



City and County of San Francisco

Disaster Debris Management Plan

An Element of the CCSF Emergency Management Program

**Disaster Debris Planning and the
2019 San Francisco Fleet Week Exercise Program**



SAN FRANCISCO'S PUSH FOR ZERO WASTE

- Achieved the state-mandated 50% landfill diversion by 2000
- Exceeded our goal of 75% diversion from landfill and incineration
- At the Global Climate Action Summit, in September 2018, updated the zero waste goal to these two pledges:
 - Reduce municipal solid waste generation by 15% by 2030 (reducing what goes to recycling, composting, and trash).
 - Reduce disposal to landfill and incineration by 50% by 2030 (reducing what goes in the black trash bins).

C&D Debris Recovery Ordinance



It's the Law

You must
recycle all
**Construction
and
Demolition**
waste material

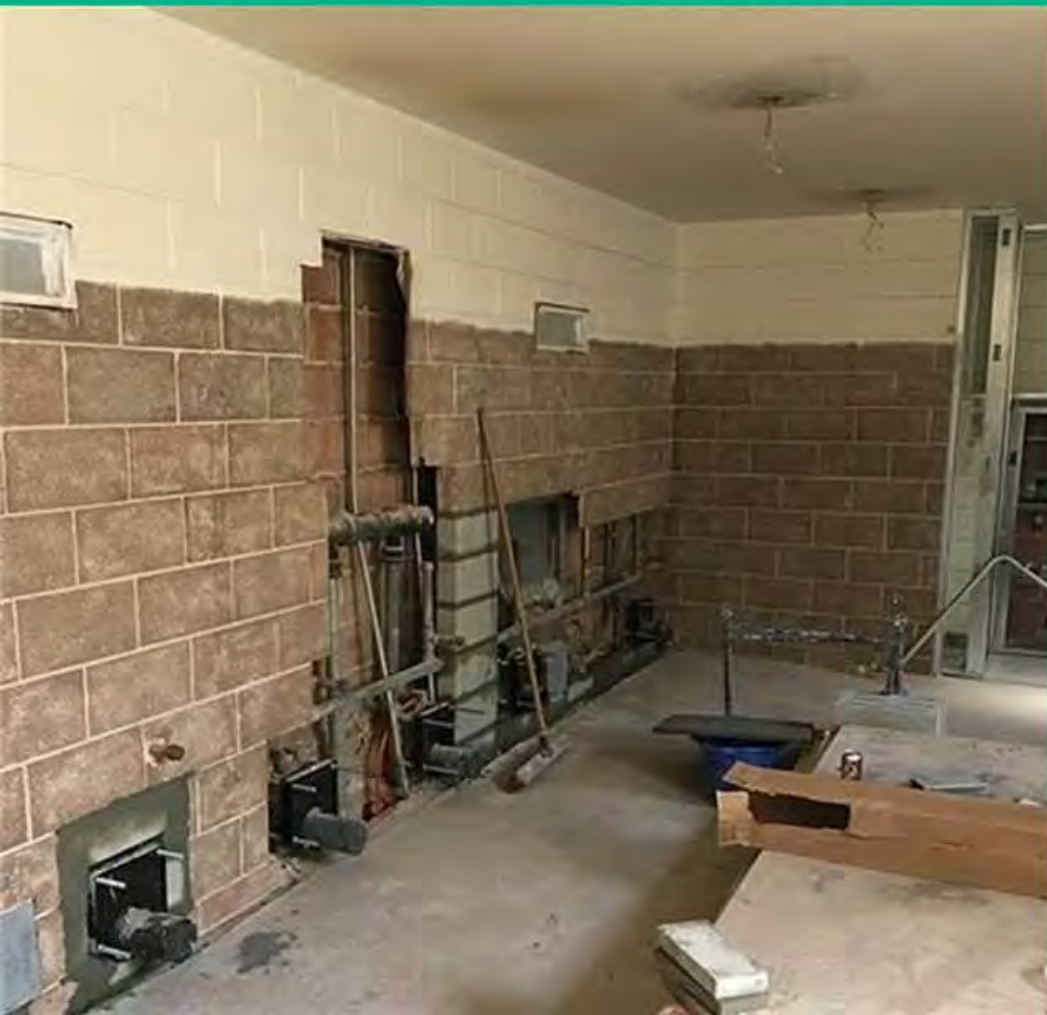
No C&D Material to Landfill!



New Construction - Commercial and Residential



All Alterations, Renovations, & Tennant Improvements



Municipal Projects



Full Structural Demolitions



Disaster Debris and Emergency Order Demolitions



DEBRIS BY THE NUMBERS

- San Francisco covers an area of roughly 47 square miles
- A M7.9 San Andreas earthquake may cause estimated *10 million tons* of debris in San Francisco
- Picture 280 football fields of debris, 8 stories high





Our Planning Process

SECTION 2.4

- Planning Team from 20 city departments.
- Numerous team and workgroup meetings over two years.
- Outreach to California Governor's Office of Emergency Services and FEMA.



PLAN STRATEGY OVERVIEW

- Move debris out of San Francisco as quickly and safely as possible by land, rail, barge.
- Process debris at existing, permitted debris management sites in Bay Area.
- Divert as much debris as possible from landfills.



