

## PHYSICAL FEASIBILITY

This section details the impacts each alternative would have on the built environment. Streetcar design and implementation may affect:

- Utility infrastructure;
- Parking capacity;
- Sky Bridge passage;
- Traffic signalization; and
- Stop placement

### Utility Impacts

Potential impacts on existing water, storm and sanitary utilities were assessed using GIS data from the City of Salem. Impacts to utilities that are parallel to the trackway and within a certain distance of the trackway were categorized as follows:

- Minor Impact – The utility is located over 6 feet from the track.
- Moderate Impact – The utility is located within 3 to 6 feet of the track.
- Major Impact – The utility is located within the 8-foot trackway, or less than 3 feet from the trackway.

As an additional screening tool, segments of storm or sewer lines that are 12 inches and larger, and water lines 8 inches and larger are identified. Figure 11 details the impacts to utility lines for each of the alignments.

**Figure 11 Utility Impacts By Alignment**

Alignment 1			
Utility	Type of Impact	Length (ft)	Major Utilities Impacted:
Water	Moderate	1,860	Bellevue east of Winter to 13th -Sanitary: 1,400 feet of 14-inch to 18-inch
	Major	700	
Sanitary	Moderate	610	
	Major	2,625	
Storm	Moderate	70	
	Major	385	
Alignment 2			
Utility	Type of Impact	Length (ft)	Major Utilities Impacted:
Water	Moderate	1,280	Union between High and Commercial -Sanitary: 800 feet of 48-inch. Court between Liberty and 12th -Sanitary: 2,700 feet of 24-inch -Storm: 1,100 feet of 12-inch to 16-inch Liberty between Broadway/High and Division -Water: 520 feet of 12-inch pipe on segment
	Major	2,850	
Sanitary	Moderate	840	
	Major	3,190	
Storm	Moderate	350	
	Major	850	
Alignment 3			
Utility	Type of Impact	Length (ft)	Major Utilities Impacted:
Water	Moderate	0	Court between Cottage and 12th -Water: 1,150 feet of 20-inch. -Sanitary: 3,000 feet of 12-inch to 24-inch -Storm: 1,650 feet of 16-inch. Liberty between Trade and Ferry. -Water: 250 feet of 10-inch.
	Major	3,350	
Sanitary	Moderate	950	
	Major	3,150	
Storm	Moderate	920	
	Major	1,750	
Single-Track Option			
Utility	Type of Impact	Length (ft)	Major Utilities Impacted
Water	Moderate	720	No utility of significant physical size is present in the corridor.
	Major	200	
Sanitary	Moderate	200	
	Major	720	
Storm	Moderate	200	
	Major	200	

## Parking Analysis

The conceptual alignments were developed assuming that existing on-street parking should be preserved whenever possible. Angled parking spaces would need to be converted to parallel parking spaces, resulting in a net reduction in spaces. The list in the following paragraph identifies street segments where existing angled parking would need to be converted to parallel parking to accommodate streetcar operations. As discussed in the next section, designs to address sky bridge clearance issues may further impact parking capacity.

A single block face with no ingress or egress can accommodate 18 to 20 angled parking stalls. Arranged in parallel, the same block face would accommodate approximately 14 to 15 stalls. The impact of changing parking from angled to parallel varies from street to street depending on the exact length of available curb space, but typically would result in the removal of five or less parking stalls.

### Alternative 1

- Liberty – West side between Court and State (1 block face).
- High – West and east sides between Court and State; east side between Center and Court (total 4 block faces).
- State – North side between High and Winter (3 block faces).

### Alternative 2

- Commercial – West side between Center and State (3 block faces).
- Court – North side between Liberty and High; south side between Cottage and 12th (5 block faces).
- State – North side between Liberty and Winter; south side between Capitol and 12th (5 block faces).

### Alternative 3

- Commercial – West side between Court and State (1 block face).
- Court – North side between Commercial and High; south side between Church and 12th (7 block faces).

- State – North side between Liberty and Winter (4 block faces).

