10 Land and Soils

10.1 Introduction

10.1.1 This chapter identifies, describes and assesses the likely direct and indirect significant effects of the Proposed Order on land and soils. The assessment includes consideration of potential pathways by which effects on land and soils could influence groundwater. The assessment of effects on groundwater receptors is presented in Chapter 11: Water.

10.1.2 This chapter presents the Principal Assessment of the likely significant effects of the Proposed Order on land and soils. The assessment compares the 2029 Permitted Operation (32 mppa) and 2029 Proposed Operation (40 mppa) in accordance with the project-wide assessment framework described in Chapter 5: Methodology.

10.1.3 Although the Proposed Order does not involve new physical infrastructure, changes in airport operations have the potential to influence land and soil receptors through changes in aircraft activity and associated operational characteristics. Accordingly, a proportionate assessment has been undertaken.

10.1.4 This chapter defines the study area, the methodology used for determining the baseline and impact assessment, provides a description of the baseline environment and presents the findings of the impact assessment in relation to land, soils and geology. Where necessary, this chapter provides details of committed mitigation and/or enhancement measures identified to avoid, prevent, reduce or offset significant adverse effects on land, soils and geological environment.

10.1.5 This Chapter was written by Edel O'Hannelly BA(Mod), MSc, an Associate Geo-Environmental Consultant at AECOM with over 25 years' experience. Edel completed the Land and Soils Environmental Impact Assessment Report (EIAR) Chapter for the Underpass beneath Runway 16/34 at Dublin Airport. Edel also completed the Land and Soils Chapter of the EIAR for the Project Opera development site in Limerick, and baseline assessments for ESB Poolbeg and Northwall in Dublin. This Chapter has been reviewed by Kevin Forde BSc, MSc, a Technical Director in AECOM's Investigation and Remediation team. Kevin completed his MSc in Hydrogeology and has over 25 years' experience.

10.1.6 The assessment of groundwater receptors, including the status and risk classification of groundwater bodies under the Water Framework Directive, is presented in Chapter 11: Water.

10.2 Legislation, Policy and Guidance

10.2.1 This chapter has been prepared in line with all relevant national legislation and policies as well as national and international good practice guidelines. Legislation, policy and guidance directly relevant to this chapter is identified below; more general legislation, policy and guidance relevant to the whole EIAR is set out in Chapter 5: Methodology.

Legislation

10.2.2 The following legislation relevant to this chapter has been considered as part of the assessment:

- The Dublin Airport (Passenger Capacity) Act 2026.
- EIA Directive 2011/92/EU (as amended by Directive 2014/52/EU); and
- European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296/2018).

Policy

10.2.3 Fingal County Council (FCC) adopted the Fingal County Development Plan 2023-2029[1], which sets out a range of proposed policy objectives for development within Fingal County up to 2029. The plan

[1] Fingal County Council, Fingal Development Plan, (2023) Available at: https://www.fingal.ie/development-plan

incorporates the mandatory objectives listed in the Act, including conservation and protection of the environment; and promotion of compliance with environmental standards.

10.2.4 In 2020 FCC also prepared a local area plan specifically for Dublin Airport, titled the Dublin Airport Local Area Plan[2], which was prepared in accordance with the Planning and Development Act, 2000 as amended.

Guidance

10.2.5 The following guidance documents relevant to this chapter have been considered as part of the assessment:

- Guidelines on the information to be contained in Environmental Impact Assessment Reports, Environmental Protection Agency (EPA), (May 2022) (hereafter referred to as 'the EPA Guidelines')[3];
- Environmental Impact Assessment of Projects - Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU), European Union, 2017[4];
- Institute of Geologists of Ireland (IGI), Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (2013)[5];
- National Roads Authority (NRA, now Transport Infrastructure Ireland (TII)), Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (2009)[6];
- Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites, EPA, (2013)[7]; and
- European Commission, EU Soil Strategy for 2030 Reaping the Benefits of Healthy Soils for People, Food, Nature and Climate, (2021)[8].

10.3 Assessment Methodology

Overall Approach

10.3.1 As described in Chapter 5: Methodology, the assessment has been undertaken in accordance with the following methodology and EPA Guidelines:

- Establishment of the baseline conditions, including identification and assessment of the receiving environment and receptor sensitivity;
- Identification of the potential impacts, and assessment of the magnitude of potential effects, and their significance;
- Consideration of mitigation measures; and

[2] Fingal County Council, Dublin Airport LAP (2020), Available at: https://www.fingal.ie/dublin-airport-local-area-plan-2020

[3] EPA, Guidelines on the information to be contained in Environmental Impact Assessment Reports (2022) Available at: https://www.epa.ie/publications/monitoring--assessment/assessment/EIAR_Guidelines_2022_Web.pdf

[4] https://ec.europa.eu/environment/eia/pdf/EIA_guidance_EIA_report_final.pdf

[5] Institute of Geologists of Ireland, Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (2013) Available at: https://igi.ie/assets/files/Codes%20and%20Guidelines/IGI%20Enviro%20Impact%202013.pdf

[6] TII, Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (2009) Available at: https://www.tii.ie/media/llvnszei/guidelines-on-procedures-for-assessment-and-treatment-of-geology-hydrology-and-hydrogeology-for-national-road-schemes.pdf

[7] EPA Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites (2013) Available at: https://www.epa.ie/publications/compliance--enforcement/waste/Guidance_on_the_Management_of_Contaminated_Land_and_Groundwater_at_EPA_Licensed_Sites.pdf

[8] European Commission, EU Soil Strategy for 2030 Reaping the Benefits of Healthy Soils for People, Food, Nature and Climate (2021) Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021DC0699

- Assessment of residual effects.

Study Area

10.3.2 The study area, to which the Proposed Order is applicable, encompasses the Dublin Airport Site as described in Chapter 2: Site and Surroundings and illustrated in Figure 2-1.

Determination of Baseline Environment

10.3.3 Data and background information in relation to the land, soils and geology were derived from publicly available sources, accessed in August 2026 including:

- Geological Survey Ireland (GSI) Spatial Resources Map Viewer, including Teagasc Soils Database (Geological Survey Ireland Spatial Resources)
- EPA website (www.epa.ie) and Map Viewer (EPA Maps)
- EPA Licence and Enforcement Access Portal (LEAP)
- EPA Industrial Emissions (IE) and Industrial Pollution Control (IPC) licence search (Licence Search)
- Tailte Éireann (formerly Ordnance Survey of Ireland (OSI)) GeoHive map viewer (www.geohive.ie)
- Tailte Éireann Irish Townland and Historical map viewer (https://osi.maps.arcgis.com)
- Google Earth

10.3.4 Additional site-specific sources of information provided by the Applicant included:

- Existing site investigation reports, including:
  - Additional Airfield Boreholes Ground Investigation Report, project number: 7687-04-18, Ground Investigations Ireland (GII), July 2018
  - 244 Airfield Surveys Phase 2 Ground Investigation Report, project number: 7926-07-18, GII, January 2019
  - daa Airfield Underpass Ground Investigation, project number: 21-1219, Causeway Geotech Limited (CGL), June 2022
  - daa Cargo Relocation Ground Investigation, project number: 25-0509, CGL, September 2025
- West Apron Vehicle Underpass Hydrogeological Report, project number: 1100040489, Ramboll Consulting Engineers, August 2020
- Dublin Airport 2021-2023 Environmental Monitoring Report, project number: P21-195, Fehily Timoney (FT), April 2024
- Dublin Airport Cargo Relocation Project Site Investigation Report, project number: P21195-FT-EGN-RP-EN-0010, FT, August 2025
- Airfield Drainage Project Environmental Impact Assessment Report, project number: 20771, Nicholas O'Dwyer (NOD)

Identification of Significant Environmental Effects

10.3.5 The Proposed Order does not involve the construction of new physical infrastructure but would result in a change in airport operations. Accordingly, the assessment has considered whether the proposed operational changes have the potential to affect identified land and soils receptors, having regard to the baseline conditions within the study area, the characteristics of the receptors and the nature of the potential effects.

10.3.6 The assessment of likely significant effects is qualitative and has also considered the potential for in-combination effects with other environmental factors and cumulative effects with other developments, where relevant.

Determination of Sensitive Receptors

Soils, Geology and Hydrogeology

10.3.7 Receptor sensitivity reflects the value, importance and vulnerability of the land and soils receptor, together with its susceptibility to the type of change arising from the Proposed Order. Receptors have been identified during the baseline study, and a qualitative assessment has been used to assign a sensitivity rating from low to extremely high based on NRA / TII's 2009 Guidelines[6]. Table 10-1sets out the criteria used to assign importance or sensitivity to the receptors.