2019 SAN FRANCISCO FLEET WEEK
DISASTER DEBRIS &
EMERGENCY ROUTE REOPENING
EXERCISE PROGRAM





EXERCISE SEQUENCE

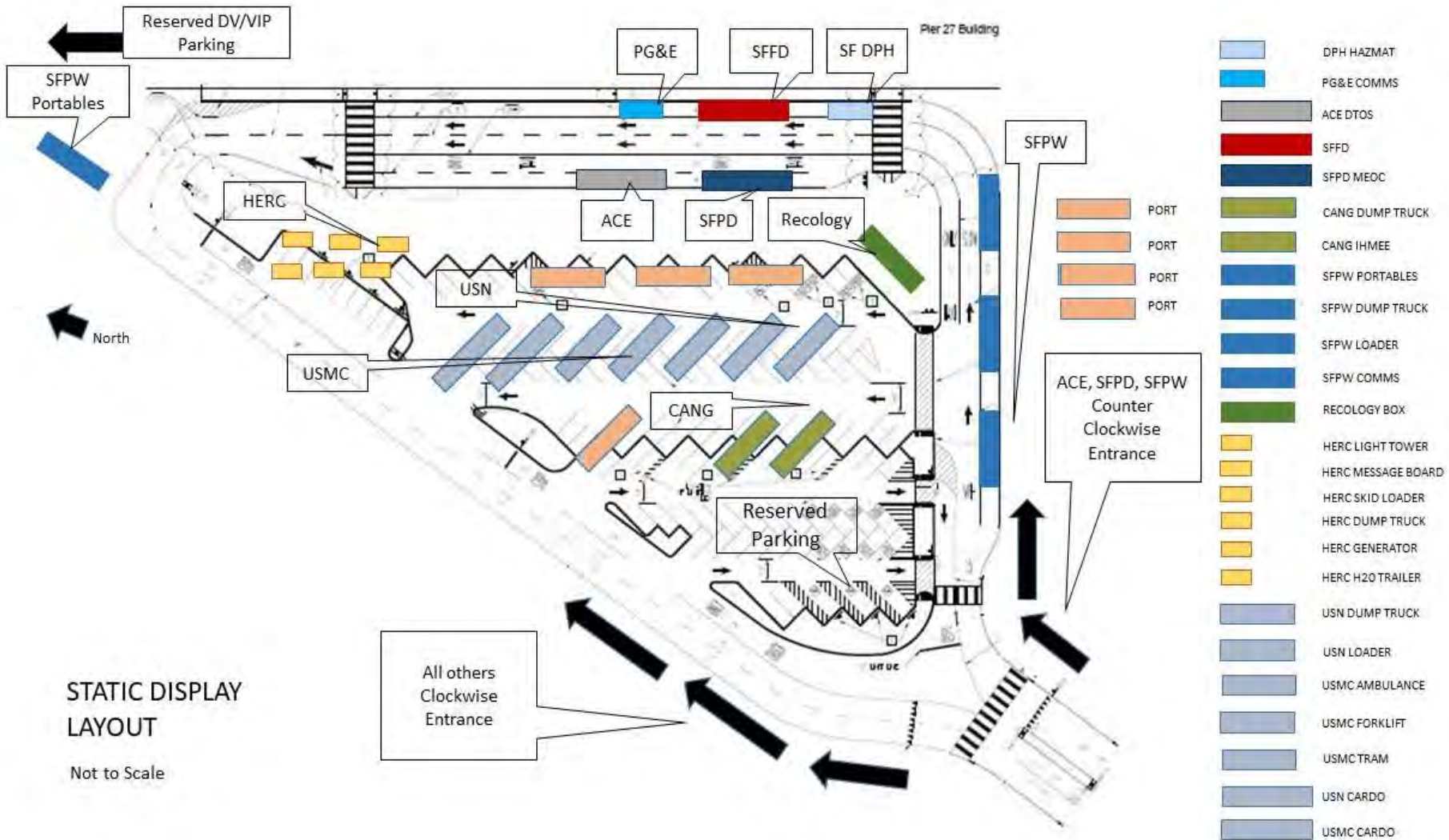
- **January 15 & 29: Local Post-Disaster Emergency Route Opening Workshops**
- **April 11: Local Disaster Debris Management Plan (DDMP) Seminar & Workshop**
- **July 2: Local Disaster Debris Management Plan (DDMP) & Emergency Route Reopening Tabletop Exercise**
- **September 17: SF Fleet Week Disaster Debris Management & Emergency Route Reopening Tabletop Exercise**
- **September 24: SF Fleet Week Regional Resource Request & Port Recovery Drill**
- **October 7: SF Fleet Week Defense Support of Civil Authorities (DSCA) Disaster Debris Management & Emergency Route Reopening Full-Scale Exercise**



PLANNING PARTICIPANTS

- CA Department of General Services (DGS)
- CA Department of Transportation (Caltrans)
- CA Highway Patrol (CHP)
- CA Military Department
- CA Environmental Protection Agency (CalEPA)
- CalRecycle
- Defense Logistics Agency (DLA)
- Federal Emergency Management Agency (FEMA)
- Federal Highway Administration (FHWA)
- Governor's Office of Emergency Services (CalOES)
- Pacific Gas and Electric Company (PG&E)
- Port of Oakland
- Port of San Francisco
- Recology
- SFFW Center for Humanitarian Assistance
- SF Dept. of Emergency Management (SFDEM)
- SF Dept. of the Environment (SFE)
- SF Dept. of Public Health (SFDPH)
- SF General Services Agency (GSA)
- SF Municipal Transportation Agency (SFMTA)
- SF Police Department (SFPD)
- SF Public Utilities Commission (SFPUC)
- SF Public Works (SFPW)
- SF Sheriff's Department (SFSD)
- SF Treasure Island Development Authority (TIDA)
- US Army Corps of Engineers (ACE)
- US Coast Guard (USCG)
- US Department of Defense (DoD)
- US Department of Homeland Security (DHS)
- US Department of Transportation (DOT)
- US Department of Transportation (DOT) Maritime Administration (MARAD)
- US Environmental Protection Agency (EPA)
- US Marine Corps (USMC)
- US Navy (USN)
- Voluntary Agencies Active in Disaster (VOAD)





- DPH HAZMAT
- PG&E COMMS
- ACE DTOS
- SFFD
- SFPD MEOC
- CANG DUMP TRUCK
- CANG IHMEE
- SFPW PORTABLES
- SFPW DUMP TRUCK
- SFPW LOADER
- SFPW COMMS
- RECOLOGY BOX
- HERC LIGHT TOWER
- HERC MESSAGE BOARD
- HERC SKID LOADER
- HERC DUMP TRUCK
- HERC GENERATOR
- HERC H2O TRAILER
- USN DUMP TRUCK
- USN LOADER
- USMC AMBULANCE
- USMC FORKLIFT
- USMC TRAM
- USN CARDO
- USMC CARDO

