Assessing your Assets –

An approach to review solid waste facilities for future service

Keith Howard, HDR
Southeast Region Waste Lead

AGENDA

- Purpose
- Physical Assessment
- Operational Assessment

Fresh Set of Eyes

Hard to see the small changes that are always happening

We've always done it this way….

ASSESSING YOUR ASSETS

- Two perspectives:
  - Physical Condition
  - Operational
- Safety
  - Underlying all observations should be a concern for safety of employees and customers
  - Often common-sense observations

Physical Assessment

Typical Transfer Station Facility Checklist

- ✓ Roadways
- ✓ Scalehouse
- ✓ Traffic Flow and Patterns
- ✓ Tip Floor
- ✓ Building Systems
- ✓ Leachate / Wastewater
- ✓ Groundwater
- ✓ Site Drainage and Stormwater
- ✓ Admin Areas
- ✓ Other Features
  Public Drop Off, HHW

ASSESSING YOUR ASSETS

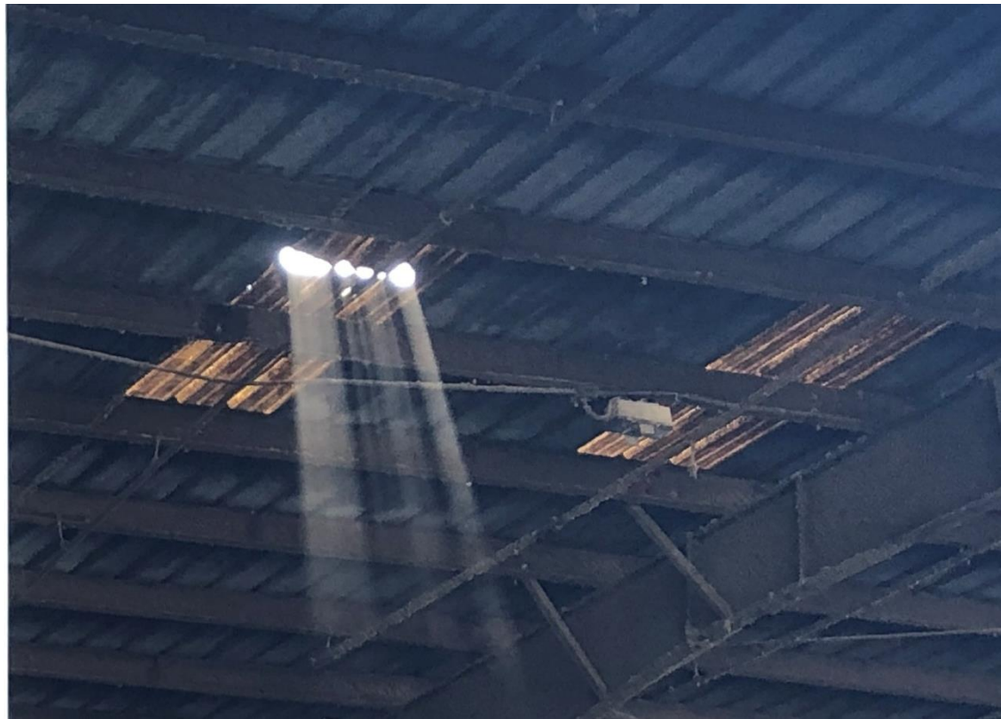
Physical – Civil

- Roadways
  - Turning radii
  - Pavement condition
  - Tracking
  - Visibility
- Pedestrian access
- Litter/Dust/Debris
- Stormwater controls
  - Sediment control
  - Conveyances and storage

ASSESSING YOUR ASSETS

Physical – Structural

- Exposed steel condition
  - Debris accumulation
  - Damage
  - Painting preservation
- Roofing
- Tip floors – wear item
  - Design features to identify wear
  - Exposed rebar
  - Damage – bollards, columns, overhead
- Push walls and pits



