

1 Executive Summary

- 1.1.1 Monitoring was undertaken across C1 throughout September 2022 in response to site construction activities. Graphs showing the monitoring data for the month are attached in Appendix A.
- 1.1.2 Monitoring at Chalfont St Peter (CSP) ventilation shaft remained at a quarterly monitoring frequency, whilst monitoring at Chalfont St Giles (CSG), Amersham (AMS), and Little Missenden (LMI) vent shaft sites continued monthly in line with the SSMP's. Chesham Road (CHR) and North Portal (NPTL) both continue to be monitored weekly in response to construction works.
- 1.1.3 Monitoring frequency decreased to monthly at Colne Valley Viaduct (CVV) Module 2. Weekly monitoring continued at Module 1 in response to rotary bored piling (RBP) at piers 10-9. Monitoring at Modules 4 and 3 remained at a monthly monitoring frequency. The continuous flight auger (CFA) piling works were completed at the South Embankment with all 1187 piles finished by the end of the month.
- 1.1.4 Monitoring across the South Portal and Western Valley Slopes areas continued at a monthly monitoring frequency, with continued surface water monitoring of the drainage systems. Pynesfield monitoring remains at a fortnightly monitoring schedule.
- 1.1.5 The priority monitoring round was completed, with all locations visited where possible. ML035-RO003a, ML035-CR004 (RTD) were both reported as dry and could not be monitored.
- 1.1.6 There was one trigger level exceedance during September; this excludes the on-going contamination identified in ML032-RC009, discussed in doc no.: 1MC05-ALJ-EV-NOT-C001-000006.
- 1.1.7 ML037-RC009 experienced elevated turbidity above trigger levels (835 NTU) on 09 September 2022. This followed the passage of both TBM's past this borehole's chainage on their path towards the CSG vent shaft.
- 1.1.8 Rain was observed throughout the month, with 13 days of rainfall recorded across the South Portal site.

Colne Valley Viaduct (CVV)

1.1.55 Rotary piling activities continued with the following locations worked on during the month:

- P6
- P7
- P8
- P12
- P13
- P16
- P17
- P18
- P19

1.1.56 Approximately 48 m³ support fluid was lost between Pier 10 and Pier 6 was reported during September. Table 10 displays the reported losses.

Table 10 Support fluid loss in September

| Pier | Loss (m3) |
|------|-----------|
| P10 | 5.58 |
| P9 | 9.26 |
| P8 | 9.19 |
| P7 | 14.86 |
| P6 | 2.50 |

At South Embankment, the continuous flight auger (CFA) piling was completed by the end of the month.

CVV Module 4 (North Embankment to Pier 43)

Groundwater

- 1.1.57 There were no trigger limit breaches during the month in Module 4.
- 1.1.58 Table 11 compares typical priority borehole ranges for the area with trigger levels and any trigger level exceedances.

Table 11 CVV Module 4 borehole in-field parameter data

| | pH | SPC (µS/cm) | Turb (NTU) | REDOX (mV) | DO (mg/L) |
|----------------------------------|---------|----------------|--|---------------|-----------|
| Typical Range | 6.5 – 8 | 700 - 875 | 1 – 25 | 50 - 300 | 8 – 11 |
| Trigger limit | 5 – 9 | 1000 | 100 ³ /250 ⁴ /500 ⁵ | - | - |
| Trigger Level Exceedances | - | | - | - | - |
| Exceeding borehole | - | | - | - | - |

- 1.1.59 Groundwater levels stayed more or less constant throughout the month.

Surface water

- 1.1.60 Surface water monitoring was completed during the month with chemical sampling and gauge board readings collected where possible. Monitoring continued both weekly and monthly. Surface water bodies within Module 4 include Denham Water-Ski Lake (ML028-SW004 and SW003) and the River Colne (ML028-SW002).
- 1.1.61 Table 12 compares typical surface water ranges for the area with trigger levels and any trigger level exceedances.

