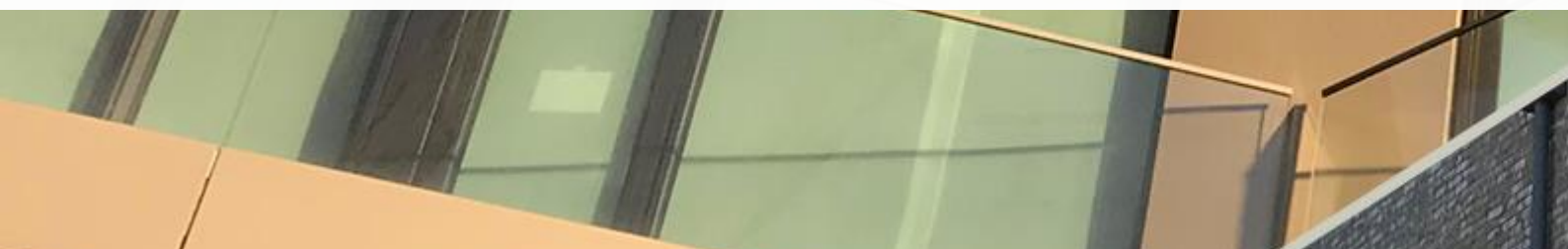

*Bringing buildings to life*

# Island Farm
# Utilities Strategy Report
# IF(S)-TBA-XX-XX-RP-ME-800001

June 2020



PROJECT
Island Farm

PROJECT REF
WA0274

REPORT
Utilities Strategy Report

DOCUMENT NUMBER (if applicable)
IF(S)-TBA-XX-XX-RP-ME-800001

STATUS:
Initial Issue

DATE:
09th June 2020

This report has been authorised by:

Kevin Searle
2020.06.09 17:28:03 +01'00'

……

**Kevin Searle**

Partner

| Revision | DCC No. | Comments | Date | Author | Checked |
|---|---|---|---|---|---|
| P01 | | Issue | 09/06/20 | CS | KS |

# Contents

# Executive Summary

Under this report multiple options have been considered for the supply of utility services (electricity, gas and water) across the Island Farm development site.

The site is being promoted as a suitable area for mixed use development in the new Bridgend Local Development Plan (LDP).

While each option represents a viable solution considerable constraints to its ongoing development may be incurred through the availability of supply capacities within the local supply company networks.

As local supply companies are unable to provide firm commitments to the availability of supply capacities. Options that are technically feasible may, through continue dialogue, become unviable due to connectivity issues that cannot be overcome.

Under the development of the scheme the options presented will need to be verified and expanded through detailed design.

# 1. Introduction

This report reviews the current local supply company infrastructure that serves the areas around the Island Farm development site in Bridgend, South Wales. The site is being promoted as a suitable area for the allocation of a mixed use development in the new Bridgend Local Development Plan (LDP).

In addition, proposals are presented for the servicing of the site against the proposed nature of its development, as further defined with Section 2 of this report.

We would highlight that the proposals have, wherever possible, been developed to align with the following:

- **Roberts Limbrick Architects:** Island Farm Proposed Masterplan
- **WL2:** Island Farm Drainage Strategies
- **Troup Bywaters + Anders:** Island Farm Energy Strategy Report

In reading this report full reference should be made to the above documentation.

## 1.1 Development Site


**DEVELOPMENT SITE BRIDGEND SOUTH WALES**

## 1.2 The Brief

In completing this work Troup Bywaters + Anders (TB+A) have considered the following in terms of an agreed brief:

- The provision of a utilities strategy the content of which will be limited to:
  - Predicted energy demands / supply capacities in terms of:
    - Electricity
    - Gas

        - Water
    - High level utility distribution strategies
    - Local supply company mapping *(where obtainable)*

**Note:** The above being conducted for both individually served properties fed directly from the local supply companies and via the utilisation of a centrally served energy centre.

## 1.3 Stakeholders and Consultation

The detail within this report is subject to further consultation with the following bodies:

- HD Limited
- Bridgend County Borough Council
- Robert Limbrick Architects
- Savills
- The local supply companies

## 1.4 Assumptions

In presenting our proposals the following assumptions have been made:

- The development site will be individually served by its own infrastructure arrangements
- The existing local supply company infrastructure arrangements are capable of being reinforced to enable the provision of the connected loads defined

## 1.5 Limitations

The limitations of this report are as defined below:

- The technical discussions presented in this report are based on the information made available to TB+A at the time of writing
- The solutions presented are subject to confirmation from the local supply companies in terms of supply availabilities and connection arrangements
- Mapping information is based on documentation received from the local supply companies ‘on-line’ portals and is subject to verification by the completion of ground investigatory surveys

# 2. Summary of the Overall Development Works

As derived from the Robert Limbrick Architects masterplan the overall development will generally consist of the following, on which the technical discussions presented within this report have been based.

## 2.1 Island Farm Site – Dwellings

**Description:** The development of 700 to 750 new build 2, 3 and 4 bedroom houses on a 30 / 40 / 30 ratio.

**Proposed floor areas:** An assumed size of the units being:

- 2 - bed: 710 to 770ft$^2$
- 3 - bed: 875 to 1,180ft$^2$
- 4 - bed: 1200 to 1,650ft$^2$

## 2.2 Island Farm Site – Primary School

**Description:** A new build one for entry (1FE) primary school

**Proposed floor area:** GIFA c.1,318m$^2$ (excluding car park and external games facilities)

*Future expansion:* *It is understood that a Special Educational Needs (SEN) facility may be developed. We have assumed this expansion would equate to less than 50% of the GIFA identified above*

## 2.3 Island Farm Site – Special Educational Needs (SEN) Facility

**Description:** A new build school to replace the existing Heronsbridge School, a Special Educational Needs (SEN) facility

**Proposed floor area:** GIFA c.1,800m$^2$ (excluding car park and external games facilities)

*Future expansion:* *It is understood that a future development may incorporate increased educational facilities and residential units. We have assumed this expansion would equate to less than 75% of the GIFA identified above*

# 3. Predicted Energy Demands / Supply Capacities

## 3.1 Electrical Distribution

### 3.1.1 Overview

Based on the information detailed in Section 2.0 of this report and by utilising BSRIA benchmark loads[1] and local supply company (Western Power Distribution (WPD)) data the following estimated demands have been determined.

### 3.1.2 Option A1: Individually served properties *(gas fired heating)*

This option utilises gas for the provision of heating (space and water) across each property inclusive of the two school developments. In addition, gas is utilised for servicing hobs within each dwelling.

