

**ATTACHMENT A  
 GEORGE BUSH INTERNATIONAL AIRPORT (IAH)  
 CENTRAL UTILITIES PLANT (CUP) RENOVATION & UPGRADE  
 DESIGN-BUILD CONTRACTOR SCOPE OF SERVICES**

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DESIGN-BUILD CONTRACTOR (DB) SCOPE OF SERVICES

**SECTION 1 - GENERAL**

1.1 INTRODUCTION

- A. The Houston Airport System (HAS) has identified a significant need for renovating and upgrading the George Bush International Airport (IAH) Central Utilities Plant (CUP). HAS contracted with the Texas A&M Engineering Experiment Station (TEES) to prepare a Design Criteria and Bridging Documents package for use by firms interested in performing the Final Design and Construction.
- B. 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.
- C. To support the HAS mission and core values, the Project will adhere to the following overarching themes, as applicable to the specific Project requirements:
  - 1. **Operational Safety**, functional, and intuitive system design for the Project and operational areas;
  - 2. **Flexible** design to safeguard for innovation and changes to technology, operations, and security;
  - 3. **Technology-enabled** for automated operations;
  - 4. **Maintainable** facilities and systems that consider whole-life cycle costing; and
  - 5. **Sustainable** and energy efficient.
- C. The Project must be designed for constructability, flexibility of operations and efficiency.

**SECTION 2 - PROJECT DESCRIPTION**

2.1 INTRODUCTION

- A. The DB will be designated as the “Prime Contractor” of the George Bush International Airport (IAH) Central Utilities Plant (CUP) Renovation and Upgrade Project. The design services will be provided by the “Designer” who may be a part of the DB’s firm or an independent firm who is a subcontractor of the Prime Contractor or may be the lead firm with constructor subcontractors.
- B. The DB will be required to coordinate and work with the Owner’s Management Team (OMT) and any other HAS contracted firms performing design and construction on the Airport or other projects as required for the Work.
- C. All subcontracted work for the Project must be awarded to subcontractors via an open and fair competitive procurement process. The DB’s competitive procurement process must be open, fair, and transparent, and should result in the DB selecting subcontractors that provide the best value to HAS.
- D. At appropriate times, as required, DB (DB) and Designer will contact Governmental Agencies including but not limited to; HAS, City, County, State and Federal agencies that may be required

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to approve the Contract Documents and the entities providing utility services to the Project. In designing the Project, Designer will respond to applicable design requirements imposed by such Governmental Agencies and by such entities providing utility services. Designer will assist HAS in connection with City’s responsibility for filing documents required for the approval of Governmental Agencies, as applicable.

- E. The DB and Designer will be expected to present to, and consult with, stakeholders and HAS staff, as required to obtain acceptance of the construction documents and coordinate performance of the work.
- F. The DB and Designer will be required to demonstrate how construction safety and safety mitigation measures have been effectively considered and incorporated into the design.

**2.2 WORK PHASES AND MILESTONES**

- A. The Contract time is as follows:

The contract time for Phase 1A and Phase 1B is two (2) years.

- B. The Liquidated Damages for each of the Milestones are: Refer to Article 6 Liquidated Damages in the Contract.

**2.3 PROJECT SUMMARY**

- A. The Houston Airport System is replacing CUP assets that were identified as reaching the end of service life as reported in the 2020/2021 HAS Asset Management Condition Assessments. This includes various pumps, transformers, switchgear, motor control centers, cooling towers, air handling units, chillers, boilers, controls, and other physical building structural components.
- B. HAS will use a Design Build delivery method to provide the infrastructure for the George Bush International Airport (IAH) Central Utilities Plant (CUP) Renovation and Upgrade Project. Refer to the Exhibits attached to this Scope of Services document for the Cover Sheet Index of Drawings and Project Location Map Site Plan.
- C. The infrastructure upgrade/replacement is anticipated to include the following:

System	Equipment	Existing to be Replaced (Y/Y-add/N)	Remaining Life (yrs)	RFQ Phase Designation
Condenser Water	CWP-10	Y	0	Phase 1A
Condenser Water	CWP-11	Y	0	Phase 1A
Condenser Water	CWP-12	Y	0	Phase 1A
Condenser Water	CWP-13	Y	0	Phase 1A
Condenser Water	CWP-14	Y	0	Phase 1A
Condenser Water	CWP-15	Y	0	Phase 1A
Condenser Water	CWP-16	Y	0	Phase 1A
Condenser Water	CWP-17	Y	0	Phase 1A
Condenser Water	CWP-18	Y	0	Phase 1A
Condenser Water	CWP-19	Y	0	Phase 1A
Electrical	MCC-2A	Y	0	Phase 1A
Electrical	MCC-4A	Y	0	Phase 1A
Electrical	MCC-6	Y	0	Phase 1A
Electrical	MCC-7	Y	0	Phase 1A

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<b>System</b>	<b>Equipment</b>	<b>Existing to be Replaced (Y/Y-add/N)</b>	<b>Remaining Life (yrs)</b>	<b>RFQ Phase Designation</b>
Electrical	MCC-10	Y	0	Phase 1A
Electrical	MCC-11	Y	0	Phase 1A
Electrical	SWITCHGEAR Chiller 5	Y	0	Phase 1A
Electrical	SWITCHGEAR-1E	Y	0	Phase 1A
Electrical	SWITCHGEAR-2E	Y	0	Phase 1A
Electrical	SWITCHGEAR-3	Y	0	Phase 1A
Electrical	SWITCHGEAR-A	Y	0	Phase 1A
Electrical	SWITCHGEAR-B	Y	0	Phase 1A
Electrical	T2	Y	0	Phase 1A
Electrical	T3	Y	0	Phase 1A
Electrical	T4	Y	0	Phase 1A
Electrical	T5	Y	0	Phase 1A
Electrical	T6	Y	0	Phase 1A
Electrical	T7	Y	0	Phase 1A
Electrical	T8	Y	0	Phase 1A
Electrical	T9	Y	0	Phase 1A
Electrical	T10	Y	0	Phase 1A
HVAC	AHU-M-1	Y	0	Phase 1A
HVAC	EF-5	Y	0	Phase 1A
HVAC	VF-1	Y	0	Phase 1A
Electrical	MCC-1A	Y	1	Phase 1A
Electrical	MCC-8	Y	1	Phase 1A
Electrical	MCC-9	Y	1	Phase 1A
Condenser Water	CT-1 Cell-1	Y	2	Phase 1A
Condenser Water	CT-1 Cell-2	Y	2	Phase 1A
Condenser Water	CT-3 Cell-7	Y	2	Phase 1A
Condenser Water	CT-3 Cell-8	Y	2	Phase 1A
Condenser Water	CT-3 Cell-9	Y	2	Phase 1A
Condenser Water	CT-3 Cell-10	Y	2	Phase 1A
Condenser Water	CT-4 Cell-11	Y	2	Phase 1A
Condenser Water	CT-4 Cell-12	Y	2	Phase 1A
Condenser Water	CT-4 Cell-13	Y	2	Phase 1A
Condenser Water	CT-4 Cell-14	Y	2	Phase 1A
HVAC	AHU-28	Y	2	Phase 1A
HVAC	AHU-30	Y	2	Phase 1A
HVAC	AHU-31	Y	2	Phase 1A
HVAC	AHU-32	Y	2	Phase 1A
HVAC	AHU-33	Y	2	Phase 1A
Chilled Water	CH-6	Y	4	Phase 1A
Chilled Water	CH-7	Y	4	Phase 1A
HVAC	AHU-25	Y	4	Phase 1A
HVAC	AHU-27	Y	4	Phase 1A
HVAC	AHU-29	Y	4	Phase 1A
Chilled Water	CH-8	Y	5	Phase 1A
Chilled Water	CH-9	Y	5	Phase 1A
Electrical	BUS-A	Y	9	Phase 1A
Electrical	BUS-B	Y	9	Phase 1A

