ATTACHMENT A

MLIT CONSTRUCTION MANAGER AT RISK SCOPE OF SERVICES

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SECTION 1 - GENERAL

1.01 INTRODUCTION

A. The Houston Airport System (HAS) has identified a significant need for the development of additional facilities at George Bush Intercontinental Airport (IAH) to handle aircraft, passengers, and cargo departing to and arriving from, domestic and international destinations on scheduled and chartered flights.

B. To support the airlines' growth plans in Houston, HAS and airlines will complete a major Capital Improvement Program (CIP), known as the IAH Terminal Redevelopment Program (ITRP) and hereinafter referred as the "Program", that will include constructing a new 11-gate concourse (New Terminal C North currently under construction) undertaken by United Airlines (UA) and reconstructing and integrating the existing Terminal C North and Terminal D into a new single common-use international facility – the Mickey Leland International Terminal (MLIT), known as the "Project" undertaken by HAS. This Scope of Services is focused on the planning, programming, design and construction of the new MLIT including coordination of airside, landside and roadway improvements, and utilities to serve the Project boundary.

C. Capitalized terms used, but not otherwise defined, in this Exhibit shall have the same meaning as the terms defined in the body of this Contract unless indicated otherwise.

1.02 MLIT VISION

A. Key to this Project's success is to support the Houston Airport System's Vision Statement to establish Houston as a five-star global gateway where the magic of flight is celebrated. The Construction Manager-at-Risk (CMAR) will embrace the following HAS core values as they relate to the MLIT planning, design, and construction:

Relationships	Service
▪ We work together with integrity; treat every individual with courtesy and respect.	▪ We WOW our customers through a "can do" attitude and respond quickly to meet and exceed their expectations.
▪ We honor our commitments and behave in a manner that earns trust.	▪ We find ways to bring fun and joy into our work and bring customers along for the ride.
▪ We promote collaboration and teamwork across the organization.	▪ We respond promptly and effectively.
▪ We are reliable and trustworthy; we honor our promises and commitments.	▪ We show respect, compassion and let people know we care.
▪ We are open, positive and constructive in our feedback.	▪ We willingly provide the necessary time and effort to meet the customer's needs.

Relationships	Service
▪ We treat people like they want to be treated.	▪ We are flexible and adaptive in a dynamically changing business environment.
▪ We take responsibility for our actions.	▪ We display enthusiasm and passion for our work.
▪ We lead by example.	
Innovation	**Excellence**
▪ We have the courage and willingness to consider new and unconventional ways of thinking.	▪ We strive for quality and skillful execution without compromise.
▪ We assume responsibility for learning new things.	▪ We use the power of total employee involvement to achieve our organizational goals.
▪ We embrace new ideas.	▪ We foster a culture of shared values that gets things done.
▪ We listen with an open mind.	▪ We take calculated risks needed to achieve results.
▪ We are future-focused; "I've always done it this way" does not exist in our vocabulary.	▪ We look for new and more effective ways to do business.
▪ We recognize change as an opportunity.	▪ We encourage continuous improvement.

B. To support the HAS mission and core values, the MLIT design will adhere to the following overarching themes:

1. **Convenient,** simple, functional, and intuitive for the entire passenger experience;

2. **Flexible** design to safeguard for innovation and changes to technology, operations, and security;

3. **Technology-enabled** for automated processing and customer convenience;

4. Creating a **sense of place** reflective of the Houston community and environment;

5. **Contemporary** and timeless design with use of natural light for an open, expansive feel;

6. **Modular** features that enable off-site construction in controlled environments with on-site assembly to expedite construction, reduce material waste, control quality, and enable easier interior updates;

7. **Maintainable** facilities and systems that consider whole-life cycle costing; and

8. **Sustainable** and energy efficient.

1.03 MLIT PLANNING OBJECTIVES

A. The MLIT Program Definition Manual (PDM), dated December 2014, outlines the Program background, existing conditions, Program requirements, development plan, conceptual design criteria and Program phasing to be validated by the Design Consultant and CMAR. During the Program definition process, the HAS planning team generated guidelines and objectives through several sources, including interviews with HAS staff, workshops, and discussions with airport stakeholders. These sources guided the planning and subsequent design efforts for the MLIT as documented in the MLIT PDM.

B. The MLIT design shall address the following key planning objectives as stated in the MLIT PDM:

1. Provide additional international gate capacity within the Project boundary;

2. Provide a high level of customer service;

3. Meet airline requirements for contact gates and passenger processing facilities;

4. Replace aging infrastructure, ensuring a focus on the maintainability and total cost of ownership of new assets;

5. Develop a terminal facility that utilizes space efficiently;

6. Develop a terminal facility that maximizes concession revenue opportunities;

7. Increase opportunities for non-airline revenue sources;

8. Maximize airside envelope to establish flexible and high gate utilization; and

9. Maintain existing operations and number of wide-body gates during construction phasing.

C. Additional considerations include the following:

1. Plan for the complete passenger experience from drop-off through customs and baggage collection with clear wayfinding and physical flow that enables a simple and clear operation;

2. Address passenger needs for 24/7 operation that include available concessions, sleep pods, and comfortable lounge-type seating;

3. Consider pay-per-use club with services that may include a spa with shower facility;

4. Connection point between arrivals to the Federal Inspection Services facility must be seamless;

5. Design the terminal facility with adequate and functional support for back-of-house operations including maintenance and equipment room space;

6. Plan for concessions logistics – consider how materials and deliveries move though the facility from the loading dock to designated spaces, away from the

passengers and within a back of house environment; plan for centralized storage for concessions;

7. Consolidate operational spaces to support an efficient operation;

8. Design the facility to both integrate art within the terminal design elements and to consider placement of art when planning facility interiors;

9. Integrate advertising with the art program; plan for retail and commercial advertising to fit within the design;

10. Plan for the modern passenger, including mobile device charging stations;

11. Design for a tight building envelope that is properly sealed with energy efficient materials and glazing; and

12. Consider the passenger's luggage needs to enable unencumbered shopping and relaxation.

1.04 INTERNATIONAL CUSTOMER RESEARCH

A. To develop a deep understanding of the international customer hierarchy of needs in support of the Project, HAS conducted a series of focus groups to inform a conjoint analysis. Focus groups of business and leisure travelers were comprised of both US residents traveling internationally, as well as departing international travelers in the following regions: Mexico, Europe, Asia, and the Middle East.

B. The report describing a list of airport amenities and features to be considered as part of the Project design will be considered by the Design Consultant during design of the MLIT.

SECTION 2 - PROJECT DESCRIPTION

2.01 OVERVIEW

A. The new MLIT will replace both existing Terminal C North Pier and the entire Terminal D facility with a new single consolidated terminal building planned to occupy four levels. The south face of the new MLIT will be constructed to the north of the current building location to accommodate landside roadway improvements. The proposed new MLIT will be planned for 15 wide-body gates including 4 gates for A380 aircraft, depending on the fleet mix, primarily on two double-loaded pier concourses. These gates will also be able to accommodate up to 30 narrow-body aircraft in alternative configurations.

B. The new MLIT replaces all of the terminal processing functions of existing Terminal D, while expanding capacity and providing the desired passenger amenities and experience found in a world class international terminal. The Project includes all the work contained within the Project boundary as shown in **Attachment A** to this Scope of Services, such as the new MLIT and its associated landside and apron work and utilities; and connections to other airport facilities, such as terminal processor facilities at the Federal Inspection Services (FIS) located within Terminal E and connection to

Terminal B (Terminal New C North). The Project boundary will vary based on final design of the Terminal and Apron. In addition, provisions will need to be made for connection (with a future pedestrian bridge) between the MLIT and an existing parking structure over North Terminal Road as well as enabling direct access to a future hotel that may be constructed adjacent to the Project.

C. Work within the Project boundary, located outside the terminal building, is generally defined to include, but not be limited to:

1. Apron pavement systems and associated infrastructure and utilities, including but not limited to, grading and storm water drainage, apron lighting, potable water, sanitary sewer, preconditioned air, ground power, power and communications, passenger boarding bridges and foundations, and hydrant fueling system from the terminal building curtain wall to the tail-of-stand-road (vehicle service road), including the vehicle service road and pavement markings.

2. Hydrant fueling system design from the aircraft fueling hydrants to the NCN connection point of the main hydrant fueling system located south of Taxiway NB and east of NJ. Remaining apron pavement and utilities system design will be under a related project.

3. Landside work, extension of the utilities conveyance corridor to the east end of the MLIT footprint, and roadway modifications. Landside work includes roadway modifications required for improved flow of vehicular traffic in and around the MLIT, additional curbfront and bypass lanes in front of the terminal, and new signage and wayfinding. The landside project includes development on the landside, or public areas, along North Terminal Drive in front of the MLIT terminal and transition to the NCN terminal, and associated roadway utility work. The new MLIT curbfront will be shifted slightly north from the existing Terminal D curbfront to create space for new arrivals and departures lanes and curbsides, while reconstruction of the existing roadway will create bypass lanes through this congested area.

D. In order to maintain operation of the airport during redevelopment of the MLIT, construction of the Terminal and associated work will need to be phased. Preliminary considerations for Project construction phases are identified below:

1. Enabling Packages – Design Consultant and CMAR shall jointly develop Enabling Packages to be issued as early procurement (work) packages for Component Guaranteed Maximum Price (CGMP) proposals, such as temporary sterile corridor(s), temporary baggage handling system, hydrant fuel main extension from NCN tie-in to the tie-in at the existing fuel main, and other enabling projects identified during the preconstruction period.

2. D1 Pier and Western Terminal Processor and Frontal Gates

3. D2 Pier and Eastern Frontal Gates

4. D3 Pier and Eastern Terminal Processor

[Note that the D3 (East) Pier has been removed and replaced with an eastern approach façade and associated site development. Connection to the FIS must be maintained and program requirements within the D3 Pier are to be provided

as needed within the D2 Pier. This requirement supersedes the D3 Pier requirements as stated in the MLIT PDM.]

E. The Project is to be designed with constructability and passenger experience at its core. Therefore, the Project must be designed and constructed in multiple phases to allow continuation of passenger services in the existing terminals, while the existing Terminal D is decommissioned and demolished in phases. Construction phasing as described within the MLIT PDM is primarily a west to east flow of construction, where construction does not begin until United Airlines vacates the existing C North Pier following completion of the new Terminal C North (NCN) Pier. The City is evaluating an option; however, to accelerate construction by advancing construction of the D2 pier and constructing the new terminal from east to west. For planning purposes, the intent is that a minimum of six (6) contact gates remain operational during the MLIT construction, including four (4) positions for wide-body and two (2) positions for A380 aircraft.

