NAVFAC
Naval Facilities Engineering Command
NAVFAC SOUTHWEST

Naval Air Weapons Station China Lake Earthquake Repair & Reconstruct Industry Forum

1 August 2019

Overview

Current Situation

- **4 Jul 19: M6.4 earthquake**
- **5 Jul 19: M7.1 earthquake**
- **4 Jul – 13 Jul: more than 80 aftershocks >M4.0**
- **16 Jul: 26 aftershocks >M2.5, largest being M4.5**
- **18 – 22 Jul: 79 aftershocks >M2.5, largest M4.6**
- **23 – 29 Jul: 88 aftershocks >M2.5; largest M4.7**
- **30 Jul: 8 aftershocks >M2.5; largest M3.6**
- **31 Jul: 5 aftershocks >M2.5; largest M2.8**

Problem/Issue Statement

- **Completeness**: Observing all effects of past and continuing earthquake damage to 3,598 facilities, many highly specialized, worth $5.245B across 1.1M acres
- **Accuracy**: Correctly assessing and costing in the limited time available all repairs, making repair vs. replace judgements, including current mission needs
- **Judicious and Transparent:** Correcting only what is required, with a consistent, rational process that withstands scrutiny

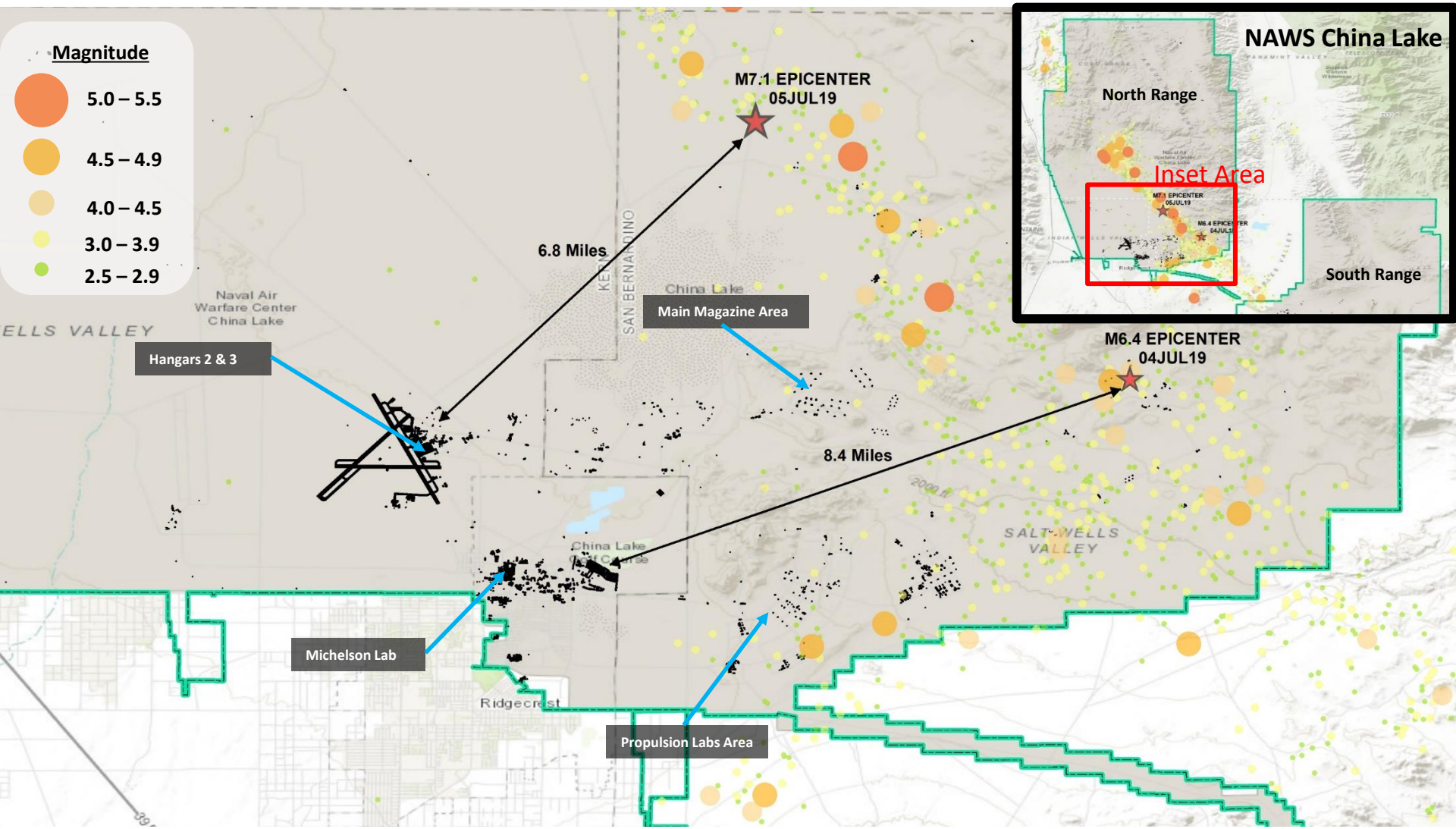
Background / Actions to Date

- **Total Plant Replacement Value (PRV) of all facilities is $5.2B, of buildings $2.2B**
- **Damage Assessment Teams (DATs) conducted 13 days of assessments of Navy buildings (1,341), plus utilities and structures**
- **Operational Performance Team analyzed assessments, applied codes, considered lessons learned, and created estimates**
- **The 250 members of Public Works Department China Lake and 100 NAVFAC SW augments plus contractors made repairs to return the installation to Partially Mission Capable**

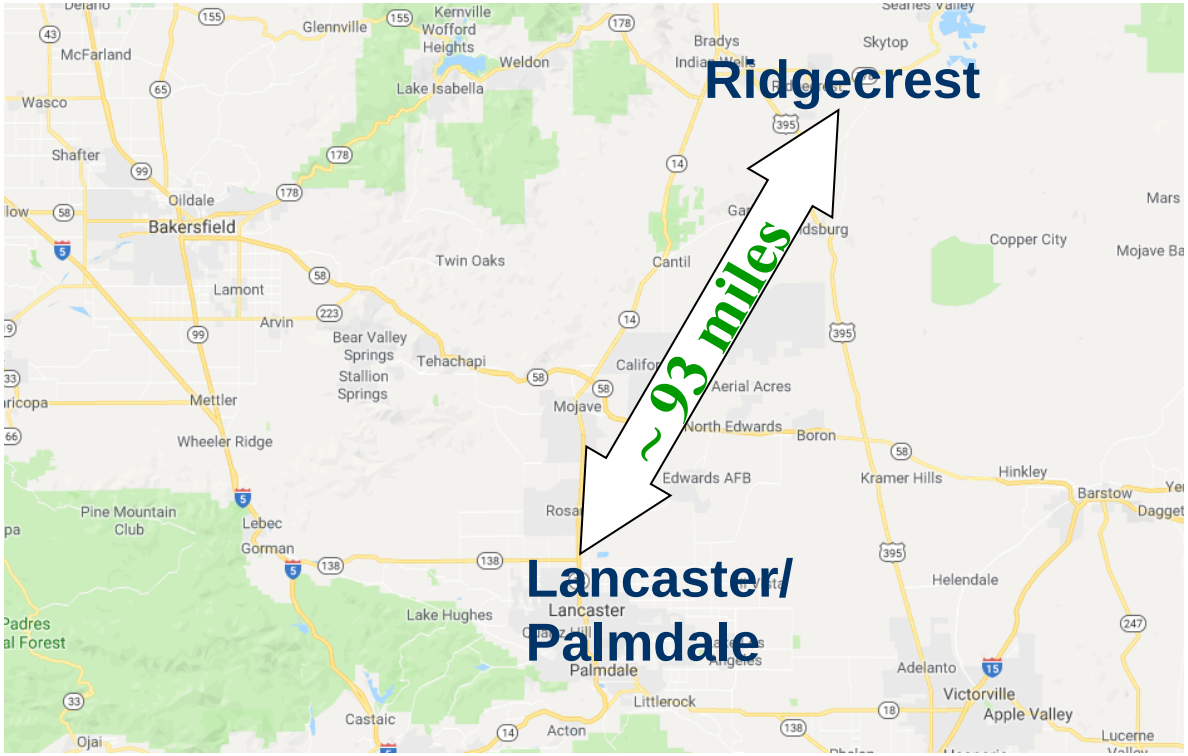
Overview of Effort

1. **Project Scopes:**
   a. Repair: To functionality of 3 Jul 19
   b. Upgrades: To functionality of 3 Jul 19, plus DoD required seismic and/or Anti-Terrorism Force Protection (ATFP) improvements
   c. Replace: Meet current mission requirement
2. **Timeline: All contracts awarded in FY19&20 for reconstitution of Naval Air Weapons Station (NAWS) China Lake**

