Wave Streetcar Addendum No. 4 Memorandum, Issued 05/22/2017

DATE: May 22, 2017

TO: District Contracts/ Final Plans

FROM: Robert Bostian, Project Manager

COPIES: File

SUBJECT: **Addendum Number 4** - Letting (mo./yr.) 08/2017

Financial Project ID 421390-7-52-01 (Lead number only)

Proposal/ Contract ID E4R84

Federal Funds: ☐No ☒Yes Federal Aid No. D417-019-B

County: Broward State Road No.

Concurred by: Robert E Bost Date: 5-30-2017
Signature of Alternate Contracting Coordinator (John Olson (primary)/ Robert Bostian (alternate)) or Designee.

Legal Approval Date: 5-26-17
(Dawn Raduano)

Central Office Approval Date: 5-25-17
(State Construction Office – Suzannah Ray)

CONTRACT TIME REVISED: ☒No ☐Yes (If yes, _____ Calendar Days)

RFP, Cover Page

Revised as follows:

Financial Projects Number(s): 421390-7-52-01,
421390-8-52-01, 435202-1-52-01

RFP, Section I Introduction

Revised as follows:

Description of Work

The Project includes the final design and construction of all elements required for a fully functional Streetcar system, including integration, by the Design-Build Firm with the selected Streetcar vehicle. All of the work described in the RFP and RFP Attachments is to be included as Bid Alternative 1~~, the Project Base Concept.~~ (Full Build-out). The work required for Bid Alternative 2 and Bid Alternative 3 is described in Section ~~VIII.A~~I.C.

The Wave Streetcar system will operate at-grade on a fixed rail embedded in the street, sharing the existing roadway right-of-way with vehicular traffic, and will be powered by an OCS throughout most of the alignment. The alignment is approximately 2.8 miles in length with two guideways, one in each direction. The Wave Streetcar revenue service alignment extends from the southern terminus at S 16th Street and S Andrews Avenue to NE 6th Street between N Andrews Avenue and NE 3rd Avenue, primarily utilizing Andrews Avenue, SE 3rd Avenue, NE 3rd Avenue, and

Brickell Avenue for north/ south movement. The alignment utilizes ~~SE 18PthPSW 18th~~ Street, SE 6th Street, Las Olas Boulevard, S 2nd Street, N 4th Street, and NE 6th Street for east/ west movement. Figure I.-1 shows the Project route.

The streetcar will operate off-wire, powered by an onboard energy storage system (OESS), for the segment of the alignment that crosses the New River bascule bridge along SE 3rd Ave, as shown on Figure I.-1. The northbound off-wire operation extends from the end of the proposed station stop at S ~~Andrew/ 7PthP~~Andrews Avenue/ S 7th Street (the station stop shall have an OCS for charging the vehicle while at the station stop) to just prior to the proposed station stop at SW 2nd Street (similarly, the station stop shall have OCS for charging the vehicle while at the station stop).

7. Vehicle Maintenance and Storage Facility

~~The VMSF, as described in the RFP and all RFP Attachments, is intended to service the future expansion of the Wave Streetcar system. The Department has established several priorities in the form of bid alternatives to implement the Project and VMSF improvements. These alternatives begin with a Project Base Concept as Bid Alternative 1 and increase in scope until the full scope as described in the RFP and RFP Attachments is achieved with Bid Alternative 3. The alternatives in priority order are Bid Alternative 1 as being the lowest priority and Bid Alternative 3 as being the highest priority.~~

~~Bid Alternative 1 is the Project Base Concept and includes the implementation of work described in the RFP and all RFP Attachments.~~

~~**Bid Alternative 2** includes everything included in Bid Alternative 1 (Project Base Concept), plus the design and construction of the VMSF loop track along SW 18PthP Court and SW 1PstP Avenue as designated in the RFP and all RFP Attachments.~~

~~**Bid Alternative** 3 includes everything included in Bid Alternative 1 (Project Base Concept) and Bid Alternative 2, plus the purchase and installation of a wheel truing machine as designated in the RFP and all RFP Attachments.~~

C. Bid Alternatives

The Department has established three (3) priorities in the form of bid alternatives to implement the Wave Streetcar project. These alternatives begin with a Project Full Build-out as Bid Alternative 1, as described in the RFP and RFP Attachments, and decrease in scope until the minimum scope is achieved, as described below, with Bid Alternative 3. The alternatives in priority order are Bid Alternative 1 as being the highest priority and Bid Alternative 3 as being the lowest priority.

Bid Alternative 1 (Priority No. 1) includes the Design and Construction of all of the work described in the RFP and all RFP Attachments (Full Build-out).

Bid Alternative 2 (Priority No. 2) includes all of the work described in Bid Alternative 1 as defined in the RFP and RFP Attachments, except the work associated with the design and construction of the following elements:

1. Wheel Truing Machine

- Do not furnish and install the wheel truing machine. Note: This item will only remove the wheel truing machine. All related and required infrastructure design and construction work, including but not limited to the maintenance pit, electrical, and other structural work shall remain as part of Bid Alternative 2.

2. Photo-Voltaic Electrical Power System

- Do not furnish and install a Photo-Voltaic Electrical Power System. Exclude all the required infrastructure, appurtenances, and connections for the Photo-Voltaic Electrical Power System.

3. SE 3rd Avenue Bridge Tongue and Jaw Locks

- Substitute mechanical locking systems with Tongue and Jaw locks on the SE 3rd Avenue Bridge.
- Alignment of the bascule span deck and streetcar tracks at the joint between the two bascule leaves shall be maintained with a pair of tongue and jaw locks. Locks shall be of a robust design that limits differential vertical movement of the deck and streetcar track as traffic crosses the bridge and that minimizes wear to the bearing surfaces. Span tongue and jaw locks shall be designed to meet the RFP loading, deflection, and streetcar track alignment criteria. The system shall consist of a jaw assembly fabricated at the toe end of the far leaf Main Girder with top and bottom shimmable shoes which mate with a solid forged steel and a tapered tongue assembly located at the near leaf to allow for incremental engagement and fully seated operation of the span.

4. PLC Monitoring as part of the Integrated Bridge Control System on the SE 3rd Avenue Bridge

- Do not furnish and install the PLC monitoring as part of the integrated bridge control system on the SE 3rd Avenue Bridge.

5. Decorative Paving at All Station Platforms

- Substitute the station platform decorative concrete surface finish with standard concrete pavement withbroom finish in accordance with FDOT Standard Specification and ADA requirements.

6. Automated Vehicle Location (AVL) Systems

- Do not furnish and install an AVL system. The Passenger Information System (PIS) shall use data from the TWC to provide real time vehicle location updates to the PIS software.

7. Landscaping along the Alignment

- Do not furnish and install landscaping along the streetcar alignment. Note: Only plants and trees are eliminated along the alignment. Sod remains as required along the alignment. Landscaping remains at the VMSF.

8. Full Build-Out of 2nd Floor Office Space

- Do not construct the full build-out of the 2nd floor office space. Note: This item excludes the design and construction of the wall partitions and furniture for offices on the second floor as shown in Figure I.-3. All related and required infrastructure design and construction work, including but not limited to structural, mechanical, plumbing, and electrical, to provide for the full build-out of the 2nd floor office space, shall remain as part of Bid Alternative 2. The Design-Build Firm shall demonstrate how the design will provide for the full build-out of the 2nd floor office space using dashed lines labeled "future offices".