Table 10-1: Sensitivity of Soil, Geological & Hydrogeological Attributes

Importance / Sensitivity	Criteria	Typical Examples
Very High	Attribute has a high quality or value on a regional or national scale Degree or extent of soil contamination is significant on a national or regional scale Volume of peat and/or soft organic soil underlying site is significant on a national or regional scale*	▪ Soil and Geology: – Geological feature rare on a regional or national scale (Natural Heritage Area (NHA)) or of high value on a local scale (County Geological Site) – Large existing quarry or pit – Proven economically extractable mineral resource
High	Attribute has a high quality or value on a local scale Degree or extent of soil contamination is significant on a local scale Volume of peat and/or soft organic soil underlying site is significant on a local scale*	▪ Soil and Geology: – Contaminated soil on-site with previous heavy industrial usage – Large recent landfill site for mixed wastes – Geological feature of high value on a local scale (County Geological Site) – Well drained and/or highly fertile soils – Moderately sized existing quarry or pit – Marginally economic extractable mineral resource
Medium	Attribute has a medium quality or value on a local scale Degree or extent of soil contamination is moderate on a local scale Volume of peat and/or soft organic soil underlying site is moderate on a local scale*	▪ Soil and Geology: – Contaminated soil on-site with previous light industrial usage – Small recent landfill site for mixed wastes – Moderately drained and/or moderate fertility soils – Small existing quarry or pit – Sub-economic extractable mineral resource
Low	Attribute has a low quality or value on a local scale Degree or extent of soil contamination is minor on a local scale Volume of peat and/or soft organic soil underlying site is small on a local scale*	▪ Soil and Geology: – Large historical and/or recent site for construction and demolition wastes – Small historical and/or recent landfill site for construction and demolition wastes – Poorly drained and/or low fertility soils – Uneconomically extractable mineral resource

* Relative to the total volume of inert soil disposed of and/or recovered

Source: Based on criteria outlined within the NRA / TII's Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (NRA / TII, 2009)

Use of Natural Resources

10.3.8 In relation to the use of natural resources (imported fill or aggregates), the assessment considers the consumption of finite natural resources associated with the operation of the airport. The assessment

examines whether the demand for these resources could result in their depletion or otherwise give rise to significant environmental effects, having regard to the scale of resource use and the availability of supply.

Describing Potential Effects

10.3.9 The methodology used for describing the potential effects considers the 'quality' of the effects (i.e., whether it is adverse or beneficial), the 'likelihood' of the event occurring, and the extent, magnitude, duration, significance and reversibility as set out in Chapter 5: Methodology.

10.3.10 With regard to the probability of an effect occurring this is defined in the EPA Guidelines[3] as:

- Likely – when effects caused by the Proposed Order that can reasonably be expected to occur, even if all mitigation measures are properly implemented
- Unlikely – when effects can reasonably be expected not to occur because of the Proposed Order if all mitigation measures are properly implemented

10.3.11 Specific assessment criteria for describing potential effects and typical examples based on information within the NRA / TII's 2009 Guidelines are outlined in Table 10-2.

Table 10-2:Criteria and Examples for Describing Potential Effects on Land and Soils

Magnitude of Impact	Criteria for Impacts	Typical Examples (Positive and Negative)
Large Adverse	Results in loss of attribute, and / or quality and integrity of attribute	▪ Soil and Geology: – Loss of high proportion of future quarry or pit reserves – Irreversible loss of high proportion of local high fertility soils – Removal of entirety of geological heritage feature – Requirement to excavate / remediate entire waste site – Requirement to excavate and replace high proportion of peat, organic soils and/or soft mineral soils
Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute	▪ Soil and Geology: – Loss of moderate proportion of future quarry or pit reserves – Removal of part of geological heritage feature – Irreversible loss of moderate proportion of local high fertility soils – Requirement to excavate / remediate significant proportion of waste site – Requirement to excavate and replace moderate proportion of peat, organic soils and/or soft mineral soils
Small Adverse	Results in minor impact on integrity of attribute or loss of small part of attribute	▪ Soil and Geology: – Loss of small proportion of future quarry or pit reserves – Removal of small part of geological heritage feature – Irreversible loss of small proportion of local high fertility soils and/or high proportion of local low fertility soils – Requirement to excavate / remediate small proportion of waste site – Requirement to excavate and replace small proportion of peat, organic soils and/or soft mineral soils
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity	▪ Soil and Geology: – No measurable changes in attributes
Minor Beneficial	Results in minor improvement of attribute quality	▪ Minor enhancement of geological heritage feature
Moderate Beneficial	Results in moderate improvement of attribute quality	▪ Moderate enhancement of geological heritage feature

Magnitude of Impact	Criteria for Impacts	Typical Examples (Positive and Negative)
Major Beneficial	Results in major improvement of attribute quality	▪ Major enhancement of geological heritage feature

Source: Based on criteria outlined within the NRA / TII's Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (NRA / TII, 2009)

Determining Significance of Effect

Soils, Geology and Hydrogeology

10.3.12 A qualitative approach is used to determine the likely significant effects, as set out in Chapter 5: Methodology.. Significance is determined by considering the sensitivity of the relevant attribute, as defined in Table 10-1, together with the magnitude of the potential impact, as defined in Table 10-2. Professional judgement is applied in interpreting the interaction between these factors, having regard to the nature, scale, duration, extent and reversibility of the potential effect, the characteristics of the affected receptor and the available baseline information. Where uncertainty exists, this is identified and taken into account in reaching the significance conclusion.

10.3.13 The magnitude of effect is judged on a six-point scale as illustrated in Table 10-3:

- Imperceptible – an effect capable of measurement but without significant consequences
- Slight – an effect which causes noticeable changes in the character of the attribute without affecting its sensitivities
- Moderate – an effect that alters the character of an attribute in a manner that is consistent with existing and emerging baseline trends
- Significant – an effect, which by its character, magnitude, duration or intensity, alters the sensitive aspects of an attribute
- Severe – an effect which by its character, magnitude, duration or intensity significantly alters most of the sensitive aspect of an attribute
- Profound – an effect which obliterates the sensitive characteristics of an attribute

Table 10-3: Typical Classifications of the Significance of Effects (Source: NRA / TII 2009)

Importance of Attribute	Magnitude of Impact			
	Negligible	Small	Moderate	Large
Extremely High	Imperceptible	Significant	Profound	Profound
Very High	Imperceptible	Significant / Moderate	Profound / Significant	Profound
High	Imperceptible	Moderate / Slight	Significant / Moderate	Severe / Significant
Medium	Imperceptible	Slight	Moderate	Significant
Low	Imperceptible	Imperceptible	Slight	Slight / Moderate

10.3.14 Table 10-3 indicates how the magnitude of the impact and the sensitivity of the receptor interact to determine the magnitude of the resulting environmental effect. Broadly speaking, impacts having a large magnitude and/or affecting important or sensitive receptors are likely to lead to significant effects.

10.3.15 Effects found to be 'profound', 'severe' or 'significant' are deemed to be significant, whilst effects found to be 'moderate', 'slight', or 'imperceptible' are considered not significant.

Use of Natural Resources

10.3.16 Table 10-4 outlines the significance criteria used with regard to the use of natural resources.

Table 10-4: Significance Criteria for Assessment of Natural Resource Usage

Effect	Criteria for Effects of Natural Resources Used	Significance
Major	Large decrease in material asset availability, greater than 5% of current baseline, potentially causing significant burden to the national material asset market.	Significant
Moderate	Moderate decrease in material asset availability, between 2% and 5% of current baseline, potentially causing moderate burden to the national material asset market.	
Minor	Minor decrease in material asset availability, between 0.1% and 1.9% of current baseline, causing a minor burden to the national material asset market.	Not Significant
Negligible	Negligible decrease in material asset availability, less than 0.1% of current baseline causing insignificant burden to the local and regional material asset market.	

10.3.17 Under the assessment of effect on natural resources, a ‘moderate’ or ‘major’ effect is considered significant, and a ‘minor’ or ‘negligible’ effect is considered not significant.

10.3.18 Once a significant effect has been identified, additional mitigation may be used to offset or compensate for any significant adverse effects, or to enhance beneficial effects. Where appropriate, mitigation measures have been described and assessed. Re-assessing the significance of the effect after applying additional mitigation allows the level of residual effect to be assessed.

Application of the Assessment Framework

10.3.19 As set out in Chapter 5: Methodology, the Principal Assessment compares the 2029 Permitted Operation (32 mppa) with the 2029 Proposed Operation (40 mppa). Both operational conditions are assessed for the same future year and against the same Future Receiving Environment and other baseline assumptions. The comparison therefore identifies the change in environmental effects on soils, geology and hydrogeology associated with the Proposed Order relative to the Permitted Operation. This comparison provides the basis for identifying likely significant effects, determining any additional mitigation measures and reporting residual effects.

10.3.20 Supporting Assessments have not been undertaken for land and soils because the Principal Assessment provides a sufficient basis for identifying and determining the likely significant effects of the Proposed Order on land and soil receptors. The Proposed Order does not involve the construction of new physical infrastructure or changes to the footprint of the airport and therefore would not result in direct disturbance, excavation, land take or the loss of soil resources. The assessment is limited to consideration of the potential effects arising from changes in airport operations, principally through the potential for accidental spillages, leaks or contamination events. Additional comparisons against interim operational scenarios would not materially assist the interpretation of the assessment or alter the conclusions on likely significant effects.

Limitations and Assumptions

10.3.21 Geological and soil conditions beneath the Dublin Airport Site may vary locally from those interpreted using the available desk study information and existing site investigation data.

10.3.22 The published geological datasets used to inform the assessment are subject to inherent limitations. For example, the recorded locations of boreholes within the Geological Survey Ireland (GSI) database may have positional accuracies ranging from approximately 10m to 250m. In addition, the GSI borehole

database may be incomplete, as there is no statutory requirement to register boreholes. Consequently, the existence of historical or current boreholes that are not included within the database cannot be discounted. Information relating to the construction, condition and operational status of third-party boreholes is also limited. However, these limitations and assumptions do not affect the robustness of the assessments and conclusions presented in this Chapter.

10.4 Current Receiving Environment

10.4.1 As outlined in Chapter 2: Site and Surroundings, the airport has been divided into sectors, relating to the current land use (see Figure 2-2). These sectors are summarised below.

