



NEW ZEALAND
LAND AND GROUNDWATER
CONFERENCE 2024
22 - 24 OCTOBER - AUCKLAND



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Community Lane Re-Development

Simon Hunt (EHS Support
New Zealand Ltd) and
Andrew Rose (Kāinga Ora—
Homes and Communities)

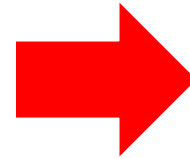


Aims of Paper / Presentation

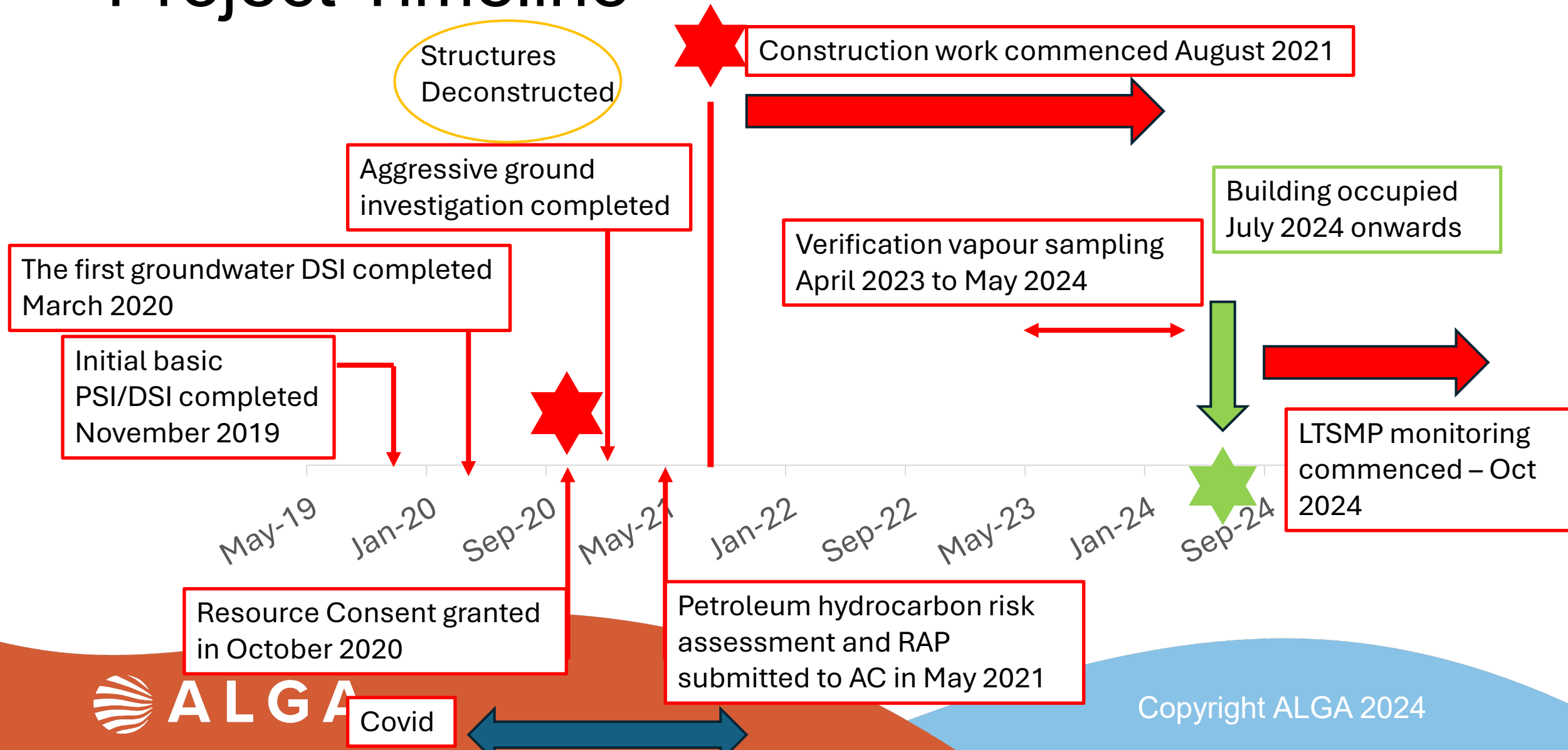
- Technical contaminated land support to Kāinga Ora from mid/late 2019 onwards.
- Considers the “life cycle” of the project (contaminated land context).
- Discusses “what worked and what didn’t work” concerning contaminated land management.