³ ML029-CR010, ML029-RO431

⁴ ML028-CR018, ML028-CR009

⁵ ML028-CR006

Table 12 CVV Module 4 surface water in-field parameter data

| | pH | SPC ($\mu\text{S}/\text{cm}$) | Turb (NTU) | REDOX (mV) | DO (mg/L) |
|--------------------|-----------|---------------------------------|------------|------------|-----------|
| Typical Range | 7.8 – 8.5 | 500 – 650 | 1 – 25 | 100 – 225 | 9 – 13 |
| Exceedances | - | - | - | - | - |
| Exceeding location | - | - | - | - | - |

CVV Module 3 (Pier 42 – P29)

Groundwater

1.1.62 Table 13 compares typical priority borehole ranges for the area with trigger levels and any trigger level exceedances.

1.1.63 No trigger limit breaches were observed during the month in Module 3.

Table 13 CVV Module 3 borehole in-field parameter data

| | pH | SPC ($\mu\text{S}/\text{cm}$) | Turb (NTU) | REDOX (mV) | DO (mg/L) |
|---------------------------|-----------|---------------------------------|------------|------------|-----------|
| Typical Range | 7.1 – 7.9 | 600 – 775 | 1 – 25 | 100 – 300 | 3 – 9 |
| Trigger limit | 5 – 9 | 1000 | 250 | - | - |
| Trigger Level Exceedances | - | - | - | - | - |
| Exceeding borehole | - | - | - | - | - |

1.1.64 Groundwater levels displayed a gentle decline (<0.1m) in line with seasonal trends into early September before increasing gently (<0.1m).

Surface water

1.1.65 Surface water bodies within Module 3 include the River Colne, Long Pond (ML028-SW001 and ML027-SW003), and Korda Lake (ML027-SW002 and ML027-SW001).

1.1.66 Table 14 compares typical surface water ranges for the area with trigger levels and any trigger level exceedances.

Table 14 CVV Module 3 surface water in-field parameter data

| | pH | SPC ($\mu\text{S/cm}$) | Turb (NTU) | REDOX (mV) | DO (mg/L) |
|--------------------|--------|--------------------------|------------|------------|-----------|
| Typical Range | 7 –8.5 | 550 - 900 | 1 – 25 | 50 - 250 | 7– 13 |
| Exceedances | - | - | - | - | - |
| Exceeding location | - | - | - | - | - |

CVV Module 2 (Pier 28 - Pier 13)

Groundwater

- 1.1.67 Table 15 compares typical priority borehole ranges for the area with trigger levels and any trigger level exceedances.
- 1.1.68 There were no trigger limit breaches in Module 2 during the month.

Table 15 CVV Module 2 borehole in-field parameter data

| | pH | SPC ($\mu\text{S/cm}$) | Turb (NTU) | REDOX (mV) | DO (mg/L) |
|---------------------------|-------|--------------------------|------------|------------|-----------|
| Typical Range | 7 – 8 | 600 - 850 | 1 – 25 | 50 - 300 | 7 – 11 |
| Trigger limit | 5 – 9 | 1000 | 250 | - | - |
| Trigger Level Exceedances | - | - | - | - | - |
| Exceeding borehole | - | - | - | - | - |

- 1.1.69 Groundwater levels were stable with minimal change over the month.

Surface water

- 1.1.70 Surface water bodies within Module 2 include Savay Lake (ML027-SW002 and ML027-SW001), and Small Pond (ML027-SW004 and SW005), as well as the Grand Union Canal (ML026-SW001).
- 1.1.71 Table 16 compares typical surface water ranges for the area with trigger levels and any trigger level exceedances.

