Research Facility Core and Shell

2013

Building Statistics 2

Figure 1: View of Building, Maffett

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Construction

The conditions of this Southern California site are quite favorable for construction. Owners and contractors benefit from the almost always sunny weather with almost no rainy days (10 inches per year on average). The Faction campus is also very spacious allowing for a large site with gracious lay down space and tie-ins to an existing central utility plant.

Figure 1 Aerial View of Site www.Bing.com

Adding to these conveniences is an existing parking lot that is next to the site which allows space for trailers as well as parking for employees, craftsman and labors. This clears the actual site, opening it even further for the trades to efficiently work. An existing fire lane that passes the site allows for easy entrance and exit for vehicles such as dump trucks, concrete trucks, and delivery trucks. As one might expect, the soil in the area remains dry which was a benefit to the project team as they did not have to pump water during excavation. The consistently sandy soil of the area also gave ease to the excavation process as well as the predictability of avoiding unforeseen conditions.

Electrical System

The electrical system of the core and shell was kept to simply main components similar to that of the mechanical scope. Power enters the building at the basement level of the N-E corner of the building traveling from the three main transformers (3000KVA, (2) 1500KVA) to a 4000 A switchgear and a 2500 A switchgear. These large switchgears are located in the main electrical room where they connect into the panel boards that smaller distribution systems will tie into during the Tenant Improvement contract.