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System	Equipment	Existing to be Replaced (Y/Y-add/N)	Remaining Life (yrs)	RFQ Phase Designation
Chilled Water	CHWP-8	Y	12	Phase 1A
Chilled Water	CHWP-9	Y	12	Phase 1A
Chilled Water	CHWP-10	Y	12	Phase 1A
Chilled Water	CHWP-11	Y	12	Phase 1A
Chilled Water	CHWP-12	Y	12	Phase 1A
Chilled Water	CHWP-13	Y	12	Phase 1A
Chilled Water	CHWP-14	Y	12	Phase 1A
Heating Water	HWP-1	Y	12	Phase 1A
Heating Water	HWP-2	Y	12	Phase 1A
Heating Water	HWP-3	Y	12	Phase 1A
Heating Water	HWP-4	Y	12	Phase 1A
Chilled Water	CHWP-5	Y	13	Phase 1A
Chilled Water	CHWP-6	Y	13	Phase 1A
Condenser Water	CWP-1	Y	13	Phase 1A
Condenser Water	CWP-2	Y	13	Phase 1A
Condenser Water	CWP-4	Y	13	Phase 1A
Condenser Water	CWP-5	Y	13	Phase 1A
Condenser Water	CWP-6	Y	13	Phase 1A
Condenser Water	CWP-7	Y	13	Phase 1A
Condenser Water	CWP-8	Y	13	Phase 1A
Condenser Water	CWP-9	Y	13	Phase 1A
Electrical	DPH3	Y	13	Phase 1A
Electrical	DPH5	Y	13	Phase 1A
Electrical	MCC-1	Y	13	Phase 1A
Electrical	MCC-2	Y	13	Phase 1A
Electrical	MCC-4	Y	13	Phase 1A
Electrical	SWITCHGEAR-1	Y	13	Phase 1A
Electrical	SWITCHGEAR-2	Y	13	Phase 1A
Electrical	CHWP-5 VFD	Y-add	23	Phase 1A
Electrical	CHWP-6 VFD	Y-add	23	Phase 1A
Electrical	CHWP-8 VFD	Y-add	23	Phase 1B
Electrical	CHWP-9 VFD	Y-add	23	Phase 1B
Electrical	CHWP-10 VFD	Y-add	23	Phase 1A
Electrical	CHWP-11 VFD	Y-add	23	Phase 1A
Electrical	CHWP-12 VFD	Y-add	23	Phase 1A
Electrical	CHWP-13 VFD	Y-add	23	Phase 1A
Electrical	CHWP-14 VFD	Y-add	23	Phase 1A
Electrical	CT-1 Cell-1 VFD	Y-add	23	Phase 1A
Electrical	CT-1 Cell-2 VFD	Y-add	23	Phase 1A
Electrical	CT-2 Cell-3 VFD	Y-add	23	Phase 1B
Electrical	CT-2 Cell-4 VFD	Y-add	23	Phase 1B
Electrical	CT-2 Cell-5 VFD	Y-add	23	Phase 1B
Electrical	CT-2 Cell-6 VFD	Y-add	23	Phase 1B
Electrical	CWP-1 VFD	Y-add	23	Phase 1A
Electrical	CWP-2 VFD	Y-add	23	Phase 1A
Electrical	CWP-3 VFD	Y-add	23	Phase 1A
Electrical	CWP-4 VFD	Y-add	23	Phase 1B

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<b>System</b>	<b>Equipment</b>	<b>Existing to be Replaced (Y/Y-add/N)</b>	<b>Remaining Life (yrs)</b>	<b>RFQ Phase Designation</b>
Electrical	CWP-5 VFD	Y-add	23	Phase 1B
Electrical	CWP-6 VFD	Y-add	23	Phase 1B
Electrical	CWP-7 VFD	Y-add	23	Phase 1B
Electrical	CWP-8 VFD	Y-add	23	Phase 1B
Electrical	CWP-9 VFD	Y-add	23	Phase 1B
Electrical	HWP-1 VFD	Y-add	23	Phase 1B
Electrical	HWP-2 VFD	Y-add	23	Phase 1B
Electrical	HWP-3 VFD	Y-add	23	Phase 1B
Electrical	HWP-4 VFD	Y-add	23	Phase 1B
Electrical	CT-3 Cell-1 VFD	N	N/A	Phase 1A
Electrical	CT-3 Cell-2 VFD	N	N/A	Phase 1A
Electrical	CT-3 Cell-3 VFD	N	N/A	Phase 1A
Electrical	CT-3 Cell-4 VFD	N	N/A	Phase 1A
Electrical	CT-4 Cell-1 VFD	N	N/A	Phase 1A
Electrical	CT-4 Cell-2 VFD	N	N/A	Phase 1A
Electrical	CT-4 Cell-3 VFD	N	N/A	Phase 1A
Electrical	CT-4 Cell-4 VFD	N	N/A	Phase 1A
Electrical	AHU-25 VFD	N	N/A	Phase 1B
Electrical	AHU-27 VFD	N	N/A	Phase 1B
Electrical	AHU-28 VFD	N	N/A	Phase 1B
Electrical	AHU-29 VFD	N	N/A	Phase 1B
Electrical	AHU-30 VFD	N	N/A	Phase 1B
Electrical	AHU-31 VFD	N	N/A	Phase 1B
Electrical	AHU-32 VFD	N	N/A	Phase 1B
Electrical	AHU-33 VFD	N	N/A	Phase 1B
Electrical	AHU-M-1 VFD	N	N/A	Phase 1B
Electrical	CWP-10 VFD	N	N/A	Phase 1B
Electrical	CWP-11 VFD	N	N/A	Phase 1B
Electrical	CWP-12 VFD	N	N/A	Phase 1B
Electrical	CWP-13 VFD	N	N/A	Phase 1B
Electrical	CWP-14 VFD	N	N/A	Phase 1B
Electrical	CWP-15 VFD	N	N/A	Phase 1B
Electrical	CWP-16 VFD	N	N/A	Phase 1B
Electrical	CWP-17 VFD	N	N/A	Phase 1B
Electrical	CWP-18 VFD	N	N/A	Phase 1B
Electrical	CWP-19 VFD	N	N/A	Phase 1B
HVAC	REFRIGERANT LEAK DETECTION SYSTEM	Y-add	N/A	Phase 1A
HVAC	CH-1 DEMOLITION (ABANDONED IN PLACE)	N	N/A	Phase 1A
HVAC	CHP-1 DEMOLITION (ABANDONED IN PLACE)	N	N/A	Phase 1B
HVAC	CHP-2 DEMOLITION (ABANDONED IN PLACE)	N	N/A	Phase 1B
HVAC	CHP-3 DEMOLITION (ABANDONED IN PLACE)	N	N/A	Phase 1B
Electrical	CH-1 VFD DEMOLITION (ABANDONED IN PLACE)	N	N/A	Phase 1B

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<b>System</b>	<b>Equipment</b>	<b>Existing to be Replaced (Y/Y-add/N)</b>	<b>Remaining Life (yrs)</b>	<b>RFQ Phase Designation</b>
Electrical	CH-2 VFD DEMOLITION (ABANDONED IN PLACE)	N	N/A	Phase 1B
Electrical	CH-3 VFD DEMOLITION (ABANDONED IN PLACE)	N	N/A	Phase 1B
Electrical	ENERGY POWER MONITORING SYSTEM	Y-add	N/A	Phase 1A
HVAC	STEAM SYSTEM DEMOLITION	N	N/A	Phase 1B
Electrical	LED LIGHTING UPGRADES (INCLUDING TUNNEL)	Y-add	N/A	Phase 1B
HVAC	DETACH CONDENSER WATER EQUALIZER LINE FROM CT-1	N	N/A	Phase 1B
Architectural	CUP BUILDING ROOF REPAIRS	Y-add	N/A	Phase 1A
HVAC	BMS ALTERATIONS	Y-add	N/A	Phase 1B
HVAC	ASBESTOS/LEAD ABATEMENT	Y-add	N/A	Phase 1A
HVAC	COOLING TOWER BASIN WATER PROOFING	Y-add	N/A	Phase 1A
Condenser Water	CWP-3	Y-add	16	Phase 1B
HVAC	CWP-3 VFD	N	N/A	Phase 1B
HVAC	AHU-B-1	Y	2	Phase 1A
HVAC	AHU-B-1 VFD	Y-add	N/A	Phase 1B
HVAC	HIPU-1 INCLUDING CONDENSER (Electrical Building)	Y-add	0	Phase 1A
HVAC	HIPU-2 INCLUDING CONDENSER (Electrical Building)	Y-add	0	Phase 1A
HVAC	HEAT TRACING AND INSULATING MAKE-UP WATER & BLOW DOWN FOR COOLING TOWERS	Y-add	N/A	Phase 1B
Architectural	TUNNEL WATER INTRUSION REPAIRS	Y-add	N/A	Phase 1A
Architectural	REMOVE GYPSUM CEILING IN ELECTRICAL BUILDING	N	N/A	Phase 1B

- D. Line items that have been identified under Phase 1A column may be authorized separately from the line items that have been identified under the Phase 1B column. More detail will be provided in a Design Criteria Package to be provided to the short-listed firms during the RFP stage of the procurement process.
- E. All work shall be performed while maintaining the active operational status of the CUP and existing Airport facilities, including maintaining uninterrupted public access to all terminals and continual use by the public of all public roads.

**SECTION 2 - RELATED PROJECTS**

**3.1 GENERAL**

- A. The DB shall collaborate with the Owner's Management Team (OMT), project stakeholders, tenants, and other contractors executing concurrent capital improvement and tenant improvement projects with respect to all aspects of this Project. The projects detailed below are either in construction or are planned to be awarded under separate procurement packages for separate

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project delivery during the time period affecting this Project.

- B. The DB will be required to collaborate with the OMT and other projects being performed at George Bush International Airport (IAH) to facilitate applicable linkages with this Project.
- C. The DB is responsible to collaborate with other projects to ensure that required operation of the Airport is maintained across applicable project sites.

**3.2 HAS INFRASTRUCTURE**

Additional projects either planned or in construction at George Bush International Airport (IAH) are identified within the HAS Capital Improvement Plan (CIP).

**3.5 FUTURE PROJECTS**

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

**3.6 HAS THIRD PARTY SUPPLIERS**

Third-party suppliers and installers may be contracted separately by HAS during the course of this Project. The DB may be required to integrate those work packages into the course of its own construction during the Project.

