

DBFL Consulting Engineers

**Proposed Boyne Greenway
(Drogheda to Mornington) Project**

**Ecological Impact
Assessment (EclA) Report**

July 2020

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It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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The findings outlined within this report and the data we have provided are to our knowledge true, and express our bona fide professional opinions. This report has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management (CIEEM) Code of Professional Conduct. Where pertinent CIEEM Guidelines used in the preparation of this report include the *Guidelines for Ecological Report Writing* (CIEEM, 2017a), *Guidelines for Preliminary Ecological Appraisals* (CIEEM, 2017b) and *Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine* (CIEEM, 2018). CIEEM Guidelines include model formats for Preliminary Ecological Appraisal and Ecological Impact Assessment. Also, where pertinent, evaluations presented herein take cognisance of recommended Guidance from the EPA such as *Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports* (EPA, 2017), and in respect of European Sites, *Managing Natura 2000 sites - The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC* (European Commission, 2019).

Due cognisance has been given at all times to the provisions of the *Wildlife Act, 1976*, the *Wildlife (Amendment) Act, 2000*, the *European Union (Natural Habitats) Regulations. SI 378/2005*, the *European Communities (Birds and Natural Habitats) Regulations 2011 (as amended)*, EU Regulation on Invasive Alien Species under *EU Regulation 1143/2014*, the EU Birds Directive 2009/147/EC and *Habitats Directive 92/43/EEC*.

No method of assessment can completely remove the possibility of obtaining partially imprecise or incomplete information. Any limitation to the methods applied or constraints however are clearly identified within the main body of this document.

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Title		Proposed Boyne Greenway (Drogheda to Mornington) Project, Drogheda, Co. Meath. Ecological Impact Assessment (EcIA) Report		

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1 Introduction

INIS Environmental Consultants Ltd. was commissioned by DBFL Engineering Ltd. to complete an Ecological Impact Assessment (EclA) report on behalf of Meath County Council, for the proposed 'Boyne Greenway: Drogheda to Mornington' project specifically the development of a pedestrian and cycle access route, which follows the River Boyne Estuary from east of Drogheda (Ship Street, which is located adjacent to the railway viaduct Belfast - Dublin line) to the coast at Mornington. The proposal is presented in the context of the works required to deliver the project; evaluated in the context of baseline ecological survey data collected by Inis ecologists and desk study information. The potential impacts arising from the construction of the project, as well as during the operational phase are assessed with regard to key biodiversity receptors identified as likely to occur within the immediate footprint of the works and within the wider study area; i.e. the zone of influence (Zol). Where required mitigation measures are proposed to avoid, reduce or remediate potential impacts in order to avoid significant impacts on sensitive ecological receptors.

1.1 Description of the Proposed Development

The proposed design comprises a pedestrian and cycle route along the Boyne Greenway: Drogheda to Mornington route corridor (a minimum of 4m wide of a cycle and pedestrian path) which will provide a safe, traffic-free environment for tourists and local users to cycle or walk adjacent to the Boyne river, estuary and coast, extending from east of Drogheda (Ship Street, which is located adjacent to the railway viaduct Belfast - Dublin line) to Mornington, Co. Meath.

The proposed Boyne Greenway route generally follows the existing R150/R151 Regional Road, to ensure that open views to the Boyne Estuary are retained where possible and maximising the benefits of the greenway. A significant portion of the route falls within the boundary of the Boyne Estuary Special Protection Area and Special Area of Conservation.

The proposed route for the Boyne Greenway is approximately 5.9 km in length with approximately 4.1 km of the route directly alongside the Regional Road, and 1.8 km off the Regional Road to ensure both a safe continuation of the route and the retention of the views across the Boyne Estuary (**Figure 1.1**).

There are a number of constraints and opportunities, both natural (i.e. existing natural environment) and physical (the built environment), which constrain route options for the proposed scheme within the defined study area. These include:

- River Boyne;
- Boyne Estuary SPA and the Boyne Coast and Estuary SAC;
- Existing and committed future development along the route;
- Existing monuments and protected structures along the route such as Mornington Bridge;
- Mature Trees and other natural features along the Marsh Road (R150) and Mornington Road (R151);
- Road alignment along the Marsh Road (R150) and Mornington Road (R151);
- The need to maintain traffic flow for access to local amenities;
- Land ownership; and

- Environmental impacts and engineering constraints such as steep topography, frequent watercourse crossings, and potential flooding.

Sections of the proposed Greenway route overlap or run adjacent to the boundaries of the Boyne Estuary Special Protection Area (SPA). The Boyne Estuary in general is the second most important estuary for wintering birds on the Louth-Meath coastline. Black-tailed Godwit occurs here in internationally important numbers and a further nine species of wintering water birds have populations of national importance (i.e. Shelduck, Oystercatcher, Golden Plover, Grey Plover, Lapwing, Knot, Sanderling, Redshank and Turnstone). Of particular significance is that three species that regularly occur, Golden Plover, Bar-tailed Godwit and Little Tern are listed on Annex I of the E.U. Birds Directive. Part of the Boyne Estuary SPA is a Wildfowl Sanctuary. The estuary provides both feeding and high-tide roost areas for these birds.

Sections of the proposed Greenway route also overlap or run adjacent to the boundaries of the Boyne Coast and Estuary Special Area of Conservation (SAC), a coastal site which includes most of the tidal sections of the River Boyne, intertidal sand- and mudflats, saltmarshes, marginal grassland, and the stretch of coast from Bettystown to Termonfeckin that includes the Mornington and Baltray sand dune systems. The site is designated due to the presence of the following habitats; Estuaries, Tidal Mudflats and Sandflats, Annual vegetation of drift lines, Salicornia Mud, Atlantic Salt Meadows, Embryonic Shifting Dunes, Marram Dunes (White Dunes), Fixed Dunes (Grey Dunes).

The western portion of the proposed Greenway lies due south and within close proximity of the River Boyne and River Blackwater SAC. This designated site includes a number of habitats and species listed on Annex I/II of the EU Habitats Directive, including: alkaline fens, alluvial forests, river lamprey, Atlantic salmon and otter.

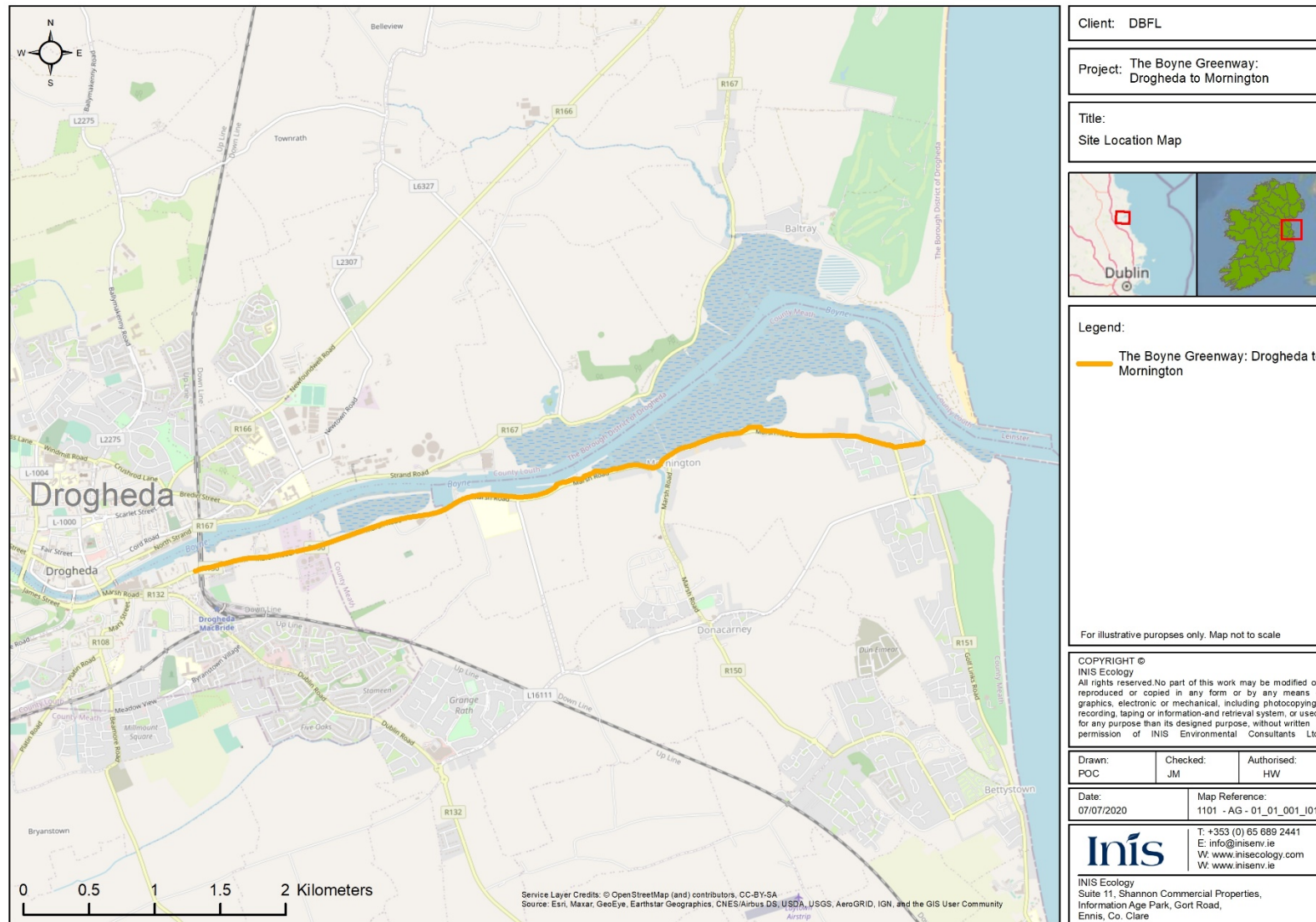


Figure 1.1: Location of the proposed Boyne Greenway Drogheda to Mornington route.

1.2 Proposed Works

1.2.1 Overview

The proposed Boyne Greenway will be constructed utilising two different methodologies, selected according to the sensitivities of the landscape and environment requirements encountered within the areas crossed by the route:

1. Construction directly alongside, or within very close proximity of, the regional road within an area of existing roadside verge; and
2. Construction significantly away from the roadside and/or within the intertidal zone/SPA/SAC.

Each of the above requirements is discussed below, providing an overview of the proposals and measures intrinsic to project design which will avoid significant impact on the ecological aspects of the scheme.

1.2.2 Greenway Construction Alongside Road

There is approximately 4.1km of the proposed greenway to be constructed alongside the road or very close to the road edge. Given the location, access and low maintenance requirements, robust construction forms are preferred. Therefore, bituminous construction, in accordance with the recommendations of the TII Design Manual for Roads and Bridges (TII DMRB) (TII, 2013) is considered the most appropriate. With this proposed form of construction, verge vegetation would be cleared with limited additional excavation. The pavement will be formed by placing imported granular subbase material on a geotextile separator and finished with approximately 100mm of bituminous surfacing in accordance with the TII DMRB (TII, 2013). The width of the greenway will be limited to 4 metres and restrained on each side with a kerb. Some similar greenway examples are provided in **Figure 1.2** for illustration.



Figure 1.2: Examples of Greenway Alongside Road (Holland and Ireland).

As part of the proposed construction methodology, a number of proposed measures will be employed to ensure minimal impact during construction of the greenway:

- a. Works will be restricted to outside the period of Oct-March at all sensitive sites where disturbance is an issue, i.e within the SAC/SPA or immediately adjacent. The timing restriction will not apply to public road sections;

- b. Construction works will be limited to daylight hours to avoid effects on bats, birds and otters. The use of construction lighting will be limited to absolute minimums. Where it is necessary, all lighting will be cowled away from sensitive habitats, with no light spillage, in line with best practice for bats. Only existing municipal compound areas will be utilised, and security lighting will be sensor based at these locations;
- c. The timing of the works and the measures intrinsic to the design, outlined above, will be sufficient to avoid significant effects. Nevertheless, if on the advice of the onsite ecologist further protection is required, then a suitable camouflage barrier netting will be utilised. Camouflage netting will be utilised on all roadside works outside the period March to September to minimise noise transfer and visual intrusion, as a matter of course;
- d. Regular monitoring of the works will be provided by a suitably qualified ECoW with authority to 'Stop the Works'. The representative will have knowledge of working on construction programmes within SAC and SPA areas where significant bird populations exist; and
- e. In operation, the roadside greenway should have a negligible impact on the fauna and flora in the long term as it is generally alongside the road which would have a similar impact to that of the greenway. Nonetheless, further direction will be taken from the ecological consultant and NPWS. The following measures are proposed to limit the impact of the greenway in operation:
 - 1) No engineered barriers are proposed. This will minimise any visual impact both from the road or estuary side. Nonetheless, natural mid-level barrier planting will be provided particularly where similar items have been removed to allow for the greenway. Native species of hedging, locally sourced, will be utilised for biodiversity enhancement. This would offer protection to birds and act as general biodiversity enhancement; and
 - 2) Operational lighting, where necessary for security and safety, will be LED based (to avoid emission of UV light) and will be cowled away from estuarine habitats with no light spillage in line with best practice for bats and birds. Low energy LED luminaires incorporating a solar power source and motion detectors will be used throughout. Furthermore, to minimise the requirement for lighting all access features, such as bollards and gates, shall have reflectorised strips in line with best practice guidance. No lighting will be provided where birds forage within 50 metres of the cycle path to avoid any disturbance.

1.2.3 Greenway Construction Intertidal Zones/SPA/SAC

There is approximately 2.4km of proposed greenway within the SPA/SAC areas with approximately 610 metres of this within the intertidal zone. In these areas it is proposed that the greenway be elevated onto a boardwalk structure to minimise impact, as agreed provisionally with the ecological consultant. The boardwalk will be constructed at a minimum level defined within the flood risk assessment report (3.54m Above Ordnance Datum). This is approximately 1.5 metre above the present day highest astronomical tide level and will mitigate the risk of flood throughout the design life of the boardwalk section of greenway. The width of the boardwalk will be limited to 4metres (maximum). Following a review of the options, and in consultation with the ecological consultant, it

has been agreed that the elevated boardwalk be formed using propriety recycled plastic elements. Further detail bellow.

1.2.3.1 Proprietary Recycled Plastic Elements

A section of Phase 1 of the Boyne Greenway has already been constructed using this form (see **Figure 1.3**). It involves installing recycled plastic components much like forming a similar timber structure. Long column type elements, typically 100mm by 100mm square, are installed into the underlying ground at regular intervals acting as mini piles. They are installed to a depth to suit the underlying geology and provide the required level of load capacity. The running surface is then created by bolting transverse and longitudinal beams together. Running boards are then fixed to the beams to provide the surface. As the boardwalk is elevated, a barrier will be necessary. This is fixed to the elevated structure and uses similar recycled plastic components.

As the intertidal, SPA and SAC areas are typically away from the road, and are most ecologically sensitive, the following measures will be employed to ensure minimal impact during construction of the greenway:

- a. The works will be scheduled to avoid the winter months between October and March when most of the species likely to be affected will be present. Therefore, all works will be undertaken between March and September;
- b. The timing of the works and the measures intrinsic to the design, outlined above, will be sufficient to avoid significant effects. Nevertheless, if on the advice of the onsite ecologist further protection is required, then a suitable camouflage barrier netting will be utilised;
- c. Construction works will be limited to daylight hours to avoid effects on bats, birds and otters. The use of construction lighting will be limited to absolute minimums. Where it is necessary, all lighting will be cowed away from sensitive habitats, with no light spillage, in line with best practice for bats. Existing municipal compound areas will be utilised with sensor-based security lighting only;
- d. Construction works will be limited to daylight hours to avoid effects on bats, birds and otters. The use of construction lighting will be limited to absolute minimums. Where it is necessary, all lighting will be cowed away from sensitive habitats, with no light spillage, in line with best practice for bats. Existing municipal compound areas will be utilised with sensor-based security lighting only;
- e. The mini piling will be installed using reduced noise equipment in accordance with best practice; and
- f. Regular monitoring of the works will be provided by a suitably qualified ECoW with authority to 'Stop the Works'. The representative will have knowledge of working on construction programmes within SAC and SPA areas where significant bird populations exist.



Figure 1.3: Boyne Greenway Upstream Recycle Plastic Elements Construction.

In operation, the boardwalk section of greenway should have a negligible impact on the fauna and flora in the long term as it will generally merge into the surroundings. To limited impact, the following measures are proposed initially:

1. To counteract impact from dogs, particularly, and avoid noise transfer to birds and other species which may occur, the boardwalk barrier will be screened to half height (~600mm) with full height (~1200 mm), an option in particularly sensitive locations. The screening will be provided by fixing boardwalk running boards to the fence posts; and
2. No lighting is anticipated in the first instance, as the boardwalk section will likely only be used during daylight hours. Should operational lighting be necessary for security and safety, it will be LED based (to avoid emission of UV light) and will be cowled away from estuarine habitats with no light spillage in line with best practice for bats and birds. Low energy LED luminaires incorporating a solar power source and motion detectors will be used only. Furthermore, to minimise the requirement for lighting all access features, such as bollards and gates, shall have reflectorised strips in line with best practice guidance. No lighting will be provided where birds forage within 50 metres of the greenway to avoid any disturbance.

1.2.4 Greenway Construction Bridge Sections

Bridge sections will be required at two locations along the route of the greenway to provide 20 metre clear spans. The bridging sections are over a stream (steel arch bridge - **Figure 1.4**) and surface water outfall (precast concrete beams - **Figure 1.4**).

The proposed steel arch bridge will be a prefabricated steel arch bridge placed on precast concrete cross beams on precast concrete piles (see **Figure 1.5**). This construction form was agreed through discussions with the architectural heritage department of Meath County Council to limit impact on the existing stone arch bridge structure and not detract from the bridge visually.

The proposed precast concrete beams bridge will be a simpler option, formed by providing a prestressed precast concrete beam resting on a precast concrete ground beam on precast concrete piles. The deck will be partially precast with in-situ finished surface (see **Figure 1.6**).

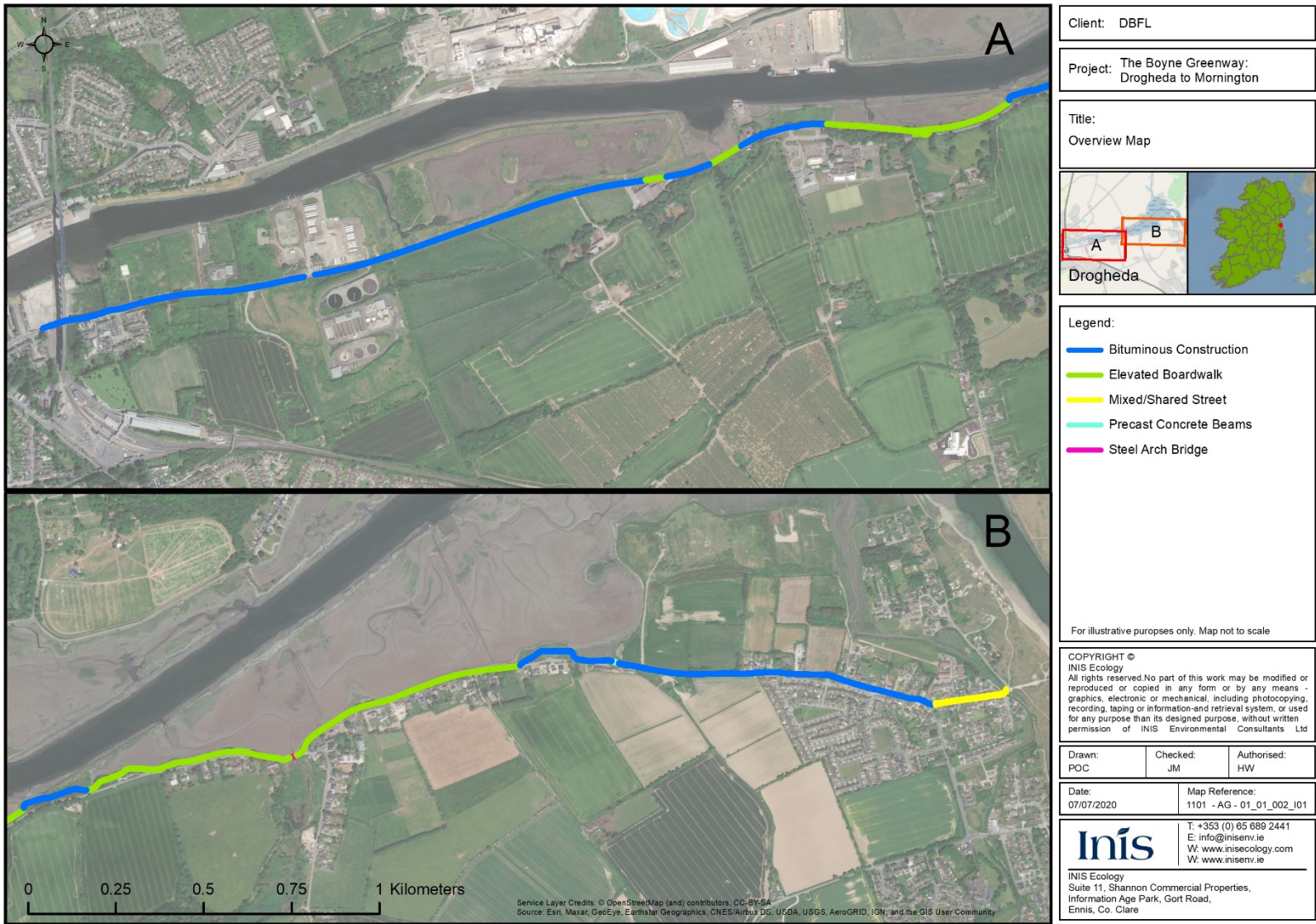


Figure 1.4: Construction methods for the proposed Boyne Greenway.



Figure 1.5: Typical Prefabricated Steel Arch Bridges.



Figure 1.6: Typical Precast Concrete Bridges.

1.2.5 Monitoring Commitment

The effectiveness of the intrinsic design measures will be monitored during construction and post construction for 3 years. Monitoring during construction will be undertaken by a suitably qualified

Ecological Clerk of Works, (ECoW) with a 'Stop Works' authority. This ecologist will have previous experience and extensive knowledge of working on construction programmes within SAC and SPA areas with significant bird populations.

The importance of the Annex species listed for the SPA requires that on-going monitoring of the greenway corridor is required during construction and for a number of years post construction to prove that birds are not displaced such that the integrity of the Natura Sites is affected negatively.

The monitoring shall test the effectiveness of the proposed design measures for the new greenway using actual bird survey counts and behaviour analysis. A report of each inspection shall be prepared and reviewed at the start and finish of each season the greenway is active. The ecologist/ornithologist shall, where necessary, recommend adaptive measures to be implemented by the greenway management team and provide advice during the implementation of measures and further monitor the effectiveness of any adaptive measures once deployed. The performance of the particular measures of importance shall be observed, such as the durability of the fencing erected, the effectiveness of any screening and feeding habits of birds adjacent to the screens.

2 Approach

2.1 Legislative Context and Relevant Guidelines

National and European legislation and policy relevant to undertaking ecological assessment have been utilised in the development of this report. The basis of this report is to accompany a Planning application by DBFL engineering for the proposed Boyne Greenway: Drogheda to Mornington Project, Drogheda, Co. Meath, and as such the project proposal comprises a planning application under the Planning and Development (Amendment) Act (2000). In the compilation of this report, cognisance is taken of relevant and appropriate legislation and guidance as follows:

- Wildlife Act, 1976 and Wildlife (Amendment) Act (2000) including all amendments. In this document, the legislation is referred to collectively as the Wildlife Acts;
- European Communities (EC) (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011; hereafter referred to as the Birds and Habitats Regulations);
- EC Birds Directive 2009/147/EEC;
- EC Habitats Directive 92/43/EEC;
- Convention on the conservation of European wildlife and natural habitats (Bern Convention);
- European Union EIA Directive 2014/52/EU
- European Union (Environmental Impact Assessment) (Planning and Development) Regulations 2014 (S.I. No. 543/2014);
- Flora (Protection) Order, 2015;
- Planning and Development Act (2000) including all amendments; and
- Planning and Development (Amendment) Act 2010;

The following guidelines were included in the evaluation of biodiversity receptors (flora and fauna) in relation to the proposed development works:

- Guidelines on The Information to be Contained in Environmental Impact Assessment Reports (Draft) (EPA, 2017);
- Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2018);
- Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (NRA, 2009);
- Best Practice Guidance for Habitat Survey and Mapping (Smith, O'Donoghue, et al., 2011); and
- A Guide to Habitats in Ireland (Fossitt, 2000).

2.2 Desk Study

The ecological desktop study completed for the proposed project evaluated the magnitude, scale and extent of the proposed project and delineated a buffer zone to comprise the zone of influence (Zoi) of the proposed works in the context of the immediate footprint and adjacent areas, as well as the wider landscape and biodiversity receptors. On this basis the Zoi for the project was determined to be variable, depending on the receptors identified within the study area and their ecological sensitivities in terms of direct and indirect disturbance to species and their supporting habitats. The desk study incorporated a review of the following information sources available online and within the public

domain:

- Records of rare and protected flora and fauna including those obtained from the NPWS website¹, presented in NPWS reporting, and the National Biodiversity Data Centre (NBDC) website²;
- National Parks and Wildlife Service (NPWS) designated site mapping, site synopses (Natura 2000 data form) and conservation objectives for European Sites³ with the identification of potential pathways from the proposed development;
- Online mapping and aerial/satellite imagery (www.google.ie; www.bing.com/maps) in order to determine broad habitats that occur within the study area;
- Water Framework Directive website⁴ and EPA Envision database (<https://gis.epa.ie/EPAMaps/>); and
- Any other relevant ecological reports and literature (published scientific literature and 'grey' literature).

2.3 Field Survey

2.3.1 Habitats and Volant Mammals

An ecological walkover survey of the proposed Greenway route was completed in April 2018. This was within the optimal mammal field survey season but outside the optimal botanical survey season. The survey was undertaken in accordance with Smith et al. (2011) and habitats within 50m of the route were classified according to Fossitt (2000). Annex I habitat evaluations were cross referenced with the NPWS conservation objectives for the Boyne Coast and Estuary SAC (NPWS, 2012b), including mapping provided in the Supporting Documents⁵. Determinations were made during the field survey with regard to saltmarsh communities aligning with Annex I habitats listed as QIs for the site and where non-Annex habitat occurred within and outside of the SAC boundary. Searches for evidence of protected species and/or presence of suitable supporting habitats were also undertaken – in particular in relation to Bats.

2.3.2 Non-Volant Mammals

A mammal survey was completed of the lands within 50m of the route, with specific searches for field signs indicating the presence of otter (slides, spraints, couches, prints and holts) and also badger activity (pathways, hairs, latrines, snuffle holes, setts, and prints). A search for signs of badger activity and badger setts was carried out within a 50m buffer of the route. However, if applicable where evidence of badger activity was high, searches extended outside of this buffer.

2.3.3 Birds

Initial scoping and consultation, including with NPWS, highlighted the requirement for any route

¹ Available at www.npws.ie/. Accessed in May 2020.

² Available at <https://maps.biodiversityireland.ie/Map>. Accessed in May 2020.

³ Available at <https://www.npws.ie/protected-sites>. Accessed in May 2020.

⁴ Available at <http://www.wfdireland.ie/wfd-more.html>. Accessed in May 2020.

⁵ Available at <https://www.npws.ie/protected-sites/sac/001957>. Accessed in May 2020.

design and later evaluation to take cognisance of interaction with shorebird populations along the route. In line with this and to ensure a robust, up-to-date baseline was available to inform a reasoned analysis of effects, bespoke surveys of shorebirds were undertaken within the intertidal sections of the proposed route. The objective of the bird survey was to supplement and update previously conducted studies for which results are available in the public domain (i.e. annual Irish Wetland Bird Surveys (I-WeBS) and Low Tide (LT) surveys (undertaken in 2011/2012; NPWS, 2012b). All these surveys incorporate a roving 'look-see' method (Bibby et al., 2000), where the observer moves from one count unit to the next over a set period to coincide with rising/falling tides, which is unsuitable in this instance to allow a full evaluation of site usage -in addition the passage of time in the interim since these studies intimated that a more up-to-date baseline was required. The current survey method was designed to provide more detailed and up-to-date information on hourly distribution of feeding and foraging birds, in particular in previously established 'count-sectors' in proximity to the proposed Greenway route, and across the tidal cycle thus providing up-to-date, definitive findings with which to inform route design and evaluate the significance of any effects.

Bird counts were completed at defined vantage points (n=6 were required to fully cover the 5 subsites; see **Table 2.1** and **Figure 2.1**) which allowed visibility in 180 degrees of the relevant count sectors. In any given day, a single count sector was surveyed across a 6-hour period. Target notes were made on other sectors during each count, if pertinent. Timings had to include, in at least one instance per count sector, a high tide (HT) period to allow the geo-referencing of HT roosts. Knowledge of the tidal cycle pertinent to the site was, therefore, required. Furthermore, timings and days selected for surveys covered the tidal cycle (e.g. from LT to HT, HT to LT or mid flood to mid ebb, etc.), to establish a baseline for each count sector the proposed route passes through across varying states of the tidal cycle.

Table 2.1: Count sectors (subsites) and sector codes (after NPWS, 2012).

SubSite_Code	Subsite
OZL02	Arp
OZL03	Port to Beaulieu
OZL05	Beaulieu Pier to Mornington
OVL01	Mornington West
OVL02	Mornington East

Hourly counts (across the tidal cycle and within pre-defined count sectors) to plot distribution/numbers of foraging and roosting birds within the likely zone of effect of the proposed Greenway corridor were undertaken. As the proposed Greenway effectively 'hugs' the shoreline, particular emphasis was given to plotting the distribution and numbers of feeding or roosting birds within specific distance bands (i.e. the likely zone of effect). Counts took place on a total of 12 days in winter period (March) 2018. Each count sector was counted on at least two occasions.

To establish numbers/distribution/usage of the likely zone of effect of the proposed development, locations within distance bands out to 50m from the proposed Greenway route were plotted as accurately as possible on field maps. In addition to numbers for each bird species, data on the location of birds in relation to the proposed route (within 50m; between 50m and 100m and over 100m away) were recorded, as well as the behaviour of the birds (noted as either foraging or roosting/other) and habitat type they were using (either intertidal, subtidal, supratidal or terrestrial).

As well as the birds themselves, notes were also taken in relation to disturbance events recorded

during the survey period that affected the birds observed, to establish any baseline trends of note. Disturbance event data included information on the disturbance type, response of the birds to the disturbance event and the duration of the disturbance event. The presence of birds of prey (that may also cause disturbance to shorebirds) was also noted.

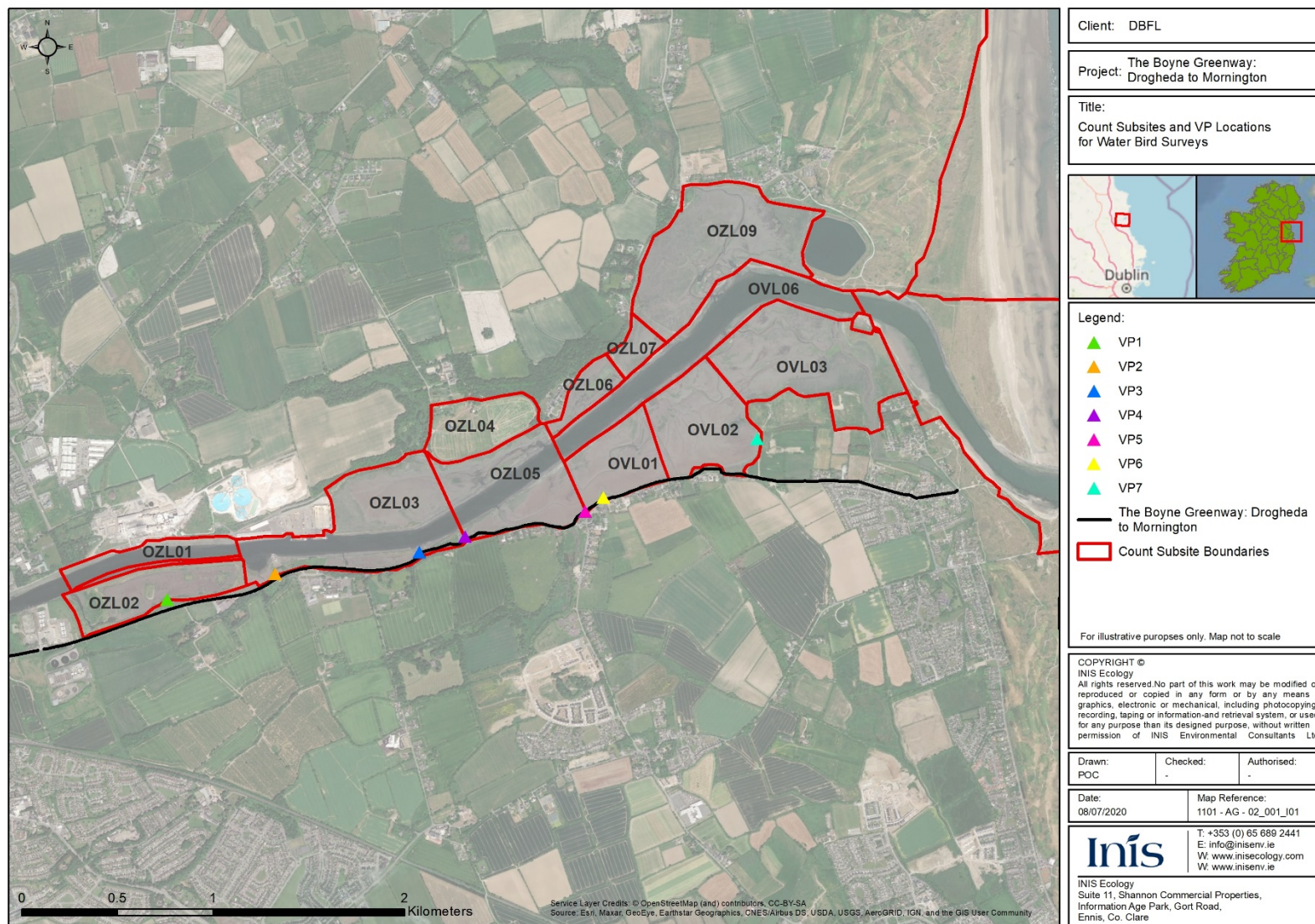


Figure 2.1: VP Locations for Water Birds Surveys.

3 Results

3.1 Desk Study

3.1.1 Designated Sites

Given the scale and nature of the proposed works, a zone of influence of 15 km has been identified for evaluation of likely significant effects of this project on European Sites, based on standard guidance (DoEHLG, 2010). From a review of the NPWS protected sites data⁶ there are six designated European sites for nature conservation within a 15km radius of the proposed works area:

- Boyne Coast and Estuary SAC (001957);
- Boyne Estuary SPA (004080);
- River Boyne and River Blackwater SAC (002299);
- River Boyne and River Blackwater SPA (004232);
- Clogher Head SAC (001459); and
- River Nanny Estuary and Shore SPA (004158).

An assessment of the potential for likely significant effects on any European site has been prepared and is presented in reporting to inform the Appropriate Assessment process (Inis, 2020). The AA reporting accompanies the current project application and addresses the potential for the project, alone or in-combination with other plans or projects, to give rise to significant adverse effects on any European Sites.

Figure 3.1 shows the designated sites within a 15 km radius of the proposed Greenway. It is noted that the Boyne Coast and Estuary SAC was previously designated as a proposed Natural Heritage Area (pNHA); however, the ecological sensitivities of this national designation have been subsumed into the SAC designation as a European site, within the Natura 2000 network. On this basis, there are no additional nationally-designated conservation areas within the study area; all designations relating to ecological receptors are included within the European sites (SAC/SPA) listed above.

3.1.1.1 Boyne Coast and Estuary SAC (001957)

This SAC is a coastal site which includes most of the tidal sections of the River Boyne, intertidal sand- and mudflats, saltmarshes, marginal grassland, and the stretch of coast from Bettystown to Termonfeckin that includes the Mornington and Baltray sand dune systems. The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I/II of the EU Habitats Directive (NPWS, 2012b):

- Estuaries [1130]
- Mudflats and sandflats not covered by seawater at low tide [1140]
- Annual vegetation of drift lines [1210]
- Salicornia and other annuals colonising mud and sand [1310]
- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330]
- Embryonic shifting dunes [2110]

⁶ Available at <https://www.npws.ie/maps-and-data>. Accessed in May 2020

- Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120]
- Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]

3.1.1.2 Boyne Estuary SPA (004080)

This moderately-sized coastal site is situated west of Drogheda, on the border of Counties Louth and Meath. The site comprises most of the estuary of the Boyne River, a substantial river which drains a large catchment. The Boyne Estuary is the second most important estuary for wintering birds on the Louth-Meath coastline. The site is of considerable ornithological importance for wintering waterfowl, with Black-tailed Godwit *Limosa limosa* occurring in internationally important numbers and nine other species having populations of national importance. Of particular significance is that three species that regularly occur, Golden Plover *Pluvialis apricaria*, Bar-tailed Godwit and Little Tern *Sterna albifrons* are listed on Annex I of the EU Birds Directive. The site is designated for the following species and habitats (NPWS, 2013):

- Shelduck (*Tadorna tadorna*) [A048];
- Oystercatcher (*Haematopus ostralegus*) [A130];
- Golden Plover (*Pluvialis apricaria*) [A140];
- Grey Plover (*Pluvialis squatarola*) [A141];
- Lapwing (*Vanellus vanellus*) [A142];
- Knot (*Calidris canutus*) [A143];
- Sanderling (*Calidris alba*) [A144];
- Black-tailed Godwit (*Limosa limosa*) [A156];
- Redshank (*Tringa totanus*) [A162];
- Turnstone (*Arenaria interpres*) [A169];
- Little Tern (*Sterna albifrons*) [A195]; and
- Wetland and Waterbirds [A999]

3.1.1.3 River Boyne and River Blackwater SPA (004232)

The River Boyne and River Blackwater SPA is a long, linear site that comprises stretches of the River Boyne and several of its tributaries; most of the site is in Co. Meath, but it extends also into Counties Cavan, Louth and Westmeath. The site includes the river channel and marginal vegetation. The River Boyne and River Blackwater Special Protection Area is of high ornithological importance as it supports a nationally important population of Kingfisher (*Alcedo atthis*) [A229], a species that is listed on Annex I of the E.U. Birds Directive (NPWS, 2020b).

3.1.1.4 River Boyne and River Blackwater SAC (002299)

This site comprises the freshwater element of the River Boyne as far as the Boyne Aqueduct, the Blackwater as far as Lough Ramor and the Boyne tributaries including the Deel, Stoneyford and Tremblestown Rivers. These riverine stretches drain a considerable area of Meath and Westmeath, and smaller areas of Cavan and Louth. The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I/II of the EU Habitats Directive (NPWS, 2020a):

- Alkaline fens [7230];
- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*,

Salicion albae) [91E0];

- River Lamprey (*Lampetra fluviatilis*) [1099];
- Salmon (*Salmo salar*) [1106]; and
- Otter (*Lutra lutra*) [1355].

3.1.1.5 Clogher Head SAC (001459)

Clogher Head is a coastal promontory, located approximately 10 km north-east of Drogheda in Co. Louth. Areas of sea cliff, bedrock shore and dry grassland also occur within the site. The site is a Special Area of Conservation (SAC) selected for the following habitats (NPWS, 2017):

- Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]; and
- European dry heaths [4030]

3.1.1.6 River Nanny Estuary and Shore SPA (004158)

The site comprises the estuary of the River Nanny and sections of the shoreline to the north and south of the estuary (ca. 3 km in length), in Co. Meath. The estuarine channel, which extends inland for almost 2 km, is narrow and well sheltered. The site is a Special Protection Area (SPA) under the EU Birds Directive, of special conservation interest for the following species and supporting habitats (NPWS, 2012a):

- Oystercatcher (*Haematopus ostralegus*) [A130];
- Ringed Plover (*Charadrius hiaticula*) [A137];
- Golden Plover (*Pluvialis apricaria*) [A140];
- Knot (*Calidris canutus*) [A143];
- Sanderling (*Calidris alba*) [A144];
- Herring Gull (*Larus argentatus*) [A184]; and
- Wetland and Waterbirds [A999].

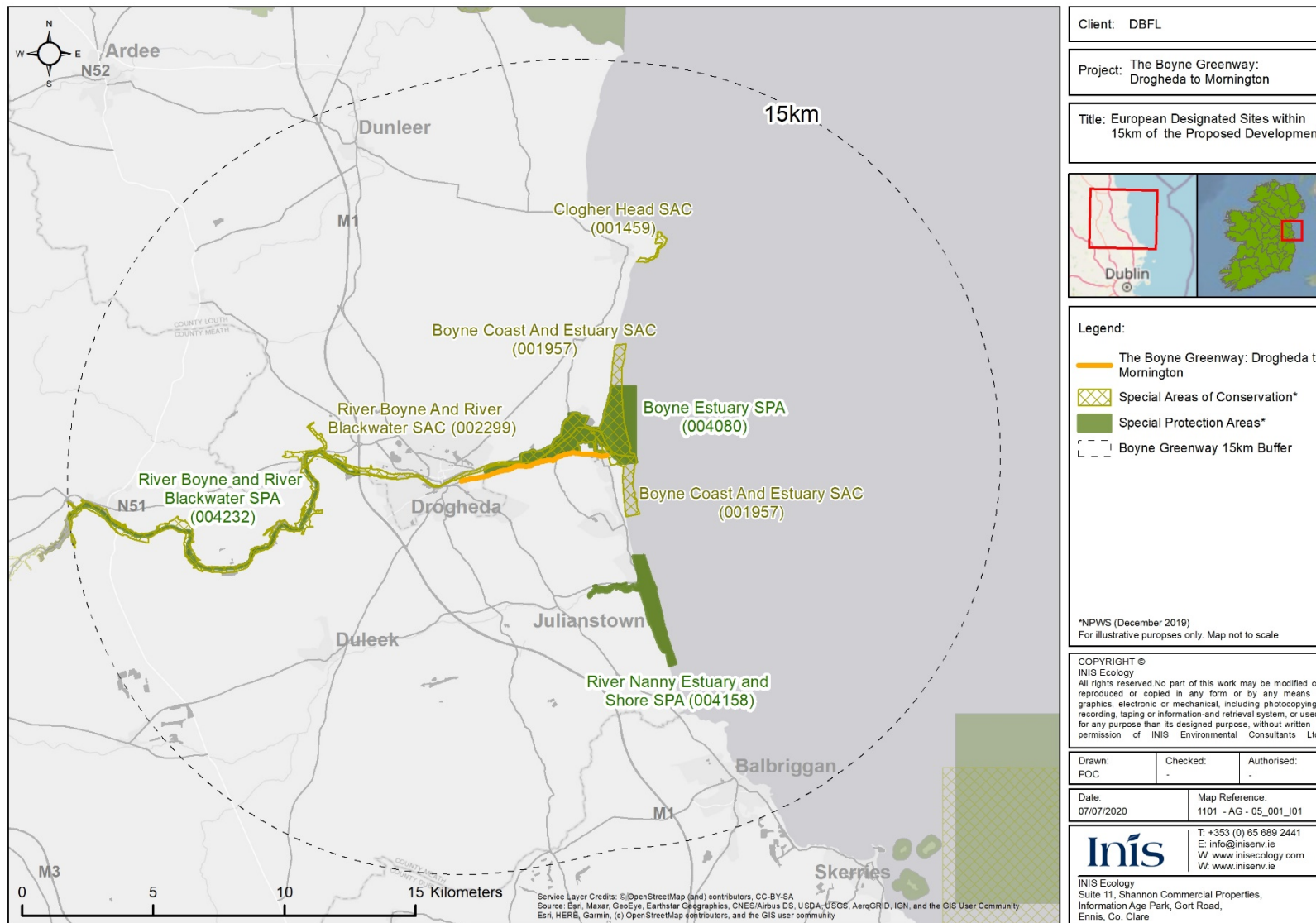


Figure 3.1: Designated sites within a 15 km radius of the proposed Boyne Greenway.

3.1.2 Terrestrial Biodiversity

3.1.2.1 Habitats and Flora

An online search was undertaken of data contained in the National Biodiversity Data Centre records base⁷. Data from an area of 2 km surrounding the proposed route was analysed for the presence of terrestrial flora and fauna records; where this radius was considered to incorporate the extent of local ecological interests potentially occurring within the ZOI of the proposed development. A total of five 2 km² grid squares was searched to cover the linear extent of the proposed route. This desk-based review included a wider study area than the field survey, which was focussed on the footprint of the proposed works and potential indirect effects associated with the construction and operation of the Greenway.

A single record of the endangered moss species Pointed Beard-moss (*Didymodon acutus*) occurs within the wider study area, recorded from the northern side of the estuary, approximately 1km from the proposed route. The near-threatened moss Side-fruited Crisp-moss (*Pleurochaete squarrosa*) has also been recorded within the 100 m² grid squares that are located adjacent to the proposed route.

3.1.2.1.1 Invasive Species

Based on existing records, there are seven locations of Japanese Knotweed (*Fallopia japonica*) to the west of the viaduct in Drogheda town, occurring mainly within housing estates in the Drogheda area, outside of the proposed route 50 m buffer zone. Japanese knotweed is classed as a high impact invasive species and is listed on the Third Schedule of the Birds and Natural Habitats Regulations (2011) and is subject to control and management requirements.

There are single records of Common Cord-grass from 2014 (*Spartina anglica*), Giant Hogweed (*Heracleum mantegazzianum*) and *Rhododendron ponticum* within 2km of the proposed route, these species are high impact species and are subject to control under the Birds and Natural Habitats Regulations (2011). There is a single record of Sea-Buckthorn, which is a medium impact invasive species; however, it is listed on the third schedule of the Birds and Natural Regulations (2011) and is subject to control and management. There is one record of Butterfly-bush (*Buddleja davidii*), six records of Sycamore (*Acer pseudoplatanus*) and one record of Japanese Rose within 2 km of the proposed route. These species are classed as medium impact invasive and are not listed on the third Schedule of the Birds and Natural Habitats Regulations (2011) and thus are not subject to control and management requirements. There is a record of Cherry Laurel (*Prunus laurocerasus*) within the study area from 2005. This species is classed as 'high impact'; however, it is not listed on the Birds and Natural Habitats Regulations (2011) and thus is not subject to control and management requirements.

3.1.2.2 Fauna

3.1.2.2.1 Mammals

The NBDC data records for the study area were evaluated for the grid squares overlapping the proposed route corridor. There are a total of 13 observations of Daubenton's Bat (*Myotis daubentonii*), one observation of Brown Long-eared Bat (*Plecotus auritus*), three observations of Lesser Noctule (*Nyctalus leisleri*), five Pipistrelle spp. and seven Soprano Pipistrelle (*Pipistrellus pygmaeus*) within the study area. All bat species in Ireland are protected under the Annex IV of the EU Habitats Directive (1992) and the Wildlife Act (2000).

⁷ Available at <http://www.biodiversityireland.ie/>. Accessed in May 2020.

There are eight records of Badger (*Meles meles*) and 20 records of Hedgehog (*Erinaceus europaeus*) within the study area; both species are protected under the Wildlife (Amendment) Act. There are 13 records of Otter (*Lutra lutra*) identified; this species is protected under the Wildlife Act (2000), is listed on Annex II and Annex IV of the EU Habitats Directive (1992) and is included as a qualifying interest of the River Boyne and River Blackwater SAC, which adjoins the western portion of the proposed route corridor. There is a single record of Irish Hare (*Lepus timidus ssp. hibernicus*) within the study area from 2009; this species is also protected under the Wildlife Act (2000).

There are three records of Harbour Seal (*Phoca vitulina*) within the study area, this species is listed on Annex II and Annex V of the European Habitats Directive. A single record of Common Dolphin (*Delphinus delphis*) and Striped Dolphin (*Stenella coeruleoalba*) were noted on the northern side of the estuary. All marine cetacean species are designated for conservation under Annex IV of the EU Habitats Directive as well as the Wildlife Act.

There are 10 records of Grey Squirrel (*Sciurus carolinensis*), which is a species listed as a high impact invasive and is subject to control and management requirements. There are six records of Rabbit (*Oryctolagus cuniculus*) within 2 km of the proposed route, which is a medium impact invasive species. There are two records of Brown Rat (*Rattus norvegicus*) with the study area, which is a species listed as a high impact invasive but is not subject to control and management on the mainland under the Birds and Natural Habitats Regulations (2011).

3.1.2.2.2 Birds

A search of bird records held by the National Biodiversity Data Centre within the 10km grid square within which the proposed route occurs was undertaken. Bird species recorded are presented in **Table 3.1** below. These species are likely associated with the coastal areas, woodland and agricultural land. All bird species in Ireland are protected under the Wildlife (Amendment) Act 2000, with additional conservation designation afforded for species listed on Annex I of the EU Birds Directive (2009), with further species listed on Annex II and Annex III of this Directive. In Ireland, Birdwatch Ireland and the Royal Society for the Protection of Birds (RSPB NI) publish the Birds of Conservation Concern in Ireland (BoCCI) list (Colhoun & Cummins, 2013) of priority bird species for conservation action on the island of Ireland. This includes birds which breed and/or winter in Ireland categorised as Red, Amber and Green, based on the conservation status of the bird and hence conservation priority.

Table 3.1: Records of birds of conservation concern for the wider study area.

Species	Date of Record	Conservation Designation	
		Birds Directive	BoCCI
Arctic Tern (<i>Sterna paradisaea</i>)	31/12/2001	Annex I	Amber
Common Tern (<i>Sterna hirundo</i>)	31/12/2009	Annex I	Amber
Barn Owl (<i>Tyto alba</i>)	31/12/2011		Red
Barn Swallow (<i>Hirundo rustica</i>)	12/06/2017		Amber
Bar-tailed Godwit (<i>Limosa lapponica</i>)	31/12/2011	Annex I	Amber
Black-headed Gull (<i>Larus ridibundus</i>)	12/06/2017		Red List
Black-legged Kittiwake (<i>Rissa tridactyla</i>)	31/12/2001		Amber
Black-tailed Godwit (<i>Limosa limosa</i>)	31/12/2011		Amber
Brent Goose (<i>Branta bernicla</i>)	04/12/2017	Annex II	Amber
Common Goldeneye (<i>Bucephala clangula</i>)	31/12/2011	Annex II	Red
Common Grasshopper Warbler (<i>Locustella naevia</i>)	31/07/1972		Amber
Common Greenshank (<i>Tringa nebularia</i>)	04/12/2017		Amber

Species	Date of Record	Conservation Designation	
		Birds Directive	BoCCI
Common Guillemot (<i>Uria aalge</i>)	05/08/1998		Amber
Common Gull (<i>Larus canus</i>)	31/12/2011		Amber
Common Kestrel (<i>Falco tinnunculus</i>)	31/12/2011		Amber
Common Kingfisher (<i>Alcedo atthis</i>)	05/09/2016	Annex I	Amber
Common Linnet (<i>Carduelis cannabina</i>)	04/12/2017		Amber
Common Pochard (<i>Aythya ferina</i>)	31/12/2001	Annex II/III	Amber
Common Redshank (<i>Tringa totanus</i>)	31/12/2011		Red
Common Sandpiper (<i>Actitis hypoleucos</i>)	31/12/2001		Amber
Common Scoter (<i>Melanitta nigra</i>)	31/12/2011	Annex II/III	Red
Common Shelduck (<i>Tadorna tadorna</i>)	12/06/2017		Amber
Corn Crane (<i>Crex crex</i>)	31/07/1972	Annex I	Red
Dunlin (<i>Calidris alpina</i>)	31/12/2011	Annex I	Amber
Eurasian Curlew (<i>Numenius arquata</i>)	04/12/2017	Annex II	Red
Eurasian Oystercatcher (<i>Haematopus ostralegus</i>)	04/12/2017		Amber
Eurasian Teal (<i>Anas crecca</i>)	31/12/2011	Annex II/III	Amber
Eurasian Tree Sparrow (<i>Passer montanus</i>)	31/12/2011		Amber
Eurasian Wigeon (<i>Anas penelope</i>)	04/12/2017	Annex II/III	Amber
Eurasian Woodcock (<i>Scolopax rusticola</i>)	31/12/2011	Annex II/III	Amber
European Golden Plover (<i>Pluvialis apricaria</i>)	31/12/2011	Annex II/III	Red
European Shag (<i>Phalacrocorax aristotelis</i>)	12/06/2017		Amber
Gadwall (<i>Anas strepera</i>)	31/12/2011	Annex II	Amber
Goosander (<i>Mergus merganser</i>)	31/12/2011	Annex II	Amber
Great Black-backed Gull (<i>Larus marinus</i>)	12/06/2017		Amber
Great Black-backed Gull (<i>Larus marinus</i>)	12/06/2017		Amber
Great Cormorant (<i>Phalacrocorax carbo</i>)	12/06/2017		Amber
Great Crested Grebe (<i>Podiceps cristatus</i>)	31/12/2011		Amber
Great Northern Diver (<i>Gavia immer</i>)	31/12/2011	Annex I	Amber
Greater Scaup (<i>Aythya marila</i>)	31/12/2011	Annex II/III	Amber
Greater White-fronted Goose (<i>Anser albifrons</i>)	31/12/2001	Annex I/II/III	Amber
Grey Partridge (<i>Perdix perdix</i>)	31/07/1972	Annex II/III	Red
Grey Plover (<i>Pluvialis squatarola</i>)	31/12/2011		Amber
Greylag Goose (<i>Anser anser</i>)	31/12/2011	Annex II/III	Amber
Hen Harrier (<i>Circus cyaneus</i>)	31/12/2011	Annex I	Amber
Herring Gull (<i>Larus argentatus</i>)	12/06/2017		Red
House Martin (<i>Delichon urbicum</i>)	31/12/2011		Amber
House Sparrow (<i>Passer domesticus</i>)	31/12/2011		Amber
Jack Snipe (<i>Lymnocyrtus minimus</i>)	31/12/2011	Annex II/III	Amber
Lesser Black-backed Gull (<i>Larus fuscus</i>)	31/12/2011		Amber
Lesser Whitethroat (<i>Sylvia curruca</i>)	31/12/2011		Amber
Little Egret (<i>Egretta garzetta</i>)	12/06/2017	Annex I	Green
Little Grebe (<i>Tachybaptus ruficollis</i>)	31/12/2011		Amber
Little Tern (<i>Sternula albifrons</i>)	31/12/2011	Annex I	Amber
Manx Shearwater (<i>Puffinus puffinus</i>)	05/08/1998		Amber
Mediterranean Gull (<i>Larus melanocephalus</i>)	31/12/2001	Annex I	Amber
Merlin (<i>Falco columbarius</i>)	31/07/1991	Annex I	Amber
Mute Swan (<i>Cygnus olor</i>)	12/06/2017		Amber
Northern Gannet (<i>Morus bassanus</i>)	31/12/2011		Amber
Northern Lapwing (<i>Vanellus vanellus</i>)	04/12/2017	Annex II	Red
Northern Pintail (<i>Anas acuta</i>)	31/12/2011	Annex II/III	Red
Northern Shoveler (<i>Anas clypeata</i>)	31/12/2011	Annex II/III	Red

Species	Date of Record	Conservation Designation	
		Birds Directive	BoCCI
Northern Wheatear (<i>Oenanthe oenanthe</i>)	06/09/2017		Amber
Red Knot (<i>Calidris canutus</i>)	31/12/2011		Red
Red-throated Diver (<i>Gavia stellata</i>)	31/12/2011	Annex I	Amber
Ringed Plover (<i>Charadrius hiaticula</i>)	12/06/2017		Amber
Ruff (<i>Philomachus pugnax</i>)	31/12/2001	Annex I	Amber
Sand Martin (<i>Riparia riparia</i>)	05/04/2016		Amber
Sandwich Tern (<i>Sterna sandvicensis</i>)	11/07/2016	Annex I	Amber
Short-eared Owl (<i>Asio flammeus</i>)	31/12/2011	Annex I	Amber
Sky Lark (<i>Alauda arvensis</i>)	31/12/2011		Amber
Spotted Flycatcher (<i>Muscicapa striata</i>)	31/12/2011		Amber
Stock Pigeon (<i>Columba oenas</i>)	31/12/2011		Amber
Tufted Duck (<i>Aythya fuligula</i>)	31/12/2011	Annex II/III	Amber
Water Rail (<i>Rallus aquaticus</i>)	31/12/2011		Amber
Whinchat (<i>Saxicola rubetra</i>)	31/07/1991		Amber
Whooper Swan (<i>Cygnus cygnus</i>)	31/12/2011	Annex I	Amber
Yellowhammer (<i>Emberiza citrinella</i>)	31/12/2011		Red

3.1.2.2.3 Reptiles and Amphibians

With the 2km grid square to the west of the viaduct in Drogheda, there is a single record each for Common Frog (*Rana temporaria*) and Smooth Newt (*Lissotriton vulgaris*); both species are protected under the Wildlife (Amendment) Act (2000), while the Common Frog is also listed on Annex V of the EU Habitats Directive. There are three records of Common Lizard within the study area; this is expected in areas where dry, south-facing coastal dunes and suburbs provide suitable habitat for this species.

3.1.2.2.4 Invertebrates

There are four records of the Red Data List *near-threatened* beetle species *Ochthebius* (*Ochthebius marinus*) within the study area. There is a record of the near threatened butterfly, Small Heath, to the north of the sand dune system at Mornington. No records of Small Heath occur within 50m of the proposed route. The following near-threatened species were also recorded within the study area; Two records of *Andrena* (*Leucandrena*) *barbilabris* from 2010, two records of *Colletes* (*Colletes*) *similis*, two records of Large Red-Tailed Bumble Bee (*Bombus* (*Melanobombus*) *lapidarius*), four records of Moss Carder-bee (*Bombus* (*Thoracomus*) *muscorum*) and two records of *Osmia* (*Helicosmia aurulenta*). A total of four records of Northern Colletes (*Colletes* (*Colletes*) *floralis*); this species is classified as vulnerable.

3.1.3 Fisheries and Aquatic Biodiversity

The study area for the proposed Greenway follows the southern margin of the Boyne Estuary, Hydrometric Area 07, due east of Drogheda town to its mouth on the east coast at Mornington. The lands crossed by the proposed development drain in a northerly direction into the Boyne Estuary.

In general, the site has been modified somewhat by human activity, such as on-going dredging for shipping. A number of factories are also present along the river, upstream of the estuary. The Boyne River channel, which is navigable and dredged, is defined by training walls that are breached in some places. Intertidal flats occur on the sides of the river channel. The sediments vary from fine muds in

the sheltered areas to sandy muds or sands towards the river mouth (J. Kelly et al., 2008).

The EU Water Framework Directive (WFD) status (2013-2018) for the Boyne estuary (IE_EA_010_0100) is characterised as 'Moderate', with specific regard to phytoplankton, macroalgae, nutrient conditions and poor hydromorphological conditions⁸. However, fish and invertebrate status are classed as 'Good'. The Boyne Estuary discharges to the Boyne Estuary Plume Zone waterbody (IE_EA_010_0000), characterised as at 'Moderate' status, including high biological status and nutrient conditions, but 'Moderate' status for phytoplankton, supporting chemistry conditions and oxygenation⁹.

The Boyne Estuary was surveyed by Inland Fisheries Ireland as part of the WFD Fish programme in 2009 (Fiona Kelly et al., 2009). A total of 23 fish species (sea trout are included as a separate 'variety' of trout) were recorded in the Boyne Estuary. Juveniles of a number of commercially important species were present, including cod, plaice and herring, as well as other species of angling importance, including flounder, sea trout and thick-lipped grey mullet. The diversity of species present reflects the salinity gradient and variety of habitat in the Boyne Estuary from more freshwater/brackish conditions in its upper reaches to more saline conditions closer to the sea. Additional monitoring surveys were completed as part of the same programme in 2012 (F. Kelly et al., 2013) which also identified 23 species of fish; however, in 2012, fifteen-spined stickleback, stone loach and two-spotted goby were recorded, while herring, thick-lipped grey mullet and whiting were recorded in the 2009 surveys, but not in 2012.

3.2 Field Survey

The study area is located in the upper portion of the Boyne Estuary extending east from Drogheda Town. Therefore, there is hydrological connectivity between the study area and the River Boyne and River Blackwater SAC (upstream) and the Boyne Coast and Estuary SAC (downstream). An ecological walkover survey of the proposed Greenway route was completed in April 2018, which involved habitat mapping and general mammal survey, as well as a targeted habitat assessment for potential occurrence of the Annex II listed Otter and the Annex I listed Kingfisher. A variety of habitats were recorded along the proposed route with Upper Salt Marsh, Lower Saltmarsh, Mud Flats and Improved Grasslands most frequently recorded in the western and central portion. Fixed Sand Dunes and Buildings and Artificial Surfaces were common in the eastern portion. The invasive species Japanese Knotweed, which is listed on the Third Schedule of the Birds and Natural Habitats Regulations (2011), was identified within the study area during the site visit (**Figure 3.7**).

Hedgerows and trees within proximity to the proposed development have potential for foraging and commuting bats; however, no suitable features comprising bat roost potential were identified within the route corridor. Similarly, no suitable nesting or foraging Kingfisher habitat was found within the development area. The habitats within the development area were found to be of medium potential for Otter; one Otter spraint was recorded within the study area.

⁸ Available at https://www.catchments.ie/data/#/waterbody/IE_EA_010_0100?_k=vzq3oe. Accessed in May 2020

⁹ Available at https://www.catchments.ie/data/#/waterbody/IE_EA_010_0000?_k=liwvvl. Accessed in May 2020.

3.2.1 Habitats and Flora

3.2.1.1 Habitat Description Along Proposed Route

The proposed Greenway commences approximately 100 metres west of the viaduct in Drogheda Town and follows the corridor of the R150 road within the roadside grassy verges (**Figure 3.2**). This section the route will be constructed from bituminous pavement.



Figure 3.2: Regional road R150 with grass verge and wall in the foreground and mud flats in the background.

Just east of the Drogheda Grammar School, the route crosses an area of species poor Amenity Grassland (GA2 - Yorkshire Fog *Holcus lanatus*, Ribwort Plantain *Plantago lanceolata*, Daisy *Bellis perennis* and Dandelion *Taraxacum spp*), just across Upper Saltmarsh (CM2) habitat. This small section of the Boyne Greenway (ca. 60m) will be constructed using recycled plastic boardwalk. The Boyne Greenway route intersects the River Boyne and River Blackwater SAC and the Boyne Estuary SPA boundaries along this boardwalk section (**Figure 3.8**).

From the boardwalk mentioned above and already outside the SAC and SPA boundaries, another bituminous section follows the road margin, incorporating Amenity Grassland habitat (GA2). Arriving at an area where the R150 road is separated by Saltmarsh habitat (CM1 and CM2) by a grassed verge and a wall (**Figure 3.2**), the Boyne Greenway construction type reverts to recycled plastic boardwalk (ca. 103m). This section crosses estuarine muddy shoreline habitat (LS4) to the north of the Greenway corridor.

The route reverts to bituminous construction, intersecting habitats of lower ecological value (e.g. BL3, GA2, WS1). Still within the bituminous section, Scattered trees and parkland habitat (WD5) is crossed, with Ash trees (*Fraxinus excelsior*). At this section, the route intersects again the River Boyne and River Blackwater SAC and the Boyne Estuary SPA (**Figure 3.8**). The majority of trees within this habitat have low bat roost suitability and may need to be removed to allow access from the road corridor. On the southern side of the road, within the grounds of Drogheda Grammar School, there are a number of mature trees with low bat roosting potential. These trees are within the grounds of the school and will not be affected by the proposed route (**Figure 3.3**).

From this point west, still within the WD5 habitat, the route transitions to boardwalk, continuing crossing habitats of Amenity Grassland (GA2). The habitats comprise scattered trees and parkland WD5 and GA2.



Figure 3.3: Example amenity grassland (GA2) and treelines (WL2) recorded outside Drogheda Grammar School.

Moving east, still within the SAC and SPA boundaries, the Boyne Greenway changes to boardwalk construction and crosses estuarine muddy shoreline habitat to the north of the greenway corridor (CM2, FS1), while its majority is located within broadleaved woodland (WD1) and scrub (WS1) habitats (**Figure 3.9**). The woodland habitat (WD1) and mature treeline habitats are characterised by the presence of Beech (*Fagus sylvatica*), Horse Chestnut (*Aesculus hippocastanum*) and mature Hawthorn (*Crataegus monogyna*). Scrub (WS1) habitat is characterised by Willow spp. (*Salix spp.*) and European Gorse (*Ulex europaeus*), with a small section within reedbed (FS1) composed of Common Reed (*Phragmites australis*). Trees occurring within these habitats have low bat roost suitability.

Continuing east, the route changes to bituminous type and runs parallel to the R150 road, outside the River Boyne and River Blackwater SAC but still within the Boyne Estuary SPA boundary, for approximately 125m. It re-enters the SAC and continues east for approximately 60m. This section of the Boyne Greenway crosses habitats of low ecological value (e.g. BL3, WS1 and GS2), dominated by European Gorse and Bramble, and Cock's Foot grass with some Meadowsweet, respectively (**Figure 3.9**).

The Greenway type of construction changes to boardwalk, crossing a scrub area (WS1), still within the Boyne Estuary SPA and the River Boyne and River Blackwater SAC boundary, where it crosses a section of hard standing with some scrub composed of Bramble, European Gorse and Buddleia (*Buddleia sp.*). This section of hard standing has an embankment to the north, which creates a border between the proposed route and lower saltmarsh (CM1) habitat present to the north of the embankment (). The embankment is dominated by grasses including Red Fescue (*Festuca rubra*). The route then crosses a small section of upper saltmarsh (CM2), which transitions into scrub and amenity grassland habitat to

the south, closer to the road.

From this point, the route crosses a small section of upper saltmarsh (CM2), and borders lower salt marsh habitat (CM1) to the north (see an illustrative example in **Figure 3.5**), which is intersected further east, approximately at the location where the route crosses again the SAC and SPA's boundaries for a short length (**Figure 3.9**). The route continues east, re-entering the SAC and SPA, intersecting lower saltmarsh (CM1) and, mostly, scrub habitat (WS1).



