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SECTION 270553

IDENTIFICATION AND LABELING OF COMMUNICATION INFRASTRUCTURE

(REV. 08-29-2013-BW)

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 with regard to 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:

- 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

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

3 DEFINITIONS

3.1 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.

3.2 Definitions

3.2.1 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.

campus

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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, connectorization, 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)

record

The permanent documentation of installed telecommunications infrastructure obtained from asbuilts.

record drawing (as-built)

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

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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.

work area; work station

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

4 DOCUMENTATION CONCEPTS

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4.1 General

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

4.2 Identifiers

- 4.2.1 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.
- 4.2.2 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.
- 4.2.3 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.

4.3 Records

- 4.3.1 A record is a collection of information about or related to a specific element of the telecommunications infrastructure.
- 4.3.2 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.
- 4.3.3 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.
- 4.3.4 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.

4.4 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.

4.5 Assignment

4.5.1 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 tele-

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communications infrastructure. This aids in troubleshooting by identifying both the physical and logical connectivity from a single circuit assignment.

4.6 Presentation of Information

- 4.6.1 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.
- 4.6.2 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.
- 4.6.3 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.
- 4.6.4 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.
- 4.6.5 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.
- 4.6.6 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.
- 4.6.7 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.

4.7 Work Orders (Symantec)

4.7.1 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 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 ac-*

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tion 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.

4.8 Summary

4.8.1 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.

5 HAS IT INFRASTRUCTURE STANDARDS FOR DOCUMENTATION

5.1 Data Collection and Administration Concepts

5.1.1 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.

5.2 STRUCTURES

5.2.1 Manholes:

Identification

Each manhole 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 manholes are identified through a numerical range specific to its respective campus and should be prefixed with 'MH'. The ranges are as follows:

Manhole Numerical Range:

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IAH: 01-999 HOU: 1000-9999 EFD: 10000-99999

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 chisel/stamp device or other approved method..

Newly constructed manholes will require that their identifiers be etched onto the lid, and the metal ring surrounding the opening or the concrete foundation (topside). Utilize an appropriate chisel or stamp to accomplish the task.

Required Fields

Each manhole requires that specific data be collected per unit. GPS equipment should be formatted to account for this information. From the STRUCTURES data dictionary matrix (See DATA Dictionary Exhibit), the following fields and their respective values are required:

STRUCTURE_ID

PROJECT

AIRPORT

AGENCY

SMANTEC_TICKET

COLLECTION_DATE

LID_TYPE

DEPTH_INCH

SPLICE_ENCLOSURE

GROUNDING

HAS_LEVEL

COMMENTS

LID_SIZE

SLACK_LOOP

STRUCTURE_SUBTYPE

STRUCTURE_TYPE

LEGACY ID

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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.)

COORD_X

COORD_Y

COORD Z

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:

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

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

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

Newly constructed manholes will require that their identifiers be etched onto the lid, the metal ring surrounding the opening or the concrete foundation (topside). Utilize an appropriate chisel or stamp to accomplish the task.

5.2.2 Handholes:

Identification

Each handhole 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 cannot be made regarding the identity of the structure, please contact the HAS IT GIS representative prior to documenting.

All handholes are identified through a numerical range specific to its respective campus and should be prefixed with 'HH'. The ranges are as follows:

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Handhole Numerical Range:

IAH: 01-999 **HOU:** 1000-9999 **EFD:** 10000-99999

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 chisel/stamp device.

Newly constructed handholes will require that their identifiers be etched onto the lid, and the metal ring surrounding the opening or the concrete foundation (topside). Utilize an appropriate chisel or stamp to accomplish the task.

Required Fields

Each handhole requires that specific data be collected per unit. GPS equipment should be formatted to account for this information. The specific data required is as follows:

STRUCTURE_ID

PROJECT

AIRPORT

AGENCY

SYMANTEC_TICKET

COLLECTION_DATE

LID TYPE

DEPTH_INCH

SPLICE_ENCLOSURE

GROUNDING

HAS_LEVEL

COMMENTS

LID_SIZE

SLACK_LOOP

STRUCTURE_SUBTYPE

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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.)

STRUCTURE_TYPE
LEGACY_ID
COORD_X
COORD_Y
COORD_Z

GPS

Each handhole should be recorded as follows:

Single shots; taken on-center. Offset shots are acceptable for handholes 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:

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 handhole depicting path orientation, conduit layout, innerduct configurations, cabling locations, and cabling counts, for each handhole both .dwg and .dwf formats; 2010 or higher; (See handhole AutoCAD butterfly exhibit; see also the OASIS standards for IT specific layering).

