285 Toll Communications

285.1 General Requirements

(1) At least two physically redundant fiber optic infrastructure paths must be provided to establish communications between a toll site and the Turnpike's tolls data centers.

(2) A toll-fiber optic lateral must be provided for each TEB and OCC.

(3) Coordinate with Turnpike Tolls Design for the tolls communications requirements of existing buildings that are re-used.

(4) All TEBs and OCCs must be directly connected to the backbone.

285.2 Communications Cabinets

285.2.1 Toll Equipment Building Toll Communications Cabinet

(1) One toll communications cabinet must be provided in each TEB.

(2) Wall-mounted toll communications cabinet, rack, fiber distribution panel(s) and all associated accessories and hardware must be provided as shown in ***Exhibit 283-16*** and ***Exhibit 285-1***.

(3) See ***Toll Facility TSP Library***, TEB Package, TSP Section for Toll Communications Cabinet for TEB Sites for additional requirements.

285.2.2 Roadside Tolling Cabinet Site Outdoor Communications Cabinet

(1) One OCC must be provided at each RTC site with the components and accessories shown in ***Exhibit 285-2***. See ***Toll Facility TSP Library***, RTC Package, TSP Section for Outdoor Communications Cabinet at RTC Toll Sites for additional requirements.

(2) Provide underground infrastructure supporting the outdoor communications cabinet power and interconnectivity as shown in RTC site enlarged electrical site plans described in ***FDM 282.3.1 Item (2)***.

(3) Provide two (2) factory-installed side-mounted 240V, 1-phase AC units each. Each unit must be shop-mounted on different sides of the enclosure (never on the same side or on the front or back). Design the cooling system such that one cooling unit will keep the interior enclosure temperature from exceeding 85 degrees Fahrenheit on a sunny day with outside ambient temperature of 95 degrees Fahrenheit with the electronic equipment inside the enclosure. See below for the heat rejection for each component in the OCC:

(a) SCADA.....56BTU/h

(b) Network Video Recorder (NVR).....341 BTU/h

(c) WAN Switch.....2,047 BTU/h

(d) RTC UPS.....500 BTU/h

(e) OCC UPS.....600 BTU/h

285.3 Tolls Fiber Allocation

(1) Fibers allocated to the Turnpike must be for exclusive use by the Turnpike. The Turnpike allocated fibers must be “patched or spliced through” and must not traverse District/tolling agency switches.

(2) Splice vault (SV) installations must take into consideration that both ITS and Tolls may need to co-locate splice enclosures in the same SV, for the purpose of extending the backbone or for providing lateral connections. ITS and Tolls fiber laterals must be labeled accordingly.

(3) For Districts or other tolling agencies, the Turnpike must be provided with Department (District other than the Turnpike) and/or tolling agency fiber optic strands to communicate with the Turnpike Tolls Data Center(s).

(4) When the Department (District other than the Turnpike) and/or tolling agency engages in construction such that new backbone fiber optic cable is installed, Turnpike Toll Systems requires two buffer tubes (specifically Red and Black) comprising twenty-four (24) strands for their exclusive and irrevocable right to use, as part of the single cable trunk, in a contiguous strand count (96, 144, 288, etc.). All fiber must be SMFOC. All fiber splicing must be fusion splicing.

(5) When the Department (District other than the Turnpike) and/or tolling agency engages in construction such that existing backbone fiber optic cable is used, tolls must be granted a minimum of four (4) fiber strands for their exclusive and

irrevocable right to use. All fiber must be SMFOC. All fiber splicing must be fusion splicing.

285.4 Toll Fiber Optic Lateral and Infrastructure

All TEBs and OCCs must fully connect to the backbone using underground conduits with a toll fiber optic lateral as described herein:

(1) Each toll fiber optic lateral connection consists of a minimum of two (2) 2-in conduits (one spare). The connection must be made from new or existing splice vaults and must terminate in a rack mounted, pre-terminated fiber optic distribution panel (patch panel) located inside the toll communications cabinet in the TEB or in the OCC.

(2) Toll fiber optic lateral and conduits must be routed to the TEB or OCC via directional bore or open trench installation with pull boxes as required. The conduit must enter the TEB or OCC via the ITS interface pull box located in the toll site. Conduits must be stubbed out five (5) feet beyond the edge of the concrete sidewalk prior to sidewalk construction. The conduits must terminate as shown in ***Exhibit 285-3***.

(3) Each tolls fiber optic lateral connection must be made via a single 48-strand SMFOC [two (2) 24-strand cables must not be provided] composed of blue, orange, green, and brown buffer tubes.