ASSESSING YOUR ASSETS

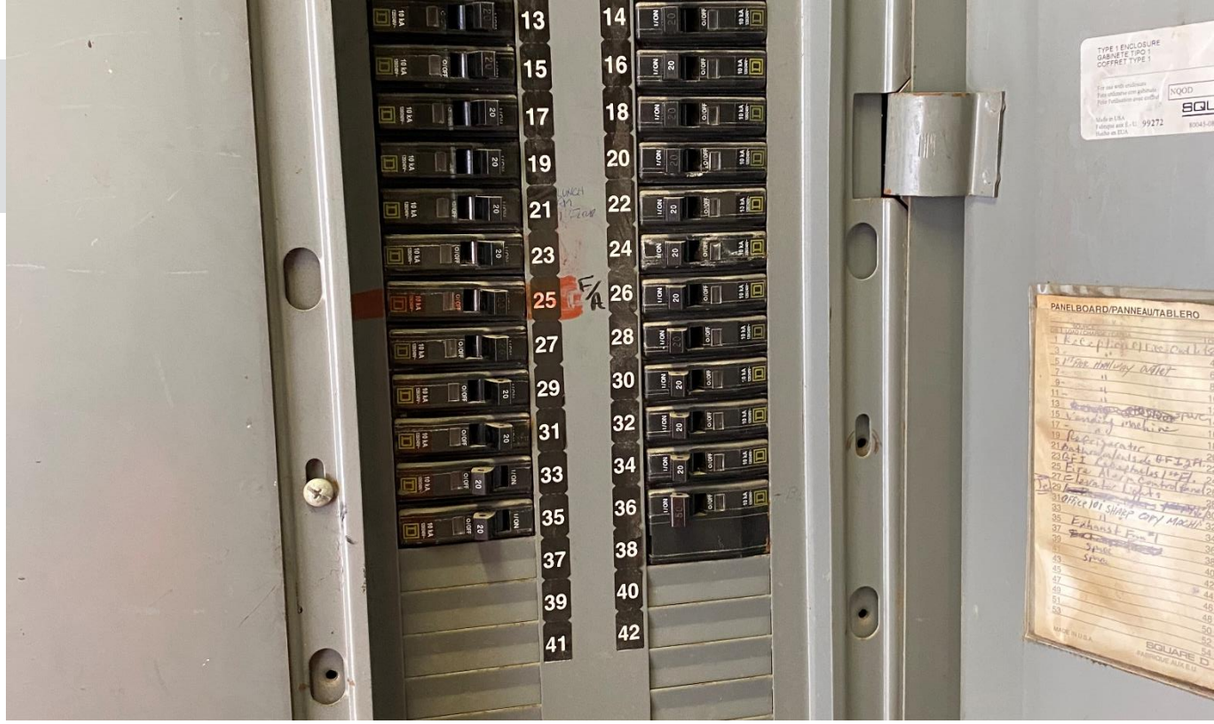
Physical – Mechanical

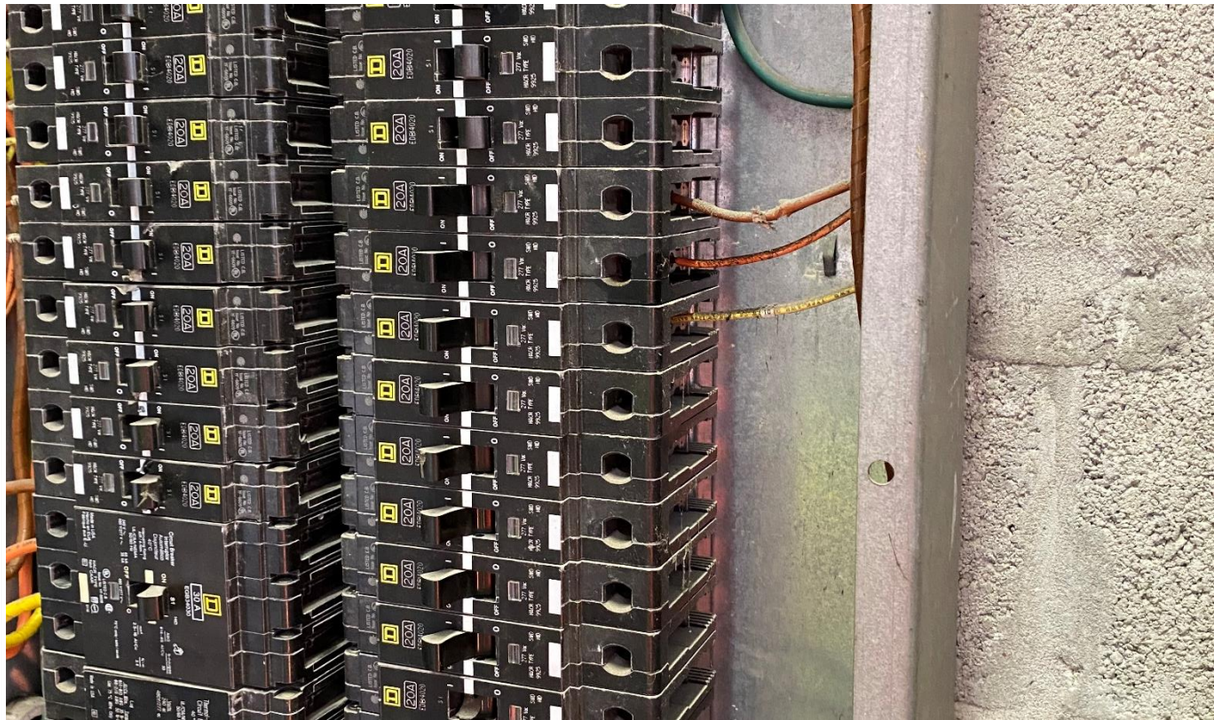
- Plumbing
  - Leaks
  - Drains
  - Leachate management
- HVAC
  - Fans, fans, fans….
- Fire and Life Safety
  - Routine checks

ASSESSING YOUR ASSETS

Physical – Electrical

- Panel Conditions
- Electrical Room Conditions
- Modifications
  - Added lighting/outlets
- Back up generators





ASSESSING YOUR ASSETS

Physical – Other

- HHW facilities
- Public drop off
- Administrative buildings
- Stormwater
- Groundwater


BAY 1
