Summary Analysis of Throat Area Options within the 3L Re-Alignment Alternative

	Impact Categories	Modified Highway Viaduct	Modified At-Grade	Soldiers Field Road (SFR) Hybrid	No Build
Summary of Construction Impacts	Charles River	• **River Users:** No impacts to Charles River user groups during or after construction. • **Navigation/Encroachment:** Limited contractor impact (equipment) for construction of outfalls in the Charles River. • **Resource Area Impacts (Temporary):** Limited impacts to the Charles River associated with outfalls. • **Ecological Impacts:** No temporary impacts to fisheries, no disturbance of sediment or production of silt. • **Noise:** No temporary construction noise due to work in the Charles River. • See Construction Section of this table for further detail	• More study is required for the following categories. • **River Users:** Construction of PDW path on boardwalk will likely require use of a barge and the contractor to occupy the watersheet, potentially impacting river users. • **Navigation/Encroachment:** Temporary encroachment of +/-40-ft plus barge and construction work zones in the Charles River. • **Resource Area Impacts (Temporary):** Temporary impacts and permanent impacts expected to have similar footprint. See Wetlands and Waterways sections of this table. • **Ecological Impacts:** Construction of living shoreline requires placement of unconsolidated fill along the banks and within flowed waters of the Charles River producing silt and disturbing river sediment. Pile driving in Charles River will disturb river sediment and produce silt and will be subject to fish run time of year restrictions. • **Noise:** Increased pile driving for PDW path may result in elevated construction noise. • See Construction Section of this table for further detail	• **River Users:** Temporary trestle into Charles River required for SFR and PDW Path during construction. Impacts to river users during construction due to narrowing of the watersheet by 110-ft. for trestle. Would temporarily take parkland from river users for maintenance of traffic on SFR and PDW Path via temporary trestle. • **Navigation/Encroachment:** Temporary impact on navigation due to the trestle in the Charles River, narrowing the watersheet by 110-ft. • **Resource Area Impacts (Temporary):** • Requires dredge in the Charles River for the temporary trestle • Impacts to Federal WOTUS/Ch. 91 Waterway for temporary I-90 and trestle • Impacts to state land under water, inland bank, and bordering land subject to flooding for temporary I-90 and trestle • **Ecological Impacts:** Temporary impact to fisheries during construction. Installation of trestle may disturb river sediment and produce silt. • **Noise:** Operation and installation of trestle may increase noise at receivers in Cambridge. • See Construction Section of this table for further detail	• No impacts anticipated
	Commuter Users	• **Worcester Mainline:** WML may either be shielded, shifted and a reduction to a single-track operation for certain periods of time. • **Grand Junction Rail:** Grand Junction RR remains open throughout most of the construction period. Does not necessitate construction of a South Side Maintenance Facility. Supports continuity of operations and a reliable fleet of well-maintained equipment using existing facilities. • **I-90:** Limited opportunity to maintain 4 lanes on I-90 for certain stages exists. Minimum 3 lanes of I-90 maintained in each direction throughout construction, approximately 6-7 years. • **Soldiers Field Road:** 2 lanes of SFR maintained in each direction throughout construction, approximately 6-7 years • **Paul Dudley White Path:** PDW Path maintained throughout construction on existing alignment for majority of construction and relocated to temporary alignments for construction of final path alignment during the final stage of construction. • See Construction Section of this table for further detail	• **Worcester Mainline:** Additional study is required. WML may either be shielded, shifted and a reduction to a single-track operation for certain periods of time. • **Grand Junction Rail:** Grand Junction RR must be closed early on during construction and remain closed throughout much of construction, necessitating construction of a South Side Maintenance Facility. A 100+ mile detour would be required to transfer equipment to the BET in Somerville for heavy maintenance. • **I-90:** Additional study is required. Greater opportunity to maintain 4 lanes on I-90 for certain stages exists. Minimum 3 lanes of I-90 maintained in each direction throughout construction, approximately 6-7 years, except for short durations to lower I-90 profile in the vicinity of the Comm. Ave. overpass • **Soldiers Field Road:** Additional study is required. 2 lanes of SFR in each direction maintained throughout construction, approximately 6-7 years, except for short durations to lower SFR profile to accommodate new GJ Bridge • **Paul Dudley White Path:** PDW Path maintained on existing, temporary and permanent alignments. • See Construction Section of this table for further detail	• **Worcester Mainline:** WML may either be shielded, shifted and a reduction to a single-track operation for certain periods of time. • **Grand Junction Rail:** Grand Junction RR must be closed early on during construction and remain closed throughout much of construction, necessitating construction of a South Side Maintenance Facility. A 100+ mile detour would be required to transfer equipment to the BET in Somerville for heavy maintenance. • **I-90:** Limited opportunity to maintain 4 lanes on I-90 for certain stages exists. Minimum 3 lanes of I-90 maintained in each direction throughout construction, approximately 8-10 years, except for short durations to lower I-90 profile in the vicinity of the Comm. Ave. overpass. • **Soldiers Field Road:** 2 lanes of SFR in each direction maintained throughout construction, approximately 8-10 years, except for short durations to switch over to trestle and then to new SFR Viaduct and to also lower SFR profile to accommodate new GJ Bridge • **Paul Dudley White Path:** PDW Path temporary intermittent closures for path relocation onto trestle • See Construction Section of this table for further detail	• More study is needed to determine level of impacts

	Impact Categories	Modified Highway Viaduct	Modified At-Grade	Soldiers Field Road (SFR) Hybrid	No Build
Environmental	Air Quality	• No significant impacts expected • Impacts expected to be similar across Throat Area alternatives • For potential air quality impacts during construction, please see the Construction section of this table	• No significant impacts expected • Impacts expected to be similar across Throat Area alternatives • For potential air quality impacts during construction, please see the Construction section of this table	• No significant impacts expected • Impacts expected to be similar across Throat Area alternatives • Further study is needed to determine if mechanical ventilation for the covered section of I-90 EB is required • For potential air quality impacts during construction, please see the Construction section of this table	• Similar to existing conditions
	Noise/Vibration	• Highway Viaduct without walls: ○ PDW Path – 63 to 76 dBA ○ Magazine Beach – 62 to 65 dBA ○ Cambridgeport –54 to 63 dBA	• Similar to Modified At-Grade as described in Scoping Summary Report (SSR) with slight differences noted below: • Without walls Modeling in progress, ○ PDW Path – likely low 60s to mid-70s dBA (increased setback distance from SFR, compared to SSR Modified At-Grade) ○ Magazine Beach – likely 63 to 67 dBA or slightly higher (SFR EB lower than SSR Modified At-Grade) ○ Cambridgeport – likely 52 to 63 dBA or perhaps very slightly higher (SFR EB lower than SSR Modified At-Grade)	• SFR without walls: ○ PDW Path – 61 to 76 dBA ○ Magazine Beach – 60 to 64 dBA ○ Cambridgeport –50 to 62 dBA • For potential noise impacts during construction, please see the Construction section of this table	• Similar to existing conditions
	Groundwater	• For potential groundwater considerations, please see the Construction section of this table	• Possible need for concrete mat to resist uplift, depending on roadway cross section and design groundwater elevation. • For potential groundwater considerations, please see the Construction section of this table	• Need to design I-90 for groundwater uplift, to avoid having to pump and possibly treat contaminated groundwater: structural mat and waterproofing, plus some measure to resist uplift, either a) tiedown anchors, or b) additional thickness, with ground improvement in areas underlain by compressible soils. • The SFR has a depressed travel corridor that may be below the groundwater table. If the system requires active pumping to manage infiltration, effluent discharge limits will need to be adhered to. Additional problems may ensue if a release of oil or hazardous materials (OHM) occurs upgradient that migrates to the dewatering system. • For potential groundwater considerations, please see the Construction section of this table	• Similar to existing conditions

