The Walt Disney Family Museum

The Presidio of San Francisco

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Mechanical Option

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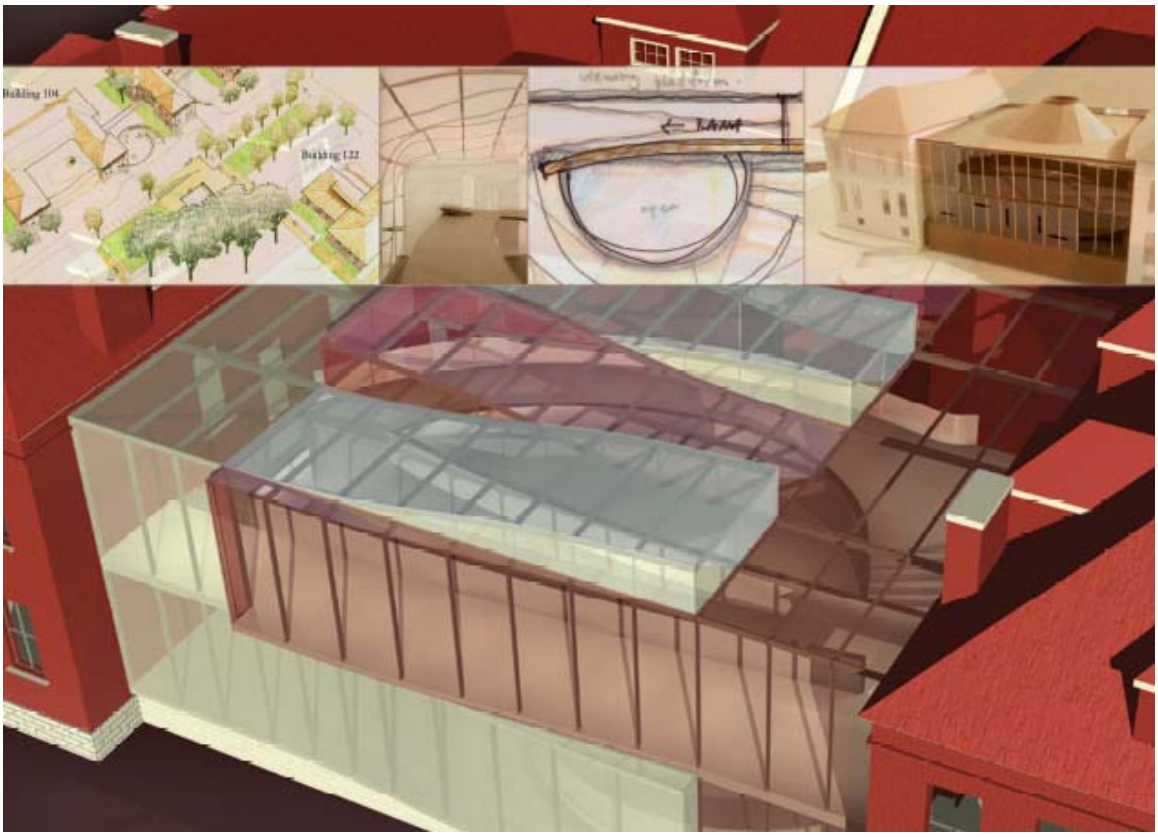
Construction Methods

Typical administrative requirements were placed upon Plant Construction during the project, such as a formal schedule in a horizontal bar format which was to be approved by the owner. Coordination of the structural and MEP systems were also required. Quality requirements, such as mock-ups, manufacturer's field services and independent lab testing were to be used when necessary.



During the construction process, a difference between the terms repaired, rehabilitation and replace must first be understood. Repair, as per the building specifications, is understood to be a second option where preservation cannot uphold the material or system for mid- to long-term use. The different aspects of the building, if needed, were to be repaired instead of replaced when necessary. During the construction phase, as much of the original materials and structure were to be preserved and protected. Uses of traditional materials and techniques were also encouraged during the construction in order to recreate an older style of building.

No smoking was allowed on site during construction.

During cleaning phases, Plant Construction was asked to aim for achieving 85% clean, instead of 100% clean because as per the specifications, damaged to historic materials occur within the final 15% of cleaning.