NO TRAILERS

ASSESSING YOUR ASSETS

Damage: Root Cause and Prevention

- The easy part – identification
- The hard part - why
  - Operator error
  - Design conflicts

Operational Assessment

ASSESSING YOUR ASSETS

Operational

- Traffic flow and movement
- Equipment utilization
- Cycle times
  - Transaction times
  - Delivery unload times
  - Trailer load times

ASSESSING YOUR ASSETS

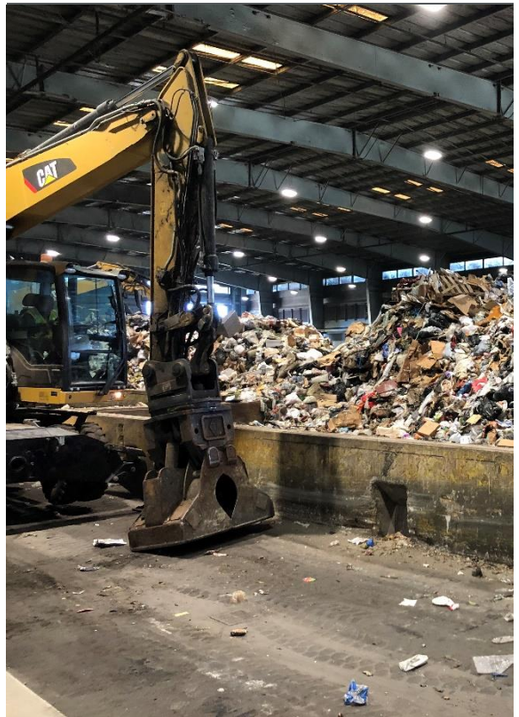
Operational – Traffic

- Flow – decision points
  - Types of traffic
  - Avoiding lost customers
- Signage
- Queuing – more on this later