	Impact Categories	Modified Highway Viaduct	Modified At-Grade	Soldiers Field Road (SFR) Hybrid	No Build

Environmental	Wetlands
	(Charles River)
		• Summary of Permanent Impacts to the Charles River:
		  ○ Federal: 1000 sq. ft. of total permanent impacts to the Charles River
		  ○ State Wetlands: 1000 sq. ft. of total permanent impacts to the Charles River
		• Approximately 500-1000 sq. ft. of impacts due to outfalls
		• Charles River bank enhancements including a living shoreline are possible upon construction completion
			• Summary of Permanent Impacts to the Charles River:
			  ○ Federal: +/-51,100 sq. ft. of total permanent impacts to the Charles River
			  ○ State Wetlands:
			  ▪ +/-41,700 sq. ft. of total permanent impact to LUW
			  ▪ +/-1,480 lf. of total permanent impact to inland bank
			  ▪ +/-4,720 sq. ft. of total permanent impact to BLSF
			• Approximately 500-1000 sq. ft. of impacts due to outfalls
			• Federal WOTUS:
			  ○ +/-600 sq. ft. from SFR solid fill
			  ○ +/- 20,000 sq. ft. fill for living shoreline;
			  ○ +/- 29,000 sq. ft. shading from PDW pile supported walkway;
			  ○ +/- 500 sq. ft. from piles (250 piles)
			• State Wetlands
			  ○ Land Under Water:
			  ▪ +/-28,200 sq. ft. shading from PDW pile supported walkway;
			  ▪ +/-500 sq. ft. from piles (250 piles);
			  ▪ +/-13,000 sq. ft. solid fill from Living shoreline
			  ▪ 0 sf SFR solid fill
			  ○ Inland Bank:
			  ▪ +/-200 lf. from PDW pile supported walkway;
			  ▪ 1,000 lf. solid fill from living shoreline
			  ▪ +/-280 lf. from SFR solid fill
			  ○ Bordering Land Subject to Flooding:
			  ▪ +/-620 sq. ft. from PDW pile supported walkway (no loss of flood storage);
			  ▪ +/-3,100 sq. ft. from living shoreline
			  ▪ +/- 1,000 sq. ft. (+/- 1,000 cf.) from SFR solid fill.
			• For potential wetland impacts during construction, please see the Construction section of this table
			• Charles River bank restoration upon construction completion possible with proposed River fill
				• Summary of Permanent Impacts to the Charles River:
				  ○ Federal: 1000 sq. ft. of total permanent impacts to the Charles River
				  ○ State Wetlands: 1000 sq. ft. of total permanent impacts to the Charles River
				• Approximately 500-1000 sq. ft. of impacts due to outfalls
				• Charles River bank restoration bank enhancements including a living shoreline are possible upon construction completion
				• For potential wetland impacts during construction, please see the Construction section of this table
					• No impacts anticipated

	Waterways
	(Charles River)
		• Summary of Permanent Impacts to the Charles River: No permanent impacts to State flowed tidelands, navigation or fisheries
		• No permanent impacts to waterways
		• No permanent impacts to navigation
		• No permanent impacts to fisheries
			• Summary of Permanent Impacts to the River: +/-50,100 sq. ft. of total permanent impacts to State flowed tidelands and permanent narrowing of the watersheet by +/-38 ft.
			• State flowed tidelands:
			  ○ +/- 29,000 sq. ft. from PDW pile supported walkway;
			  ○ +/- 20,000 sq. ft. fill for Living shoreline;
			  ○ +/- 500 sq. ft. from piles (250 piles);
			  ○ +/-600 sq. ft. from SFR solid fill
			• Permanent impact on navigation due to narrowing of the watersheet by at least +/-38-ft.
				• Summary of Permanent Impacts to the Charles River: No permanent impacts to State flowed tidelands, navigation or fisheries
				• No permanent impacts to navigation
				• No permanent impacts to fisheries
				• For potential waterway impacts during construction, please see the Construction section of this table
					• No impacts anticipated

	Impact Categories	Modified Highway Viaduct	Modified At-Grade	Soldiers Field Road (SFR) Hybrid	No Build
Environmental	Floodplain/Resiliency	• Summary: Expected to be the most resilient option as I-90 would be elevated and resilient to storm surge associated with SLR. Flood mitigation is possible. • I-90 would be elevated, resilient to storm surge associated with Sea Level Rise (SLR) • Based on DEIR (latest available information) at the 1% probability level, HV is vulnerable to 2070 flooding along the at-grade southeastern portion of SFR near the BU Bridge. • At the 0.1% probability level, Concept 3K-HV is vulnerable to 2070 flooding along: 1. A 100-foot-long section of the at-grade eastern portion of I-90 adjacent to the Commonwealth Avenue overpass, potentially flooding additional eastern portions of I-90; 2. The at-grade southeastern portion of SFR between Agganis Arena and the BU Bridge; and 3. The northern at-grade and underpass at South Cambridge St. segment of SFR with subsequent inundation into lower portions of the underpass • With regards to potential flood mitigation, the area between the Charles River, the source of flooding, and I-90 is open space where flood mitigation could be accomplished by creating a berm or structure between the river and the highway. • Maintains WML and GJR rail corridors at existing elevations, with no net flooding impact	• Summary: Expected to be less resilient than the Modified HV due to sections of I-90 depressed below the water table and narrow shoulders on I-90. This option would possibly be in conflict with City of Boston, State and Federal Infrastructure Resiliency Policies. • More information required but expected to be similar to the DEIR At-Grade and SSR Modified At-Grade • The updated Modified At-Grade proposes to narrow inside shoulders on I-90 from 4-ft to 2-ft. Any alternative that proposes to narrow shoulders where potential future increased rainfall could be controlled may potentially result in more frequent flooding of the roadway in the future and would be less resilient and possibly be in conflict with City of Boston, State and Federal Infrastructure Resiliency Policies • <u>DEIR At-Grade Results (latest available information):</u> • Sections of I-90 would be depressed below the water table, vulnerable to storm surge and more vulnerable to high intensity precipitation events than existing. Both of these vulnerabilities would be exacerbated by sea level rise (SLR). • SFR lowered 3-ft from elevation 5 to elevation 2 in the vicinity of the Grand Junction to accommodate the new Grand Junction Bridge. • Based on DEIR at the 1% probability level, At-Grade is vulnerable to 2070 flooding along the at-grade southeastern portion of SFR near the BU Bridge. • At the 0.1% probability level, of At-Grade Concept is vulnerable to 2070 flooding along: 1. A 2,100-foot-long section of the at-grade eastern portion of I-90, east of St. Paul Street potentially flooding additional eastern portions of I-90; 2. The at-grade southeastern portion of SFR near the BU Bridge; 3. The northern at-grade and underpass segment of SFR with subsequent inundation into lower portions of the underpass. • With regards to potential flood mitigation, there is no area between the Charles River and the 2,100-foot section of I-90 that would be flooded, so installing flood mitigation measures to protect I-90 would likely require additional fill in the Charles River. • Maintains or raises WML and GJR rail corridors with slight resiliency benefit within the project area, but no net benefit based on maintaining existing WML elevations to the east	• Summary: While modeling results are not available for the SFR Hybrid Throat Area, it is expected to be the least resilient option due to I-90 depressed below water table. • Detailed information regarding resiliency impacts are not currently available. • Sections of I-90 would be depressed below the water table, vulnerable to storm surge and more vulnerable to high intensity precipitation events than existing. Both of these vulnerabilities would be exacerbated by sea level rise (SLR). • SFR lowered 3-ft from elevation 5 to elevation 2 in the vicinity of the Grand Junction to accommodate the new Grand Junction Bridge. • Expected to be the least resilient alternative prior to mitigation due to I-90 depressed below water table • Maintains or raises WML and GJR rail corridors with slight resiliency benefit within the project area, but no net benefit based on maintaining existing WML elevations to the east	• No impacts anticipated

