

Zero Impact Campus Invasion: Stanford Steam to Hot Water Conversion & Replacement Central Energy Facility

Paul Beckman

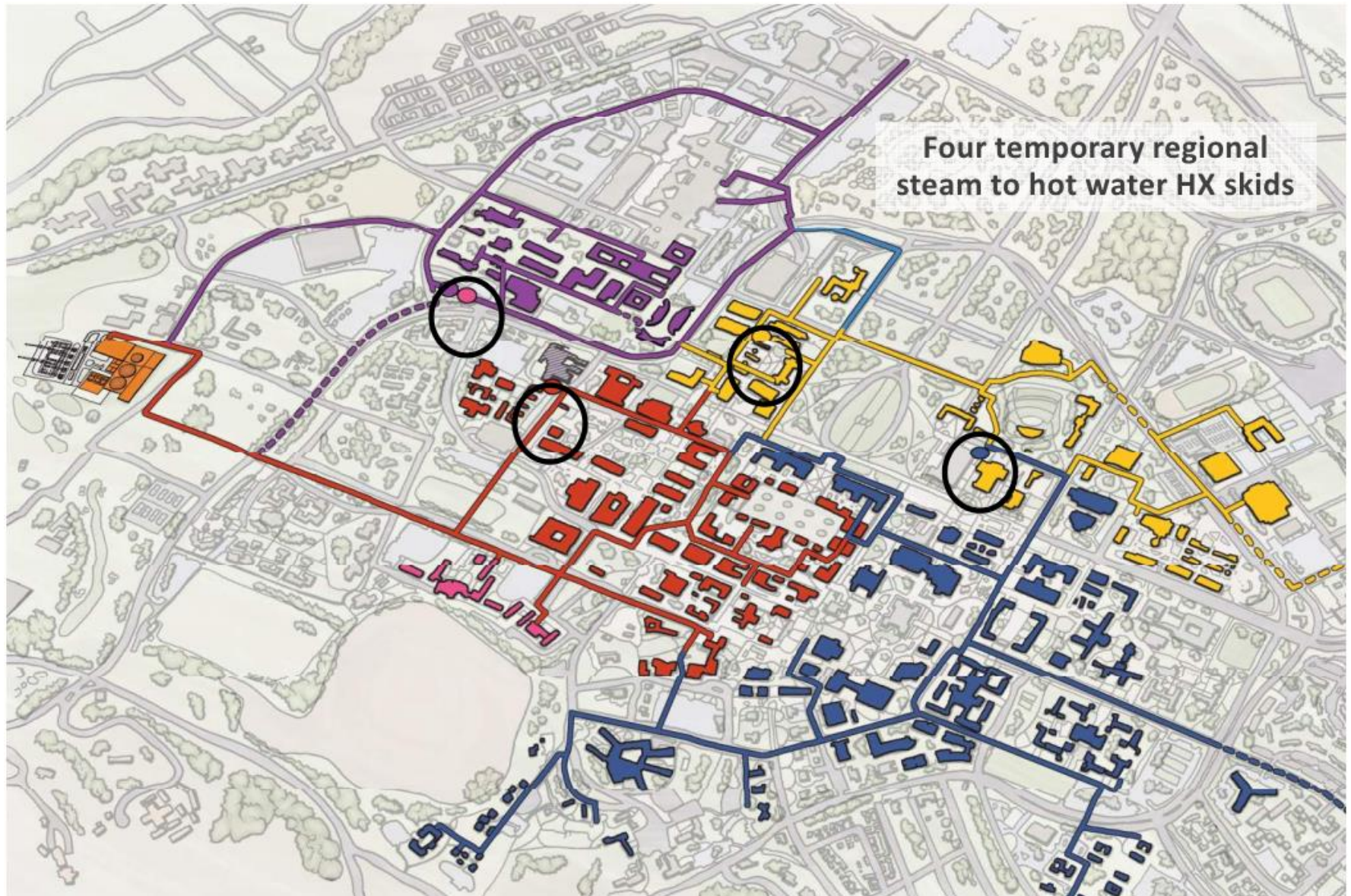
Patrick Kantor



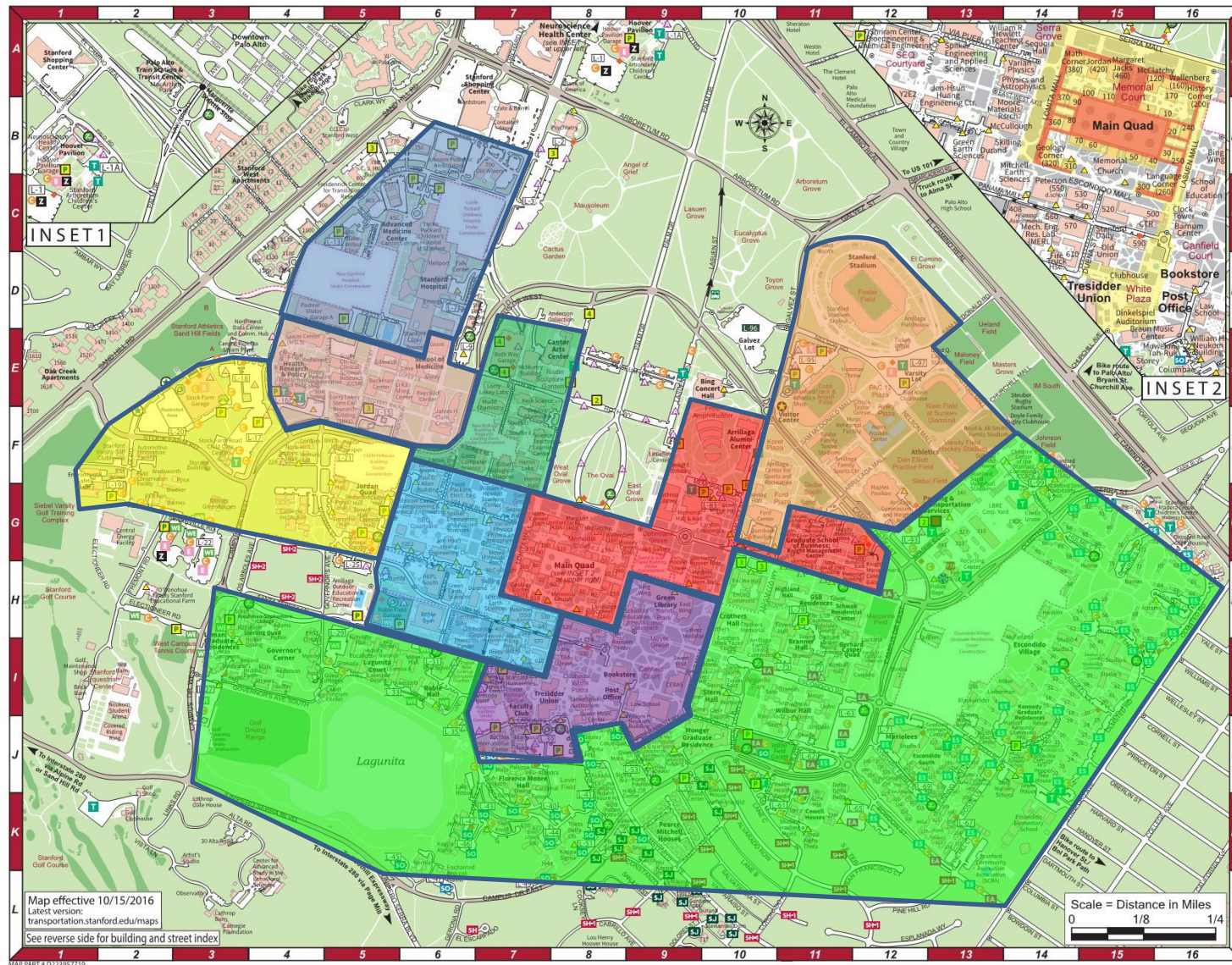
Agenda

- Introduction /Project Overview
- Underground Construction
 - Define Constraints
 - Create Schedule Flexibility
 - Execute the Plan
- Building Conversions
 - Define Constraints
 - Create Schedule Flexibility
 - Execute the Plan
- Central Plant
 - Transition Between Central Plants
 - Transition of Substation
- Q&A