F. Each phase of MLIT construction will require design and construction of temporary infrastructure to enable construction of the piers while maintaining existing operations and protecting the passenger experience. Design Consultant in collaboration with the CMAR will need to address the temporary infrastructure in each phased construction package to maintain passenger, landside, airside, airport wide work, utilities infrastructure, and Terminal E FIS access and control of sterile corridors. In addition, logistics management must be ensured within the MLIT and back-of-house corridors and building access during each phase of construction. The CMAR will identify construction phasing options that enable efficient Project construction while fully satisfying the operational requirements of the airport. The CMAR will collaborate with the Design Consultant to ensure that design of the temporary and final facilities enables maintenance of operations and efficient construction.

2.02 PROGRAMMATIC FUNCTIONS

A. The Project includes international passenger services and support facilities including: ticketing check-in, hold rooms (departure lounges), baggage handling and claim areas, passenger and baggage screening, passenger amenities, customer service areas, and non-airline facility support space. The Project will include, but is not necessarily limited to, programmatic functions listed below:

1. Ticket Counter and Support Areas
2. Security Checkpoint lanes with safeguarded planning for growth plus a separate employee security checkpoint
3. Baggage Handling Systems
4. Federal Agency Facilities
5. Checked Baggage Inspection System
6. Concourses and Hold rooms
7. Children’s play areas

8. Lactation Rooms (Mother's Nursing Stations)

9. Airline Operations Area Shell Space

10. Airline Clubs Shell Space – plan for minimum 70,000 square feet (total of 7 clubs) with vertical circulation at the club level and provision for direct club level boarding access for two A380 and one wide-body aircraft parking positions. *[NOTE: This space requirement supersedes requirements stated in the MLIT PDM.]*

11. Friends, Family and Relatives Center (FFRC) that may also be planned as part of Airline Club space

12. Airside Systems, Paving, and Utilities into and out of the building as coordinated with the related projects

13. Governmental VIP Suite (Diplomatic Room) for visiting dignitaries located on the departure level

14. Performance stage on departure level in high traffic area

15. Furniture, Fixtures and Equipment (FF&E)

16. Art Program Coordination and Provisions

17. Tenant/Concessionaire Shell Spaces for Food, Retail, Convenience, and Ancillary Services (to be built-out under separate contracts per phased construction) including Concessionaire Storage. Concessionaire space to be planned at the central core area and at the gates. Include consolidated vending areas planned as part of Concessionaire space.

18. Customer Service Areas

19. Loading Dock

20. Ground Transportation Facilities

21. Interior/Exterior Dynamic and Static Wayfinding Devices, including Airside Gate Signs

22. Passenger Boarding Bridges (PBB) - plan for two PBB at all wide-body and three PBB at all A380 capable gates

23. Aircraft Pre-Conditioned Air (PCA) Systems

24. Aircraft Ground Power 400 Hz Systems

25. Passenger Conveying Systems (vertical/horizontal circulation)

26. Passenger Information Communications Systems, Flight Information Display Systems (FIDS)

27. Baggage Information Display System (BIDS), Ramp Information Display System (RIDS), and Gate Information Display Systems (GIDS)

28. Aircraft Potable Water

29. Aircraft Sanitary Waste

30. Aircraft Guidance Parking System

31. Ground Service Equipment Battery Charging System

32. Building Systems (Structural, Curtainwall, Plumbing, Fire Protection, Mechanical, Electrical, Utility, Communications, and Security)

33. Modifications to existing Terminal B-D connector to allow connection to the new facility

34. Extension and modifications to existing tunnel connecting the FIS in Terminal E to the Project

35. Flexibility for direct connection to a future hotel

36. Hydrant Fueling System for identified aircraft layout

2.03 RELATED PROJECTS

A. CMAR shall coordinate with Design Consultant and other design teams, the Program Management Team (PMT), airline representatives, project stakeholders, and other tenants and contractors executing concurrent capital improvement and tenant improvement projects, with respect to all aspects of this Project. The following projects are either in construction or are planned to be awarded under separate procurement packages for separate project delivery.

B. The CMAR will be required to collaborate with the design consultants and contractors for these projects and other project being performed at IAH to facilitate applicable linkages with the MLIT Project.

C. The CMAR is responsible to collaborate to ensure that required operation of the airport is able to be maintained across applicable project sites.

2.03.1 UNITED NEW TERMINAL C NORTH (NCN) PIER

A. This project's design and construction is being managed separately by United Airlines with expected final completion by Second Quarter 2017. The project will construct a new concourse pier on the north ramp in between the existing Terminal B North gates and the existing Terminal C North Pier. At completion of the NCN (referred to as Terminal B in the PDM) project, United Airlines will vacate the existing Terminal C North pier and relocate operations to the NCN. This will allow demolition to begin on the existing Terminal C North pier, which is required for the construction of the Project.

B. In addition to the terminal, the NCN Project scope includes:

1. Terminal B to D Connector: This is the small linear pier running parallel to the terminal roadway west of the existing Terminal C North Pier, containing existing Gates C24-C27 and a United Club lounge. This area and two bays of concessions is the only portion of the Terminal C North Pier that will remain when the pier portion of the concourse is demolished to make way for the new MLIT D1 pier. The west end of this facility will be modified to integrate with the

NCN Pier. After demolition of the existing Terminal C North pier, the east end of this facility will be integrated with the new MLIT.

2. Renovation of Gates C24-C27 and the United Club lounge is United Airlines' responsibility, within the NCN Project. Renovation of the two bays of concessions is the responsibility of this Project. The purpose of maintaining the two bays of concessions area is to provide access for United Airlines to and from the NCN to the existing C Processor, and to provide vertical circulation service to the apron level. Phased construction of the MLIT will demolish the existing Terminal C North Pier, which serves as the connection between the existing C Processor, APM Station and the B-D Connector. For the B-D Connector to have continued access to the C Processor and APM station, a temporary pedestrian bridge will need to be constructed. The MLIT Design Consultant and CMAR teams will be responsible for maintaining this connection.

3. NCN Roadways and Drainage: There will be no new passenger ticketing, baggage claim, or curbfronts associated with the NCN project; however, there will be phased landside demolition and construction associated with a new Utilidor and to maintain acceptable vehicle access for terminal and airside support services operations. Landside North Terminal roadways will be completely rebuilt at the end of the program.

4. NCN Apron and Utilities: NCN apron and utilities consist of all the supporting apron and underground utilities associated with the NCN pier concourse. Utilities include the high voltage system, sanitary sewer, storm sewer, domestic water, fire protection, natural gas, and jet fuel. Design and construction of these facilities are the responsibility of United Airlines. The jet fuel main line system, which is in conflict with the NCN project site, will be demolished and rerouted around the north end of the NCN and extend along the north side of the NCN Project site and capped within a new vault for future connection to the MLIT Project. A new hydrant fuel loop system will be installed around the entire NCN, tapping off the new lines and connecting to the existing system near the east end of the B-D Connector.

2.03.2 ITRP ENABLING UTILITIES - LANDSIDE

A. This project is being procured under a separate design-build project, expected to commence during fourth quarter 2016 with construction expected to start by the third quarter 2017. The project scope includes design and construction of water storage tanks and distribution pumping for domestic and fire protection water service to IAH terminal facilities; reclaimed water (treated at the City of Houston wastewater treatment plant) that is planned for use at IAH facilities for cooling tower make-up, irrigation, and flushing toilets; chilled and heating hot water distribution from the IAH central utility plant; 12.5kV site power distribution from a new electrical receiving station; a new 2MW standby power generator to serve the Project on a prioritized load basis; and information technology, communications, and fiber optic (FO) trunk lines including new SCADA system, to be constructed within an underground concrete utility conveyance corridor (Utilidor) below the north side of the vehicle service road. The Utilidor and services will be terminated at the west end of the Project boundary, where

it will be connected to the MLIT Project. This Project includes design of utilities services to the MLIT from the Utilidor connection point.

B. The Utilidor will include installation of required utilities for the NCN and MLIT projects. The Utilidor will be sized to accommodate installation, maintenance, replacement, and access for operations and maintenance staff to service piping, valves, fiber and cabling installed within the Utilidor. At designated points of service, the Utilidor will branch off and connect to the NCN and MLIT buildings, as well as provide for future service connections to other central terminal area facilities, for service connections to mechanical, electrical, and communications rooms.

C. The Utilidor will be constructed in segments to align with the service needs of the MLIT construction phases. The design and phased construction approach will take into account the potential need for direct-buried temporary chilled and heated water supply lines which may be required outside the Utilidor.

D. Refer to the IAH Utilities Master Plan, dated September 12, 2014, for additional detail related to utilities planned to serve the MLIT.

2.03.3 EAST AIRCRAFT PARKING HARDSTAND

A. This project is being procured under a separate design-build project, expected to commence fourth quarter 2016, with construction expected to start by the third quarter 2017. The project scope includes design and construction of a new aircraft parking hardstand to be constructed northeast of the Project boundary and will enable construction of the proposed Project by providing a new apron parking area for boarding, de-boarding, and parking of aircraft that may be displaced by the Project construction. The hardstand will provide gate support services (i.e., hydrant fueling, ground power, pre-conditioned air, etc.) for aircraft utilizing the parking positions.

2.03.4 MLIT APRON AND TAXILANES

A. This project includes new apron pavement systems and associated infrastructure and utilities from the outer edge of the tail-of-stand road (vehicle service road) to the object free area of Taxiways NB and SF. Design and construction management services for this project is planned to be procured separately during the fourth quarter of 2016, with construction expected to start during the second quarter of 2017.

This project, which will be constructed immediately adjacent to and around the perimeter of the MLIT Project, will require specific coordination between the projects.

2.03.5 FEDERAL INSPECTION SERVICES (FIS) RENOVATION AND EXPANSION

A. The FIS Renovation and Expansion project will enlarge the existing FIS to improve operations and provide increased capacity to meet growing demand. This project includes renovation of the existing FIS facilities for improved functionality, expansion eastward of the baggage handling system, and a new dedicated CBP parking structure. This project requires close coordination with the MLIT to enable maintenance of existing operations and to construct the connections between the MILT Project and the reconfigured FIS.

B. Design and construction management services for this project is planned to be procured separately during the second quarter of 2016, with construction expected to start during the second quarter of 2017. The PDM for this project will be available for review.

2.03.6 AIRPORT-WIDE SYSTEMS

A. Airport-wide Systems projects are associated with, and needed to properly develop and operate the facilities defined in the ITRP. Not all are required to be completed before the Project is initiated. These projects range from additional off-site power distribution system improvements needed for service reliability, to information technology backbone improvements, and inter-terminal train (ITT) system improvements.

2.03.7 TENANTS

A. Tenant improvements are projects within the MLIT that third party tenants are responsible for designing and constructing the build-out. There are five major groups of tenants responsible for space build-out within the program: Airlines, concessionaires and third party service providers, Customs and Border Protection (CBP), Transportation Security Administration (TSA), plus other federal agencies. Their construction and/or installation of equipment must be phased and coordinated with the each of the construction phases so that tenant improvements are operational with the opening of that phase of the Project. Primary tenants providing design and construction components of the ITRP are federal agencies related to safety, security and border protection, the airlines, and concessions. Some of these agencies provide their own design guidelines as referenced in the PDMs. Both airlines and concessions have public (customer) and back-of-house areas.

