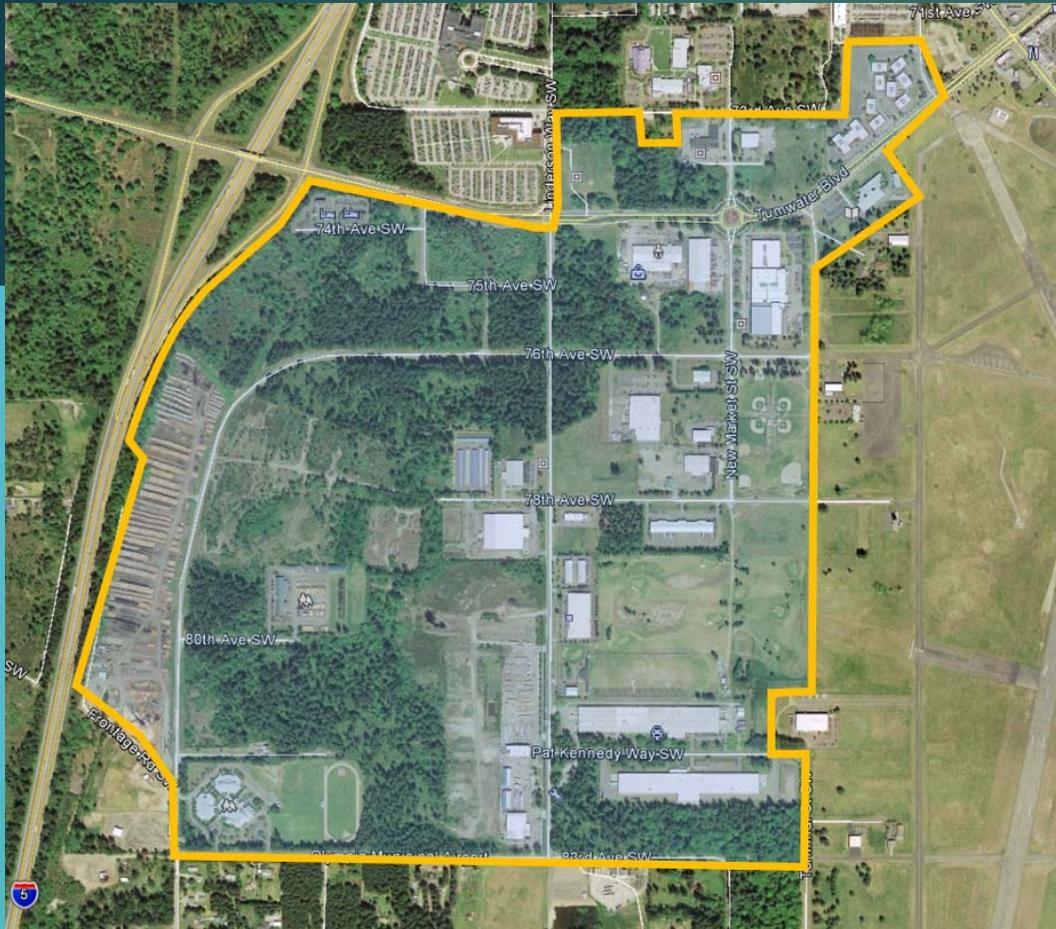


New Market Industrial Campus Soil and Hydrology Study



Presenter:
Lisa Palazzi, SCJ Alliance
Certified Professional Wetland
Scientist (PWS)
Certified Professional Soil
Scientist (CPSS)



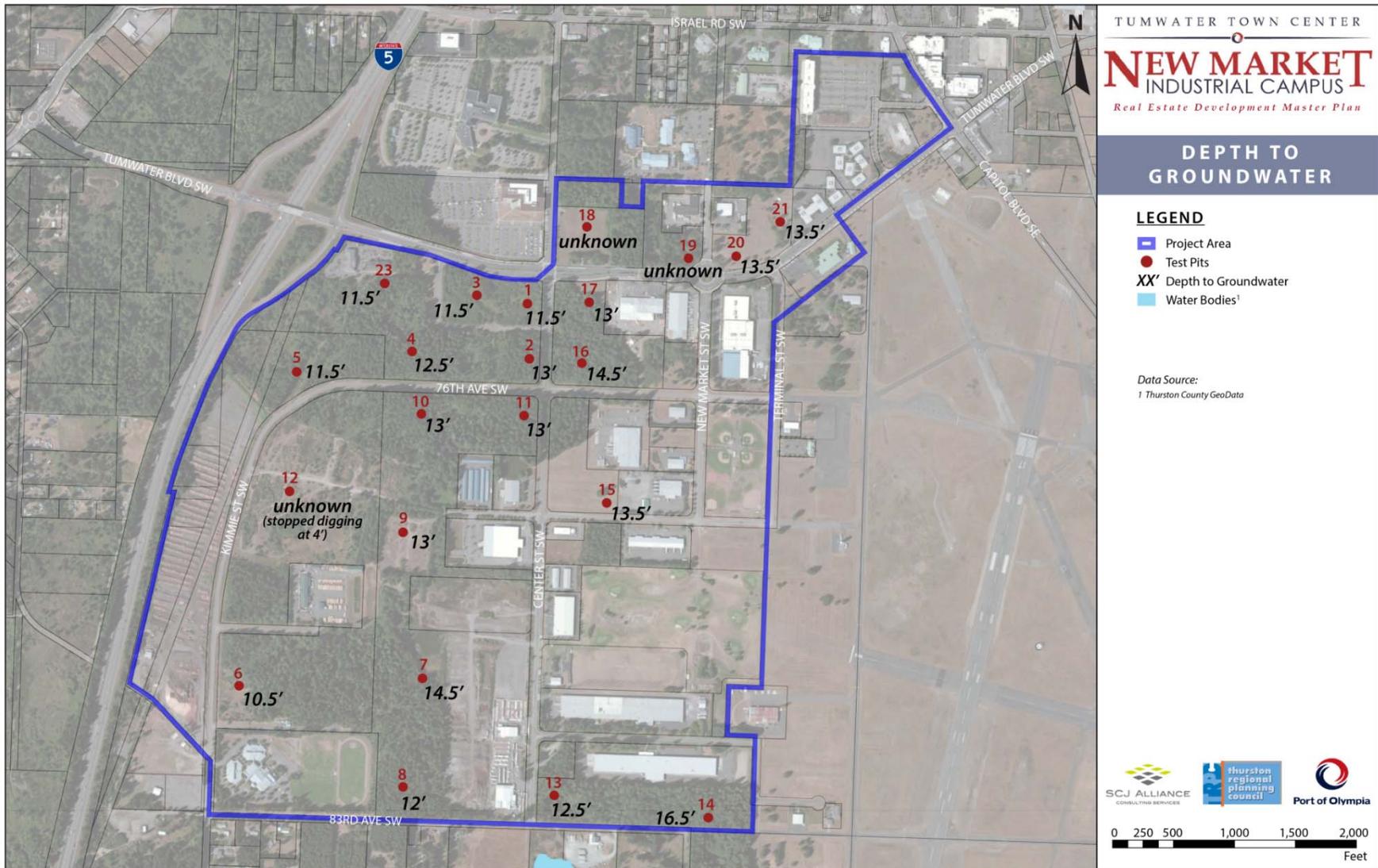
Study Description

What was this study designed to assess?