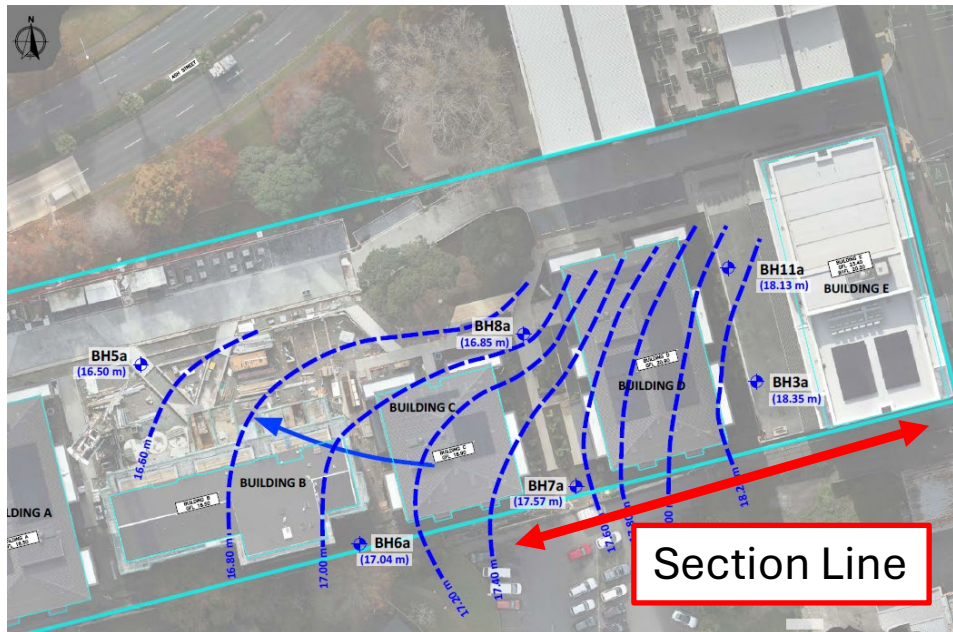
Aim of Development Project



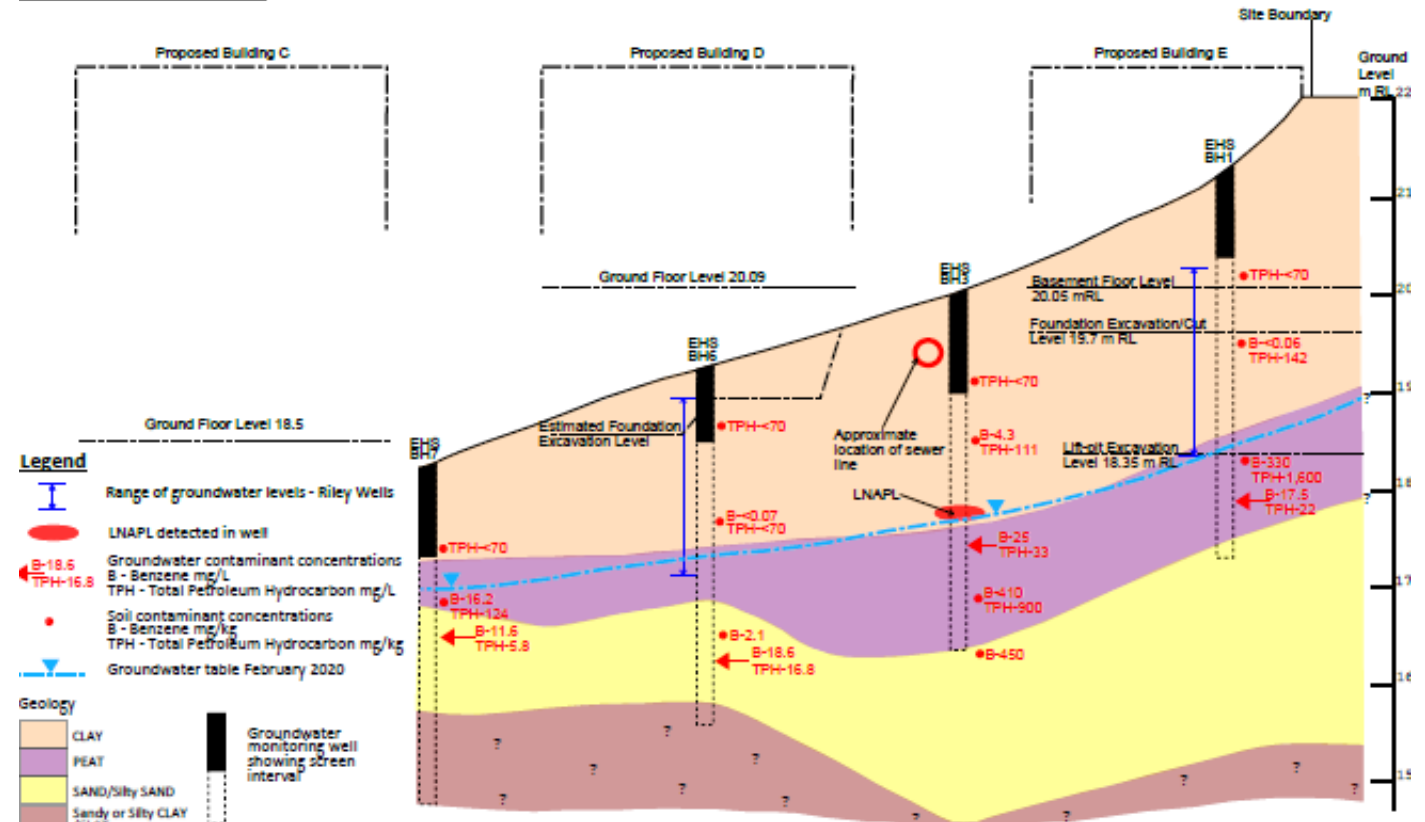
