MASSACHUSETTS BAY TRANSPORTATION AUTHORITY

DRAWINGS AND SPECIFICATION REQUIREMENTS

	15% Conceptual Design Phase	30% Preliminary Design Phase	60% Design Phase	90% Design Phase	100% - PS& E
DESIGN PHASE DEFINITION	1. Existing conditions, including basic infrastructure, major landscape features, and project facilities and equipment.	1. Building code review and describe means of compliance for major code issues. Code, fire protection and egress calculations and analyses as a sheet in the document set includes Building Code, NFPA 130, ADA, MAAB, and egress analysis allowing for 1% growth for 25 years.	1. The overall extent of the project and its elements, as well as typical and a-typical sections and detail included.	1. Drawings are complete	1. Drawings, Specifications complete in entirety. All comments resolved and incorporated.
	2. Diagrams to include (a) figure-ground plan, including municipality master plans with use groups (b) pedestrian, bicycle, automobile and transportation routes (c) accessible routes to and within any facility (d) site and facility sections showing major site and relevant adjacent features (e) facility workflow	2. Drawings that clarify spacial relationships, including the volume, sizes, and overall appearance and function through further development of the plans, sections, exterior elevations, typical construction/fabrication details, and equipment layouts, service concepts, approach to lighting and energy.	2. Documents include coordinated reflected ceiling plans, demolition plan, interior elevations, structural and initial drawings and system layout for mechanical, electrical and plumbing drawings, the impact of key equipment on room design, and preliminary engineering for all other systems such as signal, track and communications.	2. Specifications in final form; all sections included and appropriately modified to meet current design completion, only minor edits expected.	
	3. Type study, conceptual plans, elevations and sections, including at least three design alternatives	3. Bridge structural, track, civil and landscape drawings address impact of accessible paths, zoning, context, utilities, environment, parking, drainage calculations, planting and related program criteria, and begin the integrated surface restoration plan to be developed during successive phases of the project.	3. Photometric plans to illustrate compliance of lighting design with MBTA standards.		
	4. Alternatives analysis and recommendations (narratives with conceptual drawings)	4. Way finding-locations of critical passenger information	4. Way finding designs shown in plan and elevation.		
	5. 3 dimensional models of facilities to communicate with professionals other than designers, to assist with communications with community, and to assist with way finding design in complex spaces. A cost-effective computer generated model, using programs such as Sketch-up or Revit, in context is preferred. Project dependent.	5. Submitted: geometry geotechnical; structural; mechanical; plumbing; electrical; fire protection; drainage; signals; power; security; egress analysis.	5. Construction sequencing - building maintenance and protection of traffic and pedestrians during construction and accessibility during construction.		
	6. Existing Survey (ROW, property lines, major utilities).	Preliminary engineering for all other systems such as signal, track and communications.	6. Updates to any required 3-dimensional models to show architectural expression and interior spaces.		
	7.Code references.	6. Code, fire protection and egress calculations and analyses as a sheet in the document set includes building code, NFPA 130, ADA, MAAB, and egress analysis allowing for 1% growth for 25 years.	7. Temporary Traffic Control Plan.		
	8. Submit CAD Border Mockup and Numbering Sequencing for MBTA approval	7. Outline specifications that identify major building materials and systems, and establish quality standards; full specifications may be provided if available.			
		7. Outline specifications that identify major building materials and systems, and establish quality standards; full specifications may be provided if available.			
		8. 3-dimensional models to show architectural expression, and interior spaces.			

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SPECIFICATION	N/A	1. Outline specification w/same section numbering as final	1. Draft specifications with all applicable sections including front end docs. 2. Provide all construction all testing requirements.	1. Final edited specification	1. Final specification
SITE	1. Existing conditions 2. Demolition identified 3. Building outline(s) 4. Site entrance 5. Roads & driveways 6. Parking locations 7. Loading dock location 8. Waste collection locations 9. Walkway locations 10. Stairway locations 11. Future expansion 12. Utility requirements 13. Site utilities 14. Wetlands 15. Borings	1. Site Plan 2. General dimensions & elevations 3 Site demolition plan 4. Parking plan 5. Site drainage 6. Lighting plan 7. Concept details of site fixtures & equipment 8. Utility plans including proposed easements 9. Soil retention work, if applicable 10. Dewatering plan 11. Hazardous materials site plan 12. Alignment and Construction Base line 13. Wetlands 14. Soil Borings/Test-pits - Ground Water Location - top of rock location 15. Grading and Drainage Plans 16. Layout and Materials Plan 17. Information should be provided on Civil Drawings as required: - Identify Property Owners - ROW Plans - Property Plans - Preliminary Sections (critical locations) - Typical Cross Sections - Existing Pavement Cross Section - Drainage Flow Direction - Location of Structures - Retention Schemes - Pavement Limits	1. Extent of construction area and work 2. Site demolition plan 3. Traffic and pedestrian plan 4. Site development and phasing plans 1. Construction site access 2. Staging area 3. Soil erosion control plan for both construction and permanent conditions 4. Construction signage 5. Pipe sizes 6. Connection details 7. Protection requirements for construction, planting that remain. 8. Delineation 9. Wetlands 10. Flood Plains 11. Soil Borings/Test-pits 12. Ground Water Location 13. Top of Rock Location (soil boring) 14. Limits of Work 15. Structural Removal 16. Critical Clearances 17. Structure Limits (new and existing) 18. Environment - Hazardous Materials Disposition 19. Vibration Impacts 20. Hazardous Waste 21. Air Quality Requirements Specs 22. Curve Data Coordinates 23. Vertical Curve Data 24. Top of Rail Geometry 25. Parking Lots, Ramps Access 26. Pavement Design 27. Pavement Markings 28. Traffic Signs 29. Traffic Signals 30. Grate and Invert Elevations	1. Extent of construction area and work 2. Site demolition plans 3. Traffic plan, if existing roads/walks are impacted 4. Site development and phasing plans 1. Construction site access 2. Staging area 3. Soil erosion control plan for both construction and occupancy periods 4. Construction signage 5. Pipe sizes 6. Connection details 7. Protection requirements for construction, plantings that remain 8. Delineation 9. Wetlands 10. Flood Plains 11. Soil Borings/Test-pits 12. Ground Water Location 13. Top of Rock Location (soil boring) 14. Limits of Work 15. Structural Removal 16. Critical Clearances 17. Structure Limits (new and existing) 18. Environment - Hazardous Materials Disposition 19. Vibration Impacts 20. Hazardous Waste 21. Air Quality Requirements Specs 22. Curve Data Coordinates 23. Vertical Curve Data 24. Top of Rail Geometry 25. Parking Lots, Ramps Access 26. Pavement Design 27. Pavement Markings 28. Traffic Signs 29. Traffic Signals 30. Grate and Invert Elevations 31. Confirmation of Compliance with Agreements	1. Extent of construction area and work 2. Site demolition plans 3. Traffic plan, if existing roads/walks are impacted 4. Site development and phasing plans 1. Construction site access 2. Staging area 3. Soil erosion control plan for both construction and occupancy periods 4. Construction signage 5. Pipe sizes 6. Connection details 7. Protection requirements for construction, plantings that remain 8. Delineation 9. Wetlands 10. Flood Plains 11. Soil Borings/Test-pits 12. Ground Water Location 13. Top of Rock Location (soil boring) 14. Limits of Work 15. Structural Removal 16. Critical Clearances 17. Structure Limits (new and existing) 18. Environment - Hazardous Materials Disposition 19. Vibration Impacts 20. Hazardous Waste 21. Air Quality Requirements Specs 22. Curve Data Coordinates 23. Vertical Curve Data 24. Top of Rail Geometry 25. Parking Lots, Ramps Access 26. Pavement Design 27. Pavement Markings 28. Traffic Signs 29. Traffic Signals 30. Grate and Invert Elevations 31. Confirmation of Compliance with Agreements

