

CASE FILE LIST

Case: HS2-025.

Title: HS2-025 Minshull Vernon and District Council - Petitioner.

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PETITION NO. HS2-P2B-025

LEIGHTON, MINSHULL VERNON AND
WOOLSTANWOOD PC

A PRESENTATION IN 3 PARTS

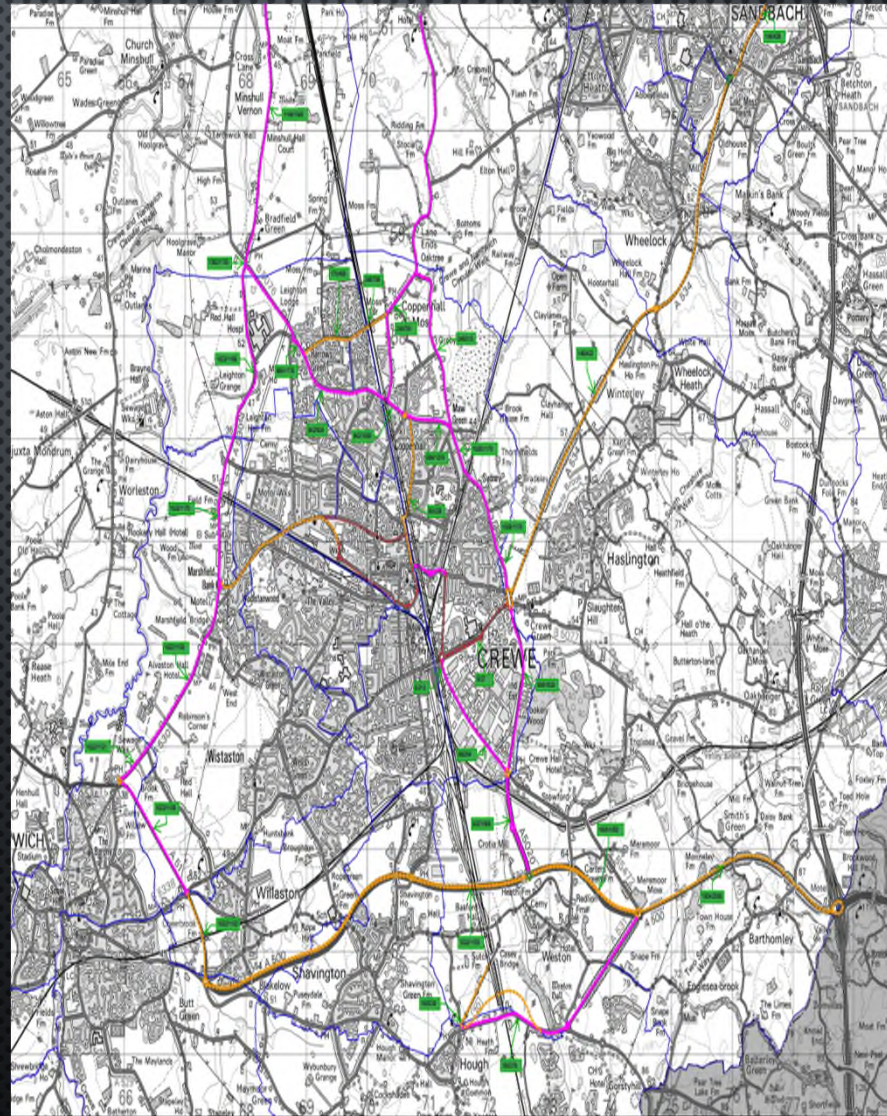
- **PART 1. CONSTRUCTION TRAFFIC ROUTES**
- **PART 2. HISTORY OF SALT WORKING ON THE CHESHIRE PLAIN**
- **PART 3. THE ROLLING STOCK DEPOT PLANNED NEAR WIMBOLDSLEY**

PART 1 CONSTRUCTION TRAFFIC ROUTES

The purple routes are high volume. We understand that the rate of flow both ways will be 1 lorry every 2 minutes, over a 10-hour day 7 days a week. If the journey time is 30 minutes, we can expect to see a convoy of 30 vehicles, each 2 minutes apart on average from the next one.

The A530 on the left of the picture, is for the most part rural but has new roundabouts.

But the Flowers Lane junction leads diagonally and quickly into busy residential urban streets lined with all the usual town hazards, especially at school opening and closing hours.