Figure 3.4: Example of lower salt marsh and mud flats habitat recorded within the study area

Further east, at a short distance from the intersection between the R151 road with the R150 road in the western direction, the Boyne Greenway route will be provided with a steel arch bridge, crossing the Stagrennan River traversing mudflat intertidal habitat (LS4) of the estuary within the SAC/SPA complex (**Figure 3.10**).



Figure 3.5: Example of upper salt marsh in the right of the photo and lower salt marsh (CM1) in the middle with mud flats to the left.

Still with boardwalk type of construction, the route then briefly leaves the SPA and SAC and crosses Amenity Grassland (GA2), re-entering the European sites shortly after (ca. 20m east), intersecting lower salt marsh (CM1) - not corresponding to Annex I Atlantic Saltmarsh – and Amenity Grassland (GA2) for ca. 705m. The route then continues east, transitioning to bituminous construction shortly after leaving the SAC and SPA boundaries. This bituminous section of ca. 290m intersects habitats of lower ecological value, as Amenity grassland (GA2), Ornamental/non-native shrub (WS3) and Dry meadows and grassy verges (GS2), mostly outside the Boyne

Coast and Estuary SAC and the Boyne Estuary SPA. Approximately 180m east, the route re-enters the SAC and SPA, on Amenity grassland (GA2) habitat bordering Lower salt marsh habitat (CM1) to the north. This section is interrupted by the precast concrete beams bridge, which drives the Boyne Greenway route outside the SAC and SPA boundaries, and follows east intersecting Amenity Grassland (GA2), Improved agricultural grassland (GA1) and Buildings and artificial surfaces (BL3) habitats. This section of the route extends for ca. 910m and runs approximately parallel to the northern site of the R151 road, passing in front of gardens, grass verges and existing hard standing areas. Non-native species such as Butterfly-bush (*Buddleja davidii*), Montbretia (*Crocasmia x crocosmiiflora*), Fuchsia (*Fuchsia magellanica*) and Wall Cotoneaster (*Cotoneaster horizontalis*) were commonly recorded in domestic gardens and in some hedgerows adjacent to houses.

The route then continues east, leaving the R151 Road and extending through the suburban area of Mornington (**Figure 3.11**). This section is the final section on the Boyne Greenway (i.e. the most eastern), where the construction method will consist of mixed or shared street facilities on Tower Road. This is a local/residential road, with very light traffic flows and slow traffic speeds, suitable for shared facilities. The route re-enters the Boyne Coast and Estuary SAC for the 18m of this Section, within Buildings and artificial surfaces (BL3) and Flower beds and borders (BC4) habitats.

3.2.1.2 Invasive/Non-native species

One species listed on the Third Schedule of the Birds and Natural Habitats Regulations (2011) was recorded from the study area in close proximity to the proposed development, although subject to control and management. Japanese Knotweed was recorded in one location (**Figure 3.7**) adjacent to the R150 and within <5m of the proposed route corridor. It was observed that this stand was previously treated with herbicide as only three dried canes remained.

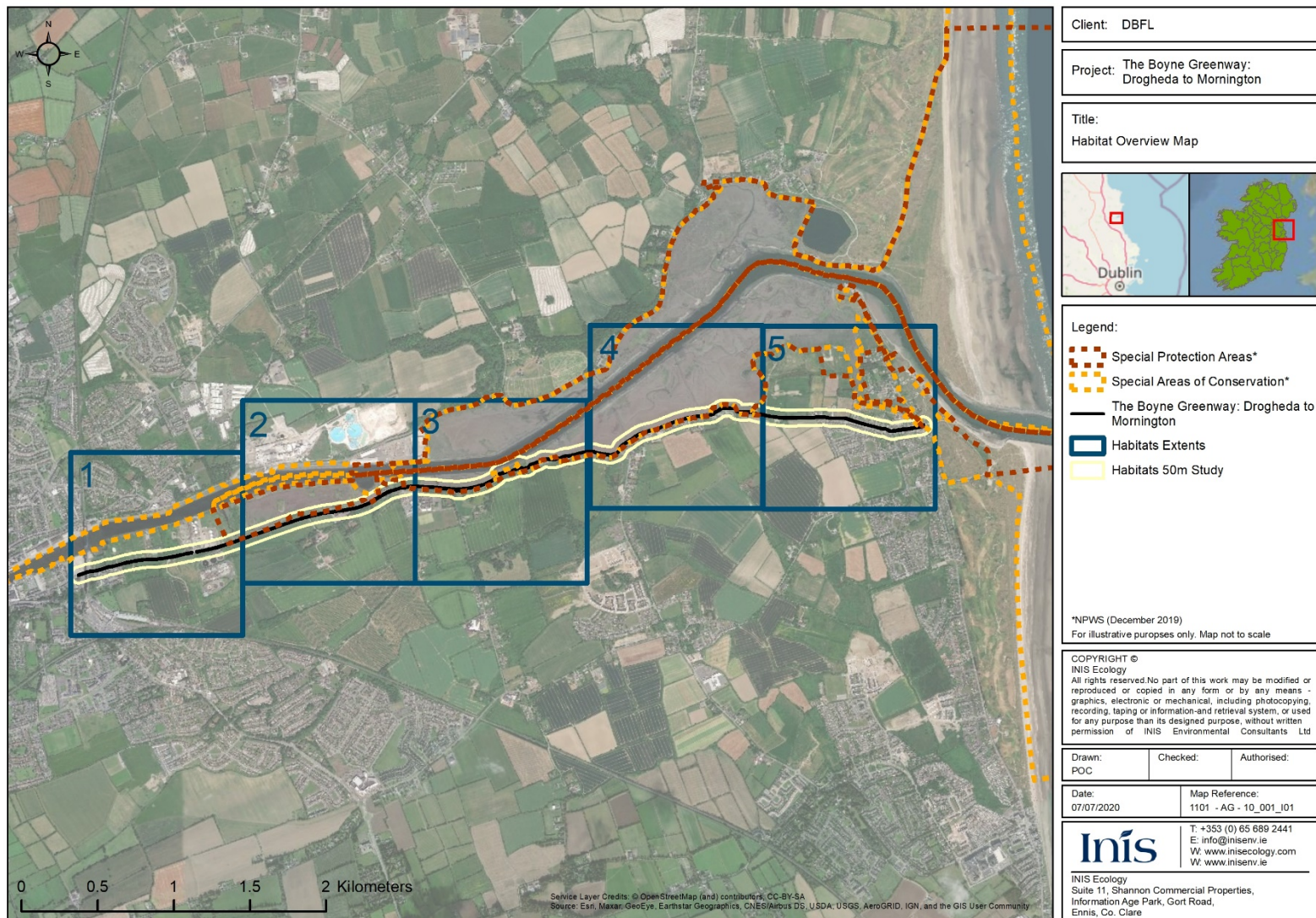


Figure 3.6: Overview location of habitat maps 1 – 5, showing Boyne Greenway Route and study area

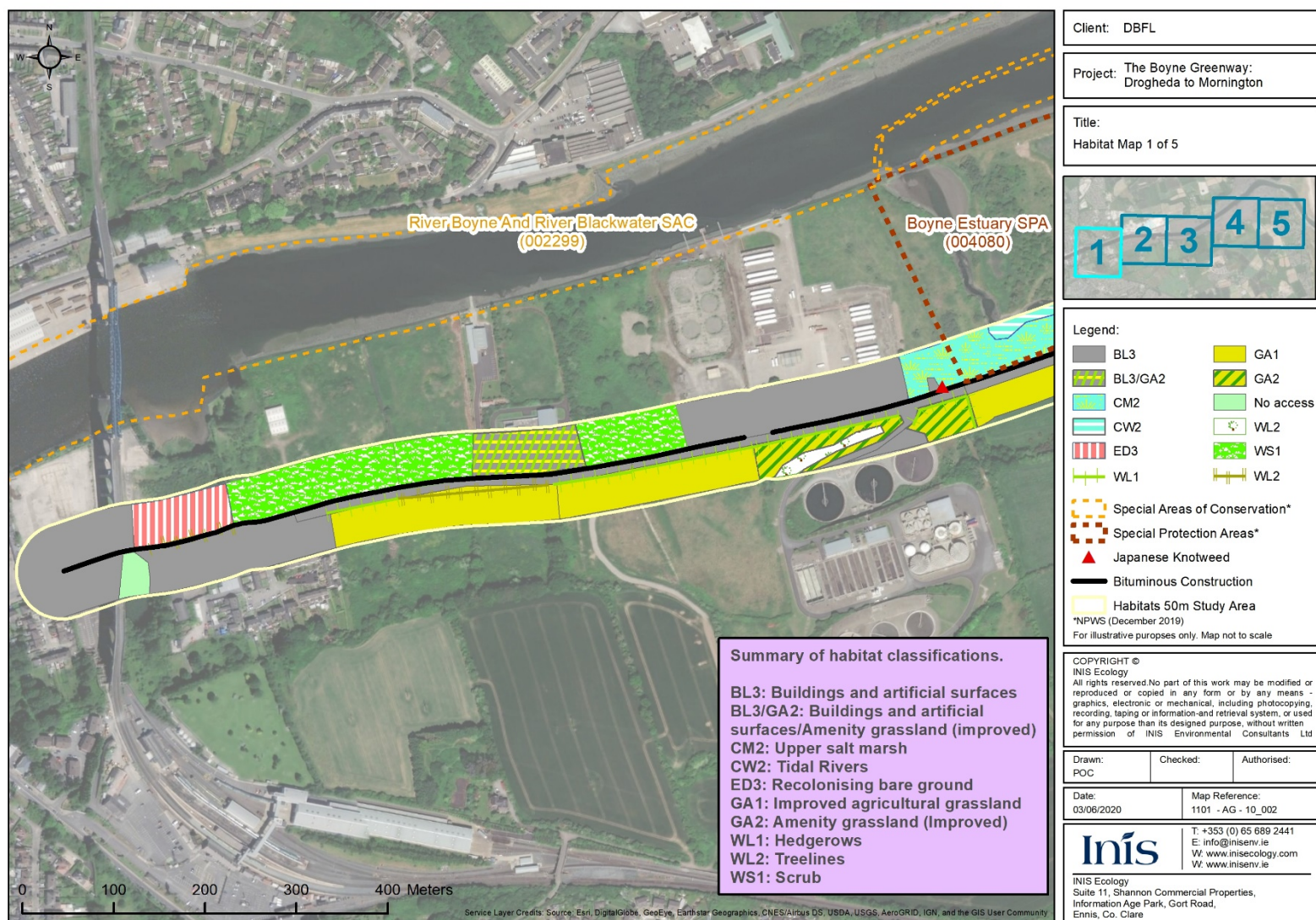


Figure 3.7: Habitats within a 50m buffer of the proposed Greenway (Map 1/5).

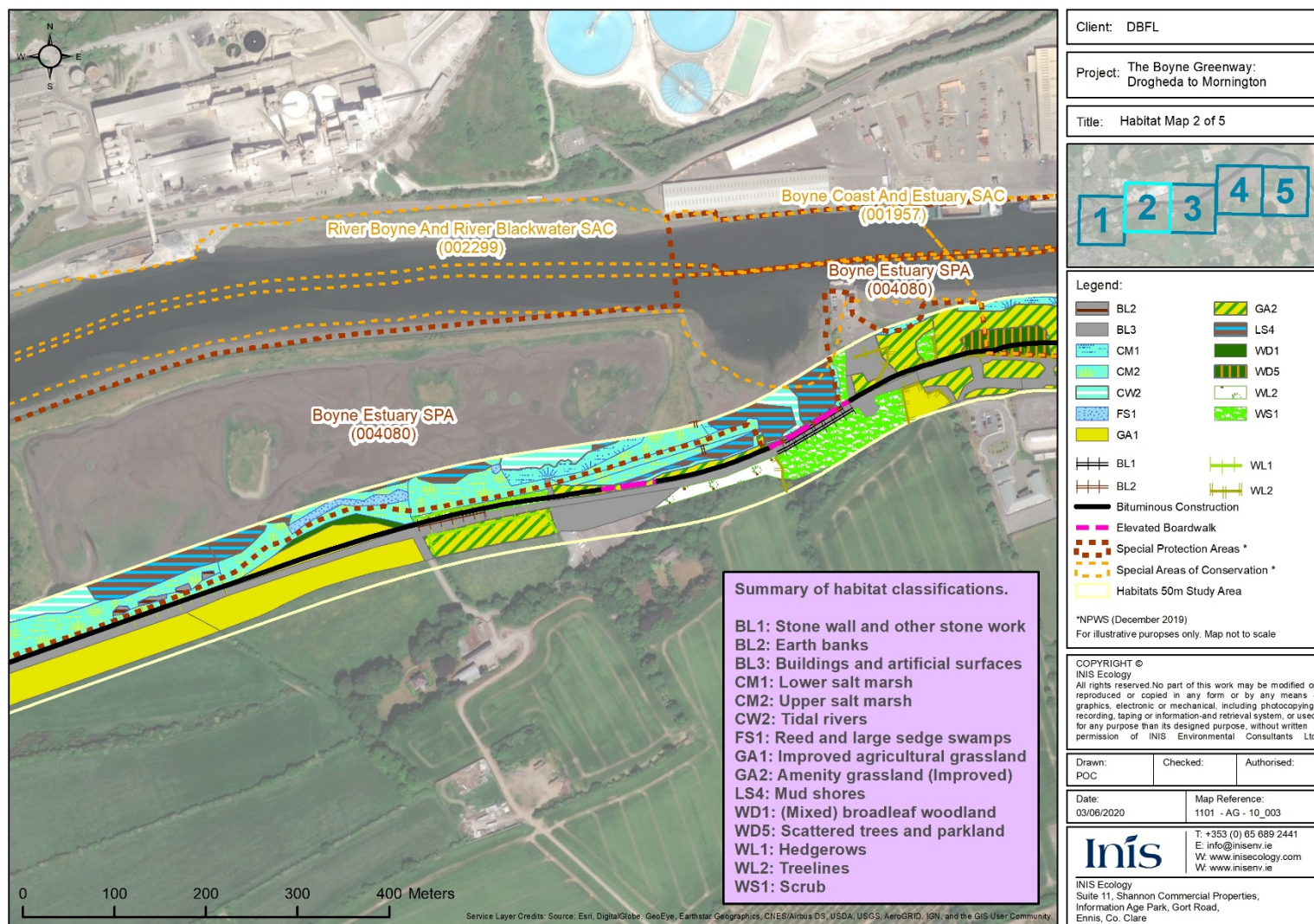


Figure 3.8: Habitats within a 50m buffer of the proposed Greenway (Map 2/5).

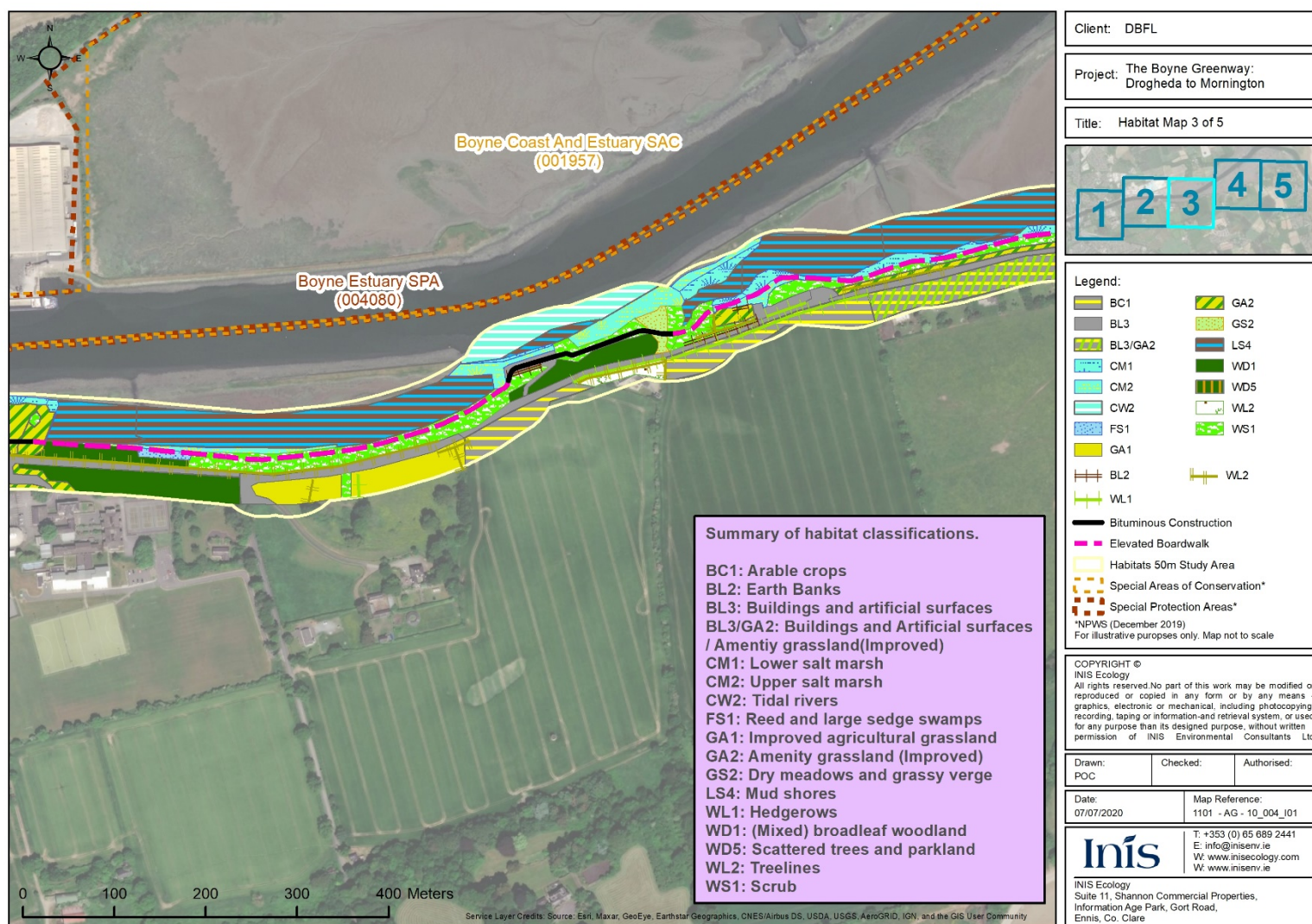
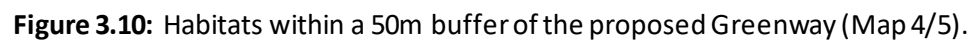


Figure 3.9: Habitats within a 50m buffer of the proposed Greenway (Map 3/5).



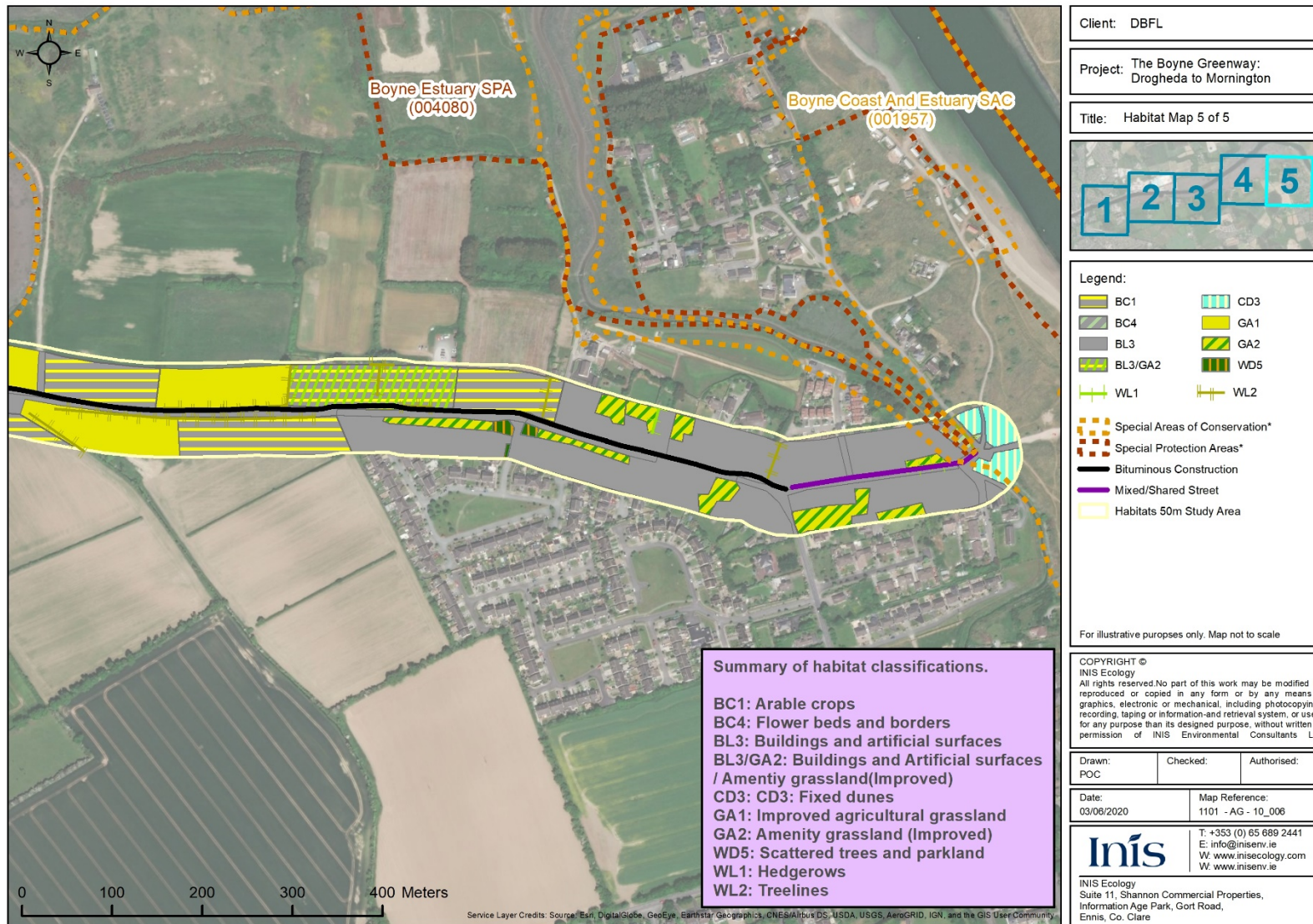


Figure 3.11: Habitats within a 50m buffer of the proposed Greenway (Map 5/5).

3.2.2 Terrestrial Fauna

3.2.2.1 Mammals

3.2.2.1.1 Bats

A visual assessment of the potential for bat habitat was completed along the proposed route corridor and included the lands immediately surrounding the proposed works. The majority of trees within the survey area were evaluated as being of negligible bat roost potential. There are a number of individual mature trees with low bat roost potential within the vicinity of Drogheda Grammar School, occurring along the road alignment. No buildings were identified as potential roost features (PRF) within the survey area. The majority of treelines recorded along the route were evaluated as having low-medium potential as foraging and commuting habitat for bats. There is a good degree of connectivity between the roadside hedgerows and treelines and to those of the adjoining field boundaries, predominantly to the south of the R150. Based on the habitats recorded, foraging and commuting bats are evaluated as likely using the habitats within the route alignment and also connected to the wider landscape.

3.2.2.1.2 Otter

An old Otter spraint was recorded along the upper salt marsh within the eastern section of the study area. No other evidence of Otter such as holts, prints, feeding remains or couches were recorded following comprehensive searching. The route alignment closely follows an active road corridor, with predominantly disturbed ground and amenity grassland. Although Otters are likely to utilise the Boyne Estuary for foraging and commuting, the baseline or background disturbance levels in the receiving environment along the proposed Greenway route corridor are evaluated as a limiting factor when considering the potential for the corridor to be used for Otter breeding or holt sites.

3.2.2.1.3 Badger

No evidence of Badger was recorded during the field survey. No Badger setts were identified along the proposed route. The presence of the existing roadway is likely to be a significant constraint to Badgers utilising the Greenway Route corridor from surrounding areas.

3.2.2.2 Birds

The proposed Boyne Greenway: Drogheda to Mornington route corridor field surveys were completed in April 2018 during the breeding bird season. Dedicated wintering bird surveys of shorebirds were also completed in March 2018, during the appropriate wintering bird season. In terms of general breeding birds, the walkover survey of the route did not record any bird species of conservation interest during the breeding season. However, dedicated shorebird surveys have been completed to inform both the iterative route design process undertaken in 2018 and the subsequent impact assessment for the final project iteration. Results of these surveys, including geo-referenced distribution maps are included in full in **Appendix A** of this report.

Surveys focussed on the potential for wading and wetland birds to occur adjacent to the proposed route corridor, in association with the estuarine and intertidal habitats of the Boyne Estuary SPA. Species of conservation interest recorded during the bird surveys at high and low tide are summarised below (**Table 3.2**). **Table 3.2** shows the maxima of birds recorded within each wintering bird survey subsite (see **Table 2.1** for a breakdown of selected sub-sites). Note that, as different subsites were surveyed

on different days, these numbers are not necessarily additive but may reflect birds moving onto different subsites within the larger Boyne Estuary complex (e.g. the 2200 Golden Plover recorded at OVL01 on 12 March may be part of the same flock of 2600 recorded at OZL05 on 16 March).

Of the species recorded during fieldwork, Golden Plover and Black-tailed Godwit are both listed as species upon which the SPA designation was made (the other two SPA species are Knot and Turnstone, neither of which were recorded in the five sub-sites surveyed). A further four species recorded are also listed as additional Special Conservation Interests in the SPA, namely Shelduck, Oystercatcher, Lapwing and Redshank.

Table 3.2: Maxima of birds by species recorded within each subsite, 2018.

Species	Survey-Sites				
	OVL01	OVL02	OZL02	OZL03	OZL05
Mute Swan				2	
Brent Goose	108			46	40
Shelduck	12	35	13	48	9
Mallard	2	2	4	7	1
Wigeon	39	14	63	40	21
Teal	43	13	76	52	56
Tufted Duck				2	
Cormorant	2			1	4
Grey Heron					1
Little Egret				2	1
Little Grebe				1	
Oystercatcher	2	6		2	
Lapwing			89	48	17
Golden Plover	2200			2	2600
Curlew	6	45	4	9	38
Black-tailed Godwit	69	270		199	407
Bar-tailed Godwit		1			1
Dunlin	115	28			200
Greenshank	2	2	4	5	1
Redshank	118	120	41	91	110
Snipe			31		
Black-headed Gull			61	10	10
Common Gull			5		
Lesser Black-backed Gull			9		2
Herring Gull	6	7	47	1	70
Great Black-backed Gull			1	2	

Table 3.3 lists the percentage of the maxima count for the 6 no. recorded bird species of conservation interest within each selected sub site against the total baseline population of birds within the Boyne Estuary SPA.

The results indicate that Oystercatcher and Lapwing were only recorded in small numbers in any of

the adjacent subsites to the Greenway, with a maximum of 0.6% of the baseline Boyne Estuary Oystercatcher population (in OVL02) and 1.9% of the Lapwing population (in OZL02). Up to one-fifth of the baseline Boyne Estuary SPA populations of Shelduck (22% in OZL03) and Redshank (20.6% in OVL02) were recorded, with higher proportions of Black-tailed Godwit (up to 86.4% of the baseline population level in OZL05).

Table 3.3: Percentage of the maxima count for the six bird species listed as SCIs for the Boyne Estuary SPA recorded within each sub site, against the total baseline population of birds within the SPA.

Species	Survey Sites					Baseline Boyne Estuary SPA Population
	OVL01	OVL02	OZL02	OZL03	OZL05	
Shelduck	5.5%	16.1%	6.0%	22.0%	4.1%	218
Oystercatcher	0.2%	0.6%	-	0.2%	-	1090
Lapwing	-	-	1.9%	1.0%	0.4%	4657
Golden Plover	36.2%	-	-	0.0%	42.8%	6070
Black-tailed Godwit	14.6%	57.3%	-	42.3%	86.4%	471
Redshank	20.2%	20.6%	7.0%	15.6%	18.9%	583

The surveys at subsites adjacent to the proposed route corridor identified important concentrations of birds, particularly Black-tailed Godwit. Therefore, the baseline populations will be evaluated to determine any likely impacts of the proposed route on the birds likely to be present and the identification of appropriate mitigation measures if required.

3.2.2.3 Other fauna

No records of other protected faunal species, or species identified as rare or sensitive were identified during the field surveys completed along the proposed route in April 2018.

3.2.3 Fisheries and Aquatic Biodiversity

During the site walkover survey along the proposed route corridor, a visual assessment was carried out along the Boyne estuary transitional water body (IE_EA_010_0100) and at the Stagrennan_10 river water body (IE_EA_07S320550), specifically at the Stagrennan stream (EPA Code: 07S32) crossed by the proposed route.

All waterbodies within the study area are transitional, tidally influenced and directly affected by downstream inputs from the Boyne estuary, as well as from saline influxes. The banks of the Boyne estuary are composed of mud flats and lower salt marsh. The Stagrennan stream meets the Boyne estuary directly adjacent to the proposed alignment and is tidal in nature, affected by fluctuations in the Boyne. At the crossing point, the Stagrennan stream was approximately 5 metres in width. The Stagrennan river water body is unassigned for the WFD monitoring network and, due to its tidal nature, was deemed unsuitable for biological sampling. Based on an evaluation of the flow and tidal character, in addition to the physical habitat present, the fish community utilising the tidal lower reaches are evaluated as being contingent and directly connected with the fish community of the Boyne estuary, immediately adjacent.

3.3 Identification of Key Biodiversity Receptors

Following guidelines for ecological impact assessment ((CIEEM, 2018; EPA, 2017), biodiversity receptors of Local Importance (higher value) or greater within the ZOI of the proposed development are carried forward to evaluate the potential or likelihood of significant effects. Potential impacts which are not likely to give rise to significant effects on biodiversity receptors are screened out.

On this basis, the key biodiversity receptors identified within the works area of the proposed Boyne Greenway: Drogheda to Mornington, and wider zone of influence, are presented in **Table 3.4**.

Table 3.4: Key biodiversity receptors identified within the zone of influence of the proposed Boyne Greenway: Drogheda to Mornington route.

Biodiversity Receptor	Evaluation	Sensitivity/ Protected status	Within footprint of works area	Occurring within construction ZoI	Occurring within operation ZoI	Screened in for further evaluation
Designated European Sites: Boyne Coast and Estuary SAC; Boyne Estuary SPA; River Boyne and River Blackwater SAC;	European Importance	EU Habitats Directive	Y	Y: Route corridor lies in proximity to and overlays the boundary of these SAC and SPA sites. Evaluation of the likelihood of Significant effects provided in AA Reporting.	Y: Route corridor lies in proximity to and overlays the boundary of these SAC and SPA sites. Impact assessment provided in AA Reporting.	Y: Construction and Operation
River Boyne Estuary (CW2/MW4)	National Importance	Annex I EU Habitats Directive.	N	Y: Construction required in proximity and overlapping this habitat in short sections, crossing portions below the high-water mark. Boardwalk and Bridge sections to be raised above this habitat.	Y: The operation / utilisation of the Greenway is directly proximate but outside of the Boyne estuary.	Y: Construction and Operation
Tidal Mudflats and Sandflats (LS4)	National Importance	Annex I EU Habitats Directive.	Y	Y: Construction required in proximity to and overlapping this habitat in short sections, crossing portions below the high-water mark. Boardwalk and Bridge sections to be raised above this habitat.	Y: The operation / utilisation of the Greenway is directly proximate to this habitat.	Y: Construction and Operation
Invasive species: Japanese knotweed	National Importance	Birds and Habitats Regulations (2015) Annex III	N	Y: This species does not occur within the route corridor, but has been recorded within proximity to, and may potentially interact with, construction activities.	Y: This species will persist in proximity to the Greenway during the operation phase.	Y: Construction and Operation
Otter	National Importance	Wildlife Act (2000); Annex II	N	Y: Otter occur within the Boyne estuary and its tributaries, adjacent to the	Y: Otter activity will continue within the Boyne estuary and its	Y: Construction and Operation

Biodiversity Receptor	Evaluation	Sensitivity/ Protected status	Within footprint of works area	Occurring within construction Zol	Occurring within operation Zol	Screened in for further evaluation
		and Annex IV, EU Habitats Directive.		construction works. No Holts or active breeding or resting sites recorded in baseline surveys.	tributaries, adjacent to the Greenway.	
Bats	County Importance	Wildlife Act (2000); Annex II EU Habitats Directive.	N	Y: Trees with low bat roost suitability adjacent to route corridor.	Y: Operation / utilisation of the Greenway will occur proximate to trees with low bat roost suitability.	Y: Construction and Operation
Badger	County Importance	Wildlife Act (2000); Annex II EU Habitats Directive.	N	N: Badger occur within the wider study area of the proposed Greenway. However, this species does not occur within or proximate to the construction corridor.	N: Absence of badger activity along the route corridor indicates no interaction during the operation / utilisation of the Greenway.	N: No interaction within the ZOI
Marine Mammals: Harbour seal, Common dolphin, Striped Dolphin	County Importance	Wildlife Act (2000); Annex II EU Habitats Directive.	N	N: Marine mammals occur incidentally within the wider study area of the proposed Greenway. However, this species does not occur within or proximate to the construction corridor.	N: Absence of records for marine mammals in proximity to the route corridor indicates no interaction during the operation / utilisation of the Greenway.	N: No interaction within the ZOI
Waders and Waterbirds (wintering): Shelduck, Oystercatcher, Golden Plover, Lapwing, Knot, Sanderling, Black-	National Importance	Annex II EU Habitats Directive.	N	Y: Estuarine and intertidal habitats supporting wintering birds occur within and adjacent to the construction corridor.	Y: Operation / utilisation of the Greenway will occur proximate to habitats supporting wintering waders and waterbirds.	Y: Construction and Operation

Biodiversity Receptor	Evaluation	Sensitivity/ Protected status	Within footprint of works area	Occurring within construction ZOI	Occurring within operation ZOI	Screened in for further evaluation
tailed Godwit, Redshank, Turnstone, Little Tern, Ringed Plover, Herring Gull						
Breeding Birds	Local Importance (higher value)	Wildlife Act (2000);	Y	Y: Breeding bird habitat occurs within and proximate to the construction corridor.	Y: Breeding birds and their habitats occur proximate to the operational Greenway corridor.	Y: Construction and Operation
Kingfisher	National Importance	Wildlife Act (2000); Annex II EU Habitats Directive.	N	N: This species occurs within the wider study area but not within or proximate to the construction works. No breeding habitat or suitable nest sites occur within construction or operational corridor.	N: There is no interaction between this species and the operation/utilisation of the Greenway corridor.	N: No interaction within the ZOI
Reptiles and Amphibians: Common Lizard; Smooth Newt	County Importance	Wildlife Act (2000);	N	Y: Potential for lizard to occur within the eastern portion of the route corridor in coastal dune habitats.	Y: Potential for lizard to occur within the eastern portion of the route corridor in coastal dune habitats.	Y: Construction and Operation
Fish/Fisheries: Salmon, Lamprey sp., etc.	National Importance	Wildlife Act (2000); Annex II EU Habitats Directive.	N	Y: Fish and fisheries occur within the Boyne estuary and its tributaries, adjacent to the construction works.	N: Fish and fisheries within the Boyne estuary and its tributaries will not be affected by the operation / utilisation of the Greenway.	Y: Construction only

4 Potential Impacts Arising from the Proposed Development

4.1 Construction Phase Impacts

4.1.1 Designated Sites

The magnitude, scale and significance of any construction impacts potentially affecting designated sites is limited within the project ZOI to effects on European Sites, i.e. SAC and SPAs. On this basis, the impact assessment and evaluation of significant effects on European Sites has been addressed in full in the reporting to inform Appropriate Assessment process (Inis, 2020) which accompanies the current planning application.

4.1.2 Terrestrial Biodiversity

4.1.2.1 Habitats and Flora

The proposed Greenway route corridor is principally aligned along existing road corridors, amenity areas and existing trackways and disturbed ground, following the southern margin of the River Boyne estuary. The construction stage of the project will require a temporary works area along the route corridor for machinery access, in addition to the permanent landcover change within the footprint. The habitats identified within the route corridor have been evaluated with respect to the required habitat loss arising from the permanent footprint of the development. The linear habitat lengths within the footprint of project construction, described by construction method are presented in **Table 4.1**. The total habitat areas within the footprint of the project are presented in **Table 4.2**.

Table 4.1: Linear habitats within the footprint of the proposed Greenway project.

Habitat Type	Habitat Code	Total Length (m)
<i>Hard surface (Bitumen, bridge works and wooden track)</i>		
Hedgerow	WL1	160
Treeline	WL2	291
<i>Elevated boardwalk (recycled plastic)</i>		
Earth banks	BL2	5

Table 4.2: Habitat areas within the footprint of the proposed Greenway project.

Habitat Type	Habitat Code	Total Area (m ²)
<i>Hard surface (Bitumen, bridge works and wooden track)</i>		
Arable crops	BC1	855
Flower beds and borders	BC4	32
Buildings and artificial surfaces	BL3	4,316
Buildings and artificial surfaces/Amenity grassland	BL3/GA2	1,081
Lower salt marsh	CM1	248
Upper salt marsh	CM2	1,108
Recolonising bare ground	ED3	404
Improved agricultural grassland	GA1	1,612
Amenity grassland	GA2	1,614
Amenity grassland/Ornamental/non-native shrub	GA2/WS3	98
Dry meadows and grassy verges	GS2	643

Habitat Type	Habitat Code	Total Area (m ²)
Muddy shore	LS4	45
Mixed (broadleaved) woodland	WD1	67
Scattered trees/parkland	WD5	378
Scrub	WS1	2,641
<i>Elevated boardwalk (recycled plastic)</i>		
Buildings and artificial surfaces	BL3	137
Buildings and artificial surfaces/Amenity grassland	BL3/GA2	38
Lower salt marsh	CM1	3,120
Upper salt marsh	CM2	830
Reeds and large sedge swamps	FS1	39
Amenity grassland	GA2	2
Amenity grassland/Ornamental shrub	GA2/WS3	779
Dry meadow and grassy verges	GS2	45
Muddy shore	LS4	1,230
Mixed (broadleaved) woodland	WD1	12
Scrub	WS1	1,823

The scale of habitat affected by the proposed Boyne Greenway for all habitats encountered within the route corridor is presented in **Table 4.1** and **Table 4.2**, above. Of these, the habitat types and associated impact footprint habitat loss calculations evaluated as being potentially significant in the context of the local environment and wider ZOI are presented in **Table 4.3**.

Table 4.3: Impact evaluation for habitats identified as biodiversity receptors within the footprint of the works area.

Habitat type	Habitat code	Impact Evaluation
<i>Hard surface (Bitumen, bridge works and wooden track)</i>		
Hedgerow	WL1	Clearance within footprint of the works will potentially result in the reduction of this habitat in the local context. <u>Mitigation is required.</u>
Treeline	WL2	Clearance within footprint of the works will potentially result in the reduction of this habitat in the local context. The construction works are temporary; however, due to the nature of this habitat, the effects will be long-term. <u>Mitigation is required.</u>
Upper salt marsh	CM2	The botanical community along the corridor identifies that this habitat is characterised by species requiring dry ground, on embankment lands which are subject to periodic inundation by elevated flood flows and low saline contributions. <u>Mitigation is required.</u>
Muddy shore	LS4	The limited extent of habitat loss occurs where the Greenway requires crossing at existing bridge locations and works directly adjacent to the Boyne Estuary. <u>No mitigation is required.</u>

Habitat type	Habitat code	Impact Evaluation
Mixed (broadleaved) woodland	WD1	Loss of this habitat type will occur during site clearance works along the route corridor. The construction works are temporary. However, due to the nature of this habitat, the effects will be long-term. <u>Mitigation is required.</u>
Scrub	WS1	Loss of this habitat type will occur during site clearance works along the route corridor. The construction works are temporary and due to the nature of this habitat, the effects will be short-term. <u>Mitigation is required.</u>
<i>Elevated boardwalk (recycled plastic)</i>		
Lower salt marsh	CM1	The boardwalk section crosses lower saltmarsh along the Boyne Estuary. However, the temporary works will require the installation of support piles for the suspended boardwalk, rather than habitat clearance. Impacts are, therefore, temporary within the calculated landcover change. <u>Mitigation is required.</u>
Upper salt marsh	CM2	The botanical community along the corridor identifies that this habitat is characterised by species requiring dry ground, on embankment lands which are subject to periodic inundation by elevated flood flows and low saline contributions. The temporary works will require the installation of support piles for the suspended boardwalk, rather than habitat clearance. Impacts are therefore temporary within the calculated landcover change. <u>Mitigation is required.</u>
Reeds and large sedge swamps	FS1	The boardwalk section crosses reeds and large sedge swamps for a limited area. Nevertheless, the temporary works will require the installation of support piles for the suspended boardwalk, rather than habitat clearance. Impacts are, therefore, temporary and of limited scale within the calculated landcover change. <u>Mitigation is not required.</u>
Muddy shore	LS4	The boardwalk section crosses lower saltmarsh along the Boyne Estuary; however, the temporary works will require the installation of support piles for the suspended boardwalk, rather than habitat clearance. Impacts are therefore temporary within the calculated landcover change. <u>Mitigation is required.</u>
Mixed (broadleaved) woodland	WD1	Loss of this habitat type will occur during site clearance works along the route corridor. The construction works are temporary. However, due to the nature of this habitat, the effects will be long-term. <u>Mitigation is required.</u>

Habitat type	Habitat code	Impact Evaluation
Scrub	WS1	Loss of this habitat type will occur during site clearance works along the route corridor. The construction works are temporary and due to the nature of this habitat, the effects will be short-term. <u>Mitigation is required.</u>

4.1.2.2 Invasive Species

The construction works along the proposed route corridor will require machinery access along the public road and extending within amenity grassland, waste ground and intertidal areas of the Boyne Estuary. The occurrence of Japanese knotweed directly adjacent to the route gives rise to the potential for the spread of this species from construction machinery or movement of excavated material along the construction corridor. Construction machinery arriving on site from other contaminated sites may also potentially result in the introduction of Japanese knotweed, or other high-risk invasive species, to additional sections along the corridor. This potential impact is evaluated as being long-term due to the difficulty of the required management regime and potentially significant in magnitude and scale due to the potential for spread outside of the works corridor and taking account of the biodiversity receptors within the ZOI. Mitigation measures will be required to avoid significant impacts.

4.1.2.3 Mammals

4.1.2.3.1 Otter

No mammal species of local importance (higher value) were recorded during the field surveys undertaken along the route corridor. There is the potential for Otter to occur along the entire length of the River Boyne Estuary, utilising the intertidal habitats and riparian margins for foraging and commuting. This species is designated within the River Boyne and River Blackwater SAC, the boundary of which adjoins the western portion of the Greenway route. The proposed construction works are temporary and do not result in the loss of permanent habitat utilised by Otter for breeding. The works will require machinery access and construction over the period April to September and will be temporary in nature. Disturbance will be limited to daytime hours which will be in line with the existing baseline, in the context of amenity usage and ongoing traffic within the study area. There are no construction impacts identified during the hours of darkness which could overlap with the preferred foraging and commuting times for this species. The potential for significant impacts is therefore limited to temporary, short-term, indirect impacts on Otter arising from disturbance during construction.

4.1.2.3.2 Bats

Existing records for bats indicate a diversity of species in the local study area. The construction stage of the proposed development does not require the removal of, or works in direct proximity, to any known bat roosts. No buildings or trees identified as having high roost potential were identified along the Greenway corridor. Therefore, potential impacts affecting bat species are limited to the removal of habitats which are integral to the continuity of commuting and foraging corridors along the route. Although hedgerow and treeline habitats require removal along the route, the width of the construction footprint will not comprise a significant gap precluding the continuation of foraging and commuting for bat species in the ZOI. Works will be restricted to daylight hours and therefore no

disturbance is identified during active periods for bats. Mitigation measures are required to avoid long term effects of habitat loss within commuting corridors.

4.1.2.4 Birds

The project construction proposal is specified as limited to the non-winter season. Therefore, the main effects likely to arise will be from disturbance along the proposed route due to construction machinery and equipment during installation. There is the potential for disturbance and displacement of breeding birds utilising the suburban and estuarine habitats crossed by the route.

4.1.2.5 Other Fauna

The Common Lizard has been recorded from the study area and is likely to occur within dune and coastal habitats at the eastern portion of the route corridor. This species is mobile and is likely to avoid construction activity within the route corridor itself. However, the works may affect existing habitat and foraging territories. Impacts are therefore evaluated as temporary, direct and potentially significant in the absence of mitigation.

4.1.3 Fisheries and Aquatic Biodiversity

The construction works to deliver the Greenway will require works within the intertidal habitats of the River Boyne estuary. The lower reaches of this watercourse are utilised by River lamprey, Sea lamprey and Atlantic salmon for holding and passage upstream to spawning grounds. Sea trout also occur through the estuary and into freshwater habitats. There are no potential impacts affecting fish passage, as works are limited to the upper tidal zone of the riparian margin along the southern bank of the river. Any potential impacts affecting fish and fisheries in the estuary are limited to indirect disturbance and water quality impacts which will be temporary and spatially restricted to the immediate proximity of the construction. There are records of Harbour seal within the Boyne Estuary complex, construction works may potentially give rise to disturbance or noise infiltrating the aquatic environment which could temporarily result in avoidance behaviours for this species in the locality of individual works elements along the intertidal zone. We note however the adherence to Best Practice measures in the prevention of noise.

The tidal reaches of the Boyne Estuary are characterised by a high turbidity loading, with background nutrient inputs from the entire Boyne catchment and Drogheda town upstream. On this basis the location and scale of the proposed construction works, taking account of their temporary nature, may potentially give rise to water quality impacts in the local context of the works footprint, these indirect impacts will likely be assimilated into the background context within each tidal cycle.

Mitigation measures are required to avoid and reduce the significance of any disturbance or indirect water quality impacts affecting aquatic biodiversity receptors during the construction stage.

Table 4.4: Summary of the potential construction impacts on key biodiversity receptors from the proposed Greenway Project.

Biodiversity Receptor	Evaluation	Sensitivity/ Protected status	Within footprint of works area	Evaluation of Construction Phase Impacts	Significance	Mitigation Required
Designated European Sites: Boyne Coast and Estuary SAC; Boyne Estuary SPA; River Boyne and River Blackwater SAC;	European Importance	EU Habitats Directive	Y	Impact assessment provided in AA Reporting (Inis, 2019).	Not significant. See Appropriate Assessment Reporting (Inis, 2019).	No. Intrinsic features which are included in the project proposal negate the requirement for mitigation.
River Boyne Estuary (CW2/MW4)	National Importance	Annex I EU Habitats Directive.	N	Construction works for the proposed Greenway are located in proximity and overlaying this habitat in short sections, crossing portions below the high-water mark. There is therefore the potential for direct and indirect impacts on this habitat arising from machinery access, disturbance and waste / emissions.	The proposed works are short-term, limited in extent to the route corridor and require limited machinery access within the estuarine habitat. The potential impacts are	<u>Yes, mitigation is required.</u>

Biodiversity Receptor	Evaluation	Sensitivity/ Protected status	Within footprint of works area	Evaluation of Construction Phase Impacts	Significance	Mitigation Required
					evaluated as slight to moderate (in line with ongoing baseline trends) and may be significant in the absence of mitigation.	
Invasive species: Japanese knotweed	National Importance	Birds and Habitats Regulations (2015) Annex III	N	These species do not occur within the route corridor, but have been recorded within proximity to, and may potentially interact with, construction activities. In the absence of mitigation, there is the potential for the spread of these species through inadvertent contact or interaction with contaminated material,	Although the proposed construction works are short-term and limited in extent, any potential introduction or spread of invasive species would likely have a	<u>Yes</u>, mitigation is required.

Biodiversity Receptor	Evaluation	Sensitivity/ Protected status	Within footprint of works area	Evaluation of Construction Phase Impacts	Significance	Mitigation Required
				either introduced to the site, or disposed of outside of the site boundary.	long-term effect. This is evaluated as potentially moderate and significant in the absence of mitigation.	
Otter	National Importance	Wildlife Act (2000); Annex II and Annex IV, EU Habitats Directive.	N	Otter occur within the Boyne estuary and its tributaries, adjacent to the construction works. Potential impacts directly affecting otter are unlikely, however, indirect and in-combination effects may include disturbance to habitat, displacement and habitat deterioration through waste / emissions.	The proposed works are short-term, limited in extent to the route corridor and requiring light machinery and inert materials. Potential impacts are evaluated as imperceptible to slight, and not significant; taking account	No, mitigation is not required.

Biodiversity Receptor	Evaluation	Sensitivity/ Protected status	Within footprint of works area	Evaluation of Construction Phase Impacts	Significance	Mitigation Required
					of the mobility of these species and the habitat availability in the local context.	
Bats	County Importance	Wildlife Act (2000); Annex II EU Habitats Directive.	N	Trees with low bat roost suitability occur adjacent to the route corridor. There are no direct impacts to bat suitability features; however, indirect impacts may include noise and lighting disturbance during construction.	The proposed works are short-term, limited in extent to the route corridor and requiring light machinery and inert materials. Potential impacts are evaluated as imperceptible to slight and may be significant in the absence of	<u>Yes</u>, mitigation is required in relation to disturbance and lighting.

Biodiversity Receptor	Evaluation	Sensitivity/ Protected status	Within footprint of works area	Evaluation of Construction Phase Impacts	Significance	Mitigation Required
					mitigation.	
Waders and Waterbirds (wintering): Shelduck, Oystercatcher, Golden Plover, Lapwing, Knot, Sanderling, Black-tailed Godwit, Redshank, Turnstone, Little Tern, Ringed Plover, Herring Gull	National Importance	Annex II EU Habitats Directive.	N	Estuarine and intertidal habitats supporting wintering birds occur within and adjacent to the construction corridor. Potential impacts are evaluated with reference to the project proposal which will avoid works during the wintering bird season and thus preclude direct or indirect effects on these species.	The proposed works are short-term, limited in extent to the route corridor and requiring light machinery and inert materials. Potential impacts are evaluated as imperceptible, taking account of the project design and timing restrictions.	No, intrinsic project design which incorporates measures into the project proposal to avoid impacts will be adopted. No mitigation measures are required during construction.
Breeding Birds	Local Importance	Wildlife Act	Y	Breeding bird habitat	The proposed	Yes, mitigation is required.

Biodiversity Receptor	Evaluation	Sensitivity/ Protected status	Within footprint of works area	Evaluation of Construction Phase Impacts	Significance	Mitigation Required
	(higher value)	(2000);		occurs within and proximate to the construction corridor, potential direct and indirect impacts include habitat removal, disturbance and displacement in the local context of the corridor itself.	works are short-term, limited in extent to the route corridor and requiring light machinery and inert materials. Potential impacts are evaluated as slight to moderate, and may be significant in the absence of mitigation.	
Reptiles and Amphibians: Common Lizard; Smooth Newt	County Importance	Wildlife Act (2000);	N	There is the potential for lizard to occur within the eastern portion of the route corridor in coastal dune habitats. Construction works may give rise to indirect	The proposed works are short-term, limited in extent to the route corridor and requiring	No, mitigation is not required.

Biodiversity Receptor	Evaluation	Sensitivity/ Protected status	Within footprint of works area	Evaluation of Construction Phase Impacts	Significance	Mitigation Required
				disturbance in the local context.	light machinery and inert materials. Potential impacts are evaluated as imperceptible to slight, and unlikely to be significant.	
Fish/Fisheries: Salmon, Lamprey sp., etc.	National Importance	Wildlife Act (2000); Annex II EU Habitats Directive.	N	There is no fisheries habitat directly within the footprint of the route corridor; however, there is the potential for indirect impacts arising due to disturbance and waste/emissions during construction.	The proposed works are short-term, limited in extent to the route corridor and requiring light machinery and inert materials. Potential impacts are evaluated as slight to moderate and	Yes, mitigation is required.

Biodiversity Receptor	Evaluation	Sensitivity/ Protected status	Within footprint of works area	Evaluation of Construction Phase Impacts	Significance	Mitigation Required
					may be significant in the absence of mitigation.	

4.2 Operational Phase Impacts

4.2.1 Designated Sites

The magnitude, scale and significance of any operational impacts potentially affecting designated sites during the utilisation of the Greenway is limited within the project ZOI to effects on European Sites, i.e. SAC and SPAs. On this basis, the impact assessment and evaluation of significant effects on European sites has been addressed in full in the reporting to inform Appropriate Assessment process (Inis, 2020) which accompanies the current planning application.

4.2.2 Terrestrial Biodiversity

4.2.2.1 Habitats and Flora

There are no pathways for operational impacts identified which could potentially affect the terrestrial habitats occurring directly adjacent to, or in proximity to the proposed Boyne Greenway: Drogheda to Mornington Project. The project design has taken account of the environmental processes prevailing upon the sensitive habitats in proximity to the Boyne Greenway route. The utilisation of a suspended boardwalk structure, elevated on piles will continue to allow tidal inundation and flushing within the marginal habitats of the Boyne Estuary, including intertidal muds and saltmarsh habitats.

4.2.2.2 Invasive Species

The operation of the Boyne Greenway, limited to amenity, cycle traffic and pedestrian access does not have the potential to give rise to pathways for the spread of non-native invasive species. The spread of such species by users of the Greenway is not considered to be a likely significant effect. However, ongoing management of Japanese knotweed by Meath Co. Co., in line with existing legislative obligations, is required as mitigation at locations where this already occurs adjacent to the route.

4.2.2.3 Mammals

There are no pathways for potential impacts affecting terrestrial mammals during the operational phase of the project. Although otter utilise the margins of the Boyne Estuary and its tributaries within the study area, there are no impact sources arising from the operation or utilisation of the Greenway which could result in direct or indirect impacts on this species within the footprint or immediate environs of the route corridor. Therefore, the potential for impacts is evaluated as being imperceptible in the local context.

4.2.2.4 Birds

During operation, the main effects likely to arise on birds will be from disturbance along the proposed Greenway from cyclists and pedestrians. However, the influence of such disturbance (i.e. the distance at which disturbance effects disrupt bird behaviour or activities) will be based upon a number of influencing factors, including species, weather and tide conditions and the exact nature of the disturbance event. A literature review conducted to inform route design and the current evaluation indicated that there are studies where human recreational activities have disturbed wintering shorebirds (e.g. Liley et al., 2011). However, the critical factor in evaluating potential disturbance

events on wintering shorebirds, particularly in relation to a site designated for their conservation (such as the Boyne Estuary SPA in this case), is to determine first the scale and extent of bird usage (if present) and then if disturbance sources have the potential for *significant* effects on the *conservation status* of priority species which occur.

Gill et al. (2001) sought to evaluate the impacts of such disturbance on an individual species (Black-tailed Godwit) to determine if disturbance was having a population effect at a study site in the UK. The authors concluded that human disturbance adjacent to foraging areas did not influence habitat use or the distribution of birds in their study area, with more importance placed on the quality of foraging habitats. However, birds were disturbed and Gill et al. (2001) noted that significant effects on Black-tailed Godwit populations could arise if disturbance occurred at critical periods, notably during periods of extreme winter weather when birds are under increased stress.

To further determine if disturbance effects are likely, the literature review looked at the individual tolerances of bird species to disturbance. Flight Initiation Distances (FID) are considered to be one of the most effective metrics to determine disturbance effects upon birds (Stankowich & Blumstein, 2005). However, birds may respond to disturbance events by other, non-flight behaviours such as increased vigilance (Fernández-Juricic et al., 2005). Minimum Approach Distances (MADs), which are a function of FIDs, are therefore a more widely used approach for establishing set-back distances (or buffers) to limit disturbance effects around areas where birds occur and are thus considered the best available scientific technique.

Livezey et al. (2016) reviewed a substantial number of studies between 2009 and 2015 where FIDs had been calculated for the species groups of interest which also occur in the Boyne Estuary SPA, including non-breeding Anseriformes (wildfowl, including Shelduck and Charadriiformes (waders, including Oystercatcher, Lapwing, Golden Plover, Black-tailed Godwit and Redshank). As it offers the most comprehensive and best scientific knowledge currently available, the MADs presented in Livezey et al. (2016) were considered an appropriate basis for use in the evaluation of effects with respect to the Boyne Estuary.

The MADs utilised were 71.0m for Anseriformes and 42.2m in Charadriiformes. As there may be site-specific effects in relation to these distances, a precautionary application was used in the analysis below, with extended MADs of 100m for Shelduck and 50m for waders- to ensure a robust approach.

Table 4.5 shows the maximum number of individuals (per species) recorded during fieldwork for the species of conservation interest in the Boyne Estuary SPA, as recorded on any visit for each subsite (under “*Maxima*”) along with the maximum number of birds recorded either further away from (outside) or within the MAD (inside) for these species. As before, these last two figures are not necessarily additive as birds move around the sub-sites in relation to tides, weather, etc and are thus recorded on more than one instance. This is most apparent from the “*All subsites*” column for Black-tailed Godwit, where the totals for the five subsites (out of a total of 14 for the Boyne Estuary SPA as a whole) exceed the baseline population of the SPA by more than double.

Table 4.5: Species maxima recorded on any one visit for the SCIs of the Boyne Estuary SPA by subsite.

Survey Sites							
Species		OVL01	OVL02	OZL02	OZL03	OZL05	All Subsites
Shelduck	Maxima	12	35	13	48	9	117
	Inside	7	9	4	6	9	35

Species		Survey Sites					All Subsites
		OVL01	OVL02	OZL02	OZL03	OZL05	
	MAD						
	Outside MAD	11	32	9	48	8	108
Golden Plover	Maxima	2200	0	0	2	2600	4802
	Inside MAD	0	0	0	0	0	0
	Outside MAD	2200	0	0	2	2600	4802
Black-tailed Godwit	Maxima	69	270	0	199	407	945
	Inside MAD	38	50	0	19	94	201
	Outside MAD	66	220	0	196	380	862
Oystercatcher	Maxima	2	6	0	2	0	10
	Inside MAD	0	0	0	0	0	0
	Outside MAD	2	6	0	2	0	10
Lapwing	Maxima	0	0	89	48	17	154
	Inside MAD	0	0	0	37	0	37
	Outside MAD	0	0	89	18	17	124
Redshank	Maxima	118	120	41	91	110	480
	Inside MAD	33	23	4	48	46	154
	Outside MAD	88	101	41	68	64	362

Table 4.6 below presents data for birds either within or outside the MAD expressed as a percentage of the maxima for the subsite. For example, the maximum total of Shelduck recorded on any visit in subsite OVL01 was 12 (in 30th March). The maximum total recorded within 100m of the proposed route on any visit was seven (also in 30th March) and the maximum total of birds recorded on that subsite, but more than 100m from the proposed route (i.e. outside the MAD), was 11 birds in 12th March. This means that the seven birds recorded within the MAD equates to 58% of the sub-site population that could have been disturbed in 12th March. However, the 11 birds recorded beyond this 100m buffer, equate to 92% of the total numbers in that sub-site that are unlikely to be affected by disturbance on the proposed route.

As birds move around the various subsites it is impossible to say what proportion of the population within an individual subsite or over the SPA as a whole may be subject to any disturbance event with any certainty. However, and to counter this, by considering the availability of habitat within each subsite that each species could utilise that is outside the likely disturbance distance (i.e. over 100m from the proposed route for Shelduck or over 50m away for waders), and the proportion of the population that could use these habitats, it is possible to estimate what the effect of disturbance could be on the population. Put simply, the consideration is not how many birds are being disturbed, but rather what the likely effects of the disturbance on the birds likely to be present will be.

Table 4.6: Birds within or outside the MAD, expressed as a percentage of the maxima for the subsite.

Species		Survey Sites				
		OVL01	OVL02	OZL02	OZL03	OZL05
Shelduck	Inside MAD	58.3	25.7	30.8	12.5	100.0
	Outside MAD	91.7	91.4	69.2	100.0	88.9
Oystercatcher	Inside MAD	0.0	0.0	0.0	0.0	0.0
	Outside MAD	100.0	100.0	0.0	100.0	0.0
Lapwing	Inside MAD	0.0	0.0	0.0	77.1	0.0
	Outside MAD	0.0	0.0	100.0	37.5	100.0
Golden Plover	Inside MAD	0.0	0.0	0.0	0.0	0.0
	Outside MAD	100.0	0.0	0.0	100.0	100.0
Black-tailed Godwit	Inside MAD	55.1	18.5	0.0	9.5	23.1
	Outside MAD	95.7	81.5	0.0	98.5	93.4
Redshank	Inside MAD	28.0	19.2	9.8	52.7	41.8
	Outside MAD	74.6	84.2	100.0	74.7	58.2

Data in **Table 4.6** above shows that no Oystercatcher or Golden Plover were recorded within the likely zone of effect for disturbance and can therefore be excluded from the consideration of likely significant impacts from the proposed development. For the remaining species (i.e. Shelduck, Lapwing, Black-tailed Godwit and Redshank), some birds are present within the potential area where disturbance could occur (i.e. inside the MAD).

The greatest risk of disturbance is for Black-tailed Godwit at subsite OVL02, where there is the potential for 10.62% of the population in the SPA (measured against the baseline population of 471 birds). Furthermore, the risk model suggests that 17.62% of the SPA population may be susceptible to disturbance on the surveyed subsites. However, it should be noted that during fieldwork, the maxima recorded for Black-tailed Godwit for the five subsites collectively was 945 birds (more than double the total baseline population for the SPA). This is a reflection of birds moving between subsites on different count days, and effectively being counted in more than one day. When considering habitat availability, data indicates that there are undisturbed habitats available to (and being used by) Black-tailed Godwit that exceeds the number of birds recorded on the subsites during fieldwork. Furthermore, Gill et al. (2001) determined that Black-tailed Godwit may not be affected at the population level at a site by disturbance if there are plenty of foraging areas, which our data suggests is the case in the Boyne Estuary. Thus, effects at a population level can be reasonably excluded.

4.2.3 Fisheries and Aquatic Biodiversity

There are no potential direct or indirect operational impacts arising from the proposed development which may affect fish and aquatic biodiversity receptors occurring adjacent to, or within the wider study area of the proposed Boyne Greenway corridor. Potential operational impacts are therefore evaluated as being imperceptible in the local context and will not be considered significant.

Table 4.7: Summary of the operational phase impacts on key biodiversity receptors from the proposed Greenway Project.

Biodiversity Receptor	Evaluation	Sensitivity/ Protected status	Within footprint of works area	Evaluation of Operational Phase Impacts	Significance	Mitigation Required
Designated European Sites: Boyne Coast and Estuary SAC; Boyne Estuary SPA; River Boyne and River Blackwater SAC;	European Importance	EU Habitats Directive	Y	Impact assessment provided in AA Reporting (Inis, 2020).	Not significant. See Appropriate Assessment Reporting (Inis, 2020)	Intrinsic specifications which are included in the project proposal negate the requirement for mitigation.
River Boyne Estuary (CW2/MW4)	National Importance	Annex I EU Habitats Directive.	N	The operation/utilisation of the Greenway will not give rise to direct impacts on the estuarine habitat. Although the Boyne estuary is directly adjacent to the Greenway corridor, the potential for indirect impacts is limited by the nature of the operational stage. Potential impact sources are limited in scale and extent, taking	The operational phase will be long-term, but limited in extent to the corridor itself, potential impacts are evaluated as being imperceptible and not significant.	No operational phase mitigation required.

Biodiversity Receptor	Evaluation	Sensitivity/ Protected status	Within footprint of works area	Evaluation of Operational Phase Impacts	Significance	Mitigation Required
				account of the pedestrian and cycling traffic predicted. Secondary and in-combination impacts on the estuarine habitat are also evaluated as being imperceptible.		
Tidal Mudflats and Sandflats (LS4)	National Importance	Annex I EU Habitats Directive.	Y	The operation/utilisation of the Greenway will not give rise to direct impacts on intertidal mudflat/sandflat habitat. Although the Boyne estuary and its intertidal habitat is directly adjacent to the Greenway corridor, the potential for indirect impacts is limited by the nature of the operational stage. Potential impact sources are limited in	The operational phase will be long-term, but limited in extent to the corridor itself, potential impacts are evaluated as being imperceptible and not significant.	No operational phase mitigation required.

Biodiversity Receptor	Evaluation	Sensitivity/ Protected status	Within footprint of works area	Evaluation of Operational Phase Impacts	Significance	Mitigation Required
				scale and extent, taking account of the pedestrian and cycling traffic predicted. Secondary and in-combination impacts on these intertidal habitats are also evaluated as being imperceptible.		
Invasive species: Japanese knotweed	National Importance	Birds and Habitats Regulations (2015) Annex III	N	There are no direct, indirect or in-combination impacts arising during the operational phase with regard to invasive species. The nature of the utilisation of this amenity space infers that operational impacts will be imperceptible.	The operational phase will be long-term, but limited in extent to the corridor. Potential impacts are imperceptible and not significant.	No project-specific mitigation required at operation stage. Statutory obligations apply for ongoing management.
Otter	National Importance	Wildlife Act (2000); Annex II and Annex IV, EU Habitats	N	There are no direct, indirect or in-combination impacts	The operational phase will be long-term, but limited in	No operational phase mitigation required.

Biodiversity Receptor	Evaluation	Sensitivity/ Protected status	Within footprint of works area	Evaluation of Operational Phase Impacts	Significance	Mitigation Required
		Directive.		arising during the operational phase with regard to Otter. The nature of the utilisation of this amenity space infers that operational impacts will be imperceptible.	extent to the corridor. Potential impacts are imperceptible and not significant.	
Bats	County Importance	Wildlife Act (2000); Annex II EU Habitats Directive.	N	The operational phase of the project will not give rise to any direct effects on bats or bat habitat. Indirect and in-combination impacts are limited to the potential for lighting provision to affect foraging and commuting potential along linear features. Taking account of the suitability and value of the landscape within the study area, operational impacts	The operational phase will be long-term, but limited in extent to the corridor. Potential impacts are imperceptible to slight, and potentially significant in the absence of mitigation.	Lighting design to be implemented during operation.

