GREENS AT LEISURE WORLD

15107 (Building #2) Interlachen Drive
Silver Spring, MD

ETC

INTRODUCTIONS

Engineer: Engineering & Technical Consultants, Inc. (ETC).

www.etc-web.com

Contractor: Simpson of Maryland

www.simpsonofmd.com

ROOF REPLACEMENT PROJECT

BUILDING INFORMATION

- Year Built: 1984
- Building Height: eleven stories
- Association Type: 55+ community
- Roof Area: 37,000 square feet

EXISTING ROOF SYSTEM

- Protected Roof Membrane Assembly (PRMA)
  - Stone ballast
  - Filter fabric
  - Extruded polystyrene (CPS) board insulation
  - Liquid-applied membrane
  - Nine-inch thick conventionally reinforced concrete slab

2010 ROOF EVALUATION

- Performed visual survey of exposed roof coverings and HVAC components
- Sampled fourteen (14) locations (removal of overburden) to inspect roof membrane
- Extracted seven (7) concrete dust samples for laboratory testing
- Sounding underside of roof slab (tenth floor ceiling)

2010 ROOF EVALUATION

- Adhesion failure of roof membrane

2010 ROOF EVALUATION

- Deterioration of exposed membrane

2010 ROOF EVALUATION

- Severe concrete deterioration
- High calcium chloride concentration
- Nine of the twenty-five residential units would be impacted with concrete repairs (surveyed by others)

ROOFTOP EQUIPMENT

- 250 heat pumps (from new to 30 years old)

ROOFTOP EQUIPMENT

- Three (3) split-component air handlers

ROOFTOP EQUIPMENT

- 30 exhaust fans
- 35 mushroom vents
- 75 vent pipe penetrations
- Over 400 electrical conduit penetrations
- 26 heat pump chases

ROOF DESIGN

- PRMA versus traditional roof design
- Roof membrane selection
- Rooftop HVAC equipment
- Concrete repairs
- Cathodic protection & corrosion inhibitors
- Design alternates

BIDDING PHASE

- Solicited Bids from five (5) Contractors
  - Three of the bidders had roofing & restoration divisions
- Bids were competitive
  - Less than one percent difference between lower three bidders
- Association selected alternative roof membrane
- Association elected to salvage & clean existing stone ballast

CONTRACT SPECIFICS

- Contract Sum : $1,950,000.00
  (Building 2 only)
- Contract Duration: 280 Calendar Days
- Start Date: March 11, 2014
- Substantial Completion: December 12, 2014

PROJECT COMMENCEMENT

- Meetings
  - Building & Grounds Committee meetings
  - Town hall meetings
  - Coordination meetings
  - Unit Owner meetings
- Surveys
  - Interior/Exterior pre-construction surveys
  - HVAC pre-construction surveys
  - Interior pre-demolition surveys

PROJECT CHALLENGE

Congested Roof Areas

PROJECT CHALLENGE

Adverse weather conditions

REMOVAL OF ROOF COVERINGS

Roof Tear Off

- Remove old roofing materials down to the concrete roof deck.
  - Metal copings
  - Stone ballast (salvaged)
  - Filter fabric
  - Insulation board
  - Roof membrane and flashings