NAWS China Lake Earthquakes: 4 & 5 Jul 19



Area Demographics



- Ridgecrest: population of 28,880; 18 hotels
- Lancaster/Palmdale: population of 217,227; 60 hotels

Inputs & Estimating

- **Inputs**
  - –Building assessments from Damage Assessment Teams (DATs), using Applied Technology Council (ATC) – 20 Detailed Evaluation Safety Assessment Form
  - –A/E evaluations and estimates
  - –Engineering and Expeditionary Warfare Center (EXWC) evaluations of magazines
  - –Limited Navy Crane Center and Naval Sea Systems Command crane evaluations
  - –NAVFAC and Army Corps of Engineers roads DAT
  - –Temporary facilities requirements for specific functions
  - –Naval Air Systems Command collaboration and input
- **Estimating**
  - –Plant Replacement Value (PRV)
  - –Actual costs of similar projects (local and otherwise)
  - –Relevant costs from current and planned projects
  - –RS Means industry cost guides

Rough Order of Magnitude (ROM) Approach

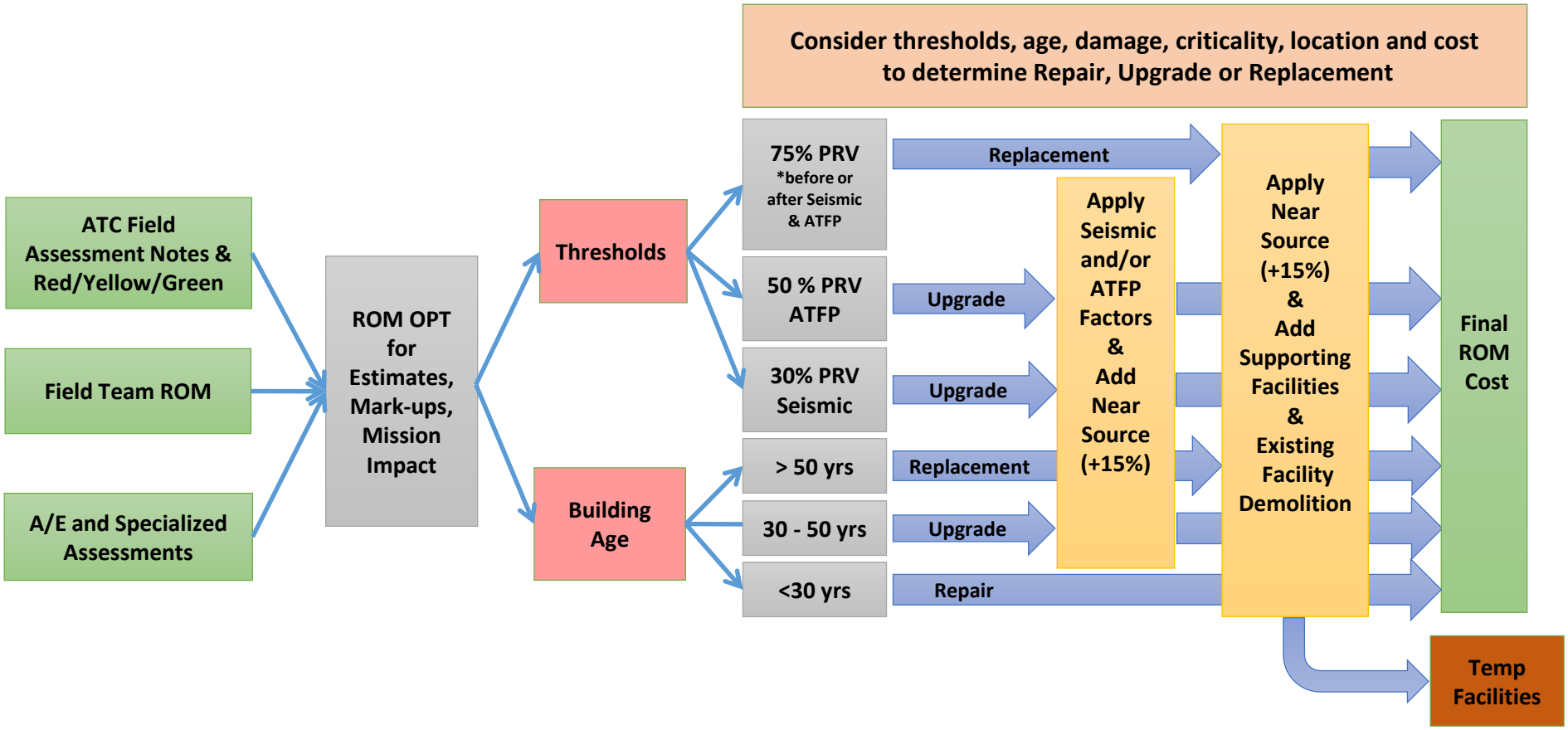
- **Detailed ROMs for assessed buildings >$5M PRV (69 total)**
  - –Estimates conducted on 782 other buildings
- **Parametric ROM for buildings <$5M PRV that did not receive individual estimates**
  - –Based on average of individual ROMs for each assessment category
  - –Parametric applied to 533 bldgs

