemplates encouraging housing downtown and near downtown overall to support the vibrancy of the downtown area, which relates to the broader Housing Plan goal of providing more housing across the City.
- The Plan provides a specific recommendation to retain existing housing and consider mixed-use buildings.
 - **Goal:** Maintain downtown as a vibrant, mixed-use activity center.
 - **Policy:** Endeavor to retain existing housing in the downtown commercial area as a component in an overall policy of preserving the existing, historic downtown character.
 - **Task:** Explore on-site residential mixed uses downtown.

2021 Louisville EDI Task Force Report

Louisville's Equity, Diversity and Inclusion (EDI) Task Force was asked to identify areas of concern about EDI issues, prioritize the most crucial ones the City can affect through its policy choices and offerings and establish goals, objectives and suggestions for addressing the identified issues. The plan's recommendations relate to five key topic areas:

- Safe and welcoming environment (including language justice)
- Housing
- Public accommodation/access to services
- Youth engagement
- Public health

One of the five focus areas identified in the report was to expand housing access for diverse and low-income communities. The report documents that Louisville has an inaccessible housing market. The socio-economic status of communities of color varies widely in Louisville from the working poor to affluent individuals. Engagement efforts found that many minorities felt that housing in Louisville was inaccessible and unaffordable, jeopardizing their ability to remain members of the vibrant community. It was also reported that there are compounding barriers that deter housing access, including a lack of language access for rental applications, the digital divide and access to capital for home ownership.

The report proposes the following *Actions and Desired Future State*:

- Educate the community and City Council about the history of housing in this country and the systemic barriers that continue to impact affordable housing to help eliminate negative perceptions, biases, and misinformation.

- All rental and home paperwork (housing applications, leasing paperwork, loan paperwork, websites, housing information) should be available in Spanish.
- Increase percentage of affordable homes allocated in new developments and hold developers accountable.
- Consider private funds that could be used for undocumented residents, those that are not US Citizens, "DACA-mented," and mixed status households which are often restricted by government funds.
- Assess housing options or programs for foster kids as they age out of the system.
- Assess hiring practices and increase representation to help families navigate housing system.

2017 Boulder County Regional Housing Strategy

The regional housing strategy, *Expanding Access to Diverse Housing for Our Community*, created in collaboration with nine jurisdictions in Boulder County, recognizes that many interconnected issues and opportunities are important elements of the discussion around solutions to the shared housing affordability crisis.

The report includes the goal for 12% housing inventory being permanently affordable (800 homes per year for next 15 years as of drafting). It also identifies the need to provide workforce housing and redevelopment needs due to land scarcity for housing development.

2020 Sustainability Action Plan

The city's Sustainability Action Plan (SAP) provides a framework to guide Louisville's vision to create a more sustainable community as well as provide a roadmap for achieving collective goals. The SAP methods to reach goals of reducing Greenhouse Gas (GHG) emissions focus on incentivizing multimodal transportation. The SAP also contemplates a short-term goal of having City staff understand their role in meeting the City's sustainability goals, which directly relates to the need for planning projects and zoning updates to help achieve lowering carbon emissions and reaching SAP goals. The Housing Study serves as an opportunity for staff to help directly further goals from the SAP (outlined below), as strategies in the Housing Plan could help achieve GHG reduction goals through increasing density, focusing housing near transportation centers and corridors, and so forth. Goals from the SAP include:

- Reduce core municipal greenhouse gas emissions annually below the 2016 baseline through 2025.
- Ensure that all departments understand their role in achieving Louisville's climate action and sustainability goals.
- Survey employees to better understand commuting patterns and available commuting solutions.

- Create new programs to mitigate vehicle miles traveled (VMT) such as parking cash-out programs, car-share opportunities, commute challenges with prizes and increased access to pool vehicles.
- Increase modal choice and decrease the single-occupancy vehicle share of local and regional trips.

2019 Resolution Setting Clean Energy and Carbon Emission Reduction Goals

City Resolution No. 25 from 2019 establishes clean energy and carbon emission reduction goals, including the following:

- Meet all of Louisville' s municipal electric needs with 100% carbon -free sources by 2025
- Reduce core municipal GHG emissions annually below the 2016 baseline through 2025
- Generate 75% of Louisville' s residential and commercial/ industrial electric needs from carbon -free sources by 2030
- Reduce core community GHG emissions annually below the 2016 baseline through 2030

Denser housing, particularly near existing for future transit opportunities can help the city meet its GHG reduction goals adopted in the resolution.