SURFACE PREPARATION

Roof Tear Off

CONCRETE SOUNDING

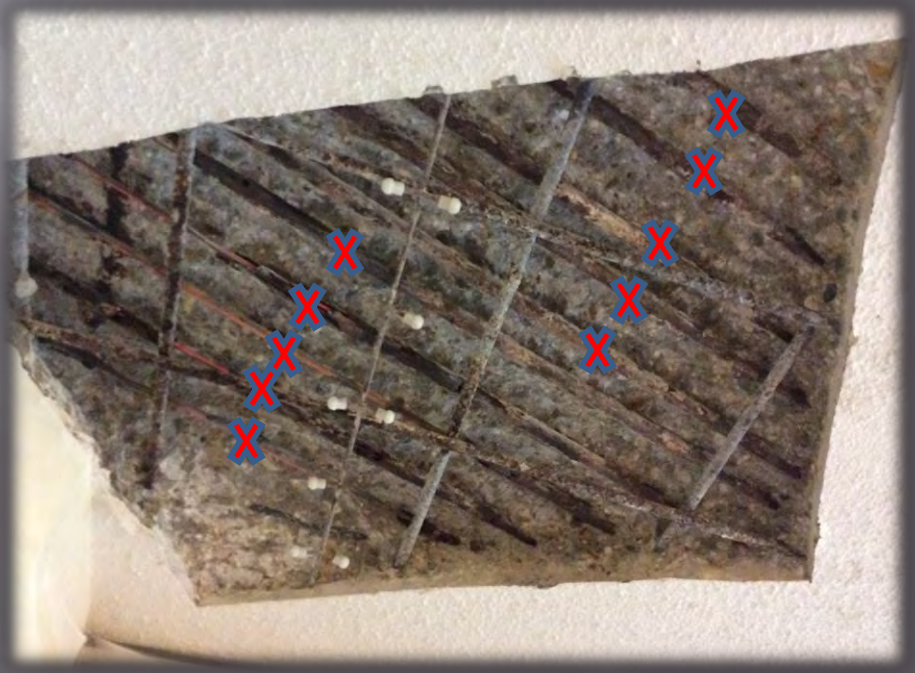
TEMPORARY PROTECTION

OVERHEAD REPAIRS PROTECTION

OVERHEAD REPAIRS PROTECTION

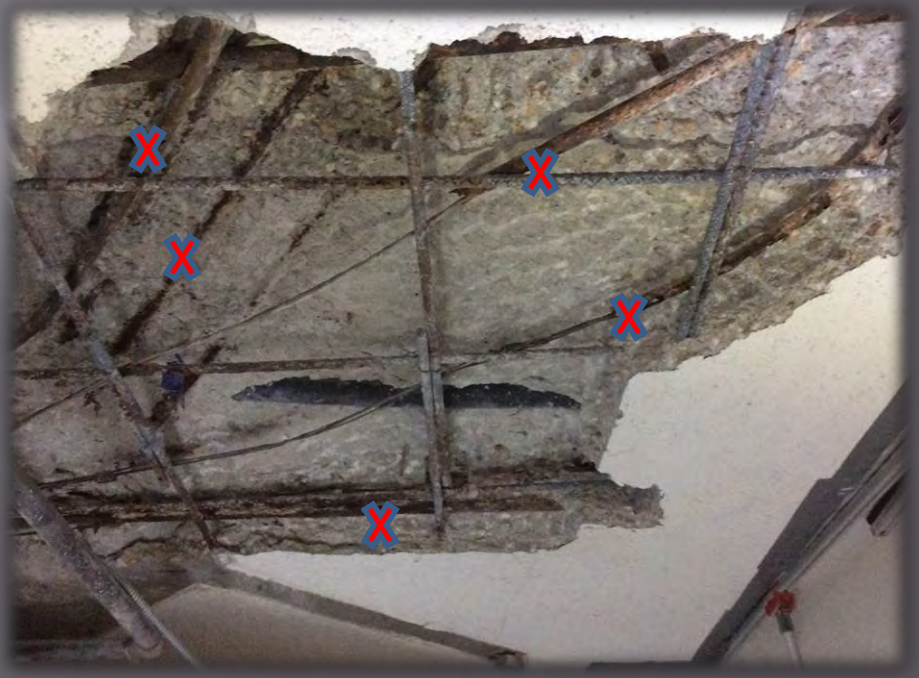
OVERHEAD REPAIRS

Demolition



PROJECT CHALLENGE

Embedded Electrical Conduits



ELECTRICAL CONDUIT REPAIRS

OVERHEAD REPAIRS

Trowel grade repair material

FULL DEPTH REPAIRS

Shoring – 9th & 10th Floors

FULL DEPTH REPAIRS

Shoring – 9th & 10th Floors

FULL DEPTH REPAIRS

Shoring – 9th & 10th Floors

PROJECT CHALLENGE

Relocation of heat pumps

PROJECT CHALLENGE

Elevator Temporary Power

FULL DEPTH REPAIRS

Concrete Demolition

FULL DEPTH REPAIRS

Reinforcing Steel Preparation

FULL DEPTH REPAIRS

Cathodic Protection

FULL DEPTH REPAIRS

Concrete Placement

FULL DEPTH REPAIRS

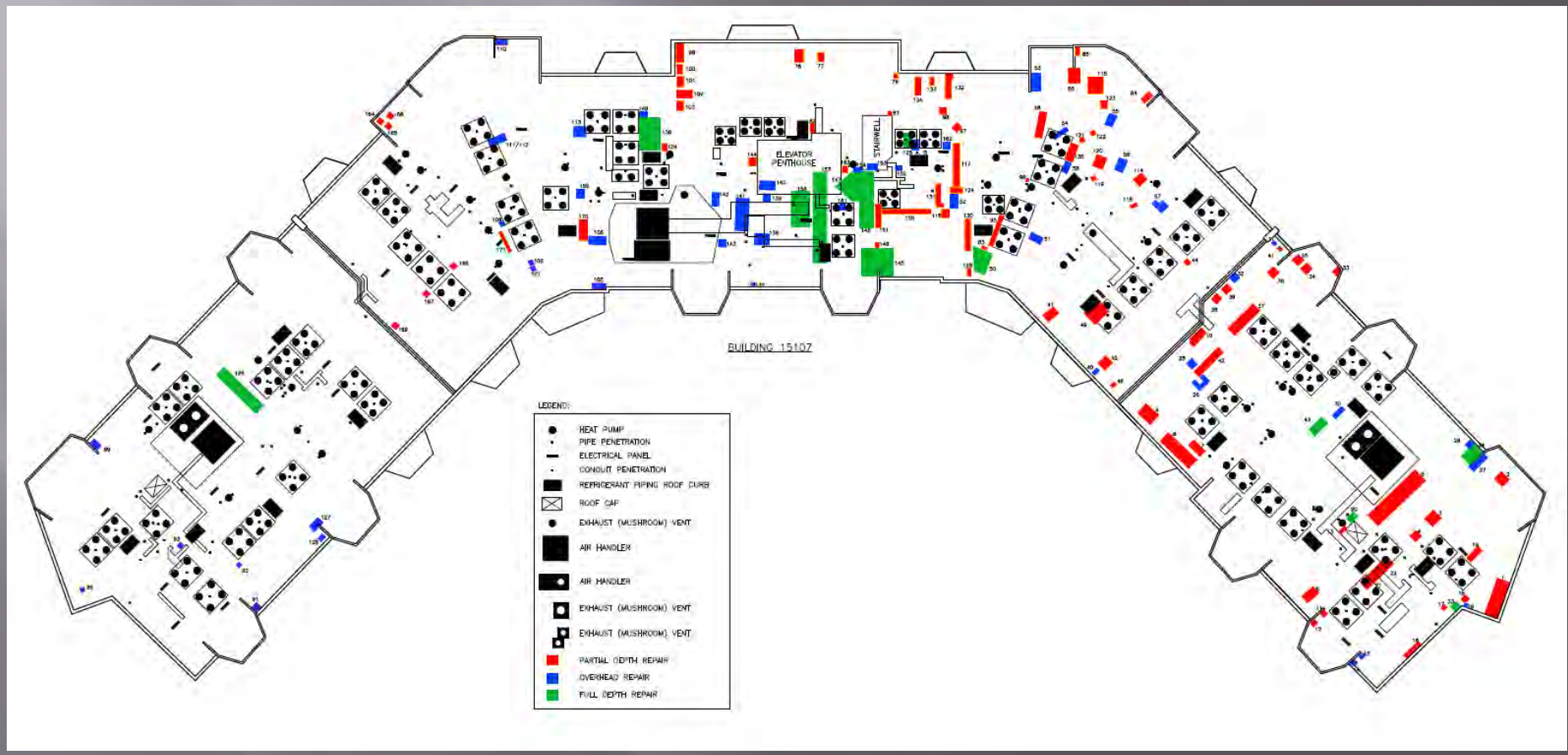
Concrete Placement

SCOPE OF WORK CONT.

Interior Finishes Restoration

PROJECT CHALLENGES CONT.

Extent of Concrete Deterioration



ROOF INSTALLATION

- Clean and prime concrete roof deck
- Install (torch-apply) new two-ply roof membrane
- Remove and replace existing roof drains
- Install new insulation board
- Clean and reinstall stone ballast
- Install new expansion joints and metal copings