- Sector A: Runways and Taxiways
- Sector B: North Apron and Hangars
- Sector C: Terminal 1 and Old Central Terminal Building (OCTB)
- Sector D: Terminal 2
- Sector E: South Apron and Cargo Terminals
- Sector F: Ground Transportation Centre (GTC) / Integrated Transport Hub (ITH), Energy Centre, Car Parks and Accommodation
- Sector G: Car Hire Compound and Long-Term Car Parking (Red / Green)
- Sector H: Eastlands South, a largely undeveloped area of land within the Applicant's ownership
- Sector I: West Apron
- Sector J: another largely undeveloped area of land within the Applicant's ownership located south of the North Runway
- Sector K: an area of landside land within the Dublin Airport Site, containing drainage infrastructure associated with Apron 5H

Site History

10.4.2 Historical mapping from 1837 – 1913, viewed on the OSI's online historical map viewer (but not reproduced in this EIAR), indicates the Dublin Airport Site was primarily utilised for agricultural purposes with minimal infrastructure and roads, and few dwellings. Some modern road alignments follow those of earlier roads, such as the modern day R122, R132 and Dunbro Lane.

10.4.3 The original airfield was first developed in 1917 at Collinstown, following which the Dubin Airport Site has been subject to substantial commercial development and expansion.

10.4.4 Historical photography from 1995 indicates that several runways were present, including a short runway in the north, the South Runway (10R/28L) and Crosswind Runway (16/34). Also present were Terminal 1, Piers 2 and 3, and aprons in the north and central areas. Car parking, hotel and cargo buildings are visible east of the terminal and west of the R132; however, east of the R132 land is substantially undeveloped, though the ALSAA Sports Centre is visible in the Eastlands area.

10.4.5 Historical photos / satellite imagery from 1996-2000 indicate little change airside, however, there has been substantial development between the R132 and the M1 in the area north of the ALSAA Sports Centre. There is also parking developed east of Dardistown cemetery and limited parking south of the R108 (the Long-Term (Blue) car park).

10.4.6 Between 2001-2005 there is limited change which included some extension of the paved apron east of the Crosswind Runway (16/34) in the north of the airfield area and a limited extension eastwards of the carpark to the south of the R108.

10.4.7 Historical photos and satellite imagery from 2006 to 2018 highlight further development within the airport. Terminal 2, Pier 4 and the lower Central Apron are constructed, along with development of the Western Apron and extension of Pier 1 is visible airside. The Long-Term (Blue) car park area has been further extended westwards, and additional parking is also visible in the area east of the ALSAA Sports Centre and west of the M1.

10.4.8 Construction of the North Runway (10L/28R) is visible from 2019. Mapping and satellite imagery from 2022 onwards shows the North Runway (10L/28R) complete with little change in imagery from 2022 to 2025.

Land Use

10.4.9 The Dublin Airport Site is an operational airport with accompanying infrastructure. The site surface cover is predominantly characterised by made ground comprising concrete at the aprons, tarmacadam along the runways and taxiways, with some soft landscaping adjacent the runways, taxiways and buildings (see Figure 2-2).

- Sector A –three runways and associated taxiways are tarmacadam with soft landscaping surrounding them consisting of grass.
- Sector B – the North Apron is an area of hardstanding (predominantly concrete) with a vacant field between Hangar 5 and the M50 Garage service station. On the southern side of the North Apron are a series of aircraft maintenance hangars which include Industrial Emission (IE) Licenced operations:
  - Hangar 5 - operated by Dublin Aerospace Limited (DAL), Industrial Emissions (IE) licence number P0480-02;
  - Hangar 3 - operated by International Aerospace Coatings (IAC), Integrated Pollution Control (IPC) licence number P0921-01.
- Sector C – Terminal 1 and the OCTB. This area is heavily developed with little or no soft landscaping airside, though the OCTB has soft landscaping landside.
- Sector D – Terminal 2 including Pier 4. There is little or no soft landscaping in this area.
- Sector E – the South Apron serves Terminal 2, cargo and Pier 4 and includes the aviation fuel storage tank farm. This area is predominantly hardstanding with little or no soft landscaping other than near to the airport boundary with the R132 and L2015 (Old Airport Road) roads in the south-east, which grass covered and includes the Cuckoo Stream downstream from its culverted channel.
- Sector F – the GTC, car parks and accommodation area is predominantly hardstanding close to the terminal buildings but, with increasing distance from the terminals, areas of soft landscaping become both more frequent and larger in area.
- Sector G – Car Hire Compound and long-term car parks (Red and Green car parks). Again, this area is predominantly hardstanding with limited soft landscaping.
- Sector H – Eastlands South is largely undeveloped, with the exception of the ALSAA Sports Centre in the north, and comprises fields and hedgerows.
- Sector I – the West Apron is predominantly hardstanding and used for cargo operations or contingency parking for aircraft. The airport fire station and Irish Aviation Authority (IAA) air control tower are also located in this sector.
- Sector J – largely undeveloped and comprises fields and hedgerows.
- Sector K – partially developed with car parking within its southern extent and grassland and trees within the northern extent. Sector K also contains pipework and underground storage tanks associated with the drainage of Apron 5H.

Topography

10.4.10 The topography within the Dublin Airport Site is relatively flat with a gentle downgradient slope noted from west to east.

10.4.11 Ground elevation is approximately 80m Above Ordnance Datum (AOD) at the western boundary of the South Runway (10R/28L) with the R122, while it is approximately 70m AOD at the western boundary of the North Runway (10L/28R) and the R108.

10.4.12 To the east, the ground elevation declines to approximately 60m AOD across the South Apron and GTC, and close to the north-eastern boundary, near the M1, the ground elevation declines to 40m AOD.

10.4.13 The average downward topographic gradient across the Dublin Airport Site is 0.005 towards the east.

10.4.14 From available GSI records there are no landslide events recorded within a 1km radius of the Dublin Airport Site.

Agricultural Land

10.4.15 Agricultural land is limited to Sectors H and J and is mapped as Pasture on the EPA mapping website. Underlying soils units consist of the Straffan association in Sector J and the Elton in Sector H, both of which are described as fine loamy drifts with limestones. However, the Straffan is noted to be a poorly drained mineral soil while the Elton is a well-drained mineral soil.

10.4.16 Areas of agricultural land are within the boundary of FCC's Dublin Airport Local Area Plan, where the objective is to ensure the effective operation and development of the airport.

Geology

Bedrock Geology

10.4.17 Geological mapping by GSI, illustrated in Figure 10-1 shows that much of the central and eastern portions of Dublin Airport Site are underlain by the Tober Colleen Formation, consisting of dark grey, calcareous shale and limestone conglomerate.

10.4.18 The western and northern portions of the Dublin Airport Site are predominantly underlain by the Malahide Formation, consisting of argillaceous bioclastic limestone and shale.

10.4.19 Extending from Terminal 1 beneath the GTC north-eastwards to the junction of the R132 with the Naul Road (L2020), lies a zone of Waulsortian Limestone Formation, a pale grey, massive limestone (mudbank) formation.

10.4.20 The south-eastern corner of the Dublin Airport Site is underlain by dark limestone and shale of the Lucan Formation, also previously known as Calp Limestone.

10.4.21 Within the Dublin Airport Site boundary, several localised areas of bedrock outcrop have been mapped, but none are mapped within the area of the Lucan Formation (Calp Limestone) in the south-east.

10.4.22 Historical site investigations indicate that bedrock comprising of medium strong limestones and weak to medium-strong mudstones have been encountered across the Site.

Table 10-5: Summary Bedrock Geology

Airport Sector	Bedrock
Sector B	Predominantly underlain by the Malahide Formation (dark grey, bioclastic limestone and shale), but the south-eastern strip extends above Waulsortian Limestone (pale grey, massive, unbedded limestone and mudstone). No areas of bedrock outcrop are mapped within Sector B.
Sector E	Underlain by the Tober Colleen Formation (dark grey, calcareous shale and limestone conglomerate). No areas of bedrock outcrop are mapped within Sector E.
Sector C	Straddles the boundary (running from north-west to south-east) between the Waulsortian Limestone (pale grey, massive, unbedded limestone and mudstone) and Tober Colleen Formation (dark grey, calcareous shale and limestone conglomerate). No areas of bedrock outcrop are mapped within the footprint of Sector C.

Airport Sector	Bedrock
Sectors A and J	Predominantly underlain by the Tober Colleen Formation (dark grey, calcareous shale and limestone conglomerate), but the north-western portion is underlain by the Malahide Formation (dark grey, bioclastic limestone and shale). There is one localised area of bedrock outcrop (Tober Colleen Formation) mapped in the eastern portion of Sectors A and J.
Sectors A, C and I	Wholly underlain by the Tober Colleen Formation (dark grey, calcareous shale and limestone conglomerate). No areas of bedrock outcrop are mapped within the footprint of Sectors A, C and I.
Sectors A, D, E, H and I	Almost entirely underlain by the Tober Colleen Formation (dark grey, calcareous shale and limestone conglomerate). At the south-eastern extremity of the Airfield Drainage Project (ADP) infrastructure, the underlying bedrock is mapped as the Lucan Formation (dark limestone and shale, Calp Limestone). No areas of bedrock outcrop are mapped within the footprint of Sectors A, D, E, H and I.
Sectors F and G	In Sector F, wholly underlain by Waulsortian Limestone (pale grey, massive, unbedded limestone and mudstone). Bedrock outcrop is mapped within the footprint of the PE7 in Sector F. In Sector G, wholly underlain by Tober Colleen Formation (dark grey, calcareous shale and limestone conglomerate). No areas of bedrock outcrop are mapped within in Sector G.
Sector F	Wholly underlain by Waulsortian Limestone (pale grey, massive, unbedded limestone and mudstone). Bedrock outcrop is mapped within Sector F.
Sector H	Sector H, together with the adjacent eastern construction compound, is underlain by the Lucan Formation (dark limestone and shale, Calp Limestone). At its western end Sector H is underlain by the Tober Colleen Formation (dark grey, calcareous shale and limestone conglomerate). No areas of bedrock outcrop are mapped within the footprint of Sector H.
Sector K	The staff car park is underlain by Waulsortian Limestone (pale grey, massive, unbedded limestone and mudstone). The access road from the north is underlain by Malahide Formation (dark grey, bioclastic limestone and shale) while the access road from the south is underlain by the Tober Colleen Formation (dark grey, calcareous shale and limestone conglomerate). No areas of bedrock outcrop are mapped within the footprint of Sector K.
n/a	
Junction of R108 and L2015 Junction of L2015 and R132 Junction of R132 and Corballis Road	Each of these four junctions is mapped as being underlain by the Tober Colleen Formation (dark grey, calcareous shale and limestone conglomerate). No areas of bedrock outcrop are mapped within the footprint of these four junctions.