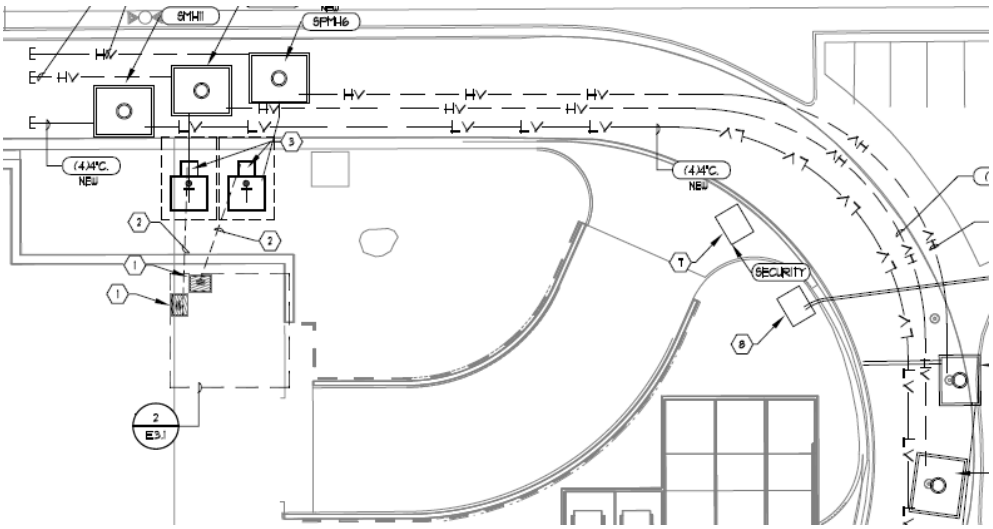

Figure 2 New High Voltage Lines

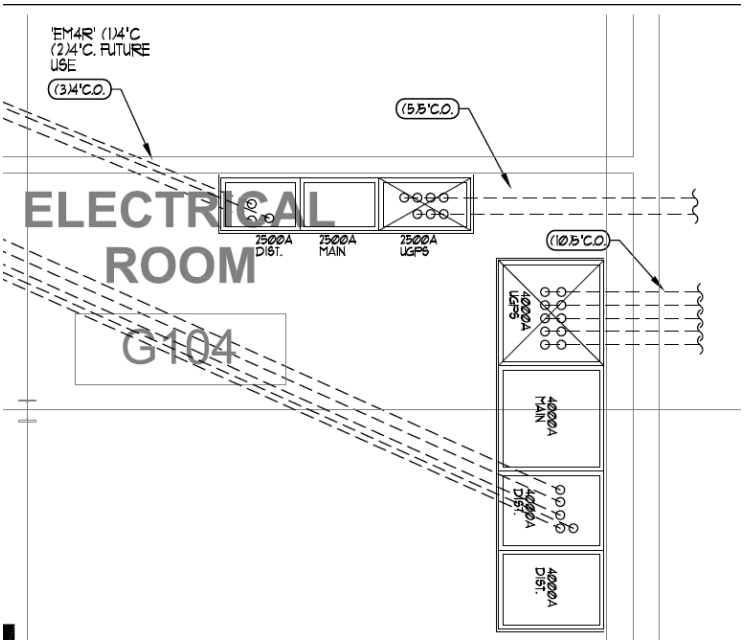

Figure 3 Main Electrical Room

Mechanical System

The portion of RFCS that is being studied incorporates only the main "core" of the mechanical system which entails large rooftop units with large ducts that travel down the main vertical chase of the building. While the scope of work is small, at this phase in the project is when the main drivers of what the mechanical system will be are installed.

The HVAC system is a constant volume dedicated outdoor air system. The core portion of the mechanical system is comprised of 4 rooftop air handling units utilizing central chilled water via a main plant on the Faction campus and will service hot water via two 4-ton rooftop boilers. A smaller mechanical/utility room is located at the garage level but most of the service will occur at the rooftop level. A large vertical chase runs from the rooftop to the garage allowing for an organized flow of ductwork and piping. This chase is located at the center of the building next to the restrooms.

Structural System

Structural Steel Frame

The main superstructure at RFCS consists of structural steel. It rests on 42 spread footings sized mainly at 11'x11' supporting the structure with a CMU wall running the perimeter of the basement bearing the load from the soil. The design is straight forward following a redundant bay scheme. Composite metal deck rests on the steel beams topped with 3 ½" normal-weight concrete. A relatively new form of lateral bracing was used on this building. It is called a "side-plate" system and involves using steel side plates to horizontally brace and connect the perimeter columns to one another. An image taken from the manufacturer's website can be seen below. The most common beam used throughout the building is a W21x44 spanning 42 ½ feet and running N-S. The girders that these beams rest on are typically W27x84 and run E-W. Columns are spaced in a typical pattern with the largest being W12x120.

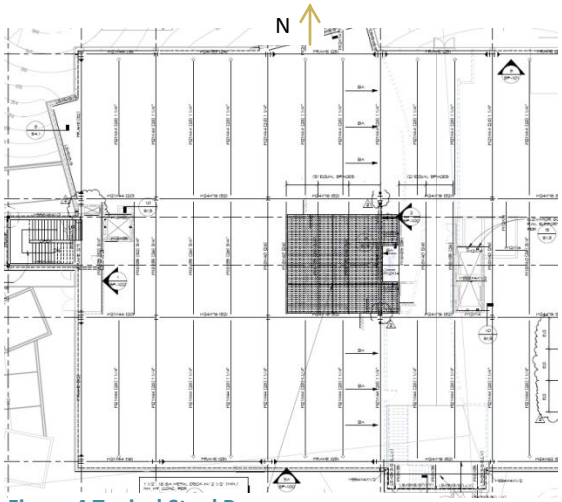

Figure 4 Typical Steel Bays

Figure 5 SidePlate System www.sideplate.com

Cast in Place Concrete

Cast in Place concrete was utilized for the foundation, slab on grade, and floor slabs. Classic wooden formwork was used for the foundation and SOG while an edge plate was built into the structure to allow for the pours onto metal deck. Trucks delivered the concrete to site allowing for direct pours for the foundation and SOG. A pump was utilized for floors 1-4 due to the elevations.

Fire Protection

An active, wet pipe, fire protection system is utilized throughout the building. The stair sets located at both plan-west and plan-east are isolated from the main building by a 2 1/2-hr rated wall system. The laboratory spaces are also designated as higher risk zones and incorporate a 2 hr rated wall system enclosing the space. The remainder of the building is designated as office space utilizing walls with 1-1 ½ hour rated systems.

Transportation

Two stair sets serve the foot traffic to elevated floors. These stair sets are located both at plan-west and plan-east and are identical. At the central core two elevators also serve to bring occupants to elevated floor levels. Next to the stairs located a plan-west is a service elevator used for carrying larger equipment and laboratory supplies.

Telecommunications

Telecommunications are not included in the Core/Shell contract. Drawings are unable to be attained due to lack of owner permission.