Tuba City Open Dump Status Report

September 15, 2010

RI/FS Deliverable Status

- Draft Final RI/FS Work Plan to be distributed September 20, 2010
- Draft Final RI/FS Work Plan will include Draft SAP (FSP and QAPP)

RI/FS Deliverable Status

- RI/FS Work Plan
  - Reviewed by BIA, stakeholders and technical work group
- Baseline Human Health and Ecological Risk Assessment Work Plan
  - Reviewed by BIA, stakeholders and technical work group

RI/FS Deliverable Status

- Community Relations Plan
  - Reviewed by BIA
  - To be submitted to EPA for modification and then distribution to larger group
- Sampling and Analysis Plan
  - Includes FSP and QAPP
  - Draft completed by Stantec
  - To be modified based on comments to work plans before being distributed to technical work group

RI/FS Work Plan Comments

- Work Plan Format
- Historical Data and Information
- RI Work Scope
- FS Work Scope
- Schedule

Work Plan Format

- RI/FS Work Plan and Baseline Risk Assessment (BRA) are two separate documents

Data Interpretation

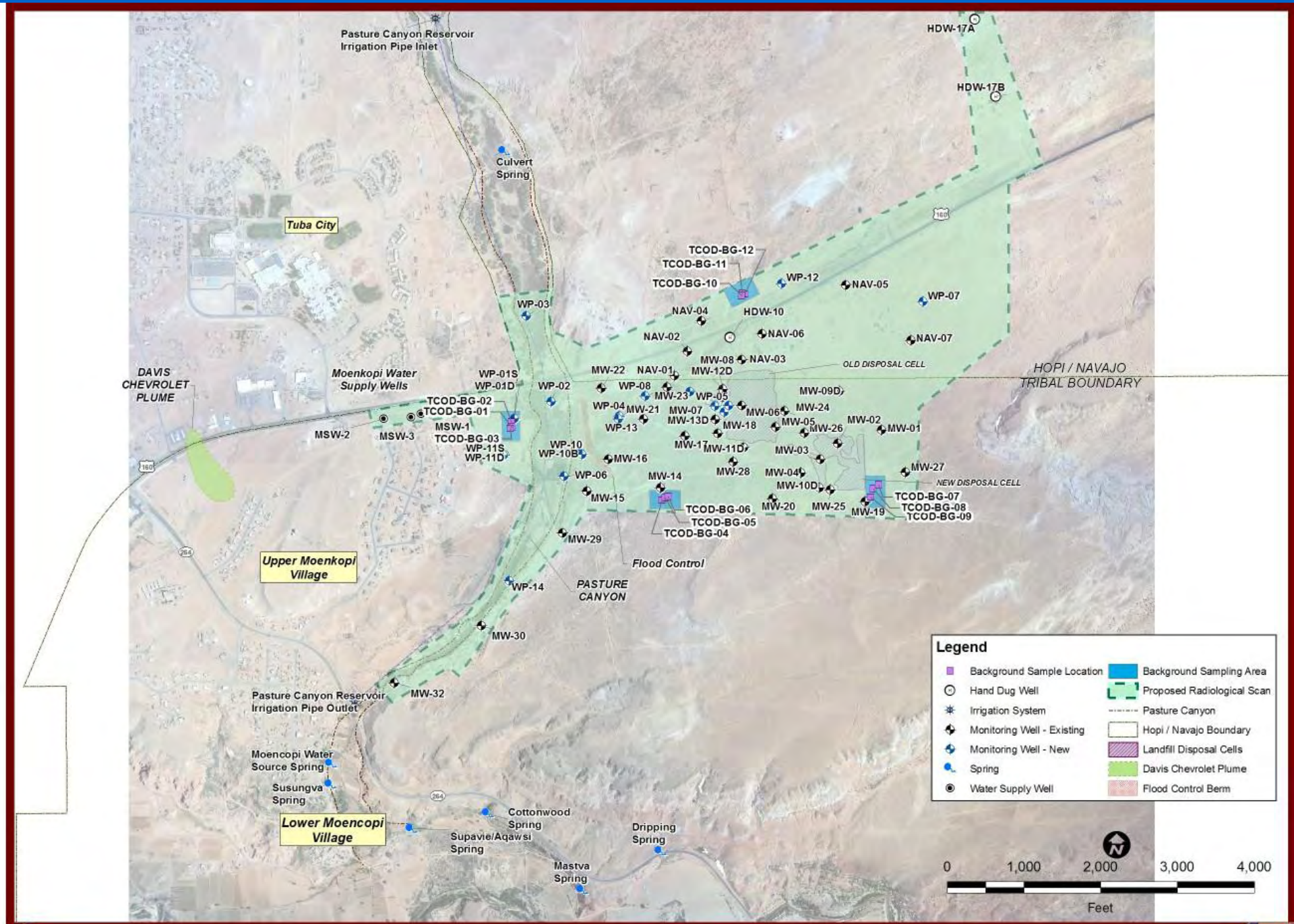
- Caliche and geology
- MW-07
- Uranium
  - Gradient
  - Sediment and Bedrock
- Hydrology
  - Flow directions
  - Cone of depression (MSW-1, 2 & 3)

