

GUIDELINES

HAS/PDC/Design Division
Houston, Texas

Project Title
Proj./CIP No.

(These Guidelines are basic minimum criteria to be met in preparing the final specifications for this section, which is the responsibility of the Designer/Contractor/Installation Team.)

SECTION 270553

IDENTIFICATION AND LABELING OF COMMUNICATION INFRASTRUCTURE

(REV. 09-28-2023-SJS)

1 INTRODUCTION

1.1 General

1.1.1 As the Houston Airport System (HAS) continues to develop both its private and commercial interests, it is essential that an effective telecommunications infrastructure be developed and maintained to ensure the support of any and all services which rely on the electronic transport of information. To effectively administer these assets requires a disciplined effort that begins with a systematic practice and procedure for capturing useful data regarding inventories that might be conducted at any point during the lifecycle of a project.

1.2 Objective

1.2.1 The objective and intent of this standard is to provide uniform GIS inventory and documentation practices/guidelines for any person or party directly involved with data collection, administration and/or accountability of the HAS IT telecommunications infrastructure or related systems.

1.3 Intended Use

1.3.1 Any designer, consultant or engineering entity contracting with the Houston Airport System to inventory/document the telecommunications physical and network configurations will need to refer to this document for clarification regarding standard operating procedures. The guidelines given here provide for effective documentation of the HAS telecommunications network. The result of following this standard will be a telecommunications infrastructure that is well documented and easily managed by the administrator.

Note: For specific criteria concerning GIS/GPS datum, refer to the OASIS Standards document maintained by direction under the HAS Planning Design and Construction department. Said datum is not specific to the Information Technology department and thus will not be replicated here.

1.4 Life of the Standard

1.4.1 This standard is a living document. The criteria contained in this standard are subject to revision without notice, as warranted by advances in administration techniques related to telecommunications technology.

1.4.2 This manual is the property of the Houston Airport System. The contents of this manual are proprietary and should not be copied or disclosed without prior written permission of the Houston Airport System. Any variation from the standards in this manual should be addressed by the Houston Airport System IT GIS contact listed below for approval prior to implementation on a project.

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2 GENERAL

2.1 Scope

2.1.1 This standard specifies the GIS inventory and documentation requirements for the Houston Airport System IT Telecommunications Infrastructure, Network Engineer and associated information databases. Areas of the infrastructure and/or databases to be inventoried, administered, monitored or maintained include:

- a) terminations for the telecommunications media located in work areas, telecommunications closets, equipment rooms, and entrance facilities;
- b) equipment/devices hosting physical terminations;
- c) telecommunications media (cable) between terminations;
- d) pathways (spans) between terminations that contain the media;
- e) spaces (structures) where terminations are located;
- f) bonding/grounding as it applies to telecommunications;
- g) geophysical plant networks i.e., manhole, handhole, pullbox, cabinet, pedestal, building access points;
- h) splice enclosures.

NOTE: Whereas this document provides an outline and overview of the GIS documentation process, the following Telecommunications Infrastructure Specifications for the Houston Airport System should be referenced for detailed administrative requirements:

2.1.2 This standard also specifies requirements for the collection, organization, and presentation of as-built data.

2.1.3 In addition to providing requirements and guidelines for a traditional paper-based documentation system, this standard will serve as the reference for all associated computer-based administration tools.

Contracting parties, by this standard, are required to attend an HAS-IT coordination meeting prior to commencement of any documentation effort; the scope of work and project expectations will be discussed at length. You will be given additional direction as required and any useful maps, diagrams, numerical sequences, etc. will be provided to you at this time.

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3. REFERENCES

The latest published version at the date of contract applies to all references. Related Documents include all Drawings and General Provisions of the Contract. In Conflict between contract documents, the most stringent will be applied.

Related Specifications: Use these Specifications for all related work not specifically covered in this specification.

1. Section 270526: Telecommunication Grounding and Bonding
2. Section 270528: Interior Communication Pathways
3. Section 270543: Exterior Communication Pathways
4. Section 270553: Identification and Labeling of Communication Infrastructure
5. Section 271100: Communication Cabinets and Equipment Rooms
6. Section 271300: Backbone and Riser Media Infrastructure
7. Section 271500: Horizontal Media Infrastructure
8. Section 272100: Data Communication Network Equipment
9. Section 272200: PC, Laptop, Servers and Equipment
10. Section 275113: Audio Communication System
11. Section 281300: Access Control System
12. Section 232313: Video Surveillance Control and Management System

4. DEFINITIONS

4.1 General

3.1.1 This section contains definitions of terms, acronyms, abbreviations, and formats that have special technical meaning or that are unique to the technical content of this standard.

4.2 Definitions

4.2.1 For the purposes of this standard, the following definitions apply:

assignment

A unique designation assigned to a person who is expected to use the circuit, equipment, service, etc., serving a particular work area. Examples of an assignment: telephone number, a name, a circuit number or a logical address.

backbone

Network of copper and fiber connections between termination panels/switches.

cable

An assembly of one or more copper conductors or optical fibers within an enveloping sheath, constructed so as to permit use of the conductors singly or in groups.

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campus

The buildings and grounds have legal contiguous interconnection. (TIA)

equipment

Generally, an endpoint for cable lengths; any hardware device/component. Used to terminate cable for cross-connection or interconnection to other cables or devices.

grounding electrode conductor

The conductor used to connect the grounding electrode to the equipment grounding conductor and/or to the grounded conductor of the circuit at the service equipment or at the source of a separately derived system.

handhole (HH)

A structure similar to a small maintenance hole in which cable can be pulled, but not large enough for a person to fully enter to perform work.

identifier

An item of information that links a specific element of the telecommunications infrastructure with its corresponding record. (TIA)

linkage

A connection between a record and an identifier or between records.(TIA)

location

A position occupied or available for occupancy within a site or infrastructure network.

manhole (MH)

A vault located in the ground or earth as part of an underground duct system and used to facilitate placing, establishing connections and maintenance of cables as well as placing associated equipment, in which it is expected that a person will enter to perform work. (TIA).

outlet box (telecommunications)

A metallic or nonmetallic box mounted within a floor, wall or ceiling and used to hold telecommunications outlet/connectors or transition device. (TIA)

outlet / connector (telecommunications)

