

Appendix S. Design Updates

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Table S-1. 15% Basis of Design Updates from Draft NEPA Design (Due to Design Progression from a 5% to 15% Level of Design)

Study Zone	Topic	NEPA Design Concept (5% Level of Design) Assumption	15% BOD Memo Concept	Rationale for Design Progression Change
1	Bridge widening at N Russell St	Foundation conflict at N Russell St not specifically identified in 5% concept	New column will require extending the existing street curb (still providing 12' lane and 6' shoulder)	Revised column to avoid lane shift on N Russell St. Curb extension will require additional review and approval.
2	Eliot Viaduct widening	Eliot Viaduct widened on grade	Eliot Viaduct widened on bridge	Improved constructability. Lane alignment remains the same.
3	Freeway profile	Centerline widening; Maintain existing profile grade	Lower mainline and relocate the 56-inch combined sewer to achieve freeway clearance targets while reducing local street impacts and improving crossroad profiles	Freeway lowering allows for reduced cross street impacts based on new highway cover construction. Need to better identify existing location of 56-inch combined sewer through SUE exploration.
3	Traffic Staging of South Cover	Temporary shoofly staging of the South Cover on permanent highway cover and constructing median columns from temporary work platforms	Temporary shoofly with temporary single span structures while constructing median shafts and columns from I-5	Temporary single span structures will improve construction access while providing additional horizontal clearance to maintain I-5 traffic for the majority of the South Cover construction
4n	Highway cover depth and shape	7' highway cover depth (2-span bridge) with partial 4-foot deep, 4-span bridge segment	Refined 4-span with reduced structure depth (improves crossroad profile); slight modification to NEPA shapes to enhance open cover concept	15% design uses "open" concept with minor shape modifications
4n	N Hancock St/N Dixon St shared-use circulation	North/south shared-use path connection from N Hancock Street to NE Broadway (less than 5% grade)	North/south shared-use path connection from the North Cover to Broadway plus new east/west shared-use path connection to the new Hancock St/N Dixon St/N Wheeler Avenue intersection	Provides multiple accessible routing choices for pedestrians and bicycles
4n	N Hancock St/N Dixon St shared-use grade	N Hancock/N Dixon crossroad profile assumed at 10% (until design refinements could be analyzed)	7% N Hancock St/N Dixon Street crossroad profile established	Shallow 4-span highway cover structure with reduced ramp vertical clearance to achieve flatter crossroad profile
4s	N Vancouver Ave lane configuration (at intersection with	Two SB through lanes with 3rd SB transit and bike only (similar to existing condition)	Two SB through lanes feeding to dual left turns to WB NE Weidler St with 3rd combined bus/general purpose (Moda	Design progression

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	Broadway)		Center) lane and bike box	
4s	N Vancouver Ave lane configuration (between Broadway and Weidler St)	Three travel lanes with 4th shared bus/bike lane	Two dual left turns to WB N Weidler Street with 3rd combined bus/general purpose (Moda Center) lane and separate bike lane	Based on revised Moda Center circulation and update operations assessment, only one lane SB to NE Wheeler Ave (shared bus and general purpose) is required. The existing SB bus stop at NE Weidler Street is relocated to a far side stop.
4s	Bike treatment	Buffered bike lanes	Elevated sidewalk level bicycle facilities to align with updated City design standards and preferences	Additional coordination on proposed facilities, total widths, and distribution of cross section to continue as part of 30% Design Package.
4s	Westbound NE Broadway lane assignment at N Williams Ave	Assumed 5 lane section: Dual right, dual through, single left turn lanes	Assumed 5 lane section: Dual right, through, through/left, and dedicated left turn lane	Proposed to mitigate extensive queuing which would extend into the 4 lane section (which is a shared vehicle and streetcar lane). Includes protected phase two-stage pedestrian crossing at N Williams Ave.
4s	Crosswalk closure (intersection of NE Weidler St and N Vancouver Ave)	Unprotected pedestrian crossing phase in conflict with SB dual left turn lanes (east leg)	Close crosswalk on the east side of intersection	Crosswalk would conflict with SB dual left turn or NB dual right turn phases creating a safety concern for crossing pedestrians.
4n/4s	FLS Systems	Passive FLS systems would satisfy tenability and structural protection requirements for the highway cover structures.	FLS systems combining passive and active components are required to achieve tenability and structural protection requirements of the highway cover structures.	NEPA assessments were based on existing cover and FLS systems in the area. Advancements and revisions to the NFPA 502 code after the NEPA analysis was performed has resulted in more stringent FLS requirements.
5	Moda Center Access	Reversing flow Moda access via NE Wheeler Ave	Two-way Moda Center access on NE Wheeler Ave with circulatory roadway ("Green egg")	Operations testing of two-way NE Wheeler Ave show acceptable operational performance while accommodating typical ingress and