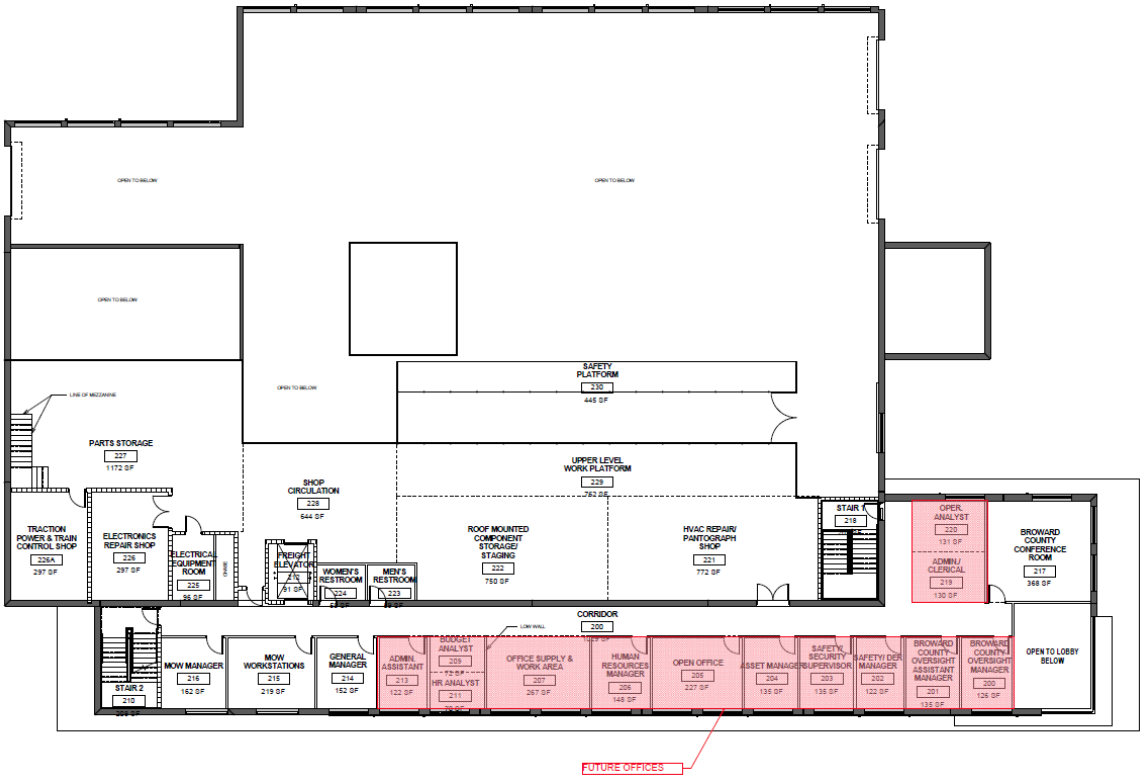


Figure I.-3 – Bid Alternative 2

Bid Alternative 3 (Priority No. 3) includes everything in Bid Alternative 1 as defined in the RFP and RFP Attachments, reduced by Bid Alternative 2 and further reduced by the following items:

1. The VMSF Yard and Loop Track

- The design of the VMSF yard track shall provide for storage and operations for the fleet size of twelve (12) streetcar vehicles; however, the construction of the yard shall provide storage and maximize operations for the five (5) initial streetcar vehicles. The tracks shall be able to be expanded to accommodate the storage and operations for the future fleet size of twelve (12) streetcar vehicles, without interrupting the routine operations and circulation patterns of the streetcar vehicles in the yard. The Design-Build Firm shall design the yard so that during the operations phase there is no interference with streetcar vehicles departing or arriving from the mainline. All switches, including those connected to the future phase track, will be provided as part of this Bid Alternative 3. The Design-Build Firm shall demonstrate how the yard layout would accommodate the future fleet expansion and operations using dashed lines

labeled "future tracks". Figure I.-4 below depicts the work to be removed as part of Bid Alternative 3.

- Do not include the VMSF loop track connecting the yard track at the south end of the VMSF on West 18th Court to two proposed tracks on SW 18th Street, including the new crossover configuration depicted in Figure I.-4.

2. VMSF Building 3rd Service Bay

- Do not construct the VMSF Building 3rd Service Bay. Note: This item excludes the construction of the building which encloses the 3rd Service Bay. All related and required infrastructure design and construction work, including but not limited to mechanical, plumbing, fire protection, electrical, systems, and other structural work shall remain as part of Bid Alternative 3; including sizing said equipment to accommodate a future expansion of the 3rd Service Bay as depicted in Figure I.-4.

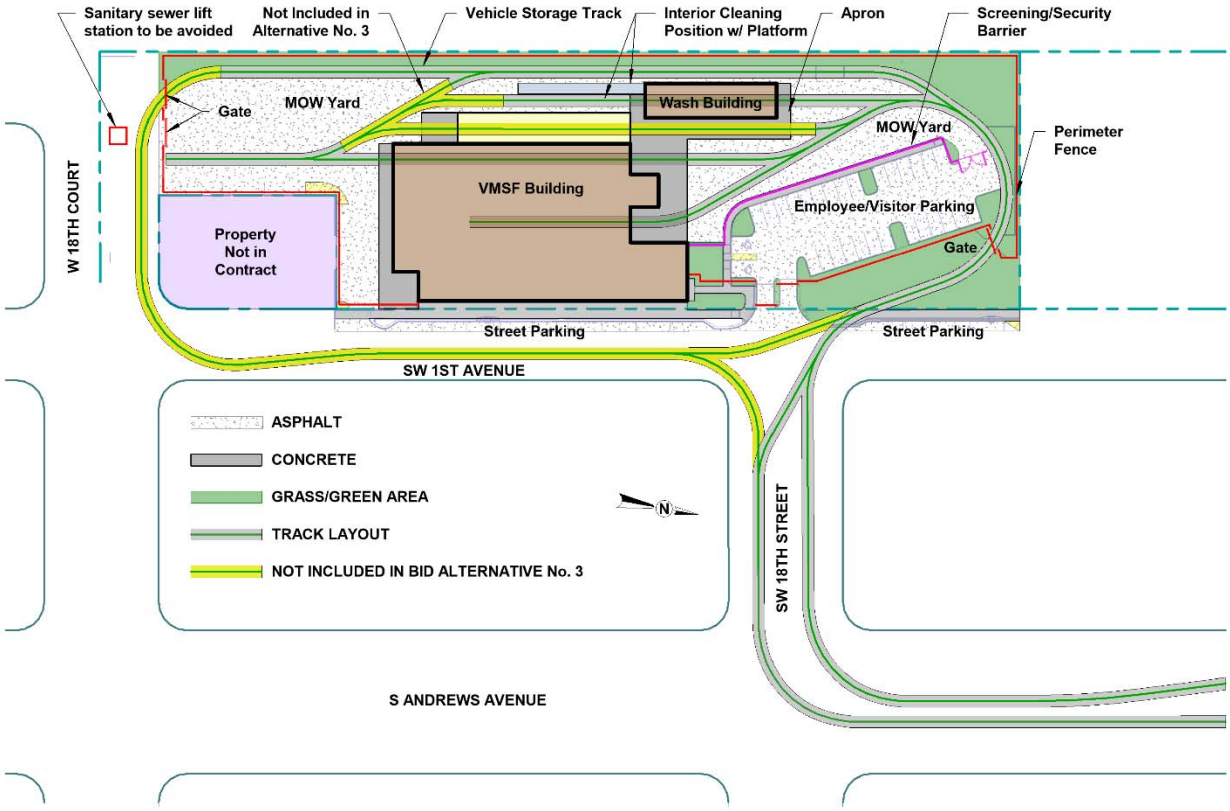


Figure I.-4 – Bid Alternative 3

3. Power Switch Machines/ Alignment

- Substitute power switch machines with hand throw/ manual switch machines on SE 6th Street and at the intersection of Las Olas and SE 3rd Avenue. **Note:** All Switch boxes and conduits shall be sized, and designed and constructed with the capability to change from the hand throw/ manual switches to power switches without impacting normal operations. Point detection and point locking shall remain as part of Bid Alternative 3.

4. Power Switch Machines/ VMSF

- Substitute power switch machines with hand throw/ manual switch machines at the VMSF, except for one switch Y21 as shown on Figure I.-5. **Note:** All Switch boxes and conduits shall be sized, and designed and constructed with the capability to change from the hand throw / manual switches to power switches without impacting normal operations. Point detection and point locking shall remain as part of Bid Alternative 3.