Biodiversity Receptor	Evaluation	Sensitivity/ Protected status	Within footprint of works area	Evaluation of Operational Phase Impacts	Significance	Mitigation Required
				are evaluated as imperceptible to slight.		
Waders and Waterbirds (wintering): Shelduck, Oystercatcher, Golden Plover, Lapwing, Knot, Sanderling, Black-tailed Godwit, Redshank, Turnstone, Little Tern, Ringed Plover, Herring Gull	National Importance	Annex II EU Habitats Directive.	N	The operation or utilisation of the Greenway will not give rise to any direct impacts on wintering waterbirds. Potential indirect impacts are identified with regard to disturbance and displacement which may occur in the immediate vicinity of the amenity corridor; however, this is evaluated in the context of the existing baseline disturbance. Potential operational impacts are therefore evaluated as slight to moderate negative.	The operational phase will be long-term, but limited in extent to the corridor itself. Potential impacts are evaluated as being imperceptible to moderate (in line with ongoing trends in the baseline).	No operational phase mitigation required.

Biodiversity Receptor	Evaluation	Sensitivity/ Protected status	Within footprint of works area	Evaluation of Operational Phase Impacts	Significance	Mitigation Required
Breeding Birds	Local Importance (higher value)	Wildlife Act (2000);	Y	There are no direct, indirect or in-combination impacts arising during the operational phase with regard to breeding bird species. The nature of the utilisation of this amenity space infers that operational impacts will be imperceptible.	The operational phase will be long-term, but limited in extent to the corridor. Potential impacts are imperceptible and not significant.	No operational phase mitigation required.
Reptiles and Amphibians: Common Lizard; Smooth Newt	County Importance	Wildlife Act (2000);	N	There are no direct, indirect or in-combination impacts arising during the operational phase with regard to reptile and amphibian species. The nature of the utilisation of this amenity space infers that operational impacts will be imperceptible.	The operational phase will be long-term, but limited in extent to the corridor. Potential impacts are imperceptible and not significant.	No operational phase mitigation required.

5 Mitigation Measures

5.1 Construction Phase Mitigation

5.1.1 Designated Sites

The magnitude, scale and significance of any construction impacts potentially affecting designated sites is limited within the project ZOI to effects on SAC and SPAs, designated as European sites. On this basis, all mitigation measures required to avoid significant adverse effects on European Sites has been addressed in full in the reporting to inform Appropriate Assessment (Inis, 2020), which accompanies the current planning application.

5.1.2 Terrestrial Biodiversity

The proposed design has incorporated intrinsic avoidance measures aimed at lessening the impact of the proposed cycle and pedestrian infrastructure on the key biodiversity receptors within the study area, including the ecological sensitivities of the Boyne Estuary SPA and the Boyne Coast and Estuary SAC. Design measures have accounted for both construction and long-term operational stages. The efficacy of the intrinsic design measures will be monitored during construction and post construction for 3 years by a suitably qualified Ecologist. Monitoring during construction will be completed by a suitably qualified Ecological Clerk of Works, (ECoW) with a 'Stop Works' authority. This Ecologist/ECoW will have previous experience and extensive knowledge of working on construction programmes within SAC and SPA areas with significant bird populations. The construction works will be compliant with:

1. The construction work will be restricted to outside the period of October – March at all sensitive sites where disturbance is an issue, i.e. within the intertidal habitats of the SAC/SPA or immediately adjacent. Therefore, all works will be undertaken between March and September, when all wintering birds are absent. The timing restriction will not apply to public road sections;
2. Construction works will be limited to daylight hours to avoid effects on bats, birds and otters. The use of construction lighting will be limited to absolute minimums. Where it is necessary, all lighting will be cowled away from sensitive habitats, with no light spillage, in line with Best Practice for bats. Only existing municipal compound areas will be utilised and security lighting will be sensor based only at these locations.
3. The timing of the works and the measures intrinsic to the design, outlined above, will be sufficient to avoid significant effects. Camouflage netting will be utilised on all roadside works outside the period March to September to minimise noise transfer, as a matter of course.
4. Regular monitoring of the works will be provided by a suitably qualified ECoW with authority to 'Stop the Works'. The representative will have knowledge of working on construction programmes within SAC and SPA areas where significant bird populations exist.

5.1.2.1 Strategic timing of works to protect breeding and wintering birds

The removal of hedgerows and trees, should it be required, will be outside of the bird breeding season (i.e. 1st of March to 31st of August) to reduce impact on breeding birds. The majority of construction work within certain work sections will be restricted to outside the period of October – March at all sensitive sites where disturbance is an issue, i.e. within the intertidal habitats of the SAC/SPA or immediately adjacent. Therefore, all works will be undertaken between March and September at times when wintering birds (i.e. the Special Conservation Interests of the SPA) are absent. The timing restriction will not apply to public road sections where disturbance is constant.

5.1.2.2 Specific measure for the avoidance of transfer of invasive species to the site

One invasive species listed on Third Schedule of the Birds and Natural Habitats Regulations (2011) was found during the survey of the site of the proposed development. Furthermore, construction works are a potential vector for the transfer of invasive species from other areas into the site. A site-specific Invasive Species Management Plan will be delivered by the appointed contractor, as a requirement in the Contract Documents. This plan will be adopted for the protection of habitats and the prevention of spread of invasive species and will be managed by a suitably qualified Ecologist with experience in dealing with Third Schedule invasive species.

5.1.2.3 Appointment of a suitably qualified Ecological Clerk of Works

A suitably qualified ECoW will be appointed to oversee environmental protection measures during the construction phase of the proposed road upgrade works. This appointment will be a contractual obligation to ensure compliance to environmental protection measures.

5.1.2.4 Visual inspection of mature trees for roosting bats within footprint of development

Prior to the commencement of works, a survey of existing trees proposed to be removed or trimmed back within the construction area will be carried out by a suitably qualified ecologist. Consideration will be given to the loss of commuting and foraging bat habitat and mitigation measures explored (e.g. reinstating treelines at the edges of new embankments to compensate for this loss of habitat).

5.1.3 Fisheries and Aquatic Biodiversity

5.1.3.1 Mitigation measures put in place for protection of aquatic biodiversity downstream of the proposed development.

The study area is located in the Boyne River catchment. Considering the hydrological connectivity of the study area to the River Boyne and River Blackwater SAC, a site designated for a number of aquatic species (e.g. River Lamprey *Lampetra fluviatilis* and Atlantic Salmon *Salmo salar*), and the Boyne Coast and Estuary SAC, designated for a number of habitats (e.g. mudflats and sandflats), it would be prudent to apply safeguards to prevent siltation and other contamination of surface and groundwaters. There are a number of river crossings along the proposed route, particular care should be taken at these locations. All mitigation measures will be in line with industry Best Practice, such as CIRIA Guidance (Murnane et al., 2006) and will be reviewed by the appointed ECoW.

Operational Phase Mitigation

5.1.4 Designated Sites

The magnitude, scale and significance of any operation impacts potentially affecting designated sites is limited within the project ZOI to effects on European sites. On this basis, all mitigation measures required to avoid significant adverse effects on European Sites has been addressed in full in the reporting to inform Appropriate Assessment (Inis, 2020), which accompanies the current planning application.

5.1.5 Terrestrial Biodiversity

During operation, the Boyne Greenway is evaluated as having a negligible impact on the fauna and flora in the long term as it will be assimilated into the existing baseline environment, which is characterised by suburban lands influenced by ongoing traffic disturbance, amenity access and disturbed ground. To limit impact, the following measures are proposed:

1. No lighting is proposed for the Boyne Greenway as a whole, as it will likely be used during daylight hours. Existing lighting associated with the road corridor and existing amenity lands will be maintained. At locations where additional operational lighting is required for security and safety, it is proposed to install LED lights to avoid emission of UV light, with cowlings directed away from estuarine habitats. Lighting design will specify no light spillage outside of the boardwalk corridor, in line with Best Practice for bats and birds. Low energy LED luminaires incorporating a solar power source and motion detectors will be specified. Furthermore, to minimise the requirement for lighting all access features, such as bollards and gates, shall have reflector strips in line with Best Practice guidance. Bird sensitive lighting, or no lighting, will be provided where birds forage within 50 metres of the Boyne Greenway to avoid any disturbance. However, the use of lighting will be subject to health and safety requirements. Bird sensitive lighting design will be required where the Boyne Greenway route passes over, adjacent or within 50 metres of mudflat habitat. Final lighting locations, if required, will be selected following consultation with the project Ecologist.
2. To counteract impact from dogs, particularly, and avoid noise transfer to birds and other species, which may occur on the outward side of the Boyne Greenway route, the boardwalk barrier will be screened to half height (~600 mm) with full height (~1200 mm), an option in particularly sensitive locations. The screening will be provided by fixing boardwalk running boards to the fence posts.
3. Signage supporting a code of conduct with respect to the maintenance of dogs on leashes at all times will be implemented. There is precedent for this on other Greenway projects.

5.1.6 Fisheries and Aquatic Biodiversity

No operational mitigation is required for fisheries and aquatic biodiversity receptors as there are no identified pathways for operational impacts, with regard to key receptors. There are no direct or indirect emissions or inputs arising from the proposal which require avoidance, reduction or remediation.

6 Residual Impacts

The proposed Boyne Greenway: Drogheda to Mornington route corridor has been selected as the preferred route through an 18-month iterative design process, in direct consultation with both the Development Applications Unit and NPWS. The construction phase of the project incorporates intrinsic design features which effectively avoid the potential for specific negative impacts on sensitive receptors. Implementation of the proposed intrinsic design submitted in the planning application as contractual obligations, in addition to the implementation in full of the proposed measures set out in **Section 5** above, will effectively avoid and, where appropriate, reduce the potential for any significant impacts on the ecological interests identified as key biodiversity receptors within the ZOI of the proposed development. Therefore, there are no significant residual impacts identified at construction stage with regard to biodiversity. This evaluation is summarised in **Table 6.1** below.

The operational phase of the Greenway, which considers the utilisation of the amenity feature by the public, is limited in its potential for impact primarily due to the nature of the scheme. Taking account of the sensitive design, and with the implementation in full of the proposed measures set out in **Section 5** above, there are no significant residual impacts identified at operation stage with regard to biodiversity. This evaluation is summarised in **Table 6.1** below.

Table 6.1: Summary of the residual impacts on key biodiversity receptors from the proposed Greenway Project.

Biodiversity Receptor	Evaluation	Sensitivity/ Protected status	Within footprint of works area	Residual Evaluation	Impact	Significance of Residual Impacts
Designated European Sites: Boyne Coast and Estuary SAC; Boyne Estuary SPA; River Boyne and River Blackwater SAC;	European Importance	EU Habitats Directive	Y	Impact assessment provided in AA Reporting (Inis, 2019).		Not significant. See Appropriate Assessment Reporting (Inis, 2019).
River Boyne Estuary (CW2/MW4)	National Importance	Annex I EU Habitats Directive.	N	Construction: Taking account of the scale, extent and phasing of the proposed works, in addition to the implementation of the required mitigation, residual impacts during construction are evaluated as imperceptible to slight, limited to the local context. Operation: The utilisation of the Greenway is evaluated as giving rise to an		Residual impacts are not significant.

Biodiversity Receptor	Evaluation	Sensitivity/ Protected status	Within footprint of works area	Residual Evaluation	Impact	Significance of Residual Impacts
				imperceptible impact on this habitat.		
Tidal Mudflats and Sandflats (LS4)	National Importance	Annex I EU Habitats Directive.	Y	<p>Construction: Taking account of the scale, extent and phasing of the proposed works, in addition to the implementation of the required mitigation, residual impacts during construction are evaluated as imperceptible to slight, limited to the local context.</p> <p>Operation: The utilisation of the Greenway is evaluated as giving rise to an imperceptible impact on this habitat.</p>		Residual impacts are not significant.
Invasive species:	National Importance	Birds and Habitats Regulations (2015)	N	Construction: Taking account of the scale,		Residual impacts are

Biodiversity Receptor	Evaluation	Sensitivity/ Protected status	Within footprint of works area	Residual Evaluation	Impact	Significance of Residual Impacts
Japanese knotweed		Annex III		<p>extent and phasing of the proposed works, in addition to the implementation of the required mitigation, residual impacts during construction are evaluated as imperceptible, limited to the local context.</p> <p>Operation: The utilisation of the Greenway is evaluated as giving rise to an imperceptible impact on these species.</p>		not significant.
Otter	National Importance	Wildlife Act (2000); Annex II and Annex IV, EU Habitats Directive.	N	Construction: Taking account of the scale, extent and phasing of the proposed works, in addition to the implementation of the required mitigation, residual impacts during		Residual impacts are not significant.

Biodiversity Receptor	Evaluation	Sensitivity/ Protected status	Within footprint of works area	Residual Evaluation	Impact	Significance of Residual Impacts
				<p>construction are evaluated as imperceptible to slight, limited to the local context.</p> <p>Operation: The utilisation of the Greenway is evaluated as giving rise to an imperceptible impact on these species.</p>		
Bats	County Importance	Wildlife Act (2000); Annex II EU Habitats Directive.	N	<p>Construction: Taking account of the scale, extent and phasing of the proposed works, in addition to the implementation of the required mitigation, residual impacts during construction are evaluated as imperceptible, limited to the local context.</p> <p>Operation: The</p>		Residual impacts are not significant.

Biodiversity Receptor	Evaluation	Sensitivity/ Protected status	Within footprint of works area	Residual Evaluation	Impact	Significance of Residual Impacts
				utilisation of the Greenway is evaluated as giving rise to an imperceptible impact on these species.		
Waders and Waterbirds (wintering): Shelduck, Oystercatcher, Golden Plover, Lapwing, Knot, Sanderling, Black-tailed Godwit, Redshank, Turnstone, Little Tern, Ringed Plover, Herring Gull	National Importance	Annex II EU Habitats Directive.	N	<p>Construction: Taking account of the scale, extent and phasing of the proposed works, in addition to the implementation of the required mitigation, residual impacts during construction are evaluated as imperceptible, limited to the local context.</p> <p>Operation: The utilisation of the Greenway is evaluated as giving rise to an imperceptible to slight impact on these species, limited to the</p>		Residual impacts are not significant.

Biodiversity Receptor	Evaluation	Sensitivity/ Protected status	Within footprint of works area	Residual Evaluation	Impact	Significance of Residual Impacts
				local context adjacent to the corridor.		
Breeding Birds	Local Importance (higher value)	Wildlife Act (2000);	Y	<p>Construction: Taking account of the scale, extent and phasing of the proposed works, in addition to the implementation of the required mitigation, residual impacts during construction are evaluated as imperceptible to slight, limited to the local context.</p> <p>Operation: The utilisation of the Greenway is evaluated as giving rise to an imperceptible impact on these species.</p>		Residual impacts are not significant.
Reptiles and Amphibians: Common	County Importance	Wildlife Act (2000);	N	Construction: Taking account of the scale,		Residual impacts are not significant.

Biodiversity Receptor	Evaluation	Sensitivity/ Protected status	Within footprint of works area	Residual Evaluation	Impact	Significance of Residual Impacts
Lizard; Smooth Newt				<p>extent and phasing of the proposed works, in addition to the implementation of the required mitigation, residual impacts during construction are evaluated as imperceptible to slight, limited to the local context.</p> <p>Operation: The utilisation of the Greenway is evaluated as giving rise to an imperceptible impact on these species.</p>		
Fish/Fisheries: Salmon, Lamprey sp., etc.	National Importance	Wildlife Act (2000); Annex II EU Habitats Directive.	N	Construction: Taking account of the scale, extent and phasing of the proposed works, in addition to the implementation of the required mitigation,		Residual impacts are not significant.

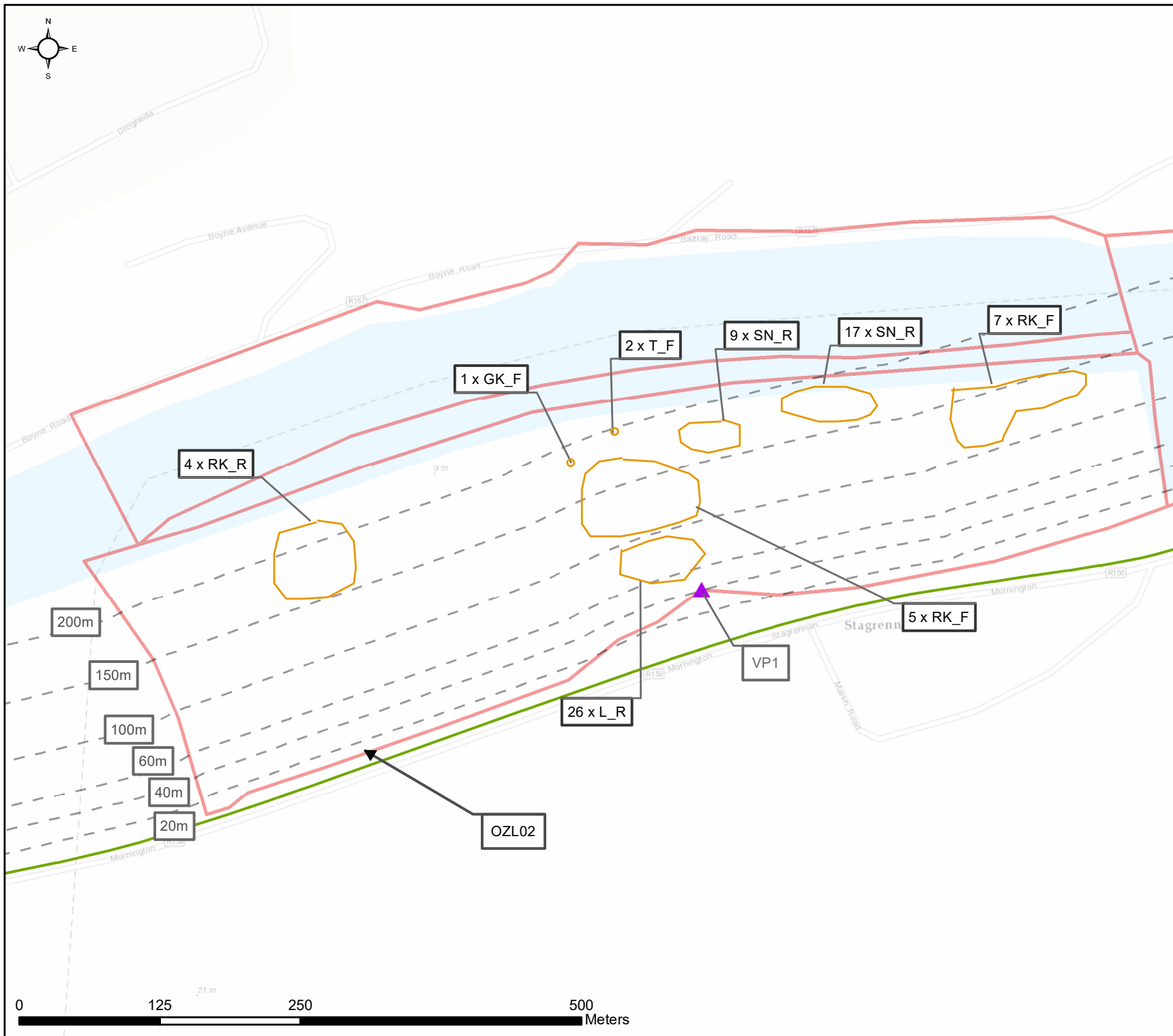
Biodiversity Receptor	Evaluation	Sensitivity/ Protected status	Protected	Within footprint of works area	Residual Evaluation	Impact	Significance Residual Impacts	of
					<p>residual impacts during construction are evaluated as imperceptible to slight, limited to the local context.</p> <p>Operation: The utilisation of the Greenway is evaluated as giving rise to an imperceptible impact on these species.</p>			

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Appendix A: Bird Survey Maps



Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:

Map 1 of 90: Water Bird Survey 06/03/18
Count Section: OZL02. (VP1)
Time: 8:35 Tide: Low

Legend:

- VP1
- Proposed Cycle Route
- Water Bird Activity Areas
- Count Subsite Boundaries

Activity Code:

(F) = Foraging
(R) = Roosting/Other

Species ID Code:

L = Lapwing
T = Teal
RK = Redshank
SN = Snipe
GK = Greenshank

For illustrative purposes only. Map not to scale

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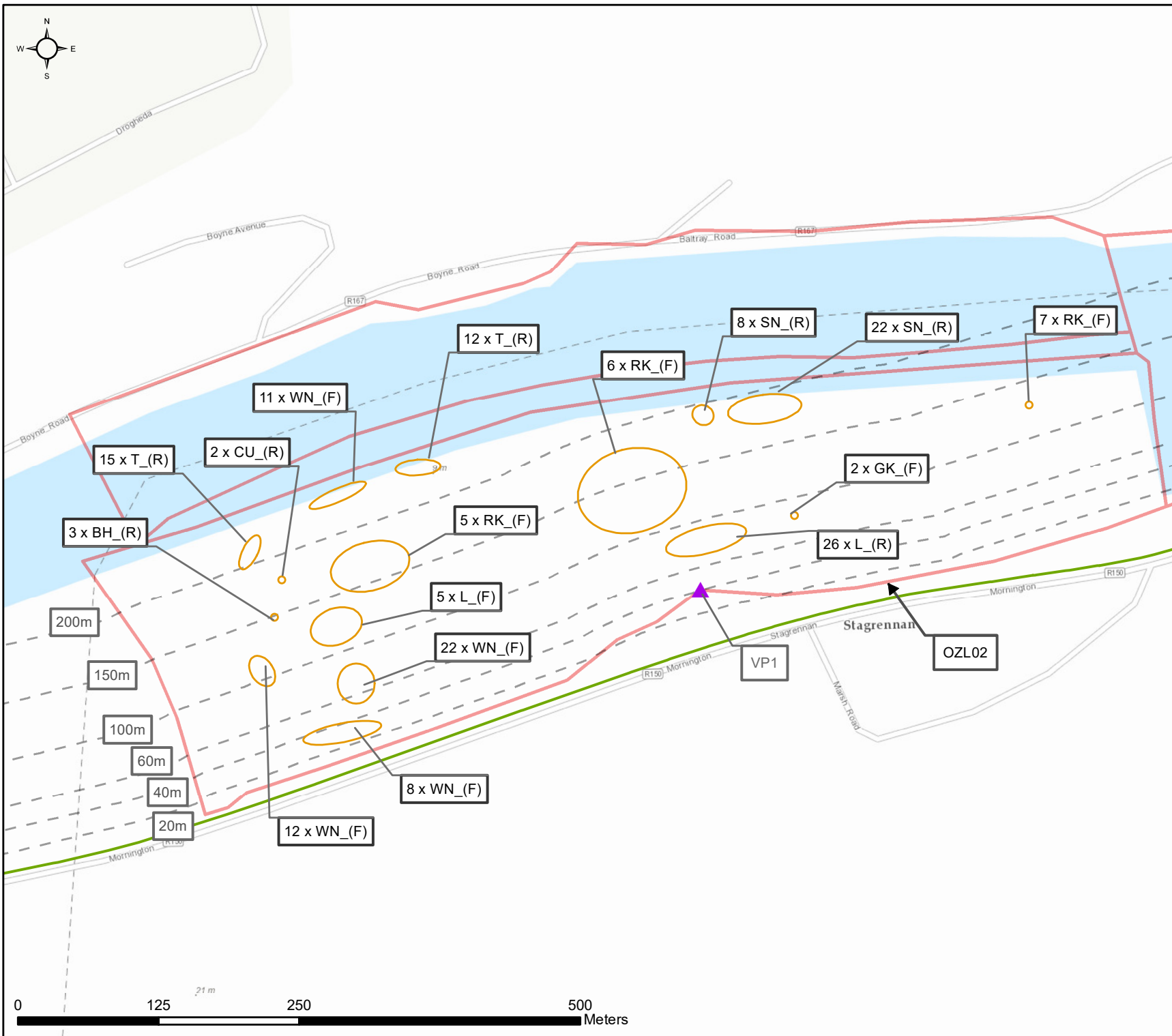
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POC	JM	HW

Date:	Map Reference:
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:

Map 2 of 90: Water Bird Survey 06/03/18
Count Section: OZL02. (VP1)
Time: 9:35 Tide: Low

Legend:

- ▲ VP1
- Water Bird Activity Areas
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:

(F) = Foraging
(R) = Roosting/Other

Species ID Code:

L = Lapwing
T = Teal
RK = Redshank
SN = Snipe
GK = Greenshank
WN = Widgeon
BH = Black-headed Gull
CU = Curlew

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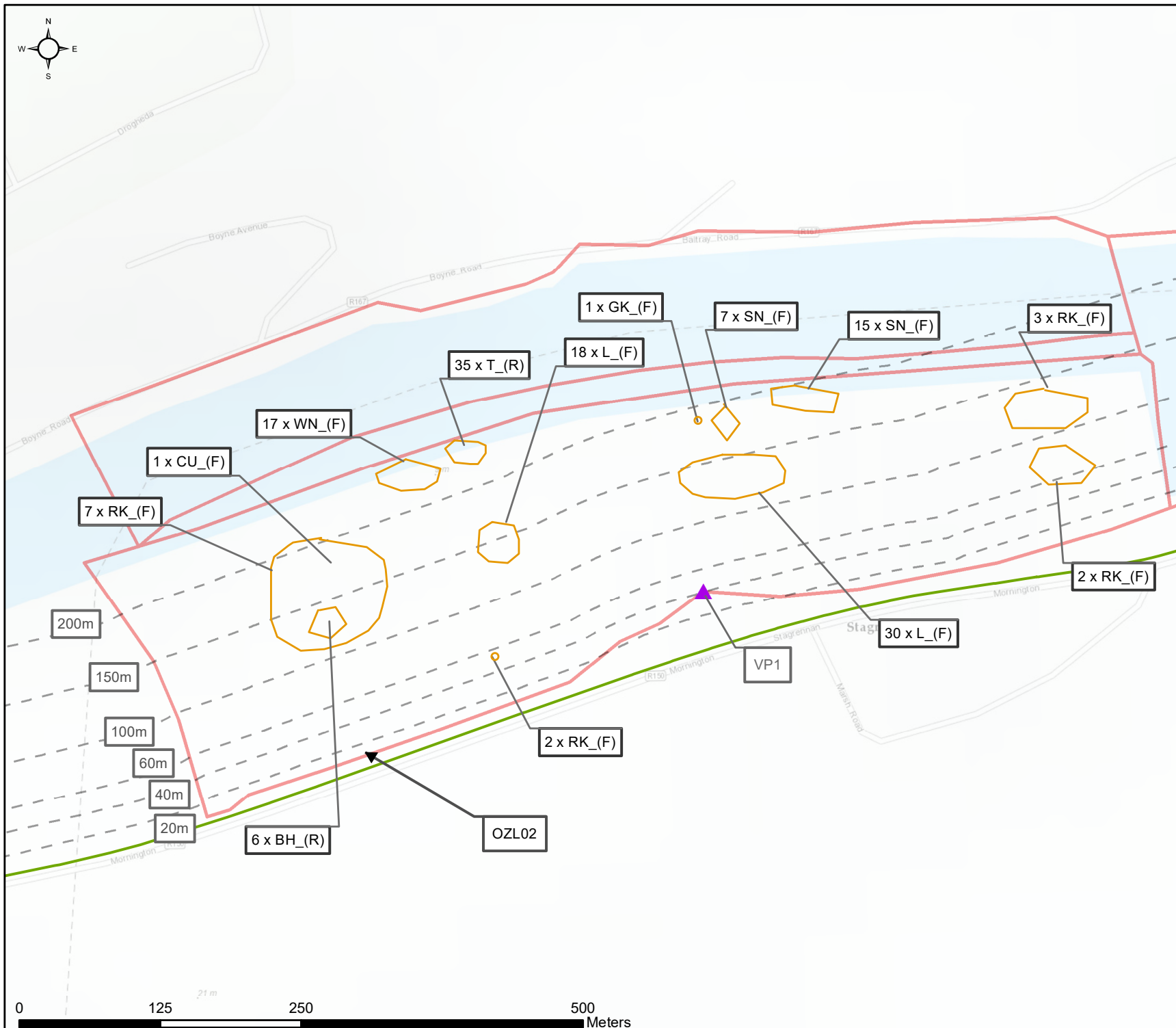
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:

Map 3 of 90: Water Bird Survey 06/03/18
Count Section: OZL02. (VP1)
Time: 10:35 Tide: Rising

Legend:

- VP1
- Proposed Cycle Route
- Water Bird Activity Areas
- Count Subsite Boundaries

Activity Code:

(F) = Foraging
(R) = Roosting/Other

Species ID Code:

L = Lapwing
T = Teal
WN = Wigeon
RK = Redshank
SN = Snipe
BH = Black-headed Gull
CU = Curlew
GK = Greenshank

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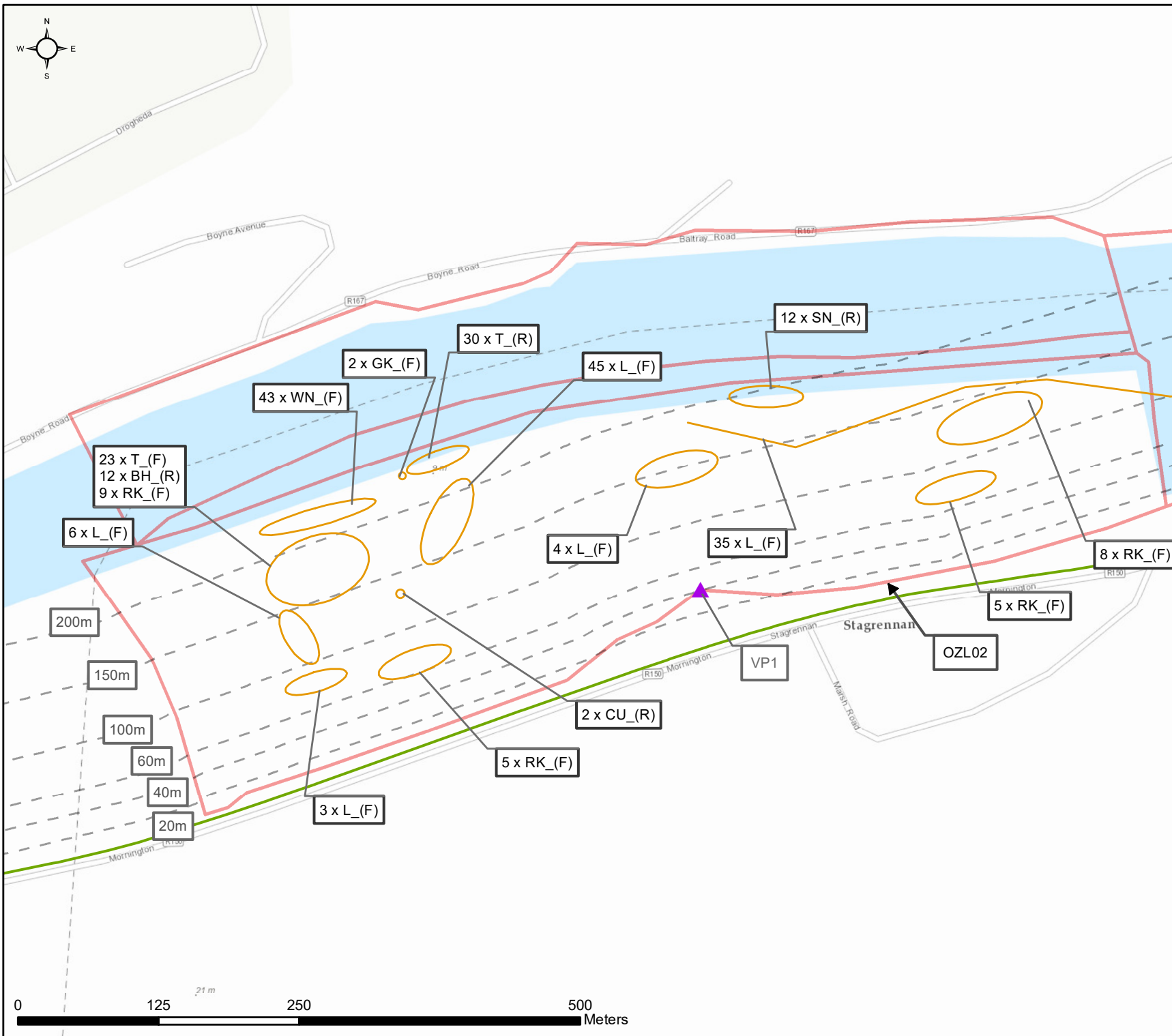
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:

Map 4 of 90 : Water Bird Survey 06/03/18
Count Section: OZL02. (VP1)
Time: 11:35 Tide: Rising

Legend:

- VP1
- Water Bird Activity Areas
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:

(F) = Foraging
(R) = Roosting/Other

Species ID Code:

L = Lapwing
T = Teal
RK = Redshank
SN = Snipe
GK = Greenshank
WN = Wigeon
BH = Black-headed Gull
CU = Curlew

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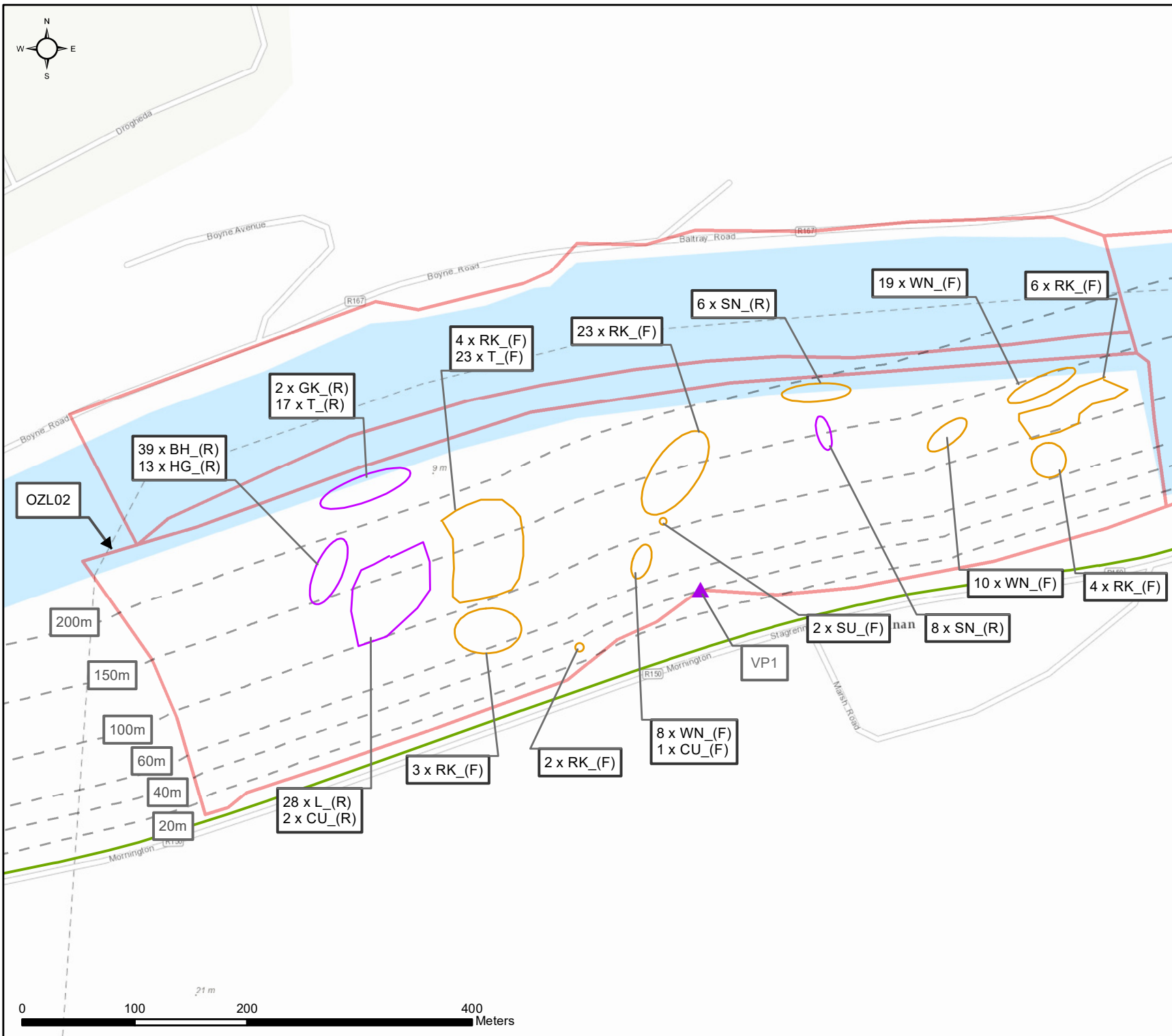
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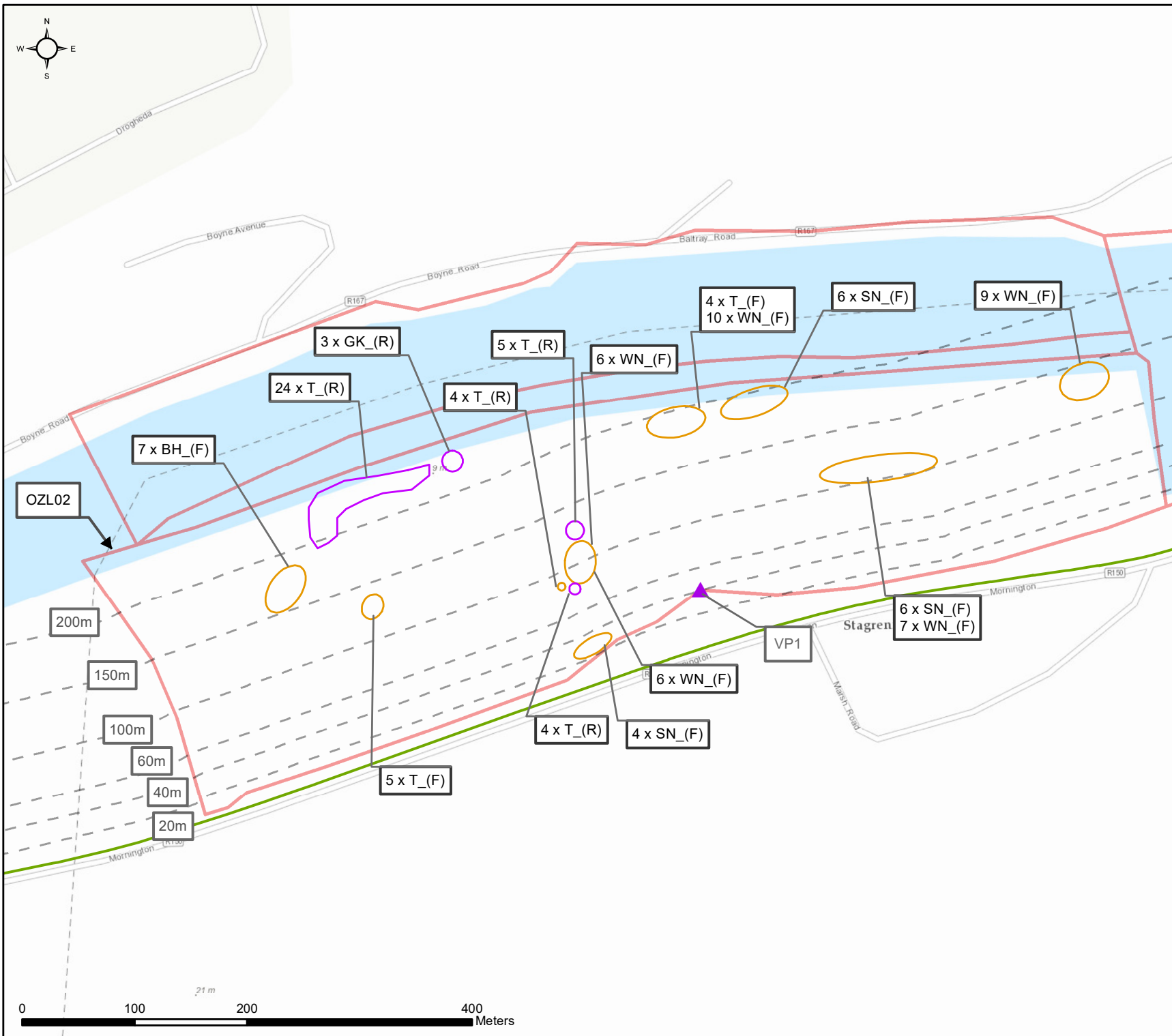
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 6 of 90: Water Bird Survey 06/03/18
Count Section: OZL02. (VP1)
Time: 13:35 Tide: High

Legend:

- ▲ VP1
- High Tide Roost Area
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting/Other

Species ID Code:
T = Teal
RK = Redshank
SN = Snipe
GK = Greenshank
WN = Wigeon
BH = Black-headed Gull
CU = Curlew

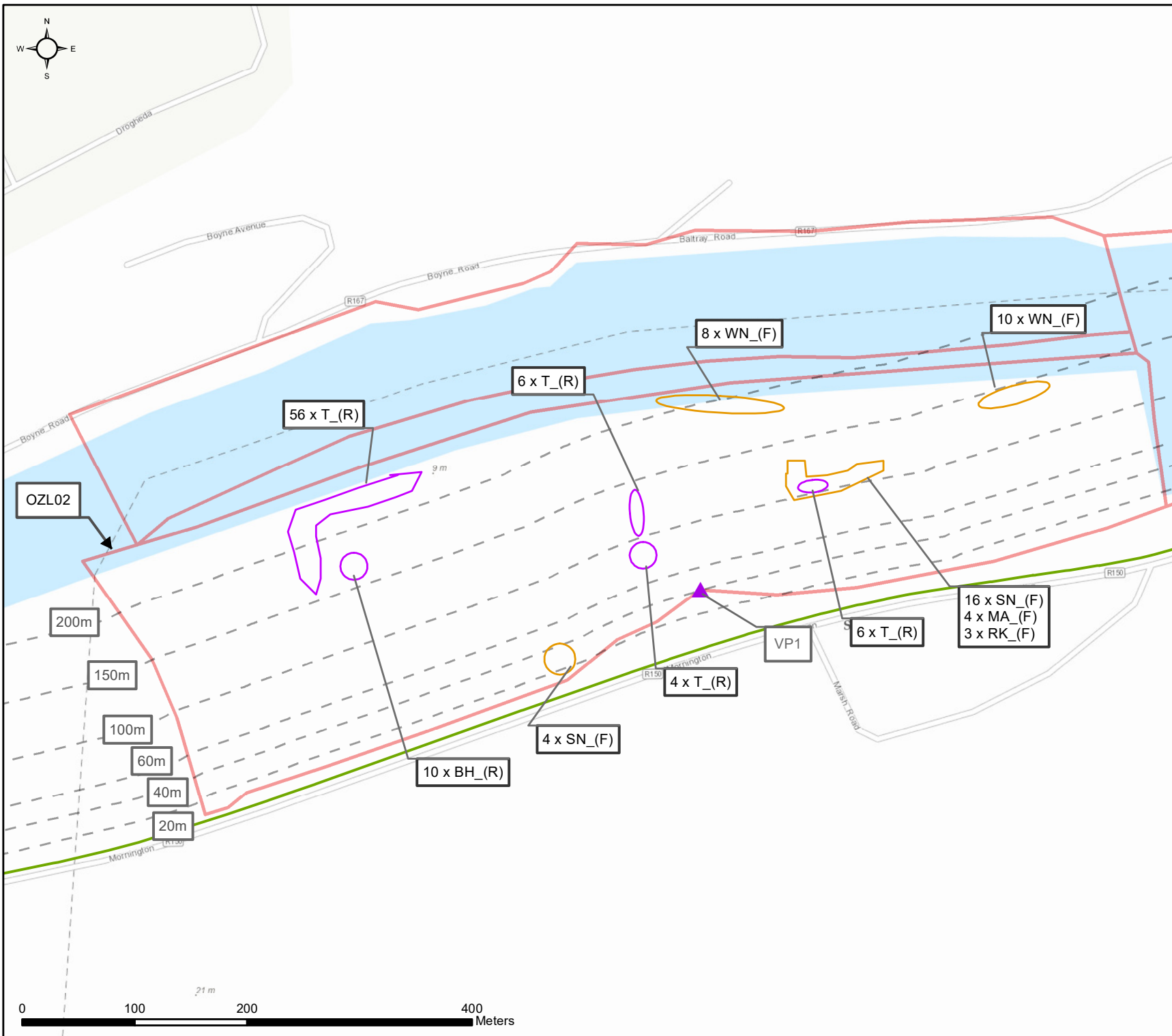
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Date: 04/06/2020	Map Reference: 1101 - AG - 06_006
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 7 of 90: Water Bird Survey 06/03/18
Count Section: OZL02. (VP1)
Time: 14:35 Tide: High

Legend:

- VP1
- High Tide Roost Area
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting/Other

Species ID Code:
T = Teal
SN = Snipe
WN = Wigeon
BH = Black-headed Gull
MA = Mallard

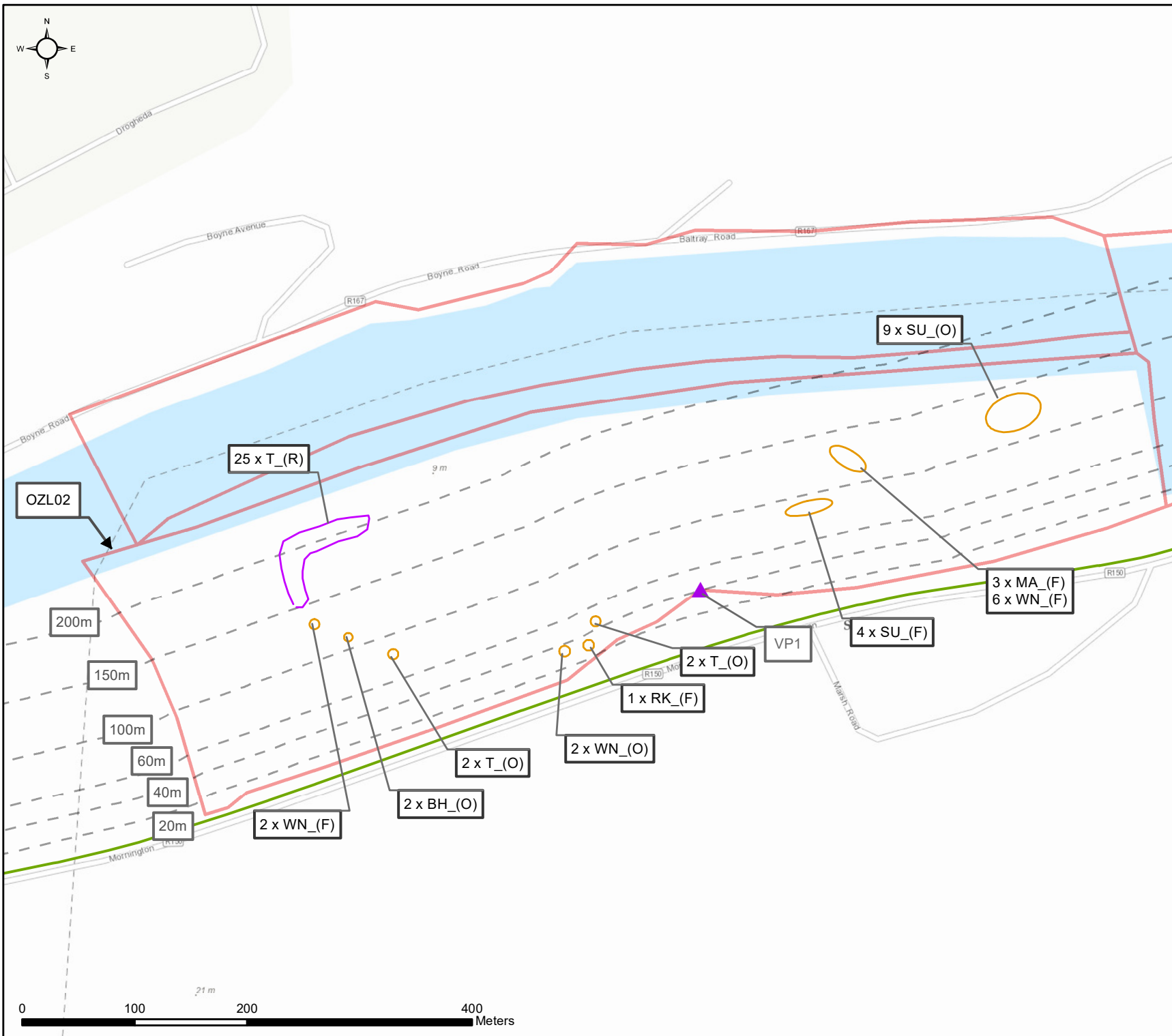
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:

Map 8 of 90: Water Bird Survey 15/03/18
Count Section: OZL02. (VP1)
Time: 10:23 Tide: High

Legend:

- VP1
- High Tide Roost Area
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:

(F) = Foraging
(R) = Roosting
(O) = Other

Species ID Code:

T = Teal
RK = Redshank
WN = Wigeon
BH = Black-headed Gull
MA = Mallard
SU = Shelduck

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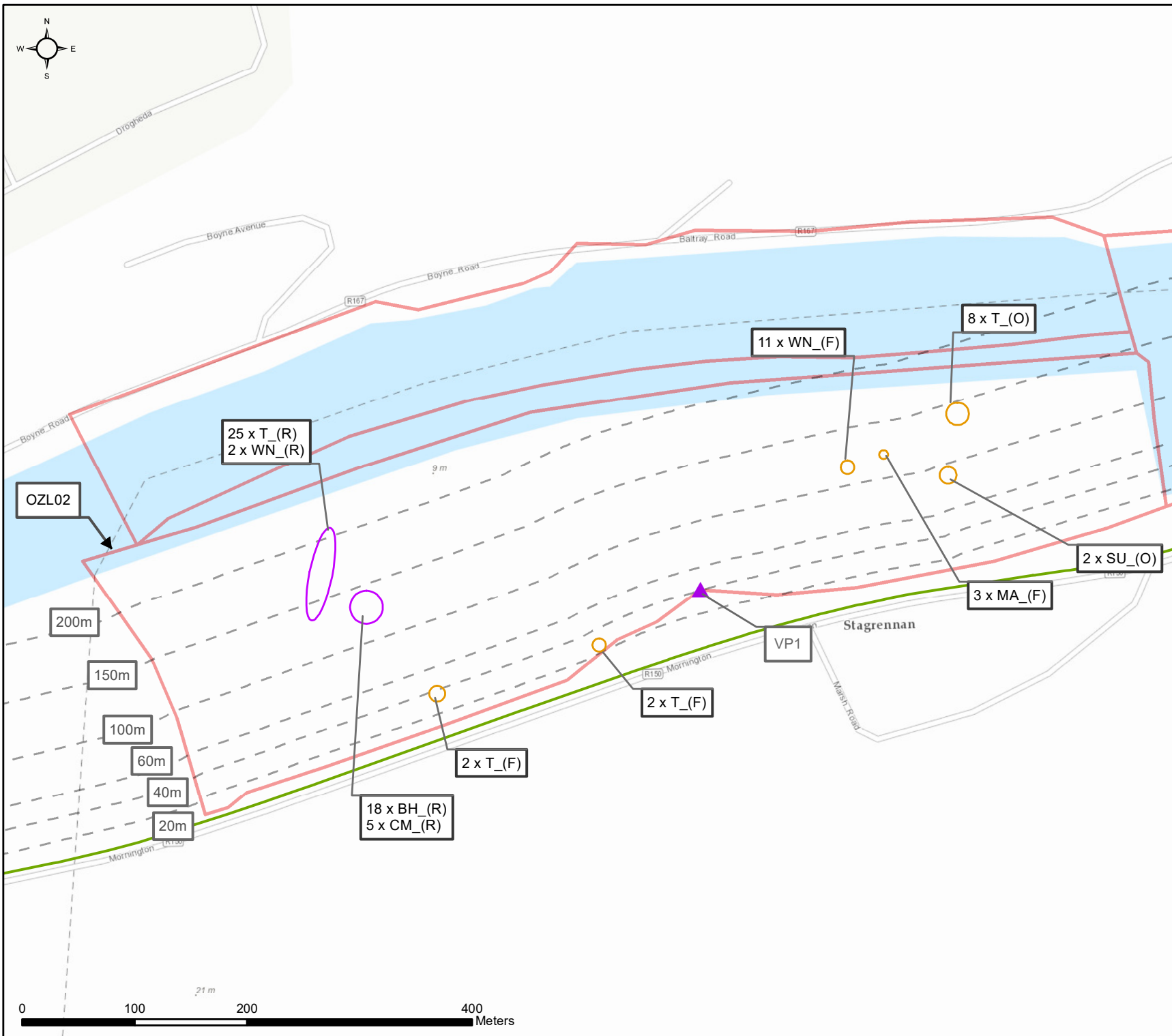
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 9 of 90: Water Bird Survey 15/03/18
Count Section: OZL02. (VP1)
Time: 11:23 Tide: High

Legend:

- VP1
- Water Bird Activity Area
- High Tide Roost Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting
(O) = Other

Species ID Code:
T = Teal
WN = Wigeon
BH = Black-headed Gull
MA = Mallard
SU = Shelduck
CM = Common Gull

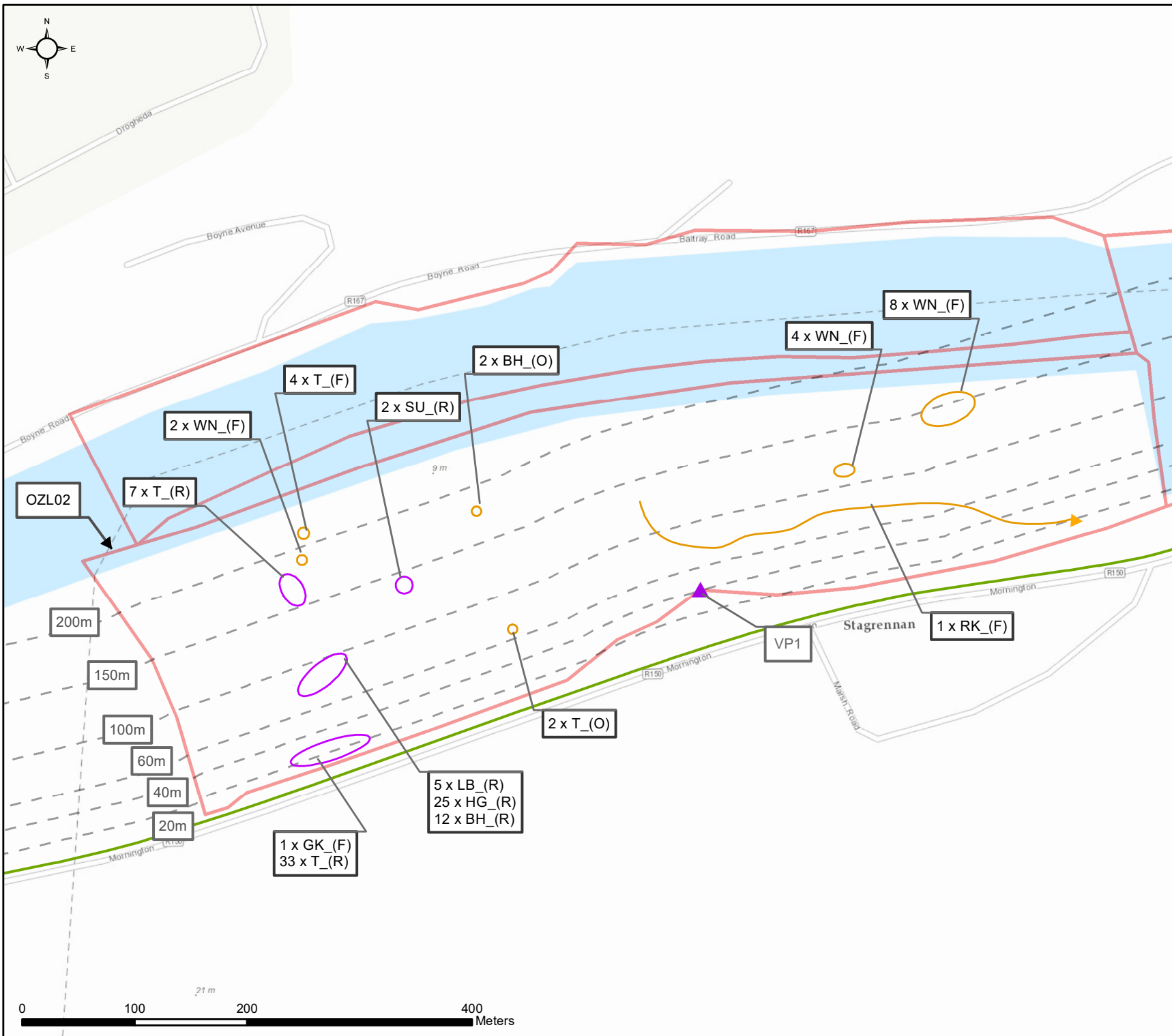
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 10 of 90: Water Bird Survey 15/03/18
Count Section: OZL02. (VP1)
Time: 12:23 Tide: Falling

Legend:

- VP1
- Water Bird Activity Area
- High Tide Roost Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting
(O) = Other

Species ID Code:
T = Teal
WN = Wigeon
BH = Black-headed Gull
SU = Shelduck
GK = Greenshank
HG = Herring Gull
LB = Lesser Black-backed Gull

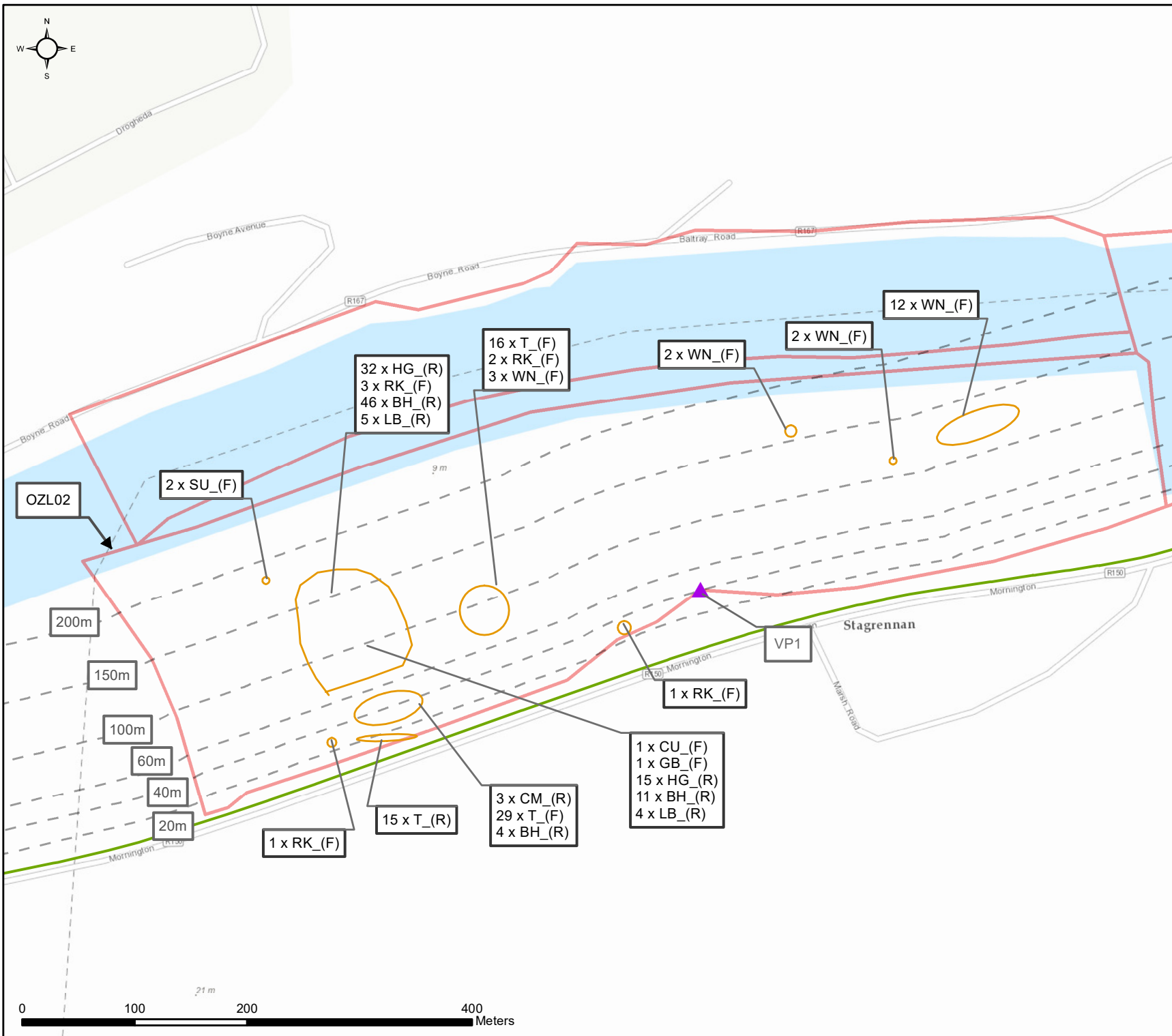
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 11 of 90: Water Bird Survey 15/03/18
Count Section: OZL02. (VP1)
Time: 13:23 Tide: Falling

Legend:

- VP1
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting
(O) = Other

Species ID Code:
T = Teal
WN = Widgeon
BH = Black-headed Gull
SU = Shelduck
HG = Herring Gull
LB = Lesser Black-backed Gull
RK = Redshank
CM = Common Gull
GB = Great Black-backed Gull
CU = Curlew

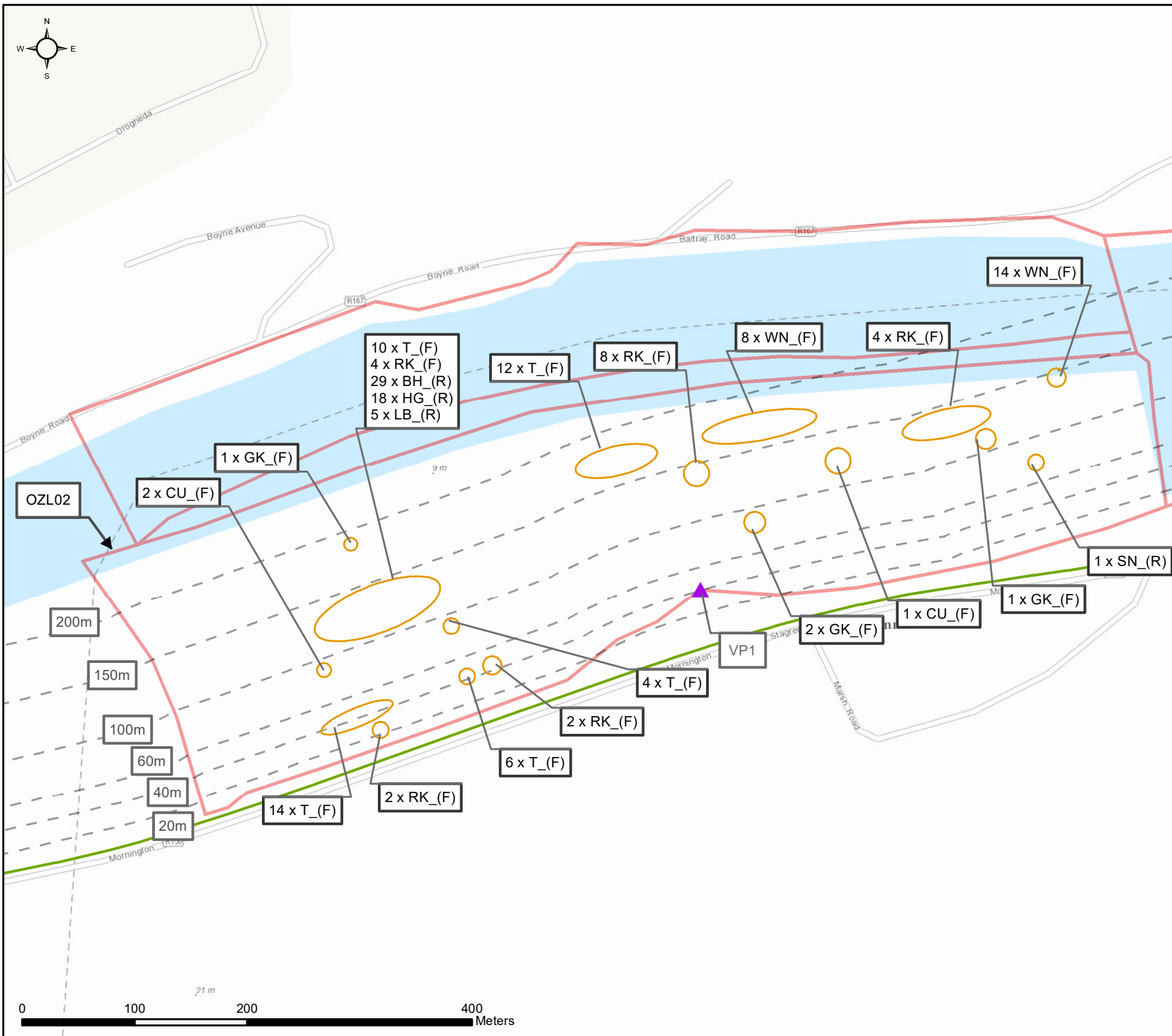
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title: Map 12 of 90 : Water Bird Survey 15/03/18
Count Section: OZL02. (VP1)
Time: 14:23 Tide: Falling

Legend:

- VP1
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:

(F) = Foraging
(R) = Roosting
(O) = Other

Species ID Code:

T = Teal
WN = Wigeon
BH = Black-headed Gull
GK = Greenshank
HG = Herring Gull
LB = Lesser Black-backed Gull
RK = Redshank
CU = Curlew
SN = Snipe

