



# The Effects of Flooding on a Non-Operating Landfill in High River, AB

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# 1 “The 2013 Flood Increased Risk to Residents”

- 70 yr. old un-lined, municipal dump-site
- Setback variance from 300m to 20m
- Potential for hazardous and toxic waste
- Inundated by floodwater – potential receptors
- *No impact*

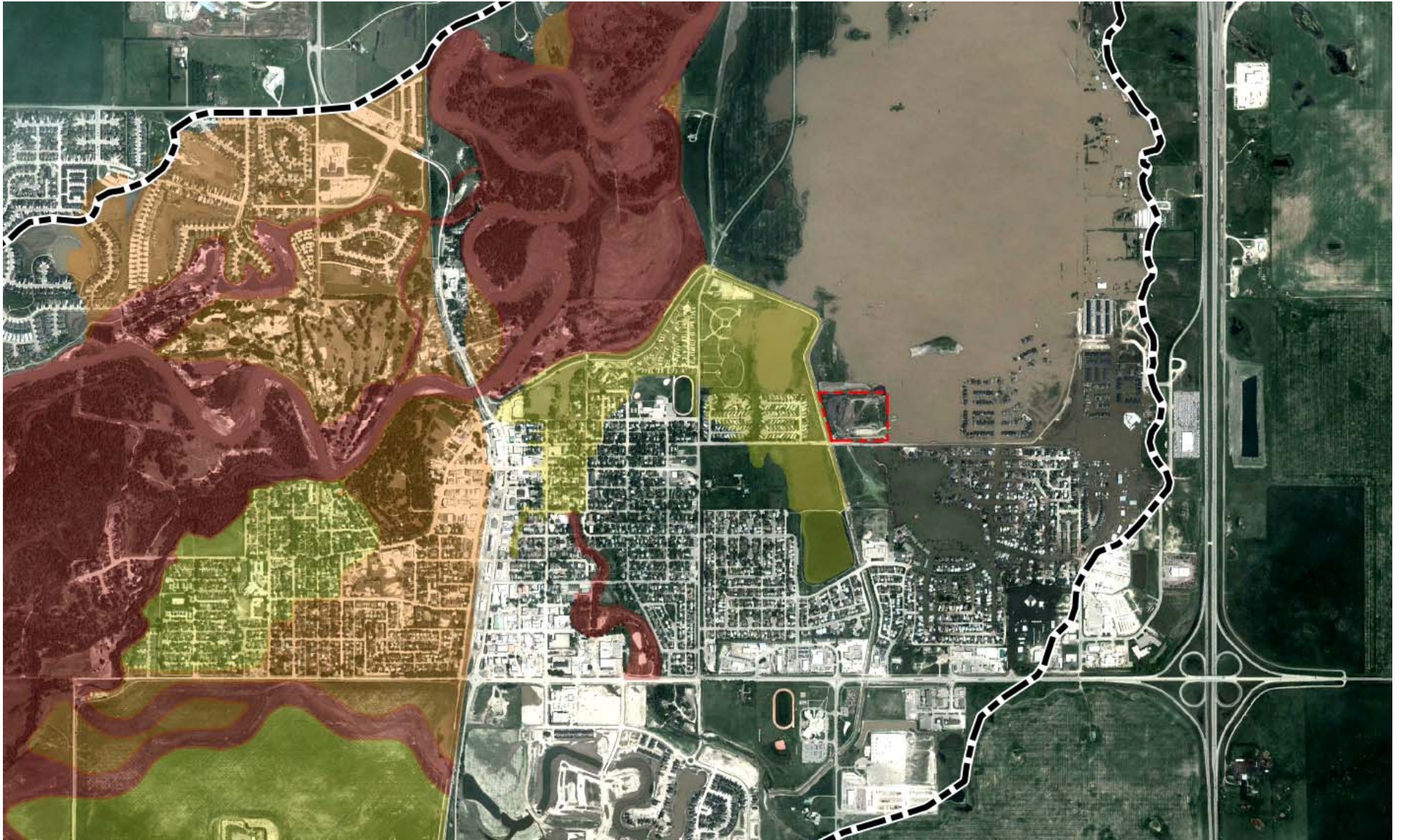
“As a planning tool, a flood hazard study should provide quality information for years to come”

“The studies show what the future flooded areas would be if the flood areas are developed appropriately”

AEP

Flood Hazard Identification Program (FHIP)