69 Buildings with PRV > $5M Represent 55% of Buildings' PRV		
$ Threshold	**# Navy Buildings** (Cumulative Count)	**Cumulative PRV ($M)**
>$50M	3	$449
>$40M	5	$539
>$30M	9	$673
>$20M	10	$695
>$10M	24	$882
>$5M	69	$1,200

MUIC	# Navy Buildings	PRV ($M)
NAVAIR	1011	$1,721
CNIC	268	$379
NAVFAC	96	$57
Other	9	$21
Total Bldgs	**1384**	**$2,180**

Total PRV $5.244B

ROM Estimating Process



Hurricane Analysis

NAVFAC and Marine Corp Installations Command developed four estimating factors to apply to east coast reconstruction following the 2018 hurricane season. Some of these factors apply to the Ridgecrest earthquakes:

- **Factor 1: National Labor Premium (0%)**
  - Unlike the hurricanes, there is not new competition for labor from other area disasters. This factor is also principally applicable to areas with low Area Cost Factor (ACF). China Lake is already high at 1.23 because labor normally needs to be imported
- **Factor 2: Contingency (50%)**
  - Applied as the typical Project Readiness Index (PRI) 0 1391 of 50%. This factor is used for all projects at the conceptual development stage when planning is incomplete and engineering studies unfinished.
- **Factor 3: Hurricane (0%)**
  - This factor addressed the competition in the local and surrounding area from event impact for labor and material. The earthquake was highly localized and even the city saw little damage; the ACF already considers the distance from major supply hubs.
- **Factor 4: Competition (4%)**
  - Based on US Army Corps of Engineers (USACE) analysis of the number of bidders expected, a 4% contingency was added to Multiple Award Construction Contracts (MACCs) which may be one of tools. NAVFAC SW MACCs have 5-8 contractors. Not all will propose on every task order, so 5 was assumed, adding a 4% factor from USACE's data

Standard Factors Applied

- **Markups to labor, material, & equipment include**
  - –50% Estimating Contingency (standard for PRI 0 1391)
  - –23% China Lake ACF
  - –20% General Requirements
  - – 8% Home Office
  - –10% Profit
  - – 4% Escalation (from today's cost to mid-point of construction)
  - – 4% Competition factor (for MACCs) from hurricane analysis
  - – 4% Design Fee (for Design-Build projects)
  - – NAVFAC post-award oversight (Repair=8%, MILCON=5.7%)

Repair & Upgrade Considerations

- **Repair typically recommended for facilities <30 years old**
  - **Repair back to condition before earthquake (3 July 2019)**

- **Upgrade typically recommended for facilities 30-50 years old**
  - **Upgrade to bring to current seismic and/or ATFP codes**
    - 30% seismic and/or 50% ATFP triggers when reached
  - **Additional markups included:**
    - Seismic upgrades
      - $40/SF for non-mission critical facilities upgraded to life safety standards
      - $60/SF for mission critical facilities
    - $30/SF for ATFP upgrades
    - 15% seismic near-source effect (IBC)
  - **Costs not included**
    - Full facility demolition
    - Supporting facilities
    - Temporary facilities (included separately when needed)

Replacement Considerations

- **Typically recommended for facilities >50 years old**
- **Construct to current mission need**
- **Additional Markups Included:**
  - **Seismic upgrades**
    - $40/SF for non-mission critical facilities upgraded to life safety standards
    - $60/SF for mission critical facilities
  - **15% seismic near-source effect**
  - **Demo of current facility**
  - **Supporting facilities**
- **Costs not included**
  - **Temporary facilities prior to construction (included elsewhere)**