A connecting device in the work area on which horizontal cable or outlet cables terminates. (TIA)

pathways

A raceway, conduit, sleeve, or exposed location, for the placing of telecommunications cable that links telecommunications spaces together.

record

The permanent documentation of installed telecommunications infrastructure obtained from as-builts.

record drawing (as-built)

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The documentation of measurements, location, and quantities of material work performed. May be in the form of marked up documents or other work order forms.

report

A presentation of a collection of information from various records.

site

Spatial location of an actual or planned structure or set of structures.

span

A raceway, conduit, sleeve, or exposed location, for the placing of telecommunications cable that links telecommunications spaces together.

splice

A joining of conductors meant to be permanent. (TIA)

splice box

A box, located in a pathway run, intended to house a cable splice.(TIA)

splice enclosure

A device used to protect a cable or wire splice.(TIA)

structure

Generally an endpoint for span lengths; i.e., manhole, handhole, cabinet, junction box, pedestal, building access point, communications rooms, work areas.

structure unit

A component of the structure; usually housing equipment i.e., cabinet, rack.

telecommunications

Any transmission, emission, or reception of signs, signals, writings, images, and sounds; that is, information of any nature by cable, radio, optical or other electromagnetic systems. (TIA)

telecommunications infrastructure

The components (telecommunications spaces, cable pathways, grounding, wiring and termination hardware) that together provide the basic support for the distribution of all telecommunications information.

telecommunications media

Wire, cable, or conductor used for telecommunications.

telecommunications space

Areas used for the installation and termination of telecommunications equipment and cable, e.g., telecommunications closets, work areas, false ceilings, and manholes/handholes.

termination position

A discrete element of termination hardware where telecommunications conductors are terminated.

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work area; work station

A building space where the occupants interact with telecommunications equipment.(TIA)

5 DOCUMENTATION CONCEPTS

5.1 General

5.1.1 This section describes the concepts of identifiers, records, linkages among records, and presentation of information necessary to administer infrastructure cable, spans and structures.

5.2 Identifiers

5.2.1 An identifier is assigned to an element of the telecommunications infrastructure to link it to its corresponding record. Identifiers shall be marked at the elements to be administered.

5.2.2 Identifiers used to access record sets of the same type shall be unique. For example, each identifier for each one of the set of cable records shall be unique. Unique identifiers across all types of telecommunications records are mandatory. For example, no cable record identifier should be identical to any pathway record identifier.

5.2.3 Labeling is the marking of an element of the telecommunications infrastructure with an identifier and (optionally) other relevant information. Labeling shall be accomplished in either of two ways: separate labels may be securely affixed to the element to be administered, or the element itself may be marked.

5.3 Records

5.3.1 A record is a collection of information about or related to a specific element of the telecommunications infrastructure.

5.3.2 Elements identified as required information and required linkages shall constitute the minimum requirements for these records. Specific information and other linkages suggest additional elements that may be useful to the administrative system, such as cable length.

5.3.3 Telecommunications records are typically used in conjunction with other records. For example, a user record or assignment may contain an identifier to the record of the cable that serves an individual's workspace. Conversely, a cable record may also contain an identifier for a user record or assignment.

5.3.4 By this standard, the Houston Airport System utilizes AutoCAD and ArcGIS as the software platforms by which all telecommunications infrastructure records and linkages are recorded and maintained.

5.4 Relationships

4.4.1 Relationships are the logical connections between identifiers and records. The records for infrastructure elements shall be interlinked. For example, in a cable record, termination port identifiers point to specific termination port records that contain additional information about each of the cable termination ports.

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5.5 Assignment

5.5.1 An “assignment” is a specific term of reference that allows the association of the end location, cable pairing record or termination port record with additional information. For example, an assignment such as a telephone number or circuit number can associate a user with elements of the telecommunications infrastructure. This aids in troubleshooting by identifying both the physical and logical connectivity from a single circuit assignment.

5.6 Presentation of Information

5.6.1 A typical documentation system includes labels, records, reports, drawings, and work orders. Reports compile and present information found in the records. Graphical information regarding the relationship of the telecommunications infrastructure to other infrastructures within the campus or site is presented in drawing format. Work orders document the operations needed to implement changes affecting the telecommunications infrastructure.

5.6.2 Reports present information selected from the various telecommunications infrastructure records. Reports may be generated from a single set of records or from several sets of interlinked records.

5.6.3 Drawings are used to illustrate different stages of telecommunications infrastructure planning and development. Generally, conceptual and installation drawings supply input to the record drawings that graphically document the telecommunications infrastructure. These record drawings as well as some equipment schedules and installation drawings (i.e., rack layouts) become part of the administration system documentation.

5.6.4 Conceptual drawings (i.e., one-line or riser diagrams) are used to illustrate the proposed design intent. They do not typically include all telecommunications infrastructure elements or identifiers and do not necessarily become part of the administration documentation.

5.6.5 Installation or bid drawings are used to document (graphically) the telecommunications infrastructure to be installed. They should illustrate relevant infrastructure elements and may also describe the means of installation. Identifiers may or may not be included on the drawings.

5.6.6 Record drawings (as-builts) graphically document the installed telecommunications infrastructure through floor plans, elevation, and detail drawings. These drawings may differ from installation drawings because of changes and specific site conditions. Key elements of the telecommunications infrastructure shall have identifiers assigned. The span/structure and wiring portions of the infrastructure each may have separate drawings if warranted by the complexity of the installation or the scale of the drawings.

5.6.7 ESRI (ArcGIS) formatted feature class and feature class layers graphically depict data in a spatial environment and are linked via physical relationship protocols established by the administrator through the utilization of software engineered towards GIS applications.