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				egress traffic patterns for event traffic as well as 2045 AM and PM rush hour operations
5	Clackamas Pedestrian and Bicycle Bridge	Curving structure with multiple northerly orientated switchbacks	Structure with single switchback and SB shared-use facility (curvature updated)	Reduced out of direction travel while achieving less than 5% max grade
5	Modified NE Wheeler Ave	Three lane NE Wheeler Avenue with east-side shared-use path	Two lane NE Wheeler Avenue with east side bi-directional separated bicycle facility and sidewalk	Based on revised Moda Center access and projected traffic volumes, additional SB lane not required
6	Transit center	New columns between existing tracks (requires temporary use of single track and/or bus bridging)	New columns between tracks using ABC methods and temporary shoofly tracks	Ongoing investigation of recommended dual track temporary condition
7	I-5 SB Bent 14 conflict (Bridge No. 08858C)	Reinforce/brace existing bent cap with new straddle bridge columns	Construct new foundation at Bent 14 with span replacement and reinforcement of Bent 15	Span replacement anticipated to result in temporary closure of I-5 SB to I-84 EB flyover ramp. Ongoing refinement to avoid the need to replace these spans.
7	NE Lloyd Blvd realignment	Maintain NE Lloyd Blvd as-is, construct straddle-bent at multiple foundations	Relocate existing curb and modify NE Lloyd Blvd typical section to reduce foundation conflicts (does not impact UPRR's MSE retaining wall)	Approval of reduced cross section of NE Lloyd Blvd would be required
7	I-84 WB to I-5 NB ramp: Column/foundation conflicts	Widen ramp towards the west and construct outrigger support at Bent 11	Modify improvement limits to within the gore I-85 WB to I-5 NB gore.	Proposed alignment avoids RR track conflicts and additional bridge columns within NE Lloyd Blvd.

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Table S-2. Design Updates Between the 15% Basis of Design and Revised Baseline Concept