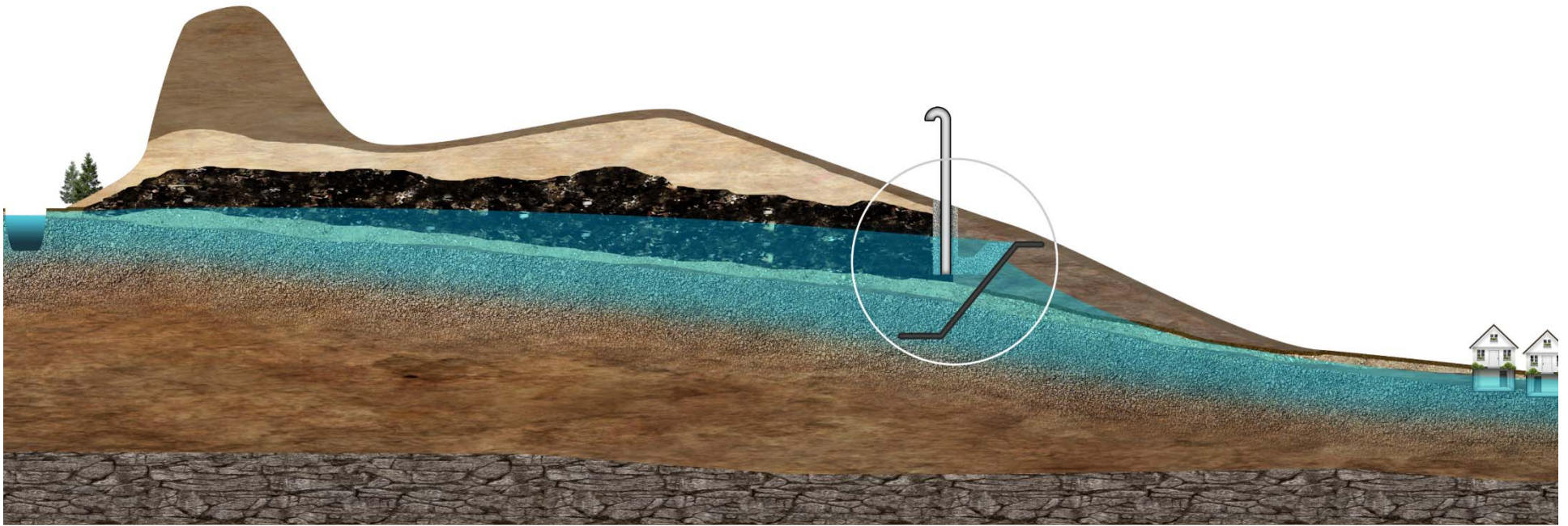
Long-term Planning 2013



## AEP - Flood Hazard Map High River Post-Flood



Ooops.