Project Timeline



Geological Cross Section & Groundwater Flow



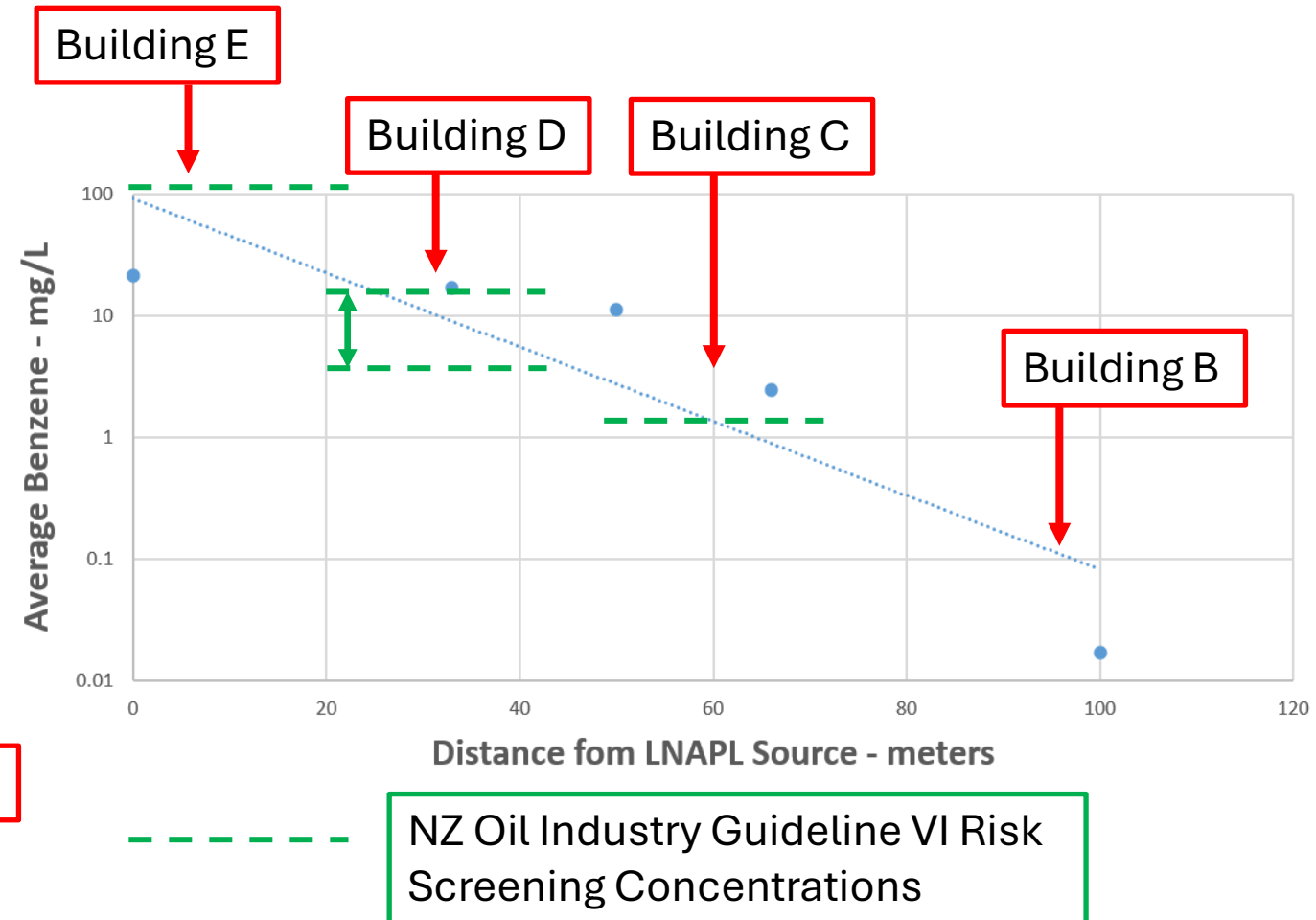