RI Scope of Work

- Radiological survey
- Surface soil and sediment sampling
- Soil vapor survey
- Groundwater well installation and sampling
- Slug testing at down gradient MW-07 wells
- Landfill gas well installation and monitoring
- Import fill evaluation

Radiological Survey

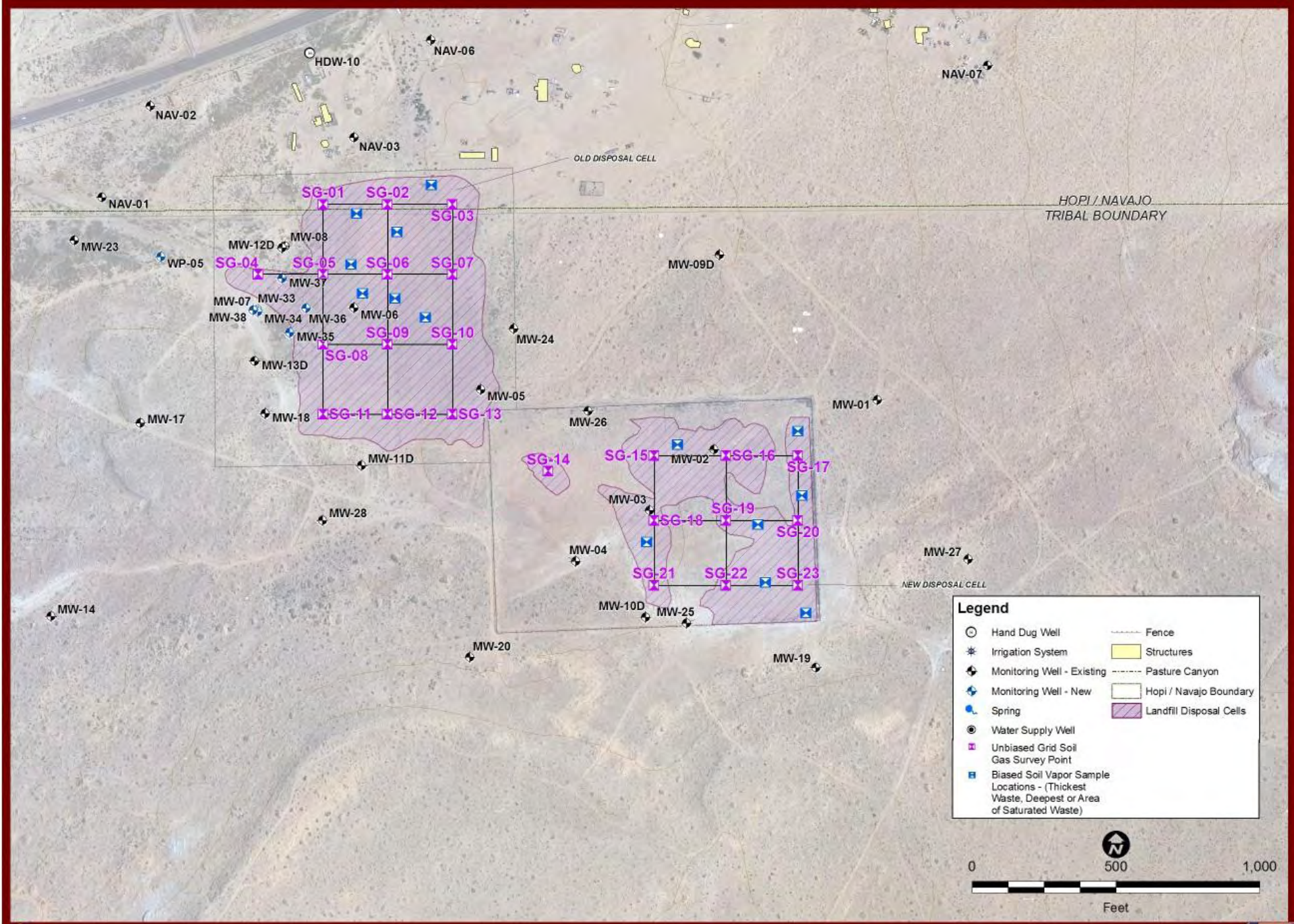
- Radiological Survey
  - GPS-linked walk over/drive over survey on 25-foot grid pattern
  - In-situ gamma spectroscopy where activities exceed 2 x background to identify radionuclides.
  - Laboratory confirmation sampling and analysis where elevated uranium is detected.