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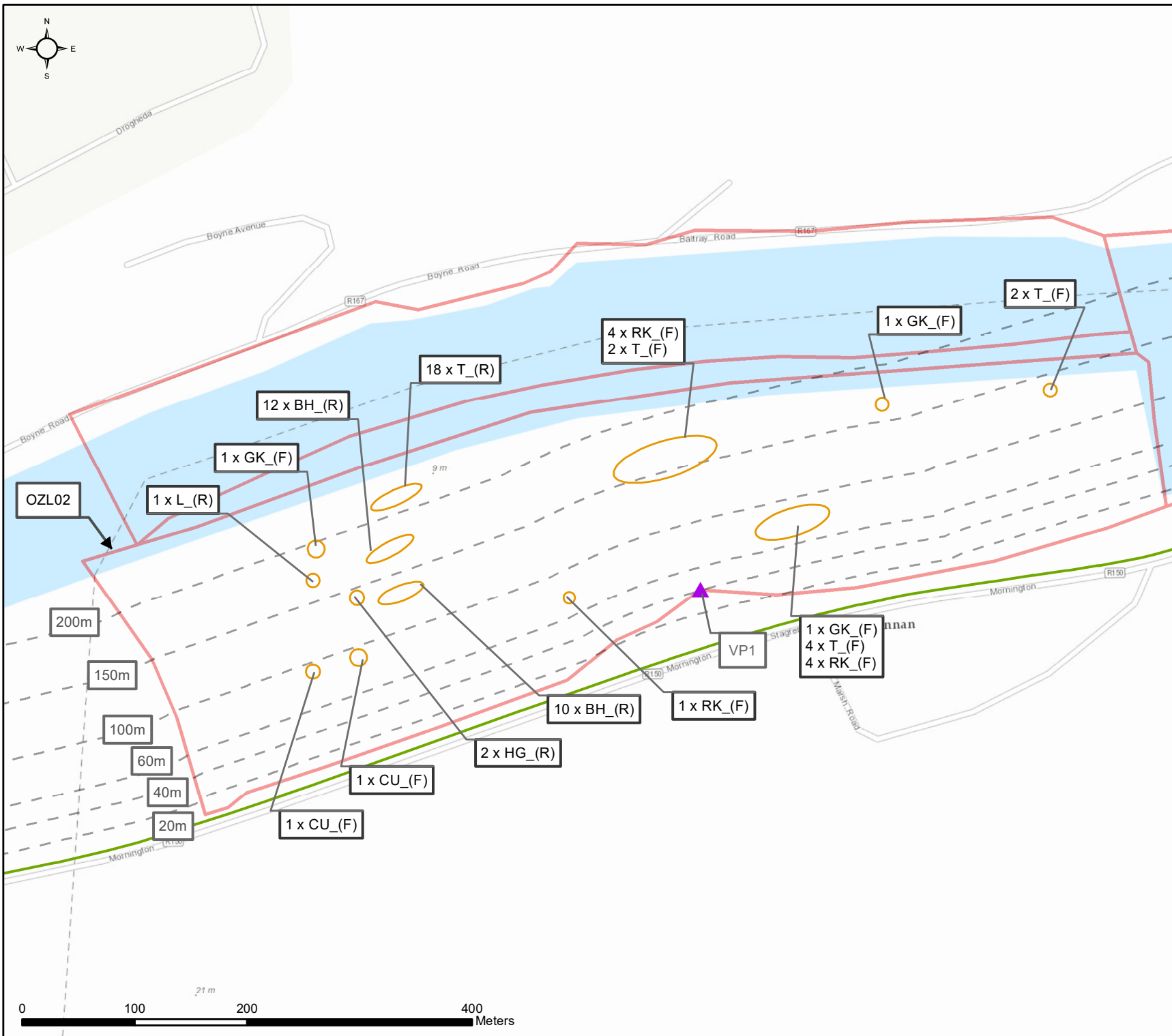
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:

Map 13 of 90: Water Bird Survey 15/03/18
Count Section: OZL02. (VP1)
Time: 15:23 Tide: Low

Legend:

- VP1
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:

(F) = Foraging
(R) = Roosting
(O) = Other

Species ID Code:

T = Teal
BH = Black-headed Gull
GK = Greenshank
HG = Herring Gull
LB = Lesser Black-backed Gull
RK = Redshank
CU = Curlew
L. = Lapwing

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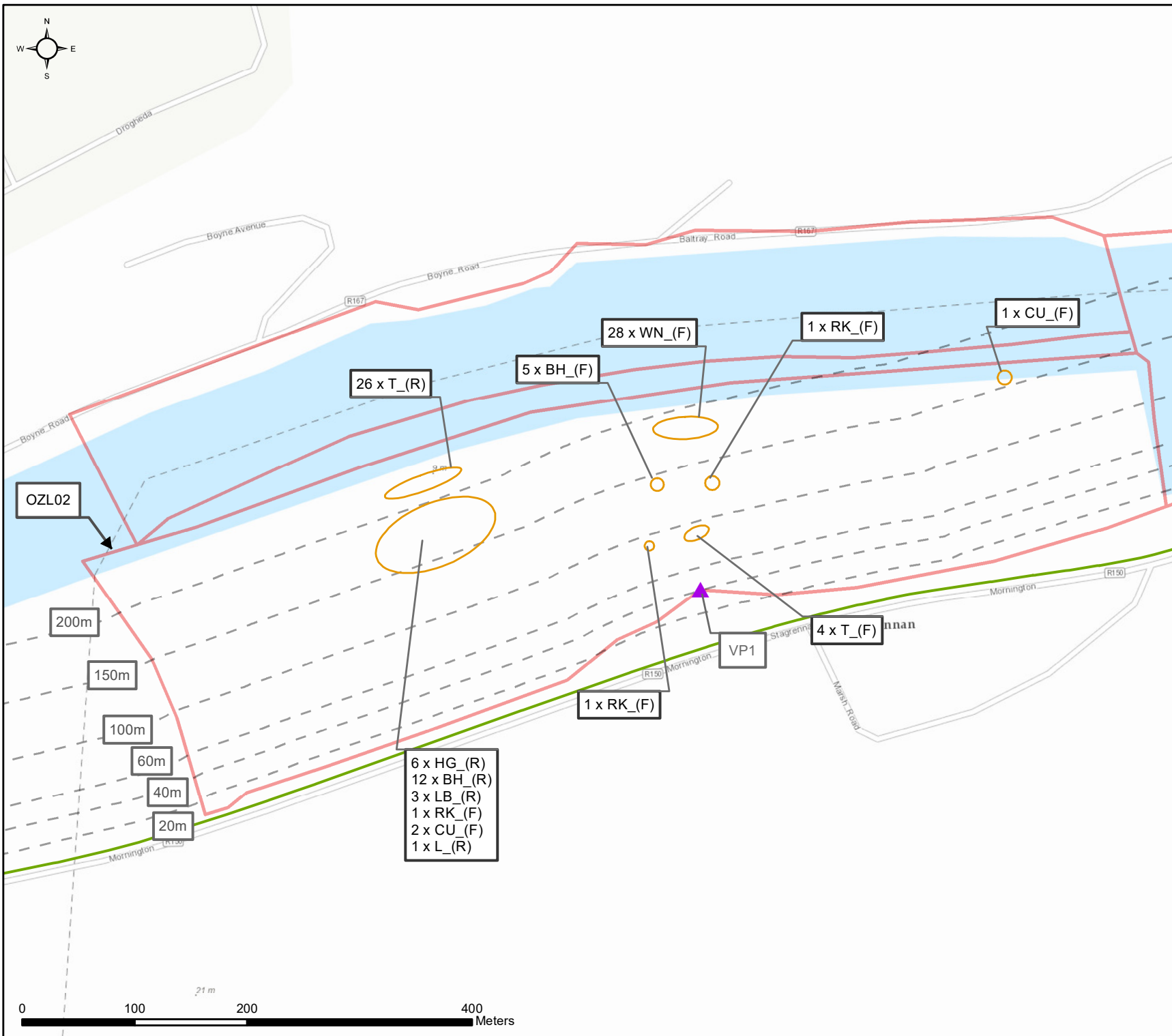
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Map Reference:
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 14 of 90: Water Bird Survey 15/03/18
Count Section: OZL02. (VP1)
Time: 16:23 Tide: Low

Legend:

- VP1
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting
(O) = Other

Species ID Code:
T = Teal
BH = Black-headed Gull
HG = Herring Gull
LB = Lesser Black-backed Gull
RK = Redshank
CU = Curlew
L = Lapwing
WN = Wigeon

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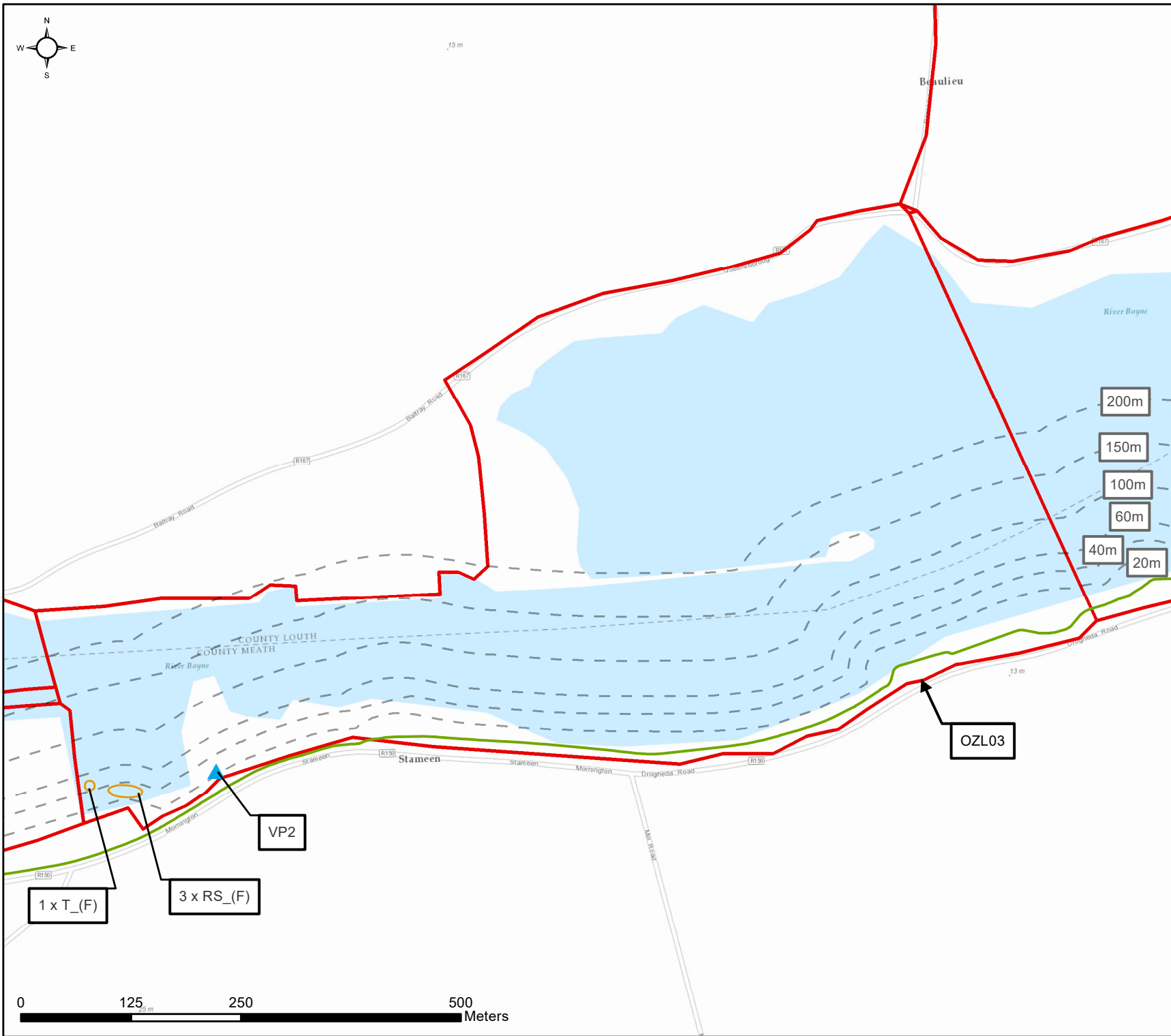
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map15 of 90: Water Bird Survey 05/03/18
Count Section: OZL03. (VP2)
Time: 07:56 Tide: Low

Legend:

- VP2
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:
(F) = Foraging

Species ID Code:
T = Teal
RK = Redshank

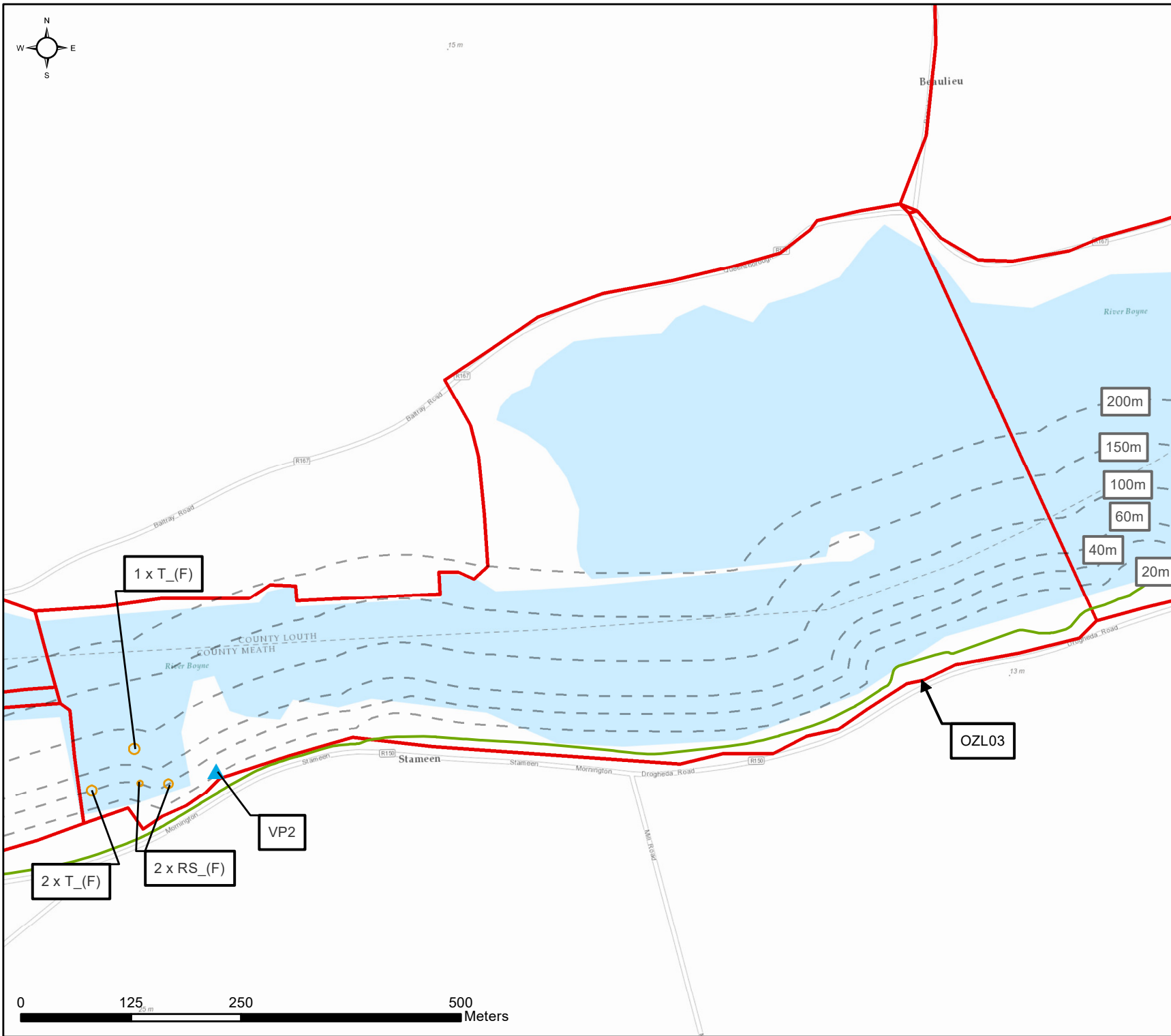
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 16 of 90: Water Bird Survey 05/03/18
Count Section: OZL03. (VP2)
Time: 08:26 Tide: Low

Legend:

- VP2
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:
(F) = Foraging

Species ID Code:
T = Teal
RK = Redshank

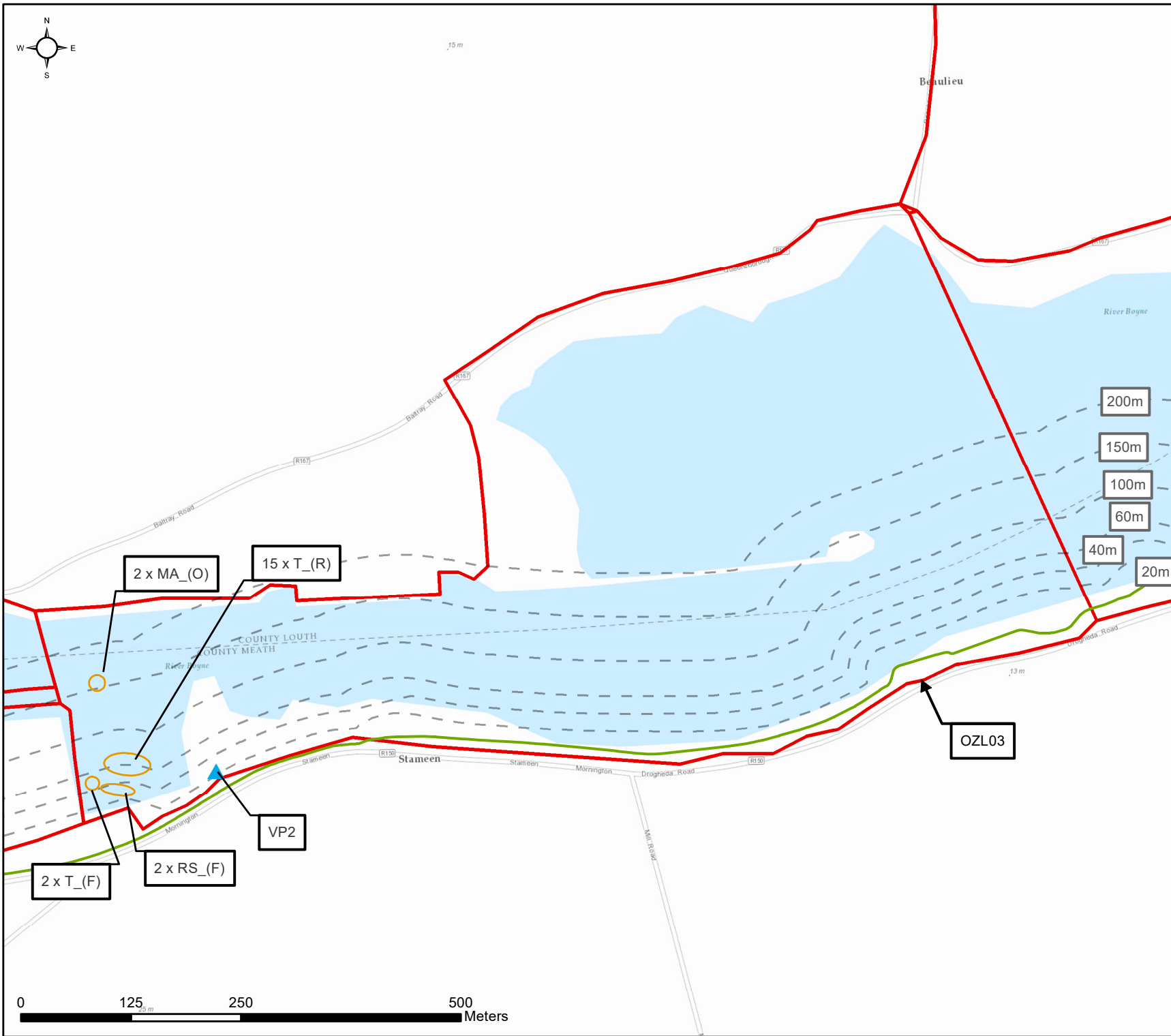
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Client: DBFL

Project: Boyneside Trail Greenway

Title:
Map 17 of 90: Water Bird Survey 05/03/18
Count Section: OZL03. (VP2)
Time: 08:56 Tide: Low

Legend:

- VP2
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting
(O) = Other

Species ID Code:
T = Teal
RK = Redshank
MA = Mallard

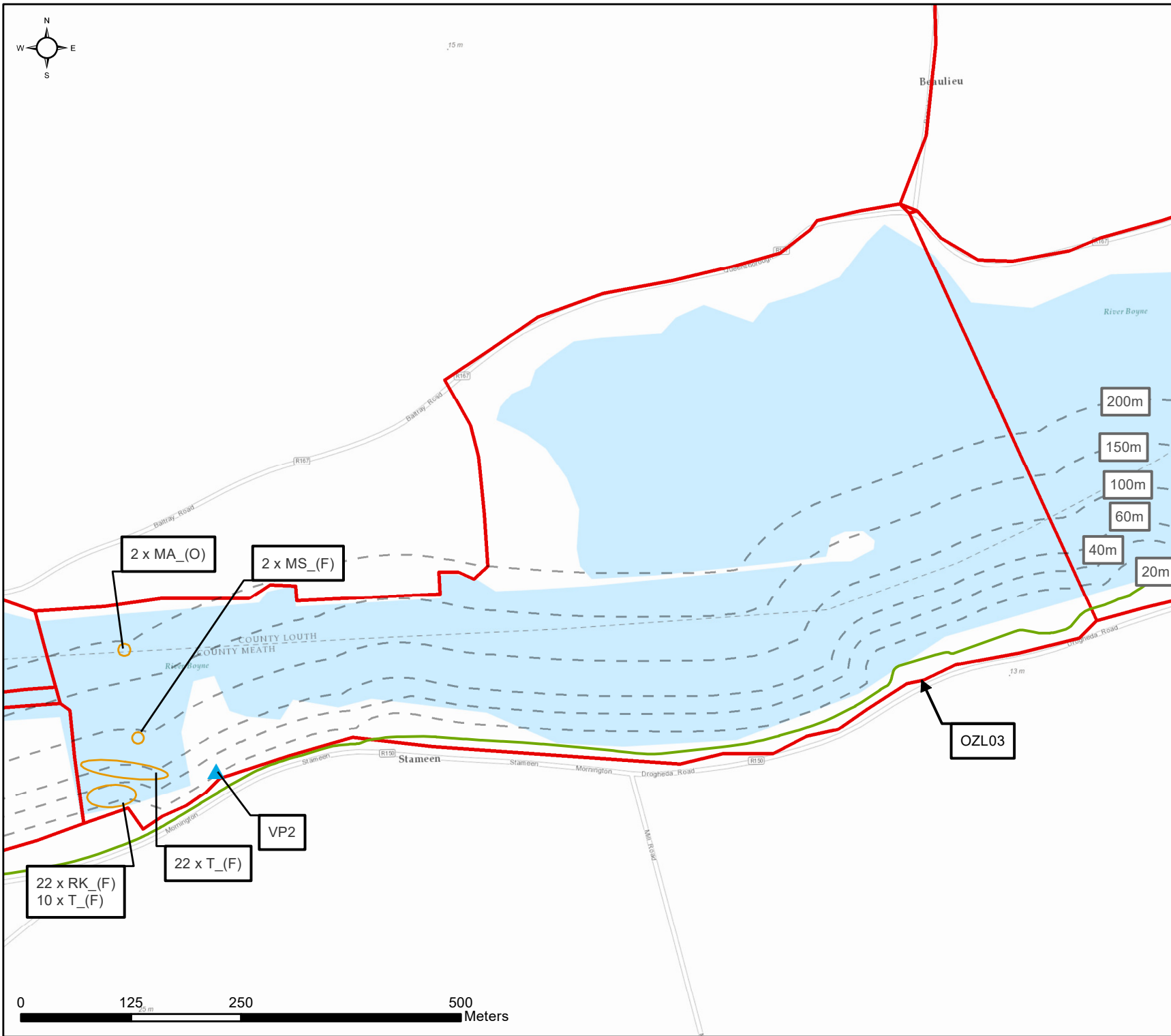
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Client: DBFL

Project: Boyneside Trail Greenway

Title:
Map 18 of 90: Water Bird Survey 05/03/18
Count Section: OZL03. (VP2)
Time: 09:26 Tide: Low

Legend:

- VP2
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting
(O) = Other

Species ID Code:
T = Teal
RK = Redshank
MA = Mallard
MS = Mute Swan

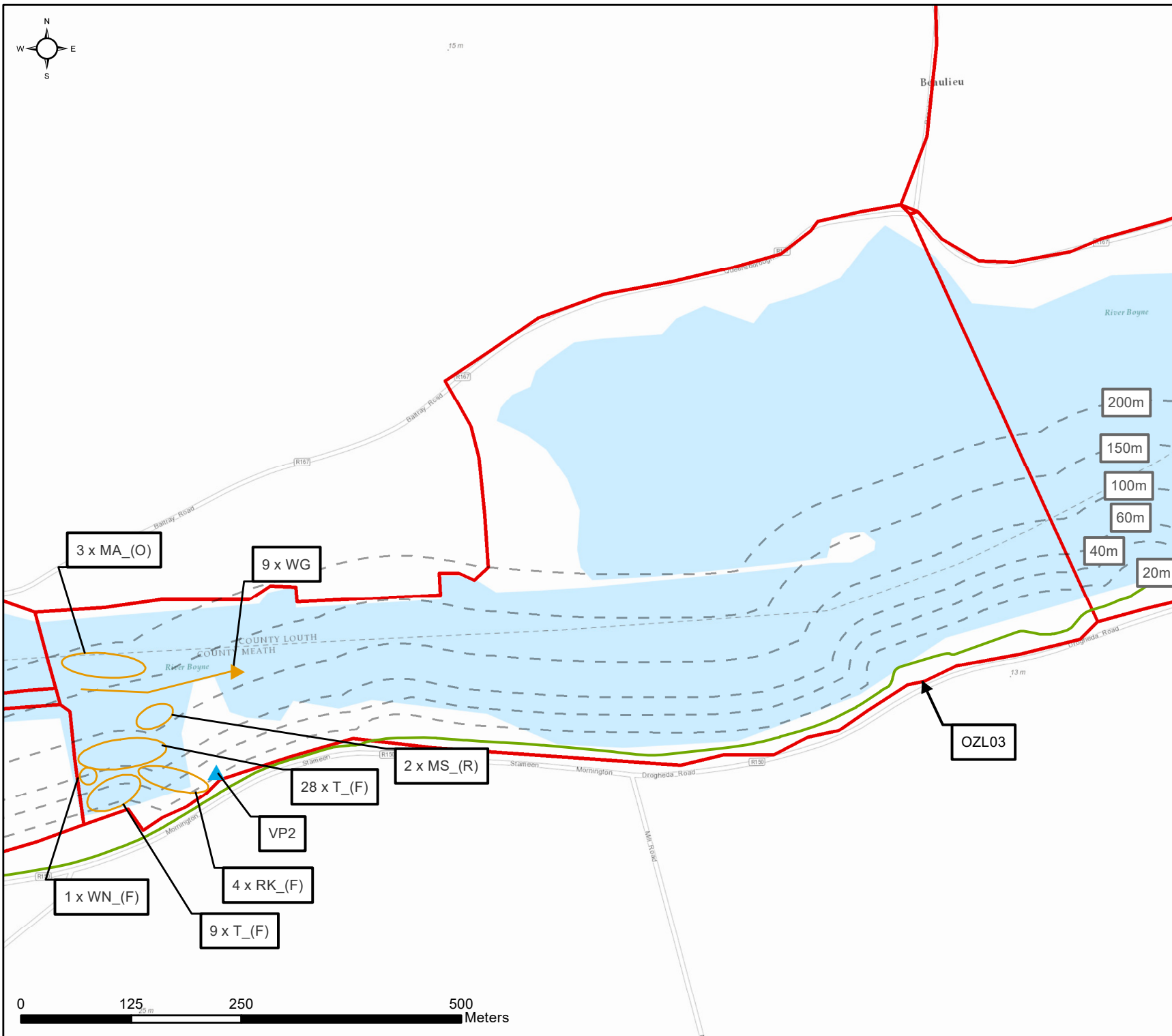
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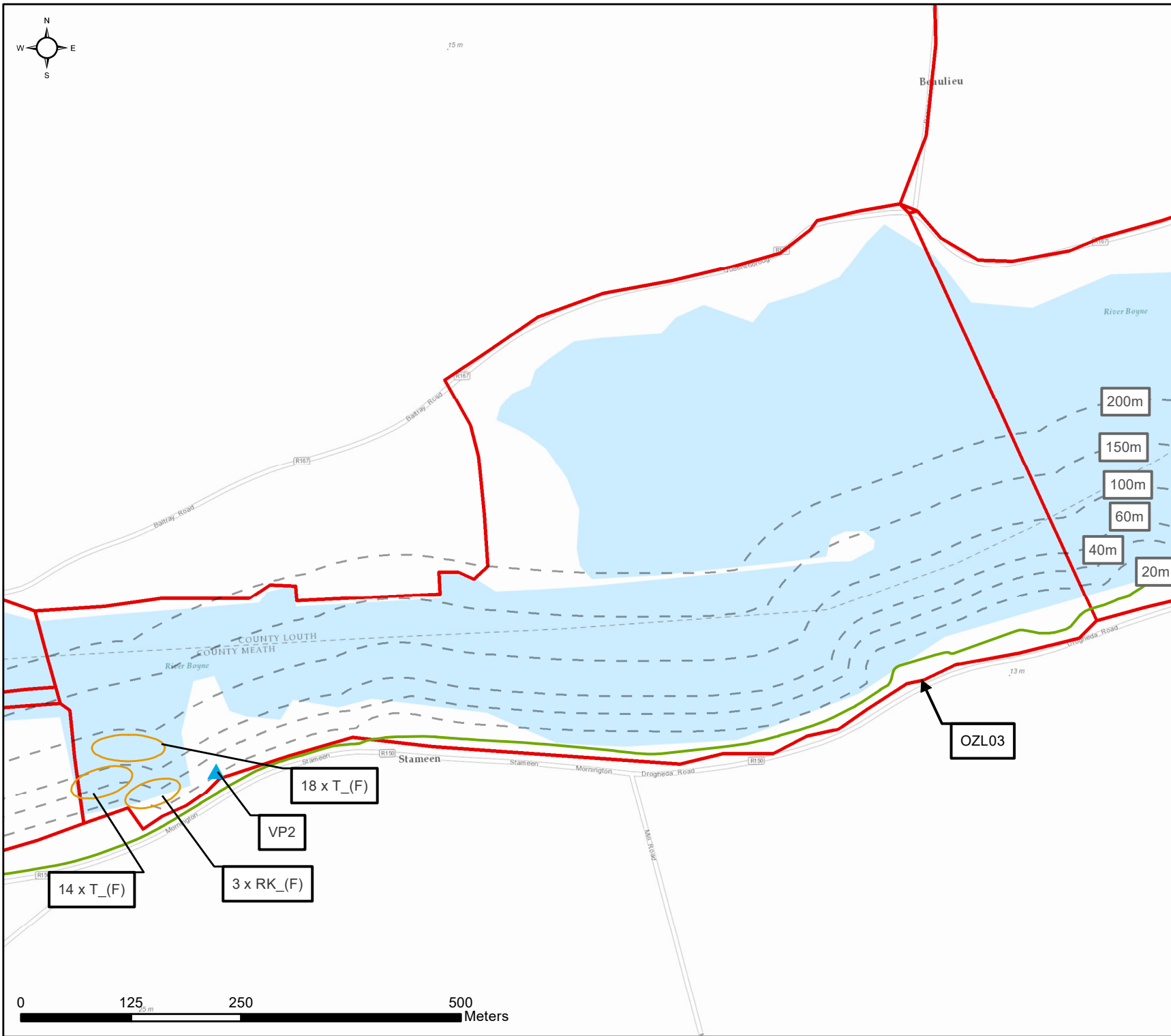
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Client: DBFL

Project: Boyneside Trail Greenway

Title:
Map 20 of 90: Water Bird Survey 05/03/18
Count Section: OZL03. (VP2)
Time: 10:26 Tide: Rising

Legend:

- VP2
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting
(O) = Other

Species ID Code:
T = Teal
RK = Redshank

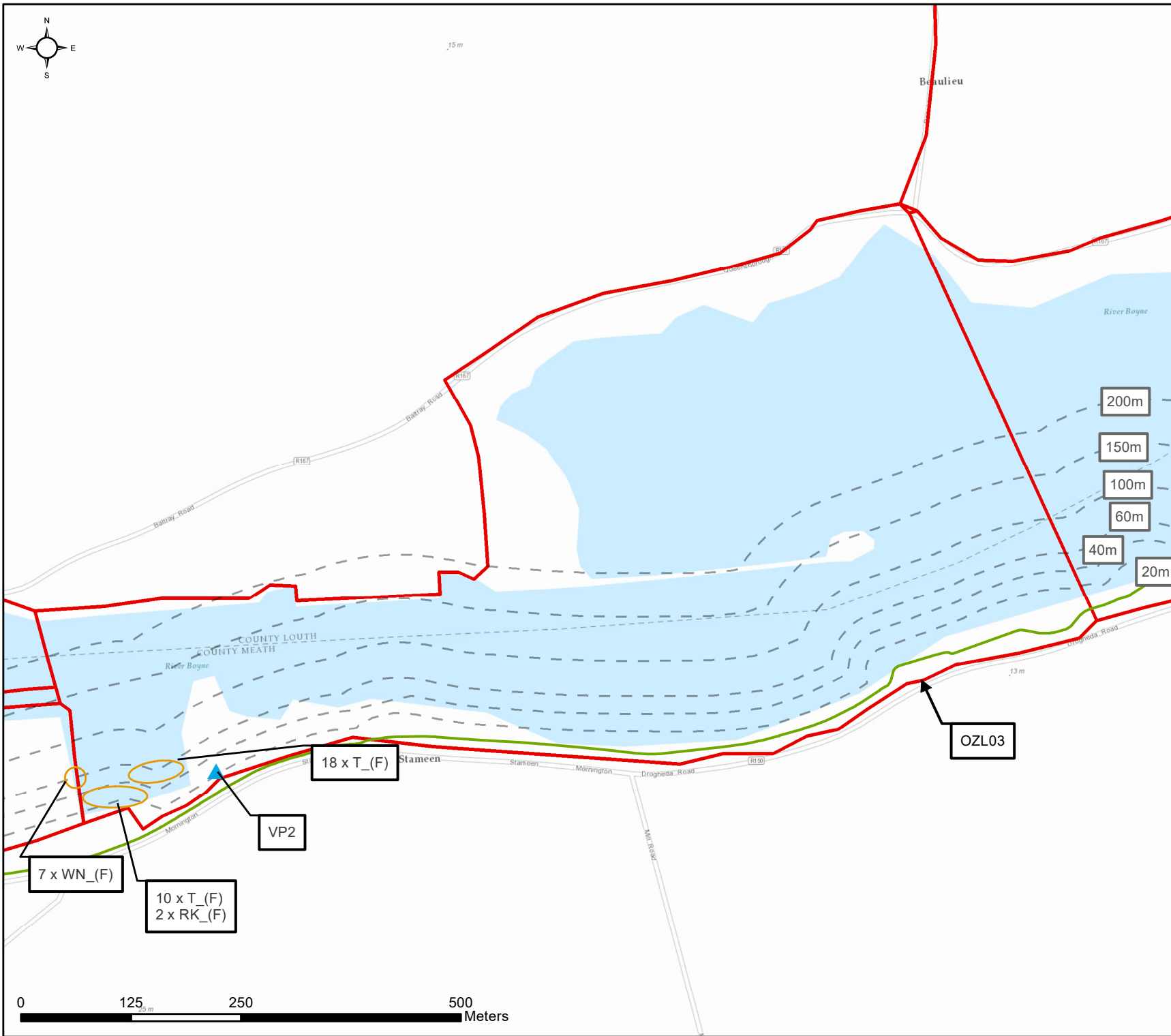
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Client: DBFL

Project: Boyneside Trail Greenway

Title:
Map 21 of 90: Water Bird Survey 05/03/18
Count Section: OZL03. (VP2)
Time: 10:56 Tide: Rising

Legend:

- VP2
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting
(O) = Other

Species ID Code:
T = Teal
RK = Redshank
WN = Wigeon

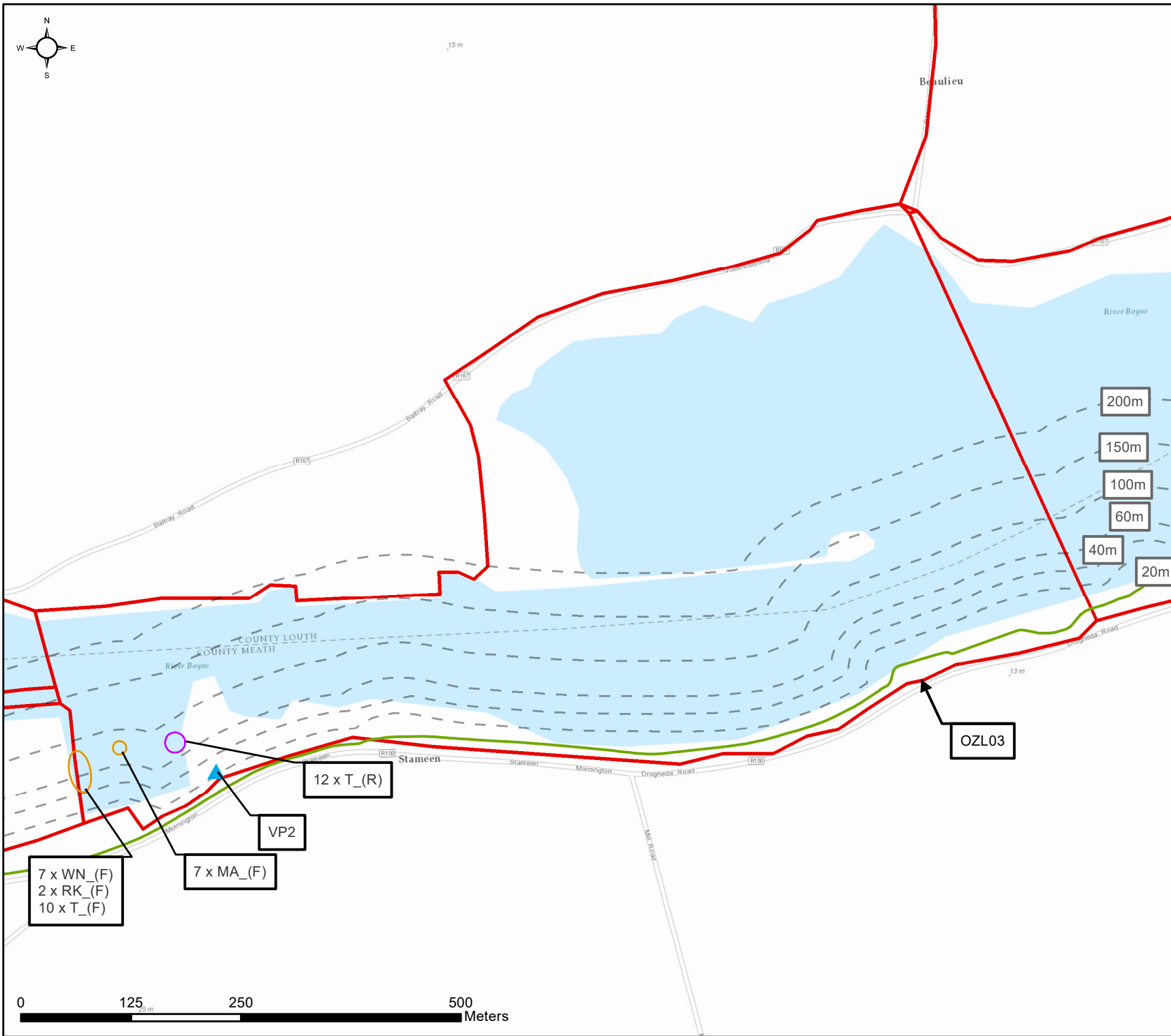
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Client: DBFL

Project: Boyneside Trail Greenway

Title:
Map 22 of 90: Water Bird Survey 05/03/18
Count Section: OZL03. (VP2)
Time: 11:26 Tide: Rising

Legend:

- VP2
- High Tide Roost Areas
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting
(O) = Other

Species ID Code:
T = Teal
RK = Redshank
WN = Widgeon
MA = Mallard

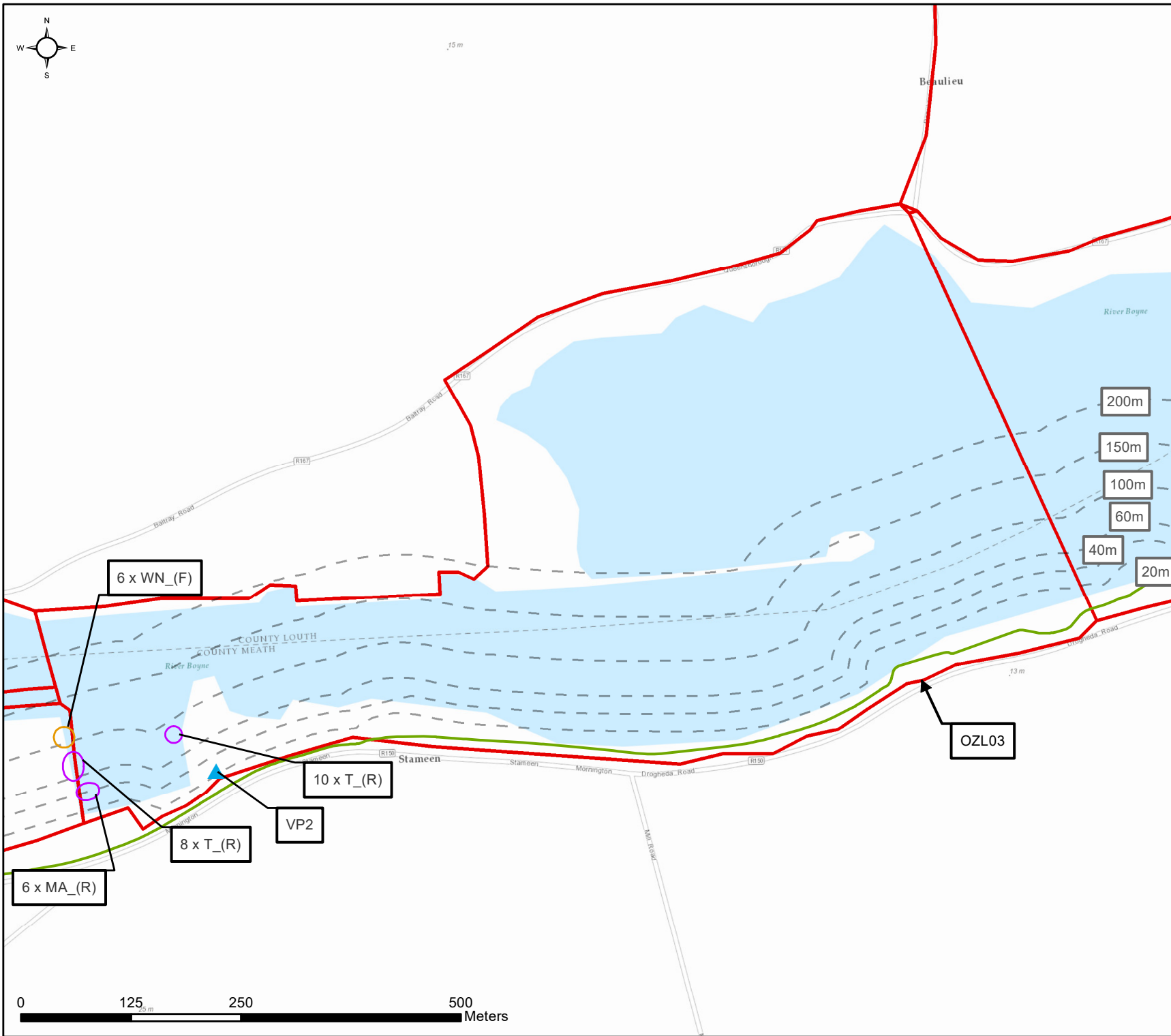
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Client: DBFL

Project: Boyneside Trail Greenway

Title:
Map 23 of 90: Water Bird Survey 05/03/18
Count Section: OZL03. (VP2)
Time: 11:56 Tide: High

Legend:

- VP2
- High Tide Roost Area
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting
(O) = Other

Species ID Code:
T = Teal
WN = Wigeon
MA = Mallard

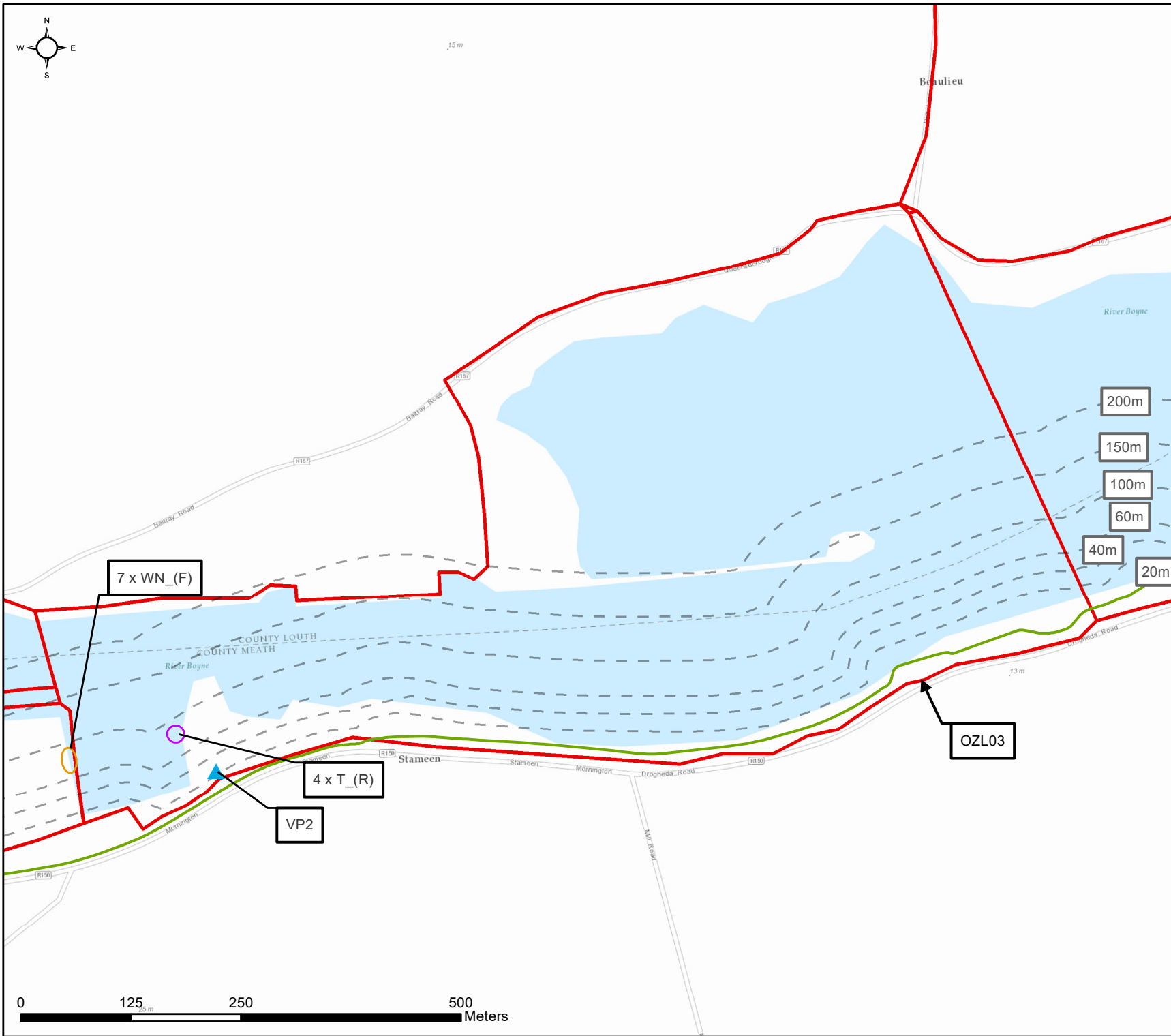
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Client: DBFL

Project: Boyneside Trail Greenway

Title:
Map 24 of 90: Water Bird Survey 05/03/18
Count Section: OZL03. (VP2)
Time: 12:26 Tide: High

Legend:

- VP2
- High Tide Roost Area
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting
(O) = Other

Species ID Code:
T = Teal
WN = Wigeon

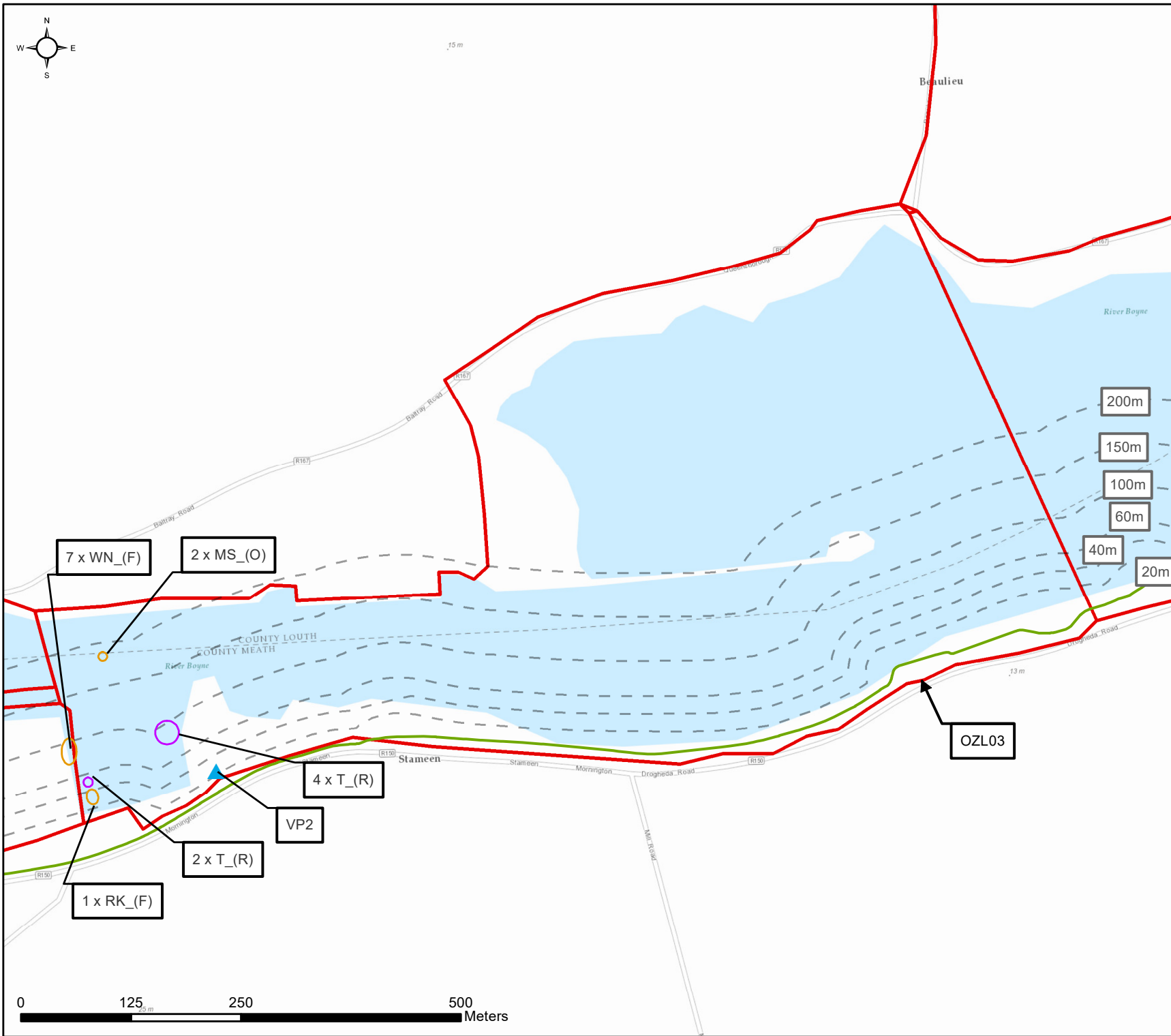
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Client: DBFL

Project: Boyneside Trail Greenway

Title:
Map 25 of 90: Water Bird Survey 05/03/18
Count Section: OZL03. (VP2)
Time: 12:56 Tide: High

Legend:

- VP2
- High Tide Roost Area
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting
(O) = Other

Species ID Code:
T = Teal
WN = Wigeon
MS = Mute Swan
RK = Redshank

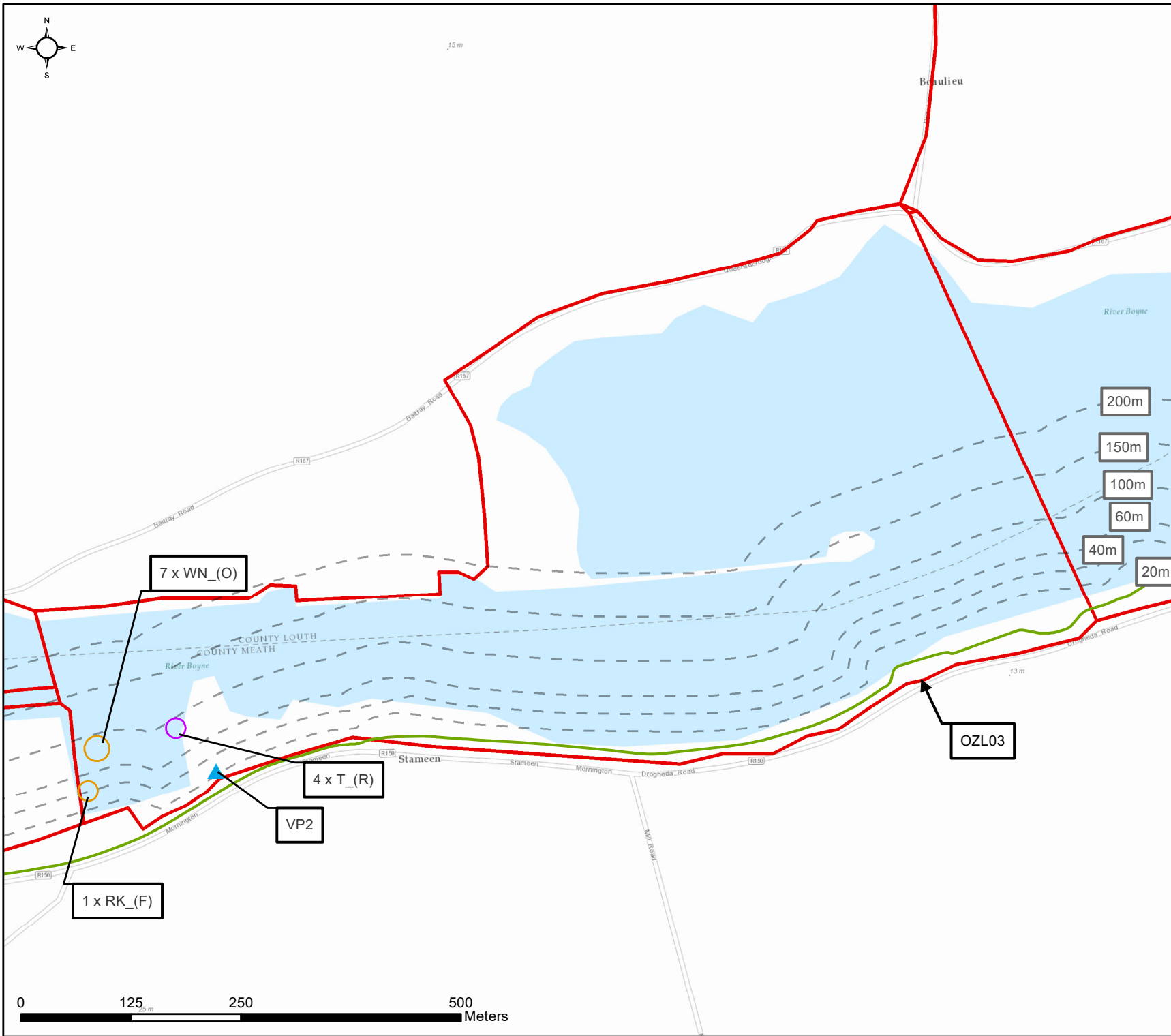
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Date: 07/07/2020	Map Reference: 1101 - AG - 06_025
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Client: DBFL

Project: Boyneside Trail Greenway

Title:
Map 26 of 90: Water Bird Survey 05/03/18
Count Section: OZL03. (VP2)
Time: 13:26 Tide: High

Legend:

- VP2
- High Tide Roost Area
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting
(O) = Other

Species ID Code:
T = Teal
WN = Wigeon
RK = Redshank

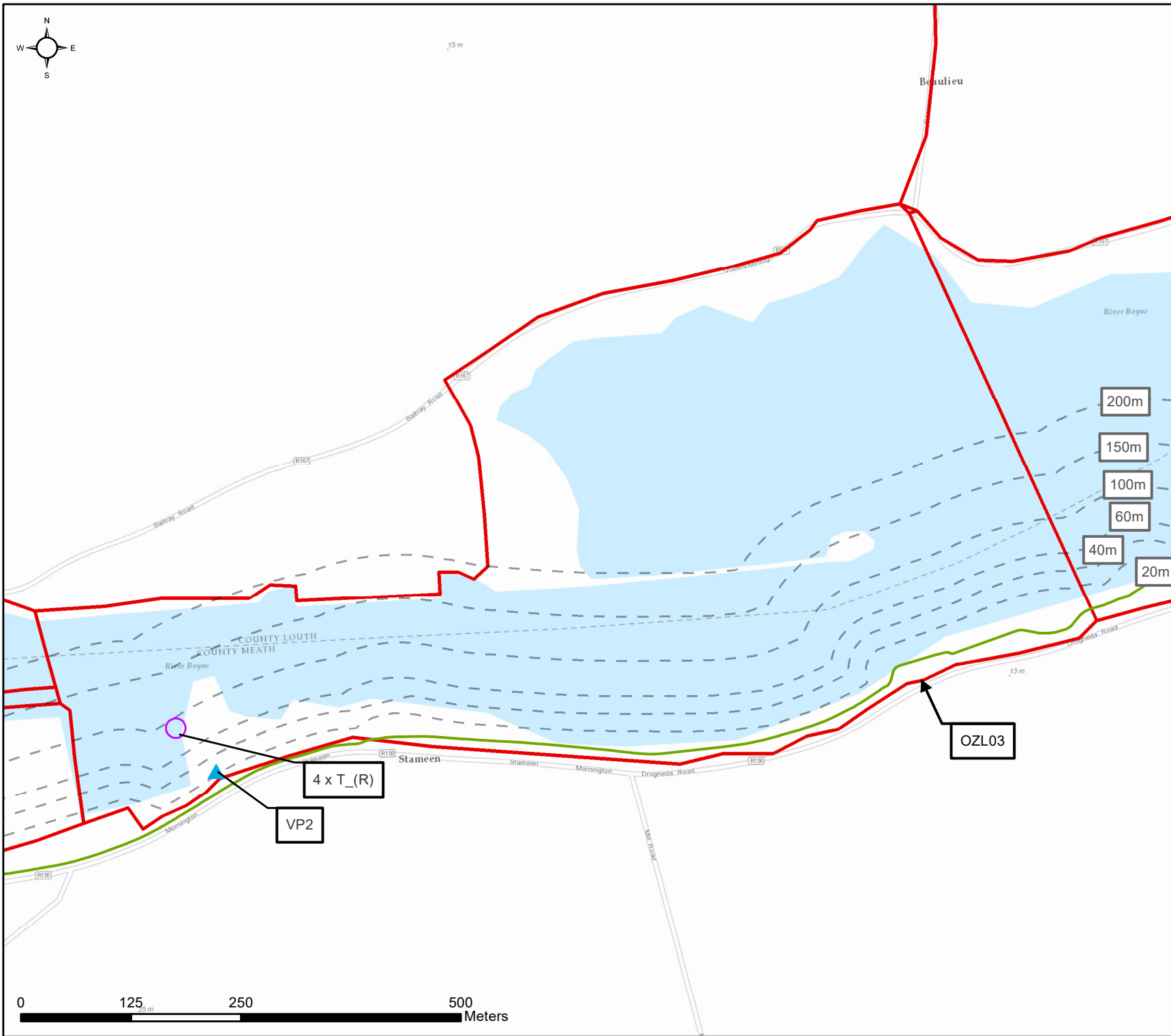
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Date: 07/07/2020	Map Reference: 1101 - AG - 06_026
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Client: DBFL

Project: Boyneside Trail Greenway

Title:
Map 27 of 90: Water Bird Survey 05/03/18
Count Section: OZL03. (VP2)
Time: 13:56 Tide: High

Legend:

- VP2
- High Tide Roost Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting
(O) = Other

Species ID Code:
T = Teal

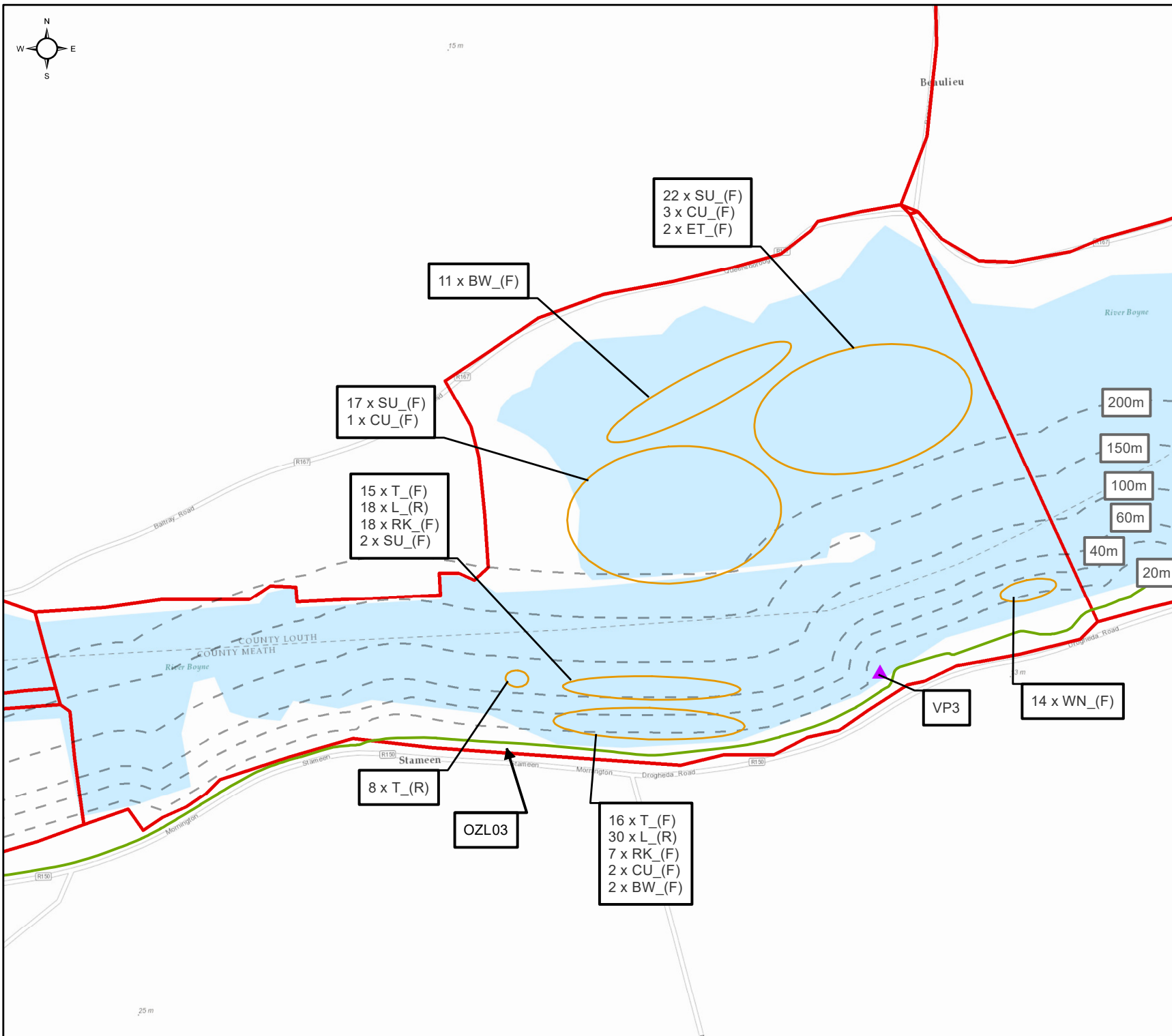
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:

Map 28 of 90 : Water Bird Survey 07/03/18
Count Section: OZL03. (VP3)
Time: 09:15 Tide: Low

Legend:

- VP3
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:

(F) = Foraging
(R) = Roosting

Species ID Code:

T = Teal
L = Lapwing
RK = Redshank
CU = Curlew
SU = Shelduck
BW = Black-tailed Godwit
WN = Wigeon
ET = Little Egret