(4) For existing buildings without a fiber optic lateral connection or other available raceways, provide conduits that must enter the building via the same wall penetrations as used for the gantry and loop conduits.

(5) Standard route marker(s) (SRM) must be provided for all toll fiber optic laterals in accordance with ***Standard Specifications, Section 630***. Label each SRM with the following, “TURNPIKE TOLLS SunWatch Operations (877) 786-3375”, for Turnpike projects.

285.5 Splicing and Termination of Tolls Fiber Optic Lateral

Each fiber optic lateral connection must be configured as follows:

(1) All lateral fiber strands must be fusion-spliced in the splice vault enclosure as shown in ***Exhibit 285-4***. Use splice trays with a minimum capacity of 24, one tray for red backbone buffer and one tray for black backbone buffer.

(2) Black buffer backbone must be spliced to lateral blue buffer going North or East. Black buffer backbone must be spliced to lateral orange buffer going South or West.

(3) When red buffer backbone is spliced, it must be spliced to lateral green buffer going north or east and to the lateral brown buffer going south or west.

(4) Patch panel cassettes must be placed such that Position A is blue buffer, Position B is orange buffer, Position C is green buffer, and Position D is brown buffer.

(5) All 48 FDP fiber strands must be fusion spliced to factory polished, pre-terminated pig tails in cassette assemblies, connectorized as SC duplex pairs. The patch panel will be mounted in the toll communications cabinet located inside the TEB or in the OCC.

(6) There must be one patch panel (including all associated accessories) for each toll fiber optic lateral.

(7) For each patch panel, jumper all ports with SC to SC single mode duplex fiber optic jumpers so as not to interrupt data communications. Jumpers must be the minimum length necessary and neatly routed in cable management with no sharp bends.

285.6 Leased Line Digital Communication

The following infrastructure must be provided for all toll facilities regardless of whether a leased circuit is actually procured:

(1) Two (2) 2-in conduits (inclusive of pull ropes, splice vaults, pull boxes, etc.) must be provided between the Telco's nearest splice vault or point of presence and each toll site. The conduit must be installed as depicted in ***Standard Plans, Index 630-001*** and ***Standard Specifications, Section 630***.

(2) A dedicated 24-in x 36-in pull box must be provided at each toll site for the Telco leased line connectivity as shown in ***Exhibit 285-5***.

(3) If there is no physically redundant (at least two paths) layer 1 fiber optic infrastructure to establish communications between a toll site and the Department's tolls data centers, provide a notice to the Department to procure a leased line at least 200 days prior to primary walk-through.

(4) For TEB sites provide the following:

(a) 24-in x 48-in wall space within the building for Telco use. The plywood finished wall space must be painted gray or white and all equipment must be placed such that space is conserved for future equipment.

(b) An orange colored 120 Volt, 20 Amp duplex receptacle adjacent to the proposed Telco equipment space for Telco use. The 120 VAC receptacles must be served from the critical power system.

285.7 Impacting Existing Tolls Communications

(1) Communications must be maintained at existing toll facilities as follows:

(a) Until a replacement toll system is installed, commissioned, tested, and actively collecting tolls.

(b) Preserve master/slave relationships until the slave communications dependencies are not required.

(2) All new toll fiber optic lateral spliced to an active fiber optic backbone will cause an outage to the Department's data communications system. The Maintenance of Communications (MOC) documents for each project must include information relating to toll site related outage as described herein:

(a) An outage request must be submitted to the Department's CEI for approval for all planned outage work. The Department must have five (5) working days to review the outage request and respond to the Contractor. The outage request must contain the following requirements at a minimum:

- Outage Request Contact Name:
- Caller Call Back Name/Cell #:
- Project FPID:
- Planned Date:
- Planned Date #2:
- Planned Start Time:
- Planned Stop Time:
- Reason:
- Prime Contractor/Cell #:
- ITS Subcontractor/Cell #:
- Splice Subcontractor/Cell #:
- Location (MP and Facility):
- Location #1:
- Location #2:

(b) To minimize impacts to the Department's existing data communications system, proposed work requiring communications outages (i.e., fusion splice, etc.) must be performed between 10:00 pm and 5:00 am.

(c) Once the new tolling systems are collecting tolls as described, the existing toll fiber optic lateral must be fully removed from end to end between the splice vault and the patch panel. The existing fibers between toll facilities must also be removed in their entirety.

(d) Once a toll fiber optic lateral is removed, the backbone must be fusion spliced color to color in the existing splice enclosure and splice tray where that toll fiber optic lateral was removed. Identify how this can be accomplished without causing an outage to the Department's data communications system. If an outage is unavoidable, ensure that the plans and specifications call for outage notification in accordance with the requirements stated above.