

SPOKANE TRANSIT AUTHORITY PLAZA OPERATIONAL ANALYSIS

Final Report

April 2019



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EXECUTIVE SUMMARY

Project Objectives

Spokane Transit Authority (STA) conducted the STA Plaza Operational Analysis project to determine how to **implement additional transit service** included in *STA Moving Forward*, the region's transit expansion plan, in and around downtown Spokane, while **shrinking the footprint of the STA Plaza**, the busiest passenger transportation center in the region. The Plaza, located in the heart of Spokane, facilitates passenger travel throughout the region, providing a place for transit customers to transfer between routes, access information, and wait comfortably for their connection. While an incredibly important facility in terms of regional mobility, STA—in cooperation with downtown community groups—committed to reducing transit use of curb space and sidewalks in front of private businesses adjacent to the Plaza.

Scope

The project included:

- Assessment of the future transit capacity needs of the Plaza and downtown Spokane given the investments committed through *STA Moving Forward*
- Development of three operational and spatial strategies to accommodate this future transit service
- Development and application of an evaluation framework to assess the strengths and weaknesses of the three strategies
- Refinement of a preferred alternative and implementation plan
- Stakeholder engagement throughout the project with City and regional planning staff (SRTC), the business community and Downtown Spokane Partnership, STA riders, and STA administration and front-line staff.

Plaza Operations and Implementation Plan

The project resulted in an operations and implementation plan that meets the objectives of the project and features fewer Plaza boarding zones that will be used more frequently. Paratransit boarding will move from Post Street to Riverside Avenue and a new early morning commuter express stop will be added to westbound Riverside Avenue. The plan will reduce the total spaces required of buses at the Plaza and the time that the buses dwell there.

STA will implement the preferred alternative in phases between summer 2019 and fall 2023 through construction activities to revise the configuration of Plaza boarding areas primarily during summer months and annual service changes in the fall to phase in transit service improvements. Key milestones include:

- Fall 2019 – Bus boarding discontinued in front of the SRBC Building
- Fall 2020 – Fixed-route bus boarding discontinued on Riverside Avenue in front of Peyton Building
- Fall 2021 – Central City Line (CCL) begins service, supported by major transit network reconfiguration and enhancements; bus boarding discontinued on Sprague Avenue in front of Peyton Building
- Fall 2023 – All STA Moving Forward service additions affecting downtown Spokane are complete

The STA Board of Directors voted unanimously to accept the Plaza Operations plan at their December 2019 meeting.

1 INTRODUCTION

The Spokane Transit Authority (STA) Plaza, located in the city's central business district, is the region's busiest passenger transportation center. Currently, 28 of STA's 40 routes affect passenger operations at or near the Plaza using a staggered pulse system to facilitate transfers. Most routes are scheduled for 5 minutes or more between arrivals and departures. This facilitates connections and in-line recovery. However, it also results in a cumulative impact on curb space, consuming loading zones at adjacent buildings; namely the Peyton Building (10 North Post Street) and the SRBC Building (801 West Riverside).

On November 8, 2016, voters approved STA Proposition 1, authorizing an increase in local sales and use tax to fund a plan - *STA Moving Forward* - to maintain, improve and expand public transit in Spokane Transit's service area. As an element of *STA Moving Forward*, and in cooperation with downtown community groups, commitments have been made to shrink the operational impact on curb space and sidewalks adjacent to the Plaza, eliminating fixed-route bus boarding on sidewalks immediately adjacent to the SRBC and Peyton buildings. The *STA Moving Forward* plan assumes restructuring of the bus network to facilitate more efficient connections for passengers at the Plaza and elsewhere, and anticipates that all routes operating with a maximum headway of 15 minutes or better will "board-and-go," or pull up to the curb, drop off passengers, pick up new passengers, and depart without extensive dwell time.

This commitment to the shrinking of operational footprint of the Plaza is the major focus of this project. In greater detail, the objective of the Spokane Transit Plaza Operational Analysis project is to craft a detailed strategy for operations at the STA Plaza that implements *STA Moving Forward* over the next five years, optimizes convenience for riders, facilitates efficient use of resources, and results in a positive outcome for all downtown street users as improvements are phased in through the year 2023. This report describes each stage of the project from an assessment of baseline conditions, re-structuring Plaza operations, and implementation phasing.

2 EXISTING AND FUTURE BASELINE CONDITIONS

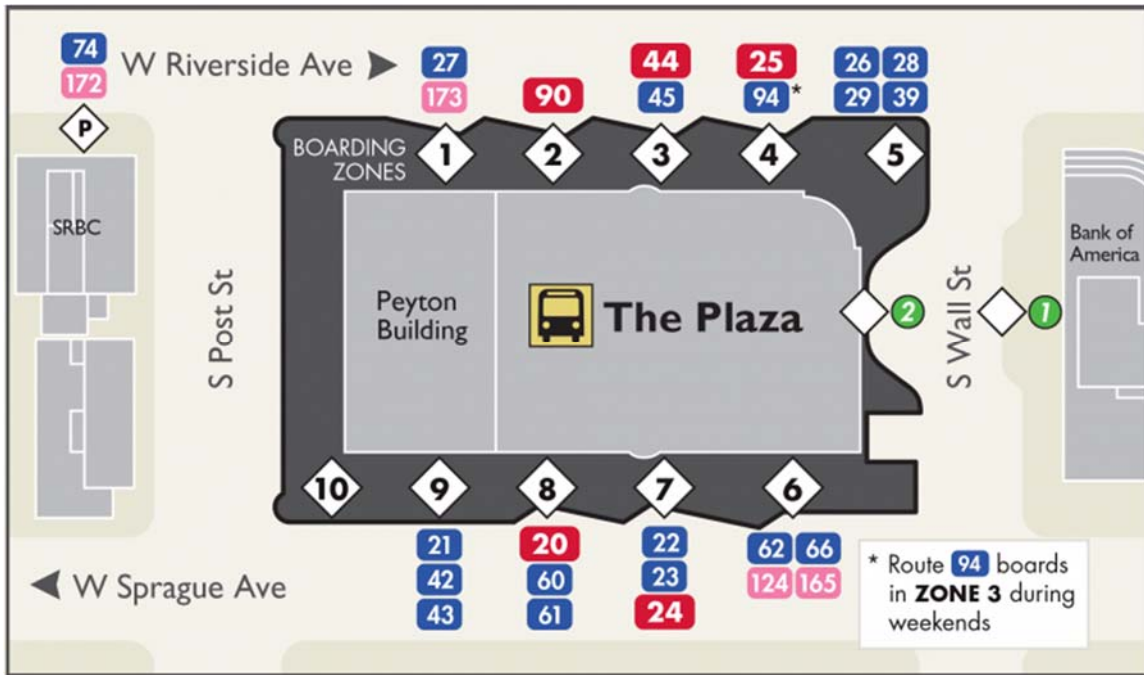
Gaining a comprehensive understanding of existing mobility conditions is vital for the identification of challenges and opportunities, and for the creation of sustainable future scenarios. In particular, a thorough assessment of life surrounding the Plaza today allows for the modeling of a future that will likely occur if no changes in transit operations are made to the Plaza. The team also created a future baseline for downtown street operations to account for background traffic and pedestrian growth and planned street and traffic modifications.

This section presents this documentation of existing fixed-route scheduling and service characteristics and the “future baseline” case in which service enhancements from *STA Moving Forward* are implemented but no changes are made to Plaza operations (i.e., boarding continues in front of the SRBC and Peyton Building). The latter provides the baseline against which all subsequent scenarios were benchmarked. In addition to transit operational and scheduling information, a base network of traffic and pedestrian volumes and signal operations were assessed for downtown Spokane. Detailed operational and traffic analyses can be found in Appendices A and B.

Existing Operations

At the commencement of the Plaza Operational Analysis project in December 2017, the project team determined that the “current” existing condition would be defined by the operational details of the January-May 2018 service period, or markup. This markup included 28 routes serving the Plaza, departing from the boarding zones shown in Figure 1. The figure shows boarding zone P in front of the SRBC, and zones 1, 9, and 10 adjacent to the Peyton Building. All other zones are considered to be within the Plaza footprint, including the two zones on Wall Street.

Figure 1 Existing Plaza Configuration and Routes/Zones (2018)



Source: Spokane Transit Authority, 2018

Network changes associated with STA Moving Forward

The Future Baseline scenario for the STA Plaza Operational Analysis includes the route enhancements and network changes proposed in *STA Moving Forward*. These include the changes in Figure 2.

Figure 2 STA Moving Forward Service Change Assumptions affecting the Plaza

Route	Change
Central City Line	New, high performance transit line implemented with service every 7.5-15 minutes at most times of day, 7 days a week
11 Plaza/Arena Shuttle	Increased peak and weeknight frequency
12 Southside Medical Shuttle	Increased peak frequency
21 West Broadway	Increased frequency 7 days a week
26 Lidgerwood	Route restructure, will no longer serve Plaza
28 Nevada	Route restructure, will no longer serve Plaza
36 17 th Ave	New route serving Plaza with Basic level of service
39 Mission	Route eliminated; service area covered by new/adjusted routes
44 29 th Ave	Increased frequency during weekday nights and weekends
60 Airport via Browne's Addition	Route combined with restructured Route 61
61 Hwy 2 via Browne's Addition	Route restructured and increased frequency 7 days a week
62 Medical Lake	Route no longer serves the Plaza
66 Cheney	Increased AM Peak frequency and off-peak frequency when EWU in session
74 Mirabeau/Liberty Lake	Increased peak frequency
144 South Express	New express route with 15-minute peak service
165 Cheney Express	Route eliminated; service area covered by restructured routes
190 Valley Express	New express route with 15-minute peak service

Figure 3 shows bus volumes at the Plaza in the existing condition (2018) and future baseline case (2021), as well as the change in buses per hour at the Plaza in that timeframe. The morning peak period is expected to experience the most significant change in volume, with an additional 12 buses per hour serving the Plaza between approximately 5:00 a.m. and 8:00 a.m. Monday through Friday, increasing the total throughput during that period from 83 to 95 buses per hour.

Figure 3 Bus Volumes at the Plaza: Existing and Future Baseline (In Service Buses per Hour)

Day Type & Period	Existing Condition (2018) Buses/Hour	Future Baseline (2021) Buses/Hour	Change in Buses/Hour
Weekday AM Peak	83	95	+12
Weekday Midday	62	62	0
Weekday PM Peak	77	86	+9
Weekday Night	26	32	+6
Saturday Day	31	33	+2
Saturday Night	24	26	+2
Sunday Day	24	28	+4
Sunday Night	1	13	+12

Future Baseline Operations and Plaza Physical Changes

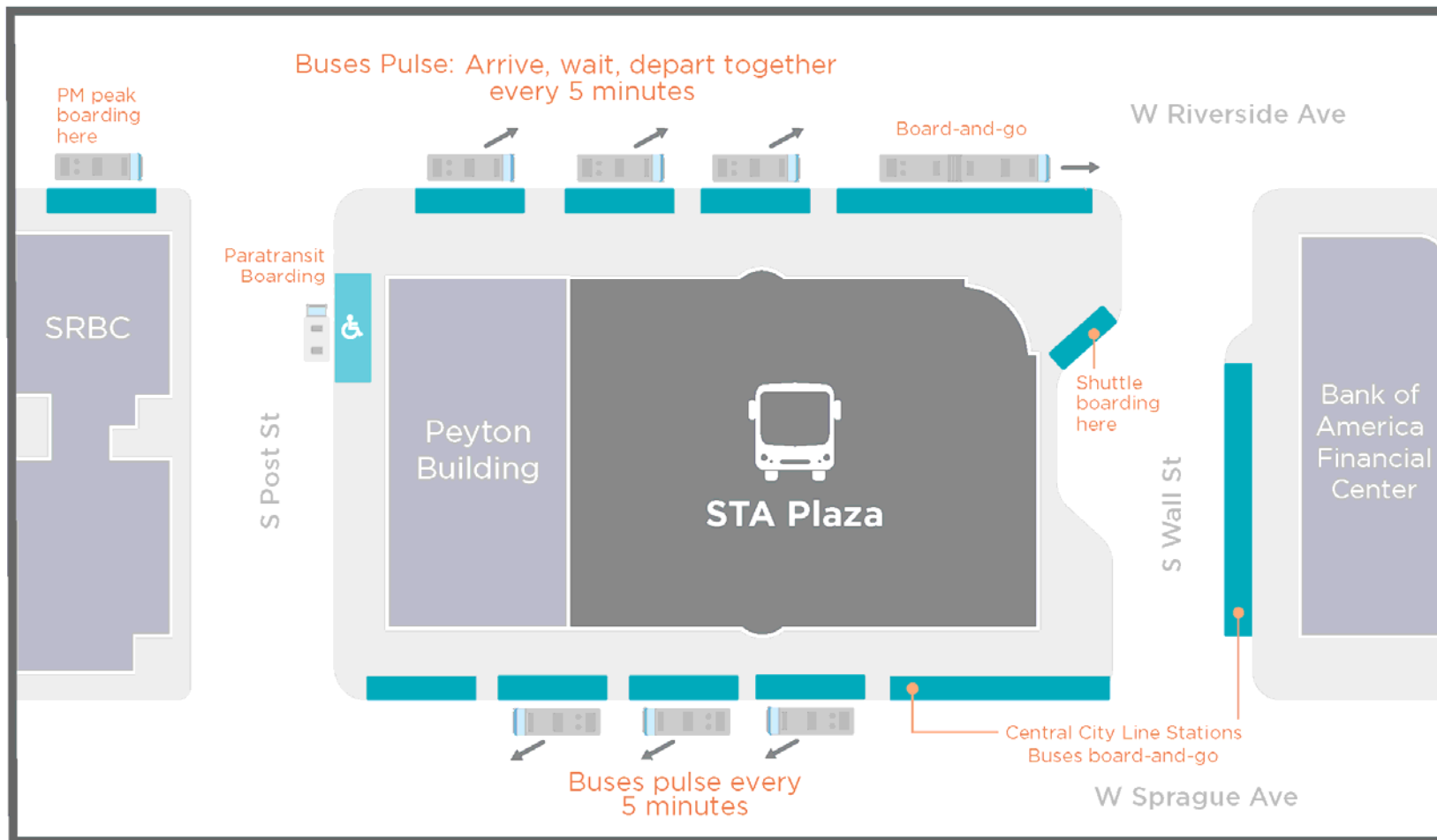
The Future Baseline case represents how the Plaza would operate without significant changes to operational practices or existing (2018) curb uses, but with higher service levels (e.g., more transit activity) included in *STA Moving Forward* through the year 2021 and summarized in Figure 3 above. The future baseline case maintains active boarding zones in front of the SRBC and Peyton Building. It assumes that the boarding zones 4 and 5 are consolidated into a single boarding zone to be used for High Performance Transit (HPT) service that operates every 15 minutes or better. The future baseline also assumes that zone 6 on Sprague Avenue and the northbound zone on Wall Street are converted to Central City Line (CCL) stations, which are elongated bus zones with higher curbs so that the floor of the bus is level with the curb for easier passenger boarding and alighting.

In the future baseline scenario, all three of these zones (new zone 4-5, zone 6, and Wall northbound) would operate under the “board-and-go” service model where transit vehicles pull up to the curb, alight passengers, board new passengers, and depart without dwelling at the curb. Remaining zones would continue to use the existing pulse service model where several buses arrive, dwell for a number of minutes, and depart at the same time. In the future baseline scenario it is assumed with the greater volume of vehicles that the frequency of pulses would increase to approximately every five minutes (compared to every seven to eight minutes today). Figure 4 below presents a schematic of operations under the future baseline scenario.

A technical memo included as Appendix A to this report describes the modeling process used to model operations of the future baseline scenario.

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Figure 4 Future Baseline Case Operations at STA Plaza – Schematic



Existing and Future Baseline Traffic

This section describes the results of the evaluation of traffic conditions for buses and autos at intersections surrounding the Plaza. This analysis was conducted for the 2016 Existing Condition and the Future Baseline scenario described above. A detailed technical memorandum on traffic modeling is included as Appendix B to this report.

Traffic Analysis Methods

Model Parameters and Techniques

Synchro Studio version 9 was used for intersection capacity analysis. Measures of Effectiveness (MOE) from Synchro include: average vehicle delay, signalized intersection Level of Service (LOS), and volume-capacity ratio (v/c).

A Synchro network of downtown Spokane developed to analyze the Central City Line (CCL) project was used as a base model for this project. For the Plaza analysis, two scenarios were analyzed: 2016 Existing Condition and 2022 Baseline. The future baseline was set at 2022 because the project aimed to evaluate conditions after the implementation of the CCL and associated physical changes to the Plaza in 2021. 2022 is the first full year after implementation of these changes.

General purpose traffic volumes for the 2022 Baseline scenario were developed by interpolating between the CCL project's 2016 Existing Condition and 2040 Baseline turning movement volumes. This resulted in approximately a 1% annual growth rate applied to 2016 Existing Condition traffic volumes.

Study Intersections and Analysis Time Period

For this Synchro study, six study area intersections were chosen for the analysis focused around the Spokane Transit Plaza during the PM peak hour. Figure 5 outlines these study intersections and traffic control type that is in place.