Proposed Surface Radiological Scanning Area

Soil Vapor Survey

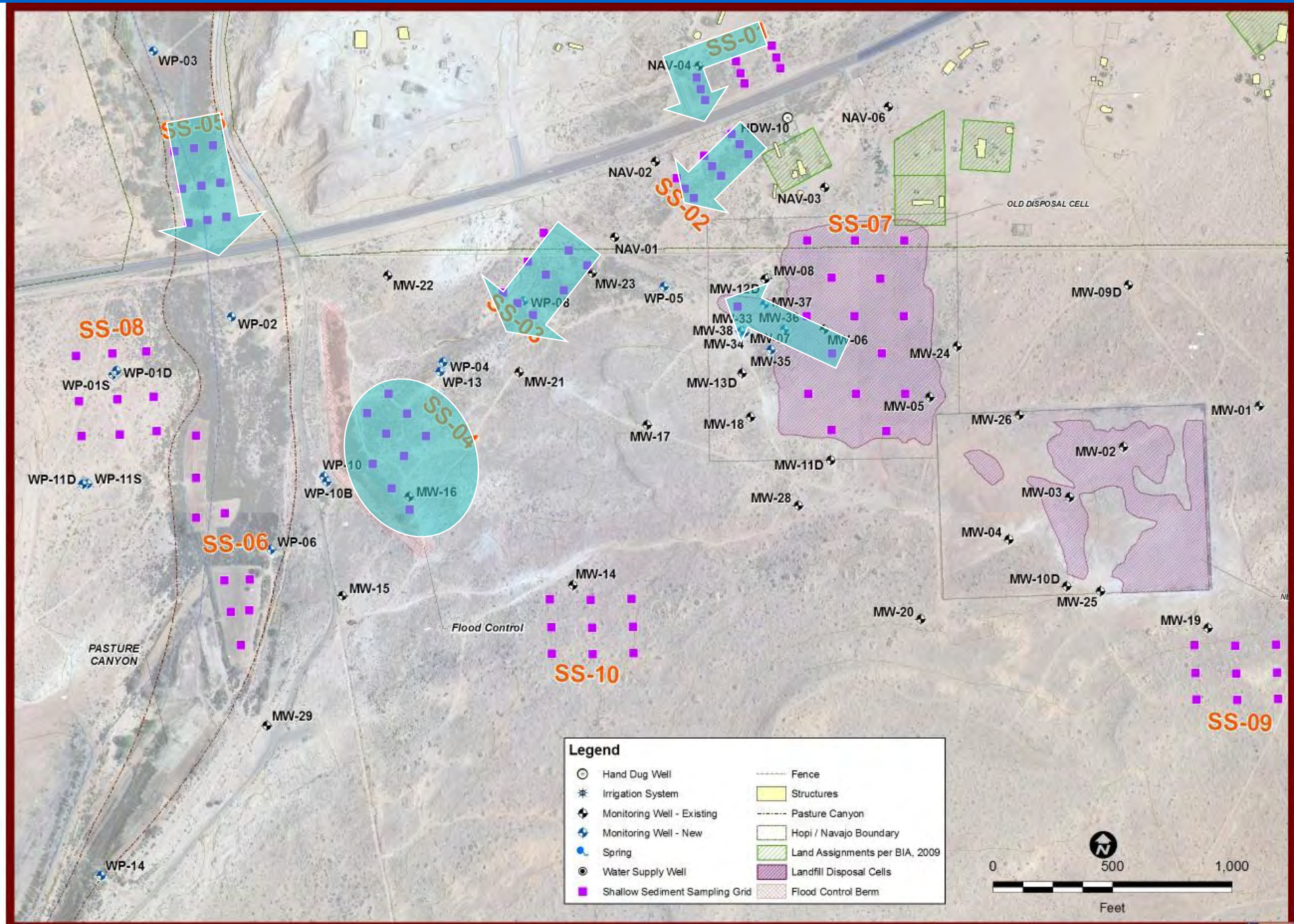
- 23 unbiased (grid) temporary soil vapor locations
- 14 biased temporary soil vapor locations
- 5-6 feet bgs
- Sample Analysis:
  - VOCs by EPA TO-15
  - Methane
  - Hydrogen sulfide
  - Oxygen, nitrogen, carbon monoxide, carbon dioxide