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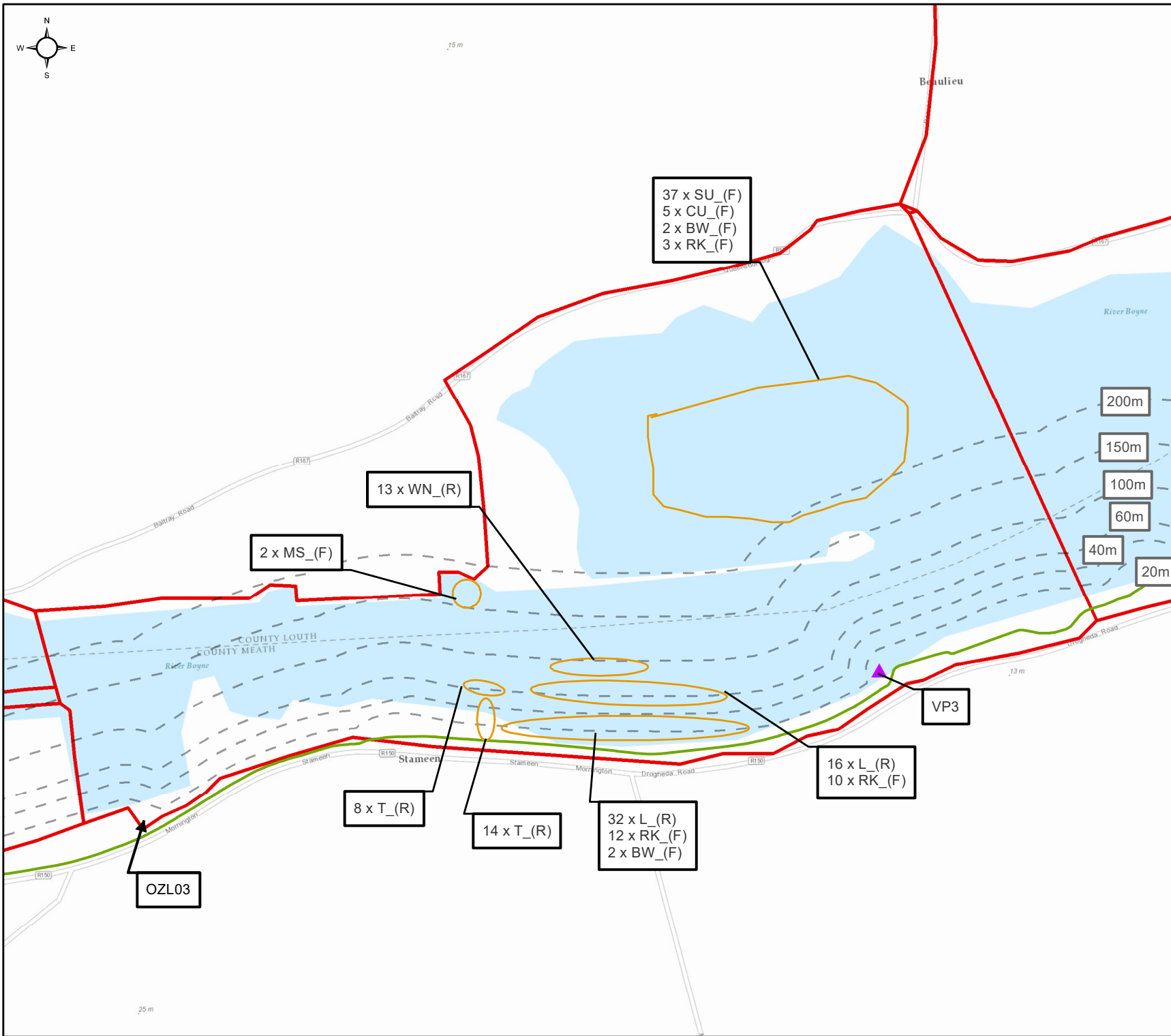
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 29 of 90: Water Bird Survey 07/03/18
Count Section: OZL03. (VP3)
Time: 10:15 Tide: Low

Legend:

- VP3
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting

Species ID Code:

T = Teal
L = Lapwing
RK = Redshank
CU = Curlew
SU = Shelduck
BW = Black-tailed Godwit
WN = Wigeon
MS = Mute Swan

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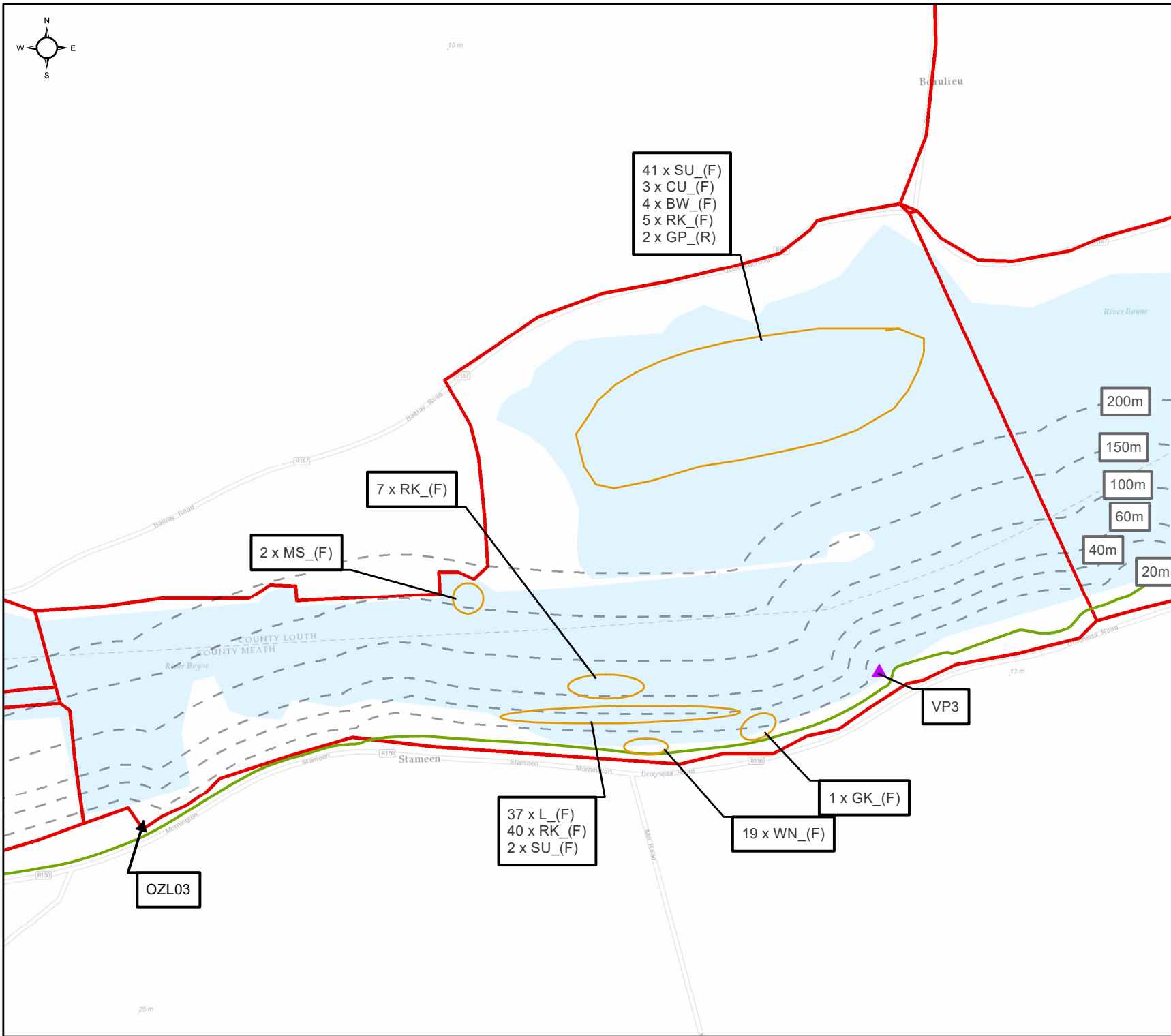
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 30 of 90: Water Bird Survey 07/03/18
Count Section: OZL03. (VP3)
Time: 11:15 Tide: Rising

Legend:

- VP3
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting

Species ID Code:

T = Teal
L = Lapwing
RK = Redshank
CU = Curlew
SU = Shelduck
BW = Black-tailed Godwit
WN = Wigeon
MS = Mute Swan

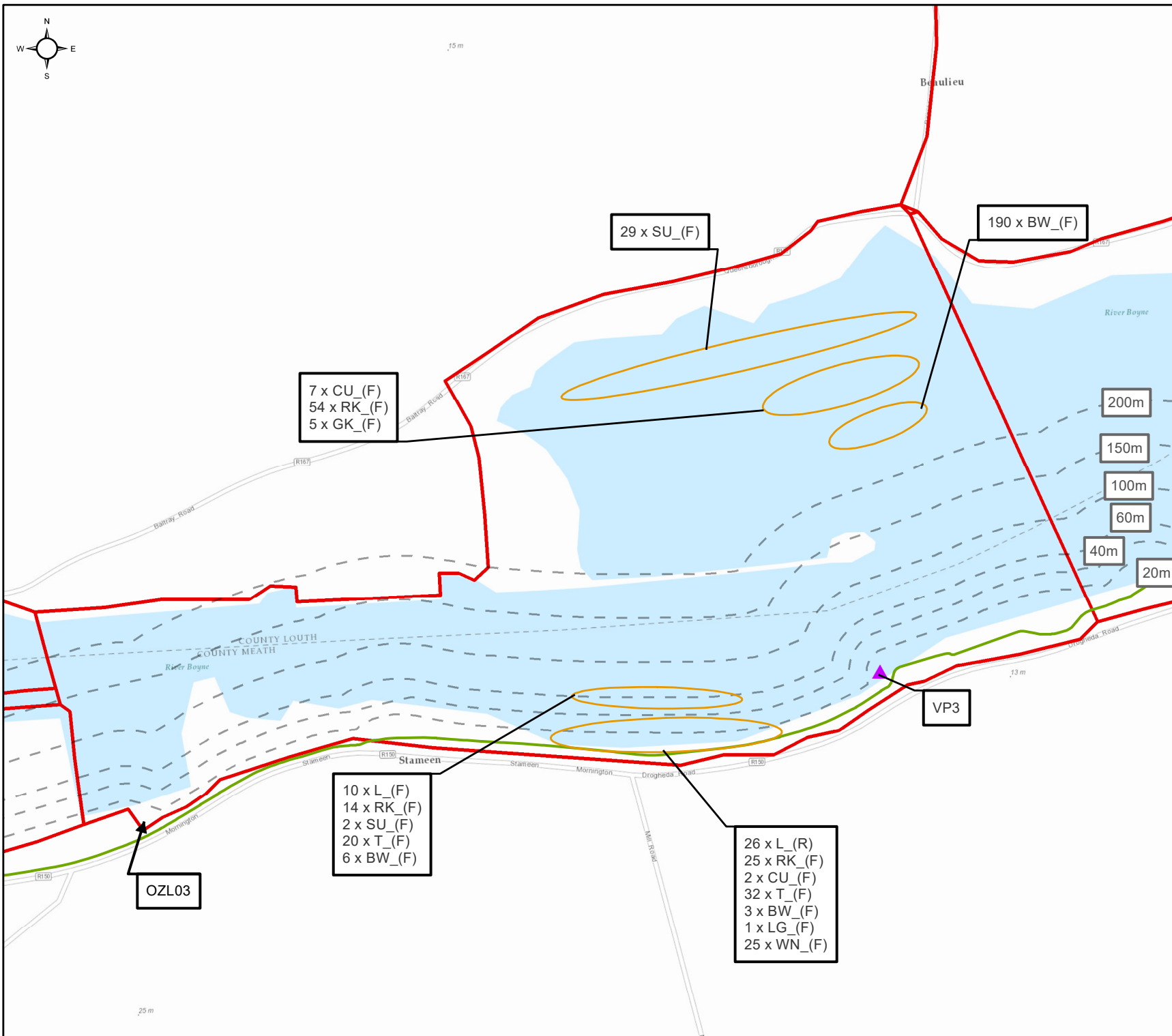
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 31 of 90: Water Bird Survey 07/03/18
Count Section: OZL03. (VP3)
Time: 12:15 Tide: Rising

Legend:

- VP3
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite

Activity Code:
(F) = Foraging
(R) = Roosting

Species ID Code:
T = Teal
L = Lapwing
RK = Redshank
CU = Curlew
SU = Shelduck
BW = Black-tailed Godwit
WN = Wigeon
LG = Little Grebe
GK = Greenshank

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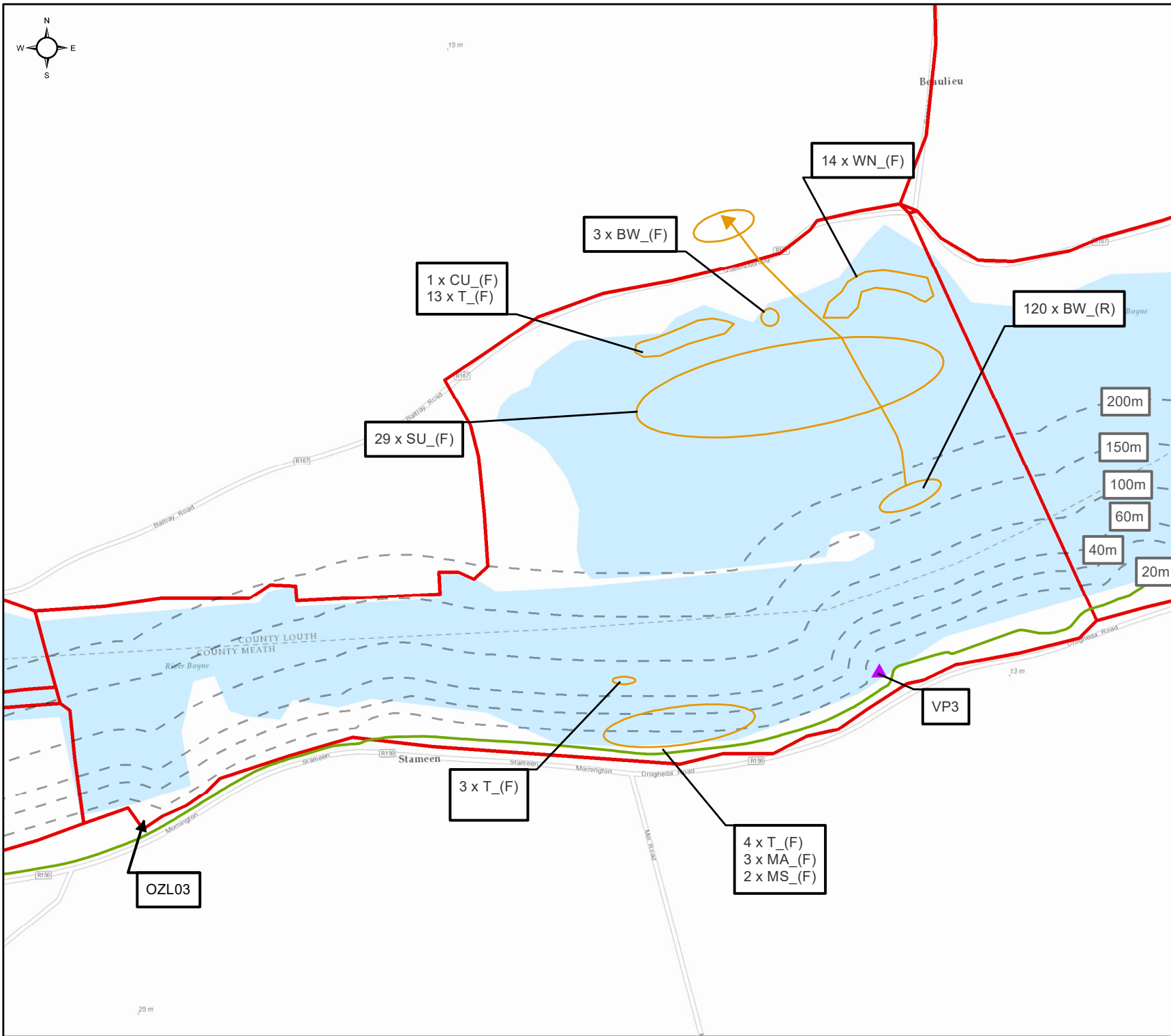
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Date: 07/07/2020	Map Reference: 1101 - AG - 06_031
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 32 of 90: Water Bird Survey 07/03/18
Count Section: OZL03. (VP3)
Time: 13:15 Tide: Rising

Legend:

- VP3
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting

Species ID Code:

T = Teal
L = Lapwing
RK = Redshank
CU = Curlew
SU = Shelduck
BW = Black-tailed Godwit
WN = Wigeon
LG = Little Grebe
GK = Greenshank

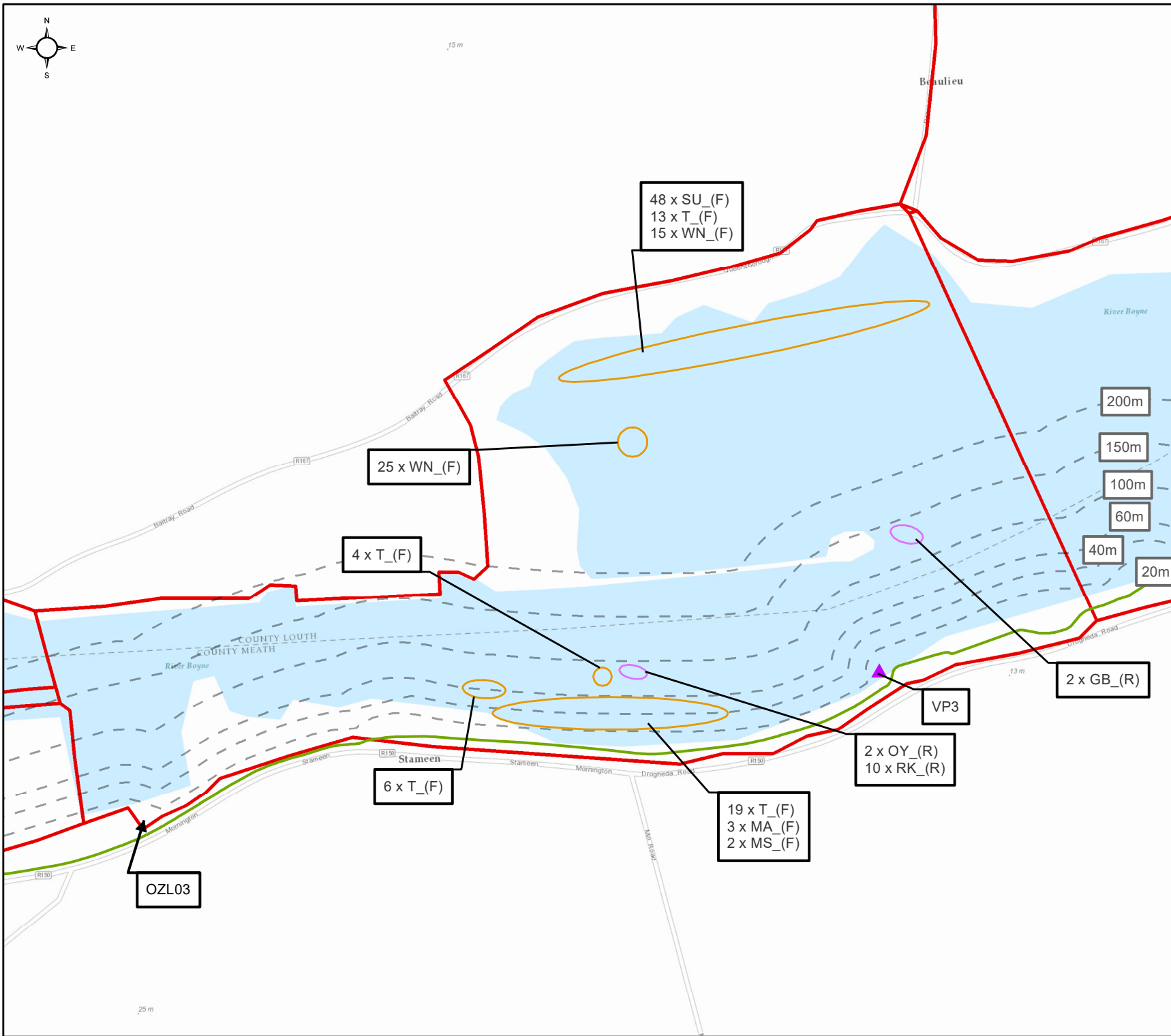
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 33 of 90 : Water Bird Survey 07/03/18
Count Section: OZL03. (VP3)
Time: 14:15 Tide: High

Legend:

- VP3
- Proposed Cycle Route
- High Tide Roost Area
- Water Bird Activity Area
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting

Species ID Code:
T = Teal
RK = Redshank
SU = Shelduck
WN = Wigeon
MA = Mallard
MS = Mute swan
OC = Oystercatcher
GB = Great Black-backed Gull

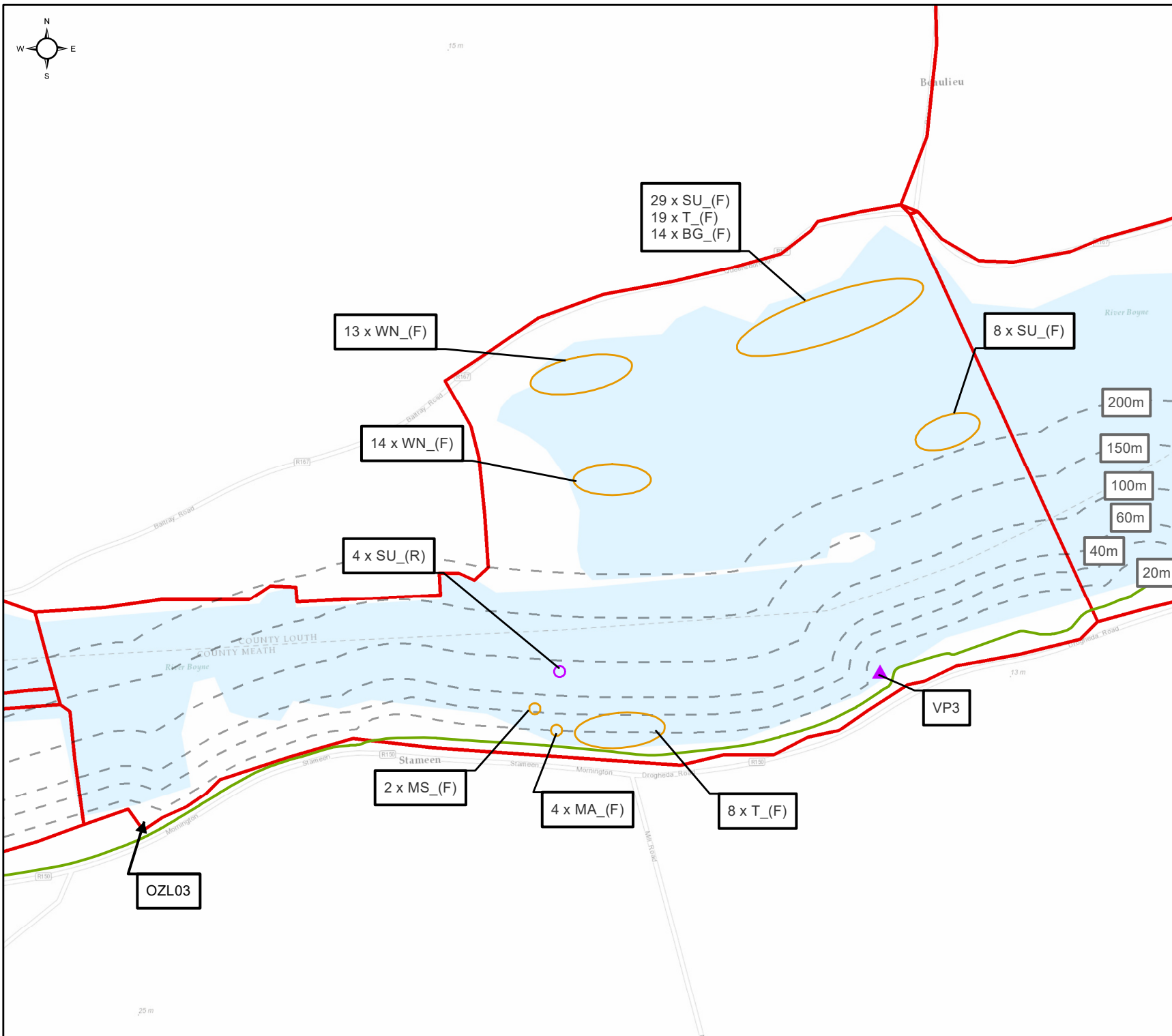
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 34 of 90 : Water Bird Survey 07/03/18
Count Section: OZL03. (VP3)
Time: 15:15 Tide: High

Legend:

- VP3
- High Tide Roost Area
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting

Species ID Code:
T = Teal
SU = Shelduck
WN = Wigeon
MA = Mallard
MS = Mute swan
BG = Brent Goose

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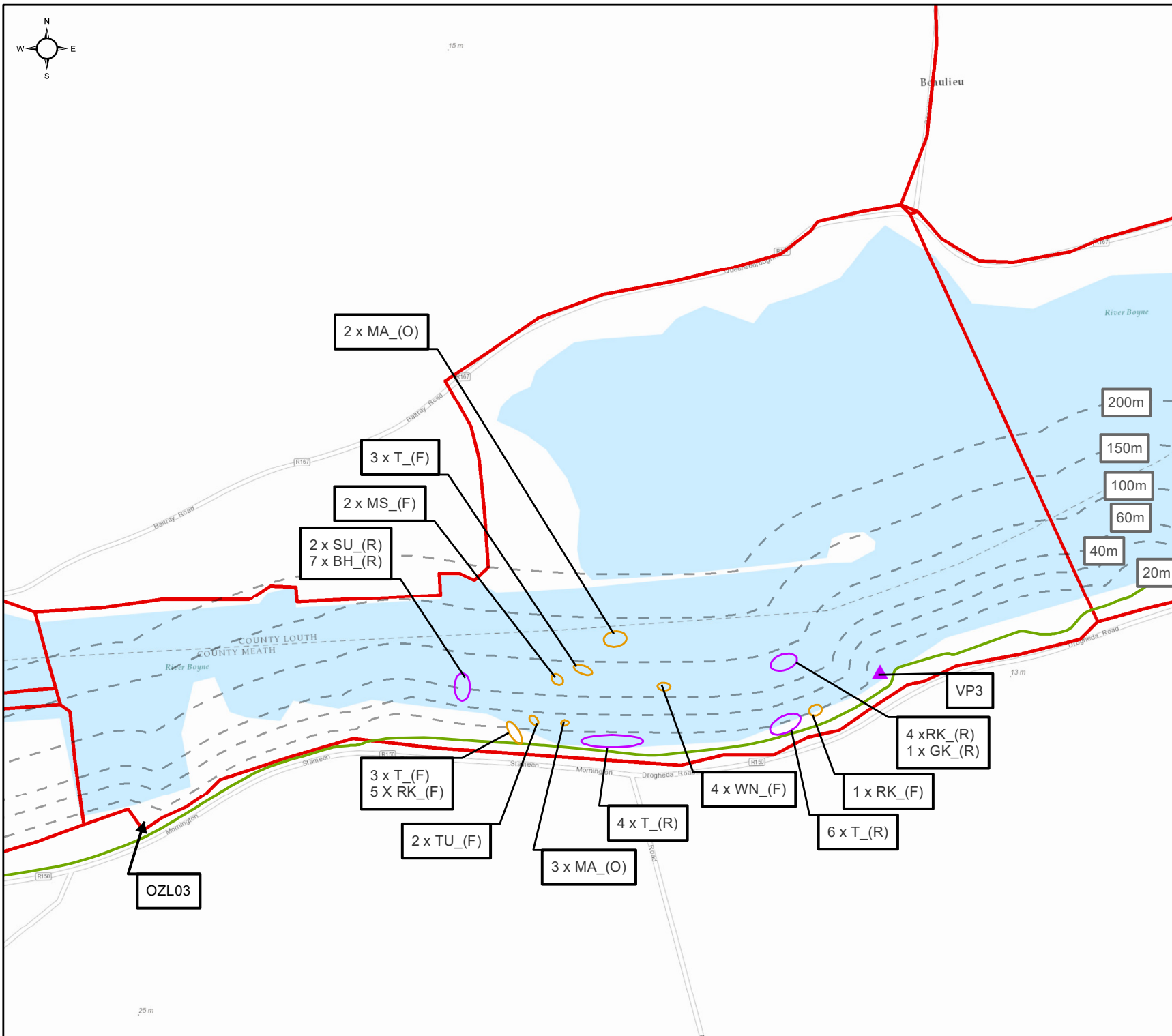
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title: Map 35 of 90: Water Bird Survey 26/03/18
Count Section: OZL03. (VP3)
Time: 07.31 Tide: High

Legend:

- VP3
- High Tide Roost Area
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting
(O) = Other

Species ID Code:
T = Teal
SU = Shelduck
MA = Mallard
MS = Mute swan
RK = Redshank
WN = Wigeon
GK = Greenshank
TU = Tufted Duck
BH = Black-headed Gull

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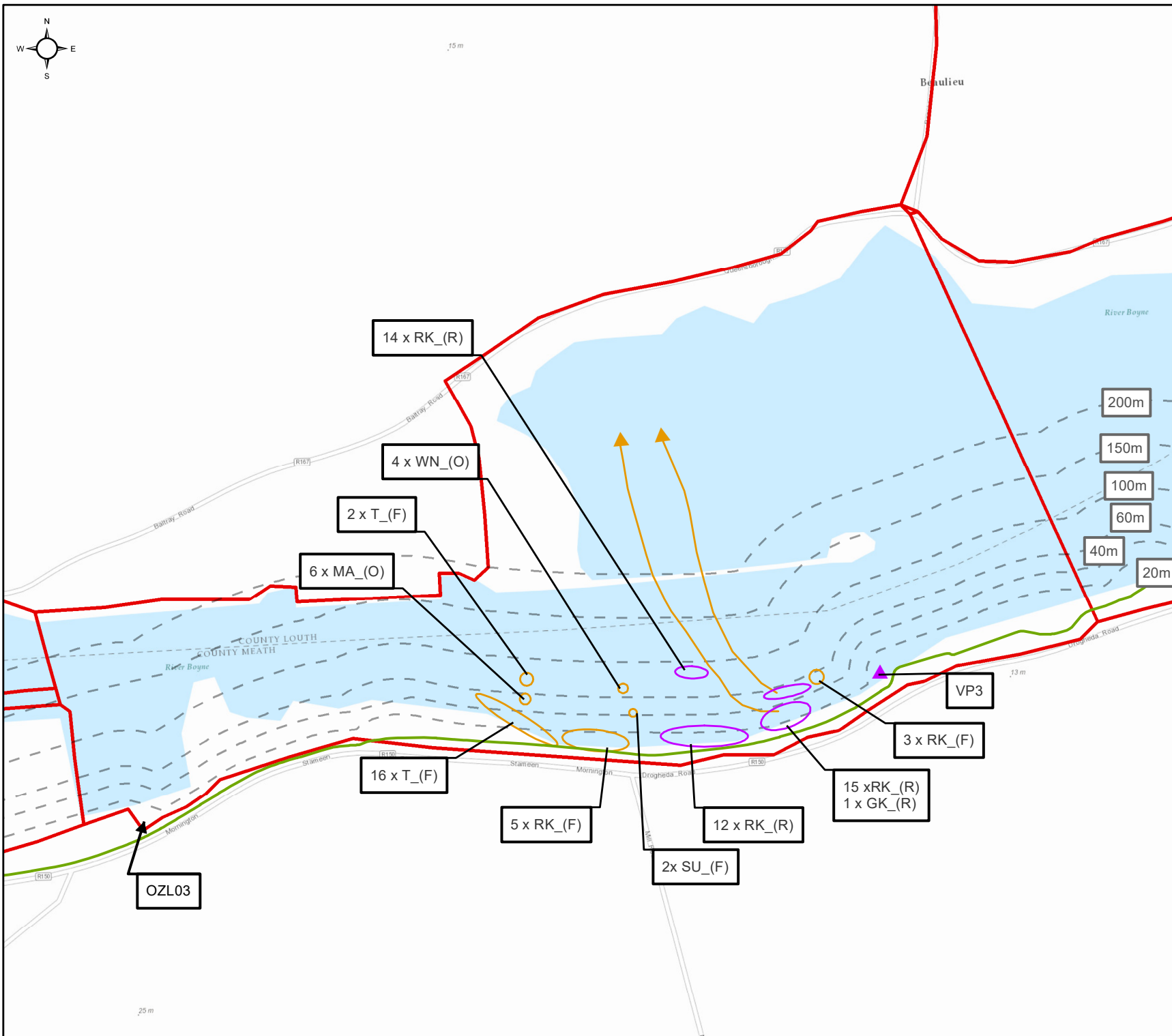
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Date: 07/07/2020	Map Reference: 1101 - AG - 06_035
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 36 of 90: Water Bird Survey 26/03/18
Count Section: OZL03. (VP3)
Time: 08.31 Tide: High

Legend:

- VP3
- Proposed Cycle Route
- High Tide Roost Area
- Water Bird Activity Area
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting
(O) = Other

Species ID Code:
T = Teal
SU = Shelduck
MA = Mallard
RK = Redshank
WN = Wigeon
GK = Greenshank
TU = Tufted Duck

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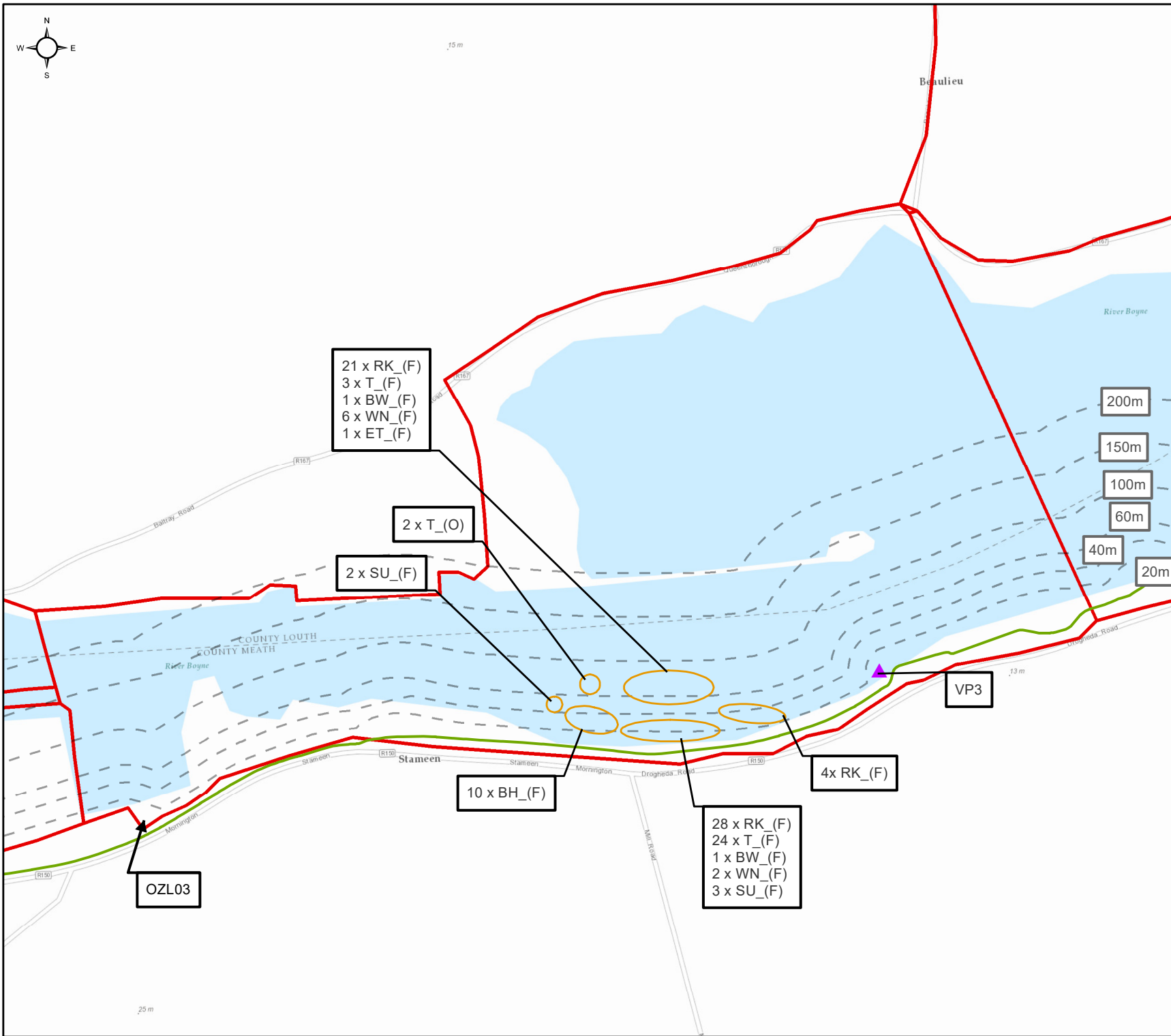
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Date: 05/06/2020	Map Reference: 1101 - AG - 06_036
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:

Map 37 of 90: Water Bird Survey 26/03/18

Count Section: OZL03. (VP3)

Time: 09.31 Tide: Falling

Legend:

- VP3
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:

(F) = Foraging

(R) = Roosting

(O) = Other

Species ID Code:

T = Teal

SU = Shelduck

RK = Redshank

WN = Wigeon

TU = Tufted Duck

BW = Black-tailed Godwit

BH = Black-headed Gull

ET = Little Egret

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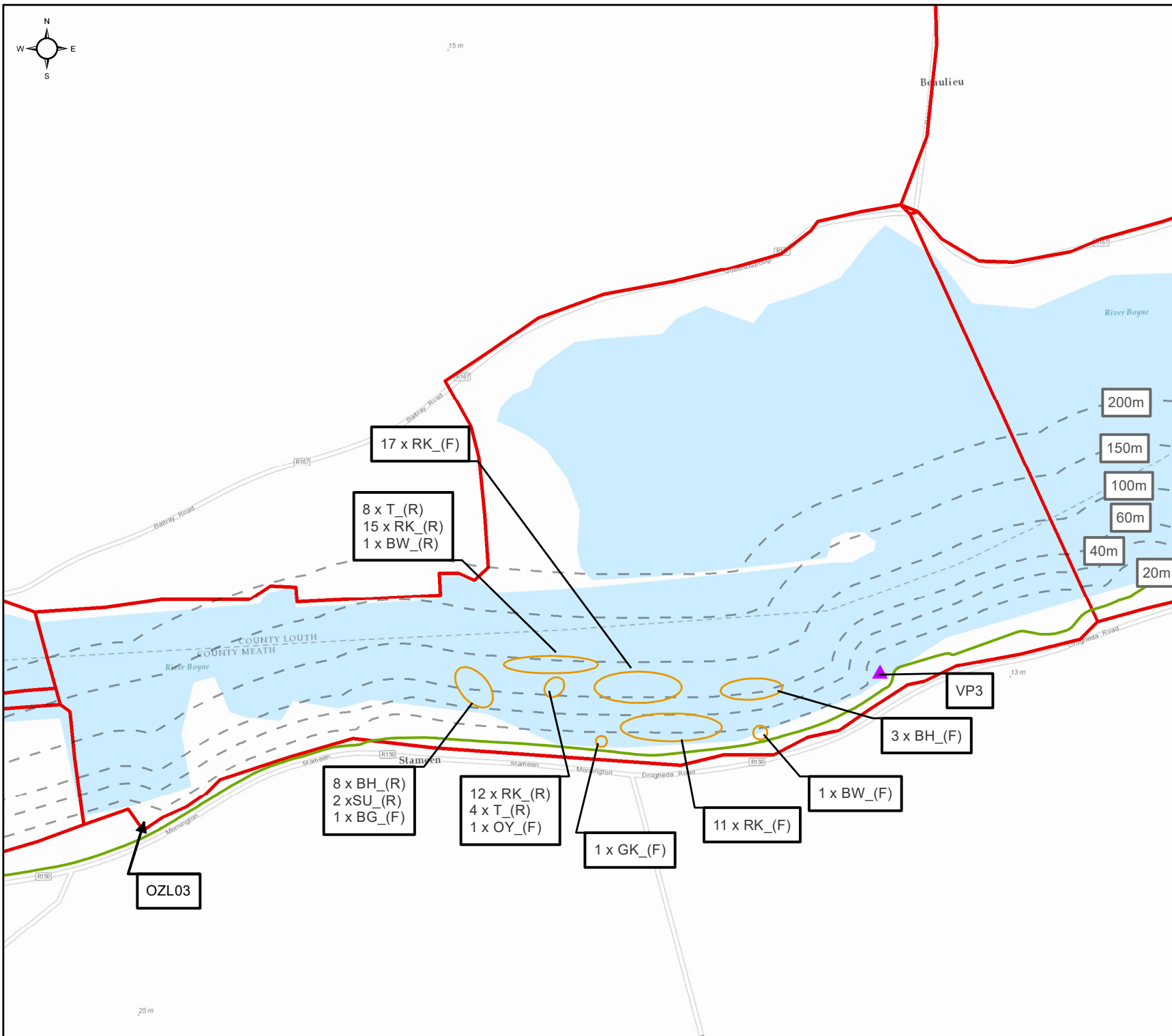
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 38 of 90: Water Bird Survey 26/03/18
Count Section: OZL03. (VP3)
Time: 10.31 Tide: Falling

Legend:

- VP3
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting

Species ID Code:
T = Teal
SU = Shelduck
RK = Redshank
BW = Black-tailed Godwit
BH = Black-headed Gull
GK = Greenshank
BG = Brent Goose
OC = Oystercatcher

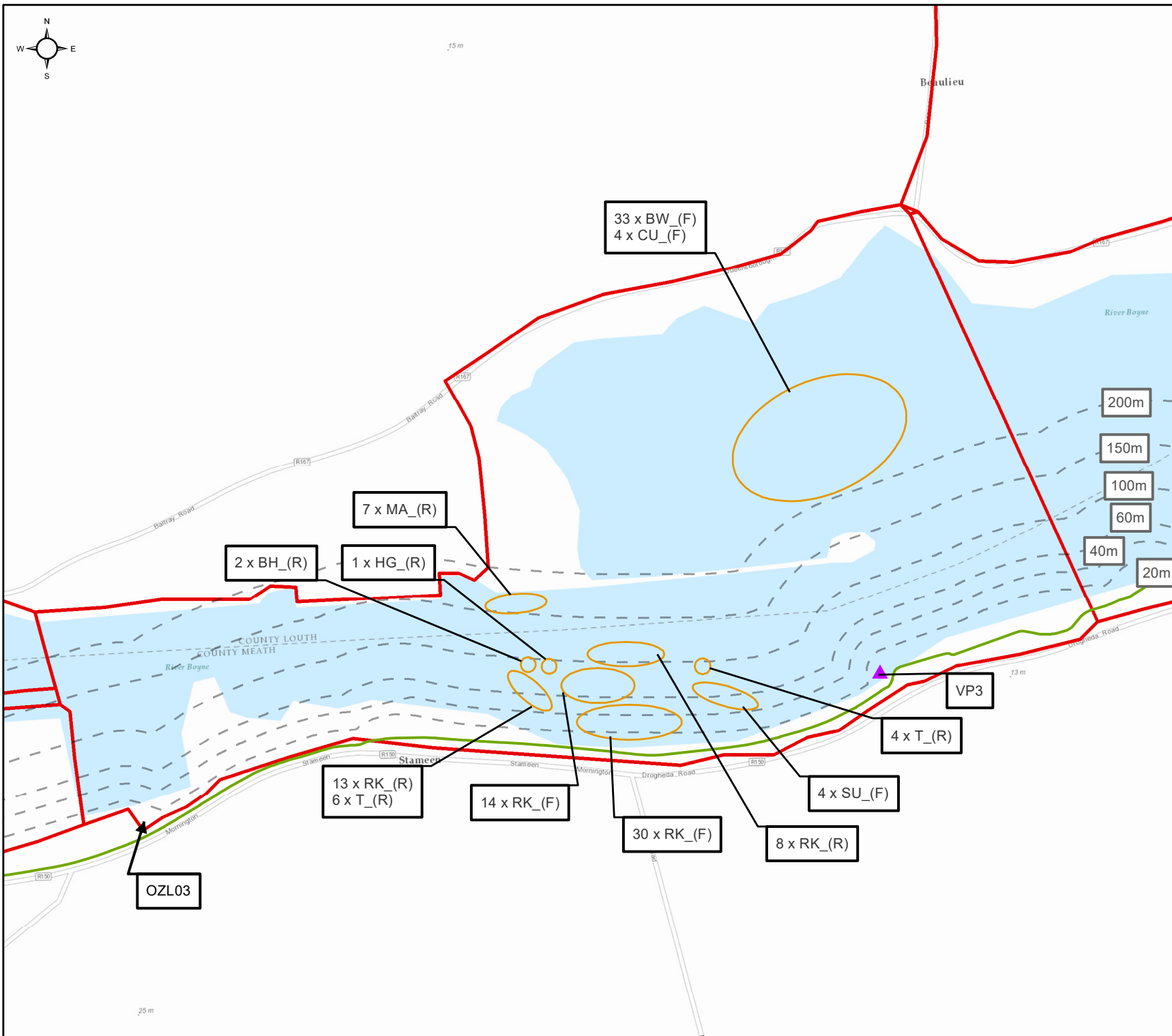
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:

Map 39 of 90: Water Bird Survey 26/03/18

Count Section: OZL03. (VP3)

Time: 11.31 Tide: Falling

Legend:

- VP3
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:

(F) = Foraging

(R) = Roosting

Species ID Code:

T = Teal

SU = Shelduck

RK = Redshank

BW = Black- tailed Godwit

BH = Black- headed Gull

HG = Herring Gull

MA = Mallard

CU = Curlew

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Date:	Map Reference:
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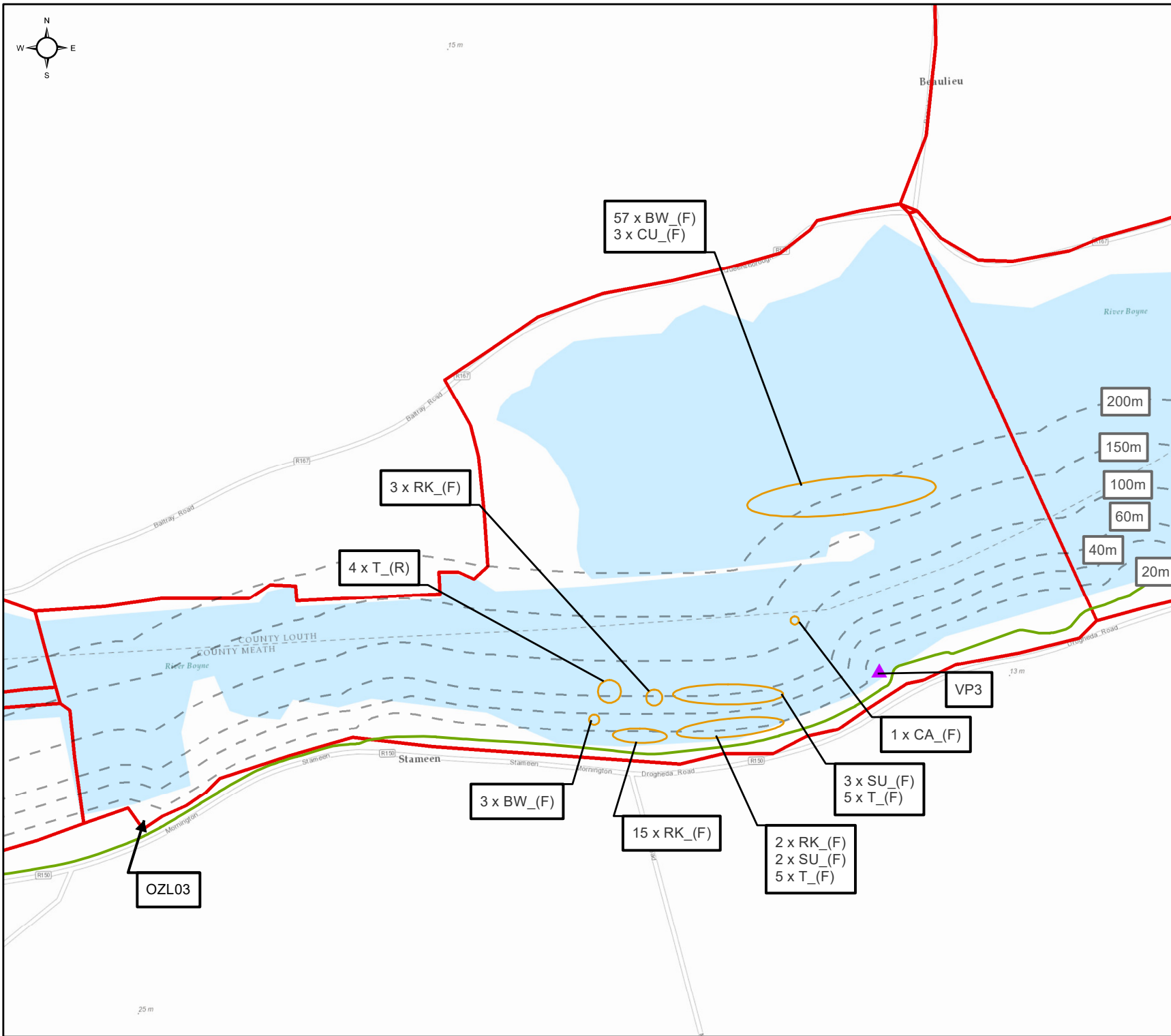
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 40 of 90: Water Bird Survey 26/03/18
Count Section: OZL03. (VP3)
Time: 12.31 Tide: Low

Legend:

- VP3
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting

Species ID Code:
T = Teal
SU = Shelduck
RK = Redshank
BW = Black-tailed Godwit
CU = Curlew
CA = Cormorant
BG = Brent Goose
WN = Wigeon

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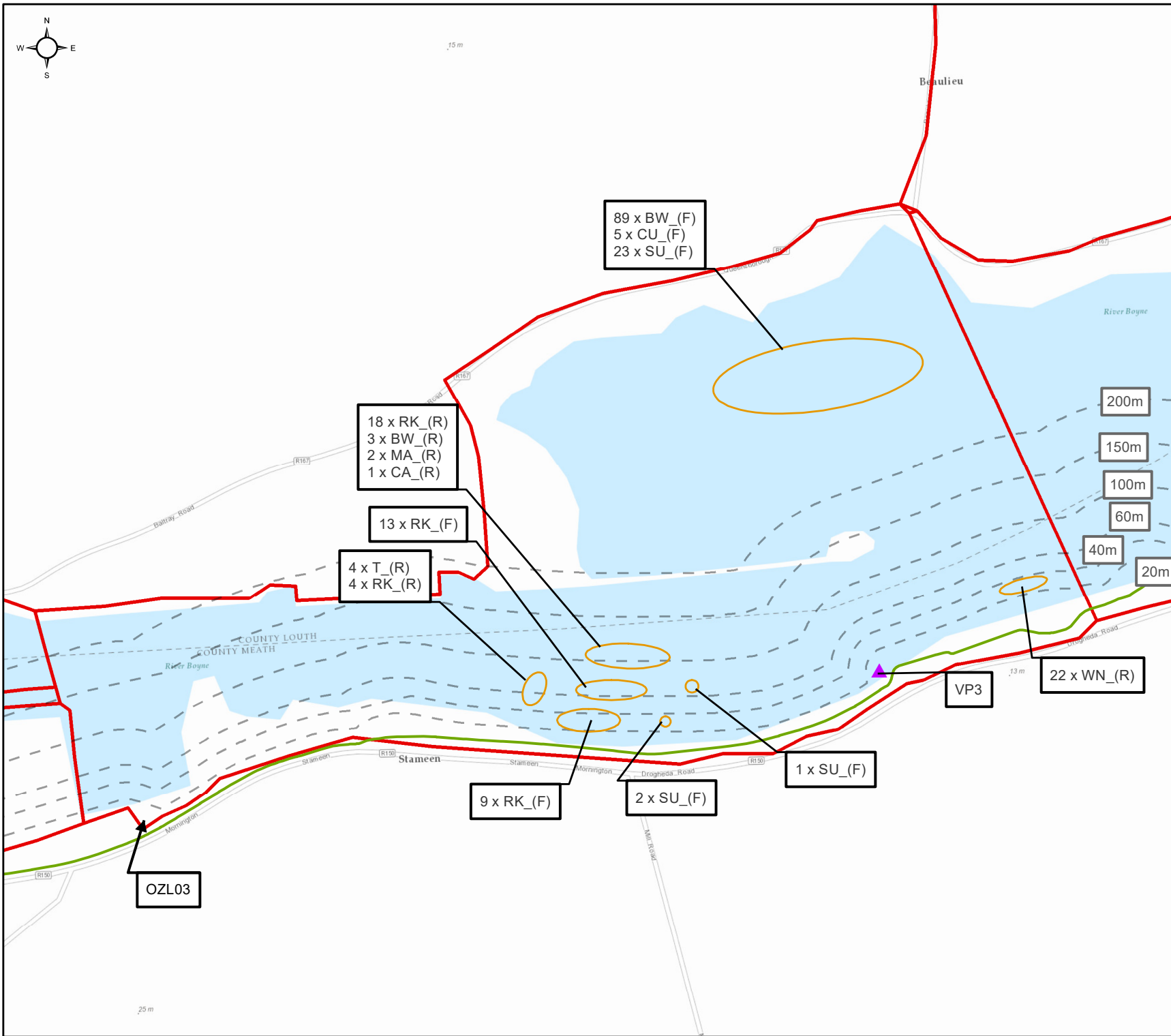
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Date: 07/07/2020	Map Reference: 1101 - AG - 06_040
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 41 of 90: Water Bird Survey 26/03/18
Count Section: OZL03. (VP3)
Time: 13.31 Tide: Low

Legend:

- VP3
- Proposed Cycle Route
- Water Bird Activity Area
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting

Species ID Code:
T = Teal
SU = Shelduck
RK = Redshank
BW = Black-tailed Godwit
CU = Curlew
CA = Cormorant
WN = Wigeon

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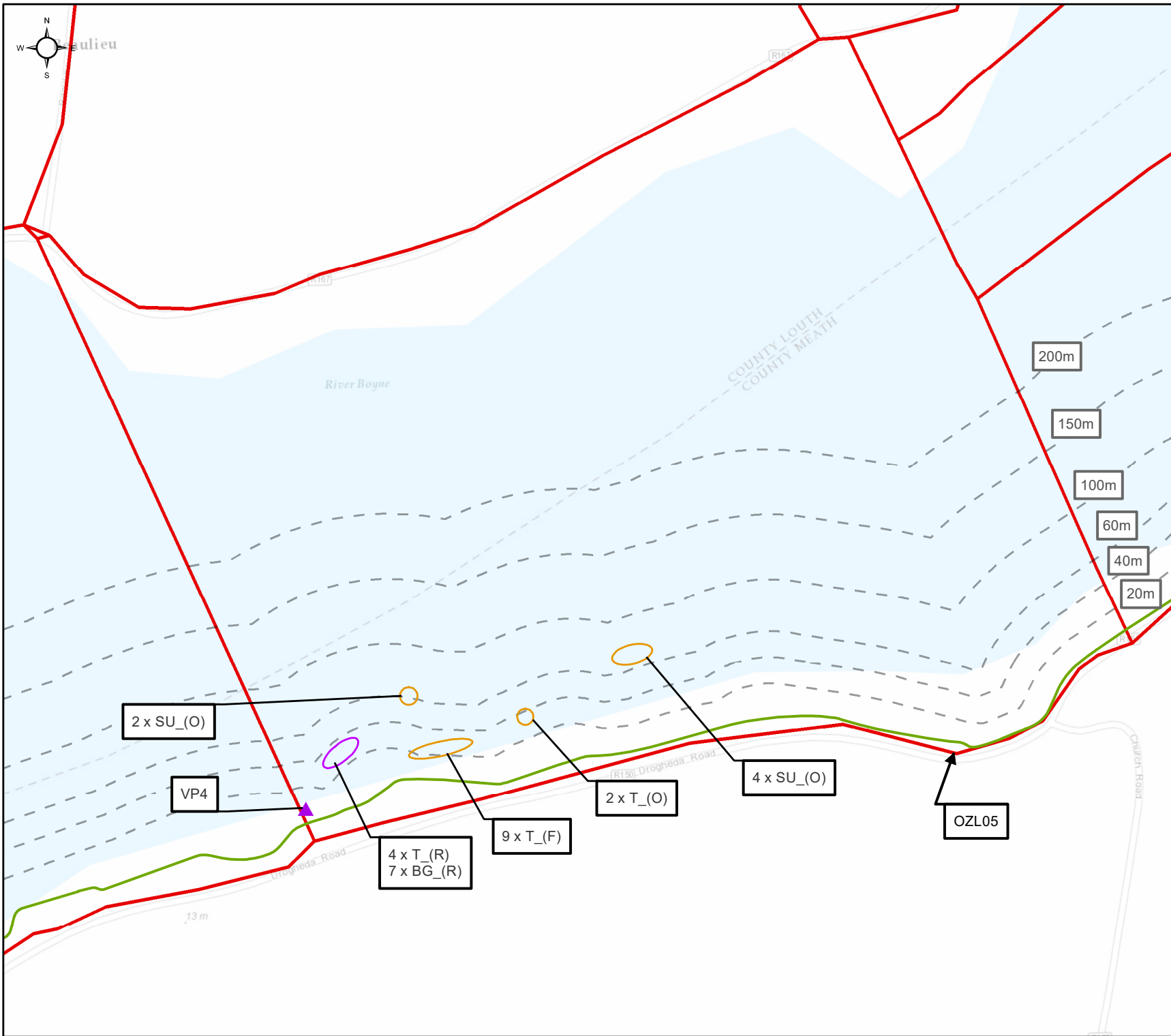
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Date: 07/07/2020	Map Reference: 1101 - AG - 06_041
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 42 of 90 : Water Bird Survey 16/03/18
Count Section: OZL05. (VP4)
Time: 11.00 Tide: High

Legend:

▲ VP4

— Proposed Cycle Route

— High Tide Roost Area

— Water Bird Activity Area

□ Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting
(O) = Other

Species ID Code:
T = Teal
SU = Shelduck
BG = Brent Goose

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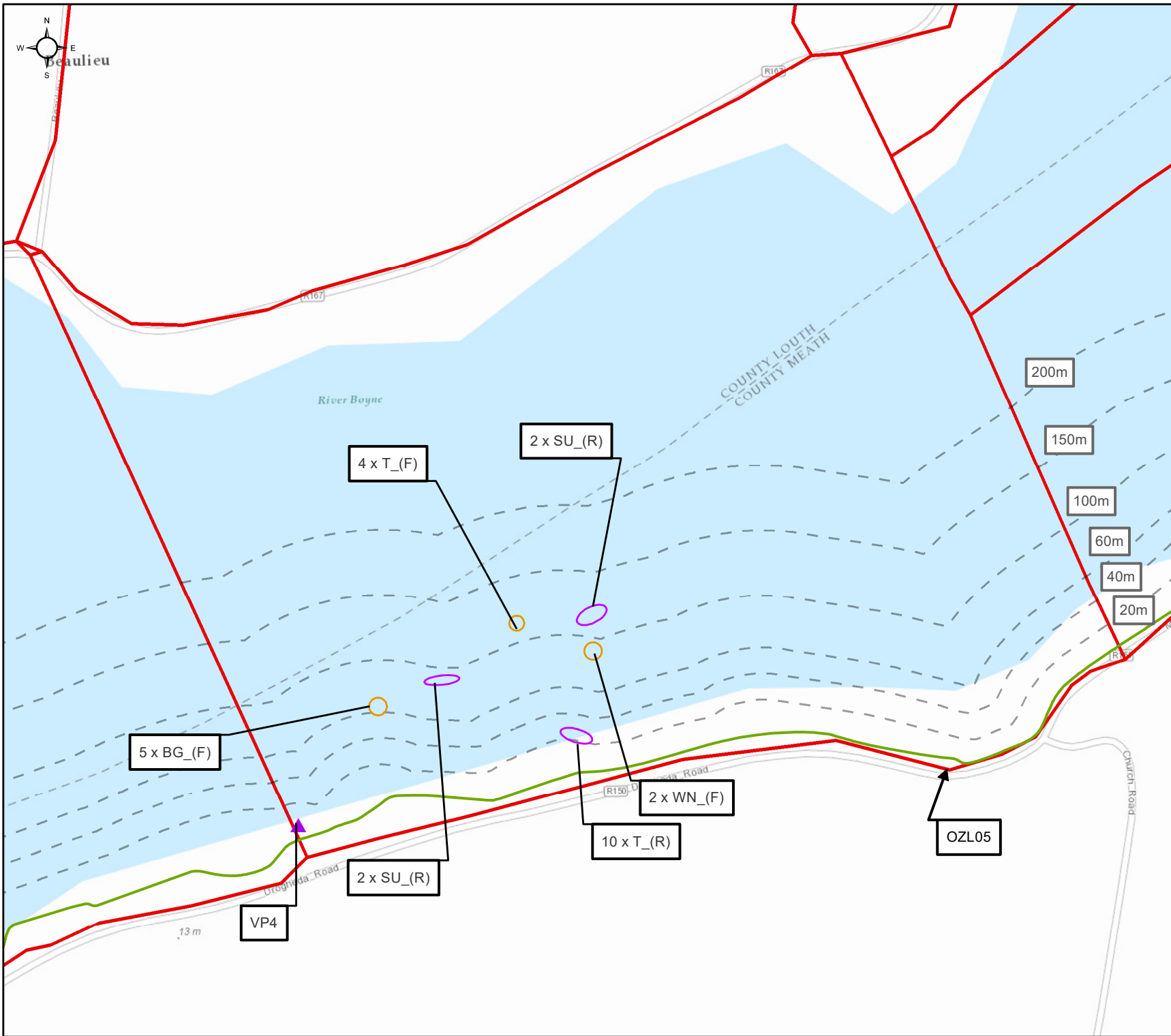
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:

Map 43 of 90: Water Bird Survey 16/03/18

Count Section: OZL05. (VP4)

Time: 12.00 Tide: High

Legend:

- VP4
- High Tide Roost Area
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:

(F) = Foraging

(R) = Roosting

Species ID Code:

T = Teal

SU = Shelduck

BG = Brent Goose

WN = Wigeon

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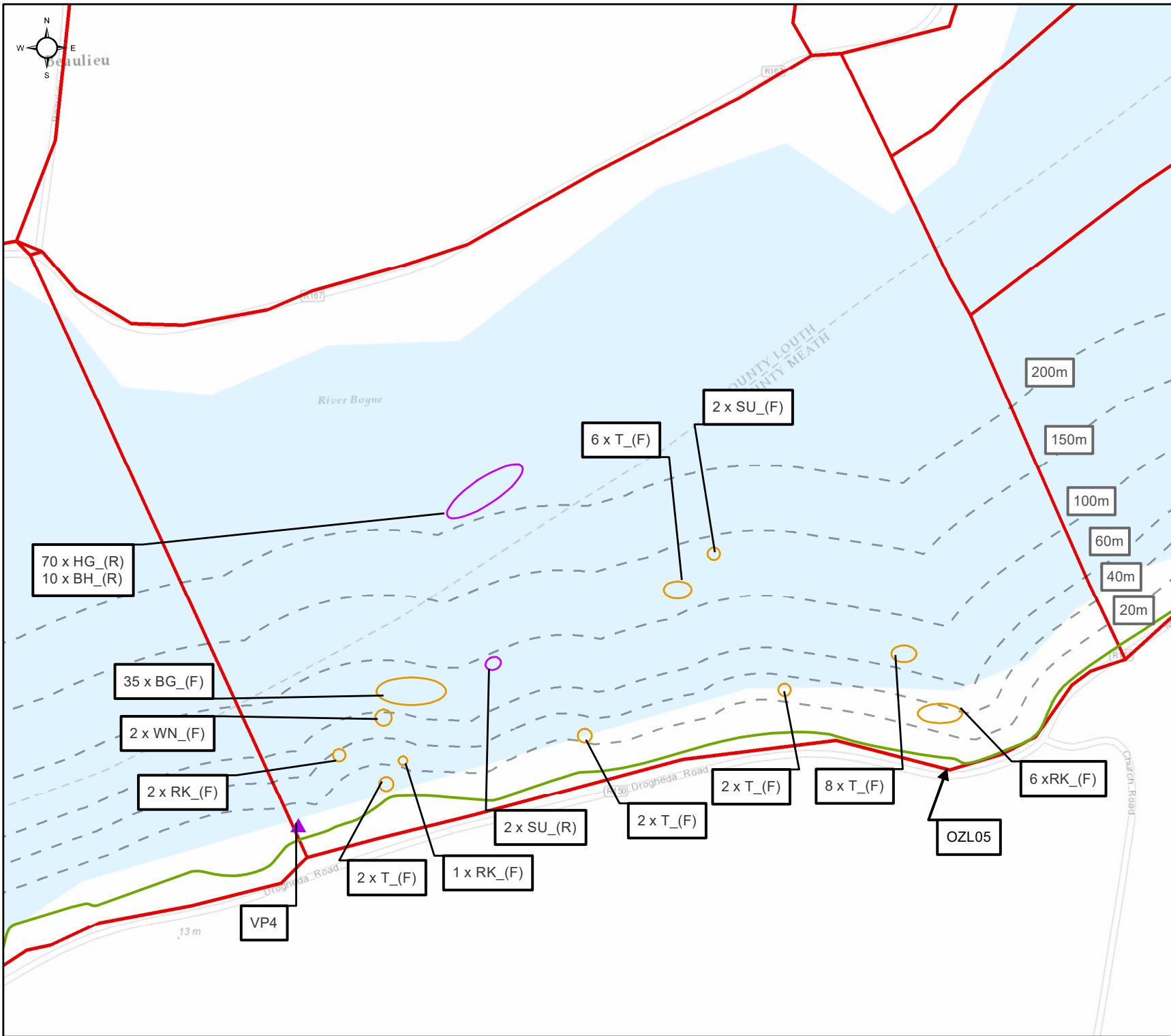
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 44 of 90: Water Bird Survey 16/03/18
Count Section: OZL05. (VP4)
Time: 13.00 Tide: High

Legend:

- VP4
- High Tide Roost Area
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting

Species ID Code:
T = Teal
SU = Shelduck
BG = Brent Goose
RK = Redshank
WN = Wigeon
HG = Herring Gull
BH = Black-headed Gull