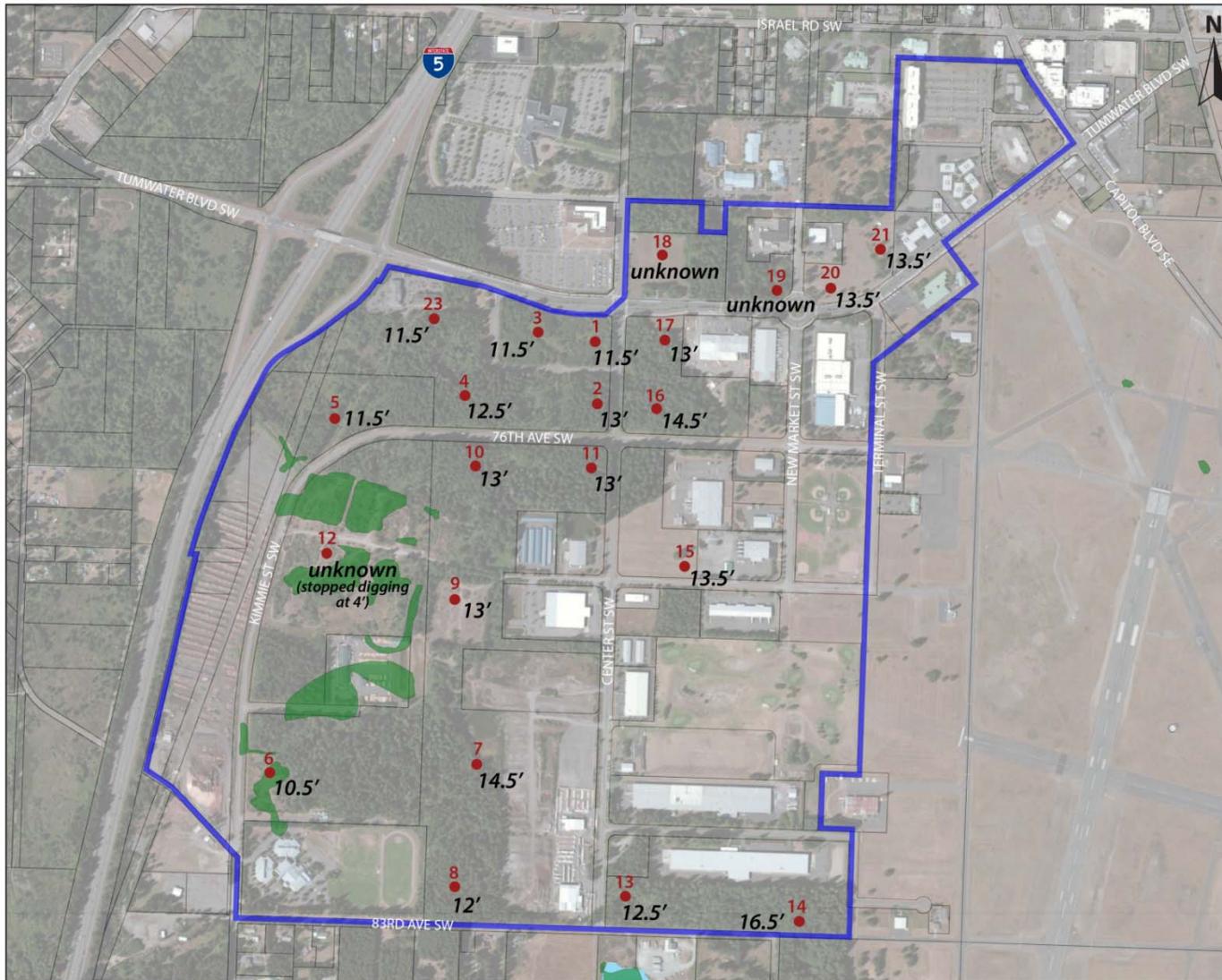
- ▶ Potential Mazama Pocket Gopher Habitat
 - ▶ Sandy soils on grassland with more than 4 feet depth to seasonal groundwater
- ▶ Potential Wetland Areas
 - ▶ Areas meeting the wetland definition – Having natural hydrology that persists within a foot of the soil surface until at least mid-March in most years (Wetland plants; Hydric soils; Wetland hydrology)
- ▶ Depth to Groundwater for Stormwater Design Purposes
 - ▶ Where is it this winter?
 - ▶ What is “normal”?
 - ▶ Where was it in the past (HGHA's)?

Soil Pit locations and Depth to Groundwater

An unexpected outcome



Thurston County GeoData Wetland Mapping Overlay



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NEW MARKET
 INDUSTRIAL CAMPUS
Real Estate Development Master Plan

**GEODATA WETLANDS
 OVERLAY**

LEGEND

- Project Area
- Test Pits
- XX'** Depth to Groundwater
- Water Bodies¹
- Wetlands¹

