MAGHERALIN SOLAR FAR

FLOOD RISK & DRAINAGE ASSESSMENT

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Magheralin Solar FRA
1
October 2023

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1 INTRODUCTION

RPS were commissioned by Renewable Energy Systems (RES) Ltd. (the Applicant) to prepare a Flood Risk & Drainage Assessment (FRA) as part of a planning application pack which seeks permission for the:

> *"Installation and operation of a 29.9MW solar farm including photovoltaic panels, mounting frames, transformer / inverter units, and on-site substation with associated ancillary development including security fencing, pole mounted CCTV, associated landscaping, internal access tracks and new site access." (The Proposed Development)*

The FRA has been prepared to meet the requirements of Planning Policy Statement 15 (PPS15) 'Planning and Flood Risk'.

The site is located south of Magheralin and south-east of Dollingstown. The approximate location of the site is shown in Figure 1.1. A detailed site location map is shown in Figure 1.2 and in Appendix A.

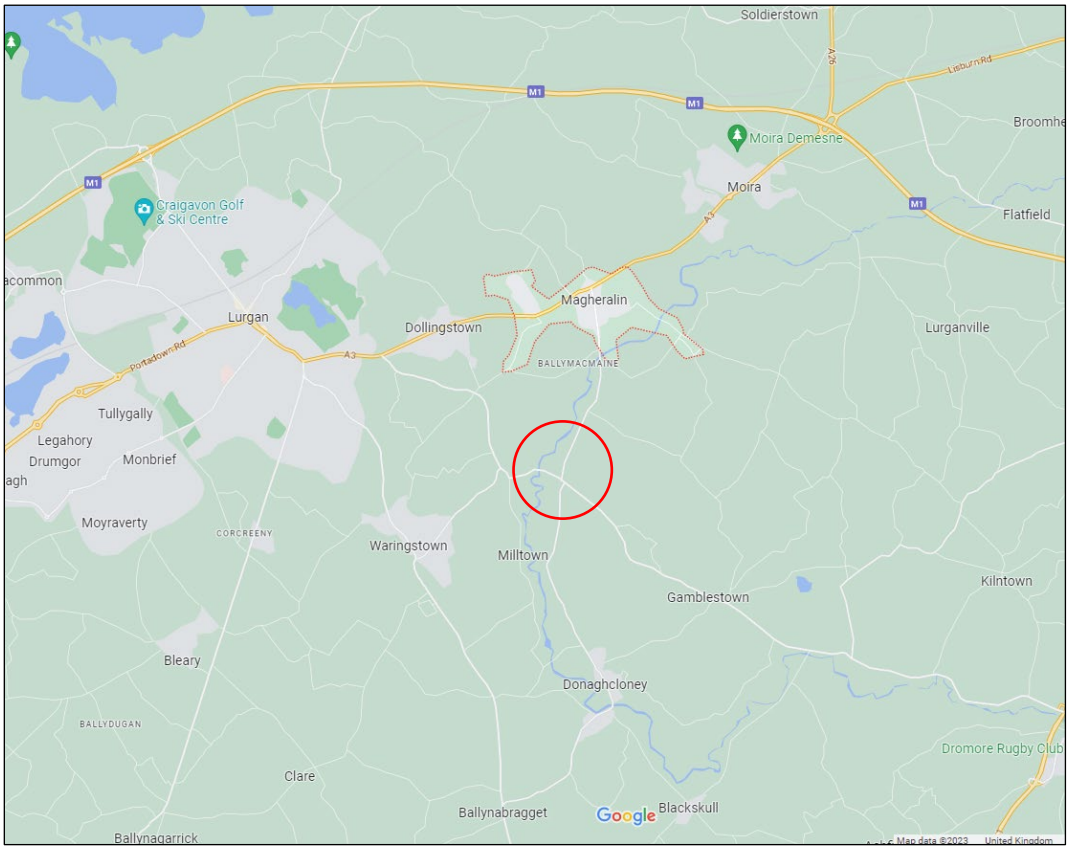

Figure 1-1 Approximate location of site

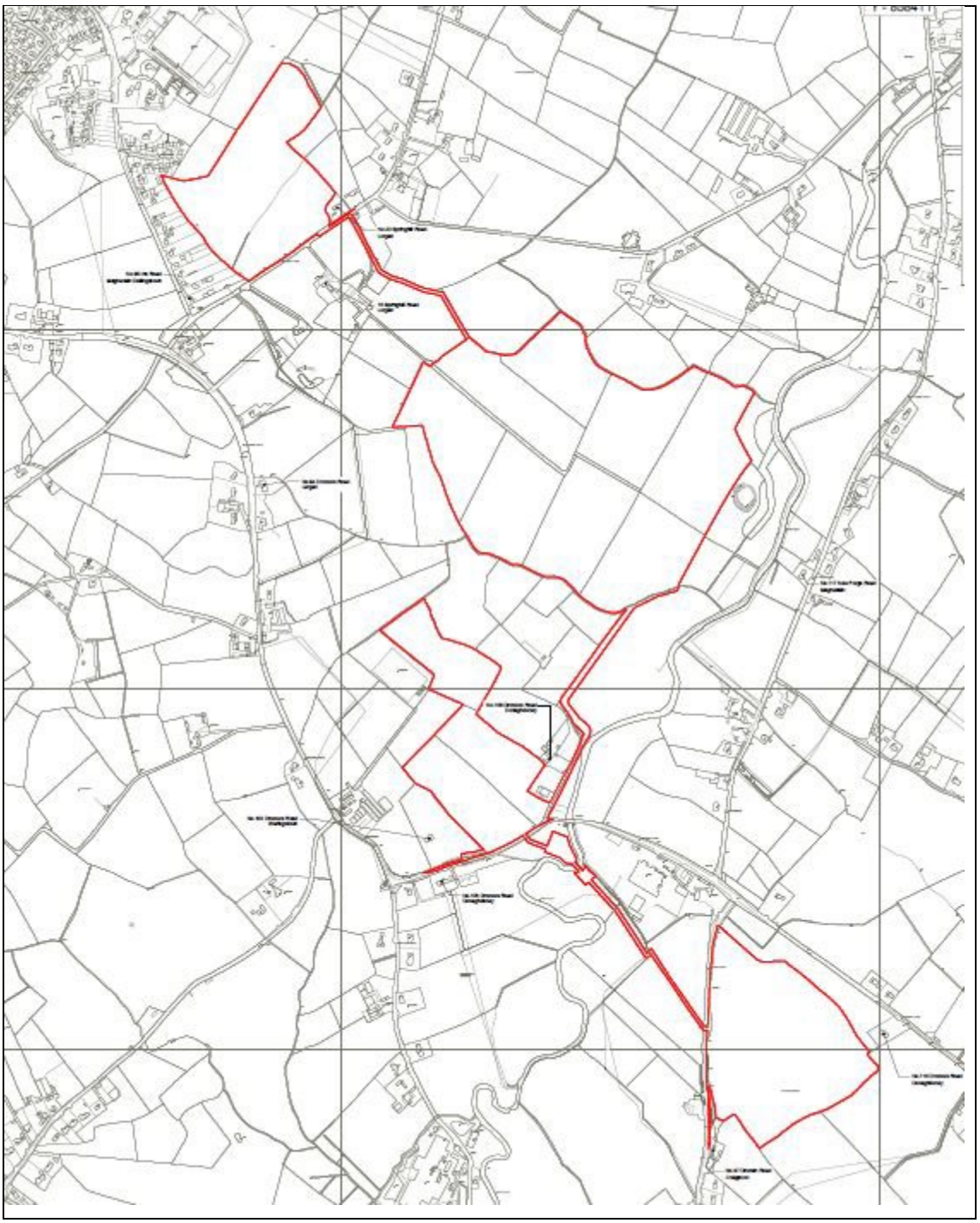

Figure 1-2 Detailed location map

2 OVERVIEW OF THE EXISTING SITE

The landholding upon which the development is proposed measures c. 64.43 hectares / 159.23 acres and is comprised of four main land-parcels which from north to south are as follows:

- Parcel 1 – Lands accessing onto Springhill Road and immediately northwest of No.22 Springhill Road. Lands extend north from Springhill Road for a distance of approximately 367m (c. 9.3 ha);
- Parcel 2 – Lands beginning approximately 267m southeast of Springhill Road and continuing southeast for a distance of approximately 740m (c.33.3ha);
- Parcel 3 – Lands accessing onto and located immediately north of Dromore Road and extending north/northeast for a distance of approximately 570m (c. 9.4 ha). Lands are located immediately east of No.108 Dromore Road; and
- Parcel 4 – Lands accessing onto Drumlin Road and located approximately 65m north of No. 67 Drumlin Road. From Drumlin Road, lands extend eastwards for approximately 360m (c. 11.5 ha).

Parcels 2 and 3 will be connected via underground cables which will pass through agricultural fields utilising existing agricultural lanes where available. The northern most land-parcel (Parcel 1) will be connected via an interconnection cable across Springhill Road and intervening agricultural lands and the second interconnection route proceeds northwards from the southern-most land parcel (Parcel 4) across Drumlin Road and through intervening agricultural lands. It is proposed to traverse the River Lagan via horizontal directional drill before crossing Dromore Road to the north, and entering Parcel 3 of the site. The interconnection cable areas comprise 0.93ha.

The lands are all currently greenfield. An aerial photo of the area is shown in Figure 2-1, which provides field numbers for ease of reference within this Report.

