FLOODING & DRAINAGE ASSESSMENT
FOR A PROPOSED EXTENSION TO
TODBER CARAVAN PARK, BURNLEY ROAD, GISBURN

CONTENTS:

1.0 INTRODUCTION
2.0 POLICY CONSIDERTIONS AND OBJECTIVES
3.0 FLOODING ISSUES
4.0 DRAINAGE
5.0 SUMMARY
6.0 CAVEATS

APPENDICES:

APPENDIX A - SITE LOCATION PLAN - FIG. 1
APPENDIX B - SITE TOPOGRAPHICAL SURVEY - FIG. 2
APPENDIX C - SITE AERIAL PHOTOGRAPH
APPENDIX D - ENVIRONMENT AGENCY RIVER NETWORK MAP
APPENDIX E - ENVIRONMENT AGENCY FLOOD MAP
APPENDIX F - ENVIRONMENT AGENCY WEBSITE RISK OF
FLOODING FROM SURFACE WATER MAPS
1.0 INTRODUCTION

1.01 Following instructions from Bilfinger GVA on behalf of Park Resorts Ltd on 26 February 2015, CoDA Structures have undertaken an assessment of flooding and drainage issues in relation to a proposed caravan park extension at Todber Caravan Park, Burnley Road, Gisburn.

1.02 The site is currently undeveloped.

1.03 The land to the north of the site is occupied by the existing caravan park.

1.04 It is proposed to extend the existing caravan park on an area of land to the south of the existing caravan park.

1.05 The local authority is Ribble Valley Borough Council (RVBC).

2.0 POLICY CONSIDERATIONS AND OBJECTIVES

2.01 National Planning Policy Framework:

Section 10 of the National Planning Policy Framework (NPPF) published in March 2012 sets out Government policy on development and flood risk for England. It aims to ensure that flood risk is taken into account at all stages of the planning process, to avoid inappropriate developments in areas at risk of flooding, and to direct development away from areas of highest risk. Where new development is thought necessary in areas of flood risk, the NPPF aims to make it safe, without increasing flood risk elsewhere, and, where possible, reduce the overall flood risk.

The NPPF promotes a sequential risk-based approach to determine the suitability of land for development in flood risk areas. The broad aim of the NPPF is to reduce the number of people and properties within the natural and built environment at risk of flooding. To achieve this aim, planning authorities are required to ensure that flood risk is properly assessed during the initial planning stages of any development.

2.02 Consideration and Objectives:

This Flooding and Drainage Assessment Report will consider the following:-

- whether the proposed development is likely to be affected by flooding.
- whether the proposed development will increase flood risk to adjacent properties.
The report will also demonstrate that any existing flood risk or flood risk associated with the proposed development can satisfactorily managed. This will include:

- whether the proposed development is likely to be affected by flooding and whether it will increase flood risk elsewhere.

- specifying the measures proposed to deal with the identified risks, including, where appropriate, proposals to reduce existing and/or future flood risk levels.

- satisfy the Local Authority that any flood risk to the development or additional risk arising from the proposal will be successfully managed so the site can be developed and occupied safely without risk to adjacent properties.

3.0 FLOODING ISSUES

3.01 The Site:

The site is located to the east of Burnley Road (A682) and is approximately 10 miles to the northeast of Clitheroe Town Centre. A site location plan (Fig. 1) is attached in Appendix A.

The Ordnance Survey co-ordinates for the centre of the site are 383310 mE, 446540 mN.

The site is approximately 2.8 hectares in area.

The site is currently undeveloped.

The general fall of the site is to the west. Site levels vary as follows:

<table>
<thead>
<tr>
<th>Location</th>
<th>Level (mAOD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern boundary</td>
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</tr>
<tr>
<td>South eastern boundary</td>
<td>189.51 – 195.56</td>
</tr>
<tr>
<td>South western boundaries</td>
<td>185.04 – 190.25</td>
</tr>
<tr>
<td>Eastern boundary</td>
<td>189.20 – 195.56</td>
</tr>
</tbody>
</table>

A site topographical survey (Fig 2) is attached in Appendix B.

A site aerial photograph is attached in Appendix C.