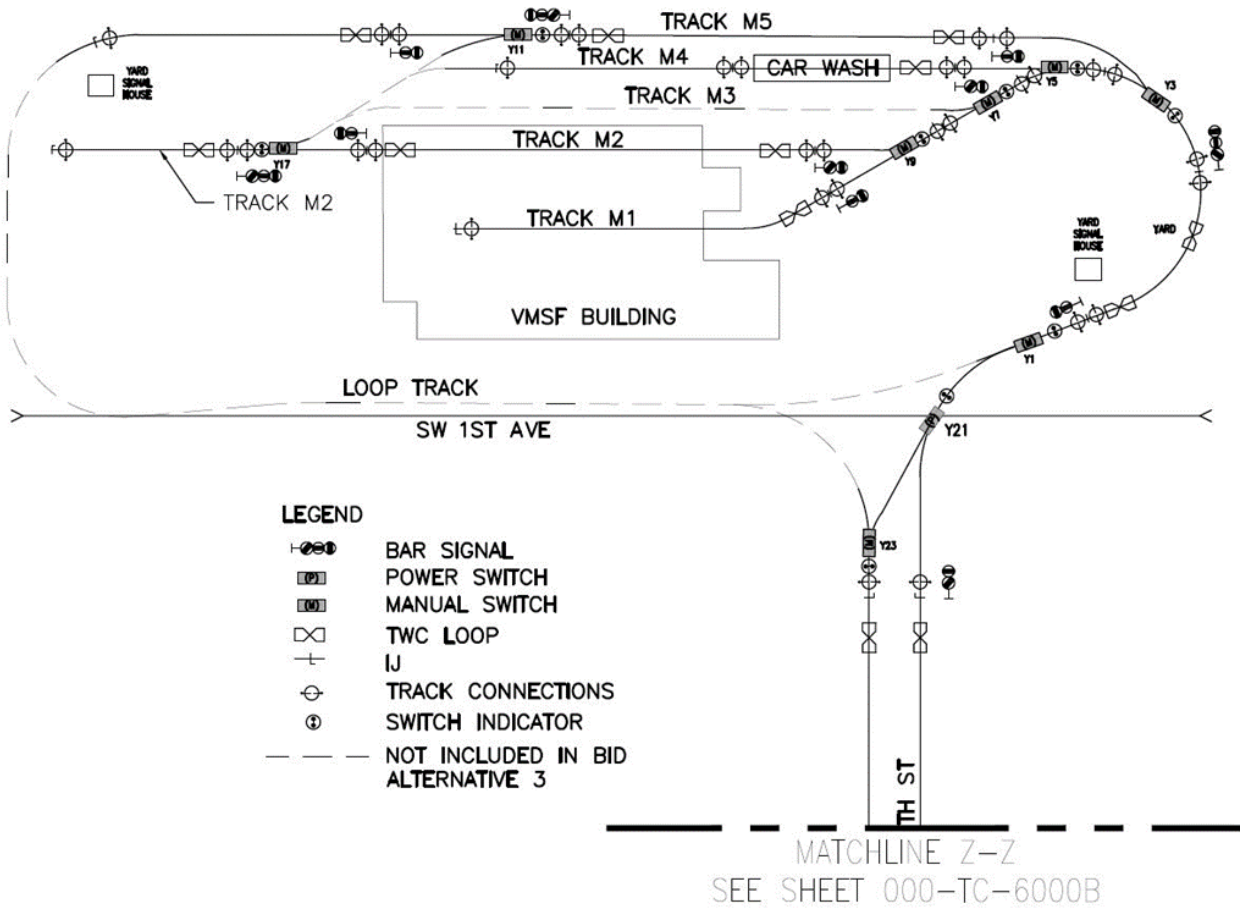


Figure I.-5 – Bid Alternative Diagram 3

RFP, Section II Schedule of Events

Revised as follows:

Table II-1: Schedule of Events

Date	Event
06/05/2017	Technical Proposals due in District Four Office by ~~1~~2:00 ~~p.m.~~pm local time.

RFP, Section VI.M.3.a. Traffic Control Requirements

Revised as follows:

6) Intersections

b) LTLC's for intersection work shall be completed in one continuous operation between 10:00 PM, Friday and 4:00 AM Monday (54 hour maximum); and

1) In the event that the Design-Build Firm does not complete the required work in a 54 hour period for major intersections; the Design-Build Firm shall restore the intersection and open for through traffic by 6:00 AM Monday morning~~.~~ at no additional cost to the Department.

RFP, Section VII.C. Evaluation Criteria

Revised as follows:

The Department shall evaluate the written Technical Proposal by each Design-Build Firm. The Technical Proposal will be evaluated based on the full build-out, Bid Alternative 1, of the Project as described under Section I, Description of Work. The Design-Build Firm shall not discuss or reveal elements of the price proposal in the written proposals. A technical score for each Design-Build Firm will be based on the following criteria:

RFP, Section VII.D. Final Selection Formula

Revised as follows:

The Bid Alternative priorities are as follows:

Bid Alternative	Priority
~~3~~1	1
2	2
~~1~~3	3

The Department intends to award the contract to the responsive Design-Build Firm with the lowest adjusted score for the highest priority bid alternative below the established funding limits. The funding for the Project is established at $114,000,000. If the Design-Build Firm with the lowest adjusted score for the highest priority Bid Alternative with a Bid Price Proposal below $114,000,000 is the same firm for the next highest priority Bid Alternative above the established funding, the Department has the option of allocating additional funds and accepting the next highest Bid Alternative. In the event that all Bid Price Proposals for Bid Alternative ~~1~~3 exceed the established funding amount, the Department reserves the right (based on the availability of additional funds) to consider the Bid Price Proposals for Bid Alternative ~~1~~3 and factor the Adjusted Scores based on those Bid Price Proposals.

RFP, Section VIII.A. Bid Price Proposal

Revised as follows:

A. Bid Price Proposal

The Department has established ~~several~~three (3) priorities in the form of bid alternatives to implement the Wave Streetcar ~~improvements~~project. These alternatives begin with a Project ~~Base Concept~~Full Build-out as Bid Alternative 1~~ and increase in scope until the full scope~~ , as described in the RFP and RFP Attachments, and decrease in scope until the minimum scope is achieved, as described below, with Bid Alternative 3. The alternatives in priority order are Bid Alternative 1 as being the ~~lowest~~highest priority and Bid Alternative 3 as being the ~~highest~~lowest priority.

Bid Alternative 1 ~~is the Project Base Concept and~~ includes the ~~implementation~~Design and Construction of all of the work described in the RFP and all RFP Attachments~~.~~ (Full Build-out).

Bid Alternative 2 includes ~~everything included~~all of the work described in Bid Alternative 1 ~~(Project Base Concept), plus all of~~as defined in the RFP and RFP Attachments, except the work associated with the design and construction of the ~~VMSF loop track along SW 18PthP Court and SW 1PstP Avenue, as designated in the RFP and all RFP Attachments.~~following elements:

1. Wheel Truing Machine

   - Do not furnish and install the wheel truing machine. Note: This item will only remove the wheel truing machine. All related and required infrastructure design and construction work, including but not limited to the maintenance pit, electrical, and other structural work shall remain as part of Bid Alternative 2.

2. Photo-Voltaic Electrical Power System

   - Do not furnish and install a Photo-Voltaic Electrical Power System. Exclude all the required infrastructure, appurtenances, and connections for the Photo-Voltaic Electrical Power System.

3. SE 3rd Avenue Bridge Tongue and Jaw Locks

   - Substitute mechanical locking systems with Tongue and Jaw locks on the SE 3rd Avenue Bridge.
   - Alignment of the bascule span deck and streetcar tracks at the joint between the two bascule leaves shall be maintained with a pair of tongue and jaw locks. Locks shall be of a robust design that limits differential vertical movement of the deck and streetcar track as traffic crosses the bridge and that minimizes wear to the bearing surfaces. Span tongue and jaw locks shall be designed to meet the RFP loading, deflection, and streetcar track alignment criteria. The system shall consist of a jaw assembly fabricated at the toe end of the far leaf Main Girder with top and bottom shimmable shoes which mate with a solid forged steel and a tapered tongue assembly located at the near leaf to allow for incremental engagement and fully seated operation of the span.

4. PLC Monitoring as part of the Integrated Bridge Control System on the SE 3rd Avenue Bridge

   - Do not furnish and install the PLC monitoring as part of the integrated bridge control system on the SE 3rd Avenue Bridge.

5. Decorative Paving at All Station Platforms

   - Substitute the station platform decorative concrete surface finish with standard concrete pavement withbroom finish in accordance with FDOT Standard Specification and ADA requirements.

6. Automated Vehicle Location (AVL) Systems

   - Do not furnish and install an AVL system. The Passenger Information System (PIS) shall use data from the TWC to provide real time vehicle location updates to the PIS software.

7. Landscaping along the Alignment

   - Do not furnish and install landscaping along the streetcar alignment. Note: Only plants and trees are eliminated along the alignment. Sod remains as required along the alignment. Landscaping remains at the VMSF.

8. Full Build-Out of 2nd Floor Office Space

   - Do not construct the full build-out of the 2nd floor office space. Note: This item excludes the design and construction of the wall partitions and furniture for offices on the second floor as shown in Figure I.-3. All related and required infrastructure design and construction work, including but not limited to structural, mechanical, plumbing, and electrical, to provide for the full build-out of the 2nd floor office space, shall remain as part of Bid Alternative 2. The Design-Build Firm shall demonstrate how the design will provide for the full build-out of the 2nd floor office space using dashed lines labeled "future offices".

Bid Alternative 3 includes everything ~~included~~ in Bid Alternative 1 ~~(Project Base Concept) and Bid Alternative 2, plus the purchase and installation of a wheel truing machine as designated in the RFP and all~~ as defined in the RFP and RFP Attachments, reduced by Bid Alternative 2 and further reduced by the following items:

1. The VMSF Yard and Loop Track

   - The design of the VMSF yard track shall provide for storage and operations for the fleet size of twelve (12) streetcar vehicles; however, the construction of the yard shall provide storage and maximize operations for the five (5) initial streetcar vehicles. The tracks shall be able to be expanded to accommodate the storage and operations for the future fleet size of twelve (12) streetcar vehicles, without interrupting the routine operations and circulation patterns of the streetcar vehicles in the yard. The Design-Build Firm shall design the yard so that during the operations phase there is no interference with streetcar vehicles departing or arriving from the mainline. All switches, including those connected to the future phase track, will be provided as part of this Bid Alternative 3. The Design-Build Firm shall demonstrate how the yard layout would accommodate the future fleet expansion and operations using dashed lines labeled "future tracks". Figure I.-4 depicts the work to be removed as part of Bid Alternative 3.
   - Do not include the VMSF loop track connecting the yard track at the south end of the VMSF on West 18th Court to two proposed tracks on SW 18th Street, including the

new crossover configuration depicted in Figure I.-4.