2.03.8 PROGRAM MANAGEMENT OFFICE (PMO) BUILDING

A. To improve program management efficiency and interaction between HAS staff, stakeholder representatives, the PMT, plus the multiple consultant and contractor organizations, HAS will be constructing a Program Management Office (PMO). The PMO will provide a centralized facility for all designated HAS staff members, designated stakeholder representatives, the PMT's key staff members, PMSS teams, principal consultant and contractor staff members, and other designated personnel. In addition, the PMO will provide conference and training facilities to support the ITRP and a consolidated location for all ITRP-related document control, records management, reproduction, and CAD/GIS functions. The PMO will be located at 115 Standifer Road.

B. The CMAR may be required to house key management personnel during design and construction in this location to enhance collaboration with the Project Team. To facilitate work planning, HAS may provide laptop computers, monitors, and project management-related software for the CMAR's personnel based in the PMO. Worker parking and a transportation staging area is planned to be located in proximity to the PMO site for support of workers on the Project site.

C. Prior to completion of the PMO, the HAS may provide alternate office space within or near IAH boundaries for the CMAR to perform Services, which is subject to availability.

2.03.9 HAS INFRASTRUCTURE

A. Additional projects either planned or in construction at IAH, identified within the HAS Capital Improvement Plan (CIP), include taxiway rehabilitation and additional airfield improvement projects, plus utility infrastructure projects.

2.03.10 FUTURE PROJECTS

A. In addition to the above identified projects, the CMAR will be required to interface with projects defined in the future that may not yet be identified as part of the CIP.

SECTION 3 - PROJECT ADMINISTRATION

3.01 GENERAL SERVICES

A. The CMAR shall be required to provide complete Preconstruction Services and perform all Construction Work associated with the Project, including furnishing of all, labor, materials and equipment, necessary and reasonable to complete the entire contemplated scope of Work in accordance with HAS requirements and the terms of the Contract. The Work includes, but is not limited to; permitting, supervision, testing, inspection, integration, commissioning system components and interfacing with third-party commissioning services provider for integrated systems testing, information technology, systems integration and activation, regulatory requirements, project closeout, and all necessary general conditions that maybe reasonably inferred.

B. The CMAR will be designated as the “Prime Contractor” for the MLIT Project.

C. The CMAR will be required to coordinate and work with the Program Management Team (PMT) and the HAS contracted Design Consultant. There will be a separate Design Consultant being procured by HAS under separate solicitation for the Project.

D. The CMAR is responsible for the management and implementation of general services works and security for the Project site. This includes, but is not limited to: management of miscellaneous site preparation activities, escorting and work force transportation to and from the areas of work, subcontractor/trade work force logistics, clean-up and housekeeping, temporary works for construction, public safety barriers, fencing, partitions etc., traffic maintenance, and temporary signage.

E. The CMAR is responsible for management of the Project environmental plan and sustainability initiatives related to the site. This includes the tracking, disposition and reporting of demolition work, salvage of any materials, and reuse of any materials.

F. Some work will be completed within the secure area of the airport. Security Identification Area or SIDA badges will be required for employees, as will full security measures and escorting.

G. A portion of the Project may be funded by the Federal Aviation Administration (FAA) Airport Improvement Program and airport collected passenger facility charges. All work for the Project must be awarded to subcontractors via an open and fair competitive procurement process. The CMAR will be required to administer a bidding process to select subcontractors for the Project. The CMAR's competitive procurement process must be open, fair and transparent, and should result in the CMAR selecting subcontractors that provide the best value to HAS.

3.02 PROJECT ROLES AND RESPONSIBILITIES

A. This section defines general roles and responsibilities for the entities involved in the Project.

B. HAS, EPM and PMSS representatives comprise the Program Management Team (PMT).

Entity	Responsibility
City of Houston (City)	▪ The City of Houston is the owner and approver of all Contracts executed for work at Houston Airports, including the Intercontinental Airport of Houston (IAH). ▪ The Houston City Council approves all Contracts and changes to Contracts, unless otherwise delegated. ▪ Delegated authority for work within the Houston Airport System is granted to the Director of the Department of Aviation.
Houston Airport System (HAS)	▪ HAS, through the Director (Department of Aviation) or their designee, represents the City of Houston with respect to management and operation of the Airport. ▪ Use of the terms City or HAS may be used interchangeably. ▪ Approves, makes decisions throughout project phases ▪ Ensures that HAS required decisions are made in a timely manner. ▪ Facilitates communication with City of Houston, Department of Public Works and Engineering (PWE) and Building Standards Group (BSG) to keep all parties informed of project progress and construction permit submittals. ▪ Provides key input on owner requirements related to planning, art program, technology, finance, operations, maintenance, security, and safety.

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Entity	Responsibility
Executive Program Management (EPM) Team	▪ Provides overall leadership of the ITRP and advises HAS on project status and key decisions affecting scope, schedule, budget, safety, and quality. ▪ Develops policies, procedures, and execution plans to deliver the Program and Projects. ▪ Coordinates all work to be undertaken with HAS divisions, HAS departments and external stakeholders (such as airlines, concessionaires) as necessary for the timely and quality execution of the Program. ▪ Engages and collaborates with airlines and other airport stakeholders to minimize disruption of operations and services throughout the duration of the Program.
Program Management Support Services (PMSS) – Project Management	▪ Led by Project Manager representatives from Program Management Support Services (PMSS) staff; provides overall management of the ITRP Projects. ▪ Acts as interface between the Executive Program Management Team, the Design Consultant and the Construction Manager at Risk (CMAR). ▪ Ensures integration and execution of project-specific controls systems. ▪ Manages contracting and project management processes through all phases of design and construction. ▪ Ensures change management decision-making is defined, documented and understood. ▪ Provides overall administrative management of contracts with the design consultants and construction contractors.
Program Management Support Services (PMSS) Team - Construction Management	▪ Led by Construction Manager representatives from the Program Management Support Services (PMSS) staff; provides management of contractors engaged to deliver ITRP projects. ▪ Provides management of cost, schedule, quality, security and safety. ▪ Manages contracting and project management process through all phases of construction. ▪ Manages the contractor's performance in accordance with the terms and conditions of the Contract.

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Entity	Responsibility
Program Management Support Services (PMSS) Team - Design Management	▪ Led by Design Manager representatives from the Program Management Support Services (PMSS) staff; provides management of design consultants engaged to deliver ITRP projects. ▪ Provides management of the design process, managing scope to budget, compliance with project requirements plus safety and security throughout design. ▪ Manages and tracks design from concept through construction permit packages and delivery of record close-out documents. ▪ Manages the design review process through all phases of design. ▪ Manages the Design Consultant's performance in accordance with the terms of the Contract.
Design Consultant Project Manager	▪ Design Consultant provides execution for all phases of design to produce a final design that achieves Project objectives, scope, schedule, safety in design, and budget. ▪ As prime consultant, leads and coordinates sub-consultants and specialty consultants.
Construction Manager at Risk (CMAR)	▪ Provides management during preconstruction and construction phases for cost, schedule, work package planning and sequencing, quality, safety and constructability. ▪ Performs design reviews and provides recommendations for design alternates to identify and resolve. constructability issues and to assist in maintaining budget and schedule. ▪ As prime contractor, leads and coordinates all sub-contractors.
Commissioning Authority (CxA)	▪ Verifies testing and operational intent of all applicable elements of the Project scope ▪ Performs design phase reviews focused on 'commissionability', functionality, maintainability, sustainability and best practices. ▪ Participates in concurrent design phase reviews with the PMT, other consultants and contractors, as applicable. ▪ Develops overall Commissioning Plan requirements as the basis for the CMAR to develop the Project technical commissioning plans.

3.03 HOUSTION AREA CONSTRUCTION EDUCATION COLLABORATIVE

A. The Houston City Council has approved funding for Lone Star College to train construction workers and trades at an IAH facility to be renovated for this purpose. The Houston Area Construction Education Collaborative (HACEC) will operate out of this facility. It is the intention that the CMAR become aligned with this initiative, employ graduates of the program, and integrate these skilled workers into the Project workforce.

B. The HAS, in partnership with local community colleges, has formed the HACEC. The mission of the HACEC is to provide safety and security training, as well as construction trade skills training, to construction contractor employees. HAS funds the delivery of the training curriculum through payment of a per-labor-hour contribution for every hour worked by construction contractor employees on HAS-designated capital projects.

C. All ITRP construction contractor employees are required to successfully complete the HACEC safety/security training prior to mobilizing on the job site.

SECTION 4 - PHASE 1 PRECONSTRUCTION SERVICES

4.01 OVERVIEW

A. The period of performance for Phase 1 Preconstruction Service will commence with an issuance of a Notice to Proceed (NTP) and will terminate upon HAS's acceptance of the MLIT GMP in accordance with the Work Phases and Milestones section of the RFQ.

1. Immediately upon issuance of the NTP, the CMAR shall thoroughly review and become familiar with the Project scope, requirements and constraints, including:

    a. The goals and objectives of the Project

    b. Development and management of the Design to Budget

    c. Required project construction quality standards and requirements

    d. The development of project reports

    e. The needs and requirements of HAS and other Project participants

    f. The Project site available records, as-builts, specifications, local conditions and all related limitations and constraints

    g. Schedule assumptions and constraints

2. CMAR services are intended to be provided in a collaborative Project team environment. The CMAR is required to be engaged in the Project Design and Construction Document development process working with the PMT and

the Design Consultant. The CMAR shall collaborate, advise, assist, estimate, schedule and provide recommendations to members of the Project team on the design and construction aspects of the Project.

4.02 KEY PERSONNEL

A. The CMAR shall provide all dedicated Key Personnel and support staff at the start of Preconstruction Services and throughout the Project as necessary to complete all Preconstruction and Construction Phase Services.

B. The CMAR Key Personnel shall be located on-site at an HAS-provided facility and shall be dedicated to the Project to perform those tasks required in the Contract.

4.03 PRECONSTUCTION MEETINGS

4.03.1 KICKOFF MEETING

A. Prior to commencing work and at a specific time and place to be determined by HAS, meet with the PMT for a Project kickoff meeting. The PMT, CMAR's key personnel, Design Consultant and the Project team key personnel will be required to attend the Kickoff Meeting. The goals of the kickoff meeting are:

1. To integrate the CMAR with the Project team
2. To achieve consensus from the overall Project team on any issues and concerns
3. To confirm that Scope of Services requirements are understood
4. To establish and explain policies and procedures for completion of a successful project
5. To establish expectations of the Project schedule
6. To establish expectations of the ongoing cost estimate process
7. To establish clear lines of communication and points of contact for each Project team

4.03.2 BI-WEEKLY PROJECT UPDATE MEETINGS

A. Following the Kickoff meeting, the CMAR shall organize and lead Bi-weekly Project Update Meetings throughout the duration of the Contract. The Bi-weekly Project Update meetings shall be attended by the CMAR and PMT key personnel. The purpose of this meeting is to address design, construction and other risks and elements affecting the Project. The CMAR shall use this meeting to review and update the following project related matters to the PMT:

a. Safety (Incident) Management
b. CMAR's Risk Management Register/Issue Log
c. Design Development Issue Log

d. Potential Change to the Work

e. Coordination and Logistic Planning

f. CPM Schedule (Critical Path or Near Critical Path)

B. Any issue in the opinion of the CMAR and/or the PMT that has the potential to impact the planning, management, or execution of the Project will be discussed in the Bi-Weekly Update Meeting. Such as maintaining the budget, schedule, scope and quality objectives.