ASSESSING YOUR ASSETS

Operational – Equipment

- Type and size
  - Right tool for the right job
  - Material dependent
  - Throughput dependent
- Condition
- Operator characteristics (i.e. drag bucket, back scraping, etc.)
- Support equipment
  - Tractor trailers
  - Skid steer loaders
  - Tamping cranes



ASSESSING YOUR ASSETS

Operational - Customers

- Transaction times
  - Inbound vs Outbound
  - Automation
  - Bypass lanes
- Dump times
  - Self tipping
  - Hand unload

INPUT VS OUTPUT

- Finding facility capacities (TS)
  - Tonnage
  - Equipment
  - Transactions
  - Storage
- Want haulers on routes not waiting in lines
- Storage doesn’t work if it limits dumping

ITS ALL ABOUT THE QUEUE

- Receipt
  - How much and when
- Processing
  - Scalehouse
  - Dump times
  - Backstack capabilities
- Removal
  - Load times

All these issues can be reinforcing when problems arise

SIMPLIFIED MATH SOLUTIONS….

Outputs

Based on rate at which transfer trailers are loaded:

$$C = (P_t \times N \times 60 \times H_t)/(T_t + B)$$

- 20 tons
- # of bays (2)
- Operating hours (10)
- Load time (25 min)
- Replacement time (5)