	Impact Categories	Modified Highway Viaduct	Modified At-Grade	Soldiers Field Road (SFR) Hybrid	No Build
Environmental	Stormwater/Water Quality	• Summary: This option will meet Massachusetts Stormwater Standard for redevelopment and can treat 97% of the Throat Area. • Meets Massachusetts Stormwater Standard for redevelopment • Total Treated Throat Area: 17.1 acres (97%) • Opportunity to provide treatment for SFR stormwater runoff • Opportunity to provide stormwater treatment below viaduct for I-90 drainage and adjacent to Paul Dudley White Path within Throat Area Does not require I-90 pavement drainage to be pumped	• Summary: More information is required. Based on the SSR Modified At-Grade, this option will meet Massachusetts Stormwater Standard for redevelopment but will require I-90 pavement drainage to be pumped without treatment. The Modified At-Grade can treat 35% of the Throat Area. • Requires extension of outfalls through the living shoreline • <u>SSR Modified At-Grade Impacts:</u> • Meets Massachusetts Stormwater Standard for redevelopment • Total Treated Throat Area: 5.9 acres (35%) without increased pumping and land takings • Opportunity to provide treatment for SFR stormwater runoff • Requires I-90 pavement drainage to be pumped without treatment	• Summary: This option will meet Massachusetts Stormwater Standard for redevelopment and can treat 52% of the Throat Area. • Meets Massachusetts Stormwater Standard for redevelopment • Total Treated Throat Area: 7.9 acres (52%) without increased pumping and land takings • Opportunity to provide stormwater treatment adjacent to Paul Dudley White Path within Throat Area Requires I-90 pavement drainage to be pumped without treatment	• Similar to existing conditions
	Historic	• Summary: 5,700 sq. ft. of direct permanent impacts to the historic district. Increases green space adjacent to PDW Path. • Charles River: No change from existing • Soldiers Field Road: Shifts onto isolated green space, toward I-90 • Parkland: Eliminates isolated inaccessible parkland greenspace, increases green space adjacent to PDW • Grand Junction Bridge over SFR: No change from existing • Area of I-90 columns/piers within historic district: 500 sq. ft.; Overhang of I-90 viaduct over historic district: 4,900 sq. ft.; Area of Grand Junction Rail shifted into historic district: 3,000 sq. ft.	• Summary: 57,000 sq. ft. of direct permanent impacts to the historic district. Creates living shoreline along the bank of the Charles River. Extends PDW Path. • Charles River: Permanent bank impacts and PDW on structure in Charles River • Soldiers Field Road: Shifts onto useable green space, toward the river • Parkland: Eliminates accessible green space adjacent to PDW; eliminates isolated green space; extends PDW under GJR & BU Bridges • Grand Junction Bridge over SFR: Replaced • Area of I-90 shifted into historic district: 57,000 sq. ft.	• Summary: 66,250 sq. ft. of direct permanent impacts to the historic district. Extends PDW Path and creates additional greenspace along the Charles River. • Charles River: Temporary SFR in the Charles River • Soldiers Field Road: Shifts onto viaduct away from the river and outside the historic district boundary • Parkland: Eliminates isolated green space; extends PDW path under GJR & BU Bridges • Grand Junction Bridge over SFR: Replaced • Area of I-90 shifted into historic district: 66,250 sq. ft.	• Similar to existing conditions
	Hazardous Materials	• For potential hazardous materials considerations, please see the Construction section of this table	• For potential hazardous materials considerations, please see the Construction section of this table	• For potential hazardous materials considerations, please see the Construction section of this table	• Similar to existing conditions
	Aesthetic/Visual Impacts	• Summary: I-90 remains on a viaduct. New viaduct will include architectural improvements. • Architectural improvements to the new viaduct will be included • Vegetation buffer for pedestrians and bicyclists on the PDW Path is feasible	• Summary: No viaducts, resulting in improved views of the Charles River from the south. Improved views for users of the PDW Path. • Removes viaduct • Improved views of the Charles River from properties on the south side of the viaduct • Vegetated buffer between PDW Path and SFR • Pedestrian and bicycle boardwalk in the Charles River resulting in improved views for users of the PDW Path	• Summary: Removes I-90 viaduct. Smaller SFR viaduct will include architectural treatments. • Removes I-90 viaduct • Architectural treatments for the new SFR viaduct will be included • Includes smaller viaduct with less height and width than existing I-90 viaduct • Vegetation buffer for pedestrians and bicyclists on the PDW Path can be quite extensive	• Similar to existing conditions

Impact Categories		Modified Highway Viaduct	Modified At-Grade	Soldiers Field Road (SFR) Hybrid	No Build

Environmental	Permits/Clearances	• Summary: USACE General, 401 WQC, WPA NOI, Ch. 91 License, Anticipated 4(f) de minimis or Net Benefit Programmatic and Article 97 likely required for this option.
		• USACE General: GP 5 Dredging; GP 9 Utility Line – SV (1) impacts of single complete project under 5,000 sq. Ft.
		• 401 WQC: BRP WW 08 Minor Project Certification dredge (between 100 cy and 5;000 cy)
		• WPA Notice of Intent for outfall work
		• Ch. 91 License
		• Anticipated 4(f) de minimis or Net Benefit Programmatic dependent on outcome of Section 106 Process
		• Article 97 required for transfer of 500 sq. ft. of land from DCR control to MassDOT control
			• Summary: USCG Bridge Permit, USACE General, 401 WQC, WPA NOI, Ch. 91 License or Variance, 4(f) Individual evaluation, and Article 97 likely required for this option.
			• USCG Section 9 Bridge Permit for Pile supported walkway
			• USACE General:
			  ○ GP 3 Structures in navigable WOTUS – PCN unless USCG Section 9 permit is required;
			  ○ GP 5 Dredging;
			  ○ GP 9 Utility Line – PCN (1) impacts of single complete project over 5,000 sq. Ft.;
			  ○ GP 10 Linear Transportation Projects
			  ○ Potential GP 23 – Aquatic Habitat Restoration
			• 401 WQC: BRP WW 08 Minor Project Certification dredge (between 100 cy and 5,000 cy); BRP WW 10 Major Project Certification for SFR, living shoreline and outfall fill (More than 5,000 sq. ft.)
			• WPA Notice of Intent for SFR fill, pile supported PDW path, living shoreline and outfall work
			  ○ Will likely not qualify as Ecological Restoration Project under Wetland Regulations because primary purpose of overall project is not restoration of natural resource areas.
			  ○ Any impact to flood storage will need to be mitigated at same elevation and within same reach of river
			• Ch. 91 License or Variance
			• Anticipated 4(f) Individual Evaluation dependent on outcome of Section 106 Process
			• Article 97 required for the transfer of 57,000 sq. ft. of land from DCR control to MassDOT control
				• Summary: USCG Bridge Permit, USACE General, 401 WQC, WPA NOI, Ch. 91 License or Variance, Anticipated 4(f) Individual Evaluation or Net Benefit Programmatic, and Article 97 likely required for this option.
				• USCG Section 9 Bridge Permit for temporary trestle
				• USACE – Assumes Massachusetts General Permit for fill, outfalls and pile supported structures; Individual Permit possible for Temporary I-90 fill, trestle approaches, outfalls
				• 401 WQC: BRP WW 08 Minor Project Certification dredge (between 100 cy and 5;000 cy); BRP WW 10 Major Project Certification for trestle and temporary I-90 fill (More than 5,000 sq. Ft.)
				• WPA Notice of Intent for trestle, temporary I-90 and outfall work
				• Ch. 91 License or Variance – Impacts would exceed 6 months in duration and therefore, would not fall under a temporary permit under Ch. 91 regulations
				• Anticipated 4(f) Individual Evaluation or Net Benefit Programmatic dependent on outcome of Section 106 Process
				• Article 97 required for the transfer of 66,250 sq. ft. of land from DCR control to MassDOT control
					• No permits anticipated