All other appliances and services being electrically served.

| **Development Site** | **Island Farm** | | |
|---|---|---|---|
| **Development Type** | Dwellings<br>*(750 new build 2, 3 and 4 bedroom houses on a 30 / 40 / 30 ratio)* | Primary School<br>*(GIFA c.1,318m$^2$ plus 50% future expansion)* | Special Educational Needs (SEN) Facility<br>*(GIFA c.1,800m$^2$ plus 75% future expansion)* |
| **Estimated Maximum Demand** | 3,225kVA | 104kVA | 198kVA |
| **Development Totals** | **3,527kVA** | | |
| **Overall Total kVA (MVA)** | **3,527kVA (3.5MVA)** | | |

***Notes:***

1. Dwellings based on the use of gas fired boilers and gas hobs with an electric oven
   a. Dwellings based on a diversified load of 5kVA per property (inclusive of a 3.5kVA allowance for an electric vehicle charging point across 80% of dwellings)
2. Primary school based on gas fire heating and hot water and electrically served catering:
   a. Primary school based on a w/m$^2$ loading of 50
3. SEN school based on gas fire heating and hot water and electrically served catering
   a. SEN school based on a w/m$^2$ loading of 60
4. The above loads are inclusive of the noted future expansion

The above figures and loading estimates will need to be verified and confirmed against the final design parameters of the development site. The figures indicated represent 'high level' evaluations to outline potential supply capacity requirements.

[1] Rules of Thumb Guidelines for Building Services (5th Edition) BG 9/2011

### 3.1.3 Option A2: Individually or centrally served properties *(electric heating and cooking)*

This option utilises electricity for the provision of heating (space and water) across each property inclusive of the two school developments. The provision of the electrically driven heating being individual to each property or central via an energy centre.

In addition, electricity is used for the provision of all cooking.

No gas connections will be afforded under this option.

| **Development Site** | **Island Farm** | | |
|---|---|---|---|
| **Property Type** | Dwellings<br>*(750 new build 2, 3 and 4 bedroom houses on a 30 / 40 / 30 ratio)* | Primary School<br>*(GIFA c.1,318m$^2$ plus 50% future expansion)* | Special Educational Needs (SEN) Facility<br>*(GIFA c.1,800m$^2$ plus 75% future expansion)* |
| **Estimated Maximum Demand kVA** | 6,413kVA | 197kVA | 348kVA |
| **Development Totals kVA** | **6,957kVA** | | |
| **Overall Total kVA (MVA)** | **6,957kVA (7MVA)** | | |

***Notes:***

1. Dwellings based on electric heat pumps and cooking
    a. Dwellings based on a diversified load of 9.25kVA per property (inclusive of a 3.5kVA allowance for an electric vehicle charging point across 80% of dwellings)
2. Primary school based on electric heat pumps and electrically served catering:
    a. Primary school based on a w/m$^2$ loading of 95
3. SEN school based on electric heat pumps and electrically served catering:
    a. SEN school based on a w/m$^2$ loading of 10
4. The above loads are inclusive of the noted future expansion

The above figures and loading estimates will need to be verified and confirmed against the final design parameters of the development site. The figures indicated represent 'high level' evaluations to outline potential supply capacity requirements.

## 3.2 Gas Distribution

### 3.2.1 Overview

Based on the information detailed in Section 2.0 of this report and by utilising BSRIA benchmark loads and local supply company (Wales and West Utilities (WWU)) data the following estimated demands have been determined.

### 3.2.2 Option A1: Individually served properties *(gas fired heating)*

This option utilises gas for the provision of heating (space and water) across each property inclusive of the two school developments. In addition, gas is utilised for servicing hobs within each dwelling.

All other appliances and services being electrically served.

| **Development Site** | **Island Farm** | | |
|---|---|---|---|
| **Development Type** | Dwellings<br>*(750 new build 2, 3 and 4 bedroom houses on a 30 / 40 / 30 ratio)* | Primary School<br>*(GIFA c.1,318m$^2$ plus 50% future expansion)* | Special Educational Needs (SEN) Facility<br>*(GIFA c.1,800m$^2$ plus 75% future expansion)* |
| **Estimated Maximum Demand** | 6.3MW | 350kW | 300kW |
| **Development Totals MW** | **6.95MW** | | |

***Notes:***

1. Dwellings based on the use of gas fired boilers and gas hobs with an electric oven
2. Primary school based on gas fire heating and hot water and electrically served catering
3. SEN school based on gas fire heating and hot water and electrically served catering
4. The above loads are inclusive of the noted future expansion

The above figures and loading estimates will need to be verified and confirmed against the final design parameters of the development. The figures indicated represent 'high level' evaluations to outline potential supply capacity requirements.

### 3.2.3 Option A2: Individually served properties *(electric heating and cooking)*

This option utilises electricity for the provision of heating (space and water) across each property inclusive of the two school developments. The provision of the electrically driven heating being individual to each property or central via an energy centre.

In addition, electricity is used for the provision of all cooking.

No gas connections will be afforded under this option.

## 3.3 Water Distribution

### 3.3.1 Overview

Based on the information detailed in Section 2.0 of this report and by utilising BSRIA benchmark loads and local supply company (Welsh Water) data the following estimated demands have been determined.

### 3.3.2 Option A1: Individually served properties (gas fired heating) / Option A2: Individually served properties (electric heating and cooking)

It should be noted that water supply requirements will remain constant under any given option.

| **Development Site** | **Island Farm** | | |
|---|---|---|---|
| **Development Type** | 750 Dwellings<br>*(2 Bed / 3 Bed / 4 Bed)* | Primary School<br>*(GIFA c.1,318m$^2$ plus 50% future expansion)* | Special Educational Needs (SEN) Facility<br>*(GIFA c.1,800m$^2$ plus 75% future expansion)* |

| | | | | | |
|---|---|---|---|---|---|
| **Estimated Peak Flow L/sec (each)** | 0.75 | 0.75 | 0.78 | 1.2 | 1 |
| **Development Totals L/sec** | **25.0L/sec** | | | | |

***Notes:***

1. Dwelling flow rates assume that tank storage will not be provided
2. Primary school based on a small break tank and dedicated booster
3. SEN school based on a small break tank and dedicated booster
4. The above loads are inclusive of the noted future expansion

The above figures and loading estimates will need to be verified and confirmed against the final design parameters of the development site. The figures indicated represent 'high level' evaluations to outline potential supply capacity requirements.

# 4. High Level Utility Distribution Strategies

## 4.1 Electrical Distribution

### 4.1.1 Existing services

A utility search for the Island Farm site indicates the presence of overhead HV (33kV) pylons, as well as, buried HV (11kV) services. These services appear to cross the site as part of the wider WPD network, in that, they do not appear to serve existing properties located within the demise of the site itself. Consideration will need to be given as to whether these existing overhead and buried services are to remain in situ or be buried / diverted. In either instance, the final development plans will need to be co-ordinated to reflect safe spatial allowances and existing wayleave agreements.