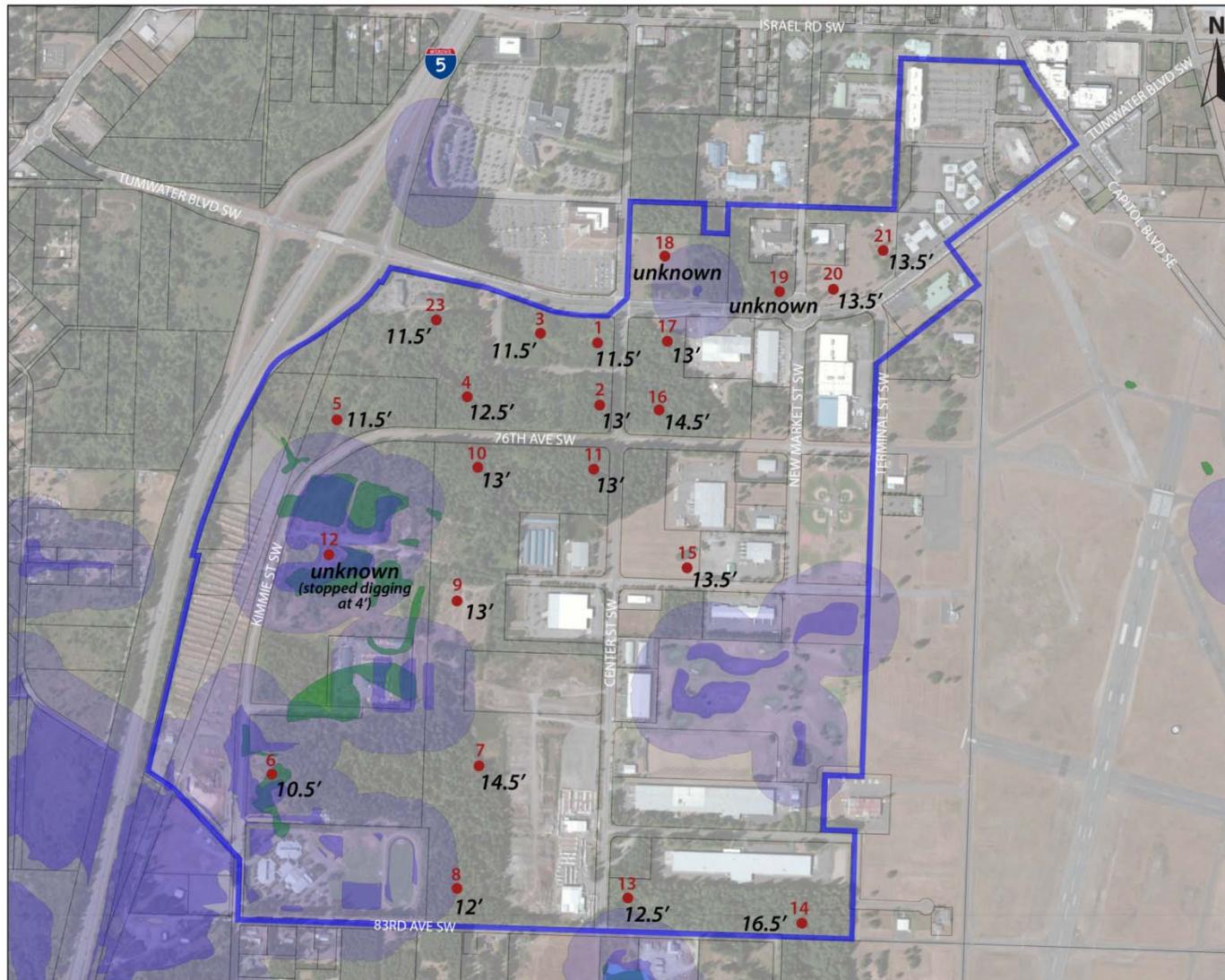
Data Source:
 1 Thurston County GeoData





0 250 500 1,000 1,500 2,000
 Feet

Thurston County GeoData High Groundwater Mapping Overlay



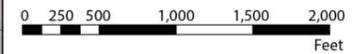
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**GEODATA HGW HAZARD
 AREA OVERLAY**

LEGEND

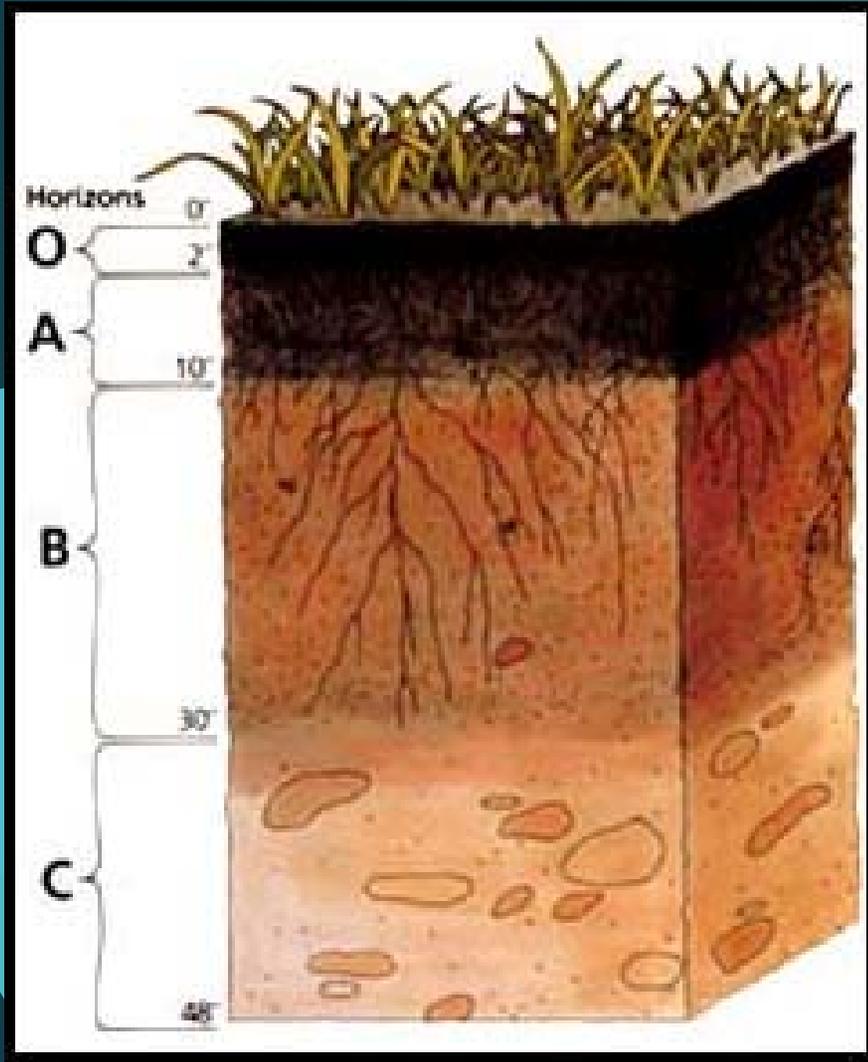
- Project Area
- Test Pits
- XX'** Depth to Groundwater
- Water Bodies¹
- Wetlands¹
- High Groundwater Hazard Areas with 300' Buffer¹