Figure 2-1 Aerial photo of site

The River Lagan flows adjacent to some areas of the site. Two smaller watercourses, the Springhill Stream Extension and the Ballymacmaine Stream, also flow through the area. All of these watercourses are

designated under the Drainage (Northern Ireland) 1973, which means that DfI Rivers are responsible for their maintenance. The locations of the watercourses are shown in Figure 2-2.

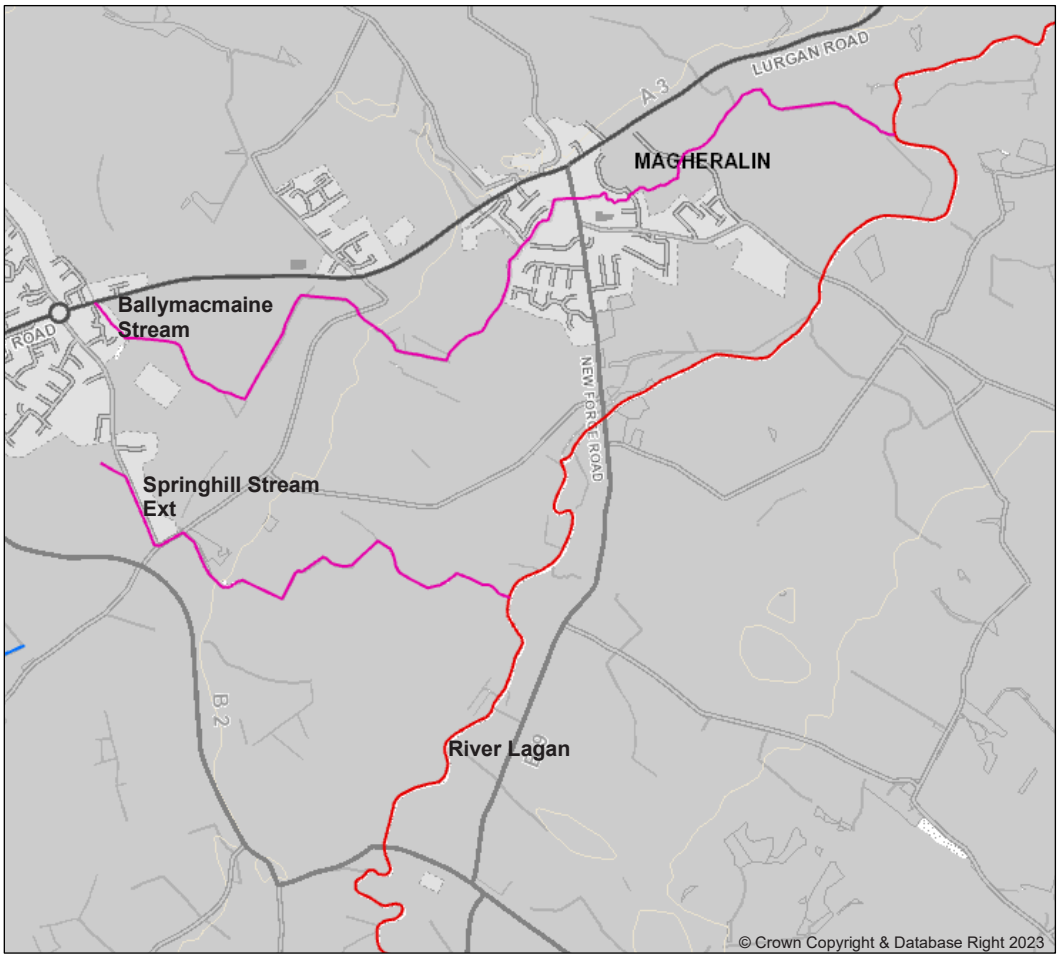

Figure 2-2 Locations of designated watercourses

3 PROPOSED DEVELOPMENT

The land-holding upon which the development is proposed measures c. 64.43 hectares/ 159.23 acres. Panels will not be placed on this entire area. The proposed layout is shown in Appendix B.

The application is for the construction and operation of a solar farm with a proposed capacity not exceeding 29.9MW. The project components are listed below:

- Photovoltaic (PV) Solar Panels erected on steel/ aluminium frames set out in south-facing arrays;
- 1 No. Primary 33kV Sub-station typically measuring 10.34m x 5.7m x 6.45m and a solar control building 8.3m x 3.45m x 4m;
- 9 No. Inverter Substations typically comprises of an inverter measuring 5m x 3m x 2.5m and a transformer typically measuring 4m x 3m x 2.5m to be located across the site;
- Perimeter post and wire security fencing (2.4m high);
- A number of strategically located CCTV security cameras (3.5m high);
- New or upgraded access points onto Dromore Road (Centre), Drumlin Road (South), and Springhill Road (North);
- Associated internal service tracks;
- Internal and interconnecting underground cabling. Connecting cables run along the back of each panel to the end of every row where they connect to the main cables which in turn connect to inverter stations and primary on-site substation. Main cables will be undergrounded.

  There are also two interconnection routes the purpose of which is to transfer the energy created from the on-site inverter stations to the on-site substation which is proposed in the centre of the site – Parcel 3.

  One interconnection route extends from the northernmost land-parcel (Parcel 1) across Springhill Road and intervening agricultural lands, then along internal tracks within the Proposed Development until it reaches the substation.

  The second interconnection route proceeds northwards from the southern-most land parcel (Parcel 4) across Drumlin Road and through intervening agricultural lands. It is proposed to traverse the River Lagan via horizontal directional drill before crossing Dromore Road to the north, and entering Parcel 3 of the site; and
- Temporary construction compounds.

4 POTENTIAL SOURCES OF FLOOD RISK

Planning Policy Statement 15 considers four main sources of flooding. Flooding from rivers occurs when the channel capacity is exceeded, and flood water overtops the banks. Coastal flooding occurs when inundation of land takes place due to a combination of high tides, wave action and storm surge. Surface water flooding occurs as a result of high intensity rainfall which can overwhelm drainage systems or cause water to collect in low lying areas. Flooding from impounded water bodies such as reservoirs and dams can arise as a result of overtopping or failure of the impounding structure which in turn may result in a sudden uncontrolled release of flood water into downstream areas. The potential for flooding has been based on the published maps available from Flood Map (NI).

DfI Water & Drainage Policy Division published 'Technical Flood Risk Guidance in relation to Allowances for Climate Change in Northern Ireland' in February 2019 which sets out the DfI Rivers approach to climate change in flood risk management. DfI have chosen the 2080s as a suitable epoch on which to base allowances for climate change for development planning and flood risk management purposes. DfI Rivers have now published Climate Change maps for the 2080 epoch on Flood Maps (NI). Both the present day and 2080 scenarios have been considered in this assessment where information is available.

4.1 River Flooding

4.1.1 Present day

In line with the principles set out in Planning Policy Statement 15, a 1% AEP event should be considered when assessing the flood risk from rivers. Detailed flood maps are available for this area for the River Lagan. An extract from the present-day floodplain is shown in Figure 4-1 with the approximate site location marked on. The map indicates that there are areas of present-day fluvial floodplain of the River Lagan within the site (Fields numbers 1, 2, 3, 6, 7 and 8 as shown in Figure 2-1), and areas of floodplain are crossed by the routes for the access roads or cables. Note that the other watercourses are too small to be included in the flood maps.

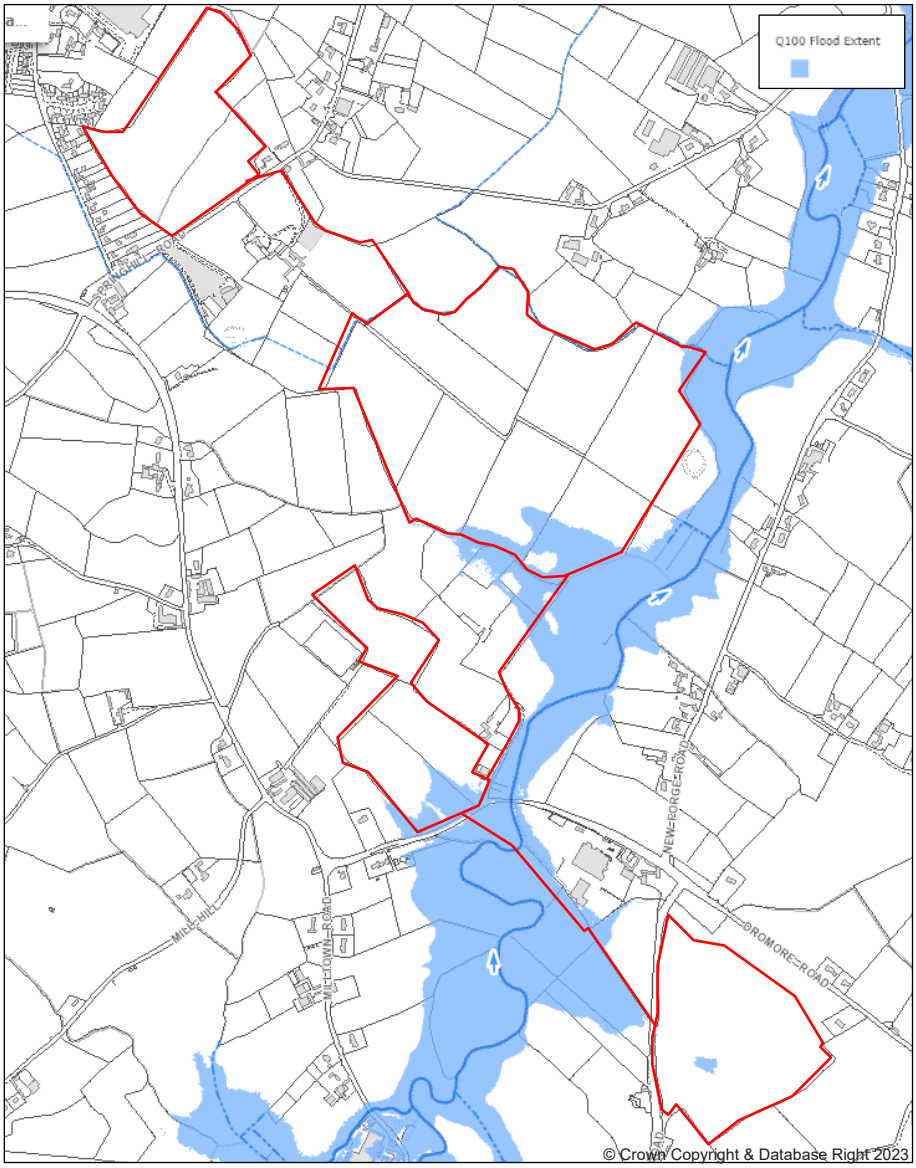

Figure 4-1 Extract from River Floodplain map (Present day)