The mapping provided, through the utility search, did not provide any form of indication as to the capacities of these mains. Also as the surrounding areas are subject to 'on-going' development the accuracy of the mapping will therefore need verification.

### 4.1.2 Option A1: Individually served properties *(gas fired heating)*

A budget quotation has been requested from the local supply company (Western Power Distribution (WPD)) to afford the following across the Island Farm development site.

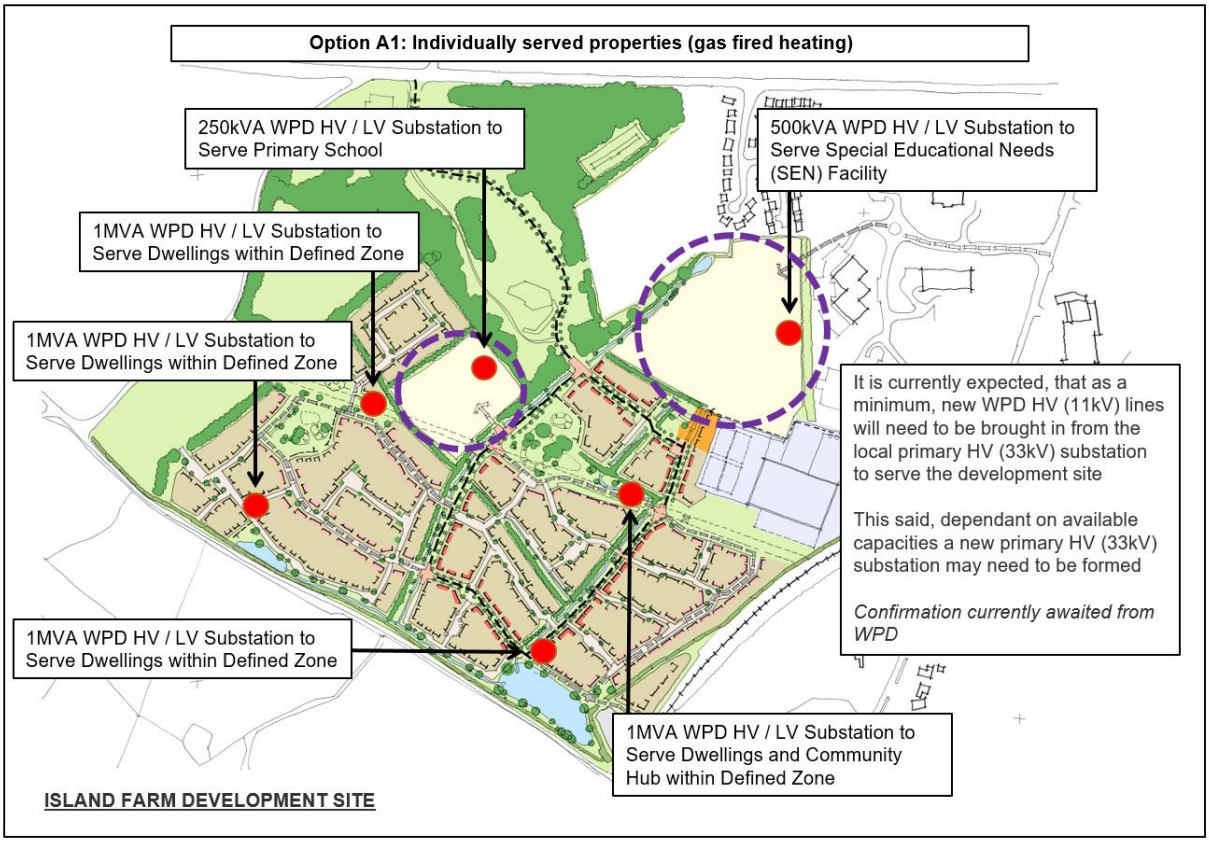
| **Development Site** | **Island Farm** | | |
|---|---|---|---|
| **Property Type** | Dwellings | Primary School | Special Educational Needs (SEN) Facility |
| **WPD Supply Request** | The provision of four 1MVA HV / LV sub-stations to afforded the estimated demand of 3,225kVA | The provision of a 250kV HV / LV sub-station to afforded the estimated demand of 104kVA | The provision of a 250kV HV / LV sub-station to afforded the estimated demand of 198kW |

The above being aligned with predicted electrical energy demands detailed within section 3.1.2 of this report.

It is currently expected, that as a minimum, new WPD HV (11kV) lines will need to be brought in from the local primary HV (33kV) substation to serve the Island Farm development site. This said, dependant on available capacities a new primary HV (33kV) substation may need to be formed.

*Confirmation as to the workability of this proposals is currently awaited from WDP.*

The following diagram indicates possible locations for the electrical infrastructure required under this distribution option (exact locations will depend on final strategies and detailed design).




### 4.1.3 Option A2: Individually or centrally served properties *(electric heating and cooking)*

A budget quotation has been requested from the local supply company (Western Power Distribution (WPD)) to afford the following across the Island Farm development site.

| **Development Site** | **Island Farm** | | |
|---|---|---|---|
| **Property Type** | Dwellings | Primary School | Special Educational Needs (SEN) Facility |
| **WPD Supply Request** | The provision of seven 1MVA HV / LV sub-stations to afforded the estimated demand of 6,413kVA | The provision of a 250kV HV / LV sub-station to afforded the estimated demand of 197kVA | The provision of a 500kV HV / LV sub-station to afforded the estimated demand of 348kW |

***Notes:***

1. If an energy centre where to be adopted the number of 1MVA HV / LV sub-stations provided across the Island Farm development site would drop to four