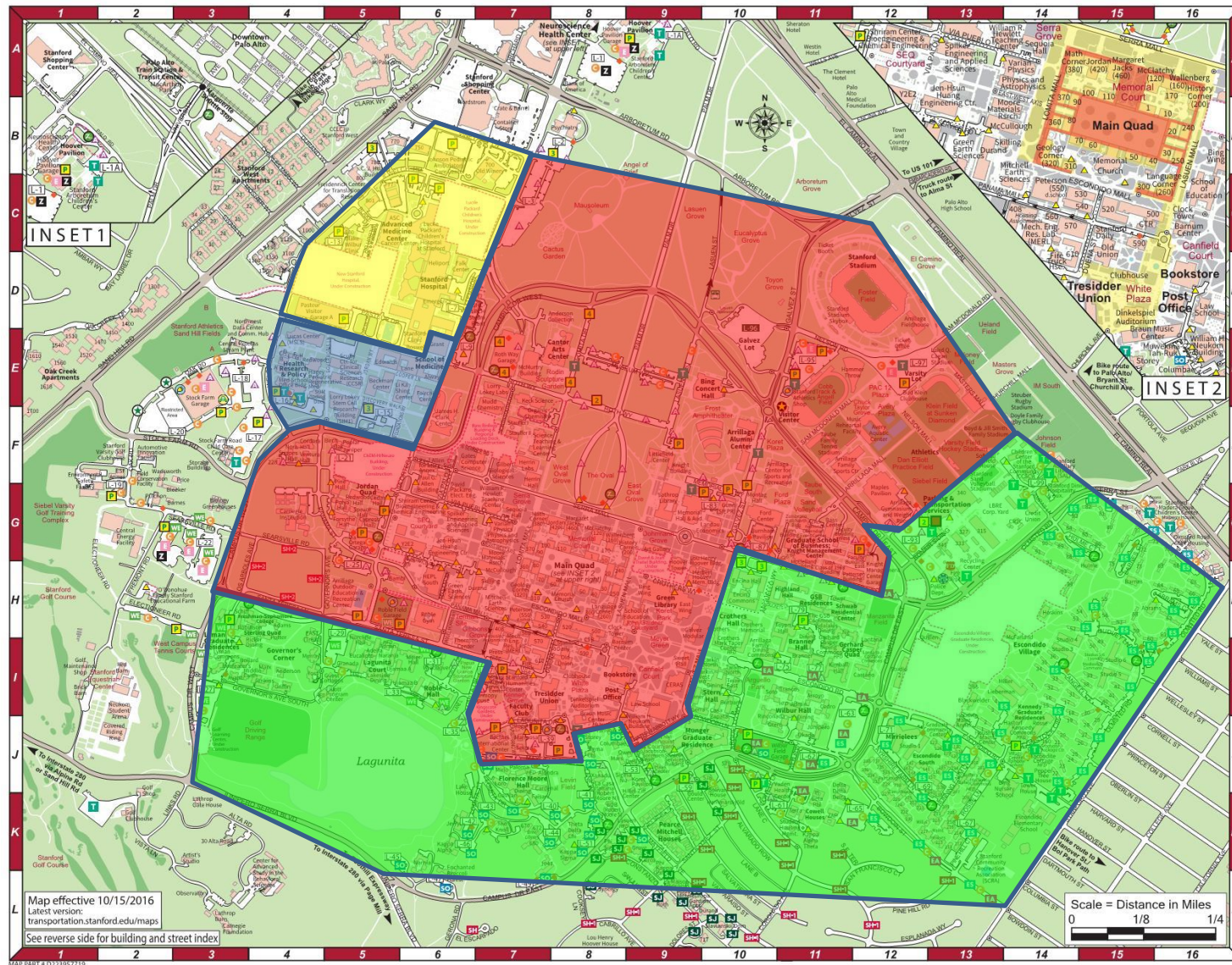
Campus Conversion Overview



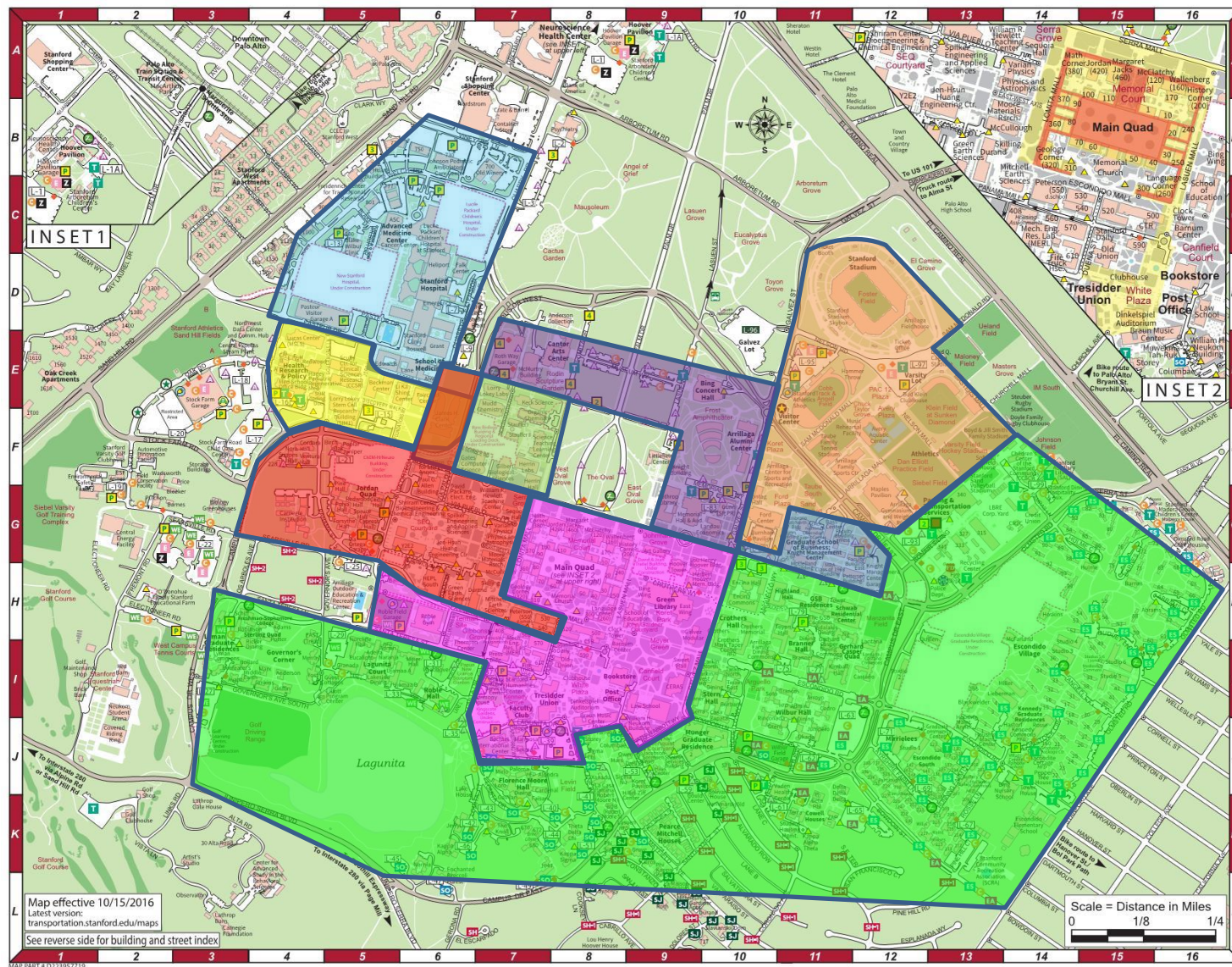
Project Overview - Zones



Project Overview - Maintenance



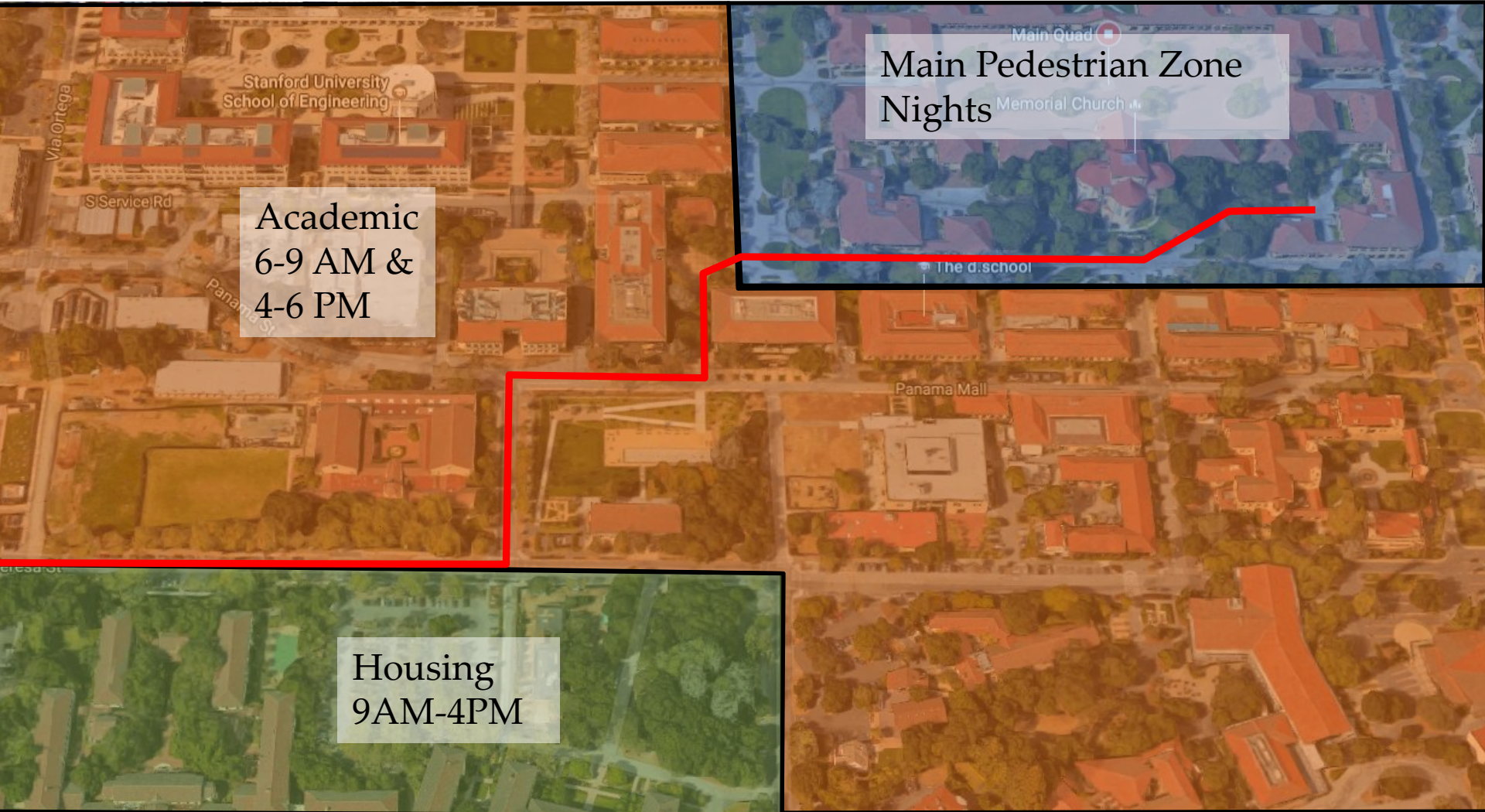
