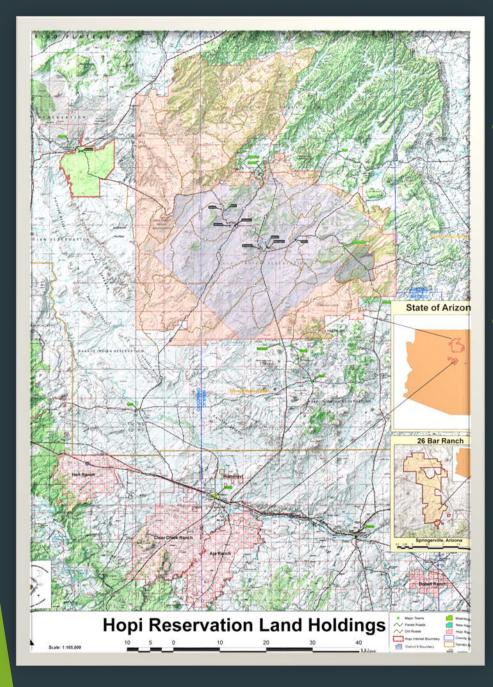
- Collaborative GIS Approaches to Tribal Road Management and Maintenance

National Transportation in Indian Country Conference-Sept. 25, 2025







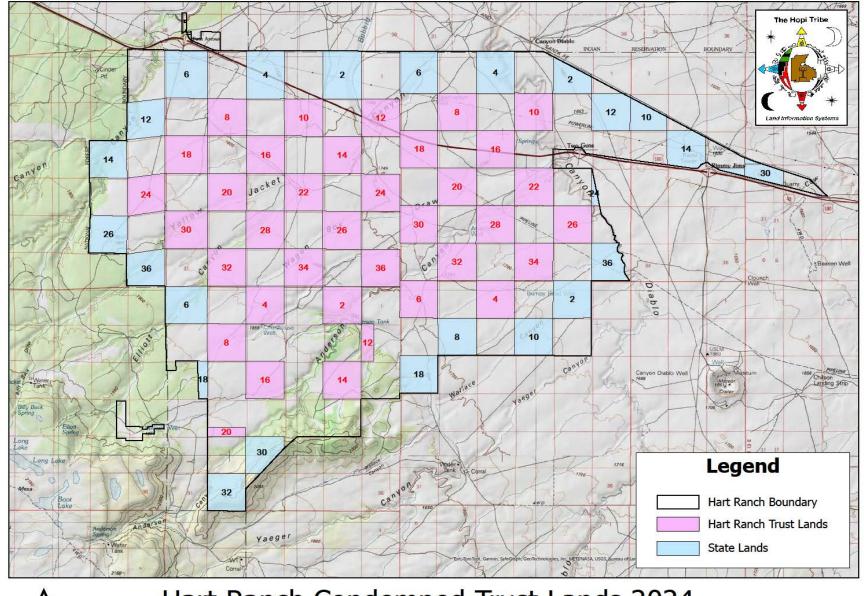


Hopi Reservation Land Holdings

- Hopi Reservation 1.6 Million Acres
 - District Six Strictly Hopi
 - Moenkopi District
 - Hopi Partitioned Lands Range Units
- Hopi 3 Canyon Ranches 400,000 +Acres
 - Hart Ranch (State Land into Trust 110,759 acres in December 2024)
 - Clear Creek Ranch
 - Aja Ranch
 - Dobell
 - 26 Bar Ranch

ARIZONA STATE LAND
DEPARTMENT,
CONDEMNED STATE
LANDS, MOVED INTO HOPI
TRIBAL TRUST
December 2024

Future plans for roads to be added to HDOT's inventory





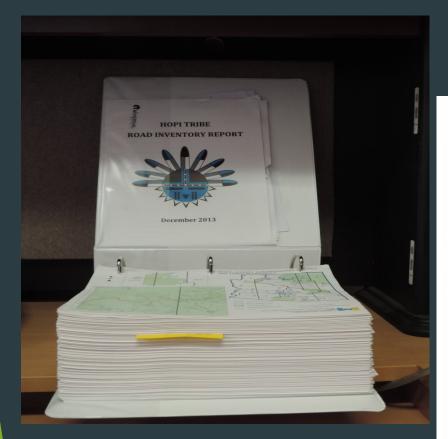
Hart Ranch Condemned Trust Lands 2024

2.5 1.25 0 2.5 5 7.5 10 Miles

Assisted Hopi Department of Transportation (HDOT)

- Hopi Department of Transportation is responsible for 1,235 NTTFI miles
- Creating a Hopi Transportation database
- Road Inventory Update
- Road Counts
- Creating Mobile Apps using some of the prebuilt apps within ESRI ArcGIS Solutions
- Sign Management, Roadway Management both using Field Maps

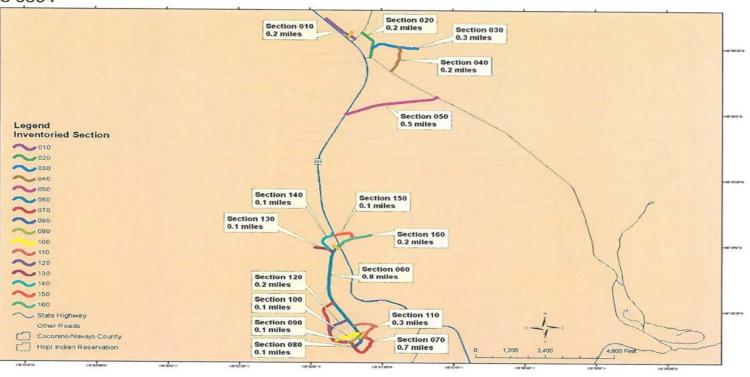




HDOT Bible

Strip Map





Roads Inventory Project



0005

Region	Н	Western	
Agency	65	Норі	
Reservation	608	Норі	
State	Arizona		
Route Number	0005		
Section	10		
Length of Route	10.93		
Ownership	BIA	Hopi	
Class Code	5 - Rural local road		
Construction Nood			

Construction Need: 1 - Existing BIA Roads needing improvement

Geographic Coordinates

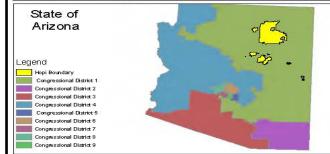
Beginning Latitude 35° 48' 13.855" N Longitude 110° 59' 25.257" W

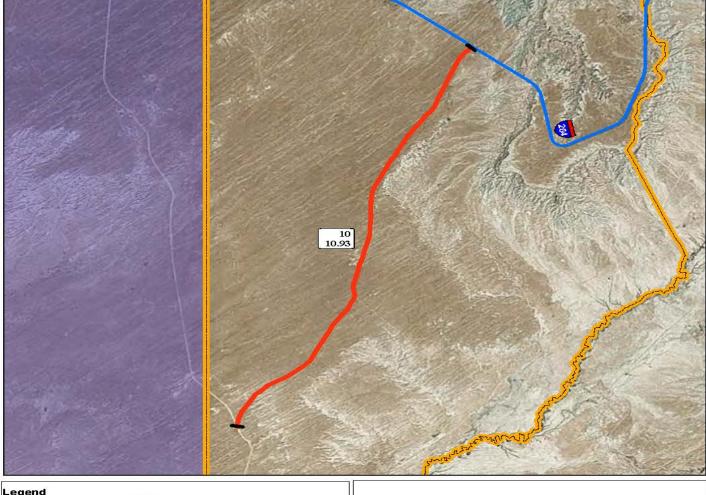
Ending

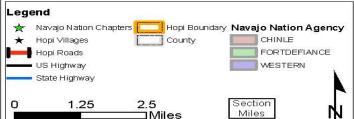
35° 56' 34.869" N Latitude Longitude 110° 54' 39.176" W WGS 1984 UTM Zone 12N Projection: Transverse Mercator Datum: WGS 1984 False Easting: 500,000.0000

False Northing: 0.0000 Central Meridian: -111.0000 Scale Factor: 0.9996 Latitude Of Origin: 0.0000









Prepared By: Hopi Land Information Systems

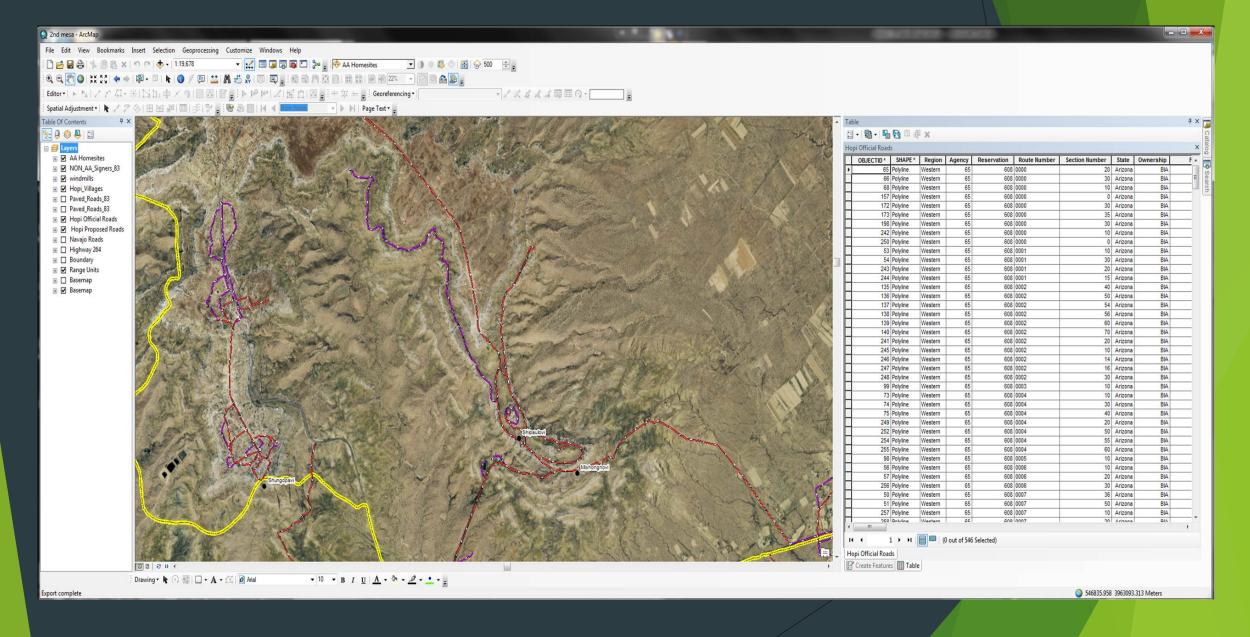
Source Data: Hopi Tribe Land Information Systems Office

NOTE: This map constitutes a representation of tribal roads and may be INCOMPLETE. It does not portray exact location, boundary or area which an accurate survey may disclose.