Airport Sector	Bedrock
Airport Roundabout on the R132	
Junction of Airport Road and Naul Road (L2020)	The fifth junction is shown on maps as being underlain by the Malahide Formation (dark grey, bioclastic limestone and shale). No bedrock outcrop is mapped within the footprint of this junction within the junction of Airport Road and Naul Road (L2020).

Source: GSI

Overburden Geology

10.4.23 Geological mapping shown in Figure 10-2 indicates the overburden (soils and subsoils) across most of the Dublin Airport Site is comprised of tills derived from limestones with localised bedrock outcrops (Sectors A, F, I and J). The EPA mapping website highlights that a large portion of the Site, particularly from the eastern boundary to the West Apron, where the main infrastructure and runways are located, is comprised of made ground.

10.4.24 Historical site investigation works, detailed further below, found the overburden to be characterised by sandy gravelly clays with high cobble content (till) and localised areas of more granular materials. Made ground is prominent across the Dublin Airport Site with various materials used, including concrete, bitmac, tarmacadam and reworked clays. Table 10-6 provides a summary of baseline geology conditions per Sector.

Table 10-6: Summary Overburden Geology

Sector	Overburden
Sector B	Till derived from limestones.
Sector E	Till derived from limestones.
Sector C	Till derived from limestones.
Sectors A and J	Till derived from limestones with a localised area of bedrock outcrop mapped in the eastern portion of the sectors.
Sectors A, C and I	Till derived from limestones with a localised area of bedrock subcrop (near-surface rock) mapped in the north-western portion of the sectors.
Sectors A, D, E, H and I	Till derived from limestones.
Sectors F and G	Till derived from limestones with a localised area of bedrock outcrop and subcrop also mapped in the eastern portion of the Dublin Airport Site in Sector F.
Sector F	Till derived from limestones with a substantial proportion of Sector F mapped as bedrock outcrop and subcrop.
Sector H	Till derived from limestones.
Sector K	The majority of the car park and access roads are mapped as being underlain by till derived from limestones. However, the northern extremity of the northern approach road is mapped as being underlain by gravels derived from limestones.

Sector	Overburden
Junction of R108 and L2015	Each of these four junctions is mapped as being underlain by till derived from limestones.
Junction of L2015 and R132	
Junction of R132 and Corballis Road	
Airport Roundabout on the R132	
Junction of Airport Road and Naul Road (L2020)	The fifth junction is shown on maps as being underlain by gravels derived from limestones.

Source: GSI

Designated Sites

10.4.25 There are no geologically designated sites within the Dublin Airport Site. The closest geological heritage site is Feltrim Quarry, a proposed Natural Heritage Area (site code 001208), which is located approximately 2km to the north-east of the eastern site boundary.

Site Investigation

10.4.26 Several site investigations have been conducted across the Dublin Airport Site, those for which data have been reviewed are summarised below:

10.4.27 **1997**[9] – A total of eight boreholes were advanced by cable percussion to depths ranging between 8.5m and 11.5m below ground level (bgl) between Piers 2 and 3, immediately west of Terminal 1 in Sector C. The overburden was described as grey, stiff to hard, silty gravelly clay with cobbles and occasional boulders, none of the boreholes progressed into bedrock. A monitoring well was installed in each borehole and depth to groundwater measurements ranged between 0.3m and 3.1m bgl.

10.4.28 **2004**[10] - A total of 10 boreholes were drilled and 14 trial pits excavated across the car park area of the Aer Lingus offices (Sector F). Five boreholes were drilled by cable percussion into overburden, to total depths ranging between 6.7m and 8.5m bgl. The overburden was described as stiff to very stiff, black, sandy, gravelly clay with cobbles and boulders. Five rotary boreholes were drilled to depths ranging between 12.5m and 22.2m bgl, with limestone bedrock encountered between 6.4m and 15.4m bgl. A groundwater monitoring well was installed in each borehole with depth to groundwater measurements ranging between 1.05m and 5.20m bgl in overburden and between 1.25m and 4.85m bgl in bedrock. All trial pits were completed at depths less than 5.0m bgl. Seven soil samples were selected from the trial pits and submitted for laboratory analysis of: metals; diesel and petrol range hydrocarbons; mineral oil; polycyclic aromatic hydrocarbons (PAHs); benzene, toluene, ethyl benzene and xylenes (BTEX) compounds; and polychlorinated biphenyls (PCBs). All samples analysed were of shallow soil, <2m bgl. No hydrocarbons, BTEX compounds, or PCBs were detected above laboratory method detection limits (MDLs). PAHs were detected in three of the seven soil samples with a maximum total PAH concentration of 1.2mg/kg reported.

10.4.29 **2008**[11] – The site investigation completed prior to construction of the Terminal 2 Multi Storey Car Park (MSCP) in Sector F. Intrusive site works included the drilling of nine cable percussive boreholes, 26 window sampling bores and 15 rotary cored boreholes. Overburden was comprised of made ground to maximum depth of 3.7m bgl with firm, brown gravelly clay with cobbles underlying. Rockhead was encountered at depths ranging from 0.5m and 8.0m bgl and was described as either a calcite limestone or an argillaceous limestone with localised weathering. One monitoring well was installed in overburden and seven were

[9] Appendix 10-1: Site Investigations Limited (1998), Revised Report on Site Investigation for Six Bay Extension – Dublin Airport, Revision 2.

[10] Appendix 10-2: Irish Geotechnical Services Limited (IGSL) (2004), Report on Ground Investigation for Proposed Refurbishment Works at Aer Lingus Offices, report reference 10136.

[11] Appendix 10-3: IGSL (2008), Ground Investigation Report, Proposed Hotel and Multistorey Car Park, report reference 13262.

installed in bedrock. Depth to groundwater readings of between 1.9m and 4.9m bgl were reported for monitoring wells screened in bedrock.

10.4.30 **2010**[12] - During ground works to install a new sewer line at Castlemoate House in 2008, buried waste was encountered. Castlemoate House is within the airport boundary but is not within any Sector. However, it is adjacent to the north access road in Sector K, and the road junction at Airport Road and Naul Road (L2020). Following identification of the buried waste and notification of relevant authorities (including FCC and the EPA), RPS conducted site investigation works and assessment of the unregulated waste disposal site on behalf of daa in 2008 and 2009. Site investigation works included the excavation of 16 trial pits; drilling of six shallow boreholes (maximum depth 4.1m bgl) with a monitoring well installed in four (BH1A, BH2, BH3 and BH4A); and, drilling of three deeper boreholes (maximum depth 20.5m bgl) with a monitoring well installed in each (BH5-BH7). The shallow monitoring wells targeted the waste layer that was generally between 1.2m and 2.8m bgl. While the deeper monitoring wells were intended to target limestone bedrock, the deepest borehole drilled (BH6) did not encounter bedrock and instead a shallow monitoring well was installed to a total depth of 6m bgl that is screened across the clay horizon. In the other two deep boreholes, limestone bedrock was encountered at 5.3m and 8.0m bgl, and monitoring wells were installed that target the limestone bedrock. Soil, groundwater and ground gas samples were analysed for a range of organic and inorganic parameters, and a generic quantitative risk assessment completed. No risks were identified to current or adjacent site users from the waste material, and waste material was concluded to present a low to moderate risk to groundwater quality within the limestone aquifer. Further monitoring was recommended, and it is understood that biannual groundwater monitoring continues at the Castlemoate House unregulated waste disposal site.

10.4.31 **2015**[13] - Further site investigation was undertaken in Sector F for an additional MSCP and accompanying buildings in 2015. The site investigation included excavation of five trial pits, drilling of 10 direct probes, 10 rotary boreholes and 10 window sampling boreholes. Bedrock, consisting of dark grey, medium to thinly bedded, fine grained, limestone and calcitic mudstone, was encountered at depths between 6.7m and 14.1m bgl. Superficial deposits were predominantly described as sandy gravelly clays with cobble content. Four samples of shallow soil (0.4m to 0.5m bgl) were submitted for chemical analysis and concentrations of PAHs, PCBs, mineral oil and BTEX hydrocarbons were either below laboratory MDLs or detected at low concentrations. Groundwater monitoring wells were installed in three of the rotary boreholes and were screened across both overburden and bedrock.

10.4.32 **2018**[14] - Seven boreholes were advanced using cable percussive and rotary coring drilling techniques to a maximum depth of 38m bgl on a section of the Crosswind Runway (16/34) within Sector A. Sandy gravelly clay subsoils were encountered and competent bedrock was encountered at depths ranging between 17.4m and 28.7m bgl. No groundwater monitoring well was installed in any of the boreholes.