STATIC DISPLAY LAYOUT
Not to Scale

USACE MV JOHN A. B. DILLARD DRIFT COLLECTOR



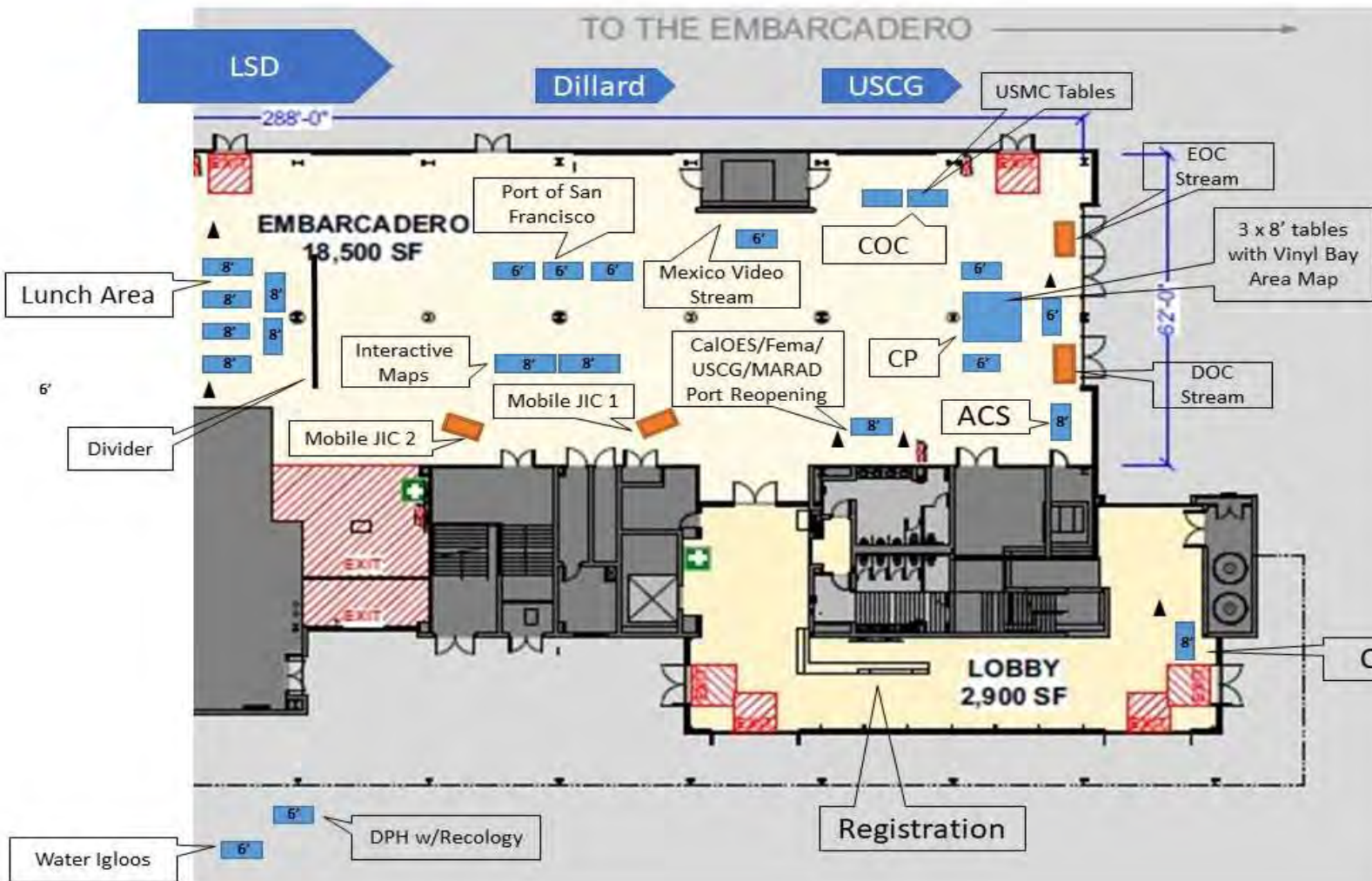




USACE

Deployable Tactical Operations System





Pier 27 Terminal FSE Layout

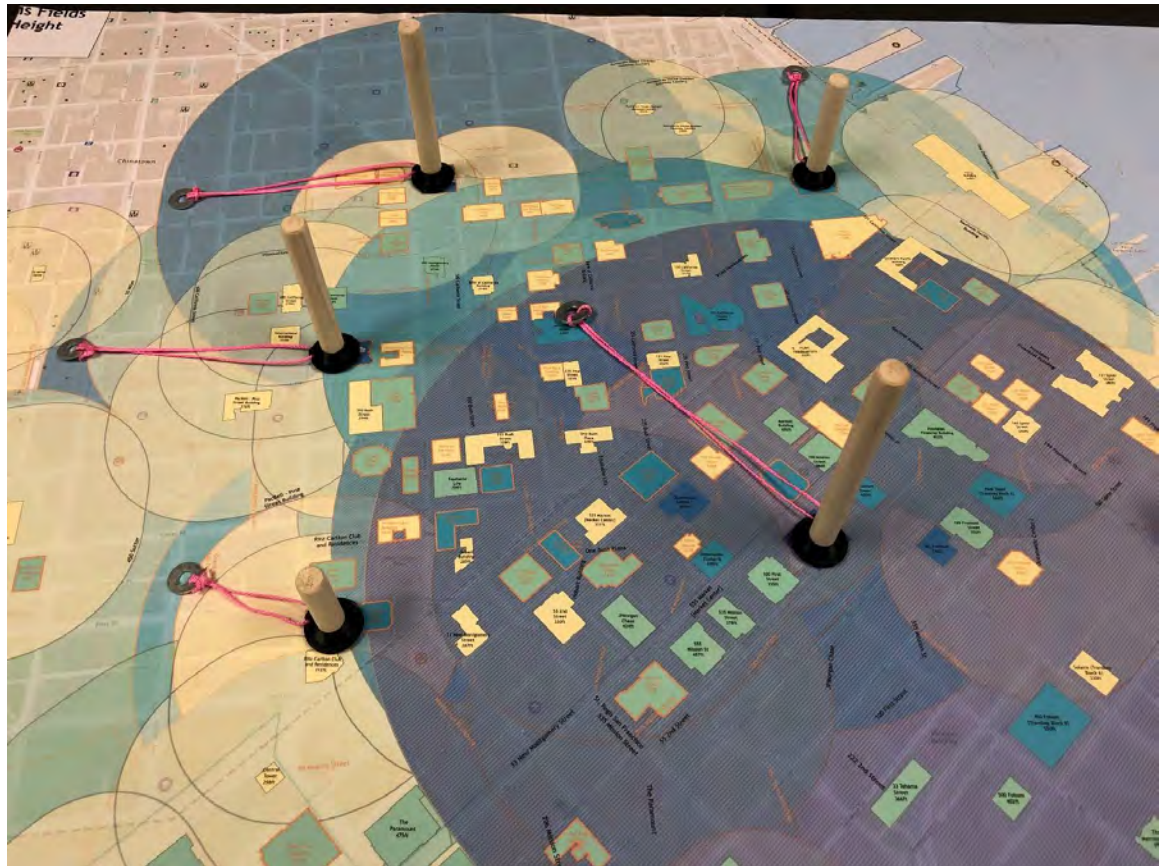
Not to Scale

- ▲ Easel
- 6' Table
- 8' Table
- Video Monitor



Photo by Lance Cpl. Tia Carr , 1st Marine Logistics Group



