UK Geos

Chester Energy Research Field Site

UKCCSRC, Sheffield, September 12th 2017

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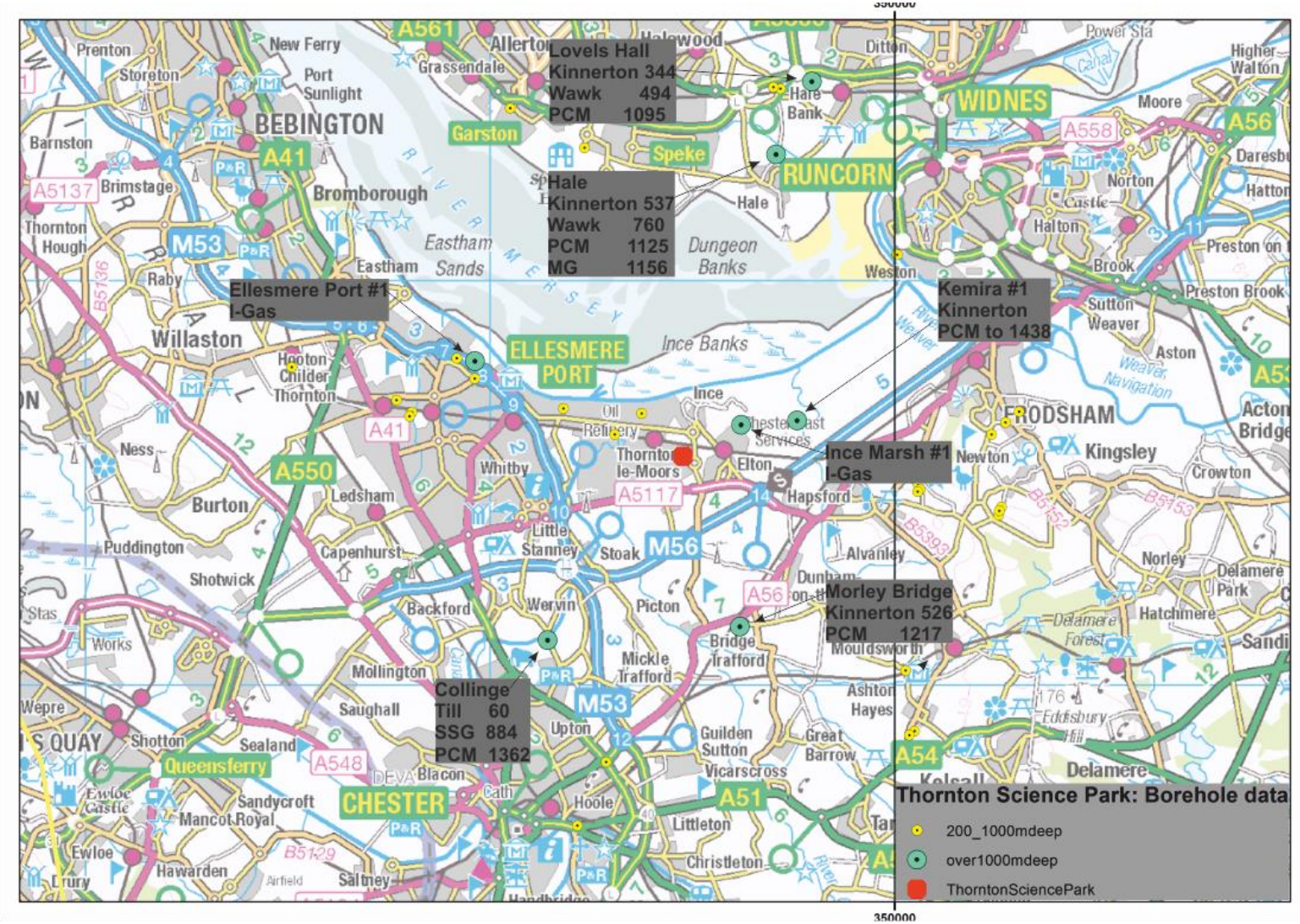
Location



Five borehole arrays of various depths / function for a range of monitoring objectives

Array 05: Injector (CCS) Well

- Rationale
- Project Assessment
- Site Characterization
- Well Design
- Monitoring
- Perceived Risks