Project Overview - Departments



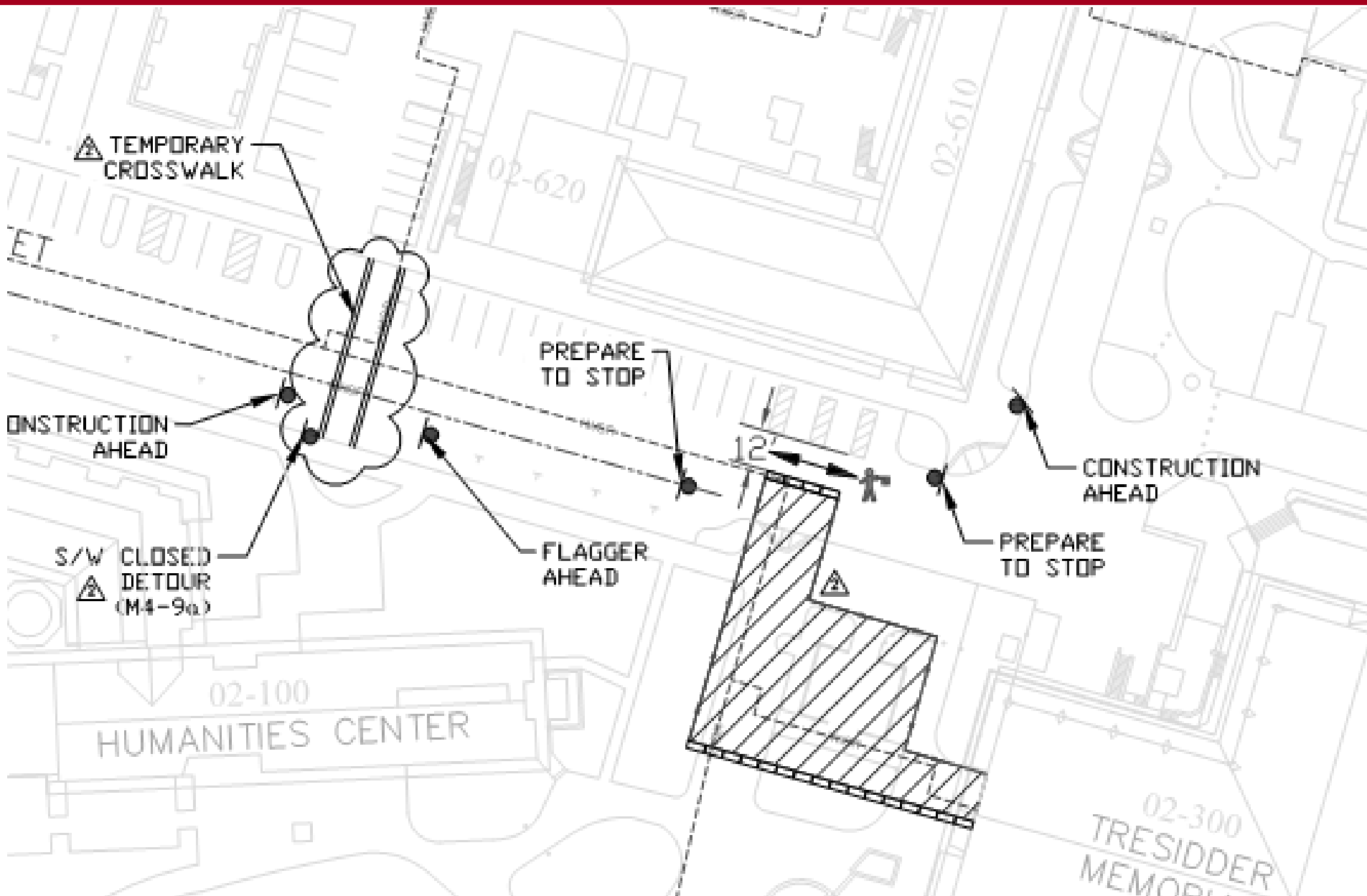
Clark Center



Define Constraints - Planning Time Frames



Define Constraints - Coordinate Site Logistics



Create Schedule Flexibility – Stockpile Piping

■ Material Availability

- Plan for long lead times
- Stanford bulk ordered with 25% drawings (not recommended)
- Need location for inventory