**SECTION 4- PROJECT ADMINISTRATION**

**4.1 GENERAL SERVICES**

- A. The services provided by the DB are intended to be provided in a collaborative Project team environment. The DB is required to manage and execute the Project Design and Construction Document development process working with OMT. The DB shall collaborate, advise, assist, estimate, schedule and provide recommendations to the OMT on the design and construction aspects of the Project.
- B. The DB shall be required to provide complete Preconstruction Services and Construction Services, which includes Design 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; Design Services, permitting, supervision, testing, inspection, integration, and interfacing with third- party commissioning services provider, information technology, systems integration and activation, regulatory requirements, project closeout, and all necessary general conditions that may be reasonably inferred.
- C. The DB 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. That also includes coordination and oversight by Airport Operations, the Transportation Security Administration (TSA), the Department of Homeland Security (DHS), and the Federal Aviation Administration (FAA).
- D. The DB is responsible for management of the Project environmental plan and sustainability

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initiatives related to the site. This includes the tracking, disposition and reporting of demolition work, salvage of any materials, and reuse of any materials.

- E. All work for the Project must be awarded to subcontractors via an open and fair competitive procurement process. The DB will be required to administer a bidding process to select subcontractors for the Project. The DB’s competitive procurement process must be open, fair and transparent, and should result in the DB selecting subcontractors that provide the best value to HAS.

**4.2 PROJECT ROLES AND RESPONSIBILITIES**

- A. This section defines general roles and responsibilities for the entities involved in the Project.
- B. The Owner’s Management Team (OMT) is comprised of representatives from HAS or from Program Management Support Services (PMSS) staffed positions.

<b>Entity</b>	<b>Responsibility</b>
City of Houston (City)	<ul style="list-style-type: none"> <li>▪ The City of Houston is the owner and approver of all Contracts executed for work at Houston Airports, including the George Bush International Airport (IAH).</li> <li>▪ The Houston City Council approves all Contracts and changes to Contracts, unless otherwise delegated.</li> <li>▪ Delegated authority for work within the Houston Airport System is granted to the Director of the Department of Aviation.</li> </ul>
Houston Airport System (HAS)	<ul style="list-style-type: none"> <li>▪ HAS, through the Director of the Department of Aviation or authorized designee, represents the City of Houston with respect to management and operation of the Airports.</li> <li>▪ Use of the terms City or HAS may be used interchangeably</li> <li>▪ Approves, makes decisions throughout project phases.</li> <li>▪ Ensures that HAS required decisions are made in a timely manner.</li> <li>▪ 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.</li> <li>▪ Provides key input on owner requirements related to planning, art program, technology, finance, operations, maintenance, security, and safety.</li> </ul>
HAS Management Team	<ul style="list-style-type: none"> <li>▪ Provides overall leadership of the airport and advises HAS Director on project status and key decisions affecting scope, schedule, budget, safety, and quality.</li> <li>▪ Develops policies, procedures, and execution plans to deliver the Program and projects.</li> <li>▪ Coordinates all work to be undertaken with HAS divisions, departments and external stakeholders as necessary for the timely and quality execution of the Program.</li> <li>▪ Engages and collaborates with airport stakeholders to minimize disruption of operations and services throughout the duration of the Program.</li> </ul>

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<b>Entity</b>	<b>Responsibility</b>
Owners Management Team - Project Management	<ul style="list-style-type: none"> <li>▪ Led by Project Manager Representatives from HAS or PMSS staff; provides overall management of the airport Projects.</li> <li>▪ Acts as interface between the HAS Management Team and Design Build Contractor (DB).</li> <li>▪ Ensures integration and execution of project-specific controls systems.</li> <li>▪ Manages contracting and project management processes through all phases of design and construction.</li> <li>▪ Ensures change management decision-making is defined, documented and understood.</li> <li>▪ Provides overall administrative management of contracts with the design consultants and construction contractors.</li> </ul>
Owners Management Team- Construction Management	<ul style="list-style-type: none"> <li>▪ Led by Construction Manager Representatives from HAS or PMSS staff; provides management of contractors engaged to deliver airport projects.</li> <li>▪ Provides management of cost, schedule, quality, security and safety.</li> <li>▪ Manages contracting and project management process through all phases of construction.</li> <li>▪ Manages the contractor's performance in accordance with the terms and conditions of the Contract.</li> </ul>
Owners Management Team- Design Management	<ul style="list-style-type: none"> <li>▪ Led by Design Manager Representatives from the HAS or PMSS staff; provides management of DB during design to deliver airport projects.</li> <li>▪ Provides management of the design process, managing scope to budget, compliance with project requirements plus safety and security throughout design.</li> <li>▪ Manages and tracks design from concept through construction permit packages and delivery of record close-out documents.</li> <li>▪ Manages the design review process through all stages of design.</li> <li>▪ During Design manages the DB performance in accordance with the terms of the Contract.</li> </ul>
Design Build Contractor Project Manager	<ul style="list-style-type: none"> <li>▪ Provides execution for all phases of design to produce a final design that achieves Project objectives, scope, schedule, safety in design, and budget.</li> <li>▪ As prime contractor, leads and coordinates sub- consultants and specialty consultants.</li> <li>▪ Provides management during preconstruction and construction phases for cost, schedule, work package planning and sequencing, quality, safety and constructability.</li> <li>▪ Performs design reviews and provides recommendations for design alternates to identify and resolve constructability issues and to assist in maintaining budget and schedule.</li> <li>▪ As prime contractor, leads and coordinates all sub- contractors.</li> </ul>

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<b>Entity</b>	<b>Responsibility</b>
Commissioning Authority (CxA)	<ul style="list-style-type: none"> <li>▪ Independent 3<sup>rd</sup> party.</li> <li>▪ Verifies testing and operational intent of all applicable elements of the Project scope.</li> <li>▪ Performs design phase reviews focused on commissioning, functionality, maintainability, sustainability and best practices.</li> <li>▪ Participates in concurrent design phase reviews with the OMT, other consultants and contractors, as applicable.</li> <li>▪ Develops overall Commissioning Plan.</li> </ul>

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**4.3 HOUSTON AREA CONSTRUCTION EDUCATION COLLABORATIVE**

- A. The Houston City Council has approved funding for Lone Star College to train construction workers and trades. It is the intention that the DB become aligned with this initiative, employ graduates of the program, and integrate these skilled workers into the Project workforce.
- B. 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 airport construction contractor employees are required to successfully complete the HACEC safety/security training prior to mobilizing on the job site.

**SECTION 5 - DESIGN SCOPE OF SERVICES**

**5.1 GENERAL RESPONSIBILITIES**

- A. The DB shall designate in writing a representative who is responsible for the day-to-day management of design services. The designated representative shall be the OMT's primary contact during the design of the Project and shall be available as required for the benefit of the Project. The designated representative shall be authorized to act on behalf of and to bind the DB in all matters related to design services. The designated representative shall not be changed without advance written approval from the Director.
- B. The DB may engage the services of a Designer and other qualified professionals as required for performance of the Design services. The DB certifies that any subcontracted Designer and all other professional consultants have been or will be selected on the basis of competence and qualifications pursuant to the Texas Government Code. The Designer shall not perform any architectural or engineering services directly unless Designer is licensed in Texas to perform such services. All drawings, specifications, and other design-related documents shall bear the seal of the licensed professional who prepared them in accordance with the applicable laws and regulations of the State of Texas.
- C. The DB shall participate in design review meetings with the OMT at the end of each design stage and shall document and respond to the OMT review comments.
- D. The DB shall be responsible for managing design services to ensure that the Project, as designed, can be constructed for an amount that is within the Design to-Budget requirements in Section 6.06. The obligation to design the Project to achieve objectives of scope and cost shall continue through completion and acceptance of Construction Documents.
- E. At appropriate times, the DB and/or Designer will contact Governmental Agencies including but not limited to; HAS, City, County, State and Federal agencies that are required to approve the Contract Documents and the entities providing utility services to the Project. In designing the Project, Designer will respond to applicable design requirements imposed by Governmental Agencies and by such entities providing utility services. Designer will assist HAS in connection with City's responsibility for filing documents required for the approval of Governmental Agencies.

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F. The DB and/or Designer will be expected to present to and consult with stakeholders and HAS staff as required.

G. HAS DESIGN CRITERIA

1. The following HAS design criteria, available on the HAS Fly2Houston website ([www.fly2houston.com](http://www.fly2houston.com)), shall be incorporated into the Project and be included as part of the Contract by reference:

- a. IAH Terminal Redevelopment Program Design Standards Manual; Version 1; June 28, 2018;
- b. HAS Wayfinding System – Signage Design Guidelines, Standards, and Typical Applications (01.17.2014);
- c. CAD/ Geospatial Data Standards and Procedures.
- d. Houston Airports BIM Standards

5.2 REVIEW OF CONSTRUCTION DOCUMENTS

A. The DB shall perform internal quality control reviews at 60% completion, 90% completion and prior to the end of the design stage. The results of these reviews shall be submitted to the OMT.

B. The DB shall provide the OMT with design document review sets as required.

C. The DB shall incorporate into the documents such corrections and amendments as the OMT requests at the design review, unless the DB objects to such changes in writing and the OMT agrees to the objections. Any additional cost incurred due to the DB's failure to incorporate the OMT's requested corrections and amendments shall be borne by the DB.