Figure 5 Study Intersections

ID	North-South Road	East-West Road	Control Type
1	Lincoln Street	Riverside Avenue	Signal
2	Post Street	Riverside Avenue	Signal
3	Wall Street	Riverside Avenue	Signal
4	Lincoln Street	Sprague Avenue	Signal
5	Post Street	Sprague Avenue	Signal
6	Wall Street	Sprague Avenue	Signal

Traffic Analysis Results

Existing Intersection Results

Results for overall intersection LOS, average vehicular delay, and v/c for the Existing 2016 PM peak hour are presented in Figure 6 below. All study intersections in the 2016 Existing Condition operate with low average vehicular delay. Each study intersection operates at LOS B or better in existing PM peak hour.

Figure 6 2016 PM Existing Condition Intersection LOS, Delay, v/c Ratio

ID	North-South Road	East-West Road	2016 PM Existing		
			LOS	Delay (sec/veh)	v/c
1	Lincoln Street	Riverside Avenue	A	8	0.41
2	Post Street	Riverside Avenue	A	6	0.27
3	Wall Street	Riverside Avenue	A	9	0.22
4	Lincoln Street	Sprague Avenue	A	8	0.47
5	Post Street	Sprague Avenue	A	8	0.30
6	Wall Street	Sprague Avenue	B	12	0.42

2022 Baseline Intersection Results

Results for overall intersection LOS, average vehicular delay, and v/c for the 2022 Baseline PM peak hour are presented in Figure 7. All study intersections in the 2022 Baseline operate at LOS B or better, with slightly higher average vehicular delay compared to the 2016 Existing Condition. The 1% annual growth in traffic volumes and localized shift in bus volumes between 2016 Existing Condition and 2022 Baseline will have a negligible impact to traffic operations.

Each of the scenarios described in Section 3 were evaluated for traffic impacts as part of the “Downtown Community” evaluation account described in Section 4. The evaluation resulted in negligible changes from the Future Baseline scenario.

Figure 7 2022 PM Baseline Intersection LOS, Delay, v/c Ratio

ID	North-South Road	East-West Road	2022 PM Baseline		
			LOS	Delay (sec/veh)	v/c
1	Lincoln Street	Riverside Avenue	A	9	0.44
2	Post Street	Riverside Avenue	A	6	0.28
3	Wall Street	Riverside Avenue	A	9	0.25
4	Lincoln Street	Sprague Avenue	A	9	0.50
5	Post Street	Sprague Avenue	A	8	0.32
6	Wall Street	Sprague Avenue	B	12	0.44

Summary and Conclusions

The intersections surrounding the Spokane Transit Plaza operate with overall low average vehicular delay during the PM peak hour in the 2016 Existing Condition and 2022 Baseline. The traffic analysis indicates that intersections adjacent to the Plaza can accommodate, with minimal overall impact, the proposed modifications of transit routes and background growth of traffic volumes.

While at an overall level the analyzed intersections near the Spokane Transit Plaza are expected to operate under capacity, the Synchro traffic analysis software lacks the capability to isolate delays

specific to transit vehicles. To fully assess the relative differences in transit travel time and delay, it would be beneficial to analyze 2016 Existing Condition and 2022 Baseline with a microsimulation tool, such as VISSIM, particularly in light of the city's plans for Riverside.

3 SCENARIOS FOR FUTURE OPERATIONS

To assess alternative approaches to the problem of accommodating increased bus and passenger volume while simultaneously shrinking the physical footprint of the Plaza, an alternative or scenario planning approach was utilized. The objective in using alternatives to reach a single preferred strategy was to reveal the dynamics and trade-offs of various approaches to the problem and use the insights gained in the analysis to reach sustainable solutions to the challenges at hand. Additionally, alternatives help stakeholders see issues from varied vantage points, prioritize different goals, and see how different development paths might affect the future. This project used the technique of Multiple Account Evaluation to assist in this assessment process, which is detailed in Chapter 4 of this report.

With this in mind, three different strategies, or alternatives, were created to model potential future operations at the STA Plaza. Each strategy deployed a different set of key operational components and was then compared to the Future Baseline case, which was presented in the previous section.

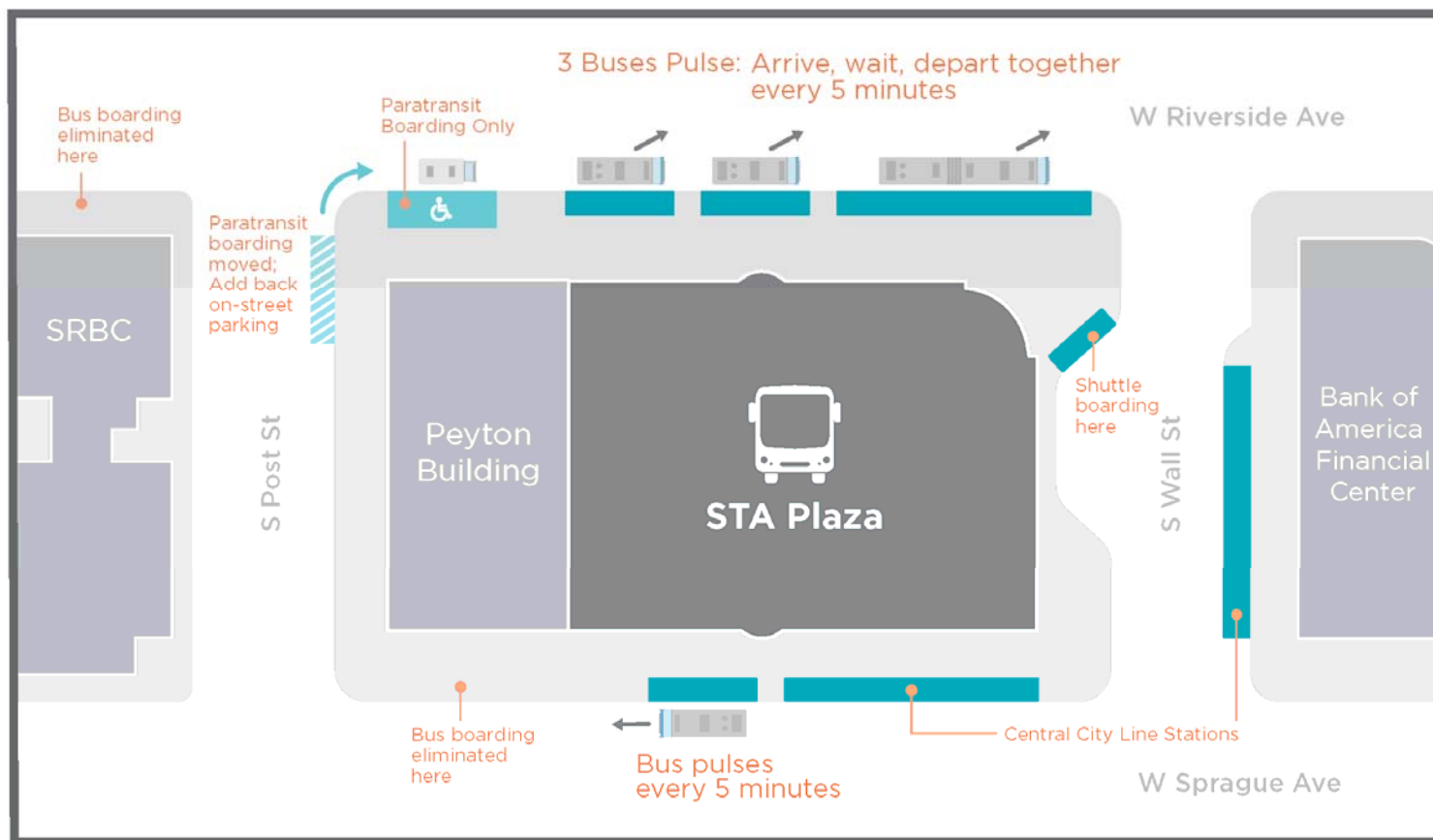
- **Strategy 1** presents the option for fewer boarding zones with intensified use.
- **Strategy 2** presents fewer boarding zones with fewer routes serving the Plaza.
- **Strategy 3** proposes a 100% board-and-go system.

Each strategy excels at optimizing some of *STA Moving Forward's* objectives and falls short of others. These tradeoffs are described and summarized in this section.

Strategy 1: Fewer Boarding Zones with Intensified Use

In Strategy 1 (Figure 8), service improvements from *STA Moving Forward* are implemented while the number of passenger zones decreases and is limited to those directly adjacent to the Plaza building and northbound Wall Street between Riverside and Sprague. It removes boarding activity from in front of the Peyton Building and SRBC. To accommodate higher volumes of buses in fewer zones, this strategy would increase the number of “pulses” – times when a group of buses arrive, wait, and depart – to every 5 minutes, instead of its current 7-8 minutes.

Figure 8 Strategy 1 Operations at STA Plaza – Schematic

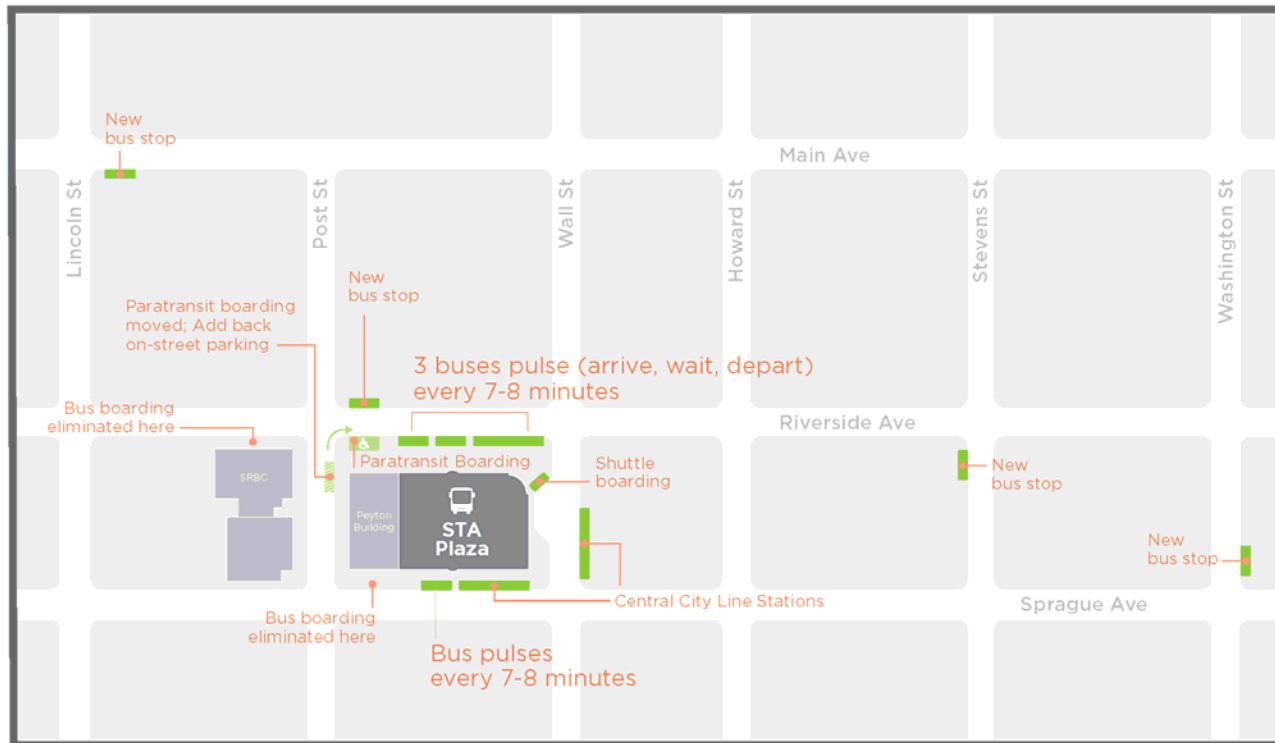


Strategy 2: Fewer Boarding Zones with Fewer Routes Served

Strategy 2 (Figure 9) implements all improvements from *STA Moving Forward* while the number of passenger zones decreases and is limited to those adjacent to the Plaza, northbound Wall between Riverside and Sprague, and four new downtown bus stops to serve routes that would be moved away from the Plaza: (1) eastbound Main Avenue just east of Lincoln Street; (2) westbound Riverside Avenue just east of Post Street; (3) southbound Stevens Street just south of Riverside Avenue; (4) northbound Washington Street just north of Sprague Avenue.

Similar to Strategy 1, boarding activity would be eliminated in front of the Peyton Building and SRBC. Buses would “pulse” (a few buses arrive, wait, and depart together) every 7-8 minutes, similar to today. Transit riders that need to connect between routes that serve the Plaza and routes that do not would have to walk two to four blocks to connect.

Figure 9 Strategy 2 Operations at STA Plaza – Schematic

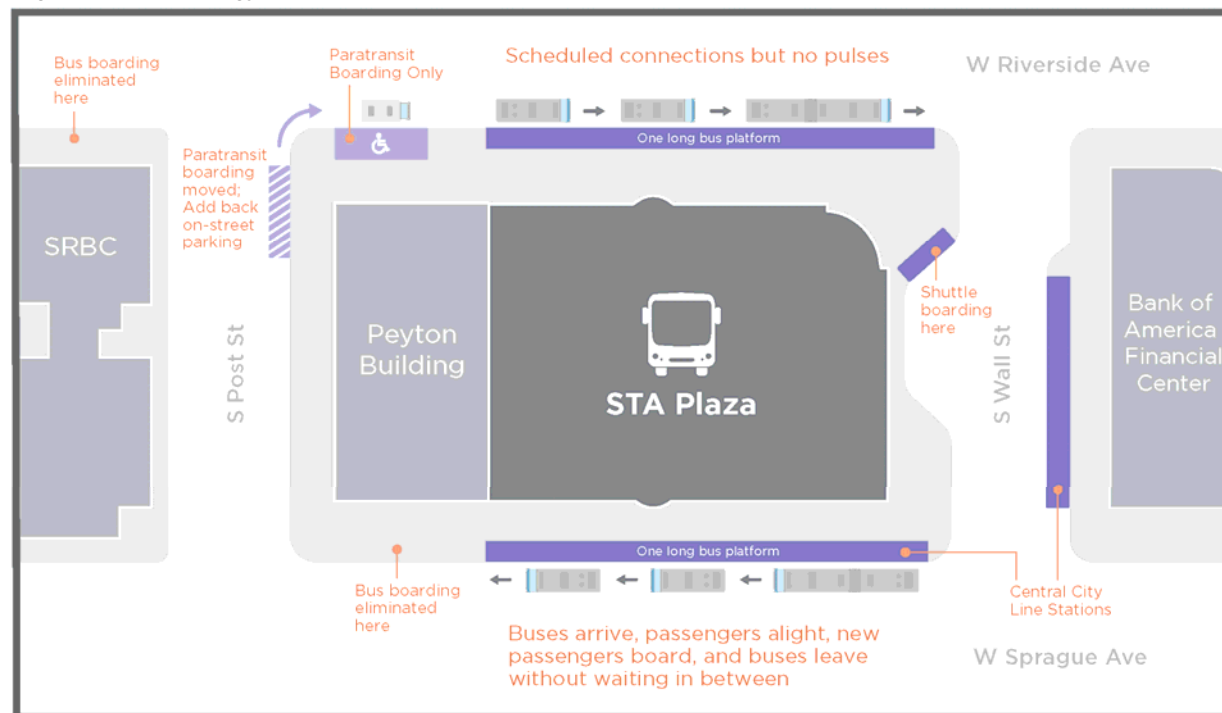


Strategy 3: Super Zones with Board-and-Go

Strategy 3 (Figure 10) also implements all improvements from *STA Moving Forward*, removes boarding activity from in front of the Peyton Building and SRBC, and limits boardings and alightings to zones adjacent to the Plaza building and northbound Wall Street between Riverside and Sprague. However, this strategy further consolidates passenger zones to a single, long bus platform in front of the Plaza on both Riverside Avenue and Sprague Avenue.

Unlike current operations and Strategies 1 and 2, buses would not be assigned specific zones, but instead would pull to the front of the boarding area, drop off passengers, board new passengers, and depart without waiting – otherwise known as “board-and-go.” Buses would still be scheduled to maintain connections to some degree, but would not arrive, wait, and depart as groups.

Figure 10 Strategy 3 Operations at STA Plaza – Schematic



Summary of Alternatives

Figure 11 below summarizes the strategies described above, organizing them by a set of five key characteristics: (1) Plaza zone assignments and geometrics; (2) schedule and pulse patterns; (3) network design; (4) fare and passenger transactions; and (5) other changes.

