MAXIMIZING UTILITY ASSETS & SUCCESSFULLY PARTNERING WITH CELL CARRIERS

Diane Pottinger, P.E.
North City Water District

Shannon Emerick, P.E.
RH2 Engineering, Inc.

CHANGING DISTRICT NEEDS

- Need to Recoat Tank
- Future Pump Station

CHANGING CELL CARRIER NEEDS

- Crowding making it very difficult to maintain/update equipment

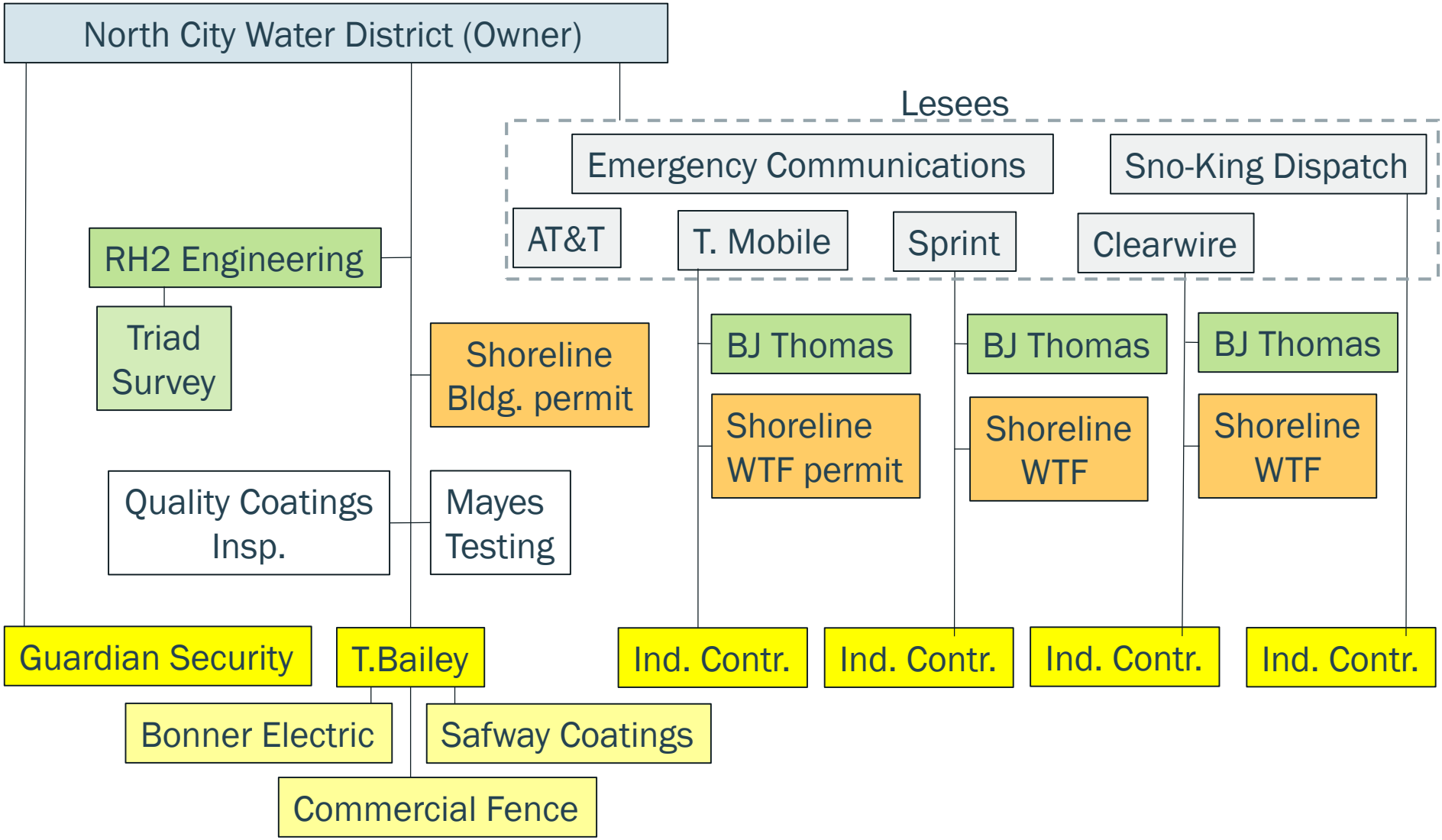
DEFINING GOALS

- Cost Sharing
- Space Allocation
- Security & Accountability
- Maintaining Cell Service During Construction
- Permit Streamlining
- Timing

FINANCIAL CONSIDERATIONS

- Cover actual costs (including coordination)
  - Rent increase 200% w/project
  - Ongoing annual rent increase
- By investing more time/capital, gained influence
- Extra construction effort on future recoating