5.3 BASIS OF DESIGN

A. The Basis of Design (BOD) is a narrative description of the Project that is intended to provide a summary of the design progression and enable development of the construction cost estimate, and includes the BOD documents thought processes and assumptions behind design decisions to meet HAS's project requirements. Designer shall submit the BOD at completion of completion of Construction Document for the OMT review.

B. The BOD shall assemble all design information prepared under each design stage and shall include the following:

1. List of assumptions;
2. Validation of the bridging documents (Design Criteria Package);
3. A discussion of the overall design concept;
4. Major design decisions with regards to systems, form, size, quantity, materials, appearance and quality;
5. Explanation of impacts on or by other projects;
6. Outstanding issues;
7. Identification of additional studies, if required;
8. Recommendations for long-lead purchase items;

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9. Identification of any outstanding issues and considerations to be resolved prior to beginning the next stage of design.
- C. The BOD also includes, but is not limited to, the following as appropriate to the Project Scope:
1. Project Scope Description;
  2. Design workshops/ information data collection sessions;
  3. Information exchange/ team meetings/ design and decision registers;
  4. Quality management process for Design;
  5. Section Drawings with Overall Dimensions;
  6. Building Code or Standards Requirement - Summary code outline;
  7. Plumbing, Fire Protection, and Mechanical Systems and Total Capacity - system type and total capacity, narrative and quantities, general sizes and number of systems;
  8. Electrical Systems - electrical system capacity and general system concept;
  9. Communication Systems;
  10. Life Safety Requirements;
  11. Security System - Confirm HAS requirements;
  12. Soils and Hydrology Report - Provide assumed foundation strategy.
  13. Drawings
    - a. Site Diagram, indicating:
      - i. General size and location of elements;
      - ii. Existing Site Plan;
      - iii. Demolition Plan and/or Drawings;
  14. Site Plan, indicating:
    - a. Outline of all structures;
    - b. Dimensions for each building component;
    - c. Paved areas and utility connections and capacity;
    - d. Storm Water Plan and/or Drawings;
  15. Civil Utility Plan:
    - a. Provide sketch plan and narrative of location of utilities to the construction boundary;
    - b. Identify utilities connection points;

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- c. Confirm sufficient capacity at site boundary;
- 16. Fire Protection Drawings and Details;
- 17. Mechanical Drawings and Schedules
  - a. Provide mechanical systems type and total capacity;
- 18. Electrical and Lighting Drawings;
- 19. Communications Drawings;
- 20. Budget, Schedule, and Risk Analysis
  - a. Designer's Estimate of Construction Cost of Final Design vs. the design criteria package;
  - b. Designer's Construction Schedule bases on the final design vs. the design criteria package with key project dates identified;
  - c. Risk Implications and Mitigation Strategies. Identify the various risks associated with the final design vs. the design criteria package and initial mitigation strategies;

**5.4 BASIC SERVICES DELIVERY**

- A. As part of Basic Services, the DB shall provide the following services as appropriate to the Project scope
  - 1. Landscape Design;
  - 2. Civil Engineering and design, including streets, roads, drainage, water, wastewater;
  - 3. Structural Engineering and design;
  - 4. Fire Protection design;
  - 5. Mechanical Engineering and design;
  - 6. Automation and Controls Systems;
  - 7. Electrical Engineering and design for power distribution ductbanks;
  - 8. Lighting Design;
  - 9. Technology and Communications design for communication distribution ductbanks;
  - 10. Security Systems (see item 9);
  - 11. Traffic Control design during construction and permanent facilities;
  - 12. Visual Communications including Signage, Graphics and Wayfinding;
  - 13. GIS Design to conform to HAS standards;
  - 14. Storm Water Pollution Prevention Plan Design Services during construction and permanent facilities;

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15. Surveying to conform to HAS standards;
16. Life Safety Code Compliance, as applicable.
17. Other Services as mutually agreed to by the DB and the OMT;

**B. Basic Services for this Project will be staged as follows:**

1. Final Design and Construction Documents;
2. Subcontract Bid Packaging and Permitting
3. Design Services during Construction;

**5.5 FINAL DESIGN AND CONSTRUCTION DOCUMENTS**

**A. Data Collection during Preconstruction and Design**

1. The DB shall take reasonable precautions to verify the accuracy and suitability of any drawings, plans, sketches, instructions, information, requirements, procedures, requests for action, and other data supplied to DB (by HAS or any other party) that DB uses for the Project. DB shall identify to the OMT in writing any such documents or data which, in DB's professional opinion, are unsuitable, improper, or inaccurate in connection with the purposes for which such documents or data are furnished.
2. The City does not warrant the accuracy or suitability of such documents or data as are furnished unless DB advises OMT in writing within five (5) Calendar Days of uncovering the unforeseen condition, that in DB's professional opinion, such documents or data are unsuitable, improper, or inaccurate and OMT confirms in writing that it wishes DB to proceed in accordance with the documents or data as originally provided.
3. The DB shall make reasonable efforts to investigate any documents provided by HAS and the visible existing conditions at the Project site to identify existing systems and construction which must be modified to accommodate DB's design for the Project and construction of the Project.
4. The DB shall identify to OMT in writing within five (5) Calendar Days, any discrepancies between the documents and visible conditions, and shall consult with OMT on any special measures, services, or further investigations required for DB to perform its services free from material errors and omissions and to properly coordinate with existing systems and construction. This investigation shall be accomplished by registered, professional architects and engineers and surveyors, as appropriate.

**B. Criteria Package Review and Design Alternatives**

1. The DB shall provide a written evaluation of the Design Criteria Package and advise OMT on alternative designs.

**C. Construction Documents**

Based on the Design Criteria Package and any further adjustments to the Project budget as authorized by HAS, the DB shall prepare Construction Documents consisting of Drawings and Specifications and submit them to HAS for approval. The Construction Documents shall set forth in detail the requirements for construction of the Project. The Construction Documents shall be consistent in all material respects with prior design criteria package and shall provide for the

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construction of the Project within the original Contract Price, unless the original Contract Price has been modified by an approved Change Order.

- D. The DB shall advise the OMT regarding construction phasing and scheduling, the construction contract time period, and such other construction conditions considered appropriate for the Project.
- E. The DB shall assist and advise the OMT in connection with HAS's responsibility and procedures for obtaining approval of Governmental Agencies having jurisdiction over the Project.
- F. Submittal of Construction Documents for Final Review
  - 1. DB shall submit completed Construction Documents, satisfying all previous review comments and suitable for permitting and construction. Final quality control elements performed by Designer such as inter-discipline coordination, peer reviews, and document and calculation checking shall be completed and incorporated. Any work remaining at this stage shall be only minor corrections to resolve discrepancies discovered during the final review.
  - 2. DB shall provide the updated Basis of Design as described in this Section with the submittal.
  - 3. Included with this design submittal will be
    - a. Construction schedule prepared by the DB which will provide logic and durations of all construction activities
    - b. Submittal schedule prepared by the DB which will list all items by specification section, that are to be submitted by the DB for review and approval.

**5.8 SUBCONTRACT BID PACKAGING AND PERMITTING**

- A. The Designer shall provide documents for use by the DB in procurement packages for all work to be subcontracted by the DB to support the construction schedule. The construction packages may be released at different times, which may require the DB to prioritize the work and provide separate design submittals for approval.
- B. The DB shall submit final design and construction documents for all permits required by the authorities and agencies having jurisdiction. All permits shall be paid as allowances under the contract.

**5.9 DESIGN SERVICES DURING CONSTRUCTION**

- A. The DB is fully responsible for the services performed by their Designer. It is expected that these Services shall generally include the following to support Phase 1A and 1B Construction Work:
  - 1. Project site visits at intervals appropriate to the type and stage of construction progress to observe the progress and quality of the Work.
  - 2. For general observation, Designer shall visit the site for specific purposes related to start-up or mock-up reviews for significant work activities and for formal inspections of the Work.
  - 3. Interpretation of the technical requirements of the Contract Documents. Interpretations and recommendations shall be consistent with the intent of and reasonably inferable from the Contract Documents.

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4. Review and approve or take other appropriate action upon the DB's submittals such as shop drawings, product data, and samples, but only for conformance with the design concept of the Work set forth in the Contract Documents. These actions shall be taken prior to issuance of these submittals to the OMT for concurrence.
5. Participate in concealed space inspections, systems start-up inspections, and Substantial Completion inspections.
6. Review DB's submission of operating and maintenance instructions, and all manuals, brochures, drawings, and other close-out documentation furnished by the DB for conformance with the requirements of the Construction Documents.