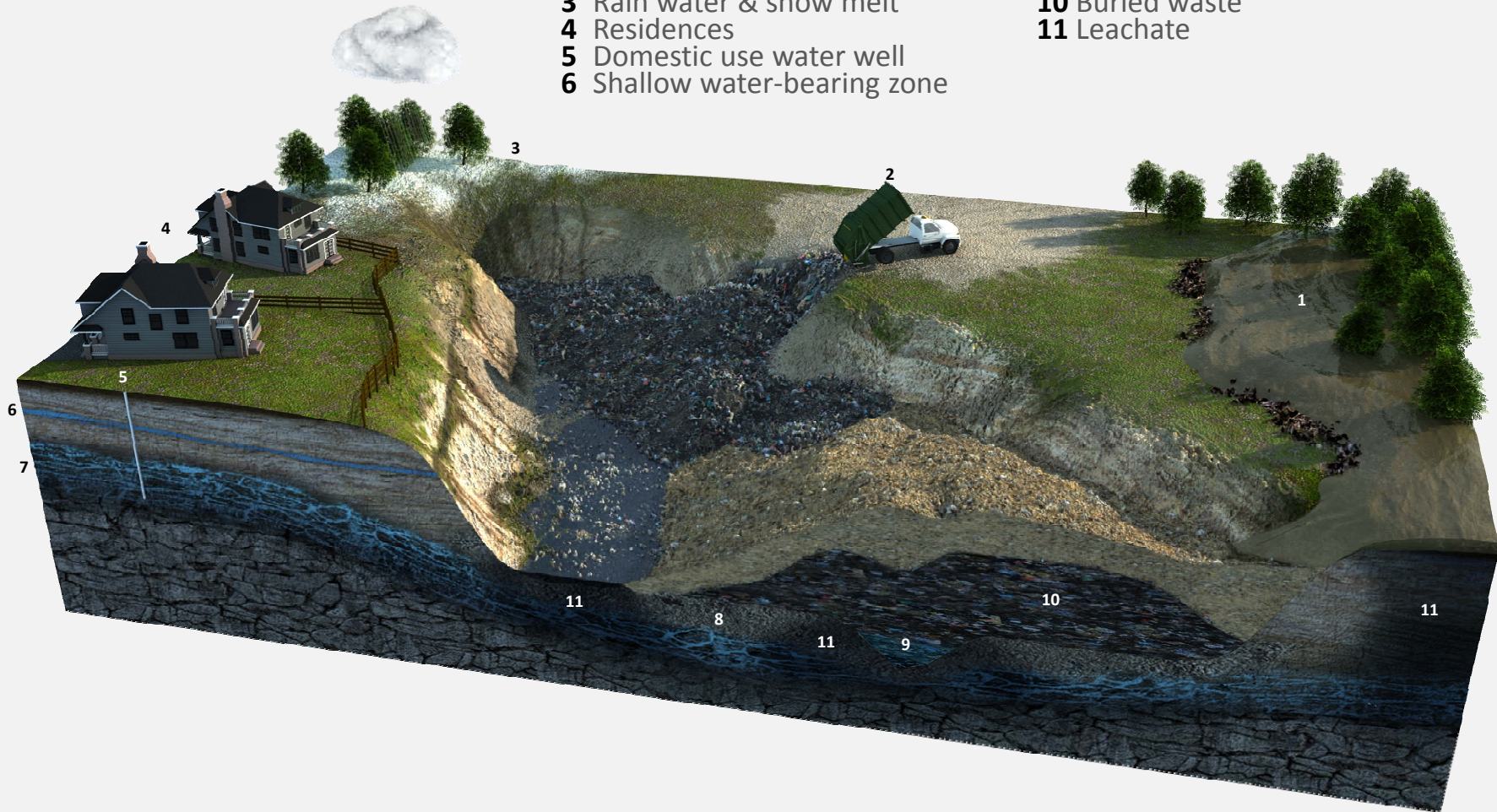


## 2 Planning a Data Collection Program

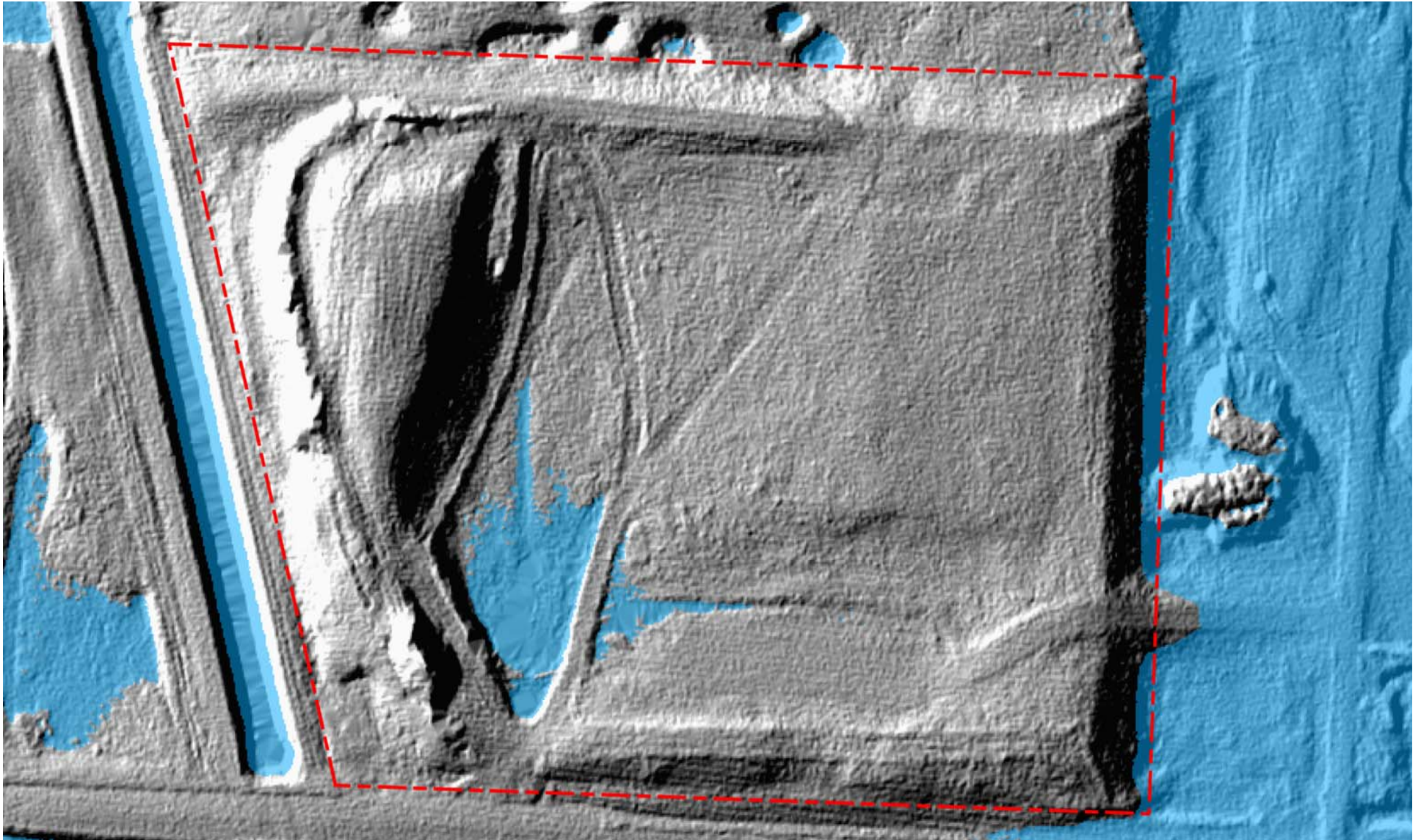
- Past practices
- 10 years of environmental quality data
- DEM/ground survey
- Intrusive investigation
- Conceptual Site Model (CSM)

