ANNEX A

FOI DOF/2025-0375

Request

I am seeking information regarding the technical governance, maintenance, and accuracy of the coordinate control networks maintained by Ordnance Survey of Northern Ireland (OSNI) and/or Land & Property Services (LPS), specifically covering the RTK GNSS infrastructure, passive survey control networks, vertical datums, and associated QA procedures.

DoF response

I can confirm the department holds the information requested. Please see responses below:

1. GNSS / RTK Base Station Network

1.1. What is the current protocol for verifying the positional accuracy of OSNI RTK base stations?

Coordinates for the OSNI CORS included in the EUREF Permanent GNSS Network are computed every week by the EPN Analysis Centres, following the rules and guidelines set up by the International GNSS Service and supplemented by the EUREF Governing Board (Guidelines for EUREF Analysis Centers).

As part of the NRTK solution, coordinates of all OSNI CORS are continually monitored to detect movement, deformation, or data issues. This is completed as a rigorous real-time network calculation. A warning system is in place should tolerances be exceeded.

1.2. When was the last full network-wide verification or QA audit undertaken across the RTK infrastructure?

The extent of the infrastructure is reviewed at least annually, in advance of identifying annual budget requirements.

Verification of the infrastructure is managed as an ongoing programme rather than a single verification exercise. A rolling programme is in place to update the CORS infrastructure and replace equipment in line with its asset life.

Firmware upgrades are applied as they become available. Communications links are replaced depending on performance and contract periods. The infrastructure is also included in the LPS asset verification exercise.

1.3. How frequently are base station coordinates recalculated or checked against the current ETRS89 reference frame?

Coordinates for the OSNI CORS included in the EUREF network are computed every week by the EPN Analysis Centres tied to the latest ITRS realisation.

High precision multi GNSS processing of all OSNI CORS indicates ITRS coordinate repeatability of better than 2mm in easting and northing, and better than 3.5mm vertically.

1.4. Have any base stations been retired, relocated, or reconfigured in the past 5 years? Please list affected stations and dates.

Within the last 5 years CORS station THMS was dismantled (2024). Hardware has been replaced at the BNGR (2025), BPTK (2025), BFST (2020), KILL (2021), KLRE (2022), MRKT (2025), OMGH (2021), and QUB1 (2025) stations.

2. Vertical Datum and Levelling

2.1. When was the last levelling campaign or loop undertaken to validate the OSNI height network?

OSNI do not maintain the BM network. Industry practice for establishing height is to use survey quality dual frequency GNSS positioning combined with a geoid model.

2.2. Does the height network still reference Belfast or Poolbeg Datum? Are there plans to migrate to a GNSS-compatible vertical datum such as ODN or EVRS?

OSNI benchmarks refer to MSL Belfast Lough. Yes we are currently working on our vertical datum.

2.3. Have OSNI conducted or published any comparisons between traditional height benchmarks and GNSS-derived orthometric heights?

Details of the transformations and accuracies are included in "Transformations and OSGM15 User Guide" which is included in the Grid InQuestII OSTN15 and OSGM Developer Pack (Coordinate tools and resources | Coordinate transformations | OS).

3. Coordinate Reference Systems and QA

3.1. Please provide documentation for coordinate transformations used between Irish Grid / ITM and ETRS89 in OSNI systems.

Details of the transformations between Irish Grid and ETRS89 are available in "Transformations and OSGM15 User Guide" which is included in the Grid InQuestII OSTN15 and OSGM Developer Pack (Coordinate tools and resources | Coordinate transformations | OS)

3.2. What QA checks are in place to ensure the positional accuracy of coordinate data published via OSNI's public services (e.g. Map Shop, Fusion)?

OSNI does not directly publish coordinate data via public services.

OSNI's mapping and data products are continually reviewed and revised and Quality Assurance checks are built into the normal business as usual production processes. This data is then published and made available via public services such as the map shop.

3.3. Has any independent QA, audit, or review of OSNI's geodetic infrastructure been carried out by external parties (e.g., OSGB, academia, or international bodies) in the past 10 years?

Coordinates of the OSNI CORS included in the EUREF network are computed every week by a minimum of two Regional Data Centres. Weekly reports are produced for data latency, and for consistency between the RINEX headers and the site logs.

Data from OSNI CORS stations is included in the Tailte Eireann (OSi) network and monitored by their QA systems. OSNI CORS data is also included in third party NRTK systems and by third parties for real time processing and monitored by their QA systems.