Data Source:
 1 Thurston County GeoData



SOIL SCIENCE TRAINING FOR CONTEXT

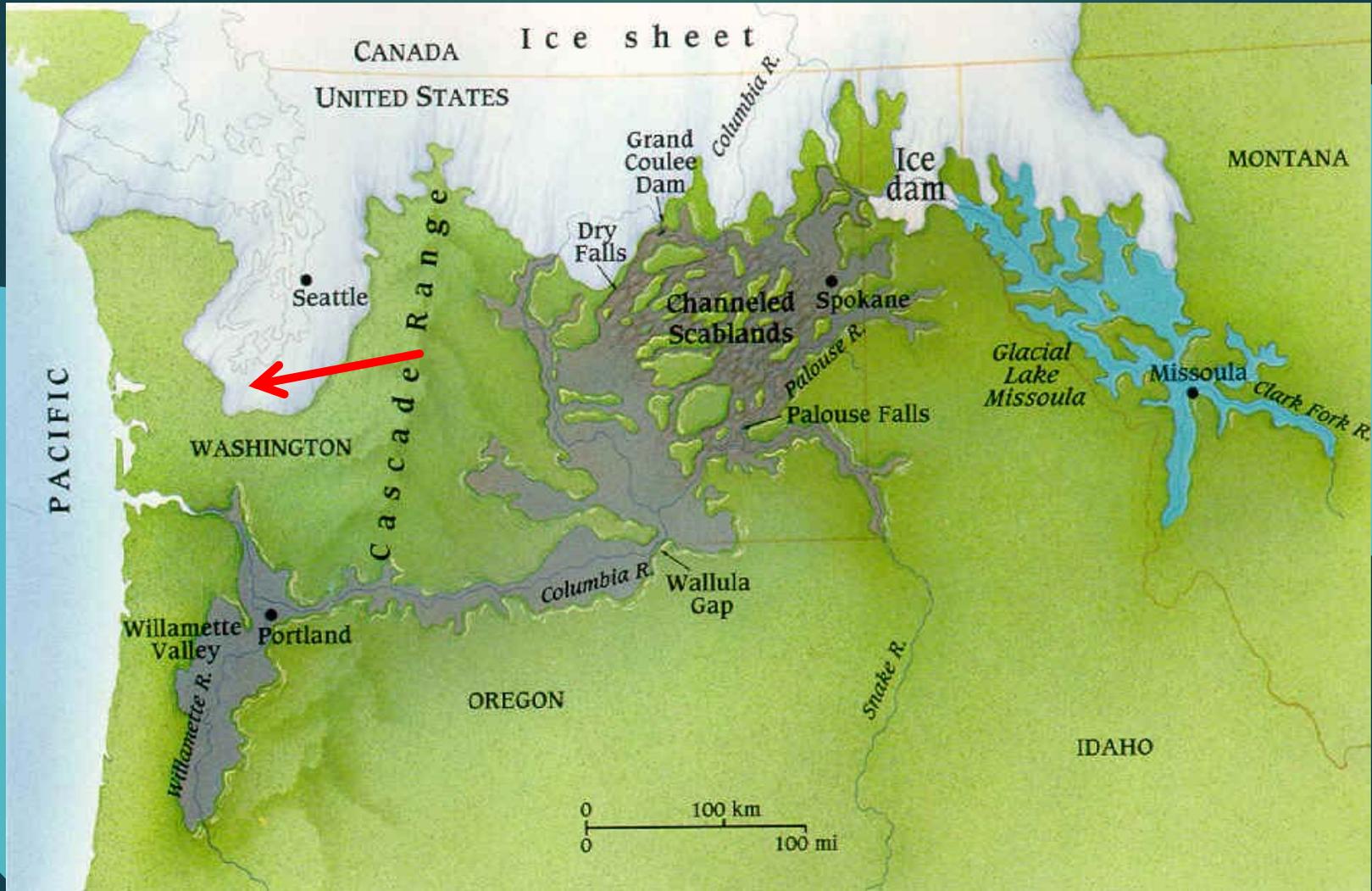
Basic Soil Profile Development



- A horizon: Dark-colored zone of organic matter accumulation at soil surface (10s to 100s of years)
- B horizon(s): Color change below A, Zone of leachate accumulation (salts), and secondary mineral (clay) development (100s-1000s yrs to develop young B; 10,000+ yrs to develop clay-rich B horizon) More than one B horizon means older soil.
- C Horizon: Zone of relatively undifferentiated Parent Material

WHAT IS OUR LOCAL GEOLOGY BACKGROUND? CONTINENTAL GLACIATION IN WASHINGTON, IDAHO AND MONTANA

[HTTP://HUGEFLLOODS.COM/](http://hugefloods.com/)



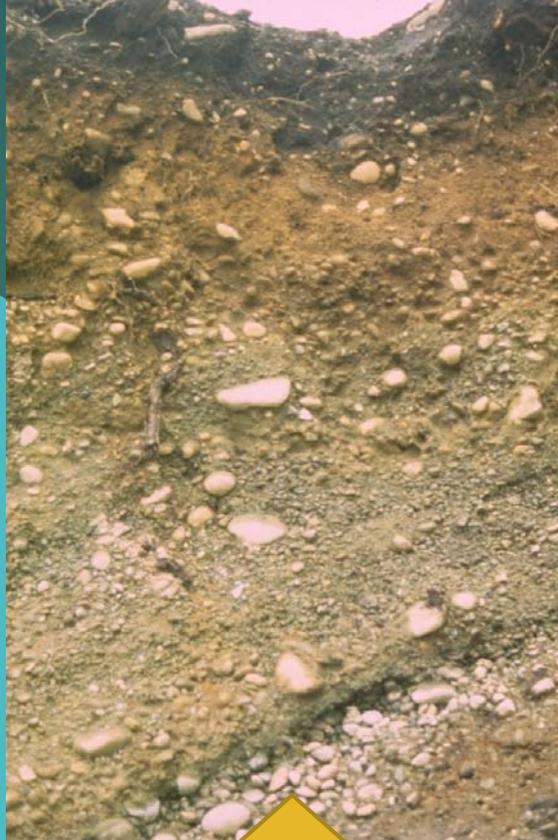
HOW DID THE GLACIER AFFECT OUR LOCAL SOILS?

GLACIAL TILL SOILS
(ICE LAID)



Shelton soil, Mason Co.

GLACIAL OUTWASH SOILS
(WATER LAID)



Everett soil, Mason Co.