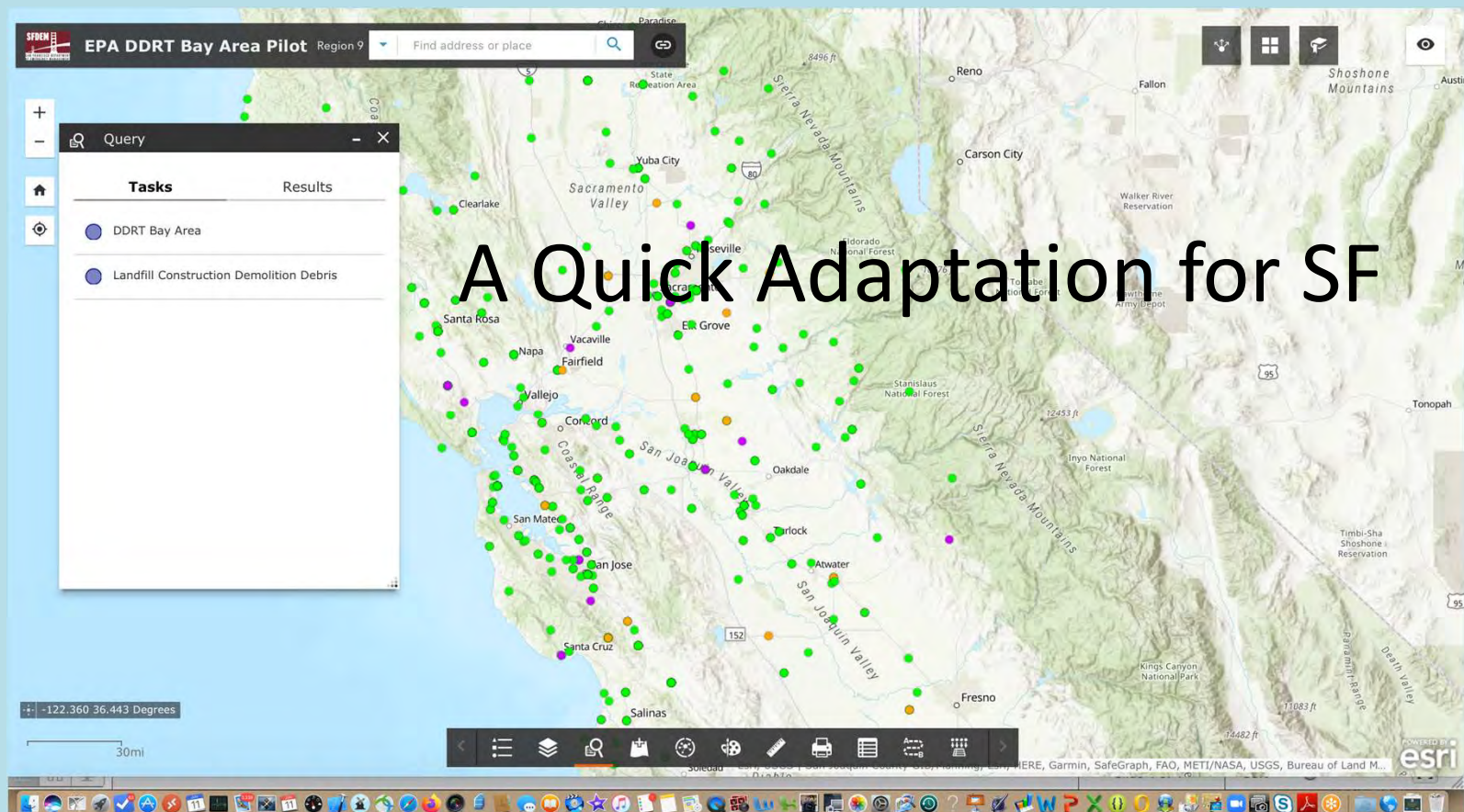


GIS DEBRIS TOOLS



Debris Disaster Recovery Tool

Disaster Recovery Exercise,
Fleet Week 2019, SFDEM



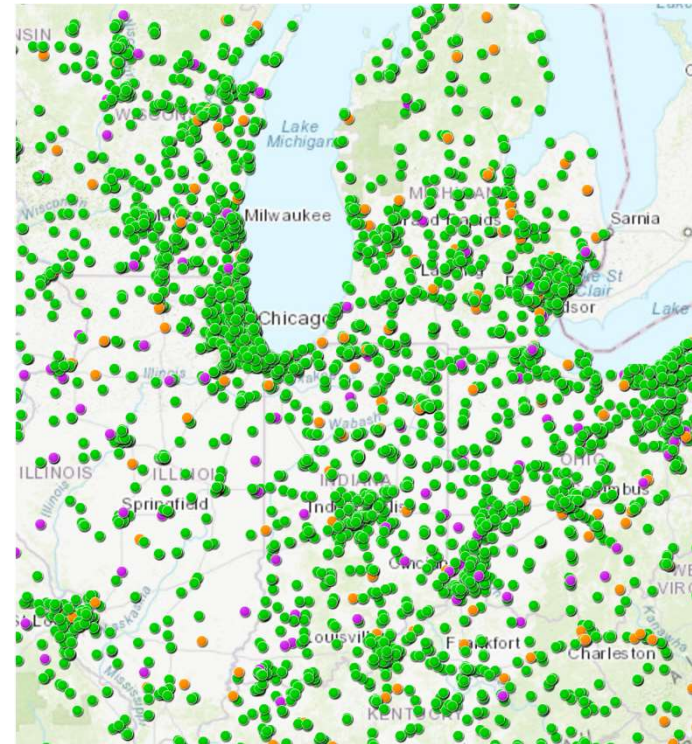


EPA DDRT Bay Area Pilot Region 9

- The challenge
- DEM development
- End result
- Debris Exercise Mapping Portfolio
- Future Development
- Contact Information