■ Peak of 15 Underground Installation Crews



Create Schedule Flexibility - Minimize Footprint

- **Managing Spoils and Bedding**
 - 40,000 SF Material Transfer Station
 - Large Truck Delivery to Transfer Station
 - Small Trucks Through Campus
- **Backfill Before Hydro Test**
 - Stanford had full time inspector
 - Third Party inspector used for all welds, leak detection wiring, and joint kit installation.
 - 6 leaks occurred in 4,400 welds



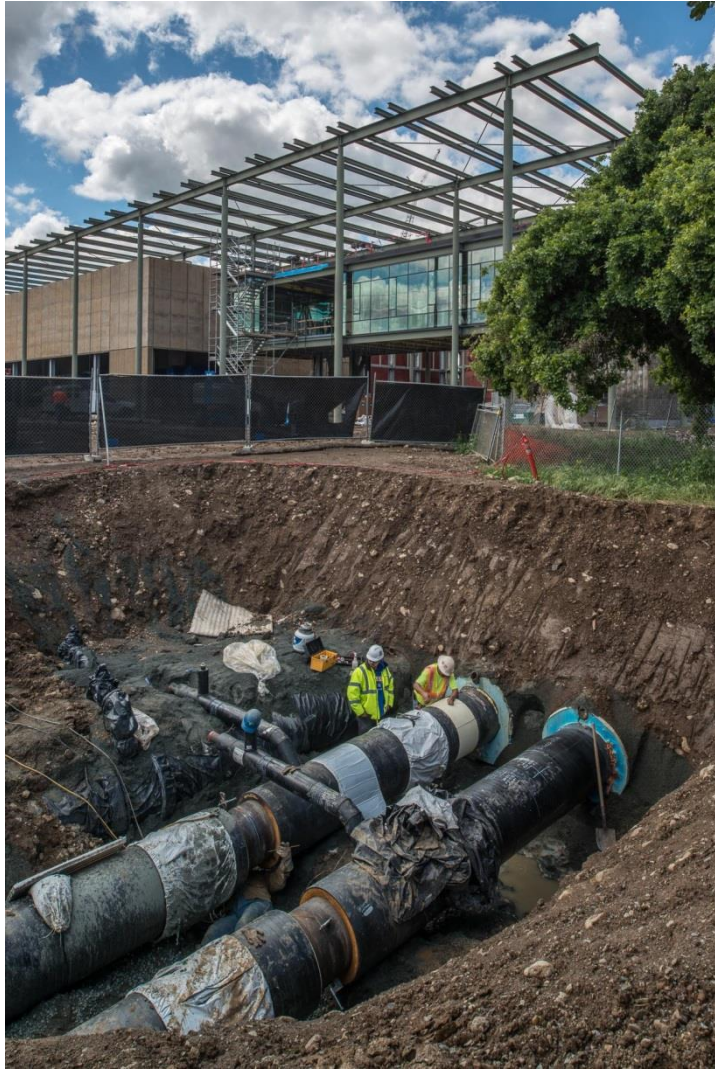
Execution - Minimize Install Time

- **Easier Installation**
 - Shallow Bury
 - Self-Restrained
 - Direct Bury Valves
 - Eliminated Vaults, Anchors & Expansion Joints