4.1.2 Climate Change (2080)

An extract from the 2080 strategic flood map is shown in Figure 4-2 with the approximate site location marked on. Similar areas (Fields numbers 1, 2, 3, 6, 7 and 8) are predicted as a result of river flooding in the climate change scenario as in the present-day scenario. A small Section of Field 10 is also impacted in this scenario.

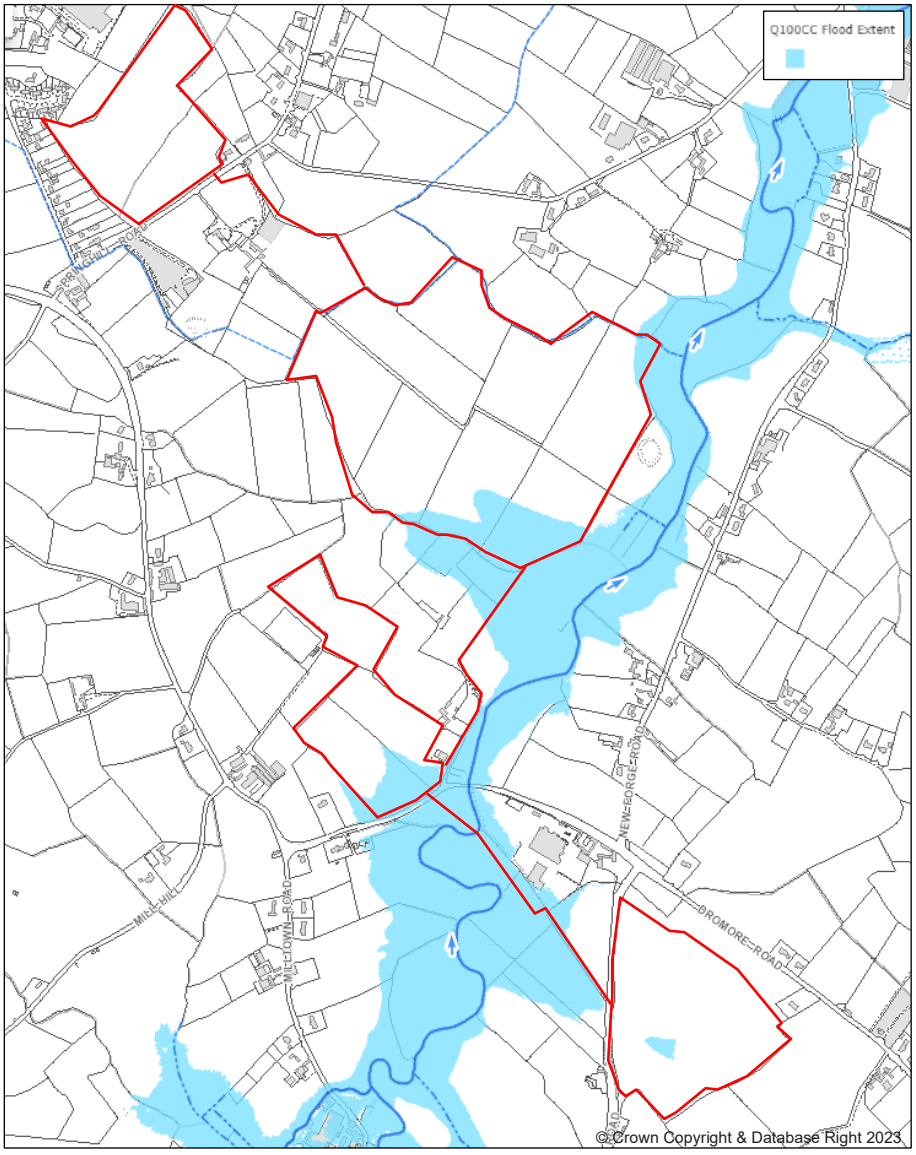

Figure 4-2 Extract from River Floodplain map (Climate change)

4.2 Potential for Coastal Flooding

In line with the principles set out in Planning Policy Statement 15, a 0.5% AEP event should be considered when assessing the flood risk from the sea. Due to its inland location, there is no risk of coastal flooding at the site.

4.3 Potential for Surface Water Flooding

4.3.1 Present day

The present-day surface water flooding extents (0.5% AEP) are shown in Figure 4-3 with the approximate site location marked on. The map shows limited areas of present-day surface water floodplain within the site, mostly with depths of less than 0.3m (Field numbers 2, 6 and 12). There are two small areas with depths up to 1m (Field numbers 1 and 4).

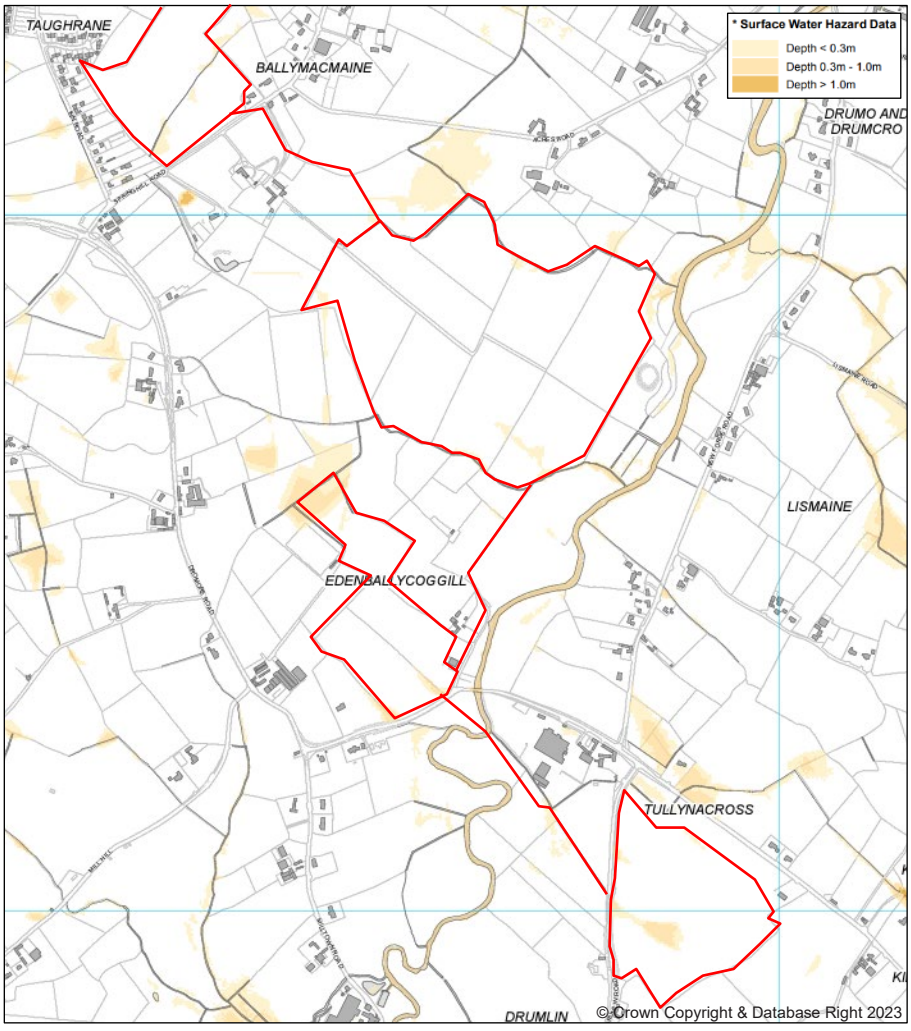

Figure 4-3 Extract from Surface Water Map (Present day)

4.3.2 Climate Change (2080)

The 2080 surface water flooding extents are shown in Figure 4-4. Similar areas are predicted as a result of surface water flooding in the climate change scenario as in the present-day scenario, with similar depths.