Proposed Soil Gas Sampling Locations

Surface Soil Sediment Sampling

- 10 grid sample locations
  - TCOD (16 sample points)—surface samples only
  - 9 grids outside TCOD (nine sample locations per grid) with samples collected at surface, 2.5 (3 locations in each grid will be extended to bedrock with samples at 5′, 10′, etc. to bedrock
    - North Gully and Flood Control Berm (4 nine-point grids)
    - Pasture Canyon background (1 nine-point grid) north of highway
    - Agricultural fields (nine samples) collected at surface, 2.5, 5, 10, etc. to bedrock
    - Three Tetra Tech background areas (MW-19, WP-01, and MW-13



Proposed Shallow Sediment Sampling Grids

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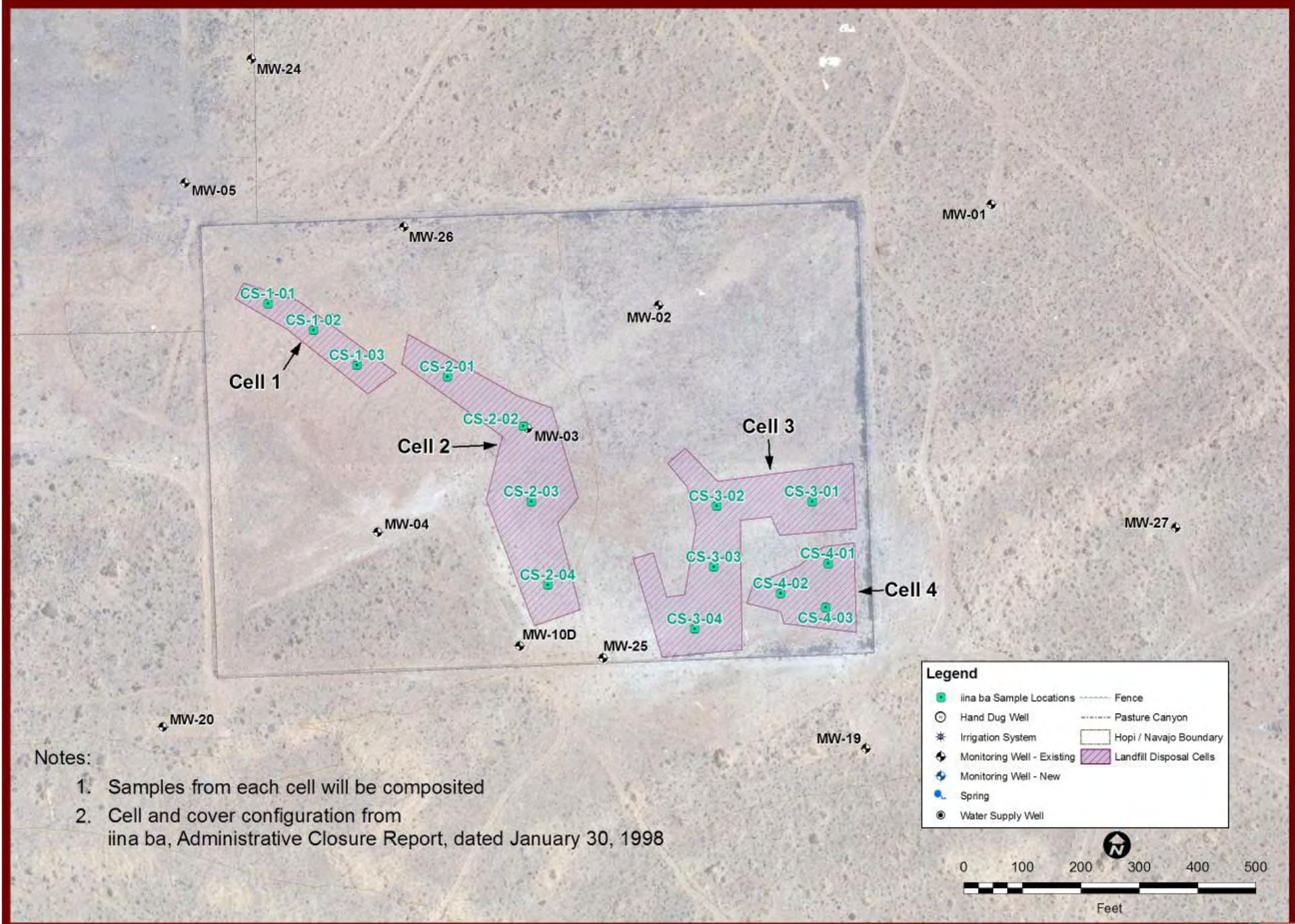
Surface Sediment Sampling