LOGSTOR



Execution - LTHW Piping - Installation

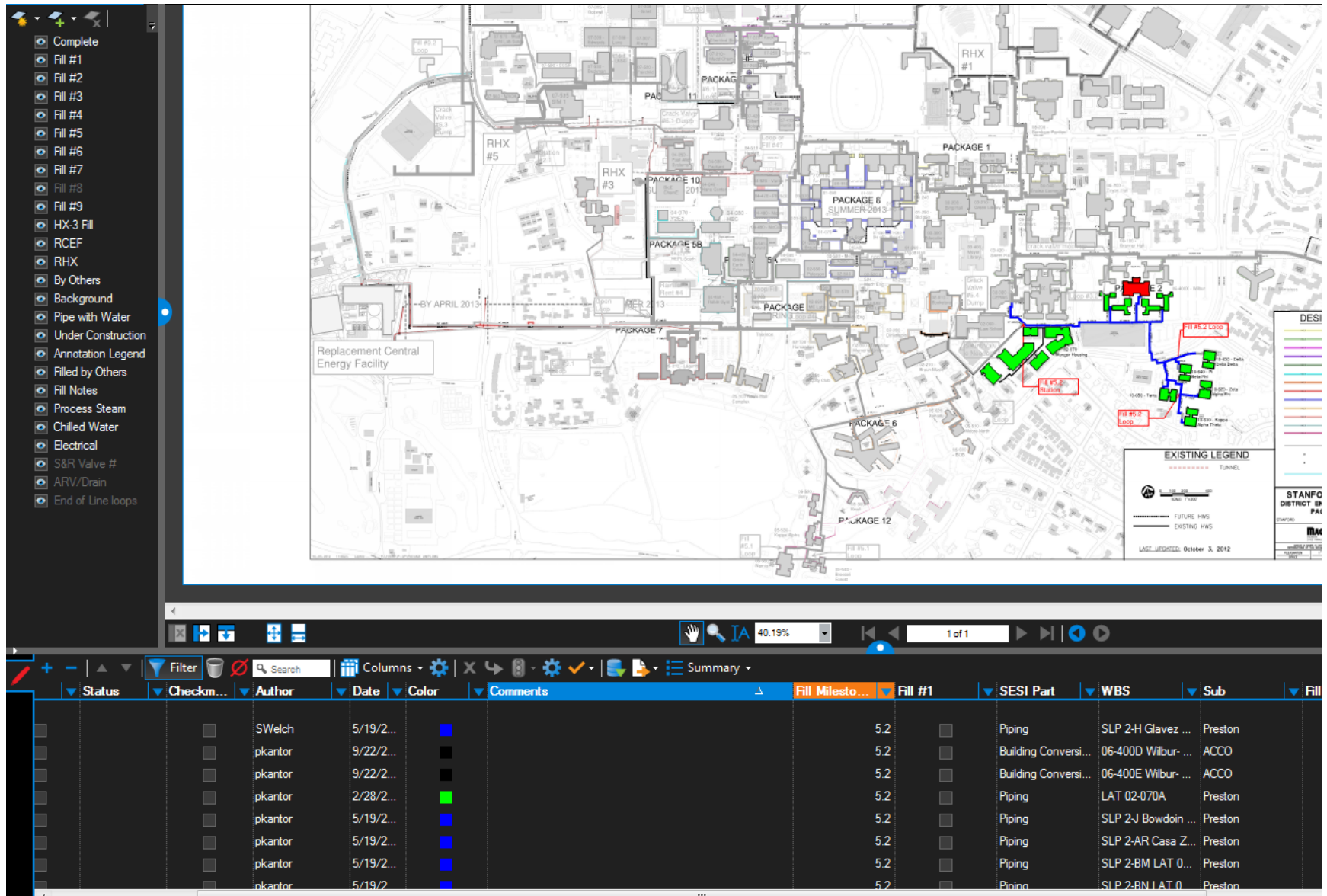


24" Dia. LTHW At RCEF
Jack & Bore Under Tree



Joint Trench
LTHW & High Voltage (12KV)