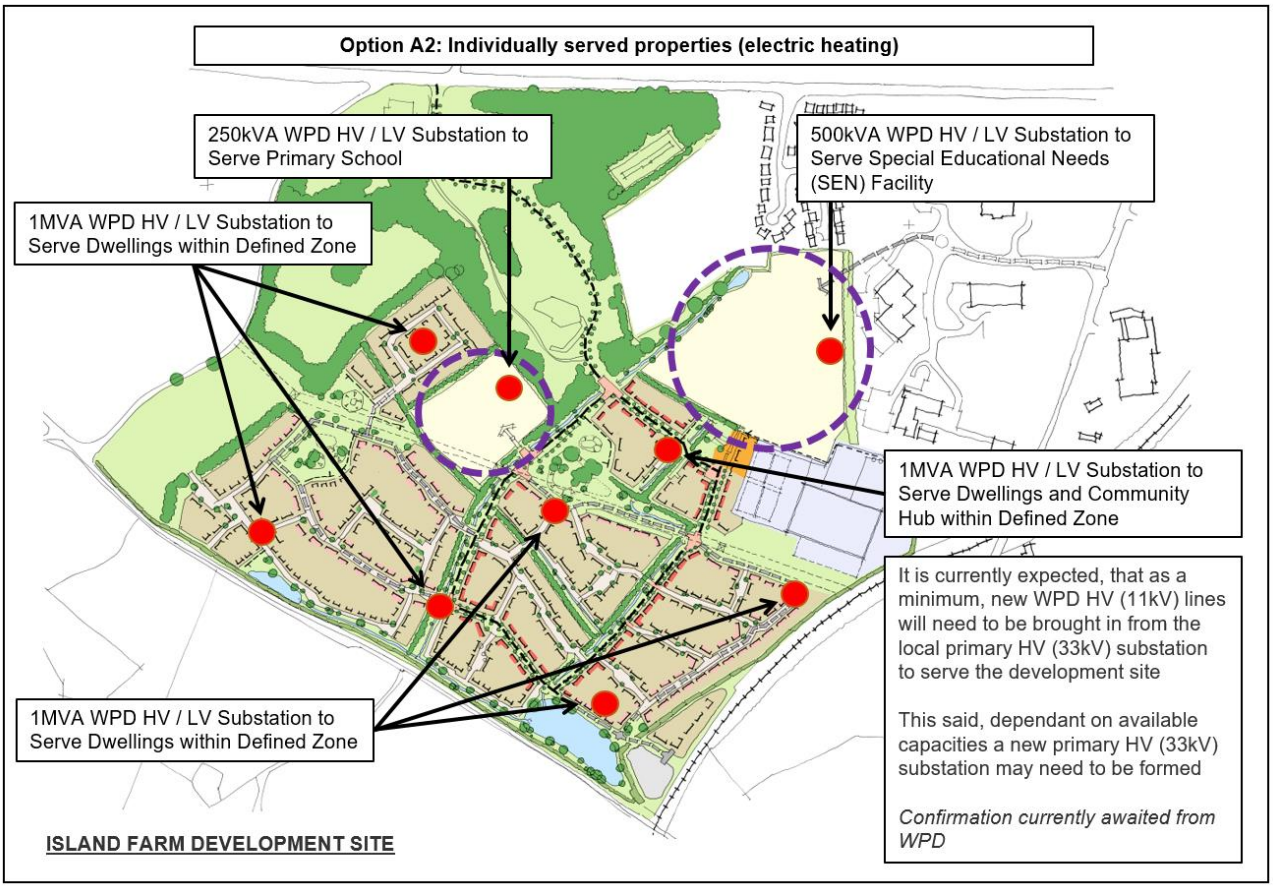
   A HV connection would then be required to serve the energy centre through the provision of a private 3MVA HV / LV sub-station (***Note:*** WPD will not provide HV / LV sub-stations over 1MVA in size)

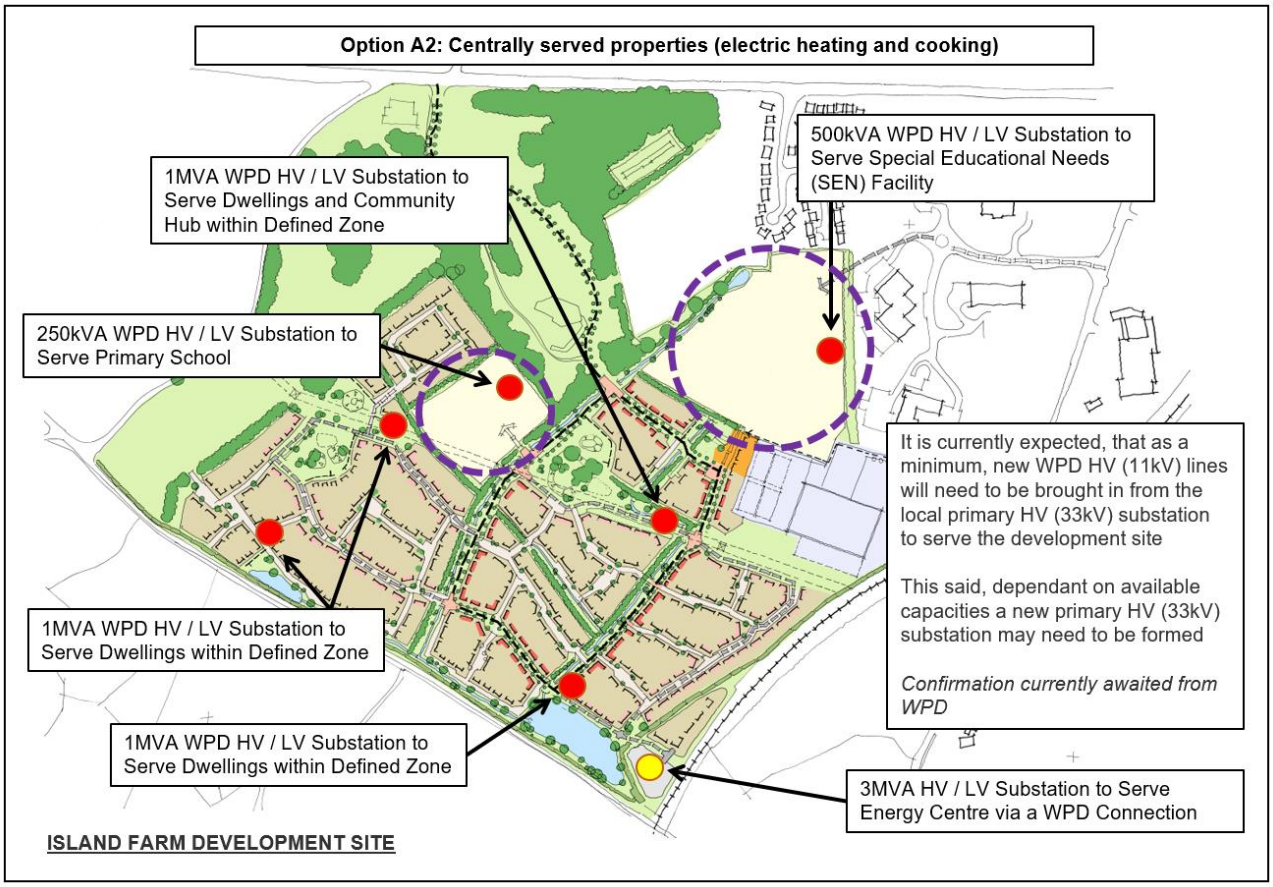
The above being aligned with predicted electrical energy demands detailed within section 3.1.2 of this report.

It is currently expected, that as a minimum, new WPD HV (11kV) lines will need to be brought in from the local primary HV (33kV) substation to serve the Island Farm development site. This said, dependant on available capacities a new primary HV (33kV) substation may need to be formed.

*Confirmation as to the workability of this proposals is currently awaited from WDP.*

The following diagrams indicates possible locations for the electrical infrastructure required under this distribution option (exact locations will depend on final strategies and detailed design). The diagrams illustrates options for both individually and centrally served properties.