Spatial Data Deliverables

The entire handhole 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

Newly constructed handholes will require that their identifiers be etched onto or affixed to the lid and collar (topside). Utilize an appropriate epoxy with metal tag to accomplish the task.

5.2.3 Pullboxes:

Identification

Each pullbox 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 cannot be made regarding the identity of the structure, please contact the HAS IT GIS representative prior to documenting.

All pullbox are identified through a numerical range specific to its respective campus and should be prefixed with 'PB'. The ranges are as follows:

Pullbox Numerical Range:

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IAH: 01-999 HOU: 1000-9999 EFD: 10000-99999

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 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 pullbox housing.

Required Fields

Each pullbox requires that specific data be collected per unit. GPS equipment should be formatted to account for this information. From the STRUCTURES data dictionary matrix (See Data Dictionary exhibit), the following fields and their respective value are required:

STRUCTURE ID

PROJECT

AIRPORT

AGENCY

SYMANTEC_TICKET

COLLECTION_DATE

LID TYPE

DEPTH_INCH

SPLICE_ENCLOSURE

GROUNDING

HAS_LEVEL

COMMENTS

LID_SIZE

SLACK_LOOP

STRUCTURE_SUBTYPE

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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.)

STRUCTURE_TYPE
LEGACY_ID
COORD_X
COORD_Y
COORD_Z

GPS

Each pullbox should be recorded as follows:

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

Supporting Documentation Deliverables

No action required

Spatial Data Deliverables

The entire pullbox 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

Newly constructed pullboxes will require that their identifiers be etched onto or affixed to the lid and collar (topside). Utilize an appropriate epoxy with metal tag to accomplish the task.

5.2.4 Cabinets:

Identification

Each cabinet 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:

Junction Box Numerical Range:

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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 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 cabinet housing.

Required Fields

Each cabinet requires that specific data be collected per unit. GPS equipment should be formatted to account for this information. From the STRUCTURE data dictionary matrix (See Data Dictionary exhibit), the following fields and their respective values are required:

STRUCTURE_ID **PROJECT AIRPORT AGENCY** SYMANTEC_TICKET COLLECTION_DATE SPLICE_ENCLOSURE HAS LEVEL COMMENTS SLACK_LOOP STRUCTURE_SUBTYPE STRUCTURE_TYPE

LEGACY_ID

COORD X

COORD Y

COORD_Z

GPS

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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.)

Each cabinet should be recorded as follows:

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

Supporting Documentation Deliverables

No action required.

Spatial Data Deliverables

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

Special Instructions

Newly constructed cabinets will require that their identifiers be etched onto or affixed to the door/housing. Utilize an appropriate epoxy with metal tag to accomplish the task.

5.2.5 Building Access Points:

Identification

Each building access point has been assigned a unique campus identifier. All building access identifiers follow some specific schema; new building access points must be identified accordingly. In the event that a determination cannot be made regarding the identity of the building access points, please contact the HAS IT GIS representative prior to documenting.

All building access points are identified through a numerical range specific to its respective campus and should be prefixed with 'BA'. The ranges are as follows:

Building Access Point Numerical Range:

IAH: 01-999 HOU: 1000-9999 EFD: 10000-99999

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

Building Access Points are identified for the purposes of GIS referencing and are linked to structure/span inventories but are not physically labeled per current guidelines.

Required Fields

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Each building access point requires that specific data be collected per unit. GPS equipment should be formatted to account for this information. From the STRUCTURE data dictionary matrix (See Data Dictionary exhibit), the following fields and their respective values are required:

STRUCTURE_ID
PROJECT
AIRPORT
AGENCY
COLLECTION_DATE
HAS_LEVEL
COMMENTS
STRUCTURE_SUBTYPE
STRUCTURE_TYPE
LEGACY_ID
COORD_X
COORD_Y
COORD_Z
GPS

Each building access point should be recorded as follows:

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

Supporting Documentation Deliverables

No action required

Spatial Data Deliverables

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

Special Instructions

No action required

5.2.6 Communications Rooms:

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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.)

Identification

Each communications room 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 architectural spaces are identified through a numerical range specific to its respective campus schema. For further clarification on the room numbering schemas as they are applied to a particular campus contact Tony Bradshaw in the HAS Planning, Design and Construction department; layouts may be provided to assist with identifying interior space.

Note: When planning to identify newly constructed architectural space, the contractor is expected to coordinate with the HAS IT GIS staff prior to incorporating the identifier into deliverable records. This action will account for all identifiers previously assigned and prevent duplications or omissions.

Labeling

Labeling of architectural space is handled by direction under the authority of the HAS Planning, Design and Construction department. By authorization this task may be delegated to contracting parties as part of a CIP project scope.