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CONSTRUCTION TRAFFIC CONTINUED

• IN CONCLUSION

- **NONE OF US CAN SEE THIS ROUTE WORKING SAFELY AND CERTAINLY NOT EFFICIENTLY.**
- **LORRIES WILL BE DELAYED INEVITABLY, AT SCHOOL TRAFFIC HOURS, AND THE HS2 TIMETABLE WILL SUFFER.**
- **WE BELIEVE THAT THE FLOWERS LANE — BRADFIELD ROAD — NORTH ST. — REMER ST. SIDNEY ROAD ROUTE SHOULD BE RESTRICTED TO OUTSIDE SCHOOL TRAFFIC HOURS, IF NOT ABANDONED AT THE OUTSET.**

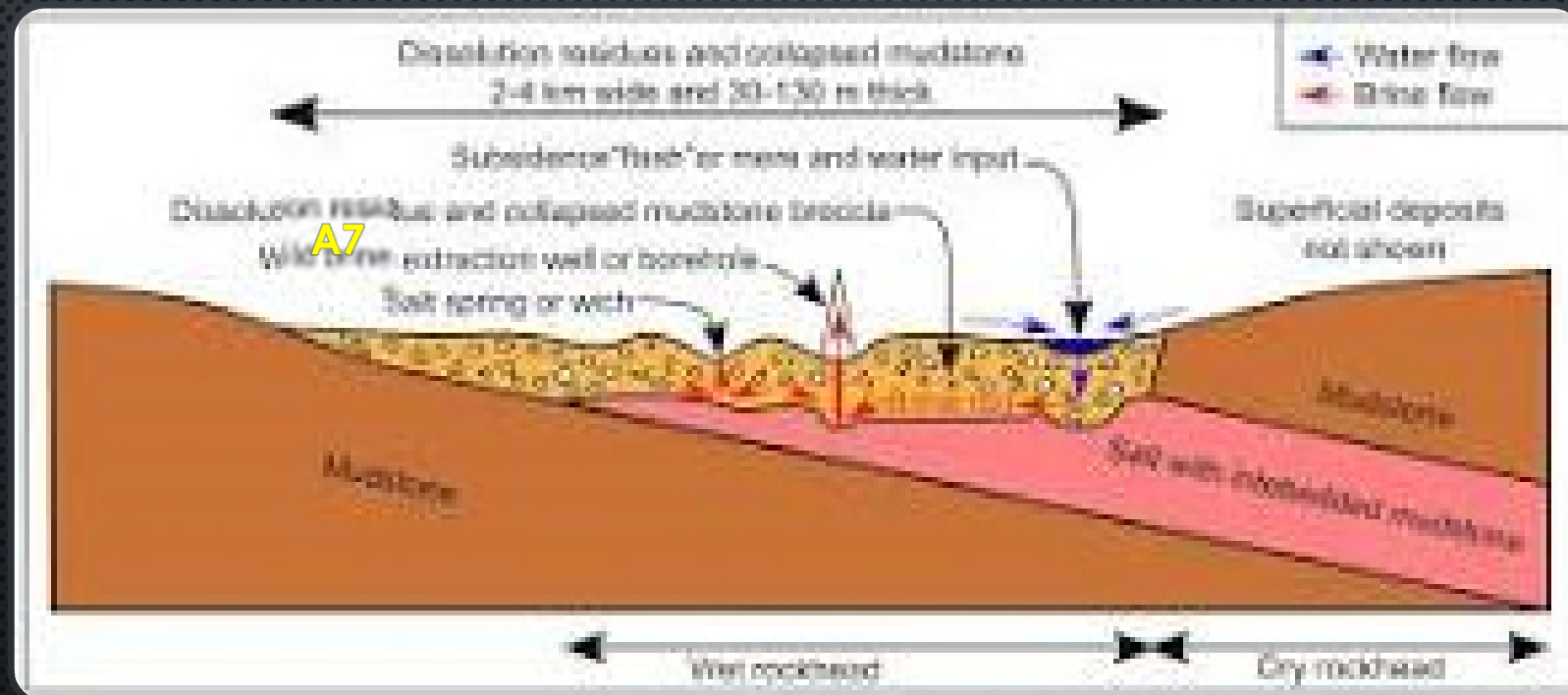
PART 2 HISTORY OF SALT WORKING IN CHESHIRE