Figure 11 Summary of Alternatives by Key Characteristics

Key Characteristic	Alternative			
	BASELINE: Keep operations mostly the same	STRATEGY 1: Fewer Boarding Zones Used More Intensely	STRATEGY 2: Fewer Boarding Zones, Fewer Routes Serve the Plaza	STRATEGY 3: Super Zones - All Routes Board and Go
Plaza zone assignments and geometrics	Minor changes to accommodate higher volumes	Some reassignment of zones; some layovers moved away from plaza. May require removing all sawtooth bays	Plaza reserved for routes with high volume of transfers Some routes moved away from Plaza but still serve downtown streets	Major changes due to no plaza layover. May require removing all sawtooth bays
Schedule and pulse patterns	Minor changes to accommodate higher volumes	12 pulses per hour; minimal dwell at Plaza for pass-through routes (CCL, Monroe-Regal)	Minor changes but same number of pulses as today (max 8/hr.) at Plaza	No pulses. Schedules coordinated to accommodate high-volume transfers.
Network design	As envisioned in STAMF Plan but no additional modifications	As envisioned in <i>STA Moving Forward</i> with some operational modifications to accommodate fewer zones	Maintains integrity of <i>STA Moving Forward</i> but with network and operational modifications	As envisioned in <i>STA Moving Forward</i> with operational modifications, but few network modifications
Fare and passenger transactions	No changes	High Performance Transit (HPT) routes with back door fare validation	Perhaps all routes with all door boarding at Plaza	Perhaps all routes with all door boarding at Plaza
Other changes	None	All passenger boarding in Plaza zones only (no boarding in zones P/1/9/10)	All passenger boarding in Plaza zones only (no boarding in zones P/1/9/10). New alighting only zones on WB Riverside.	All passenger boarding in Plaza zones only (no boarding in zones P/1/9/10)

4 EVALUATION OF ALTERNATIVES

To evaluate each strategy, the project team employed the Multiple Account Evaluation method, which allows mixing of quantitative and qualitative evaluation criteria without one set of criteria overshadowing the other. While this technique does not result in the more typical singular numeric evaluation of alternatives, it does allow stakeholders and decision makers the ability to carefully weigh trade-offs of non-quantifiable community impacts versus the impacts that can be readily translated into quantitative comparisons.

For this project, four accounts were used: Regional Community, Downtown Community, Environment, and Transit Efficiency, all of which are further defined within this section. Each of these are important and are of different values to different constituencies. The accounts, and the criteria that describe them, were first established through a workshop process with STA and consulting team staff, then vetted through the Technical Team and STA leadership before being finalized. A tabular summary of this evaluation methodology can be found in Appendix C.

Account 1: Regional Community

The Regional Community account considers impacts to current and future riders of the transit system. Figure 12 below lists each criterion in this account along with a criterion description.

Figure 12 Regional Community Criteria Descriptions

Criteria	Description
Transit ridership	Strategy's expected influence on transit ridership
On-time performance	Qualitative description of the likely impacts to on-time performance of each strategy
Connectivity Index	Quantitative measure of ability to transfer between routes based on opportunities, time, and importance, e.g., larger volume and more important transfers have greater weight
Transfer distance	Measure of change in distance for customers to walk between buses
Travel time	Measure of change in travel time for a cross-section of common trips
System legibility	Qualitative assessment of how the strategy affects how a new or current rider understands how to use the system
Ride experience	Qualitative assessment of how the strategy affects perceived safety and quality of experience, e.g. transfers on a downtown street vs. at the Plaza: is a street crossing introduced?
Accessibility	Qualitative assessment of how the alternative affects accessibility of the transit system for people with disabilities

Account 2: Downtown Community

The Downtown Community account evaluates impacts to people and businesses in downtown Spokane. The criteria in this account pay specific attention to impacts along downtown business frontages, such as passenger activity (waiting, boarding, alighting) and vehicles dwelling (waiting) at the curb. It also considers impacts to parking and bicycle facilities. Figure 13 below provides a description of each criterion in this account.

Figure 13 Downtown Community Criteria Descriptions

Criteria	Description
Pedestrian level of service in transit boarding areas	How much congestion is expected in transit boarding areas
Curb space and dwell time for transit vehicles along business frontage	Length of curb space (feet) and amount of dwell time (minutes) occupied by transit vehicles
Changes to auto level of service at affected intersections	How changes in bus volumes and pathways affect intersection level of service (LOS)
Transit vehicle accumulations at particular nodes	Qualitative measure of how different strategies disperse layover in other downtown locations not currently used for layover
Out of service miles downtown	Measure of how much maneuvering transit vehicles would need to do to position themselves for revenue service
Passenger boarding volumes	Number of people expected to board in downtown transit zones along private business frontage
Passenger drop-off volumes	Number of people expected to alight in downtown transit zones along private business frontage
Compatibility with land use transition from institutional to retail	Qualitative assessment of how alternatives fit with the changing character of downtown and Riverside Avenue in particular
Parking impacts	Expected change in number of on-street parking spaces by type (commercial loading, meter, etc.)
Bicycle facility impacts	Expected impacts on existing or planned bicycle lanes or other facilities, e.g. on-street bikeshare corrals.

Account 3: Environment

The third account evaluates each strategy based on anticipated environmental impacts, primarily related to air quality impacts of vehicle emissions. Figure 14 below provides descriptions for each environmental criterion.

Figure 14 Environment Criteria Descriptions

Criteria	Description
Adaptability to battery buses	Ability of Scenario to accommodate wayside charging
Downtown dwell times	Measure in minutes of the accumulation of all dwell times when buses are at the curb idling – a proxy for vehicle emissions
Number of buses entering downtown core	Number of buses that enter Spokane’s downtown core as part of regular in-service trips or deadhead/not-in-service trips.

Account 4: Transit Efficiency

The criteria in the Transit Efficiency account are related to the relative efficiency in use of transit resources – both operating and capital – likely to result from the implementation of each strategy. Figure 15 below summarizes each transit efficiency criterion.













Figure 15 Transit Efficiency Criteria Descriptions

Criteria	Description
Vehicle hours	Total hours vehicles are on the road
In-service hours	Hours vehicles are providing service (as opposed to “deadheading” or positioning the bus to provide passenger service)
Number of transit vehicles required	Number of vehicles required to provide the future baseline level of service with the strategy in place
Distribution of layover time: downtown versus other locations	Spatial and temporal measure of transit vehicle layover distribution, i.e., where and when vehicles lay over (wait to begin their next trip) with each strategy in place
Impact on operator work shifts	Change in the quality and/or quantity of operator work shifts caused by implementation of the strategy
Capital investment required	Measure of new capital (non-vehicle) investment required by the strategy that is not presently planned in <i>STA Moving Forward</i> , e.g. new layover or transfer facilities, upgrading stops for increased anticipated passenger volumes
O&M costs for new facilities	Cost of maintenance and security needed to address higher volumes of passengers or new passenger facilities that would otherwise not be expended

Evaluation Results

Figure 16 below summarizes the evaluation results for each account within each strategy. In most cases the evaluation was based on a comparison to the Baseline scenario. In other words, in this account, is this strategy a positive or negative change relative to the Baseline? A closer explanation of the scoring follows the figure. For extended scoring, see Appendix D.

Figure 16 Evaluation Results as Compared to the Baseline Alternative

ACCOUNT	Strategy 1	Strategy 2	Strategy 3
Regional Community			
Downtown Community			
Environment			
Transit Efficiency			

Regional Community

Strategy 1 – As this strategy largely compresses the current operation into a smaller physical space, it offers benefits for transit riders in terms of shorter distances between buses and shorter wait times. A notable potential negative of this strategy is a higher probability that reliability, or on-time performance, of the system would be degraded based on less “slack” in the system at the downtown end of trips.

Strategy 2 – In all but one criteria, on-time performance, this strategy proves to offer less convenience to current transit riders, in particular those who transfer between routes in downtown. For those who might be travelling through downtown on one of the joined together pairs of routes that are the basis of this strategy, service would be better. Service may also be better for people with destinations in different portions of downtown who happen to ride the routes that would be moved away from the Plaza AND where the move puts them closer to their destination. However, for those who transfer, travel times and travel distances would increase for the riders in an amount that would be quite detectable to almost all riders. For riders with disabilities who also transfer, navigating between stops could be a substantial challenge. The other less desirable consequence is that during hours of less intense transit operations, such as nights and weekends, the newly established bus stops will have less intensity in terms of passengers waiting. Most often transit riders feel less secure when there are fewer people present at a waiting location. The dispersal of the system does offer the benefit of reducing the potential for routes that experience delays to impact the operations of other routes, but by comparison to the less desirable consequences of this strategy, those benefits are of small consequence.

Strategy 3 – Generally this strategy is equal to or better than the baseline operation. There are three rider experience areas where there are potential negative consequences. One of those areas is in connectivity. While Strategy 1 offers greater connectivity, this strategy degrades connectivity by about 5% compared to the baseline. Similar to Strategy 1, this strategy also increases opportunity for compounding delays on one route to impact services on another route and would, therefore, be somewhat less reliable. System legibility is also a potential issue, but it is one that is “different” than today, as opposed to a degradation. Today, a rider travels to a particular location on the Plaza to board a specific route. In this strategy, a rider would go to either Sprague or Riverside to find a specific departing route, but would be required to find the specific route from among, potentially, up to three buses. This type of operation is common in many transit systems, but increases the challenges for riders with visual or cognitive disabilities, or those who are less comfortable with dynamic situations. Riders would be required to assess a more dynamic situation in real time; that is, to pick their bus out along about 200 feet of curb line, rather than travel to a specific boarding location.

Downtown Community

From a street operations perspective, measured by intersection level of service, none of the three strategies offer measureable benefit or disadvantage compared to the baseline operation. There may be perceptual differences between the three, but the current state of traffic modeling is unable to replicate or detect this level of difference.

Strategy 1 and Strategy 3 – These two strategies operate nearly identically and overall create positive benefits to the downtown community in terms of reducing the transit footprint in downtown. While the sidewalk area surrounding the Plaza would intensify in terms of the number of people waiting, boarding, and alighting from buses, the area has adequate waiting and sidewalk area to accommodate this increased activity, at least within projections of passenger activity for *STA Moving Forward*. Pedestrian level of service would degrade very slightly, but not enough to be considered a lower level of service per industry standards. One area where these two strategies offer less potential is in terms of increasing pedestrian activity along new frontages in downtown. On the other hand, both strategies reduce the level of transit activity that occurs adjacent to downtown businesses. These strategies also create the potential to slightly increase on-street parking.

Strategy 2 – Compared to today’s operation, this strategy explores the potential for dispersing transit activity over a larger area in downtown Spokane. The tradeoff is increased pedestrian activity and accessibility in some parts of downtown, but at the cost of removing some on-street parking to establish new bus zones. One of the criteria also measures the change in level of transit activity adjacent to business frontage. This strategy increases the amount of transit activity adjacent to businesses, deemed to be a less desirable outcome.

Environment

None of the strategies demonstrate a notable change in the criteria established to evaluate environmental factors. **Strategies 1 and 3** offer the potential to move some bus idling away from the centralized location of the Plaza into locations outside downtown. **Strategy 2** would retain about the same level of idle time within the downtown core, although a somewhat more dispersed locations. **Strategy 3** offers the potential for more efficient deployment of electric buses if STA chooses to use on-line charging as a deployment strategy. This advantage disappears if STA moves to a strategy that deploys “depot charging” where buses are re-charged in the same

way as they are re-fueled today. The unknown is the extent to which battery technology will direct this choice in the next five years. Thus, this is a relatively small advantage for **Strategy 3**.

Transit Efficiency

Strategy 1 – This strategy performs somewhat less efficiently than the baseline in terms of bus operating hours and the number of buses required. However, in terms of increases in capital and operating costs, it is the closest to the baseline. This strategy could be implemented within the bounds of changes already forecasted in *STA Moving Forward*.

Strategy 2 – Operationally, this strategy is very close to the baseline in terms of bus operating hours and number of buses required. However, this strategy has the greatest potential for increases in capital and operating costs. The strategy assumes the location of new, substantial, transit facilities in downtown Spokane beyond those assumed in *STA Moving Forward*. This increases both capital costs and operating and maintenance costs to care for and secure the new facilities. The bus operating costs for this strategy are not substantially different than the other two strategies, the differences are all based on the need to construct and maintain new downtown bus facilities.

Strategy 3 – This strategy appears to be the most operationally efficient of the three strategies in terms of bus operating hours and number of buses required. By that measure, it is also the closest to the baseline operation. However, this strategy assumes the development of two or more layover locations at the periphery of downtown.

Overall – Impact on Operator Work Shifts – The project was not scoped to do a mock runcut for any of the alternatives or the preferred alternative. However, the changes in Plaza operations contemplated by these alternatives are not forecasted to have any more impact on operator shifts than increasing the level of service in the system as a whole. Yes, operator shifts may change, but it will be impossible to tell if that is the result of service expansion or Plaza operations. If it were possible to control for service increases, the types of changes being implemented at the Plaza would have little to no overall impact on operator shifts.

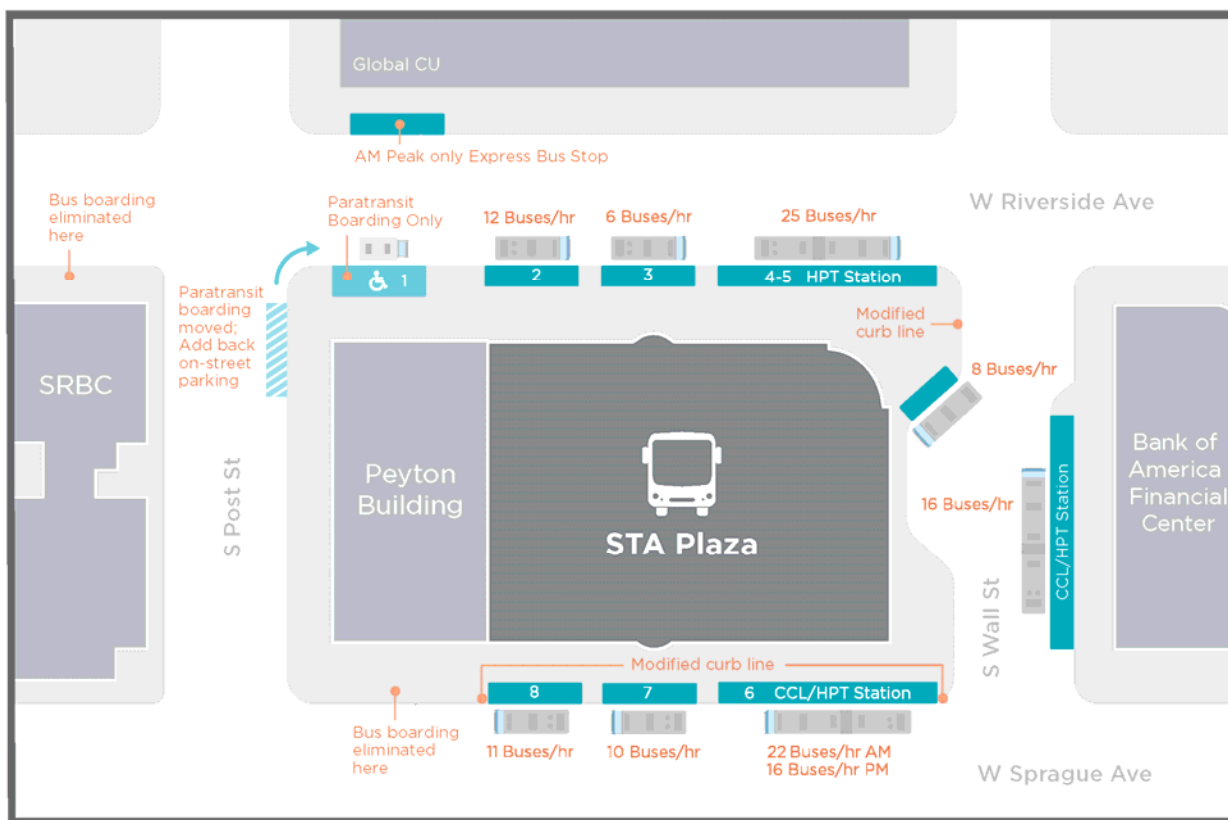
5 PREFERRED ALTERNATIVE

From the evaluation and subsequent stakeholder engagement process, the most advantageous portions of each strategy were combined to form a Preferred Alternative. This section describes analytical work and summarizes findings and development of the preferred option for the future operations of the STA Plaza. The crafting of this preferred strategy involved continued evaluation and some reorganization of routes to address capacity issues surrounding the Plaza. This strategy assumes full build-out of the *STA Moving Forward* plan.

Preferred Plan

The preferred alternative operations are confined completely to the transit facilities immediately adjacent to the Plaza and have been designed to discontinue boarding activity at stops adjacent to the SRBC and Peyton Building. The one exception is the assumption that Zone 1, at the corner of Riverside Avenue and Post Street, will be used for paratransit operation, which is currently operating on northbound Post Street just south of the intersection with Riverside Avenue. Alighting activity, though unscheduled, will continue in front of the SRBC and in Zone 1. Figure 17 provides a schematic diagram of the preferred alternative.

Figure 17 Preferred Plan at STA Plaza – Schematic



Bay Assignments

Zone 1: Paratransit boarding/alighting zone

Zone 2: Routes 27, 74, 172

Zone 3: Routes 29, 36, and 94

Zone 4-5: Routes 25, 44, 90, 144, 190

Zone 6: Routes 20, 66, CCL

Zone 7: Routes 21, 61

Zone 8: Routes 22, 23, 24, 124

Wall Street Southbound: 12, 42, 43

Wall Street Northbound: 11, CCL

Scheduling

STA's portfolio of routes serving the Plaza includes routes that operate every 30 minutes for most of the day (Basic), routes that operate every 15 minutes or better most of the day (Frequent) and weekday, peak-only, limited-stop routes that primarily serve longer-distance commute and school trips (Express)

All Basic routes are scheduled to leave on a pulse (several buses arrive, wait at the curb until a specified time, board passengers, and depart at the same time) with five minutes of dwell time, similar to how most Plaza routes operate today. Pulses are coordinated to maximize transfers for the routes with the greatest number of transfers between them.