Required Fields

Each communications room requires that specific data be collected per unit. GPS equipment should be formatted to account for this information. From the STRUCTURE data dictionary matrix (See Data Dictionary exhibit), the following fields and their respective values are required:

STRUCTURE_ID PROJECT

AIRPORT

AGENCY

SYMANTEC_TICKET

COLLECTION_DATE

SPLICE_ENCLOSURE

HAS_LEVEL

COMMENTS

SLACK_LOOP

STRUCTURE_SUBTYPE

STRUCTURE_TYPE

LEGACY_ID

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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.)

GPS

No action required

Supporting Documentation Deliverables

AutoCAD – floorplan and rackface layouts of structure depicting orientation, and/or configurations in both .dwg and .dwf formats; 2010 or higher; (See AutoCAD communications room exhibit; see also the OASIS standards for IT specific layering).

Floorplan drawings should include layouts for Floorplan, Cable Ladder, Conduit, Room-Wall Details. Details; MDF wall details in AutoCAD, IDF details in digital photo format only.

Rackface drawings should depict cabinet/rack rows and installed equipment; one layout per row as applicable.

Spatial Data Deliverables

No action required

Special Instructions

The structure identifier being the parent identifier anchors and establishes the root relationship link to all structure-units and equipment.

5.2.7 Buildings or Facilities:

Identification

Each building or facility 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 cannot be made regarding the identity of the structure, please contact the HAS IT GIS representative prior to documenting.

All buildings or facilities are identified through an alpha-numerical range specific to its respective campus schema. For further clarification on the building numbering schemas as they are applied to a particular campus contact Bill Zrioka in the HAS Planning, Design and Construction department; layouts may be provided to assist with identifying these locations.

Note: When planning to identify newly constructed buildings, the contractor is expected to coordinate with the HAS IT GIS staff prior to incorporating the identifier into deliverable records. This action will account for all identifiers previously assigned and prevent duplications or omissions.

Labeling

Labeling of buildings is handled by direction under the authority of the HAS Planning, Design and Construction department. By authorization this task may be delegated to contracting parties as part of a CIP project scope.

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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.)

Required Fields

Each building or facility requires that specific data be collected per unit. GPS equipment shall be formatted to account for this information. From the STRUCTURES data dictionary matrix (SEE Data Dictionary exhibit), the following fields and their respective values are required:

STRUCTURE_ID **PROJECT AIRPORT AGENCY** SYMANTEC_TICKET COLLECTION_DATE SPLICE_ENCLOSURE HAS_LEVEL **COMMENTS** SLACK_LOOP STRUCTURE_SUBTYPE STRUCTURE_TYPE LEGACY_ID COORD_X COORD_Y COORD_Z

GPS

New buildings/facilities will need to be digitized (single-point) and included in the ArcGIS STRUCTURE feature class spatial data deliverable.

Supporting Documentation Deliverables

No action required other than specified for communication rooms in previous text.

Spatial Data Deliverables

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.)

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

No Spatial Data required for ISP inventory.

Special Instructions

No action required

5.3 **STRUCTURE UNITS**

5.3.1 Cabinets/Racks:

Identification

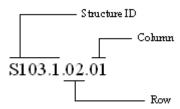
Each cabinet/rack has been assigned a unique campus identifier. All structure unit identifiers follow some specific schema; new structure units must be identified accordingly. In the event that a determination can not be made regarding the identity of the structure unit, please contact the HAS IT GIS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

All structure units are identified through a numerical range specific to its respective structure; column and row separated by decimal.

Example:

S103.1.02.01

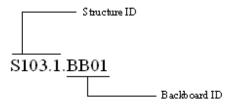
Translation: Cabinet or Rack in Room (Structure) \$103.1, row 02, column or position 01.



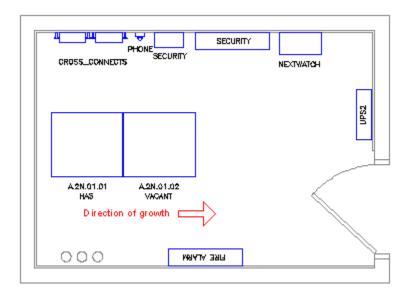
S103.1.BB01

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

(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.)



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

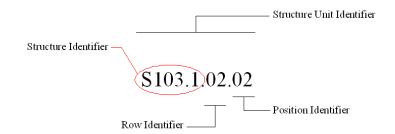
Labeling should follow the identification schema.