- **THE SALT WORKS TIME LINE**
- **REF HS2 DOCUMENT 3RD MARCH 2023 FIG 5 (TIMELINE OF INDUSTRIAL ACTIVITY)**

Time	OCCURRENCE
252 to 201 MYA	Cheshire was part of Pangea and 1000's of miles further south
201 MYA onwards	Seas evaporated, salt deposits some 25 metres thick formed and were submerged under silt. This happened 4 times in 25m thick salt layers.
Later MYA	Pangea split up. Tectonic drift took the salt layers north. Huge faults developed salty ends become exposed to the wind, rain and mankind.
Roman times	Ancient Brits and Romans exploited the exposed salt springs and rocks. and built a settlement eventually called Northwich.
1670	Salt beds discovered whilst drilling for coal, salt mining began.
1800's	Mining was uneconomic so extraction with hot water was used.
1800's	Widespread collapse of salt mines in Northwich. Effects could be seen up to 5km from the bore holes. (Wild brining).
1800's	Other towns e.g. Middlewich and Nantwich, began extracting salt by hot water and by pumping out flooded mines. Cavernous mines collapsed.
1900's	Rock-salt mining by Pillar and Stall thrived at Winsford. The mines under Northwich flooded.
1952	The Cheshire Brine Subsidence Board (the CBSB) was set up to and dealt with 4800 claims, some ongoing. ongoing claims related to salt mining.
To Date	Wild brining by pumping water was eventually made illegal. Now Rock-salt production continues at Winsford, the largest UK rock salt mine. The mines are the size of 700 football pitches in area and growing.

A WET ROCK HEAD

A7



A8

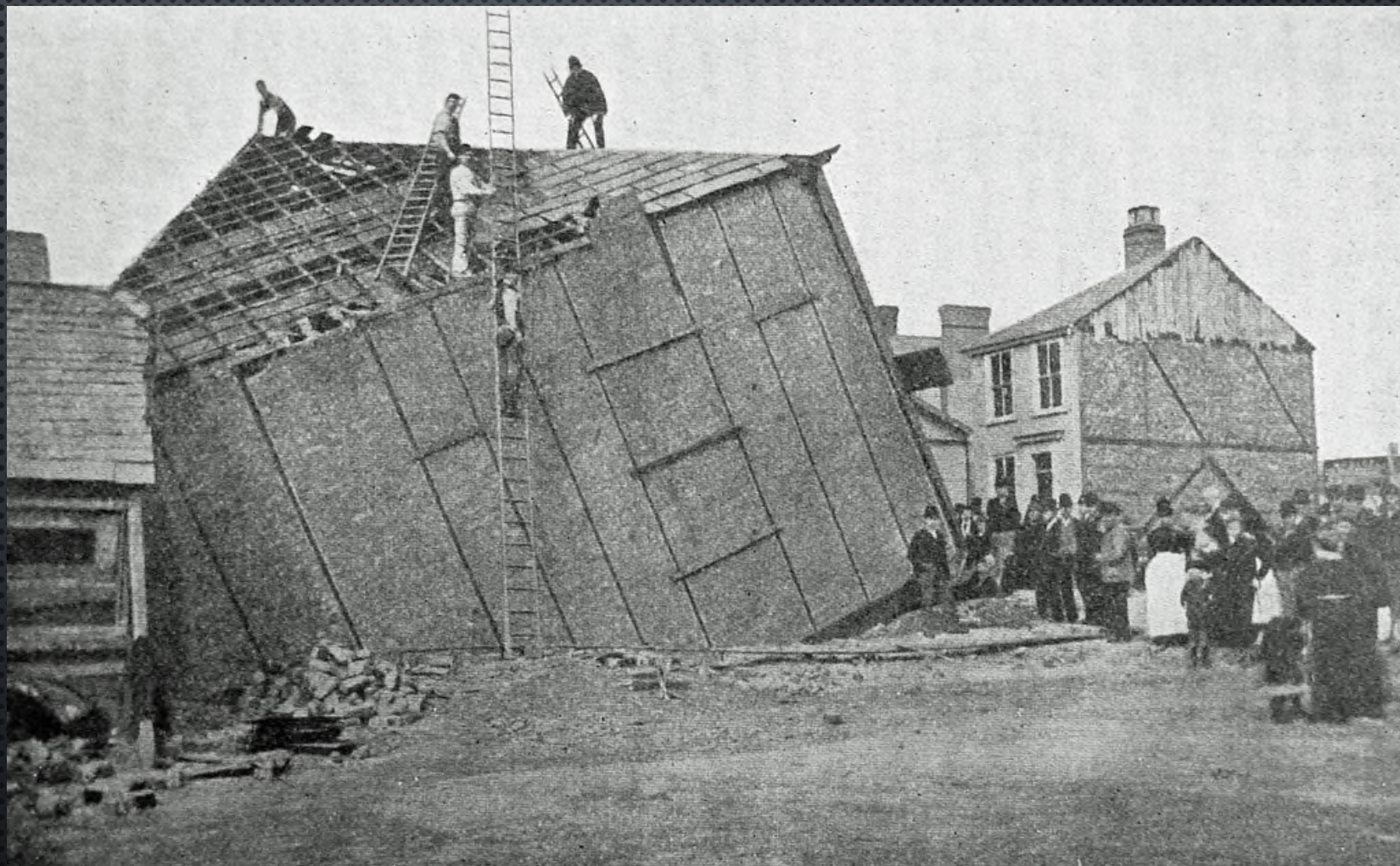
THE WINSFORD ROCK-
SALT MINE UNDER A
WET ROCK HEAD.
150M DOWN.
ABOVE IS AN
UNDERGROUND SALT
LAKE.