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DRAWINGS AND SPECIFICATION REQUIREMENTS

	15% Conceptual Design Phase	30% Preliminary Design Phase	60% Design Phase	90% Design Phase	100% - PS& E
LANDSCAPING	1. Existing conditions	1. Planting plan 2. Irrigation plan 3. Existing irrigation 4. Standard Landscaping Details	1. Existing tree protection 2. Soil preparation & planting specifications 3. Guying diagrams 4.Irrigation Piping diagrams 5. Irrigation Pipe sizes 6. Landscape details	1. Existing tree protection 2. Soil preparation & planting specifications 3. Guying diagrams 4.Irrigation Piping diagrams 5. Irrigation Pipe sizes 6. Landscape details	1. Existing tree protection 2. Soil preparation & planting specifications 3. Guying diagrams 4.Irrigation Piping diagrams 5. Irrigation Pipe sizes 6. Landscape details
STRUCTURAL	1. Structural diagrams	1. Foundation plan 2. Framing plans 3. Main member sizing 4. Structural sections 5. Identify Lateral Resistance System 6. Classify Structural sheets	1. Location of control joints 2. Beam, column & slab schedules (preliminary) 3. Mechanical and electrical concrete pads 4. Foundation details 5. Structural details 6. Structural notes	1. Definition of control joints 2. Beam, column & slab schedules 3. Mechanical and electrical concrete pads 4. Foundation details 5. Structural details 6. Structural notes 7. Final calculations, if requested.	1. Definition of control joints 2. Beam, column & slab schedules 3. Mechanical and electrical concrete pads 4. Foundation details 5. Structural details 6. Structural notes 7. Final calculations. 8. BIM models 9. As Builts/RFIs
ARCHITECTURE	1. Site plans and sections in diagrammatic form showing: a. pedestrian, bicycle, automobile and other transportation routes in the neighborhood context b. accessible routes to and within any facility, including elevators and escalators locations c. major site program and relevant adjacent features, d. facility work flow 2. Facility plans and sections in diagrammatic form showing: a. type study, including at least three design alternatives b. the premise on which the recommended design is based, including sketches with illustrate indoor and outdoor relationships, access and future expansion c. area uses identification and program square footage d. preliminary layout of major spaces with facility work/customer flow including major fixed equipment and MEP/FP spaces e. conceptual circulation plan including elevators, escalators, stairs and ramps locations, and egress routes 3. 3-D representation of project to convey massing and/or space 4. Demolition plan in diagrammatic form	1. Floor plans for all levels including the roof identifying: a. floor plans demolition and/or existing conditions b. all program spaces and sizes c. indicating the facility's general structural, mechanical, electrical, plumbing and other systems including duct or chase spaces d. major fixed equipment and furniture locations/layouts 2. Prepare a fire protection and egress plan which indicates fire areas, fire walls, smoke zones, travel distances, etc. 3. Building elevations: a. indicate surface materials for all areas. b. different vertical plans with differentiated line weights or shadows c. finish grades d. maler floor elevations, including those below grade e. sections when elevation is shown by taking f. significant planting and other site elements (e.g. bodies of water, hills, earth beams when important in defining space and volume) g. significant mechanical and electrical equipment. (Roof top units, chimneys, louvers, transformers, pole lines, etc.)	1. Architectural Floor Plans including: a. Relative wall thickness - use different width solid lines (no material indication). Differentiate between opaque and transparent walls. b. Room names, Department or Area names c. Floor elevations (at least relative to some d. Equipment, furnishing and other space defining elements e. Multi-level spaces, both above (dotted) and below the floor represented f. Skylights - lightwells, etc. g. Significant mechanical and electrical equipment/including all electrical panels h. Indicate fire areas, fire walls, and smoke zones 2. Roof Plan a. Skylights b. Major mechanical or electrical equipment c. Major roof elevations 3. Building Elevations a. Indicate surface materials for all areas	1. Floor Plans a. Room finish numbers b. Door symbols c. Glazed light symbols d. Window types and numbers e. Pits, trenches, etc. f. Column numbering g. Furring notes h. Hatch walls and partitions i. Metal toilet partitions j. Depressed floor for terrazzo tile, etc. k. Corridor handrails l. Floor elevations m. Curbs for mechanical rooms penetrations n. Sump pits, gratings	1. Complete stamped and signed drawings