5.7 Work Orders (Symantec)

5.7.1 Work orders document the actions needed to implement changes affecting the telecommunications infrastructure as it was actually installed. The changes may involve several telecommunications components as well as other related systems. The Documentation Team utilizes Symantec software as its change-management notification platform. Typical Symantec tickets document actions such as moving a

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patch cord, installing a conduit, cross-connect or relocating an outlet box. A Symantec ticket may involve structures, spans, cable, splices, terminations, or grounding, either individually or in combination. A Symantec ticket should list both the personnel responsible for the physical action and those responsible for updating various portions of the documentation to assure its accuracy. *Prior to commencement of an action that would result in a change to any telecommunications infrastructure component or related system; a Symantec ticket should be submitted in accordance with departmental and operational requirements.*

5.8 Summary

5.8.1 This section has presented basic concepts of documentation for the Houston Airport System Telecommunications Infrastructure. The sections that follow specify the administration of each of the components of the infrastructure in greater detail.

6 HAS IT INFRASTRUCTURE STANDARDS FOR DOCUMENTATION

6.1 Data Collection and Administration Concepts

6.1.1 This section describes the documentation of assets within the administrative jurisdiction of the Houston Airport System - Public Safety and Information Technology department. As changes are made to the assets, affected labels, records, reports and drawings shall be updated or revised.

The following outline assumes that the contracting parties understand the GIS/GPS datum specifications and requirements as provided in the OASIS standards. Further, that the equipment to be used towards gathering the data has been configured accordingly.

6.2 STRUCTURES

- Manhole
- Handhole
- Pullbox
- Cabinet (Pole Mounted, Pedestal)
- Building Access
- Dog House
- Remote Location
- Entrance Facility
- Workspace
- Main Distribution Frame (MDF)
- Building Distribution Frame (BDF)
- Intermediate Distribution Frame (IDF)
- Point of Presence (POP)
- Pathway Transition
- Aerial Pole

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Identification

Each **Structure** has been assigned a unique GIS database identifier. This identifier serves as a primary-key for each database record. Each record contains additional fields and values relative to the feature identified by the primary-key.

All structure identifiers follow a specific schema; new structures must be identified accordingly. In the event that a determination cannot be made regarding the identification of a structure, please contact an HAS IT GIS representative prior to documenting.

All structures are identified through a numerical range with prefix characters specific to a respective airport campus, technology asset designation, and feature-category.

Airport Campus Characters:

IAH:	I
HOU:	H
EFD:	E

Asset Designation Character:

Technology:	T
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Feature-Category Characters:

Structure:	S
Pathway:	P
Equipment:	E
Cable:	C

Numerical Range:

0000 – 9999

Example:

ITS0054 (IAH Structure), **HTS0054** (HOU Structure), **ETS0054** (EFD Structure)

Manhole Numerical Range:

Note: When planning to identify newly constructed or newly placed HAS assets, the contractor is expected to coordinate with the HAS IT GIS staff prior to labeling. This action will account for all identifiers previously assigned and prevent duplications or omissions.

Labeling

Labeling should follow the identification schema and further be accomplished via an approved method described below.

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Newly constructed structures (manhole, handhole, pullbox, cabinet) will require that their identifiers be etched onto the lid or affixed with an appropriate label material. Manholes and handholes should be stamped on the lid itself, as well as the metal ring/material surrounding the opening; or the concrete foundation (topside). Utilize an appropriate chisel or stamp, or labeling device to accomplish the task.

The Technology Infrastructure group does not maintain the specification for labeling newly constructed structures (dog house, remote location, entrance facility, workspace, MDF, BDF, IDF, POP, Pole). These should be placarded according to current HAS Infrastructure specification. The Technology Infrastructure GIS identifiers (described in the previous paragraphs) relevant to these spaces and locations are preserved for GIS database record keeping purposes only. Contact an HAS Infrastructure representative for clarification on physical labels for architectural spaces.

Required Fields

Each structure requires that specific data be collected per unit. GPS equipment should be formatted to account for this information:

TELECOM_ID
COORD_X
COORD_Y
COORD_Z
AIRPORT
AGENCY
LID_TYPE
DEPTH_INCH
SPLICE_CLOSURE
SLACK_LOOP
GROUNDING
COMMENTS
BUILDING_NAME
LEGACY_ID
STRUCTURE_TYPE
STRUCTURE_SUBTYPE
HAS_LEVEL
LID_SIZE
PROJECT
COLLECTION_DATE
LID_SHAPE

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LID_MATERIAL

PROJECT_CLASS

GPS

Each manhole should be recorded as follows:

Single shots; taken on-center. Offset shots are acceptable for manholes not available to satellite coverage but these shots must be coordinated with an HAS-IT GIS contact prior to.

Supporting Documentation Deliverables

Additional documentation records are required to support GPS data. The documentation is as follows:

- Manholes and Handholes only

Digital photos – top (north to top of photo), north wall, west wall, south wall, east wall; for manholes not true to cardinal compass points adjust call-outs as necessary.

AutoCAD – butterfly diagram of manhole depicting pathway orientation, conduit layout, innerduct configurations, cabling locations, and cabling counts for each manhole unit in both .dwg 2010 or higher and .pdf formats; (See manhole AutoCAD butterfly exhibit; see also the OASIS standards for IT specific AutoCAD layering).

Video – 360 degree imagery of interior; .mpg format.

- Communication Rooms

AutoCAD – floorplan (where applicable) layouts of structure units depicting orientation, and/or configurations in both .dwg 2010 or higher and .pdf formats; (See AutoCAD communications room exhibit).

Spatial Data Deliverables

The entire manhole inventory should be delivered separately in ArcGIS feature class (version 10) format along with any records outlined in the ‘*Supporting Documentation*’ paragraph. This feature class (STRUCTURE) should contain the attribute values from the ‘Required Fields’ paragraph.

Special Instructions

None

6.2.4 Cabinets/Racks

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Identification

Each cabinet/rack has been assigned a unique campus identifier. All structure identifiers follow some specific schema; new structures must be identified accordingly. In the event that a determination can not be made regarding the identity of the structure, please contact the HAS IT GIS representative prior to documenting.

All cabinets are identified through a numerical range specific to its respective campus and should be prefixed with 'PC' (pedestal cabinet) or 'PM' (pole mounted cabinet). The ranges are as follows:

Example:

ITS0054.02.01

Translation: Cabinet or Rack in Room (Structure) ITS0054, row 02, column or position 01.

ITS0054.BB01

Translation: Backboard (plywood) 01 in Room (Structure) S103.1.