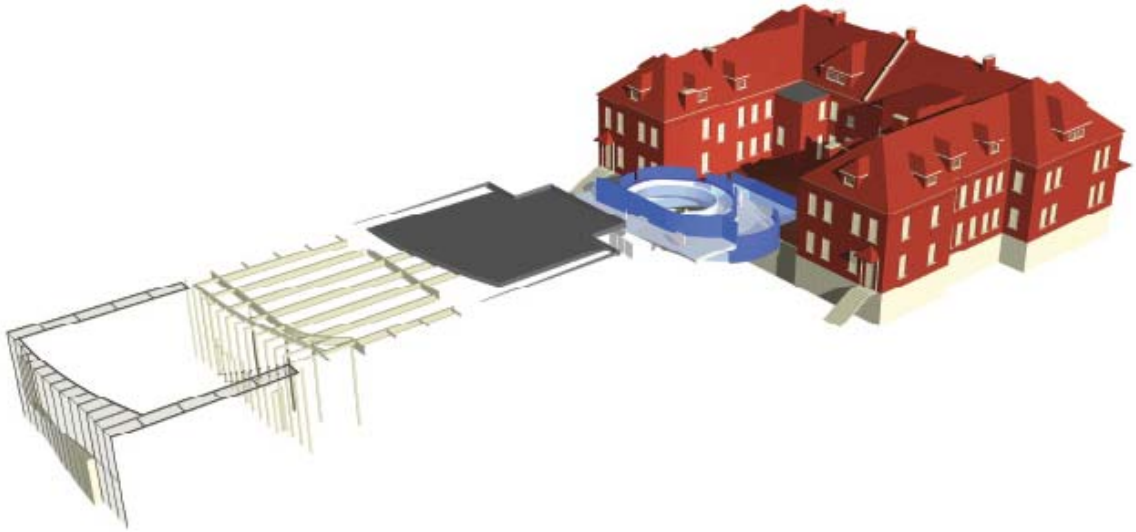
A Historic Preservation Architect as well as a Restoration Specialist were both part of the construction phases, which both were required to have numerous years of experience.

"Cutting and Patching", which requires cutting into the existing structure in order to coordinate MEP and structural systems as well as laboratory testing of materials, and then patching the original building in order to restore the surfaces to their original condition, without notice of disturbance. Approval from the Historic Preservation Architect was often required.

Structural System

A new steel structural foundation system was laid for the basement theater area within the basement of Building 104.

Steel roof deck consists of an acoustical roof deck, non-composite type, galvanized steel sheet with plan vertical flute faces perforated with holes staggered on center. Other roof decking consists of non-composite steel sheet with a galvanized coating.



Mechanical System

Within Building 108, a central chilled water and heating water plant will provide service to buildings 122 and 104.

Three evaporatively cooled chillers with low ozone refrigerants, HFC-123a and HFC 134, provide chilled water with a 270 ton capacity. Two condensing type hot water boilers are also housed within Building 108 with a 1,400,000 BTU/hr capacity.

Two primary chilled water pumps at 435 gpm, and two secondary chilled water pumps at 435 gpm, two condensing water pumps at 740 gpm, and two hot water pumps at 60 hpm. Each of the two sets of pumps are variable frequency drives, with the second pump on standby, if needed.

Variable volume chilled water and hot water will be pumped to distribute the chilled water and heating water from Building 108 in order to meet the heating and cooling loads of the buildings. Such heating load demands that were taken into consideration include gallery displays, media projectors and interactive lighting exhibits.

With Building 104, 4 air handling units are found in the subbasement mechanical room, providing heating, cooling and ventilation service throughout the building.

AHU-104-1 supplies 28,000CFM of air to the Learning Areas, as well as the Infill Area also known as Scene 9. Special considerations were given to this space regarding thermal control, outdoor air economizer and ventilation, however, no humidity control is provided as it is an exhibit area. This area's exterior envelope also had upgraded glazing, walls and roof in order to provide thermal insulation, solar control, infiltration and moisture control, as this area is where the newly built atrium space is found.

AHU-104-2 provides 34,000 CFM to the North Wing on Levels 1, 2 and 3, while AHU-104-3 supplies 22,000 CFM to the South Wing on Levels 1, 2 and 3, in which typical HVAC service is provided again. No humidity control is required.

AHU-104-4 dedicates 4,000 CFM to the Lecture Hall found in the basement level in order to properly ventilate and condition this space. This is the only room that this AHU services.

Spaces with gallery type conditions require proper environmental control such as precise temperature and humidity control, robust automatic control system, additional air filtration as well as minimum outside air ventilation.

Exhibit Areas do not require humidity control, meaning that humidity levels are allowed to vary with outside air variations.