10.4.33 **2018**[15] - Site investigation was undertaken across six different sites, some of which were outside the Proposed Order Site boundary. A total of seven boreholes were completed by cable percussion and rotary methods, with 30 trial pits excavated. A summary of relevant site investigation locations completed within the Proposed Order Site boundary is provided below. Selected soil samples from trial pits were submitted for laboratory analysis of asbestos, metals, speciated total petroleum hydrocarbons (TPH), BTEX, PAHs and PCBs.

- Sector H, eight trial pits were excavated through topsoil, stiff yellow / brown silt and stiff grey / brown slightly sandy, slightly gravelly clay, to total depths of 2.0m. One borehole was drilled to a total depth of 17m bgl through firm to stiff slightly sandy, slightly gravelly clay; no bedrock was encountered and no monitoring well was installed. Four soil samples were submitted for laboratory analysis. Apart from trace detections of PAH compounds in two samples (up to 2mg/kg for the sum of 17 PAHs), all other organic parameters were below laboratory MDLs, asbestos was also below detection.

[12] Appendix 10-4: RPS (2010), Investigation at Unregulated Waste Disposal Site – Castlemoate House, Dublin Airport, report reference MDE0792Rp0004F01

[13] Appendix 10-5: IGSL (2015), Ground Investigation Report, Dublin Airport Multistorey Office Blocks and Car Park, report reference 18609.

[14] Appendix 10-6: Ground Investigations Ireland (GII) (2018), Additional Airfield Boreholes Ground Investigation Report, report reference 7687-04-18.

[15] Appendix 10-7: Causeway Geotech Limited (CGL) (2018), Ground Investigation, report reference 18-0577.

- Sector J, seven trial pits were excavated and three boreholes drilled. All trial pits progressed through topsoil and firm to stiff sandy, gravelly clay to total depths of 2.0m bgl. The boreholes were drilled to total depths between 7.4m and 11.8m bgl, with top of bedrock encountered between 2.0m and 9.7m bgl. No monitoring well was installed. Four soil samples were submitted for laboratory analysis, with all organic parameters and asbestos below laboratory MDLs.
- Road junction at Airport Roundabout on the R132. Three trial pits were excavated to the north and east of this junction. All trial pits progressed through topsoil and firm to stiff sandy, gravelly clay to total depths of 2.0m bgl. Two soil samples were submitted for laboratory analysis, with all organic parameters and asbestos below laboratory MDLs.

10.4.34 **2018**[16] - Four shallow trial pits were excavated within Sector F between building A1 in Dublin Airport Central (DAC) and Terminal 2 MSCP. The trial pits were no more than 1.7m bgl in depth and extended through made ground into brown, firm to stiff, sandy gravelly clay.

10.4.35 **2019**[17] - This site investigation included a series of trial pits, slit trenches and cable percussion boreholes in Sector A, predominantly to the east of the Crosswind Runway (16/34). Beneath the made ground was firm to stiff sandy, gravelly clay. All 17 boreholes were completed at depths of 6m bgl or less and did not progress into bedrock. No groundwater monitoring wells were installed.

10.4.36 **2019**[18] – A site investigation conducted within the northern area of the DAC development within Sector F. A total of seven boreholes were drilled through a combination of light percussion and rotary methods, and seven trial pits were excavated. Overburden consisted of made ground underlain by grey, firm to very stiff, slightly gravelly clay. All trial pits were completed at depths between 2.4m and 3.0m bgl. Boreholes were progressed to total depths of between 5.5m and 16.2m bgl. Bedrock was encountered in two boreholes at depths of 2.4m and 15.0m bgl. Bedrock consisted of grey argillaceous limestone and grey / black mudstone. A total of 25 soil samples were analysed from depths of <5.0m bgl. Samples were analysed for speciated TPH, metals, PAHs, PCBs and BTEX compounds, none were detected at elevated concentrations, and most results were below MDLs. Groundwater monitoring wells were installed in three of the seven boreholes. One monitoring well was installed within the overburden with a total depth of 6.5m bgl, and an average depth to groundwater of 1.0m bgl. The second monitoring well was installed with a screen across the top of bedrock and into the overlying stiff sandy, gravelly clay, with a total depth of 7.2m bgl and an average depth to groundwater of 5.75m bgl. The third monitoring well was screened entirely within limestone bedrock, with a total depth of 6.25m bgl and an average depth to groundwater of 2.58m bgl.

10.4.37 **2022**[19] – A ground investigation near Runway (16/34) in Sectors A, C and I included the drilling of 13 rotary cored boreholes, with monitoring well standpipe installations in 11 of them. Glacial tills in the form of sandy gravelly clays with cobble content and frequent lenses of granular materials were recorded in the boreholes. Bedrock, comprising both limestones and mudstones, was encountered at depths between 21.4m and 32.5m bgl, and total bored depths ranged between 22.0m and 36.6m bgl; all boreholes progressed at least 1m into bedrock. Depth to the top of bedrock tended to increase from west to east. All monitoring wells were installed in overburden, with total installation depths ranging between 12m and 30m bgl, no depth to groundwater readings were noted in the report. Not included in the proposed underpass ground investigation report, but provided separately, were raw pump test data for step and constant rate pump tests conducted in BH105 and BH107 in May and June 2022. The 48-hour constant rate pump tests were conducted at average abstraction rates of 1.3m^3/hr (BH105) and 1.6m^3/hr (BH107), the wells were tested separately. The standing groundwater elevation in BH105 was drawn down by approximately 10.3m (from 56.2m OD to 45.9m OD) over the course of the 48-hour pump test, with little or no water level response seen in six of the eight observation wells. For BH107, the standing groundwater elevation was drawn down approximately 11.4m (from 56.0m OD to 46.6m OD), little or no water level response was seen in five of the eight observation wells. The maximum draw-down seen in an observation well was approximately 1.8m in BH101 during the pumping of BH105; BH101 is located approximately 250m north-west of BH105. During the pump test at BH107, the maximum draw-down was approximately 1.2m in BH105, approximately 230m to the west.

[16] Appendix 10-8: IGSL (2018), Airport Link Bridge, report reference 21431.

[17] Appendix 10-9: GII (2019), Airfield Surveys Phase 2 Ground Investigation Report, report reference 7926-07-18.

[18] Appendix 10-10: CGL (2019), Dublin Airport Central Phase 2 Ground Investigation, report reference 18-1467.

[19] Appendix 10-11: CGL (2022), daa Airfield Underpass – Ground Investigation, report reference 21-1219.

10.4.38 **2023**[20] – A site investigation was conducted between June 2022 and February 2023 across Sectors D, E and F near the South Apron. A total of three light percussion boreholes and 23 rotary boreholes were drilled, together with the excavation of 40 trial pits. Groundwater monitoring wells were installed in four of the rotary bores. The boreholes commenced on either hardstanding or topsoil and progressed through made ground into firm to stiff, sandy gravelly clay, with occasional sand horizons. None of the 26 boreholes progressed into bedrock and all were completed at depths between 1.2m and 10.5m bgl. Trial pits progressed through similar geology and were completed at depths between 1.2m and 3.6m bgl. All monitoring wells were installed with a 6m screen section from 4m to 10m bgl and standing groundwater levels were reported between 1.55m and 3.26m bgl in three of the four wells; one monitoring well remained dry. A total of 56 soil samples were collected from selected boreholes and trial pits, and submitted for laboratory analysis of TPHs, metals, PAHs, BTEX compounds, major ions and asbestos. No determinands were detected at elevated concentrations, with many results below laboratory MDLs.

10.4.39 **2023**[Error! Bookmark not defined.,Error! Bookmark not defined.,Error! Bookmark not defined.,Error! Bookmark not defined.,Error! Bookmark not defined.] – While site investigation reports for the IE licensed site were not available for review it is known from annual environmental reports submitted as part of the IE licence compliance monitoring reports that there is a network of 15 monitoring wells around that site. Of these, 10 wells are screened within overburden to total depths of no more than 9.1m bgl. The remaining five are screened within bedrock to total depths of no more than 23.5m bgl.

10.4.40 In addition to being monitored for the unregulated waste site at Castlemoate House, it is known from Fehily Timoney (FT) per- and polyfluoroalkyl substances (PFAS) monitoring report[21] that four of the monitoring wells installed by RPS have been included in the PFAS monitoring work. It is also known from FT's PFAS monitoring report that there are three additional monitoring wells on the Castlemoate site; one of these additional wells (BH9) was installed in 2019 by CGL, no details are available for when the other two monitoring wells (BH8S/BH8D) were installed. Seven of the ten wells were sampled as part of PFAS monitoring works between 2022 and 2023. Well BH9 was drilled and installed to a total depth of 20m bgl and is screened within limestone bedrock which was encountered at 14.9m bgl. Wells BH8S and BH8D are a dual installation, with BH8D installed to a total depth of 15m bgl, and both wells are screened entirely within overburden. For the wells screened within overburden (BH1A, BH6, BH8S and BH8D), the depth to groundwater ranged between 0.51m and 2.80m bgl. For those wells screened within limestone bedrock (BH5, BH7 and BH9), the depth to groundwater ranged between 1.59m and 10.36m bgl.

10.4.41 Neither was a site investigation report available for review for the North Runway (10L/28R) and former Fire Fighting Training Ground (FFTG) in Sector A. However, it is known from the FT PFAS report that there is a current network of ten groundwater monitoring wells, with an eleventh well understood to have been decommissioned prior to the first monitoring round in 2023. All wells are reported to have been installed in bedrock, with most installed to a total depth of 10.0m bgl but with one current well installed to a total depth of 19.5m bgl. Depth to groundwater measurements reported in the FT PFAS report range between 0.00m and 5.08m bgl.