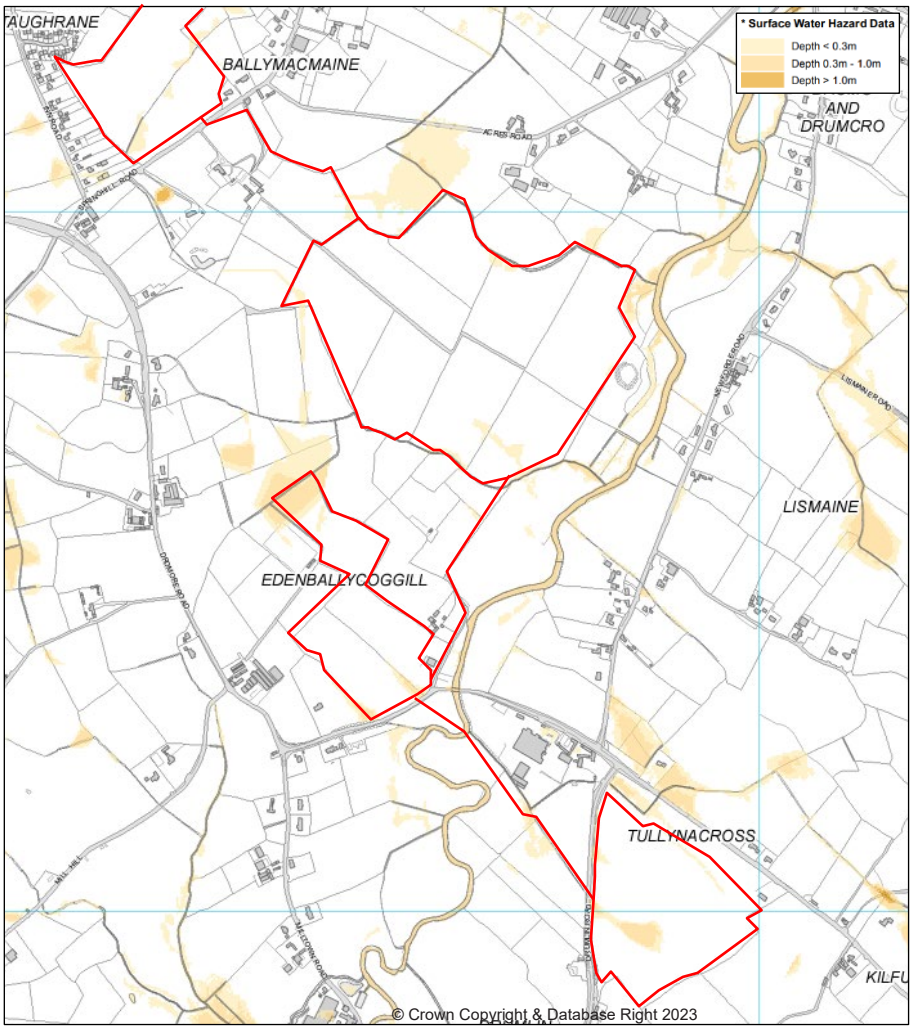

Figure 4-4 Extract from Surface Water Map (Climate change)

4.4 Potential for Flooding from Impounded Water Bodies

Magheralin Pond which is controlled reservoir is located to the east of the site. Dfl Rivers' Reservoir Flood Mapping for Emergency Planning shows that the site is not affected by the potential inundation area of this reservoir. An extract from the reservoir flood map shown in Figure 4-5 with the approximate site location marked on.

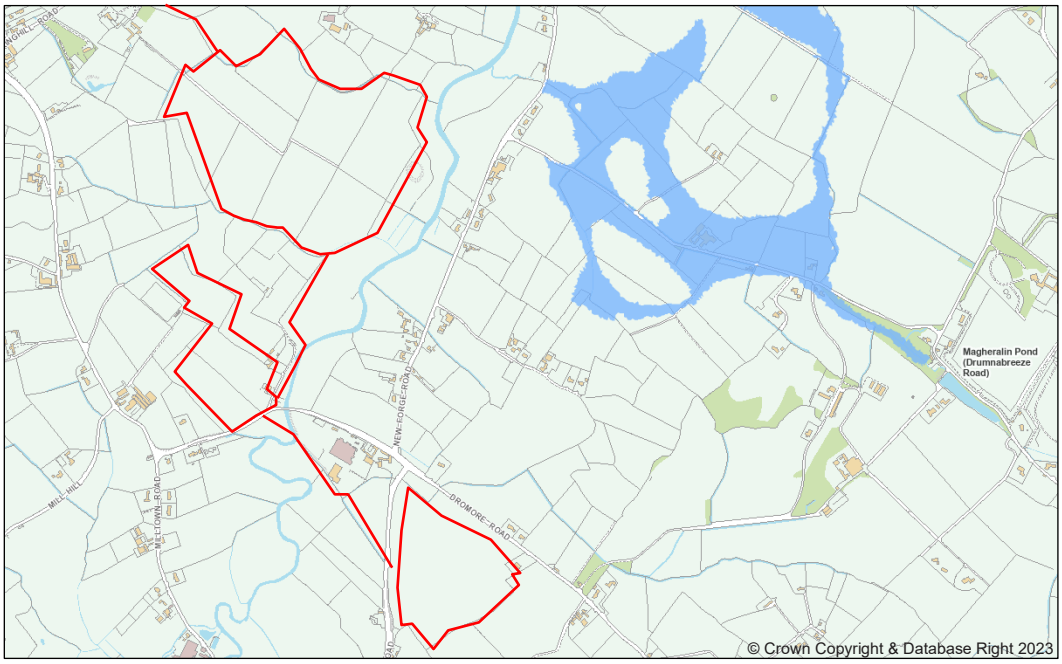

Figure 4-5 Extract from Reservoir Flood Mapping

4.5 Historical Flooding

Flood Map (NI) shows historical flooding at the site from the River Lagan. The extent of the historical flooding is shown in Figure 4-6 with the approximate site location marked on. Flood events are noted to have occurred in December 1978, February 1994 and November 1997, and would have affected parts of the site (Field numbers 6, 7 and 8).

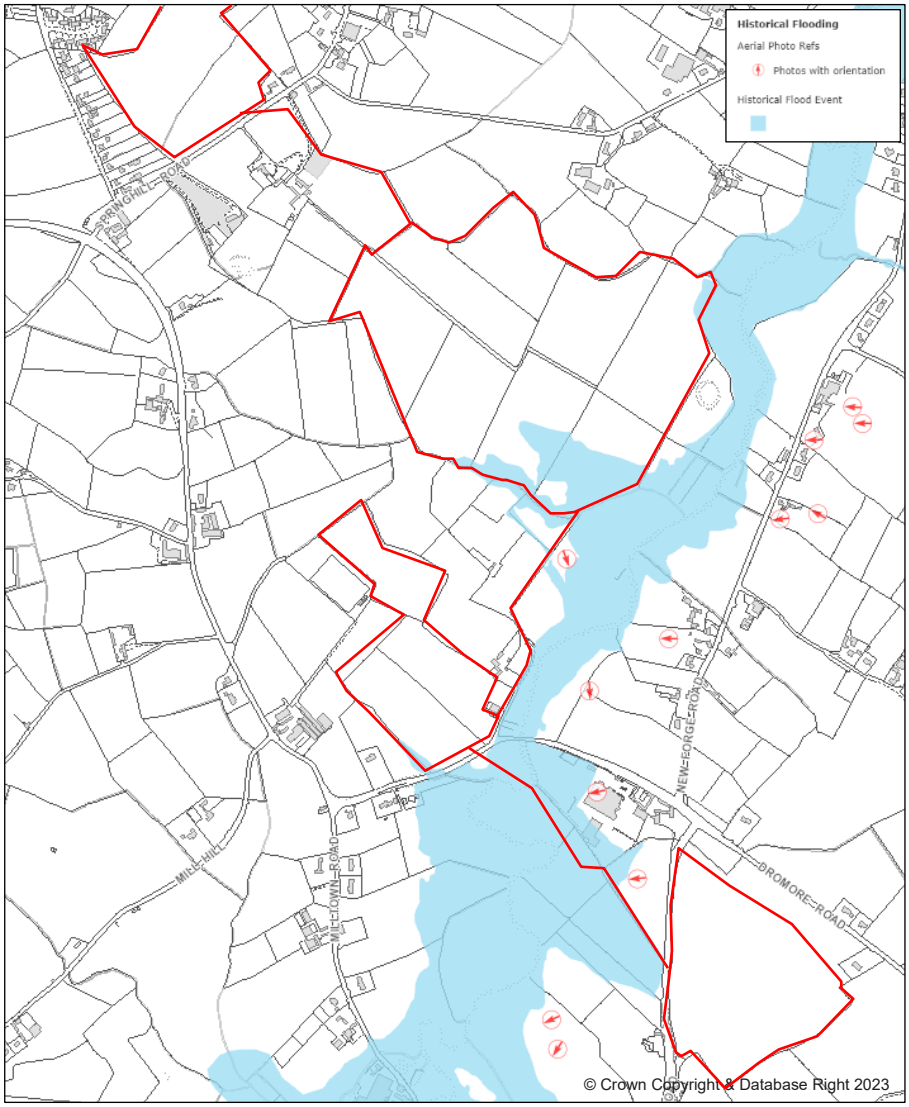

Figure 4-6 Historical flooding

4.6 Summary of Flood Risk

RPS has considered all possible sources of flooding (river, tidal, surface water and impounded water bodies) and the results of this are summarised in Table 4-1. The main flood risk to the site is river flooding from the River Lagan.

Table 4-1 Summary of flood risk

Source of flooding	Summary of flood risk
River	Flood Map (NI) indicates that there are areas of present-day and climate change fluvial floodplain of the River Lagan within the site, and areas of floodplain are crossed by the routes for the access roads or cables. Note that the other watercourses are too small to be included in the flood maps.
Coastal	Due to its inland location, there is no risk of coastal flooding at the site.
Surface water	Flood Map (NI) shows limited areas of present-day surface water floodplain within the site, mostly with depths of less than 1m. There are two small areas with depths greater than 1m.
Impounded water bodies	Reservoir Flood Mapping for Emergency Planning shows that the site is not affected by the inundation area of any controlled reservoir.