- Laboratory analysis
  - Major Anions (Cl, nitrate, nitrite, SO4)
  - Alkalinity
  - Cations and metals-Total, TCLP, SPLP and alkaline leachate (As, B, Ba, Ca, Cd, Cr, Co, Cu, Fe, K, Hg, Mg, Mn, Mo, Na, Ni, Pb, S, Se, Sb Sr, U, V, and Zn). Scope of leaching studies may change based on Tetra Tech study.
  - Dieldrin, Pentachlorophenol
  - TPH
  - PAHs: B[a]P and B[g,h,i]perylene
  - Ra-226 and Ra-228

New Cell Interim Cover

- 14 sample locations (Composite to 4)
  - Geotechnical Parameters
    - Moisture Density relationship (Proctor)
    - Bulk Density
    - Hydraulic Conductivity
    - Grain Size Distribution
    - Atterberg Limits
  - Geochemical
    - RCRA 8 metals plus uranium
    - TCLP on total metals in excess of 20 times respective toxicity characteristic values.



Notes:

1. Samples from each cell will be composited
2. Cell and cover configuration from iina ba, Administrative Closure Report, dated January 30, 1998

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Proposed New Cell Existing Cap Sampling Locations

Groundwater Monitoring Wells

Three new Deep Wells

- Pasture Canyon between MW-07 and Municipal wells—screen ~70 to 90 feet bgs
- West side of Pasture Canyon between MW-01S and Municipal Wells (just west of hanging dune)--screen~90 to 120 feet bgs
- Pasture Canyon (area of MW-30)—Screen ~55 to 75 feet bgs.