Land Use and Economic Development	ROW Takings/Cost	• Summary: Temporary ROW and partial property acquisitions likely required.
		• Requires temporary right-of-way (ROW) within BU to rehabilitate I-90 viaduct and potential, undefined partial property acquisitions for demolition and construction
			• Summary: Additional 7’ of BU ROW acquisition and permanent acquisitions on south side along the Throat Area.
			• Additional 7 ft. BU ROW acquisition (compared to Highway Viaduct) is required due to the southerly shift of the WML tracks
			• Requires permanent acquisitions along south side of the transportation corridor all along the Throat Area
			  ○ Noise barrier along Nickerson Field
			  ○ Reconstruct retaining wall along Buick St. (private road)
			  ○ Demolish BU Garage
			  ○ Remove viaduct columns and foundations
			  ○ Construct new retaining walls and track within existing BU surface parking lot
			  ○ Relocate BU utilities away from new tracks
			• Additional temporary access to BU property for demolition and construction
				• Summary: Additional 7’ of BU ROW acquisition and permanent acquisitions on south side along the Throat Area.
				• Additional 7 ft. BU ROW acquisition (compared to Highway Viaduct) is required due to the southerly shift of the WML tracks
				• Requires permanent acquisitions along south side of the transportation corridor all along the Throat Area
				  ○ Noise barrier along Nickerson Field
				  ○ Reconstruct retaining wall along Buick St. (private road)
				  ○ Demolish BU Garage
				  ○ Remove viaduct columns and foundations
				  ○ Construct new retaining walls and track within existing BU surface parking lot
				  ○ Relocate BU utilities away from new tracks
				• Additional temporary access to BU property for demolition and construction
					• Temporary access required

	Impact Categories	Modified Highway Viaduct	Modified At-Grade	Soldiers Field Road (SFR) Hybrid	No Build
Land Use and Economic Development	Economic development/air rights/parcel accessibility	• Challenges exist for all alternatives and there is uncertainty where developable lots could be located within the Throat Area under any option • Access to any Throat Area overbuild would be a significant challenge • The location and height of the highway viaduct infrastructure would likely conflict with potential air rights and limit development	• Challenges exist for all alternatives and there is uncertainty where developable lots could be located within the Throat Area under any option • Access to any Throat Area overbuild would be a significant challenge • Insufficient room to support air rights due to tight cross section and narrow constraints for supporting columns	• Challenges exist for all alternatives and there is uncertainty where developable lots could be located within the Throat Area under any option • Access to any Throat Area overbuild would be a significant challenge • Challenges to air rights exist similar to the modified highway viaduct.	• Similar to existing conditions, limited development potential
	Park Land/Open Space	• Summary: Total of 5,400 sq. ft. of permanent impacts to parkland from I-90; net increase of 4.4 acres of useable greenspace; PDW Path widened and separated for most of the Throat Area • Results in 7.1 acres of parkland, of which 4.5 acres is new useable greenspace • Impacts of I-90: 500 sq. ft. of parkland from I-90 piers; 4,900 sq. ft. I-90 overhang • PDW Path widened from existing conditions. • Separated bike/ped path along the PDW Path for the majority (but not all) of the length of the Throat • Impacts of GJR: 3,000 sq. ft. of parkland use from realignment of GJR	• Summary: Total of 57,000 sq. ft. of permanent impacts to parkland from I-90; 1.1 acre of parkland taken from river users for pedestrian use; net increase of 3.9 acres of useable greenspace; PDW on boardwalk is widened and separated • Results in 7.3 acres of publicly accessible parkland which is a net increase of 3.9 acres in new useable greenspace over existing condition • Would take 1.1 acre of parkland from river users and replace it with parkland for pedestrians (boardwalk), cyclists and living shoreline. • Impacts of I-90: 57,000 sq. ft. of parkland from I-90 at-grade • Separated bike/ped path along the PDW Path on boardwalk • Impacts of GJR: SFR GJR Bridge Replacement may be a use of historic property	• Summary: Total of 66,250 sq. ft. of permanent impacts to parkland from I-90; net increase of 6.1 acres of useable greenspace; PDW widened and separated for entire duration of the Throat Area • Results in 8.7 acres of parkland, of which 6.1 acres is new useable greenspace • Impacts of I-90: 66,250 sq. ft. of parkland from I-90 at-grade • PDW Path widened from existing conditions. • Separated bike/ped path along the PDW Path for the entire length of the Throat • Impacts of GJR: SFR GJR Bridge Replacement may be a use of historic property	• Similar to existing conditions
Construction	Duration [Assumes conventional single daily shift construction]	• Summary: 6-7 years required for total construction • Length of construction: 6.5 years •	• Summary: More information required; 6-7 years likely required for total construction • Duration likely similar to the SSR Modified At-Grade staging scheme: 6-7 years.	• Summary: 8-10 years required for total construction • Length of construction: 8-10 years	• Approximately 6 years
	Traffic Operations/Congestion	• Summary: 3 lanes in each direction on I-90 and 2 lanes in each direction on SFR maintained throughout construction. • Temporary widening of elevated structure may be required to maintain 3 travel lanes on I-90 in both directions • 3 lanes of I-90 and 2 lanes of SFR maintained in each direction throughout construction	• Summary: 3 lanes in each direction on I-90 and 2 lanes in each direction on SFR maintained throughout construction. More study is required. • SFR maintained on temporary and permanent alignments throughout construction • 3 lanes of I-90 maintained in each direction throughout construction except for short durations to lower I-90 profile in the vicinity of the Comm. Ave. overpass • 2 lanes of SFR in each direction maintained throughout construction except for short durations to lower SFR profile to accommodate new GJ Bridge • Requires restrictive horizontal geometry with slower operating speeds resulting in diminished vehicular capacity	• Summary: 3 lanes in each direction on I-90 and 2 lanes in each direction on SFR maintained throughout construction. Temporary trestle required to maintain traffic on SFR and users of the PDW Path during construction. • Temporary trestle in Charles River required for SFR traffic during construction • 3 lanes of I-90 maintained in each direction throughout construction except for short durations to lower I-90 profile in the vicinity of the Comm. Ave. overpass • 2 lanes of SFR in each direction maintained throughout construction except for short durations to switch over to trestle and then to new SFR Viaduct and to also lower SFR profile to accommodate new GJ Bridge • Requires restrictive horizontal geometry with slower operating speeds resulting in diminished vehicular capacity	• I-90 lane reductions required, more study is needed • SFR maintained throughout construction