C. The CMAR shall submit the aforementioned project update documents to the PMT at least three business days prior to the Bi-weekly Project Update Meeting.

4.03.3 DESIGN PROGRESS MEETINGS

A. The PMT will schedule regular Design Progress Meetings to monitor progress of the Design portion of the Work. These meetings will start within 30 days from the date of the Phase 1 NTP after the project is awarded to the CMAR and will occur as follows:

1. Phase 1 Design to Budget Period: Once a week minimum and as required to accomplish the Design to Budget task.

2. Phase 2: Bi-weekly until submittal completion then as needed and determined by the PMT.

B. Attendee: Design Progress Meetings will be attended by:

1. The PMT

2. The CMAR's key personnel

3. Major subcontractors as they become available.

4. Others as directed by the PMT

C. Agenda: The Design Consultant will be responsible for developing the meeting agendas in collaboration with the CMAR. The purpose of the meeting is to discuss significant items that could affect completion of the Construction Documents and that have a major impact on the quality, cost and overall schedule of Work.

D. Minutes: The CMAR will record and distribute meeting minutes, regardless of whether someone else is also doing the same to facilitate verification of a complete and accurate understanding of the meeting. The minutes shall be issued to the PMT for review and comment within two (2) days of the meeting.

4.04 PRELIMINARY SCHEDULE

A. The CMAR shall coordinate the requirements of this Section with Specification Section 01 32 16, Project Schedules and Progress Reporting.

B. Within Thirty (30) days after NTP, the CMAR shall prepare and submit a preliminary schedule for execution of the Work for PMT review and response.

C. The Preliminary Schedule shall include Design Consultant's design activities as appropriate to identify the collaborative activities between the CMAR and the Design Consultant.

D. The CMAR shall update the Preliminary Schedule as required to reflect progress of the Work and as indicated in the Contract. Such updates shall not be construed as relieving the CMAR of its complete and exclusive control over the means, methods, sequences, and techniques for executing the Work.

4.05 DESIGN TO BUDGET

A. Within forty-five (45) Calendar Days of NTP for Preconstruction services, the CMAR and Design Consultant will develop a cost component framework (template). The CMAR and Design Consultant will jointly use their experience, knowledge, and industry information from similar projects to develop an initial Probable Cost of the Work. The cost component framework, the Probable Cost of the Work, and the Agreed Cost of the Work must be approved by the Director prior to proceeding with Schematic Design.

B. During the design process, the CMAR shall conduct site visits and field investigations to ensure plans and specifications accurately reflect current field conditions and make recommendations for changes to the plans and specifications if necessary, based on these findings.

C. During the design process, the CMAR will conduct constructability reviews and provide input and suggestions to align the design with the Agreed cost of Work. The CMAR, working with the PMT and the Design Consultant will perform more detailed analysis of selected items to include analysis of alternative methods, systems, materials, equipment, or designs feasible to complete the construction at the lowest reasonable cost while achieving HAS's Project objectives.

D. The CMAR will evaluate opportunities and make recommendations to improve maintainability and sustainability and reduce lifecycle costs and energy use.

E. The Probable Cost of the Work shall not exceed the Agreed Cost of the Work accepted by the Director.

F. Cost Estimating and Reporting

1. The CMAR will provide cost estimating throughout the Preconstruction and Construction Phases. The CMAR will utilize an electronic data-base program to research and store pricing of various construction items. All estimates will build-off and reconcile to the approved Probable Cost of the Work. The estimates developed by the CMAR at each Design Milestone (30%, 60%, 90%, and 100%) in addition to the monthly estimates, will be used by HAS during negotiations with the CMAR to set the GMP or CGMPs. All estimates shall be open book.

2. The CMAR will work with the PMT's cost estimators in reconciling methods and information sources for the pricing of construction elements. As estimates are developed, the CMAR shall develop a system to manage and organize the various estimates utilizing the Work Breakdown Structure (WBS) provided by the PMT.

3. During Preconstruction, the CMAR will provide monthly cost estimate reports. The reports shall include the updated Probable Cost of Work, changes and variances from previous report and/or selected milestone reports, constructability review summary, list of value engineering/lifecycle cost reduction recommendations, and market updates.

4. Once construction is authorized, the CMAR will provide a monthly budget report/buy-out report with their request for payment summarizing the Work accomplished in the month for which the request is being submitted, the forecast cost to complete, a summary of the pending and authorized GMP or CGMP adjustments, Work planned for the following month, progress percentage complete of Work deliverables, current status per budget line item, plus variances and deviations from the Agreed Cost of Work.

G. Cost Estimate Reconciliation and Presentation

1. Design Consultant will submit design options and deliverables throughout the Design Phases to the CMAR, through the PMT, in order for the CMAR to provide cost estimates. The CMAR will conduct meetings with the Design Consultant participates and the PMT to discuss the CMAR's cost estimates, receive clarification, and reconcile any differences that may exist. Following the cost estimate reconciliation, the Design Consultant in collaboration with the CMAR will prepare a technical memorandum describing the cost estimate resolution process and any remaining unresolved differences between the respective estimates in relation to the Agreed Cost of The Work.

2. The PMT will arrange a meeting between the Director, CMAR, and the Design Consultant to discuss the technical memorandum, the reconciled cost estimate and any outstanding differences. This meeting will include discussion of the unresolved differences in the estimates and if the estimate exceeds the Agreed Cost of the Work, identify areas where the progressed design can be modified to bring the Project within the Agreed Cost of the Work. The technical memorandum shall include an assessment of the impact of potential changes to the progressed design on aesthetics, function and impact to the maintainability or efficiency of the Project. The intent of the meeting is to obtain acceptance of any design modifications and the Agreed Cost of the Work from the Director.

3. The PMT will document decisions reached and any Agreed Cost of the Work adjustments resulting from the cost estimate presentation meeting.

4.06 DEVELOPMENT OF THE GUARANTEED MAXIMUM PRICE (GMP) OR COMPONENT GUARANTEED MAXIMUM PRICE (CGMP)

A. When the Design Consultant has completed and issued the Design Development (60% Design Completion) submittal, the CMAR shall be responsible for preparing and submitting a proposed GMP to construct the MLIT within the within the Agreed Cost of the Work.

B. The PMT will develop a parallel estimate which will be used to reconcile and negotiate the GMP which, when accepted by the Director, will be submitted to the Houston City Council for approval.

C. Should HAS and the CMAR not be able to reach an agreement on the GMP, HAS may, at their sole discretion, use the work products produced to-date to complete the Project.

D. HAS will require a GMP for the Project no later than the 60% Design stage; however, HAS may authorize the CMAR to proceed with early packages in order to meet the Project schedule. If early packages are issued, an independent CGMP submittal and negotiation process will be followed.

E. HAS will issue a request to the CMAR to establish the GMP or CGMP Proposal for the complete Project or for multiple Work Packages(s). The CMAR shall deliver to HAS a proposed GMP or CGMP Proposal, with a detailed estimate prepared by the CMAR which will be reviewed by the PMT before being deemed to be adequately supported prior to submittal to the Director for review and acceptance. Each GMP or CGMP proposal shall include the following sections:

1. Section One: Summary of Work, including a list of all Construction Documents.
2. Section Two: GMP or CGMP Price Summary with line item Schedule of Values.
3. Section Three: Project Team and Burden Rates
4. Section Four: Scope Clarifications and Assumptions.
5. Section Five: Procurement Plan.
6. Section Six: GMP or CGMP Construction Schedule.
7. Section Seven: Analysis of impact on the Total Construction Budget and Project Schedule.
8. Section Eight: MBE/WBE/DBE/SBE participation level, including a total-to date participation level status report.
9. Section Nine: Permitting Plan.
10. Section Ten: Risk Management Plan.
11. Section Eleven: Construction Work Plan.
12. Section Twelve: Commissioning and Activation Plans.
13. Section Thirteen: Project Manuals.
14. Section Fourteen: Bonds.
15. Section Fifteen: Insurance.

F. In addition to the Cost of Work, a GMP or CGMP may include agreed-to allowances needed to complete the scope of work that cannot be defined in a bid package or the CMAR's Contingency. This Contingency is the CMAR's contingency and may not be used for any costs not specifically allowed herein and may only be used with the PMT's written permission. The PMT shall track the net, cumulative unused Contingency until Project completion, at which time the balance of the unused Contingency will revert to City.

G. For the GMP or each CGMP, the CMAR shall develop a corresponding Schedule of Values, including the Schedule of Stored Materials, if applicable.

H. The GMP or each CGMP will be subject to modification for changes as allowed by the Contract Documents.

I. The actual price paid by the City to the CMAR shall be the actual incurred Cost of Work plus the CMAR's fee as defined by the Contract.

4.07 CMAR MANAGEMENT PLAN

A. Within Thirty (30) days after NTP, the CMAR shall prepare a CMAR Management Plan, to be reviewed and accepted by the PMT, which documents the CMAR's plan for delivery of the Project. The CMAR Management Plan shall be updated monthly to reflect actual project progress and shall be submitted to the PMT at least one week prior to the Monthly Progress Review Meetings. The CMAR Management Plan shall address, but not be limited to:

1. Project Management and Administration Plans.

    a. Project communications plan in accordance with ITRP policies and procedures.

    b. Preconstruction and Construction Organization Chart.

    c. Schedule management plan.

    d. Management reporting plan.

    e. Pay request preparation and submittal plan.

    f. Record keeping and document control plan.

    g. Change management plan.

    h. Project Procurement Plan

    i. Material Management Plan

    j. Coordination and Logistics Plan

    k. Subcontracting Plan

    l. Construction Work Plan

2. Preconstruction Evaluation Report

    a. Project Schedule incorporating design activities and progress.

    b. CMAR's constructability recommendations including construction phasing, site logistics and traffic control.

    c. Identify opportunities for increased efficiency and/or innovation.

d. Material recommendations and risks due to inflation, lead times, resource availability and supply demands.

e. Design option reviews including a comparison of the risks and benefits of the different design element types and their corresponding schedule, cost, construction related impacts.

f. Development of the Project Procurement Plan outlining supporting CMAR deliverables and project buy out.

g. Forecast and Trend Reports that identify and itemize specific events which cause Design to Budget variations.

h. Any issue that, in the opinion of the CMAR, should be considered in the planning, management, or execution of the Project to maintain budget, schedule, scope and quality objectives.

i. Recommendations and identification of issues concerning the Project schedule, risk analysis and mitigation, and other required information updated based on the design development and changes to the Project known at the time of submittal.