The Challenge

- Creating a San Francisco Specific Tool
- A short turn around time (a week!)
- Data needed for San Francisco Bay Area
- Custom code was not available

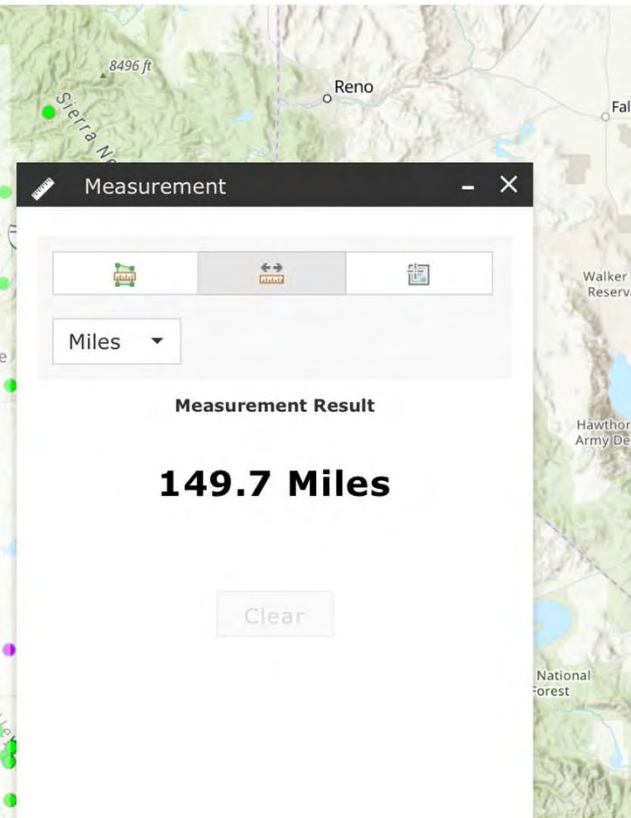




EPA DDRT Bay Area Pilot Region 9

Data for the SF Bay Area

- Lucy Stanfield of the EPA Region 5 Office reviewed and provided data for debris management facilities within 150 miles of San Francisco
- Data in ArcGIS Layer Package





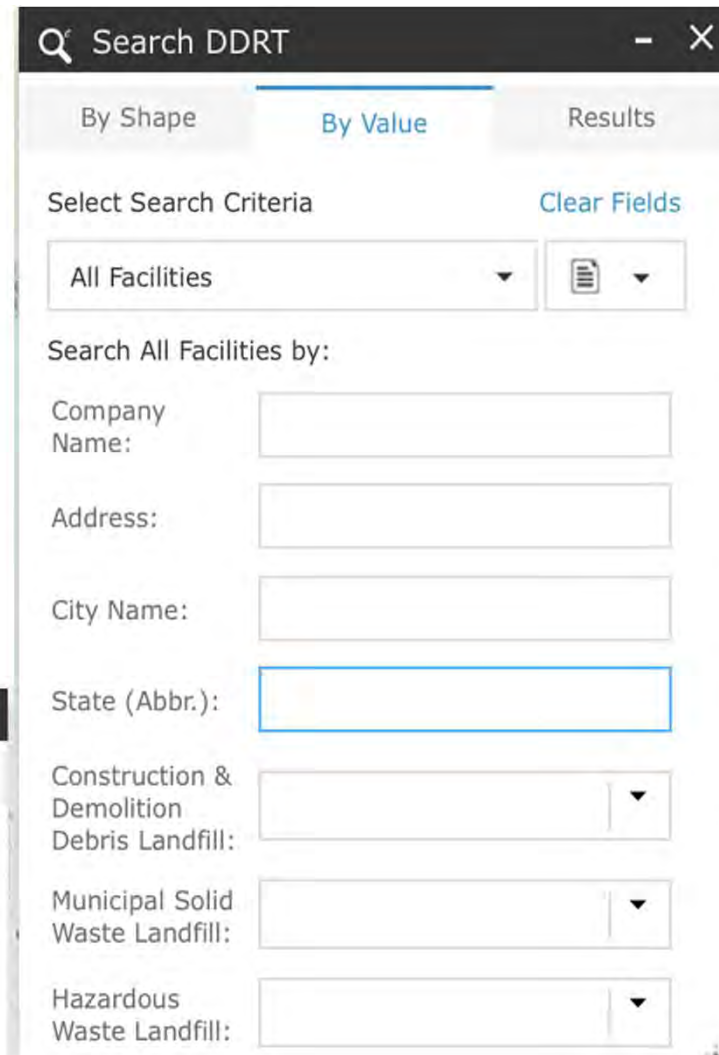
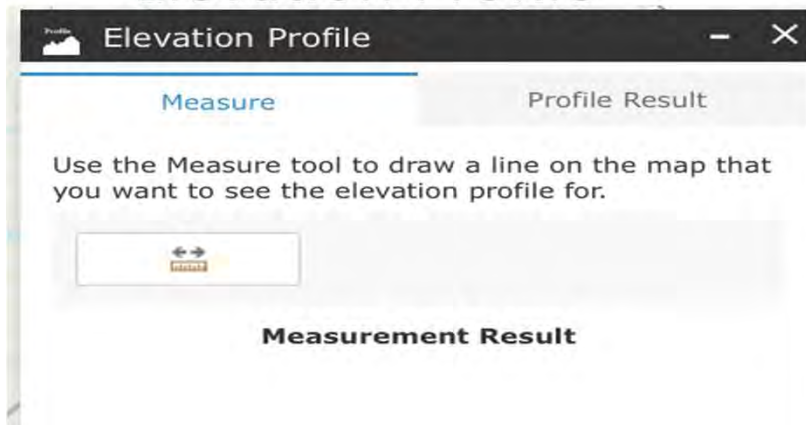
EPA DDRT Bay Area Pilot Region 9

Assessment of EPA Region 5 DDRT Application

- ArcGIS Online Platform
- Custom Widgets used in the Application
- ESRI Web AppBuilder for Developer
- Determine theme and widget configuration
- Different views of same data set to filter specific facilities by turning layers on and off
- Different symbology used in the views to differentiate facility types and materials processed.