## 4.2 Gas Distribution

### 4.2.1 Existing services

The utility search identified two medium pressure gas mains within the vicinity of the Island Farm site. One being located under the A48, near to the Junction with Island Farm Road. The other being located under Ewenny Road. A low pressure main is also shown as being positioned to the north of the site in Merthyr Mawr Road.

The mapping provided, through the utility search, did not provide any form of indication as to the capacities of these mains. Also as the surrounding areas are subject to 'on-going' development the accuracy of the mapping will therefore need verification.

### 4.1.4 Option A1: Individually served properties *(gas fired heating)*

A budget quotation has been requested from the local supply company (Wales and West Utilities (WWU)) to afford the following across the Island Farm development site.

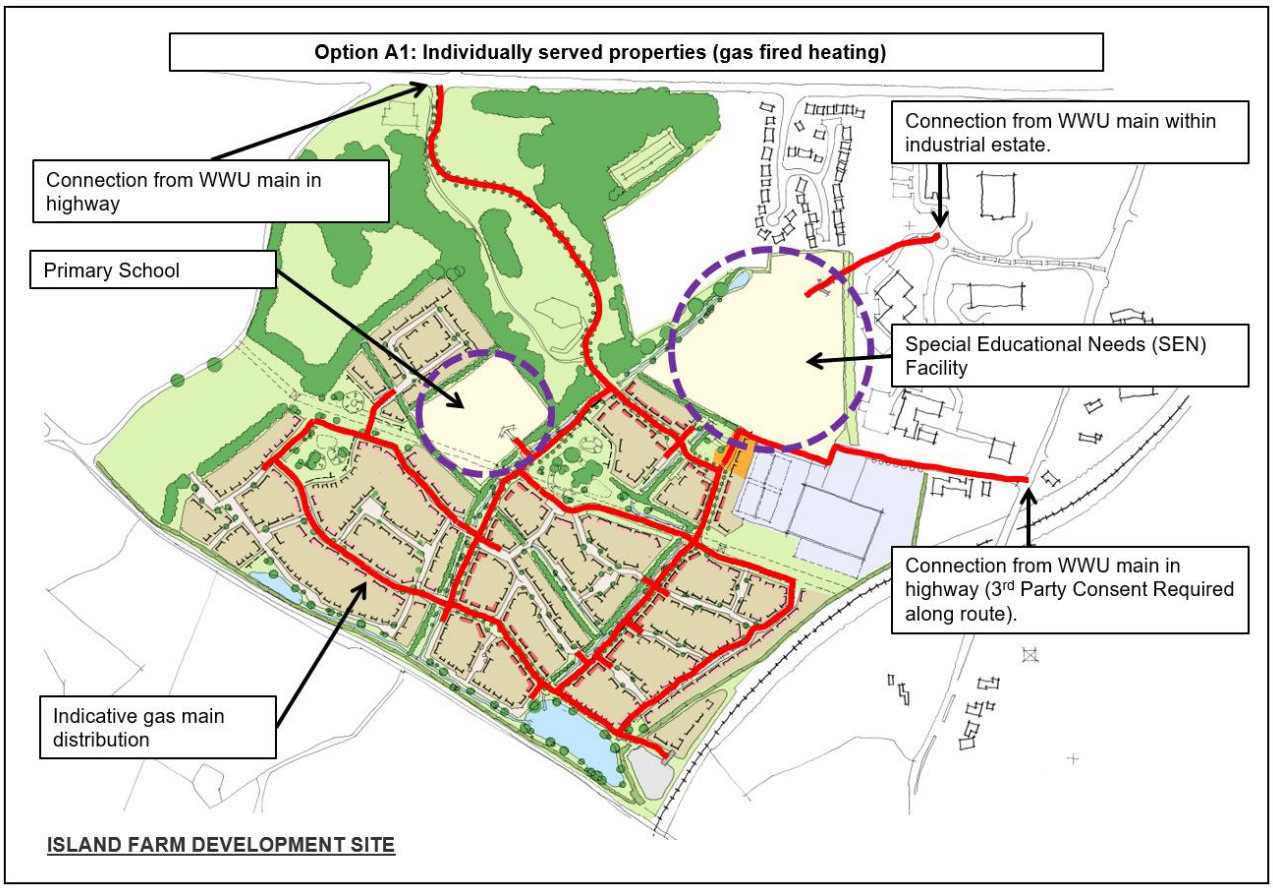
| **Development Site** | **Island Farm** | | |
|---|---|---|---|
| **Development Type** | Dwellings<br>*(750 new build 2, 3 and 4 bedroom houses on a 30 / 40 / 30 ratio)* | Primary School<br>*(GIFA c.1,318m$^2$ plus 50% future expansion)* | Special Educational Needs (SEN) Facility<br>*(GIFA c.1,800m$^2$ plus 75% future expansion)* |
| **Estimated Maximum Demand** | 6.3MW | 350kW | 300kW |
| **Development Totals MW** | **6.95MW** | | |

The above being aligned with predicted gas demands detailed within section 3.2.2 of this report.

It is currently expected, that the existing gas mains in and around the Island Farm development site will be extended to provide the necessary connections. This said, dependant on available capacities reinforcement works may be required.

*Confirmation as to the workability of these proposals is currently awaited from W&WU.*

The following diagrams indicates possible routes for the new gas mains required under this distribution option (exact locations will depend on final strategies and detailed design).



### 4.1.5 Option A2: Individually or centrally served properties *(electric heating and cooking)*

This option utilises electricity for the provision of heating (space and water) across each property inclusive of the two school developments. The provision of the electrically driven heating being individual to each property or central via an energy centre.

In addition, electricity is used for the provision of all cooking.

No gas connections will be afforded under this option.

## 4.3 Water Distribution

### 4.3.1 Existing services

The utility search identified two water mains within the vicinity of the Island Farm site. One being located under the A48. The other being located under Ewenny Road.

The mapping provided, through the utility search, did not provide any form of indication as to the capacities of these mains. Also as the surrounding areas are subject to 'on-going' development the accuracy of the mapping will therefore need verification.