	Impact Categories	Modified Highway Viaduct	Modified At-Grade	Soldiers Field Road (SFR) Hybrid	No Build
Construction	Transit Operations/Ridership	• See below for construction phase impacts on Rail Operations • MBTA will make every effort to maintain its ability to transport its carrying capacity on the Worcester Main Line except for short term closure periods described below. • Potential single-track operation may effect on-time performance and lead riders to other modes.	• See below for construction phase impacts on Rail Operations • MBTA will make every effort to maintain its ability to transport its carrying capacity on the Worcester Main Line except for short term closure periods described below. • Potential single-track operation may effect on-time performance and lead riders to other modes.	• See below for construction phase impacts on Rail Operations • MBTA will make every effort to maintain its ability to transport its carrying capacity on the Worcester Main Line except for short term closure periods described below. • Potential single-track operation may effect on-time performance and lead riders to other modes.	• See Rail Operations
	Bike/Ped Operations/Access	• PDW Path maintained throughout construction on existing alignment for majority of construction and relocated to temporary alignments for construction of final path alignment during the final stage of construction.	• PDW Path maintained on existing, temporary and permanent alignments.	• Temporary trestle in Charles River required for PDW Path users during construction • PDW Path temporary intermittent closures for path relocation onto trestle	• No impacts anticipated
	Safety	• 5 construction stages requiring I-90 and SFR alignment shifts (fewer alignment shifts are generally more favorable as drivers don't need to refamiliarize driving route) • All Throat Area alternatives will have to follow strict safety guidelines during each of their construction stages.	• Similar to SSR Modified At-Grade. • SSR Modified At-Grade Impacts: • 13 construction stages requiring I-90 and SFR alignment shifts (fewer alignment shifts are generally more favorable as drivers don't need to refamiliarize driving route) • Challenging and/or substandard geometric alignments required during construction • All Throat Area alternatives will have to follow strict safety guidelines during each of their construction stages.	• 10 construction stages requiring I-90 and SFR alignment shifts (fewer alignment shifts are generally more favorable as drivers don't need to refamiliarize driving route) • Challenging and/or substandard geometric alignments required during construction • All Throat Area alternatives will have to follow strict safety guidelines during each of their construction stages.	• More study is needed.

	Impact Categories	Modified Highway Viaduct	Modified At-Grade	Soldiers Field Road (SFR) Hybrid	No Build
Construction	Rail Operations	• Summary: Grand Junction RR remains open throughout most of the construction period. WML may either be shielded, shifted and a reduction to a single-track operation for certain periods of time. • Worcester Mainline operations would be impacted by demolition and reconstruction of viaduct superstructure elements. WML may either be shielded, shifted or endure short term closure (weekends or early evening access) during overhead demolition and erection. New or temporary column construction may require shifting and a reduction to a single-track operation for certain periods of time depending on construction means and methods. • Grand Junction RR remains open throughout most of the construction period, with similar exceptions as WML. Short term closure of GJ should have very limited impact on operations due to the brief impact periods anticipated and MBTA's ability to plan/preposition enough spare operating equipment on the south side to avoid shortages.	• Summary: Grand Junction RR must be closed early on during construction and remain closed throughout much of construction, necessitating construction of a South Side Maintenance Facility. A 100+ mile detour would be required to transfer equipment to the BET in Somerville for heavy maintenance. WML may either be shielded, shifted and a reduction to a single-track operation for certain periods of time. More study is required. • Similar to SSR Modified At-Grade • <u>SSR Modified At-Grade Impacts:</u> • Worcester Mainline operations would be impacted by demolition of viaduct superstructure and foundation elements and by the need to shift the alignments both horizontally and vertically. WML may be shielded during demolition, but must be shifted or closed and/or reduced to single-track operations while the tracks are rebuilt and during reconstruction of the Buick St. retaining wall and demolition of the easterly viaduct columns and foundations and the BU garage. • Grand Junction RR must be closed early on to facilitate temporary and permanent SFR horizontal and vertical alignment shifts to allow for construction of GJ over SFR bridge to begin. A Grand Junction bypass operation would divert MBTA equipment bound for the Commuter Rail Maintenance Facility in Somerville, MA on a 100+ mile path at slow speed via Worcester (WML) and Ayer (Fitchburg Main Line) and two freight tracks. Alternatively, MassDOT/MBTA would construct and commission a new maintenance facility on the south side, potentially deferring I-90 reconstruction until such time as the new facility is opened. A new south side facility would not support functions such as engine overhauls, and the detour would be used to transfer equipment that cannot be serviced at the south side facility. Additional fleet vehicles would be needed to create spares and assure a satisfactory supply of vehicles to replace equipment undergoing north side maintenance. This south side maintenance facility would have independent utility and be constructed regardless of the I-90 project, but the I-90 project would likely prompt an earlier consideration of the construction of such a facility. Heavy maintenance likely would still be conducted at BET.	• Summary: Grand Junction RR must be closed early on during construction and remain closed throughout much of construction, necessitating construction of a South Side Maintenance Facility. A 100+ mile detour would be required to transfer equipment to the BET in Somerville for heavy maintenance. WML may either be shielded, shifted and a reduction to a single-track operation for certain periods of time. • Worcester Mainline operations would be impacted by demolition of viaduct superstructure and foundation elements and by the need to shift the alignments both horizontally and vertically. WML may be shielded during demolition, but must be shifted or closed and/or reduced to single-track operations while the tracks are rebuilt and during reconstruction of the Buick St. retaining wall and demolition of the easterly viaduct columns and foundations and the BU garage. • Grand Junction RR must be closed as soon as I-90 traffic is brought to grade on a temporary or permanent path and will remain closed until it can be rebuilt to the east and over the depressed I-90 segment. A Grand Junction bypass operations would divert MBTA equipment bound for the Commuter Rail Maintenance Facility in Somerville, MA on a 100+ mile path at slow speed via Worcester (WML) and Ayer (Fitchburg Main Line) and two freight tracks**.** Alternatively, MassDOT/MBTA would construct and commission a new maintenance facility on the south side, potentially deferring I-90 reconstruction until such time as the new facility is opened. A new south side facility would not support functions such as engine overhauls, and the detour would be used to transfer equipment that cannot be serviced at the south side facility. Additional fleet vehicles would be needed to create spares and assure a satisfactory supply of vehicles to replace equipment undergoing north side maintenance. This south side maintenance facility would have independent utility and be constructed regardless of the I-90 project, but the I-90 project would likely prompt an earlier consideration of the construction of such a facility. Heavy maintenance likely would still be conducted at BET.	• Temporary impacts to WML and GJR anticipated, more study is needed to determine level of impacts.

	Impact Categories	Modified Highway Viaduct	Modified At-Grade	Soldiers Field Road (SFR) Hybrid	No Build
Construction	Environmental	• Summary: Potential handling and disposal of hazardous material and contaminated groundwater exists for all options. • Potential exists for handling and disposal of hazardous material and contaminated groundwater during excavation activities for all Throat Area options. The extent of excavation is what varies among the options. • Requires excavation of materials to support new footings and utilities	• Summary: More study is required. Construction of living shoreline requires unconsolidated fill along the banks of the Charles River, producing silt and disturbing sediment. Construction of boardwalk will likely require contractor to occupy the watersheet during construction. Pile driving could cause noise impacts. Potential handling and disposal of hazardous material and contaminated groundwater exists. • Similar to SSR Modified At-Grade unless temporary structure for SFR/PDW path is used to maintain traffic for I-90 WB as described in the Traffic Operation/Congestion section above. • Construction of living shoreline requires placement of unconsolidated fill along the banks and within flowed waters of the Charles River producing silt and disturbing river sediment. • Construction of PDW path on boardwalk will likely require the contractor to occupy the watersheet, potentially impacting river users, and the use of a barge. • Increased pile driving for PDW path may result in elevated construction noise. • Pile driving in Charles River will be subject to fish run time of year restrictions • Potential exists for handling and disposal of hazardous material and contaminated groundwater during excavation activities for all Throat Area options. The extent of excavation is what varies among the options. • Requires extensive excavation in order to build I-90 below Grand Junction RR and support for relocated utilities • Air Quality: Requires additional train movements for a 100-mile detour during construction. Impacts on air quality (if any) from detour will be described in DEIS.	• Summary: Temporary trestle in the Charles River required for construction, resulting in dredge in the river and temporary impacts to navigation and fisheries. Federal: +/-63,600 sq. ft. total temporary impacts to the Charles River. Pile driving could cause noise impacts. Potential handling and disposal of hazardous material and contaminated groundwater exists. • Potential exists for handling and disposal of hazardous material and contaminated groundwater during excavation activities for all Throat Area options. The extent of excavation is what varies among the options. • Requires extensive excavation in order to build I-90 below at-grade under SFR and under Grand Junction RR and relocated utilities. • Requires dredge in the Charles River for the temporary trestle and a dredge dewatering area • Temporary trestle into Charles River required for SFR and PDW Path during construction • Federal WOTUS/Ch. 91 Waterway: +/-60,300 sq. ft. of fill for temporary I-90 and trestle • State Wetland Land Under Water: +/-50,700 sq. ft. fill for temporary I-90 and trestle • State Inland Bank: +/-1,775 sq. Ft. Fill from temporary I-90 and trestle • State Bordering Land Subject to Flooding: +/-7,700 cf. from temporary I-90 and trestle • Temporary impact on navigation due to the trestle in the Charles River • Temporary impacts to fisheries during construction • Air Quality: Requires additional train movements for a 100-mile detour during construction. Impacts on air quality (if any) from detour will be described in DEIS. • Operation and installation of trestle may increase noise at receivers in Cambridge. • Operation and installation of trestle may be an adverse effect under Section 106. • Impacts to parkland use of River during construction due to trestle	• Limited impacts anticipated. More study is required. • Temporary impacts anticipated within historic district due to temporary viaduct widening