2. VMSF Building 3rd Service Bay

   - Do not construct the VMSF Building 3rd Service Bay. Note: This item excludes the construction of the building which encloses the 3rd Service Bay. All related and required infrastructure design and construction work, including but not limited to mechanical, plumbing, fire protection, electrical, systems, and other structural work shall remain as part of Bid Alternative 3; including sizing said equipment to accommodate a future expansion of the 3rd Service Bay as depicted in Figure I.-4.

3. Power Switch Machines/ Alignment

   - Substitute power switch machines with hand throw/ manual switch machines on SE 6th Street and at the intersection of Las Olas and SE 3rd Avenue. **Note:** All Switch boxes and conduits shall be sized, and designed and constructed with the capability to change from the hand throw/ manual switches to power switches without impacting normal operations. Point detection and point locking shall remain as part of Bid Alternative 3.

4. Power Switch Machines/ VMSF

   - Substitute power switch machines with hand throw/ manual switch machines at the VMSF, except for one switch Y21 as shown on Figure I.-5. **Note:** All Switch boxes and conduits shall be sized, and designed and constructed with the capability to change from the hand throw / manual switches to power switches without impacting normal operations. Point detection and point locking shall remain as part of Bid Alternative 3.

RFP Attachment E, SE 3rd Avenue Bridge Rehabilitation Criteria, Section 3.2Span Locks and Centering Devices

Revised as follows:

~~The~~Mechanical span lock ~~system and centering devices~~systems shall meet the following requirements and include the following features:

1. Each span lock shall be independent and shall be a complete stand-alone system.
2. The span lock actuator equipment shall be accessed by way of access doors in the sidewalk and from access platforms below the sidewalks. Access doors shall be fabricated from stiffened aluminum construction and include engineered gas lifters, automatic hold-open features, slam locks, locking feature with removable key, recessed handle, and stainless steel hardware. The access platform floor shall consist of a solid aluminum plate. Provide manual means of pulling the lock bars accessible through the sidewalk access hatch.
3. Forward guides and receivers shall be mounted in the web of the end floorbeams, with access to adjust the shims from the toe ~~side~~front of the end floorbeams with the bascule leaves partially raised.
4. Lock bars, guides, receivers, actuator machinery, support weldments shall be of robust construction, designed to meet the RFP loading, strength, deflection, and streetcar alignment requirements.

5. Guides and receivers shall include shoes with shims for initial and periodic adjustment. Shims shall be slotted for convenient adjustment and include keepers.
6. The span locks shall accommodate maximum lateral and vertical bridge misalignment of 0.~~25~~5 inches between the bascule leaves with tapers on the ends of the lock bars and bearing shoes. The bearing shoes in the forward and rear guides shall include features to guide the lock bar as it is driven. The bearing shoes on the receivers shall include side clearances to accommodate lateral misalignment.
7. Bearing shoe geometry shall minimize edge loading of the lock bar on the shoes as the main girders deflect under traffic. Shoes shall include a cylindrical surface.
8. Moving parts shall be lubricated with grease with lubrication ports and lines directed to stations conveniently located on the access platforms.

- ~~Lock bars shall be fabricated from steel forgings and guide and receiver shoes from hard bronze. Lock bars shall have a Brinell hardness a minimum of 25 points higher than that of the bearing shoes.~~

9. ~~Lock bar actuators shall consist of electric linear actuators or electric motors with brakes, fully enclosed gear reduction, links and cranks.~~ Fluid power systems, such as hydraulic cylinders or hydraulic motor systems, are not permitted. ~~The actuator machinery shall be connected to the lock bar linkage system with clevis pins for quick disconnect. Actuators shall drive or retract the lock bar in no more than 5 seconds. Provide manual means to operate the actuator, such as a hand crank or wheel, with convenient access from the access platform.~~

- ~~Provide limit switches to disable primary operation when manual operation is in use. Provide limit switches to detect lock bar fully-driven and fully-retracted positions.~~
- ~~Guide and receiver shoes shall be fabricated from hard bronze and supported on steel weldments incorporated into the end floorbeams of the two bascule leaves.~~

RFP Attachment E, SE 3rd Avenue Bridge Rehabilitation Criteria, Section 4 Electrical Power and Controls

Revised as follows:

A summary of requirements is as follows:

1. Provide a new electric service as needed to power the new bridge electrical equipment, including transformers, switches, upstream distribution, service entrance equipment as required by the RFP and FPL, etc. Coordinate with FPL as needed.

~~1.~~2. Electrical service to the bridge shall be 480/277Vac, 3 phase. Furnish and install a new main disconnect switch, meter can, and fused disconnect switch in accordance with the requirements of Florida Power and Light.

RFP Attachment E, SE 3rd Avenue Bridge Rehabilitation Criteria, Section 4.1 Electrical Service

Revised as follows:

4.1 ELECTRICAL SERVICE ~~ENTRANCE~~

Remove the existing service, including transformers, pole, weatherhead, wiring, meter, etc., as

well as upstream distribution, to accommodate other work proposed for the site. Provide temporary power via generators, transformers, temporary service points, etc. to maintain the systems operational where required. Coordinate with FPL as needed.

The electrical service entrance equipment shall include a service rated non-fused disconnect switch, a meter socket and CT enclosure, and a fused disconnect switch.

RFP Attachment E, SE 3rd Avenue Bridge Rehabilitation Criteria, Section 6.3 Control Relays and Plug-In Relays

Revised as follows:

17. If a bypass of a fault is available, a momentary key-operated selector switch should be enabled indicating the availability of the operation. The PLC will log the use of any bypass switch. Use reset logic at the end of each bypass operation to turn-off the function. Make provisions for full safety interlock protection. In emergency mode, equipment must be capable of operating each leaf in sequence at 50% of full speed~~.~~ or, if single leaf operation is not possible, operate both leaves at 25% of full speed.

RFP Attachment E, SE 3rd Avenue Bridge Rehabilitation Criteria, Section 6.4 Operating Sequence

Revised as follows (inserted section title):

6.4 OPERATING SEQUENCE

RFP Attachment F, Technical Requirements for Bridge Construction, Section 465.5.4 Bolting

Revised as follows:

Preload for High Strength SAE Bolts and Studs: Tension bolts, cap screws and other threaded fasteners shall be as follows:

For permanent connections: $F_t = 0.75 \times A_t \times S_p$
For turned bolt connections: $F_t = 0.50 \times A_t \times S_p$

RFP Attachment F, Technical Requirements for Bridge Construction, Section 465.5.12.2 Movable Bridge Functional Checkout

Revised as follows:

Construction Requirements:

B. Tests

2. Acceptance Criteria:

c. Control Functions (testing both manual and automatic operations)

7) Span Locks:

a) Operate each span lock through one complete cycle and record, with chart recorder, motor power (watts) throughout the operation, record lockbar-to-guide and lockbar-to-receiver, clearances.
b) Operate each lock with hand crank ~~or manual pump~~ for one complete cycle.
c) Record time of operation, stroke, and maximum ~~operating and relief pressures~~ motor power for each lock bar ~~and power unit~~assembly.
d) Verify lock bar to guides and receiver clearances and parallelism.
e) Verify that there is no movement of the leafs caused by the operation of the span locks, when the locks are pulled and driven with the bridge fully seated.
~~f) Demonstrate hydraulic power unit fluid level and containment in all span positions.~~

RFP Attachment F, Technical Requirements for Bridge Construction, Section 465.5.13 Span Lock Assemblies

Revised as follows:

General Requirements

A. Furnish and install new ~~hydraulic operators for~~electric span lock assemblies including ~~power units~~, linear electric actuator, front and rear guide and shoe assemblies, receiver socket guide and shoe assemblies, shims, connection clevises and linkages, lubrication system, limit switches, integration into control systems, mounting bolts, and ~~cylinders~~supports.
B. Maintain the span locks in the fully engaged position (fully driven) whenever vehicle traffic is passing over the bridge.

Related Work

A. Coordinate work with adjacent structural, mechanical, electrical, and control system work. Reference specifications include movable bridge machinery, span lock assemblies, live load shoes, fasteners, and movable bridge ~~hydraulic~~drive systems.

Submittals

A. Provide Shop Drawings in accordance with FDOT Specification 105, including but not limited to:

1. Indicate adjustment tolerances, fits, finishes, profiles, sizes, fasteners and accessories. Indicate connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, erection tolerances, elevations, span lock power unit layout with component configuration, and details where applicable.
2. Indicate welded connections using standard AWS welding symbols.

3. With the Bascule Leaf Shop Fabrication and Alignment Procedure submit a procedure for establishing dimensional control and machining the floorbeams and brackets that interface with the span locks and centering devices.
4. Proposed procedure for the installation of span locks and centering devices after alignment and adjustment of Bascule Leaf live load shoes.