- 1 Overland floodwater
- 2 Undifferentiated waste & hazardous/toxic chemicals
- 3 Rain water & snow melt
- 4 Residences
- 5 Domestic use water well
- 6 Shallow water-bearing zone

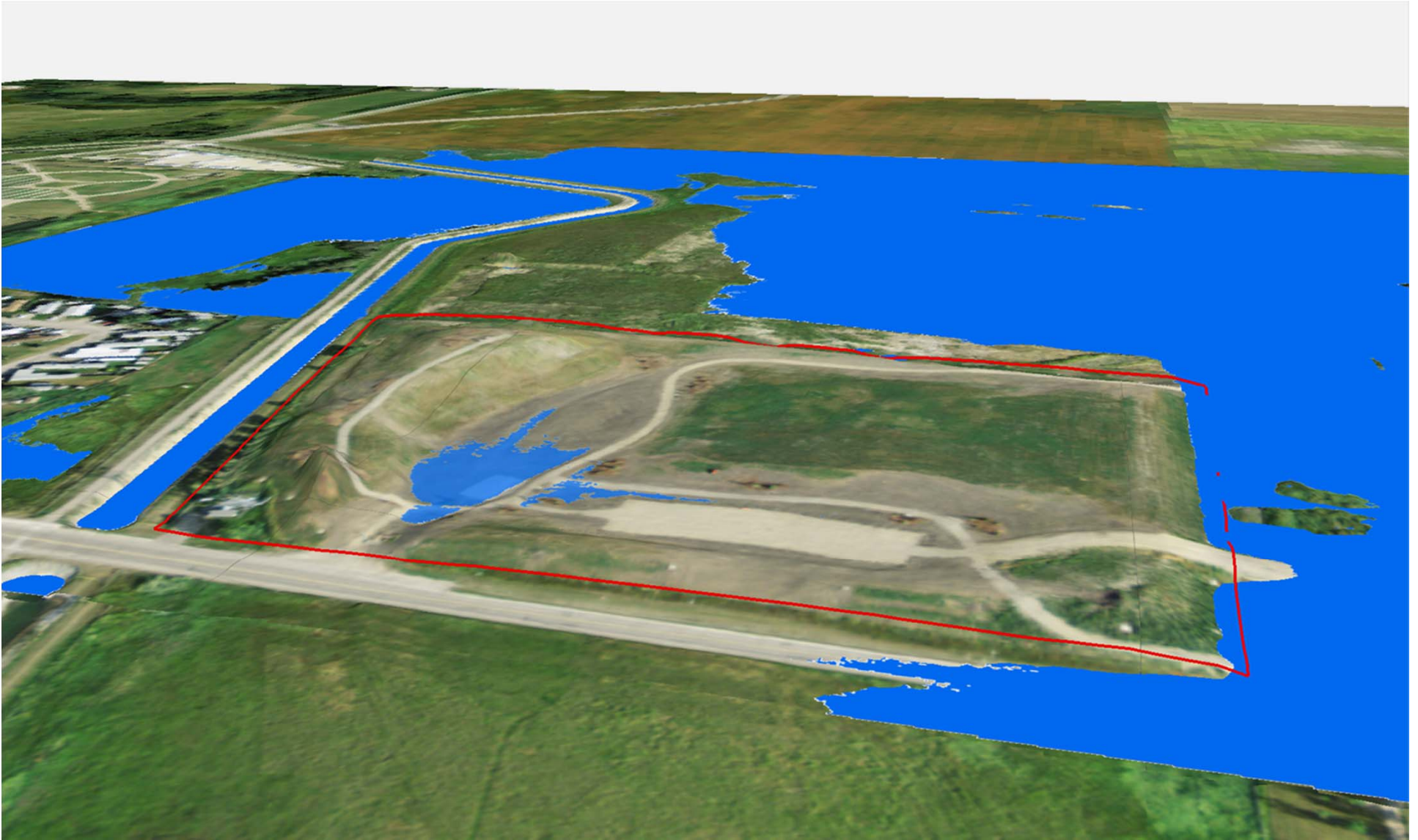
- 7 Groundwater
- 8 Riverbed cobbles & gravels
- 9 Stream
- 10 Buried waste
- 11 Leachate