10.4.42 **2025**[22] - This site investigation, conducted in July 2025, included a total of 13 boreholes drilled across Sector H for the cargo relocation project. Five boreholes were drilled by cable percussion, five by rotary coring and three were started by cable percussion with rotary follow-on. The cable percussion boreholes were completed at depths between 4.0m and 5.0m bgl, with the 10 rotary/cable percussion with rotary follow-on boreholes completed at depths between 10m and 15m bgl. None of the boreholes progressed into bedrock, all were completed within unconsolidated overburden. In addition, 20 trial pits were excavated to depths between 2.8m and 4.5m bgl. The general geologic sequence encountered consisted of topsoil on soft to firm brown, sandy gravelly CLAY overlying very stiff, grey to black sandy gravelly CLAY. Material became sandier with depth from 7.5m to 10.0m bgl. No field evidence of gross soil contamination was noted on the geological logs. Groundwater monitoring wells were installed at two borehole locations; one was installed at a depth of 4.0m bgl, with the second at 6.0m bgl. In the deeper monitoring well, in the west of Sector H. Depth to groundwater readings ranged between 3.01m and 3.16m bgl. A total of 26 soil samples were submitted for laboratory analysis. Asbestos, PCBs, VOCs, SVOCs and BTEX compounds were below laboratory detection limits in all soil samples analysed. Low concentrations of TPHs were detected in four of the 26 soil samples, maximum concentration of 27.2mg/kg for total C5 to C35 aromatics

[20] Appendix 10-12: CGL (2023), NASAH South Apron Ground Investigation, report reference 21-0403S.

[21] Fehily Timoney (FT) (2024), Dublin Airport 2021-2023 Environmental Monitoring Report, project number: P21-195.

[22] Appendix 10-13: CGL (2025), DAA Cargo relocation Ground Investigation Report, report reference: 25-0509

and aliphatics. PAHs were detected at low concentrations in seven of the 26 soil samples analysed, maximum concentration of 16mg/kg for total 16 PAHs. TPHs were also detected in the groundwater samples, with reported concentrations of 310 μg/L and 3,700 μg/L for total C10 to C44 aromatics and aliphatics. The reported concentrations for total 16 PAHs in groundwater were below the stated laboratory MDLs.

10.4.43 **2025**[23] - FT conducted additional soils analysis for PFAS compounds from trial pits excavated by CGL in Sector H for the cargo relocation project. Up to two soil samples were collected per trial pit, with a total of 44 original soil samples collected and submitted for laboratory analysis. FT reported that no PFAS compounds were detected above laboratory MDLs.

PFAS

10.4.44 PFAS are a numerous group of long-lasting synthetic compounds which have been used in many industries since the 1950s, including: aerospace, automotive, food processing, pharmaceutical, clothing, construction, household products, cookware and firefighting. PFAS can pass into the soil, water and air during production and use. PFAS are of concern because they are persistent in the environment and have been related to several health effects, such as increased cholesterol; changes in liver enzymes; increased risk of high blood pressure or pre-eclampsia in pregnant women; and increased risk of kidney or testicular cancer.

10.4.45 At airports, including the Dublin Airport Site, the primary source of PFAS was through the use of aqueous film-forming foams (AFFF), which were used historically in fire-fighting training and to fight petroleum-based fires. These foams commonly contained fluorinated surfactants (principally perfluorooctanesulfonic acid (PFOS and perfluorinated octanoic acid (PFOA)) that helped the foam spread rapidly over flaming liquids, smothering and extinguishing fires efficiently.

10.4.46 Since 2013, the fire fighting foam used by the Dublin Airport Fire Service has been a fluorine-free foam approved by the International Civil Aviation Organisation (ICAO). Fluorine-free foams do not contain PFAS.

10.4.47 PFAS are an emerging contaminant of concern and over the last decade legislation has been introduced within the European Union (EU) to control and limit production. However, the legislation introduced to date is limited to a small number of individual PFAS compounds, rather than the whole class of chemicals.

10.4.48 There is no legal requirement in Ireland to analyse for PFAS in in-situ soil and concrete. During excavation works, soil which is being removed for off-site disposal needs to be analysed for Waste Acceptance Criteria, classified and disposed to an appropriate licensed soil waste facility. Where PFAS is detected in excavated soil, it must be disposed to an appropriate waste facility which is licensed to accept it.

10.4.49 Neither is there a current legal limit for PFAS in groundwater in Ireland. Apart from some EPA licensed facilities which are required under the terms of their licence to analyse for PFAS in groundwater, there is no legal requirement for organisations to analyse for PFAS in groundwater. There are, however, limits for PFAS in drinking water of 100 ng/L for the sum of 20 most common PFAS compounds; and 500 ng/L for total PFAS. These limits were defined in EU Drinking Water Directive (EU 2020/2184) and in Irish law under Statutory Instrument No. 99 of 2023, European Union (Drinking Water) Regulations 2023.

10.4.50 Low concentrations of PFAS were detected in soil at the former FFTG in Dublin Airport in 2016. Over the following years, legislation and awareness of this issue increased and since 2021 the Applicant's environmental consultant, FT, has been conducting a surface water and groundwater monitoring programme across the Dublin Airport Site. Data collected between 2021 and 2023 were reported in FT's 2024 report, and it is understood that the monitoring programme is continuing with data through to the end of 2025 provided for review.

10.4.51 Key areas across the Dublin Airport Site where historic PFAS use was identified in the 2024 FT report[21] were:

[23] Appendix 10-14: FT (2025), Dublin Airport Cargo Relocation Project Site Investigation Report, report reference: P2195-FT-ZZ-RP-EN-0010

- **The former fire station within the North Apron, Sector B.** This fire station is understood to have operated between 1940 and 2000, and PFAS AFFF may have been stored there and released to ground during fire training or suppression.
- **East of the North Apron, Sector B.** This area has been identified through monitoring results rather than being an area of documented PFAS use / storage.
- **North Runway Development / former Fire Fighting Training Ground (FFTG – APEC 5)**, this is within Sector A, extends into the North Runway area and close to former FFTG APEC 5. The former FFTG was likely used from the opening of Dublin Airport and its use ceased in 2000. In 2016, PFAS was identified in soil during development of the North Runway (10L/28R) with remedial soil excavation works completed. The excavated soil was reinstated on site and encapsulated in boulder clay. As it was not possible to completely remove by excavation the PFAS contaminated soil, eleven monitoring wells were installed at FFTG APEC 5 to facilitate ongoing monitoring of the PFAS plume within groundwater and the direction of groundwater flow which is to the north-east.
- **Castlemoate House**, an historic unregulated waste disposal site in the north-east of the Proposed Order Site which was identified in 2008 during ground works. This site is not within any Sector. However, it is adjacent to the access road from the north in Sector K, and the road junction improvement at Airport Road and Naul Road (L2020). Intrusive site investigation in 2008 determined the buried material comprised a mix of historical general waste and historical aircraft catering waste, which was estimated to date from between 1975 and 1984. No waste has been buried at the site since the mid-1980s. PFAS has been detected in groundwater from the area (see below).

10.4.52 The 2024 FT report[21] details the results of soil, groundwater and surface water sampling for PFAS. Results for soil and groundwater sampling are summarised below with surface water discussed in Chapter 11: Water.

10.4.53 Soil samples were collected from:

- Slit trenches along the departures road within Sector F. No PFAS was detected in either sample.
- Apron 5H, is located in Sector B. FT report that in 2008, soil and crushed concrete from construction projects across the airport were stockpiled here creating a land raise of approximately 2m above the natural ground level. In April 2022, FT completed 13 trial pits to total depths of 2m bgl and collected soil samples at 0.5m intervals. PFAS was detected in soil samples from four of the 13 trial pits. Soil excavated from Apron 5H during development works was exported for treatment and disposal to appropriately licensed facilities. During subsequent construction works between October 2022 and March 2023, and again in August 2023, extensive sampling was conducted from surface, subsurface and stockpiled soils, with widespread detection of PFAS in soil across the Apron 5H area.
- Across Sectors A, C and I, FT report that in the 2022 site investigation[19], 27 soil samples were submitted for analysis of PFAS. No PFAS was detected.
- North Apron South Apron Hub, in addition to the site investigation at the South Apron conducted in 2023[20], FT report that site investigation was also conducted at the North Apron. A total of 21 soil samples from the South Apron were submitted for PFAS analysis, with none detected. From the North Apron (Sector B), a total of 40 soil samples were submitted for PFAS analysis, with PFAS detected in 23 samples. The PFAS detections came primarily from site investigation locations to the west and north of Hangars 1, 2 and 3; east of Hangar 5; and, west of Hangar 6.

10.4.54 Groundwater monitoring from the North Apron, North Runway and Castlemoate House, with samples also collected from the Gardener's Well and an off-site private reservoir north of the North Runway.

- **North Apron** – groundwater samples were collected from the IE licensed site's monitoring wells near Hangars 1, 2 and 3 and west of Hangar 6. A total of 12 monitoring rounds were completed between November 2021 and November 2023, as reported by FT, with groundwater sampled from up to nine monitoring wells in each round. Additional groundwater monitoring data have been provided by daa for 2024 and 2025. This sampling is in addition to that required under the IE licence. The sum of 20 PFAS compounds was detected above the laboratory MDL at least once in groundwater from all monitoring wells, with the maximum concentration detected being 3,108 ng/L,

compared to the Drinking Water threshold of 100 ng/L. This highest concentration was reported for a well west of Hangar 6.