	Impact Categories	Modified Highway Viaduct	Modified At-Grade	Soldiers Field Road (SFR) Hybrid	No Build
Construction	Utilities (Construction)	• Summary: No relocation of major utilities required. • No relocation of major utilities • Retains existing MassDOT pump station at viaduct's easterly abutment • Relocate telecom fiber optic lines from existing to new viaduct	• Summary: I-90 profile must be lowered into a boat section, requiring relocations of major utilities. • SSR Modified At-Grade Impacts: • Requires relocations of major utilities • Relocation of BWSC 60" storm drain (crossing Throat north to south) by lowering it in elevation in order to cross the depressed I-90 section, requiring construction of syphon or new BWSC pump station • The Massachusetts Water Resource Authority (MWRA) sewer line that runs longitudinally along the throat here is also impacted and at a minimum will require partial relocation. • No impact to the MWRA waterline that is at the midpoint of the throat. • MassDOT pump station would need to be reconstructed in a different location • Relocate Boston University utilities, including a steam utility, which may involve time-of-year restrictions. • Relocate private telecom fiber optic backbone that runs between the WML and the property line at BU • Relocate telecom fiber optic lines from existing viaduct to below grade	• Summary: I-90 profile must be lowered into a boat section, requiring extensive relocations of major utilities. • Requires extensive relocations of major utilities, which will increase the duration of construction. • 60" MWRA water main crossing the Throat from north-south will need to be relocated • MWRA sewer line crossing the throat from east-west will need to be relocated • 60" BWSC storm drain crossing the Throat from north-south will need to be relocated. • MassDOT pump station would need to be reconstructed in a different location • Relocate Boston University utilities, including a steam utility, which may involve time-of-year restrictions. • Relocate private telecom fiber optic backbone that runs between the WML and the property line at BU • Relocate telecom fiber optic lines from existing viaduct to below grade	• Existing utilities will be maintained.
Cost	Estimated total construction cost [Includes project-wide total cost, not just Throat Area]	• Summary: Total estimated cost: $1.3B. Cost of mitigation variable. • Base construction cost: $623M Indirect and contingency costs: $677M Total estimated cost: $1.3B • Environmental performance commitments costs are variable between alternatives and are unknown at this time	• Summary: Total estimated cost: $1.3B, which does not include the cost of a South Side Maintenance Facility, needed for this alternative and estimated to be $300M. Cost of mitigation variable. • Similar to SSR Modified At-Grade • Base construction cost: $612M Indirect and contingency costs: $688M • Total estimated cost: $1.3B • Would necessitate construction of a South Side Maintenance Facility estimated to be $300M, not included in this estimate • Environmental performance commitments costs are variable between alternatives and are unknown at this time	• Summary: Total estimated cost: $1.6B, which does not include the cost of a South Side Maintenance Facility, needed for this alternative and estimated to be $300M. Cost of mitigation variable. • Base construction cost: $752M Indirect and contingency costs: $848M • Total estimated cost: $1.6B • Would necessitate construction of a South Side Maintenance Facility estimated to be $300M, not included in this estimate • Environmental performance commitments costs are variable between alternatives and are unknown at this time	• Base construction cost: $208M Indirect and contingency costs: $237M Total estimated cost: $445M
	Estimated total life-cycle cost	• Summary: While a total life-cycle cost is expected to be a differentiator between the Throat Area options, estimates of life-cycle cost are not currently available. Life-cycle cost will be available for the DEIS. LCCA Study Planned for early 2021.	• Summary: While a total life-cycle cost is expected to be a differentiator between the Throat Area options, estimates of life-cycle cost are not currently available. Life-cycle cost will be available for the DEIS. LCCA Study Planned for early 2021.	• Summary: While a total life-cycle cost is expected to be a differentiator between the Throat Area options, estimates of life-cycle cost are not currently available. Life-cycle cost will be available for the DEIS. LCCA Study Planned for early 2021.	• LCCA Study Planned for early 2021