## Past Practices - Waste Disposal Using Natural Features



## Digital Elevation Model (0.5M LIDAR) and GPS-RTK Ground Survey



## Using the DEM to understand flood impact



### 3 Executing the Data Collection Program

- Job Hazard Assessment!
- ASCM damage - road construction
- Risks with assessment activities in un-lined landfill
- Hazardous materials in drill cores and on surface





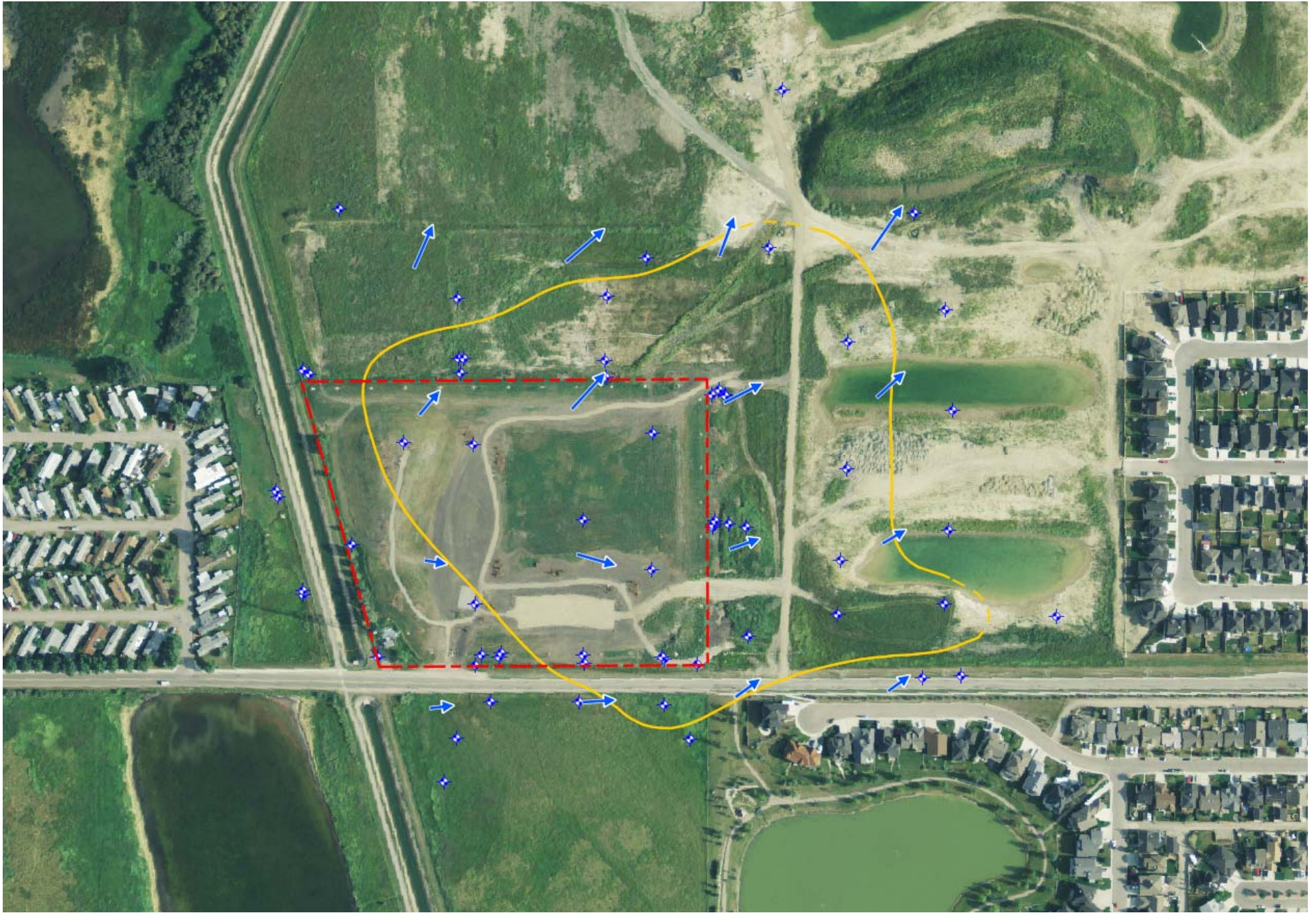


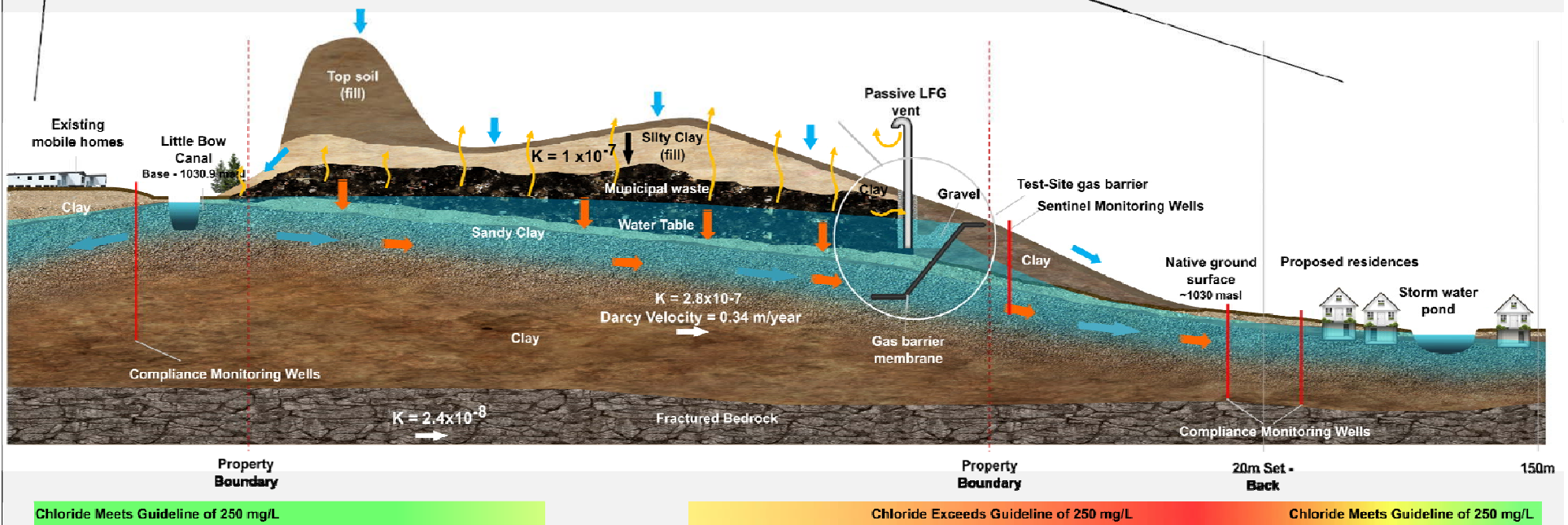




## 5 Data Interpretation and CSM

- Establish background conditions
- Verify historical data - even if its your own!
- Spend time to get the hydrogeology right
- Use the CSM as a base-model
- Big picture - risk focused





# Conceptual Site Model



## 6 Lessons-learned

- Be prepared to abandon your hypothesis
- High-level “so what” risk-based approach
- Use a strong CSM as a base-model
- Effective communication program (stakeholders)

# QUESTIONS?



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