- **North Runway** – FT reported results for groundwater samples collected from ten monitoring wells on between six and eleven occasions between September 2020 and November 2023. Subsequent monitoring data for 2024 and 2025 has been provided by daa for review. The sum of 20 PFAS compounds was detected above the laboratory MDL at least once in groundwater from all monitoring wells, with the maximum concentration detected being 5,341 ng/L, compared to the Drinking Water threshold of 100 ng/L.
- **Castlemoate House** – FT reported results for groundwater samples collected from up to seven monitoring wells on between eleven and thirteen occasions between November 2021 and November 2023. Subsequent monitoring data for 2024 and 2025 has been provided by daa for review. The sum of 20 PFAS compounds was detected above the laboratory MDL at least once in groundwater from all monitoring wells, with the maximum concentration detected being 642 ng/L, compared to the Drinking Water threshold of 100 ng/L.
- **The Gardener's Well** is located in Sector F. It was sampled on eleven occasions between August 2021 and November 2023, as reported by FT with additional monitoring data for 2024 and 2025 provided by daa. The sum of 20 PFAS compounds was detected above the laboratory MDL on two occasions, with a maximum concentration of 3.33 ng/L, compared to the Drinking Water threshold of 100 ng/L.
- The **off-site private reservoir** is located approximately 1km north of the North Runway (10L/28R) and was sampled on nine occasions between November 2021 and November 2023. The sum of 20 PFAS compounds was detected above the laboratory MDL on five occasions, with a maximum concentration of 2.47 ng/L, compared to the Drinking Water threshold of 100 ng/L.

10.4.55 In addition to the above groundwater samples reported in the FT PFAS report and in data provided by daa, analytical data are available for two samples of groundwater collected prior to pump tests in the Underpass beneath Runway 16/34[19]. No PFAS was detected above laboratory MDLs in these samples.

10.4.56 Soil samples collected in 2025 from within Sector H[23] were also analysed for PFAS and none was detected.

10.4.57 Table 10-7 below provides a summary of known PFAS use / storage and detections in soil and groundwater across the Dublin Airport Site by Sector.

Table 10-7: PFAS Use & Detection

Sector	Historic PFAS Use	Detected in Soil
Sector B	Former fire station	Yes, west and north of Hangars 1, 2 and 3
Sector E	No	No
Sector C	No	Not sampled
Sector A and J	No	Not sampled
Sector A, C and I	No	No
Sector A, D, E, H and I	No	Not sampled in Sectors A, D, E and I Sampled in Sector H and not detected
Sector F	No	No
Sector F	No	No
Sector H	No	No

Sector	Historic PFAS Use	Detected in Soil
Sector K	No	Not sampled
n/a		
Junction of R108 and L2015	No	Not sampled
Junction of L2015 and R132	No	Not sampled
Junction of R132 and Corballis Road	No	Not sampled
Airport Roundabout on the R132	No	Not sampled
Junction of Airport Road and Naul Road (L2020)	No	Not sampled

Source: FT (2024)[21] and raw pump test data supplementary to the CGL (2022) report[19]

Summary of Baseline Conditions

10.4.58 A summary of the baseline conditions at the site is provided in Table 10-8. Site Investigation results are discussed in Section 10.4.26

10.4.59 Most of the sectors across the Dublin Airport Site have been developed to a greater or lesser extent and have underground services.

10.4.60 The western half of the Dublin Airport Site (Sectors A and J) consists of runways and taxiways, with few building structures and with some agricultural land. Moving eastwards (Sectors B, C, D, E and F), land use becomes more developed with the terminal buildings, hangars and maintenance areas, the GTC and car parking. Included within the eastern half of the Dublin Airport Site are storage areas for aviation fuel (Sector E), and EPA licensed sites (DAL, IEL P0480-02; and IAC, IPC P0921-01). There is also some agricultural land within Sector H, in the south-east of the Dublin Airport Site.

10.4.61 Ground surfacing consists either of grass, tarmacadam or concrete with some soft landscaped areas landside of the terminal buildings and in the ITH (Sectors C and F). Within agricultural areas, (Sectors H and J), soils consist of fine loamy drift. Overburden consists of made ground underlain by firm to stiff sandy gravelly clays.

10.4.62 Depth to bedrock across the Dublin Airport Site varies. In some sectors, bedrock outcrop has been mapped (Sectors A, F and I), while in others, bedrock is beneath a significant thickness of overburden (over 30m thick in Sector A). Bedrock consists of argillaceous limestone and calcareous mudstone and shale.

10.4.63 Bedrock beneath the Dublin Airport Site is classified as either a Poor Aquifer or a Locally Important Aquifer, though there are few wells mapped by GSI within a 1km radius of the airport boundary, with most being to the south or west (up-gradient) of the Dublin Airport Site.

10.4.64 Due to the presence of low permeability overburden, groundwater beneath the southern half of the Dublin Airport Site is mapped as having Low vulnerability, with vulnerability increasing to Moderate to High moving northwards, and with localised areas of Extreme vulnerability where bedrock outcrop has been mapped (within Sectors A (west), F and I).

10.4.65 Several site investigations have been conducted across the airport for specific projects. While limited soil sampling has been conducted for chemical analysis, there was little by way of contamination noted in site investigation reports reviewed.

10.4.66 PFAS has been detected in soil beneath the Northern Runway (10L/28R), Apron 5H area (PFAS detections in this area appear to be associated with the deposition of soil and crushed concrete from construction projects across the airport in 2008), and the North Apron near where the former fire station was located. PFAS is also detected in groundwater from these areas. The presence of PFAS has been attributed to the legacy use of AFFF prior to 2013. The foams used by Dublin Airport Fire Service since 2013 are classified

as Fluorine Free and do not contain PFAS chemicals. Any soil excavated during the works at Apron 5H that contains PFAS is being sent for treatment / disposal at licensed and regulated sites in accordance with Waste Management legal requirements.

10.4.67 The Dublin Airport Site has a long history of development and use in the context of an operational airport, with an airfield having been first developed in 1917. There are no designated sites from a geological heritage perspective within a 1km radius of the Dublin Airport Site.

Table 10-8: Summary of Baseline Conditions

Airport Sector	Soil and Geology	Importance / Sensitivity
Sector B	– Predominantly underlain by the Malahide Formation but the south-eastern strip extends above Waulsortian Limestone. – No areas of bedrock outcrop are mapped. – Overburden is till derived from limestones. – PFAS has been detected in soil.	Medium, due to the presence of contamination
Sector E	– Underlain by the Tober Colleen Formation. – No areas of bedrock outcrop are mapped. – Overburden is till derived from limestones. – No soil contamination, including PFAS, has been detected in soil.	Low
Sector C	– Straddles the boundary between Waulsortian Limestone and Tober Colleen Formation. – No areas of bedrock outcrop are mapped. – Overburden is till derived from limestones. – No soil contamination has been identified, no soil samples have been analysed for PFAS. Not an area where PFAS containing AFFF is known to have been stored / used.	Low
Sectors A and J	– Predominantly underlain by the Tober Colleen Formation but the north-western portion is underlain by the Malahide Formation. – There are localised areas of bedrock outcrop (Tober Colleen) mapped. – Overburden is till derived from limestones. – PFAS contaminated soil was removed from within the North Runway (10L/28R). – Some agricultural land use within Sector J.	Low
Sectors A, C and I	– Wholly underlain by the Tober Colleen Formation. – No areas of bedrock outcrop are mapped within the footprint of the Underpass. – Till derived from limestones with a localised area of bedrock subcrop mapped in the north-western portion of the site. – No soil contamination, including PFAS, has been detected in soil.	Low
Sectors A, D, E, H and I	– Almost entirely underlain by the Tober Colleen Formation. At the south-eastern extremity of the ADP infrastructure, the underlying bedrock is mapped as the Lucan Formation (Calp Limestone). – No areas of bedrock outcrop are mapped within the footprint of the ADP. – Overburden is till derived from limestones. – No soil contamination has been identified. Soil samples in Sector H were analysed for PFAS and none was detected. No soil samples from within footprint of the ADP in other Sectors have been analysed for PFAS. – Agricultural land use within Sector H.	Low
Sectors F and G	– Wholly underlain by Waulsortian Limestone in Sector F, with bedrock outcrop mapped in the ITH. – In Sector G, wholly underlain by Tober Colleen Formation with no areas of bedrock outcrop. – Overburden is till derived from limestones. – No soil contamination has been identified, no soil samples from within the ITH have been analysed for PFAS.	Low
Sector F	– Wholly underlain by Waulsortian Limestone. – Bedrock outcrop is mapped within the footprint of the Terminal 2 MSCP. – Overburden is till derived from limestones. – No soil contamination, including PFAS, has been detected in soil.	Low