~~5.~~1. ~~Complete system schematic with component reference numbers matching reference numbers on the Plans.~~

~~6. Bill of Materials for all components of the span lock HPU's including a table of contents and manufacturers data cuts on all system components. Provide a Bill of Materials that includes all required elements and components of the span lock hydraulic system and associated equipment. Submit supporting details for any HPU item proposed to be custom fabricated. Reference numbers for the Bill of Materials to match those shown in the schematics of the Plans.~~

~~7.~~1. ~~Initial values for all adjustable components. Clearly indicate these values on the system schematic.~~

~~8. Hydraulic power unit layout indicating dimensions and placement of all system components (manifolds, reservoir, frame, electrical junction boxes, etc.). Provide a layout that details clearances between the HPU and adjacent structures, equipment, and walkways.~~

~~9.~~5. Detailed shop test procedure.

~~10. Names and certification numbers (Certified Fluid Power Technician, Specialist, or Engineer) of individuals proposed for hydraulic installation and startup.~~

~~11. Complete field piping layout and material data cuts for all plumbing and support devices including piping, tubing, flexible hose, hose ends, fittings, pipe and tube support devices, and all related hardware required for installation. Include details of proposed routing and length of fluid conductors with relation to the Span Lock HPU's and drive cylinders.~~

~~12. Factors of safety as required of these requirements for all hydraulic plumbing.~~

~~13.~~6. Paint material and painting procedures, including color identifications, surface preparation procedures and product specifications.

~~14.~~7. List of spare parts provided with manufacturer, model/ part numbers and quantity to be supplied.

~~15.~~8. As-Built measurements of the clearance between lock bar and guide shoes of the receiving, front and rear guides at the top and bottom of the lock bar. Submit the total shim thickness for each guide shoe after final alignment.

~~Qualifications~~

~~A. Qualification demonstrating certification of Certified Fluid Power Engineer and/or Certified Fluid Power Specialist from the Fluid Power Society.~~

~~B. Qualification demonstrating certification of Certified Hydraulic Technician or Certified Industrial Hydraulic Mechanics from the Fluid Power Society.~~

~~Materials~~

~~A.~~ Materials~~Hydraulic Locks~~

A. Linear Actuators

~~1.~~ Provide ~~span lock power unit pumps of a positive displacement type as shown on the Plans.~~

~~2. Locate air breathers so that no hydraulic fluid leaks from the unit as the Bascule Leaf rotates.~~

~~3. Provide quick disconnect connections with the cylinder hoses for removal and attachment of an auxiliary hydraulic hand pump for manual operation of the spanlock bar~~ linear electric actuators meeting the sizing requirements in the ~~event of hydraulic power unit failure. Furnish one hydraulic auxiliary hand-pump complete with hoses, connections, and oil supply and deliver to the Department for storage in the tender house. Provide a heavy plastic or wooden box for the auxiliary hand pump unit and spare parts for safe storage at the bridge.~~

~~4.~~1. ~~Provide lock system cylinders as shown in the Plans or of equal quality with~~ plans and herein: stroke ~~and~~length, bore ~~as shown in the Plans. Provide each cylinder fitted with adjustable pressure relief valves and configured for mounting as shown in the Plans. Provide cylinder rods made of ASTM A276 Grade 316 stainless steel, protected by suitable rubber boot covers. Paint cylinders with a shop applied epoxy enamel. As required, field touch-up paint following installation. Provide pressure test ports at both ends of the cylinders~~size, thrust, HP, speed, etc.

2. The actuator machinery shall be connected to the lock bar linkage system with clevis pins for quick disconnect. Actuators shall drive or retract the lock bar in no more than 5 seconds. Provide manual means to operate the actuator, such as a hand crank or wheel, with convenient access from the access platform.
3. Do not exceed the specified maximum motor horsepower unless approved by the engineer.
4. Provide linear actuators of a complete package, from a single OEM / manufacturer, to include all electrical motors, brakes, belts, pulleys, reducers, ball screws, rod ends, manual cranks with safety disconnect, trunnions, trunnion mounting brackets and accessories. The motor must have class “F” insulation minimum and thermal protection.
5. Paint actuators and all mounted equipment with a factory finish intended for use in corrosive industrial applications. Provide storage compartment or clamp for the hand wheel at each actuator location if the wheel is not permanently attached to the actuator. Detail storage mechanism in the shop drawings. Refer to the plans for specific actuator requirements, including accessories. Coordinate details of the actuator hand wheel, manual electric drive and motor disconnect with the structural details for the access hand hole to make the hand wheel easily accessible to maintenance personnel.

B. Lock Bar Guide and Receiver Bushings

1. ~~: Provide~~ Lock bar guide and receiver bushings ~~as specified in the Plans.~~shall be of ASTM B22 Alloy C86300 High Strength Manganese Bronze. Minimum deformation limit (compression) ~~of~~shall be 55,000-PSI.

~~2. Provide an alignment coupler on the rod end of the span lock cylinder. Coupler push-pull load rated for 45-kips minimum, parallel misalignment of 1/8-inch and 10 degrees spherical rotation.~~

~~3. Lock System Hydraulic Valves: Mount the spanlock system relief valves and crossover valve module on the self-contained power unit.~~

C. Lock Bars

1. Lock bars shall be fabricated from steel forgings.
2. Lock bars shall have a Brinell hardness a minimum of 25 points higher than that of the bearing shoes.

D. Miscellaneous

1. Provide Materials as shown in the Plans and specified herein.

~~4.~~2. Provide limit switches for position confirmation of lockbar that are of the lever operated type. Provide two limit switches with each ~~cylinder~~linear actuator to sense the limits of travel.

~~5. Use ISO grade 68 hydraulic oil for the system. Provide anti-wear oil with oxidation stability and corrosion protection, provide air and water separation to prevent foaming and protect system from water damage. Ensure oil meets or exceeds the following industry specifications:~~

~~a. Viscosity, ASTM D445~~
~~b. Viscosity Index, ASTM D2270~~
~~c. Specific Gravity, ASTM D1298~~
~~d. Copper Strip Corrosion, ASTM D130~~
~~e. Rust Characteristics Procedure B, ASTM D665~~
~~f. Foam Sequence I, II, III, ASTM D892~~

~~6. Supply the following spare parts for the span lock hydraulic system:~~

~~a. Hydraulic Cylinder Assembly~~
~~b. High Pressure Hoses with Fittings~~
~~c. Complete power unit~~

~~Filters~~Provide limit switches to disable primary operation when manual operation is in use.

Construction Requirements

B. Span Lock Adjustment: Adjust Span Locks to the following conditions and tolerances:

1. Do not make the final adjustment of the lock bars until the live load shoes are properly adjusted, the elevations at the tip ends of the bascule girders are within 1/16-inch of one another, and the bridge is balanced within the final requirements detailed in these Technical Special Provisions.
2. Prior to installing the lock bar, place a straight edge vertically on the horizontal surface of the bronze bearings of the rear guide, front guide and the receiver to verify alignment. Ensure the straight edge contacts each of the shoes and the maximum allowable gap between the straight edge and the bronze bearings at any point is 0.003-inch.
3. Prior to installing the lock bar, place a straight edge horizontally on the vertical surface of the front guide and rear guide to verify alignment. Ensure the straight edge contacts each of the shoes and the maximum allowable gap between the straight edge and the bronze bearings at any point is 0.005-inch.
4. Ensure the position of the actuator relative to the lock bar is such that no more than 1/32-inch of offset misalignment and no more than ~~1/4~~¼ deg. angular misalignment exists at the connection to the lock bar with the actuator in either the fully

~~funcriven~~driven or fully retracted positions.

5. Initial installation of the actuator on the support must be performed with a minimum of ¼ inch reserve stroke extended from the actuator, or with other means of ensuring that the required final reserve stroke will be present after final shimming of the assembly. Install the components of the assembly in accordance with the approved procedure. Include the sequence of installation and the tolerance for actuator alignment with the installation procedure submittal.

~~5.~~6. Ensure the position of the actuator is such that there is an equal amount of reserve stroke remaining following operation in the driving and in the retracting directions.

~~6.~~7. Adjust span locks such that driving and/or pulling the locks causes no change in the contact of the live load shoes.

~~7.~~8. Shim lock bars to obtain a total vertical clearance of ~~0.010/0.025-inch~~an RC6 fit between bar and guide/socket bushings. Clearance may vary between top and bottom faces of bar, but neither clearance can be less than 0.005-inch.

RFP Attachment F, Technical Requirements for Bridge Construction, Section 465.5.14 Tongue and Jaw Lock Assemblies

Revised as follows:

465.5.14 TONGUE AND JAW LOCK ASSEMBLIES

Tongue and jaw type configuration, also known as jaw locks, meet the following requirements and include the following features:

General Requirements

Jaw locks are commonly used on rolling-lift bascule bridges and are a passive system with no actuated components. The lock components are incorporated into the tip end of the bascule leaf main girders, with a “tongue” mounted on the tip of one main girder that overlaps and engages a “jaw” at the tip end of the opposite leaf and provides a single point of load transfer.