Horizontal Scale Approximately 1:500



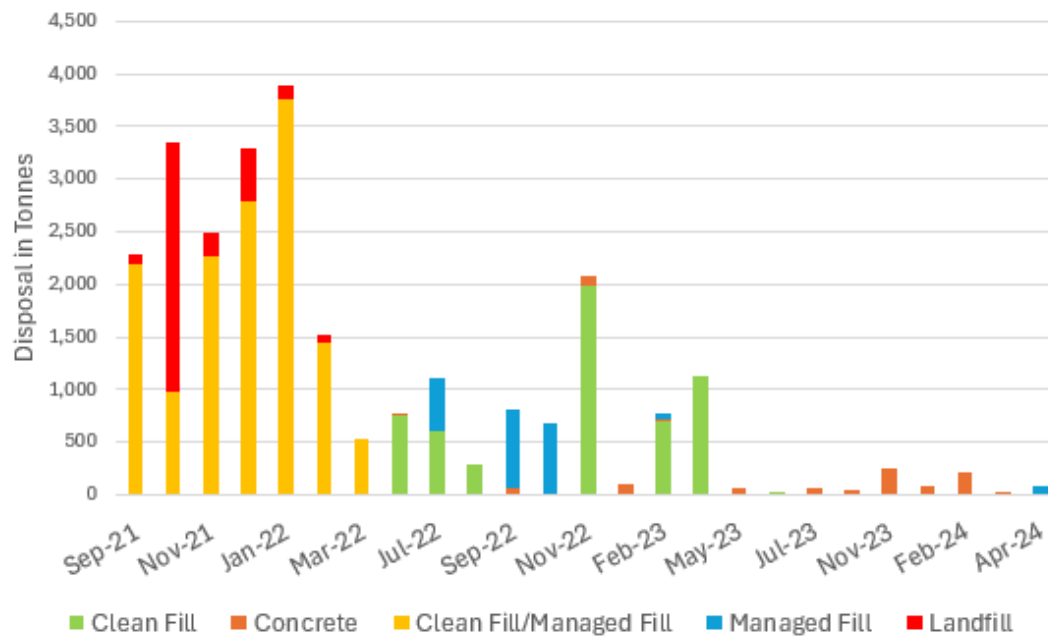
Extent of BTEX Groundwater Contamination