5 DRAINAGE ASSESSMENT

As the development is in excess of 1 ha, a Drainage Assessment is required to demonstrate that adequate measures will be put in place so as to effectively mitigate the surface water flood risk to the proposed development and from the development elsewhere. The risk from surface water flooding to and from the proposed solar farm is considered in Section 6.2. This section focuses on the potential for runoff from the proposed development.

The majority of the site currently consists of agricultural/ permeable ground which provides varying degrees of infiltration. The proposed development will not increase the rate of runoff from that currently as there are limited areas of hardstanding associated with the development.

There will be no re-grading of land or cut and fill to facilitate panel placement. Excavation is required to allow cable laying only together with the foundations for the inverter stations and on-site sub-station, and minor excavation for security fence posts and CCTV bases.

The solar panels will not form large impermeable surfaces. Installation of the panels will have minimal impact on the ground as the panel stanchions are small in cross-sectional area and spaced at a distance apart. The front bottom edge of the panels will be typically 0.7m above existing ground level and within a range of 500mm to 1.2m, depending on local topography. There is a minimum spacing of 2m between the arrays. In addition, there are spaces between each of the panels as they are affixed to the supporting structure, allowing rainwater to pass through the arrays and disperse evenly. These design features combine to ensure permeability within the solar panels, and runoff will be no greater for the developed site than it is for the pre-developed site. Rainfall will fall onto open ground as usual or run-off the panels through the gaps into the ground to be dispersed by the same routes that are currently in place. Photos of the panels from a recently constructed solar farm are shown in the Figures 5-1 and 5-2, where the spaces between the panels are clearly visible.

Figure 5-1 Photo of solar panels (front elevation)

Figure 5-2 Photo of solar panels (underneath)

The panels are being installed on the land as it is currently. When operational the site will support a dual renewable/ farming use and the overwhelming land area will remain agricultural. Therefore, there will be no changes made to existing ground levels or ground cover, and the existing surface runoff paths are unchanged. The existing vegetation beneath and around the solar panels will be retained. Grass cover helps reduce runoff and erosion by slowing movement of water in the affected area. Earth disturbance and grading activities will be minimised. This will therefore replicate the pre-development condition after the construction is finished. Figures 5-1 and 5-2 show how the grass has been retained at the recently constructed solar farm.

Any flows that do not infiltrate will drain to the existing drainage ditches within the site. The overall drainage regime for the site will not therefore be significantly altered as a result of the proposed development. Therefore, no additional drainage works are proposed as part of the development.

There is no other significant infrastructure being installed that will impact significantly on runoff. Access to the site is proposed via new or upgraded access points onto Dromore Road (Centre), Drumlin Road (South), and Springhill Road (North). The development will utilise existing agricultural lanes for servicing purposes in so far as is reasonably possible. Access will also be achievable during construction and operation via tractor or 4 x 4 vehicles around the periphery of existing fields where buffers to field boundaries are designed into development proposals. As such the extent of proposed new access tracks is minimised. Where new tracks are required, these will be permeable and of stone construction.

The substation and control building will sit atop a concrete foundation however the remainder of the compound will be permeable and of stone construction. The control and sub-station buildings will have gutters and downpipes, and rudimentary soakaways will be provided for each pipe (consisting of a stone pit).

The invertor stations will be accommodated in small modular cabin like buildings positioned throughout the site. The invertor stations are constructed atop concrete plinths. The small areas of roofs created by the invertor stations are insignificant compared to the size of the site, and any limited runoff will soak away naturally.

The cable trenches will be approximately 1m deep, depending on the detailed terrain. The first 150 - 300mm of trenches will be filled with sand. The remainder of the trenches will be backfilled with the existing topsoil which was previously removed to facilitate the cable laying. Vegetation soil turves will be laid beside the trench and used to reinstate the ground to original levels after the cables have been installed. The cable trenches will therefore not cause any additional surface water flow paths to develop.

It is not usual for water channels to form as a result of runoff from the panels, especially if the ground is vegetated. However, checks will be undertaken by staff visiting the site for maintenance visits at 6 monthly intervals. If necessary, erosion control methods will be used.

The overall drainage regime for the site will not be significantly altered as a result of the proposed development. Therefore, no additional drainage works are proposed as part of the development.

6 FLOOD MITIGATION MEASURES

6.1 River Flooding

6.1.1 Solar Panel Arrays

The proposed solar panel layout is shown in Figure 6-1 with the river floodplain marked on. To be conservative the 2080 floodplain has been used, although the operational lifespan of the project is 40 years. Some of the panels will be located within the identified floodplain (Field numbers 1, 6, 7 and 8). It is only proposed to construct the solar arrays in areas with flood depths less than 0.75m, no development will take place in areas with a flood depth greater than 0.75m. The depths have been determined using the predicted 1% AEP flood levels and topographical surveys. To mitigate the flood risk, a minimum freeboard of 300mm will be applied between the solar panel and the 1% AEP flood level. Using this design methodology, the solar arrays in these areas will be constructed to ensure that the individual solar panels are situated 1.1m above ground level at their front, lowest level. The solar PV arrays to be raised are shown in light blue in the layouts in Appendix B.

Where the panels are located within the river floodplain, the impact on flood risk elsewhere is considered negligible since the footprint of the stanchions on the ground will be insignificant in relation to the floodplain area. The stanchions are small in cross-sectional area and spaced at a distance apart, with the total area of pile stanchions making up less than 0.2% of the total site area. The proposed development will therefore not increase the risk of river flooding elsewhere.

The flood maps do not show the floodplain of the other minor watercourses that flow through the site. A 5m buffer either side of any watercourse has been used in the siting of the panels, and this will allow for any potential floodplain to be avoided. The panels are typically 700mm and within a range of 500mm to 1.2m above ground level so will only be at risk of flooding if the depth exceeds this. Water levels of this depth are unlikely to occur given that the watercourses throughout the site are very small and are unlikely to have the flows to create this depth of flood.

The substation and invertor stations must avoid flooding and accordingly are located outside of the floodplains.

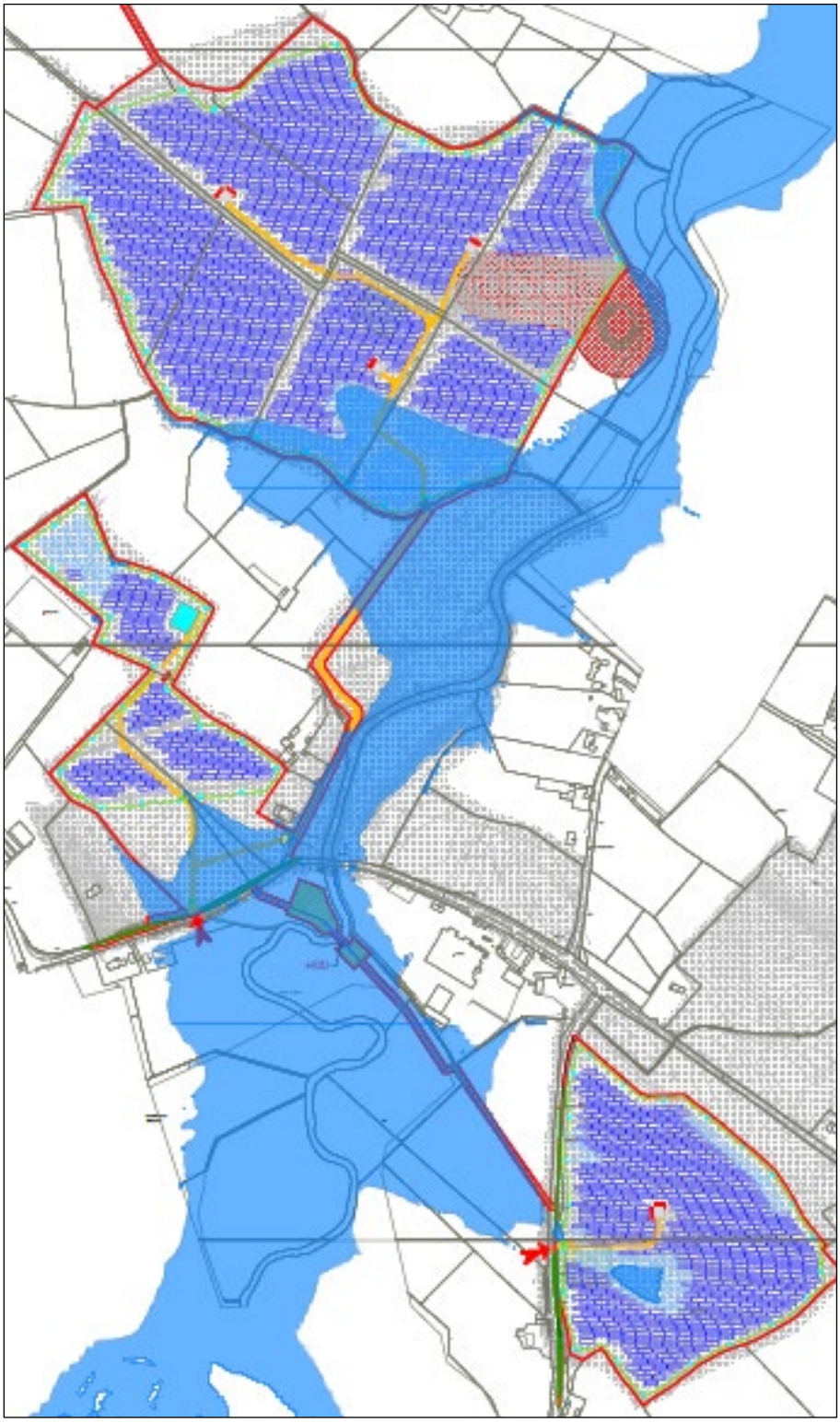

Figure 6-1 Proposed layout and 1% AEP river floodplain (2080)

6.1.2 Access Roads

A number of existing and new access tracks will be located within the floodplain. These will be constructed at existing ground levels and can be allowed to flood, so there is therefore no impact on the floodplain. The depths of flooding are generally less than 1m as shown in Figure 6-2 (approximate route of access road shown as dashed line). There are no permanent staff associated with the development but if emergency access is required alternative access/ egress is available if the access tracks are flooded. The access road will cross a small watercourse which will require Schedule 6 approval (consent to undertake works to a watercourse) from the local DfI Rivers Area Office. It is anticipated that this requirement will be attached to any emerging planning consent for the application.

