UNH A-lot Parking Garage

Team Members: Michael Spencer, Americo Santamaria, Benjamin Sawyer, Stephen Eustis
Project Supervisor: Professor Raymond A. Cook

Introduction – Why UNH Garage?
- Enrollment figures set to continue to increase through 2020 with opening of new schools
- This will result from increase in staff and faculty (18:1 Faculty to student ratio)
- Parking currently scarce around campus with central hot spots causing congestion
- Problems with event parking for the Whittemore Center
- West Edge Parking Lot not convenient
- Current parking locations investigated to be replaced by Garage capacity
- Removed parking lots in center of campus to aid congestion problems
- Will hold over 900 vehicles
- Structure has three parking floors and a greenhouse roof
- Garage located within UNH A-lot
- Roof with viewing gantry for students and over 7,000 sq. ft. to accommodate poor erratic soil conditions and high footings
- Mat foundation determined to be best solution to accommodate poor erratic soil conditions and high structural loads due to greenhouses
- Deep foundation determined uneconomical
- Spread footings found to be oversized and impractical
- Settle 3D software used to perform settlement analysis

Summary of Geotechnical Engineering
- Data gathered from existing site investigation reports by UNH team
- Soil topographic profile created to evaluate best garage placement
- Shallow bedrock at 5'-20' in most areas
- Steeply sloping bedrock in northeast sections of A-lot down to 85'
- Water table of 8' was assumed for conservative calculation purposes
- Better geotechnical conditions discovered at southern section of site
- Geotechnics are main influence dictating garage positioning

Construction Issues & Implications
- Part of A-lot will be closed off from project beginning
- Current A-lot users to use West Edge parking lot
- Bus schedule to be amended for whole duration of project
- Extra buses to minimize inconvenience to portion of current A-lot users
- Construction work to begin end of May and progress through summer months ensuring minimal disruption to UNH campus as reasonably possible
- Night time operations a serious consideration
- Construction traffic likely to enter site via Route 155A to minimize central campus disruption
- Roof carries largest of any floor loads with structural skeleton of roof designed in conjunction with greenhouse placement
- Storm drains shall extend out building down exterior brick wall of elevator, and will connect to the local storm sewer system used by the rest of campus
- Separate drainage systems provided for storm water from roof areas
- Pressure gravity drainage type that does not rely on storage of water on roof
- Local storm sewer system used by rest of campus
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- Local storm sewer system used by rest of campus
- Storm drainage entails all other garage decks, bathrooms (utility areas)
- Sanitary drainage entails all other garage decks, bathrooms (utility areas)

Project Business & Economics
- Projected total project cost in region of $16 million - $19 million
- Garage permits, charges and penalties will be used for project payback
- Permit system to be made available to staff and faculty only
- Garage will try to decrease student car presence and increase car pulling
- Full time permit spaces and other reserved spaces prioritized for ground floor
- Second floor use for part-time permit holders and some general parking
- Third floor available to pay-per-hour users
- Special exemptions and conditions to be revised for large UNH events
- Pay-per-hour rates to vary for peak and non-peak times

Additional Design Proposals
- Strands Pattern:
  - Level 1: Beam to Column Connection
  - Level 2: Beam to Double Tee Connections

Greenhouse & Roof Detail
- 11 greenhouses encompassing 42,600 sq. ft. of rooftop space with a 12,570 sq. ft. greenhouse corridor
- Volume exceeds current capacity of UNH Greenhouses (approx. 35,000 sq. ft. facility)
- Current UNH greenhouses obsolete for renovation or replacement
- Purposely designed to maximize sunlight efficiency
- Current UNH greenhouses not efficiently oriented

Garage Floor & Roof Plans

Transportation System
- Garage easily accessible from all routes into UNH campus
- Transportation entrance at Gables way – congestion alleviation
- Garages main access point features 2 entrance and 3 exit lanes
- 3 exit lanes to deal with peak exit traffic volumes
- Incorporated east side pedestrian access in anticipation of pedestrian tunnel beneath Boston and Maine Railroad to Whittemore Center
- Elevators and stairwells exit to main street and conveniently accessible bus stops to maximize efficiency of the garage to users

UNH Predicted Enrollment figures by 2020

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UNH A-lot Parking Garage 3D Views and Elevations

North Elevation
West Elevation
South Elevation
East Elevation

Summary of Structural Engineering
- All members and connections were designed in accordance to AISC

Carbonation resistant concrete specified

Additional Information:

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Level One Beam to Column Connection (Not To Scale)

Beam cross-sectional View

Beam to Double Tee Connections (Not To Scale)

Connection Plan View

Connection Detail

Floor System Cross Section (Not To Scale)

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