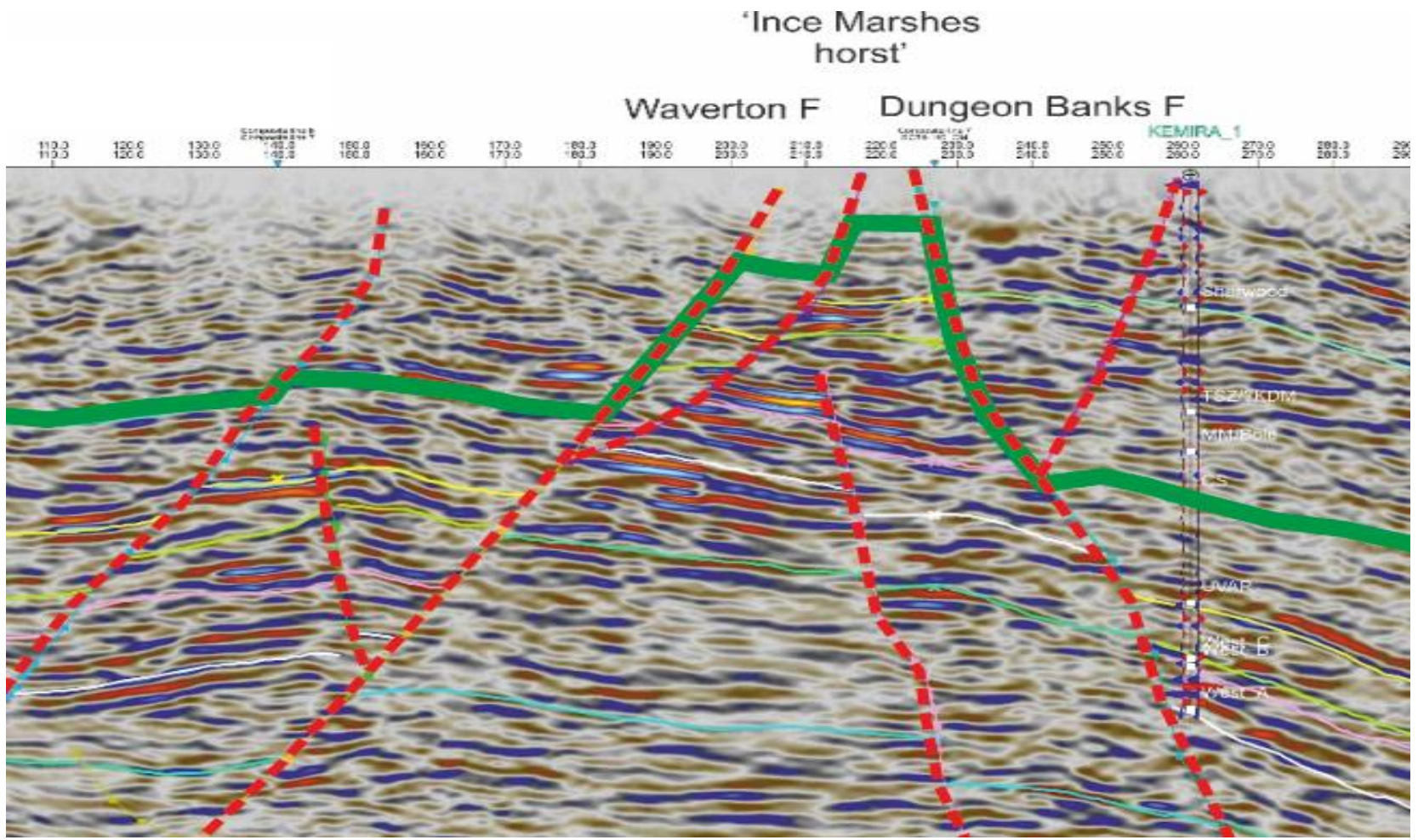
Rationale

- Carbon Storage is an integral part of the low-emissions energy research landscape
- Permo-Triassic Collyhurst Sandstone analogue for Irish Sea storage
- Provide key processes learnings in UK storage reservoir

Project Assessment

- At this stage, only the Groundwater Monitoring and Seismic baseline arrays are guaranteed.
- Favoured location for the CCS well sits within the Groundwater baseline and Seismic Monitoring baseline footprints
- Well designs are currently being reviewed and costed.
- Land access is being negotiated
- Next step is external critique by both the project external science advisory group, and an external panel of CO_2 storage / wellbore technology experts.

Site Characterisation



Faults (red) displace basal Permo-Triassic sandstones (green)

Seismic of moderate quality so detailed structure / stratigraphy uncertain

New Vibroseis and shallow seismic acquisition to be acquired

Site Characterisation

- Eastward downthrow from a horst block, well location about 600 m from where we believe the fault would express itself at surface.
- Fault terraces with positional uncertainty.
- Nearest offset well ~300 m north (Kemira 1).
- Current seismic does not image topmost 150 m, < 80 m of superficial deposits expected.
- Vibroseis and shallow seismic acquisition in next 2- 4 weeks.
- By the time we would drill the CCS well, we will have drilled many wells in the area – essential learning for stability of the overburden.

Well Design

- A preliminary design has been worked by the UK Geos technical team who have experience of CO_2 injection wells.
- Designs reviewed and reworked by our drilling contractor.
- Well designs are currently being reviewed and costed by our operator.
- Next step is external review/critique.
- Wells will be strategically cored to acquire core across overburden.
- Collyhurst and contacts will be cored in their entirety.