All other routes are set to have regular headways, but are not pulsed, nor will they have extended dwell times. These routes would approach the zone, alight passengers, board passengers and leave immediately (board-and-go). The capacity of Zones 4-5 and 6 is such that successful operations in those zones depends on minimizing dwell time. Excessive dwell time in these two zones, in particular, will lead to buses arriving at the Plaza with no zone available to them.

Arriving routes scheduled to board-and-go either wait for up to 2 minutes to become another route and depart, or alight passengers and leave immediately for an off-Plaza layover location. In addition, the following interlines were created in both directions. These routes all arrive, dwell for five minutes, then depart as the next route:

- Route 22 with Route 27
- Route 29 with Route 43
- Route 23 with Route 94
- Route 36 with Route 42

The following route pairs will also be interlined, but dwell times will be restricted to only what is needed to conduct passenger alighting and boarding:

- Route 25 with Route 20 - this interline will only happen during the core of the day on weekdays. At other times they will operate independently.
- Route 124 with Route 144

Schedule Templates

The following schedule templates summarize how Plaza operations would work in 2023 in the AM and PM Peak in the preferred scenario. Full templates are provided in Appendix A. *Note: DH stands for Deadhead; vehicle is arriving from or departing to layover. Pull-out refers to a vehicle that is arriving from base.*

Figure 18 Riverside Zone 2 Weekday Schedule Templates – AM and PM Peak Hour

AM Peak					PM Peak				
Arriving Route	Arrival Time	Departing Route	Departure Time	Dwell	Arriving Route	Arrival Time	Departing Route	Departure Time	Dwell
61	7:08	74	7:10	0:02	61	16:08	172	16:10	0:02
22	7:15	27	7:20	0:05	DH	16:10	74	16:10	0:00
61	7:23	74	7:25	0:02	22	16:15	27	16:20	0:05
61	7:38	74	7:40	0:02	190	16:22	172	16:22	0:00
22	7:45	27	7:50	0:05	61	16:23	74	16:25	0:02
61	7:53	74	7:55	0:02	61	16:38	74	16:40	0:02
					DH	16:40	172	16:40	0:00
					22	16:45	27	16:50	0:05
					190	16:52	172	16:52	0:00
					61	16:53	74	16:55	0:02

Figure 19 Riverside Zone 3 Weekday Schedule Templates – AM and PM Peak Hour

AM Peak					PM Peak				
Arriving Route	Arrival Time	Departing Route	Departure Time	Dwell	Arriving Route	Arrival Time	Departing Route	Departure Time	Dwell
23	7:00	94	7:05	0:05	23	16:00	94	16:05	0:05
42	7:07	36	7:12	0:05	42	16:07	36	16:12	0:05
43	7:15	29	7:20	0:05	43	16:15	29	16:20	0:05
23	7:30	94	7:35	0:05	23	16:30	94	16:35	0:05
42	7:37	36	7:42	0:05	42	16:37	36	16:42	0:05
43	7:45	29	7:50	0:05	43	16:45	29	16:50	0:05

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Figure 20 Riverside Zone 4-5 Weekday Schedule Templates – AM and PM Peak Hour

AM Peak					PM Peak				
Arriving Route	Arrival Time	Departing Route	Departure Time	Dwell	Arriving Route	Arrival Time	Departing Route	Departure Time	Dwell
DH	7:00	144	7:00	0:00	24	16:01	44	16:03	0:02
24	7:01	44	7:03	0:02	DH	16:03	190	16:03	0:00
190	7:07	DH	7:07	0:00	124	16:04	DH	16:04	0:00
124	7:07	190	7:07	0:00	190	16:07	DH	16:07	0:00
21	7:07	90	7:09	0:02	21	16:07	90	16:09	0:02
66	7:07	DH	7:07	0:00	66	16:07	DH	16:07	0:00
DH	7:08	190	7:08	0:00	20	16:10	25	16:12	0:02
20	7:10	25	7:12	0:02	Pull-out	16:15	144	16:15	0:00
DH	7:15	144	7:15	0:00	24	16:16	44	16:18	0:02
24	7:16	44	7:18	0:02	DH	16:18	190	16:18	0:00
190	7:22	144	7:22	0:00	21	16:22	90	16:24	0:02
66	7:22	DH	7:22	0:00	66	16:22	DH	16:22	0:00
21	7:22	90	7:24	0:02	20	16:25	25	16:27	0:02
DH	7:23	190	7:23	0:00	DH	16:30	144	16:30	0:00
20	7:25	25	7:27	0:02	24	16:31	44	16:33	0:02
124	7:25	190	7:25	0:00	Pull-out	16:33	190	16:33	0:00
DH	7:30	144	7:30	0:00	21	16:37	90	16:39	0:02
24	7:31	44	7:33	0:02	124	16:37	DH	16:37	0:00
190	7:37	144	7:37	0:00	66	16:37	DH	16:37	0:00
66	7:37	DH	7:37	0:00	20	16:40	25	16:42	0:02
21	7:37	90	7:39	0:02	66	16:42	DH	16:42	0:00
DH	7:38	190	7:38	0:00	Pull-out	16:45	144	16:45	0:00
20	7:40	25	7:42	0:02	24	16:46	44	16:48	0:02
124	7:40	190	7:40	0:00	Pull-out	16:48	190	16:48	0:00
DH	7:45	144	7:45	0:00	21	16:52	90	16:54	0:02
24	7:46	44	7:48	0:02	66	16:52	DH	16:52	0:00
190	7:52	DH	7:52	0:00	20	16:55	25	16:57	0:02
21	7:52	90	7:54	0:02					
66	7:52	DH	7:52	0:00					
DH	7:53	190	7:53	0:00					
20	7:55	25	7:57	0:02					
124	7:55	190	7:55	0:00					

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Figure 21 Sprague Zone 6 Weekday Schedule Templates – AM and PM Peak Hour

AM Peak					PM Peak				
Arriving Route	Arrival Time	Departing Route	Departure Time	Dwell	Arriving Route	Arrival Time	Departing Route	Departure Time	Dwell
DH	7:05	66	7:05	0:00	CCL	16:00	CCL	16:00	0:00
CCL	7:07	CCL	7:07	0:00	DH	16:05	66	16:05	0:00
25	7:08	20	7:10	0:02	25	16:08	20	16:10	0:02
Pull-out	7:12	66	7:12	0:00	CCL	16:08	CCL	16:08	0:00
CCL	7:14	CCL	7:14	0:00	CCL	16:15	CCL	16:15	0:00
Pull-out	7:20	66	7:20	0:00	DH	16:20	66	16:20	0:00
CCL	7:22	CCL	7:22	0:00	25	16:23	20	16:25	0:02
25	7:23	20	7:25	0:02	CCL	16:23	CCL	16:23	0:00
CCL	7:29	CCL	7:29	0:00	CCL	16:30	CCL	16:30	0:00
DH	7:35	66	7:35	0:00	DH	16:35	66	16:35	0:00
CCL	7:37	CCL	7:37	0:00	25	16:38	20	16:40	0:02
25	7:38	20	7:40	0:02	CCL	16:38	CCL	16:38	0:00
CCL	7:37	CCL	7:37	0:00	CCL	16:45	CCL	16:45	0:00
144	7:39	Pull-in	7:39	0:00	DH	16:50	66	16:50	0:00
74	7:42	Pull-in	7:42	0:00	25	16:53	20	16:55	0:02
DH	7:42	66	7:42	0:00	CCL	16:53	CCL	16:53	0:00
Pull-out	7:50	66	7:50	0:00					
CCL	7:52	CCL	7:52	0:00					
25	7:53	20	7:55	0:02					
DH	7:57	66	7:57	0:00					
CCL	7:59	CCL	7:59	0:00					

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Figure 22 Sprague Zone 7 Weekday Schedule Templates – AM and PM Peak Hour

AM Peak					PM Peak				
Arriving Route	Arrival Time	Departing Route	Departure Time	Dwell	Arriving Route	Arrival Time	Departing Route	Departure Time	Dwell
DH	7:05	61	7:05	0:00	DH	16:05	61	16:05	0:00
74	7:07	DH	7:07	0:00	90	16:08	21	16:10	0:02
90	7:08	21	7:10	0:02	Pull-out	16:20	61	16:20	0:00
DH	7:20	61	7:20	0:00	74	16:22	DH	16:22	0:00
172	7:22	61	7:22	0:00	90	16:23	21	16:25	0:02
90	7:23	21	7:25	0:02	DH	16:35	61	16:35	0:00
74	7:27	DH	7:27	0:00	74	16:37	DH	16:37	0:00
DH	7:35	61	7:35	0:00	90	16:38	21	16:40	0:02
90	7:38	21	7:40	0:02	DH	16:50	61	16:50	0:00
DH	7:50	61	7:50	0:00	74	16:52	DH	16:52	0:00
172	7:52	DH	7:52	0:00	90	16:53	21	16:55	0:02
90	7:53	21	7:55	0:02					
74	7:54	DH	7:54	0:00					

Figure 23 Sprague Zone 8 Weekday Schedule Templates – AM and PM Peak Hour

AM Peak					PM Peak				
Arriving Route	Arrival Time	Departing Route	Departure Time	Dwell	Arriving Route	Arrival Time	Departing Route	Departure Time	Dwell
94	7:00	23	7:05	0:05	94	16:00	23	16:05	0:05
44	7:10	24	7:12	0:02	Pull-out	16:07	124	16:07	0:00
27	7:15	22	7:20	0:05	44	16:10	24	16:12	0:02
144	7:24	124	7:24	0:00	27	16:15	22	16:20	0:05
44	7:25	24	7:27	0:02	44	16:25	24	16:27	0:02
94	7:30	23	7:35	0:05	94	16:30	23	16:35	0:05
44	7:40	24	7:42	0:02	Pull-out	16:37	124	16:37	0:00
27	7:45	22	7:50	0:05	44	16:40	24	16:42	0:02
144	7:54	124	7:54	0:00	27	16:45	22	16:50	0:05
44	7:55	24	7:57	0:02	DH	16:52	124	16:52	0:00
					44	16:55	24	16:57	0:02

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Figure 24 Wall Northbound Zone Weekday Schedule Templates – AM and PM Peak Hour

AM Peak					PM Peak				
Arriving Route	Arrival Time	Departing Route	Departure Time	Dwell	Arriving Route	Arrival Time	Departing Route	Departure Time	Dwell
12	7:00	11	7:02	0:02	CCL	16:01	CCL	16:01	0:00
CCL	7:01	CCL	7:01	0:00	12	16:02	11	16:04	0:02
11	7:04	11	7:09	0:05	11	16:06	11	16:11	0:05
CCL	7:08	CCL	7:08	0:00	CCL	16:08	CCL	16:08	0:00
12	7:15	11	7:17	0:02	CCL	16:16	CCL	16:16	0:00
CCL	7:16	CCL	7:16	0:00	12	16:17	11	16:19	0:02
11	7:19	11	7:24	0:05	11	16:21	11	16:26	0:05
CCL	7:23	CCL	7:23	0:00	CCL	16:23	CCL	16:23	0:00
12	7:30	11	7:32	0:02	CCL	16:31	CCL	16:31	0:00
CCL	7:31	CCL	7:31	0:00	12	16:32	11	16:34	0:02
11	7:34	11	7:39	0:05	11	16:36	11	16:41	0:05
CCL	7:38	CCL	7:38	0:00	CCL	16:38	CCL	16:38	0:00
12	7:45	11	7:47	0:02	CCL	16:46	CCL	16:46	0:00
CCL	7:46	CCL	7:46	0:00	12	16:47	11	16:49	0:02
11	7:49	11	7:54	0:05	11	16:51	11	16:56	0:05
CCL	7:53	CCL	7:53	0:00	CCL	16:53	CCL	16:53	0:00

Figure 25 Wall Southbound Zone Weekday Schedule Templates – AM and PM Peak Hour

AM Peak					PM Peak				
Arriving Route	Arrival Time	Departing Route	Departure Time	Dwell	Arriving Route	Arrival Time	Departing Route	Departure Time	Dwell
36	7:07	42	7:12	0:05	11	16:00	12	16:02	0:02
11	7:10	12	7:12	0:02	36	16:07	42	16:12	0:05
29	7:15	43	7:20	0:05	11	16:15	12	16:17	0:02
11	7:25	12	7:27	0:02	29	16:15	43	16:20	0:05
36	7:37	42	7:42	0:05	11	16:30	12	16:32	0:02
11	7:40	12	7:42	0:02	36	16:37	42	16:42	0:05
29	7:45	43	7:50	0:05	11	16:45	12	16:47	0:02
11	7:55	12	7:57	0:02	29	16:45	43	16:50	0:05

Layover Needs

The needed capacity of the off-Plaza layover locations is as follows:

East Layover –four buses.

- This is for buses that are aligning to make a new trip through the Sprague Avenue side of the Plaza. It would not be necessary to accommodate all of these buses in one location. However, if that is possible it simplifies communications with operators about where to go to layover as well as the provision of comfort stations for the operators. There is enough space on the south curb of W First between Washington and Bernard to accommodate this volume of layover. An assessment of the current amount of parking allowed on that block face will need to be conducted. Other locations might include space on Sprague between Stevens and Howard. For route like the 66, this may be a better location than the space on W. First, assuming it is possible to secure operator comfort stations adjacent to this site.
- Currently, there is space on Riverside between Wall and Howard, directly in front of the Bank of America building. While this space is desirable given its adjacency to the Plaza, its future is very uncertain given the City plans for reconfiguring Riverside. If this space continues to be available, it may be desirable for route 66 buses.

West layover –two buses.

- This is for buses that are aligning to make a new trip through the Riverside Avenue side of the Plaza. Similar to the East Layover location, it would not be necessary to accommodate all of these buses in one place. However, doing so presents communication and logistical benefits. The present layover zone on the north curb of Second at Lincoln may be sufficient to meet this need. Further evaluation of space at this site is needed.

Bus Requirements and Revenue Hours

Figure 26 below describes the weekday revenue hours and peak bus requirement for the future baseline scenario and the preferred alternative. As shown in the figure, the preferred scenario will add approximately 55 hours of revenue service per weekday and two peak vehicles compared to the future baseline scenario.

Figure 26 Weekday Revenue Hours and Peak Bus Requirement Comparison

Alternative	Revenue Hours (Weekday)	Peak Bus Requirement
Future Baseline	1812:50	142
Preferred	1867:47	144

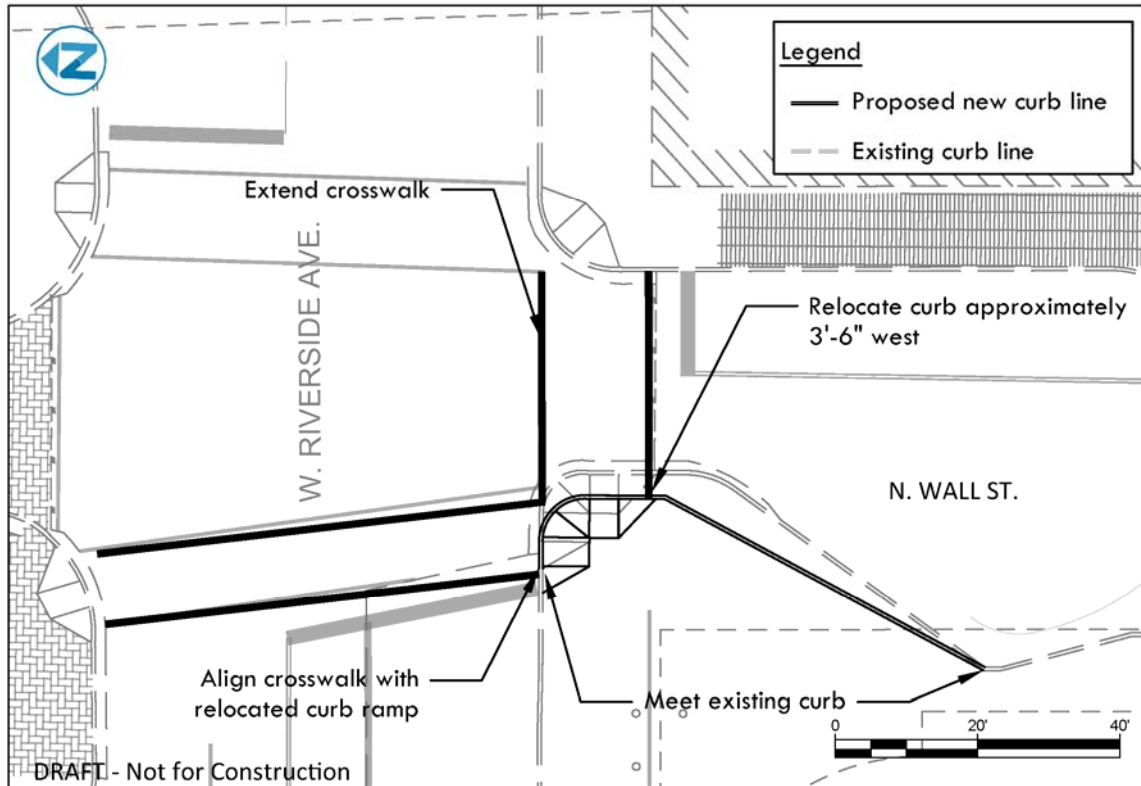
Curb Line Changes

To accommodate efficient movement of a larger volume of transit vehicles on the roadways surrounding the Plaza, the following curb line modifications are recommended:

Northeast corner of Plaza (Riverside and Wall)

Relocate existing Wall Street curb 3'6" to the west and adjust curb line of Wall Street southbound bus zone to meet existing curb on Wall Street. Adjust crosswalks to align with relocated curb ramps accordingly. This will allow vehicles (including transit coaches and other large vehicles) to travel southbound on Wall Street south of Riverside Avenue when a 40' coach is dwelling in the Wall St southbound zone. Refer to Figure 27 for a schematic diagram of the recommended changes.