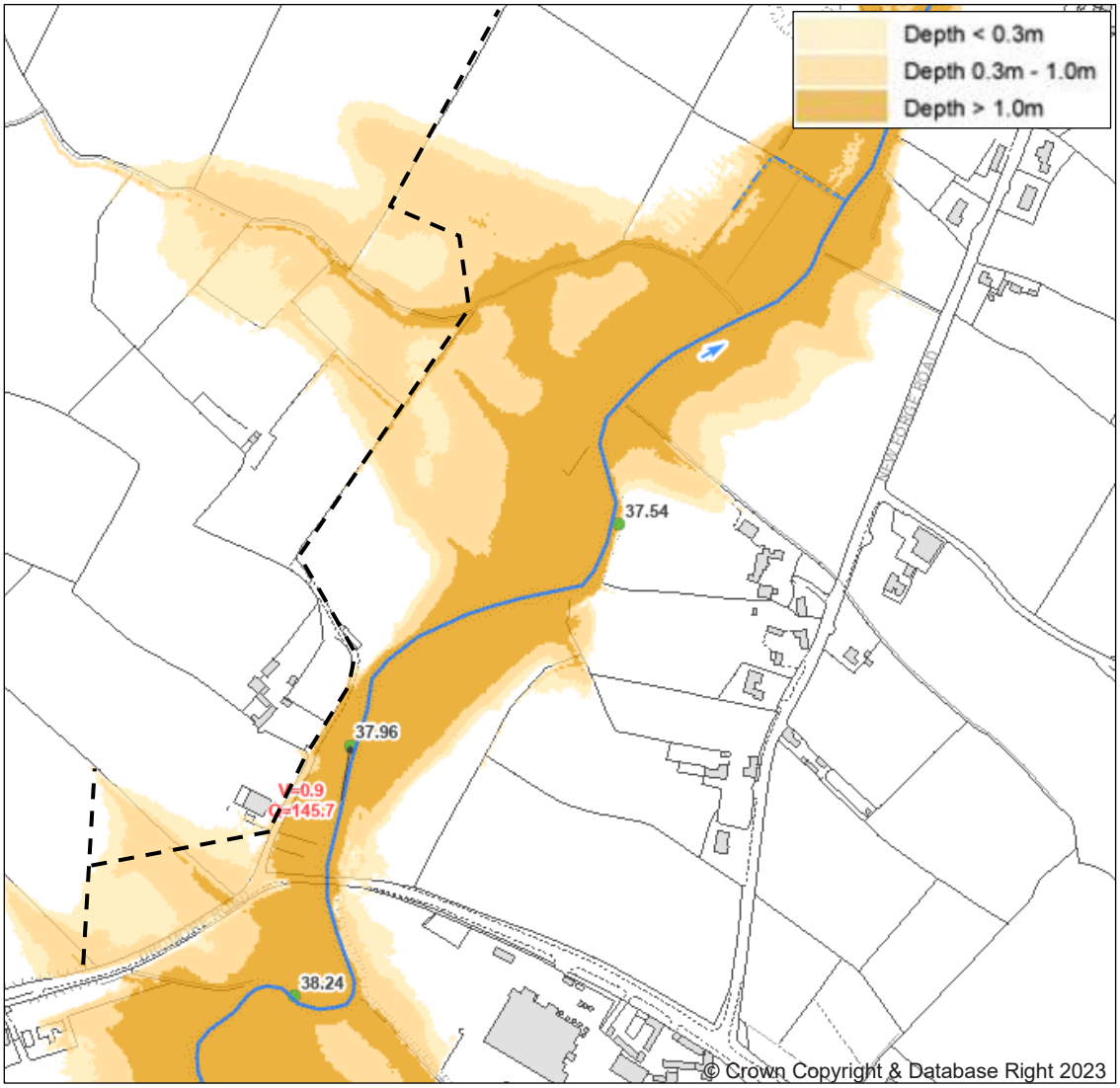

Figure 6-2 Approximate locations of access tracks and flood depths (1% AEP, Present day)

6.1.3 Interconnection Cable

An underground interconnection cable will laid through the floodplain as shown in Figure 6-3 as a dashed red line. Special consideration will need to be given to the construction methodology to limit the impact. The crossing of the River Lagan will be undertaken by horizontal directional drilling. An Outline Construction Environmental Management Plan (OCEMP) is included as part of the planning pack, which sets out environmental management and mitigation techniques to help ensure there are no significant impacts on the environment during construction. It is a "live" document and will be further developed by the Contractor during the construction stage. Appendix H of the OCEMP provides an outline Horizontal Directional Drilling Methodology including best practice design and construction methodology. This confirms methods to protect from flood risk including temporary deposition of materials will be kept outside of any floodplain and the timing of proposed construction works during periods of dry weather when the risk of a flood event is minimal/negligible.

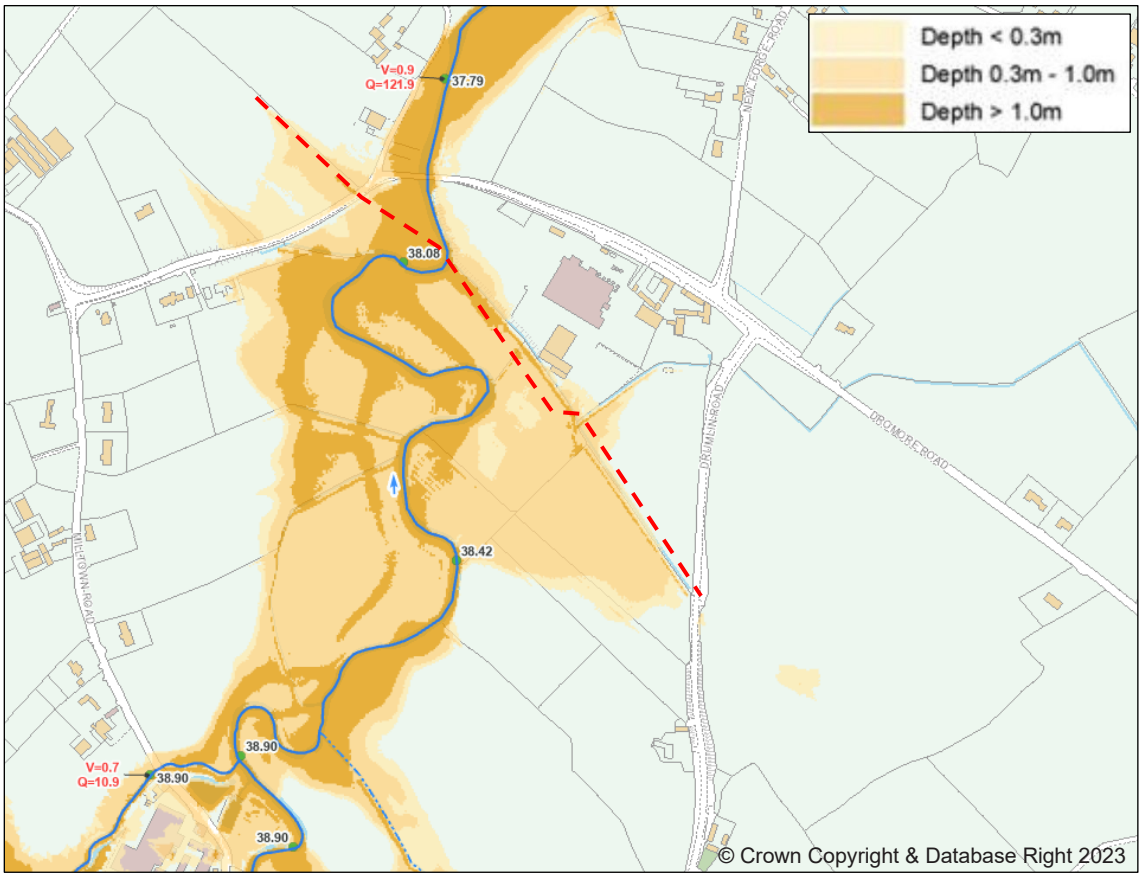

Figure 6-3 Approximate location of interconnection cable and flood extent (1% AEP, Present day)

6.2 Surface Water Runoff

Surface water flooding occurs when the ground is unable to absorb the rainwater, causing it to flow over the surface and fill depressions and low spots in the landscape where the local natural and engineered drainage systems are overwhelmed. Some areas of potential flooding from surface runoff have been identified within the site as shown in Figure 6-4, but they will not impact the proposed development as they are mostly of limited depths (less than 0.3m) and the panels will be typically 0.7m above existing ground level (Field numbers 2, 6 and 12). There are some areas identified where the surface water flooding has depths of up to 1m (Field numbers 1 and 4), and in these areas the panels will be raised to 1.2m above ground level. The solar PV arrays to be raised are shown in light blue in the layouts in Appendix B. No critical infrastructure such as the sub-station and invertor stations will be located in surface water flood risk areas.