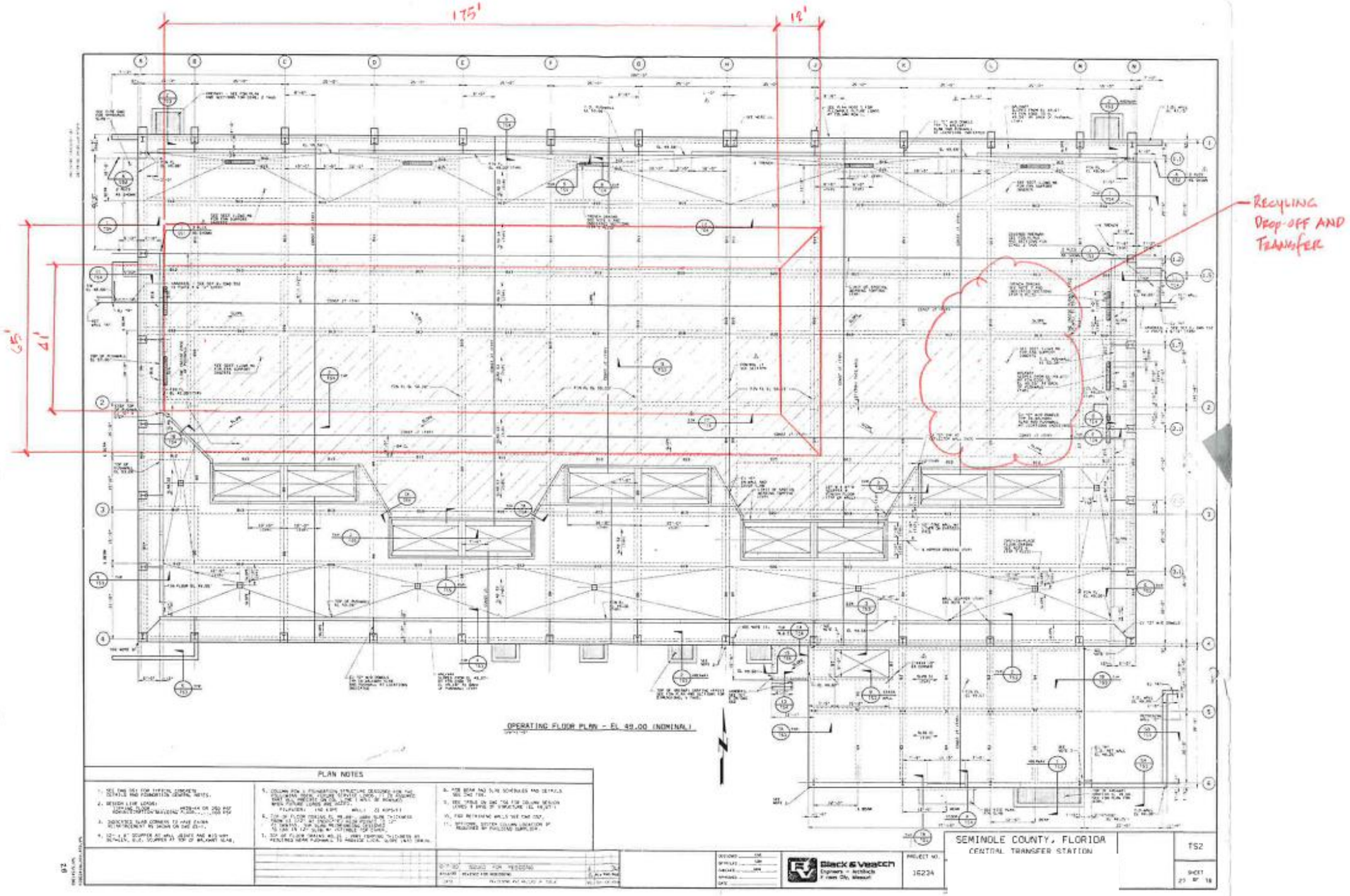
- C=(20x2x60x10)/(25+5)
- C = 800 tpd

Where:

C	Station capacity (tons/day)
P_C	Collection vehicle payloads (tons)
L	Total length of dumping space (feet)
W	Width of each dumping space (feet)
H_W	Hours per day that waste is delivered
T_C	Time to unload each collection vehicle (minutes)
F	Peaking factor (ratio of number of collection vehicles received during an average 30-minute period to the number received during a peak 30-minute period)
P_t	Transfer trailer payload (tons)
N	Number of transfer trailers loading simultaneously
H_t	Hours per day used to load trailers (empty trailers must be available)
B	Time to remove and replace each loaded trailer (minutes)
T_t	Time to load each transfer trailer (minutes)
N_n	Number of hoppers
L_n	Length of each hopper
L_p	Length of each push pit (feet)
N_p	Number of push pits
B_c	Total cycle time for clearing each push pit and compacting waste into trailer

CAPACITY GUIDELINES (THROUGHPUT)

- Loadout is only as efficient as the ability to have trailers available
- Storage Capacity can mitigate inconsistent deliveries and loadout
  - Mounded storage
  - Push walls
  - One day storage assumption – can one day's receipt be stored without significant impact to operations?
- Sufficient equipment to fully utilize facility
  - Loaders – clear and stack, charge pits
  - Packers – stationary vs mobile
  - Ideally – loader loads and charges, packer packs and trims