### 4.3.2 Option A1: Individually served properties *(gas fired heating)* / Option A2: Individually served properties *(electric heating and cooking)*

A budget quotation cannot be requested from the local supply company (Welsh Water (WW)) to afford the following across the Island Farm development site until a formal planning application has been submitted.

| **Development Site** | **Island Farm** | | | | |
|---|---|---|---|---|---|
| **Development Type** | 750 Dwellings *(2 Bed / 3 Bed / 4 Bed)* | | | Primary School *(GIFA c.1,318m$^2$ plus 50% future expansion)* | Special Educational Needs (SEN) Facility *(GIFA c.1,800m$^2$ plus 75% future expansion)* |
| **Estimated Peak Flow L/sec (each)** | 0.75 | 0.75 | 0.78 | 1.2 | 1 |
| **Development Totals L/sec** | **25.0L/sec** | | | | |

***Notes:***

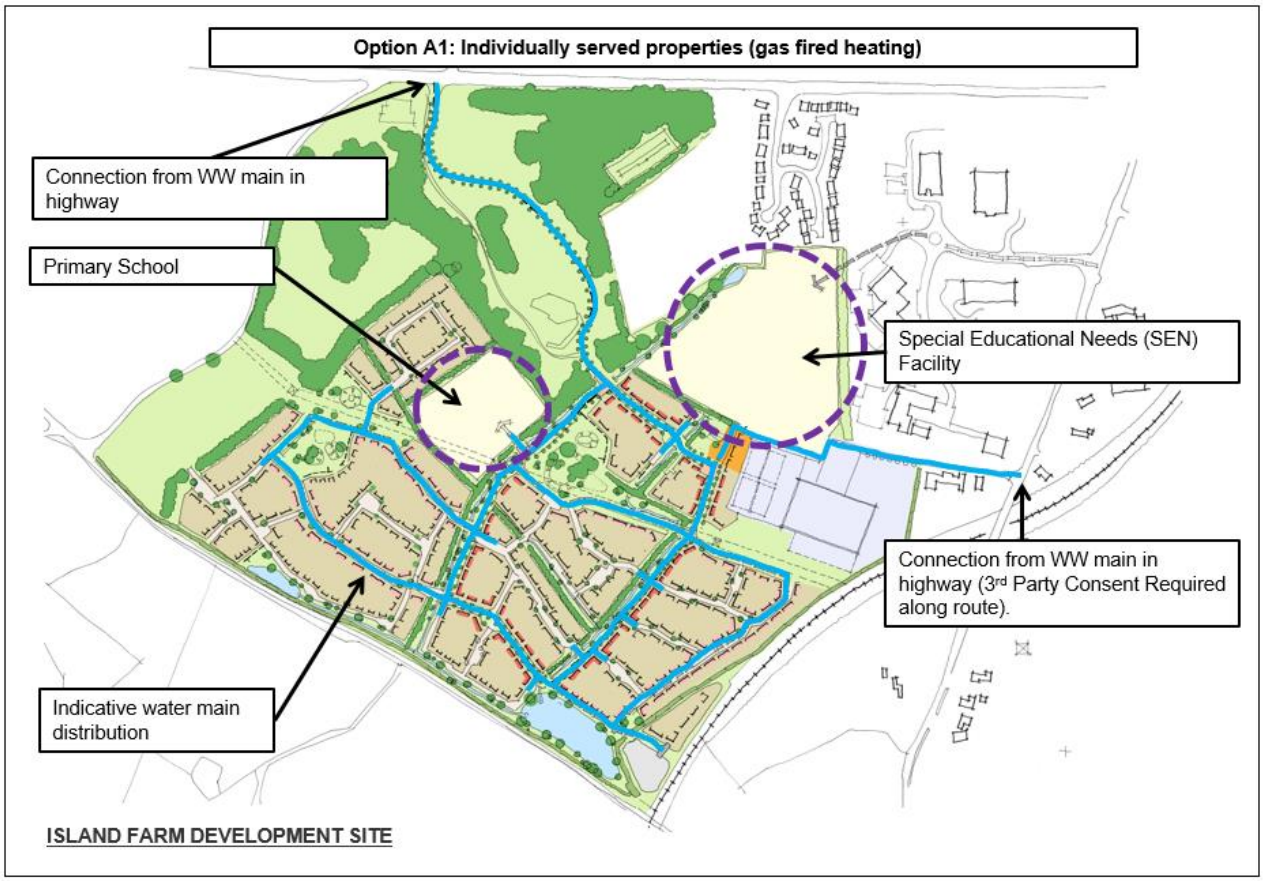
1. If energy centre where to be adopted additional water connections would be required to each energy centres.

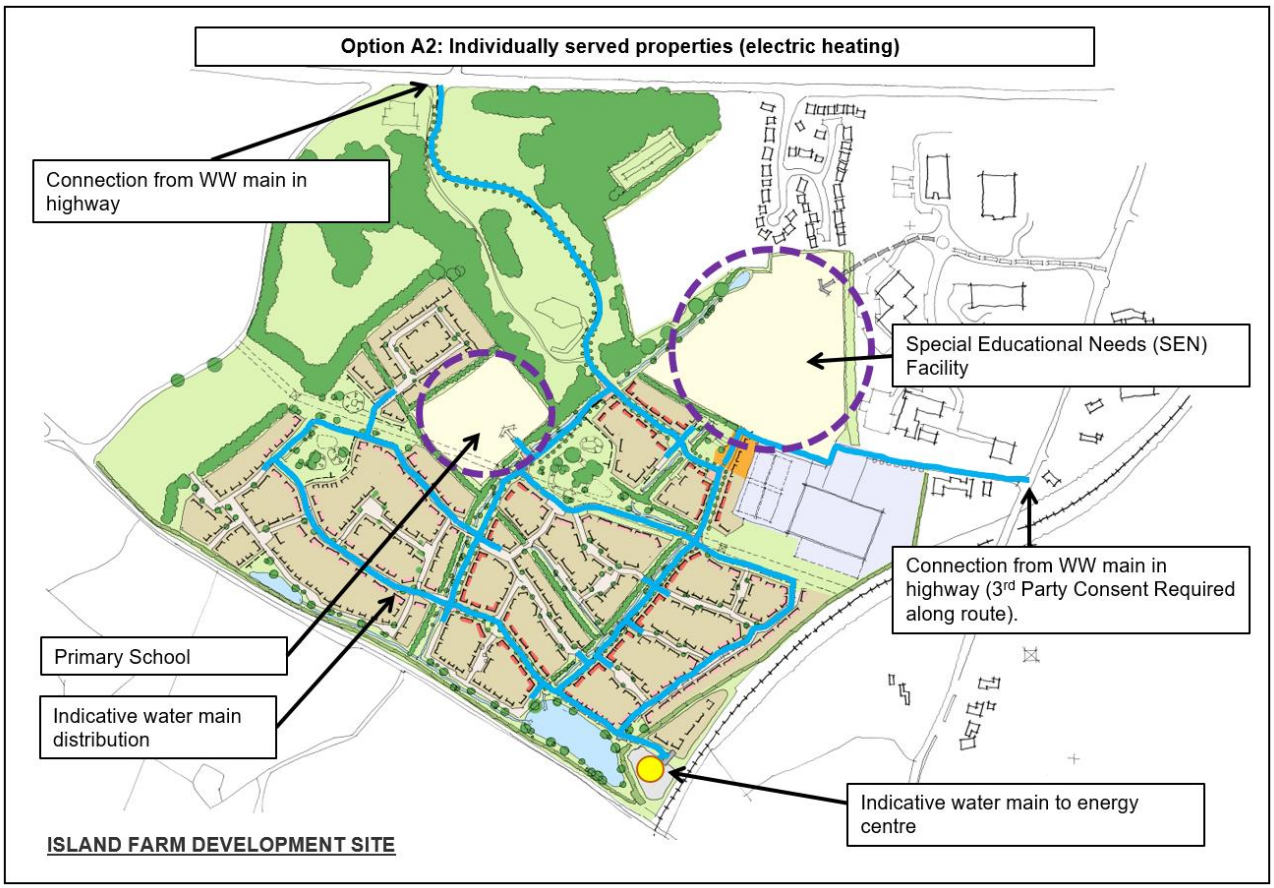
The above being aligned with predicted gas demands detailed within section 3.3.2 of this report.