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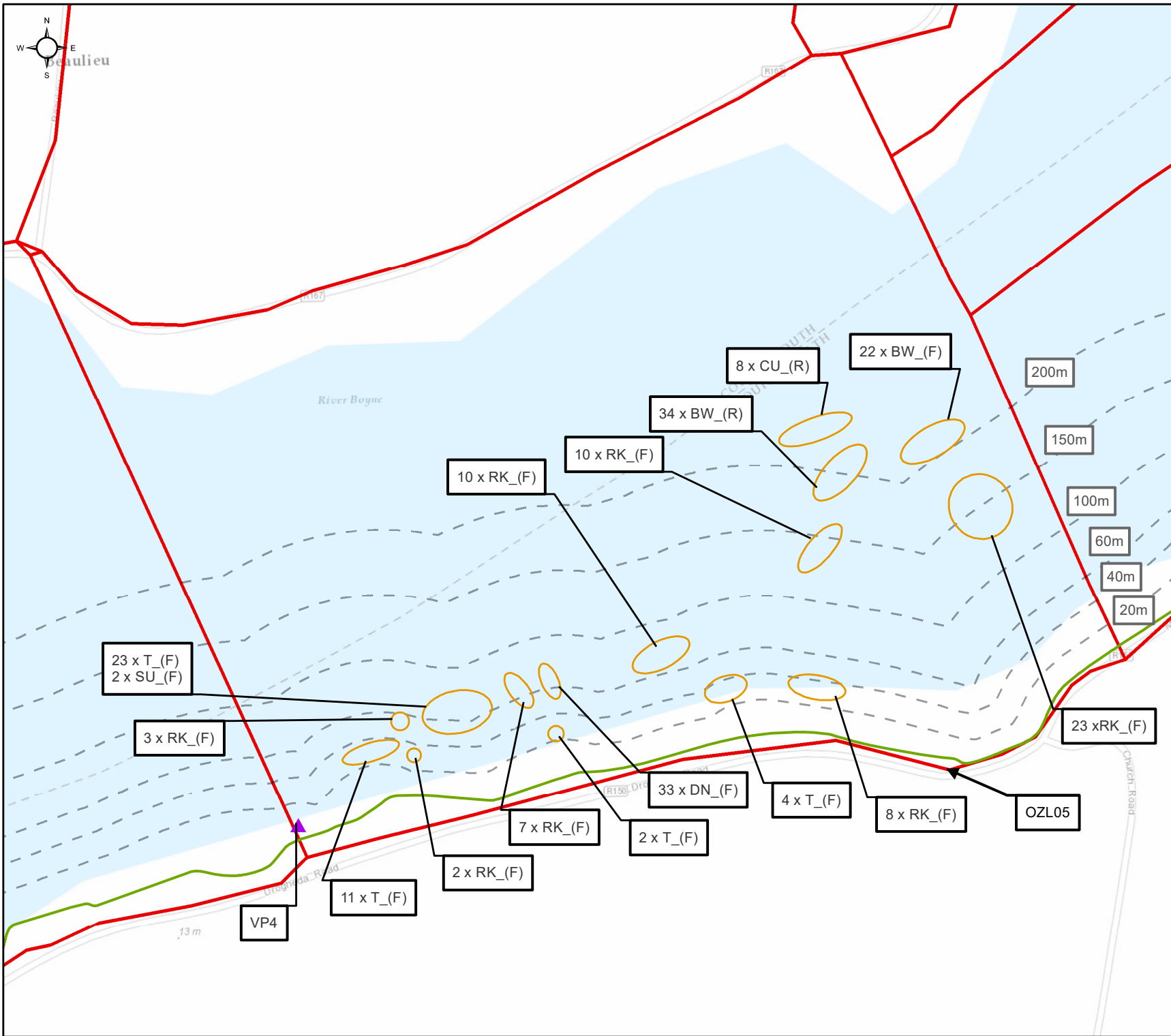
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 45 of 90: Water Bird Survey 16/03/18
Count Section: OZL05. (VP4)
Time: 14.00 Tide: Falling

Legend:

- VP4
- Proposed Cycle Route
- Water Bird Activity Area
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting

Species ID Code:
T = Teal
SU = Shelduck
RK = Redshank
DN = Dunlin
BW = Black-tailed Godwit
CU = Curlew

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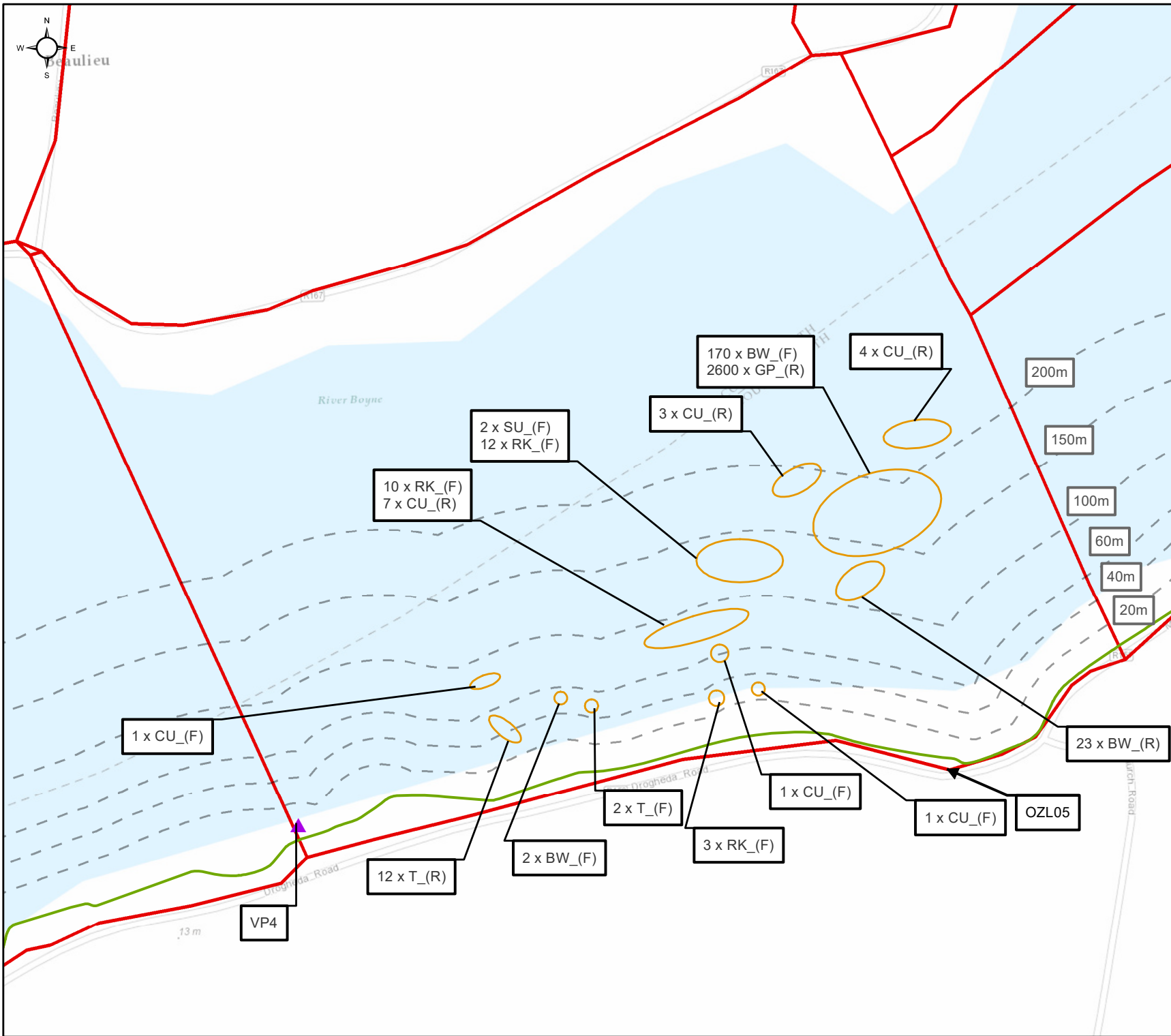
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 46 of 90: Water Bird Survey 16/03/18
Count Section: OZL05. (VP4)
Time: 15.00 Tide: Falling

Legend:

- VP4
- Proposed Cycle Route
- Water Bird Activity Area
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting

Species ID Code:
T = Teal
SU = Shelduck
RK = Redshank
BW = Black-tailed Godwit
CU = Curlew
GP = Golden Plover

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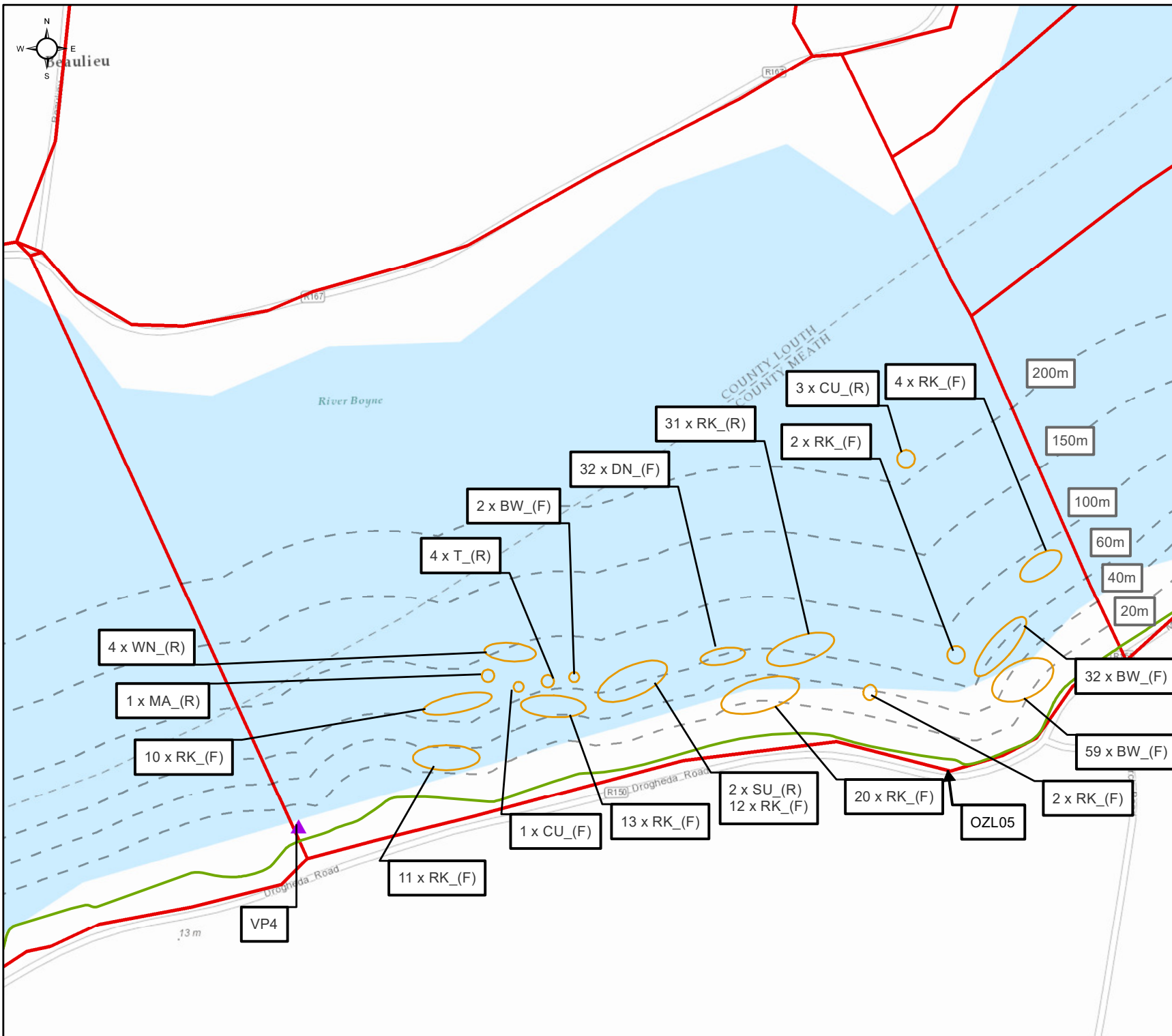
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 47 of 90: Water Bird Survey 16/03/18
Count Section: OZL05. (VP4)
Time: 16.00 Tide: Low

Legend:

VP4

Water Bird Activity Area

Proposed Cycle Route

Count Subsite Boundaries

Activity Code:

(F) = Foraging
(R) = Roosting

Species ID Code:

T = Teal
SU = Shelduck
RK = Redshank
BW = Black-tailed Godwit
CU = Curlew
DN = Dunlin
MA = Mallard
WN = Wigeon

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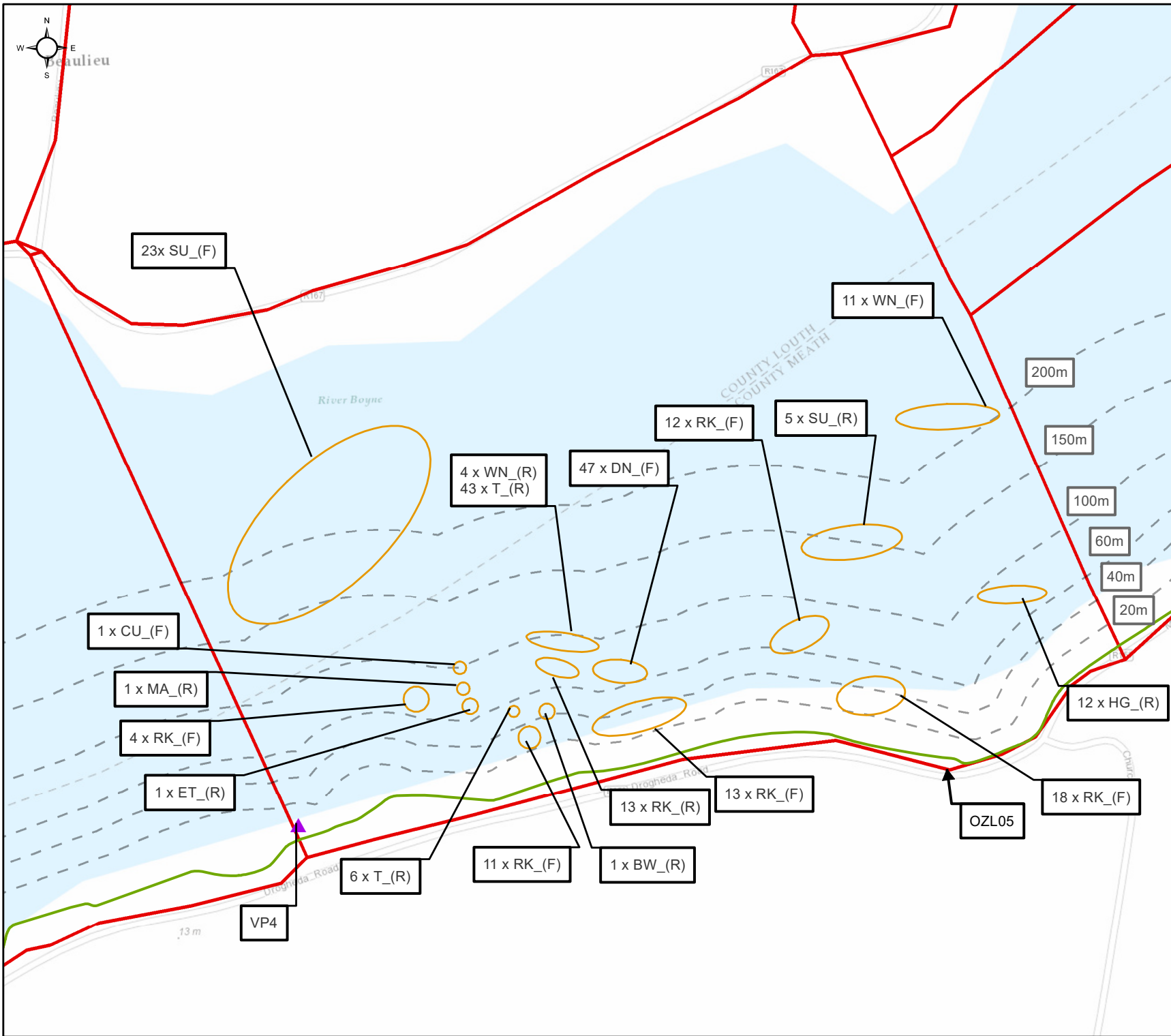
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 48 of 90: Water Bird Survey 16/03/18
Count Section: OZL05. (VP4)
Time: 17.00 Tide: Low

Legend:

VP4

Proposed Cycle Route

Water Bird Activity Area

Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting

Species ID Code:
T = Teal
SU = Shelduck
RK = Redshank
BW = Black-tailed Godwit
CU = Curlew
DN = Dunlin
MA = Mallard
WN = Wigeon
HG = Herring Gull
ET = Little Egret

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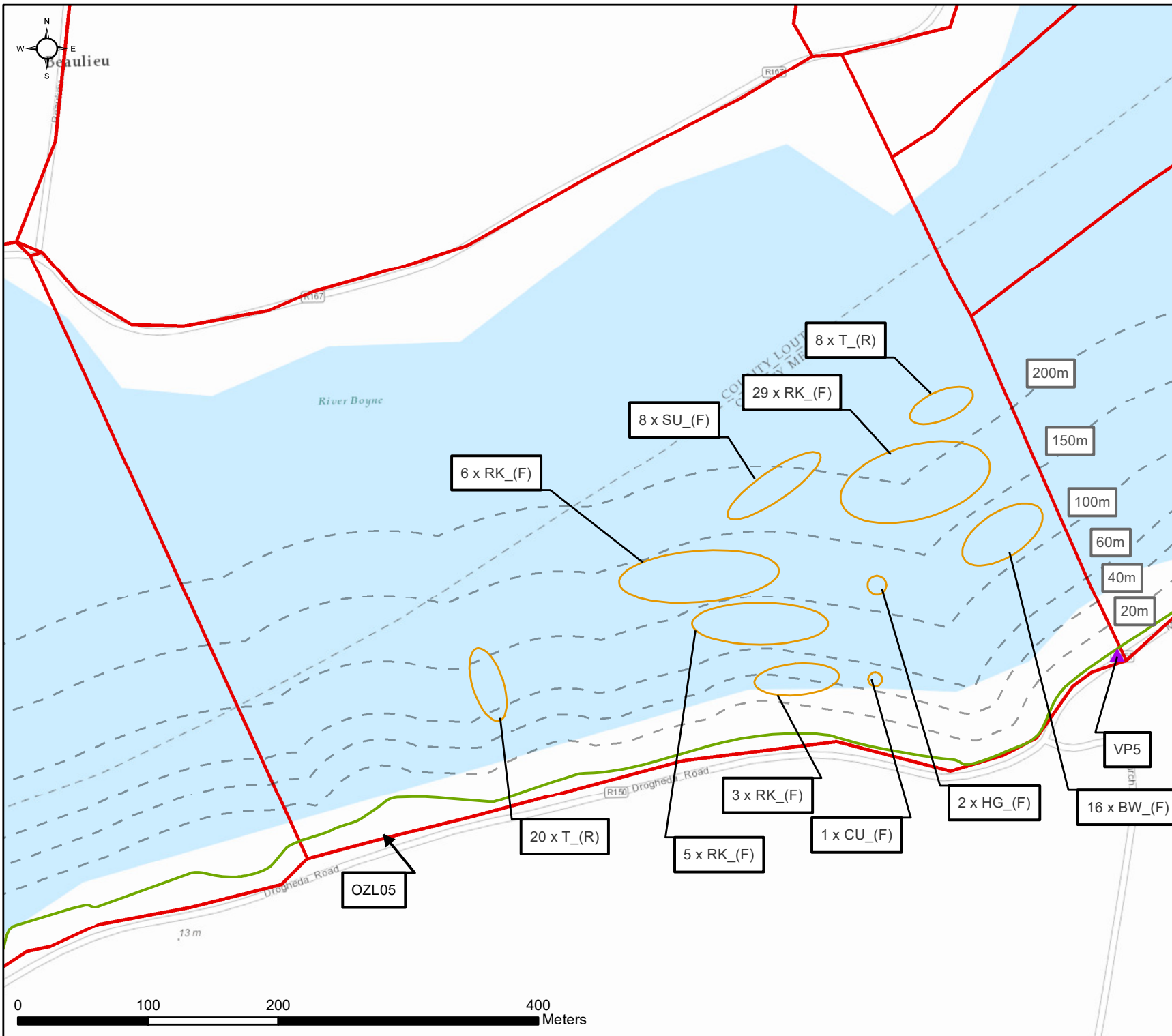
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 49 of 90: Water Bird Survey 08/03/18
Count Section: OZL05. (VP5)
Time: 10.00 Tide: Low

Legend:

VP5

Water Bird Activity Area

Proposed Cycle Route

Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting

Species ID Code:
T = Teal
SU = Shelduck
RK = Redshank
BW = Black-tailed Godwit
CU = Curlew
HG = Herring Gull

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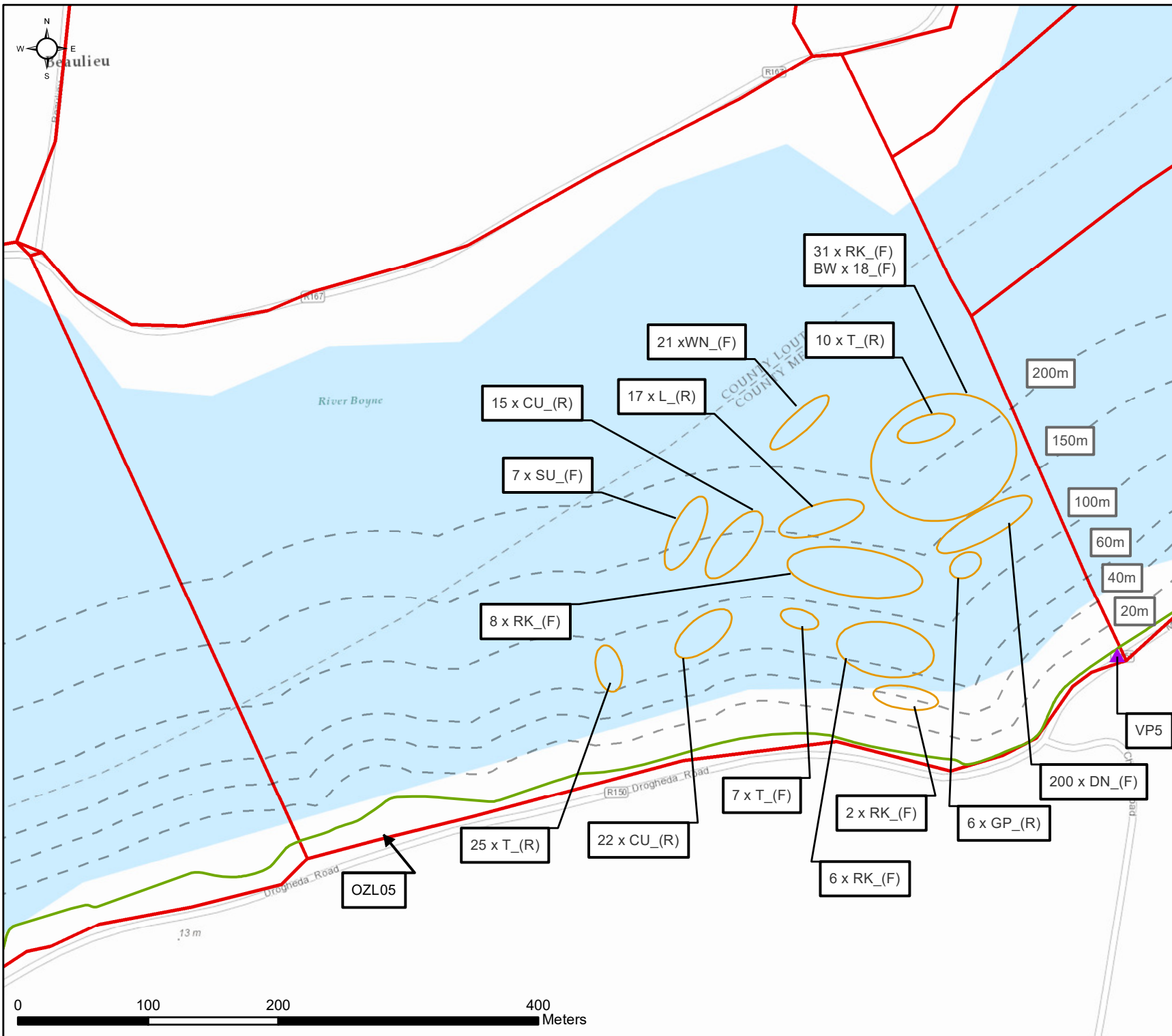
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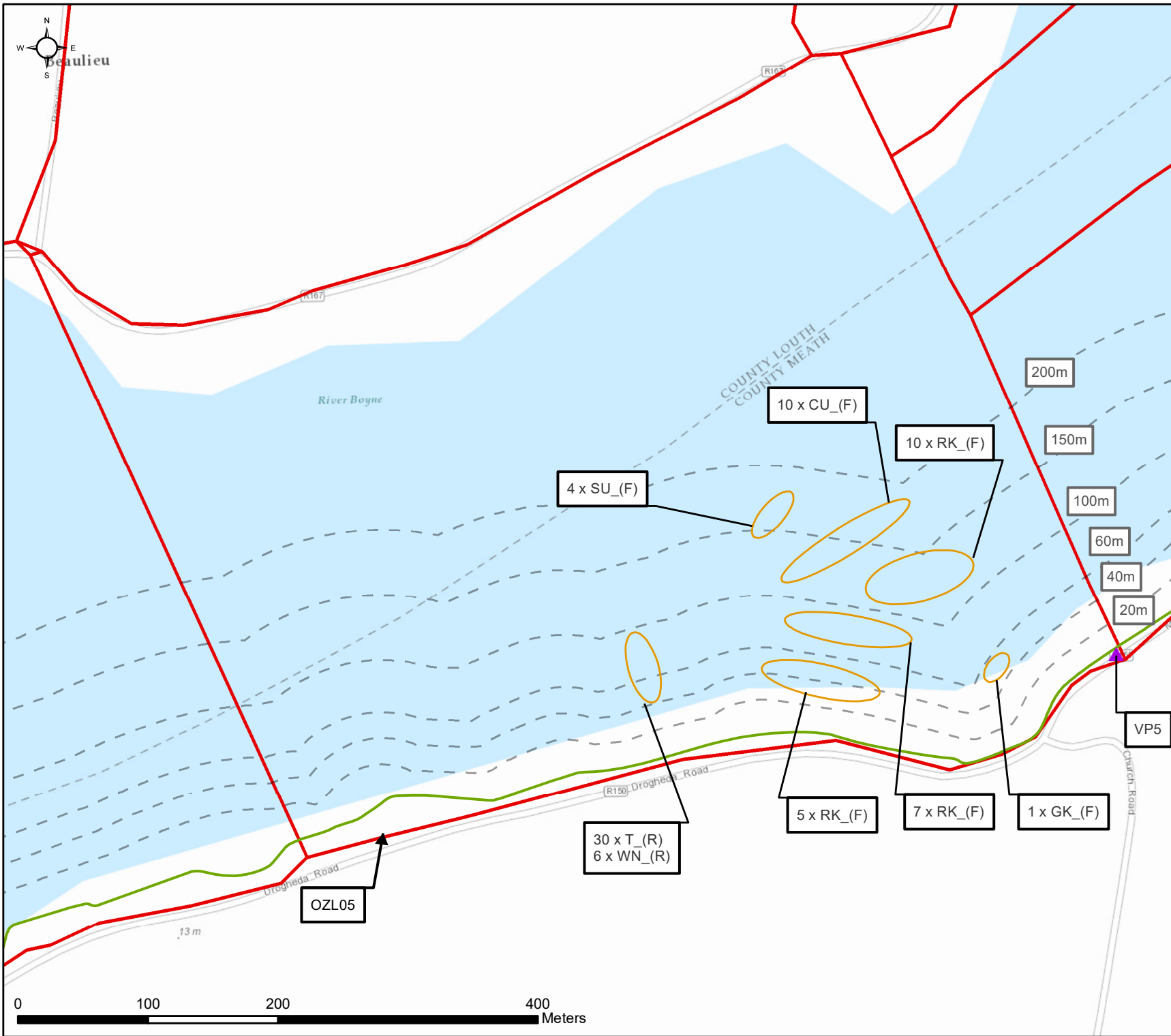
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Client: DBFL		
Project: The Boyne Greenway: Drogheda to Mornington		
Title: Map 50 of 90: Water Bird Survey 08/03/18 Count Section: OZL05. (VP5) Time: 11.00 Tide: Low		
Legend: <ul style="list-style-type: none"> VP5 Proposed Cycle Route Water Bird Activity Area Count Subsite Boundaries 		
Activity Code: (F) = Foraging (R) = Roosting		
Species ID Code: T = Teal SU = Shelduck RK = Redshank BW = Black-tailed Godwit CU = Curlew GP = Golden Plover DU = Dunlin L. = Lapwing WN = Wigeon		
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 51 of 90: Water Bird Survey 08/03/18
Count Section: OZL05. (VP5)
Time: 12.00 Tide: Rising

Legend:

- VP5
- Proposed Cycle Route
- Water Bird Activity Area
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting

Species ID Code:
T = Teal
SU = Shelduck
RK = Redshank
CU = Curlew
WN = Wigeon
GK = Greenshank

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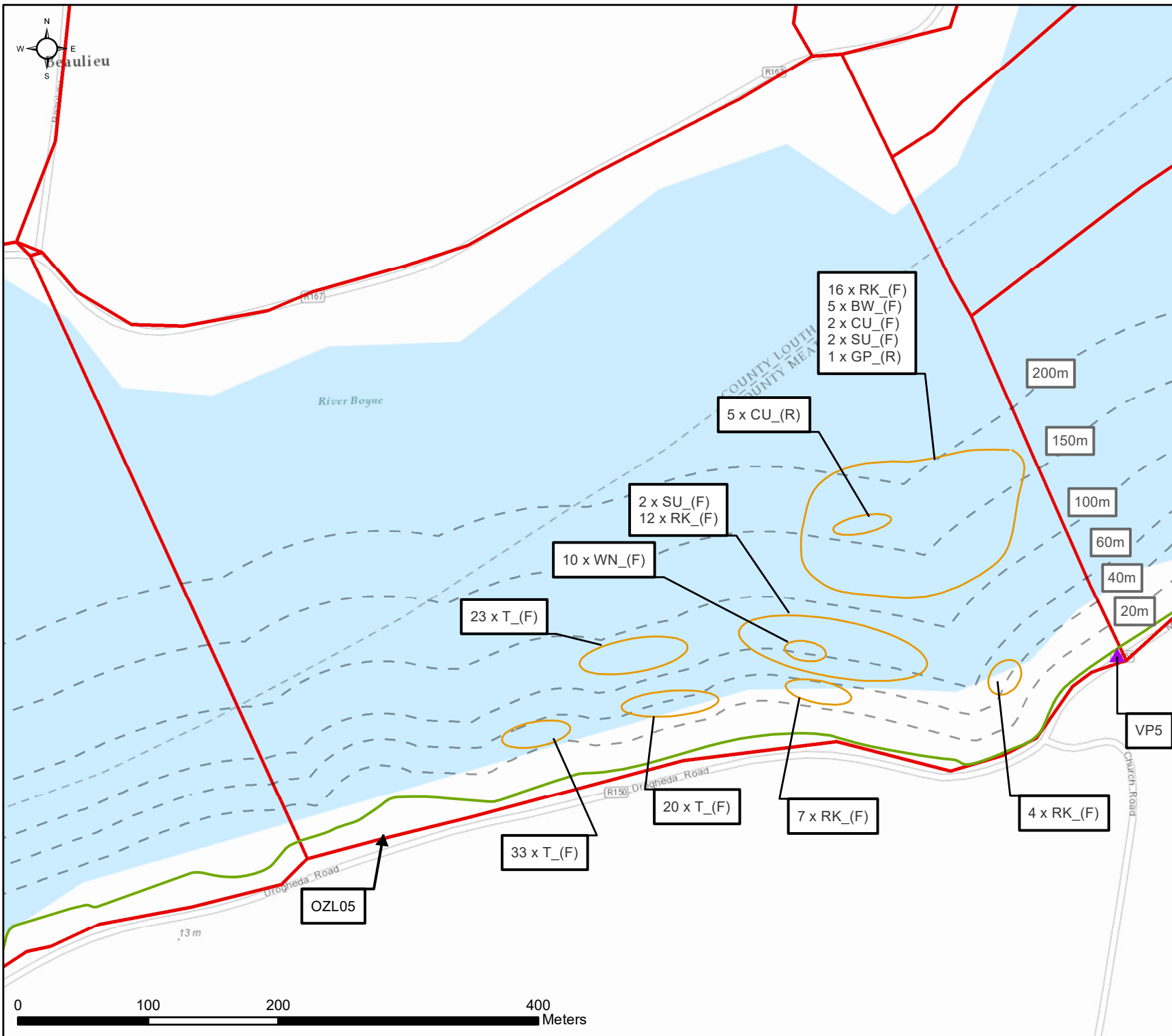
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 52 of 90: Water Bird Survey 08/03/18
Count Section: OZL05. (VP5)
Time: 13.00 Tide: Rising

Legend:

- VP5
- Proposed Cycle Route
- Water Bird Activity Area
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting

Species ID Code:
T = Teal
SU = Shelduck
RK = Redshank
CU = Curlew
BW = Black-tailed Godwit
GP = Golden Plover

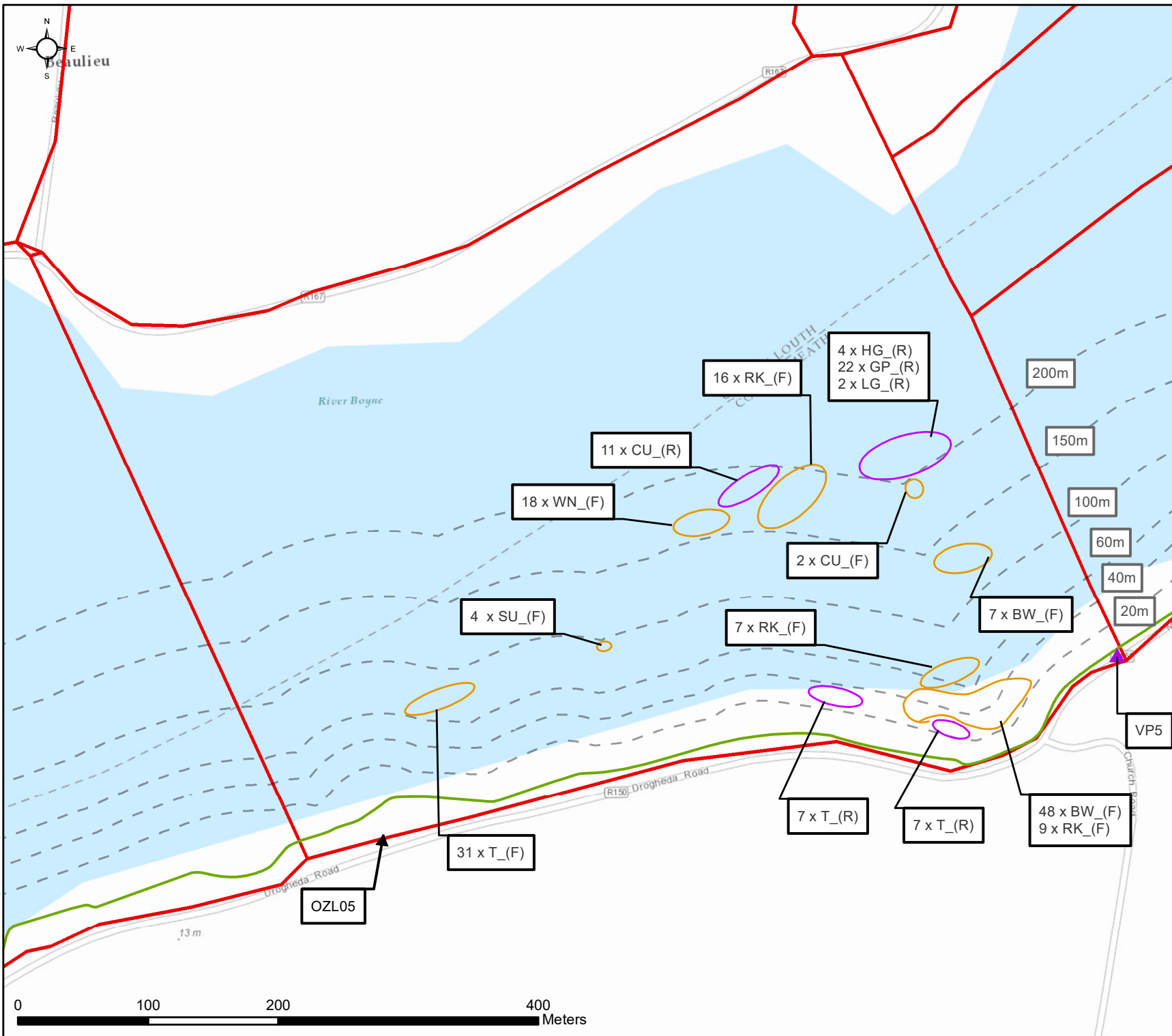
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 53 of 90: Water Bird Survey 08/03/18
Count Section: OZL05. (VP5)
Time: 14.00 Tide: High

Legend:

VP5

High Tide Roost Area

Water Bird Activity Area

Proposed Cycle Route

Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting

Species ID Code:
T = Teal
SU = Shelduck
RK = Redshank
CU = Curlew
WN = Wigeon
BW = Black-tailed Godwit
HG = Herring Gull
L = Lapwing
GP = Golden Plover

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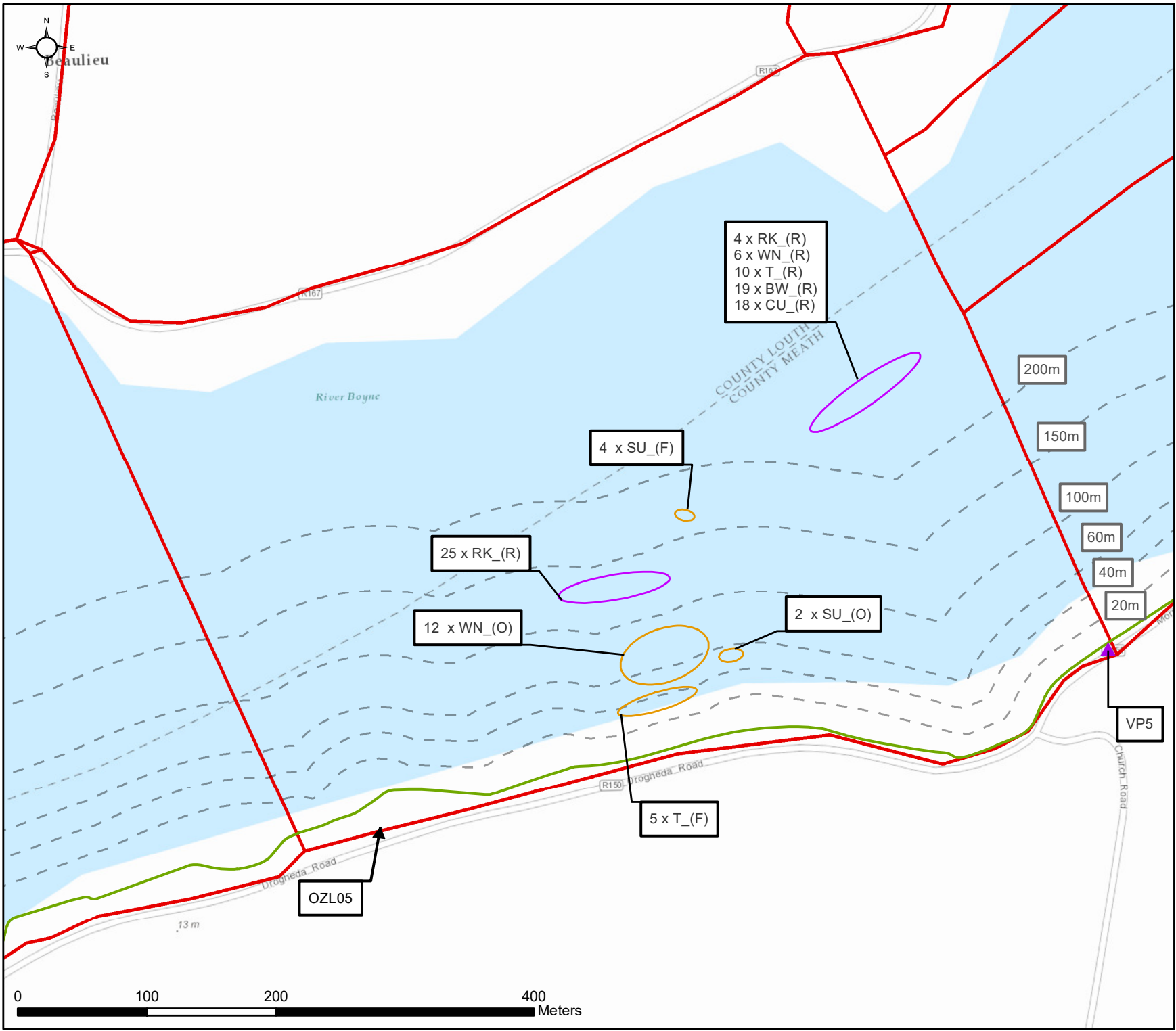
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:

Map 54 of 90: Water Bird Survey 08/03/18
Count Section: OZL05. (VP5)
Time: 15.00 Tide: High

Legend:

- VP5
- Proposed Cycle Route
- High Tide Roost Area
- Water Bird Activity Area
- Count Subsite Boundaries

Activity Code:

(F) = Foraging
(R) = Roosting
(O) = Other

Species ID Code:

T = Teal
SU = Shelduck
RK = Redshank
CU = Curlew
WN = Wigeon
BW = Black-tailed Godwit

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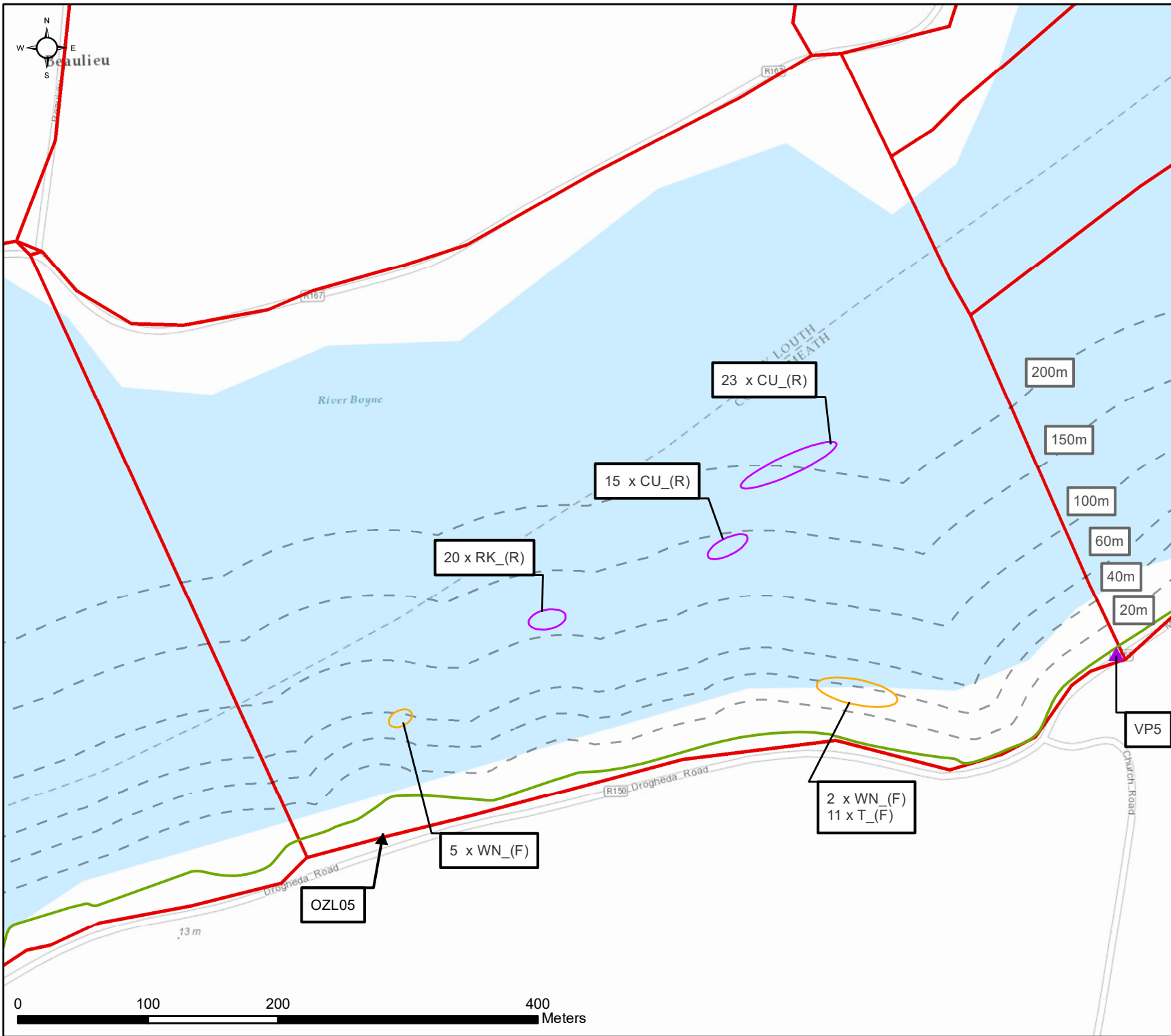
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 55 of 90: Water Bird Survey 08/03/18
Count Section: OZL05. (VP5)
Time: 16.00 Tide: High

Legend:

- VP5
- Proposed Cycle Route
- Water Bird Activity Area
- High Tide Roost Area
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting

Species ID Code:
T = Teal
RK = Redshank
CU = Curlew
WN = Wigeon

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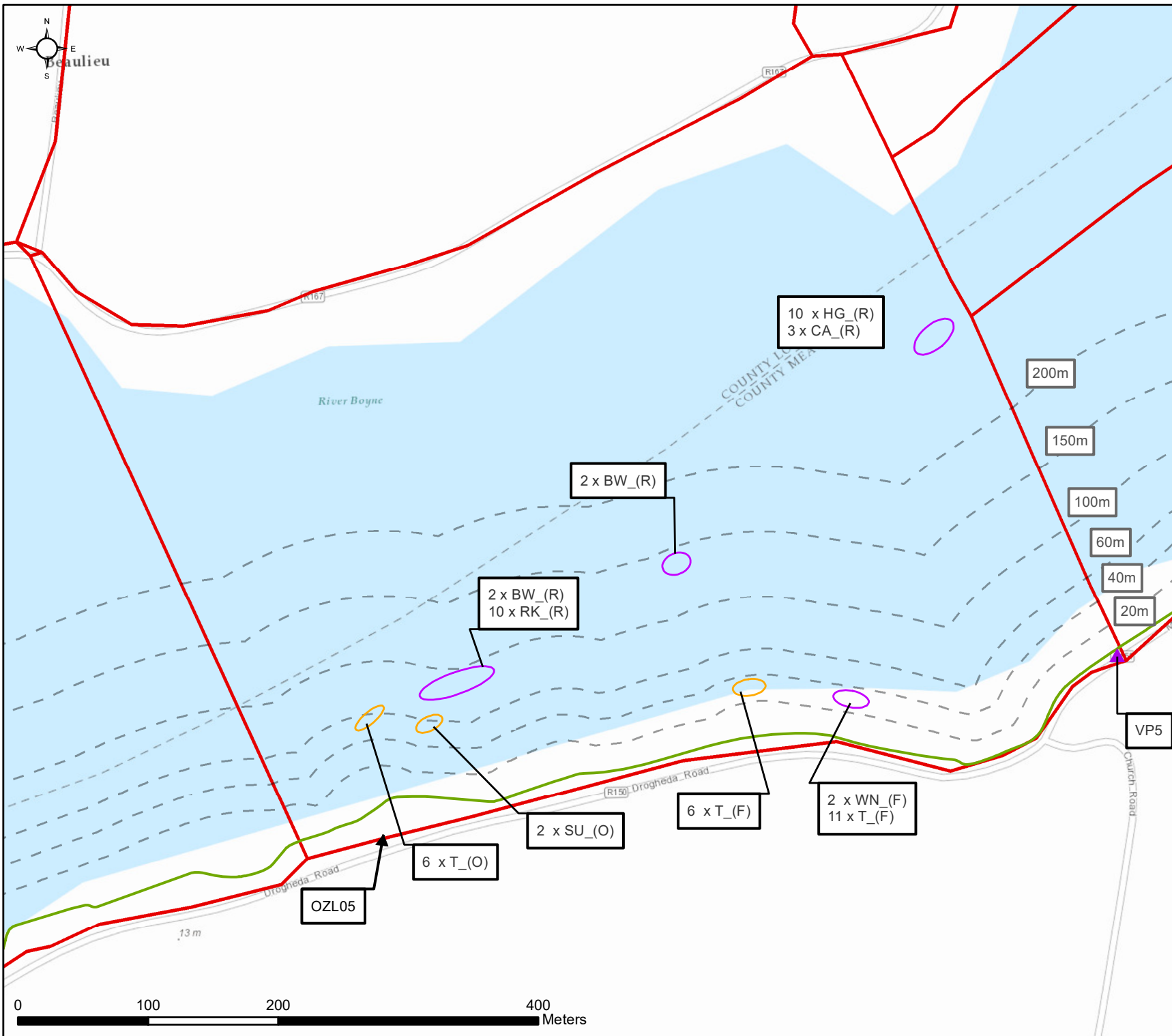
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 56 of 90: Water Bird Survey 29/03/18
Count Section: OZL05. (VP5)
Time: 10.55 Tide: High

Legend:

- VP5
- High Tide Roost Area
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting
(O) = Other

Species ID Code:
T = Teal
RK = Redshank
SU = Shelduck
BW = Black-tailed Godwit
HG = Herring Gull
CA = Cormorant

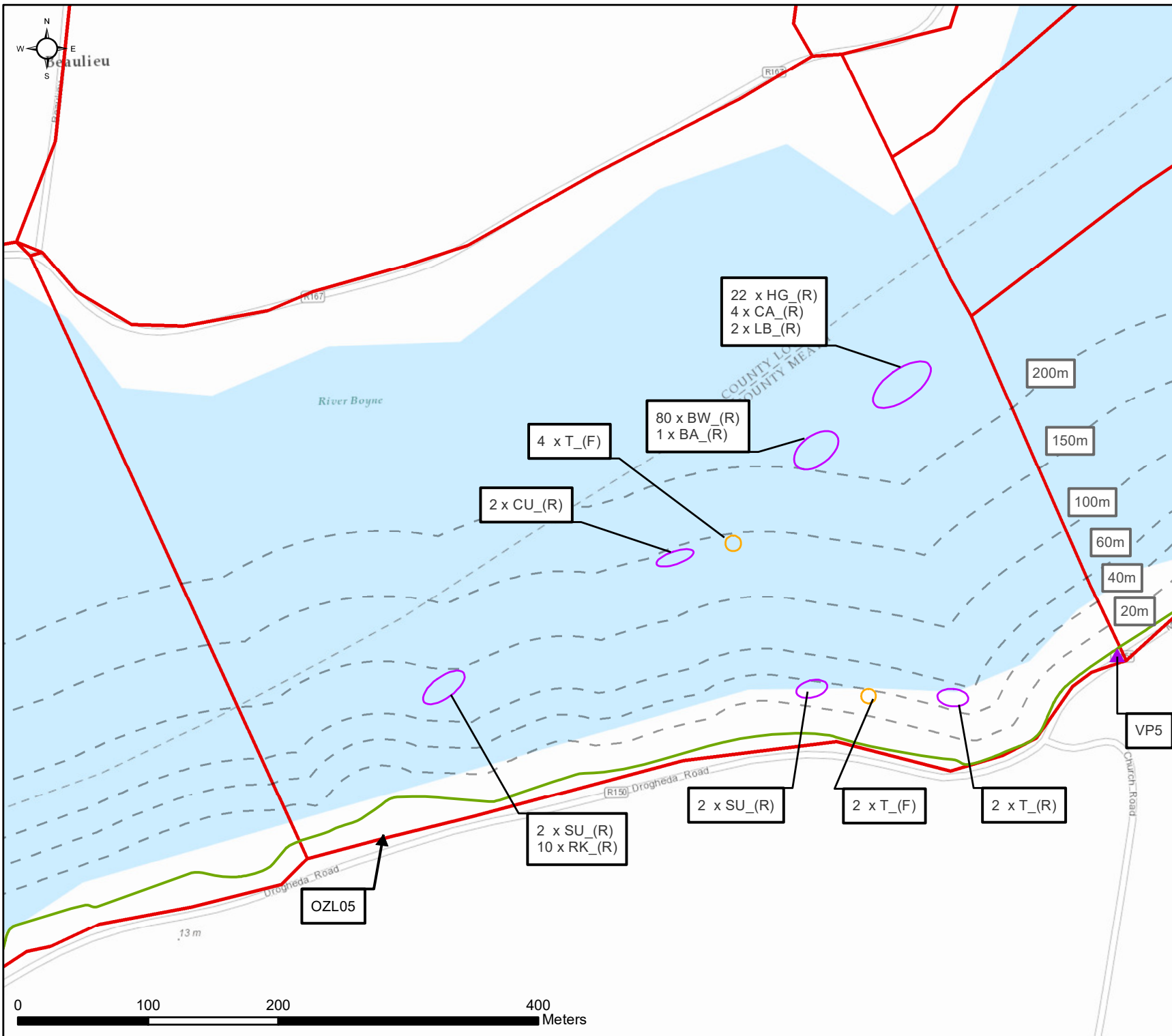
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:

Map 57 of 90: Water Bird Survey 29/03/18
Count Section: OZL05. (VP5)
Time: 11.55 Tide: High

Legend:

- VP5
- High Tide Roost Area
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:

(F) = Foraging
(R) = Roosting

Species ID Code:

T = Teal
RK = Redshank
SU = Shelduck
BW = Black-tailed Godwit
HG = Herring Gull
CA = Cormorant
CU = Curlew
LB = Lesser Black-backed Gull

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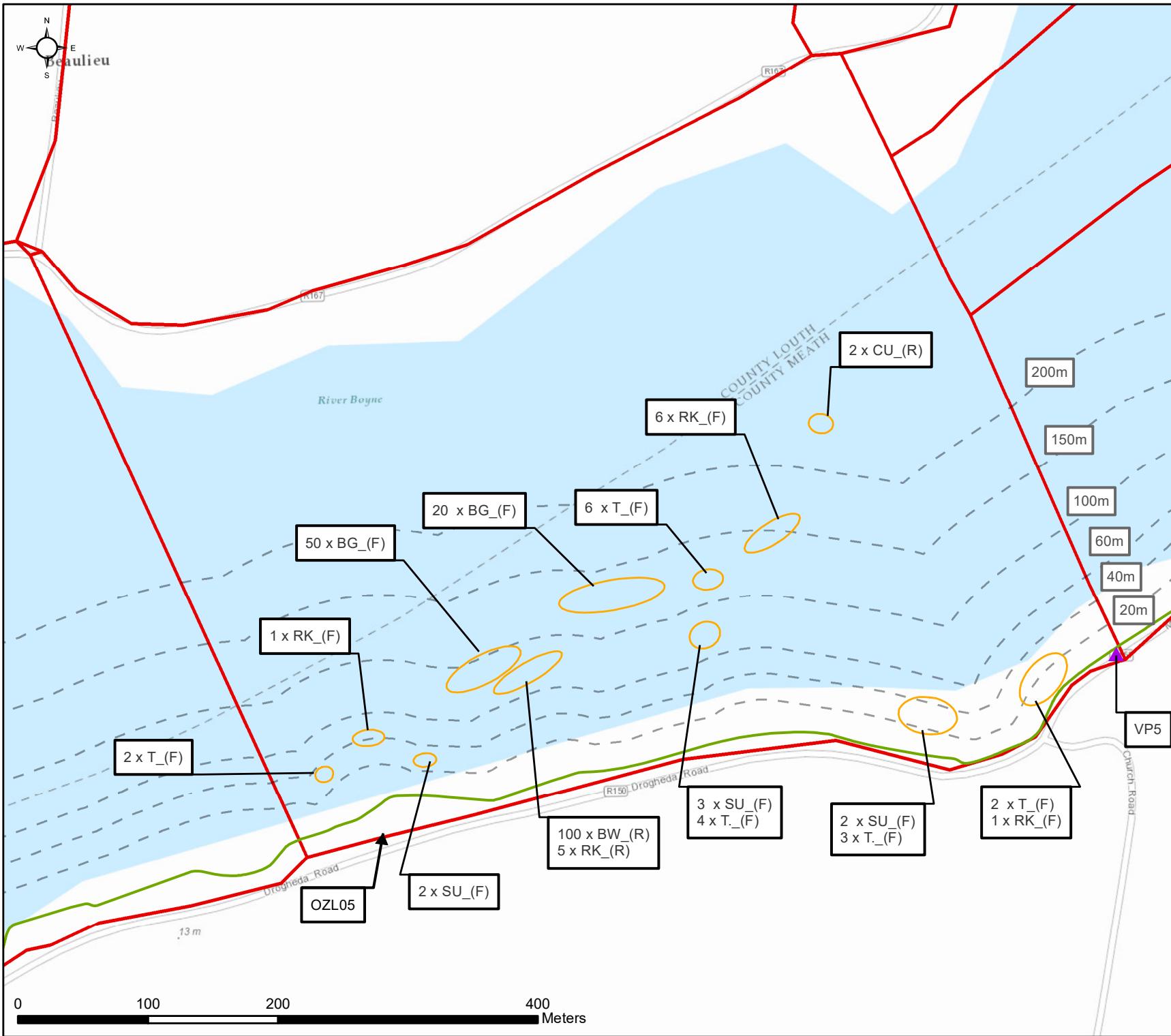
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 58 of 90: Water Bird Survey 29/03/18
Count Section: OZL05. (VP5)
Time: 12.55 Tide: Falling

Legend:

- VP5
- Proposed Cycle Route
- Water Bird Activity Area
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting

Species ID Code:
T = Teal
RK = Redshank
SU = Shelduck
BW = Black-tailed Godwit
CU = Curlew
BA = Bar-tailed Godwit
BG = Brent Goose

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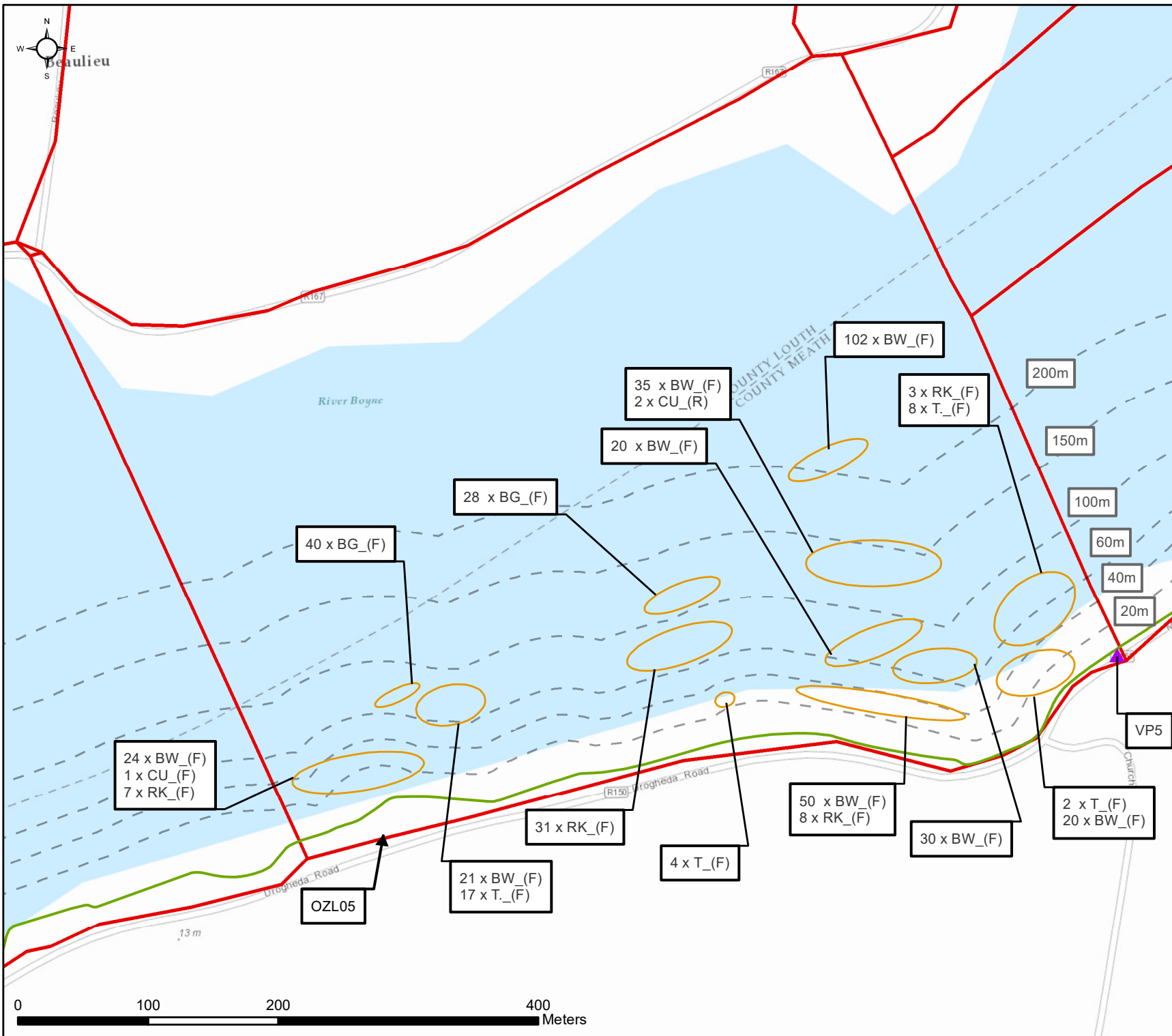
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 59 of 90: Water Bird Survey 29/03/18
Count Section: OZL05. (VP5)
Time: 13.55 Tide: Falling

Legend:

- VP5
- Proposed Cycle Route
- Water Bird Activity Area
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting

Species ID Code:
T = Teal
RK = Redshank
SU = Shelduck
BW = Black-tailed Godwit
CU = Curlew
BG = Brent Goose

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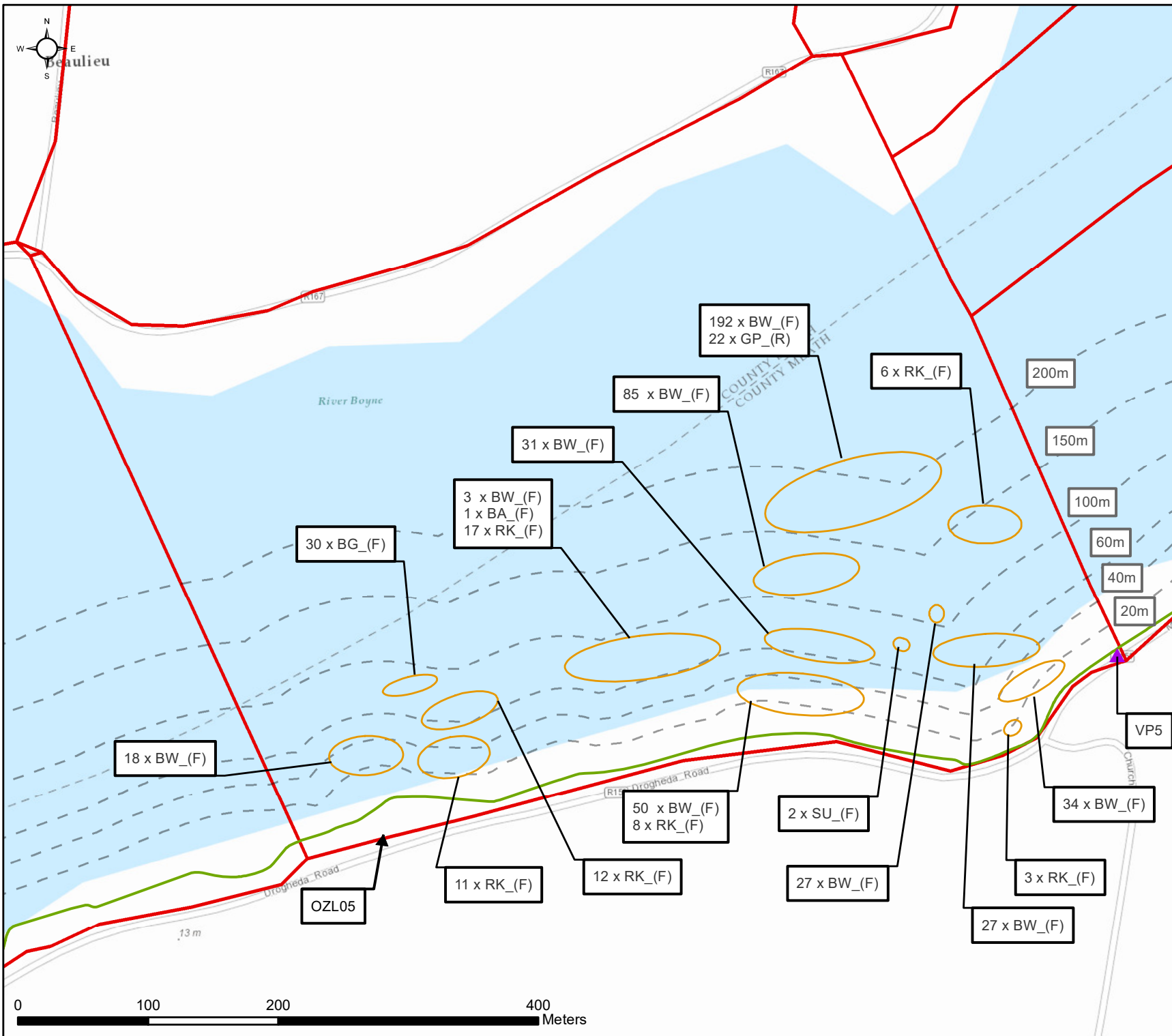
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Date: 07/07/2020	Map Reference: 1101 - AG - 06_059
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:

Map 60 of 90: Water Bird Survey 29/03/18

Count Section: OZL05. (VP5)

Time: 14.55 Tide: Falling

Legend:

- VP5
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:

(F) = Foraging

(R) = Roosting

Species ID Code:

T = Teal

RK = Redshank

SU = Shelduck

BW = Black-tailed Godwit

BG = Brent Goose

BA = Bar-tailed Godwit

GP = Golden Plover

HG = Herring Gull

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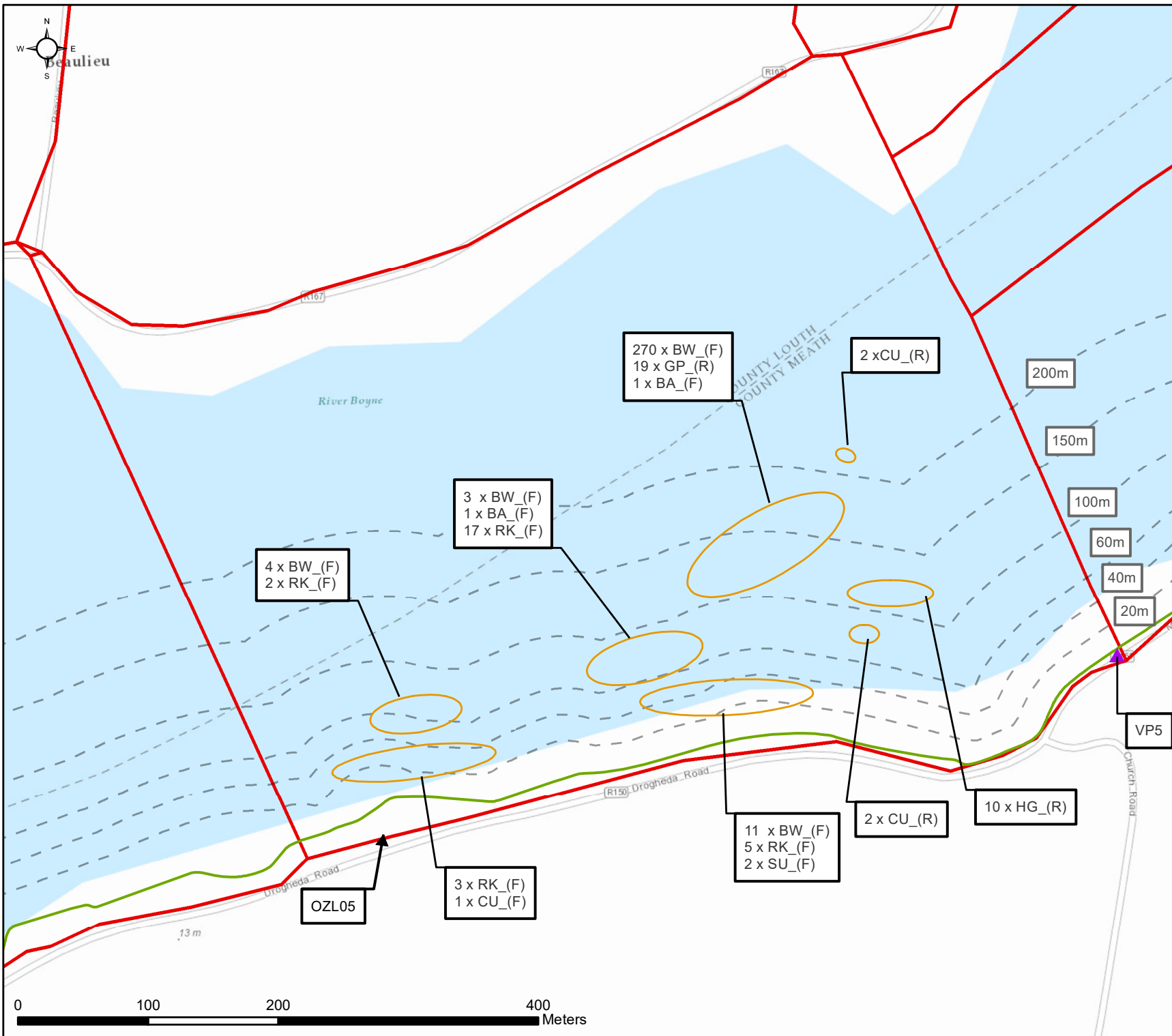
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Date:	Map Reference:
07/07/2020	1101 - AG - 06_060

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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 61 of 90: Water Bird Survey 29/03/18
Count Section: OZL05. (VP5)
Time: 15.55 Tide: Low

Legend:

- VP5
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting

Species ID Code:
RK = Redshank
SU = Shelduck
BW = Black-tailed Godwit
BA = Bar-tailed Godwit
GP = Golden Plover
HG = Herring Gull
CU = Curlew

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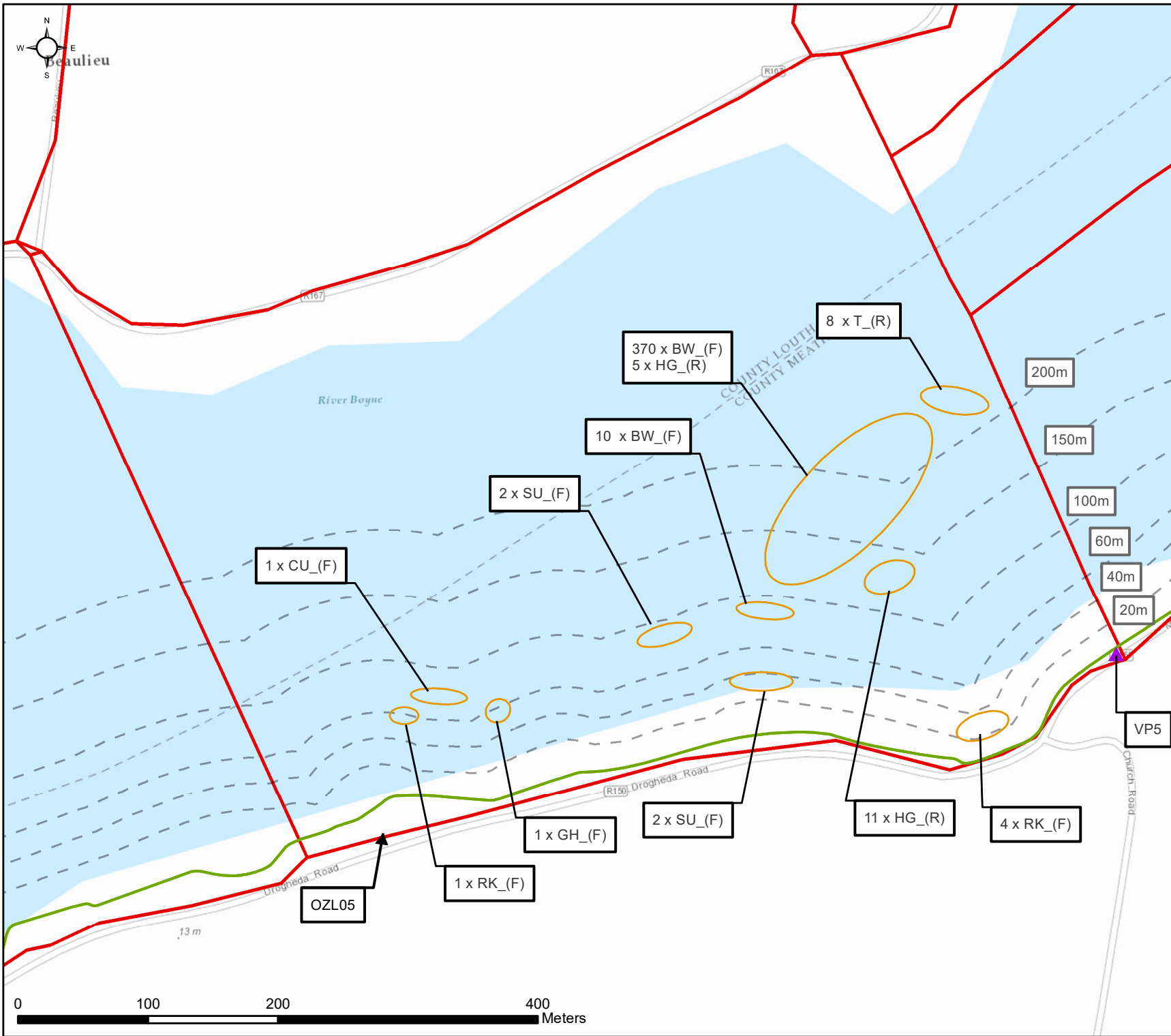
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
map 62 of 90: Water Bird Survey 29/03/18
Count Section: OZL05. (VP5)
Time: 16.55 Tide: Low

Legend:

- VP5
- Proposed Cycle Route
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting

Species ID Code:
RK = Redshank
SU = Shelduck
BW = Black-tailed Godwit
HG = Herring Gull
CU = Curlew
H. = Grey Heron
T. = Teal

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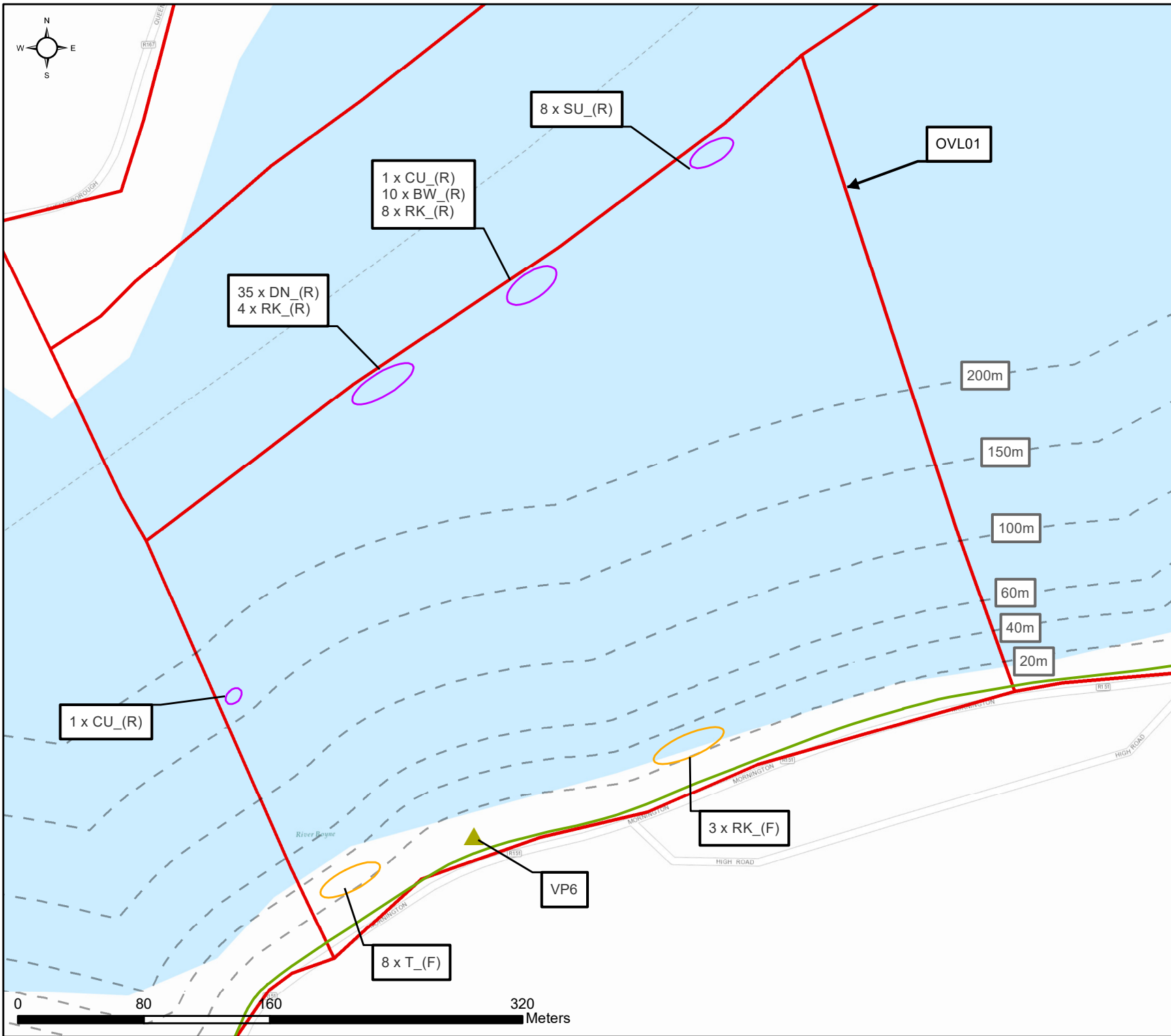
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 63 of 90 : Water Bird Survey 12/03/18
Count Section: OVL01. (VP6)
Time: 07.57 Tide: High

Legend:

- VP6
- Proposed Cycle
- High Tide Roost Area
- Water Bird Activity Area
- Count Subsite

Activity Code:
(F) = Foraging
(R) = Roosting

Species ID Code:
RK = Redshank
SU = Shelduck
BW = Black-tailed Godwit
CU = Curlew
T. = Teal
DN = Dunlin

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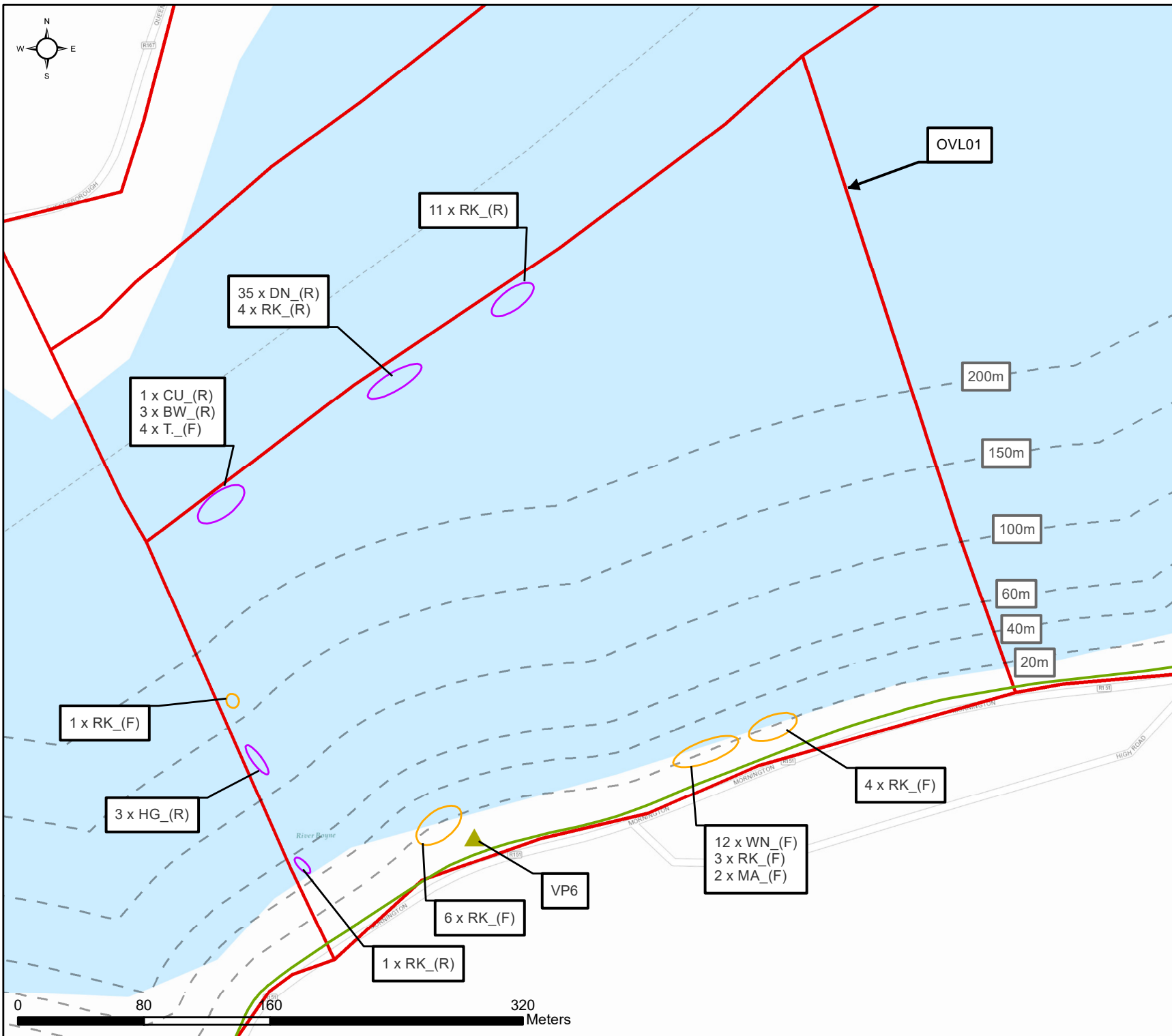
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 64 of 90: Water Bird Survey 12/03/18
Count Section: OVL01. (VP6)
Time: 08.57 Tide: High

Legend:

- VP6
- High Tide Roost Area
- Water Bird Activity Area
- Proposed Cycle
- Count Subsite

Activity Code:
(F) = Foraging
(R) = Roosting

Species ID Code:
RK = Redshank
SU = Shelduck
BW = Black-tailed Godwit
CU = Curlew
T. = Teal
DN = Dunlin

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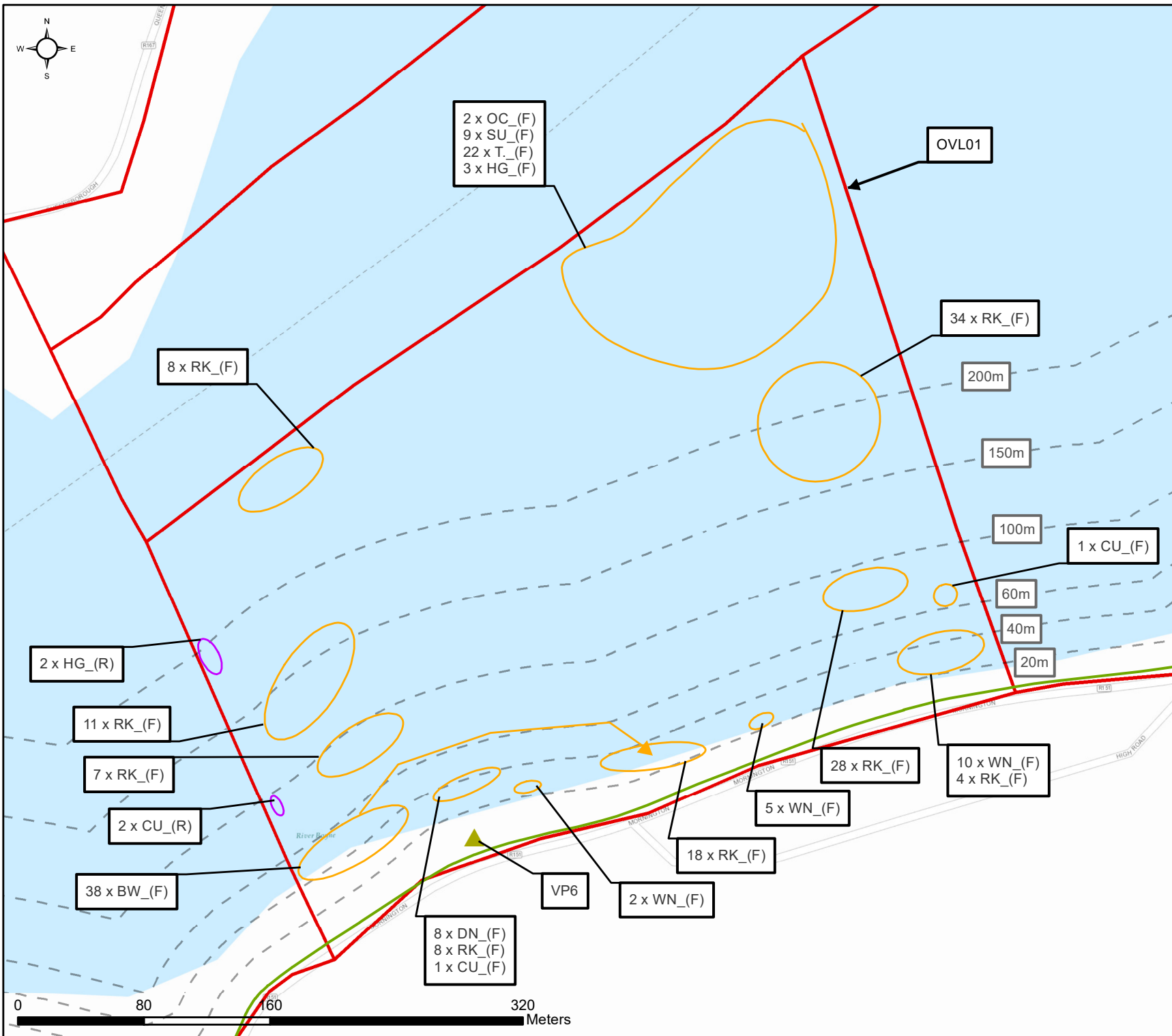
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 65 of 90: Water Bird Survey 12/03/18
Count Section: OVL01. (VP6)
Time: 09.57 Tide: Falling

Legend:

- ▲ VP6
- High Tide Roost Areas
- Water Bird Activity Areas
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:

(F) = Foraging
(R) = Roosting

Species ID Code:

RK = Redshank
SU = Shelduck
BW = Black-tailed Godwit
CU = Curlew
T. = Teal
DN = Dunlin
WN = Wigeon
HG = Herring Gull
OC = Oystercatcher

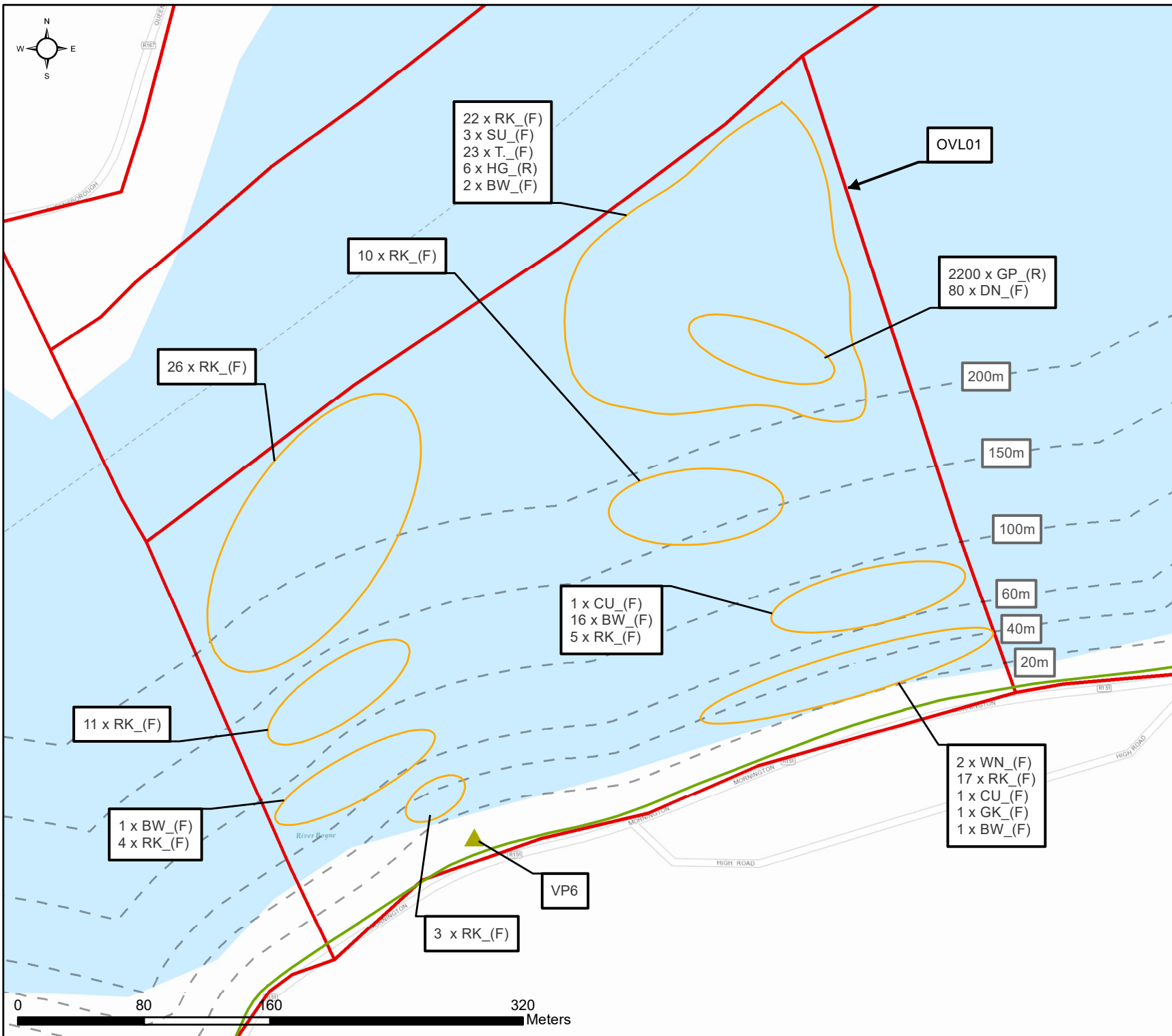
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:

Map 66 of 90: Water Bird Survey 12/03/18
Count Section: OVL01. (VP6)
Time: 10.57 Tide: Falling

Legend:

- ▲ VP6
- Proposed Cycle Route
- Water Bird Activity Area
- Count Subsite Boundaries

Activity Code:

(F) = Foraging
(R) = Roosting

Species ID Code:

RK = Redshank
SU = Shelduck
BW = Black-tailed Godwit
CU = Curlew
T. = Teal
DN = Dunlin
WN = Wigeon
GK = Greenshank
HG = Herring Gull
GP = Golden Plover

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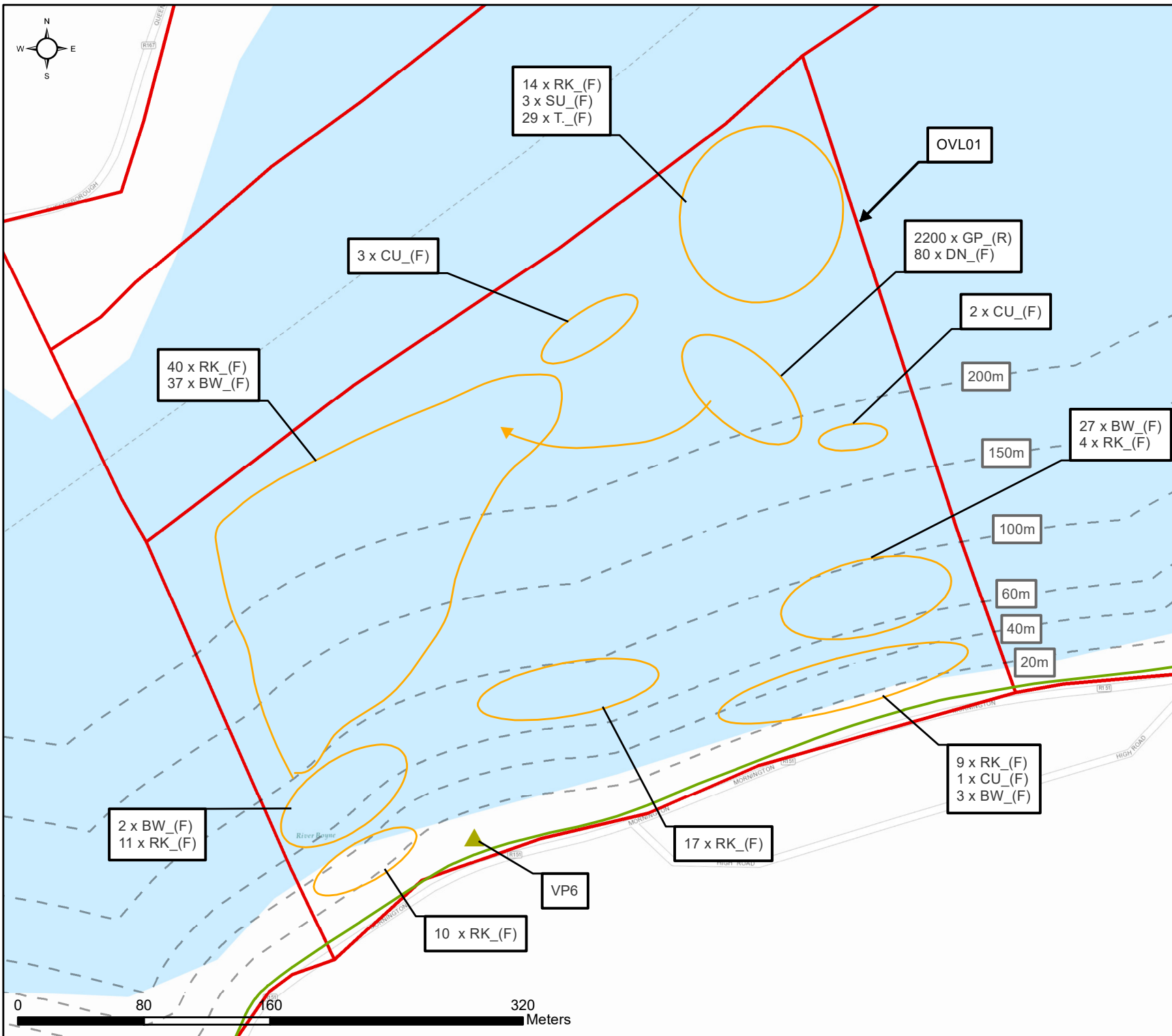
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:

Map 67 of 90: Water Bird Survey 12/03/18
Count Section: OVL01. (VP6)
Time: 11.57 Tide: Falling

Legend:

- VP6
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:

(F) = Foraging
(R) = Roosting

Species ID Code:

RK = Redshank
SU = Shelduck
BW = Black-tailed Godwit
CU = Curlew
T = Teal
DN = Dunlin
GP = Golden Plover

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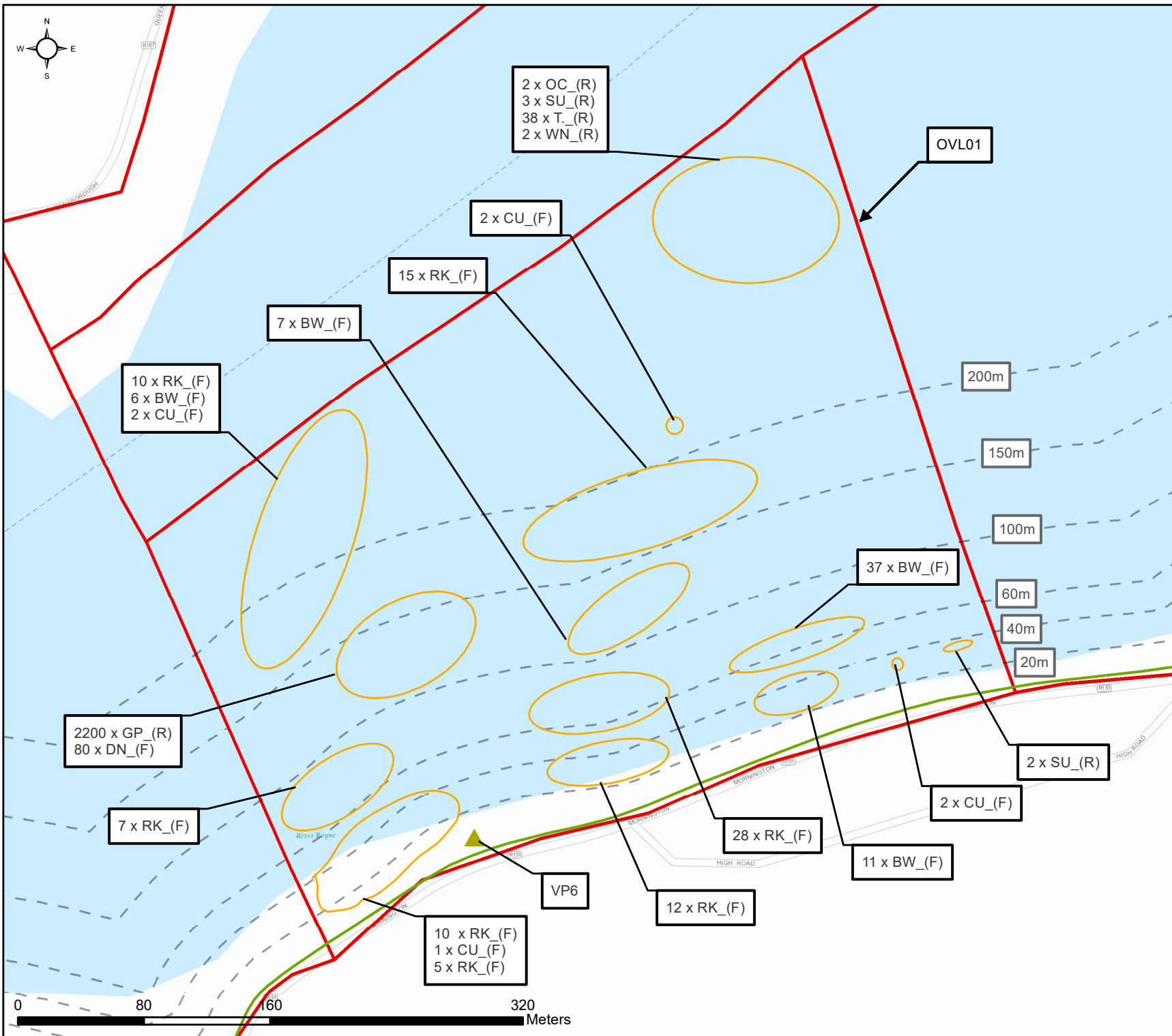
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:

Map 68 of 90: Water Bird Survey 12/03/18
Count Section: OVL01. (VP6)
Time: 12.57 Tide: Low

Legend:

- VP6
- Proposed Cycle Route
- Water Bird Activity Area
- Count Subsite Boundaries

Activity Code:

(F) = Foraging
(R) = Roosting

Species ID Code:

RK = Redshank
SU = Shelduck
BW = Black-tailed Godwit
CU = Curlew
T = Teal
DN = Dunlin
GP = Golden Plover
WN = Widgeon
OC = Oystercatcher

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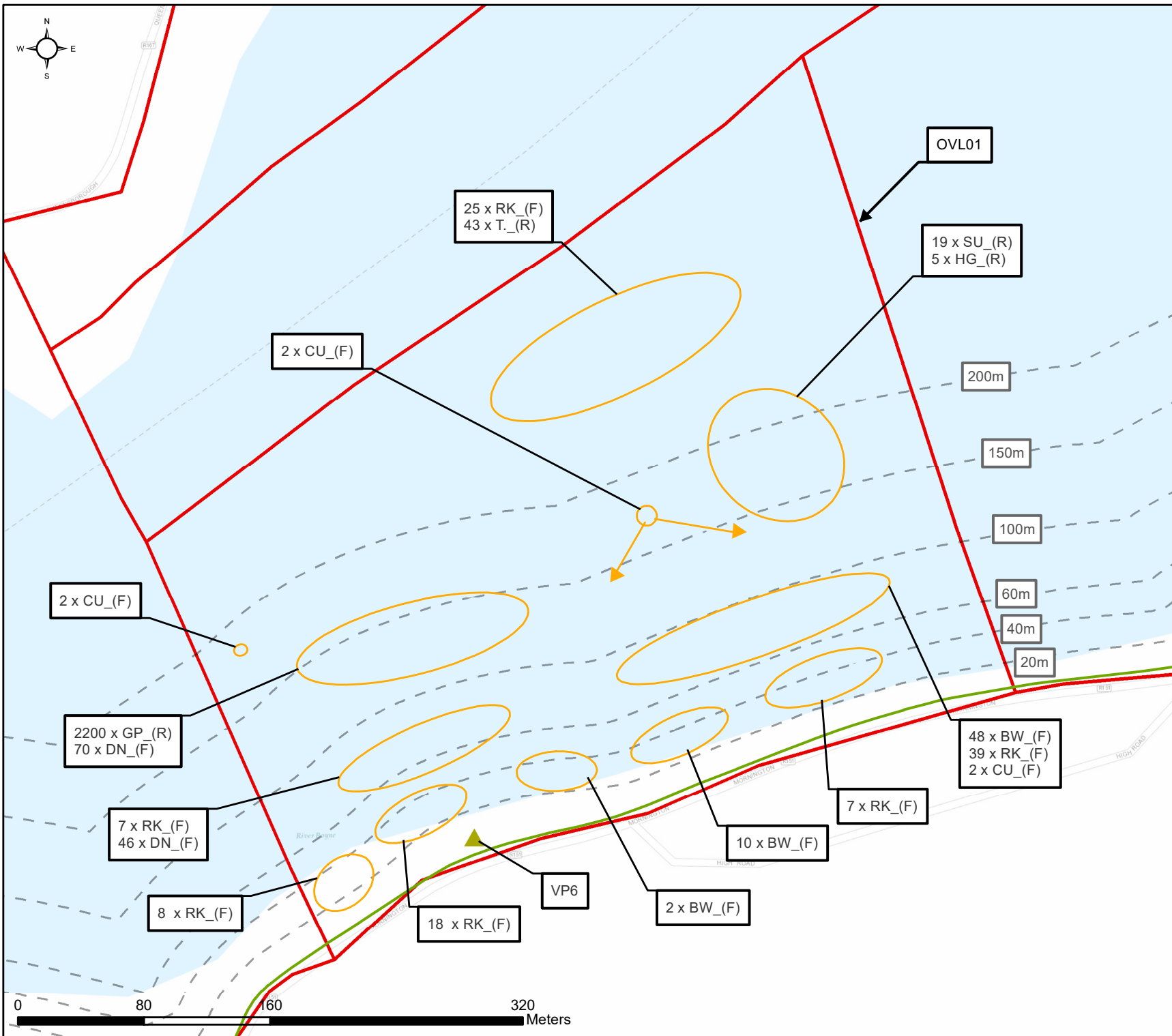
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Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 69 of 90: Water Bird Survey 12/03/18
Count Section: OVL01. (VP6)
Time: 13.57 Tide: Low

Legend:

- VP6
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting

Species ID Code:
RK = Redshank
SU = Shelduck
BW = Black-tailed Godwit
CU = Curlew
T. = Teal
DN = Dunlin
GP = Golden Plover
HG = Herring Gull

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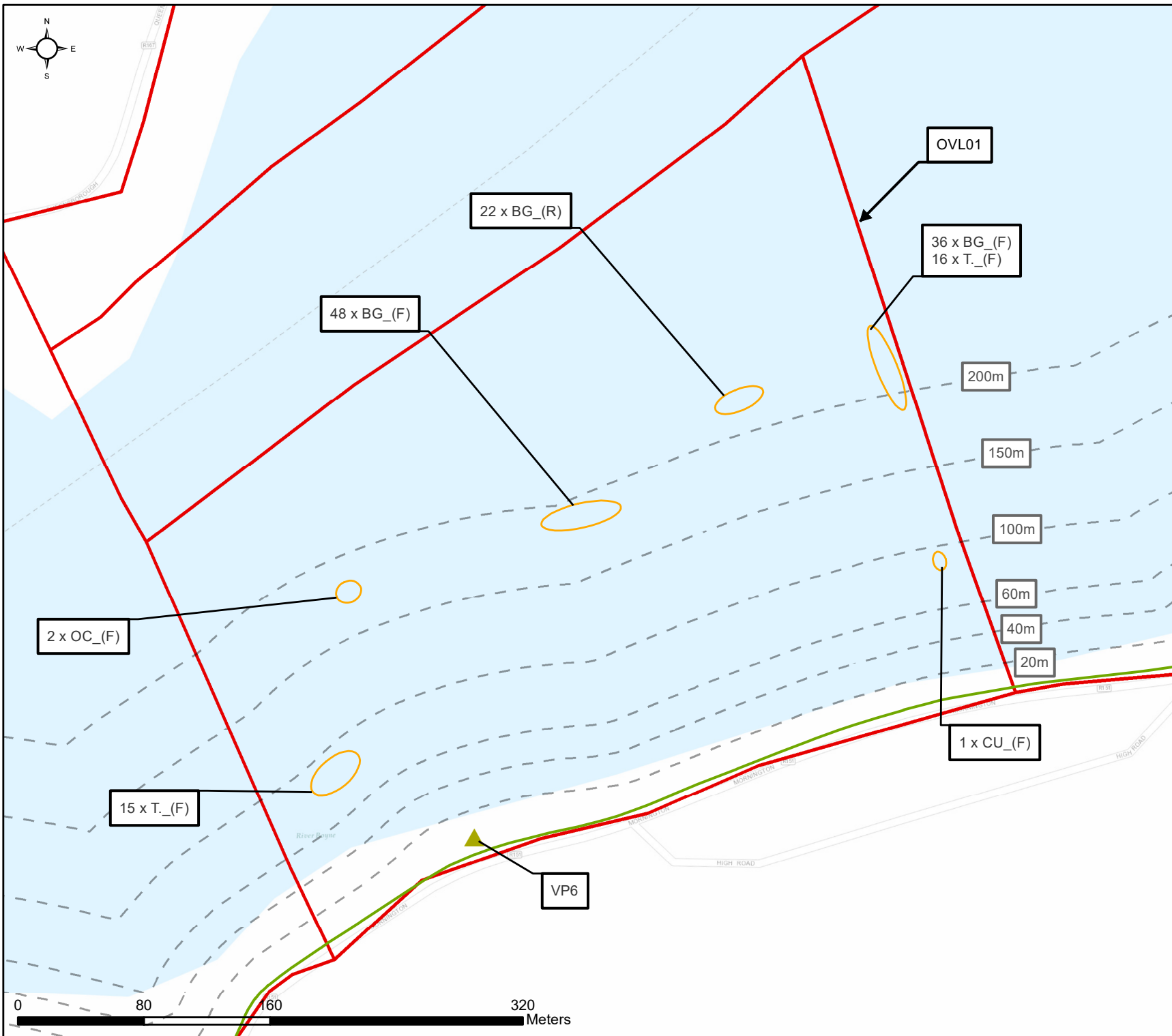
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 70 of 90: Water Bird Survey 30/03/18
Count Section: OVL01. (VP6)
Time: 08.45 Tide: Rising

Legend:

- VP6
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting

Species ID Code:
CU = Curlew
T. = Teal
OC = Oystercatcher
BG = Brent Goose

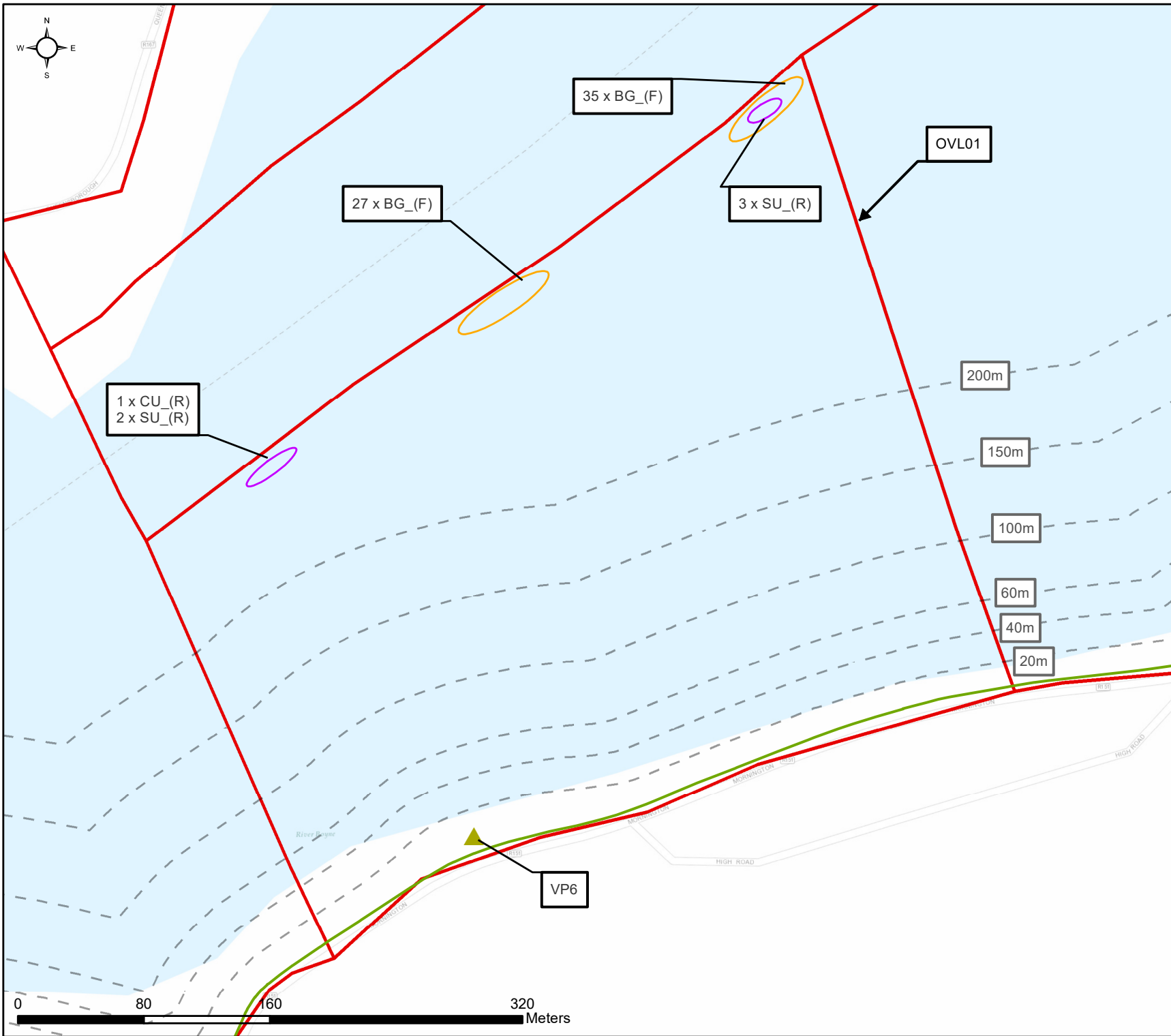
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 71 of 90: Water Bird Survey 30/03/18
Count Section: OVL01. (VP6)
Time: 09.45 Tide: High

Legend:

- VP6
- High Tide Roost Areas
- Water Bird Activity Areas
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting

Species ID Code:
CU = Curlew
BG = Brent Goose
SU = Shelduck

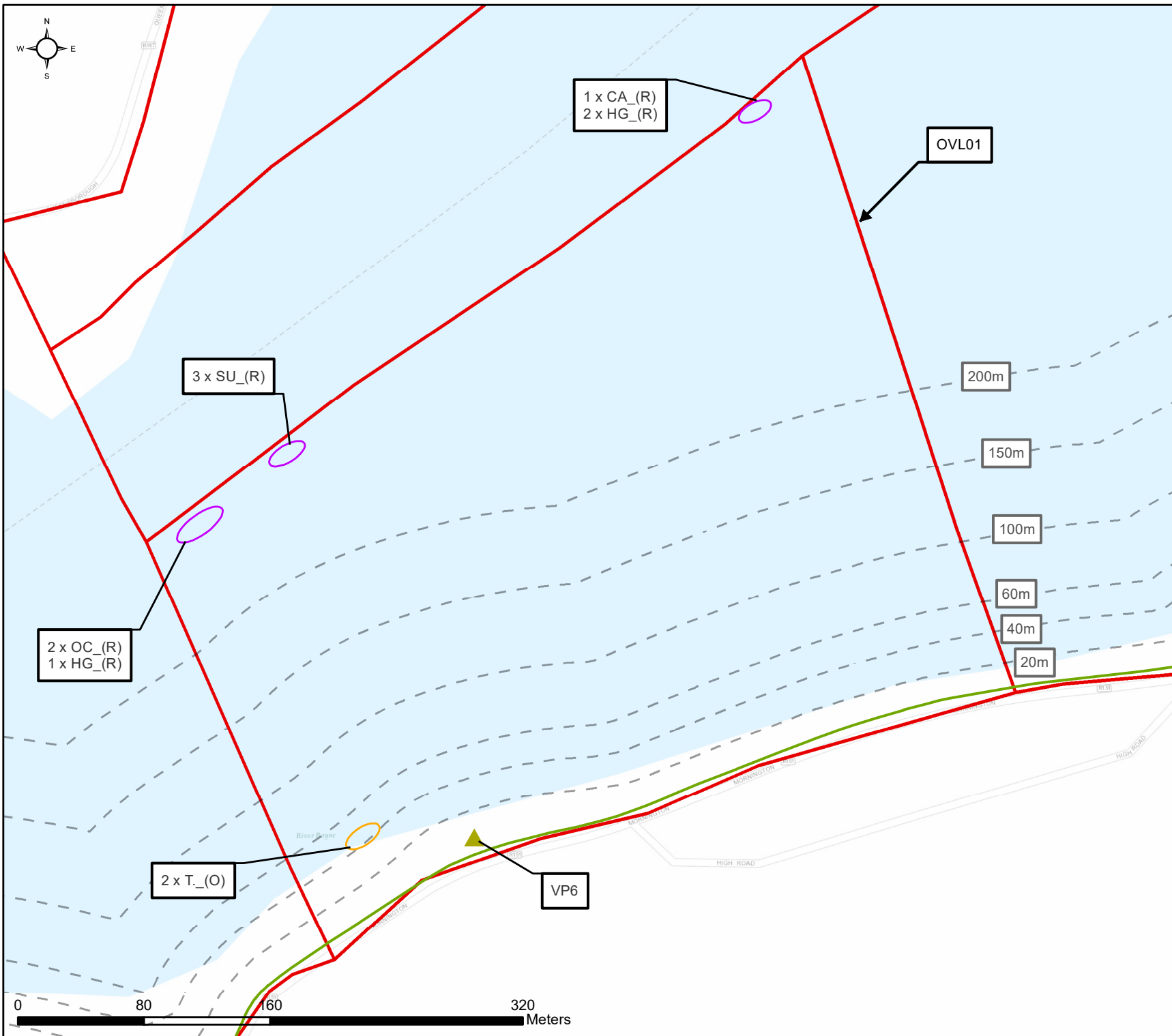
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:

Map 72 of 90 : Water Bird Survey 30/03/18
Count Section: OVL01. (VP6)
Time: 10.45 Tide: High

Legend:

- ▲ VP6
- High Tide Roost Areas
- Water Bird Activity Areas
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:

(F) = Foraging
(R) = Roosting
(O) = Other

Species ID Code:

BG = Brent Goose
T. = Teal
OC = Oystercatcher
HG = Herring Gull
SU = Shelduck
CA = Cormorant

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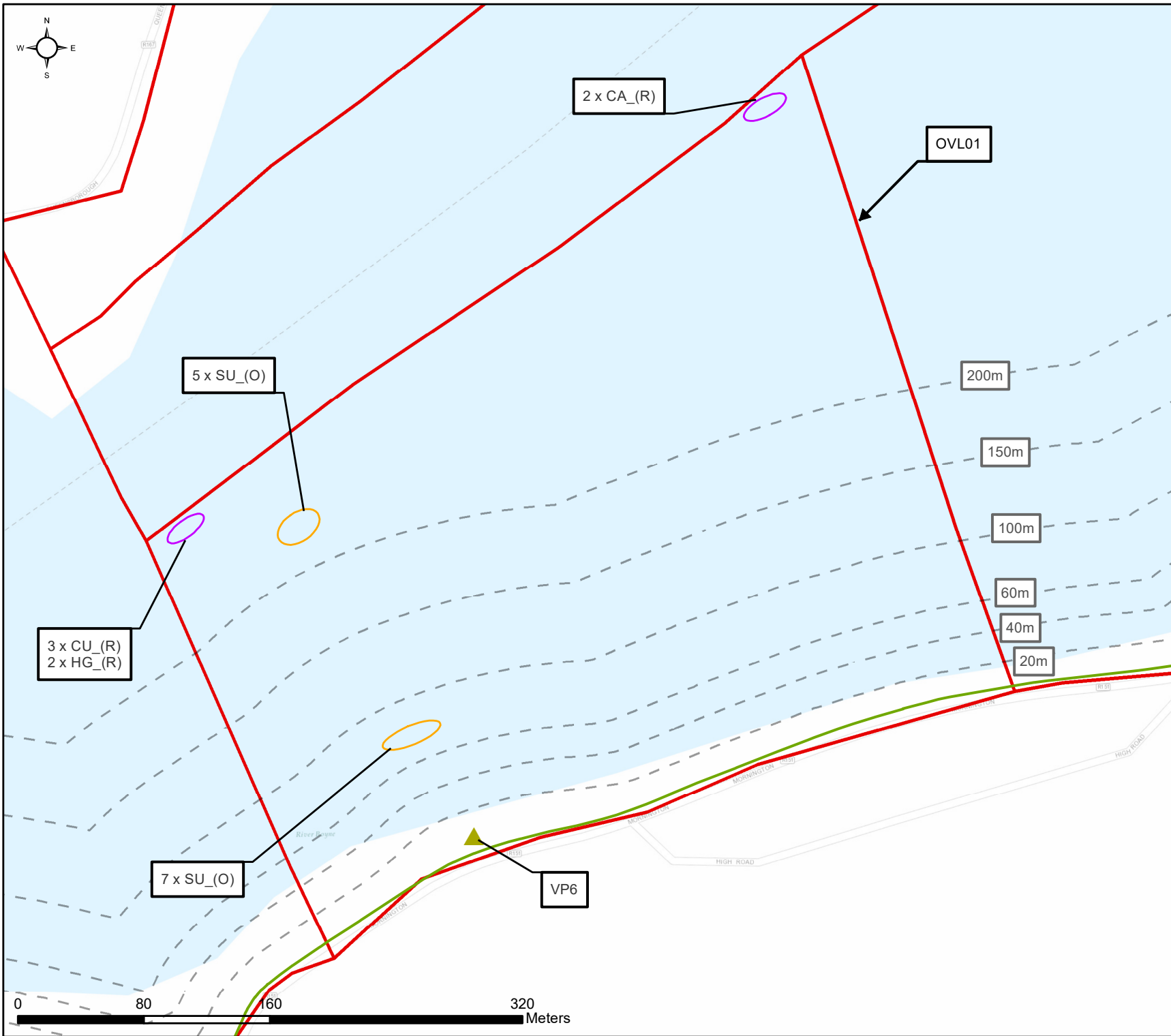
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 73 of 90: Water Bird Survey 30/03/18
Count Section: OVL01. (VP6)
Time: 11.45 Tide: High

Legend:

VP6

High Tide Roost Areas

Water Bird Activity Areas

Proposed Cycle

Count Subsite

Activity Code:

(F) = Foraging
(R) = Roosting
(O) = Other

Species ID Code:

CU = Curlew
HG = Herring Gull
SU = Shelduck
CA = Cormorant

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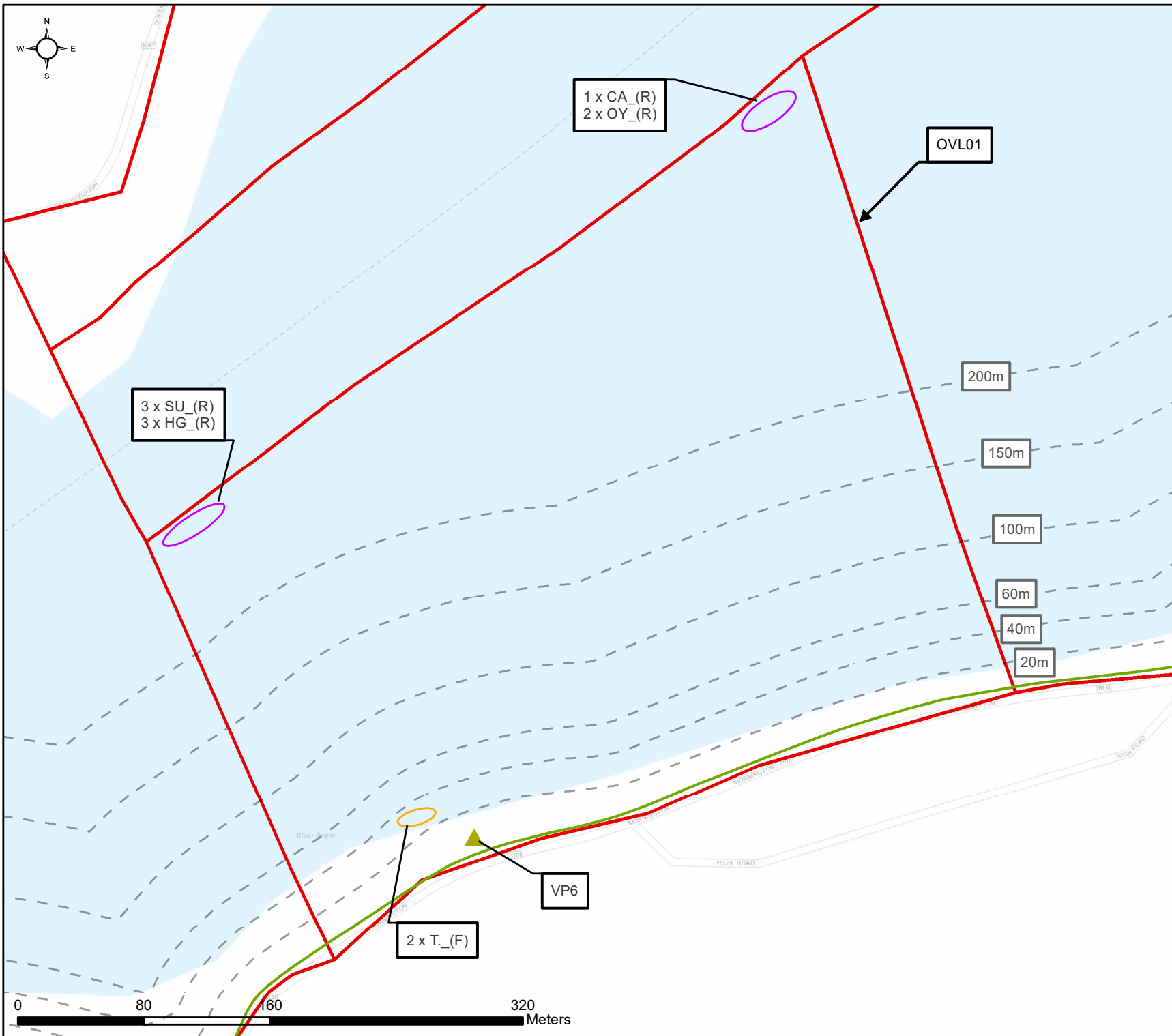
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:

74 of 90: Water Bird Survey 30/03/18
Count Section: OVL01. (VP6)
Time: 12.45 Tide: High

Legend:

- VP6
- High Tide Roost Area
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:

(F) = Foraging
(R) = Roosting

Species ID Code:

CU = Curlew
HG = Herring Gull
CA = Cormorant
T. = Teal
OC = Oystercatcher

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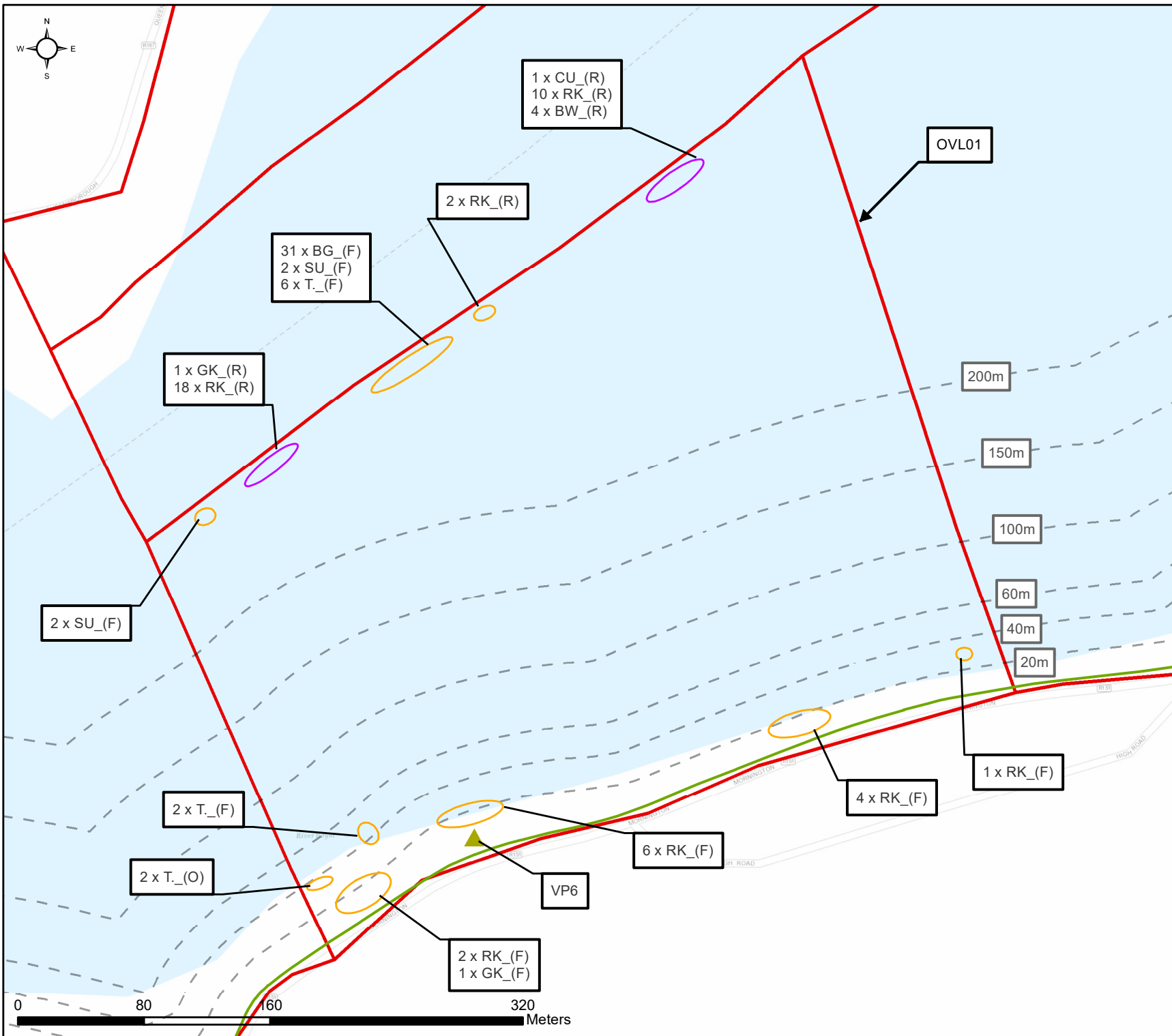
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:

Map 75 of 90: Water Bird Survey 30/03/18
Count Section: OVL01. (VP6)
Time: 13.45 Tide: Falling

Legend:

- VP6
- High Tide Roost Area
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:

(F) = Foraging
(R) = Roosting
(O) = Other

Species ID Code:

CU = Curlew
T. = Teal
RK = Redshank
GK = Greenshank
SU = Shelduck
BG = Brent Goose
BW = Black-tailed Godwit