Table 16 CVV Module 2 surface water in-field parameter data

| | pH | SPC (µS/cm) | Turb (NTU) | REDOX (mV) | DO (mg/L) |
|--------------------|---------|-------------|------------|------------|-----------|
| Typical Range | 7 – 7.7 | 700-850 | 1 – 25 | 0 - 250 | 6 – 13 |
| Exceedances | - | - | - | - | - |
| Exceeding location | - | - | - | - | - |

1.1.72 EC and pH at ML026-SW001 (surface water location in the Grand Union Canal (GUC)) have displayed increasing variability since February/March 2022. Observations during this time have gone from ranging between 800 – 900 µS/cm / 7.7 to 8.2 pH (November to March) to 650 to 950 µS/cm / 7.7 – 8.8pH (July to September).

1.1.73 Previous data from 2021 displays a gradual decrease in EC from March to August, before increasing significantly from September to December. It is possible that this is a natural phenomenon within the canal. It is also likely that under a higher frequency of monitoring, variability within the canal has been more obvious.

1.1.74 ALIGN are not conducting works that would be likely to impact the surface water at within the GUC. Considering the River Colne and GUC join and split several times upstream of this location, the changes are attributed to outside influences rather than Align’s work.

CVV Module 1 (Pier 13 to South Embankment)

Groundwater

1.1.75 Table 17 compares typical borehole ranges for the area with trigger levels and any trigger level exceedances.

1.1.76 There were no trigger limit breaches in Module 1 during the month.

Table 17 CVV Module 1 borehole in-field parameter data

| | pH | SPC (µS/cm) | Turb (NTU) | REDOX (mV) | DO (mg/L) |
|---------------|-----------|-------------|------------|------------|-----------|
| Typical Range | 6.7 – 7.7 | 620 - 1300 | 1 – 25 | -50 - 300 | 1 – 11 |

| | pH | SPC (µS/cm) | Turb (NTU) | REDOX (mV) | DO (mg/L) |
|---------------------------|-------|-------------------|------------|------------|-----------|
| Trigger limit | 5 – 9 | 1500 ⁶ | 500 | - | - |
| Trigger Level Exceedances | - | - | - | - | - |
| Exceeding borehole | - | - | - | - | - |

1.1.77 Groundwater levels displayed an increase across September approximately 0.1 m.

Surface water

1.1.78 Surface water bodies within Module 1 include Harefield lake No. 2 (ML026-SW002 and ML026-SW003) and New Years Green Bourne (ML026-SW005 and ML026-SW006).

1.1.79 Table 18 compares typical surface water ranges for the area with trigger levels and any trigger level exceedances.

Table 18 CVW Module 1 surface water in-field parameter data

| | pH | SPC (µS/cm) | Turb (NTU) | REDOX (mV) | DO (mg/L) |
|--------------------|-----------|-------------|------------|------------|-----------|
| Typical Range | 7.7 – 8.5 | 600 - 1200 | 1 – 20 | 0 - 300 | 7.5 – 13 |
| Exceedances | - | - | - | - | - |
| Exceeding location | - | - | - | - | - |

1.1.80 The New Years Green Bourne (NYGB) remained dry throughout September.

1.1.81 ML026-SW002 showed elevated levels of EC during the month. The conductivity in ML026-SW002 showed some unusual spikes similar in behaviour to ML026-SW001 (in the Grand Union Canal), whilst the other parameters are more similar to ML026-SW003 (the other Harefield Lake location). This may indicate a connection between the Grand Union Canal boatyard and the lake. Alternatively, due to the striking similarity in the data,

⁶ Due to pre-existing contamination in the module 1 area, EC values are generally higher than anywhere else in Section C1.

it is possible the data was incorrectly allocated to the wrong location. This will be watched closely in the coming month.

South Portal and Western Valley Slopes

- 1.1.82 Activity on South Portal is focused on the continued operations of the Tunnel Boring Machine (TBM) and the Slurry Treatment Plant (STP). Chalk cake placement on the WVS is ongoing.
- 1.1.83 Construction of the new WTP was completed in September and commissioning began from week commencing 19th September. Performance tests continue to be carried out, but test results thus far indicate the water quality leaving the plant meets specifications. The consent variation to allow discharge from the plant was received on 15 September 2022 (EPR-QB3092NR-V003).