What was known in March 2020



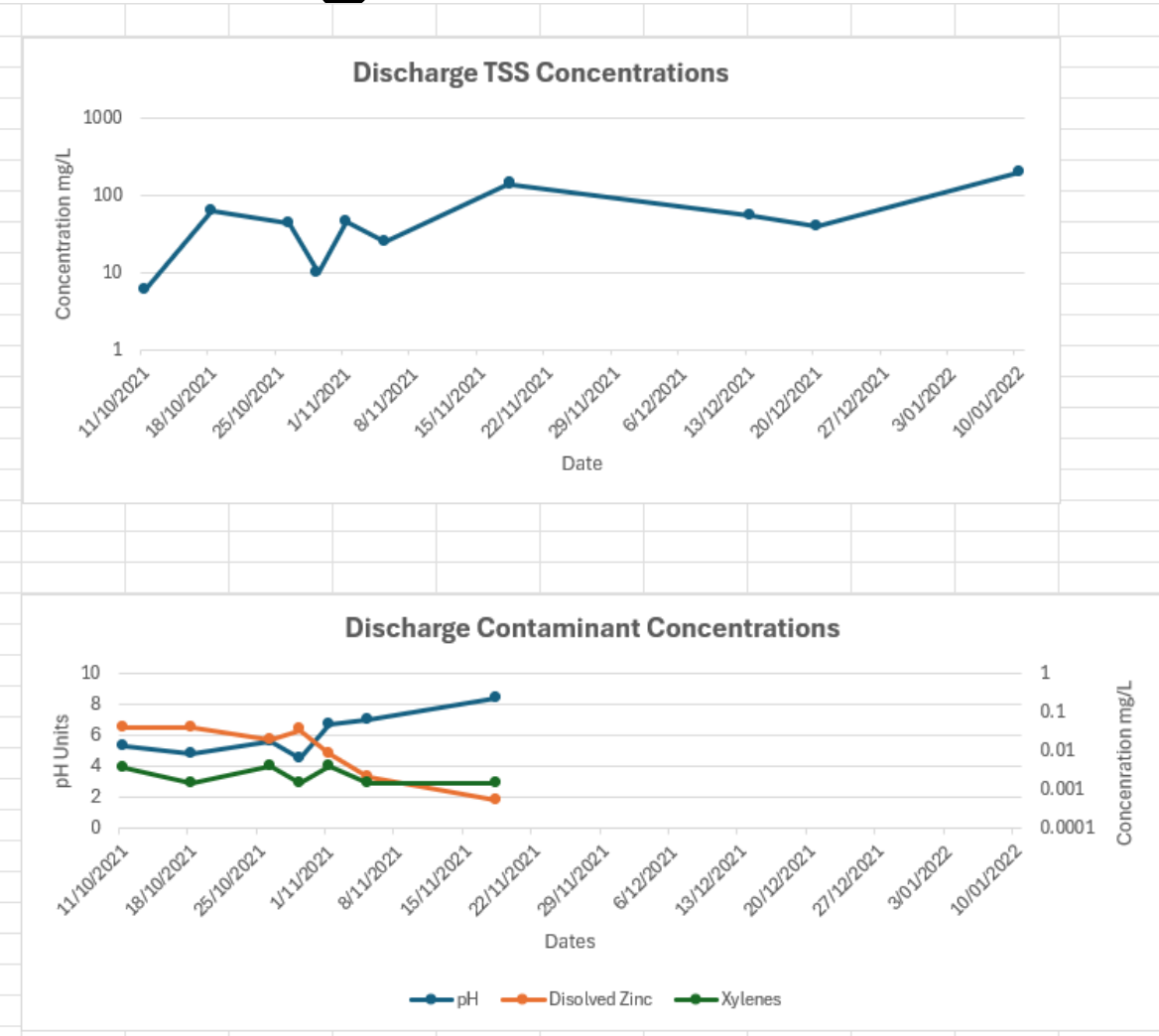
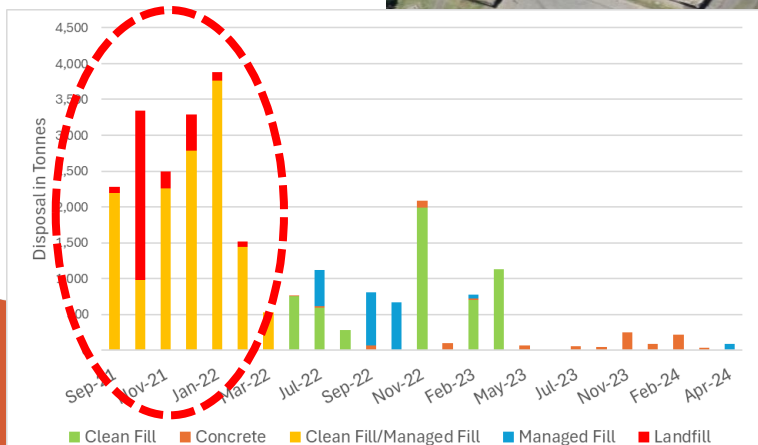
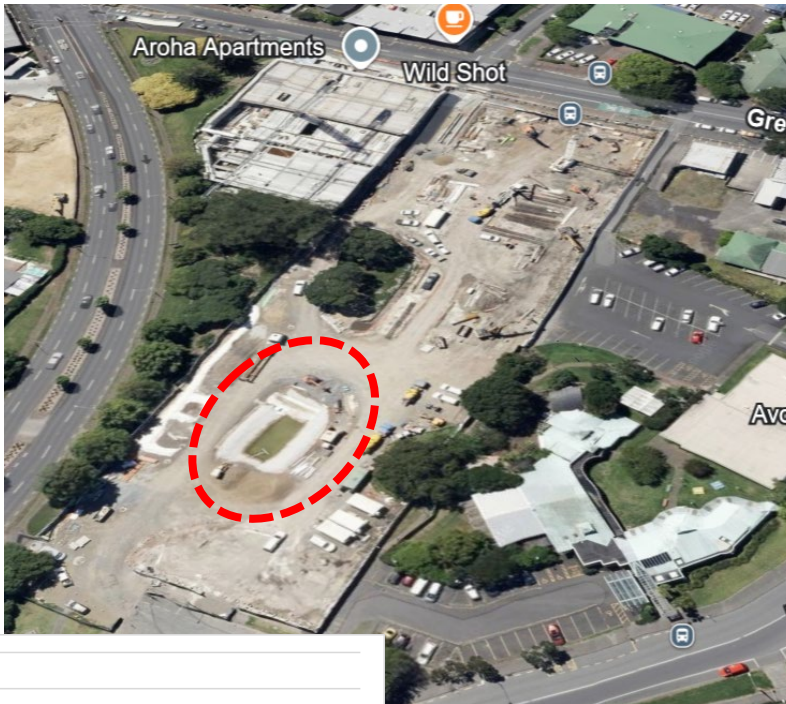
Soil Excavation and Disposal