**SECTION 6 - PRECONSTRUCTION SERVICES**

**6.1 GENERAL RESPONSIBILITIES**

- A. The DB will be required to coordinate and work with the OMT and HAS.
- B. The DB is responsible for the management and implementation of general services works and security for the site. This includes but is not limited to: management of miscellaneous site preparation activities, escorting if required, safety, and work force transportation to and from the areas of work if required, subcontractor/trade work force logistics, clean-up and housekeeping, temporary works for construction, public safety barriers, fencing, partitions etc., traffic maintenance, and temporary signage.
- C. The DB is responsible for management of the Project environmental plan and sustainability initiatives related to the Project. This includes the tracking, disposition and reporting of demolition work, salvage of any materials, and reuse of any materials.
- D. The DB's Designer is responsible for designing the Project in accordance with all applicable local, state, and federal codes and standards to enable permits to be obtained from the City of Houston and other Governmental Agencies for approval and/or construction.
- E. The DB shall furnish all services in accordance with a professional standard of care and design standards currently practiced on projects similar in size, complexity, and cost.
- F. The DB shall design the Project to a level of detail sufficient for construction and permitting and shall be responsible for the quality, completeness, accuracy, and coordination of Construction Documents.
- G. The DB shall provide quality control over design before review submissions to OMT.
- H. The DB shall establish, implement, and modify Project administrative functions and reporting requirements to the OMT at periodic intervals.
- K. The DB shall identify and provide corrective actions for all Project risks.
- L. The DB shall participate in appropriate weekly Project meetings.

**6.2 PHASE 1 NOTICE TO PROCEED**

- 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 final design and permitting.

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1. Immediately upon issuance of the NTP, the DB 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 process
  - c. Required project construction quality standards and requirements
  - d. The development of project reports
  - e. The needs and requirements of HAS and other Project stakeholders
  - f. The Project site available records, as-builts, specifications, local conditions and all related limitations and constraints
  - g. Schedule assumptions and constraints

### 6.3 KEY PERSONNEL

- A. The DB 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 Design Services and the Construction Phase Services.

### 6.4 PRECONSTRUCTION MEETINGS

#### 6.4.1 KICKOFF MEETING

- A. Prior to commencing work and at a specific time and place to be determined by HAS, DB shall meet with the OMT for a Project Kickoff meeting. The OMT, the DB, including Designer, and the Project team key personnel will be required to attend the Kickoff Meeting and Project On-Boarding Process. The goals of the kickoff meeting are:
  1. To coordinate the DB and 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 cost estimate process
  7. To establish clear lines of communication and points of contact for each Project team

#### 6.4.2 SCHEDULING CONFERENCE

- A. Scheduling Conference
  1. A separate scheduling conference is required during both Preconstruction and Design Phase and the Construction Phase(s) of the Project.

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**B. Attendees**

1. OMT, the DB's Key Management Personnel, Designer, major Subcontractors, 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.

**C. Agenda**

1. Introduction to the DB's scheduling team's qualified personnel that will develop and update the Project Schedule.
2. Content, format, and submittal requirements and reports.
3. Schedule for other concurrent work under HAS's separate contracts and coordination with other work and personnel.
4. Review time required for design and construction phase submittals and resubmittals.
5. Review time required for RFI's and Change Orders.
6. Regulatory Agency Reviews and Approvals.
7. Project logistics.
8. Requirements for tests and inspections by independent testing and inspecting agencies.
9. Time required for completion and startup procedures. List of Contract activities to be included in schedule. Procedures for updating schedule.
10. Project scheduling and document management software.

**D. Minutes**

1. The DB 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 OMT within two (2) days of the meeting for review and comment.

**6.4.3 BI-WEEKLY PROJECT UPDATE MEETINGS**

- A.** Following the Kickoff meeting, the DB shall organize and lead Bi-weekly (once every two weeks) Project Update Meetings throughout the duration of the Contract. The Bi-weekly Project Update meetings shall be attended by the DB and OMT key personnel. Any issue in the opinion of the DB and/or the OMT 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. The DB shall use this meeting to review and update, but not limited to, the following project related matters to the OMT:

1. Safety (Incident) Management
2. Designer's Issue Log
3. DB's Issue Log and Risk Register

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4. Potential Change to the Work
  5. Coordination and Logistic Planning
  6. CPM Schedule including a schedule variance report and mitigation plans
- B. The DB shall submit the project update documents to the OMT at least three (3) business days prior to the Bi-weekly Project Update Meeting.

**6.4.4 DESIGN PROGRESS MEETINGS**

- A. The OMT will schedule regular Design Progress Meetings to monitor progress of the Design portion of the Work. These meetings will start within 15 days from the date of Phase 1 NTP and will occur as follows:
1. Preconstruction and Design Phase: Once a week minimum and as required to accomplish the Final Design submittal.
  2. Construction Phase(s): Bi-weekly until the design and construction submittals are complete, then as needed and determined by the OMT.
- B. Attendees: Design Progress Meetings will be attended by:
1. The OMT
  2. The DB, Designer, and Key Personnel
  3. Major design subcontractors, as required
  4. Others as directed by the OMT
- C. Agenda: The DB will be responsible for developing the meeting agendas in collaboration with the OMT. 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 DB 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 OMT within two (2) days of the meeting for review and comment.

**6.5 PRELIMINARY SCHEDULE**

- A. The DB shall coordinate the requirements of this Section with Specification Section 01 32 16, Project Schedules and Progress Reporting (Refer to Exhibit).
- B. Within thirty (30) days after Phase 1 NTP, the DB shall prepare and submit a preliminary schedule for execution of the Work for the OMT review and response.
- C. The Preliminary Schedule shall include the Preconstruction and Design activities.
- D. The DB 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 DB of its complete and exclusive control over the means, methods, sequences, and techniques for executing the Work.

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6.6 DESIGN TO BUDGET

- A. Within thirty (30) Calendar Days of NTP for Preconstruction services, the DB will use the Design Criteria Package to develop an initial Probable Cost of the Work. This initial Probable Cost of the Work shall not exceed the Contract Price and will be the basis of the Schedule of Values used in the administration of the Construction Phase of the project.
- B. During the design process, the DB 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 DB shall conduct constructability reviews and provide input and suggestions for design optimization to align the design with the Agreed cost of the Work. The DB will perform more detailed analysis of selected items to include alternative methods, systems, materials, equipment, or designs feasible to complete the construction at the lowest reasonable cost while achieving HAS's Project objectives.
- D. During the performance of the final design, any change to the Probable Cost of the Work due to changes or proposed changes in the Design shall be immediately forwarded in a letter to the OMT. The DB shall not proceed with those affected elements of final Design or Construction if the Probable Cost of the Work exceeds the Contract Price.
- E. The DB will evaluate opportunities and make recommendations to improve maintainability and sustainability and reduce lifecycle costs and energy use.
- F. Cost Estimating and Reporting
  - 1. The DB will utilize an electronic data-base program to research and store pricing of various construction items. All estimates will built-off and reconciled to the approved Probable Cost of the Work. The estimates developed by the DB will be used by HAS during negotiations with the DB to negotiate Change Orders or use of Owner's Contingency. All Probable Cost of Work estimates shall be open book.
  - 2. The DB will work with the OMT's cost estimators in reconciling methods and information sources for the pricing of construction elements. As estimates are developed, the DB shall develop a system to manage and organize the various estimates utilizing the Work Breakdown Structure (WBS) provided by the OMT.
  - 3. During Preconstruction, the DB 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.
    - a. If the (OMT/DB) reconciled cost estimate exceeds the Contract Price. The OMT will arrange a meeting between the Director, DB, to present the cost estimate and to identify areas where the progressed design can be modified to bring the Project within the Agreed Cost of the Work. The presentation 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 Contract Price from the Director.
    - b. The OMT will document decisions reached and any change to the Contract Price resulting from the cost estimate presentation meeting and initiate a Change Order to

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the Contract.

4. After construction is authorized, the DB 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 Contract Price including any Change Orders, Work planned for the following month, progress percentage complete of Work deliverables, current status per budget line item, plus forecast variances and deviations from the Contract Price.

**6.7 DESIGN BUILD CONTRACTOR MANAGEMENT PLAN**

- A. Within Thirty (30) days after Phase 1 NTP, the DB shall prepare a DB Management Plan, to be reviewed and accepted by the OMT, which documents the DB's plan for delivery of the Project. A summary of the status of each element of the DB Management Plan shall be prepared monthly to reflect actual project progress and shall be submitted to the OMT at least one week prior to the Monthly Progress Review Meetings. The DB Management Plan shall address, but not be limited to:

1. Project Management and Administration Plans.
  - a. Project communications plan in accordance with Airport policies and procedures.
  - b. Preconstruction and Construction Organization Chart.
  - c. Design management plan
  - d. Design quality assurance/control plan
  - e. Schedule management plan.
  - f. Management reporting plan.
  - g. Pay request preparation and submittal plan.
  - h. Record keeping and document control plan.
  - i. Change management plan.
  - j. Project Procurement Plan
  - k. Material Management Plan
  - l. Coordination and Logistics Plan
  - m. Subcontracting Plan
  - n. Construction Work Plan
2. Preconstruction Evaluation Report
  - a. Preliminary Project Schedule incorporating design activities and progress.
  - b. DB's constructability recommendations including construction phasing, site logistics and traffic control.
  - c. Identify opportunities for increased efficiency and/or innovation.