Define Constraints - Planning Time Frames



Define Constraints - Planning Time Frames

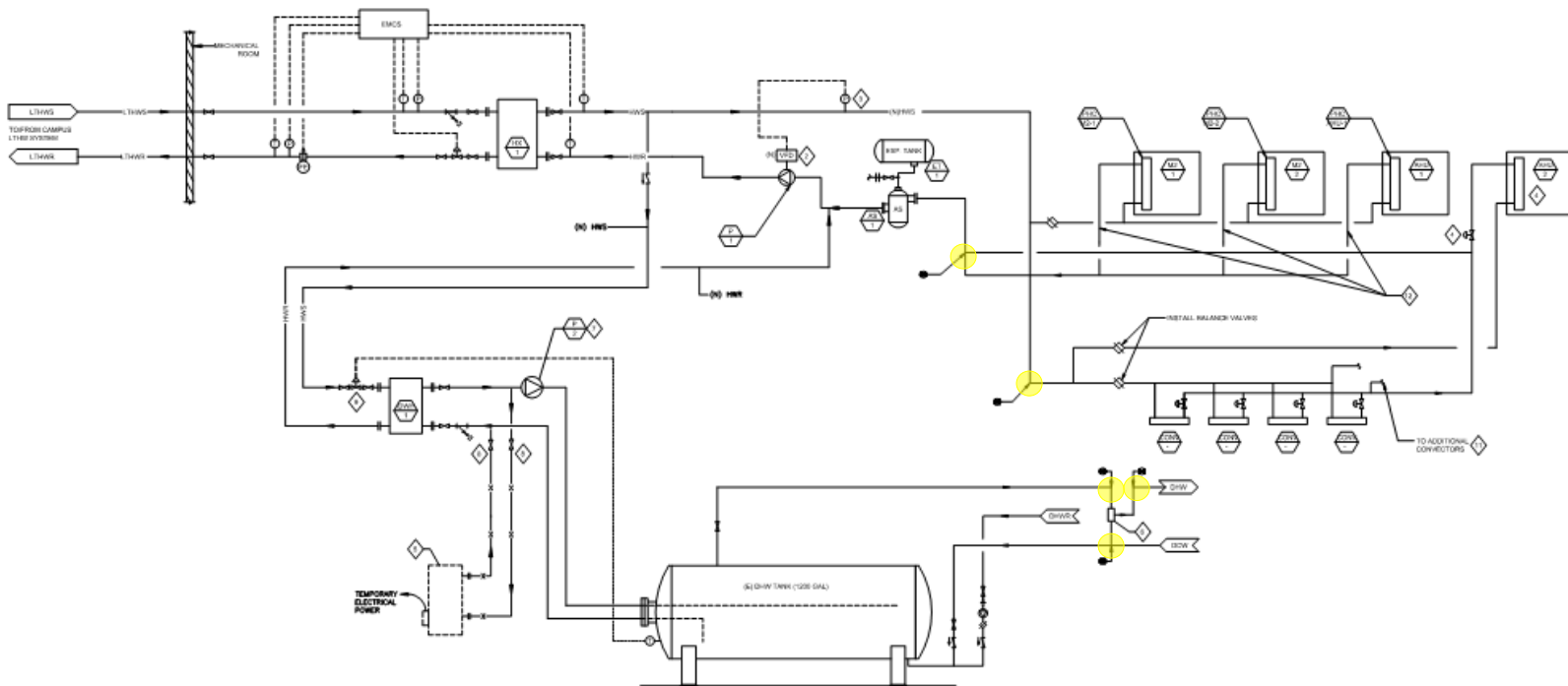


Create Schedule Flexibility – Stockpile Critical Equipment



Create Schedule Flexibility - Minimize Downtime

- Install T's & Valves During Low Heating Demand



2 PARALLEL DOMESTIC HOT WATER/HEATING HOT WATER PIPING DIAGRAM - NEW WORK
SCALE: 1/8" = 1'-0"

Create Schedule Flexibility - Temporary Systems

- Hot Water-Hot Water HX Skid
- Steam-Hot Water HX Skid
- Electric DHW Generator

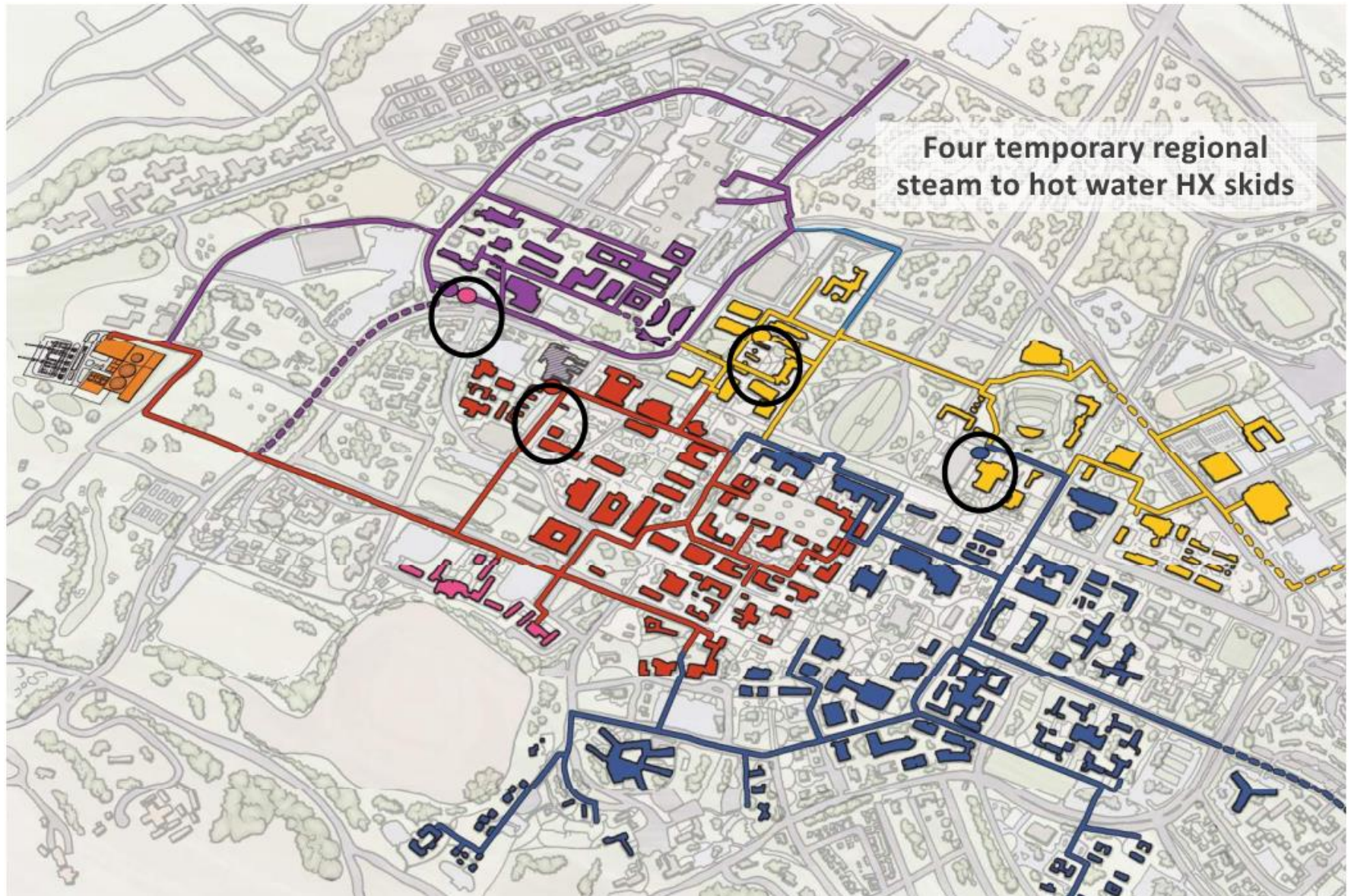


Execute - Minimize Installation Time

- **Pre-Conversion Readings**
- **HX Skids**
 - Less Time to Install
 - Consistent for 8 Different Mechanical Contractors
- **Tech Team**