	Tonnes	Approx. Percentage
Clean Fill	5,467	21%
Clean Fill / Managed Fill	13,939	54%
Managed Fill	2,038	8%
Landfill	3,394	13%
Concrete	1,095	4%
Total	25,932	

- Minimised volume disposed to landfill.
- Shallow soils impacted by structure deconstruction.
- Strategy developed to manage HC - impacted soil during pile construction (given piling plant stand-by cost approx. \$35K/day).

Treated Stormwater Discharge

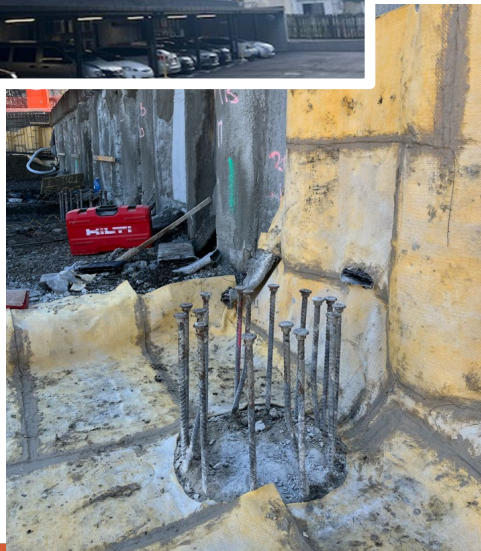


Material Durability

- Acid groundwater – but no acid sulphate soils.
- Hydrocarbon impact.
- XA2 cement used on the piles and select ground beam.
- Barrier pipe proposed for potable water and fire water pipework (because of hydrocarbons), ductile iron used.



Building E - Mitigation



- Residual Geology – approx. 1.5 m clay, overlying peat.
- Groundwater – confined conditions, base of confining layer 1.5 m below floor slab.
- Contamination – LNAPL, soil, dissolved + vapour.
- Ground floor use – below-ground car park.
- Mitigation:
 - Clay substrate.
 - Underside of floor slab – bentonite.
 - Lift pit tanked – bentonite.
 - Vented below-ground car park.