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- 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, and construction related impacts.
  - f. Development of the Project Procurement Plan outlining supporting DB subcontract and deliverables and project buy out schedule.
  - g. Forecast and Trend Reports that identify and itemize specific events which may cause costs to change.
  - h. Any issue that, in the opinion of the DB, should be considered in the planning, management, or execution of the Project to maintain cost, 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 DB shall prepare a Risk Management Plan that will include risk identification, allocation and mitigation based upon the Work. Risks to be addressed include, cost, schedule, design/constructability risks, and any other matter that affects the execution of the Project. The DB shall work with OMT to review and update the preliminary list of preconstruction and construction related risks which:
    - (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) Defines 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) Proposes 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 DB will intend to seek payment for stored materials.
5. Quality Control (QC) Program
- a. The DB shall submit a Quality Control Program for Preconstruction and Construction Phase Services for the Project for the OMT review and acceptance. The DB shall ensure that all services comply with the Project requirements, all design services fully comply with the requirements of the Contract and all procured materials conform to plans, technical specifications and any other project requirements, whether constructed by the DB or procured from Subcontractors or vendors. The DB shall assume full responsibility for the QC Program execution throughout the Preconstruction and Construction phases of the Project.

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b. The DB 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 DB 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 OMT for inspections or testing,
- (3) Coordinating with suppliers and subcontractors,
- (4) Tracking and resolution of non-conformance issues,
- (5) Hiring and management of quality control laboratories and professionally credentialed consultants appropriate to meet the Contract Documents requirements.

6. Industry Outreach

a. The DB 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 DB shall also conduct bid research to determine that bids were reasonable as well as responsive to the Work Packages.

7. Subcontracting Plan

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

8. Construction Work Plan

a. The DB shall develop a Construction Work Plan which shall define the DB'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 OMT 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 and temporary facility 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 OMT regarding airlines, tenants and other stakeholders including utility disruptions.
- (8) Protection of private and public properties, including lease properties on at the Airport
- (9) Dust/dirt/debris mitigation.
- (10) Temporary erosion control.
- (11) Storm water drainage management during construction.
- (12) Proposed construction means and methods validation.
- (13) 3rd party coordination with utilities and other entities.
- (14) Construction zone accommodation of vehicular traffic, deliveries and employee parking.
- (15) Safety Plan including public and worker health and safety protection.

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- (16) Security Plan.
- (17) Temporary construction signage.
- (18) Traffic Control Plan during construction.
- (19) Security of work site including Airport Operational Areas (AOA).
- (20) BIM Execution Plan.
- (21) Closeout Plan

**SECTION 7 - CONSTRUCTION SERVICES**

**7.1 GENERAL**

- A. Upon issuance of the Construction Phase NTP(s), the DB 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 DB will be solely responsible for construction means and methods of the Work.
- C. The DB shall comply at all times with any and all oral and /or written instructions by the OMT 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 DB shall coordinate with the OMT 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 OMT. 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 DB is expected to solicit bids from subcontractors for elements of the work. Under management of the DB, the selected subcontractor/trade may provide materials, equipment and labor including the necessary coordination, supervision, programming, scheduling, cost control, contract administration, field engineering, 3<sup>rd</sup> party commissioning support, and closeout and support services to accomplish the work covered by each work package. Award of the Work to major subcontractors (over 10% of the Contract value) will be procured using a transparent competitive process which may be witnessed by HAS.
- E. The DB will be responsible for completing all Work related to this Project whether or not Work is contained in trade packages or subcontracts for the Project.
- F. The DB will be responsible to interact and efficiently coordinate with the various HAS departments, FAA, and TSA, and other agencies and utility companies, as required and address all federal, state, county and city permitting requirements. The OMT and Director will be kept fully informed regarding communication with these parties and shall be included in all interagency meetings, unless otherwise decided by the Director or authorized designee. All communications with these parties shall be documented by the DB for inclusion in the Project records and appropriate submittal to the Director.

**7.2 COORDINATION RESPONSIBILITIES**

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- A. The DB shall coordinate all construction operations included in the Contract to ensure efficient and orderly development and installation of each part of the Work. The DB shall not delegate responsibility for project coordination to any Subcontractor. The DB's coordination responsibilities include but are not limited to:
1. Preparing and issuing material and subcontractor bids to obtain input from Subcontractors for use in the final design phase.
  2. Scheduling and managing the documentation and permitting process with the various regulatory agencies with jurisdiction over the Project.
  3. Scheduling and managing the construction 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 Operational Readiness, Activation and Transition (ORAT) Teams to support the requirements for turn-over of the completed Project to HAS, as required.

**7.2.1 COORDINATION WITH THE PROGRAM MANAGEMENT TEAM**

- A. The DB shall notify the OMT 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 by the OMT for longer durations.
- B. Within 30 days of Phase 1 NTP, the DB shall notify OMT 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 DB Management Plan and discussed with the OMT and affected HAS representatives regarding the required notice period and actual scheduling of work.
- C. Observation of Work by HAS or the OMT shall not be interpreted as relieving the DB from responsibility for coordination, superintendence, scheduling, and direction of the Work.
- D. Coordinate with the OMT 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.

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**7.3 CONSERVATION**

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

**7.4 PROJECT REPORTS**

**A. Daily Construction Reports**

- 1. Prepare and submit within 24 hours of 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:
    - i. The number of DB's workers at the Project site;
    - ii. The number of subcontractor workers at the Project site, by subcontractor, vendor, etc.
  - i. The DB 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**

- 2. 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

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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.

3. For material stored off-site, the DB 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 DB shall prepare and submit a detailed report in accordance with the provisions of the Contract.

**7.5 PROJECT MEETINGS**

The person designated to make decisions binding on and on behalf of the DB, defined as the DB'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 OMT.

**A. Scheduling Conference**

1. A separate scheduling conference is required during both Preconstruction and Design Phase and Construction Phase(s) of the Project.
2. Attendees: OMT, the DB's Key Management Personnel, Designer, major Subcontractors, 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 DB'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 design and construction phase submittals and resubmittals.
  - e. Review time required for RFI's, Change Orders.
  - f. Regulatory Agency Reviews and Approvals.
  - g. Project logistics.
  - h. Requirements for tests and inspections by independent testing and inspecting agencies.
  - i. Time required for completion and startup procedures. List of Contract activities to be included in schedule. Procedures for updating schedule.
  - j. Project scheduling and document management software.
4. Minutes: The DB 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 OMT within two (2) days of the meeting

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for review and comment.

**B. Preconstruction Conference**

1. The OMT will schedule a preconstruction conference and organizational meeting, following the construction scheduling conference and before start of construction.
2. Attendees: OMT, the DB and its Project Manager, Superintendent, Quality Control Manager, major Subcontractors, Designer, 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

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- v. First aid and Local Emergency Response Plan
  - w. Security
  - x. Project in-progress site cleaning
  - y. Construction waste management
4. Minutes: The DB 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 OMT within two (2) days of the meeting for review and comment.
- C. Project Coordination and Logistics Meetings
- 1. The DB 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 OMT, DB, Designer, 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 DB 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 DB shall develop an agenda incorporating all operational impacts identified in the DB'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 OMT.
  - 6. The DB 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 OMT.
  - 7. The DB 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 DB at least 30 days prior to the proposed shutdown time, unless otherwise defined by the OMT based on the level of impact to the affected facilities. Primary airport infrastructure shutdowns will require longer notification periods, defined through coordination with the OMT and the affected parties. An ASR/USR meeting will be held with the DB and OMT and Airport Operations before any ASR is approved. Agenda for the meeting will include:
    - a. Review of current ASR and USR work as well as look-ahead scheduling for all project work. Provide appropriate narratives, schedules, documentation, and graphics to adequately describe planned work and to meet requirements of ASR and USR applications

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- 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
9. The DB 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 (Refer to Exhibit))
11. The DB 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 OMT will schedule and administer weekly progress meetings following Construction Phase NTP(s). The OMT will distribute agendas in advance of the meeting and minutes of each meeting to those in attendance. The DB shall coordinate the meeting agendas with the OMT for issuance.
- 2. Attendees: In addition to the OMT, the DB 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 discussion shall be established as appropriate to the current status of the Project such as:
  - a. The DB'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:
    - c. Safety
    - d. Security
    - e. Four (4) week look ahead Schedule
    - f. Project Logs
    - g. Submittals
    - h. RFI's
    - i. Work Change Directives

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- j. Non-Conformances
  - k. Quality Control and Work standards
  - l. Traffic Control
  - m. Site utilization
  - n. Hours of Work
  - o. Temporary facilities and services
  - p. Temporary Erosion Control
  - q. Deliveries
  - r. Status of off-site fabrications
  - s. Project Costs: budget, commitment and progress payments.
  - t. Project Record File additions (Change Orders, meeting minutes, etc.)
  - u. Applications for Payment
  - v. 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 DB 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 OMT for review and comment within two (2) days of the meeting.

**E. Pre-Installation Meetings**

1. The DB will conduct pre-installation meetings before each major construction activity or activity that requires coordination with others. The DB will develop a list and schedule for the OMT of all required meetings and scheduled dates. Dates of pre- installation meetings shall be identified on the Project Schedule.
2. Attendees: The OMT, Consultants, DB management team and Subcontractors, equipment 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 DB 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:

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- 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 DB 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 OMT within two (2) days of the meeting for review and comment.
5. The DB shall not proceed with installation if the pre-installation conference cannot be successfully concluded. The DB 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 DB 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

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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 OMT, the DB's senior construction scheduler, project manager, general superintendent, Designer 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 DB's published, updated and approved construction schedule. Determine how design and/or 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 DB 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 DB 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. DB shall submit revisions to schedule logic to conform to current job status and directions, without changing original activity identification.
6. Schedule Updating:
  - a. The DB will revise the actualized construction schedule after each monthly progress review meeting, where revisions to the schedule have been made or recognized. The DB will issue revised schedule concurrently with the minutes of each meeting. Upon acceptance by the OMT, schedule revisions submitted by the DB shall be incorporated into the Project Schedule in the next monthly update.
7. Minutes: The DB 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 OMT within two (2) days of the meeting for review and comment.