NOTE: The mileage on this map is rounded to the nearest tenth of a mile per RIFDS standards.

Print Date: 10/31/2017

Roads Inventory Project-Hopi GIS Database

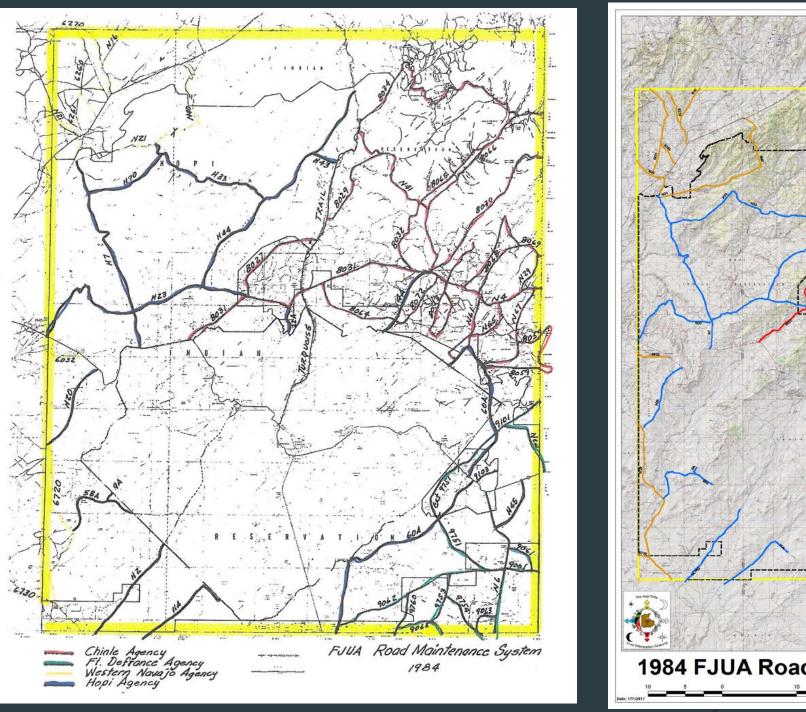


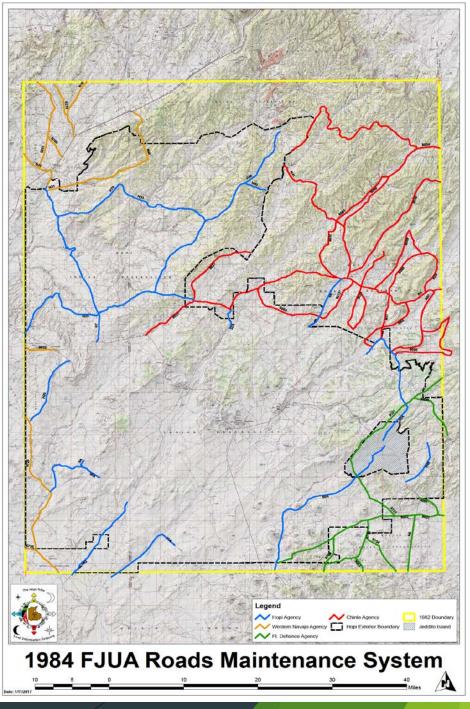
1984 Road Maintenance Agreement between BIA Navajo & BIA Western Region For Former Hopi/Navajo Joint Use Area accomplished by Chinl Agency, Fort Defiance Agency, West in Navajo Agency and Hopi Agency. There are 692.5 miles of system roads within the Former Joint Use Area and these miles are identified with each Agency as follows:

Chinle Agency	264.5	miles
Fort Defiance Agency	101.0	miles
Western Navajo Agency	101.0	miles
Hopi Agency	226.0	miles

The route descriptions by Agency are as follows:

	No.	Description	Miles		
Chinle Agency					
	N4	Pinon East to East FJUA Boundary	14.0		
	N29	N4 NE to East FJUA Boundary	5.0		
	N41	Pinon to Forest Lake to Turquoise Trail	20.0		
	N61	H60 North to N4	9.0		
	N65	N61 NE and north to N4	5.0		
	N67	Low Mountain East and North to N4	12.4		
,	8027	Dinnebito TP NE to Turquoise Trail	10.0		
	8029	Turquoise Trail to Route N41 at Forest Lake	9.0		
	8030	Pinon Northeast along Wepo Wash - East Steep Hill Valley - East Former Joint Use Area Boundary	19.0		
	8031	A264 (Dennibito Wash) to Dennibito TP to Hardrocks to Pinon	36.0		
	8032	8031 1 mile west of Pinon north to N41	9.0		
	8034	Turquoise Trail (8027) NE & E to 8066	25.6		
	8059	67 to East Former Joint Use Area Boundary and Low Mountain to East Former Joint Use Area Boundary	10.0		





Field Verification-Route Issues

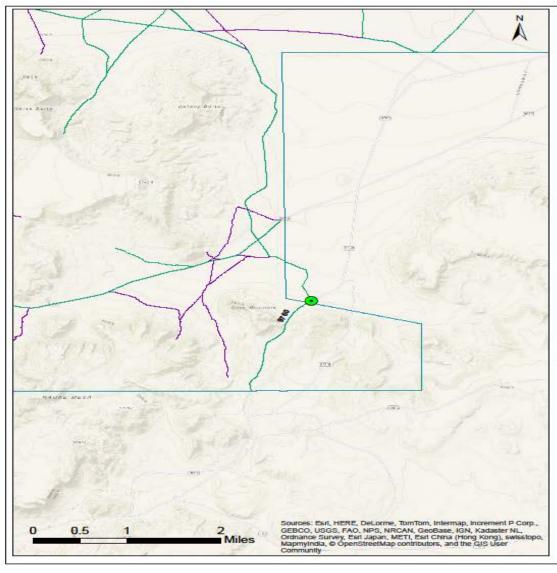




Photo: Looking Southwest

RT 9760 HPL/NPL Boundary

Legend



Site Location



"Official" Hopi Routes



Proposed Roads
Hopi Boundary



Date: 12/23/2016

Field Verification-Route Issues



Official Route- was back in the day, but not no more

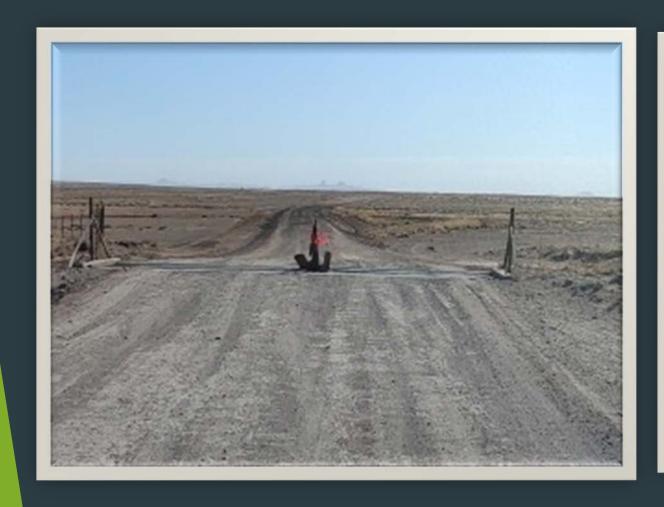
Roads Inventory Project-boundary verification



Roads Inventory Project-Navajo BIA Body Language Change



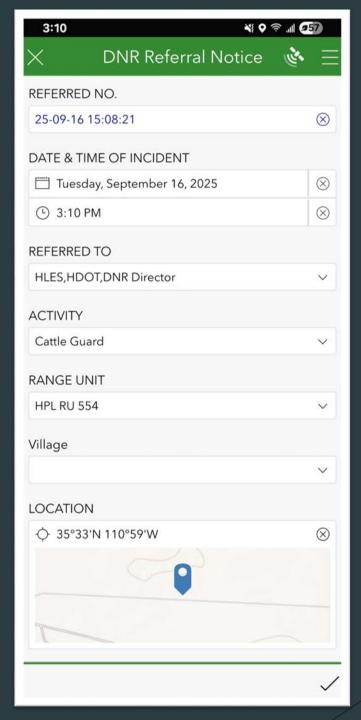
USING APP TO REPORT DAMAGES







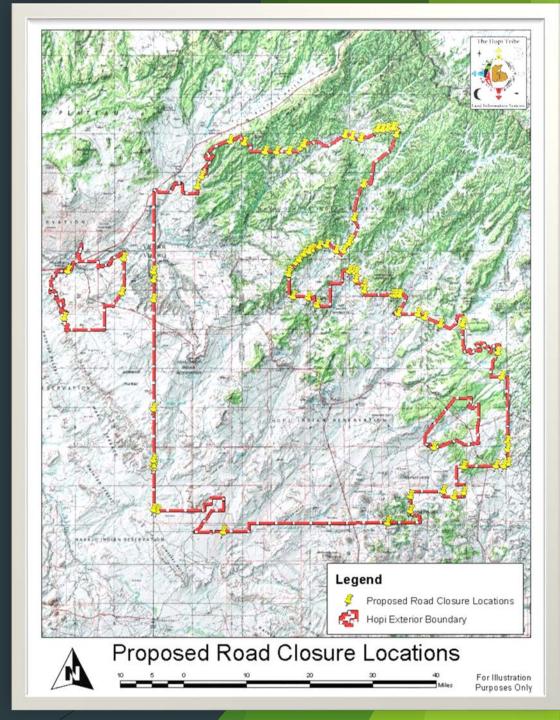
Survey 123 App
DNR Referral Notice
Used to report the
Damage to the Cattle
Guard on Route 6730