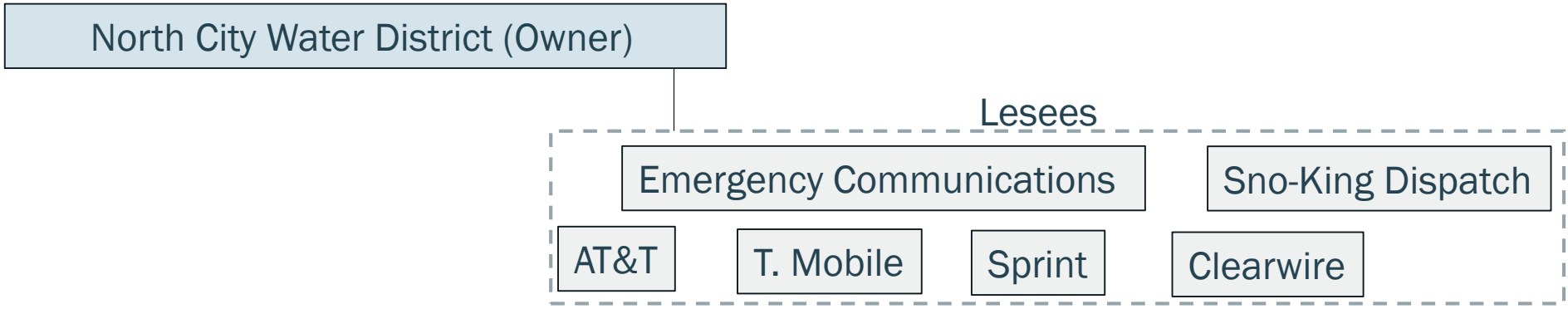
23 ENTITIES TO COORDINATE



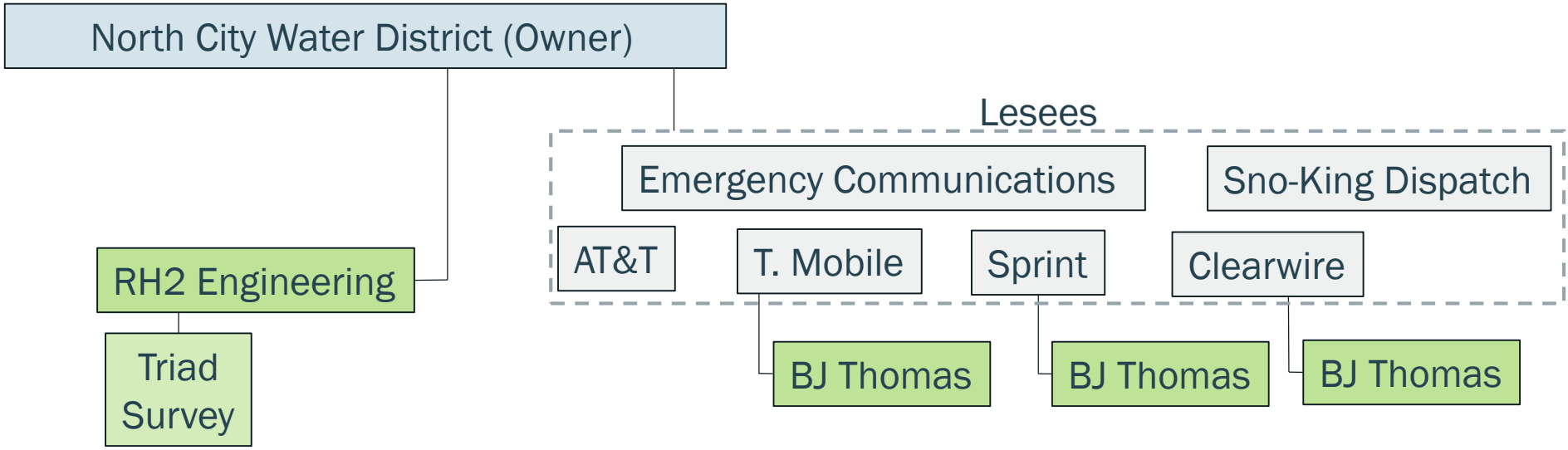
OWNER

North City Water District (Owner)