Figure 27 Recommended curb line modifications for the corner of Wall and Riverside



Sprague Avenue Zones

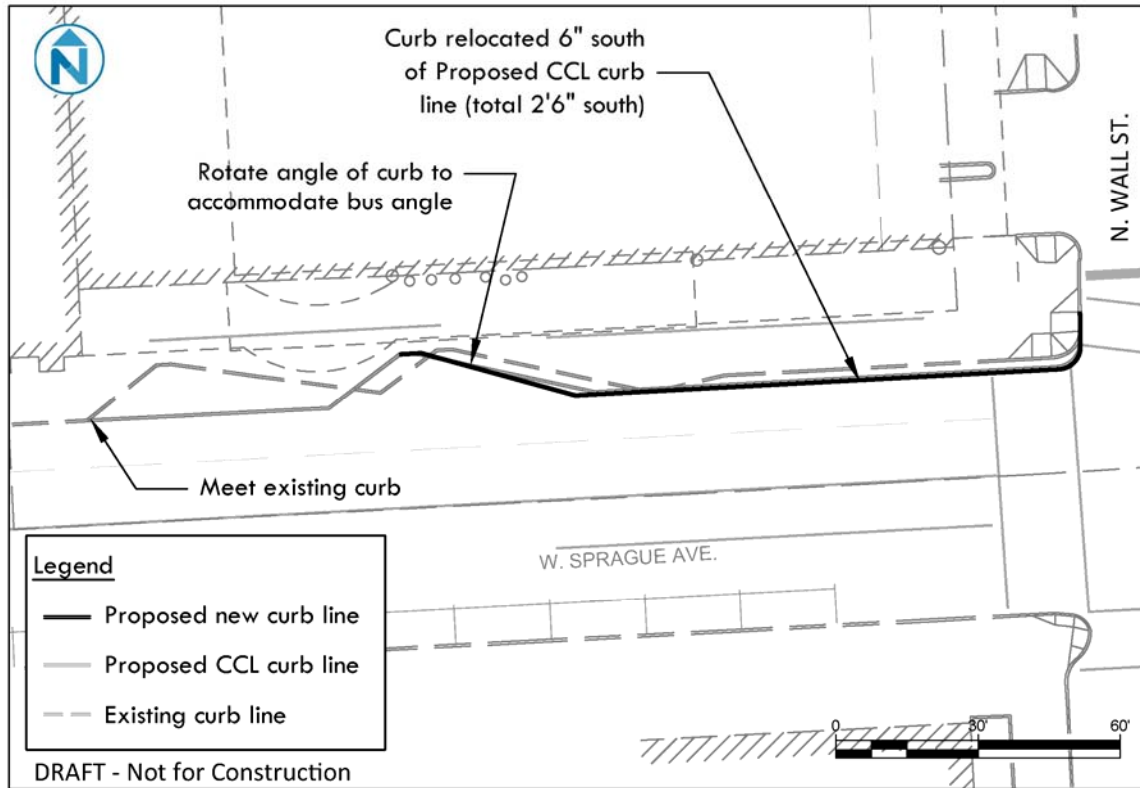
Zone 6 (southeast corner of Plaza): Relocate proposed CCL curb line 6" to the south (the currently proposed CCL curb line would extend the existing curb several inches; this proposal suggests extending the CCL curb line an additional 6" for a total of 2'6" from the existing curbline). This will allow for better alignment of articulated coaches' rear wheels and doors when approaching the zone from westbound Sprague Avenue.

Zone 7 (middle zone on Sprague Avenue): Adjust the angle of the curb to accommodate entry into and exit from the zone when coaches are dwelling in the adjacent zones.

Zone 8 (western-most zone on Sprague Avenue): Our analysis concurs with the CCL curb line plan to replace the saw tooth zone with a straight curb line zone matching the curb line of the western portion of the block. This will allow coaches to occupy the zone without impeding the ability of coaches in Zone 7 (to the east) to exit.

Figure 28 shows the recommended curb line changes for the Sprague Avenue side of the Plaza.

Figure 28 Recommended curb line modifications for Sprague Avenue between Wall and Post



Additional Considerations

The operational changes recommended through this analysis will require changes in how STA customers interact with the transit system. Importantly, for all routes with service every 15 minutes or better, customers will need to be on the platform waiting to board the bus when it arrives rather than having a window of five minutes or more during which to board the bus. While arrival times will be scheduled, the new mode of operations will introduce greater variability into the system. STA should consider additional investments to enhance the customer experience not only to ease the transition for current riders, but also to make the transit system easy to navigate for new and inexperienced riders. It would be most advantageous for STA to make the recommended physical enhancements in coordination with other physical improvements to the Plaza (e.g., during the curb line changes above and/or during construction of CCL stations) in order to economize on costs and minimize service disruptions from road/zone closures. Programmatic enhancements should be coordinated with the annual service change cycle (markup). The most helpful of these improvements would be real time passenger information posted at each zone of the Plaza that describes only the activity occurring at that zone. Within the Plaza, system-level real time information could also be provided.

There are clearly operational challenges with involved with increasing the intensity of use, particularly at the HPT zones on Sprague and Riverside. While from a scheduling perspective these zones appears to operate well within the bounds of any urban transit zone in a downtown area, it is well known that the day to day operations will present variations to how the schedules

appear. The most significant issues are buses approaching these zones that only need to drop passengers. A good portion of the time the operator will be able to do that, but what about the other 20% (give or take)? First, an operational policy needs to be established so operators clearly know their options. Second, real time monitoring and control may become necessary, if bus dwell times are allowed to become extended. That will cause issues and should be considered. Certainly, as STA phases in to this new way of operating the Plaza increased vigilance of dispatch and on-site supervision will be needed.

Very few urban transit systems operate with a hybrid pulse system that is proposed for STA's Plaza operation. In most urban systems, stop failure (there is no place for the bus to get to the curb when it arrives) is a very common occurrence. In nearly every case, the bus operator waits on the street for a space to clear. Sometimes this will result in queues of buses awaiting zones. This practice may work in downtown Spokane, but will have limitations. A wait of less than 30 seconds, for example, may be acceptable, but a bus stopped in a traffic lane for more than 5 minutes, for example, may be highly problematic. That is why increased presence and action by both on-site supervision and dispatch will be important as the service levels increase and curb space becomes more intensely utilized.

Physical Enhancements

- **All-door boarding fare collection** should be implemented for all HPT routes at a minimum and considered for all routes. This will minimize dwell time at the Plaza and help to maintain adequate curb space for a larger volume of vehicles. This advancement will require implementation of off-board fare payment to make that possible. Operational studies in Los Angeles, San Francisco, and Seattle have shown this to be an effective method to significantly reduce bus dwell time, which, in turn, allows greater intensity of use at the curb and speeds up operations. A really good example of this practice is being implemented in downtown Seattle in March 2019. All King County Metro and Sound Transit buses operating in the downtown Seattle Transit Tunnel are being moved to surface street operations, over 800 bus trips per weekday. One of many mitigations for this move and to enhance bus zone capacity is to implement universal all door boarding in downtown Seattle. Note this has already been accomplished for Metro's version of Spokane Transit's HPT system, Rapid Ride. The practice has proven to be a noticeable enhancement of dwell times on Rapid Ride routes.
- **Real time arrival information** should be posted both inside the Plaza building as well as at each boarding zone outside. Dynamic message boards or screens should show the next several departing routes and estimated times for arrival at the zone.
- **Large-scale static or dynamic maps** clearly showing the routes that depart from each zone should be located near every Plaza building access point, as well as a "You are here" marker
- **Downtown wayfinding** – Consider implementing additional wayfinding both inside and outside the Plaza for downtown attractions and destinations. Any new wayfinding should be coordinated with other providers of downtown wayfinding to provide consistent messaging and visual coherence among wayfinding elements.
- **Additional weather protection in outdoor waiting areas**, especially in zones 4/5 and 6. These will become HPT zones with all routes operating with minimal dwell time. That means passengers need to be waiting at the zone when the bus arrives. Presently

these zones offer no weather protection under the plan that passengers wait either inside the Plaza, or under the roof overhangs, outside. This is likely to be unworkable for most passengers under the new operating plan due to the need to cover some distance to board a bus. Most passengers will tend to congregate at the stop to ensure they are present when the bus arrives. Weather protection should be provided to make these waits more comfortable.

- **Smoking area** – continue to monitor the smoking area for changes over time in order to consider future relocation.

Programmatic Enhancements

- **Plaza Ambassadors** – Consider staffing the Plaza at the busiest times, especially in the weeks following major service changes, with Plaza Ambassadors to answer questions and help people access the information and services they need to successfully use the STA system.
- **Additional support for travel training** – Consider additional staffing and resources for the Mobility Services division to support travel training during the period of transition from current operations through the service changes in Fall 2021.

6 IMPLEMENTATION PHASING

Once the Preferred Plan was agreed upon, a phasing strategy had to be crafted that laid out an anticipated timeline for each development stage of the plan. Up to the point where a Preferred Plan was set, the project had been focused on accommodating the full implementation of *STA Moving Forward*. However, the actual operations strategy will phase in over a period of service changes. This implementation phasing plan establishes milestones that may be achievement of a goal – such as removing bus stop operations from the front of the SRBC building, or a construction milestone – such as completion of a curb modification on Sprague Avenue. The plan forms a roadmap based on what is known today. It is very likely those known factors will shift over the implementation period, but the roadmap was constructed in such a way that allows the consideration of alternative pathways without the derailment of the phasing timeline.

Implementation Timeline

While the STA Plaza Operational Analysis project objectives included planning for physical changes through 2021, the implementation timeline includes full implementation of *STA Moving Forward* service additions affecting downtown Spokane by 2023. The changes occur in phases of summer construction followed by fall service changes from 2019 through 2021, with final service changes in fall 2023. Timing of other non-downtown projects, such as CCL stations along the entire CCL alignment, Moran Station Park and Ride, and Phase II West Plains Transit Center will have an influence on the timing of service changes.

2019

Summer: Make curb line adjustments to Zones 7 and 8 on Sprague Avenue. This would likely require temporary closure of those zones. Zones 9 and 10 may be used more intensively during the brief construction period.

Fall: Implement the first phase of service changes to routes serving zones on Riverside Avenue. This would discontinue boarding activity from in front of the SRBC Building, intensifying activity in the zones located between Post Street and Wall Street on Riverside.

2020

Summer: Make curb line adjustments to the corner of Wall Street and Riverside Avenue (northeast corner of Plaza)

Fall: Shift Routes 42 and 43 from Sprague Avenue to the zone on southbound Wall Street.

2021

Summer: Construct CCL stations on Sprague Avenue and northbound Wall Street. This would likely require temporary closure of Zone 6 and the Wall Street northbound zone. Zones 9 and 10 may be used more intensively during the brief construction period. This would be the final curb line changes to the Plaza.

Fall: Implement service changes to routes that depart from Sprague Avenue and begin CCL service. Implement second phase of service changes on Riverside Avenue, shifting fixed-route service out of Zone 1 and moving Paratransit pick-ups to Zone 1. This would also discontinue boarding activity from Zones 9 and 10 in front of the Peyton Building on the Sprague Avenue side.

2022

No changes.

2023

Fall: Implement remaining *STA Moving Forward* service changes affecting downtown Spokane.

Figure 29 below describes the zone assignments for routes as service changes over time. Note that route assignments are most likely to be set by fall 2021.

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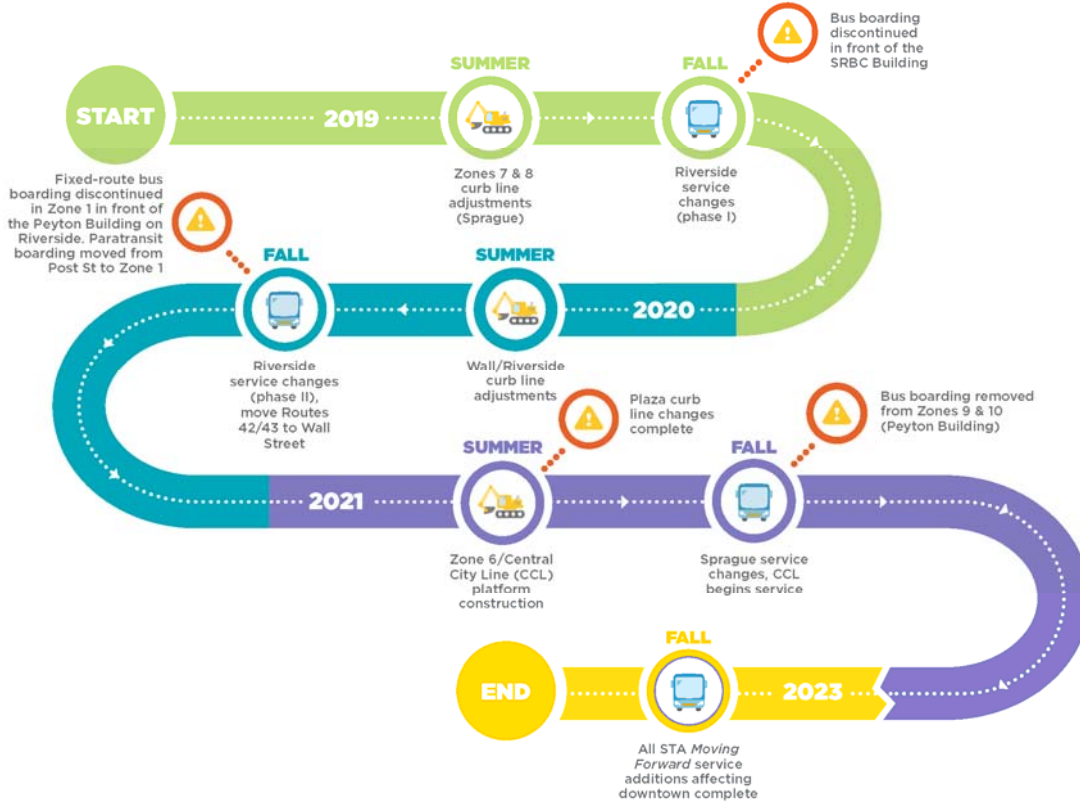
Figure 29 Plaza Zone Route Assignments, 2018 – 2023 (changes shown in *bold italics*)

Zone	Fall 2018	Fall 2019	Fall 2020	Fall 2021	Fall 2022	Fall 2023
SRBC	74, 172	<i>Drop-off only</i>	Drop-off only	Drop-off only	Drop-off only	Drop-off only
1	45, 173, 190	<i>74, 172, 173, 190</i>	74, 172, 173, 190	<i>Paratransit</i>	Paratransit	Paratransit
2	27, 44, 94	27, <i>45</i> , 94	27, 45, 94	<i>27, 74, 172</i>	27, 74, 172	27, 74, 172
3	26, 28, 29, 39	26, 28, 29, 39	26, 28, 29, 39	29, <i>36, 94</i>	29, 36, 94	29, 36, 94
4-5	25, 90	25, <i>44</i> , 90, <i>144</i>	25, 44, 90, 144	25, 44, 90, <i>144, 190</i>	25, 44, 90, 144, 190	25, 44, 90, 144, 190
6	64, 66, 124	64, 66, 124	64, 66, 124	<i>CCL, 20</i> , 66	CCL, 20, 66	CCL, 20, 66
7	22, 23, 24	22, 23, 24	22, 23, 24	<i>21, 61</i>	21, 61	21, 61
8	20, 60, 61	20, 60, 61	20, 60, 61	<i>22, 23, 24, 124</i>	22, 23, 24, 124	22, 23, 24, 124
9 (Peyton)	21, 42, 43	21, 42, 43	21	<i>Drop-off only</i>	Drop-off only	Drop-off only
10 (Peyton)	Drop-off only	Drop-off only	Drop-off only	Drop-off only	Drop-off only	Drop-off only
Wall North	11	11	11	<i>CCL, 11</i>	CCL, 11	CCL, 11
Wall South	12	12	12, <i>42, 43</i>	12, 42, 43	12, 42, 43	12, 42, 43

Figure 30 below provides a roadmap that summarizes these route and zone changes as well as related construction activities.

Figure 30 Implementation Phasing Plan

STA Plaza Construction and Service Changes, 2019-2023



7 STAKEHOLDER ENGAGEMENT

The Plaza is at the very heart of STA’s present network design and has been for decades. This project faced the complex challenge of ensuring that the transit focus of STA remains at the Plaza but operational influences—such as buses on layover or large crowds of transit passengers in tight spaces—are reduced and/or dispersed. One of the considerations for this project was to ensure that the solutions formulated could be understood and endorsed by a wide variety of interest groups, including transit riders, transit operators, property owners, business owners, business employees, downtown pedestrians, vehicle drivers, and City of Spokane employees responsible for operating and maintaining downtown streets and sidewalks.

This wide variety of stakeholders pushed the importance of involvement and communication to a particularly high level. As a result, the project team underwent a thoughtful stakeholder engagement process that involved a series of communications and meetings to ensure the intent of the project was clear and stakeholders concurred with the ultimate direction for STA’s downtown Spokane operations. This section summarizes this stakeholder engagement process. For detailed summaries of each outreach phase, see Appendices E, F, and G.