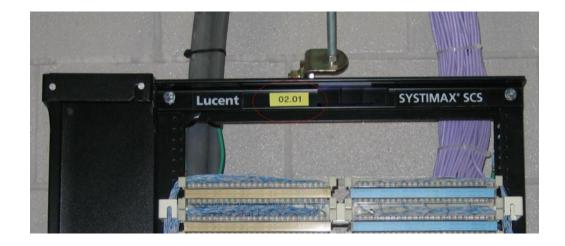
Labels should be affixed to top-center of identified structure unit. For labeling purposes only, the structure identifier can be omitted from the structure unit identifier to minimize space required for the label. It will be assumed that all structure units located in the same structure will carry the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

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.)

Example:





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 and .dwf formats; 2010 or higher; (See AutoCAD communications room exhibit; see also the OASIS standards for IT specific layering).

Spatial Data Deliverables

No action required

Special Instructions

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.)

Structure units are visibly marked with a reference tag identifying its column and row. The Structure ID 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.

5.4 PATHS

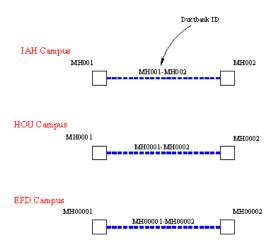
5.4.1 Paths:

Identification

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

All paths are identified by inclusion of the endpoint (structure) identifiers specific to their respective campus.

Example:



Labeling

Paths 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 path requires that specific data be collected per unit. GPS equipment should be formatted to account for this information. From the PATH data dictionary matrix (See Data Dictionary exhibit), the following fields and their respective values are required:

HAS/PDC/Design Division Houston, Texas

PATH_ID

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.)

PATH_NUMBER
HAS_LEVEL
AIRPORT
AGENCY
PATH_TYPE
ENCASEMENT
CONDUIT SIZE
CONDUIT_QTY
SYMANTEC_TICKET
PROJECT
END1_DEPTH
END2_DEPTH
FROM_STRUCTURE_ID
TO_STRUCTURE_ID
COLLECTION_DATE
COMMENTS
LEGACY_ID
END1_X_COORDINATE
END1_Y_COORDINATE
END1_Z_COORDINATE
END2_X_COORDINATE
END2_Y_COORDINATE
END2_Z_COORDINATE

GPS

Each path must be recorded as follows:

Care should be taken to accurately locate the span 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

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.)

No action required

Spatial Data Deliverables

The entire path 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 (PATH) should contain the attribute values from the *'Required Fields'* paragraph.

Special Instructions

No action required

5.4.2. Cable Ladder:

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

5.5 PATH UNITS

5.5.1 Conduits:

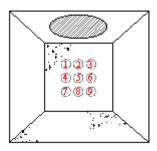
Identification

For deliverable purposes conduits are only being depicted via AutoCAD formats; i.e. butterfly diagrams or floorplans.

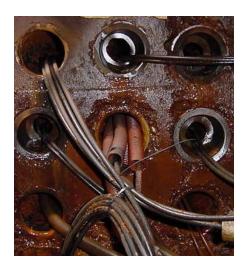
In the outside plant environment, conduits should be identified where applicable by size, location and position respective to their endpoints (structures) i.e. handhole wall, building access point, etc.

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.

(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.)

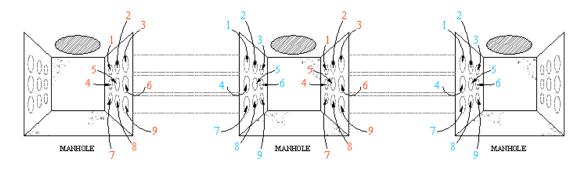


MANHOLE



Note: Careful attention should be focused on the annotation process regarding butterfly diagrams; keeping in mind that the numerical orientation on one wall inside a given structure does not transfer directly to the numerical orientation on the opposing structure wall. The sequence is mirrored.

Example:



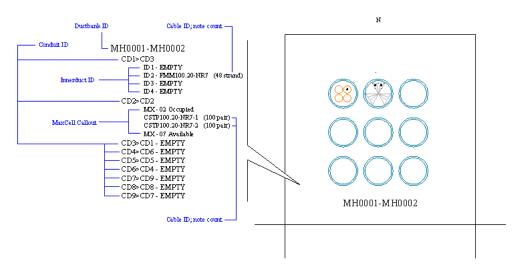
Project Title Proj./CIP No.

(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.)

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 (Path)
Conduits (Path-Unit)
Innerduct, MaxCell (Path-Unit)
Cabling (Cable) note cable-count

Example:

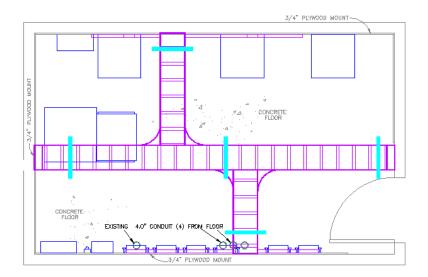


In the inside plant environment, conduits should be identified where applicable by position and location respective to their endpoints (structures) i.e. communications rooms, vaults

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

Example:

(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.)