Jaw locks shall include the following features:

A. Tongues and support weldments, jaw bearing shoes and support weldments shall be of robust construction.
B. Provide means of initially and periodically adjusting the jaw upper and lower bearing shoes with shims. The shims shall be slotted for convenient adjustment and shall include keepers.
C. Tongues shall include a machined cylindrical surface for consistent line contact on the jaw upper and lower machined bearing shoes during engagement and while the main girders deflect under traffic.
D. Upper and lower jaw flanges of the main girder to receive the bearing shoes and main girder webs to receive the tongue shall be machined for proper alignment and fit-up.
E. Jaw locks shall act as lateral span guides (i.e. centering device) to realign the bascule leaves when the jaw locks engage. The span guide feature shall accommodate maximum lateral misalignment of 0.5 inches between the bascule leaves. Guides and/or receivers shall include machined bronze guide plates with end tapers and means to adjust side clearances with shims. The shims shall be slotted for convenient adjustment and shall include keepers. The portion of main girders to receive the guide plates and/or acts as

guides or receivers shall be machined for proper alignment and fit-up.

F. Tongues shall be fabricated from steel forgings and bearing shoes fabricated from hard bronze. Tongues shall have a Brinell hardness a minimum of 25 points higher than that of the bearing shoes.

G. Tongues shall be bolted to the main girder with high-strength turned bolts and bearing shoes bolted to the main girder with recessed cap screws.

H. Tongues and bearing shoes shall be lubricated with a spray or brush applied dry film lubricant.

I. Provide a means to access the jaw locks from the sidewalk for inspection, lubrication, and clearance measurement (e.g. hinged portion of the sidewalk plate at the tip end of both bascule leaves.) Access doors shall be fabricated from stiffened aluminum plate, and shall include heavy duty hinges, recessed T-handles with pawl-type lock latch and keyed lock, and stainless steel hardware.

Related Work

A. Coordinate work with adjacent structural, mechanical, electrical, and control system work. Reference specifications include movable bridge machinery, live load shoes, and fasteners.

Submittals

A. Provide Shop Drawings in accordance with FDOT Specification 105, including but not limited to:

1. Indicate adjustment tolerances, fits, finishes, profiles, sizes, fasteners and accessories. Indicate connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, erection tolerances, elevations, and details where applicable.
2. Indicate welded connections using standard AWS welding symbols.
3. With the Bascule Leaf Shop Fabrication and Alignment Procedure submit a procedure for establishing dimensional control and machining the floorbeams and brackets that interface with the locks.
4. Proposed procedure for the installation of tongue and jaw lock assemblies after alignment and adjustment of Bascule Leaf live load shoes.
5. Complete system schematic with component reference numbers matching reference numbers on the Plans.
6. Initial values for all adjustable components. Clearly indicate these values on the system schematic.
7. Paint material and painting procedures, including color identifications, surface preparation procedures and product specifications.
8. List of spare parts provided with manufacturer, model/ part numbers and quantity to be supplied.
9. As-Built measurements of the clearance between shoes at the top and bottom of the tongue assembly. Submit the total shim thickness for each guide shoe after final alignment.

Materials

A. Tongue – Fabricate from Solid ASTM A668 Class K Steel Forgin with 250 Min Brinell Hardness,

B. Guide/Jaw Shoes – Fabricate from ASTM B22 Alloy C86300 Bronze with Min. 225 Brinell Hardness.
C. Top and Bottom Shoes - Fabricate from ASTM B22 Alloy C86300 Bronze with Min. 225 Brinell Hardness.
D. Bolts – Use ASTM A449 High Strength Turned Bolts

Construction Requirements

A. Installation

1. Coordinate with related work.

a. Coordinate with live load shoe work.
b. Install locks per approved procedure.
c. Do not field cut or alter structural members without authorization of the EOR with concurrence from the Department.
d. After erection, prime welds, abrasions, bolts, and surfaces not shop primed.
e. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

B. Span Lock Adjustment: Adjust Span Locks to the following conditions and tolerances:

1. Do not make the final adjustment of the Jaw shoes until the live load shoes are properly adjusted, the elevations at the tip ends of the bascule girders are within 1/16-inch of one another, and the bridge is balanced within the final requirements detailed in these Technical Special Provisions.
2. Shim Jaw shoes to obtain a total vertical clearance of an LC6 fit between adjacent shoes.

RFP Attachment G, Transit Criteria, Revision Record

Revised as follows:

REV. DATE	REV. NO.	SECTIONS AFFECTED	COMMENTS
05/22/17	3	Sections 2, 3,4, and 7	Addendum 4

RFP Attachment G, Transit Criteria, Section 2.1.3 Special Trackwork

Revised as follows:

For alignment requirements through special trackwork areas, refer to Section 3.4~~.2~~ of these requirements.

RFP Attachment G, Transit Criteria, Section 3.4.2 Switch Machines

Revised as follows:

- Hand throw/ manual switch machines will be of the spring/ toggle type and will ~~not normally~~ require point detection ~~or~~and point locking; and

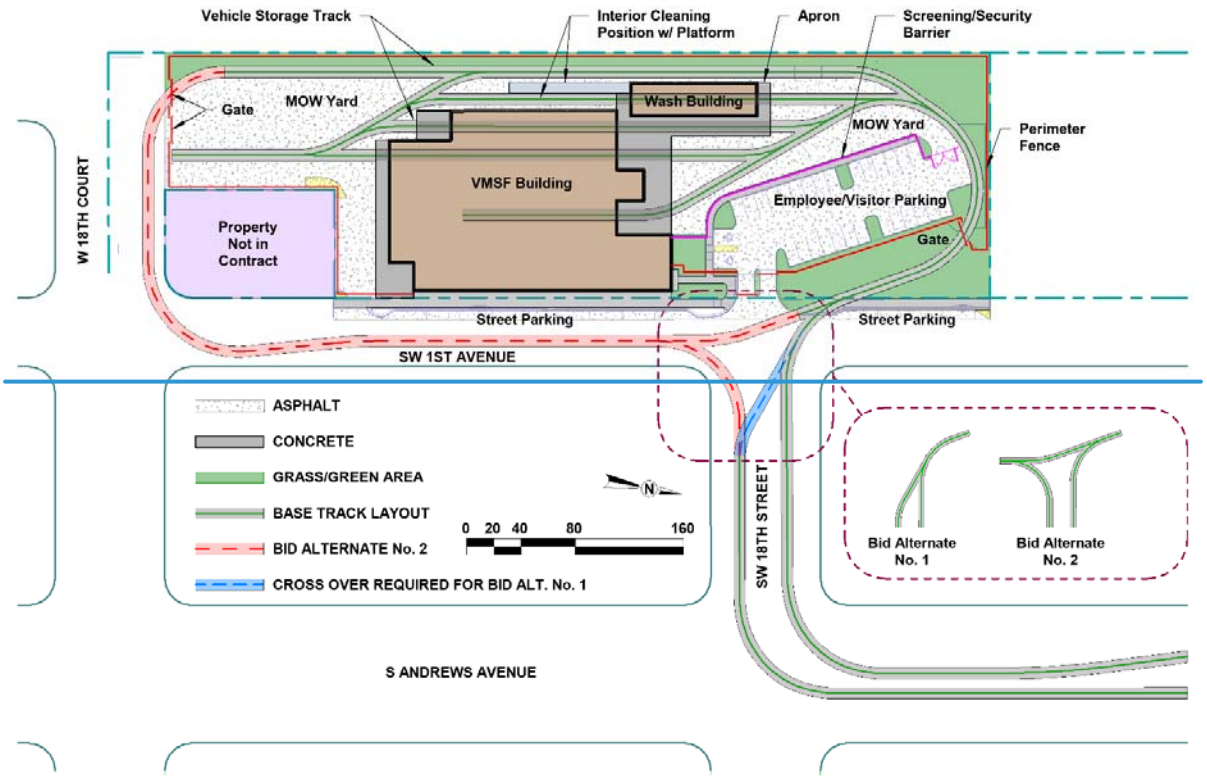
RFP Attachment G, Transit Criteria, Section 4.2.4 Yard Track Layout

Revised as follows:

The Design-Build Firm shall design and construct the loop track and the SW 18th Street double tracks similar to the suggested concept plan shown in Figure 4-1. ~~All work associated with the design and construction of the loop track along SW 18th Court and SW 1st Avenue shall be included as part of Bid Alternative 2.~~

- Streetcars moving from the storage tracks to the VMSF Repair, Service & Inspection (S&I), or Wheel Truing ~~(if included)~~ positions for maintenance or testing purposes.

There shall be three tracks located within the VMSF. One track will serve as the maintenance bay track, and the second track will serve as the inspection track with a pit and mezzanine~~.~~, and the third track will be utilized as vehicle storage.