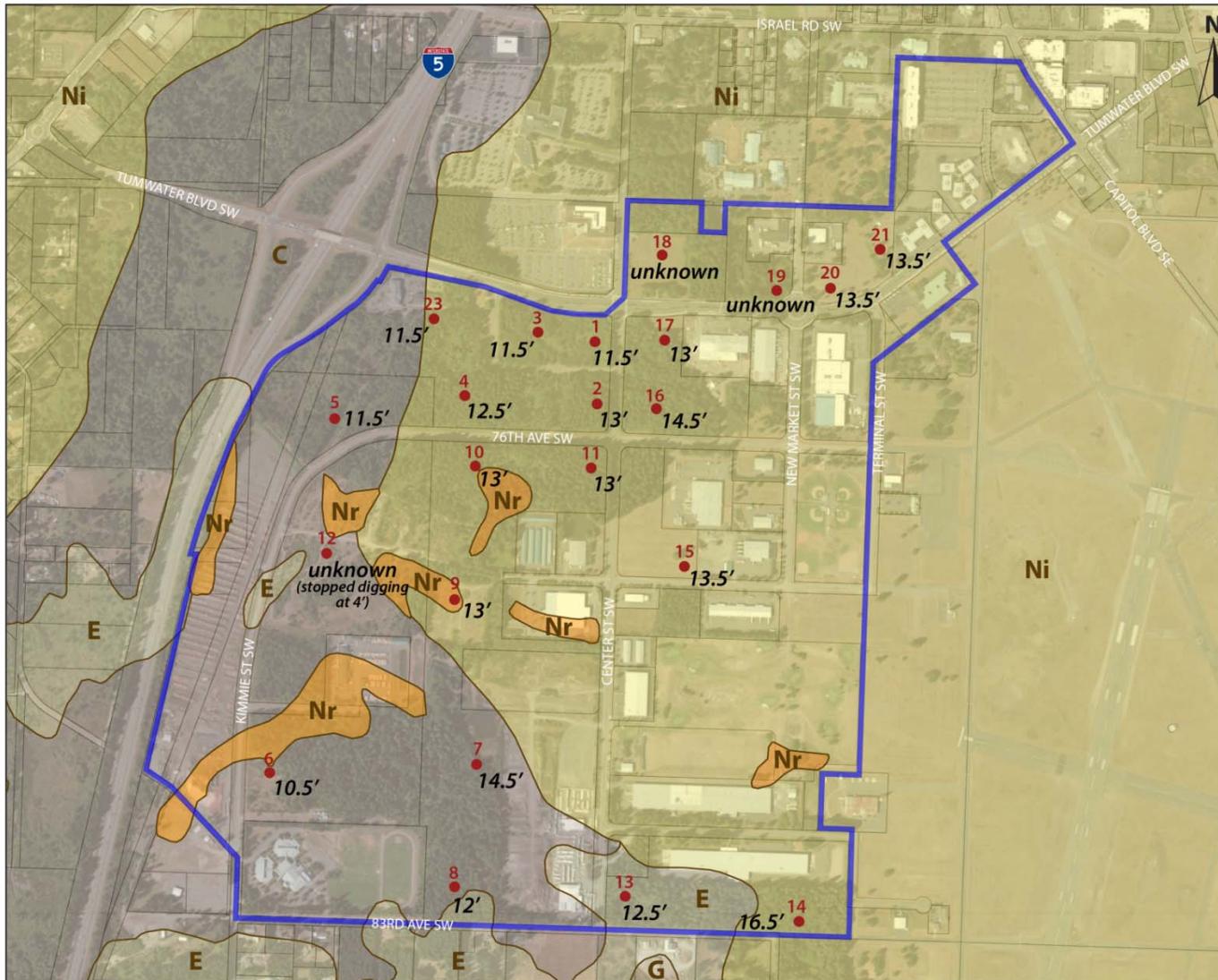
Gravelly and Sandy Outwash
Soils Dominate at Study Area

GLACIAL LAKEBED SEDIMENTS
(WATER LAID)



Giles soils, Thurston Co.

HOW ARE THE LOCAL SOILS MAPPED AND IS THE MAPPING CORRECT?



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SOIL SURVEY

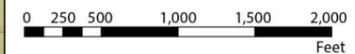
LEGEND

- Project Area
- Test Pits
- XX'** Depth to Groundwater

SOILS¹

- Nr** NORMA SILT LOAM
Poorly drained
- Ni** NISQUALLY LOAMY FINE SAND
Well drained
- E** EVERETT VERY GRAVELLY LOAM
Well drained
- C** CAGEY LOAMY SAND
Moderately well drained
- G** GRAVEL MINE

Data Source:
 1 Thurston County GeoData



Main Native Soil Types Observed Onsite



Pit 10

Everett very gravelly
sandy loam



Pit 11

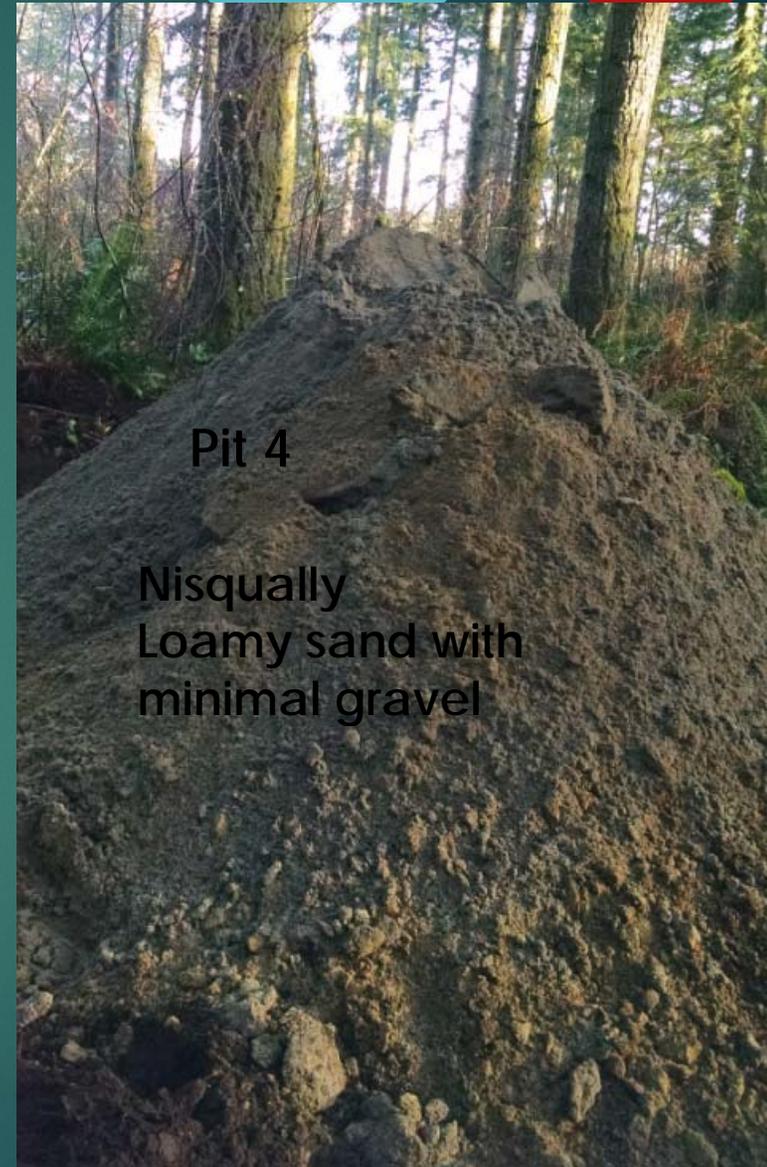
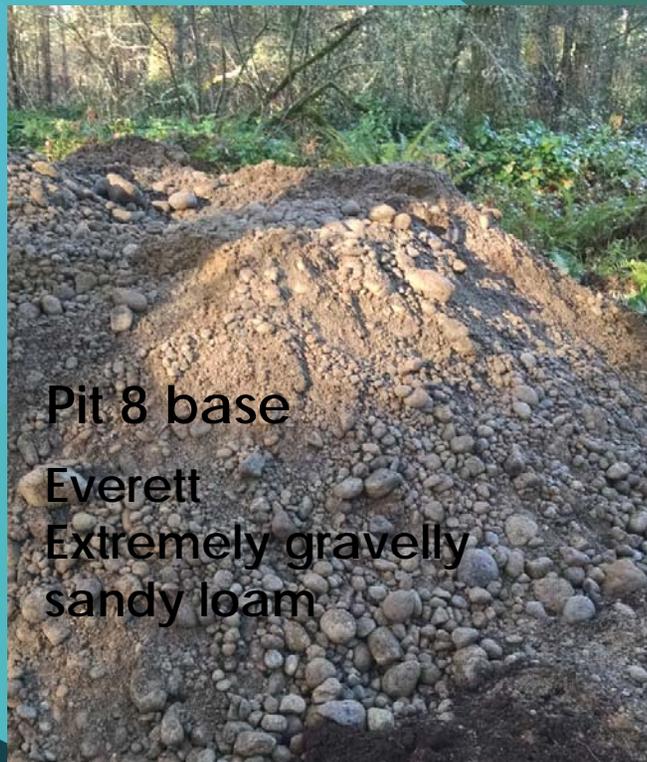
Nisqually loamy fine sand