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DRAWINGS AND SPECIFICATION REQUIREMENTS

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ARCHITECTURE (con't)		4. Building Sections: a. relative thickness of floors and walls - use different width solid lines (no material indication) except in the case of deep structural elements b. Major floor elevations c. finish grades (existing and proposed) if important - dotted lines through building section d. relationship to site contours and other important site elements (as shown in building elevation drawings) e. major room names f. significant mechanical and electrical equipment g. completed ceiling space coordination diagram(s) 5. Updated 3D representation of recommended design to convey massing and/or space 6. Plan to address existing hazardous materials, if applicable 7. If there is not a 15% submittal, 15% design requirements must be included in the 30% design with the recommended alternative developed per 30% design requirements.	b. Different vertical plans with differentiated line weight at shadows c. Finish grades d. Major floor elevations, including those below grade e. Sections when elevation is shown by taking vertical cut through another space f. Significant planting and other site elements (bodies of water, hulls, earth beams when important in defining space and volume) g. Significant mechanical and electrical equipment (rooftop units, chimneys, louvers, transformers, pole lines, etc.) 4. Typical and Atypical Building Sections a. Relative thickness of floors and walls - use different width solid lines (no material indication) except in the case of deep structural elements b. Malar floor elevations c. Finish grades (existing and proposed) if important - dotted lines through building section d. Relationship to site contours and other important site elements (as shown in building elevation drawings) e. Major room names f. Significant mechanical and electrical 5. Typical Wall Sections and Details a. Show typical wall at all opening types, including windows, doors and louvers b. Show typical solid wall 6. Interior Elevations Sections and Details a. Typical and repetitive spaces b. Areas of special interest or complexity such as stairs, elevators, escalators, way finding and marketing. 7. Reflected Ceiling Plans a. Indicate for all typical areas and those of special interest. Show location of major components. 8. Enlarged plans, sections and elevations for toilets and major equipment rooms. 9. Exterior wall sections 10. Interior wall sections 11. Elevator plans and sections 12. Stair plans and sections 13. Interior elevations 14. Section details 15. Plan details 16. Interior details	o. Plumbing fixtures p. Sections lines q. Drinking fountains r. Soffits (dotted) s. Fire walls (indicate rating) 2. Roof Plans a. Cant strips b. Scuppers c. Roof drains and drainage areas d. Ladders e. Section lines f. Roof hatches g. Skylights h. Smoke zone walls i. Precast receptors j. Lockers and benches k. Chimney detail l. Recessed mats m. Elevators n. Fire extinguishers o. Hose cabinets p. Expansion joints q. Control joints in masonry r. Mechanical equipment s. Pipe trench t. Shower stalls u. Display cases v. Convectors w. Low partitions x. Stairs	

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DRAWINGS AND SPECIFICATION REQUIREMENTS

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ARCHITECTURE (con't)			17. Window and louver schedules 18. Door schedules 19. Finish schedules 20. Furniture, fixtures and equipment schedules	y. Ramps z. Floor material changes aa. Millwork ab. Finding VMS ac. Dedication plaque ad. Worker Tie -Offs ae. Elevation indications for sloped areas af. Antennas ag. Curbs for roof openings ah. Expansion joints ai. Flashing detail indications aj. Gutters, downspouts ak. Vents al. Mechanical equipment am. Walkways an. Special surfaced areas ao. Parapets/railing - check code requirements 3. Reflected Ceiling Plans a. Ceiling b. Ceiling and indications c. Light fixtures d. Gilles e. Diffusers f. Heat detectors g. Smoke detectors h. Soffits 4. Building Plans a. Window types and numbers b. Entrance types and numbers c. Door types and numbers d. Wall material indication e. Coping materials f. Overhand fascia materials g. Top of foundation wall line h. Footing and foundation line i. Floor lines j. Existing grades k. New grades l. Vertical dimensions 5. Building Sections a. Vertical dimensions b. Floor elevations c. Column lines d. Chimneys e. Stacks f. Guy Wires g. Penthouses h. Skylights i. Access panels j. Room numbers k. Hatches	

DRAWINGS AND SPECIFICATION REQUIREMENTS

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ARCHITECTURE (con't)				l. Major structural members (if sight exposed) m. Hoods n. Gas columns o. Way finding VMS and Life Safety Signage p. Sections lines q. Column centerlines r. Louvers s. Mechanical or electrical equipment t. Stairs (handrails) u. Ramp v. Cornerstone w. Chimneys x. Stacks y. Light fixtures z. Room numbers/names aa. Rooftop equipment ab. Wall section designations ac. Millwork and detail designation ad. Interior glazed panels (dimensions and details) ae. Base indication af. Mechanical grilles, thermostats, gas outlets, etc. ag. Wall handrails 6. Details (Interior) a. Millwork b. Locker bases (all base types) c. Soffits d. Curbs for mechanical penetrations e. Hollow metal - door leaf schedule door details f. Hollow metal glazed panels g. Stairs h. Handrails i. Expansion joints j. Fireproofing at beams and columns k. Low walls l. Folding partitions m. Rolling doors n. Interior finishes (wall, wainscot, etc.) o. Toilet accessories p. Electrical receptacles (speakers, clocks, light fixtures, etc.) q. Plumbing fixtures r. Locker designation s. Automatic sliding door details t. Expansion joint details u. Typical hardware location on doors v. Typical partition construction w. Exhaust hood details	