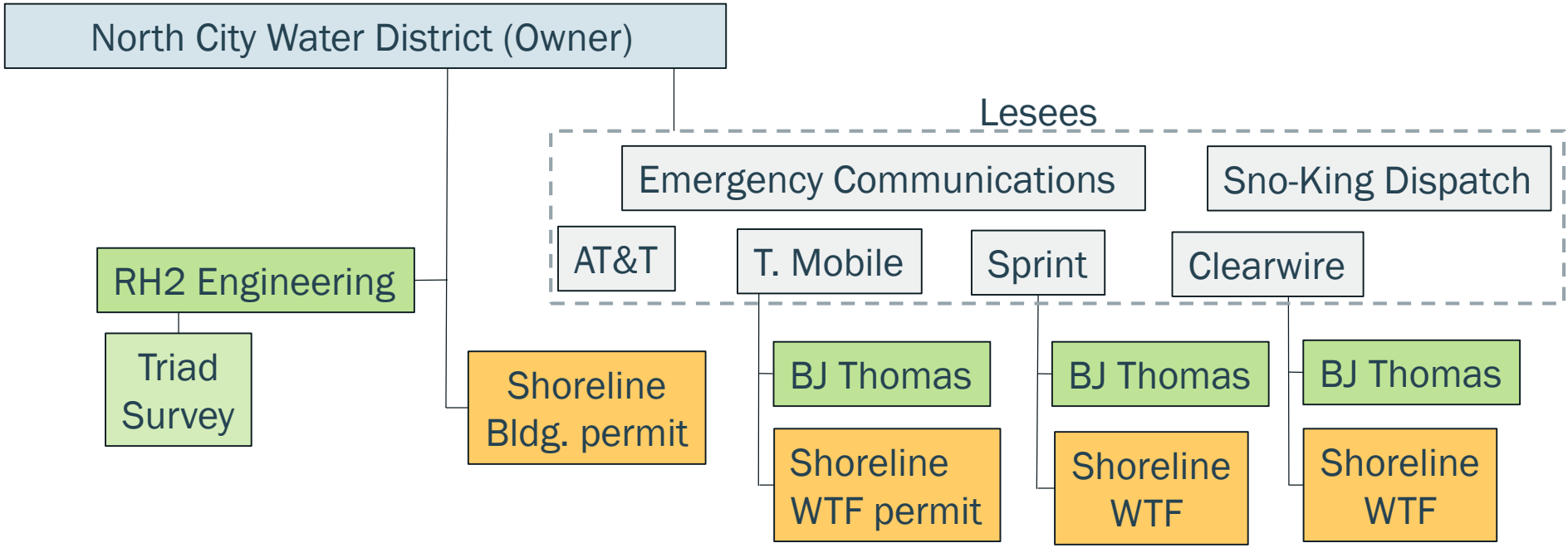
CELL CARRIERS/LESEES



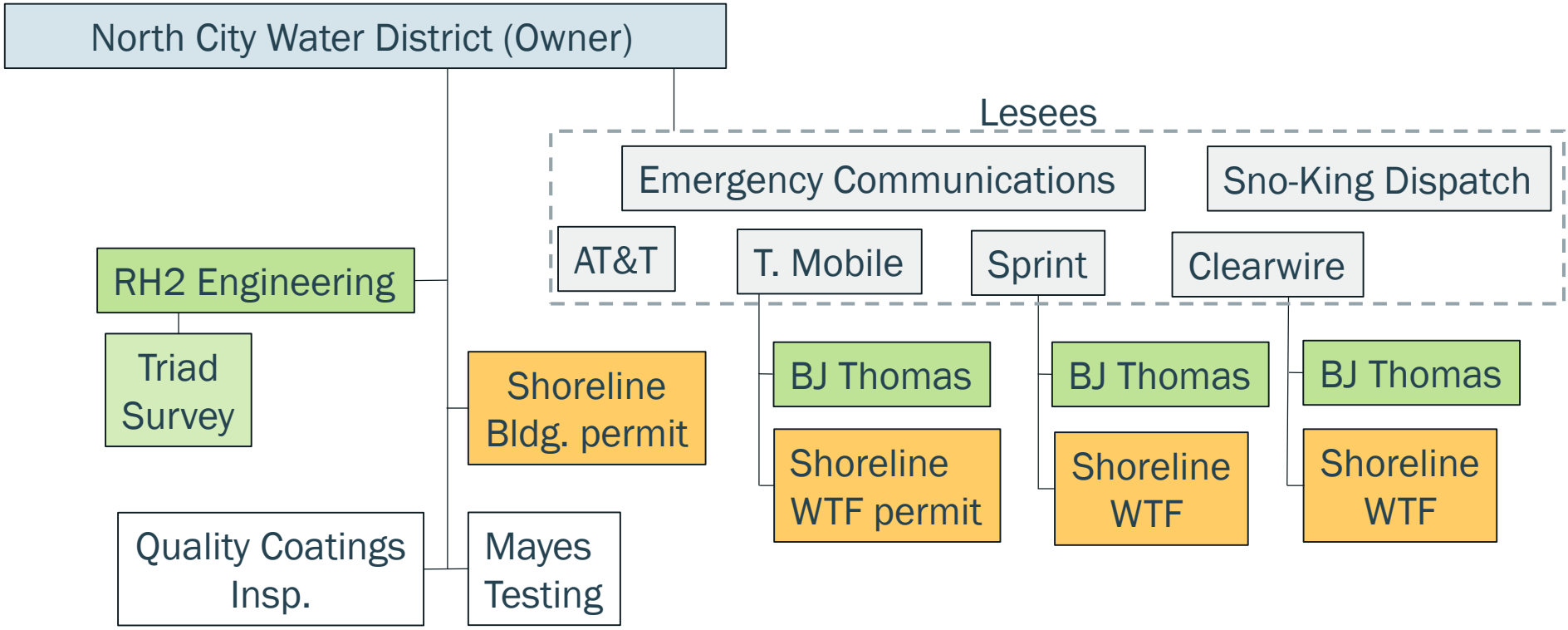
DESIGNERS


North City Water District (Owner)
Lesees
Emergency Communications
Sno-King Dispatch
AT&T
T. Mobile
Sprint
Clearwire
RH2 Engineering
Triad Survey
BJ Thomas
BJ Thomas
BJ Thomas