Facilities for Replacement > $2M

Building No.	Building Name	Size (SF)
20000	HANGAR 3	201,000
5	MICHELSON LABORATORY WING 8	205,000
20002	HANGAR 2	45,500
VARIOUS	INSTRUMENTATION OPERATIONS BUILDING (IOB)	49,200
22	GYM / POOL / PLAYING COURTS	43,500
VARIOUS	22 MAGAZINES	49,000
20001	AIR TRAFFIC CONTROL TOWER	2,500
15730	CAST PROP MIX BUILDING	15,000
31598	CORPORATE OPS SUPPORT OFFICE	22,700
2601	ALL FAITH CHAPEL	13,000
15988	RADIOGRAPHIC INSPECTION FACILITY (CLPL)	13,500
11570	ORDNANCE TEST SUPPORT (CLPL)	11,000
947	ACADEMIC TRAINING BUILDING	11,000
15800	RADIOGRAPHIC BUILDING (CLPL)	3,700
11150	WARHEAD CASING OPERATIONS BUILDING (CLPL)	6,000
15950	MOTOR ASSEMBLY BUILDING (CLPL)	9,600

Facilities for Replacement > $2M (cont'd)

Building No.	Building Name	Size (SF)
31180	CONTROL BUILDING	6,000
31468	TEST BAY 5	3,000
16077	SKYTOP FIRING BAY (CLPL)	1,000
16095	FIRING BAY 2 SKYTOP (CLPL)	3,000
16120	ROCKET MOTOR TEST BAY (CLPL)	10,300
11680	TECHNICAL SERVICES LABORATORY (CLPL)	4,500
20009	AIRCRAFT FIRE/RESCUE STATION 3 VEHICLE BAYS	12,000
14535	SALT WELLS ANTENNAE RANGE (CLPL)	3,000
1016	STEAM PRODUCTION PLANT 2 BUILDING	5,000
VARIOUS	ALL UNDER $2M REPLACEMENT	VARIOUS
	TOTAL	**749,000 +**

Facilities for Upgrade > $1.5M

Building No.	Building Name	Size (SF)
31433	THOMPSON LABORATORY	25,000
19	NEX EXCHANGE & FITNESS ANNEX	24,000
11020	DETONATION SCIENCE OFFICE	4,000
2023	COMMISSARY	23,800
VARIOUS	ALL UNDER $1.5M UPGRADE COST	VARIOUS
	TOTAL	**76,800+**

Facilities for Repair > $1.5M

Building No.	Building Name	Size (SF)
5	MICHELSON LABORATORY (WINGS 1-7)	366,000
10	MCLEAN LABORATORY	178,000
20001	HANGAR 1 (LESS ATC)	68,500
31455	AIR RANGE CONTROL CENTER	38,000
2334	VISUAL PROJ/COMPUTER GRP	20,000
12	WEAPONS & ARMAMENT TECH LAB	77,600
16060	T-RANGE (CLPL)	5,000
11530	FUSE DEPT ELECTRO LAB (CLPL)	16,300
VARIOUS	ALL UNDER $1.5M REPAIR COST	VARIOUS
	TOTAL	**769,400+**

Acquisition Phasing

FY19

- Shops work
- Repairs <$50K
- Urgent utilities repairs
- Demolition (not in reconstruction projects)
- Roads
- Temporary facilities (not in reconstruction projects)
- Facilities unsafe or restricted with high mission dependency

FY20

- Repairs >$50K
- Upgrades
- Replacement facilities
- Deliberate utility repairs
- New discoveries

Notes:

- **General division of work between FYs, exceptions will exist**
- **PWD for <$50K repairs and roads**
- **FEC for >$50K repairs, demolition, upgrades, replacements, and A/E**

Industry Insight

- **Desired Feedback**
  - –Approach to competition for limited resources (i.e. housing, personnel, etc.,) in the vicinity of China Lake – proposed cost factors
  - –Approach to logistics/supplies required to execute a significant amount of construction at China Lake in a short period of time – proposed cost factors
  - –Approach to executing construction safely and with high quality – proposed cost factors
  - –Approach to partnering for a major construction effort at China Lake – proposed cost factors
  - –Concerns regarding potential barriers to bidding and/or execution (i.e. rules, regulations, etc.,) that the government should review