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SIGNAGE	1. Meet with MBTA Graphics & Way finding to discuss process, scope, and placement/strategy of wayfinding. 2. Station Rehab: Existing signage survey with recommendations for reuse of frames in good condition.	1.Site Plan and Floor Plan 2. Identification of accessible/nonaccessible path of travel 3. Identification of major sign types 4. Preliminary signage plans based on meeting discussion and diagrams from MBTA Graphics & Way finding. MBTA provided sign graphic files placed in drawing set. 5. Specifications to be included, as applicable: 10400 Fixed Signage 10401 Metal Sign Frames 10426 Tactile Signage 10428 MBTA Logo “Lollipop” Sign 10100 Display Case	1. Signage key plan elevations and schedule. Frame types, details and schedule; Coordinated architectural plans, elevations and details including VMS, Exit Signs, and security cameras. 2. MBTA provided sign graphic files placed in drawing set, including tactile/Braille signage. 3. Customer Assistance area located and defined with all required elements. 4. Tactile/Braille signs identified for all rooms, stairs, and exits per ADA and life safety code. Coordinate with MBTA Graphics & Way finding for locations at station entrances and platforms. 5. Area of Refuge/Area of Safe Dispersal located and defined with all required elements.	1. Modified and updated: Signage key plan elevations and schedule. Frame types, details and schedule; Coordinated architectural plans, elevations and details including VMS, Exit Signs, and security cameras. 2. MBTA provided sign graphic files placed in drawing set, including tactile/Braille signage. 3. Elevator panels design including levels designation.	1. Modified and Updated: Signage key plan elevations and schedule. Frame types, details and schedule; Coordinated architectural plans, elevations and details including VMS, Exit Signs, and security cameras. 2. MBTA provided sign graphic files placed in drawing set, including tactile/Braille signage. 3. Graphics package for use by contractor.
HVAC	1. Identify special occupancy/use zones. 2. Equipment space requirements 3. Mechanical room location	1. Single-lines floor plans showing approximate locations of duct and pipe systems with specifications relative to Architectural and structure. 2. Location(s) of major equipment (w/enlarged mechanical plan(s) if applicable). 3. One-line diagrams and other materials as required to describe the fundamental design concept for all mechanical (airside and waterside) systems. 4. All major equipment and systems 5. Control diagrams (concept form) for all mechanical and piping systems.	1. One-line flow diagrams for all mechanical systems: 2. Detailed floor plans of mechanical rooms w/all components and required service access areas drawn to actual scale. 3. Floor plans w/ all airside and waterside components drawn to actual scale. Indicate pipe sizes, duct sizes and air terminal CFMs 4. All air and water valves shown on plans. 5. Schedules for all equipment. 6. All control panels, thermostats, sensors, detectors and miscellaneous controls shown on plans. 7. Equipment, penetration, installation and connection details, 8. General controls drawings, including clear differentiation of trade responsibility for control, fire, and control power wiring.	1. Complete one-line flow diagrams for all mechanical systems: 2. Detailed floor plans of mechanical rooms w/all components and required service access areas drawn to actual scale. 3. Detailed floor plans w/ all airside and waterside components drawn to actual scale. Indicate pipe sizes, duct sizes and air terminal CFMs. 4. All air and water valves shown on plans and sized accurately. 5. Complete schedules for all equipment. 6. All control panels, thermostats, sensors, detectors and miscellaneous controls shown on plans. 7. Equipment, penetration, installation and connection details, 8. Detailed controls drawings, including clear differentiation of trade responsibility for control, fire, and control power wiring 9. Cross-sections through mechanical rooms and areas where there are installation / coordination issues (tight space, zoning of utilities). Indicate required service access areas	1. Complete one-line flow diagrams for all mechanical systems: 2. Detailed floor plans of mechanical rooms w/all components and required service access areas drawn to actual scale. 3. Detailed floor plans w/ all airside and waterside components drawn to actual scale. Indicate pipe sizes, duct sizes and air terminal CFMs. 4. All air and water valves shown on plans and sized accurately. 5. Complete schedules for all equipment. 6. All control panels, thermostats, sensors, detectors and miscellaneous controls shown on plans. 7. Equipment, penetration, installation and connection details, 8. Detailed controls drawings, including clear differentiation of trade responsibility for control, fire, and control power wiring 9. Cross-sections through mechanical rooms and areas where there are installation / coordination issues (tight space, zoning of utilities). Indicate required service access areas