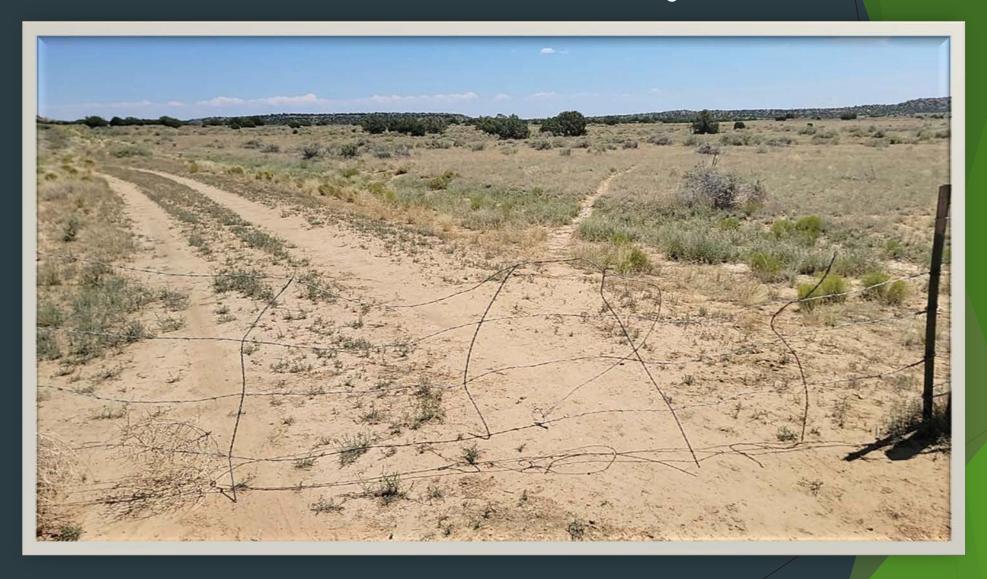
Over 130+ Unauthorized Boundary Access Locations

Boundary Issues Include:

- Illegal Roads/Usage
- Trespass of Livestock
- Damages to Land Base
- Illegal Dumping of Trash
- Green Tree Wood Cutting



Road Closure & Fence Cutting

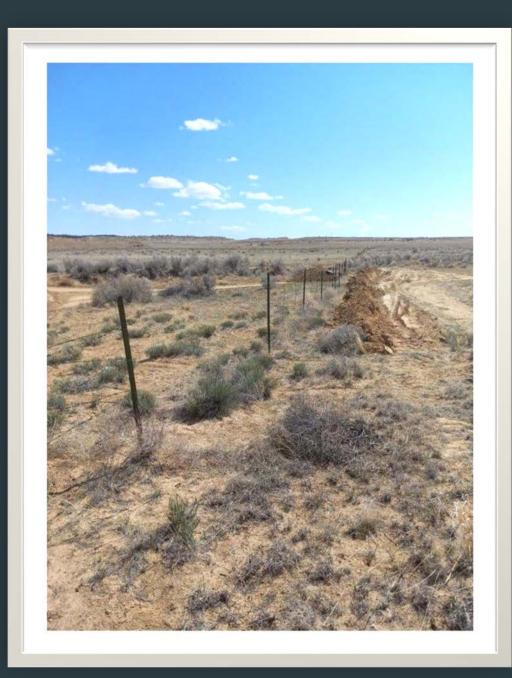


Actions Taken:

- Cattle Guard Pulled
- Fence Line Set
- Road Blocked



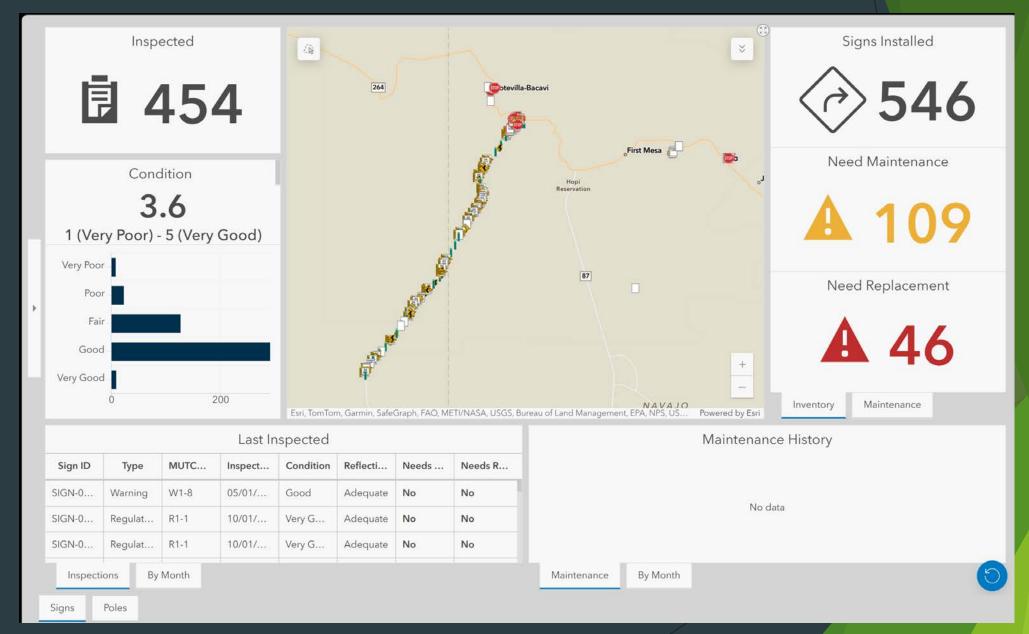




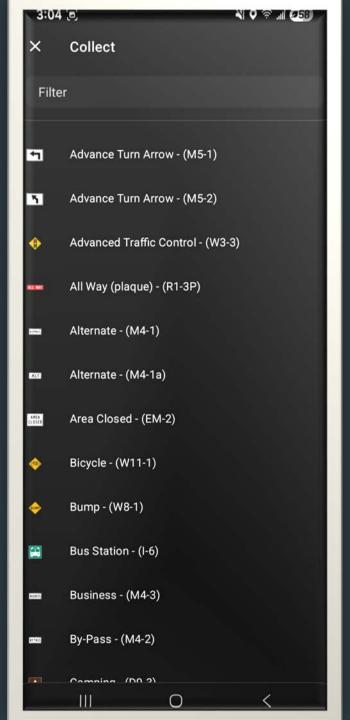
Cut Again - Day and a Half Later

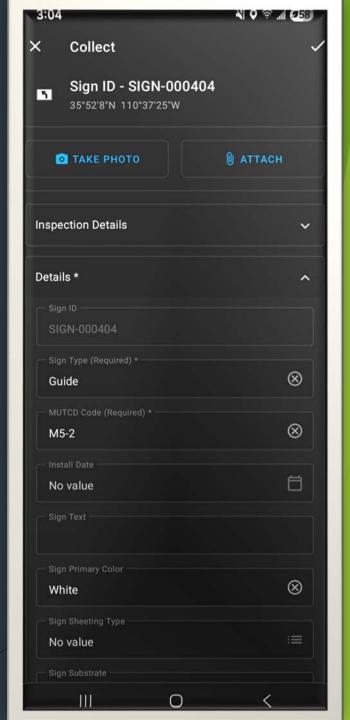


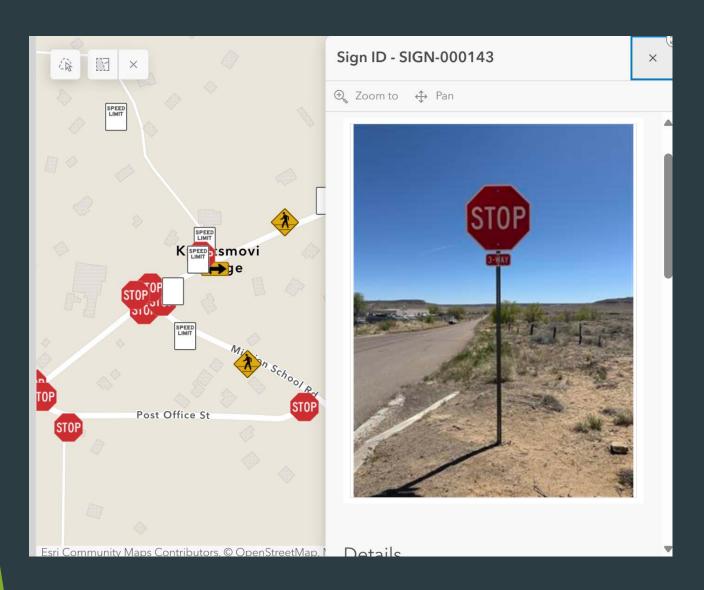
HDOT SIGN PROJECT-Alrye P. HDOT Sign Technician