Stakeholder Groups

As described above, the high profile nature of this project meant that multiple and diverse groups of stakeholders needed to be kept apprised of issues and provide feedback at key project milestones. The primary stakeholder groups and engagement strategies used during this project are listed below. Engagement with key stakeholder groups will continue after the conclusion of this project; those cases are also noted below.

Technical Team: City of Spokane, Downtown Spokane Partnership (DSP), Spokane Regional Transportation Council (SRTC), Mobility Center

The Technical Team convened to work through key issues throughout the project. The first meeting took place in mid-February to review the results of the Evaluation Criteria Workshop. The team met again in March to review the draft Plaza alternatives. Following the technical work to evaluate each alternatives, the Technical Team met in August to review and provide feedback on the results of the evaluation. The team gathered for a final meeting in late November to review and provide feedback on the preferred alternative.

Key External Stakeholders: City Council, Downtown Spokane Partnership (DSP)

Key external stakeholder groups received project presentations and briefings from the STA team at key milestones. STA staff also responded on an as-needed basis to stakeholder inquiries about the project.

Broader Spokane Community

STA staff delivered in-person community relations presentations to stakeholder groups within the broader Spokane community including the STA Citizen Advisory Committee. The first round of presentations took place early in the project timeline with a description of the project process and timeline for major milestones. A second round of presentations was conducted to obtain feedback on alternatives.

Central City Line (CCL) Consultant Team

A CCL team representative attended the kickoff meeting and STA staff kept the CCL team apprised of progress throughout the project.

STA Board of Directors

STA staff briefed the STA Board of Directors throughout the project. The STA Board of Directors concurred with the final project approach and phasing plan at its December 2018 meeting.

STA Operations staff

As the front-line of STA, Operations staff had extremely beneficial insight and will likely field many questions from curious riders about the project as implementation gets underway. Information about the project was shared and feedback from Operations staff was gathered in person at Operator Mark-up, at an all employee meeting, and at an Operator Round-Table Discussion. Moving forward, it will be important for the project team to continue to apprise front-line staff of upcoming service and physical changes at the Plaza in advance of releasing information to the public to ensure that they are prepared to respond to inquiries from riders.

Riders

The primary concern for STA riders will be how the outcome of this project will affect their daily travels. Outreach during the project phase included a rider roundtable and solicitation for feedback via social media. Additional outreach to riders will be more appropriate as the proposed changes are moving into the implementation phase. It will be extremely important to clearly communicate the changes, the rationale for making changes, what riders are getting in exchange (more and better service), and solicit feedback from riders on specific proposals as the service and physical changes to the Plaza become imminent. STA will use its standard and tested methods for rider outreach as each phase of implementation approaches.

Engagement Phases

The stakeholder engagement effort for this project was divided into three phases, summarized in Figure 31 and described in greater detail below.

Figure 31 Engagement Phases and Schedule

Phase	Topic	Schedule
1	Introduce project, inventory specific concern, share draft evaluation criteria and preliminary operational concepts	February-April 2018
2	Share preliminary analysis of alternatives and preliminary preferred alternative concept	August-October 2018
3	Share draft preferred alternative	November-December 2018

Phase 1

Phase 1 engagement began with the project kickoff meeting in December 2017, but primarily comprised briefings and meetings that took place during February, March, and April of 2018. The purpose of the first phase of outreach was to introduce the project to various stakeholder groups, share and collect feedback on the draft evaluation criteria that would be used to evaluate the Plaza operational alternatives, and to share and collect feedback on the alternatives themselves. This phase of engagement was also intended to inventory stakeholders' concerns and observations about current operations.

This phase included ten meetings/presentations and reached multiple stakeholder groups, including the DSP, STA Board, City of Spokane staff and Council, SRTC, STA staff from other divisions including Operators, and the STA Citizen Advisory Committee. Refer to Appendix E for a details on Phase 1 engagement activities.

Phase 2

The second phase of engagement took place from August through October of 2018. During Phase 2, the team shared preliminary results from the analysis of Plaza alternatives using the evaluation criteria developed during Phase 1.

This phase included seven meetings/presentations and reached the DSP, STA Board, City of Spokane staff and council, SRTC, STA Operations staff, and riders. STA staff worked closely with

the DSP staff and a subcommittee of DSP members to discuss the potential impacts of the various alternatives to downtown businesses, street frontage, and on-street parking. Feedback from all stakeholders during this phase of engagement was used to develop the preferred Plaza operations alternative. Refer to Appendix F for a details on Phase 2 engagement activities.

Phase 3

The third and final phase of engagement was conducted in November and December 2018 and included six updates and briefings on the draft preferred alternative and implementation phasing approach. Project staff reached key stakeholders through formal presentations and a Technical Team meeting. This phase concluded with concurrence from the DSP and STA Board of Directors on the preferred alternative and project implementation approach.

Refer to Appendix G for a details on Phase 3 engagement activities.

Appendix A Scheduling Technical Memorandum and Schedule Templates

Memo

To: Emily Yasukochi, Senior Associate, Nelson\Nygaard
From: Robert Madison, Senior Associate, CSched
Date: January 7, 2018
Subject: Spokane STA Transit Plaza – Technical Memo
Project 927961.001 Contract 2017-10044

CSched worked with Nelson\Nygaard and Spokane Transit Authority staff to develop baseline, future baseline, and alternative scenario schedules for the STA Transit Plaza Operations Analysis.

Baseline and Future Baseline

The baseline schedule was obtained from the Spokane Transit GTFS data effective January 2018 and converted and imported into CSched's HASTUS scheduling software.

From the baseline, CSched made certain tweaks and assumptions, under consultation with Nelson\Nygaard, in order to make the scheduling data more manageable. Perhaps the most significant was the removing of "X" service, which is extra (supplemental) service to address crowding conditions. Additionally, with route 66 having different service levels depending on EWU's academic calendar, we utilized the highest level of regular service for this modeled baseline.

The future baseline was then created from the modeled baseline, including changes that were known and provided, with the addition of new routes (including the CCL), and deletion or modification of others. All routes and specs are based on the "2021 STA Future Baseline Spec.xlsx" file provided from STA using a Remix export.

Running times for existing STA routes were based on the baseline (January 2018) schedules as imported from the GTFS files (and cross-referenced against Trapeze headway sheets provided by the STA, as well as public timetables available on the website at the time of the import). For new routes, or for routes with significant routing modifications/extensions, running times were based on the previously mentioned STA Future Baseline Spec file from Remix (rounded to the nearest whole minute). New and significantly modified routes were scheduled to keep within the number of buses specified in the Remix file. Headways generally conformed to the headways specified (particularly when the headway was a round number), however during transition periods, the headways may be higher or lower than the number

given (it should be noted that the Remix specifications do not always work logically; e.g. route 42, which specified a 60 minute headway on Sundays except for the period from 7:05 to 7:18 pm, where the headway was indicated to be 16 minutes; in these cases, we used our best judgment to keep the service as consistent as possible).

Overall, the modeled baseline schedule has 958 revenue trips arriving into the Plaza (all zones, including Wall St.) on a weekday. The future baseline, on the other hand, has 1163 revenue trips arriving into the Plaza, with the CCL being responsible for almost the entire difference. The future baseline assumed that routes maintain their pulse scheduling on the existing eight pulses per hour setup (except for the CCL), with certain routes that no longer serve the Plaza being replaced by the other new routes in the future baseline scenario.

The baseline and future baseline scenarios include services that do not operate downtown or serve the Plaza. For the sake of consistency, and to have a more meaningful costing total, these routes were modeled in HASTUS but did not factor into any meet builder analysis. However, to maintain consistency in blocking, certain non-plaza interlines were retained when possible, including routes 20-33 and routes 32-97.

Assumptions and other factors

As part of this analysis, CSched assumed that current running times would be used for future service analysis. CSched also assumed that these running times, either from existing schedules, or from the Remix file, are accurate enough for modeling purposes, as analysis and calibration of run times were not a part of the scope of this project. Using these assumptions, schedules were built that attempt to maximize the use of the limited facilities at the Plaza.

CSched also assumed a minimum layover of 15% **except** at the Plaza, or at any other terminals where it was apparent from existing blocking that buses are scheduled to run through without waiting. At the Plaza, layovers were generally set to 5 minutes based on the existing pulses. *In alternative scenarios, layovers were set on a route-by-route basis using input from Nelson\Nygaard and STA regarding specific interlines and dwell times at the Plaza. Layovers at the Plaza were generally set to 2 or 5 minutes, depending on the route and interline. In the various alternative scenarios, if a link could not be made using the minimum layover, the assumption was that the bus would deadhead to an offsite layover location.* CSched did not evaluate capacity constraints at any terminals other than the Plaza/downtown layovers.

For costing and bus count purposes, CSched assumed all buses would pull from/to the main STA garage just north of downtown. CSched did not schedule any buses from the garage near the VTC area, nor did we assume any other garage locations.

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2023 - Scheduling Template - Full Buildout

Weekday
AM Peak
Zone 2 - Riverside

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
61	7:08	74	7:10	0:02
22	7:15	27	7:20	0:05
61	7:23	74	7:25	0:02
61	7:38	74	7:40	0:02
22	7:45	27	7:50	0:05
61	7:53	74	7:55	0:02

Weekday
Midday
Zone 2 - Riverside

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
61	12:08	74	12:10	0:02
22	12:15	27	12:20	0:05
61	12:38	74	12:40	0:02
22	12:45	27	12:50	0:05

Weekday
PM Peak
Zone 2 - Riverside

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
61	16:08	172	16:10	0:02
Deadhead	16:10	74	16:10	0:00
22	16:15	27	16:20	0:05
190	16:22	172	16:22	0:00
61	16:23	74	16:25	0:02
61	16:38	74	16:40	0:02
Deadhead	16:40	172	16:40	0:00
22	16:45	27	16:50	0:05
190	16:52	172	16:52	0:00
61	16:53	74	16:55	0:02

Saturday
Day
Zone 2 - Riverside

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
22	12:45	27	12:50	0:05

Sunday
Day
Zone 2 - Riverside

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
61	12:12	Deadhead	12:12	0:00
61	12:42	Deadhead	12:42	0:00
22	12:45	27	12:50	0:05

Weekday
AM Peak
Zone 3 - Riverside

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
23	7:00	94	7:05	0:05
42	7:07	36	7:12	0:05
43	7:15	29	7:20	0:05
23	7:30	94	7:35	0:05
42	7:37	36	7:42	0:05
43	7:45	29	7:50	0:05

Weekday
Midday
Zone 3 - Riverside

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
23	12:00	94	12:05	0:05
42	12:07	36	12:12	0:05
43	12:15	29	12:20	0:05
23	12:30	94	12:35	0:05
42	12:37	36	12:42	0:05
43	12:45	29	12:50	0:05

Weekday
PM Peak
Zone 3 - Riverside

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
23	16:00	94	16:05	0:05
42	16:07	36	16:12	0:05
43	16:15	29	16:20	0:05
23	16:30	94	16:35	0:05
42	16:37	36	16:42	0:05
43	16:45	29	16:50	0:05

Saturday
Day
Zone 3 - Riverside

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
23	12:30	94	12:35	0:05
42	12:37	36	12:42	0:05
43	12:45	29	12:50	0:05

Sunday
Day
Zone 3 - Riverside

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
23	12:30	94	12:35	0:05
42	12:37	36	12:42	0:05
43	12:45	29	12:50	0:05

Weekday
AM Peak
Zone 4/5 - Riverside

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
Deadhead	7:00	144	7:00	0:00
24	7:01	44	7:03	0:02
190	7:07	Deadhead	7:07	0:00
124	7:07	190	7:07	0:00
21	7:07	90	7:09	0:02
66	7:07	Deadhead	7:07	0:00
Deadhead	7:08	190	7:08	0:00
20	7:10	25	7:12	0:02
Deadhead	7:15	144	7:15	0:00
24	7:16	44	7:18	0:02
190	7:22	144	7:22	0:00
66	7:22	Deadhead	7:22	0:00
21	7:22	90	7:24	0:02
Deadhead	7:23	190	7:23	0:00
20	7:25	25	7:27	0:02
124	7:25	190	7:25	0:00
Deadhead	7:30	144	7:30	0:00
24	7:31	44	7:33	0:02
190	7:37	144	7:37	0:00
66	7:37	Deadhead	7:37	0:00
21	7:37	90	7:39	0:02
Deadhead	7:38	190	7:38	0:00
20	7:40	25	7:42	0:02
124	7:40	190	7:40	0:00
Deadhead	7:45	144	7:45	0:00
24	7:46	44	7:48	0:02
190	7:52	Deadhead	7:52	0:00

Weekday
Midday
Zone 4/5 - Riverside

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
24	12:01	44	12:03	0:02
21	12:07	90	12:09	0:02
66	12:07	Deadhead	12:07	0:00
20	12:10	25	12:12	0:02
24	12:16	44	12:18	0:02
21	12:22	90	12:24	0:02
66	12:22	Deadhead	12:22	0:00
20	12:25	25	12:27	0:02
66	12:27	Deadhead	12:27	0:00
24	12:31	44	12:33	0:02
66	12:32	Deadhead	12:32	0:00
21	12:37	90	12:39	0:02
66	12:37	Deadhead	12:37	0:00
20	12:40	25	12:42	0:02
24	12:46	44	12:48	0:02
21	12:52	90	12:54	0:02
66	12:52	Deadhead	12:52	0:00
20	12:55	25	12:57	0:02

Weekday
PM Peak
Zone 4/5 - Riverside

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
24	16:01	44	16:03	0:02
Deadhead	16:03	190	16:03	0:00
124	16:04	Deadhead	16:04	0:00
190	16:07	Deadhead	16:07	0:00
21	16:07	90	16:09	0:02
66	16:07	Deadhead	16:07	0:00
20	16:10	25	16:12	0:02
Pull-out	16:15	144	16:15	0:00
24	16:16	44	16:18	0:02
Deadhead	16:18	190	16:18	0:00
21	16:22	90	16:24	0:02
66	16:22	Deadhead	16:22	0:00
20	16:25	25	16:27	0:02
Deadhead	16:30	144	16:30	0:00
24	16:31	44	16:33	0:02
Pull-out	16:33	190	16:33	0:00
21	16:37	90	16:39	0:02
124	16:37	Deadhead	16:37	0:00
66	16:37	Deadhead	16:37	0:00
20	16:40	25	16:42	0:02
66	16:42	Deadhead	16:42	0:00
Pull-out	16:45	144	16:45	0:00
24	16:46	44	16:48	0:02
Pull-out	16:48	190	16:48	0:00
21	16:52	90	16:54	0:02
66	16:52	Deadhead	16:52	0:00
20	16:55	25	16:57	0:02

Saturday
Day
Zone 4/5 - Riverside

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
Deadhead	12:01	25	12:07	0:06
66	12:05	Deadhead	12:05	0:00
61	12:12	90	12:15	0:03
24	12:13	44	12:15	0:02
20	12:20	25	12:22	0:02
21	12:28	90	12:30	0:02
Deadhead	12:31	25	12:37	0:06
66	12:35	Deadhead	12:35	0:00
61	12:42	90	12:45	0:03
24	12:43	44	12:45	0:02
20	12:50	25	12:52	0:02
21	12:58	90	13:00	0:02

Sunday
Day
Zone 4/5 - Riverside

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
66	12:05	Deadhead	12:05	0:00
24	12:08	44	12:10	0:02
20	12:13	25	12:15	0:02
21	12:28	90	12:30	0:02
66	12:35	Deadhead	12:35	0:00
24	12:38	44	12:40	0:02
Deadhead	12:45	25	12:45	0:00
21	12:58	90	13:00	0:02

Articulated Coach

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Spokane Transit Authority

2023 - Scheduling Template - Full Buildout

Weekday AM Peak Zone 6 - Sprague

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
Deadhead	7:05	66	7:05	0:00
CCL	7:07	CCL	7:07	0:00
25	7:08	20	7:10	0:02
Pull-out	7:12	66	7:12	0:00
CCL	7:14	CCL	7:14	0:00
Pull-out	7:20	66	7:20	0:00
CCL	7:22	CCL	7:22	0:00
25	7:23	20	7:25	0:02
CCL	7:29	CCL	7:29	0:00
Deadhead	7:35	66	7:35	0:00
CCL	7:37	CCL	7:37	0:00
25	7:38	20	7:40	0:02
CCL	7:37	CCL	7:37	0:00
144	7:39	Pull-in	7:39	0:00
74	7:42	Pull-in	7:42	0:00
Deadhead	7:42	66	7:42	0:00
Pull-out	7:50	66	7:50	0:00
CCL	7:52	CCL	7:52	0:00
25	7:53	20	7:55	0:02
Deadhead	7:57	66	7:57	0:00
CCL	7:59	CCL	7:59	0:00

Weekday Middy Zone 6 - Sprague

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
Deadhead	12:05	66	12:05	0:00
25	12:08	20	12:10	0:02
CCL	12:09	CCL	12:09	0:00
CCL	12:19	CCL	12:19	0:00
Deadhead	12:20	66	12:20	0:00
25	12:23	20	12:25	0:02
CCL	12:29	CCL	12:29	0:00
Deadhead	12:35	66	12:35	0:00
25	12:38	20	12:40	0:02
CCL	12:39	CCL	12:39	0:00
CCL	12:49	CCL	12:49	0:00
Deadhead	12:50	66	12:50	0:00
25	12:53	20	12:55	0:02
CCL	12:59	CCL	12:59	0:00