Study Zone	Topic	15% BOD Memo Concept	Revised Baseline Concept	Rationale for Design Progression Change
1	I-405 Bridge Widening	12' right and 6' left shoulder in widened portion of I-405 exit ramp	Provide 10' right and 12'+ left shoulders transitioning back to 6' right and 4' left shoulders north of the ramp gore to match existing conditions	Reduces bridge widening (and cost). More consistent with existing cross section as well as adjacent ramp shoulder width
2-6	General Wall Updates	See structure update table included in sheets J01 and J02	See structure update table included in sheets J01 and J02	Design progress and cost reduction
3	Median Shoulder Width	9' median shoulders for the full length of highway cover	Improved some areas of highway cover median shoulder to 12' with a revised striping alignment	Reduces areas of substandard shoulders without introducing additional horizontal tapers or reversing curves
3	I-5 SB Entrance Ramp: 3 lane ramp meter shoulder	8' right shoulder on the I-5 SB entrance ramp from Weidler Street	13' right shoulder to accommodate 3 lane ramp meter operations	Provides additional ramp meter storage
4s	Highway Cover Shape	South cover assumed girders perpendicular to I-5	South cover assumed girders parallel to Broadway and Weidler	Improved MOT by reducing number of stages and allowing more of the cover to be constructed under each phase
4n	Shared-Use Path South of Flint Ave	Provided additional retaining wall and grading to accommodate a potential shared-use path connection	Includes additional retaining wall and a paved shared-use path connection between Flint Ave and the north cover	Implement City's facility plan of a shared-use facility
4n	N Hancock St Contraflow Bicycle Facility	No contraflow bike facility provided along south side of Hancock between Flint Ave and Vancouver Ave to provide connection for SB Vancouver bikes to the Broadway Bridge	Added a contraflow bike facility to accommodate heavy SB to WB bike movements from SB Vancouver Ave	Provides an enhanced, separated, bike facility that permits by-passing the ramp terminal intersection while accessing the Broadway Bridge
4n	Vancouver Ave Cross Section	2 SB General Purpose (GP) lanes, 1 bus lane, buffered bike lane, and east-side sidewalk	1 SB GP lane, 1 bus lane, sidewalk level bike facility, and sidewalks on both sides (under development)	Cross section is still under refinement pending review of intersection layout, traffic operations, and intersection safety. Revisions provide more complete urban network
4n/4s	Williams Southbound Bike Facility	Assumed bi-directional bike facility from Hancock St to Multnomah St	Assumes NB-only bike facility from Hancock St to Weidler St. Provisions for left turn movements for WB Broadway bikes provided at Vancouver and not at Williams.	Consistent with existing bike corridor movements (NB on Williams and SB on Vancouver). Reduces intersection conflicts, improves cross section and through-put for NB bikes. Provides opportunity to extend bus-only lane on Williams to Broadway.
4s	Weidler/Williams Intersection Layout	No western crosswalk and included SB bike facility	Western crosswalk provided. Sidewalk in front of Madrona Studios separated into thru bikes near the curb, pedestrians, and left-turning bikes to NB Williams at the back of walk (similar to existing conditions). Larger bike box provided in front of NB Williams bus lane.	Provides direct pedestrian access to west side of Williams between Weidler and Broadway. Provides better separation and queuing space for all movements on SW corner of Weidler/Williams.
4s	Victoria Ave Lane Configuration between Broadway and Weidler	Maintained existing left, through-left turn lanes with non-MUTCD compliant signal phasing	Dual left turn lane with separate NB through lane	Provides for MUTCD compliant signal phasing while preserving WB bike signal phase. Maximizes signal timing options while preserving the westerly pedestrian crosswalk.
4n/4s	Fire and Life Safety (FLS) Systems	Jet fans under investigation dependent on design fire	Approximately 6 rows of 4.5' diameter jet fans placed in each direction near the median and right shoulders of the highway cover.	Establishment of hydrocarbon fire as design fire
4n/4s	Streetcar MOT	Streetcar operations through the Broadway/Weidler construction work zone to be interrupted for a 2 to 3 year period. During this time, Streetcar riders would use bus bridge.	Maintain temporary tracks through work zone with only short-duration shut downs to construct tie-in connections.	Long duration bus bridging not acceptable to City/PSI. Reduces risk to drop in Streetcar ridership.
5	Moda Center Access	Circulating roadway ("Green Egg") to replace Wheeler Ave serving both event and non-event access	Modify Vancouver/Wheeler between Weidler St and Ramsay Way to be a two-way facility. Maintain existing N Center Ct access. Modify Ramsay Way from N Center Ct to Wheeler Ave with a signalized T intersection and preserve the "Green Triangle." Includes SB sidewalk level protected bike lane north of Ramsay Way.	Enhances multimodal access for bus, bike, and pedestrians during both event and non-event conditions while providing alternative access to the Garden Garage following the relocation of the I-5 SB entrance ramp.
6	Rose Quarter Transit Center MOT	New columns between tracks assuming a 4-month closure with potential temporary LRT shoofly tracks and/or relocating the transit platform	New columns between tracks using accelerated bridge construction (ABC) methods with weekend or two-week-plus-limited-weekend bus bridging	Reduces overall transit impacts while reducing construction cost and risk

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7	I-5 SB Bent 14 conflict (Bridge No. 08858C)	Construct new foundation at Bent 14 with span replacement and reinforcement of Bent 15	Relocate exit ramp to avoid conflict with existing Bent 14 column	Avoids need for new foundation on the "C" structure. Avoids long term detour for span replacement.
7	NE Lloyd Blvd Realignment	Relocate existing curb and modify NE Lloyd Blvd typical section to reduce foundation conflicts (does not impact UPRR's MSE retaining wall)	Construct single straddle bent to avoid realignment or cross section reduction of Lloyd Blvd.	Due to avoidance of other column impacts, straddle bent at this one location further reduces impacts to the local street network and cross section.