It is currently expected, that the existing water mains in and around the Island Farm development site will be extended to provide the necessary connections. This said, dependant on available capacities reinforcement works may be required.

*Confirmation as to the workability of these proposals is required from WW.*

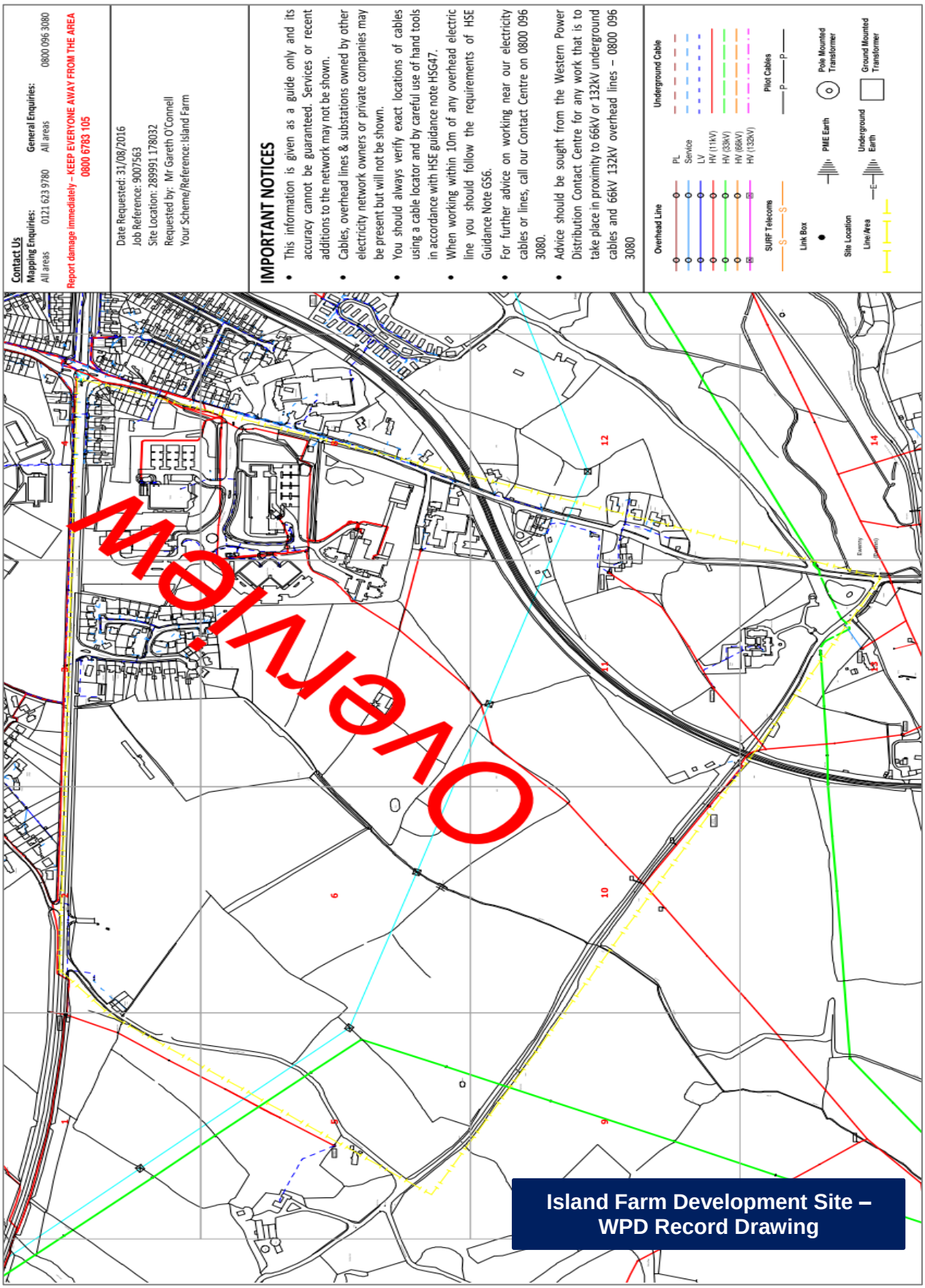
The following diagrams indicates possible routes for the new water mains required under these distribution option (exact locations will depend on final strategies and detailed design). The diagrams illustrate options for both individually and centrally served properties.


Option A1: Individually served properties (gas fired heating)
Connection from WW main in highway
Primary School
Special Educational Needs (SEN) Facility
Connection from WW main in highway (3rd Party Consent Required along route).
Indicative water main distribution
ISLAND FARM DEVELOPMENT SITE