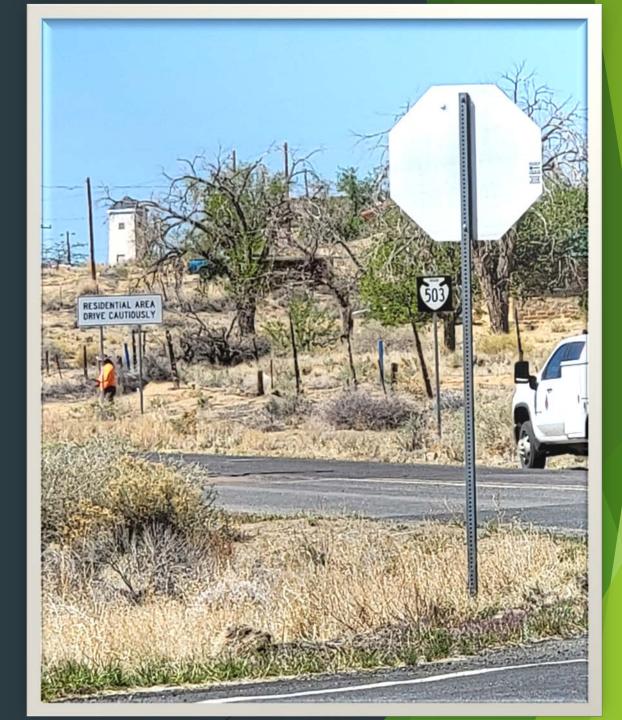




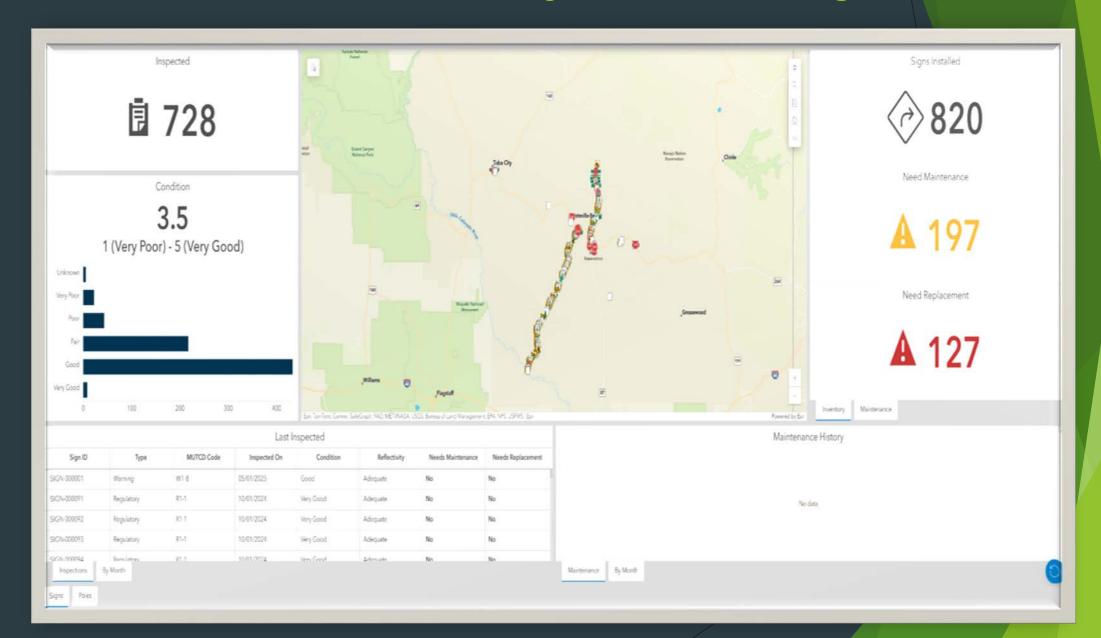


Sign Type	Regulatory
MUTCD Code	Stop - (R1-1)
Sign Primary Color	Red
Sign Text	STOP with Three-way sign
Sign Sheeting Type	Type I (Engineer Grade)
Sign Substrate	Aluminum
Supplemental Plaque	Yes
Facing Direction	Northeast
Height	30 Inches
Width	30 Inches
Mounting Height	7 Feet
Lateral Offset	7 Feet
Angle	0
Manufacturer	INTERWEST SAFETY SUPPLY
Warranty Date	
Notes	Installed before sign program 2024