Airport Sector	Soil and Geology	Importance / Sensitivity
Sector H	– Underlain by the Lucan Formation in the east and Tober Colleen Formation in the west. – No areas of bedrock outcrop are mapped within the footprint of the Long-term Car Park (Red). – Overburden is till derived from limestones. – No soil contamination, including PFAS, has been identified. – Agricultural land use within Sector H.	Low
Sector K	– The staff car park is underlain by Waulsortian limestone. The access road from the north is underlain by Malahide formation while the access road from the south is underlain by the Tober Colleen formation. – No areas of bedrock outcrop are mapped within the footprint of the Staff Car Park North. – Overburden is till derived from limestones with the northern extremity of the northern approach road being underlain by gravels derived from limestones. – No soil contamination has been identified, no soil samples from within footprint of ADP infrastructure have been analysed for PFAS.	Low
n/a		
Junction of R108 and L2015	– Underlain by the Tober Colleen formation. – No bedrock outcrop is mapped within the footprint of this junction. – Overburden is till derived from limestones. – No soil contamination has been identified, no soil samples from within footprint have been analysed for PFAS.	Low
Junction of L2015 and R132	– Underlain by the Tober Colleen formation. – No bedrock outcrop is mapped within the footprint of this junction. – Overburden is till derived from limestones. – No soil contamination has been identified, no soil samples from within footprint have been analysed for PFAS.	Low
Junction of R132 and Corballis Road	– Underlain by the Tober Colleen formation. – No bedrock outcrop is mapped within the footprint of this junction. – Overburden is till derived from limestones. – No soil contamination has been identified, no soil samples from within footprint have been analysed for PFAS.	Low
Junction of Airport Road and Naul Road (L2020)	– Underlain by the Malahide formation. – No bedrock outcrop is mapped within the footprint of this junction. – Overburden is gravels derived from limestones. – No soil contamination has been identified, no soil samples from within footprint have been analysed for PFAS.	Low

Current Design and Management

10.4.68 Dublin Airport currently operates from two terminals and three runways (North Runway, South Runway and Crosswind Runway; since the opening of North Runway in 2022, Crosswind Runway has been retained primarily for aircraft taxiing and essential occasional runway use). The Proposed Order would not alter this established operational layout. Existing environmental management measures relating to the protection of land, soils and the water environment will remain in place. Measures to manage potential releases to the water environment are described in Chapter 11: Water. In addition, the licensed facilities within the Dublin Airport Site, including Sector B Hangar 5 (daa, IE licence number P0480-02) and Hangar 3 (IAC, IPC licence number P0921-01), are operated in accordance with the conditions of their respective environmental licences, which include requirements for the management of potential releases to the environment.

10.5 Future Receiving Environment

10.5.1 This section describes the anticipated evolution of the land and soils baseline between the current receiving environment and the Principal Assessment year (2029).

10.5.2 No material changes to the land and soils baseline within the Dublin Airport Site are anticipated by 2029. The airport will continue to operate broadly as described in the Current State of the Environment, with no changes expected that would materially alter the characteristics of land, soils or geology.

10.5.3 The Future Receiving Environment takes account of the anticipated evolution of the Dublin Airport Site to 2029, including relevant operational improvements associated with the Airport Development Programme (ADP), as described in Chapter 5: Methodology. These are not anticipated to materially alter the land and soils baseline relevant to the assessment of the Proposed Order.

10.6 Assessment of Likely Significant Effects

10.6.1 This section presents the findings of the Principal Assessment (2029 Permitted Operation (32mppa) compared to 2029 Proposed Operation (40mppa)). This section forms the basis for identifying likely significant effects and any additional mitigation measures.

10.6.2 With the Proposed Order in place and when compared to the Permitted Operation (32mppa), the airport operations would intensify, including increased aircraft taking off and landings, increased airside ground activity associated with aircraft taxiing, handling and servicing as well as increased vehicular traffic accessing and departing the airport and airport environment, and increased activity within existing terminal buildings and operational areas.

Screening of Receptors

10.6.3 The Proposed Order does not involve construction activities or changes in land use and therefore would not result in direct effects on land, soils or other geoenvironmental receptors, nor would it result in the use of natural resources in the form of imported fill or aggregate for construction works. Accordingly, the screening of land, soils and geology receptors has not been undertaken, as there is no credible pathway for direct effects to occur.

Accidental Spills and Leaks

10.6.4 The Dublin Airport Site is predominantly hardstanding which will limit the potential for infiltration of surface water and/or contamination through to soils, superficial deposits and groundwater. Runoff from these hard standing areas will be diverted to the pollution control system, where attenuation will take place prior to being discharged offsite to surface water.

10.6.5 Given the increased operational activity associated with the 2029 Proposed Operation (40 mppa), there is the potential for an increase in the frequency of accidental spills, leaks and contamination events compared with the 2029 Permitted Operation (32 mppa). Potential sources include fuel leaks from vehicles or aircraft, fire events and de-icing activities. However, the potential for such events to affect land and soils is limited by existing embedded environmental control measures, including impermeable hardstanding, contained drainage systems and pollution control infrastructure.

10.6.6 In the event of an accidental spill, leak or contamination event, potentially contaminated runoff from operational areas would generally be conveyed through the existing surface water drainage network, which incorporates measures to manage and control pollution. These measures limit the potential for contaminants to infiltrate the ground and affect underlying soils and geological receptors. The potential for effects on groundwater and surface water receptors is considered separately in Chapter 11: Water.

10.6.7 Taking account of the nature of the operational changes associated with the Proposed Order, the predominantly impermeable surfaces within operational areas and the existing pollution control measures, the likelihood of additional contamination of land and soils attributable to the Proposed Order is considered low. While an accidental release could result in localised contamination where pollutants reach exposed soils, the magnitude of any additional effect attributable to the Proposed Order is considered negligible. The resulting effect on land and soils is therefore assessed as imperceptible and not significant. No additional mitigation measures are considered necessary.

10.7 Mitigation and Monitoring

10.7.1 As the Proposed Order will not have any significant effects on land and soils, there is no requirement for mitigation to be implemented. No monitoring measures are proposed.

10.8 Residual Effects

10.8.1 The assessment has identified no likely significant adverse effects on land, soils or geology arising from the Proposed Order. Accordingly, no additional mitigation measures are required.

10.9 Cumulative Effects

10.9.1 Potential interactions between effects on the land and soils environment and effects assessed within other environmental topics have been considered. In particular, interactions may arise with Chapter 11: Water, due to the relationship between soils, geology and groundwater.

10.9.2 The approach to the identification and assessment of cumulative schemes, including the identification of other existing, approved and reasonably foreseeable developments, is set out in Chapter 20: In-combination and Cumulative Effects. The potential for cumulative effects on land and soils has been considered having regard to the nature of the Proposed Order, the effects identified in this chapter and the potential for effects associated with other developments to act upon the same receptors.

10.9.3 The Proposed Order does not involve new physical infrastructure, excavation, land take or changes to existing land uses. Consequently, it would not give rise to direct effects on land and soil resources that could combine with those arising from other developments. The principal potential operational effects relate to accidental spills, leaks and contamination events. As described above, existing impermeable surfaces, drainage infrastructure and pollution control measures limit the potential for contaminants to reach underlying soils and geological receptors. Having regard to these measures and the negligible magnitude of the additional effects attributable to the Proposed Order, no likely significant cumulative effects on land and soils are predicted in combination with other developments considered in Chapter 20: : In-combination and Cumulative Effects.

10.9.4 The cumulative assessment has also had regard to the two EPA-licensed installations within the Dublin Airport Site, namely Dublin Aerospace Limited (IE licence P0480-02) and International Aerospace Coatings (IPC licence P0921-01), as identified in Section 10.4. The existing operations of these installations form part of the receiving environment considered in this assessment, including the identified areas of historical contamination and existing environmental management controls. The potential for additional effects on land and soils arising from the Proposed Order has therefore been considered in the context of these existing operations. The approach to cumulative assessment with other developments is described in Chapter 20: In-combination and Cumulative Effects.

10.9.5 Slight adverse effects are identified in relation to the potential for accidental spills, leaks and contamination events, pathways which overlap with those considered in Chapter 11: Water. Both assessments consider potential effects arising from the same activities and, where relevant, the same pollutant pathways. They do not, however, represent separate or additional sources of effect that would combine to increase the overall environmental effect. Given the limited magnitude of the effects identified and that the residual effects are slight and not significant, no significant in-combination effects between Land and Soils and Water are predicted.

10.9.6 In-combination effects from air quality emissions are also considered. Air quality is assessed in Chapter 7: Air Quality, impacts to air quality as a result of the Proposed Order are assessed as slight adverse and not significant. Given this, there is no significant in-combination effect to Land and Soils from the deposition of contaminants to ground from emissions to air.

10.10 Indirect, Secondary and Transboundary Effects

10.10.1 Indirect and secondary effects are described in the EPA Guidelines as “effects on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway”. Transboundary effects are those affecting another state or jurisdiction. The zone of influence of the effect identified does not affect any other state or states.

10.10.2 The potential for indirect and secondary effects on land and soils arising from the Proposed Order has been considered, including those associated with accidental spills, leaks and contamination events during airport operations. As described above, the existing impermeable surfaces, drainage infrastructure and pollution control measures limit the potential for contaminants to reach underlying soils and geological receptors. The potential for effects on groundwater and surface water receptors through associated

pollutant pathways is assessed separately in Chapter 11: Water. Taking account of these existing measures and the nature of the operational changes associated with the Proposed Order, no likely significant indirect or secondary effects on land and soils are anticipated. No transboundary effects are predicted.

10.11 Conclusion

10.11.1 The Proposed Order would facilitate an increase in passenger throughput and associated aircraft and vehicular movements without the construction of new physical infrastructure or changes in land use. Consequently, no direct effects on land, soils or geology are anticipated.

10.11.2 The assessment concludes that the Proposed Order would not give rise to likely significant effects on land, soils or geology. Taking account of the existing environmental control measures and the nature of the proposed operational changes, the effects associated with accidental spills, leaks and contamination events are assessed as imperceptible and not significant.

10.11.3 No mitigation or monitoring measures are required because no likely significant adverse effects have been identified. Similarly, no likely significant in-combination, cumulative, indirect, secondary or transboundary effects have been identified. Overall, the Proposed Order is not predicted to result in any likely significant effects on land, soils or geology during operation.