Building D - Mitigation



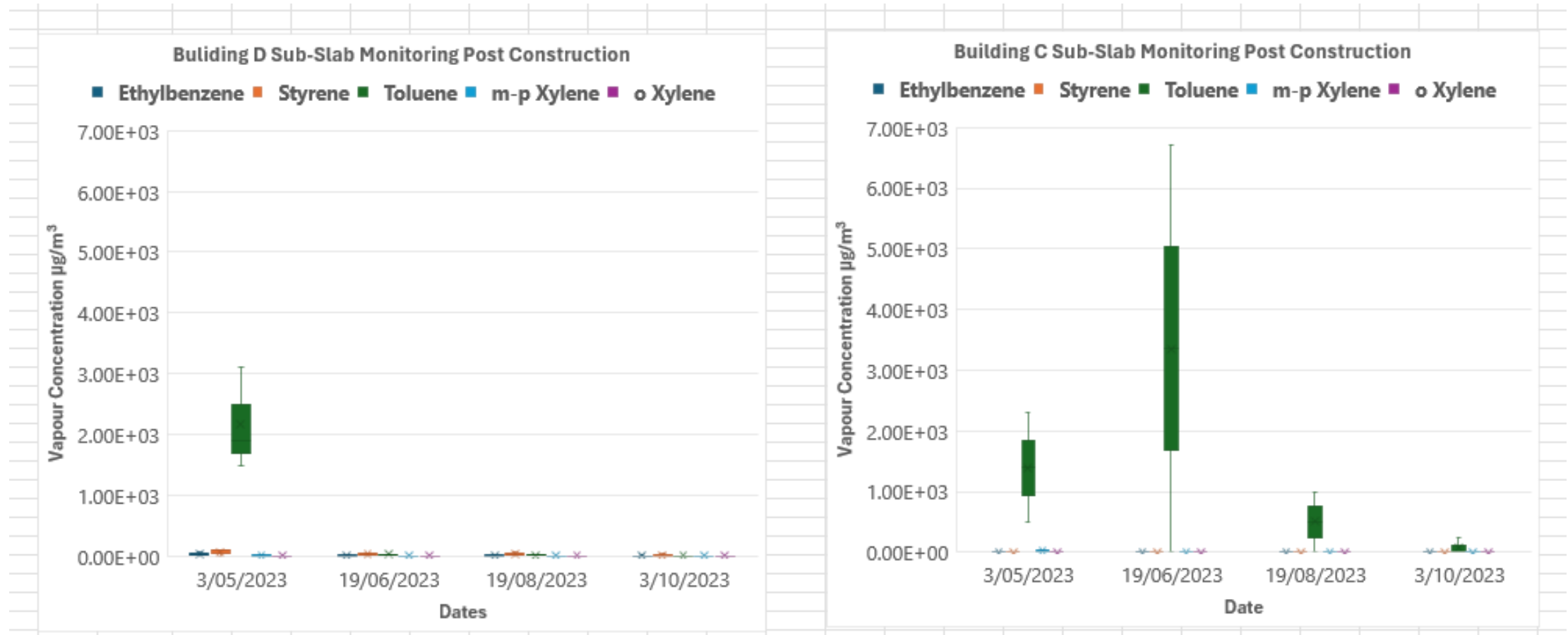
- Residual Geology – zero to 1 m clay, overlying peat.
- Groundwater – unconfined/confined, groundwater table 2 m below the floor slab level.
- Contamination – soil, dissolved + vapour.
- Ground floor use – high-density residential.
- Mitigation:
 - 1.5 m gravel blanket – engineered venting through barometric pumping (generate an oxygen-rich environment – supports risk assessment assumptions).
 - Lift pit tanked – bentonite.
 - Active venting/air conditioning in ground floor apartments (managed by Kāinga Ora).