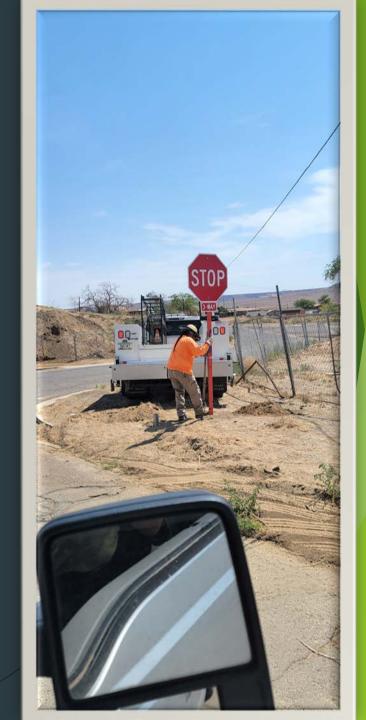


UPDATED DASHBOARD - Alrye P. HDOT Sign Technician





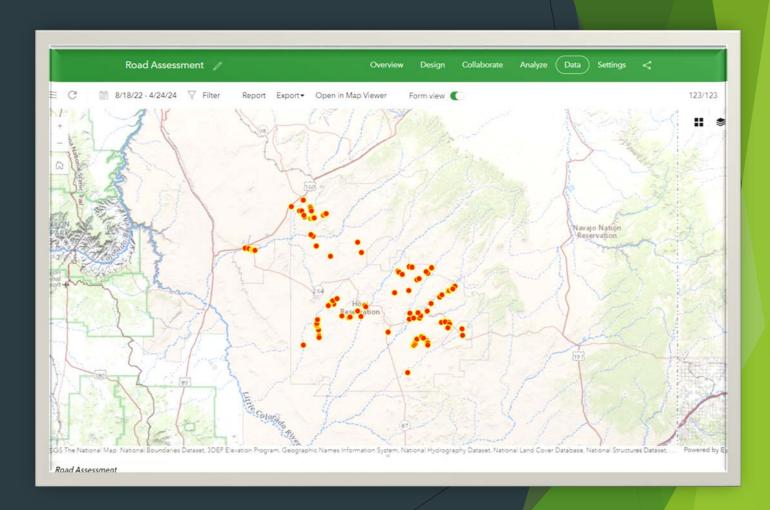


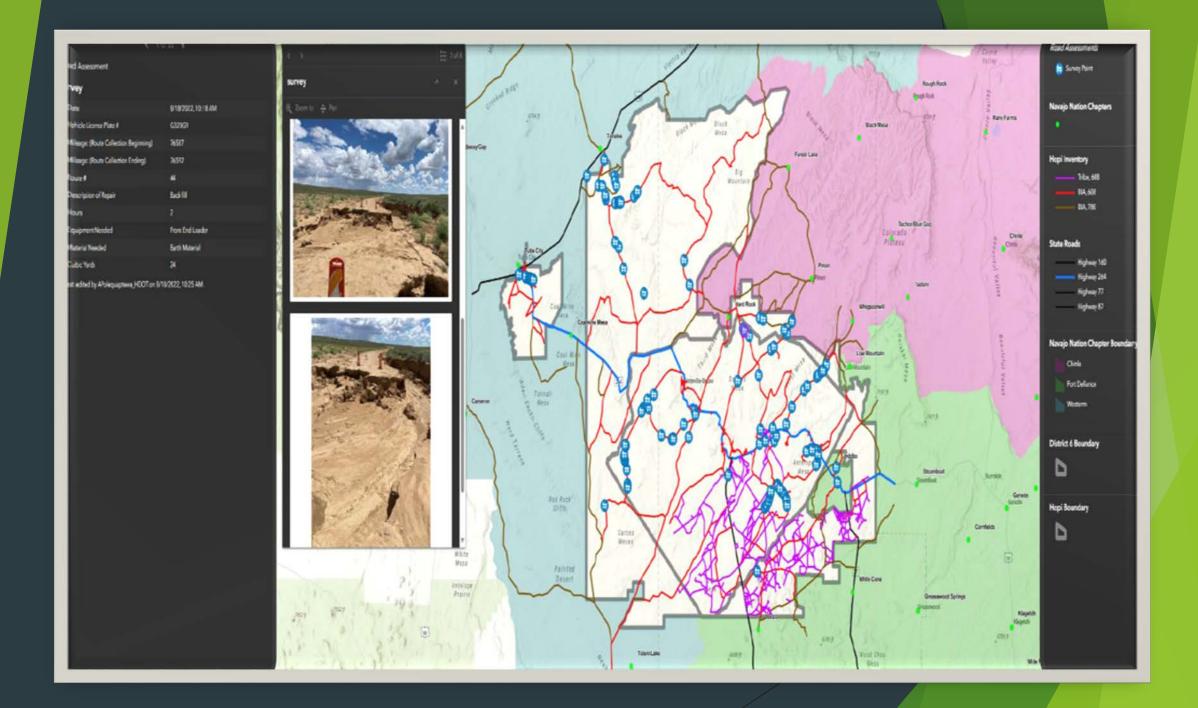


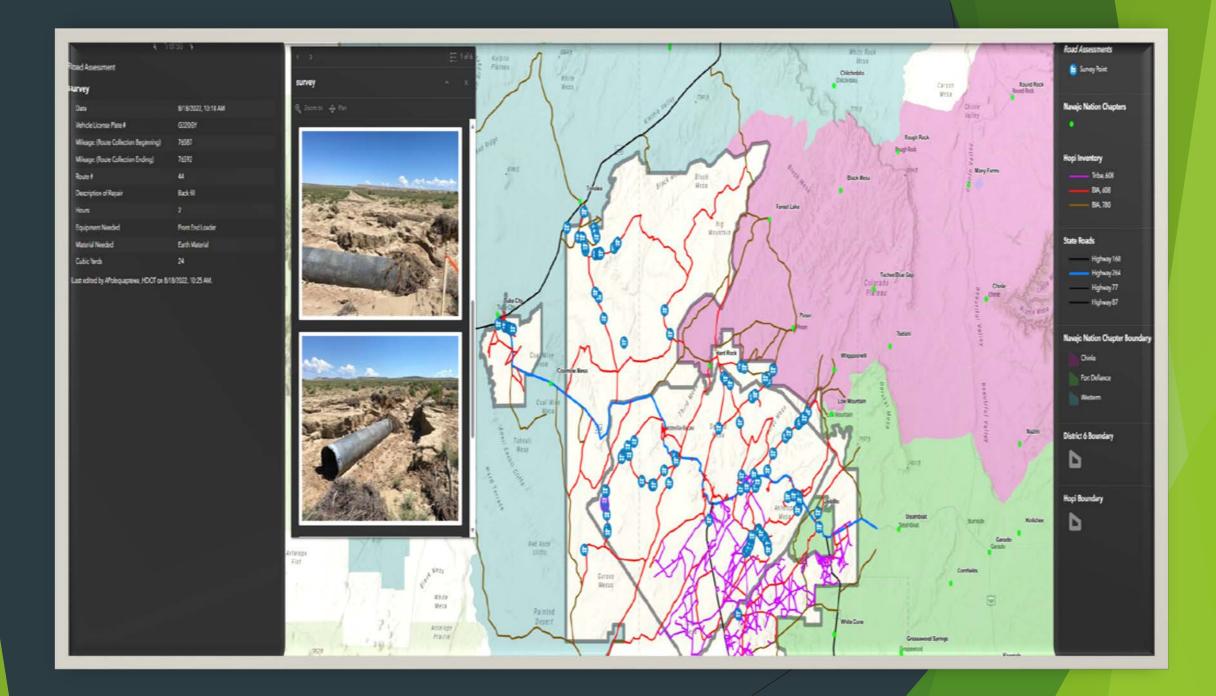
Using Apps for Emergency Assessments

Weather Related Concerns

- Road
- Washouts
- Cattle Guards
- Etc...







Road Assessment

Submitted by: Anonymous user

Submitted time: Aug 25, 2022, 3:54:21 PM

Date

Aug 25, 2022

Vehicle License Plate #

G62 0607Z

Mileage: (Route Collection Beginning)

2

Mileage: (Route Collection Ending)

100 feet

Route #

45

Description of Repair

Bring in sides to fill wash

Hours

3

Equipment Needed

Front-end loader

Pictures

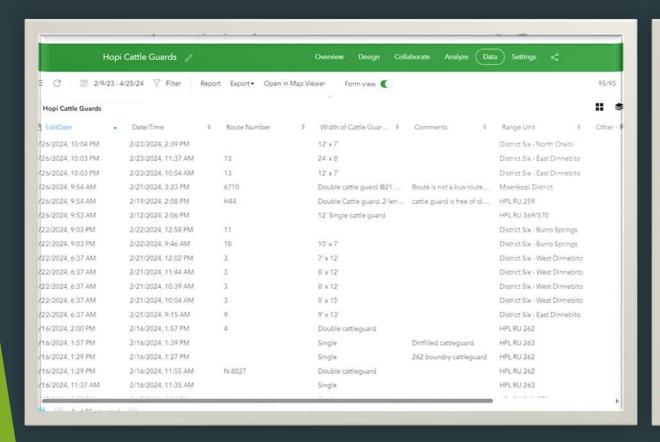


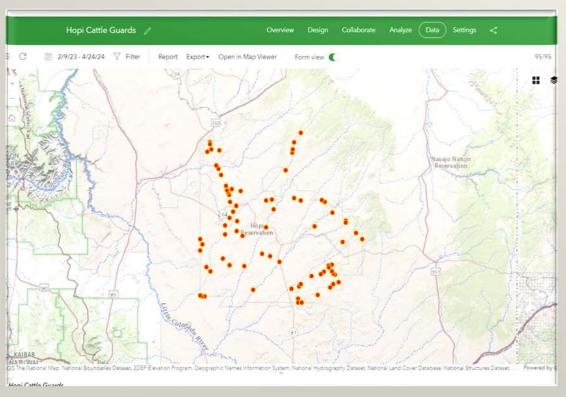






Data collected Hopi Cattle Guards





Hopi Cattle Guards

Submitted by: KJames_ORM

Submitted time: Apr 3, 2024, 11:19:52 PM

Date/Time

Apr 3, 2024, 8:42:39 AM

Range Unit

District Six - Burro Springs

Bus Route

No

Cattle Guard Location

Lat: 35.737088 Lon: -110.569395



Earthstar Geographics

Picture





Width of Cattle Guard/Description



Hopi Addressing & NG911

Approached Arizona Public Service (APS) utility company

Used APS meter GPS Data and assigned address

Approached all 12 Villages to generate street names

Generated numbers for households that are not on APS service

Currently working on NDA with APS for data sharing



FIRST MESA CONSOLIDATED VILLAGES



First Mesa Surrounding

- 1. Tawapa Road
- 2. Tsuah Road
- 3. Pahlatska Road
- 4. Monongya Road
- 5. Deer Road
- 6. Wind Top Road
- 7. Coyote Springs Road
- 8. Five Houses Road
- 9. Sheep Camp Road
- 10. Windmill Road
- 11. Com Road
- 12. Sand Hills Road
- 13. Mesa Road
- 14. Pagaap Road
- 15. Suta Road
- 16. Tuuwa Road
- 17. Sepala Road
- 18. Akowsi Road
- 19. Wepo Road
- 20. Reed Road
- 21. Rabbit Road
- 22. Piva Lane
- 23. Koho Road
- 24. Blanket Hill Road
- 25. Butterfly Road
- 26. Winslow Road
- 27. Ridge Road
- 28. Airport Road
- 29. Uhyie Road
- 30. Pahtki Road
- 31. Kuhkyang Road
- 32. Eesow Road

Keams Canyon Surrounding:

- 33. Qa'Havi Road
- 34. Bluebird Canyon Road
- 35. Awatovi Road
- 36. Beaver Dam Road
- 37. Quahu Street
- 38. Agency Road
- 39. Tank Road
- 40. Sahlehna Road 41. Cienega Canyon Road
- 42. Tewa Owingeh



FIRST MESA CONSOLIDATED VILLAGES

Ms. Vanessa Taho, Geodatabase Administrator Land Information Systems Hopi Tribe Kykotsmovi, AZ 86039

September 4, 2024

These are the names for First Mesa and Keams Canyon surrounding areas. (Attached - Page 2) They don't follow any particular order. I've sent a kmz file with this. Please contact me if you need a different format. The road to the Sand Clan Housing is going to be named by Ms. Terri Honani. She also indicated she wanted to add the road to the Tewa Community Center.

I have added three roads, two (2) in First Mesa and one (1) in Keams Canyon. These are indicated by Blue paths. Numbers 3- Pahlatska Road., 14.- Paqaap Road, and 33.- Qa'Havi Road

The house identification for the mesa is being completed and will follow soon.

Please contact me if there are any inconsistencies with the list and map or if you have any questions. Thank you

Regards

Interim Village Administrator First Mesa Consolidated Villages



Bridge Assessments







April 30, 2018



Aug 27, 2025

Traffic Counts



Setting counters and collecting GPS and attribute data







Department of Natural Resources Programs

- Office of Range Management (ORM)
 - Windmill Crew
 - Fence Crew
- Wildlife Ecosystems Management Program (WEMP)
- Water Resources Program (WRP)
- Office of Hopi Lands Administration (OHLA)
- Cultural Preservation Office (CPO)
- Mining and Mineral Resources Program (MMRP)
- Hopi Renewable Energy Office (HREO)
- Small Animal Control Program









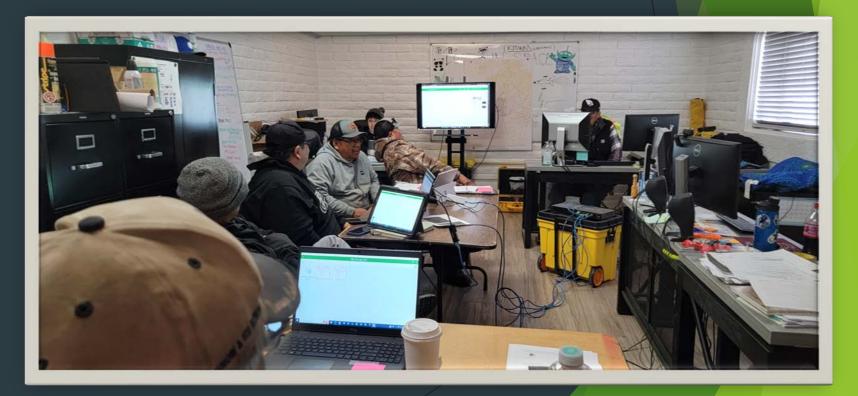






GIS Training for DNR Staff on

- Introducing GIS Apps to Field Crew
 - Survey 123
 - Field Maps
- Generating app attributes from paper forms
- Real time data collected