Labeling

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

Required Fields

Conduit counts and size as prescribed in the path 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; see also the OASIS standards for IT specific layering).

Spatial Data Deliverables

No action required

Special Instructions

See note regarding annotation above.

5.5.2 Innerducts:

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.)

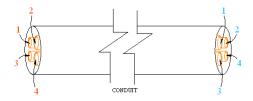
Identification

Currently innerducts are only being depicted via AutoCAD formats for the outside plant environment only.

In the outside plant environment, innerducts should be identified where applicable by size, location and position respective to their endpoints (structures) i.e. handhole wall, building access point, etc. OSP innerducts are depicted on manhole/handhole butterfly diagrams as to their size, position and orientation. As a general rule, innerducts are identified left-to-right and top-to-bottom as you're facing the wall to be inventoried and should be prefixed with 'ID'.

Note: Careful attention should be focused on the annotation process regarding butterfly diagrams; keeping in mind that the numerical orientation on one wall inside a given structure does not transfer directly to the numerical orientation on the opposing structure wall. The sequence is mirrored.

Example:



In the inside plant environment, innerducts are not typically identified but may be referenced by position and location respective to their endpoints (structures) i.e. communications rooms, vaults

ISP innerducts are not typically depicted on communication-room layouts but may be referenced as to their position and orientation; they are not numbered.

Labeling

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

Required Fields

No action required

GPS

No action required

Supporting Documentation Deliverables

AutoCAD manhole/handhole butterfly diagrams for OSP innerducts; (See AutoCAD manhole/handhole butterfly exhibit; see also the OASIS standards for IT specific layering).

Spatial Data Deliverables

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.)

No action required

Special Instructions

See note regarding 'annotation' above

5.5.3 MaxCell:

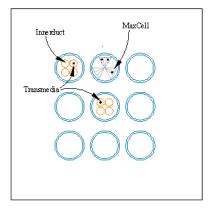
Identification

Currently MaxCell is only being depicted via AutoCAD formats for the outside plant environment only.

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

OSP MaxCell is depicted on manhole/handhole butterfly diagrams as to its cell-count, position and orientation. As a general rule, MaxCell is not identified sequentially but depicted so as to reflect occupied/available cells.

Example:



MANHOLE WALL DETAIL

In the inside plant environment, MaxCell is not typically identified but may be referenced by position and location respective to their endpoints (structures) i.e. communications rooms, vaults

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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.)

Labeling

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

Required Fields

No action required

GPS

No action required

Supporting Documentation Deliverables

AutoCAD manhole/handhole butterfly diagrams for OSP MaxCell; (See AutoCAD manhole/handhole butterfly exhibit; see also the OASIS standards for IT specific layering).

Spatial Data Deliverables

No action required

Special Instructions

No action required

5.6 CABLE

5.6.1 Fiber Cable:

Identification

For GIS documentation purposes, only backbone/riser cable information is required.

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

All fiber cable are identified by type, count and endpoint (structure) identifiers specific to their respective campus.

Type designations are indicated as follows:

SM – single mode

MM - multi mode

Count designations are indicated as follows:

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.)

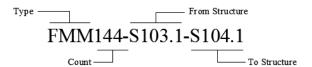
2, 6, 12, 24, 48, 72, 96, 144, 216, 288

Fiber Backbone

Example:

FMM144-S103.1-S104.1

Translation: fiber, multi-mode, 144-count, between structures S103.1 and S104.1



If more than one cable of the same type routes between the same structures, each cable should be appended with a numerical value following in sequence. Example:

FMM144-S103.1-S104.1-1, FMM144-S103.1-S104.1-2, FMM144-S103.1-S104.1-3, etc.

Translation: three multi-mode cables between structures S103.1 and S104.1



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. From the CABLE data dictionary matrix (See Data Dictionary exhibit), the following fields and their respective values are required:

CABLE ID

LEGACY_ID

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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.)

AIRPORT

AGENCY

CABLE_TYPE

CABLE_COUNT

FROM_STRUCTURE_ID

TO_STRUCTURE_ID

FROM_STRUCTURE_UNIT_ID

TO_STRUCTURE_UNIT_ID

FROM_EQUIPMENT_ID

TO_EQUIPMENT_ID

HAS_LEVEL

PROJECT

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

Butterfly diagrams (OSP) AutoCAD format; (See AutoCAD manhole/handhole butterfly exhibit; see also the OASIS standards for IT specific layering).