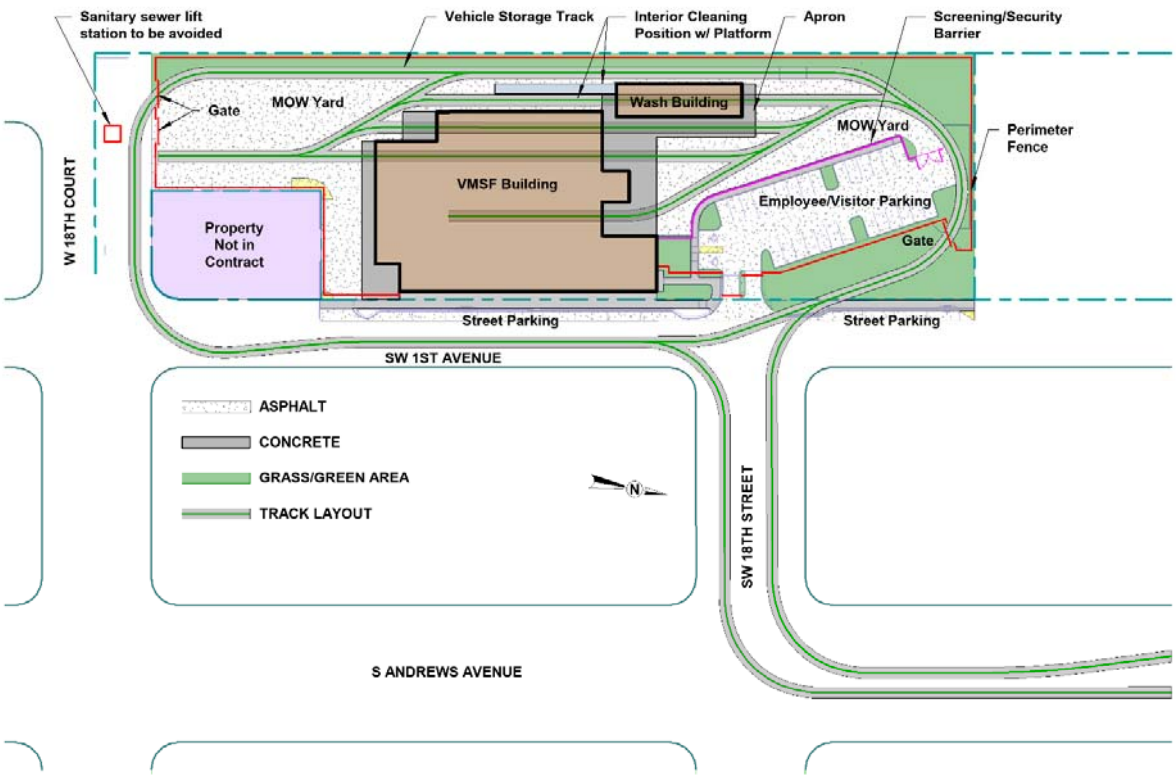


Figure 4-1: Site Layout

RFP Attachment G, Transit Criteria, Section 4.3.28.2 Specialty Equipment

Revised as follows:

Wheel truing equipment ~~(Bid Alternative).~~

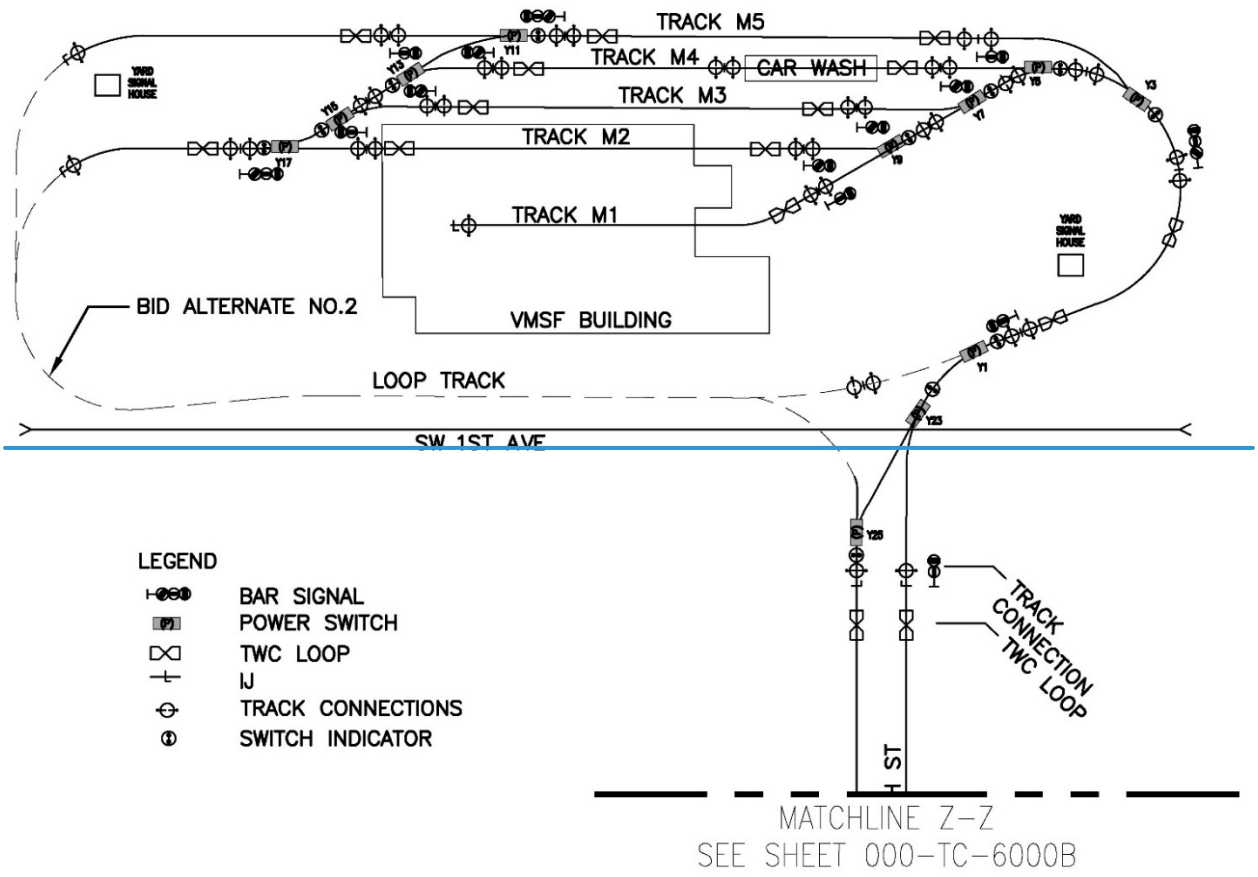
RFP Attachment G, Transit Criteria, Section 7.3 Functional Design Requirements

Revised as follows:

The VMSF Yard train control system shall be fully signaled in both directions and include powered switches, track circuits, bar signals and TWC loops~~. Two (2) VMSF Yard diagrams are shown below within this document; Diagram 1a (Base) and Diagram 1a (Alternate 2 – Loop).~~, as shown in Figure 7-1.

RFP Attachment G, Transit Criteria, Section 7.4 Operational Design Requirements

Revised as follows:


TRACK M5
TRACK M4
CAR WASH
TRACK M3
TRACK M2
TRACK M1
YARD SIGNAL HOUSE
BID ALTERNATE NO.2
VMSF BUILDING
LOOP TRACK
SW 1ST AVE
LEGEND
BAR SIGNAL
POWER SWITCH
TWC LOOP
IJ
TRACK CONNECTIONS
SWITCH INDICATOR
TRACK CONNECTION
TWC LOOP
ST
MATCHLINE Z-Z
SEE SHEET 000-TC-6000B