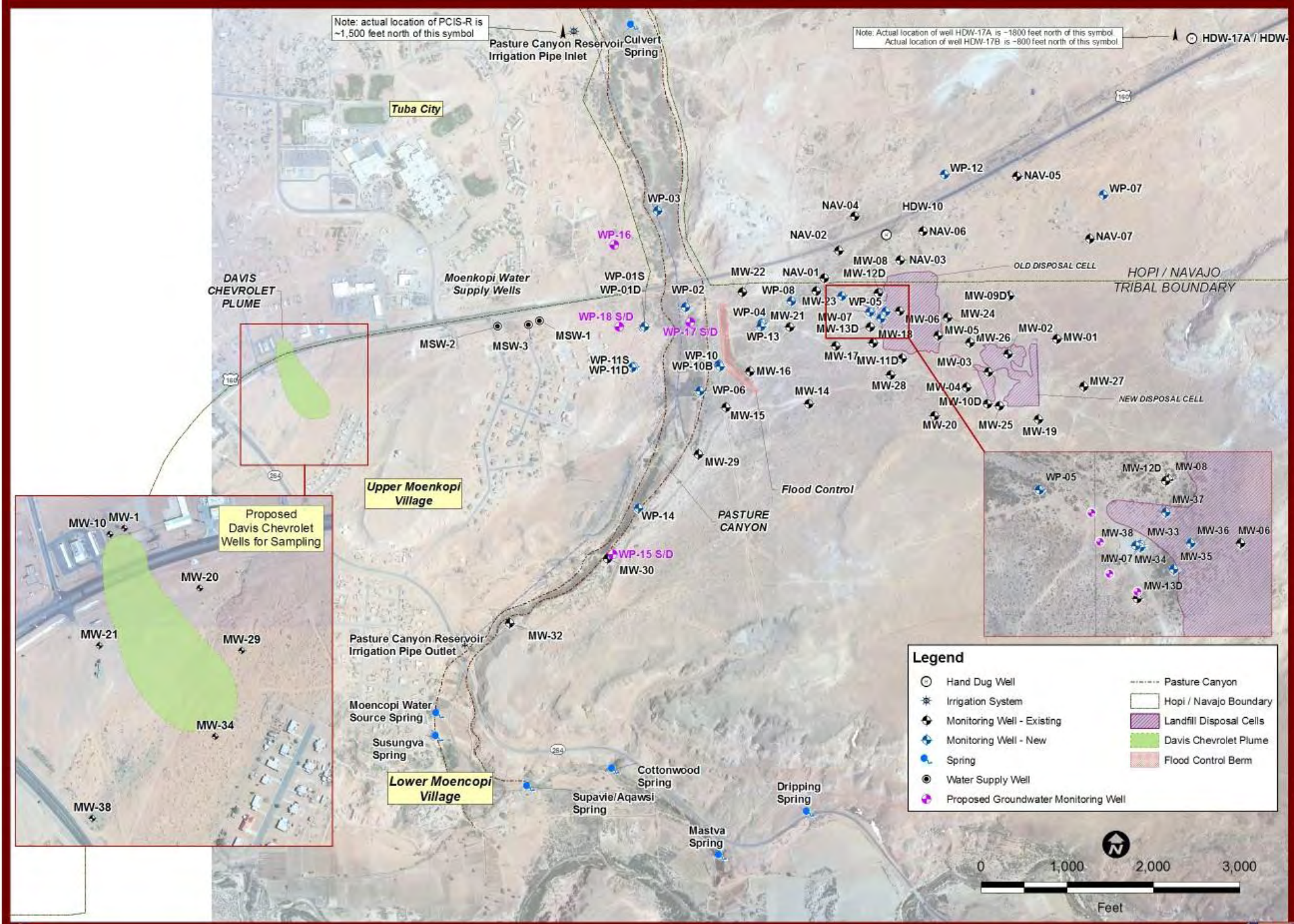
Groundwater Monitoring Wells

Eight New Shallow Wells

- Pasture Canyon between MW-07 and Municipal wells
- West side of Pasture Canyon between MW-01S and Municipal Wells (just west of hanging dune)
- West side of Pasture Canyon, north of Highway 160
- Replace MW-30 in Pasture Canyon