DATE: August 28, 2023
TO: City of Louisville; Rob Zuccaro, Amelia Hogstad, Monai Myles
FROM: ECONorthwest; Tyler Bump, Lee Ann Ryan
SUBJECT: Draft Strategy Matrix and Framework – Louisville Housing Plan

The matrix below outlines **preliminary** policy and program recommendations for the city to consider as we work towards developing the Housing Strategy. Each strategy will ultimately include a **rationale** for why it is included in the plan, **detailed actions**, **opportunity sites**, the city’s potential **role in implementation**, nuanced **considerations**, and potential housing **affordability impacts**.

The matrix below provides a list of **29 actions** for consideration in the Louisville Housing Plan. These actions fall within **6 draft strategies**, which are designed to address community needs identified through community engagement and the Housing Needs Assessment (HNA). This is a preliminary list of example actions for the City to consider, refine, revise, and evaluate to help further each strategy.

Action Types

- **Incentives** encourage housing developers to provide desired housing types.
- **Policy Changes** may update the city’s code, processes, or requirements related to housing.
- **Financial Support** increases available funding for a variety of housing initiatives.
- **Partnerships** to strengthen relationships with other organizations to further the city’s housing goals.
- **Research** may require additional evaluation prior to moving forward towards adoption or implementation.

Housing Income Level

The qualitative designation of ‘**Low**,’ ‘**Moderate**,’ ‘**High**,’ or ‘**All**’ gives a relative approximation of what household income levels will likely be served but does not include a specific threshold.

#	Strategies	Actions	Action Summary	Action Type	Income Level Served
1	Identify Opportunities for Residential Development <i>Louisville has vacant or redevelopable sites that could be suitable for residential development. The city can work to identify areas to consider for rezoning and adopt appropriate policies to facilitate new housing projects in those areas.</i>	1.1: Establish criteria and identify areas to rezone to support additional residential development	To meet housing goals and support the broad range of housing needs represented within Louisville, the City will need to rezone areas not currently zoned, but suitable, for residential development. Staff should work towards establishing criteria for identifying areas to rezone. Criteria could include access to transit or underutilized/vacant commercial areas.	Policy Evaluation/Change	All
		1.2: Develop standards to encourage and ensure a range of housing types are provided on large greenfield sites	The city may not currently have a large inventory of greenfield development sites for residential development, but it’s possible that some may be identified when the city considers rezones to pursue. Greenfield sites are important opportunities for the city to further housing goals related to addressing needs for a variety of incomes by ensuring the sites are developed with a range of housing types, not just single-family. The city should consider creating a new zone or ensuring the site’s new zoning designation will require a new development to provide a range of housing types.	Policy Change	All
		1.3: Establish cost-sharing opportunities for infrastructure on sites where affordable housing is provided, particularly on large sites that are rezoned for housing	Large sites often require significant infrastructure development before they are ready for housing which can impact their financial feasibility and preclude the site from being developed in a manner consistent with the city’s housing goals or at all. The city can develop cost-sharing opportunities for infrastructure development to help ease the financial impact on new projects, particularly those that provide affordable housing or meet other established housing goals. The city can prioritize existing or develop new funding tools, such as development agreements.	Policy Change/Incentive	All
		1.4: Conduct a market analysis during major planning processes to ensure that proposed future land uses are economically viable	The city should consider conducting market assessments in areas where major land use changes are considered, particularly in areas the city is looking to revitalize. A market analysis will help provide insights into the most suitable and economically viable land use for a specific location to determine if there is a sufficient market for the proposed land use. A market analysis can also help identify potential risks and challenges that could impact the economic viability of future projects which can allow the city to develop mitigation strategies. It will also help determine if the proposed land use aligns with the anticipated growth and changes in the market over time.	Research	All
2	Adopt Code Allowances for More Diverse Housing Development <i>Expand permitted housing types in certain zones and adopt standards to support their development. This strategy will</i>	2.1: Conduct a robust code audit to properly evaluate the effectiveness of development regulations and identify existing barriers to housing development	Stakeholder engagement revealed that portions of Louisville’s zoning code are outdated and in need of a major update. There are likely development barriers, particularly for housing development, that persist within the current code. The city should begin the code update process by first conducting a robust code audit to identify the range of barriers, identify priorities, and ensure the eventual update is organized and strategic. The city may also consider beginning the audit process by first engaging homeowners and developers to help identify barriers, as they may differ or more nuanced than the barriers staff identify. Common barriers include permitted uses, large minimum lot sizes, low density allowances, building height, parking requirements, and ambiguous design standards, etc.	Policy Evaluation/Research	All