Where the panels are located within the surface water floodplain, the impact on flood risk elsewhere is considered negligible since the footprint of the stanchions on the ground will be insignificant in relation to the floodplain area. The stanchions are small in cross-sectional area and spaced at a distance apart, with the total area of pile stanchions making up less than 0.2% of the total site area. The proposed development will therefore not increase the risk of surface water flooding elsewhere.

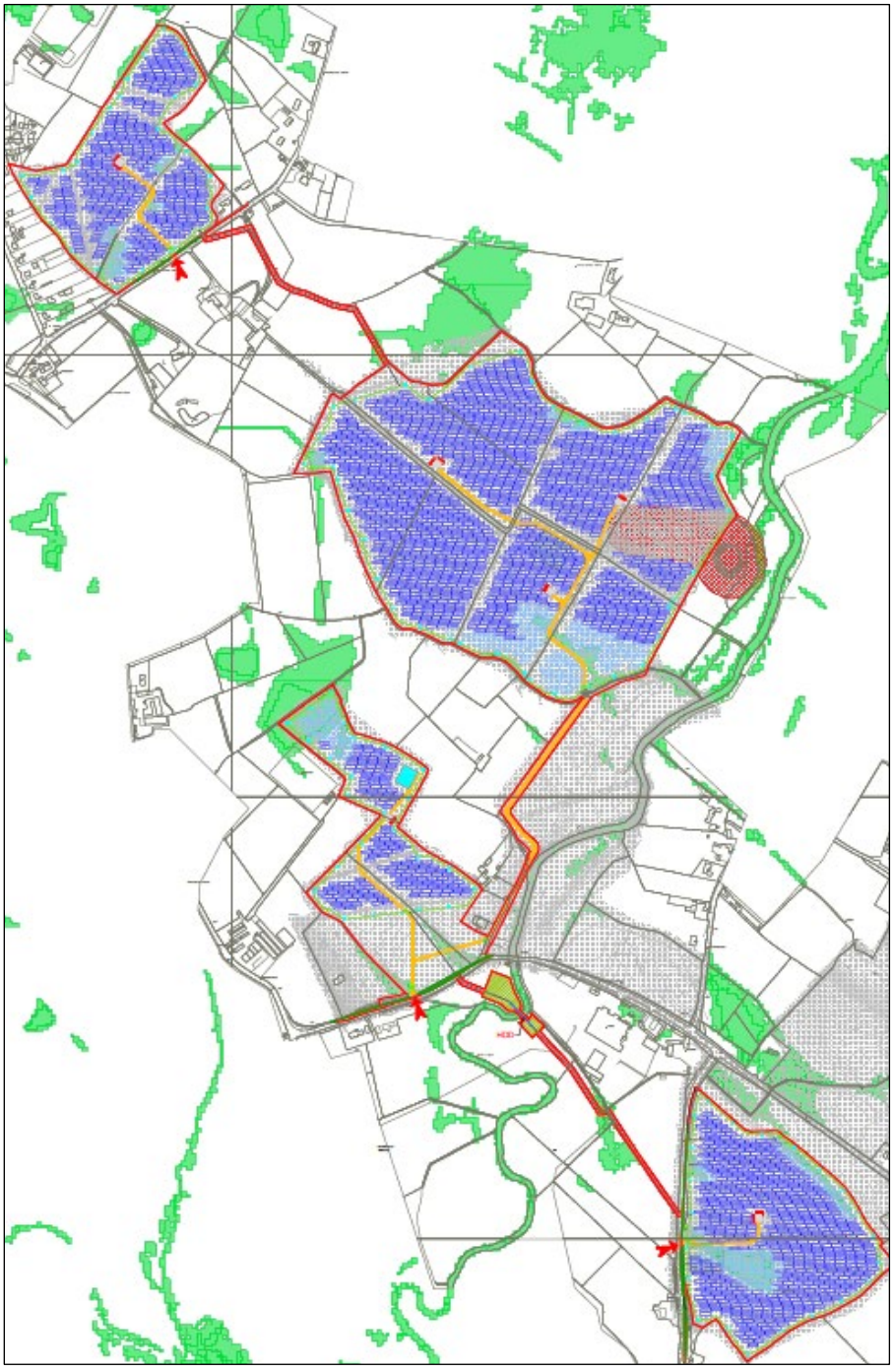

Figure 6-4 Proposed layout and 0.5% AEP surface water floodplain (2080)

As described in Section 5, the proposal will not significantly increase the rate of runoff from the current rates and no formal drainage systems are being installed. Therefore, no further mitigation measures are proposed.

The retention of the existing grass cover helps reduce runoff and erosion by slowing the movement of water. Earth disturbance and grading activities will be minimised. This will therefore replicate the pre-development condition after the construction is finished. Disturbance during construction will be minimal and grass will be retained. However, where construction activities have impacted on existing areas of vegetation, these areas will be chisel ploughed and re-seeded with agricultural grazing/ silage sward grass species. Chisel ploughing will reduce soil compaction on the site and promote growth; it has been proven to significantly increase infiltration rates thereby reducing runoff rates. Additionally, the planting provides high levels of natural attenuation which will serve to reduce the erosion and limit surface water flows across the site. The site will be actively managed to keep the soil in good condition during the operational phase and maintain the sward where possible.

It is not usual for water channels to form as a result of runoff from the panels, especially if the ground is vegetated. However, checks will be undertaken by staff visiting the site for maintenance visits at 6 monthly intervals. If necessary, erosion control methods will be used.

7 COMPLIANCE WITH PLANNING POLICY STATEMENT 15

Revised Planning Policy Statement 15 (PPS15) 'Planning and Flood Risk' was published in September 2014. In line with the requirements of PPS15, RPS have considered all possible sources of flooding and have taken a conservative approach in establishing the flood risk to the site. The information provided in this FRA is compliant with the requirements of Annex D of the Revised PPS 15.

7.1 Policy FLD1 Development in River and Coastal Floodplains

Under Policy FLD1, development will not be permitted within the 1% AEP fluvial floodplain unless the applicant can demonstrate that the proposal constitutes an exception to the policy. There are areas of 1% AEP fluvial floodplain of the River Lagan within the site, and therefore Policy FLD1 is applicable to the proposed development.

Some of the panels will be located within the identified floodplain. It is only proposed to construct the solar arrays in areas with flood depths less than 0.75m, no development will take place in areas with a flood depth greater than 0.75m. To mitigate the flood risk, a minimum freeboard of 300mm has been used between the solar panel and the 1% AEP flood level. Using this design methodology, the solar arrays in these areas will be constructed to ensure that the individual solar panels are situated 1.2m above ground level. Where the panels are located within the river floodplain, the impact on flood risk elsewhere is considered negligible since the footprint of the stanchions on the ground will be insignificant in relation to the floodplain area. The stanchions are small in cross-sectional area and spaced at a distance apart, with the total area of pile stanchions making up less than 0.2% of the total site area. The proposed development will therefore not increase the risk of river flooding elsewhere.

The flood maps do not show the floodplain of the other minor watercourses that flow through the site. A buffer of 5m has been used in the siting of the panels either side of any watercourse/ drain, and the panels will be above the ground by typically 700mm (within a range of 500mm to 1.2m). These measures will ensure that the risk of flooding to the panels is minimised.

The substation and invertor stations must avoid flooding and are located on higher ground, outside of the floodplains.

A number of the existing and new access tracks will be located within the floodplain. These will be constructed at existing ground levels and can be allowed to flood, so there is therefore no impact on the floodplain.

The solar farm development is compliant with the standards of Policy FLD1.

7.2 Policy FLD2 Protection of Flood Defence and Drainage Infrastructure

Policy FLD2 states that development will not be permitted that would impede the operational effectiveness of flood defence and drainage infrastructure. There are no defences associated with the watercourses in the area. Where a new development is located beside a watercourse it is essential that an adjacent working strip is retained to facilitate future maintenance by DfI Rivers or other statutory undertaker or riparian landowner. DfI Rivers recommends that a minimum working strip of 5m is provided. Therefore, a working strip of 5m will be provided along all watercourses within the site, and nothing in connection with the development will be constructed within these strips.

The solar farm development is compliant with the standards of Policy FLD2.

7.3 Policy FLD3 Development and Surface Water Flood Risk Outside Floodplains

As the site is in excess of 1ha, a Drainage Assessment is required under Policy FLD3. This is presented in Section 5.

Some areas of potential flooding from surface runoff have been identified within the site, but they will not impact the proposed development as they are mostly of limited depths (less than 0.3m) and the panels will be typically 0.7m above existing ground level and within a range of 500mm to 1.2m. There are some areas identified where the surface water flooding has depths of up to 1m, and in these areas the panels will be raised to 1.2m above ground level. No critical infrastructure such as substation and invertor stations will be located in surface water flood risk areas. The proposed development will therefore not be at risk of surface water flooding.

Where the panels are located within the surface water floodplain, the impact on flood risk elsewhere is considered negligible since the footprint of the stanchions on the ground will be insignificant in relation to the floodplain area. The stanchions are small in cross-sectional area and spaced at a distance apart, with the total area of pile stanchions making up less than 0.2% of the total site area. The proposed development will therefore not increase the risk of surface water flooding elsewhere.