Custom Widgets

- Search/Query/Filter
 - Allows search using Shape selection tool in addition to preconfiguring search fields
- Elevation Profile



Custom Widgets

- GeoLocator
- Imagery
- Draw



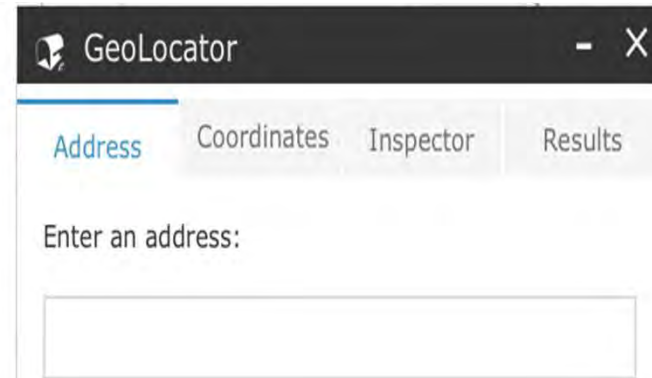
Imagery

Select data source(s) and click on the map, or enter a latitude and longitude below for image views. You can select up to 4 images.

[Unselect All]

- Google Street View
- Bing Maps Bird's Eye
- Bing Maps Aerial
- ESRI Imagery
- ESRI 3D
- USGS Imagery 1-meter
- USGS Imagery 1-foot

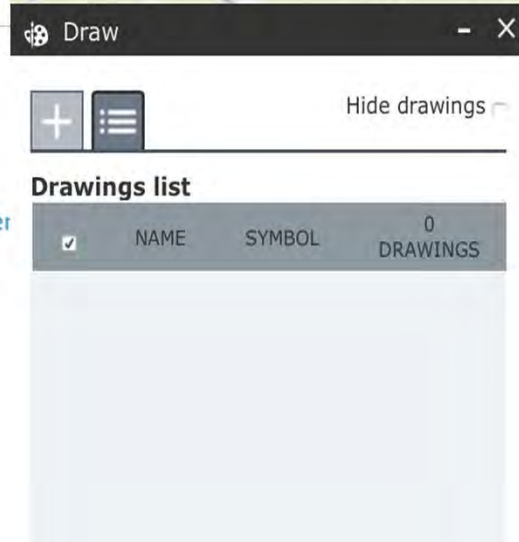
elpaso



GeoLocator

Address Coordinates Inspector Results

Enter an address:



Draw

Hide drawings

Drawings list

<input checked="" type="checkbox"/>	NAME	SYMBOL	0 DRAWINGS

Limit address search to maps extent.

Locate

Priorities

Given a short time frame and access to custom widgets, what were the primary objectives?

- Show Debris Recovery and Recycling sites near San Francisco.
- Recreate the look and feel of the EPA Region 5 application as much as possible.
- Use configurable widgets available through Web AppBuilder in ArcGIS Online rather than Web AppBuilder for Developer.



EPA DDRT Bay Area Pilot Region 9

- Publish a feature service in ArcGIS Online using the provided data for San Francisco Bay Area
- Create a web map using the same basemap as the Region 5 DDRT and symbolize the feature service in the map to match.
- Create views of specific types of materials processed at facilities.

- Landfills & Recovery
- Landfills
- Recovery

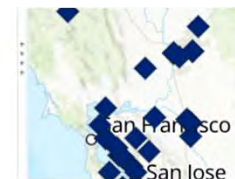
Filter: Recycler Metals

View Edit

Metals is 'Yes'














REMOVE FILTER CLOSE

Recycler Metals





EPA DDRT Bay Area Pilot Region 9

 Transfer Station	Feature Layer (hosted, view)
 Demolition Contractors	Feature Layer (hosted, view)
 Composters	Feature Layer (hosted, view)
 Recyclers Vehicles	Feature Layer (hosted, view)
 Recyclers Tires	Feature Layer (hosted, view)
 Recycler Household Hazardous Waste	Feature Layer (hosted, view)
 Recycler Metals	Feature Layer (hosted, view)
 Recycler Electronics	Feature Layer (hosted, view)
 DDRT Bay Area	Feature Layer (hosted)
 Recycler Construction Demolition Debris	Feature Layer (hosted, view)
 Landfills Hazardous Waste	Feature Layer (hosted, view)
 Landfills Municipal Solid Waste	Feature Layer (hosted, view)
 Landfill Construction Demolition Debris	Feature Layer (hosted, view)

Web AppBuilder

- Create the new application in Web AppBuilder using ArcGIS Online
- Select the theme, add widgets, and configure them to match the Region 5 application.
- Configure the Query widget to perform two searches since this is a demo and the custom widget contained many queries.