- Four shallow wells northwest, south, southwest and west of MW-07

Davis Chevrolet Well Sampling

- Seven wells outside of TPH plume
  - MW-1, 10, 20, 21, 29, 34, 38



Proposed Groundwater Monitoring Well Locations

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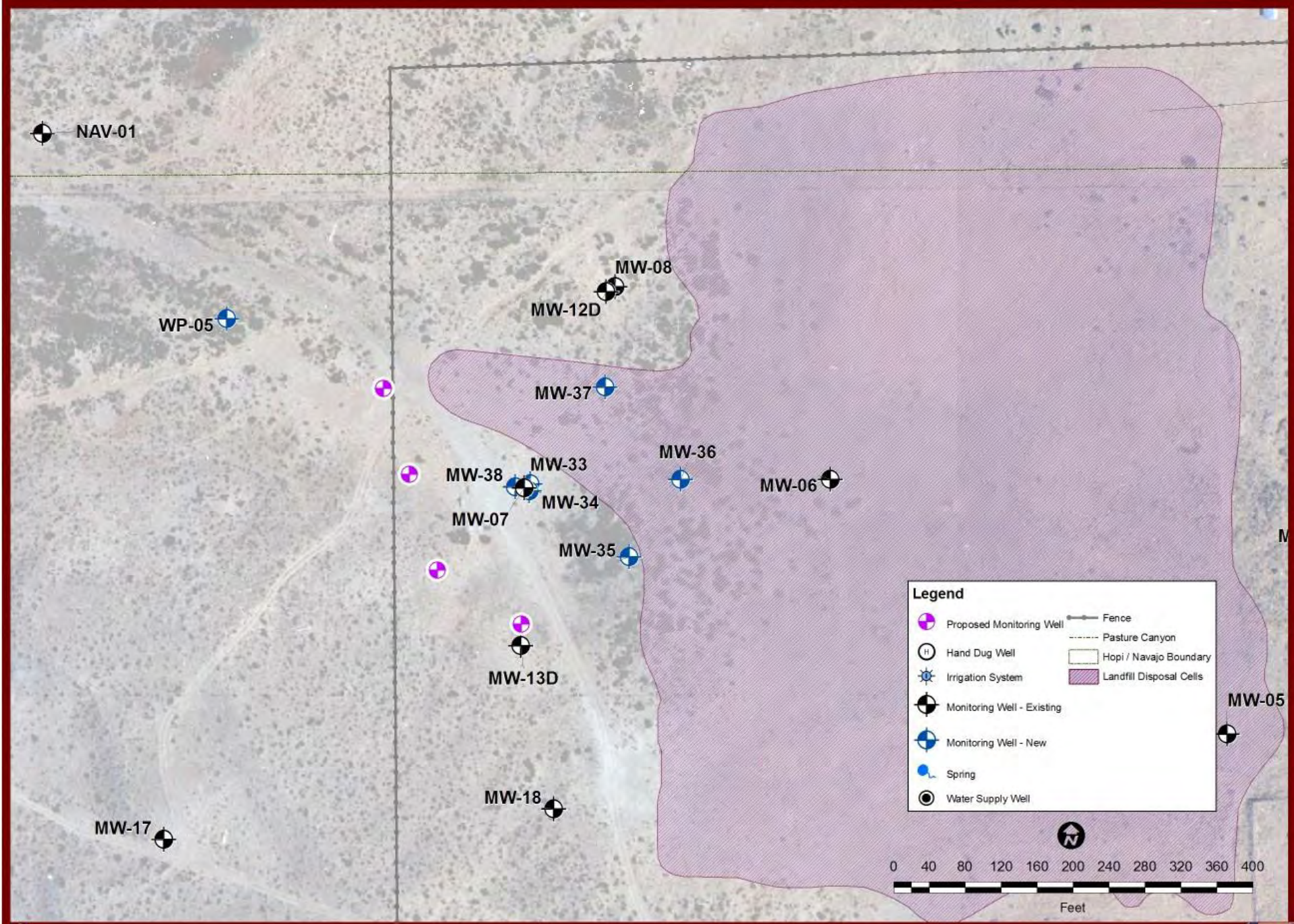