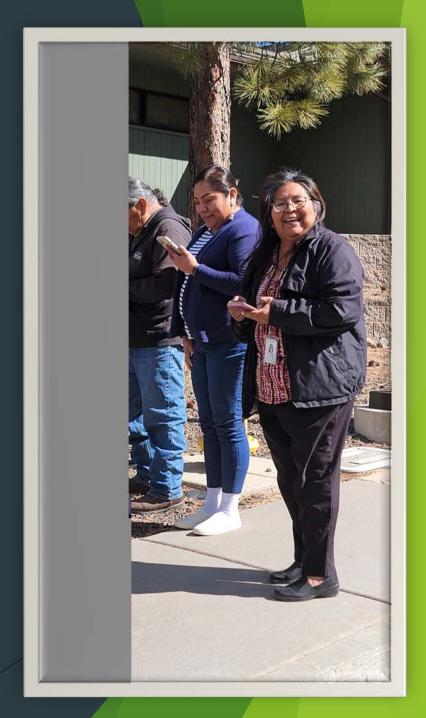
GIS Training for DNR Staff on Referral Form

- Collaborating with all DNR programs to help streamline process of referrals
- Introducing Survey 123 and Field Maps to DNR programs
- Developing Apps to assist DNR programs with asset management





- Continued training with apps
- User Friendly
- Executive Office Staff utilizing apps



Generated PDF Report from DNR Referral (Survey 123) App of data collected



Timothy L. Nuvangvaoma CHAIRMAN

> Craig Andrews VICE CHAIRMAN

REFERRAL NO. 25-06-17 14:42:23

DATE & TIME OF INCIDENT: June 17, 2025 2:42 PM

REFERRED TO: HDOT, DNR

ACTIVITY: Roads

LOCATION: HPL RU 251 & 255,

COORDINATES: Longitude: -110.888344 Latitude: 36.156695



BRIEF DESCRIPTION: Two gates have been installed along Route 7 at mileposts 13 and 15.8 by the Water Resources Program to facilitate the management and preservation of the Blue Canyon "Talestima" sensitive ecosystem and cultural resources. Photographs of the gates were taken by LIS on June 17, 2025.

Additionally, on June 4, 2025, at approximately 10:30 a.m., an incident was reported to HLES involving an individual who became stranded in the wash due to high water flow. LIS and DNR personnel were conducting a site visit at the time, and the individual stated he had been trapped since 5:00 a.m. The Fire & Rescue crew was also summoned; they were advised that, in order to reach the individual, they would need to approach from the north side via Red Lake, as the wash was impassable at that time.

It is recommended that additional signage be installed indicating road closures during inclement weather, as the current warning signage consists of only two "Do Not Enter When Flooded" signs located at the wash. PHOTO/MAPS ATTACHED: Yes

REFERRED BY: Betty Poley-Land Info Systems

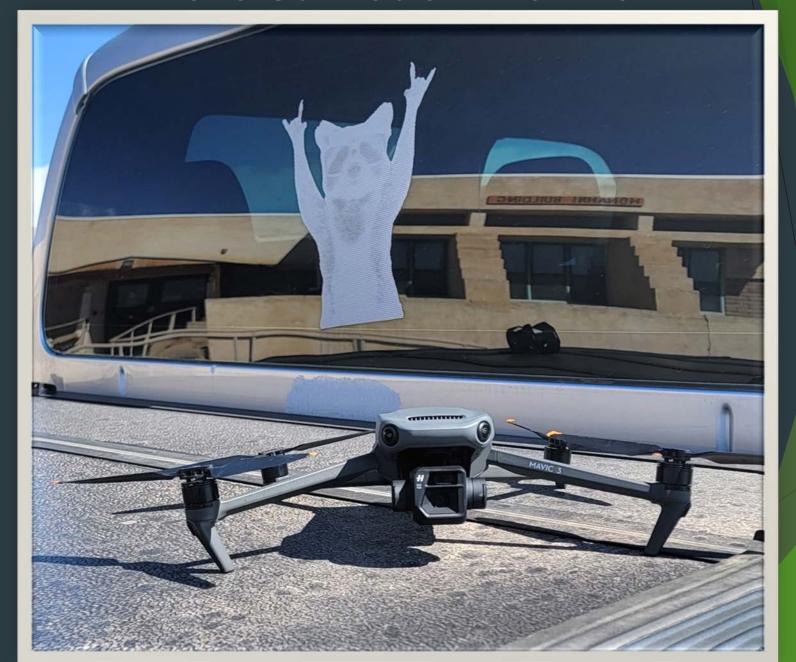
June 4, 2025 10:00 AM

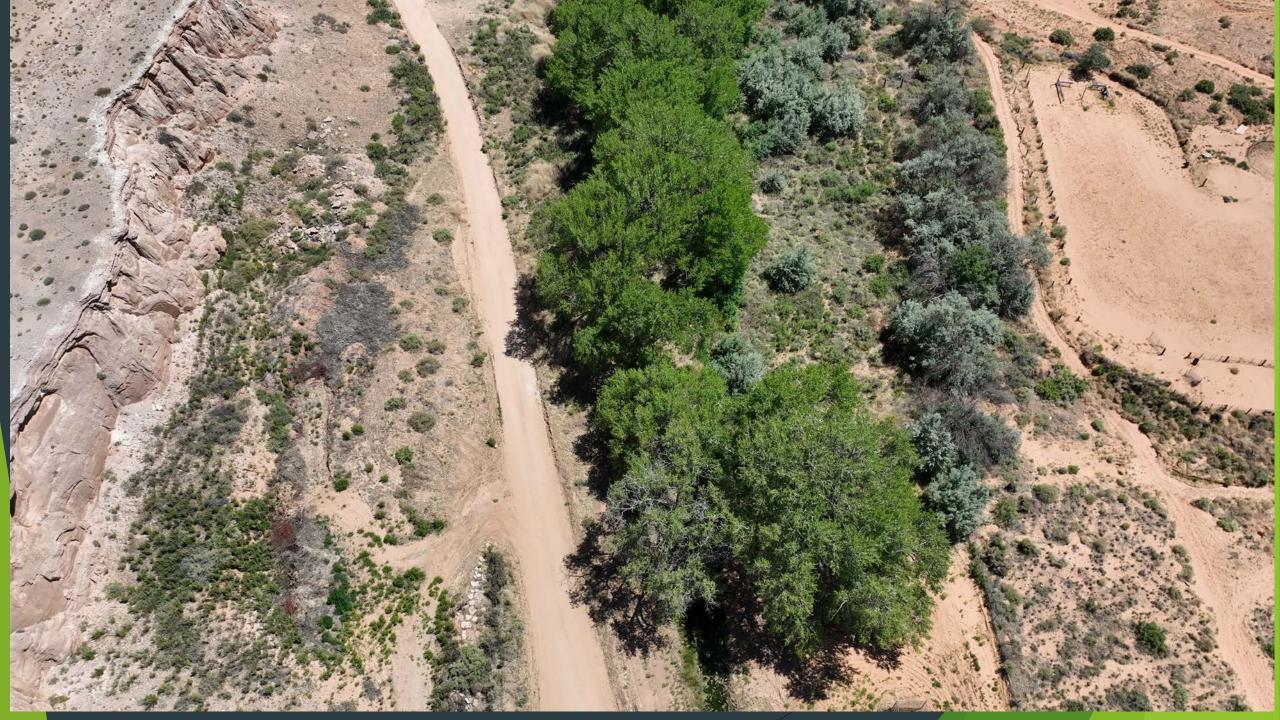
Stuck vehicle on RT 7 in Blue Canyon-Moenkopi Wash, a resident of Dinnebito stuck in wash since 5:00AM, full size SUV with a car hauler trailer.

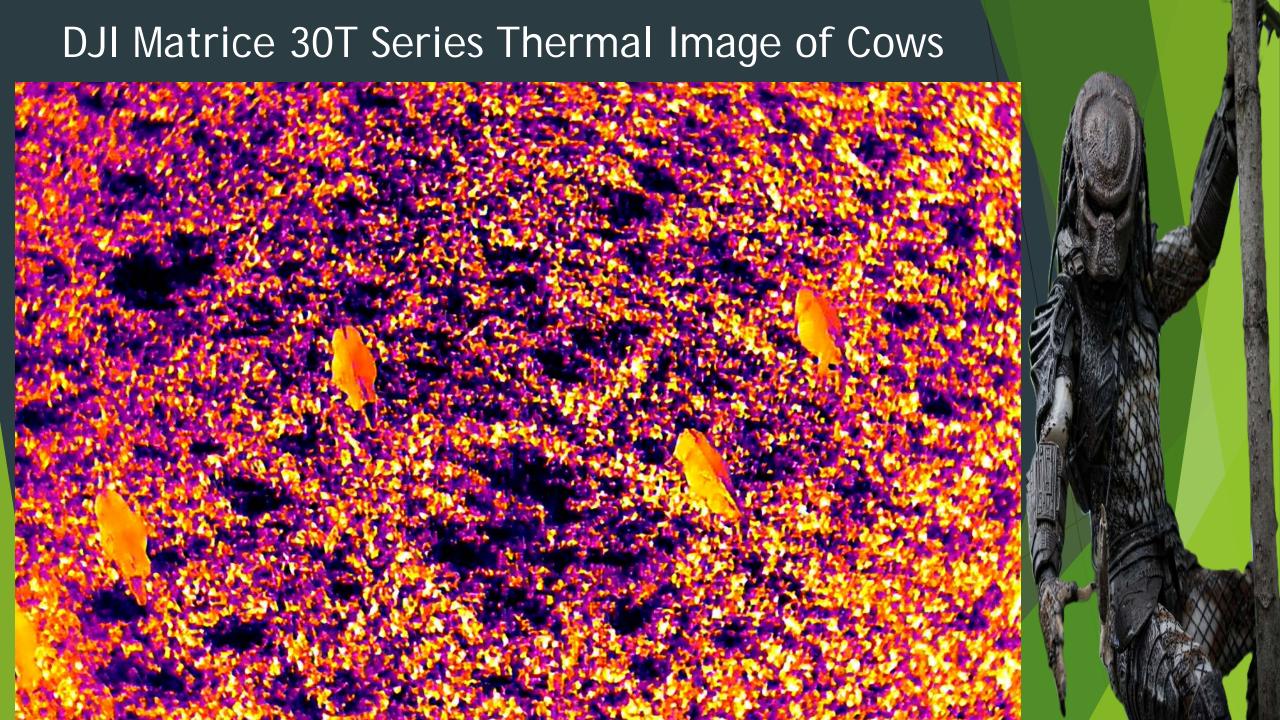
Longitude:-110.902781 Latitude:36.162332