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PLUMBING	1. Equipment space requirements 2. Electric Closet(s) location(s) 3. Water service room location	1. Plumbing plans with major equipment and piping. 2. Location(s) of major equipment (w/enlarged mechanical plan(s) if applicable). 3. Schedules for all major equipment	1. Cold and hot water riser diagram, including assumed fixture counts per floor connection. 2. Waste and vent riser diagrams including assumed fixture counts per floor connection. 3. Riser diagrams of other plumbing systems, such as natural gas, process water, storm water, etc. 4. Floor plans w/ all piping and equipment drawn to actual scale. Indicate pipe sizes. 5. Schedules for all equipment. 6. All floor drains, cleanouts, and other sanitary connections shown. 7. Complete coordination with structural and architectural disciplines. General coordination with electrical and instrumentation disciplines. 8. Typical equipment, piping, penetration, installation and connection details, including signage 9. General sequence of operations; controls panels located. 10. Complete design calculations.	1. Detailed cold and hot water riser diagram, including assumed fixture counts per floor connection. 2. Detailed waste and vent riser diagrams including assumed fixture counts per floor connection. 3. Detailed riser diagrams of other plumbing systems, such as natural gas, process water, storm water, etc. 4. Detailed floor plans w/ all accurately sized piping and equipment drawn to actual scale. 5. Complete schedules for all equipment. 6. All floor drains, cleanouts, and other sanitary connections shown and sized. 7. Complete coordination with all internal and external disciplines. 8. Typical equipment, piping, penetration, installation and connection details, including signage 9. Detailed sequence of operations; controls panels located. 10. Complete design calculations.	1. Detailed cold and hot water riser diagram, including assumed fixture counts per floor connection. 2. Detailed waste and vent riser diagrams including assumed fixture counts per floor connection. 3. Detailed riser diagrams of other plumbing systems, such as natural gas, process water, storm water, etc. 4. Detailed floor plans w/ all accurately sized piping and equipment drawn to actual scale. 5. Complete schedules for all equipment. 6. All floor drains, cleanouts, and other sanitary connections shown and sized. 7. Complete coordination with all internal and external disciplines. 8. Typical equipment, piping, penetration, installation and connection details, including signage 9. Detailed sequence of operations; controls panels located. 10. Complete design calculations.
FIRE PROTECTION	1. Sprinkler/standpipe dedicated space	1. Fire protection plans 2. Riser diagram	1. Fire protection service entrance details 2. Fire protection plans (including header and riser 3. Typical equipment, piping, penetration, installation and connection details, including signage such as for fire command center and standpipe. 4. Complete coordination with structural and architectural disciplines. General coordination with electrical and instrumentation disciplines. 5. Complete design calculations	1. Detailed fire protection service entrance details 2. Detailed fire protection plans (including header 3. Typical equipment, piping, penetration, installation and connection details, including signage such as for fire command center and standpipe. 4. Complete coordination with all internal and external disciplines. 5. Complete design calculations	1. Detailed fire protection service entrance details 2. Detailed fire protection plans (including header 3. Typical equipment, piping, penetration, installation and connection details, including signage such as for fire command center and standpipe. 4. Complete coordination with all internal and external disciplines. 5. Complete design calculations
LIGHTING	N/A	1. Lighting plans 2. Fixture types & schedule 3. Light level calculation drawings (Photometric Plan) 4. Energy code requirements	1. Lighting plans of all areas 2. Control diagrams 3. Design Calculations (Photometric Plan) 4. Installation details, including structural support requirements 5. Lighting Schedule (Preliminary)	1. Lighting plans of all areas 2. Control diagrams 3. Design Calculations (Photometric Plan) 4. Installation details, including structural support requirements 5. Lighting Schedule	1. Lighting plans of all areas 2. Control diagrams 3. Design Calculations (Photometric Plan) 4. Installation details, including structural support requirements 5. Lighting Schedule

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ELECTRIC POWER DISTRIBUTION	1. Exterior equipment locations 2. Electric closet(s) location(s) 3. Green power potential, solar, wind, etc. 4. Area classifications 5. Equipment space requirements	1. Power plan riser 2. Equipment layout/sizes 3. Panel locations/schedules (Preliminary)	1. Load summary 2. Panel schedules 3. Details of power service to building 4. Power distribution plans that indicates the location of all receptacles 5. Plans and details of emergency power generation system and controls 6. Connections to other building systems, including fire alarm & HVAC systems 7. Impacts on existing equipment if involved. Shut-down plans, etc. 8. Details of special terminal devices 9. MCC, distribution panels, transformer, disconnect details. 10. Penetration details 11. Design calculations (Panel Loading shown in schedules) 12. Normal power riser diagram with circuit breaker & fuse sizes 13. Emergency power riser diagram with circuit breaker & fuse sizes 14. IT System, Lightning protection requirements, Building BDA system, Antennae systems, Green power potential, solar, wind, etc. preliminary designs and riser connections shown.	1. Load summary 2. Panel schedules 3. Details of power service to building 4. Power distribution plans that indicates the location of all receptacles 5. Plans and details of emergency power generation system and controls 6. Connections to other building systems, including fire alarm & HVAC systems 7. Impacts on existing equipment if involved. Shut-down plans, etc. 8. Details of special terminal devices 9. MCC, distribution panels, transformer, disconnect details. 10. Penetration details 11. Design calculations (Panel Loading shown in schedules) 12. Normal power riser diagram with circuit breaker & fuse sizes 13. Emergency power riser diagram with circuit breaker & fuse sizes 14. IT System, Lightning protection requirements, Building BDA system, Antennae systems, Green power potential, solar, wind, etc. preliminary designs and riser connections shown. 15. Panel matrix with details 16. Complete circuiting details all devices 17. Revised project specific specification.	1. Load summary 2. Panel schedules 3. Details of power service to building 4. Power distribution plans that indicates the location of all receptacles 5. Plans and details of emergency power generation system and controls 6. Connections to other building systems, including fire alarm & HVAC systems 7. Impacts on existing equipment if involved. Shut-down plans, etc. 8. Details of special terminal devices 9. MCC, distribution panels, transformer, disconnect details. 10. Penetration details 11. Design calculations (Panel Loading shown in schedules) 12. Normal power riser diagram with circuit breaker & fuse sizes 13. Emergency power riser diagram with circuit breaker & fuse sizes 14. IT System, Lightning protection requirements, Building BDA system, Antennae systems, Green power potential, solar, wind, etc. preliminary designs and riser connections shown. 15. Panel matrix with details 16. Complete circuiting details all devices 17. Completely revised and updated project specific specification.
FIRE ALARM	1. Local Fire Department connection point	1. Fire alarm plan	1. Connection details 2. Riser diagram 3. All head-end equipment located 4. Device locations 5. Indication of connection to fire alarm, HVAC & central campus monitoring systems	1. Connection details 2. Riser diagram 3. All head-end equipment located 4. Device locations 5. Indication of connection to fire alarm, HVAC & central campus monitoring systems 6. Full equipment matrix 7. Revised project specific specification	1. Connection details 2. Riser diagram 3. All head-end equipment located 4. Device locations 5. Indication of connection to fire alarm, HVAC & central campus monitoring systems 6. Full equipment matrix 7. Completely revised and updated project specific specification.