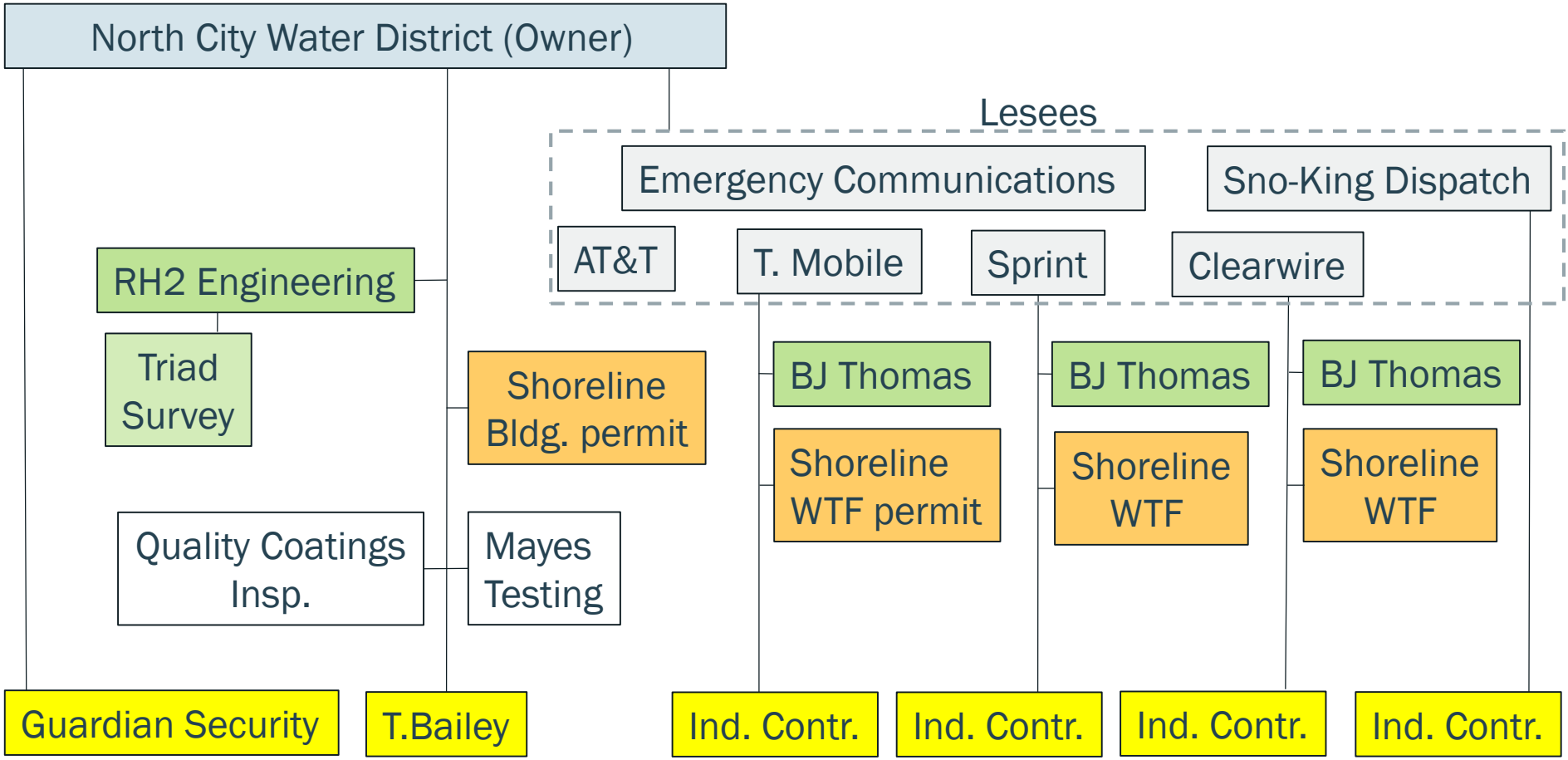
PERMITTING


North City Water District (Owner)
Lesees
Emergency Communications
Sno-King Dispatch
AT&T
T. Mobile
Sprint
Clearwire
RH2 Engineering
Triad Survey
Shoreline Bldg. permit
BJ Thomas
Shoreline WTF permit
BJ Thomas
Shoreline WTF
BJ Thomas
Shoreline WTF