A41(9)

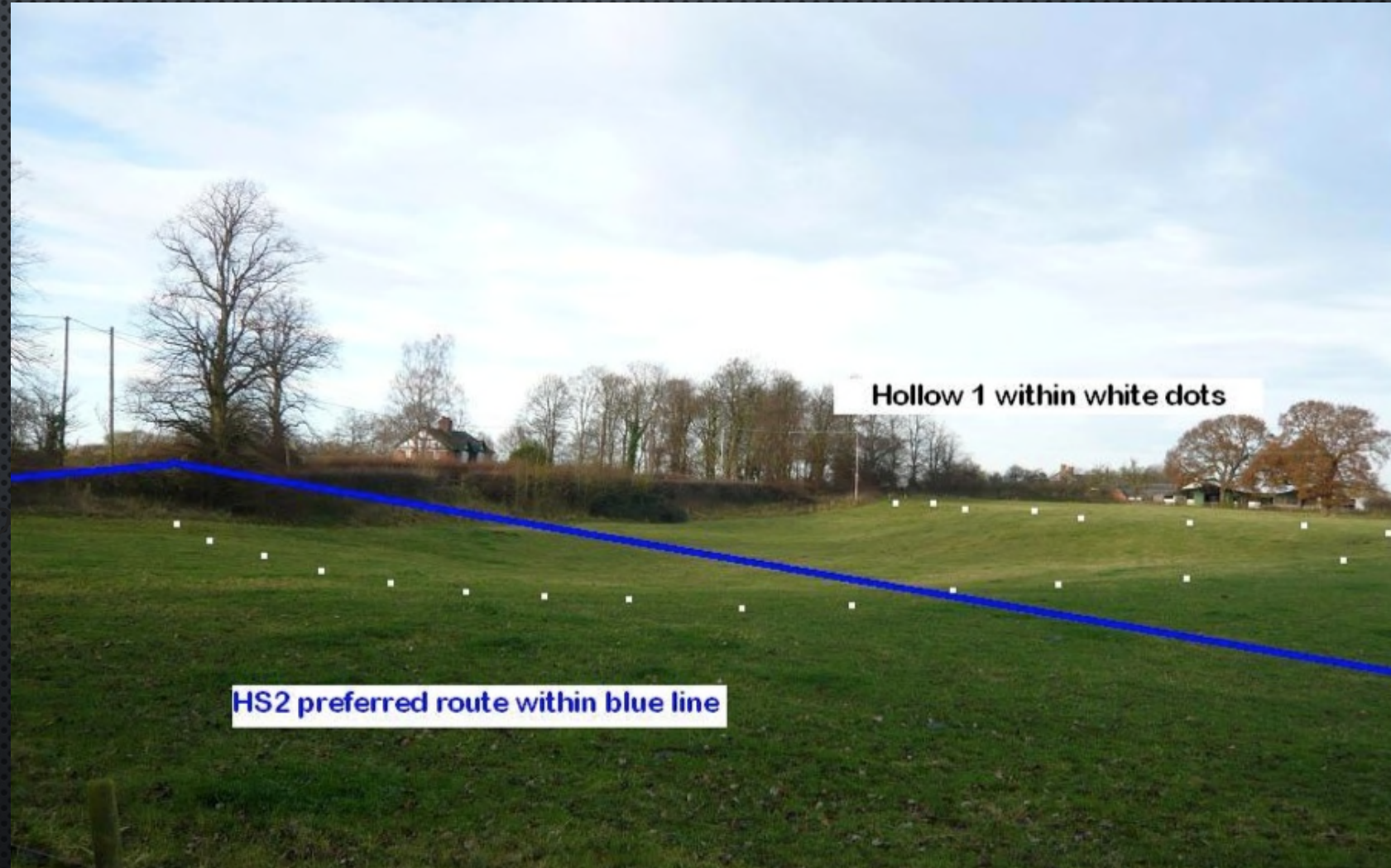
A10

RESULTS OF WILD BRINE
PUMPING AT NORTHWICH



A41(10)