$A = \frac{L_1 + L_2}{2} * h$

$A = \frac{(41+65)}{2} * 12$

$A = 636\ ft^2$

$V \approx 636 \times 197$

$V = 125{,}292\ ft^3$

$T = 927$ TONS

STORAGE ANALYSIS

Figure 2

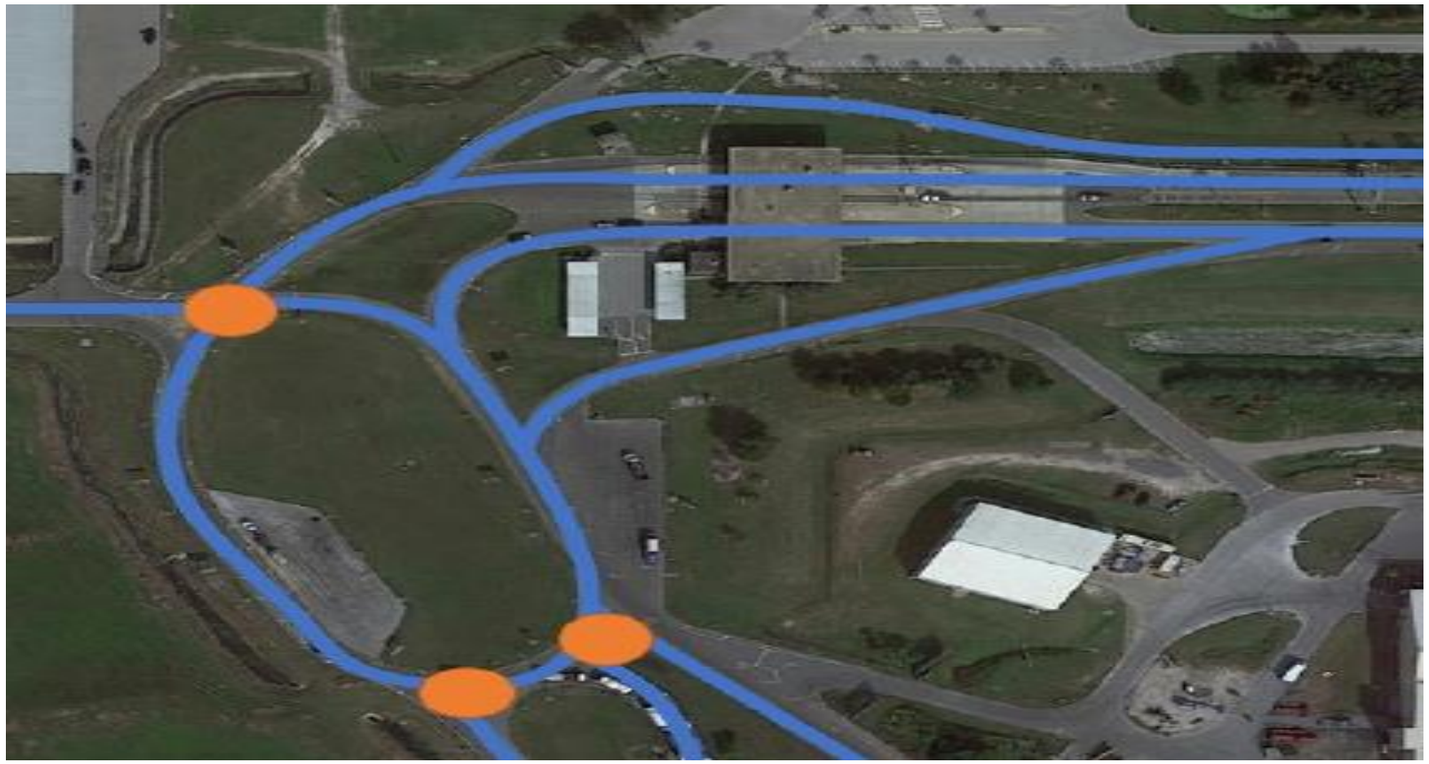
Inputs

Queuing Studies

- Collect existing operational data
  - Tickets/transaction
  - Date stamped – inbound, outbound if not tared
  - Staff observations
- Collect field data
  - Traffic counts during peak events
  - Field observation/timing
  - Cameras

Queuing Studies

- Develop modeling
  - Tickets
  - Transaction times
    - Measured
    - Assumed
  - Field adjustments/calibration
- Simulation
  - Evaluate alternatives




© 2020 DigitalGlobe
© 2020 Microsoft Corporation
©CNES (2020) Distribution Airbus DS
Microsoft Bing

In Conclusion

- Site Assessments are a useful tool to realign maintenance and capital activities
- Outside perspective can see past the daily changes
- Maintenance and operations need to co-exist
- Operational reviews offer new perspective on what a facility is doing and can do
  - Looks beyond legacy practices
  - Help Identify what’s holding the facility back
- Preserving the asset for today and tomorrow’s environment

Thank You!

Questions?

Keith Howard, HDR

941-321-8205

keith.howard@hdrinc.com