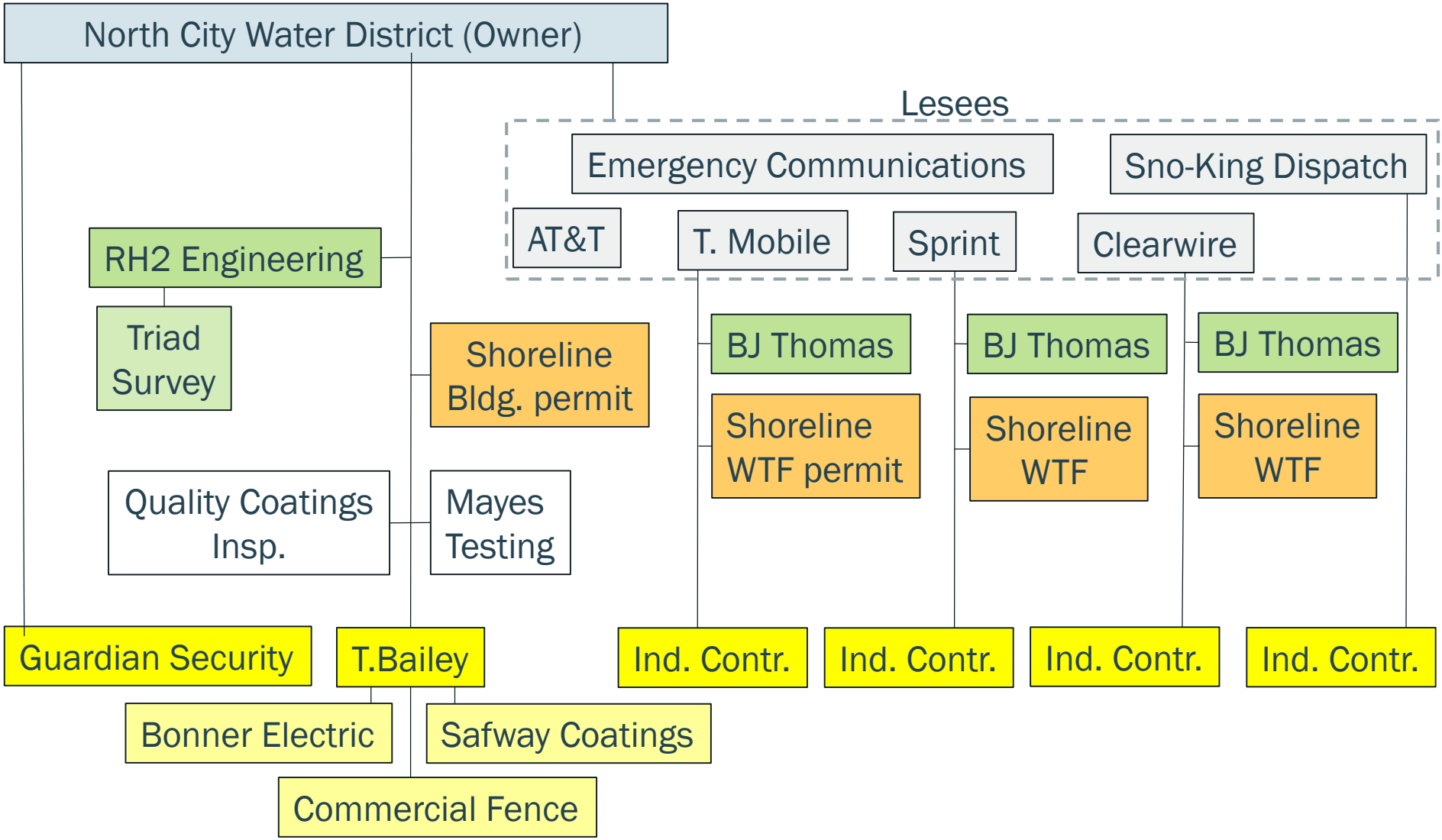
INSPECTION AND TESTING



GENERAL CONTRACTORS



SUBCONTRACTORS



WIRELESS TRANSMISSION FACILITIES

- City of Shoreline Wireless Transmission Facility permit (for each carrier):
  - Structural Calcs and Appearance