1M DEEP SUBSIDENCE
HOLLOW OVER 2YEARS
AT GREENHEYE'S FARM
MIDWAY BETWEEN
WINSFORD AND
MIDDLEWICH
DEC 2013



A12

ONE OF THE BILLINGE
GREEN FLASHES
ADJOINING THE TRENT
AND MERSEY CANAL.
HALFWAY BETWEEN
NORTHWICH AND
MIDDLEWICH AS
LISTED IN HS2
DOCUMENT 3RD
MARCH 2023 4.3.1



PROPOSED SOLUTION TO OVERCOME SUBSIDENCE UNDER THE HS2 LINE, VIADUCTS EMBANKMENTS AND CUTTINGS

- TO OVERCOME SUBSIDENCE PROBLEMS DUE TO WHATEVER MECHANISM, THE ENGINEERS PLAN TO DRILL BOREHOLES OF A CERTAIN WIDTH, MANY FEET IN DEPTH, AND THEN FILL THEM WITH STEEL REINFORCING BARS AND A WET CONCRETE MIXTURE WHICH WILL SET IN-SITU, IN THE SALT LADEN SOIL.
- THE BELIEF IS THAT THE LAND UNDER VIADUCT SUPPORTS, GANTRY SUPPORTS AND EMBANKMENTS WILL BE FULLY STABILISED.
- HOWEVER, THERE IS ACCUMULATED EVIDENCE IN BUILDING TECHNOLOGY JOURNALS AND ACADEMIA THAT THE COMPRESSIVE STRENGTH OF CONCRETE ALLOWED TO SET WHEN SURROUNDED BY SODIUM CHLORIDE SOLUTION, HAS A REDUCED COMPRESSIVE STRENGTH DUE TO SALT CRYSTALS FORMING AND WEAKENING THE STRUCTURE. THE FORMATION OF WEAKENING, PRESSURISED CRYSTALS OF SODIUM OXYCHLORIDE IS EVEN MENTIONED, CONTRIBUTING, WITH RUST, TO “CONCRETE ROT”.

ACCORDING TO PROFESSOR. DR. AQEEL AL-ADILI WORKING IN SOIL MECHANICS AND FOUNDATION ENGINEERING 2019,

THE COMPRESSIVE STRENGTH OF CONCRETE IS AFFECTED NEGATIVELY BY ALLOWING IT TO SET IN WET SALTY SOIL

[HTTPS://WWW.RESEARCHGATE.NET/PUBLICATION/305689370_EFFECT_OF_SALTY_SOIL_ON_SUBSURFACE_CONCRETE_STRENGTH](https://www.researchgate.net/publication/305689370_EFFECT_OF_SALTY_SOIL_ON_SUBSURFACE_CONCRETE_STRENGTH)



EXTRACT - It can be seen from the table and the figure that the compressive strength declined steadily with the increase in the salt content within the sand. It can also be seen that the long term (90 days) curing, with more exposure to the salty environment, had detrimental effects on the compressive strength, reducing it further.

Moreover, the strength reduction was more pronounced in the 1:2:4 concrete mixes than in the 1:1.5:3 mixes. The reduction in compressive strength of concrete can be attributed to the wetting and drying cycles, and changes in humidity and temperature, which can result in the formation of salt crystals that exert a physical stress on concrete (Stark 2002).

ABSTRACT FROM THE PROFESSOR'S REPORT

THE INVESTIGATION OF EFFECT OF THE SALTY, CLAYEY, SILTY SOIL ON THE COMPRESSIVE STRENGTH OF THE CONCRETE INDICATES THAT THE SALT HAS SIGNIFICANT EFFECT ON REDUCTION OF THE STRENGTH FROM ABOUT 11% TO ABOUT 22% REGARDING THE REFERENCE CONCRETE (WITHOUT SALT SOIL) AS SHOWN IN TABLE-5 AND FIGURE-6. IT CAN BE SEEN THAT THERE IS STEADY REDUCTION IN THE STRENGTH WITH INCREASING SALT CONTENT.

THE TEST ALSO REVEALED THAT THE REDUCTION PERCENTAGES IN THE COMPRESSIVE STRENGTHS OF CONCRETE EMBEDDED IN SALTY SANDY SOIL ARE GREATER THAN REDUCTIONS IN SALTY CLAYEY SOIL IN
GENERAL

**TABLE 5 COMPRESSIVE STRENGTH OF CONCRETE EMBEDDED
IN SALTY CLAYEY SILTY SOIL**

Salt %	N/mm²	Variation % for 28 Days
0	28.26	-----
10	25.16	10.97
15	23.00	12.17
20	22.10	18.6
25	22.10	21.8

SEVERAL OTHER EARLIER RESEARCHERS REACHED THE SAME CONCLUSION E.G.