3. Risk Management Plan

a. The CMAR shall prepare a Risk Management Plan that will include risk identification, allocation and mitigation based upon the Work Package(s). Risks to be addressed include, cost, schedule, design/constructability risks, and any other matter that affects the execution of the Project. The CMAR shall work with PMT to review and update the preliminary list of preconstruction and construction related risks. The CMAR shall conduct risk analysis workshops to develop a Risk Matrices and supporting documents for the Preconstruction and Construction phases of the Project that:

1) Lists the related program risks.

2) Creates a qualitative ranking of the risks most critical to the achievement of Project schedule and budget limitations.

3) Definition of the potential cost and schedule impacts of the identified risks.

4) Includes research and development of documents and materials on topics specific to the identified Project risks and opportunities.

5) Proposed risk mitigation strategies.

4. Material Management Plan

a. Prepare a plan for ordering materials and equipment and provide a monthly procurement, fabrication, and delivery status report.

b. Identify long-lead and early procurement materials plans, including definition of materials for which the CMAR will intend to seek payment for stored materials.

5. Quality Control (QC) Program.

a. The CMAR shall submit a Quality Control Program for Preconstruction and Construction Phase Services for the Project for the PMT review and acceptance. The CMAR shall ensure that all services comply with the Project requirements and all procured materials conform to plans, technical specifications and any other project requirements, whether constructed by the CMAR or procured from Subcontractors or vendors. The CMAR shall assume full responsibility for the QC Program execution throughout the Preconstruction and Construction phases of the Project.

b. The CMAR shall be responsible for all activities necessary to manage, control, and document Work to ensure compliance with the QC Program established to comply with the requirements of the Contract Documents. The CMAR responsibilities include, but are not limited to;

1) Ensuring adequate resources (labor, equipment and materials) are provided for quality control services to be accomplished on and off-site by its organization,

2) Pre-inspection of work prior to notifying the PMT for inspections,

3) Coordinating with suppliers and subcontractors,

4) Tracking and resolution of non-conformance issues,

5) Hiring and management of certified quality control laboratories and professionally credentialed consultants appropriate to meet the Contract Documents requirements.

6. Industry Outreach, Trade Participation and Bid Research

a. The CMAR shall perform sufficient industry outreach to ensure that adequate trade and MBE/WBE/SBE participation, as required by the Contract, occurs for each Work Package and the complete Project. The CMAR shall also conduct bid research to determine that bids were reasonable as well as responsive to the Work Packages.

7. Subcontracting Plan

a. The CMAR shall develop and submit to the PMT a subcontracting plan that addresses all Subcontractor required elements of the Contract as well as how the CMAR plans to meet the criteria.

8. Construction Work Plan

a. The CMAR shall develop a Construction Work Plan which shall define the CMAR's approach to constructing the Project. At a minimum, the Plan shall include:

1) Project management systems necessary for successful execution of the Project and use of how they are integrated into HAS's systems. The PMT will implement project management systems specific to this Project.

2) Phasing, Coordination and Logistics Plans tied to the Project schedule.

3) Construction Disruption Mitigation Analysis, which includes coordination of airfield safety, logistics and airport/airlines operations.

4) Field office and staging area needs.

5) Plans and actions taken to comply with environmental requirements and permits.

6) Use and access to public roadways.

7) Coordination of Work and communication of construction activities with the PMT regarding airlines, tenants and other stakeholders including utility disruptions.

8) Protection of private and public properties, including lease properties on the airport site.

9) Dust/dirt/debris mitigation.

10) Temporary erosion control.

11) Storm water drainage management.

12) Vibration control and monitoring.

13) Proposed construction means and methods validation.

14) Temporary facilities.

15) 3rd party coordination with utilities and other entities.

16) Construction zone accommodation of vehicular, GSE equipment and aircraft traffic.

17) Safety Plan.

18) Security Plan.

19) Temporary construction signage.

20) Traffic Control Plan.

21) Temporary dust walls and construction enclosure strategy for passenger facing areas.

22) Maintenance of vehicular service roads, taxiways/ taxilanes and aprons during emergencies.

23) Vehicle provisions.

24) Public and worker health and safety protection.

25) Security of work site including Airport Operational Areas.

26) BIM Execution Plan.

27) Commissioning Plan.

28) Closeout Plan

29) Hazardous material abatement, handling and disposal, including but not limited to contaminated groundwater, contaminated soil, asbestos containing building material, lead containing building material and mold containing building material.

SECTION 5 - PHASE 2 CONSTRUCTION SERVICES

5.01 GENERAL

A. Upon issuance of the Phase 2 NTP, the CMAR shall provide all labor, materials, equipment, temporary utility service and facilities to construct the entire Project as required by the Contract Documents. Those policies and procedures defined in the Preconstruction Phase Services section of this document shall be maintained, enhanced and utilized throughout management of Construction Phase Services.

B. The CMAR will be solely responsible for construction means and methods of the Work.

C. The CMAR shall comply at all times with any and all verbal and /or written instructions by the PMT regarding routes of travel to be used in moving personnel and/or materials to and from the Project site. The deliveries of materials and removal of construction related debris may be required to be done at night. The CMAR shall work with the PMT on the schedule of any night work that needs to be performed on HAS property. Delivery vehicles, material trucks and heavy equipment shall enter and depart through a point designated by the PMT. Except as otherwise directed or approved by HAS, vehicles in use on the Airport shall be confined to the Project site. Only operators with current restricted area driving passes issued by HAS will be permitted to operate vehicles in the AOA. When an operator does not have a current pass, a HAS authorized driver must escort the operator.

D. The CMAR will be required to solicit bids from subcontractors for the various trade packages. Under management of the CMAR, the selected subcontractor/trade will provide all materials, equipment and labor including the necessary coordination, supervision, programming, scheduling, cost control, contract administration, field engineering, commissioning, and closeout and support services to accomplish the work covered by each work package. Based on prior HAS approval, the CMAR

can self- perform up to 20% of the value of the GMP or each CGMP. Award of the Work will be based on a competitive process witnessed by HAS.

E. The CMAR will be responsible for completing all Work related to the MLIT Project whether or not Work is contained in one trade package or subcontract or another, but is on or contained in one of several bid packages as prepared for the Project.

F. The CMAR will be responsible to interact and efficiently coordinate with the various HAS departments, FAA, and the Transportation Security Administration (TSA), and other agencies and utility companies, etc., as required and address all federal, state, county and city permitting requirements. The PMT will be kept fully informed regarding communication with these parties and shall be included in all meetings, unless otherwise chosen by the PMT. All communications with these parties shall be documented by the CMAR for inclusion in the Project records and appropriate submittal to the PMT.

5.02 COORDINATION RESPONSIBILITIES

A. The CMAR shall coordinate all construction operations included in the Contract to ensure efficient and orderly development and installation of each part of the Work. The CMAR's coordination responsibilities include but are not limited to:

1. Preparing and issuing trade bids to obtain early design assist input from Subcontractors, when applicable.

2. Scheduling and managing the documentation and permitting process with the various Regulatory Agencies with jurisdiction over the Project.

3. Scheduling and managing the submittal process.

4. Preparing and managing the Project Safety and Security Plans.

5. Scheduling construction operations in the sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.

6. Coordinating the installation of all components to ensure maximum performance and allow access for required maintenance, service, and repair, including but not limited to mechanical, electrical and plumbing systems.

7. Making adequate provisions to accommodate items scheduled for future installation.

8. Resolving actual or potential conflicts between Subcontractors concerning coordination, interference, and sequencing.

9. Coordinating Code and Permit documentation requirements.

10. Implementation of all systems integration and commissioning for compliance with contractual and permitting requirements.

11. Coordination with ORAT and Activation teams to support the requirements for turn-over of the completed Project to HAS.

B. The CMAR shall not delegate responsibility for project coordination to any Subcontractor.

5.02.2 COORDINATION WITH THE PROGRAM MANAGEMENT TEAM

A. The CMAR shall notify the PMT in writing, a minimum of thirty (30) calendar days in advance, of any activity that will be outside the Contract limits or that would interfere with HAS's daily operation. Utility interruptions (shutdowns or connections) require at a minimum thirty (30) days advance written notice or as otherwise directed HAS for longer durations.

B. Within 30 days of Phase 1 NTP, the CMAR shall notify PMT of any foreseeable Project work that requires interruption of primary airport facilities or infrastructure. Any such work shall be specifically identified on the Project schedule, included with the CMAR Management Plan and discussed with the PMT and affected HAS representatives regarding the required notice period and actual scheduling of work.

C. Observation of Work by HAS or the PMT shall not be interpreted as relieving the CMAR from responsibility for coordination, superintendence, scheduling, and direction of the Work.

D. Coordinate with the PMT to assure that Work on the project site, access to and from the project site, and the general conduct of operations is maintained in a safe and efficient manner, and that disruption and inconvenience to existing facilities and property is minimized.

5.03 CONSERVATION

A. The CMAR will coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

B. The CMAR will salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to the Contract Documents for disposition of salvaged materials that are designated as HAS's property.

5.04 PROJECT REPORTS

A. Daily Construction Reports

1. Prepare and submit within 24 hours at the end of each construction work day, Daily Construction Reports which record at a minimum, the following information describing the daily events, incidents, accomplishments, and general progress as well as environmental conditions on the Project:

    a. Description of construction activities performed.

    b. Meetings and significant decisions.

    c. Accurately recorded high and low temperatures, and general weather conditions at the site, including the presence and quantity of rain, sleet, or snow, wind direction and speed, and the relative humidity.

d. Project security and safety compliance.

e. Unusual events (including the discovery of missing or damaged materials).

f. The list of all Subcontractors (of any tier) at the Project site.

g. The list of other Contractors at the Project site.

h. The total number of all workers at the Project site, subdivided into:

1) The number of CMAR's workers at the Project site.

2) The number of subcontractor workers at the Project site, by subcontractor, vendor, etc.

i. The CMAR and Subcontractors' equipment at the Project site.

j. Material deliveries for the Project by location of delivery.

k. Quality related issues and Non-Conformance Reports.

B. Material Location Reports

1. At weekly intervals, prepare and submit a comprehensive list of materials delivered to and stored at the Project site. The list shall be cumulative, showing materials previously reported plus items recently delivered. Include with the list a statement of progress and delivery dates for materials or items of equipment fabricated or stored away from the Project site.

2. For material stored off-site, the CMAR shall provide the address where fabricated equipment and materials are stored (see General Conditions for further requirements).

C. Field Condition Reports

1. Immediately upon discovery of a difference between field conditions and the Contract Documents, the CMAR shall prepare and submit a detailed report in accordance with the provisions of the Contract.

5.05 PROJECT MEETINGS

The person designated to make decisions binding to and on behalf of the CMAR, defined as the CMAR's Project Manager, shall attend all of the meetings described below. Meetings in addition to those described below may be required for special purposes as determined by the PMT.