	Impact Categories	Modified Highway Viaduct	Modified At-Grade	Soldiers Field Road (SFR) Hybrid	No Build
Public Input	Public officials	• Public comments vary with respect to all Throat Area alternatives. • See Frequently Received Comments on the Scoping Report • Continued public input/involvement since publication of the Scoping Report. Additional public meetings planned	• Public comments vary with respect to all Throat Area alternatives. • See Frequently Received Comments on the Scoping Report • Continued public input/involvement since publication of the Scoping Report. Additional public meetings planned.	• Public comments vary with respect to all Throat Area alternatives. • See Frequently Received Comments on the Scoping Report • Continued public input/involvement since publication of the Scoping Report. Additional public meetings planned.	• Public comments vary with respect to all Throat Area alternatives.
	Public-at-large	• Public comments vary with respect to all Throat Area alternatives. • See Frequently Received Comments on the Scoping Report • Continued public input/involvement since publication of the Scoping Report. Additional public meetings planned	• Public comments vary with respect to all Throat Area alternatives. • See Frequently Received Comments on the Scoping Report • Continued public input/involvement since publication of the Scoping Report. Additional public meetings planned	• Public comments vary with respect to all Throat Area alternatives. • See Frequently Received Comments on the Scoping Report • Continued public input/involvement since publication of the Scoping Report. Additional public meetings planned	• Public comments vary with respect to all Throat Area alternatives.
	Task Force	• Many Task Force members express concerns that the existing viaduct acts as a barrier, causing visual impacts and limiting bicycle and pedestrian connectivity. • Comments vary with respect to all Throat Area alternatives. • See Frequently Received Comments on the Scoping Report • Continued public input/involvement since publication of the Scoping Report. Additional public meetings planned	• Public comments vary with respect to all Throat Area alternatives. • See Frequently Received Comments on the Scoping Report • Continued public input/involvement since publication of the Scoping Report. Additional public meetings planned. Public input anticipated relative to input received on Modified HV, SSR Modified At-Grade and SFR Hybrid	• While the parkland aspects of the SFR Hybrid are desirable, many Task Force members indicate that they do not support the project team's proposal to construct the SFR Hybrid due to the need for a temporary trestle causing construction-phase impacts to the Charles River. • Comments vary with respect to all Throat Area alternatives. • See Frequently Received Comments on the Scoping Report • Continued public input/involvement since publication of the Scoping Report. Additional public meetings planned	• Comments vary with respect to all Throat Area alternatives.
	Environmental justice	• Virtually the entire study area is considered an Environmental Justice area. • Impacts are not anticipated to disproportionally adversely impact the human health or environment of EJ populations compared to the no-build alternative • The Throat Area options are not anticipated to have differing impacts to the EJ communities, other than for construction duration. Construction duration for the Modified HV is approximately 6-7 years. • All Throat Area alternatives will improve ped/bike access and connections in the Throat Area	• Virtually the entire study area is considered an Environmental Justice area. • Impacts are not anticipated to disproportionally adversely impact the human health or environment of EJ populations compared to no-build alternative • The Throat Area options are not anticipated to have differing impacts to the EJ communities, other than for construction duration. Construction duration for the SSR Modified At-Grade is approximately 6-7 years. • All Throat Area alternatives will improve ped/bike access and connections in the Throat Area	• Virtually the entire study area is considered an Environmental Justice area. • Impacts are not anticipated to disproportionally adversely impact the human health or environment of EJ populations compared to the no-build alternative • The Throat Area options are not anticipated to have differing impacts to the EJ communities, other than for construction duration. Construction duration for the SFR Hybrid is approximately 8-10 years. • All Throat Area alternatives will improve ped/bike access and connections in the Throat Area	• Similar to existing conditions
	Title VI impacts	• Similar for all alternatives. Enhanced public participation may include use of alternative media outlets such as community or ethnic newspapers, use of alternative information repositories, and translation of materials or interpretation services prior to and during public meetings where the relevant EJ population uses a primary language other than English in the home.	• Similar for all alternatives. Enhanced public participation may include use of alternative media outlets such as community or ethnic newspapers, use of alternative information repositories, and translation of materials or interpretation services prior to and during public meetings where the relevant EJ population uses a primary language other than English in the home.	• Similar for all alternatives. Enhanced public participation may include use of alternative media outlets such as community or ethnic newspapers, use of alternative information repositories, and translation of materials or interpretation services prior to and during public meetings where the relevant EJ population uses a primary language other than English in the home.	• Similar to existing conditions

	Impact Categories	Modified Highway Viaduct	Modified At-Grade	Soldiers Field Road (SFR) Hybrid	No Build
Mobility and Access	Traffic Flow/Congestion	• All alternatives provide similar level of traffic operations in the Throat Area as the number of travel lanes for both I-90 and SFR do not differ between alternatives	• All alternatives provide similar level of traffic operations in the Throat Area as the number of travel lanes for both I-90 and SFR do not differ between alternatives	• All alternatives provide similar level of traffic operations in the Throat Area as the number of travel lanes for both I-90 and SFR do not differ between alternatives	• Similar to existing condition
	Rail/Transit	• Passenger access to West Station is similar under each alternative.	• Passenger access to West Station is similar under each alternative.	• Passenger access to West Station is similar under each alternative.	• Similar to existing conditions, West Station is not constructed, and existing service is maintained
	Bike/Ped	• Summary: PDW Path is widened to 26-ft to the extent possible and separated for bicycles and pedestrians for most of the length of the Throat. Agganis Way connection possible with users walking/biking under a viaduct and over rail. • PDW Path widened to 26 ft. to the extent possible: 10’ wide pedestrian path and 10’ wide bicycle path with 2’ offset to rail along river and a 4’ space between paths • Potential for separated bicycle and pedestrian paths for most, but not all, of the length of the PDW path in the throat • Provides potential for Agganis Way connection from Boston University • Pedestrian connection at Agganis Way (challenges): Getting up from Agganis Way to the level of the bridge is straightforward. The challenge is experiential. What is the experience of walking under a viaduct? Concept proposes an overlook at the water side and a plaza at the BU side.	• Summary: More study is required. PDW Path is widened to 20-ft on a boardwalk and separated for bicycles and pedestrians. Based on analysis of the SSR Modified At-Grade, an Agganis Way connection is possible, but constraints require switchback configuration. • PDW Path widened to 20 ft. with 16 ft. useable space for pedestrians and cyclists • Separated bicycle and pedestrian path for the PDW path in the throat • Provides potential for Agganis Way connection from Boston University • Pedestrian connection at Agganis Way (challenges): A sloped walk needs to rise to provide clearance over the tracks. The constraints of the BU service drive and the rail setback require the use of a switchback configuration with a narrowed deck and may require narrowing driveway to Nickerson Field.	• Summary: Summary: PDW Path is widened to 26-ft and separated for bicycles and pedestrians for the entire length of the Throat. Agganis Way connection possible. • PDW Path widened to 26 ft.: 10’ wide pedestrian path and 10’ wide bicycle path with 2’ offset to rail along river and a 4’ space between paths • Separated bicycle and pedestrian paths for the PDW path throughout the entire length of the throat • Provides potential for Agganis Way connection from Boston University • Pedestrian connection at Agganis Way (challenges): Requires a bridge approach to rise 10 to 11 feet. This lengthens the switchback, pinching it on the western end where the setback from the track and the service drive begin to converge. This restriction narrows the bridge clear width to 8 feet. The constraints of the BU service drive and the rail setback require the use of a switchback configuration with a narrowed deck and may require narrowing driveway to Nickerson Field.	• Similar to existing conditions
	Emergency vehicle	• Emergency response is expected to be similar across Throat Area alternatives with slightly more width (4’ on each barrel of I-90) available for emergency response and maintenance vehicle operations	• Emergency response is expected to be similar across Throat Area alternatives with slightly less width (6’ on each barrel of I-90) available for emergency response and maintenance vehicle operations	• Emergency response is expected to be similar across Throat Area alternatives with slightly less width (4’ on each barrel of I-90) available for emergency response and maintenance vehicle operations	• Similar to existing conditions