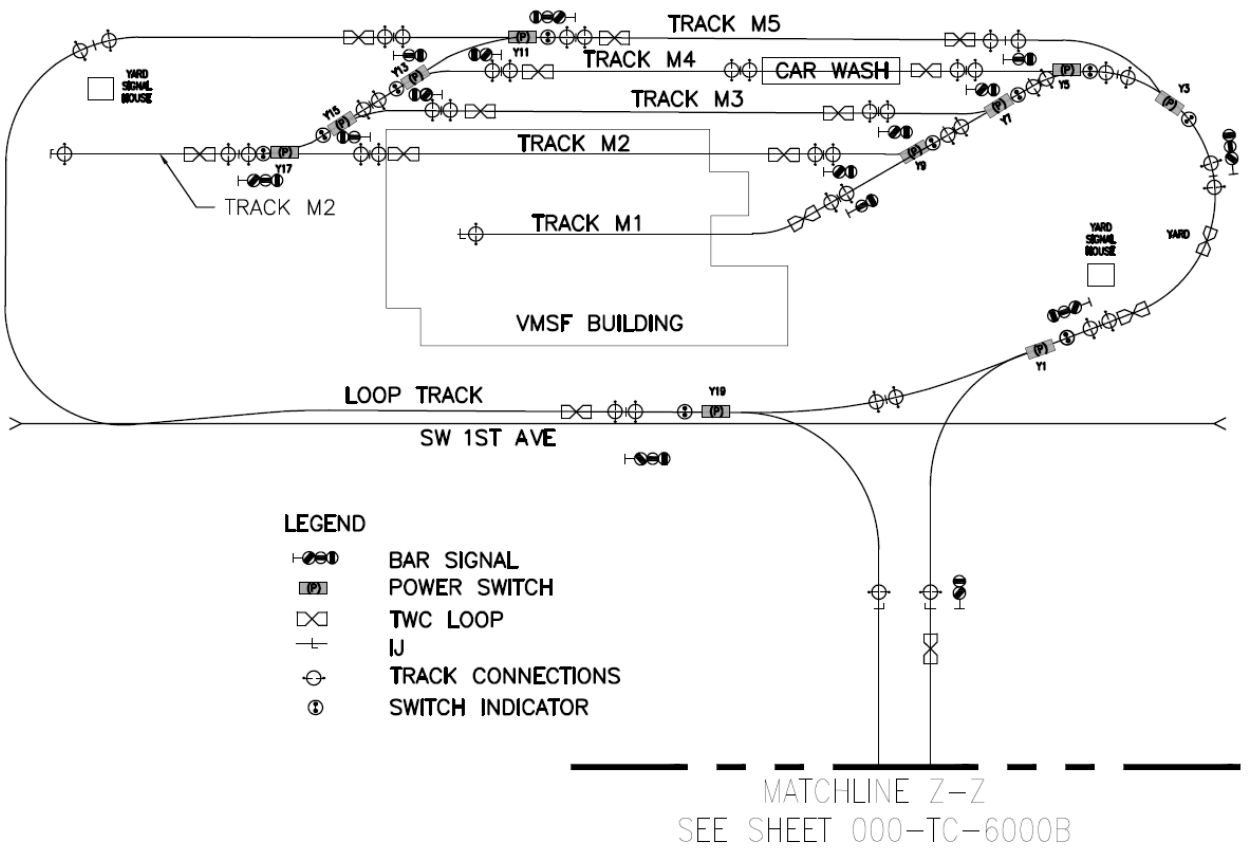
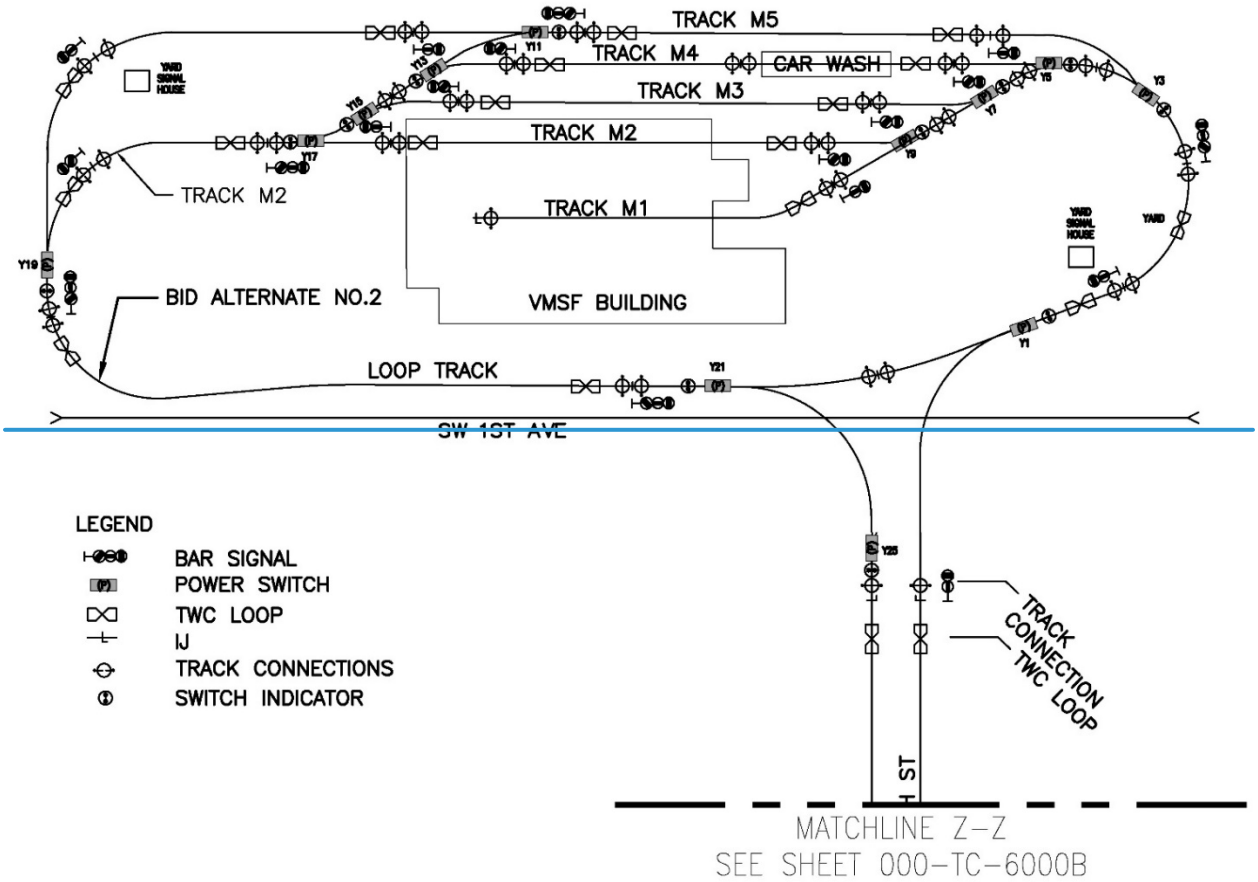


FIGURE 7-~~1a – BID ALT #~~1: Signal System Overview – Full Build-Out



~~**FIGURE 7-1a – BID ALT #2: Signal System Overview**~~

RFP Attachment H.2., Volume 2A Systems Traction Power Supply and Distribution, Signal and Route Control, Fare Collection, Systems Integration, Section 811.2.9.2.12 Switch Machines for Embedded Track

Revised as follows:

811.2.9.2.12 ~~Power~~ Switch Machines for Embedded Track

~~Provide a~~All switch ~~machine~~ machines provided shall be that can be mounted in an earth-box between the two running rails. All switches shall be furnished with either a manual or powered switch throw mechanism. Switch mechanisms shall have hydraulic dampers, point detection.

Each switch throw mechanism shall be furnished with four (4) throwing irons. The access for throwing the switch shall be located between the gauge. A locking device will be incorporated in the design of the cover plate to prevent unauthorized movement of the switch points.

Boxes and switch throw mechanisms shall be insulated from the turnout for signaling circuits.

An operating and maintenance manual shall be furnished for each switch throw mechanism.

A. Power Switch Machine (Electro-hydraulic~~:~~):

1. Operational voltage of motor: 230 V AC single phase.
2. Provide a power switch machine with the following features:

    a. Locking Non-Trailable.
    b. Adjustable point opening, minimum range 1.25 to 4.00 inches.

~~B. Point position detected with contactless proximity switches.~~

~~a.~~c. Manually settable with an external lever.
~~b.~~d. Lever shall be bar type, not part of machine.
~~c.~~e. Motor power shall be cut whenever the lever is installed.
~~d.~~f. Maximum force moment of 300 foot-pounds required to manually set machine with lever.

B. Manual Switch Machine:

1. Manual switch mechanisms shall use the same box as the Power Switch (manual mechanisms shall use adapters inside the box).
2. Manual switch throw mechanisms shall have minimum installation height available for selected mechanism.
3. Switch throw mechanisms shall be trailable at max speed 15 MPH.
4. Adjustable point opening, minimum range 1.25 to 2.50 inches.
5. Lever shall be bar type, not part of machine.

C. Switch Operating temperature: Minimum range minus 10 to ~~120~~140 degrees F.
D. Earth Box:

1. Provide an earth-box which has been designed for the Design-Build Firm-provided switch machine:

    a. Conduit entrance of the earth-box shall be coordinated with the design of the switch machine so that no field modifications are required to either the earth-box or the switch machine.
    b. Design to allow for storm water drainage.
    c. Earth-box shall maintain rail-to-earth isolation of the running rails.
    d. Earth box shall not affect the operation of the track circuits.
    e. Provide with a cover that can be removed in sections.
    f. Throw and lock rods can be accessed without exposing the machine.
    g. Machine can be accessed without exposing the throw and lock rods.
    h. Traffic Rating: HS-20.

~~D.~~E. Point Detection:
~~E. Provide normal and reverse point detection for spring switches with facing point movements.~~

1. Point position shall be detected with contactless proximity switches.
2. Provide normal and reverse point detection for all switches.

RFP Attachment Z, Operations and Maintenance Plan, Section 3.4.1 VMSF Shop and Administration Buiding

Revised as follows:

- **Wheel Truing:** The facility will include ~~utility infrastructure and provisions for expansion to accommodate~~ an in-ground wheel-truing lathe. The wheel-truing lathe will be located to allow drive through from the Repair Position.

RFP Attachment Z, Operations and Maintenance Plan, Figure 4 VMSF Layout

Revised as follows:

Figure updated

RFP Section V.A.1 Manuals and Guidelines

35. Florida Department of Transportation Facilities Design Manual (Topic No. 625-020-016)

Document attached