The solar panels will not form large impermeable surfaces. The arrays are arranged in well-spaced rows with open avenues in between. In addition, there are spaces between each of the panels as they are affixed to the supporting structure, allowing rainwater to pass through the arrays and disperse evenly. These design features combine to ensure permeability within the solar panels. Rainfall will fall onto open ground as usual or run-off the panels through the gaps into the ground to be dispersed by the same routes that are currently in place.

Owing to the retention of vegetation there will not be a measurably increased runoff as a result of installation of the panels. Any flows that do not infiltrate the ground will drain to the existing drainage ditches within the site. The overall drainage regime for the site will not therefore be significantly altered as a result of the proposed development. There will be no storm water drainage installed as part of the development, and no discharge consents are required.

There will be no increase in runoff rates or volumes from the site, and no changes to the upstream or downstream hydrology and flood risk as a result of the development.

The solar farm development is compliant with the standards of Policy FLD3.

7.4 Policy FLD4 Artificial Modification of Watercourses

Policy FLD4 is concerned with the artificial modification of watercourses. The project will not alter any watercourses, although there will be a water crossing of a small drain between Fields 2 and 3 which will require a Schedule 6 application to the DfI Rivers Area Office. Therefore Policy FLD4 is not applicable to this project.

7.5 Policy FLD5 Development in Proximity to Reservoirs

DfI Rivers' Reservoir Flood Mapping for Emergency Planning shows that the site is not affected by the potential inundation area of any controlled reservoir. Therefore, Policy FLD5 does not apply.

8 CONCLUSION

This FRA has been prepared to show that the proposal complies with Planning Policy Statement 15 'Planning and Flood Risk' (PPS15). The main sources of flooding (coastal, river, surface water, and reservoirs) have been considered, based on published flood maps.

The flood map shows that small areas of the site are affected by the 1% AEP floodplain of the River Lagan. Some of the panels will be located within the identified floodplain. It is only proposed to construct the solar arrays in areas with flood depths less than 0.75m and no development will take place in areas with a flood depth greater than 0.75m. To mitigate the flood risk, a minimum freeboard of 300mm has been used between the solar panel and the 1% AEP flood level. Using this design methodology, the solar arrays in these areas will be constructed to ensure that the individual solar panels are situated 1.2m above ground level. Where the panels are located within the river floodplain, the impact on flood risk elsewhere is considered negligible since the footprint of the stanchions on the ground will be insignificant in relation to the floodplain area. The flood map does not show flooding for the other minor watercourses which flow through the site. A buffer of 5m has been used in the siting of the panels either side of any watercourse/ drain, and the panels will be above the ground by typically 700mm (within a range of 500mm to 1.2m). These measures will ensure that the risk of flooding to the panels is minimised. The substation and invertor stations must avoid flooding and are located on higher ground, outside of the floodplains. A number of the existing and new access tracks will be located within the floodplain. These will be constructed at existing ground levels and can be allowed to flood, so there is therefore no impact on the floodplain. The proposed development will therefore not increase the risk of river flooding elsewhere. The solar farm development is compliant with PPS15 Policy FLD1.

Policy FLD2 of PPS15 states that development will not be permitted that would impede the operational effectiveness of flood defence and drainage infrastructure. There are no defences associated with the watercourses in the area. Where a new development is located beside a watercourse it is essential that an adjacent working strip is retained to facilitate future maintenance by DfI Rivers or other statutory undertaker or riparian landowner. A working strip of 5m will be provided along all watercourses within the site, and nothing in connection with the development will be constructed within these strips. The solar farm development is compliant with PPS15 Policy FLD2.

The flood map shows some areas of potential surface water flooding within the site, but these will not impact the proposed development. As has been shown, the proposals for the site will not increase the rate of discharge from the current pre-development surface water run-off rates, and no formal drainage systems will be installed. Disturbance during construction will be minimal and grass will be retained. However, where construction activities have impacted on existing areas of vegetation, these areas will be chisel ploughed and re-seeded with agricultural grazing/ silage sward grass species. The site will be actively managed to

keep the soil in good condition during the operational phase and maintain the sward where possible. Checks will be undertaken by staff visiting the site for maintenance visits at 6 monthly intervals. There will be no increase in runoff rates or volumes from the site, and no changes to the upstream or downstream hydrology and flood risk as a result of the development. The solar farm development is compliant with PPS15 Policy FLD3.

Policy FLD4 of PPS15 is concerned with the artificial modification of watercourses. The project will not alter any watercourses, although there will be a water crossing of a small drain between Fields 2 and 3 which will require a Schedule 6 application to the DfI Rivers Area Office. Therefore, Policy FLD4 is not applicable to this project.

DfI Rivers' Reservoir Flood Mapping for Emergency Planning shows that the site is not affected by the potential inundation area of any controlled reservoir. Therefore, Policy FLD5 does not apply.

It is the opinion of RPS that the development is at a low risk of flooding, and the development will not increase flooding elsewhere. In accordance with PPS15, this FRA has demonstrated that:

a) All sources of flood risk to and from the Proposed Development have been identified; and

b) There are adequate measures to manage and mitigate any increase in flood risk arising from the development.

Appendix A

Site location

X - 710449
Y - 858411

X - 712909
Y - 858411

X - 713754
Y - 857699

X - 710449
Y - 855641

X - 713749
Y - 855641

No.22 Springhill Road
Lurgan

No.90 Inn Road
Magheralin Dollingstown

15 Springhill Road
Lurgan

No.64 Dromore Road
Lurgan

No.117 New Forge Road
Magheralin

No.108 Dromore Road
Donaghdoney

No.102 Dromore Road
Waringstown

No.105 Dromore Road
Donaghdoney

No.119 Dromore Road
Donaghdoney

No.67 Drumlin Road
Craigavon

LOCATION PLAN
SCALE 1:250,000

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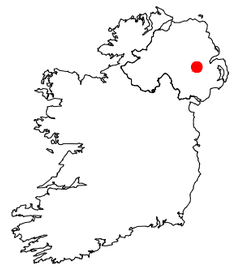
KEY:

SITE BOUNDARY
(*OUTSIDE EDGE OF LINE DENOTES BOUNDARY*)

Produced by: Francesco Ghergo

Renewable Energy Systems Ltd
Registered Office: Beaufort Court,
Egg Farm Lane, Kings Langley,
Hertfordshire WD4 8LR



SITE LOCATION - NOT TO SCALE

N

ISSUE	DRAWN	CHKD	APPD	DATE	REVISION NOTES
4	FG	RB	EB	2023-10-27	Minor amends (background map, addresses labels)
3	FG	RB	EB	2023-10-25	Site boundary update (cable route)
2	FG	RB	EB	2023-09-08	Site boundary update
1	FG	RB	EB	2023-01-18	First Issue

PURPOSE: PERMITTING	COORDINATES: IRENET95 ITM
SCALE: 1:10,000 @A3	DATUM: N/A
LAYOUT DRAWING: N/A	T-LAYOUT NO: N/A

PROJECT TITLE
MAGHERALIN

DRAWING TITLE
FIGURE 1
SITE LOCATION PLAN

RES DRAWING NUMBER	REV
05215-RES-LAY-DR-PT-002	4

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Appendix B

Proposed site layout

X - 710251
Y - 856383

X - 713776
Y - 856383

X - 710251
Y - 855638

X - 713776
Y - 855638

SHEET 2
SHEET 3
SHEET 4
SHEET 5
SHEET 6
SHEET 7
SHEET 8
SHEET 9
SHEET 10
SHEET 11
SHEET 12
SHEET 13
SHEET 14
SHEET 15
SHEET 16
SHEET 17
SHEET 18
SHEET 19
SHEET 20

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KEY:

- PLANNING APPLICATION BOUNDARY (*OUTSIDE LINE DENOTES BOUNDARY*)
- ACCESS TRACK
- FENCING
- GATE (FENCE)
- INDICATIVE SOLAR PV ARRAY
- INDICATIVE SOLAR PV ARRAY TO BE RAISED
- HARDSTAND
- INVERTER SUBSTATION
- 33kV SUBSTATION COMPOUND
- TEMPORARY CONSTRUCTION COMPOUND
- CCTV
- INDICATIVE STREAM CROSSING
- SITE ENTRANCE
- SITE ENTRANCE - VISIBILITY SPLAY
- UNDERGROUND CABLE
- DIRECTIONAL DRILLING
- PROPOSED ARCHAEOLOGICAL EXCLUSION ZONE
- HDD LAYDOWN WORKING AREA

Produced by: Francesco Ghergo

Renewable Energy Systems Ltd
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OVERVIEW
SHEET 1 OF 20

ISSUE	DRAWN	CHKD	APPD	DATE	REVISION NOTES
7	FG	JM	RB	2023-11-17	Indicative solar PV array update
6	FG	JM	RB	2023-10-25	HDD crossing design added
5	FG	JM	RB	2023-10-03	Minor update (substation accesss added)
4	FG	JM	RB	2023-09-11	Substation key note udpated

PURPOSE: PERMITTING
COORDINATES: IRENET95 ITM
SCALE: 1:5,000 @ A1
DATUM: N/A
LAYOUT DWG: N/A
T-LAYOUT NO.: N/A

PROJECT TITLE
MAGHERALIN

DRAWING TITLE
FIGURE 4
SITE LAYOUT

RES DRAWING NUMBER: 05215-RES-LAY-DR-PT-005
REV: 7

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