Drone Utilization "Kermie"









Collaboration with Hualapai Road Maintenance Program



Elisa Suminimo Road Maintenance Program Manager Elisa.Suminimo@hualupai-nsn.gov

Hualapai Road Maintenance Inventory



Planning Meeting



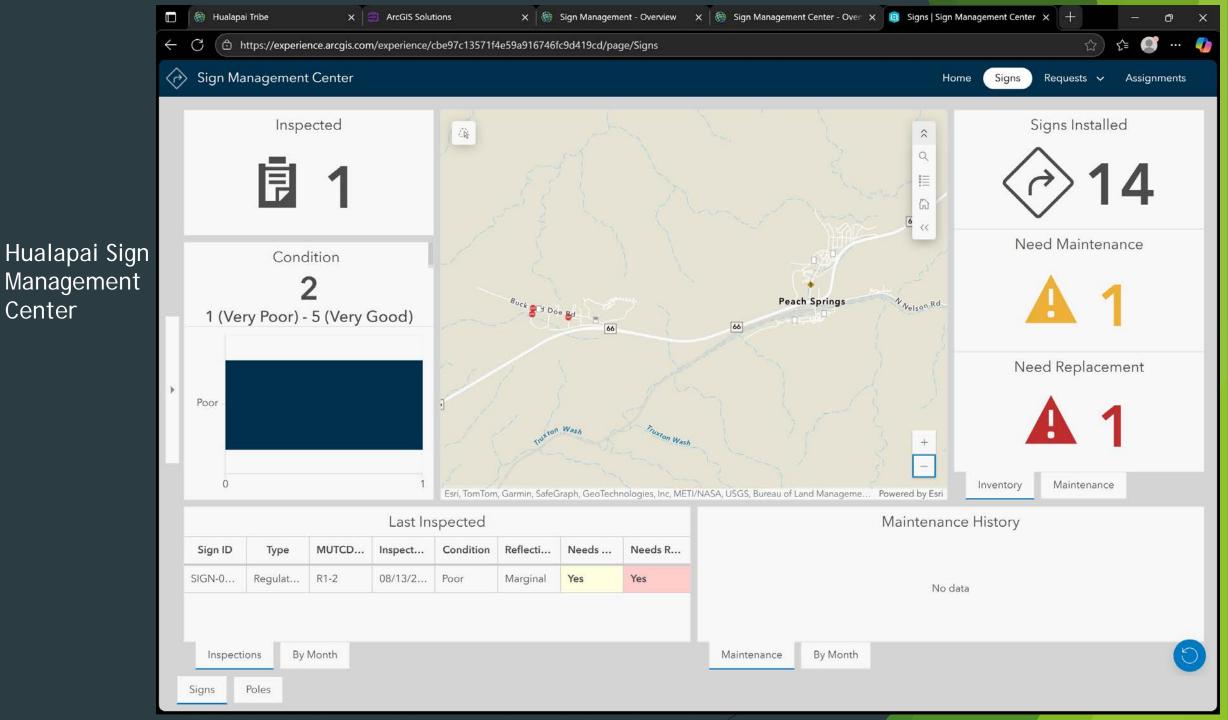
ArcGIS Online & App Training

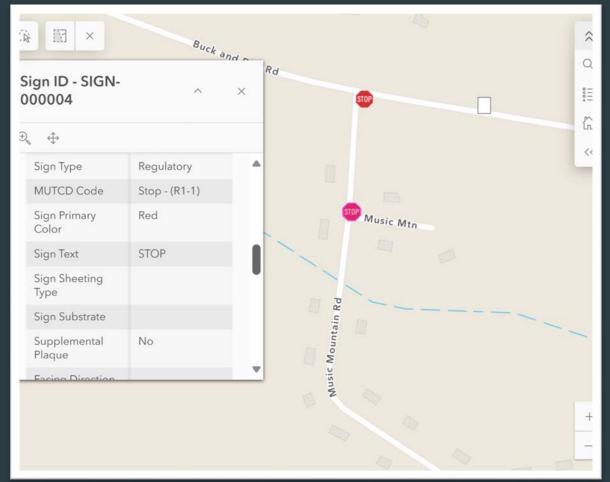








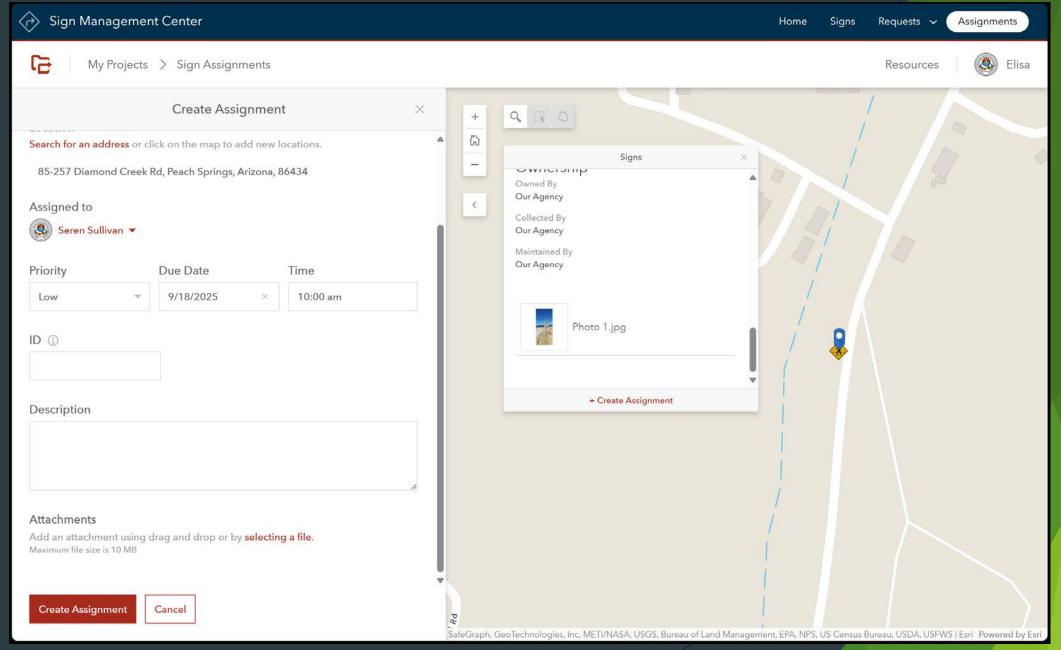




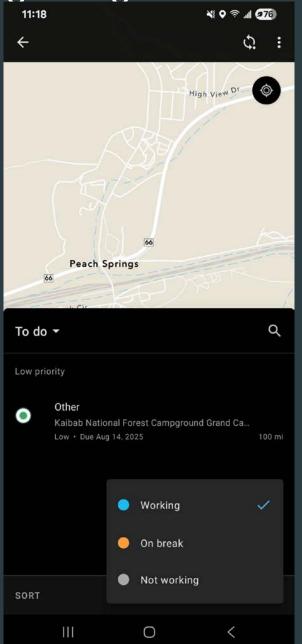
Hualapai Sign Management Center provides a for centralized platform to inventory, track, and manage roadway signs. It allows staff to collect field data, maintain compliance with MUTCD standards, streamline inspections, and visualize sign conditions on an interactive map

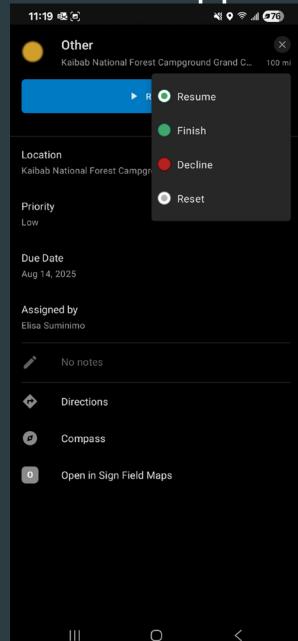


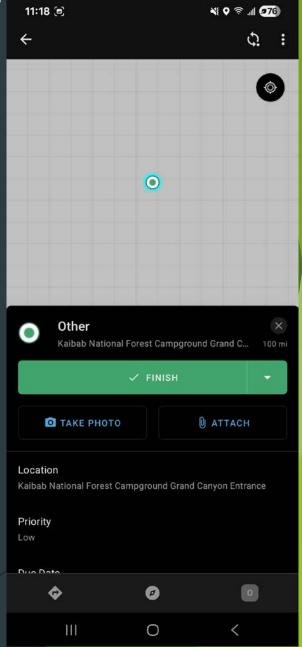
Creating Work Assignments in Sign Management Center