**G. Safety Meetings**

1. Within thirty (30) days after the Construction Phase NTP(s) but prior to commencement of field work activities, the DB will arrange a Safety Meeting with the OMT to review Project safety requirements.

**H. Pre-Demolition Meetings**

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1. The DB shall schedule and administer meetings through the OMT for stakeholders affected by the Work prior to any demolition activities. Demolition work shall not start unless authorized by the OMT. In addition to addressing specific requirements of the proposed demolition Work to be undertaken, the DB shall include requirements of the "Project Coordination and Logistics Meetings" defined earlier in this section.
- I. Project Closeout Conference
1. The DB shall request a Project Closeout Meeting at a time convenient to the OMT, 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 OMT 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 (Refer to Exhibit).
  2. Attendees: The OMT, the DB 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 DB'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. Responsibility for removing temporary facilities and controls
    - m. Site cleanup and restoration
  4. Minutes: The DB 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 OMT within two (2) days of the meeting for review and comment.

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**SECTION 8 - DESIGN SUBMITTAL PRODUCTION STANDARDS**

**8.1 DEFINITIONS**

- A. The HAS BIM Manager leads the BIM implementation and oversees the BIM application of the program. The HAS BIM Manager is the point of contact between HAS and the Design Consultant BIM Manager for technical issues, BIM-related topics, and Model(s) delivery.
- B. The Design Consultant BIM Manager leads the BIM implementation and oversight for the Design Consultant.
- C. Design Model(s): created and developed by the Design Consultant will be used to develop the project design.
- D. Construction Model(s): created by the construction team from the Design Model will be used to develop and fulfill the construction needs.
- E. As-Built Model(s): prepared by the construction team will be used to show on-site changes to the original Construction Models.
- F. Record Model(s): prepared by the Design Consultant from the Design Model must reflect on-site changes the construction team noted in the As-Built Models. The record model(s) must, at a minimum, contain the required systems information to integrate the project data into the HAS Asset Management System.
- G. The BIM Project Execution Plan (BPxP) is a comprehensive document that helps the project team identify what, when, and how to execute the BIM implementation. The BPxP defines communication procedures, BIM deliverables, collaboration and addresses the HAS BIM requirements and procedures.
- H. The HAS ASIS Group will lead the BIM data integration process from the delivered Model(s) to the HAS end-user applications.

**8.2 BIM GENERAL**

- A. The Houston Airport System (HAS) requires that project documentation be created using Building Information Modeling (BIM) processes and software. The intent is to provide essential project information to create accurate spatial and data models of the building system's required components.
- B. HAS expects data-rich Model (s) to serve as a legacy for future building improvements and expansion, maintain accuracy between building component systems and GIS-BIM models, and capture project data for building life cycle integration for the HAS Asset Management System and airport infrastructure needs.
- C. The Design Consultants shall exchange Model(s) and data freely and openly within a collaborative environment with all parties involved in the project. Development of the Model(s) will include collaborative efforts between the Design Consultant teams with oversight from the HAS BIM manager.
- D. A detailed BIM Project Execution Plan (BPxP) will be assembled through a series of workshops with stakeholders and updated as many times as necessary during the project life cycle.

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**8.3 BIM PURPOSE AND PRIMARY USE**

- A. Deliver an integrated, coordinated, and constructible design.
- B. Generate construction documents from BIM Model(s).
- C. Create technically accurate and highly developed BIM model(s) of building system elements for Preconstruction, Construction Phases and Facility Management.
- D. Deliver a data-rich Record Model(s) at project close-out with the required HAS Shared Parameters fulfilled for integrating BIM model(s) with the end-user applications and the HAS Facility Management/Asset Management System.
- E. Share Model(s) and Model-Project data with extended team to leverage information across disciplines.
- F. Maintain and update all Models throughout design and construction, incorporating all addenda, bulletins, and documented modifications during construction.
- G. Model(s) developed by the Design Build BIM Manager may be utilized for multiple purposes including, but not limited to: design, documentation, as-built condition, building systems spatial coordination, interference checking, record drawings, cost estimation, schedule analysis, project controls, commissioning, location of required building components, integration in the GIS platform and operations and maintenance. Model(s) scope will be decided and documented during BIM Project Execution Plan workshops with HAS, the Design Consultant.

**8.4 DRAWING CONVENTIONS FOR DOCUMENTATION**

- A. Project files 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 and guidelines.
- B. HAS documentation standards are available on the HAS Fly2Houston website but are not limited to:
  - 1 HAS Design Standards Manual.
  - 2 HAS BIM Standards and Procedures to address HAS Building Information Modeling general requirements.
  - 3 HAS Shared Parameters to address Facility Management/Project Data Integration required building system components.
  - 4 HAS CAD/ Geospatial Data Standards and Procedures to address Airport Spatial Information System (ASIS) general requirements and CAD drawing standards.
  - 5 Houston Airport Addressing and Room Numbering Guideline.
  - 6 HAS Wayfinding System.
- C. HAS manages assets data in a series of building systems; depending on the project's size and complexity, building systems may be organized in separated models or delivered in one Model. Design Build BIM Manager will give recommendations to the HAS BIM Manager based on

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technical and collaboration matters. The HAS BIM Manager, together with the ASIS group and Design Consultant BIM Manager will decide the appropriate building systems models organization and it will be set in the BPxP.

**8.5 DESIGN SUBMITTAL FILE FORMATS**

- A. Design Consultant shall submit drawings electronically at each deliverable Milestone in the following formats:
- 7 All files and documents used to create design submittals shall be submitted in their native authoring format, and PDF format as well. As any prescribed deliverable format.
  - 8 All supporting files including but not limited to MEP analysis, building performance, LEED calculation, GIS analysis tools, AIRTOP Terminal, Life Cycle Analysis, and other documents to create design submittal shall be submitted in their native authoring format and PDF as well.
  - 9 The HAS BIM Manager and Design Consultant will prepare a list of file types to be submitted before the Schematic Design submittal and will be updated in the BPxP.
  - 10 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, as revised.
  - 11 Project Manuals shall be submitted in their native and PDF file format.
  - 12 All electronic deliverables shall include a description of the content, required links, references, etc.
  - 13 Design-Build Contractor shall submit to HAS printed half size design review sets and printed project manuals of each design phase submittal at each formal design review stage.
- B. BIM Model(s) and design drawings shall be delivered in the following formats:
- 14 Autodesk Revit native Model(s) used to generate documentation with approved HAS version.
  - 15 Autodesk Civil3D native Model(s) used to generate documentation with approved HAS version.
  - 16 Autodesk Navisworks containing each Model's specific scope with an approved HAS version. The file shall be exported from a 3D view that shows all 3D objects in the Model without cropping and without 2D objects or 3D objects from references. An .NWF or .nwd assembles all NWC files and contains the design coordination data.
  - 17 Autodesk AutoCAD 2D files for each sheet will comply with the HAS BIM standards.
  - 18 PDF of each drawing sheet exported from BIM Model(s) and Civil 3D.
- C. Other secondary software usage shall be based upon mutual agreement and with approval by HAS BIM Manager.
- D. All electronic format file delivery shall be in accordance with the requirements of Specification, Section 01 33 00 Submittal Procedures (Refer to Exhibit).

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**8.6 HAS/BIM REQUIREMENTS**

- A. For future re-use, renovation, and to avoid rework, HAS will keep ownership as well as the data contained in the Model(s), including but not limited to BIM Models, Construction Documents, drawings, renders, animation, and simulations of building and model(s) performance. (Houston Airport System shall have exclusive rights to the BIM Model(s)).
- B. HAS maintains Standards, Guidelines and Procedures on the HAS Fly2Houston website, they must be followed and be reviewed from time to time to address the Houston Airport System general requirements, CADD/Geospatial Data Standards, BIM Standards and HAS Shared Parameters.
- C. The HAS BIM Manager and the Design Consultant BIM Manager will jointly develop standards and procedures within the BPxP to create processes and tools for delivering the project.
- D. The HAS Asset Management System is the core of the building life cycle for operation, preventive maintenance, future planning, and facility modifications. The HAS Asset Management System requires Record Model(s)s and As-Built Model(s) to contain the HAS Shared Parameters as a crucial factor for integrating model-project data and delivering data to end-users.
- E. The HAS Shared Parameters are considered the most important data in BIM files. The Design Consultant will fulfill the required shared parameters requirements during project phases. The Record Model(s) will be delivered to HAS with the HAS Shared Parameters updated from As-Built conditions. Further instruction will be addressed through the BPxP workshops.