Before

Photo simulation

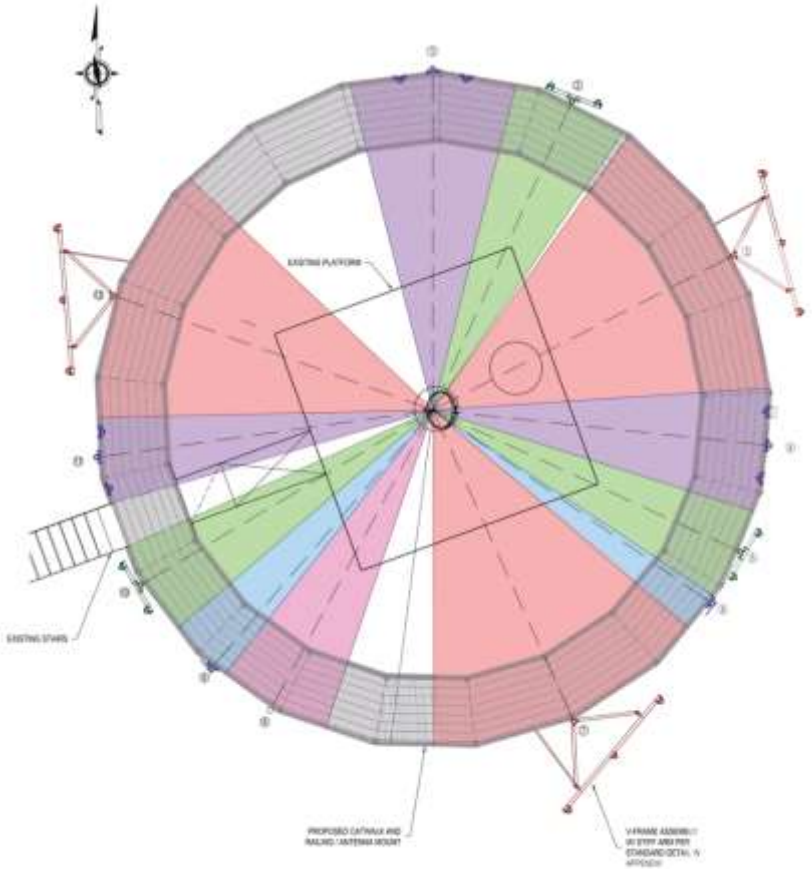
As constructed

CONSTRICTED SITE

ANTENNA NEEDS

- Orientation
- Elevation

LEASED RAILING DELINEATION	
AZIMUTH RANGE	*CARRIER*
345.67°-14.30°	T-MOBILE
14.30°-34.35°	CLEARWIRE
35.52°-86.25°	SPRINT
86.25°-107.50°	T-MOBILE
107.50°-123.49°	CLEARWIRE
123.49°-130.40°	CLEARWIRE MW
130.40°-179.81°	SPRINT
198.73°-218.23°	SNO-KING DISPATCH
218.23°-229.49°	CLEARWIRE
229.49°-245.92°	CLEARWIRE MW
253.85°-268.75°	T-MOBILE
268.75°-313.54°	SPRINT