Weekday PM Peak Zone 6 - Sprague

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
CCL	16:00	CCL	16:00	0:00
Deadhead	16:05	66	16:05	0:00
25	16:08	20	16:10	0:02
CCL	16:08	CCL	16:08	0:00
CCL	16:15	CCL	16:15	0:00
Deadhead	16:20	66	16:20	0:00
25	16:23	20	16:25	0:02
CCL	16:23	CCL	16:23	0:00
CCL	16:30	CCL	16:30	0:00
Deadhead	16:35	66	16:35	0:00
25	16:38	20	16:40	0:02
CCL	16:38	CCL	16:38	0:00
CCL	16:45	CCL	16:45	0:00
Deadhead	16:50	66	16:50	0:00
25	16:53	20	16:55	0:02
CCL	16:53	CCL	16:53	0:00

Saturday Day Zone 6 - Sprague

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
CCL	12:10	CCL	12:10	0:00
25	12:13	20	12:15	0:02
Deadhead	12:20	66	12:20	0:00
CCL	12:25	CCL	12:25	0:00
25	12:28	Deadhead	12:28	0:00
CCL	12:40	CCL	12:40	0:00
25	12:43	20	12:45	0:02
Deadhead	12:50	66	12:50	0:00
CCL	12:55	CCL	12:55	0:00
25	12:58	Deadhead	12:58	0:00

Sunday Day Zone 6 - Sprague

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
CCL	12:10	CCL	12:10	0:00
Deadhead	12:20	66	12:20	0:00
CCL	12:25	CCL	12:25	0:00
25	12:28	Deadhead	12:28	0:00
CCL	12:40	CCL	12:40	0:00
Deadhead	12:50	66	12:50	0:00
CCL	12:55	CCL	12:55	0:00
25	12:58	20	13:00	0:02

Articulated Coach

Weekday AM Peak Zone 7 - Sprague

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
Deadhead	7:05	61	7:05	0:00
74	7:07	Deadhead	7:07	0:00
90	7:08	21	7:10	0:02
Deadhead	7:20	61	7:20	0:00
172	7:22	61	7:22	0:00
90	7:23	21	7:25	0:02
74	7:27	Deadhead	7:27	0:00
Deadhead	7:35	61	7:35	0:00
90	7:38	21	7:40	0:02
Deadhead	7:50	61	7:50	0:00
172	7:52	Deadhead	7:52	0:00
90	7:53	21	7:55	0:02
74	7:54	Deadhead	7:54	0:00

Weekday Middy Zone 7 - Sprague

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
Deadhead	12:05	61	12:05	0:00
90	12:08	21	12:10	0:02
Deadhead	12:20	61	12:20	0:00
74	12:22	Deadhead	12:22	0:00
90	12:23	21	12:25	0:02
Deadhead	12:35	61	12:35	0:00
90	12:38	21	12:40	0:02
Deadhead	12:50	61	12:50	0:00
74	12:52	Deadhead	12:52	0:00
90	12:53	21	12:55	0:02

Weekday PM Peak Zone 7 - Sprague

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
Deadhead	16:05	61	16:05	0:00
90	16:08	21	16:10	0:02
Pull-out	16:20	61	16:20	0:00
74	16:22	Deadhead	16:22	0:00
90	16:23	21	16:25	0:02
Deadhead	16:35	61	16:35	0:00
74	16:37	Deadhead	16:37	0:00
90	16:38	21	16:40	0:02
Deadhead	16:50	61	16:50	0:00
74	16:52	Deadhead	16:52	0:00
90	16:53	21	16:55	0:02

Saturday Day Zone 7 - Sprague

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
90	12:05	61	12:05	0:00
Deadhead	12:20	61	12:20	0:00
90	12:20	21	12:25	0:05
90	12:35	61	12:35	0:00
Deadhead	12:50	61	12:50	0:00
90	12:50	21	12:55	0:05

Sunday Day Zone 7 - Sprague

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
Deadhead	12:15	61	12:20	0:05
90	12:20	21	12:25	0:05
Deadhead	12:45	61	12:50	0:05
90	12:50	21	12:55	0:05

Weekday AM Peak Zone 8 - Sprague

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
94	7:00	23	7:05	0:05
44	7:10	24	7:12	0:02
27	7:15	22	7:20	0:05
144	7:24	124	7:24	0:00
44	7:25	24	7:27	0:02
94	7:30	23	7:35	0:05
44	7:40	24	7:42	0:02
27	7:45	22	7:50	0:05
144	7:54	124	7:54	0:00
44	7:55	24	7:57	0:02

Weekday Middy Zone 8 - Sprague

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
94	12:00	23	12:05	0:05
44	12:10	24	12:12	0:02
27	12:15	22	12:20	0:05
44	12:25	24	12:27	0:02
94	12:30	23	12:35	0:05
44	12:40	24	12:42	0:02
27	12:45	22	12:50	0:05
44	12:55	24	12:57	0:02

Weekday PM Peak Zone 8 - Sprague

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
94	16:00	23	16:05	0:05
Pull-out	16:07	124	16:07	0:00
44	16:10	24	16:12	0:02
27	16:15	22	16:20	0:05
44	16:25	24	16:27	0:02
94	16:30	23	16:35	0:05
Pull-out	16:37	124	16:37	0:00
44	16:40	24	16:42	0:02
27	16:45	22	16:50	0:05
Deadhead	16:52	124	16:52	0:00
44	16:55	24	16:57	0:02

Saturday Day Zone 8 - Sprague

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
94	12:00	23	12:05	0:05
44	12:10	24	12:15	0:05
44	12:40	24	12:45	0:05
27	12:45	22	12:50	0:05

Sunday Day Zone 8 - Sprague

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
94	12:00	23	12:05	0:05
44	12:15	24	12:20	0:05
44	12:45	24	12:50	0:05
27	12:45	22	12:50	0:05

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2023 - Scheduling Template - Full Buildout

Weekday
AM Peak
Wall - north

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
12	7:00	11	7:02	0:02
CCL	7:01	CCL	7:01	0:00
11	7:04	11	7:09	0:05
CCL	7:08	CCL	7:08	0:00
12	7:15	11	7:17	0:02
CCL	7:16	CCL	7:16	0:00
11	7:19	11	7:24	0:05
CCL	7:23	CCL	7:23	0:00
12	7:30	11	7:32	0:02
CCL	7:31	CCL	7:31	0:00
11	7:34	11	7:39	0:05
CCL	7:38	CCL	7:38	0:00
12	7:45	11	7:47	0:02
CCL	7:46	CCL	7:46	0:00
11	7:49	11	7:54	0:05
CCL	7:53	CCL	7:53	0:00

Weekday
Midday
Wall - north

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
CCL	12:05	CCL	12:05	0:00
12	12:09	11	12:11	0:02
CCL	12:15	CCL	12:15	0:00
CCL	12:25	CCL	12:25	0:00
12	12:29	11	12:31	0:02
CCL	12:35	CCL	12:35	0:00
CCL	12:45	CCL	12:45	0:00
12	12:49	11	12:51	0:02
CCL	12:55	CCL	12:55	0:00

Articulated Coach

Weekday
PM Peak
Wall - north

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
CCL	16:01	CCL	16:01	0:00
12	16:02	11	16:04	0:02
11	16:06	11	16:11	0:05
CCL	16:08	CCL	16:08	0:00
CCL	16:16	CCL	16:16	0:00
12	16:17	11	16:19	0:02
11	16:21	11	16:26	0:05
CCL	16:23	CCL	16:23	0:00
CCL	16:31	CCL	16:31	0:00
12	16:32	11	16:34	0:02
11	16:36	11	16:41	0:05
CCL	16:38	CCL	16:38	0:00
CCL	16:46	CCL	16:46	0:00
12	16:47	11	16:49	0:02
11	16:51	11	16:56	0:05
CCL	16:53	CCL	16:53	0:00

Saturday
Day
Wall - north

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
CCL	12:04	CCL	12:04	0:00
CCL	12:19	CCL	12:19	0:00
12	12:30	11	12:35	0:05
CCL	12:34	CCL	12:34	0:00
CCL	12:49	CCL	12:49	0:00

Sunday
Day
Wall - north

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
12	12:00	11	12:05	0:05
CCL	12:14	CCL	12:14	0:00
CCL	12:29	CCL	12:29	0:00
CCL	12:44	CCL	12:44	0:00
CCL	12:59	CCL	12:59	0:00

Note: Schedules for routes 11 and 12 will need to be re-written to avoid conflicts with the CCL. Recommend these are always acheduled to just lag behind the CCL to avoid conflicts, particualrly with the longer layovers that are build into these schedules

Weekday
AM Peak
Wall - south

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
36	7:07	42	7:12	0:05
11	7:10	12	7:12	0:02
29	7:15	43	7:20	0:05
11	7:25	12	7:27	0:02
36	7:37	42	7:42	0:05
11	7:40	12	7:42	0:02
29	7:45	43	7:50	0:05
11	7:55	12	7:57	0:02

Weekday
Midday
Wall - south

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
11	12:05	12	12:07	0:02
36	12:07	42	12:12	0:05
29	12:15	43	12:20	0:05
11	12:25	12	12:27	0:02
36	12:37	42	12:42	0:05
11	12:45	12	12:47	0:02
29	12:45	43	12:50	0:05

Weekday
PM Peak
Wall - south

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
11	16:00	12	16:02	0:02
36	16:07	42	16:12	0:05
11	16:15	12	16:17	0:02
29	16:15	43	16:20	0:05
11	16:30	12	16:32	0:02
36	16:37	42	16:42	0:05
11	16:45	12	16:47	0:02
29	16:45	43	16:50	0:05

Saturday
Day
Wall - south

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
11	12:30	12	12:35	0:05
36	12:37	42	12:42	0:05
29	12:45	43	12:50	0:05

Sunday
Day
Wall - south

Route coming from	Arrival time	Route departing as	Departure time	Dwell time in zone
11	12:00	12	12:05	0:05
36	12:37	42	12:42	0:05
29	12:45	43	12:50	0:05

Note: Schedules for routes 11 and 12 will need some adjustment to share the one bay available on Wall south. The volume is very managable, the schedules need to be more interleaved. In theory, using the PM peak as an example, every bus could have a five minute dwell time, with a two minute clearance interval.

Appendix B Traffic Analysis Technical Memorandum

Subject Spokane Transit Plaza – Task 3 Document Existing and Anticipated Condition Traffic Analysis

Project Name Spokane Transit Plaza Operational Analysis

Attention Emily Yasukochi/Nelson Nygaard, Tim Payne/Nelson Nygaard

From Charlie Wence/Jacobs, Jennifer John/Jacobs

Date Friday, January 4, 2019

Copies to

1. Overview

This technical memorandum evaluates traffic conditions for buses and autos at intersections surrounding the Spokane Transit Plaza, downtown Spokane's hub of bus service. This analysis was conducted for the 2016 Existing Condition and a 2022 Baseline scenario. The Spokane Transit Plaza project proposes modifications to bus schedules and routes serving the transit plaza.

2. Traffic Analysis Methods

2.1 Model Parameters and Techniques

Synchro Studio version 9 was used for intersection capacity analysis. Measures of Effectiveness (MOE) from Synchro include: average vehicle delay, signalized intersection Level of Service (LOS), and volume-capacity ratio (v/c). These MOE are based on the 2000 Highway Capacity Manual (HCM) methodology.

A Synchro network of downtown Spokane developed to analyze the Central City Line (CCL) project was used as a base model for this project. For the Spokane Transit Plaza analysis, two scenarios were analyzed: 2016 Existing Condition and 2022 Baseline.

Turning movement volumes were used directly from the CCL 2016 Existing Condition model. General purpose traffic volumes for the 2022 Baseline scenario were developed by interpolating between the CCL project's 2016 Existing Condition and 2040 Baseline turning movement volumes. This resulted in approximately a 1% annual growth rate applied to 2016 Existing Condition traffic volumes.

Bus volumes were not included in the volume growth calculation. Overall, 2022 Baseline bus volumes are similar to 2016 Existing Condition but with some minor, localized shifts at intersections surrounding the Spokane Transit Plaza. The bus volumes assumed for traffic analysis do not include deadhead movements. These movements were determined later in the evaluation process as the preferred alternative was developed. However, the volumes are not large enough to incur significant impacts on any of the study intersections.

Signal timing parameters (cycle lengths, splits, turn types, offsets) were used from the CCL 2016 Existing Condition model. Signal timings were not optimized for the 2022 Baseline scenario and are the same as 2016 Existing Condition. This is because signal timings from 2016 Existing Condition can adequately accommodate the modest growth in traffic volumes between 2016 and 2022.

2.2 Study Intersections and Analysis Time Period

For this Synchro study, six study area intersections were chosen for the analysis focused around the Spokane Transit Plaza. The PM peak hour was the only time period evaluated. **Table 1** outlines these study intersections and traffic control type that is in place.

Table 1. STA Plaza Study Intersections

ID	North-South Road	East-West Road	Control Type
1	Lincoln Street	Riverside Avenue	Signal
2	Post Street	Riverside Avenue	Signal
3	Wall Street	Riverside Avenue	Signal
4	Lincoln Street	Sprague Avenue	Signal
5	Post Street	Sprague Avenue	Signal
6	Wall Street	Sprague Avenue	Signal

3. Traffic Analysis Results

3.1 Existing Intersection Results

Results for overall intersection LOS, average vehicular delay, and v/c for the Existing 2016 PM peak hour are presented in **Table 2** below. All study intersections in the 2016 Existing Condition operate with low average vehicular delay. Each study intersection operates at LOS B or better in existing PM peak hour.

Table 2. 2016 PM Existing Condition Intersection LOS, Delay, v/c Ratio

ID	North-South Road	East-West Road	2016 PM Existing		
			LOS	Delay (sec/veh)	v/c
1	Lincoln Street	Riverside Avenue	A	8	0.41
2	Post Street	Riverside Avenue	A	6	0.27
3	Wall Street	Riverside Avenue	A	9	0.22
4	Lincoln Street	Sprague Avenue	A	8	0.47
5	Post Street	Sprague Avenue	A	8	0.30
6	Wall Street	Sprague Avenue	B	12	0.42

3.2 2022 Baseline Intersection Results

Results for overall intersection LOS, average vehicular delay, and v/c for the 2022 Baseline PM peak hour are presented in **Table 3**. All study intersections in the 2022 Baseline operate at LOS B or better, with slightly higher average vehicular delay compared to the 2016 Existing Condition. The 1% annual growth in traffic volumes and localized shift in bus volumes between 2016 Existing Condition and 2022 Baseline will have a negligible impact to traffic operations.

Table 3. 2022 PM Baseline Intersection LOS, Delay, v/c Ratio

ID	North-South Road	East-West Road	2022 PM Baseline		
			LOS	Delay (sec/veh)	v/c
1	Lincoln Street	Riverside Avenue	A	9	0.44
2	Post Street	Riverside Avenue	A	6	0.28
3	Wall Street	Riverside Avenue	A	9	0.25
4	Lincoln Street	Sprague Avenue	A	9	0.50
5	Post Street	Sprague Avenue	A	8	0.32
6	Wall Street	Sprague Avenue	B	12	0.44

4. Summary and Conclusions

The intersections surrounding the Spokane Transit Plaza operate with overall low average vehicular delay during the PM peak hour in the 2016 Existing Condition and 2022 Baseline. The traffic analysis indicates that intersections adjacent to the Spokane Transit Plaza can accommodate, with minimal overall impact, the proposed modifications of transit routes and background growth of traffic volumes.

While at an overall level the analyzed intersections near the Spokane Transit Plaza are expected to operate under capacity, the Synchro traffic analysis software lacks the capability to isolate delays specific to transit vehicles. To fully assess the relative differences in transit travel time and delay, it would be beneficial to analyze 2016 Existing Condition and 2022 Baseline with a microsimulation tool, such as VISSIM.

Appendix C Multiple Account Evaluation Criteria

Account	Criteria	Notes
Regional Community	Transit ridership	Expected influence on transit ridership. Keep in mind difference between number of rides, passengers, passenger miles.
	On time performance	Qualitative description of the likely impacts to on-time performance of different alternatives.
	Connectivity Index	Measure of ability to transfer between routes. Generated by HASTUS, based on opportunities, time, and importance or weight; e.g. larger volume and more important transfers will have greater weight.
	Transfer distance	Measure of change in distance for customers to walk between buses. Also weighted based on usage.
	Travel time	Measure of change in travel time for a cross-section of common trips.
	System legibility	Qualitative assessment of how the alternative affects how a new or current rider understands how to use the system.
	Ride experience	Qualitative assessment of how the alternative affects perceived safety and quality of experience, e.g. transfers on a downtown street vs at the Plaza.
	Accessibility	Qualitative assessment of how the alternative affects accessibility of the transit system for people with disabilities.
	Downtown Community	Pedestrian level of service in transit boarding areas
Curb space and dwell time for transit vehicles along business frontage		Will look at curb space and dwell time for all locations, but of particular interest is how much of that is occurring along private business frontage.
Changes to auto level of service at affected intersections		This may end up being only effective for particular movements at specific intersections. Will know more as alternatives are shaped. May lead to recommendations for intersection improvements.