An open watercourse lies on the eastern boundary of the site and flows through the existing caravan park to the north. Sections of the watercourse have been piped through the existing caravan park. The source of the watercourse appears to be a groundwater issue in the southeast corner of the site.
There are other watercourses in the surrounding area (within 500m) of the site as follows:-

- Widow Hill Beck approximately 140m to the north.
- Skell Banks Dyke approximately 150m to the south.
- Unnamed watercourse approximately 150m to the west.
- Unnamed watercourse approximately 275m to the east.
- Unnamed watercourse approximately 375m to the west.
- Unnamed watercourse approximately 425m to the southwest.
- Unnamed watercourse approximately 425m to the east.
- Unnamed watercourse approximately 450m to the south.
- Crag Clough approximately 475m to the south.
- Unnamed watercourse approximately 500m to the southeast.

There are a number of groundwater issues in the surrounding area (within 500m) of the site. One of the groundwater issues is on the existing caravan park to the north of the site.

The position of the water courses are indicated on the Site Location Plan (Fig. 1) attached in Appendix A and the Environment Agency (EA) River Network Map attached in Appendix D.

3.02 Flood Zone Classification:

The site is located within Flood Zone 1 on the EA flood map. This zone comprises land assessed as having less than 1 in 1000 (<0.1%) annual probability of tidal or river flooding in any year.

A copy of the EA flood map is attached in Appendix E.

3.03 Sources of Flood Risk:

The following table shows a summary of the forms of flood and the potential issues in relation to the site that require further assessment.

<table>
<thead>
<tr>
<th>Flood Source</th>
<th>Applicable</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluvial</td>
<td>✓</td>
<td>There is a watercourse adjacent the eastern boundary of the site.</td>
</tr>
<tr>
<td>Tidal</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Run Off</td>
<td>✓</td>
<td>Potential for run off from higher land to the south.</td>
</tr>
<tr>
<td>Groundwater</td>
<td>✓</td>
<td>There are groundwater issues on and in the vicinity of the site.</td>
</tr>
<tr>
<td>Sewers</td>
<td>X</td>
<td>There are no public sewers on or within the vicinity of the site.</td>
</tr>
<tr>
<td>Reservoirs, Canals, etc.</td>
<td>X</td>
<td>No such features within 1000m of the site.</td>
</tr>
</tbody>
</table>
3.04 Flood Risk Assessment:

The site is within Flood Zone 1. This zone comprises land assessed as having less than a 1 in 1000 (<0.1%) annual probability of tidal or river flooding in any one year.

The watercourse on the eastern boundary of the site may be a source of localised fluvial flooding that has not been captured on the Environmental Agency Flood Zone map.

From the inspection of OS maps, site levels and a site walkover the site may be at risk from potential overland flood waters from surface water runoff from adjacent higher land to the south.

From inspection of the EA Website Risk of Flooding from Surface Water Maps, it would appear there is a very low risk (less than 1 in 1000 [0.1%]) of surface water flooding affecting the majority of the site. However, it would appear there is a low risk (between 1 in 1000 [0.1%]) of surface water flooding affecting a small area of the centre of the site and along the eastern boundary of the site which appears to be associated with the watercourse adjacent the boundary. It is indicated that there is a low chance of below 300mm depth of surface flooding affecting these areas of the site. It should be noted that surface water flooding can be difficult to predict and occurs when rainwater does not drain away through the ‘normal’ drainage systems or soaks into the ground but lies on or flows over the ground instead.

The EA Website Risk of Flooding from Surface Water Maps are attached in Appendix F.

The effect of groundwater as a flood source is not considered an issue at this location as groundwater issues adjacent the site appear to flow directly into watercourses.

The site is not at risk from overland flood waters from potential overloading of the public sewers as there are none on or in the vicinity of the site.

There are no lakes, ponds, canals etc in the surrounding area to the site.

3.05 Sequential Test:

The Sequential Test should be applied at all stages of planning. Its aim is to steer new development to areas at the lowest probability of flooding.

Table 2 of the Technical Guidance to the NPPF (which categorises the flood risk vulnerability of land uses) indicates the proposed development is categorised as a ‘more vulnerable’ land use.