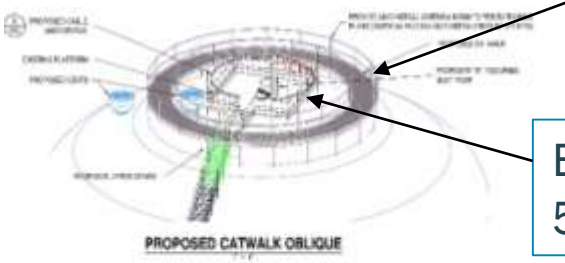


ANTENNA MOUNTING PLAN

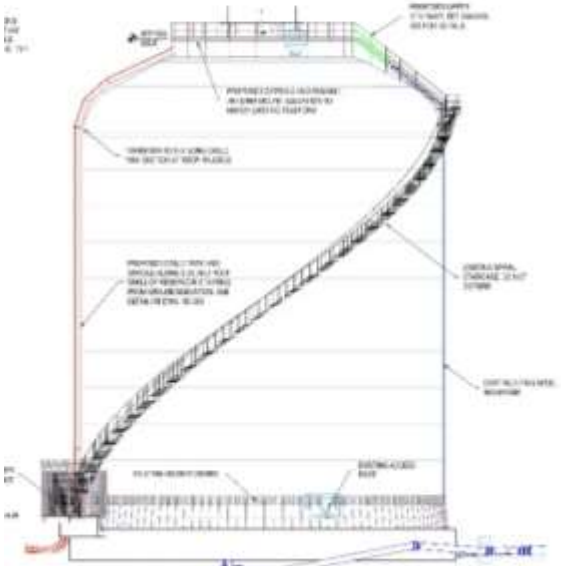
ANTENNA SPACE

New Catwalk:
120 lf rail

Exist. Platform:
50 lf rail

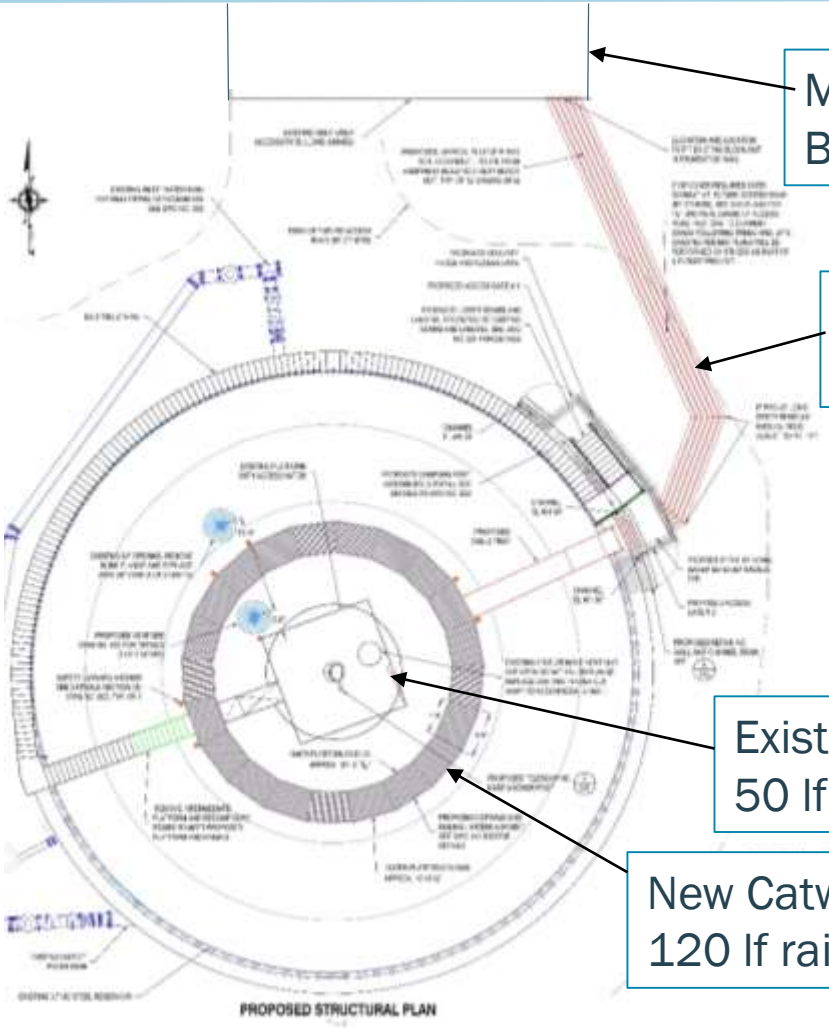


PROPOSED CATWALK OBLIQUE



PROPOSED STRUCTURAL ELEVATION

ANTENNA SPACE



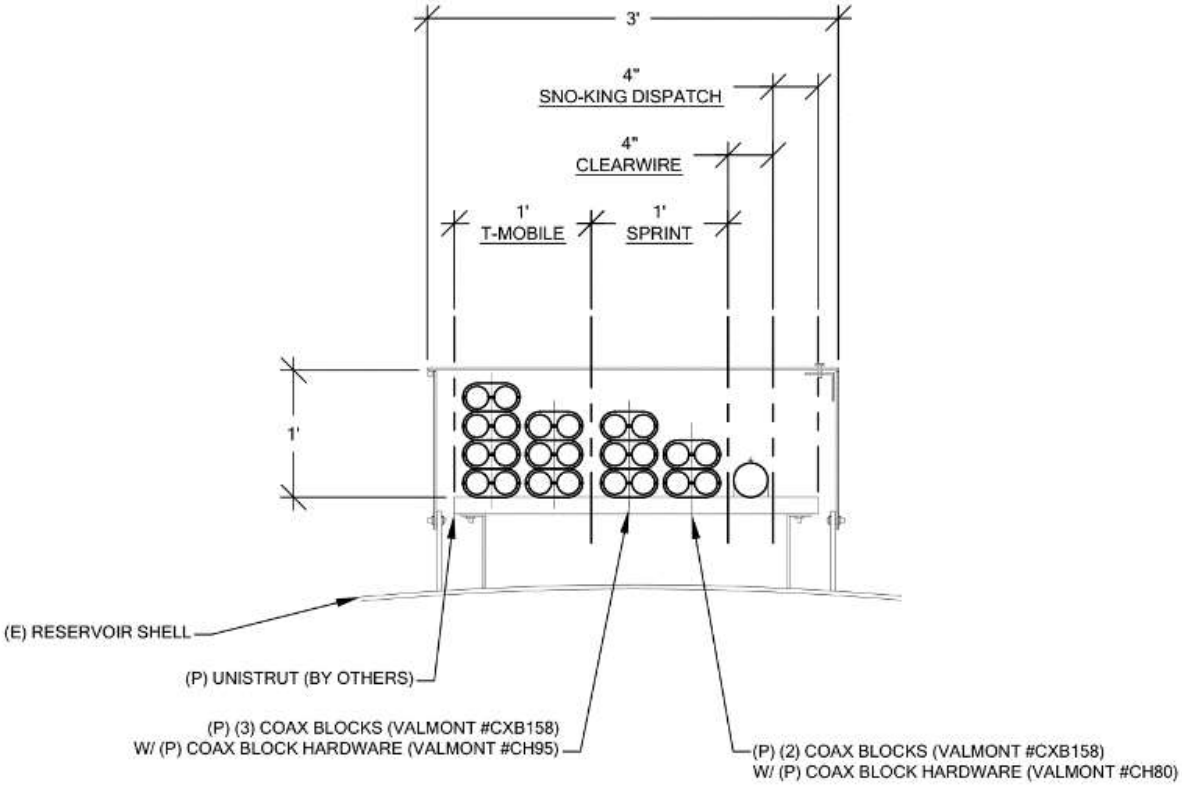
Multi-user Accessory Equip. Building (MUAEB)