Pit 8

Nisqually surface grading to
extremely gravelly with depth

Main Native Soil Types Observed Onsite



Main Soil Types Observed Onsite

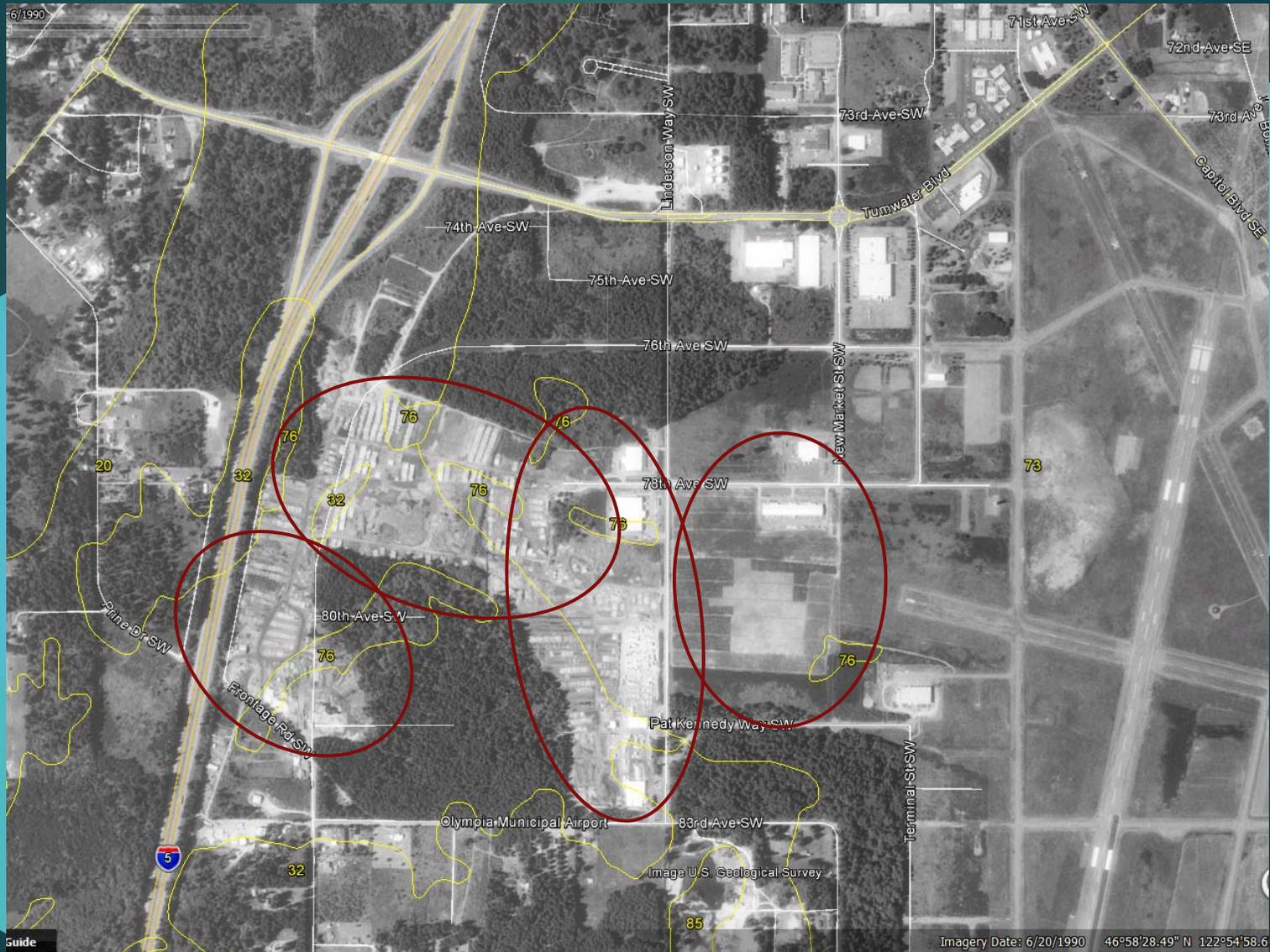
Pit 9



Native Soils capped with compacted fill (quarry spalls and cobbles)