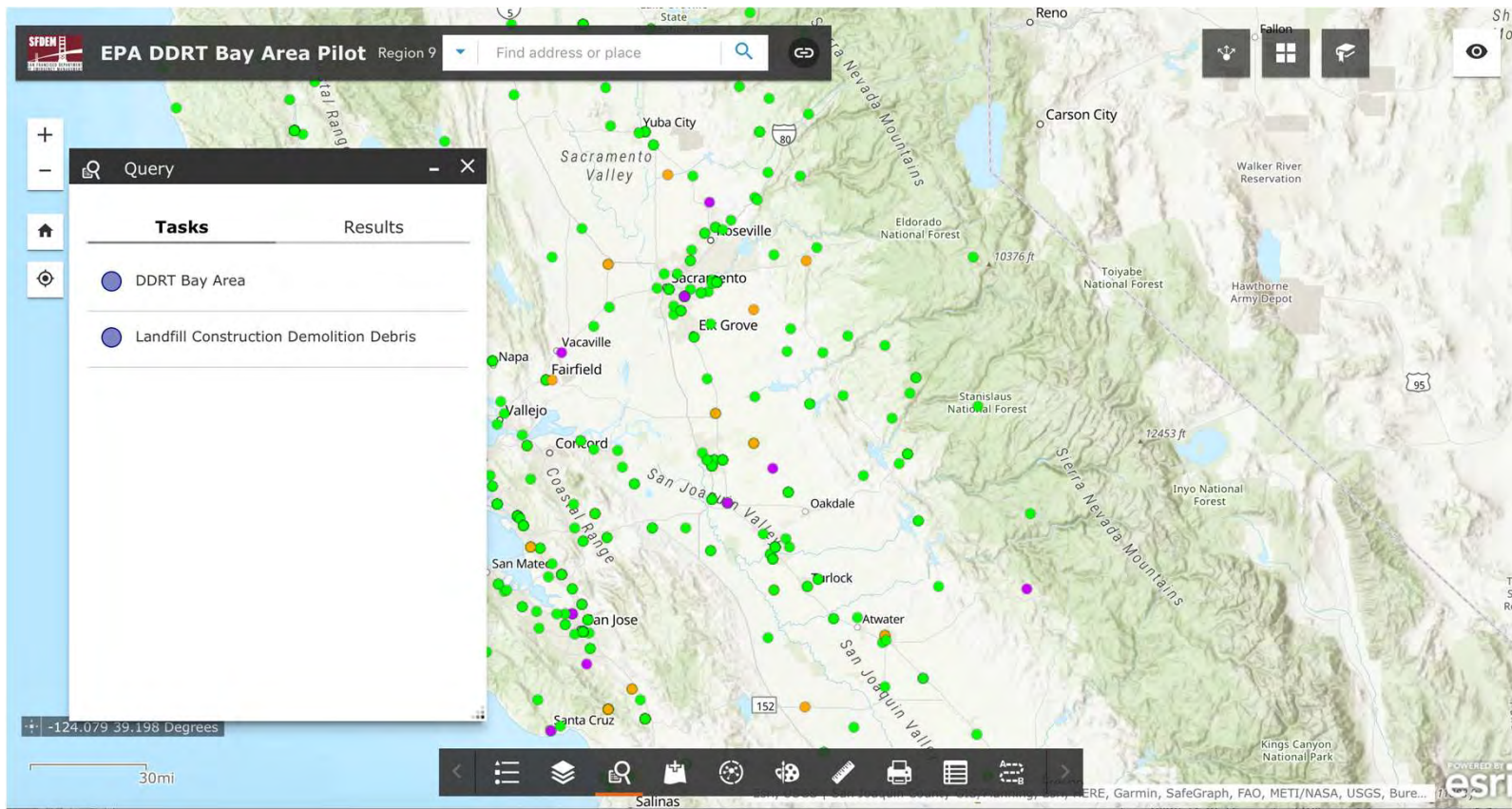


Launchpad Theme





EPA DDRT Bay Area Pilot Region 9





EPA DDRT Bay Area Pilot Region 9

The screenshot displays the EPA DDRT Bay Area Pilot application interface. On the left, a 'Query' form is visible with the following fields:

- Task:** DDRT Bay Area (selected)
- Query criteria:**
 - Company is: [empty]
 - Address is: [empty]
 - City is: [empty]
 - State is: [empty]
 - LF-C&D is: Yes
 - LF_CD = 'Yes'
- Result layer name:** DDRT Bay Area _Query result
- Apply** button

In the center, a 'Results' panel shows a list of features:

- Displayed features: 27
- Displayed feature: Keller Canyon
- Other features in the list include: Neal Road Recy, Eastlake Sanita, Tri Cities Recyc, San Martin Tra, Johnson Canyo, Corinda Los Tr Mountain, All Cities Landfill / KOFY Radio Site, and John Smith Road Class III Landfill.

On the right, a map shows the geographic location of the results. A context menu is open over the map, listing actions such as Zoom to, Pan to, Export to CSV file, Export to feature collection, Export to GeoJSON, Statistics..., Save to My Content, View in Attribute Table, Remove this result, and Change symbol.