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	15% Conceptual Design Phase	30% Preliminary Design Phase	60% Design Phase	90% Design Phase	100% - PS& E
SECURITY SYSTEMS	N/A	N/A	1. Riser diagrams 2. Equipment closet layout & elevations 3. Concealed and exposed raceways 4. Installation details 5. Security system riser diagrams 6. Security equipment locations 7. Card access equipment closet layout & elevations	1. Riser diagrams 2. Equipment closet layout & elevations 3. Concealed and exposed raceways 4. Installation details 5. Security system riser diagrams 6. Security equipment locations 7. Card access equipment closet layout & elevations 8. Full equipment labeling with matrix 9. Revised project specific specification 10. Equipment Rack layouts	1. Riser diagrams 2. Equipment closet layout & elevations 3. Concealed and exposed raceways 4. Installation details 5. Security system riser diagrams 6. Security equipment locations 7. Card access equipment closet layout & elevations 8. Full equipment labeling with matrix 9. Completely revised and updated project specific specification. 10. Complete equipment rack layout details with Horizontal and Vertical Cable management design.
SIGNAL SYSTEMS	1. Space Available for Central Instrument Housing (existing conditions) 2. Interface Requirements Established - Vehicles - Coord. Of instruments on vehicles with signal systems. Need to ID which type of vehicles 3. Site Access	1. Space Available for Central Instrument Housing (existing conditions) 2. Double Line Plans Match Civil Drawings 3. Fixed Equipment Shown on Double Line Plan (how many pieces mounted in the field) 4.Preliminary Mechanical Clearances, Space and Maintenance Access. 5.Typical Circuits/Software for Vital Functions Requirements Defined 6. Typical Circuits/Software for Non-Vital Functions Requirements Defined 7. Typical Power Distribution Connections Requirements Defined 8. Block Diagrams Depict System Interconnect Requirements 9. Interface Requirements Established - Trackwork 10. Interface Requirements Established - Traction Power (3rd Rail/Overhead 11. Interface Requirements Established - Vehicles - Coord. Of instruments on vehicles with signal systems. Need to ID which type of vehicles 12. Sequence of Construction 13. Site Access 14. Coordinate System Design with Operating Plan 15. Future Expansion Capability	1. Space Available for Central Instrument Housing (existing conditions) 2. Specifications Match Plans 3. Double Line Plans Match Civil Drawings 4. Fixed Equipment Shown on Double Line Plan (how many pieces mounted in the field) 5. Final Mechanical Clearances, Space and Maintenance Access 6. Typical Circuits/Software for Vital Functions Requirements Defined 7. Typical Circuits/Software for Non-Vital Functions Requirements Defined 8. Typical Power Distribution Connections Requirements Defined 9. Block Diagrams Depict System Interconnect Requirements 10. Typical Arrangements Shown for Major Items 11. Detailed Cable Plan Shown 12. Typical Installation Requirements Shown 13. Interface Requirements Established - Trackwork 14. Interface Requirements Established - Traction Power (3rd Rail/Overhead 15. Interface Requirements Established - Communication 16. Interface Requirements Established - Operations Control Center System (OCC) 17. Interface Requirements Established - Vehicles - Coord. Of instruments on vehicles with signal systems. Need to ID which type of vehicles 18. Sequence of Construction 19. Site Access 20. Coordinate System Design with Operating Plan 21. Future Expansion Capability	1. Space Available for Central Instrument Housing (existing conditions) 2. Specifications Match Plans 3. Double Line Plans Match Civil Drawings 4. Fixed Equipment Shown on Double Line Plan (how many pieces mounted in the field) 5. Consistency of Notes, Details and Sections (QA) 6. Final Mechanical Clearances, Space and Maintenance Access 7. Typical Circuits/Software for Vital Functions Requirements Defined 8. Typical Circuits/Software for Non-Vital Functions Requirements Defined 9. Typical Power Distribution Connections Requirements Defined 10 . Block Diagrams Depict System Interconnect Requirements 11. Typical Arrangements Shown for Major Items 12.Detailed Cable Plan Shown 13. Typical Installation Requirements Shown 14. Interface Requirements Established - Trackwork 15. Interface Requirements Established - Traction Power (3rd Rail/Overhead 16. Interface Requirements Established - Communication 17. Interface Requirements Established - Operations Control Center System (OCC) 18. Interface Requirements Established - Vehicles - Coord. Of instruments on vehicles with signal systems. Need to ID which type of vehicles 19. Sequence of Construction 20. Site Access 21. Coordinate System Design with Operating Plan 22. Future Expansion Capability	1. Space Available for Central Instrument Housing (existing conditions) 2. Specifications Match Plans 3. Double Line Plans Match Civil Drawings 4. Fixed Equipment Shown on Double Line Plan (how many pieces mounted in the field) 5. Consistency of Notes, Details and Sections (QA) 6. Final Mechanical Clearances, Space and Maintenance Access 7. Typical Circuits/Software for Vital Functions Requirements Defined 8. Typical Circuits/Software for Non-Vital Functions Requirements Defined 9. Typical Power Distribution Connections Requirements Defined 10 . Block Diagrams Depict System Interconnect Requirements 11. Typical Arrangements Shown for Major Items 12.Detailed Cable Plan Shown 13. Typical Installation Requirements Shown 14. Interface Requirements Established - Trackwork 15. Interface Requirements Established - Traction Power (3rd Rail/Overhead 16. Interface Requirements Established - Communication 17. Interface Requirements Established - Operations Control Center System (OCC) 18. Interface Requirements Established - Vehicles - Coord. Of instruments on vehicles with signal systems. Need to ID which type of vehicles 19. Sequence of Construction 20. Site Access 21. Coordinate System Design with Operating Plan 22. Future Expansion Capability