Cell Cables in Underground Conduit

Exist. Platform: 50 lf rail

New Catwalk: 120 lf rail

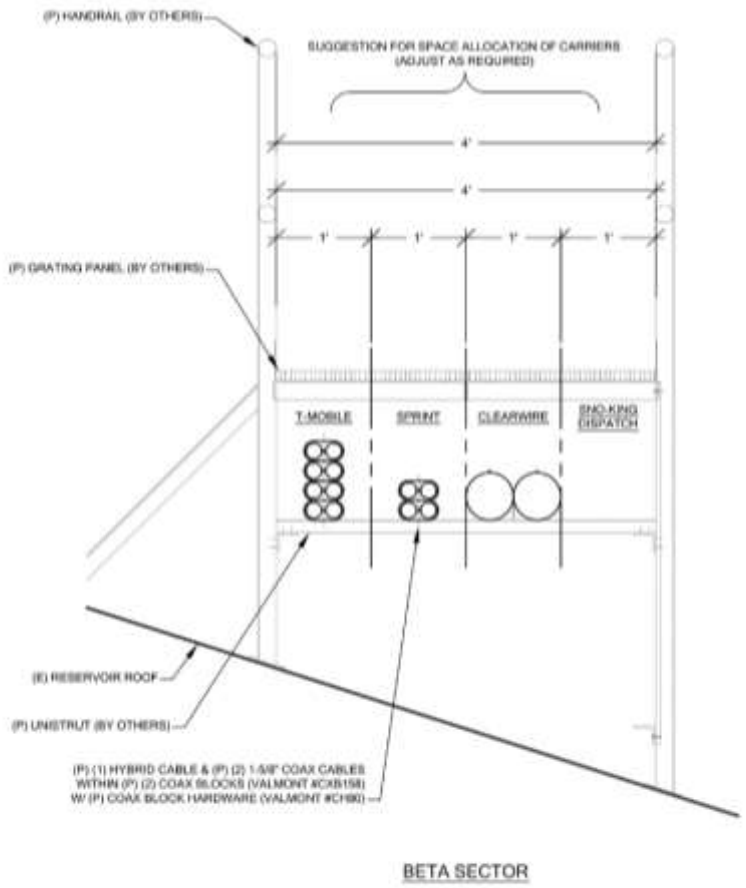
CABLE SPACE ALLOCATION (WALL)



Raceway up Tank Wall
Plan View

CABLE SPACE ALLOCATION (ROOF)

- Watch Transitions
- Check During:
  - plan development
  - shop drawing review
  - construction
  - cable installation
- Physically Mark Space
- Allow for Adjustment



Raceway Under Catwalk
Vertical Section

ROOF AFTER IMPROVEMENTS

- Clearance for Recoating
- Design for Growth

DOMED ROOF CONCERNS

- Fall Protection
- Visual Screening

CABLE RACEWAY

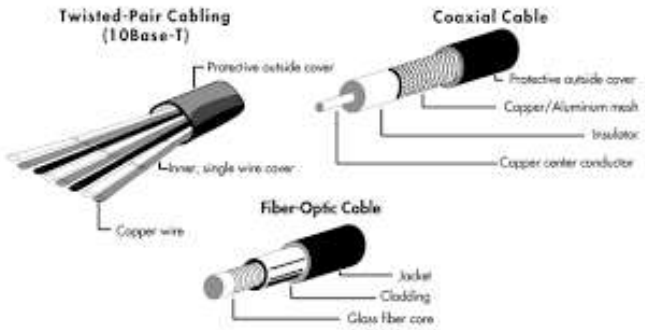
- Consider Shroud Costs vs. Benefits
- Provide Ability to Add/Change

Before

After

CHANGING TECHNOLOGY

- Coaxial vs. Hybrid Fiber
- Different clearance & support needs



TANK TO GROUND TRANSITION (EXT.)

- Access/Security
- Visual Screening

Before

After

TANK TO GROUND TRANSITION (INT.)

- Clearance for Recoating
- Prevent Water in Conduit
- Watch Electrical Transitions

SECURITY/ACCESS

- Cut-free/Climb Free Fence
- Co-location and Security

Before

After

GROUND TO BUILDING TRANSITION

- Equipment Protection
- Ability to Add/Change

Outside

Inside

INSIDE THE MULTI-USER BUILDING

- Co-Location and Security
- Equipment Support
- Ability to Add/Change

MAKING IT A SUCCESS

- Coordination!
- Budget Future Recoating Effort
- Capacity to Add/Change
- If Modifying Existing,
  Plan for Some Rehab
- Check New Tech Needs

LESSONS LEARNED

- "I wish we had posted the plans for every project on this site in one common location" – *Mike Jansma, Project Manager, T. Bailey & Associates*

- "through **partnership** ….(and) **team atmosphere** (we) achieved the design goals of everyone"
  – *Unnamed cell carrier representative*

- "It was the District's willingness to work together with the cell carriers that made this a success."
  – *Sprint and T Mobile representative*

CONTACT INFORMATION

Diane Pottinger, P.E.
North City Water District
206.362.8100

Shannon Emerick, P.E.
RH2 Engineering, Inc.
425.951.5345