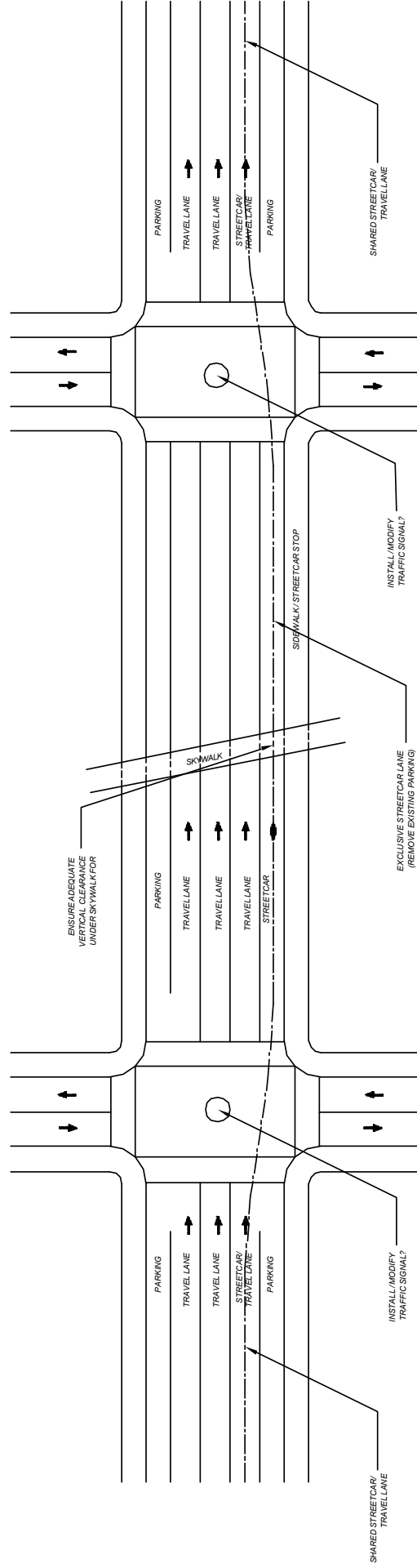
***Single Track Alignment***

- Commercial – West side between Center and State (3 block faces).
- Chemeketa – North and south sides between Liberty and Capitol; north side between Capitol and 12th (13 block faces).

**Sky Bridge Analysis**

The presence of sky bridges along each alignment would impact traffic flow and existing on-street parking when coupled with streetcar operations. The overhead catenary system for the streetcar would require 18 feet of vertical clearance from top of rail and would limit clearance for regular traffic. To achieve this clearance, the trackway would have to be located adjacent to the curb, which would result in the removal of any existing on-street parking. Except for Alignment 3, this is the case on the east side of Liberty between Center and Chemeketa. Figure 12 illustrates the conceptual streetcar configuration in order to address the OCS clearance conflict with a sky bridge.

Figure 12 Possible Streetcar Configuration with Sky Bridge



### Traffic Signal Improvements

Each alignment will require modifications to existing traffic signals or installation of new traffic signals to accommodate proposed streetcar operations. Generally, existing unsignalized (stop-controlled) intersections would remain as such, except where required to safely allow for a new streetcar maneuver such as a crossover at the termini on Broadway or at 12th and Mill.

#### Alignment 1 (4 new signals, 17 modified signals)

Direction	Segment	Cross Street	Proposed Action
NB & SB	Broadway	Market	Install signal
NB	Liberty	High	Modify existing signal
		Marion	Modify existing signal
		Center	Modify existing signal
		Chemeketa	Modify existing signal
		Court	Modify existing signal
		State	Modify existing signal
		Ferry	Modify existing signal
SB	High	Union	Modify existing signal
		Marion	Modify existing signal
		Center	Modify existing signal
		Chemeketa	Modify existing signal
		Court	Modify existing signal
		State	Modify existing signal
EB	State	Church	Modify existing signal
		Winter	Install new signal
WB	Ferry	High	Modify existing signal
		Church	Modify existing signal
		Winter	Install new signal
NB & SB	Winter	Bellevue	Modify existing signal
EB & WB	Bellevue	12th-Mission	Install new signal

**Alignment 2 (2 new signals, 19 modified signals)**

Direction	Segment	Cross Street	Proposed Action
NB & SB	Broadway	Market	Install new signal
NB	Liberty	High	Modify existing signal
		Marion	Modify existing signal
		Center	Modify existing signal
		Chemeketa	Modify existing signal
		Court	Modify existing signal
SB	High	Union	Modify existing signal
		Commercial	Modify existing signal
SB	Commercial	Marion	Modify existing signal
		Center	Modify existing signal
		Chemeketa	Modify existing signal
		Court	Modify existing signal
		State	Modify existing signal
EB	State	Liberty	Modify existing signal
		High	Modify existing signal
		Church	Modify existing signal
		12th	Modify existing signal
WB	Court	High	Modify existing signal
		Church	Modify existing signal
		12th	Modify existing signal
NB & SB	12th	Mill	Install new signal

**Alignment 3 (3 new signals, 17 modified signals)**

Direction	Segment	Cross Street	Proposed Action
NB	Liberty	Leslie	Install new signal
		Trade	Modify existing signal
		Ferry	Modify existing signal
		State	Modify existing signal
		Court	Modify existing signal
		Chemeketa	Modify existing signal
		Center	Modify existing signal
SB	Commercial	Leslie	Install new signal
		Trade	Modify existing signal
		Ferry	Modify existing signal
		State	Modify existing signal
		Court	Modify existing signal
EB	Center	High	Modify existing signal
		Church	Modify existing signal
		12th	Modify existing signal
WB	Court	High	Modify existing signal
		Church	Modify existing signal
		12th	Modify existing signal
NB & SB	12th	State	Modify existing signal