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Account	Criteria	Notes
	Transit vehicle accumulations at particular nodes	Just in case the alternatives move to disperse layover in other downtown locations and we want to evaluate the impact of that dispersion.
	Out of service miles downtown	Related to vehicle accumulations at nodes, this is a measure of how much maneuvering transit vehicles would need to do to position themselves for revenue service.
	Passenger boarding volumes	Number of people expected to board in downtown transit zones along private business frontage.
	Passenger drop-off volumes	Number of people expected to alight in downtown transit zones along private business frontage.
	Compatibility with land use transition from institutional to retail	Qualitative assessment of how alternatives fit with the changing character of downtown & Riverside Ave in particular.
	Parking impacts	Expected change in number of on-street parking spaces by type (commercial loading, meter, etc.).
	Bicycle facility impacts	Expected impacts on existing or planned bicycle lanes or other facilities, e.g. on-street bikeshare corrals.
Environment		
	Adaptability to battery buses	Most important issue would be wayside charging, if that is a direction STA is headed.
	Downtown dwell times	Accumulation of all dwell times when buses are at curb idling. Looking at concentrations of mobile source emissions that essentially become point source emissions.
	Number of buses entering downtown core	Overall reducing or increasing this measure is relatively neutral as more buses means more mobility, fewer buses means lower emissions, unless they are all electric, that is.
Transit Efficiency		
	Vehicle hours	Total hours vehicles are on the road, this is more important in terms of the comparison between alternatives rather than the precise absolute number.
	In-service hours	Hours vehicles are providing service. Also a comparison between alternatives and may end up being stated as a ratio of in-service hours to total vehicle hours and the differences between alternatives.
	Number of transit vehicles required	Comparison between alternatives.

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Account	Criteria	Notes
	Distribution of layover time downtown versus other locations	This is both spatial and temporal (i.e. even if total layover hours remain unchanged, has the distribution of layover durations changed?)
	Impact on operator work shifts	This is a place holder until we know if there is a distinguishing characteristic that is likely to change, for example, more split runs versus straight runs, or changes in relief locations.
	Capital investment required – non-vehicle	Do the alternatives require new capital (non-vehicle) investment not presently planned in Moving Forward? (E.g. new layover or transfer facilities, upgrading stops for increased anticipated passenger volumes.)
	O&M costs for new facilities	Maintenance and security: higher volumes of passengers or new passenger facilities require higher levels of both.

Appendix D Strategy Evaluation Results

Regional Community

Criteria	Strategy 1	Strategy 2	Strategy 3	Methodology	Data Source #1	Data source #2
Transit ridership				Calculated based on estimated # of riders per hour	Zone ridership and route assumptions	Number of buses at transit plaza by alternative
On time performance						
Connectivity Index						
Transfer distance				Multiply ridership/bus route by distance from transit plaza (Alt C only)	Walk distance/time to plaza from new bus stop(s)	
Travel time						
System legibility				Total number of stops no longer at the plaza		
Rider experience				Look at curb cuts and street crossings of new stops in alternative C; look at store frontages outside of new stops in Alt C vs. plaza stops		
Accessibility				Look at curb cuts and street crossings of new stops in alternative C		

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Downtown Community

Criteria	Strategy 1	Strategy 2	Strategy 3	Methodology	Data Source #1	Data source #2
Pedestrian level of service in transit boarding areas				Divide # of boardings/day by # of buses/day at plaza-adjacent stops. Assume non-plaza stops have adequate ped LOS	Zone ridership and route assumptions	Number of buses at transit plaza by alternative
Curb space and dwell time for transit vehicles along business frontage				Look at dwell times for each bus route that stops in front of a business (*need dwell time data, bus stop location data); measure curb space of bus stops in front of businesses (and combine totals)		
Changes to auto level of service at affected intersections						
Transit vehicle accumulations at particular nodes						
Out of service miles downtown						
Passenger boarding volumes				Look at each bus stop that is adjacent to a business frontage and number of passengers boarding at these stops		
Passenger drop-off volumes				Look each bus stop that is adjacent to a business frontage and number of passengers alighting at these stops		
Compatibility with land use transition from institutional to retail				Look at all bus stops that will be stopping along Riverside Ave		

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Criteria	Strategy 1	Strategy 2	Strategy 3	Methodology	Data Source #1	Data source #2
Parking impacts				Total number of feet of bus stop space in front of new stops proposed for Alternative C		
Bicycle facility impacts				Number of routes that conflict with routes in bike plan	Spokane Bike Plan (future network)	













Environment

Criteria	Strategy 1	Strategy 2	Strategy 3	Methodology	Data Source #1	Data source #2
Adaptability to battery buses						
Downtown dwell times				Researched bus emissions per minute of dwell; multiply total amount of dwell time per alternative by amount of emissions/minute		
Number of buses entering downtown core				Assume all alternatives are equal since all bus routes will continue to travel downtown		

Transit Efficiency

Criteria	Baseline	Strategy 1	Strategy 2	Strategy 3	Methodology	Data Source #1	Data source #2
Vehicle hours	1812.58	1907.28	1917.67	1894.12			
In-service hours	1279.58	1280.5	1295.88	1279.68			

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Number of transit vehicles required	142	148	148	144			
Distribution of layover time at Plaza versus other locations		17.60%	16.70%	15.20%			
Impact on operator work shifts							
Capital investment required – non-vehicle		 	 	 	Looked at Spokane bus stop design guidelines; looked at ridership at each new stop; looked at avg. cost of bus stop amenities; determine amenities based on passenger volumes, and calculate total amenity costs per stop	Spokane Bus Stop Design Standards	Zone ridership and route assumptions
O&M costs for new facilities					Based on above calculation (higher capital investment = higher O&M investment)	Spokane Bus Stop Design Standards	Zone ridership and route assumptions

Appendix E Outreach Phase 1 Summary

Outreach during Phase 1 consisted of:

- 10 outreach events
- Eight distinct groups of participating stakeholders

Outreach Events

This section includes brief summaries of the outreach conducted, along with a table showing the dates and number of participants at each meeting. Meeting notes and documents are included in the Appendix.

Phase 1 Outreach Dates and Participants

Date(s)	Meeting	Participating Stakeholders
12/21/17	Kick-Off Meeting	DSP, consultant team, STA
2/12/18	City Council Urban Development Committee	City Council Committee
2/15/18	Technical Team	City of Spokane, consultant team, DSP, SRTC, STA, Mobility Center
3/14/18	Technical Team	City of Spokane, consultant team, DSP, SRTC, STA, Mobility Center
4/4/2015	STA Board Performance Monitoring and External Relations Committee	STA
4/9/2018	Downtown Spokane Partnership (DSP) President and Staff	DSP
4/11/2018	STA Citizen Advisory Committee	Residents, STA
4/16/2018-4/27/2018	Fixed-route Operator Outreach	STA
4/25/2018	DSP Business Improvement District	Business community, DSP
4/25/2018	DSP Board	DSP

Project Kick-Off Meeting

The project kick-off meeting, held on December 21, 2017, included STA staff members, consultant team members, and Andrew Rowles from DSP.

City Council Urban Development Committee

On February 12, 2018, STA staff gave the Spokane City Council's Urban Development Committee a presentation and briefing sheet that included the project background, timeline, and goals.

Technical Team Meetings

The Spokane Plaza Operational Analysis project team held two meetings with the project Technical Team: one on 2/15/18 and another on 3/14/18.

The February Technical Team meeting reviewed project objectives, the impact of scenarios on paratransit access, pedestrian level of service (LOS), bicycle LOS, impacts to businesses, auto parking impacts, and scenario evaluation criteria. The Technical Team proposed changing the Downtown Community evaluation criteria to include impacts to parking and commercial loading (based on an initial parking inventory), as well as impacts on existing or planned bicycle lanes. The criteria 'Efficiency' was proposed to be renamed to 'Transit Efficiency', and a category 'Other Impacts of Benefits' was suggested as an addition.

In the March Technical Team meeting, participants discussed bike infrastructure, the potential incorporation of the Intermodal Center, system legibility for new riders, clarification on the Bank of America stop, snow storage, and other items. The team also stressed the importance of graphic representation of alternatives, as well ensuring that ideas are discussed only as ideas, and not as if they've been already decided. Amongst other project proposals, the team recommended lettering – instead of numbering – the alternatives.

STA Board Performance Monitoring and External Relations Committee

On April 4th, STA staff gave a presentation and cover letter to the STA Board's Performance Monitoring and External Relations Committee, outlining the project background, timeline, goals, draft alternatives, and draft evaluation criteria. At this meeting, it was stressed that the project should consider phasing and sequencing within the context of other downtown construction projects.

Presentations to Downtown Spokane Partnership (DSP)

STA staff made a total of three presentations to DSP. On April 9th, STA staff delivered draft presentation to DSP President Mark Richard and staff member Andrew Rowles. STA staff then delivered presentation on April 25th to the DSP Business Improvement District (BID) and the DSP Board. The presentation was delivered along with a cover letter and included project background, timeline, goals, draft alternatives, and draft evaluation criteria.

Presentation to STA Citizen Advisory Committee

On April 11th, STA staff delivered a presentation to the STA Citizen Advisory Committee, along with a cover letter including information on project background, timeline, goals, draft alternatives, and draft evaluation criteria.

Operator Feedback Event

From April 16th to 27th, STA planning staff conducted outreach with STA fixed-route operators through staff discussion groups and poster sessions during operator mark-up. This outreach included information on project background, timeline, goals, draft alternatives, and draft evaluation criteria. Valuable feedback was garnered from this outreach, including:

- **General Comments**
 - Real-time signage will be needed
 - Operators value the short five-minute breaks at the plaza

- Zone-specific comments
- Bathrooms are important
- Winter hurts on-time performance
- **Alternative B**
 - Concern that alternative would not work well in inclement weather
 - Concern over boarding/alighting of passengers
 - Note that this was tried in the '90s
- **Alternative C**
 - Concern it would not be easy to understand for the riders
 - Security concerns
 - Concerns with snow removal
 - Concerns that passengers will not like it
- **Alternative D**
 - Concerns over rush hour operation
 - Concerns over vehicle breakdowns or medical emergencies
 - Idea to have staff help boarding buses
 - Concerns over accessibility for people with disabilities
 - Concerns over impacts to Plaza businesses
 - Approval of sawtooth layout
 - Note that drivers give helpful information to riders during their five-minute breaks
 - Wayfinding would likely be important

Appendix F Outreach Phase 2 Summary

Date	Meeting/Attendees	Materials
STA Service Improvement Committee		
Every other week throughout the project	Committee of Operations, Training, Communications and Planning Staff kept updated on the project.	PowerPoint
RIDER ROUND TABLE		
8/20/2018	Discussed 3 strategies (see mtg notes for attendees)	Plaza Operational Study PowerPoint, Demographic forms
OPERATOR ROUND TABLE		
9/11/2018	Discussed 3 strategies (see mtg notes for attendees)	Plaza Operational Study PowerPoint, Evaluation Criteria Results
Technical Team		
8/30/2018	Technical Team - Evaluation Results (see mtg notes for attendees)	Strategy Diagrams, Evaluation Criteria, Draft Evaluation Results
Directors Alternative Analysis Review		
8/30/2018	STA staff discussed results of the alternatives analysis with CEO E. Susan Meyers, Chief Operations Officer Roger Watkins, Communications Director Brandon Rapez-Betty	Same power point that was used at the tech team meeting the same day.
PMER		
9/5/2018	Karl Otterstrom presented the results of the alternatives analysis to the Performance Monitoring and External Relations (PMER) Committee of the STA Board.	Cover letter, PowerPoint
DSP Ad Hoc		
10/4/2018	Discussed 3 strategies (see mtg notes for attendees)	PowerPoint.

Rider Round Table

DATE: August 20th, 2018

TIME: 5:30 – 7:00 PM

ATTENDEES

1. Kerri McIntosh
2. Lindsey Bekemeyer
3. Lisa Kenneson
4. Susan Gray
5. Suzie Saunders

STRATEGY ONE

Likes:

- Frequency of pulse
- Less loitering
- Paratransit more visible from Plaza

Dislikes:

- Driver stress
- Chance to miss connections

STRATEGY TWO

Likes:

- New stops downtown
- Allows for growth

Dislikes:

- Disjointed, not intuitive
- Potential to miss transfer
- Potential to impact businesses by new stops
- Confusing to tourists
- Relocating stops for large events
- Adaptability complications
- Uncertainty of no connection at plaza

Notes:

- Does City Loop connect with the new stops?

STRATEGY THREE

Likes:

- Smoother when buses are late
- Easier on drivers
- Simple, intuitive
- Only 2 places to board
- Less loitering

Dislikes:

- Possibility to miss bus
- Large area to watch for buses
- Fewer timed transfers
- Hard to plan trips to unfamiliar locations
- Not knowing exactly where your bus loads especially for people with disabilities

Notes:

- How does this impact riders with disabilities?

- Diagonal access through plaza?

Operator Round Table

DATE: September 11th, 2018

TIME: 3:00 – 4:00 PM

ATTENDEES

1. Eric Woods
2. Michael Ball
3. Mary Clarry
4. Greg Matthews
5. Dave Goodwin
6. Mary Beth Fitzgerald
7. Scott Leinen
8. Ashley Potter

STRATEGY ONE:

Likes:

1. Less time at the Plaza
2. More use on Wall Street with pedestrian safety

Dislikes:

1. Risk of being behind (late) due to weather of wheelchairs
2. Ripple effect of being late
3. Not enough time for “walk around” during operator change
4. Less predictability
5. EMS vehicles taking up space

Notes:

1. Two lanes for transit and double stack to board/alight
2. Use paratransit to alight if early
3. ADA ramp
4. Specific boarding/alighting area

STRATEGY TWO:

Likes:

1. Relieving pressure from Plaza
2. Commuters want stops outside of Plaza
3. Bus stops with Transit amenities (shelters)

Dislikes:

1. Nordstrom’s/event traffic

STRATEGY THREE:

Likes:

1. No waiting

Dislikes:

1. Crowd could prevent passengers from boarding
2. No recovery time
3. Might result in more idling
4. Requires more discretion for leaving
5. Potential to leave wheelchairs (who wait at the front of the line) behind if passengers alight at the end and reach capacity
6. Riders won’t/can’t see all buses
7. No bathrooms
8. Learning curve boarding riders with disabilities

Notes:

1. Need more monitors to notify riders
2. Front/back designations for load and go
3. Audio/deck sign departure notice
4. Reader board for wheelchair riders notifying operator which bus they need

Other Concerns:

1. Bank of America parking garage
2. Pedestrians crossing Wall St
3. Lengthy alight with cash fare
4. Move commercial loading to Riverside in front of Bank of America
5. Remove/adjust parking on Wall between Sprague and First

Downtown Spokane Partnership Ad Hoc Committee

10/4/2018

Andrew Rolwes, DSP Vice President of Public Policy & Parking invited members of the DSP BID and Board and property managers of properties surrounding the plaza to participate in an ad hoc committee on the project.

The meeting was held on Thursday, October 4th, at 10:00 AM at the Downtown Spokane Partnership offices.

In attendance:

- Kevin Gutherie, manager of the Peyton Building
- Ron White, manager of the Bank of America Building

DSP Staff:

- Andrew Rolwes, DSP Vice President of Public Policy & Parking

STA Staff:

- Karl Otterstrom, Planning Director
- Brandon Rapez-Betty, Communications Director
- Kathleen Weinand, Principle Planner

Karl Otterstrom gave an overview of the operational strategies and the analysis.

Ron White provided the following thoughts:

- He likes alternative 3 because there would be less platooning of buses.
- Whatever is implemented needs to be reliable, consistent, and not confusing.
- Anything that has less of an impact on Bank of America is good.
- The Plaza benefits downtown
- Would like the departures to be less pulsed

Kevin Gutherie provided the following thoughts:

- Likes the idea of layover at the Rookery Block (nearside of WB Sprague and Howard)
- Getting the parking space in front of the Peyton Building back a plus

- Before 9:00 AM there is no retail activity
- Very grateful that STA is moving this along
- The solution needs to be reliable, simple, understandable
- Likes smaller quicker pulses and the idea of a hybrid approach
- The early morning drop at Global Credit Union (nearside of WB Riverside and Post) should not be an impact

Appendix G Outreach Phase 3 Summary

Date	Meeting/Attendees	Materials
STA Citizen Advisory Committee		
11/15/2018	Kathleen Weinand presented the draft plan to the CAC	PowerPoint
Technical Team		
11/26/2018	The consultant team presented the draft preferred alternative to the Technical Team and facilitated a discussion among team members. See meeting notes for attendees.	Preferred Alternative Memo, Plaza Diagram, PowerPoint
DSP Business Improvement District		
11/28/2018	Karl Otterstrom had 10 mins to present the draft plan at a monthly meeting of the DSP BID. They made a motion to support the plan.	PowerPoint
DSP Board		
11/28/2018	Karl Otterstrom had 10 mins to present the draft plan at a monthly meeting of the DSP Board. They made a motion to support the plan.	PowerPoint
PMER		
11/28/2018	Karl Otterstrom presented the recommended strategy and phasing to the Performance Monitoring and External Relations (PMER) Committee of the STA Board. They voted to recommend acceptance of the Board.	Cover letter, Draft Plan Graphic, PowerPoint
STA Board		
12/13/2018	The STA Board accepted the recommended strategy and phasing at their December Board Meeting.	Cover letter, Draft Plan Graphic, Phasing Graphic, PowerPoint