Spatial Data Deliverables

The entire OSP cable 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 (CABLE) should contain the attribute values from the *'Required Fields'* paragraph.

No Spatial Data required for ISP inventory.

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.)

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.

5.6.2 Copper Cable:

Identification

For GIS documentation purposes, only backbone/riser cable information is required.

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

All copper cable are identified by type, count and endpoint (structure) identifiers specific to their respective campus.

Type designations are indicated as follows:

UTP - unshielded twisted pair

STP - shielded twisted pair

TP - twisted pair

CX - Coaxial

Count designations for backbone runs are indicated as follows:

25, 50, 100, 200, 300

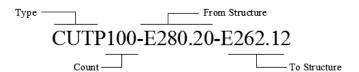
Note: no count designation is required for horizontal/drop copper cable

Copper Backbone

Example:

CUTP100-E280.20-E262.12

Translation: copper, unshielded twisted pair, 100 count, between structures E280.20 and E262.12



If more than one cable of the same type routes between the same structures, each cable should be appended with a numerical value following in sequence.

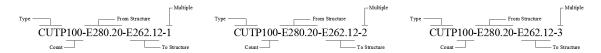
Project Title Proj./CIP No.

(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.)

Example:

CUTP100-E280.20-E262.12-1, CUTP100-E280.20-E262.12-2, CUTP100-E280.20-E262.12-3, etc.

Translation: Three, copper, unshielded twisted pair, 100 count, between structures E280.20 and E262.12

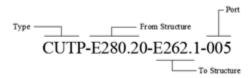


Horizontal

Example:

CUTP-E280.20-E262.12-005

Translation: copper, unshielded twisted pair between structures E280.20 and E262.12, landing port 005



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

All horizontal cabling is documented as part of the iPatch process (see Exhibits – iPatch SOP.pdf).

Each backbone cable requires that specific data be collected per unit. From the CABLE data dictionary matrix (See Data Dictionary exhibit), the following fields and their respective values are required:

CABLE_ID

LEGACY_ID

AIRPORT

AGENCY

CABLE_TYPE

CABLE_COUNT

FROM_STRUCTURE_ID

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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.)

TO_STRUCTURE_ID

FROM_STRUCTURE_UNIT_ID

TO_STRUCTURE_UNIT_ID

FROM_EQUIPMENT_ID

TO_EQUIPMENT_ID

HAS LEVEL

PROJECT

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 (see Exhibits – iPatch SOP.pdf).

Cable testing records; .pdf format

Butterfly diagrams (OSP) AutoCAD format; (See AutoCAD manhole/handhole butterfly exhibit; see also the OASIS standards for IT specific layering).

Spatial Data Deliverables

The entire OSP cable 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 (CABLE) should contain the attribute values from the 'Required Fields' paragraph.

No Spatial Data required for ISP inventory.

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.

5.6.3 Jumper Cables / Patch Cords / Cross-Connects:

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.)

n	Δ	nt	11	ica	tı	\sim	n
u	\mathbf{c}	ΙIL	,,,	u	u	v	,,

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).

5.7 **EQUIPMENT**

5.7.1 Splice Enclosures:

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.)

Identification

Even as pullboxes, cabinets, pedestals and splice enclosures provide access to cable in a similar way to manholes and handholes, splice enclosures are not administered to as STRUCTURES, but rather EQUIPMENT for the purposes of this standard.

Each splice enclosure has been assigned a unique campus identifier. All splice enclosure identifiers follow some specific schema; new splice enclosures must be identified accordingly. In the event that a determination cannot be made regarding the identity of the splice enclosure, please contact the HAS IT GIS representative prior to documenting.

All splice enclosures are identified through a numerical range specific to its respective campus and should be prefixed with 'SE'. The ranges are as follows:

Splice Enclosure Numerical Range:

IAH: 01-999 HOU: 1000-9999 EFD: 10000-99999

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 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 (P/N 18489)

Labels should be affixed to the splice enclosure housing.

Required Fields

Each splice enclosure requires that specific data be collected per unit. GPS equipment should be formatted to account for this information. From the EQUIPMENT data dictionary matrix (See Data Dictionary exhibit), the following fields and their respective values are required:

EQUIPMENT_ID

STRUCTURE_ID

SYMANTEC_TICKET

CABLE_ID

LEGACY_CABLE_ID

AIRPORT

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.)

AGENCY

PROJECT

COLLECTION_DATE

COMMENTS

LEGACY_ID

EQUIPMENT TYPE

EQUIPMENT_SUBTYPE

GPS

Each splice enclosure 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 splice enclosure depicting cable connections and cable counts for each splice enclosure in both .dwg and .dwf formats; 2010 or higher; (See AutoCAD splice enclosure exhibit; see also the OASIS standards for IT specific layering).