Note: Backboards tend to be randomly arranged within the structure and are usually not numbered according to wall orientation. Different identifiers are however assigned to each. Any one backboard could host a wide assortment of equipment; see EQUIPMENT for identifier schemas.

Note: Future expansion of rows should be a major consideration during identifier/labeling phase; numbering from low to high in the direction of any available space.

Labeling

Labeling should follow the identification schema and further be accomplished via the use of below specified labeling device or approved equivalent:

DYMO RhinoPRO 5000 Industrial Label Maker

¾" Flexible Industrial Strength Nylon label tape - yellow

Labels should be affixed to the cabinet housing.

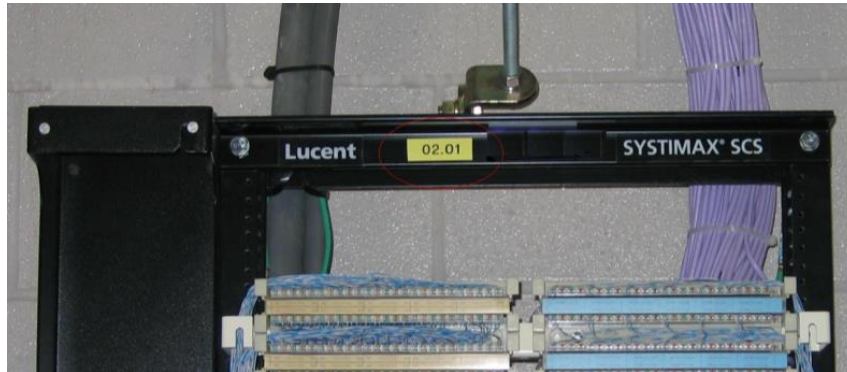
Labels should be affixed to top-center of identified structure unit. For labeling purposes only, the structure identifier can be omitted from the structure unit identifier to minimize space required for the label. It will be assumed that all structure units located in the same structure will carry the same structure identifier. *Note: this is for labeling purposes only; data collection records/tables must use complete identifier including telcom structure identifier.*

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Required Fields

No Action required

GPS

No Action required

Supporting Documentation Deliverables

AutoCAD – floorplan and rackface layouts of structure units depicting orientation, and/or configurations in both .dwg 2010 or higher and .pdf formats; (See AutoCAD communications room exhibit).

Spatial Data Deliverables

No Action required

Special Instructions

Structure units are visibly marked with a reference tag identifying its column and row. The telecom structure (ITS, HTS, ETS) is omitted from the reference tag but should be included in the structure unit tables. Newly placed structure units will require that their identifiers be affixed to the cabinet face or rack frame. Utilize specified labeling device to accomplish the task.

PATHWAYS

- Ductbank
- Trench
- Direct Buried
- Cable Tray

Identification

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Each **Pathway** has been assigned a unique GIS database identifier. This identifier serves as a primary-key for each database record. Each record contains additional fields and values relative to the feature identified by the primary-key.

All pathway identifiers follow a specific schema; new pathways must be identified accordingly. In the event that a determination cannot be made regarding the identification of a pathway, please contact an HAS IT GIS representative prior to documenting.

All pathways are identified through a numerical range with prefix characters specific to a respective airport campus, technology asset designation, and feature-category.

Airport Campus Characters:

IAH:	I
HOU:	H
EFD:	E

Asset Designation Character:

Technology:	T
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Feature-Category Characters:

Structure:	S
Pathway:	P
Equipment:	E
Cable:	C

Numerical Range:

0000 – 9999

Example:

ITP0054 (IAH Pathway), **HTP0054** (HOU Pathway), **ETP0054** (EFD Pathway)

Labeling

Pathways are identified for the purposes of GIS referencing and are linked to structure inventories but are not physically labeled per current guidelines.

Required Fields

Each pathway requires that specific data be collected per unit. GPS equipment should be formatted to account for this information.

CONDUIT_SIZE

COMMENTS

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AIRPORT

HAS_ENCASEMENT

AGENCY

CONDUIT_QTY

PATH_ID

PATH_NUMBER

PATH_TYPE

END1_COORD_X

END1_COORD_Y

END1_COORD_Z

END2_COORD_X

END2_COORD_Y

END2_COORD_Z

HAS_LEVEL

COLLECTION_DATE

PROJECT

TICKET

LEGACY_ID

PATHWAY_MATERIAL

FROM_TELECOM_ID

TO_TELECOM_ID

TELECOM_ID

PROJECT_CLASS

DEPTH_END1

DEPTH_END2

GPS

Each pathway must be recorded as follows:

Care should be taken to accurately locate the pathways prior to commencing with documentation.

Continuous-line shots; taken on center. Line-shots should begin and end on-center of endpoint (structure) locations.

Supporting Documentation Deliverables

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No action required

Spatial Data Deliverables

The entire pathway inventory should be delivered separately in ArcGIS feature class (version 10.x) format along with any records outlined in the 'Supporting Documentation' paragraph. This feature class (PATHWAY) should contain the attribute values from the 'Required Fields' paragraph.

Special Instructions

No action required

- **Cable Tray**

Identification no requirements per current guidelines

Required Fields no requirements per current guidelines

GPS no requirements per current guidelines

Supporting Documentation Deliverables no requirements per current guidelines

Spatial Data Deliverables no requirements per current guidelines

Special Instructions no requirements per current guidelines

PATHWAY UNITS

- **Conduits**

Identification

For deliverable purposes conduits are only being depicted via AutoCAD formats; i.e. butterfly diagrams or floorplans (see Exhibits: Communication Room Exhibit, Rackface Exhibit)

In the outside plant environment, conduits should be identified where applicable by size, location and position respective to their endpoints (structures) i.e. handhole wall, building access point, etc.

Further, on manhole / handhole butterfly diagrams, OSP conduits are depicted relevant to their size, position and orientation. As a general rule, conduits are identified left-to-right and top-to-bottom as you're facing the wall to be inventoried and should be prefixed with 'CD' on the AutoCAD documents.