Proposed Groundwater Monitoring Well Locations

Groundwater Well Borehole Sampling and Analysis

- MW-7 down gradient wells
  - Analyze soil samples from surface to groundwater (1, 5, 10, 15 feet)
  - Anions, cations, metals (total and leachable)
- Hold samples and cores for all other boreholes.
  - If GW samples indicate elevated COPCs, analyze samples and cores from the well borehole for metals suite (total and leachable).

Groundwater Sampling and Analysis

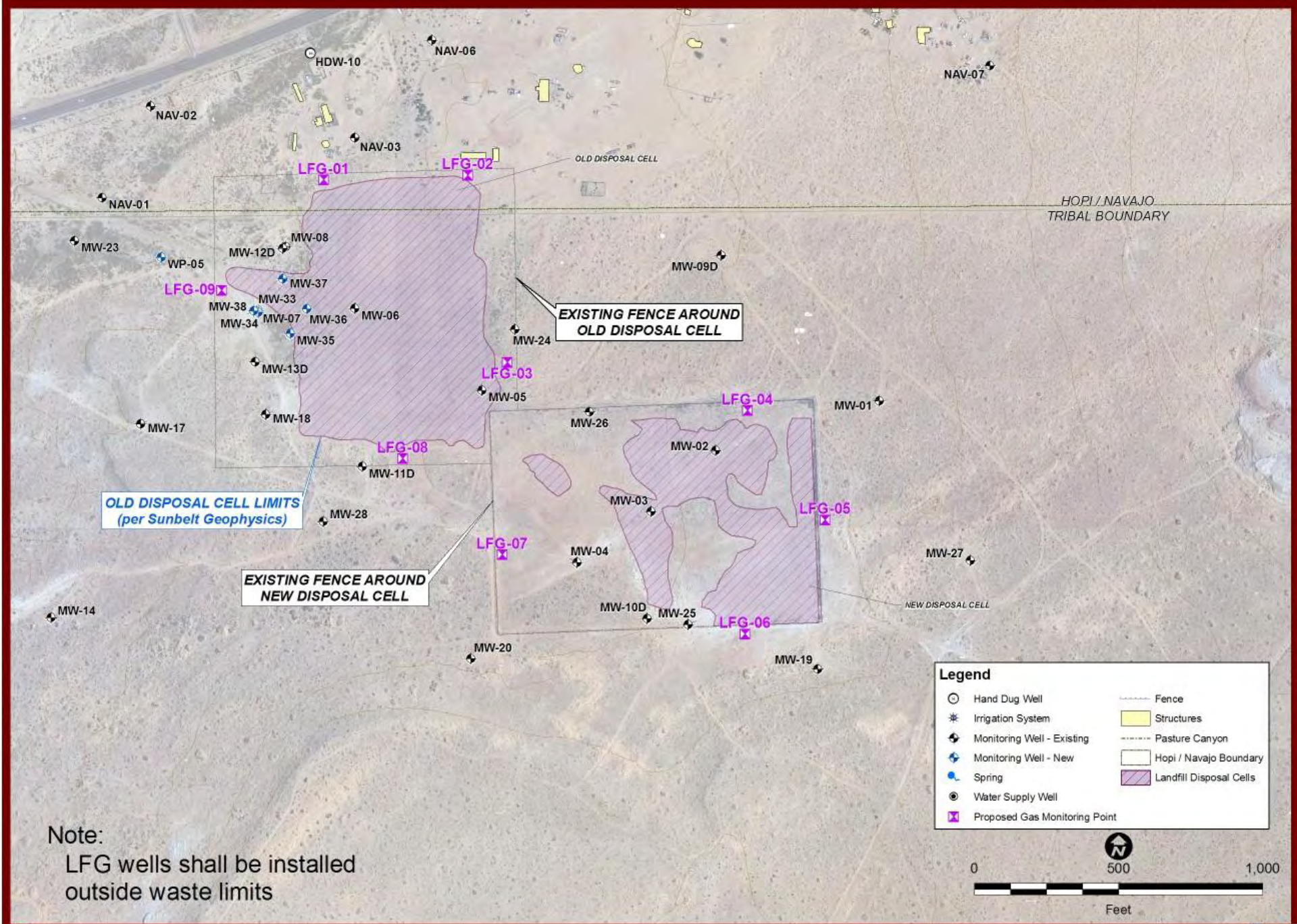
- Alkalinity (carbonate/bicarbonate)
- Anions (chloride, nitrate/nitrite, and sulfate)
- Total Dissolved Solids
- Total Organic Carbon (TOC)
- Total and Dissolved (field filtered, 0.45 micron filter) Metals (Ca, Fe, Mg, Mn, K, Na, As, Ba, Cr, Co, Cu, Li, Mo, Pb, Se, Sr, U, V, and Zn)
- Gross alpha and beta
- Radium 226 and 228
- Thorium 228, 230, and 232
- Uranium 234, 235, and 238
- Chloroform
- BEHP
- Alpha-BHC

Slug Testing

- Conduct slug tests on four new monitoring wells located down gradient of MW-7

LFG Wells

- Confirm locations with soil vapor survey data
- Nine perimeter wells
- Screen 7 to 12 feet bgs
- Sample in accordance with 40 CFR 258 requirements
- Sample for VOC and gases consistent with soil vapor survey analytical suite.



Note:

LFG wells shall be installed outside waste limits

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Proposed Landfill Gas Monitoring Points

FS Scope of Work

- Hopi: Groundwater treatment bench scale tests are unnecessary.
- Hopi: Groundwater treatments should focus on reuse of groundwater as drinking water.
- EPA: Treatability study work plan should be prepared now and conducted concurrently with RI

Bench Scale Testing

- Stantec concurs that sufficient data are available for selection of a short list of ex situ groundwater treatment alternatives.
- Complexity of groundwater geochemistry makes treatment selection beyond the short list problematic.
- Ex situ groundwater treatment will require multiple treatment systems in series to address geochemistry. Some testing will be required to identify best options.
- Processing or disposal of groundwater treatment waste will require some form of bench scale and pilot scale testing.

Groundwater Reuse

- Reuse of extracted groundwater is a priority, but will require evaluation of different alternatives for effectiveness and cost comparisons.
  - Reverse osmosis;
  - Ion exchange;
  - Biological systems;
- As mentioned previously, reuse would require bench scale and pilot testing (to avoid exacerbating the problem)

Proposed Change to FS Work Scope

- Addition of a Treatability Work Plan to be prepared by RI/FS contractor either before, after or concurrently with the FS.
  - Remedial alternatives will be developed, screened and ranked in a matrix for effectiveness, implementability and cost.

Schedule

- EPA's schedule does not contemplate review of documents by Hopi and Navajo.
- EPA's schedule does not consider Hopi request to review interim documents

Schedule

- EPA's schedule does not consider BIA requirement to bid RI/FS work.
  - Deliverables such as HASP, SMP, Treatability Study Work Plan will be developed by the RI/FS Contractor.