A. Scheduling Conference

1. A scheduling conference is required during both Phase 1 and Phase 2 of the Project.

2. Attendees: PMT, the CMAR and its Project Manager, Superintendent, major Subcontractors, Design Consultant and other major Consultants and other

concerned parties shall each be represented at the conference by persons familiar with and authorized to conclude matters relating to the Work.

3. Agenda:

   a. Introduction to the CMAR's scheduling team's qualified personnel that will develop and update the project schedule.

   b. Content, format, and submittal requirements and reports.

   c. Schedule for other concurrent work under HAS's separate contracts and coordination with other work and personnel.

   d. Review time required for submittals and resubmittals.

   e. Review time required for RFI's, Change Orders and Regulatory.

   f. Agency Reviews and Approvals, and project logistics.

   g. Requirements for tests and inspections by independent testing and inspecting agencies.

   h. Time required for completion and startup procedures. List of Contract activities to be included in schedule. Procedures for updating schedule.

   i. Project scheduling and document management software.

4. Minutes: The CMAR will record and distribute meeting minutes, regardless of whether someone else is also doing the same to facilitate verification of a complete and accurate understanding of the meeting. The minutes shall be issued to the PMT for review and comment within two (2) days of the meeting.

B. Preconstruction Conference

1. The PMT will schedule a preconstruction conference and organizational meeting, following the Phase 2 scheduling conference and before start of construction.

2. Attendees: PMT, the CMAR and its Project Manager, Superintendent, Quality Control Manager, major Subcontractors, Design Consultant and other concerned parties shall each be represented at the conference by persons familiar with and, authorized to conclude matters relating to the Work.

3. Agenda: The purpose of the meeting will be to discuss items of significance that could affect progress, including the following:

   a. Introduction/designation of Key Personnel and their duties

   b. Procedures to be followed during performance of the Work

   c. Construction phase schedule

   d. Critical work sequencing and long-lead items

   e. Phasing

f. Work restrictions

g. Work hours

h. Procedures for processing change requests

i. Procedures for requesting information (RFIs)

j. Procedures for testing and inspecting

k. Procedures for processing Applications for Payment

l. Distribution of the Construction Documents

m. Submittal procedures

n. Preparation of record documents

o. Use of the premises and if applicable, existing building(s)

p. Parking availability

q. Office, work, and storage areas

r. HAS occupancy requirements

s. Responsibility for temporary facilities and controls

t. Equipment deliveries and priorities

u. Safety

v. First aid

w. Security

x. Project in-progress site cleaning

y. Construction waste management

4. Minutes: The CMAR will record and distribute meeting minutes, regardless of whether someone else is also doing the same to facilitate verification of a complete and accurate understanding of the meeting. The minutes shall be issued to the PMT for review and comment within two (2) days of the meeting.

C. Project Coordination and Logistics Meetings

1. The CMAR will schedule and administer coordination and logistics meetings among all parties affected by the Work, as required to effectively manage performance of the Project.

2. Attendees shall include, but are not limited to, the PMT, CMAR, Design Consultant, relevant Subcontractors, applicable Consultants and applicable, representatives of entities or Regulatory Agencies affected by or having jurisdiction over the Work plus stakeholders that will be affected by the Project.

3. The CMAR shall plan ahead for work that requires approvals from regulatory agencies and other logistical considerations to allow for a reasonable review and preparation time.

4. Refer to the Contract Documents for specific requirements on utility work and shutdowns, navigation and traffic impact plans, and other logistical and environmental mitigation or special construction work.

5. The CMAR shall develop an agenda incorporating all operational impacts identified in the CMAR's logistical and coordination plan into the Project schedule to allow for at least thirty (30) days' notice before implementation of Work affecting normal operations of the premises Airport operations, unless more time is indicated in the Contract Documents or defined by the PMT.

6. The CMAR shall identify all oversized, over-weight and/or long materials to be delivered to the Project site and shall define specific plans for the handling of these materials for review and acceptance by the PMT.

7. The CMAR shall identify long-lead materials and establish a plan to obtain the materials to not unnecessarily impact the Project schedule.

8. Applications for Area Shutdown Request (ASR) and Utility Shutdown Request (USR) are required to be submitted by the CMAR at least 30 days prior to the proposed shutdown time, unless otherwise defined by the PMT based on the level of impact to the affected facilities. Primary airport infrastructure shutdowns will require longer notification periods, defined through coordination with the PMT and the affected parties.

9. The CMAR shall coordinate with HAS for identification and inclusion of HAS defined blackout periods within the Project Schedule.

10. Traffic Control Plans for impacts to vehicular traffic must be prepared by professionals in traffic management. The plans must meet HAS drawing standards and are required to support ASR applications. (See Division 01 55 26 Traffic Control for further requirements)

11. Agenda to include:

    a. Review of current ASR and USR work as well as look-ahead scheduling for all project work.

        1) Provide appropriate narratives, schedules, documentation and graphics to adequately describe planned work and to meet requirements of ASR and USR applications.

    b. Plans for forthcoming ASR and USR work,

    c. Long-lead materials procurement plans,

    d. Project coordination and logistics plan, and

    e. Traffic control plan

12. The CMAR is to publish minutes of the meetings. Minutes to include: topics discussed, alternatives considered, reasons that given alternatives were either discarded or adopted, attendees and copies as appropriate of documents distributed. Publish minutes within two days of the meeting to all attendees and to other appropriate parties as identified.

D. Weekly Progress Meetings

1. The PMT will schedule and administer weekly progress meetings following Phase 2 NTP. The PMT will distribute agendas in advance of the meeting and minutes of each meeting to those in attendance. The CMAR shall coordinate the meeting agendas with the PMT for issuance.

2. Attendees: In addition to the PMT, Consultants, the CMAR management team, applicable Subcontractors, plus other entities concerned with current progress or who are involved in planning, coordination or performance of future activities.

3. Agenda: Agenda items include reviewing, correcting or approving minutes of the previous progress meeting and reviewing other items of significance that could affect Project progress. Topics for discussions shall be established as appropriate to the current status of the Project such as:

    a. The CMAR's Four-Week Look-Ahead Construction Schedule and Overall Construction Schedule status.

    b. Review the current and future needs of each entity present, including such items as:

        1) Safety

        2) Security

        3) 4 week look ahead Schedule

        4) Project Logs

            a) Submittals

            b) RFI's

            c) Work Change Directives

            d) Non-Conformances

        5) Quality Control and Work standards

        6) Traffic Control

        7) Site utilization

        8) Hours of Work

        9) Temporary facilities and services

        10) Temporary Erosion Control

11) Deliveries

12) Status of off-site fabrications

c. Project Costs: budget, commitment and progress payments.

d. Project Record File additions (Change Orders, meeting minutes, etc.)

e. Applications for Payment

f. Project Risks including:

1) Hazardous conditions

2) Hazardous materials

3) Unforeseen conditions and potential impacts and mitigation measures.

4) Major coordination or construction challenges that affect project's budget, schedule, or its environment (logistics, sequencing, traffic).

4. Minutes: The CMAR will record and distribute meeting minutes, regardless of whether someone else is also doing the same to facilitate verification of a complete and accurate understanding of the meeting. The minutes shall be issued to the PMT for review and comment within two (2) days of the meeting.

E. Pre-Installation Meetings

1. The CMAR will conduct pre-installation meetings before each major construction activity or activity that requires coordination with others. The CMAR will develop a list and schedule for the PMT of all required meetings and scheduled dates. Dates of pre-installation meetings shall be identified on the Project schedule.

2. Attendees: The PMT, Consultants, CMAR management team and Subcontractors, Installer and representatives of manufacturers and fabricators involved in or affected by installation, and its coordination or integration with other materials and installations that have preceded or will follow the installation.

3. The CMAR will review progress of construction activities affected by the installation and preparations for the particular activity under consideration at each pre-installation meeting. The review shall include, but not be limited to, requirements for the following, as applicable:

a. Applicable Construction Documents/Specifications

b. Manufacturer’s recommendations

c. Governing regulations

d. Installation means and methods

e. Deliveries/site logistics

f. Space and access requirements/limitations

g. Existing facilities and Work protection

h. Possible conflicts

i. Temporary facilities

j. Time schedules

k. Weather limitations

l. Submittals and RFI's

m. Shop Drawings, product data and quality-control sample

n. Review of mockups, as applicable

o. Compatibility of materials

p. Warranty requirements

q. Safety

r. Inspecting and testing requirements

s. Required performance results

t. Project records requirements

4. Minutes: The CMAR will record and distribute meeting minutes, regardless of whether someone else is also doing the same to facilitate verification of a complete and accurate understanding of the meeting. The minutes shall be issued to the PMT for review and comment within two (2) days of the meeting.

5. The CMAR shall not proceed with installation if the pre-installation conference cannot be successfully concluded. The CMAR shall initiate whatever actions are necessary to resolve impediments to performance of Work and reconvene the pre-installation conference at earliest feasible date.

F. Monthly Progress Reviews

1. In addition to the requirements of the Contract Documents, the CMAR will conduct project status review meetings on a monthly basis, or as otherwise needed to effectively and efficiently deliver the Project in accordance with the Contract Documents.

2. The Monthly Progress Review meetings will be held in lieu of the Weekly Progress Meeting once each month and shall include the following agenda items in addition to the weekly meeting agenda topics, as required. Weekly meeting attendees shall be adjusted to reflect the Monthly meeting agendas.

3. Attendees: The PMT, the CMAR's senior construction scheduler, project manager, general superintendent plus relevant subcontractors and Consultants.

4. Purpose: Review of the Project progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in

relation to the CMAR's published and updated construction schedule. Determine how construction that is behind schedule will be expedited (including review of recovery schedules, as appropriate) and secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

5. Agenda: The intent of the meeting is to expand the weekly progress meeting agenda to include any proposed schedule revisions including, but not limited to, the following:

    a. Delays to critical path and near critical path activities and actions taken or to be taken by the CMAR to mitigate the delays.

    b. An analysis of any Project progress problem areas, current and anticipated delaying factors (causes) and their impacts, explanations of corrective action taken or to be taken, and any proposed schedule revisions to facilitate a recovery plan.

    c. Revisions of any assumed activity durations including those due to conditions the CMAR deems to be outside their control.

    d. Proposed Change Orders issued during the update period including any time impacts.

    e. The resolution of conflicts between actual Work progress and schedule logic when out-of-sequence activities develop due to actual construction progress. CMAR shall submit revisions to schedule logic to conform to current job status and directions, without changing original activity identification.

6. Schedule Updating:

    a. The CMAR will revise the actualized construction schedule after each monthly progress review meeting, where revisions to the schedule have been made or recognized. The CMAR will issue revised schedule concurrently with the minutes of each meeting. Upon acceptance by the PMT, schedule revisions submitted by the CMAR shall be incorporated into the Project Schedule in the next monthly update.