**8.7 BIM MODELS AUTHORSHIP**

- A. In order to maximize effectiveness throughout the Project's planning, design, and construction phases, the BIM Design Model(s) will be authored, maintained, and kept accurate at all times by the Design Consultant BIM Manager during design phase.
- B. The Design Consultant BIM Manager will create, share with its consultants and update the HAS Shared Parameters in the BIM Design Model(s).
- C. The Design Consultant BIM Manager will update the Data Entry Responsibility and Data Collection Responsibility Party in the spreadsheet HAS Shared Parameters and send it to the HAS BIM Manager to incorporate in and update the BPxP.
- D. The DB BIM Manager will author, maintain, and keep the Construction Model(s) accurate during construction. The DB BIM Manager will provide the Construction Model(s) information to the Designer BIM Manager for incorporation into the Design Model(s).
- E. The Design Consultant BIM Manager will oversee the review of interference checking reports, note areas that require further coordination or redesign, review all models for integrity, and validate that Project facility data is populated.
- F. The Designer will retain control of the final Design Model. The Design Model(s) shall be monitored at accepted milestones during preconstruction and construction phases to ensure that the Design Model is correctly updated and meets the HAS requirements.
- G. As the project proceeds through to construction completion, the Design Consultant BIM

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Manager will track and capture in collaboration with the Design Build BIM Manager all deviation, record conditions in BIM Model(s) as each system is built and installed.

- H. As the project proceeds through construction completion, the Design Build BIM Manager will collaborate with the Design Consultant BIM Manager to compile information, data acquisition, tracking, and capture all record conditions to reflect the Record BIM Model(s) content

**8.8 INTERFERENCE CHECKS**

- A. The Design Consultant in collaboration with the team, shall coordinate the Design Model(s) in order to eliminate or minimize conflicts between design elements. Before every transmittal, the Design Consultant shall coordinate the Design Models and check for clashes between model elements using the interference check tool.
- B. The Design Consultant will be responsible for presenting and documenting interference checks/clashes and resolutions during the design phase.
- C. The HAS BIM Manager, Design Build BIM Manager, and Design Consultant BIM Manager will collaborate to resolve interferences and clashes through the project/program phases.
- D. The Design Build BIM Manager shall coordinate the Construction Models to minimize or eliminate conflicts between construction elements during the construction phase. Before every transmittal of construction files, the Design Build BIM Manager shall coordinate the construction models and check for clashes between Model(s) elements using the interference check tool.
- E. The Design Build BIM Manager will be responsible for presenting and documenting interference checks /clashes and resolutions during the construction phases.
- F. The Design Consultant BIM Manager will oversee the review of interference checking reports and note areas that require further coordination or redesign. The Design Consultant BIM Manager will review the integrity and validate that the Design Model and Record Model meet HAS requirements.
- G. The DB shall keep the Designer current with any clashes or field changes affecting the Design Model throughout the construction phase. The Designer shall support this effort as needed with updates provided in response to RFI, HAS requested changes, and other design modifications affecting the Construction Model.
- H. Specific processes, meetings, and reports will be defined in the BPxP workshops.

**8.9 ORGANIZATIONAL ROLES**

- A. Design Consultant BIM Manager
  - 19 The Design Consultant BIM Manager will lead the efforts for creating and managing the Design Model(s) for the extended design team consultants. The Design Consultant BIM Manager will be the primary point of contact for the design team, including all Subconsultants, and represent the design team in development and assembly of the BIM Project Execution Plan.
  - 20 The Design Consultant BIM Manager will direct and coordinate the work of the Subconsultants to ensure that the Subconsultants BIM performance is seamlessly

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integrated into the project.

- 21 The Design Consultant BIM Manager will verify the work of the Subconsultants is aligned with HAS BIM requirements and comply with the HAS BIM Standard to produce accurate Construction Documents.
- 22 The Design Consultant BIM Manager will work closely with the Design Build BIM Manager and the HAS BIM Manager to incorporate design phase feedback, transition and integration of Design Model(s) to the construction phase, and develop accurate Record Models.
- 23 The Design Consultant BIM Manager represents the design team in all BIM related meetings and workshops.

**B. HAS BIM Manager**

- 1 The HAS BIM Manager will be the primary point of contact for BIM-related issues, oversee the quality and application of BIM technologies, and ensure that the Model(s) meets HAS-specific goals and requirements.
- 2 The HAS BIM Manager will lead and oversee the BIM Project Execution Plan (BPxP) workshops and other BIM-related meetings as determined in the BPxP.
- 3 HAS BIM Manager will be responsible for performing reviews and audits of the Model(s) deliverables to ensure BIM Models comply with the HAS BIM Standards, HAS requirements, and all set out in the BPxP.
- 4 The HAS BIM Manager will coordinate between the Design Consultant, the HAS ASIS group, and the Asset Management group for all related to Asset Management requirements, room numbering, and Record Model(s) delivery.

**C. Design Build BIM Manager**

- 1 The Design Build BIM Manager will work closely with the HAS BIM Manager and Design Consultant to add value to the Design Models by providing feedback during the design phase.
- 2 The Design Build BIM Manager will coordinate between multiple project participants and be the primary point of contact for the extended Construction Team, including all subcontractors and trades. Represents the Construction Team in all BIM related meetings, workshops and helps to assemble the BIM Project Execution Plan.
- 3 The Design Build BIM Manager will use the Design Model(s) to develop the Construction Model(s), Shop Drawings for fabrication, As-Built Model(s) and be responsible for assembling and coordinating subcontractors.
- 4 The Design Build BIM Manager, will collaborate and facilitate required data, during the construction phase to the Design Consultant for the Record Model(s) creation and control what has been designed against what is to be built.
- 5 The Design Build BIM Manager ensures that the design process is done within the assumed time, quality, budget and HAS requirements are met.

**8.10 BIM PROJECT EXECUTION PLAN (BPxP)**

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- A. The HAS BIM Manager, the Design Consultant BIM Manager, and the Design-Build BIM Manager shall collaborate to develop the Project BPxP no later than thirty (30) calendar days after the Preconstruction NTP is issued. The BPxP is a living document that responds to the HAS BIM execution strategy and will be updated as many times as needed during project phases.
- B. The BPxP will provide a framework for deploying BIM on the project, and will identify project goals, project characteristics, methods, and procedures.
- C. The BPxP defines how the BIM project will be executed, monitored, and controlled.
- D. The BPxP will document detailed BIM use on the project, including roles and responsibilities of each party, how the BIM aspect is carried out, capabilities of the team members, project data integration into HAS Asset Management System, software and hardware requirements, and recommendations.
- E. The BPxP defines Future and recurring BIM related meetings, including but will not be limited to:
  - i. Model Reviews
  - ii. BIM Coordination
  - iii. Spatial Coordination / Clash Detection
  - iv. Design Review
- F. The BPxP template will be provided by HAS BIM Manager and will include at a minimum, the following:
  - 2 Project goals and approved BIM uses.
  - 3 Roles and Responsibilities.
  - 4 General BIM Procedures for the Project.
  - 5 Model Progression Specification (LoD Matrix).
  - 6 BIM and Facility Data Requirements.
  - 7 Collaboration Procedures.
  - 8 BIM process road map.
  - 9 Quality Control
  - 10 Model Structure
  - 11 Project Deliverables

**8.11 COMMUNICATION PLAN**

- A. The team members, including the Design Consultant, the Design-Build Contractor, and HAS shall jointly develop a Communication Plan to describe inter-party communication methods and procedures. It will be established in the early stage of the development of the BPxP. The Communication Plan should, at a minimum, include the following:
- B. Level of access to the BIM Model(s) for each party team member.
- C. Establish who, when and how to integrate data to the BIM Model(s).

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- D. Assume each party's responsibility in creating and maintaining Model(s) and portions of the project.
- E. Collaboration workflow.
- F. Model coordination.
- G. Establish frequency of communication and data exchange.

**8.12 CONSTRUCTION SERVICES DELIVERABLES**

- A. The Design Build BIM Manager will keep the Design Consultant current with any construction coordination or field changes affecting the Model(s) throughout the construction phase.
- B. The Design Build BIM Manager will provide the final coordinated trade construction and/or fabrication Model(s) in the native file format and a federated Navisworks model to HAS at the end of the construction phase.
- C. Design Consultant shall continuously update Model(s) to include RFI 's, HAS requested changes, changes provided by Design Build BIM Manager, HAS Shared Parameters values, coordination with existing conditions, and other design modifications affecting the Model(s).
- D. After receiving the As-Built drawings and As-Built Models from the Design Build BIM Manager, the Design Consultant shall update the BIM Design Model to deliver the final Record Model to HAS as part of project close-out documents.

**SECTION 9 - ENERGY AND SUSTAINABILITY**

**9.1 INTRODUCTION**

- A. The DB 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 IAH Terminal Redevelopment Program Design Standards Manual as a guide.

**9.2 SUSTAINABLE MANAGEMENT PLAN**

- A. HAS developed Sustainable Management Plans for their airports.
- B. The Airport may require the DB to incorporate the concepts in the final design or construction documents where feasible at the time of preparation of these documents using the IAH Terminal Redevelopment Program Design Standards Manual as a guide.

**9.3 LIFE CYCLE ANALYSIS**

- A. The DB, shall perform Life Cycle Analysis (LCA) for the Project lifetime period as defined by the OMT (minimum 30-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, for the applicable portion of the Project.

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**Exhibits**

**Drawing No:**

- I. Cover Sheet Index of Drawings
- II. Project Location Map Site  
Plan
- III. Referenced Division 01  
Specification Sections