ROOF INSTALLATION

Field Plies Installation

ROOF INSTALLATION

Field Test Cuts

ROOF INSTALLATION

Raising & lowering of heat pumps

ROOF INSTALLATION

Raising & lowering of heat pumps

ROOF INSTALLATION

PMMA Flashing Installation

ROOF INSTALLATION

Membrane Flashing Installation

ROOF INSTALLATION

Air Handler Flashing

ROOF INSTALLATION

Air Handler Flashing

ROOF INSTALLATION

Overburden Installation

ROOF INSTALLATION

Metal Work

ADDITIONAL WORK

- Replacement of rooftop HVAC ductwork
- Replacement of metal chase covers

ADDITIONAL WORK CONT.

Replacement of Rooftop HVAC Ductwork

ADDITIONAL WORK CONT.

Replacement of Metal Chase Covers

PROJECT CHALLENGES RECAP

- Working on an occupied building.
  - Noise and vibrations, parking restrictions, working inside units, relocation of residents, etc.
- Congested roof areas.
- Extent of formwork, shoring, dust protection, etc.
- Extent of concrete deterioration.
- Raising/lowering and relocation of heat pump units.
- Corroded electrical conduit embedded in roof.
- Elevator shutdown.
- Coordination between various contractors.
- Adverse weather conditions - snow/rain/high winds

THANK YOU

Engineering and Technical Consultants

ETC