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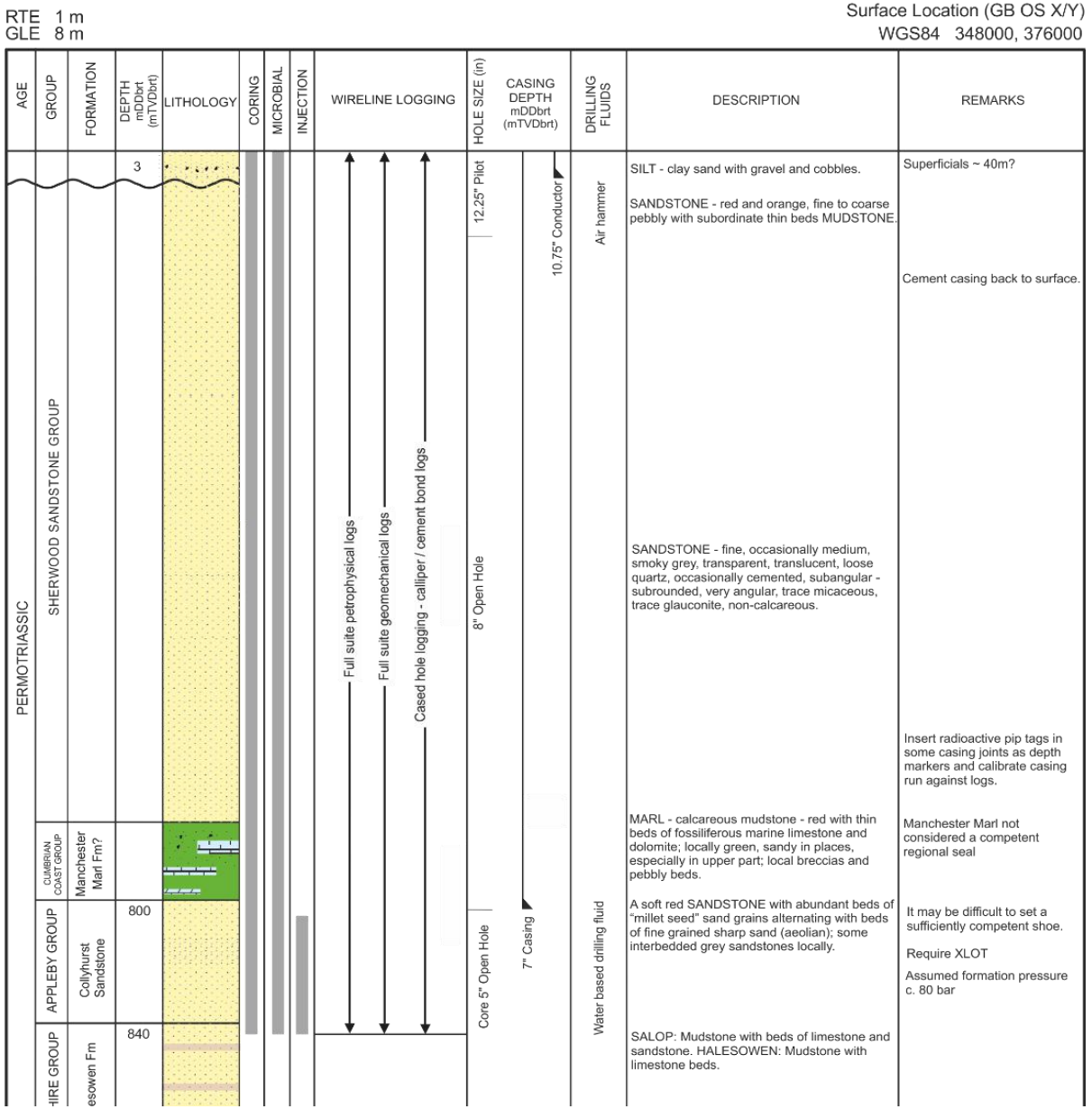
Carbon Storage Injection Well



Monitoring

- The CCS injection well will sit within the Groundwater Monitoring and Baseline Seismic arrays.
- Depending on the injection programme, additional specialised monitoring is likely to be implemented.
- The well will be re-logged and sampled over its lifetime, additional sidewall coring of the Collyhurst will be required.
- Well will require a pressure head and data logger

Perceived Risks

- Business Risk – Wells are expensive investments, how do we assure we get value?
- Geological Risks – Uncertainty around Manchester marl as a seal?
- Geological Risks – Fault geometry is uncertain, drilling into faults or fault damage zone is possibility.
- Engineering Risks – Obtaining a competent shoe in the top Collyhurst will be challenging, especially as an Extended Leak Off Test will be required immediately below.
- Societal Risk – Failure to obtain landowners permission for access.

Questions for the CCS Community

- What is the research programme for this well for the next 10 – 20 years?
- Geology constrains injection strategy and reservoir performance are the focus of research
  - Small scale
  - Reservoir processes, capillary trapping, dissolution etc.
- How do we ensure value is achieved?