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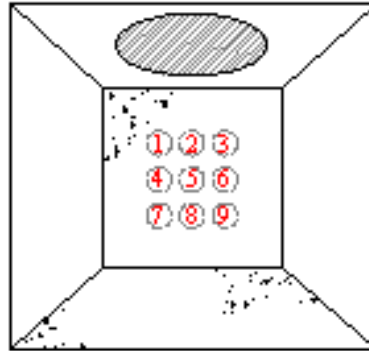
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MANHOLE

For the purposes of illustration and to be included as part of the manhole butterfly diagram draft document, each wall should identify the following:

Ductbank (Telecom Pathway Identifier for each respective manhole / handhole wall face)

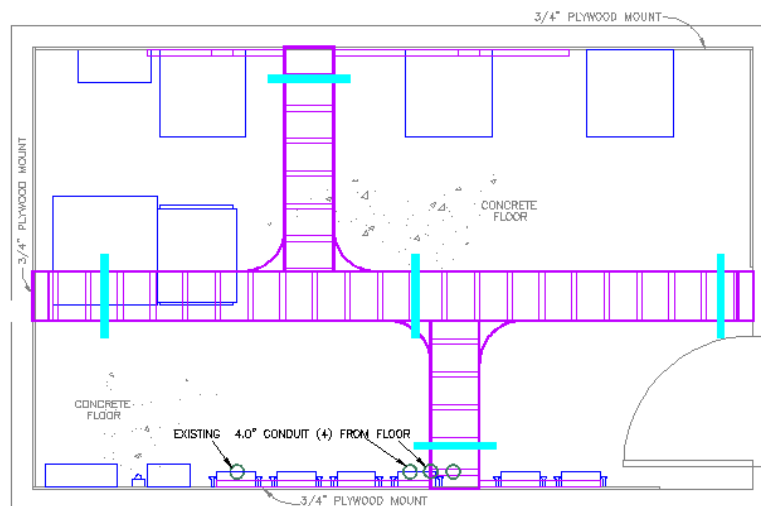
Conduits (Count, Orientation)

Cabling (Telecom Cable Identifier, Cable Type, Cable Count, location within respective conduit)

In the inside plant environment, conduits should be identified where applicable by position and location relative to their endpoints (telecom structures) i.e. communications rooms, vaults

ISP conduits are depicted on communication-room AutoCAD layouts as to their position and orientation; and are not numbered.

Example:



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Labeling

Not physically labeled per current guidelines.

Required Fields

Conduit counts, and size as prescribed in the pathway sub-topic

GPS

No action required

Supporting Documentation Deliverables

AutoCAD manhole / handhole butterfly diagrams for OSP conduits and communication-room layouts for ISP conduits; (See manhole / handhole AutoCAD butterfly exhibit).).

Spatial Data Deliverables

No action required

Special Instructions

See note regarding annotation above.

CABLE

- Inside Plant Copper
- Inside Plant Fiber (Single-Mode, Multi-Mode)
- Outside Plant Copper
- Outside Plant Fiber (Single-Mode, Multi-Mode)
- Inside Plant Copper Coax
- Outside Plant Copper Coax
- Inside Plant Hybrid
- Outside Plant Hybrid

Identification

Each **Cable** has been assigned a unique GIS database identifier. This identifier serves as a primary-key for each database record. Each record contains additional fields and values relative to the feature identified by the primary-key.

All cable identifiers follow a specific schema; new cable must be identified accordingly. In the event that a determination cannot be made regarding the identification of a cable-run, please contact an HAS IT GIS representative prior to documenting.

All cables are identified through a numerical range with prefix characters specific to a respective airport campus, technology asset designation, and feature-category.

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Airport Campus Characters:

IAH: I
HOU: H
EFD: E

Asset Designation Character:

Technology: T

Feature-Category Characters:

Structure: S
Pathway: P
Equipment: E
Cable: C

Numerical Range:

0000 – 9999

Example:

ITC0054 (IAH Cable), **HTC0054** (HOU Cable), **ETC0054** (EFD Cable)

Note: When planning to identify newly constructed or newly placed HAS assets, the contractor is expected to coordinate with the HAS IT GIS staff prior to labeling. This action will account for all identifiers previously assigned and prevent duplications or omissions.

Labeling

Labels should be affixed to all connection ends of identified cable and on any visible length at key access points, i.e. manhole, handhole cable ladder runs.

"All adhesive inside/outside plant cable labels for horizontal and backbone cables shall be covered with **clear heat shrink tubing"**

Required Fields

Each cable requires that specific data be collected per unit. GPS equipment should be formatted to account for this information.

TELECOM_ID

LEGACY_ID

AIRPORT

AGENCY

CABLE_TYPE

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CABLE_COUNT
FROM_TELECOM_ID
TO_TELECOM_ID
FROM_STRUCTURE_UNIT_ID
TO_STRUCTURE_UNIT_ID
FROM_EQUIPMENT_ID
TO_EQUIPMENT_ID
HAS_LEVEL
PROJECT
PROJECT_CLASS
COLLECTION_DATE
SYMANTEC_TICKET
COMMENTS

GPS

Each cable should be recorded as follows:

OSP – continuous GPS shot between identified structures

ISP – conventional GPS services are unavailable inside-plant; therefore inside-plant cabling will need to be digitized and included in the ArcGIS CABLE feature class spatial data deliverable.

Supporting Documentation Deliverables

ISP Horizontal cabling (see Exhibits – iPatch SOP.pdf).

Cable testing records; .pdf format (see Exhibits – C_Cable Test Exhibit, F_Cable Test Exhibit.pdf).

Butterfly diagrams (OSP) AutoCAD format; (See AutoCAD manhole / handhole butterfly exhibit).

Spatial Data Deliverables

The entire OSP cable inventory should be delivered separately in ArcGIS feature class (version 10.x) format along with any records outlined in the ‘*Supporting Documentation*’ paragraph. This feature class (CABLE) should contain the attribute values from the ‘*Required Fields*’ paragraph.

No Spatial Data required for ISP inventory.

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Special Instructions

No cable testing should be conducted on any live circuit. Ensure that necessary precautions are observed to guarantee existing network integrity and no active circuits are impacted.