Areas with surface compaction from past land use





Surface Ponding as a Result of Compacted Surface Fill



Surface Ponding as a Result of Compacted Surface Fill

Near Pit 9



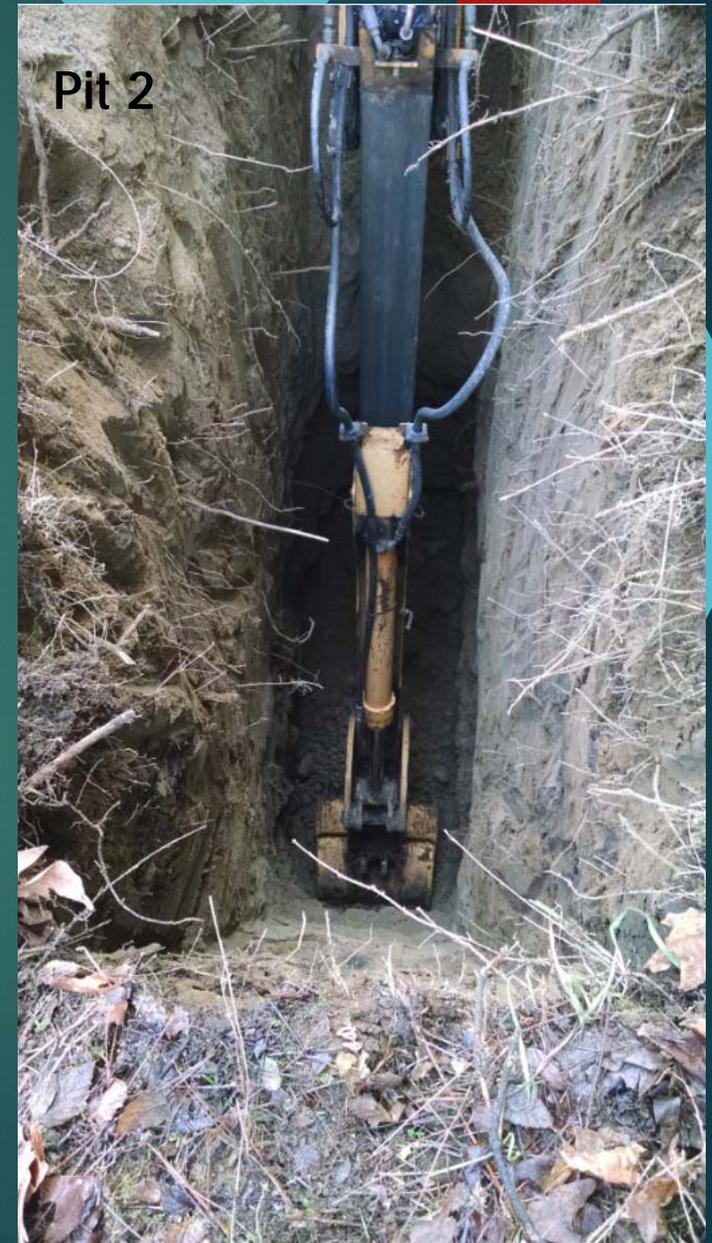
Near Pit 7

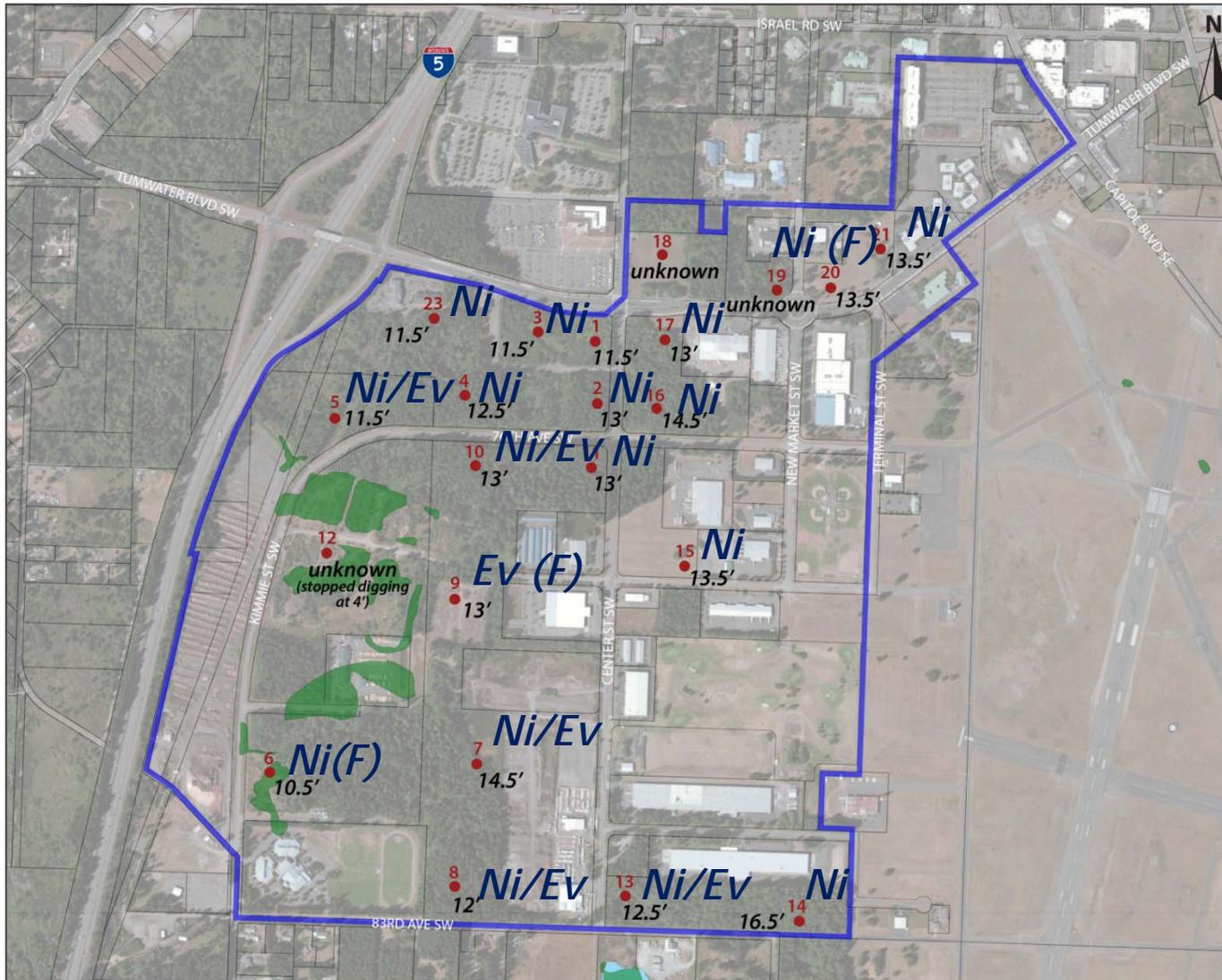


Near Pit 7



Depth to groundwater
ranges between 9.5 -16.5
feet across Study Area





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- Wetlands¹

Data Source:
¹ Thurston County GeoData

SCJ ALLIANCE CONSULTING SERVICES | thurston regional planning council | Port of Olympia

0 250 500 1,000 1,500 2,000 Feet

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**GEODATA WETLANDS
 OVERLAY**