Opening Assignments in Workforce app that opens up Field Maps



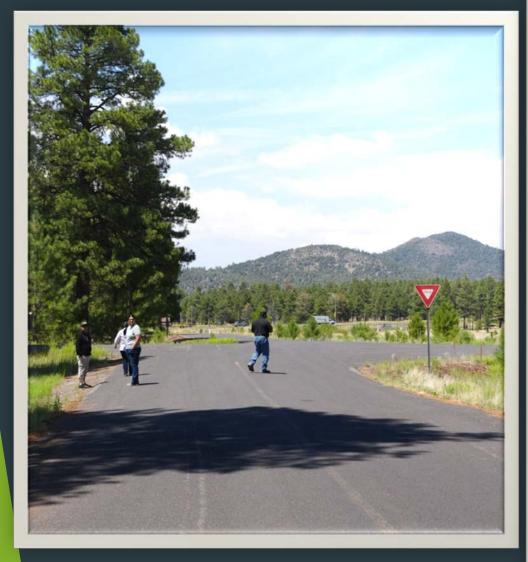








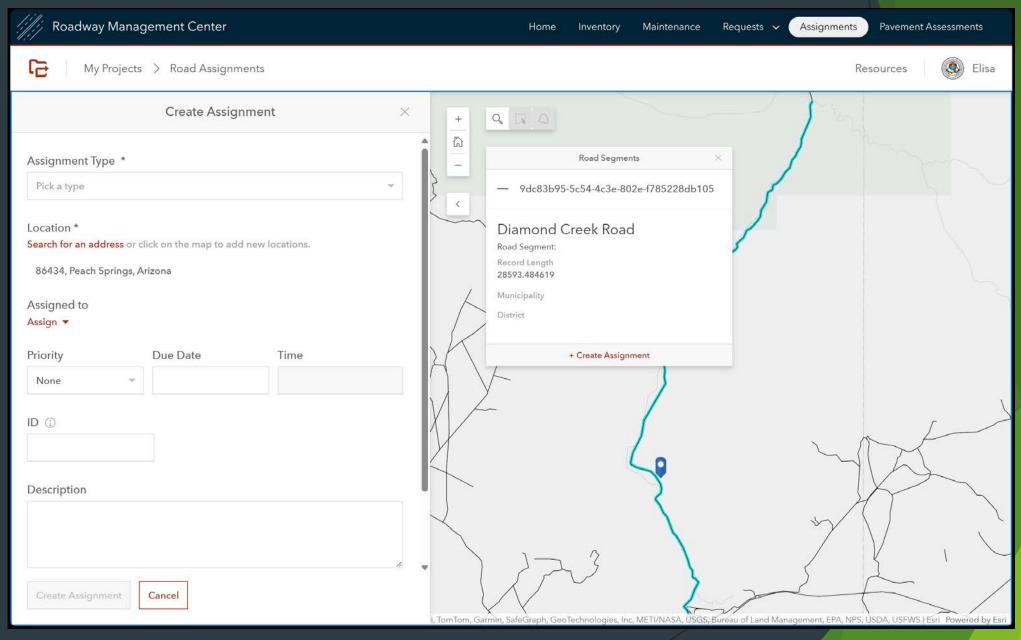






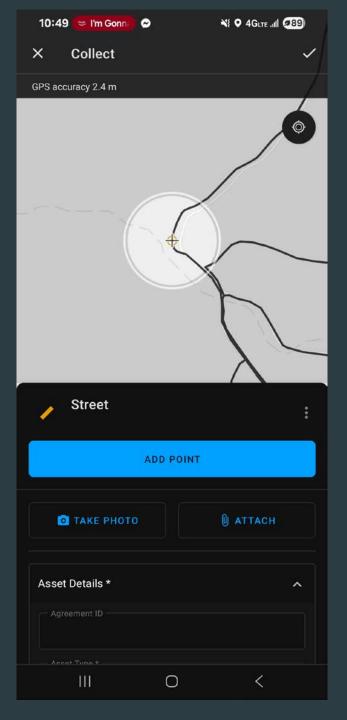


Roadway Management Center Assignments Generator

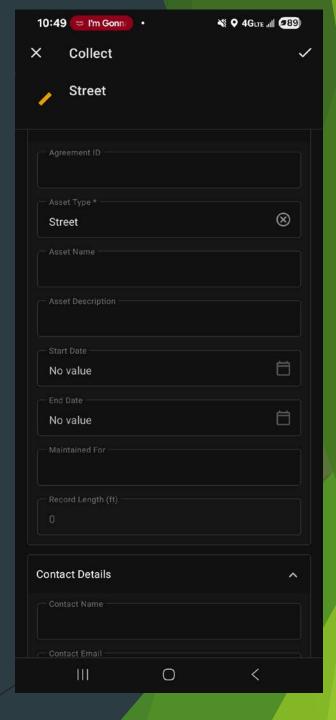


Creating a Survey 123 form to be used in Field Maps

	Project Work Order	
Name:	·	
Date:		
☐ Date		
Clock-In Time:		
(L) Time		
Bend N Stretch:		
Yes No		
Safety Topic:		
Salety Topic.		
Safety Presenter:		
Jaiety Fresenter.		
Project Assignment:		
Troject rooigiiment		
Crew Assigned:		
3		
▼ Vehicle		
Vehicle:		
Mileage Start:		
Mileage End:		
Pre Insp. Leaks:		
Ok Not Ok		
Pre Insp. Lights:		
Ok		



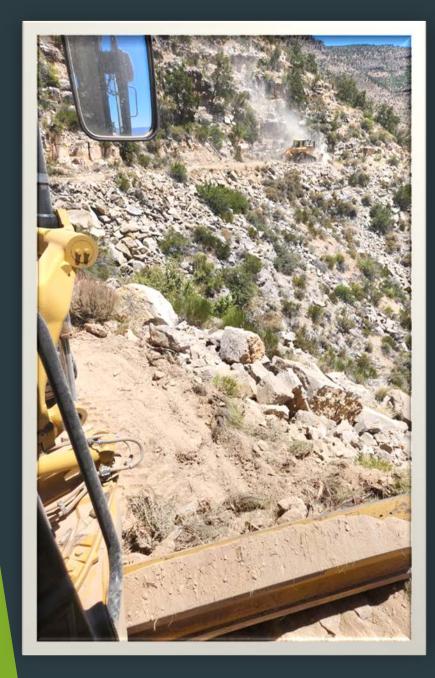
Field Maps App opens when the assignment is opened through Workforce app. Through Field Map app you are able to collect different values for the route, this also includes the Survey 123 form created and added to this application.



Road Maintenance Activities













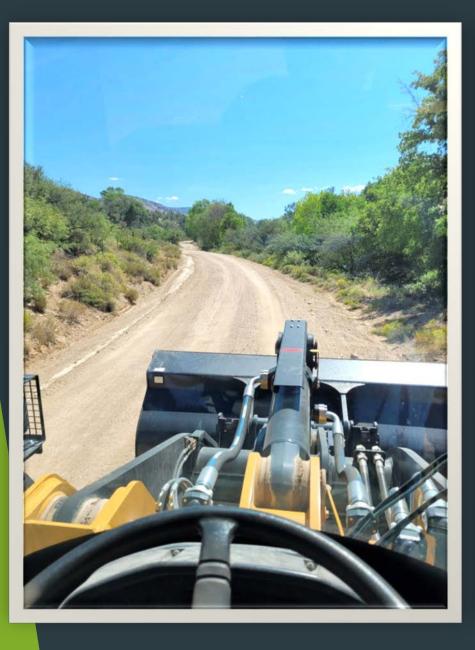


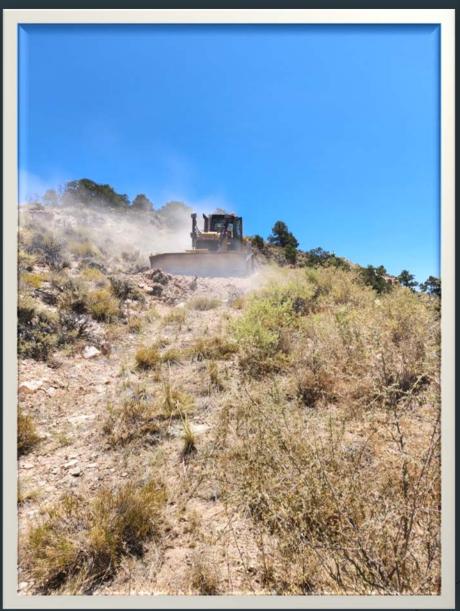


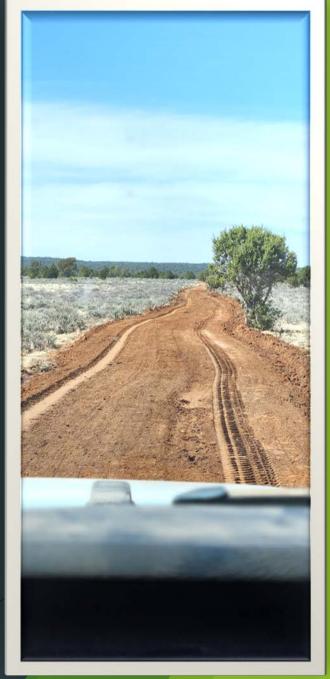














THANK YOU