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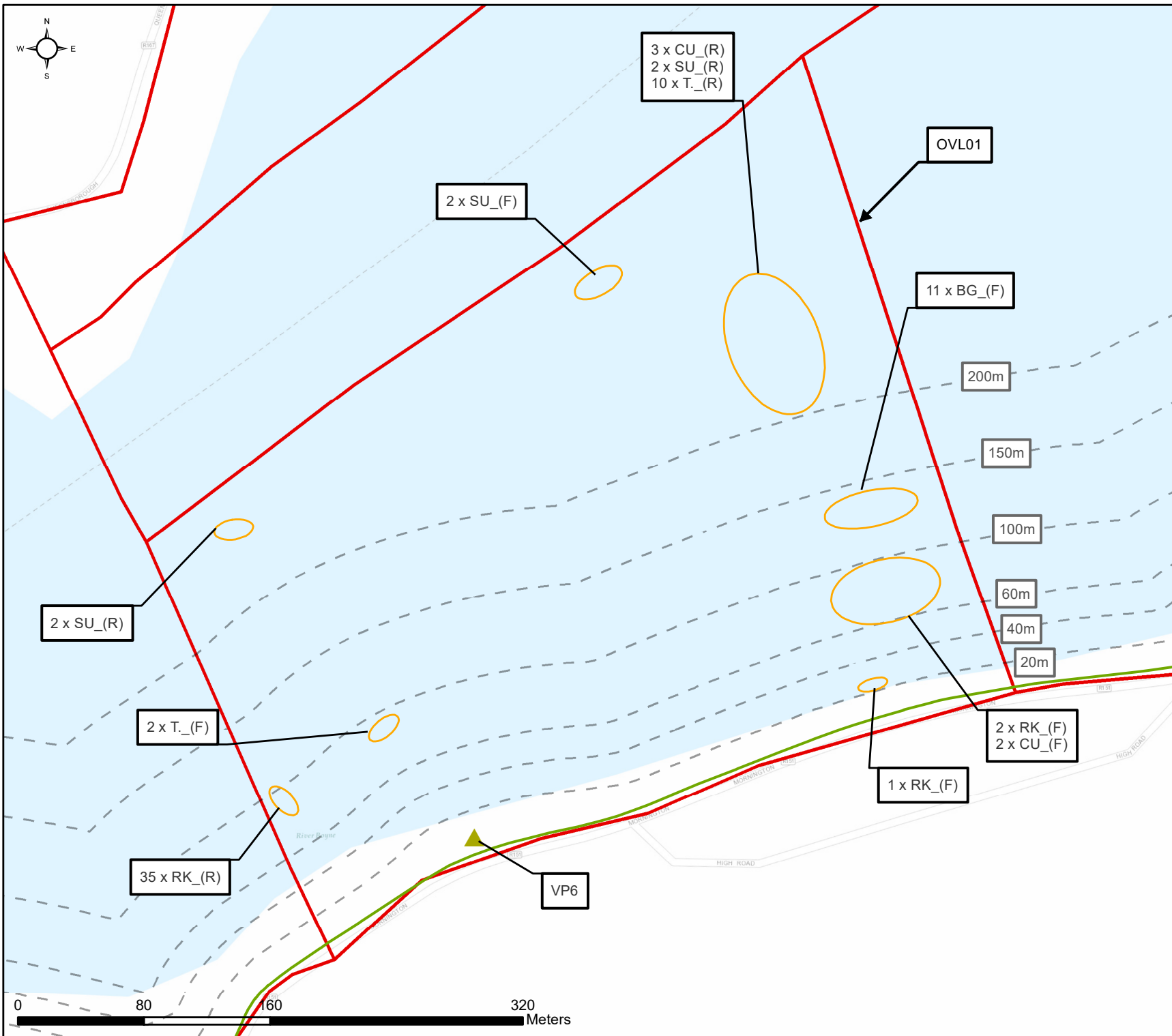
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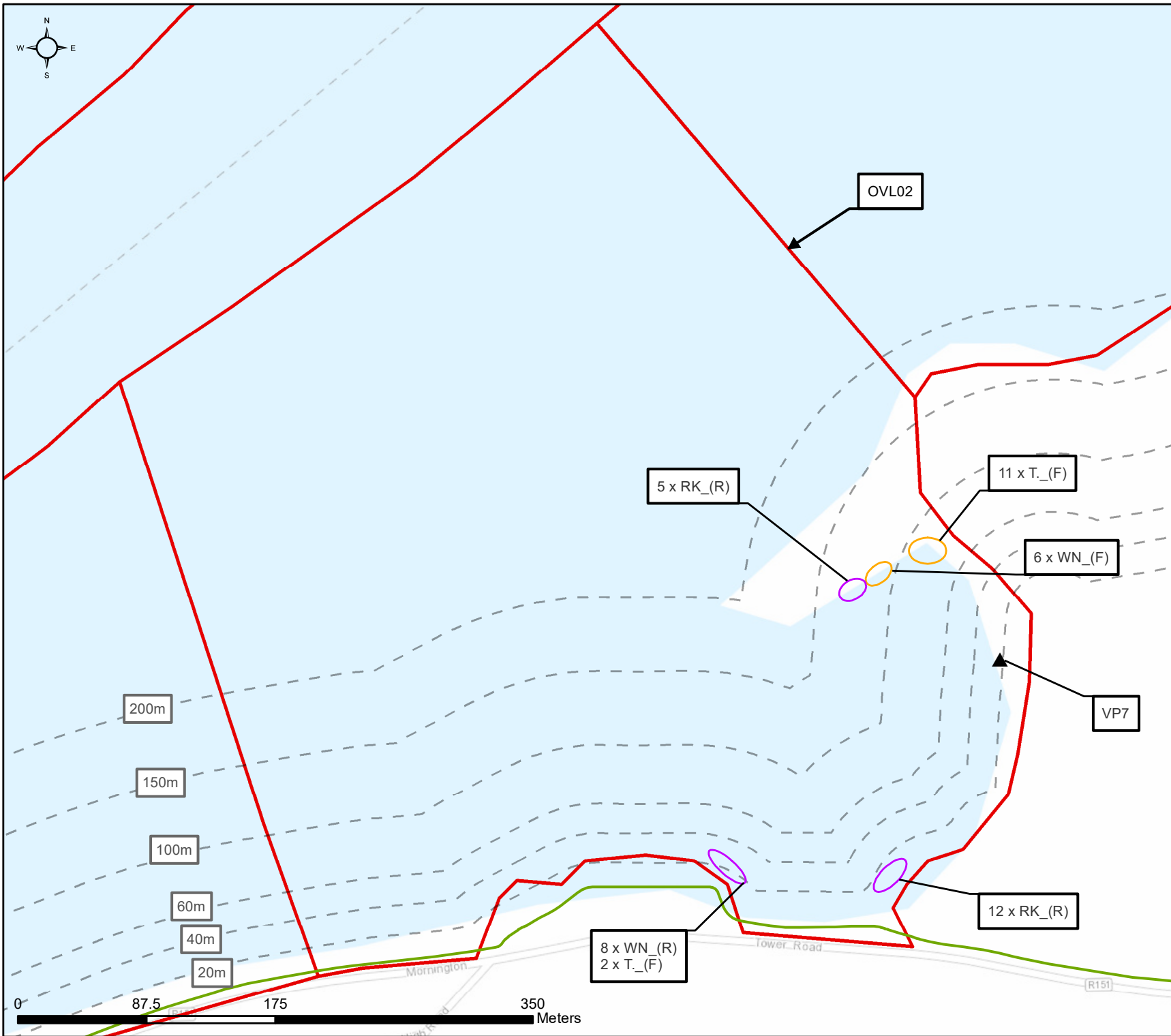
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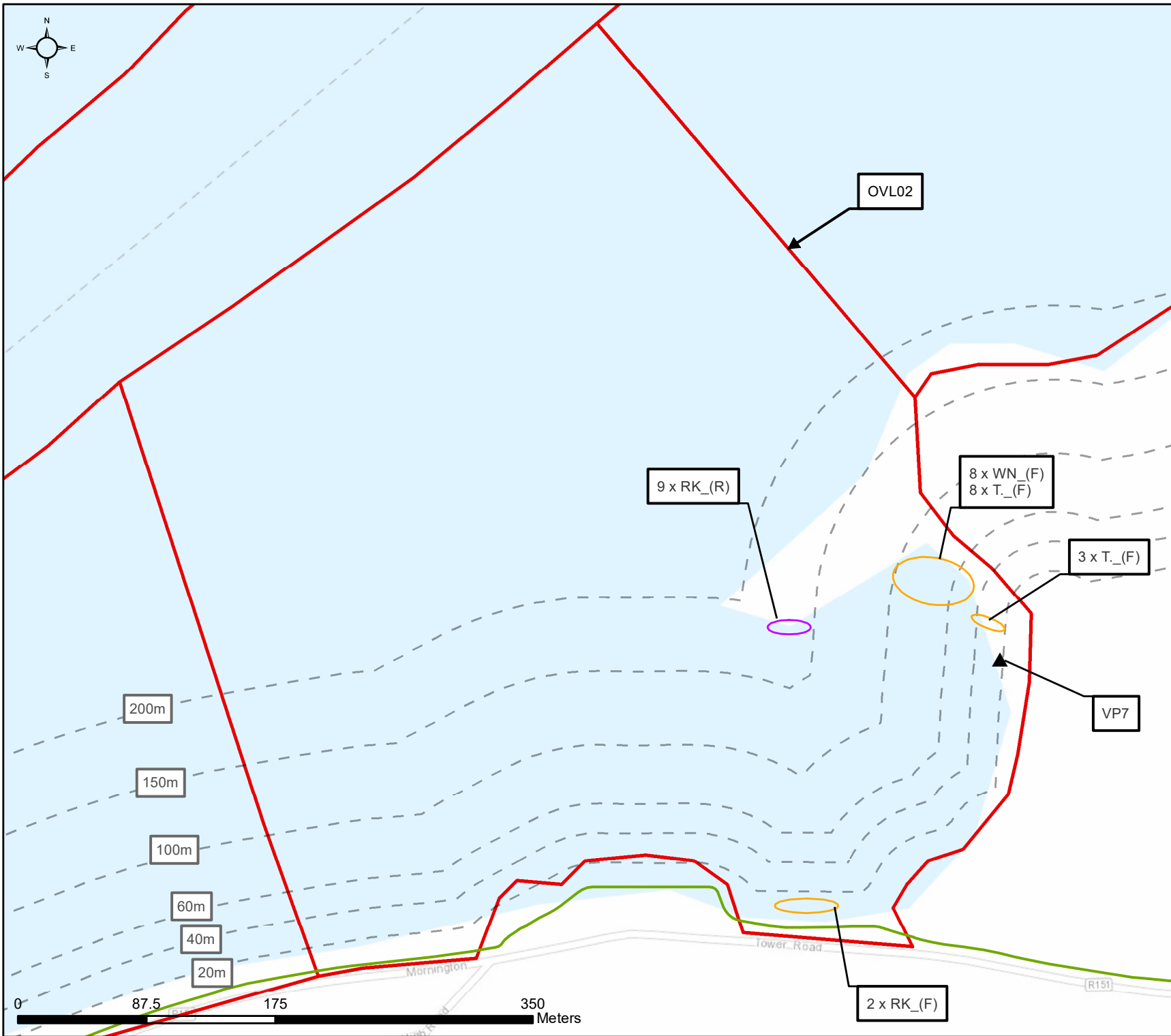
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Client: DBFL		
Project: The Boyne Greenway: Drogheda to Mornington		
Title: Map 77 of 90 : Water Bird Survey 13/03/18 Count Section: OVL02 (VP7) Time: 08.55 Tide: High		
Legend: <ul style="list-style-type: none">▲ VP7High Tide Roost AreaWater Bird Activity AreaProposed Cycle RouteCount Subsite Boundaries		
Activity Code: (F) = Foraging (R) = Roosting		
Species ID Code: T. = Teal RK = Redshank WN =Wigeon		
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Date: 05/06/2020	Map Reference: 1101 - AG - 06_077	
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 78 of 90: Water Bird Survey 13/03/18
Count Section: OVL02 (VP7)
Time: 09.55 Tide: High

Legend:

- ▲ VP7
- High Tide Roost Area
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting

Species ID Code:
T. = Teal
RK = Redshank
WN =Wigeon

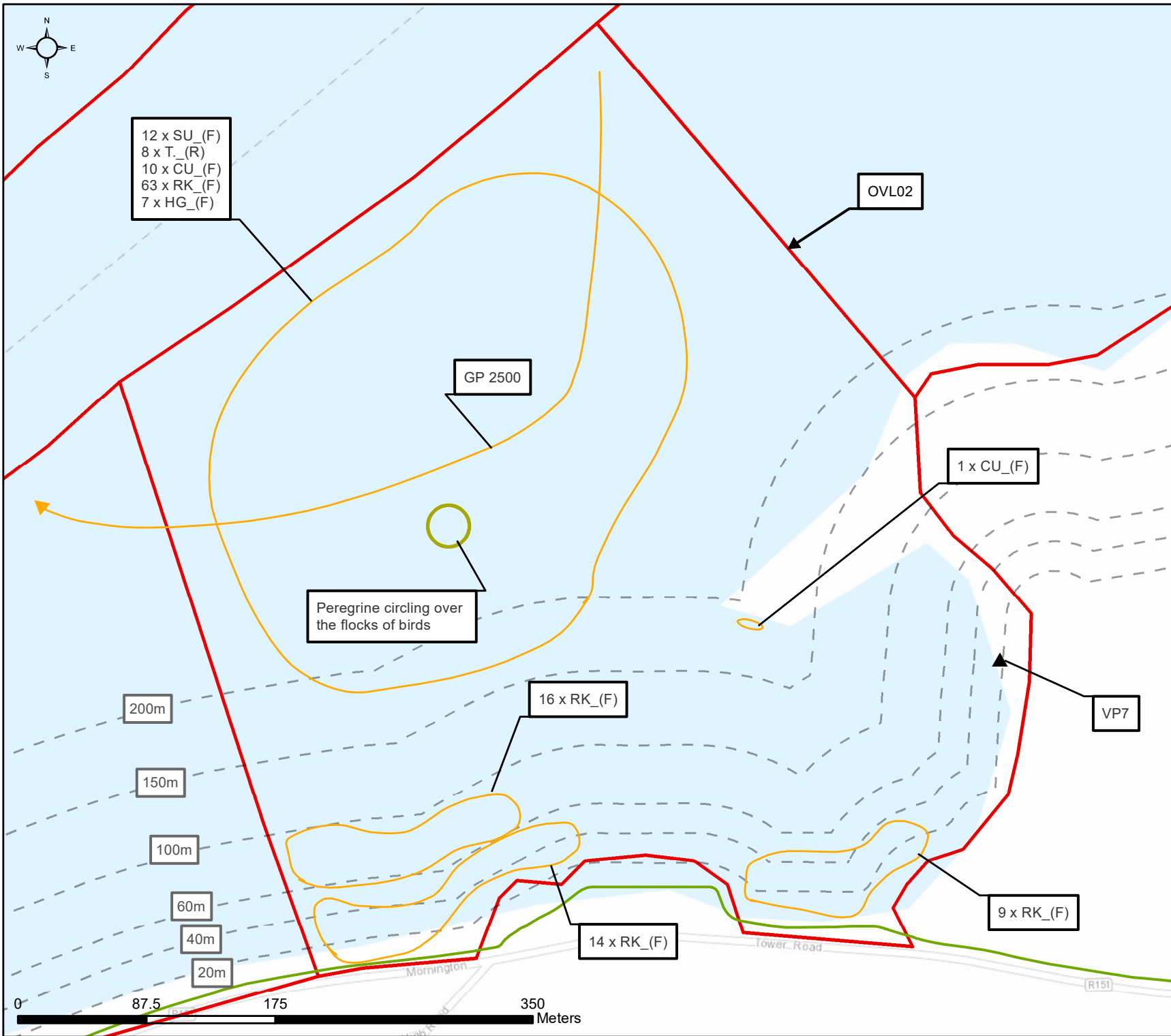
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 80 of 90: Water Bird Survey 13/03/18
Count Section: OVL02 (VP7)
Time: 11.55 Tide: Falling

Legend:

▲ VP7

— Water Bird Activity Area

— Proposed Cycle Route

□ Count Subsite Boundaries

Activity Code:

(F) = Foraging
(R) = Roosting

Species ID Code:

T. = Teal
RK = Redshank
BW = Black- tailed Godwit
CU = Curlew
SU = Shelduck
HG =Herring Gull

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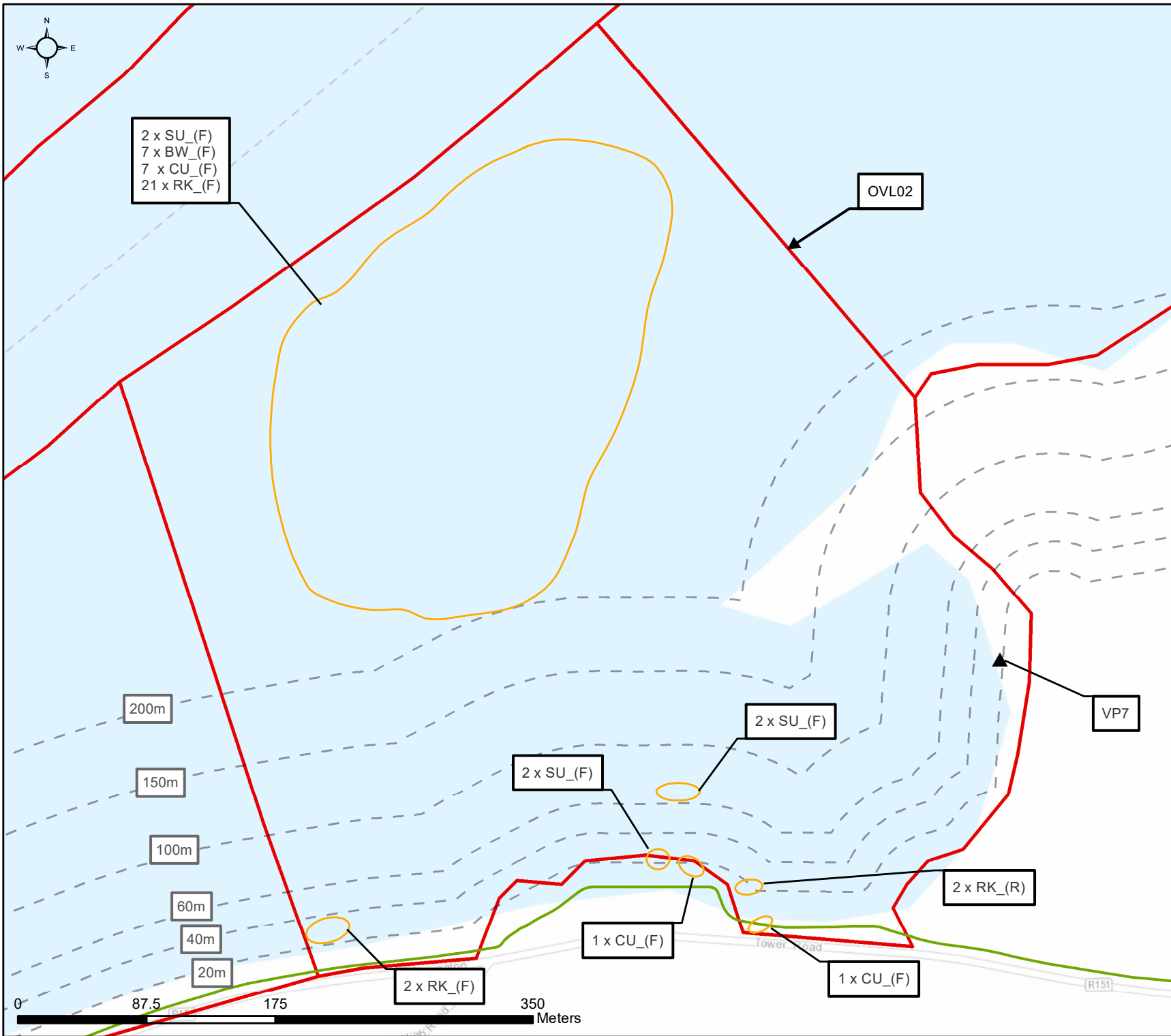
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Date:
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Map Reference:
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 81 of 90: Water Bird Survey 13/03/18
Count Section: OVL02 (VP7)
Time: 12.55 Tide: Falling

Legend:

- ▲ VP7
- Water Bird Activity
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting

Species ID Code:
T. = Teal
RK = Redshank
BW = Black- tailed Godwit
CU = Curlew
SU = Shelduck
HG =Herring Gull

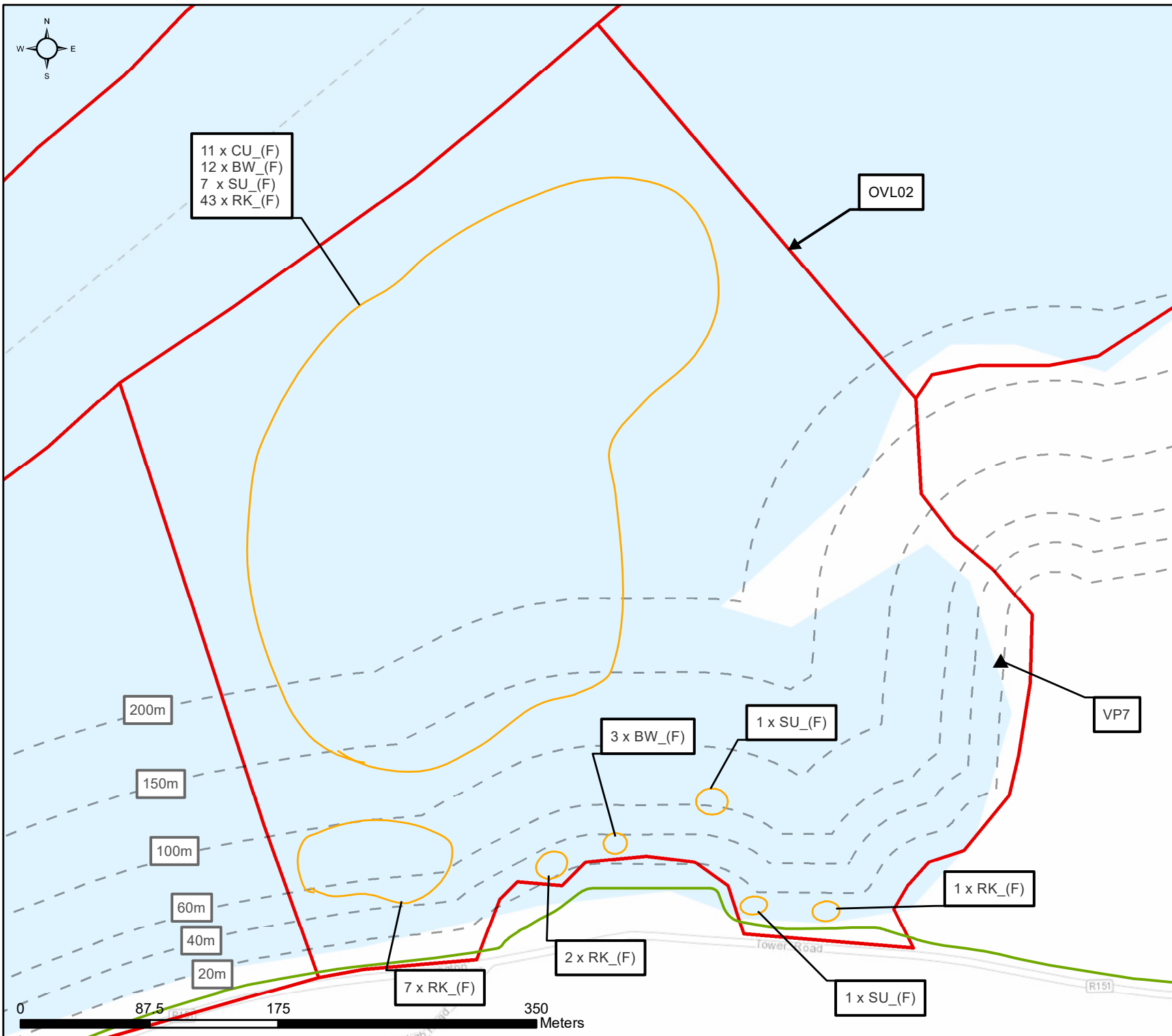
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Date: 05/06/2020	Map Reference: 1101 - AG - 06_081
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:

Map 82 of 90: Water Bird Survey 13/03/18

Count Section: OVL02 (VP7)

Time: 13.55 Tide: Low

Legend:

▲ VP7

— Water Bird Activity Area

— Proposed Cycle

□ Count Subsite

Activity Code:

(F) = Foraging

(R) = Roosting

Species ID Code:

RK = Redshank

BW = Black-tailed Godwit

CU = Curlew

SU = Shelduck

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JM

Authorised:
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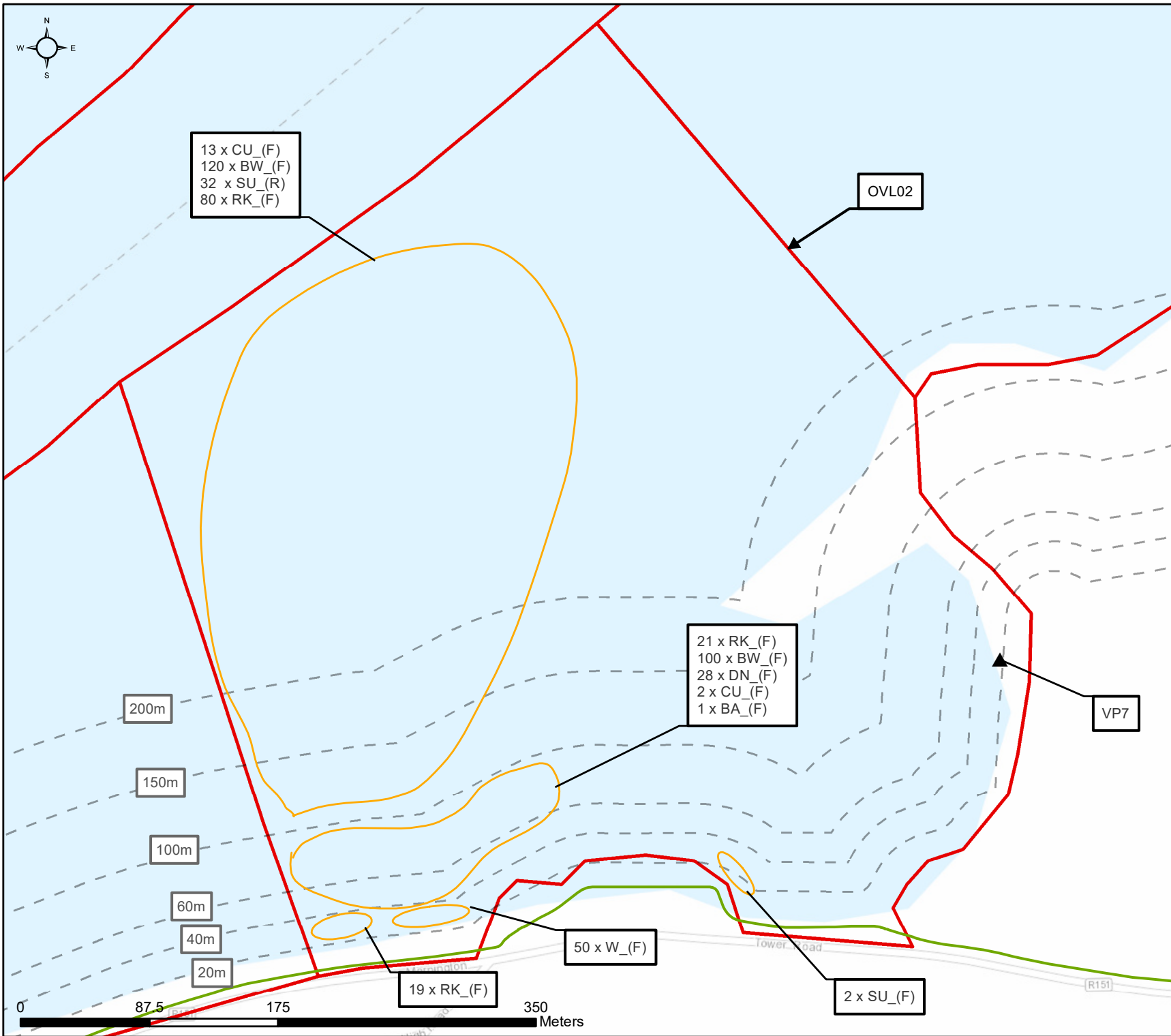
Date:
05/06/2020

Map Reference:
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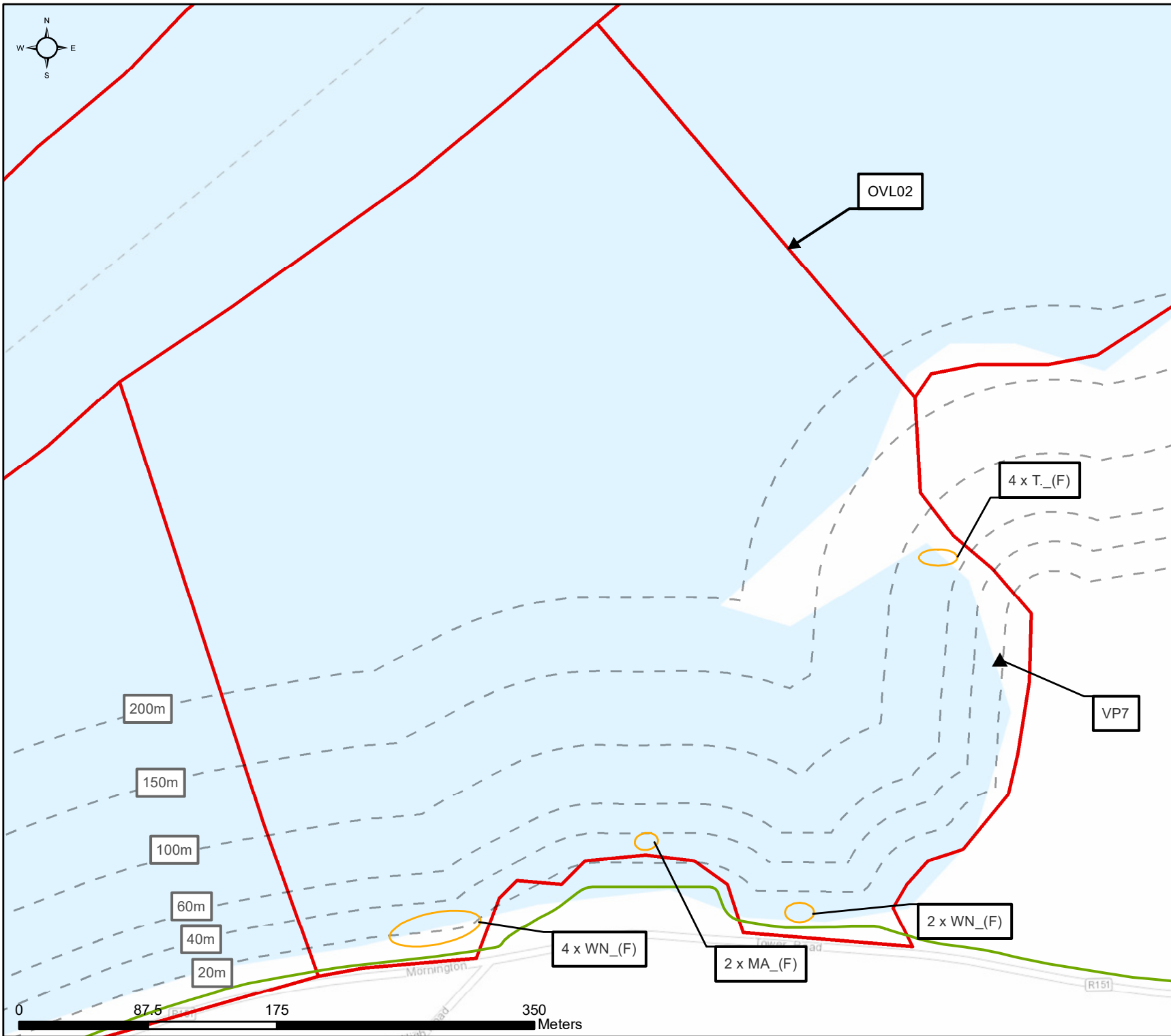
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Client: DBFL		
Project: The Boyne Greenway: Drogheda to Mornington		
Title: Map 83 of 90: Water Bird Survey 13/03/18 Count Section: OVL02 (VP7) Time: 14.55 Tide: Low		
Legend: <ul style="list-style-type: none">▲ VP7— Water Bird Activity Area— Proposed Cycle Route□ Count Subsite Boundaries		
Activity Code: (F) = Foraging (R) = Roosting		
Species ID Code: RK = Redshank BW = Black-tailed Godwit CU = Curlew SU = Shelduck BA = Bar-tailed Godwit DN = Dunlin CU = Curlew		
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Morrington

Title:
Map 84 of 90: Water Bird Survey 28/03/18
Count Section: OVL02 (VP7)
Time: 09.55 Tide: High

Legend:

- ▲ VP7
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting

Species ID Code:
SU = Shelduck
MA = Mallard
WN = Widgeon
T. = Teal

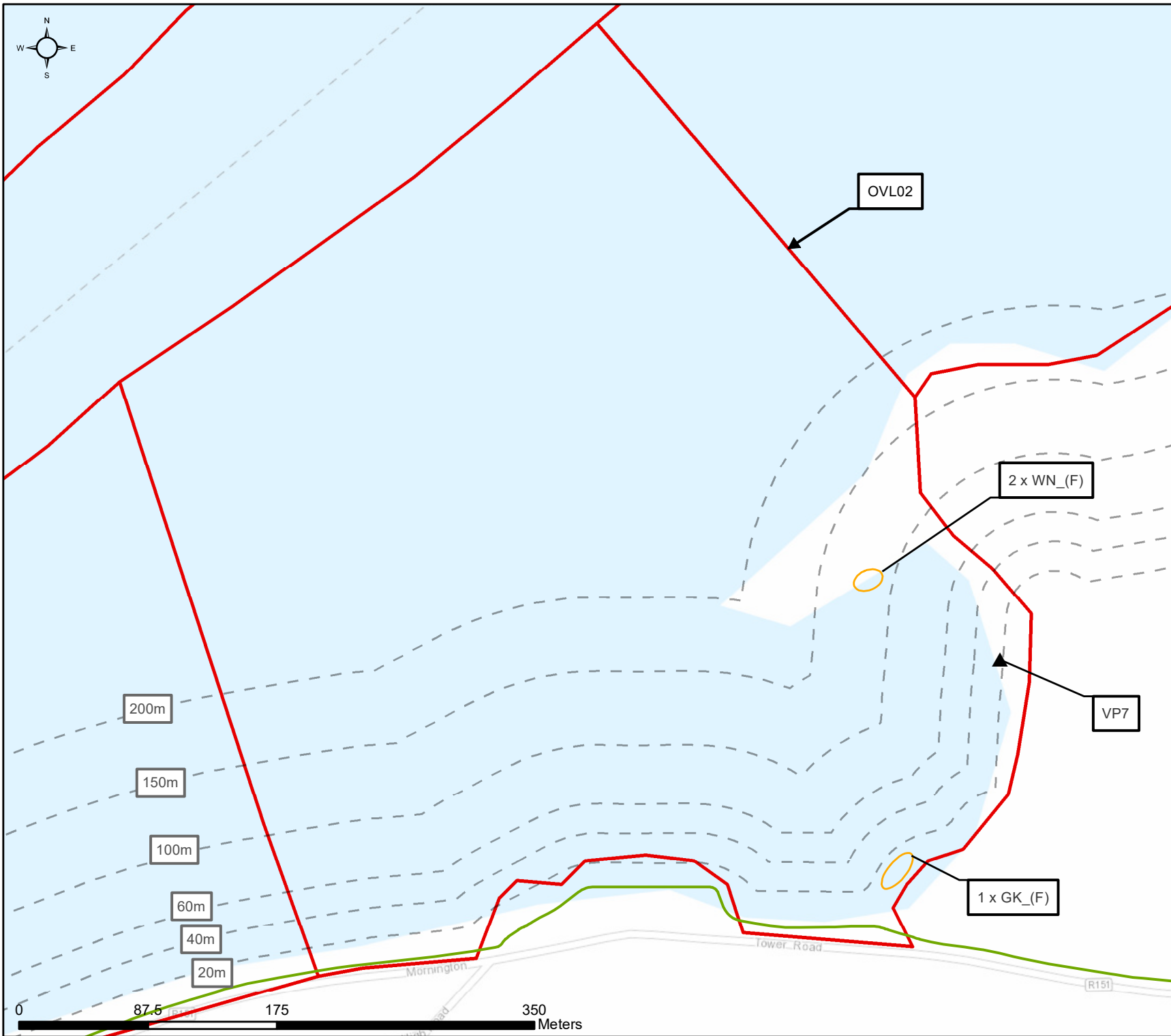
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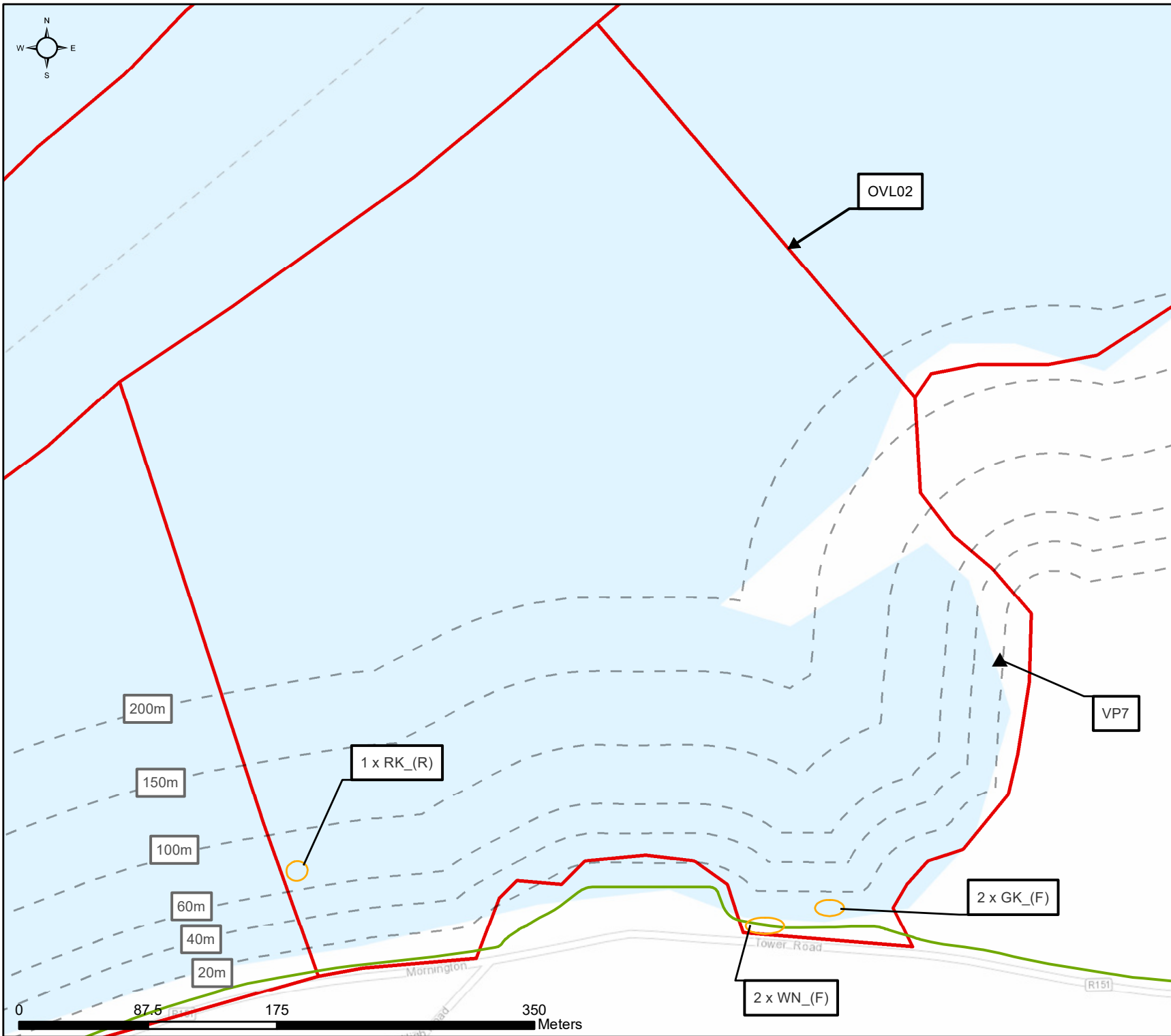
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Date: 05/06/2020	Map Reference: 1101 - AG - 06_084
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Client: DBFL		
Project: The Boyne Greenway: Drogheda to Morrington		
Title: Map 85 of 90: Water Bird Survey 28/03/18 Count Section: OVL02 (VP7) Time: 10.55 Tide: High		
Legend: <ul style="list-style-type: none">▲ VP7— Water Bird Activity Area— Proposed Cycle Route□ Count Subsite Boundaries		
Activity Code: (F) = Foraging (R) = Roosting		
Species ID Code: WN = Widgeon GK = Greenshank		
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 86 of 90: Water Bird Survey 28/03/18
Count Section: OVL02 (VP7)
Time: 11.55 Tide: Falling

Legend:

- ▲ VP7
- Water Bird Activity Area
- Proposed Cycle
- Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting

Species ID Code:
WN = Widgeon
GK = Greenshank
RK = Redshank

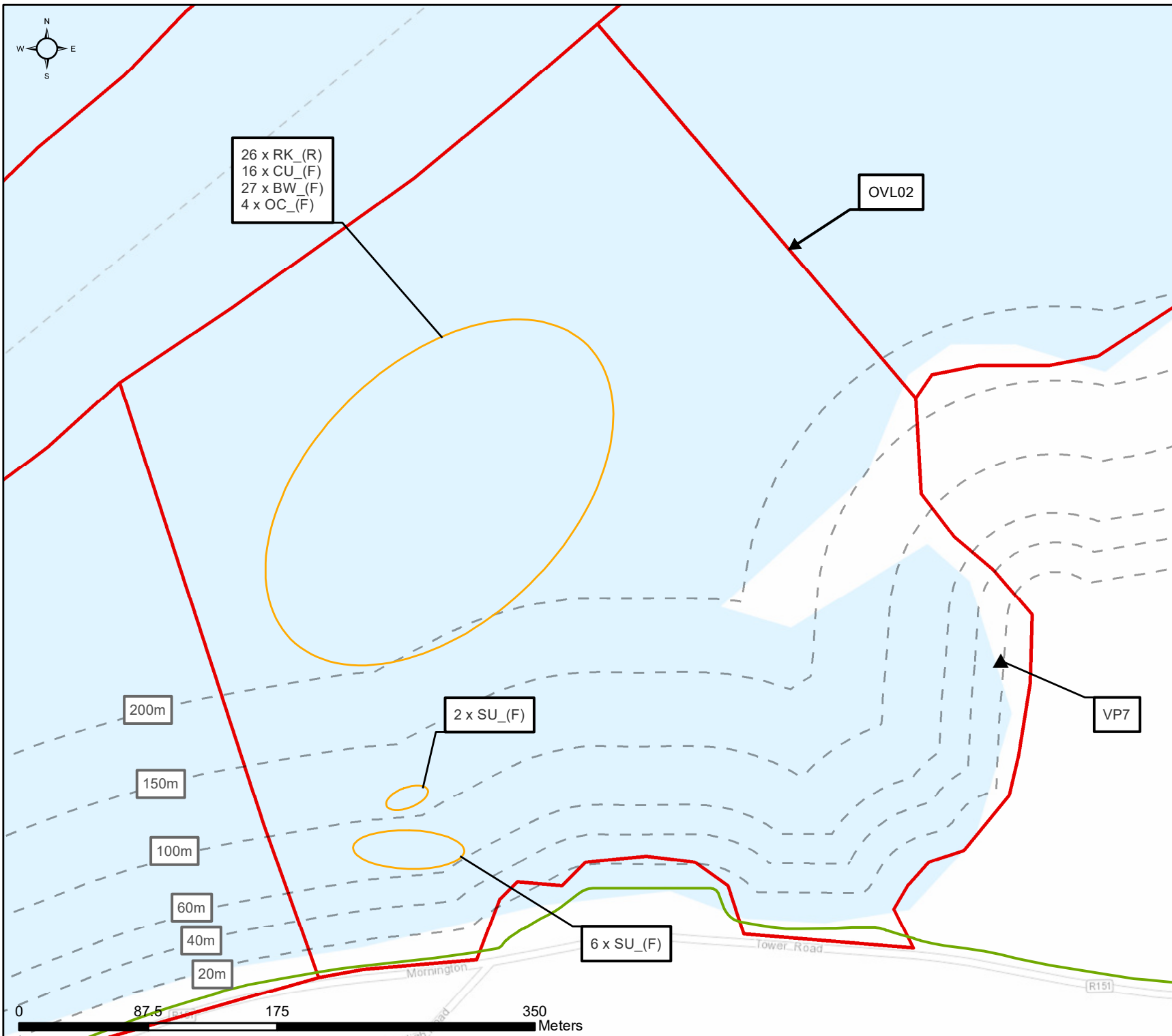
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 87 of 90: Water Bird Survey 28/03/18
Count Section: OVL02 (VP7)
Time: 12.55 Tide: Falling

Legend:

- ▲ VP7
- Water Bird Activity Area
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:

(F) = Foraging
(R) = Roosting

Species ID Code:

RK = Redshank
SU = Shelduck
CU = Curlew
BW = Black-tailed Godwit
OC = Oystercatcher

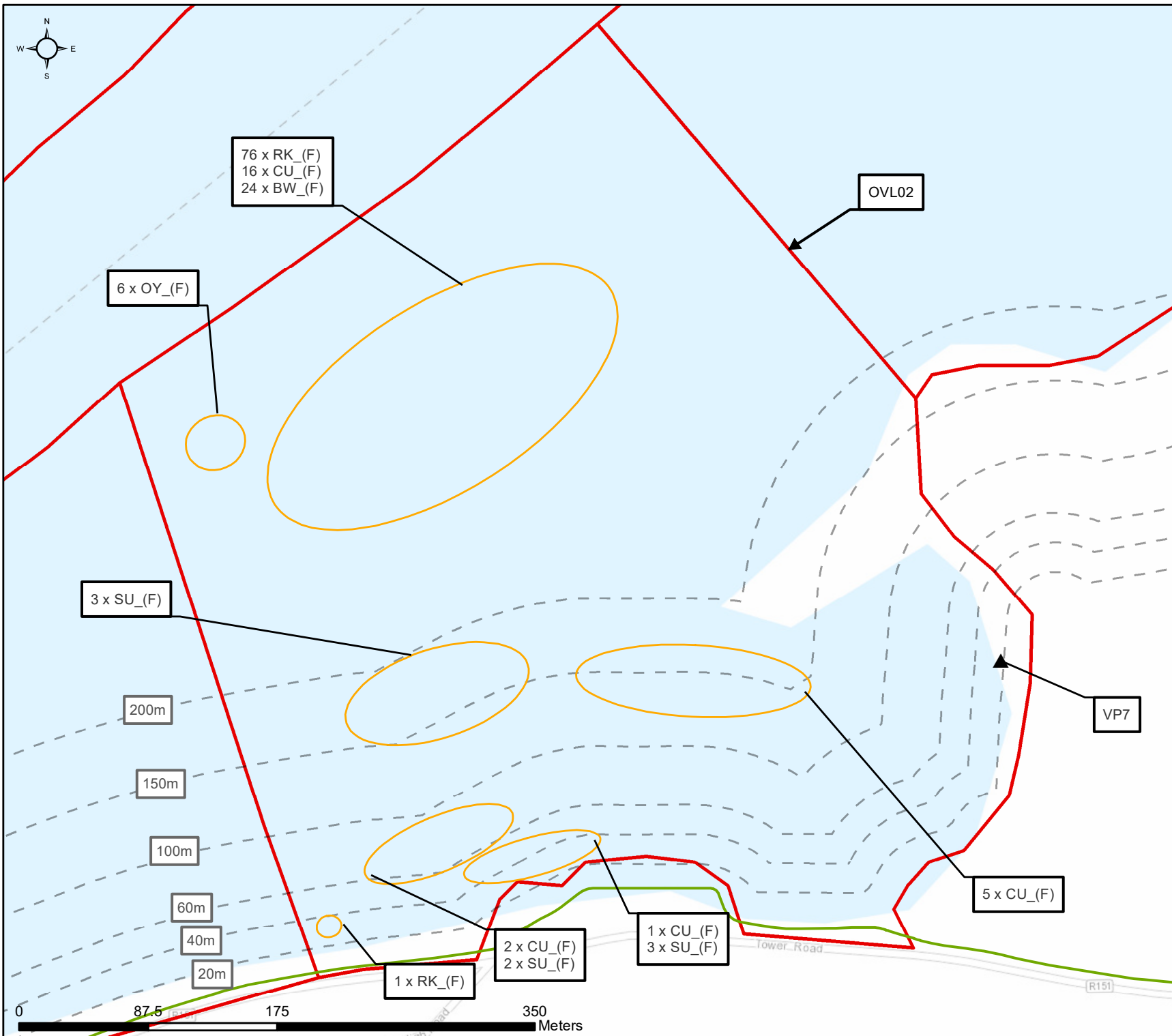
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:

Map 88 of 90: Water Bird Survey 28/03/18
Count Section: OVL02 (VP7)
Time: 13.55 Tide: Falling

Legend:

- ▲ VP7
- Water Bird Activity Areas
- Proposed Cycle Route
- Count Subsite Boundaries

Activity Code:

(F) = Foraging
(R) = Roosting

Species ID Code:

RK = Redshank
SU = Shelduck
CU = Curlew
BW = Black-tailed Godwit
OC = Oystercatcher

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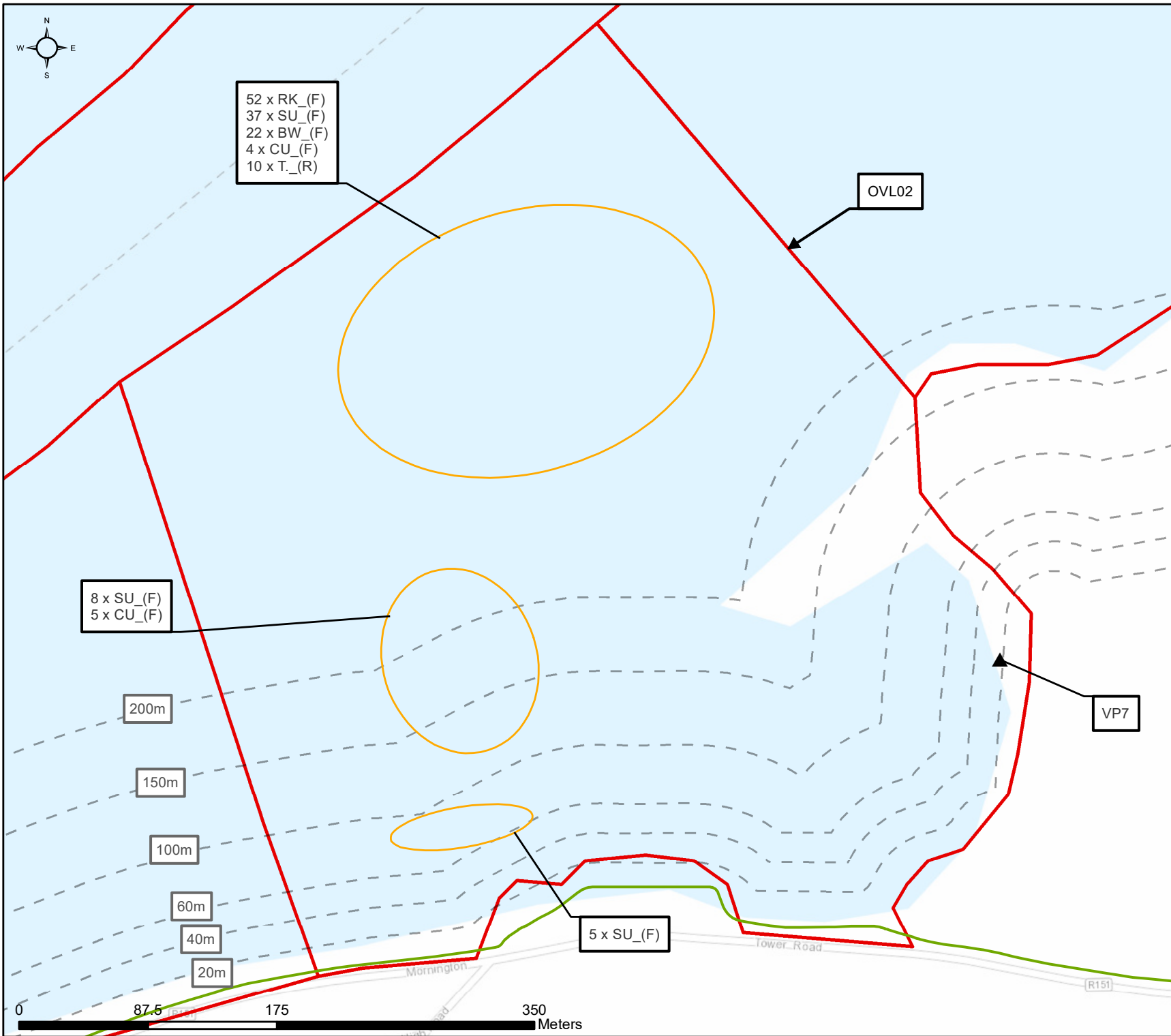
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Client: DBFL

Project: The Boyne Greenway: Drogheda to Mornington

Title:
Map 89 of 90: Water Bird Survey 28/03/18
Count Section: OVL02 (VP7)
Time: 14.55 Tide: Low

Legend:

▲ VP7

— Water Bird Activity Area

— Proposed Cycle Route

□ Count Subsite Boundaries

Activity Code:
(F) = Foraging
(R) = Roosting

Species ID Code:
RK = Redshank
SU = Shelduck
CU = Curlew
BW = Black-tailed Godwit
T = Teal

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Date:
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Map Reference:
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Appendix B: Consultation

Minutes of Meeting in Knocksink Wood Education Centre 27/9/18 between Inís Consultants, Meath County Council and NPWS to discuss the Boyne Greenway

Attendees: Cormac Ross (CR), Meath County Council (MCC)
Howard Williams (HW) and Chris Cullen (CC), Inís Environmental Consultants
Linda Patton (LP), NPWS, Dept. Culture, Heritage and the Gaeltacht

Background to project

The background to the project was discussed by Howard Williams, Chris Cullen and Cormac Ross. CR outlined the current project being put forward by MCC as comprising the Boyne Greenway from just before the viaduct in Drogheda out to Mornington. The very first section of the route is in Co. Louth, however CR outlined that an agreement will be in place between Louth Co. and MCC to allow MCC to progress the project through the planning process and construction phase.

The Boyneside Trails Group/MCC had previously commenced work on a route but this was designed with no cognisance of the special conservation interests or qualifying features of Natura sites.

Meath County Council, as advised by Inís Consultants following their appointment, have modified the original route extensively following scoping and a comprehensive constraints evaluation by Inís based on Best Practice surveys to be ecologically 'fit for purpose'. CC also noted a review had been undertaken of the precedent set in other European Sites on similar projects and referred to providing examples later.

By way of background CR/CC outlined some data from a greenway/cycleway in Co. Waterford, where a peak daily figure of 5000 cyclists/pedestrians was recorded (2017), with a daily average of approximately 1100.

Ecologists input – intrinsic design

This was presented by Chris Cullen and Howard Williams.

CC/HW outlined the iterative approach undertaken from the initial scoping visit carried out by Inís in February 2018 through to the present date.

Key knowledge gaps identified in informing the optimum route iteration from an Ecological perspective were bird distribution during the winter months within adjacent estuarine areas, and the scale and nature of sensitive habitats along the route corridor.

The requirement to apply intrinsic design was also identified at an early stage in the project as the most robust approach in ensuring the avoidance of effects on Biodiversity.

As a route had already been chosen, ecological constraints were examined and the route was amended where necessary through multiple iterations in conjunction with MCC's appointed Engineering Design company (DBFL). The original route impacted on bird roosts and saltmarsh and proposed a bridge across the area known as 'the gut'. This was deemed unacceptable by Inís Environmental Consultants at an early stage and these locations are now wholly avoided.

Bird surveys to inform route selection followed the survey areas as per the conservation objectives sections for compatibility of data. Count sectors referred to were those available

from NPWS low tide counts previously conducted and which form part of the online supporting documentation to Conservation Objectives (Tierney et al. 2012), CC provided a map illustrating the count sectors.

CC noted this approach was intentional to allow for robust side by side comparison upon which to inform route selection options. CC explained that the methodology was the same in principle as the Low Tide survey programme however rather than single counts within a 2-hour window either side of the LT point, hourly counts across a 6-hour period of the tidal cycle (HT to LT, LT to HT, mid-ebb to mid-flood etc) were completed from fixed vantage points (VP's). All locations and activities of feeding roosting birds etc. was recorded in line with the Low Tide methodology. All roosts were identified and mapped on the hourly count coinciding with High Tide. Bird flocks/activity and roosts were georeferenced at 50 metre intervals extending from the Greenway. Bird surveys comprised 12 days in total.

CC provided some information on survey results such as a total of 28 species being recorded, with maximum densities of species such as Golden Plover (max 2600). Roosts were recorded intertidally, supra-tidally and terrestrially- many of these were ephemeral roosts of e.g. single birds. CC provided a sample map of results from one survey.

No significant bird populations are using the area adjacent to the greenway route however there are roosts within the distance bands out to 200m from it. CC noted that whilst obviously the more expansive count sectors where the estuary widens hold higher numbers of birds, the size of the uncovered intertidal areas at these points means birds may be at distances of >200m from the Greenway.

Mammals were surveyed using NRA and Highways Agency Best Practice methodology within a 50m buffer of the proposed greenway.

Trees were examined for bat suitability in line with Best Practice. Some trees are suitable at Drogheda Grammar School however these will be unaffected. CC noted the adherence to Best Practice in lighting etc to fully avoid effects on Bats and referred to later to be discussed intrinsic design.

No otter holts were found although otters are present throughout the estuary. CC pointed out on the map a location where some runs were found (near Flogas Ireland).

Vegetation was mapped using Fossitt classification and indicating annexed habitats. Invasive species included one plant of knotweed which was not on the route and there is sea buckthorn in the dunes. HW indicated that MCC have agreed that an Invasives Species Management Plan will be completed for the submission.

Route design and final layout

CC and HW then proceeded to run through an A1 map overview of the proposed route which outlined by colour, the differing construction methods proposed and the inherent design elements applicable to Biodiversity.

There will be no lighting during operation of sensitive sections adjacent to intertidal birds. Away from sensitive intertidal areas, lighting if required during operation will be motion sensor activated, and LED in nature (to avoid effects on Bats and Birds). Increased reflective barriers at entry and egress points will be a matter of course.

No compounds are required; only existing municipal compounds will be used during construction.

There will be an ECoW with the power to stop the works employed for the full duration of the construction period. The ECoW will be experienced in assessing bird behaviour and will monitor the construction to ensure that all intrinsic design features are applied correctly.

Construction will be during daylight hours only and will have camouflage hoarding during the wintering bird season where necessary. No works will be carried out at the inlet or any sensitive intertidal areas during the wintering bird season (October to March inclusive).

Educational information will also be part of the project to tell of the importance of the site.

Most of the route will be beside the road and will be a tarmac surface and will be screened by a waist high hedge of native species to enhance Biodiversity.

In Mornington Dunes the route will be on the existing track and will have wooden boardwalk maps. Signage will indicate restricted access. The boardwalk here will be cut to match the exact size of the existing track.

Other off-road parts will have a recycled plastic boardwalk. Boardwalk will have a waist high screening board made of the same material (minimum height 600mm) to avoid noise transfer from e.g. dogs and disturbance pathways to birds.

Some research was also done of greenways in similar locations, within Natura sites in other countries. CC ran through some examples such as on Schierlonnikoog Island within the Waddenzee SPA, Terschelling Island within the Waddenzee SPA, Het Zwin SPA in the Netherlands and the River Po delta SPA where in all instance's greenways run through or immediately adjacent to designated areas for wildfowl. LP commented on the availability of data on the effects, if any, of these greenways. CC noted this.

In one part, where there is proximity to an inlet, there is no room to have the route beside the road so it will go the other side of the wall. It will be a boardwalk on stilts within the mudflats (this will also apply to any other similar location where the adjacent grass verge is non-existent and/or the boardwalk is required to go on the outer side of the roadside wall). Linda Patton was of the view this was the part most likely to result in the project screening in for AA, it will result in a potential impact on a small part of the wetlands habitat used by birds however it was explained that large aggregations of birds do not use this part of the estuary, in close proximity. She advised looking at the issue of a boardwalk, shading and birds in the S 2 S EIS and accompanying documents that was submitted to ABP. The possibility of removing infill to allow for the creation of more wetlands was also discussed as an intrinsic design measure to offset any potential loss of mudflat habitat. This offset should be greater than the potential habitat loss to affect a net gain on the SPA. HW acknowledged this, as did CR.

There was a discussion about court judgements and mitigation (i.e. Recent case law such as *People over Wind*) and whether effective loss of habitat was deemed significant. Habituation was brought up by HW and discussed briefly.

CC noted that the rationale for stilts was to allow light penetration thus not excluding birds from potential foraging areas. Disturbance effects are considered to be brief if at all given the existing source of disturbance from on-road traffic. CC also noted some of the existing disturbance sources recorded during surveys such as water vessels on the river.

There was also a discussion about a proposal to have some marram planting at habitat damaged areas at Mornington beach which Meath County Council are happy to progress as part of the project. This is an added measure to provide habitat over and above any effects from the development.

The need for an outline construction management plan to allow for a complete assessment was also discussed. This was acknowledged by CR/CC as a matter of course.

It was agreed that Linda Patton would send a standard scoping response to EcIA following the meeting.

‘During’ and ‘Post Construction’ monitoring

There will be three years post construction monitoring to ensure measure the efficacy of all measures employed. A report of the findings will be submitted to NPWS at the end of this term.

CC outlined that there is a precedent for this project in the Irish context from e.g. a Greenway/Cycleway project in Wexford. This will be an important element in supporting the efficacy of the intrinsic design of the project in avoiding effects on any European Sites.

Proposed reporting

Reporting was discussed during the early portion of the meeting when the likely Part 8 application was brought up. In response to CC outlining the consideration of the iterative process that had gone into a final intrinsic design, LP queried whether Appropriate Assessment Screening would be the level of Appropriate Assessment reporting undertaken. CC acknowledged that this was currently under consideration given the intrinsic design.

During the discussion on case law CC outlined a recent case in the UK (R (Langton) v Secretary of State for Environment) wherein the judge found that integral features within a scheme can be considered at Screening (i.e. Stage 1) of the Appropriate Assessment process.

Final Minutes: Meeting on the Proposed Boyne Greenway

Location: Department of Culture, Heritage and the Gaeltacht (DCHG), 90 North King Street, Smithfield, Dublin 7, D07 N7CV. Room 2.26

Date and Time: 18 December 2019, 2.00pm – 3.30pm

Attendees:

Name:	Initials:	Role/Organisation:
Gerry Clabby	GC	Head of Ecological Assessment – NPWS
Annette Lynch	AL	Divisional Ecologist – NPWS
Kelly Muldoon	KM	Ecological Assessment Unit – NPWS
Nicholas Whyatt	NW	Senior Engineer – Meath County Council
Cormac Ross	CR	Resident Engineer – Meath County Council
Howard Williams	HW	Ecologist – Inis Environmental Consultants
Chris Cullen	CC	Ecologist – Inis Environmental Consultants
Frank Magee	FM	Senior Executive Engineer – Louth County Council
Brendan McSherry	BMcS	Heritage Officer – Louth County Council
Bill Bates	BB	Director – DBFL Consulting Engineers

Minutes:

- 1. Welcome and Introductions:** GC welcomed all attending and introductions followed.
- 2. Project Overview:** Inis Environmental Consultants briefly outlined the proposed scheme. Meath County Council has recently conducted a non-statutory consultation on the proposed route to invite comments from the public prior to submitting a planning application to An Bord Pleanála (ABP). GC explained that NPWS had requested an opportunity to review the scheme as part of this consultation process as representations had been made to the Department concerning the scheme. GC thanked Meath County Council for their co-operation in this matter and for attending the meeting on foot of the concerns highlighted in the Department's observations dated 13 December 2019. NPWS highlighted its support for the provision of greenways but pointed out that the Department has a duty, as a statutory consultee in the planning code and the lead Department with regard to nature conservation, to highlight nature conservation concerns when they arise. In addition, all public authorities have a duty to ensure in carrying out their functions that the objectives of the Habitats and Birds Directives are met as set out in Regulation 27 of the EC (Birds and Natural Habitats) Regulations, 2011.
- 3. DCHG observations in relation to the proposal:** GC highlighted that the Department is solely concerned with nature conservation issues which may arise from the proposed greenway, in

the context of its role as a statutory consultee in the planning code. The Department's observations are aimed at ensuring that the project is delivered in a way which minimises impacts to nature conservation interests. GC mentioned potential impacts at construction and operational phases, including the potential impacts of bringing more people to habitats of conservation concern which are already under pressure. In addition the potential for further future development through expansion of the route, with consequent potential for impacts to designated sites needed to be considered. The consent authority for the proposed greenway is An Bord Pleanála.

On this basis GC and AL highlighted a number of issues:

- a. The Route Options Assessment Main Report provides a detailed appraisal of Section 2 of the route including Multi-Criteria Analysis (MCA), which is required under the Public Spending Code for projects between €5 million and €20 million. Sections 1 and 3 have been omitted from MCA in the detailed appraisal stage. The Department recommends that these sections are included in the MCA as set out in the observations issued by the Department because of their potential to impact European sites.

It was queried if alternative routes outside of European sites had been considered for Sections 1 and 3 of the proposed route. In preparing an EIAR reasonable alternatives need to be considered and it was suggested that the applicants should consider looking at alternative routes which avoid potential impacts to European sites as part of the EIA alternatives process. GC noted that whilst European Sites are not excluded from development, there is a need in any appropriate assessment to demonstrate that the proposal will not adversely affect the integrity of a European site or sites. This is so when there is no reasonable scientific doubt as to the absence of such effects.

There was a general discussion in relation to Section 1 of the proposed route and the proposed boardwalk structure. AL clarified a number of points of detail. GC queried if the posts for raised boardwalks would be inserted into the mudflats. CC clarified that they would be placed in the grass verge where possible but some would need to be placed in the mudflats. The structure would be 1 m above the high tide mark to allow light through to the habitat underneath. GC raised concerns about the proposal in relation to land take due to the placement of piles in the ground, the potential impact of the boardwalk on habitats due to light reduction, and the potential impact of increased footfall on birds. GC highlighted the need to ensure any appropriate assessment can conclude that the proposal would not adversely impact the integrity of a European site. GC also mentioned pertinent case law such as the Galway bypass case. CC provided a brief overview of the surveys undertaken on wintering birds to inform the iterative route selection process i.e. in line with Best Practice surveys such as the Low Tide Project. He also referred to a comment in the Department's observations on the occurrence of Annex 1 level saltmarsh along the proposed route, and queried whether this statement was based on more recent surveys than the date of the available information on the NPWS website, in SAC supporting documents.

- b. GC queried the proposal to locate Section 3 of the route within a European site, given its potential negative impacts on the site including impacts to priority habitats. AL queried

the end location of the greenway (Section 3 of the proposed route) in an unofficial carpark and whether there would be land take here to upgrade the carpark. CR clarified that there was no proposal no proposal to upgrade the carpark as part of this project. There was discussion in relation to potential impacts due to an increase in people coming to this area leading to increased trampling, dune walking, recreational activities etc. which could lead to habitat loss. HW suggested that this is occurring already and needed to be managed. GC acknowledged that the site needed management but suggested that the current greenway proposal may not be the best way to manage the site and could exacerbate the current situation. CC noted that the test as set out in case law suggests that habitat loss may have to be irreparable to constitute adverse effects on site integrity – and queried whether the use of a boardwalk within sand dunes at Mornington would meet this criterion. GC queried if the proposed greenway was part of a bigger plan, to extend proposed greenway further into the European site beyond what was currently proposed, as any cumulative impact would then need to be considered. NW clarified that this was a standalone project at present but more projects could be proposed as part of the national strategy.

- c. FMCG, in stressing the socio economic benefits of the project, discussed the need for the area to be an amenity to draw tourism as well as a commuter corridor between Drogheda and Mornington. With particular reference to the section in Louth FMCG queried whether the section could be just within the SAC/SPA to achieve amenity value as a greenway rather than along the roadside. GC reiterated that while it was agreed that the Councils needed to pursue these objectives, NPWS highlighted the need to ensure that European sites, and biodiversity generally, were protected as part of any proposals.
 - d. GC discussed a recent ABP finding that Greenways or Cycleways constitute public roads from a project classification standpoint. (see <http://www.pleanala.ie/casenum/303499.htm>)
4. Before the meeting closed, CC queried whether there was more up to date data on Annex 1 quality salt marsh habitat along the proposed route available from NPWS. He was advised to submit a data request form through the NPWS website and all relevant information would be made available on request. The meeting then closed. CC thanked everyone for their time.