LEGEND

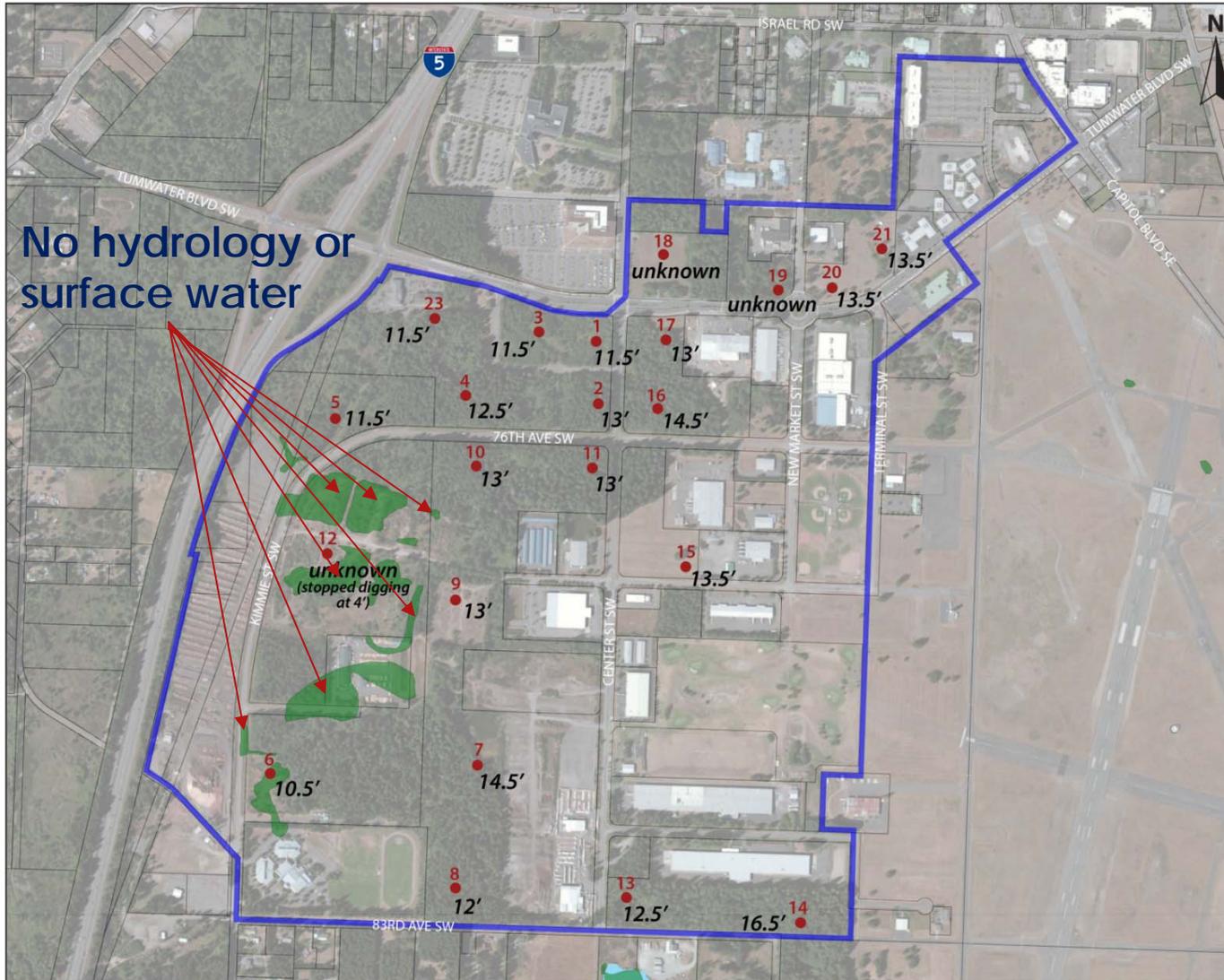
-  Project Area
-  Test Pits
- XX'** Depth to Groundwater
-  Water Bodies¹
-  Wetlands¹

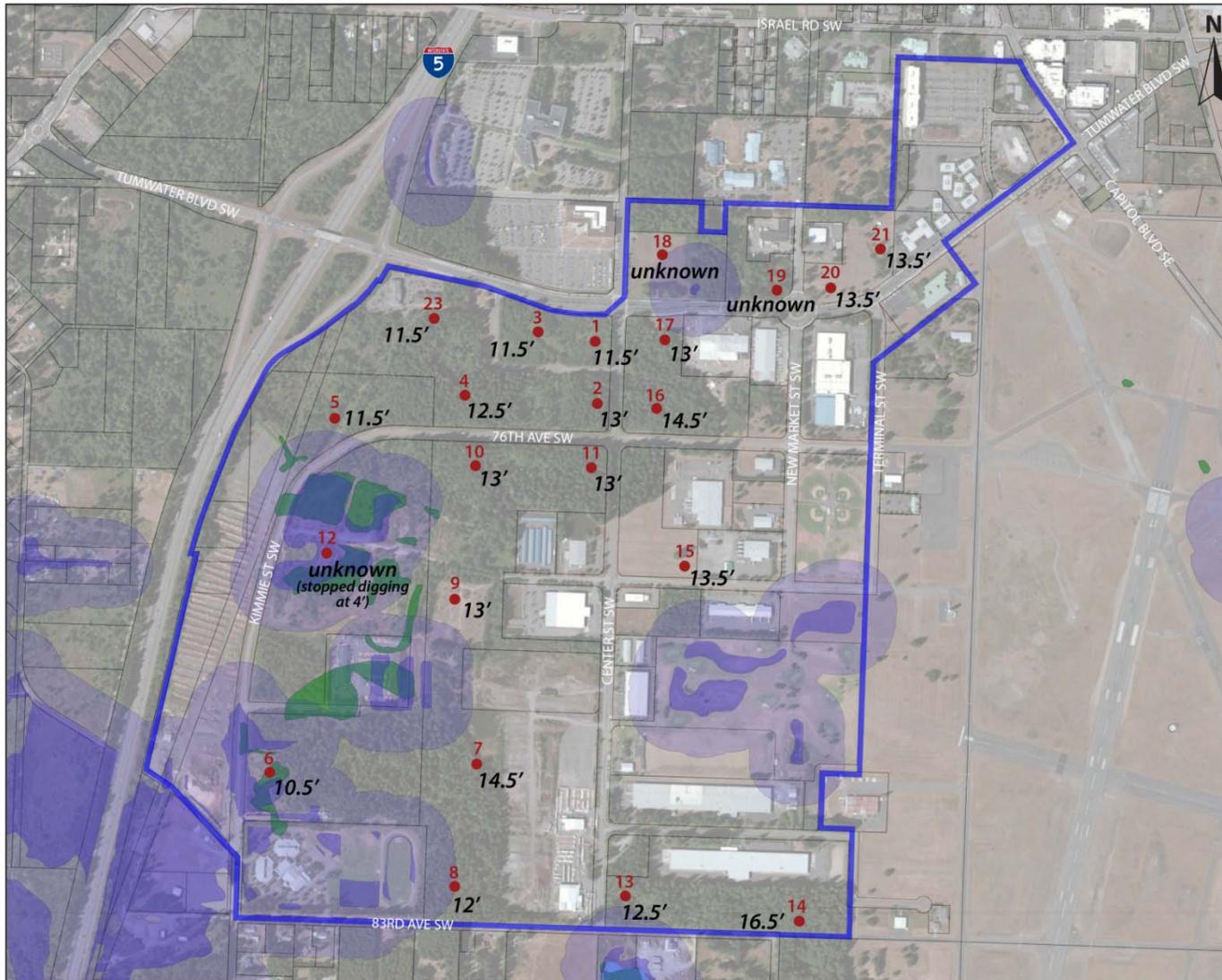
Data Source:
 1 Thurston County GeoData





0 250 500 1,000 1,500 2,000
 Feet





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- High Groundwater Hazard Areas with 300' Buffer¹

Data Source:
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0 250 500 1,000 1,500 2,000
 Feet

Current Status:

- ▶ Potential Mazama Pocket Gopher Habitat
 - ▶ Only areas around Pits 20, 21 and 15 are acceptable habitat
- ▶ Potential Wetland Areas
 - ▶ None of the areas mapped as wetlands were found to have natural, current hydrology
 - ▶ Met with Local, State and Federal Agencies to get a jurisdictional determination
- ▶ Depth to Groundwater for Stormwater Design Purposes
 - ▶ Depth ranges from 10.5 to 16.5 – shallower to west; transitions to soil into south with shallow glacial till
 - ▶ These depths are representative of the long-term “normal” winter water table
 - ▶ We are working with hydrogeologist to assess data from local monitoring wells in relation to high groundwater flooding in the late 1990s