- **Jumper Cables / Patch Cords / Cross-Connects:**

Identification

No action required

Labeling

No action required

Required Fields

Refer to iPatch SOP (see Exhibits - iPatch SOP.pdf)

GPS

No action required

Supporting Documentation Deliverables

ISP cabling (see Exhibits - iPatch SOP.pdf)

Spatial Data Deliverables

No action required

Special Instructions

No cable testing should be conducted on any live circuit. Ensure that necessary precautions are observed to guarantee existing network integrity and no active circuits are impacted.

As iPatch is the administration application for these assets - all project managers, inspectors and consultants overseeing 'new-build' infrastructure configurations must strictly adhere to guidelines specified in the iPatch SOP (see Exhibits - iPatch SOP.pdf). Further, you must contact an iPatch database administrator directly to coordinate the data collection and documentation-deliverable evolution.

Bulk import of key iPatch modeling components can be facilitated by utilization of a specifically formatted spreadsheet (see Exhibits - iPatch Bulk Import.xls).

Updates/changes to fiber patching can be facilitated by utilization of a specifically formatted cut-sheet (see Exhibits – Fiber Patching Cut Sheets.xls).

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EQUIPMENT

- Termination Point
- Patch Panel
- Network Switch
- 110 Block
- Splice Enclosure
- Cable Transition
- EFSO Button
- Copper Modem
- Tap
- Camera
- AP's

Identification

All **Equipment** has been assigned a unique GIS database identifier. This identifier serves as a primary-key for each database record. Each record contains additional fields and values relative to the feature identified by the primary-key.

All equipment identifiers follow a specific schema; new equipment must be identified accordingly. In the event that a determination cannot be made regarding the identification of a piece of equipment, please contact an HAS IT GIS representative prior to documenting.

All equipment is identified through a numerical range with prefix characters specific to a respective airport campus, technology asset designation, and feature-category.

Airport Campus Characters:

IAH:	I
HOU:	H
EFD:	E

Asset Designation Character:

Technology: T

Feature-Category Characters:

Structure:	S
Pathway:	P
Equipment:	E
Cable:	C

Numerical Range:

0000 – 9999

Example:

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ITE0054 (IAH Equipment), **HTE0054** (HOU Equipment), **ETE0054** (EFD Equipment)

Labeling

Labeling should follow the identification schema and further be accomplished via the use of below specified labeling device or approved equivalent:

DYMO rhinoPRO 5000 Industrial Label Maker

3/4" Flexible Industrial Strength Nylon label tape - yellow

Labels should be affixed to the splice enclosure housing.

Label placement should be affixed to or as near to equipment as possible.

Label all cameras and AP's with VSS ID as programmed into the HAS software system.

Label shall be minimum 14pt font. Use 3-layer engraved lexan label for all interior cameras and AP's. Use metallic die-tapped label for exterior cameras. Label shall be permanently affixed adjacent to the VSS housing. The label shall be visible and may not be attached to the camera housing.

Required Fields

All equipment requires that specific data be collected per unit. GPS equipment should be formatted to account for this information.

EQUIPMENT_ID

TELECOM_ID

SYMANTEC_TICKET

CABLE_ID

TELECOM_CABLE_ID

LEGACY_CABLE_ID

AIRPORT

AGENCY

PROJECT

PROJECT_CLASS

COLLECTION_DATE

COMMENTS

LEGACY_ID

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EQUIPMENT_TYPE

HAS_LEVEL

GPS

No action required for ISP equipment

Each splice enclosure (OSP) should be recorded as follows:

Single shots; taken on-center. Offset shots or other means of location are acceptable for splice enclosures not available to satellite coverage but these shots or options must be coordinated with an HAS-IT GIS contact prior to.

Supporting Documentation Deliverables

AutoCAD – one-line diagram of ACCESSIBLE for splice enclosures depicting cable identifiers, connections and cable counts for each splice enclosure in both .dwg 2010 or higher and .pdf formats; (See AutoCAD splice enclosure exhibit).

AutoCAD – rackface layouts of structure units depicting orientation, and/or configurations in both .dwg 2010 or higher and .pdf formats; (See AutoCAD communications room exhibit).

Spatial Data Deliverables

The entire equipment inventory should be delivered separately in ArcGIS feature class (version 10.x) format along with any records outlined in the ‘Supporting Documentation’ paragraph. This feature class (EQUIPMENT) should contain the attribute values from the ‘Required Fields’ paragraph.

Special Instructions

Do not attempt to open a splice enclosure that appears to be in a fragile state or does not provide for ready access (sealed). Note in ‘comments’ field that the enclosure was inaccessible.

Do not move, adjust ‘live’ equipment in order to identify or label. Ask for assistance from qualified HAS Technology Infrastructure personnel.

Do not disconnect cabling in order to identify or label. Ask for assistance from qualified HAS Technology Infrastructure personnel.

• Outlets

Identification

Each outlet-faceplate is identified specific to its servicing IDF; regardless of the number of outlets within a given location. All outlet-faceplate ports are labeled to correspond with the servicing IDF panel port. **Note: These space identifiers are architectural identifiers, and are designated by reference to the HAS Infrastructure schema for identifying building spaces. This is not a GIS Technology Infrastructure database identifier.**

Example Outlet-Faceplate Identifier:

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S103.1

Translation: Outlet serviced by IDF S103.1

In the event that a determination cannot be made regarding the identity of the outlet, please contact the HAS IT GIS representative prior to documenting.

Note: When planning to identify newly constructed or newly placed HAS assets, the contractor is expected to coordinate with the HAS IT GIS staff prior to labeling. This action will account for all identifiers previously assigned and prevent duplications or omissions.

Labeling

Outlet label placement 2-port: under top-aligned, Plexiglas cover – servicing IDF identifier over port identifiers. Ports should be identified left-to-right.



Outlet label placement 3-port: under top-aligned, Plexiglas cover – servicing IDF identifier over port identifiers. Ports should be identified left-to-right. Under bottom-aligned, Plexiglas cover – servicing IDF identifier over port identifiers. Ports should be identified left-to-right.

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Outlet label placement 4-port: under top-aligned, Plexiglas cover – servicing IDF identifier over port identifiers. Ports should be identified left-to-right. Under bottom-aligned, Plexiglas cover – servicing IDF identifier over port identifiers. Ports should be identified left-to-right. Follow 3-port example.