#	Strategies	Actions	Action Summary	Action Type	Income Level Served
	<i>also lean on results from the proforma analysis.</i>	2.2: Adopt code amendments to reduce barriers to residential development with sensitivity to existing overlays and districts (e.g., historic overlay)	Once a code audit is conducted and the city has identified a range of barriers and priorities within the code to address. The city should prepare a package of code amendments to address the barriers, offer incentives, and streamline processes. Code amendments might include reduced parking standards, increased density, modified landscape requirements, changes to minimum lot size, or increased building height in appropriate areas. New standards should be developed with sensitivity to existing overlays and districts such as this historic district.	Policy Change	All
		2.3: Offer a height bonus for projects that pay a higher fee in lieu than currently required under the city's existing inclusionary housing program	A financial analysis conducted by ECONorthwest revealed that residential projects could benefit from adding an additional story in multifamily development projects and afford to pay a higher fee-in-lieu in exchange for the additional story under the city's existing inclusionary program. The city could consider adding a voluntary inclusionary program option in certain zones where additional height maybe be appropriate.	Incentive	Low-Moderate Income
		2.4: Explore permitting allowances for cottage housing and detached/attached ADU development, and internal conversions	Creating flexibility within development codes for projects that retain existing units and character can not only result in more housing units without altering the existing context, it can also create more financial opportunity for homeowners by generating rental income, allowing them to remain in their homes long-term. The city can create specific allowances for ADUs, cottages, and internal conversions on infill lots to both support additional density while maintaining character.	Policy Change	Low-Moderate
		2.5: Consider expanding allowances for low-density middle housing into single-family zones	The city has several single-family zones, that prohibit the development of lower-density attached (or detached housing in some cases), often referred to as "middle housing". Opportunities for middle housing largely exist within the RM and RH zones. Given the widespread single-family zoning, the city could expand allowances for middle housing in these zones to increase opportunity for their development. Middle housing types could include cottages, duplexes, triplexes and townhomes.	Policy Change	All
		2.6: Incentivize accessibility and visitability standards and first floor accessible housing options for seniors	Louisville has an aging population that will have specific housing needs in order to age in place comfortably and safely. The city can consider incentivizing the development of housing units that go above and beyond accessibility requirements and that also adhere to visitability standards. Accommodating the necessary infrastructure and supportive features for accessible and visitable units requires additional space, as units typically need to be larger to accommodate things like wider doorways, specific layouts for kitchens and bathrooms, etc. These features can also increase development costs. The city could offer increased density, height bonuses, or more direct financial support in exchange for the development of accessible and visitable units.	Incentive	All
3	Facilitate Development and Preservation of Income-Restricted Housing Through Prop 123 <i>Use Prop 123 as a launch point for facilitating income-restricted affordable housing projects by supporting and adopting policies and programs for affordable housing development.</i>	3.1: Adopt regulations and programs to better support income-restricted housing development, particularly in TOD areas	The HNA demonstrates a new for housing units affordable to all income brackets below 120% AMI. It will be challenging for market-rate projects to provide enough units to meet income-restricted affordable housing goals and needs. Solely income-restricted projects that supply housing for the city's lowest income earners (60% AMI and below) will need to be part of the solution. These projects are challenging to deliver as they often require a patchwork of financial resources that can be difficult to obtain. The city can support these projects by creating flexibility within the city's regulatory environment through increased building heights and densities or reduction in open space and parking requirements. The City could also explore the option of allowing expedited permitting for qualifying projects.	Policy Change/Incentive	Low-Moderate
		3.2 Consider establishing a commercial linkage fee to provide financial support for income-restricted affordable housing projects	A commercial linkage fee is a policy tool that requires developers of new commercial projects to contribute a fee to be used to fund the construction or preservation of affordable housing units. The city could use revenues from the fee to provide direct financial support to gap finance new income-restricted housing projects or provide funding to maintain affordability in existing developments.	Financial Support	Low
		3.3: Monitoring income-restricted units for expiring subsidies and explore intervention options to maintain affordability	Rising housing costs and loss of existing income-restricted housing units could displace low-income residents. Publicly available inventories for regulated affordable units are often incomplete, lack essential data points, or are out of date. Louisville has a supply of regulated affordable housing, but to assist in their preservation, the city must understand how many units there are, their condition, subsidy expiration dates, and current ownership to accurately assess their vulnerability risk. The City should monitor existing developments and develop strategies to maintain the affordability of units where subsidies are expiring. The commercial linkage fee and/the low-income housing property tax exemption could assist with this effort.	Research/Policy Change	Low
		3.4: Establish a land banking program to support new income-restricted affordable housing projects	Land control is critical to affordable housing development because overall development costs make affordable housing development difficult or financially infeasible. Through land banking, the City can provide a pipeline of land for future development and control the type of development that may occur on that land. Cities have several options for developing or participating in a land banking program. The city could designate city-owned land as surplus and contribute that land to the land bank, eventually conveying that land to affordable housing developers or it could purchase properties directly for the purpose of building affordable housing, or it could provide funds to support land banking efforts by another organization.	Financial Support	Low