Transition Central Plants



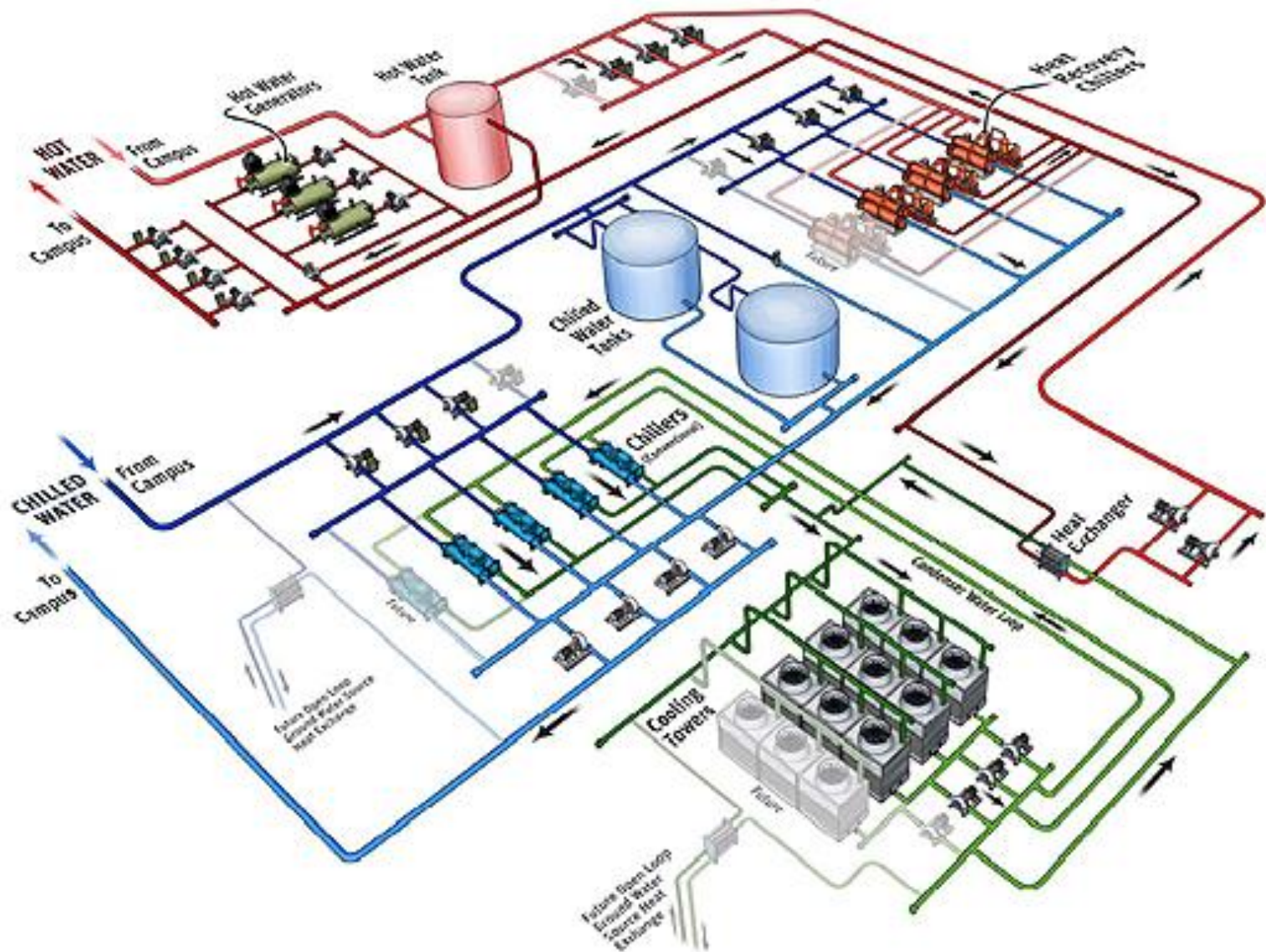
Transition Central Plants



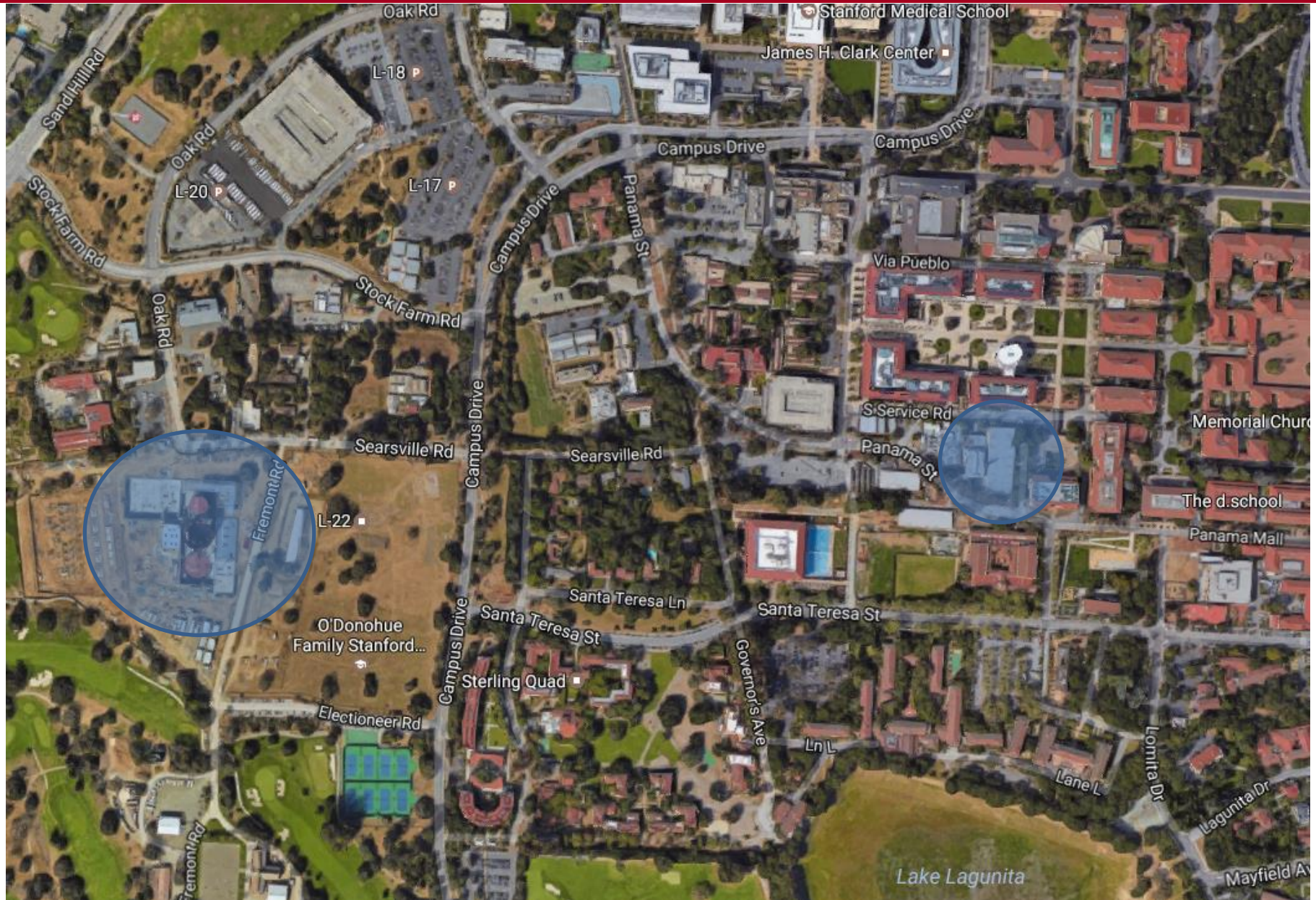
Regional HX Station for School of Medicine Buildings

One of four Regional HX Stations

Transition Central Plants - Heat Recovery with Thermal Storage



Transition Between Substations



Questions?