Outlet label placement 6-port: under top-aligned, Plexiglas cover – servicing IDF identifier over port identifiers. Ports should be identified left-to-right. Any mid-faceplate ports will require an adhesive label - servicing IDF identifier over port identifiers. Ports should be identified left-to-right. Under bottom-aligned, Plexiglas cover – servicing IDF identifier over port identifiers. Ports should be identified left-to-right. These types of outlets are 'Non-Standard'.

Required Fields

No action required

GPS

OSP – No GPS action required

ISP – No GPS action required

Supporting Documentation Deliverables

Additional documentation records are required to support iPatch data. The documentation is as follows:

AutoCAD – floorplan (where applicable) depicting outlet locations; (See AutoCAD communications room exhibit.).

Spatial Data Deliverables

No action required

Special Instructions

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(These Guidelines are basic minimum criteria to be met in preparing the final specifications for this section, which is the responsibility of the Designer/Contractor/Installation Team.)

Outlets are visibly marked with a reference tag indicating the outlet identifier. Additionally any port associated to the outlet is identified with a port number related specifically back to its respective servicing equipment. Newly placed outlets will require that their identifiers be affixed to the outlet face. Utilize specified labeling device to accomplish the task.

• Door Contacts

Identification

Each door-contact sensor (without card-reader) is identified by an alpha-numeric sequence specific to its location. All door-contact identifiers are coded with building or complex character, followed by level character, followed by numerical sequence character, followed by 'CCM' designation. "CCM" is an acronym for 'Control Contact Monitoring.'

Example Outlet-Faceplate Identifier:

B-2057CCM

Translation:

<i>B</i>	<i>(building/complex character)</i>	<i>Terminal B</i>
<i>2</i>	<i>(level character)</i>	<i>Level 2</i>
<i>057</i>	<i>(numerical sequence character)</i>	<i>Contact # 057</i>
<i>CCM</i>	<i>(CCM designation)</i>	<i>Control Contact Monitoring</i>

In the event that a determination cannot be made regarding the identity of a door contact, please contact the HAS IT Project Manager prior to documenting.

Note: When planning to identify newly constructed or newly placed HAS assets, the contractor is expected to coordinate with the HAS IT Project Manager prior to labeling. This action will account for all identifiers previously assigned and prevent duplications or omissions.

Labeling

Door-contacts (without card-reader) require identifier plates per 'Special Instruction' specification below

Required Fields

TBD

GPS

OSP – No GPS action required

ISP – No GPS action required

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Supporting Documentation Deliverables

AutoCAD floorplans indicating door contact location including label plate identifier annotation

Spatial Data Deliverables

No action required

Special Instructions

Install Black Lexan Label Plate: sized 1 ½" X 4", black background, white lettering and Door Alarm Identifier engraved (i.e. B-2057CCM). Locate plate on door frame above contact. Clean door frame prior to placement. Affix with 3M double-sided tape.

Provide paper and electronic copies (.pdf format) of all Electronic Lock Permits and Submittal Documents for any door requiring City of Houston door lock permit to the HAS IT Project Manager prior to Acceptance Testing.

• Card Readers

Identification

Each electronic lock is identified by an alpha-numeric sequence specific to its location. All electronic lock identifiers are coded with building or complex character, followed by level character, followed by numerical sequence character.

Example Outlet-Faceplate Identifier:

C-1015

Translation:

C	(building/complex character)	Terminal C
1	(level character)	Level 1
015	(numerical sequence character)	Lock # 015

In the event that a determination cannot be made regarding the identity of a door contact, please contact the HAS IT Project Manager prior to documenting.

Note: When planning to identify newly constructed or newly placed HAS assets, the contractor is expected to coordinate with the HAS IT Project Manager prior to labeling. This action will account for all identifiers previously assigned and prevent duplications or omissions.

Labeling

Electronic locks require identifier plates per 'Special Instruction' specification below

Required Fields

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TBD

GPS

OSP – No GPS action required

ISP – No GPS action required

Supporting Documentation Deliverables

AutoCAD floorplans indicating card reader location including label plate identifier annotation

Spatial Data Deliverables

No action required

Special Instructions

Install Black Lexan Label Plate: sized approximately 3 ¼" X 5 ½", black background, white lettering and Card Reader Identifier engraved (i.e. C-1015). Affix plate to single-gang cabinet with 5/32" screws.

Provide paper and electronic copies (.pdf format) of all Electronic Lock Permits and Submittal Documents for any door requiring City of Houston door lock permit to the HAS IT Project Manager prior to Acceptance Testing.

CONNECTIONS

• Ports

Identification

Each port has been assigned an identifier; combined with the equipment identifier, the sequence becomes unique. Therefore port identifiers may be replicated on separate pieces of equipment because again, the true and complete port ID is coupled to the equipment ID.

Example:

100.20.01.02.35-39 (equipment ID) + FP03 = 100.20.01.02.35-39 FP03

100.25.01.01.12-17 (equipment ID) + FP03 = 100.25.01.01.12-17 FP03

Fiber port 03 is replicated on two different pieces of equipment. Coupling it to the equipment ID makes the string unique

All ports are identified through a numerical range specific to its respective equipment. Ports may be prefixed with 'FP' (fiber port) or 'CP' (copper port) as is pertinent to the cable category and space allows on the equipment.

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Regarding service outlets: ports are identified via reference to IDF and IDF equipment (see Outlet). This data should be recorded in the Excel data record tables.

Regarding termination panels: ports are identified according to equipment port capacity.