7. Minutes: The CMAR will record and distribute meeting minutes, regardless of whether someone else is also doing the same to facilitate verification of a complete and accurate understanding of the meeting. The minutes shall be issued to the PMT for review and comment within two (2) days of the meeting.

G. Safety Meetings

1. Within thirty (30) days after the Phase 2 NTP but prior to commencement of field work activities, the CMAR will arrange a Safety Meeting with the PMT Program Safety Manager to review Project safety requirements.

H. Pre-Demolition Meetings

1. The CMAR shall schedule and administer meetings through the PMT for stakeholders affected by the Work prior to any demolition activities. Demolition work shall not start unless authorized by the PMT. In addition to addressing specific requirements of the proposed demolition Work to be undertaken, the CMAR shall include requirements of the "Project Coordination and Logistics Meetings" defined earlier in this section.

I. Project Closeout Conference

1. The CMAR shall request a Project Closeout Meeting at a time convenient to the PMT, but no later than 90 days prior to the scheduled date of Substantial Completion. Refer to the defined requirements on Project Closeout for specific policy and procedure details. The PMT will conduct the meeting to review requirements and responsibilities related to Project closeout, in accordance with the provision of Specification Section 01 77 00 Closeout.

2. Attendees: The PMT, Consultants, the CMAR Management Team, including QC Manager, Senior Superintendent and Construction Manager, major Subcontractors, suppliers, and other concerned parties. Participants at the meeting shall be familiar with the Project and authorized to conclude matters relating to the Work.

3. Agenda: Discuss items of significance that could affect or delay Project closeout including, as applicable, the following:

   a. Preparation of as-built documents

   b. Procedures required prior to inspection for Substantial Completion

   c. Submittal of written warranties

   d. Requirements for preparing sustainable design documentation, as applicable

   e. Requirements for preparing operations and maintenance data and manuals

   f. Requirements for demonstration and training

   g. Preparation of CMAR’s punch list

   h. Procedures for processing Applications for Payment at Substantial Completion and for final payment

   i. Final Submittals procedures

   j. Beneficial use requirements

   k. Installation of HAS’s equipment

   l. Tenant space built-outs

   m. Responsibility for removing temporary facilities and controls

n. Site cleanup and restoration

4. Minutes: The CMAR will record and distribute meeting minutes, regardless of whether someone else is also doing the same to facilitate verification of a complete and accurate understanding of the meeting. The minutes shall be issued to the PMT for review and comment within two (2) days of the meeting.

SECTION 6 - COMMISSIONING AND ACTIVATION

6.01 GENERAL

A. Commissioning refers to a systematic process confirming that building systems have been installed, properly started, and consistently operated according to criteria set forth in the Contract Documents, that all systems are complete and functioning in accordance with the Design Consultant's Basis of Design document at Substantial Completion, and that the CMAR has provided HAS operations and maintenance staff, plus other identified users of the facilities with required system documentation and training.

B. HAS will contract directly with an independent Commissioning Authority (CxA) to perform technical reviews of project design documents focused on energy efficiency design and documentation of maintainability, building system control sequences, and operational strategies; and prepare technical commissioning specifications. During construction, the CxA will verify equipment and system testing by the CMAR, observe system tests against Contract Document requirements, track deficiencies, and recommend solutions.

6.02 CMAR RESPONSIBILITIES

A. Submit a Commissioning Plan that describes the commissioning and training processes for all self-performed and sub-contractor performed Work.

B. Submit phased Commissioning/Training schedules and update prior to Commissioning Meetings.

C. Submit system/equipment specific technical Commissioning Plans 30 days prior to start of any commissioning activities.

D. Submit Test and Balance (TAB) Plan 30 days prior to performance of systems testing and balancing. Submit field test and balancing results for review prior to final reports being submitted for approval.

E. Submit Operation and Maintenance Manuals 30 days prior to training.

F. Submit Training Plans 30 days prior to training.

G. Provide management oversight for commissioning, training and closeout processes.

H. Support the HAS Commissioning Authority.

I. Provide a plan and process to capture, address and close issues discovered during and related to commissioning, training and closeout.

J. The CMAR will record and distribute minutes of all meetings conducted during the commissioning and activation period.

K. Refer to Specification Section 01 91 13 General Commissioning Requirements for additional requirements.

SECTION 7 - OTHER REQUIREMENTS

A. The CMAR will complete the Work and close out the physical and financial aspects of each subcontract/trade package.

1. Prepare and submit all final as-built and record documents as required.
2. Prepare any and all certificates and warranties, as required.
3. Prepare release bonds and any associated bond release documents, as required.
4. Prepare Final Certificate of Occupancy permit application, as required.
5. Complete all work as required by the punch list.
6. Schedule for completion of the punch list work.
7. Deliver any final Operation and Maintenance Manuals (O&M) and other submissions as required per the Contract Documents.
8. Close out the safety and security program.
9. Clean out staging areas and lay-down areas, restoring them to their original condition.
10. Issue final environmental, sustainability or documentation, as needed.
11. Final cleaning, including but not limited to, full and complete cleaning Project site; removing trash and surplus materials from Project site.

B. Prior to final GMP negotiation, the CMAR may be asked to prepare a proposal for the following work:

1. Provide a maintenance program for the building systems to begin after Final Completion of the Project. This maintenance program will encompass all systems that the CMAR installed during construction that have “moveable” or other serviceable elements that are generally known to require routine maintenance or inspection to remain in operable condition.

    a. This program does not include regular housekeeping and cleaning services.

    b. The CMAR may be asked to provide 5-year and 10-year building system and component maintenance programs that commence after the Project has achieved final completion status.

c. The CMAR may be asked to provide all management, personnel, materials, supplies, and equipment needed to manage, operate, and provide building maintenance services for the Project.

1) The program will include all parts and labor necessary for maintaining the building systems and components in optimal operating conditions per HAS-defined service levels.

d. The maintenance services may include preventive maintenance, defined as performing scheduled preventive maintenance services to include lubrication, adjustments, inspecting, testing, and operating equipment to verify any probable failures or to verify working conditions.

1) Records and logs will be kept on all inspected and tested equipment.

2) Records and logs will be kept on all maintenance actions and parts management.

e. Electrical and safety inspections as required on systems that are part of this Project.

2. ORAT

a. The CMAR will provide input into ORAT planning and will be required to support ORAT activities as requested by PMT.

SECTION 8 - DESIGN SUBMITTAL PRODUCTION STANDARDS

8.01 DEFINITIONS

1. PMT BIM (Building Information Modeling) Manager leads BIM implementation and oversees the BIM application to the Project.

2. Design Consultant BIM Manager leads BIM implementation and oversight for the Design Consultant.

3. Construction Manager at Risk BIM Manager (CMAR BIM Manager) leads BIM implementation and oversight for the CMAR.

4. Design Model(s): created and developed by the Design Consultant in order to develop the Project design.

5. Construction Model(s): created by the CMAR from the Design Model in order to develop and fulfill construction requirements.

6. As-Built Model(s): prepared by the CMAR to show on-site changes to the original Construction Models.

7. Record Model: prepared by the Design Consultant from the Design Model to reflect on-site changes that the CMAR noted in the As-Built Models.

8. The BPxP defines BIM requirements which shall be performed during Project execution. The BPxP at a minimum shall include:

a. Project information

b. Key Project contacts

c. Project goals / BIM uses

d. BIM process design

e. BIM information exchanges

f. BIM and facility data requirements

g. Modeling requirements

h. Construction sequencing and cost loading (4D and 5D) requirements

i. Collaboration procedures

j. Coordination procedures

k. Quality control

l. Technological infrastructure needs

m. Model structure

n. Project BIM deliverables

o. Delivery strategy / contract

8.02 BIM INTENT

A. The PMT requires that project documentation be created using Building Information Modeling (BIM) processes and software. The intent is to leverage technology to create spatial and data accurate models of the architectural, structural, civil and building system elements that provide value through design, construction and into operation and maintenance of the airport facilities and infrastructure. The Construction Manager at Risk (CMAR) and Design Consultant shall be expected to freely and openly exchange models and data within a collaborative environment. Development of the models will include collaborative efforts between the CMAR and Design Consultant teams with oversight from the PMT. It is the intent of this section to provide an overview of the use of BIM on this Project and overall Program. A detailed BIM Project Execution Plan (BPxP) will be developed through a series of workshops with stakeholders and will be appended to this scope once complete. The fundamental use and purpose of BIM for this Project will be to accomplish the following objectives:

1. Deliver an integrated, coordinated, and constructible design.

2. Generate Construction Documentation (CD) from Design Models.

3. Share Models and Model data with extended team to leverage information across disciplines.

4. Maintain and update all Models throughout design and construction incorporating all addenda, bulletins, and documented modifications during construction.

5. Deliver a data-rich Record Model at Project close-out for use with the HAS FM/Asset Management System.

B. Model(s) developed for the Project may be utilized for multiple purposes including, but not limited to: design, documentation, building systems spatial coordination, interference checking, record drawings, cost estimation, schedule analysis, project controls, commissioning, and operations and maintenance. The extent to which each model can be utilized will be decided and documented during BIM Project Execution Plan workshops with HAS, the PMT, Design Consultant, and CMAR.

8.03 DRAWING CONVENTIONS FOR DOCUMENTATION

A. All files are specific to the Project and must be organized and delivered in a manner that facilitates the production of Construction Documents, record documents, as-built documents and other project submittals. Project files including building and site models, details, sheets, schedules, text, database, symbols, borders, title blocks, and other files used in the creation of project deliverables shall comply with HAS documentation standards.

8.04 DESIGN SUBMITTAL FILE FORMATS

A. Design Consultant shall submit drawings electronically at each deliverable milestone in the following formats:

1. All files and documents used to create design submittals shall be submitted in both native authoring format, PDF format as well as any prescribed deliverable format.

2. All Models and CAD files shall be delivered in the airport specific NAD83 State Plane Coordinate System as defined in the HAS CAD/Geospatial Data Standards and Procedures.

3. All electronic deliverables shall include a description of content, required links, references, etc. required for use.

B. BIM Model and design drawings shall be delivered in the following formats:

1. Autodesk Revit native Model(s) used to generate documentation with approved HAS version.

2. Autodesk Civil3D native Model(s) used to generate documentation with approved HAS version.

3. An Autodesk Navisworks .NWC containing each model’s specific scope with approved HAS version.

4. Autodesk AutoCAD 2D files for each sheet compliant to HAS BIM standards.

5. PDF of each Drawing.

SECTION 9 - ASIS/BIM REQUIREMENTS

9.01 GENERAL

A. HAS maintains CADD/Geospatial Data Standards and Procedures, available on the HAS Fly2Houston website to address Airport Spatial Information System (ASIS) general requirements and CAD drawing standards. This includes an AutoCAD drawing-layering standard for consistency on HAS projects. For this Project, HAS, the PMT along with the Design Consultant and CMAR will jointly develop standards and procedures within a BIM Project Execution Plan for delivering the Project using BIM processes and tools.