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DRAWINGS AND SPECIFICATION REQUIREMENTS

	15% Conceptual Design Phase	30% Preliminary Design Phase	60% Design Phase	90% Design Phase	100% - PS& E
COMMUNICATIONS		1. Typical Arrangements Shown for Major Items 2. Site Assessment - Existing Conditions: Floor Space; power; rack space; ground and lightening protection; openings/penetration; HVAC; fire protection; security for room; and radio/microwave tower	1. Specifications Match Plans 2. Single Line Plans Match Civil Drawings 3. Fixed Equipment Shown on Single Line Plan 4. Consistency of Notes, Details and Sections 5. Mechanical Clearances, Space and Maintenance Access 6. Typical Arrangements Shown for Major Items 7. Typical Cable Plan Shown 8. Typical Installation Requirements Shown 9. Typical Communication Detail Drawings 10. Communications Room Equipment Arrangement 11. Communications Equipment Locations 12. Conduit Plans, Floor Openings/Trenches 13. Design Match Specification 14. Telephone System Requirements 15. Communications/Signals 16. Communications/Traction Power 17. Communications/Building Services (elevators/emergency generator/HVAC) 18. Communications/Security 19. Communications/IT 20. Communications/Fire Alarm 21. Sequence of Construction 22. Site Access	1. Specifications Match Plans 2. Single Line Plans Match Civil Drawings 3. Fixed Equipment Shown on Single Line Plan 4. Consistency of Notes, Details and Sections 5. Mechanical Clearances, Space and Maintenance Access 6. Typical Arrangements Shown for Major Items 7. Typical Cable Plan Shown 8. Typical Installation Requirements Shown 9. Typical Communication Detail Drawings 10. Communications Room Equipment Arrangement 11. Communications Equipment Locations 12. Conduit Plans, Floor Openings/Trenches 13. Design Match Specification 14. Telephone System Requirements 15. Communications/Signals 16. Communications/Traction Power 17. Communications/Building Services (elevators/emergency generator/HVAC) 18. Communications/Security 19. Communications/IT 20. Communications/Fire Alarm 21. Sequence of Construction 22. Site Access	1. Specifications Match Plans 2. Single Line Plans Match Civil Drawings 3. Fixed Equipment Shown on Single Line Plan 4. Consistency of Notes, Details and Sections 5. Mechanical Clearances, Space and Maintenance Access 6. Typical Arrangements Shown for Major Items 7. Typical Cable Plan Shown 8. Typical Installation Requirements Shown 9. Typical Communication Detail Drawings 10. Communications Room Equipment Arrangement 11. Communications Equipment Locations 12. Conduit Plans, Floor Openings/Trenches 13. Design Match Specification 14. Telephone System Requirements 15. Communications/Signals 16. Communications/Traction Power 17. Communications/Building Services (elevators/emergency generator/HVAC) 18. Communications/Security 19. Communications/IT 20. Communications/Fire Alarm 21. Sequence of Construction 22. Site Access
TRACTION POWER	1. Consistency of Notes, Details and Sections 2. Layouts of Substation for Size and Access of Equipment 3. Location of Substations 4. Layout form Electrical Viewpoint 5. Equipment Arrangement 6. Design is in accordance w/the Applicable version of the NEC and Local Codes 7. Switchgear and other equipment have Suff Room to serv and check the drawout space for circuit breakers 8. Interface Requirements Established - civil	1. Consistency of Notes, Details and Sections 2. Layouts of Substation for Size and Access of Equipment 3. Location of Substations 4. Layout form Electrical Viewpoint 5. Equipment Arrangement 6. Design is in accordance w/the Applicable version of the NEC and Local Codes 7. Switchgear and other equipment have Suff Room to serv and check the drawout space for circuit breakers 8. Interface Requirements Established - civil 9. Exterior and Interior AC and DC Cables for Mech Continuity 10. Cable Trays, Bus Ducts, and light fixtures are Coord with Air Ducts and Mech Features 11. Ground Grids, Grounding and Bonding 12. Size of Power Co. AC Service is Coordinated 13. Conduits/Duct Banks Cable Tray properly sized. Sufficient Space Capacity.	1. Consistency of Notes, Details and Sections 2. Layouts of Substation for Size and Access of Equipment 3. Location of Substations 4. Layout form Electrical Viewpoint 5. Equipment Arrangement 6. Design is in accordance w/the Applicable version of the NEC and Local Codes 7. Switchgear and other equipment have Suff Room to serv and check the drawout space for circuit breakers 8. Interface Requirements Established - civil 9. Exterior and Interior AC and DC Cables for Mech Continuity 10. Cable Trays, Bus Ducts, and light fixtures are Coord with Air Ducts and Mech Features 11. Ground Grids, Grounding and Bonding 12. Size of Power Co. AC Service is Coordinated 13. Conduits/Duct Banks Cable Tray properly sized. Sufficient Space Capacity. 14. 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DRAWINGS AND SPECIFICATION REQUIREMENTS