FALAH M. WEGIAN 2010 [HTTPS://WWW.TANDFONLINE.COM/DOI/FULL/10.1080/19373260.2010.521048](https://www.tandfonline.com/doi/full/10.1080/19373260.2010.521048)

- **IN THIS ARTICLE, THE EFFECTS OF MIXING AND CURING CONCRETE WITH SEAWATER ON THE COMPRESSIVE, TENSILE, FLEXURAL AND BOND STRENGTHS OF CONCRETE ARE INVESTIGATED. CONCRETE MIXES WERE PREPARED BY VARYING COARSE AGGREGATES, CEMENT PROPORTIONS AND TYPES. SIX GROUPS OF CONCRETE MIXES WERE MIXED AND CURED IN FRESH WATER, SIX GROUPS WERE MIXED AND CURED IN SEAWATER, WHILE FOUR GROUPS WERE MIXED WITH FRESH WATER AND CURED IN SEAWATER. THE COMPRESSIVE STRENGTH AND SUBSEQUENTLY THE OTHER RELATED STRENGTHS OF CONCRETE WERE SHOWN TO INCREASE FOR SPECIMENS MIXED AND CURED IN SEAWATER AT EARLY AGES UP TO 14 DAYS, WHILE A DEFINITE DECREASE IN THE RESPECTIVE STRENGTHS WAS OBSERVED FOR AGES MORE THAN 28 DAYS AND UP TO 90 DAYS. THE REDUCTION IN STRENGTH INCREASES WITH AN INCREASE IN EXPOSURE TIME, WHICH MAY BE DUE TO SALT CRYSTALLIZATION FORMATION AFFECTING THE STRENGTH GAIN.**

MANY MORE SCIENTIFIC STUDIES EXIST ON THE WEAKENING EFFECT THAT SODIUM CHLORIDE INGRESS HAS ON THE COMPRESSIVE STRENGTH OF CONCRETE AS IT SETS IN-SITU.

FOR EXAMPLE:

1. [HTTPS://WWW.IJERT.ORG/RESEARCH/EFFECT-OF-SODIUM-CHLORIDE-NACL-ON-CONCRETE-COMPRESSIVE-STRENGTH-IJERTV3IS032005.PDF](https://www.ijert.org/research/effect-of-sodium-chloride-nacl-on-concrete-compressive-strength-ijertv3is032005.pdf)
2. [HTTPS://WWW.ICEVIRTUALIBRARY.COM/DOI/ABS/10.1680/JADCR.19.00159](https://www.icevirtualibrary.com/doi/abs/10.1680/jadcr.19.00159)
3. [HTTPS://WWW.YOUTUBE.COM/WATCH?V=fRNgGXXzPYA](https://www.youtube.com/watch?v=fRNgGXXzPYA)
4. [HTTPS://WWW.NCBI.NLM.NIH.GOV/PMC/ARTICLES/PMC8434449/](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8434449/)
5. [HTTPS://WWW.GOOGLE.COM/SEARCH?Q=SODIUM+CHLORIDE+IN+CONCRETE&RLZ=1C1CHBF_EN](https://www.google.com/search?q=sodium+chloride+in+concrete&rlz=1C1CHBF_EN)
6. [HTTPS://WWW.SCIENCEDIRECT.COM/SCIENCE/ARTICLE/ABS/PII/S0950061816300472](https://www.sciencedirect.com/science/article/abs/pii/S0950061816300472)
7. [HTTPS://WWW.SCIENCEDIRECT.COM/SCIENCE/ARTICLE/ABS/PII/S0958946522002001](https://www.sciencedirect.com/science/article/abs/pii/S0958946522002001)

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WE HAVE BEEN ASKED THE QUESTION , "WHAT DO YOU WANT THE SELECT COMMITTEE TO DO FOR THE PETITION ?".

- 1). ENSURE THAT HS2 ENGINEERS CONSIDER THE PLETHORA OF PEER REVIEWED ACADEMIC REPORTS ABOUT THE EFFECT OF BRINE ON THE COMPRESSIVE STRENGTH OF CONCRETE PILES, FREELY AVAILABLE IN ACADEMIA.**
- 2). GIVE AN UNDERTAKING TO PUBLISH THE DETAILED REPORT ON THE GROUND CONDITIONS AS EACH SECTION IS COMPLETED.**