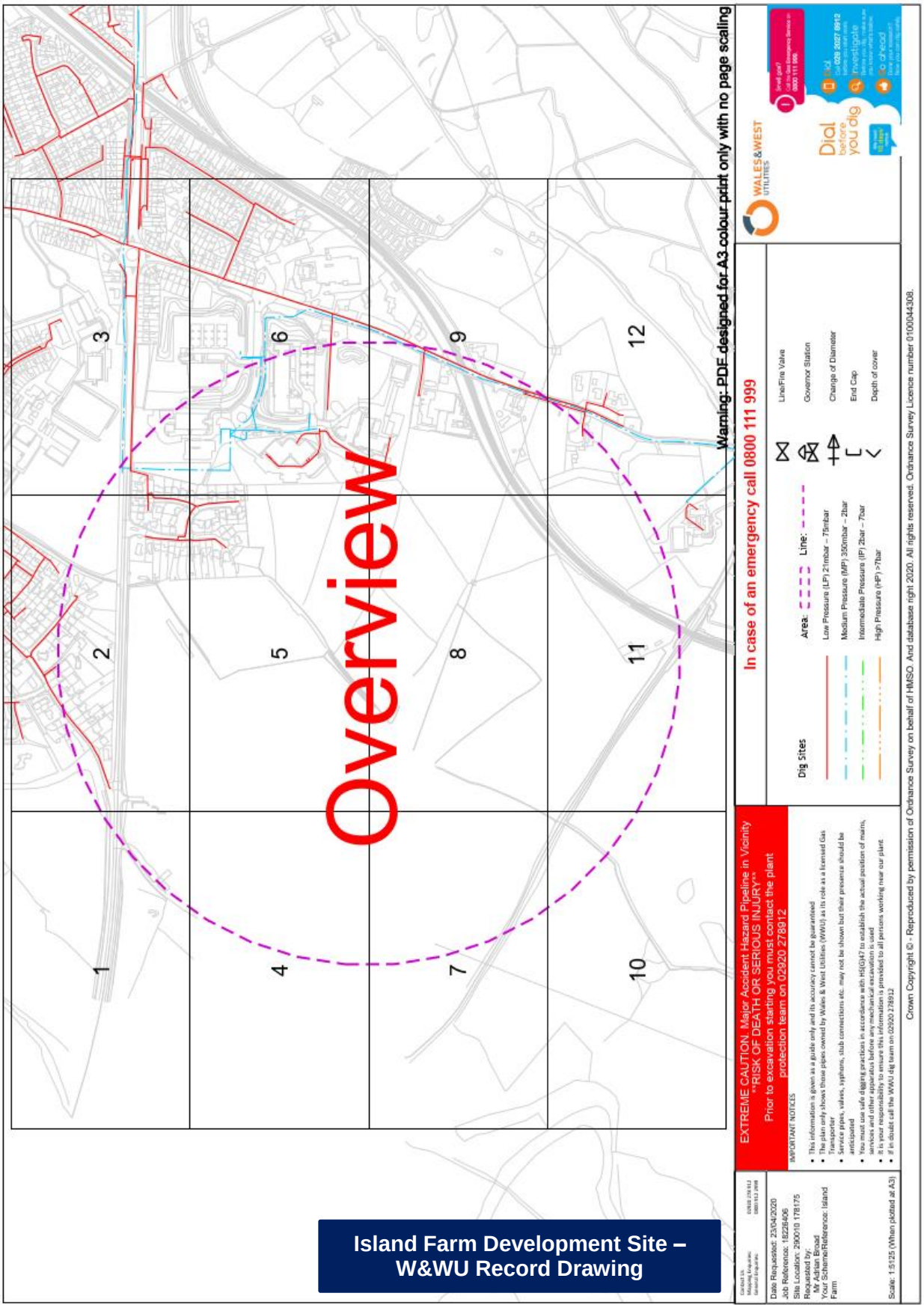

Option A2: Individually served properties (electric heating)
Connection from WW main in highway
Special Educational Needs (SEN) Facility
Connection from WW main in highway (3rd Party Consent Required along route).
Primary School
Indicative water main distribution
Indicative water main to energy centre
ISLAND FARM DEVELOPMENT SITE

# 5. Local Supply Company Mapping

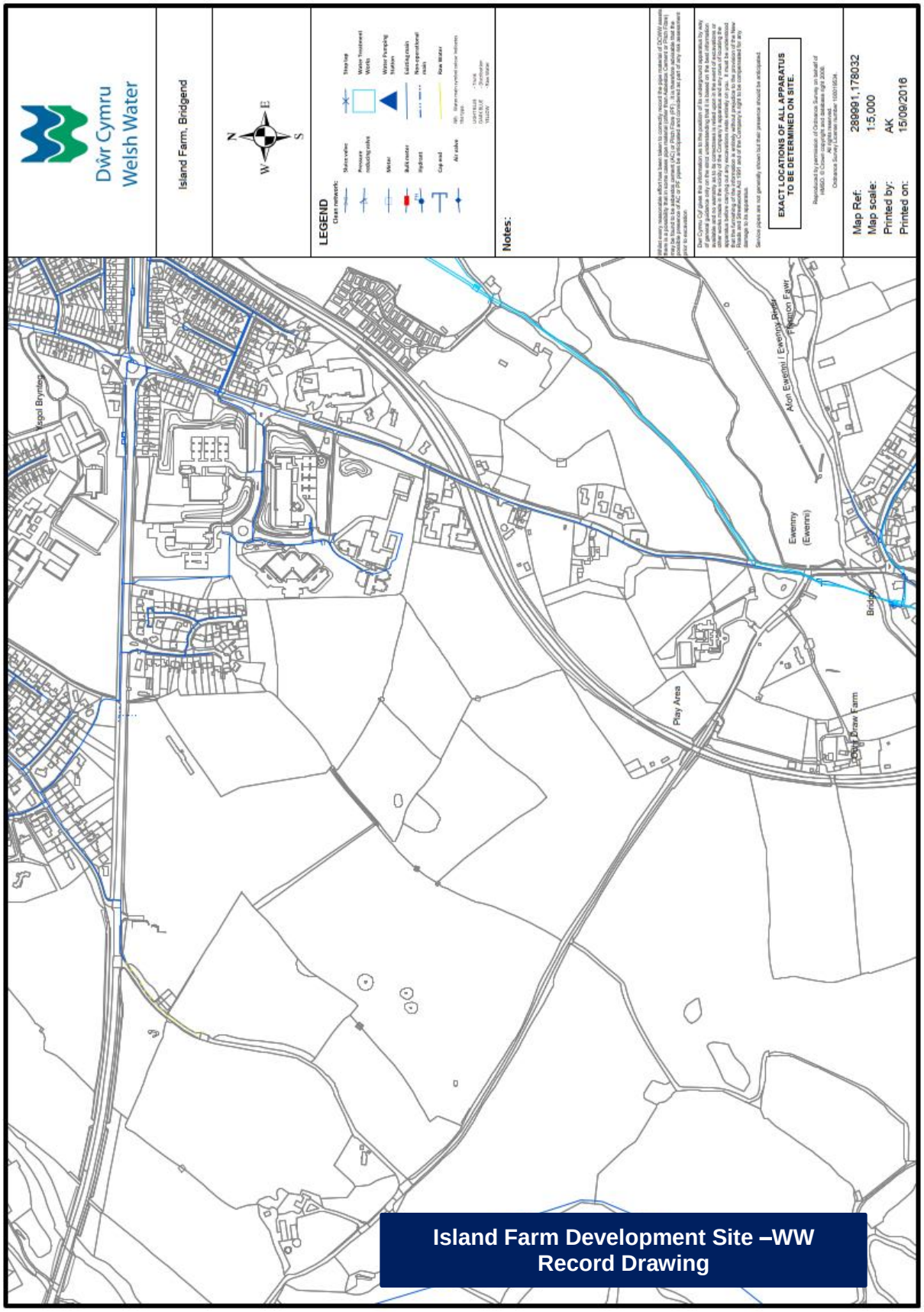
## 5.1 Electrical Distribution



## Gas Distribution



## 5.2 Water Distribution



TROUP
BYWATERS
+ ANDERS

tbanda.com