B. HAS maintains HAS BIM Standards and Procedures, available on the HAS Fly2Houston website to address Airport Building Information Modeling general requirements.

C. A key factor in the creation and maintenance of the BIM is to enable direct access to Record and As-Built Models that will be readily available to HAS operations and maintenance staff for preventive and predictive maintenance and for planning future facility modifications. The Record and As-Built Models must contain information required by HAS operations and maintenance as defined through the BPxP workshops.

9.02 ORGANIZATIONAL ROLES

9.02.1 PMT BIM MANAGER

A. The PMT BIM Manager will be the primary point of contact for BIM related issues, overseeing application of BIM technologies and ensuring that all the Models adhere to all internal and HAS-specific goals. The PMT BIM Manager will lead the BIM Project Execution Plan (BPxP) workshops and other BIM related meetings as determined in the BPxP and will oversee the application of BPxP. The PMT BIM Manager will also be responsible for archiving models and conducting reviews/audits of model deliverables.

9.02.2 DESIGN CONSULTANT BIM MANAGER

A. The Design Consultant BIM Manager will lead the efforts for creating and managing the Design Models for the extended Design Team. The Design Consultant BIM Manager will be the primary point of contact for the Design Team including all subconsultants and will represent the Design Team in development and application of BIM Project Execution Plan. The Design Consultant BIM Manager will direct, and coordinate the work of subconsultants to ensure that subconsultants' BIM-based work products are seamlessly integrated into the Project and result in accurate Construction Documents meeting HAS BIM Standards. The Design Consultant BIM Manager will work closely with the CMAR and PMT to incorporate design phase feedback, transition the model to construction phase integration, and represent the Design Team in all BIM related meetings and workshops, as well as developing accurate Record Models.

9.02.3 CONSTRUCTION MANAGER AT RISK (CMAR) BIM MANAGER

A. The CMAR BIM Manager will work closely with the PMT and Design Consultant to add value to the Design Models by providing feedback during the design phase. The CMAR BIM Manager will be the primary point of contact for the extended Construction Team including all subcontractors/trades and will represent the Construction Team in all BIM related meetings and workshops. The CMAR BIM Manager will use the Design Models as the basis for developing Construction Models, As-Built Models and shop drawings for fabrication and will be responsible for the assembly and coordination of the subcontractor (trade) models.

9.03 BIM EXECUTION PLAN

A. The PMT jointly with the Design Consultant and CMAR will develop a BIM Project Execution Plan (BPxP) to provide a framework for deploying BIM technology on the Project that will also integrate with HAS facility management software systems. The BPxP will document detailed BIM use on the Project, including roles and responsibilities of each party, relevant business processes, as well as software and hardware requirements and recommendations. The BPxP will at a minimum include the following:

1. Approved BIM uses
2. Roles and Responsibilities
3. General BIM Procedures for the Project
4. Model Progression Specification (LoD Matrix)
5. Facility Data Requirements
6. Collaboration Procedures
7. Change Management process for the BPxP
8. Future and recurring BIM related meetings including but not limited to:
    a. Design Model Reviews
    b. BIM Coordination
    c. Spatial Coordination / Clash Detection
    d. Design Review
    e. Construction Model Reviews

9.04 INTERFERENCE CHECKS

A. Design Consultant in collaboration with the CMAR shall coordinate the Design Models to eliminate or mitigate conflicts between design elements. Prior to every transmittal of design files, Design Consultant shall coordinate the Design Models and check for clashes between model elements. Design Consultant will be responsible for

presentation and documentation of interference checks/clashes and resolutions during the design phase. The CMAR will be responsible for presentation and documentation of interference checks/clashes and resolutions during the construction phase. The PMT, CMAR and Design Consultant will collaborate in the resolution of interferences and clashes through all phases of the Project to enable identification of the best solution that addresses both design and construction considerations. Specific processes, meetings and reports will be defined in the BPxP workshops.

9.05 CONSTRUCTION PHASE DELIVERABLES

A. The CMAR BIM Manager will keep the Design Consultant current with any construction coordination or field changes affecting the Design Model throughout the construction phase. The Design Consultant shall support this effort with updates provided in response to RFI's, HAS requested changes, and other design modifications affecting the Construction Models. The CMAR will provide the final coordinated trade Construction, As-Built and/or Fabrication Models in native file format, as well as a federated Navisworks model to HAS at the end of construction.

B. After receiving the CMAR's As-Built drawings and As-Built Models, the Design Consultant shall revise the BIM Design Model to within tolerances and scope as defined in the BPxP, to incorporate all addenda, all change orders, and modifications and deliver the final Record Model to HAS as part of project close-out documents. The deliverables at the minimum shall contain:

1. Autodesk Revit native Model used to generate documentation with approved HAS version.

2. Autodesk Civil3D native model used to generate documentation with approved HAS version.

3. An Autodesk Navisworks .NWC containing each model's specific scope with approved HAS version.

4. Autodesk AutoCAD 2D files for each sheet compliant to HAS BIM standards.

5. PDF of each drawing.

SECTION 10 - ENERGY AND SUSTAINABILITY

10.01 INTRODUCTION

A. While sustainability and energy conservation are critical factors in the determination of system design concepts and in the selection of building materials, the City will not seek the U.S. Green Building Council Leadership in Energy and Environmental Design (LEED™) certification for the Project. The Design Consultant; however, will be required to design the Project to include energy and sustainability measures as appropriate to the Project for the City's review, using the LEED™ certification rating system for new building design and construction as a guide. The City has defined an aspiration that the initiatives equivalent to LEED Gold be considered during design and construction, as well as including the consideration of all sustainable measures, defined as cost effective in consideration of total cost of ownership of the completed Project.

B. The Project shall be designed with energy efficient technologies to achieve a “net zero energy building” such that the new MLIT will consume no additional utilities than the existing Terminal D facility. Energy efficiency improvements associated with the planned enabling utilities project will contribute to this objective.

C. The Design Consultant will be expected and required to consider the facility design to qualify for energy program incentives and then document and request such incentive payments. The incentive payments received, if any, shall be credited to the City. The CMAR is responsible for construction of the Project and delivery of appropriate documentation so as to comply with the requirements for the City to obtain the energy program incentives.

10.02 SUSTAINABLE MANAGEMENT PLAN

A. HAS is in the process of developing a Sustainable Management Plan for IAH and William P. Hobby airports to be prepared in two phases with final completion targeted June 2016.

1. Phase 1 will focus on energy and waste reduction/ recycling

2. Phase 2 will focus on water efficiency/ reuse

B. The Phase 1 and 2 Reports will be issued to the selected Proposer, when available.

10.03 LIFE CYCLE ANALYSIS

A. The Design Consultant, with input from the CMAR, shall perform Life Cycle Analysis (LCA) for the Project lifetime period as defined by the PMT (minimum 20-year service life) to select design alternatives related to all energy and water consuming devices and to select materials and finishes for total cost of ownership that reflects overall building operation and maintenance parameters that are the most cost effective and sustainable.

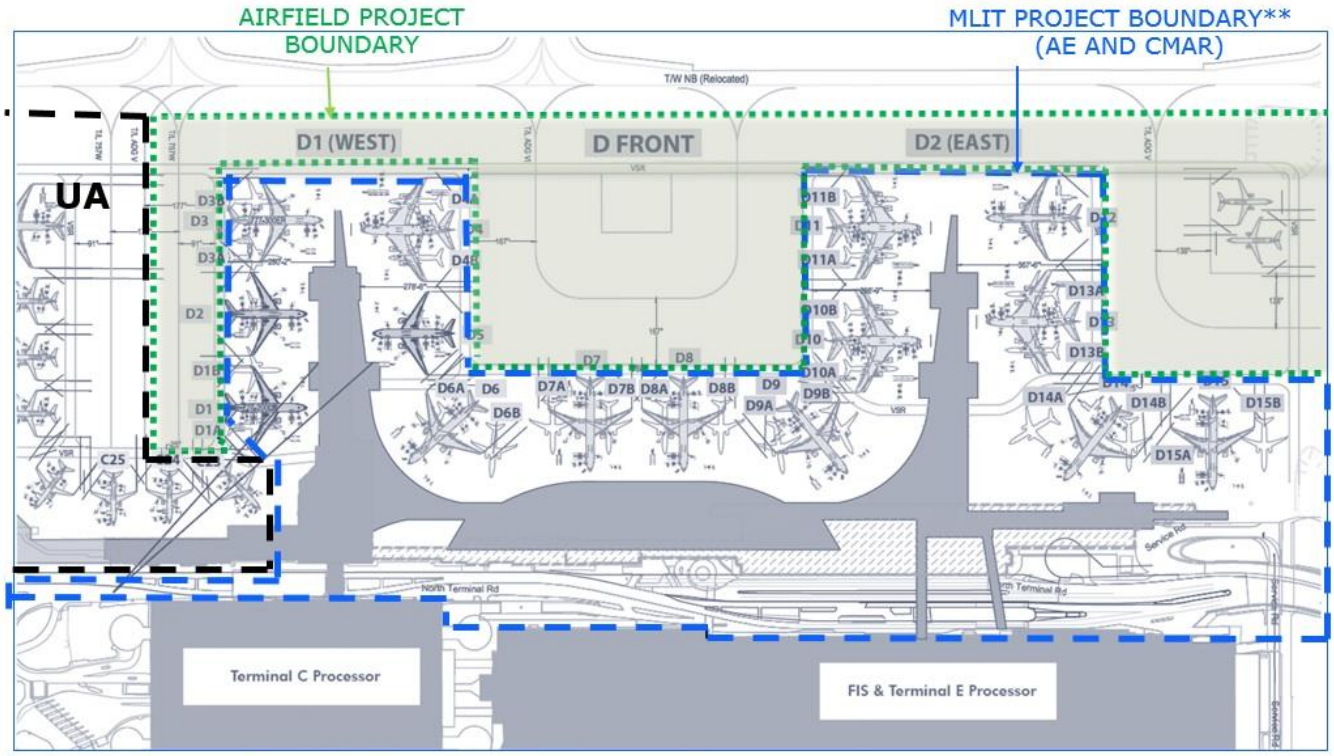
B. The Design Consultant is to specify systems that present the best value (in net present value terms) and that demonstrate simple payback of five (5) years or less. Consideration is to be given to the life-cycle cost (total cost of ownership) of implementing technologies, including, but not limited to, the use of renewable energy sources, in the Project. The technologies to be considered for LCCA include, but are not limited to: systems such as HVAC, heat recovery, renewable energy, and variable air volume; motors and drives; building envelope; lighting; controls; and sustainable building materials, where feasible.

The Design Consultant and CMAR are expected to be familiar with economic analyses required to perform LCCA. All LCCA for design alternatives are to be completed no later than conclusion of Design Development.

ATTACHMENT A –

Project Boundary Graphic

ATTACHMENT A



** - Current scope boundary based on PDM layout – Subject to change depending on final design of terminal and apron