EPA DDRT Bay Area Pilot Region 9

Add Data

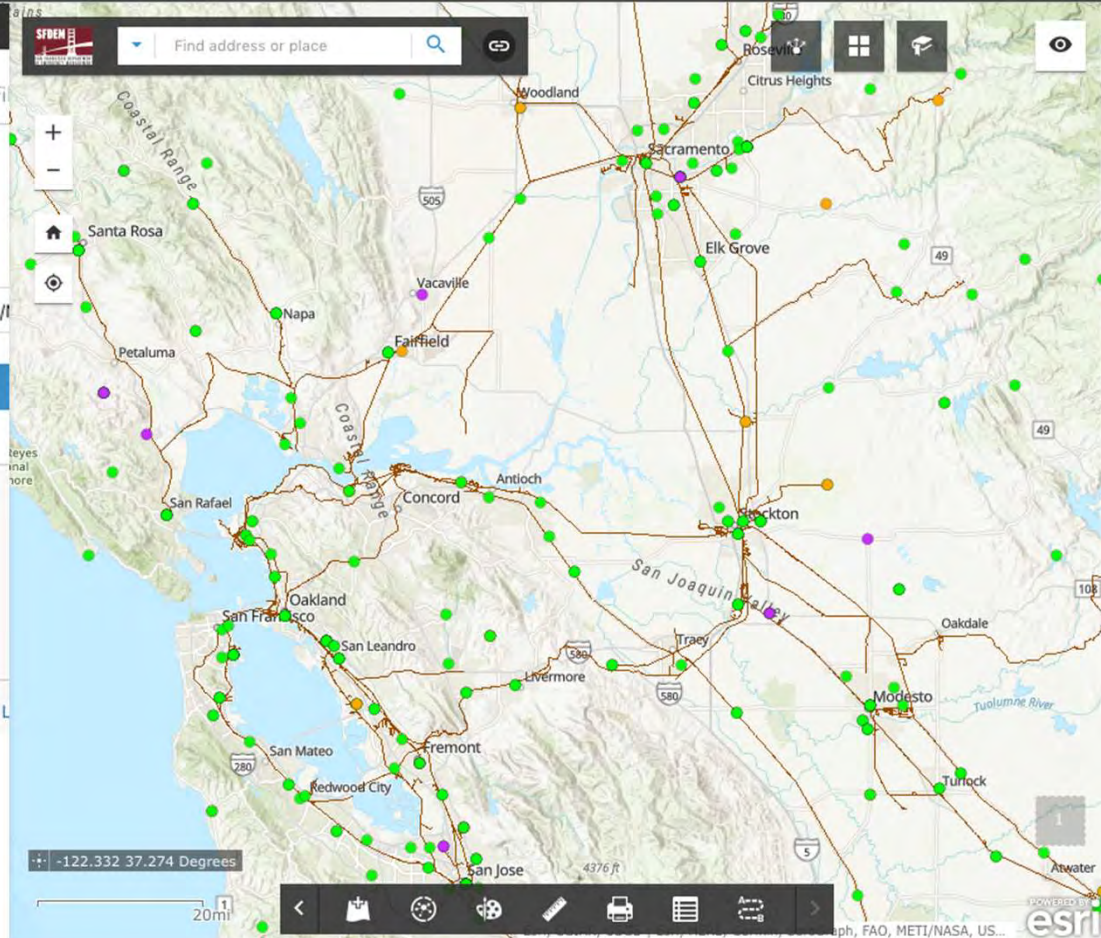
Search URL File

Type
An ArcGIS Server Web Service

URL
<https://geo.dot.gov/server/rest/services/NTAD/>

SAMPLE URL(S) **ADD**

Add Data:
North
American Rail
Lines



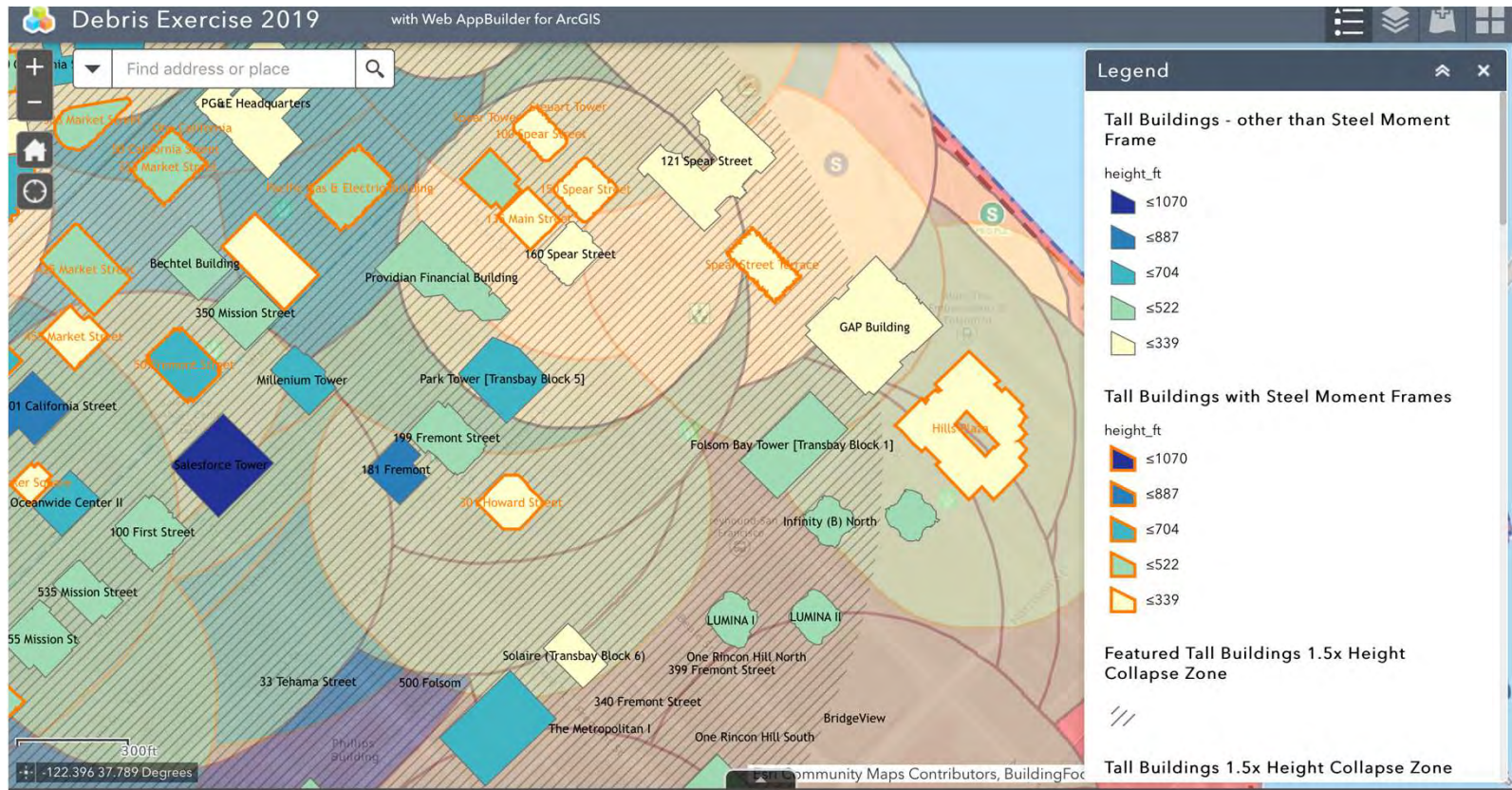


EPA DDRT Bay Area Pilot Region 9

The Exercise

- The U.S. Marine Corps group uploaded the DDRT data and other San Francisco data sets into the operations and mapping tool they were using during the debris clearing exercise. They also accessed the DDRT application.
- The DDRT application was presented along with several other tools in interactive demos with attendees.

Debris Exercise Viewer



Layer List

Layers

- Steel Movement Frame Tall Buildings ...
- Tall Buildings - other than Steel Moment Frame ...
- Tall Buildings with Steel Moment Frames ...
- Featured Tall Buildings 1.5x Height Collapse Zone ...
- Tall Buildings 1.5x Height Collapse Zone ...
- Tall Buildings Steel Moment 1.5x Height Collapse Zone ...
- Hazards ...
- Soft Story Buildings ...
- Critical Assets ...
- Port of San Francisco Emergency Assets ...
- Debris ...
- Fire Battalions ...
- Police Districts ...

- Police Districts ...
- Reservoirs ...
- Reservoir Inundation Hazard Area ...
- Liquefaction ...
- Landslide Susceptibility ...
- Total Debris ...

DebrisTota



3D ArcGIS Pro View (Placeholder)

Feedback From Demo of DDRT

- Interest in seeing the different types of debris handling facilities
- Where could this go next for debris management in a disaster?
 - Add capabilities to manage debris in a disaster such as locations of debris, amount of debris type at each location.
 - Contract status with facilities
 - Capacity of facilities
 - Cost to move debris from site using different modes of transportation to a facility.



Thank You!

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San Francisco Department of Emergency Management

-122.475 39.010 Degrees