Building C - Mitigation

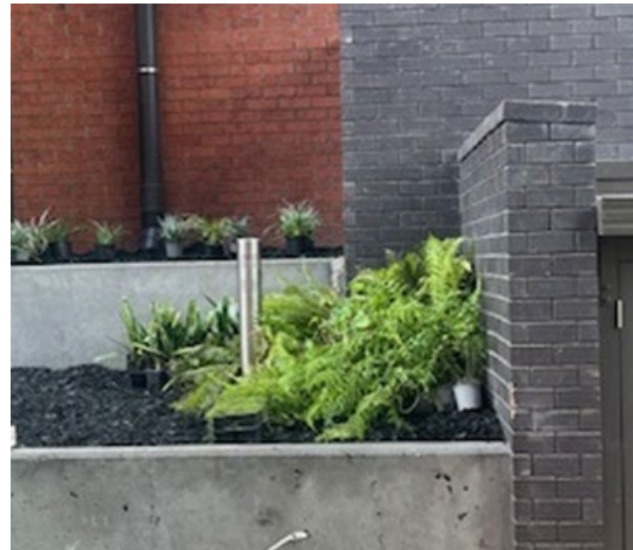
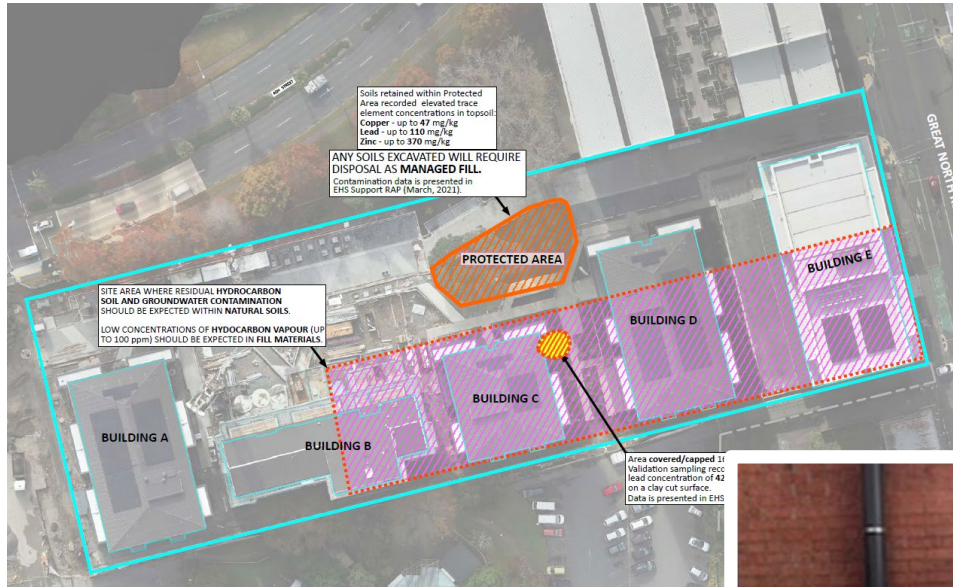


- Residual Geology – 1 m granular fill below floor slab level, overlying silty sand.
- Groundwater – unconfined, 1 m below floor slab level.
- Contamination – soil, dissolved + vapour.
- Ground floor use – high-density residential.
- Mitigation:
 - Verified vapour barrier.
 - Engineered passive venting below vapour barrier.
 - Lift pit tanked – bentonite.
 - Active venting/air conditioning in ground floor apartments (managed by Kāinga Ora).

Sub-Slab Vapour Verification Results



Long Term Site Management



- LTSM process just started.
- Passive systems **need** active management.
- Monitoring groundwater quality triggers
 - Building B – benzene 0.7 mg/L
 - Building C – benzene 13 mg/L

What Worked Well

- Remedial works / mitigation working effectively.
- Auckland Council happy to issue an “enabling type” consent – with milestones.
- Project Team worked cooperatively, particularly the main earthworks / piling contractor.
- Client / contractors saw the “value” in completing additional DSI work to reduce life cycle project cost.
- Asbestos in soil issues managed well by the contractor – “expected” discovery.
- Stormwater treatment pond (during initial work stages).
- Pre-investigation of pile construction through the BTEX plume – reduce contaminated soil disposal.
- Pre-treated pile casing water before discharge to treatment pond.
- Auckland Council happy to vary vapour risk sign-off methodology to what was originally proposed.

What Didn't Work So Well

- Deconstruction of the original structures generated additional contaminated soil.
- Initial use of canisters to sample vapour didn't provide conclusive results – passive samplers yielded more tangible results.
- Hydrocarbon RAP required the vapour barrier to be installed following CIRIAC735 Good Practice on the Testing and Verification of Protection Systems for Buildings against Hazardous Ground Gases.
 - Contractors not familiar with guidance.
 - Vapour barrier design changed partway through installation.
 - EHS Support completed 35 verification inspections during installation.

Thank You

- Kāinga Ora – Homes and Communities.
- Various contractors involved with the project – Dempsey Wood, CMP, Inovo, Architectus, and Rileys.