	15% Conceptual Design Phase	30% Preliminary Design Phase	60% Design Phase	90% Design Phase	100% - PS& E
OVERHEAD CONTACT SYSTEM	1. Drawings for Clarity, Design continuity and Legibility 2. Line weight , lettering, abbreviations and note consistency 3. Cross section details 4. Sub-Grade or overhead utility crossings and OCS provisions 5. Side or center pole location for track section 6. Grade crossing, tunnel or over-bridge prov for pole/support, cont. grad. Span length and vert clear. 7. OCS Assemblies for double insulation provisions 8. Location of insulated overlaps w/TP substation loc and feeder pole stub-up prov. Cable length viability. 9. Location of Sec Insulators. Manual motorized disconnect. Switching modes with sectioning and oper plans. 10. Conductor electrical sizing and tension particulars	1. Drawings for Clarity, Design continuity and Legibility 2. Line weight , lettering, abbreviations and note consistency 3. Cross section details 4. Sub-Grade or overhead utility crossings and OCS provisions 5. Side or center pole location for track section 6. 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Walkout notes, height and stagger survey, areas of pole loc interference with terrain conditions and clearances 21. Sequence of Construction and Site Access 22. Integrated Coordination Required - Signaling System	1. Drawings for Clarity, Design continuity and Legibility 2. Line weight , lettering, abbreviations and note consistency 3. Cross section details 4. Sub-Grade or overhead utility crossings and OCS provisions 5. Side or center pole location for track section 6. Grade crossing, tunnel or over-bridge prov for pole/support, cont. grad. Span length and vert clear. 7. OCS Assemblies for double insulation provisions 8. Location of insulated overlaps w/TP substation loc and feeder pole stub-up prov. Cable length viability. 9. Location of Sec Insulators. Manual motorized disconnect. Switching modes with sectioning and oper plans. 10. Conductor electrical sizing and tension particulars 11. Pole location referencing, span length indication. 12. 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Walkout notes, height and stagger survey, areas of pole loc interference with terrain conditions and clearances 21. Sequence of Construction and Site Access 22. Integrated Coordination Required - Signaling System

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DRAWINGS AND SPECIFICATION REQUIREMENTS

	15% Conceptual Design Phase	30% Preliminary Design Phase	60% Design Phase	90% Design Phase	100% - PS& E
TRACKWORK	1. Plans that include the following: Typical Track Sections; transition spirals; super elevation; maximum gradient; track types; street grade crossings; turnout and crossover locations.	1. Plans that include the following: Typical Track Sections; transition spirals; super elevation; maximum gradient; track types; street grade crossings; and turnout and crossover locations.	1. Typical Track Sections 2. Track Drainage 3. Duct Bank and Manhole Interfaces 4. Maintenance of Traffic (LRT) 5. Contractor's Work, Storage and Access Areas 6. Horizontal Clearances 7. Track Centers 8. Design Speeds 9. Curvature 10. Transition Spirals 11. Minimum Lengths of Alignment Elements 12. Minimum Tangent Lengths (adj. to Curves, Turnouts and Station Platforms 13. Super Elevation 14. Maximum Gradient 15. Minimum Lengths of Vertical Curves and Tangents 16. Overhead Clearances 17. Track Types 18. Tie/Fastener Spacing 19. Direct Fixation Fastener Details 20. Embedded Track (Polymer Grout, etc.) 21. Street Grade Crossings 22. Guarding 23. I.J. Locations Coordinated 24. OTM Details 25. Ballasted Track 26. Turnout and Crossover Geometry 27. Turnout and Crossover Details 28. Turnout and Crossover Locations 29. Minimum Tangent Track Adjacent to Special Trackwork 30. Tie Layouts	1. Typical Track Sections 2. Track Drainage 3. Duct Bank and Manhole Interfaces 4. Maintenance of Traffic (LRT) 5. Contractor's Work, Storage and Access Areas 6. Horizontal Clearances 7. Track Centers 8. Design Speeds 9. Curvature 10. Transition Spirals 11. Minimum Lengths of Alignment Elements 12. Minimum Tangent Lengths (adj. to Curves, Turnouts and Station Platforms 13. Super Elevation 14. Maximum Gradient 15. Minimum Lengths of Vertical Curves and Tangents 16. Overhead Clearances 17. Track Types 18. Tie/Fastener Spacing 19. Approach Slabs 20. Direct Fixation Fastener Details 21. Track Charts 22. Embedded Track (Polymer Grout, etc.) 23. Street Grade Crossings 24. Guarding 25. I.J. Locations Coordinated 26. OTM Details 27. Ballasted Track 28. Turnout and Crossover Geometry 29. Turnout and Crossover Details 30. Turnout and Crossover Locations 31. Minimum Tangent Track Adjacent to Special Trackwork 32. Rail Bending Diagrams 33. Tie Layouts	1. Typical Track Sections 2. Track Drainage 3. Duct Bank and Manhole Interfaces 4. Maintenance of Traffic (LRT) 5. Contractor's Work, Storage and Access Areas 6. Horizontal Clearances 7. Track Centers 8. Design Speeds 9. Curvature 10. Transition Spirals 11. Minimum Lengths of Alignment Elements 12. Minimum Tangent Lengths (adj. to Curves, Turnouts and Station Platforms 13. Super Elevation 14. Maximum Gradient 15. Minimum Lengths of Vertical Curves and Tangents 16. Overhead Clearances 17. Track Types 18. Tie/Fastener Spacing 19. Approach Slabs 20. Direct Fixation Fastener Details 21. Track Charts 22. Embedded Track (Polymer Grout, etc.) 23. Street Grade Crossings 24. Guarding 25. I.J. Locations Coordinated 26. OTM Details 27. Ballasted Track 28. Turnout and Crossover Geometry 29. Turnout and Crossover Details 30. Turnout and Crossover Locations 31. Minimum Tangent Track Adjacent to Special Trackwork 32. Rail Bending Diagrams 33. Tie Layouts
NOTES	*1. Each of the requested documents noted in this service shall contain, at a minimum, 60% of the information required for each document.* *2. Each of the requested documents noted in this service shall contain, at a minimum, 90% of the information required for each document.* *3. 100% (Final Review) shall incorporate all revisions of the 90% phase review.* *4. All movable furnishings and artwork are considered to be independent of the architectural design project.* *5. All plan drawings, including enlarged plans and plan details, shall include north arrows.*				