Air is supplied to the spaces by conventional air distribution systems in which traditional ductwork supplies air from the coordinating AHU. However, in Exhibit Areas, spaces are conditioned by dual duct VAV overheard conventional air distribution system, which is served from the AHUs in the subbasement.

Supply duct risers and floor supply air ducts are constructed in accordance with

1995 SMACNA construction, 2 inch pressure class, seal Class A, while exhaust ducts are constructed in accordance with 1995 SMACNA construction, 1 inch pressure class, seal Class A.

All primary ducts within 20 feet of AHU supply are constructed of 2-inch double wall with fiberglass insulation and internal perforated sheet while acoustical lining is provided when necessary to reduce noise throughout the building.

Flexible duct runs to each diffuser, with a maximum length of 6 feet.

No return air ducts found in the buildings. The entire building campus is driven by pressure differences throughout the buildings when concerning return air.

Throughout the building, certain areas needed to be exhausted through the building to exhaust fans located at the roof. Heating and ventilation systems provide service Toilet Rooms as well as the Projection Room in Building 104, the Electrical Closet in Building 104, the Emergency Generator Room, Elevator Machine Room and finally, the A/V, IT, Main Telecom and Main Electrical Rooms.

Building 104 – 4 AHU s

Air Handling Units within Building 104 (Museum) and Total Airflow Rates (CFM)	
AHU-104-1	28,000
AHU-104-2	34,000
AHU-104-3	22,000
AHU-104-4	4,000

Electrical System

The Presidio Trust supplies electrical service to the Walt Disney Family Museum campus in the form of 160 volt primary, 120/208 volt secondary.

In Building 104, the main electrical room and main switchgear is located in the sub-basement in Room 003 that consists of 2,500A, 120/208V, 3-phase, 4-wire.

Building 108, the electrical room is found in Room 000 and consists of 2,000A, 120/208V, 3-phase, 4-wire service.

Building 122, the electrical room is found in Room 005, 800A, 120/208V, 3-phase, 4-wire electricity.

A generator for the campus is found within Building 108 and provides power to emergency loads. The generator is one radiator cooled, diesel fuel fired standby engine supplying 300kW/375kVA 120/208V, 3-phase, 4-wire electricity and is fueled by 300-gallons of oil fuel which can provide power for loads up to 8-hours.

Emergency power is supplied to emergency/life safety loads and optional loads which are wired to two automatic transfer switches found in the generator room of Building 108.

Life safety systems consist of exit signs, egress lighting fixtures, and fire management systems while optional loads consist of air handling system equipment used to maintain environmental control of the galleries where art storage is located, sump pumps and sewage ejector pumps, building management systems, security systems and telecom systems.

Main electrical switchboard for servicing Buildings 108 and 122 is found within Building 104 as well as the emergency power generator.

Piping Systems

Special considerations were given to gallery, exhibit, art storage and other water sensitive areas and therefore, no piping system is present.

Water is supplied to each building by a separate service, which connects to the site domestic water main found 5 feet from the building line.

Water pressure at all fixtures set at a maximum pressure of 2 to 3 PSI per 100 feet of pipe and at a maximum velocity of 6 ft/s. Adequate pressure must be supplied in order to operate fixtures.

An electric water heater will provide hot water at 120 °F and is stored in a hot water tank at 140°F.

Sewage in the buildings complies with the International Plumbing Code in which sanitary and vent systems fall under.

Storm drainage is provided through the roof and gutters which provide downspouts which discharge at a rate based on 2.0 inches per hour of rainfall intensity and maximum velocity of 3 ft/s.

The piping distribution system throughout building is made of black steel or copper with appropriate solar such as tin silver or copper. Refrigerant piping is made of Type "L" copper, 45% silver solder.

Piping is supported with hangers with spacing for supports based on diameter as well as supports on both sides in or to brace changes in direction. Supports are also provided for valves and fittings within systems and seismic bracing is also present throughout the systems.

Insulation for piping is also present throughout the buildings as required by California Title 24.

The piping system throughout the buildings has shut off valves consisting of butterfly valves and full-port ball valves to allow for water shut off in one area of the system without shutting down the entire system.

Shut off valves are provided on all supply and return piping for chilled water and heating hot water. Valves are also provided at the base of all risers, supply and return, for chilled water and heating hot water.

Balancing/Flow Control valves are found throughout the system in areas such as the floor connection to the distribution loop and at the return pipe and riser of each piece of equipment.

Control valves are provided on all heating hot water piping systems in order to handle differential pressures found throughout the system.

Strainers are provided at each pump with a drain valve.