	Impact Categories	Modified Highway Viaduct	Modified At-Grade	Soldiers Field Road (SFR) Hybrid	No Build
Safety	Highway	• Summary: 12-ft travel lanes on I-90 with 4-ft shoulders, allowing for minor shifting of travel lanes during maintenance or vehicle breakdown or accidents. Maintains existing I-90 restrictive geometry with reverse curves and steeper grades. 11-ft travel lanes on SFR with 1-ft shoulders. • 12-foot travel lanes with 4-foot shoulders on I-90 allow for minor shifting of travel lanes during highway and viaduct maintenance activities and during vehicle breakdown or accident • Maintains existing and vertical and horizontal geometry at the eastern end of the Throat Area. Existing geometry more restrictive due to reverse curves and steeper grades. • Improved geometry at western connection to realigned I-90 through interchange area	• Summary: 11-ft travel lanes on I-90, resulting in less width to accommodate larger vehicles, and 4-ft outside and 2-ft inside shoulders. Improves I-90 geometry by providing a flatter straighter highway. 11-ft travel lanes on SFR with 1-ft shoulders. • 11-foot travel lanes provide less width for accommodating larger vehicles on I-90 as compared to the 12-foot standard width lanes for an interstate • 2-foot inside shoulders on I-90 allow for less minor shifting of travel lanes during highway and viaduct maintenance activities and during vehicle breakdown or accident • Improves I-90 alignment by removing existing vertical and horizontal reverse curves providing a flatter and straighter highway • Improved geometry at western connection to realigned I-90 through interchange area	• Summary: 11-ft travel lanes on I-90, resulting in less width to accommodate larger vehicles, and 4-ft shoulders. Improves I-90 geometry by providing a flatter straighter highway. 11-ft travel lanes on SFR with 1-ft shoulders. SFR realignment introduces steep reverse curves. • 11-foot travel lanes provide less width for accommodating larger vehicles on I-90 as compared to the 12-foot standard width lanes for an interstate • 4-foot shoulders on I-90 allow for minor shifting of travel lanes during highway and viaduct maintenance activities and during vehicle breakdown or accident • Improves I-90 alignment by removing existing vertical and horizontal reverse curves providing a flatter and straighter highway • SFR realignment for viaduct introduces steep vertical and horizontal reverse curves • Improved geometry at western connection to realigned I-90 through interchange area	• Same number of travel lanes as existing conditions • A slight increase in the travel way width would be achieved with new bridge railing and median barrier, and elimination of the existing safety walks.
	Rail/Transit	• Rail layouts are similar under each Throat Area alternative.	• Rail layouts are similar under each Throat Area alternative.	• Rail layouts are similar under each Throat Area alternative.	• Existing infrastructure maintained
	Bike/Ped	• Provides 10-foot wide separated bike/ped facilities within portion of throat and widened combined ped/bike facility within remainder of Throat Area • Accommodates future north-south ped/bike connection from Agganis Way area to PDW Path and potential connection to West Station from Agganis Way. Does not require ramp switchbacks to get from Agganis area to north-south crossing over Throat Area to PDW Path.	• Provides 20-foot combined bike/ped facility within Throat Area • Emergency response access more challenging due to separated facility from SFR • Accommodates future north-south ped/bike connection from Agganis Way area to PDW Path and potential connection to West Station from Agganis Way. Requires longer ramp and a switchback to get from Agganis area to north-south crossing over Throat Area to PDW Path and driveway to Nickerson Field width reduction for ramp.	• Provides 10-foot wide separated bike/ped facilities within Throat Area • Accommodates future north-south ped/bike connection from Agganis Way area to PDW Path and potential connection to West Station from Agganis Way. Requires longest ramp and a switchback to get from Agganis area to north-south crossing over Throat Area to PDW Path and driveway to Nickerson Field width reduction for ramp.	• Similar to existing conditions

Impact Categories		Modified Highway Viaduct	Modified At-Grade	Soldiers Field Road (SFR) Hybrid	No Build
Operations and Maintenance	Highway	• Summary: Traditional bridge scuppers for stormwater inlets for I-90 with no drainage structures in travel way of interstate. 12-ft travel lanes on I-90 with 4-ft shoulders, allowing for minor shifting of travel lanes during maintenance or vehicle breakdown or accidents. • I-90 travel lane widths: 12-ft • I-90 shoulder widths: 4-ft • SFR travel lane widths: 11-ft • SFR shoulder widths: 1-ft • Existing viaduct to be replaced with new viaduct that will require maintenance • Maintains existing and vertical and horizontal geometry at the eastern end of the Throat Area • Improved geometry at western connection to realigned I-90 through interchange area • Utilizes traditional bridge scuppers for stormwater inlets for I-90 that limit drainage spread to shoulders with all piping and conveyance structures below viaduct and not in travel way of interstate • Provides for stormwater treatment below viaduct	• Summary: More complicated and frequent stormwater inlet design for I-90 requiring drainage manholes in travel way of interstate. Frequent maintenance of relocated utilities required. 11-ft travel lanes on I-90, resulting in less width to accommodate larger vehicles, and 4-ft outside and 2-ft inside shoulders. • I-90 travel lane widths: 11-ft • I-90 shoulder widths: 4-ft outside and 2-ft inside • SFR travel lane widths: 11-ft • SFR shoulder widths: 1-ft • Highway viaduct replaced with at-grade and partial below grade roadway with boat slab and retaining wall structures that will require maintenance • Below grade portion of I-90 requires pumping of stormwater and new pump station with direct discharge to the river • Reduction of 4-ft inside shoulders to 2-ft inside shoulders requires more complicated and frequent stormwater inlet design for I-90 to limit drainage spread to shoulders and introduces frequent drainage manholes in travel way of interstate. Risk for settlement is introduced with drainage structures in travel way of I-90 • I-90 boat section and retaining walls required for a portion of the Throat Area to provide for GJ bridge over I-90 • Frequent maintenance of relocated 60-inch BWSC drain in potential syphon chamber • Maintenance of existing 58”x63” MWRA Sewer more complicated due to location below and parallel I-90, therefore, potentially requiring relocation below SFR	• Summary: More complicated stormwater inlet design for I-90 requiring drainage manholes in travel way of interstate. Frequent maintenance of relocated utilities required. 11-ft travel lanes on I-90, resulting in less width to accommodate larger vehicles, and 4-ft shoulders. • I-90 travel lane widths: 11-ft • I-90 shoulder widths: 4-ft • SFR travel lane widths: 11-ft • SFR shoulder widths: 1-ft • Highway viaduct replaced with at-grade and extensive below grade roadway with boat slab and retaining wall structures that will require maintenance • Below grade portion of I-90 requires pumping of stormwater and new pump station with direct discharge to the river • Requires complicated stormwater inlet design for I-90 to limit drainage spread to shoulders and introduces frequent drainage manholes in travel way of interstate. • Extensive I-90 boat section and retaining wall structures required • Frequent maintenance of relocated 60-inch BWSC drain in potential syphon chamber • Maintenance of relocated 58”x63” MWRA Sewer more complicated due to location below PDW Path • New SFR viaduct introduced that will require maintenance • SFR realignment for viaduct introduces vertical and horizontal reverse curves that will impact traffic operations by decreasing driver sight distance	• Similar to existing conditions
	Rail/Transit	• All three Throat Area options offer similar post-construction railroad operational characteristics for WML and GJRR. Each option provides for two Throat Area WML tracks that connect with the existing tracks continuing into Boston. Each option also offers two independent Grand Junction tracks through the Throat Area that merge to the single Grand Junction track that crosses the Charles River, supporting the existing MBTA non-revenue operations between the south side and the Commuter Rail Maintenance Facility.	• All three Throat Area options offer similar post-construction railroad operational characteristics for WML and GJRR. Each option provides for two Throat Area WML tracks that connect with the existing tracks continuing into Boston. Each option also offers two independent Grand Junction tracks through the Throat Area that merge to the single Grand Junction track that crosses the Charles River, supporting the existing MBTA non-revenue operations between the south side and Commuter Rail Maintenance Facility. • MBTA will need to maintain a new bridge that carries the Grand Junction RR over relocated and depressed I-90 on a skew, with foundations integral to the I-90 boat section walls.	• All three Throat Area options offer similar post-construction railroad operational characteristics for WML and GJRR. Each option provides for two Throat Area WML tracks that connect with the existing tracks continuing into Boston. Each option also offers two independent Grand Junction tracks through the Throat Area that merge to the single Grand Junction track that crosses the Charles River, supporting the existing MBTA non-revenue operations between the south side and Commuter Rail Maintenance Facility. • MBTA will need to maintain a new bridge that carries the Grand Junction RR over relocated and depressed I-90 on a skew, with foundations integral to the I-90 boat section walls.	• Similar to existing conditions
	Bike/Ped	• PDW Path readily accessible for maintenance and snow removal activities • Future north-south crossing maintenance may be complicated due to the structure being located below I-90 and above rail.	• Similar to SSR Modified At-Grade: • PDW Path access more complicated for maintenance and snow removal activities due to barrier on both sides of path. • Future north-south crossing maintenance least complicated due to the structure being located above I-90 and rail.	• PDW Path readily accessible for maintenance and snow removal activities • Future north-south crossing maintenance most complicated due to the structure being located above SFR viaduct and long ramps with switchback inhibit access for maintenance vehicles.	• Similar to existing conditions