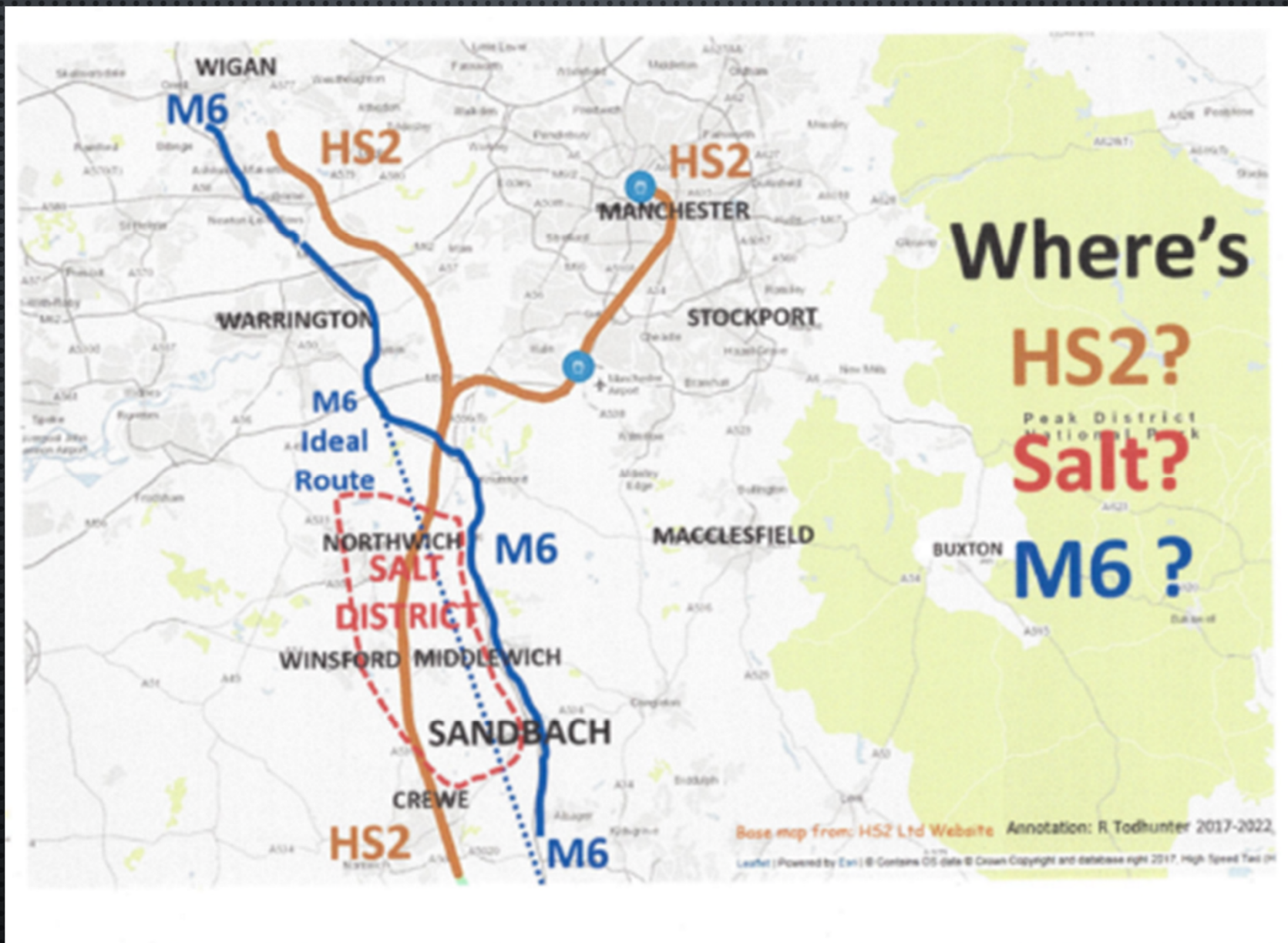
CONCLUSION

- **IN CONCLUSION: BECAUSE OF THE UNPREDICTABLE AND ONGOING LAND INSTABILITY, AND THE USE OF REINFORCED CONCRETE PILES, ALLOWED TO SET IN THE PRESENCE OF VARYING CONCENTRATIONS OF BRINE, WE SUPPORT THE PETITIONS OF OUR NEIGHBORING PARISHES IN THE BELIEF THAT THE LAND IS UNSAFE FOR HIGH-SPEED TRAINS.**

A21

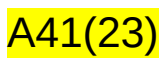
PART 3 CREWE NORTH ROLLING STOCK DEPOT

A22



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A41(23)



4.3 Route Alignment

4.3.1 The route of the Proposed Scheme was selected to minimise the risks posed by ground conditions in the Area of Interest. In particular, the route selected:

- Avoids major areas of former high subsidence as marked by flashes (see Figure 6), with the one exception of Billinge Flash (refer to section 3.2 and 4.4);
- Avoids a line of Meres that broadly align southeast of Rostherne Mere (refer to section 3.2 and Figure 6);
- Avoids areas of ground subsidence such as those which the Cheshire Brine Compensation Board defines as requiring statutory consultation in relation to any new development (see Figure 7 and refer to section 3.3.12);
- Does not pass within 2 km of any known former locations of historical wild brine well pumping sites, with one possible exception, a suspected brine well in the vicinity of Clive Green Lane (refer to section 3.3.10 and 4.4.14);
- Avoids clusters of subsidence features as historically mapped by BGS (refer to Figure 6);
- Avoids historical and controlled salt mines, whether remediated or not (refer to section 3.3.19); with the exception of Winsford Salt mine (refer to section 4.4.19); and
- Avoids existing brining extraction and gas storage caverns, passing just west and northwest of Warmingham and Holford brinefields respectively (refer to section 3.3.28).

4.3.2 It has not been possible to select a route which avoids entirely all possible sources of risk posed by the ground conditions in the Area of Interest. However, HS2 Ltd is satisfied that the Proposed Scheme can be designed, constructed, safely operated and maintained, as set out in the following sections.

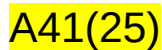
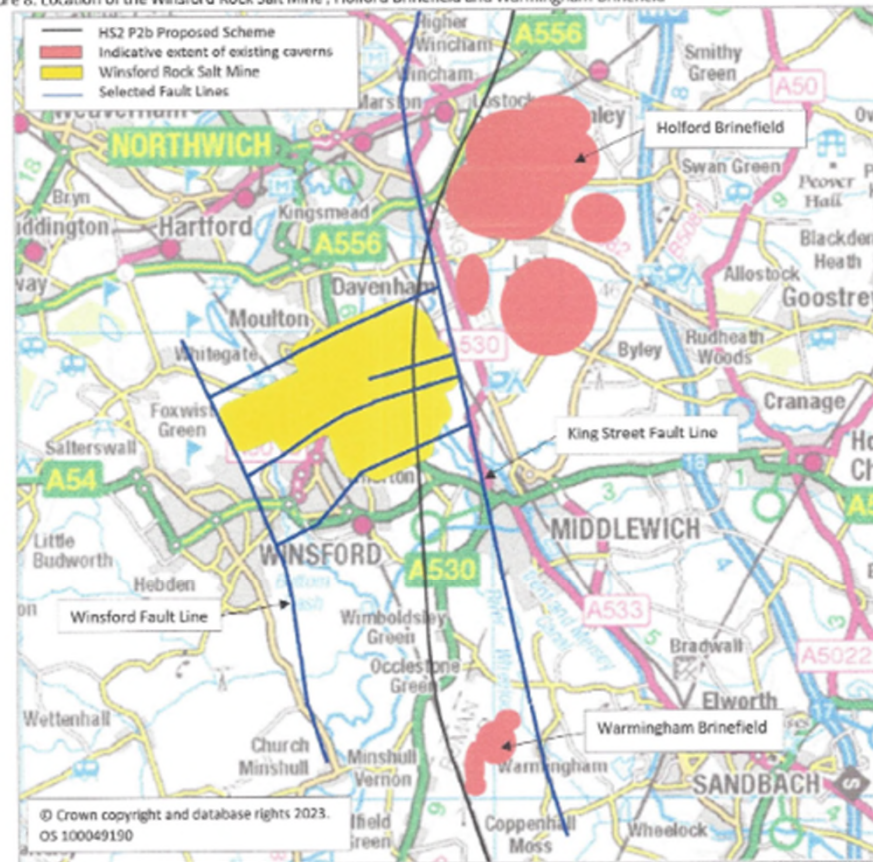


Figure 8: Location of the Winsford Rock Salt Mine, Holford Brinefield and Warmingham Brinefield



Controlled Mining

- 3.29 Winsford Rock Salt Mine is the only active salt mine within Cheshire and has been in continuous operation since the 1930s. The mine provides 75% of the rock salt market of the UK and hence is of strategic national importance. The mine is traversed by the Proposed Scheme for a distance of 3 km as shown in Figure 8.

The mine is situated within the wet rockhead area between the King Street Fault to the east and the Winsford Fault to the west. The mine experienced a period of expansion and modernisation in the 1960s which was preceded by an investigation phase comprising 20 boreholes constructed through the superficial deposits,

CONCERNS OVER SAFETY, GROUND STABILITY, COST AND CLASH WITH SALT INDUSTRIES:

HS2 Crosses Working Area of Winsford Rock Salt Mine