Spatial Data Deliverables

The entire splice enclosure 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 (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.

5.7.2 Slack Loop:

Identification

For the purposes of this standard and GIS modeling, slack loops are administered to as EQUIPMENT in the documentation process.

Each slack loop has been assigned a unique campus identifier. All slack loop identifiers follow some specific schema; new slack loops must be identified accordingly. In the event that a determination can not be

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made regarding the identity of the slack loop, please contact the HAS IT GIS representative prior to documenting.

All slack loops are identified through a numerical range specific to its respective campus and should be prefixed with 'SL'. The ranges are as follows:

Slack Loop Numerical Range:

IAH: 01-999 **HOU:** 1000-9999 **EFD:** 10000-99999

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

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

Required Fields

Each slack loop requires that specific data be collected per unit. GPS equipment should be formatted to account for this information. From the EQUIPMENT data dictionary matrix (See Data Dictionary exhibit), the following fields and their respective values are required:

EQUIPMENT_ID

STRUCTURE_ID

SYMANTEC_TICKET

CABLE_ID

LEGACY_CABLE_ID

AIRPORT

AGENCY

PROJECT

COLLECTION_DATE

COMMENTS

LEGACY_ID

EQUIPMENT_TYPE

EQUIPMENT_SUBTYPE

GPS

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Each slack loop should be recorded as follows:

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

Supporting Documentation Deliverables

No action required

Spatial Data Deliverables

The entire slack loop inventory should be delivered separately in ArcGIS feature class (version 10) format. This feature class (EQUIPMENT) should contain the attribute values from the 'Required Fields' paragraph.

Special Instructions

None

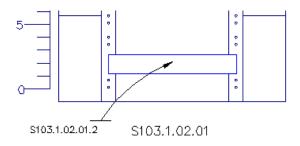
5.7.3 Devices / Components:

Identification

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

All device/components are identified through a numerical range specific to their respective structure; column and row and rack-unit. Rack-unit ranges are determined by maintaining a 1.75" incremental measurement from the base of the structure unit. 1 RU = 1.75".

Example:

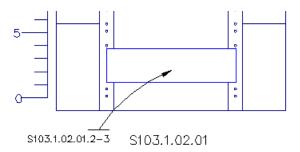


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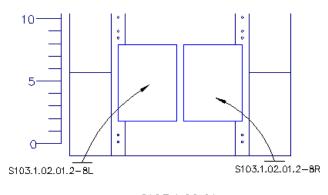
If the device/component occupies more than one RU, its identifier is appended with all RU-s occupied.

Example:



Some ISP scenarios will require the use of 'L' or 'R' to designate left or right when utilizing the same RU space designator.

Example:

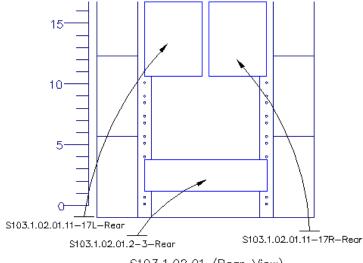


\$103.1.02.01

Further, in addition to the use of 'L' or 'R' to designate left or right when utilizing the same RU space designator, devices/components located to the rear of any structure unit will require the inclusion of 'REAR' in the identifier.

Example:

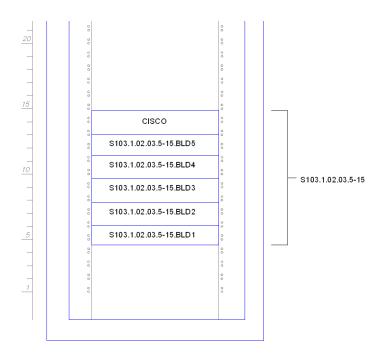
(These Guidelines are basic minimum criteria to be met in preparing the final specifications for this section, which is the responsibility of the Designer/Contractor/Installation Team.)



S103.1.02.01 (Rear View)

If the device/component occupies more than one RU and contains additional devices as would be the case with a switch chassis housing more than one blade. Its overall device identifier is still dependent on the number of RUs occupied. However, the blades themselves will need to be identified with BLD and numbered in sequence accordingly.

Example:



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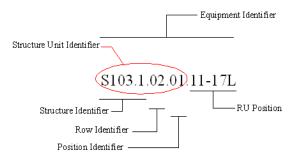
(These Guidelines are basic minimum criteria to be met in preparing the final specifications for this section, which is the responsibility of the Designer/Contractor/Installation Team.)