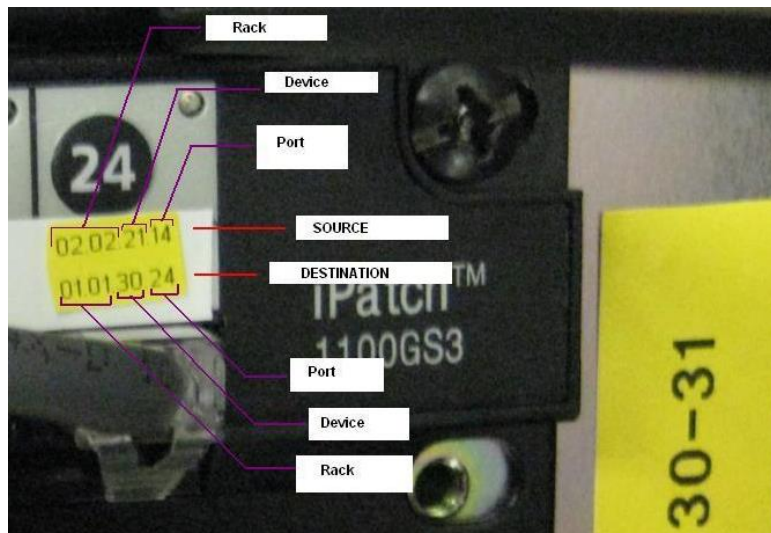
Regarding patch panels: ports are identified in sequence and may be prefixed with structure identifier references.

Regarding switches: ports are identified in sequence and may be prefixed according to cable compatibility; i.e. 'FP' or 'CP'. The port sequence should follow left-to-right and top-to-bottom.

Regarding devices housing multiple blades: ports are identified in sequence as related to respective blades and may be prefixed according to cable compatibility; i.e. 'FP' or 'CP'. The port sequence should follow left-to-right and top-to-bottom.

Regarding SYSTIMAX (iPatch) 'equipment panels': ports are identified with a source-over-destination, (panel-to-panel) schema and inclusive of rack/cabinet (structure-unit) identifiers.

Regarding SYSTIMAX (iPatch) 'service panels': ports are identified in sequence and may be prefixed with structure identifier references.



All port identifiers follow some specific schema; new ports must be identified accordingly. In the event that a determination cannot be made regarding the identity of the port, please contact the iPatch database administrator prior to documenting.

Note: When planning to identify newly constructed or newly placed HAS assets, the contractor is expected to coordinate with the HAS IT GIS staff prior to labeling. This action will account for all identifiers previously assigned and prevent duplications or omissions.

Labeling

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Regarding switches: generally space does not allow for switch port labeling; ports must be identified however in order to correlate circuit connectivity to/from/through the device.

Labeling should follow the identification schema and further be accomplished via the use of below specified labeling device or approved equivalent:

DYMO rhinoPRO 5000 Industrial Label Maker

3/4" Flexible Industrial Strength Nylon label tape - yellow

Labels should be affixed to applicable port locations. Not all ports allow for label placement but these ports should be identified and recorded as part of iPatch SOP; respective to cable or equipment.

Required Fields

Each port requires that its relationship be established between cable and equipment via use of the iPatch cut sheet (see Exhibits – iPatch SOP.pdf).

GPS

No action required

Supporting Documentation Deliverables

ISP cabling/port configurations (see Exhibits – iPatch SOP.pdf)

Spatial Data Deliverables

No action required

Special Instructions

Careful attention should be given to accurately accounting for and recording relationships established between ports – cable, and ports – equipment.

7 STANDARD OPERATING PROCEDURES – BEST PRACTICES

7.1 Data Collection Methodology

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7.1.1 This section includes a general outline of procedures that can be utilized towards the collection and processing of HAS' IT physical data requirements. The outline establishes some of the recommended methods which have proven to be most successful during previous data collection cycles.

This guide does not mandate adherence to these methods provided that the contracting party can determine a like process to produce the intended results. Said process must however provide for the specific formatting of all aforementioned physical data deliverables including data record tables, .DWF / .DWG, .PDF, feature class, feature class, and photo imagery.

Note: Safety is paramount and discussions with regard to OSHA and other regulatory or governing authorities including Airport Operations must be coordinated with the HAS IT representatives prior to commencement of any project scope.

7.2 Outside Plant

7.2.1 Identify outside plant network locations as defined by project scope of work including all structures, pathways, cable and equipment. This requires extensive communication and coordination with HAS airport campus authorities before and during the evolution. Contracting parties will be provided with respective contact information prior to commencement of data collection effort.

Coordinate with HAS IT representative to determine existing network identifiers and to specify any new network identifiers that must be incorporated into data deliverables.

If applicable to the GPS equipment that will be utilized to collect data, format custom projections to campus, format code-list.

GPS locate structures; ensure all attribute fields are populated. For MH, HH produce field sketch - butterfly layout depicting pathways unit counts orientation; cable types / counts, location. These field sketches should be used to create AutoCAD .DWF / .DWG deliverables.

Produce photo imagery

GPS locate all splice enclosures, slack loops.

Label all end-equipment, splice enclosures, slack loops, cable, pullboxes, cabinets, pedestals. Stamp all MH, HH per guidelines.

GPS locate pathways; ensure all attribute fields are populated.

Physically locate outside plant associated equipment; ensure all attribute fields are populated.

Building Access Points can be approximated where the PATHWAY intersects the building face for purposes of GPS data collection; single-shot.

GPS locate cable routing; ensure all attribute fields are populated including end-equipment identifiers.

QA/ QC to ensure that all data relationships have been established; i.e. equipment-structure, structure-pathways, pathways-cable and that all attribute fields have been populated.

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Finalize, format deliverables

7.3 Inside Plant

7.3.1 Identify inside plant network locations as defined by project scope of work including all structures, cable and equipment. This requires extensive communication and coordination with HAS airport campus authorities before and during the evolution. Contracting parties will be provided with respective contact information prior to commencement of data collection effort.

Coordinate with iPatch database administrator to determine existing network identifiers and to specify any new network identifiers that must be incorporated into data deliverables.

Prepare field sketch (floorplan, rackface) of interior space and equipment. Document and dimension structure space and contents required to generate layouts for the floorplan, cable ladder, conduit, room details, and Install details. Rackface layouts should be created in a separate document. These field sketches should be used to create AutoCAD .DWF / .DWG deliverables.

Label all structure units, cable and equipment per guidelines.

Record information specific to iPatch SOP for structure units, equipment, cable; this process will be covered in depth at the coordination meeting held prior to commencement of data collection effort. This information establishes infrastructure relationships that will be used to model the communications environment.

Test Cable.

QA/ QC to ensure that all data relationships have been established; i.e. structure – structure, structure – structure units, structure units – equipment, equipment – ports, ports – cable.

Finalize, format deliverables.

EXHIBITS