#	Strategies	Actions	Action Summary	Action Type	Income Level Served
		3.5: Adopt the low-income housing property tax exemption to financially support new projects	HB23-1184 recently expanded an existing low-income housing property tax exemption to include more nonprofit organizations that build and sell affordable housing. The exemption can last for up to 10 years and creates a new property tax exemption for land owned by community land trusts and other nonprofit affordable homeownership providers that develop permanently affordable for-sale homes. The city can adopt this tax exemption locally to assist affordable housing projects, particularly those needed under the city's commitment under Prop 123.	Financial Incentive/Support	Low
		3.6: Adopt development fee reductions and/or exemptions for income-restricted projects	The city can help reduce project costs by reducing or exempting a development from paying city-levied development fees. Reducing development costs can increase the financial viability of a project and facilitate more affordable housing production. Reduced or exempted fees could include building permit fees, utility connection fees, or impact fees.	Financial Incentive/Support	Low
4	Evaluate Land Use Procedures and Streamline Processes/Standards <i>Identify areas in the city's procedures, particularly for land use decisions, where some application types can be evaluated and decided on administratively to help streamline processes, reduce timelines and risks for new projects.</i>	4.1: Establish clear and objective development standards	In recent years, particularly in areas where housing prices have soared and development has become more expensive, cities have made efforts to streamline development processes in a variety of ways to not only help speed up housing development but also reduce its costs. Establishing clear and objective standards for new projects is one approach. Having clear and objective development standards provide transparency that can reduce uncertainty and create a more predictable process that developers can build into their financing plans. Clear standards streamline the review process by eliminating ambiguity and subjectivity, which saves time and resources for both developers and cities by reducing the need to debate interpretations.	Procedure/Policy Change	All
		4.2: Establish thresholds for development types that meet objective criteria to be reviewed and permitted administratively	The City can also consider allowing certain development types to be reviewed administratively, rather than discretionary, as an additional way to streamline the development process. By adopting clear and objective standards you increase the ability for staff to process permits administratively, include land use permits. Unlike discretionary applications, administrative applications move through the project review process more quickly. Because they do not require additional environmental analysis, planning commission recommendation, council action, or a formal public hearing, the timeline for administrative applications is often months shorter than the turnaround for discretionary entitlement applications. Discretionary processes can be unpredictable and introduce another degree of risk for projects that may already be risky, particularly for projects under today's economic conditions and affordable housing projects which are typically risky endeavors in general.	Policy Change	All
		4.3: Allow more housing types to be permitted "by-right" to reduce the need for variances or conditional uses processes	If a project meets the development standards and zoning regulations outlined in Louisville's zoning code and does not require additional or formal planning approvals, it is considered a "by-right" project, and the applicant may move directly into requesting a building permit. The city can consider allowing more housing types to be developed by-right, which will require an assessment of which standards need to be in place to make both by-right projects and projects that can be reviewed administratively possible.	Policy Evaluation/Change	All
5	Support More Flexible Infill Development <i>Adopt code amendments or expand allowances to increase flexibility for infill development where opportunities exist.</i>	5.1 Define standards in the downtown for the ground floor requirements and allow commercial or residential above, without a special review process	Community Commercial zoning designation allows multifamily development in downtown Louisville, but through a Special Review process. The Special Review process is a discretionary process that requires planning commission public hearing, review and recommendation, with city council decision. This can introduce risk for projects downtown. The city can develop standards to ensure projects can meet the community's vision for downtown while reducing the entitlement timeline and risk associated with discretionary review, increasing opportunity for more residential development downtown needed to support existing and future commercial businesses.	Procedure/Policy Change	All
		5.2 Increase height allowances to 3 stories throughout Downtown for projects that include income-restricted affordable housing units	The commercial Core Area of Downtown Louisville allows a maximum building height of 45 feet with no more than three stories. However, in the Transition Area of Downtown Louisville, the maximum building height is limited to 35 feet with no more than two stories. The City could consider incentivizing development in the transition area where height is more limited by offering a third story if the development includes affordable housing units.	Policy Change	Low
		5.3 Allow ADUs both attached and detached on all single-family lots, city-wide	ADUs offer an opportunity to increase the housing supply, especially for renters, on a small-scale and incremental way, while protecting existing community character and without putting pressure on existing infrastructure systems. It can also create more financial flexibility for homeowners to supplement their income or it can offer seniors an opportunity to downsize without selling their property or leaving their community. The city should consider allowing ADU development on single-family properties across the city to help increase housing supply and diversity and creating more flexibility for homeowners.	Policy Change	All
		5.4 Expand allowances for more stand-alone residential development in commercial areas	Commercial areas need residential development to help maintain consumer demand, but mixed-use development can be challenging and more costly for many developers to build and maintain. The City can create more opportunities for residential development in existing and future commercial areas by allowing stand-alone residential development on parcels that are not situated along major corridors. However, to maintain public realm activity, the City can consider requiring ground floor activation in stand-alone residential developments which could evolve into mixed-used spaces over time. Ground floor activation	Policy Change	All