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

Label placement is dependent upon type of equipment but should be affixed to or as near to equipment as possible. For labeling purposes only, the structure unit i.e. rack, cabinet, backboard identifier can be omitted from the equipment identifier to minimize space required for the label. It will be assumed that all equipment housed by the same structure unit will carry the same structure unit identifier. *Note: this is for labeling purposes only; data collection records/tables must use complete identifier including structure unit.*

Example:



For labeling purposes only device/components such as a switch chassis - housing more than one blade, the structure unit i.e. rack, cabinet, identifier can be omitted from the equipment identifier to minimize space required for the label. It will be assumed that all equipment housed by the same structure unit will carry the same structure unit identifier. Further, pertaining to blades, the chassis identifier can be omitted. It is assumed that all blades housed within the same chassis will carry the same equipment identifier.



(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.)







Required Fields

OSP – limited to slack loops, splice enclosures and transitional (ISP to OSP or vice versa) devices: EQUIPMENT_ID

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STRUCTURE_ID

STRUCTURE_UNIT_ID

SYMANTEC_TICKET

CABLE_ID

LEGACY_CABLE_ID

AIRPORT

HAS_LEVEL

AGENCY

PROJECT

COLLECTION_DATE

COMMENTS

LEGACY_ID

EQUIPMENT_TYPE

EQUIPMENT_SUBTYPE

ISP - See iPatch SOP (see Exhibits - iPatch SOP.pdf)

GPS

OSP - No GPS action required

ISP - No GPS action required

Supporting Documentation Deliverables

AutoCAD – floorplan (where applicable) and rackface layouts of structure units depicting orientation, and/or configurations in both .dwg and .dwf formats; 2010 or higher; (See AutoCAD communications room exhibit; see also the OASIS standards for IT specific layering).

Spatial Data Deliverables

In terms of spatial data, the device inventory will be limited to OSP devices and some ISP devices where cabling transition between environments. Splices and Slack Loops are part of this inventory for GIS documentation purposes.

The entire equipment inventory should be delivered separately in ArcGIS feature class (version 10) format. This feature class (EQUIPMENT) should contain the attribute values from the 'Required Fields' paragraph.

Special Instructions

Devices/components are visibly marked with a reference tag identifying their rack-unit location. The Structure IDs and Unit IDs are omitted from the reference tag but should be included in the equipment tables.

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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.)

Newly placed devices/components will require that their identifiers be affixed to the equipment face. Utilize specified labeling device to accomplish the task.

5.7.4 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.

Example Outlet-Faceplate Identifier:

S103.1

Translation: Outlet serviced by IDF S103.1

In the event that a determination can not 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.



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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.



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; see also the OASIS standards for IT specific layering).

Spatial Data Deliverables

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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.)

No action required

Special Instructions

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.

5.7.5 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:

B (building/complex character) Terminal B

2 (level character) Level 2

057 (numerical sequence character) Contact # 057

CCM (CCM designation) Control Contact Monitoring

In the event that a determination can not 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

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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.)

TBD

GPS

OSP - No GPS action required

ISP - No GPS action required

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.

5.7.6 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 can not be made regarding the identity of a door contact, please contact the HAS IT Project Manager prior to documenting.

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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.)

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

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.

5.8 CONNECTIONS

5.8.1 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

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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.)

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.

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.

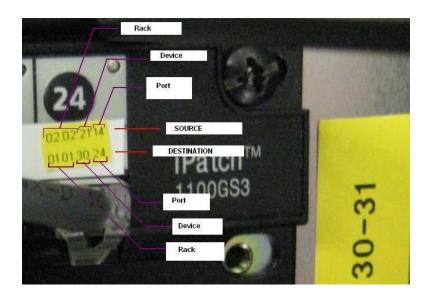
Regarding patch panels: ports are identified in sequence and may be prefixed with structure identifier references.

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.



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All port identifiers follow some specific schema; new ports must be identified accordingly. In the event that a determination can not 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



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 (P/N 18489)

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

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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.)

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

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6. STANDARD OPERATING PROCEDURES – BEST PRACTICES

6.1 Data Collection Methodology

6.1.1 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.

6.2 Outside Plant

6.2.1 Identify outside plant network locations as defined by project scope of work including all structures, spans, 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 - butter-fly layout depicting span 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 spans; ensure all attribute fields are populated.

Physically locate outside plant associated equipment; ensure all attribute fields are populated. Generally these will be the end-point terminations for cable located inside a facility. Since GPS locating equipment inside plant is not a practical application of the tool-set, this data is recorded in the master cable Excel spreadsheet.

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

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

Finalize, format deliverables

6.3 Inside Plant

6.3.1 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 units, structure units – equipment, equipment – ports, ports – cable.

Finalize, format deliverables.

END OF SECTION