**Single-Track Alignment (8 new signals, 13 modified signals)**

Direction	Segment	Cross Street	Proposed Action
<b>NB &amp; SB</b>	Broadway	Market	Install new signal
<b>NB</b>	Liberty	High	Modify existing signal
		Marion	Modify existing signal
		Center	Modify existing signal
		Chemeketa	Modify existing signal
<b>SB</b>	High	Union	Modify existing signal
		Marion	Modify existing signal
		Center	Modify existing signal
		Chemeketa	Modify existing signal
<b>EB</b>	Chemeketa	Church	Modify existing signal
		Cottage	Modify existing signal
		Winter	Modify existing signal
		Capitol	Modify existing signal
		12th	Modify existing signal
<b>NB &amp; SB</b>	12th**	Mill	Install new signal

*\*\*Note: An independent streetcar signaling system will be required to control the single-track segment of the alignment.*

## **Streetcar Stops**

Locations of streetcar stops were determined using a general spacing of 600 feet (or 2 blocks). The following stops were assumed for each alternative. Individual stop locations could easily be adjusted in detailed planning and design phases.

### ***Alignment 1 Stop Locations (16 total)***

- Broadway @ Market
- Broadway @ Liberty
- Broadway @ High
- Liberty & High @ Division
- Liberty & High @ Marion
- Liberty & High @ Chemeketa
- Ferry @ Trade
- State @ Church
- State @ Winter
- Bellevue @ Winter
- Bellevue @ University (2)
- 12th/Amtrak station (end of line)

### ***Alignment 2 Stop Locations (18 total)***

- Broadway @ Market
- Broadway @ Liberty
- Broadway @ High
- Liberty & High @ Division
- Liberty & Commercial @ Marion
- Liberty & Commercial @ Chemeketa
- Court @ High
- State @ Liberty
- Court/State @ Cottage
- Court @ Capitol
- State @ Waverly
- 12th @ Ferry (2)
- Amtrak station

### ***Alignment 3 Stop Locations (17 total)***

- Commercial & Liberty @ Leslie
- Commercial & Liberty @ Bellevue
- Commercial & Liberty @ Trade
- Court @ State
- Court @ Liberty
- Liberty @ Chemeketa
- Center & Court @ Church
- Center & Court @ Winter
- Center & Court @ Capitol
- 12th @ State
- Amtrak station (end of line)

### **Single-Track Alignment Stop Locations (13 total)**

Broadway @ Market  
Broadway @ Liberty  
Broadway @ High  
Liberty & High @ Division  
Liberty & High @ Marion  
Liberty & High @ Chemeketa  
Chemeketa @ Cottage  
Chemeketa @ Capitol  
12th @ State  
Amtrak station

### **Development Potential Along Streetcar Alignments Build-Out Capacity of Land Uses**

This section estimates build out potential for commercial and residential activity along the various streetcar alignments. Based on current zoning codes and applicable special district overlays, the following table highlights the maximum level of development within easy walking distance of the streetcar system. This evaluation is based purely on maximum allowable zoning and has no tie to actual development trends or proposals.

Figure 13 presents the results of this analysis while Figure 14 highlights the zoning for properties in the study area. The following conditions are assumed in the development of these estimates:

- Seventy-five percent of the lot area is available for occupancy on each allowed floor. This accounts for restrictions due to open space, parking and FAR limitations imposed on some lots. This represents an average for all lots as some zoning requires zero-lot lines while others require greater right-of-way buffers.
- Central Business District lots within the Historic Core District Overlay are built out to four stories per the City of Salem Development Design Handbook.
- The remaining Central Business District lots built out to six stories. This is the limit for properties in the Front Street District Overlay. There is no height limit for lots outside the Front St and Historic Districts.

- First floor space is allocated to retail, other floors are assumed to be commercial for all CB and CR zoned properties.
- Other commercial lots with 70-foot height limits are built out with six stories while those with 50-foot limits are built out with four stories.
- The Green and Yellow parking lots on the Capitol Mall are available for four stories of office commercial space, assuming lower levels will remain for parking.
- One single-family dwelling unit is allocated per lot that is zoned RS.
- Development in the Multi-Family High-Rise Residential zones is built out to 80 dwelling units per acre. There is no density limit in these zones. City code limits other multi-family zoned lots to 28 dwelling units per acre.

**Figure 13 Development Build Out Capacities**

	Alignment			
	1	2	3	3 (with extension)
1st Floor Retail Space (sq. ft.)	3,723,170	4,453,605	3,897,659	4,232,134
Other Commercial Space (sq. ft.)	22,076,076	24,347,097	18,387,454	21,827,687
Residential Dwelling Units	1,492	2,061	563	1,026
Other Commercial Space If All Lots Limited to 4 Stories (sq. ft)	15,146,182	17,186,582	13,447,100	16,132,863

**Figure 14 Study Area Zoning Codes**