#	Strategies	Actions	Action Summary	Action Type	Income Level Served
			techniques might include situated lobby entrances on corners, placing building amenities on the first floor like a gym or community room.		
		5.5 Lower the minimum lot size to accommodate more subdivision opportunities on large lots	Lowering minimum lot sizes in certain zones can allow some property owners the option to subdivide larger lots and add incremental density in lower density zones. This has been a popular approach for seniors who would like the opportunity to stay in their home, but may no longer need or be able to maintain the additional land. In many cases the existing home may be centered in the middle of the lot which may preclude many lots from subdividing if they desire to maintain the existing home, which would limit the scale at which subdivision would occur if this policy was implemented.	Policy Change	All
		5.6 Offer incentives for adaptive reuse projects downtown	There is a need and demand for more housing near the downtown area, and housing will generate more visitors and help stabilize and sustain downtown businesses. However, given Louisville’s unique character downtown that many community members cherish, careful consideration over how downtown grows and adapts will be crucial. The City can create more opportunity for residential development downtown by expanding allowances for it while incentivizing adaptive reuse projects that will allow for a change in use while maintaining downtown’s historical identity. Financial support through the Housing Preservation Fund could be allocated to projects that reuse existing structures while either increasing density, providing affordable housing, or changing the use to residential.	Incentive	All
6	Support the Preservation of Naturally Occurring Affordable Housing <i>Adopt programs and policies that would directly support the preservation of existing unrestricted rental housing in order to preserve affordability.</i>	6.1 Remove or raise occupancy restrictions	Occupancy restrictions for unrelated individuals can limit the number of people who can share a living space. This can limit housing options by forcing people to own or rent spaces that are too large for their needs or force people to live alone, both of which may be unaffordable to them. By removing or raising these restrictions, more individuals can share housing costs, making it more affordable for everyone involved. Additionally, not all households conform to traditional living arrangements. Raising or removing occupancy restrictions allows for greater flexibility in how people choose to live, accommodating diverse living arrangements that suit their needs and preferences.	Policy Change	All
		6.2 Explore programmatic and zoning approaches to preserving manufactured home parks	Manufactured home parks (MHPs) play a significant role in providing naturally occurring affordable housing. However, they are at risk of disappearing when property owners are tempted to sell the MHP. In order to preserve MHPs, the City should consider establishing zoning, procedures, and guidelines to assist the acquisition, purchase, and preservation of existing MHPs.	Financial Support/Policy Change	Low-Moderate
		6.3 Establish partnerships with non-profit housing providers, affordable housing providers, and/or religious organizations to support intervention efforts.	Property acquisition is one of the most effective ways for the City to advance preservation efforts, but it’s also the costliest. However, there are many partners the city could consider working directly with to help share the cost and support affordable housing preservation efforts. There are numerous ways the city could assist other organizations with property acquisition in exchange for establishing or maintaining affordability. The city could offer technical assistance, provide direct financial support to rehabilitate, upgrade, and/or acquire the property, or offer land through a land banking program, or establish a right-of-first refusal policy under HB 1190.	Policy Change/Financial Support	Low
		6.4 Create a legacy homeownership program.	The City of Boulder maintains a program known as the Housing Legacy Program which is created through the “donation” of homes or other real estate by homeowners, companies or other organizations. The program aims to create more affordable homeownership in Boulder for dedicated to those with low, moderate, and middle incomes. The City does not own the homes through this program but rather maintains a deed restriction that mandates affordability. Homeowners interested in entering their homes into the legacy program place an affordability covenant on their home.	Policy Change	Low