From the EA flood zone map site is identified as being Flood Zone 1.
Table 3 of the Technical Guidance to the NPPF indicates where the proposed land use is ‘more vulnerable’ development is appropriate in Flood Zone 1. Therefore the Sequential Test has been passed.

3.06 Exception Test

Table 3 of the Technical Guidance to the NPPF indicates where the proposed land use is ‘more vulnerable’ development is considered appropriate in Flood Zone 1 and the Exception Test is not required.

Notwithstanding the above the following sections of this report will demonstrate that the proposed development will be safe from flooding and will not increase flood risk elsewhere.

3.07 Effect of Development on the Wider Catchment:

The proposed development will result in impermeable area on the site and therefore unattenuated surface water flows from the development, if not addressed, would increase the flood risk to the local catchment.

3.08 Flood Risk Mitigation:

The proposed development is in Flood Zone 1.

The external levels around the development should be set to route any potential overland flood waters to the west as the existing situation.

The finished floor level of the proposed lodges should be set 0.30m minimum above existing ground level.

4.0 DRAINAGE

4.01 Public Sewers:

There are understood to be no public sewers in the vicinity of the site.

4.02 Existing Drainage:

The client has advised the following:-

- The foul drainage treatment system has been recently replaced on the existing caravan park.

- A new sewage treatment plant has been installed on the site with the treated effluent being and discharged to Widow Hill Beck adjacent the northern boundary of the existing caravan park.
There are no surface water outfalls from the existing caravan park to either Widow Hill Beck to the north or the watercourse adjacent the eastern boundary of the site.

There is a pipe from the site which runs under Burnley Road (A682) to a drainage ditch adjacent the south western verge of the road.

The reed beds on the site are redundant following the installation of the new sewage treatment plant.

4.03 Geology:

1:50,000 British Geological Survey (BGS) Sheet 68 Clitheroe indicates the following:-

- The site is overlain with glacial boulder clay.
- The site is underlain by Limestone of the Dinantian Age.
- No faults lie within 1000m of the site.

4.04 Ground Conditions:

A ground investigation has not been undertaken on the site.

4.05 Foul Water:

A separate foul drainage system will be provided on the site discharging to the new sewage treatment plant on the site.

Subject to the confirmation of invert levels it appears that a gravity system can be utilised on the development. However, if a pumped system is required the pumping station should have duty and standby pumps, adequate emergency storage and should be serviced on a regular basis (i.e. on an annual service contract).

It should be noted that an application to vary the existing Environment Permit in relation to the existing package treatment plant which serves the existing caravan park may need to be made to cater for the additional foul water loading from the proposed development.

4.06 Surface Water Drainage:

A separate surface water drainage system will be provided on the development.

Geological maps would indicate that the use of shallow soakaways will not be feasible on the development as relatively impermeable clays are likely to be present on the site.
It is therefore proposed to discharge surface water from the development, via the existing pipe under the A682, at greenfield runoff.

A greenfield runoff of 3.0 l/sec/hec is proposed for the site which equates to $2.8 \times 3.0 = 8.4$ l/sec but this discharge rate would need to be agreed with the local drainage authority.

Stormwater storage would be provided for storms up to 1:100 year return period plus an allowance for climate change.

The stormwater storage would be provided in the form of a dry detention basin and/or swales.
5.0 SUMMARY

The Site
The site is located to the east of Burnley Road (A682) and is approximately 10 miles to the northeast of Clitheroe Town Centre.
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The effect of groundwater as a flood source is not considered an issue at this location as groundwater issues adjacent the site appear to flow directly into watercourses.
The site is not at risk from overland flood waters from potential overloading of the public sewers as there are none on or in the vicinity of the site.

Sequential Test
The Sequential Test should be applied at all stages of planning. Its aim is to steer new development to areas at the lowest probability of flooding.
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**Flood Risk Mitigation**
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The external levels around the development should be set to route any overland flood waters to the west as the existing situation.

**Foul Drainage**
A separate foul drainage system will be provided on the site discharging to the new sewage treatment plant on the site.

Subject to the confirmation of invert levels it appears that a gravity system can be utilised on the development. However, if a pumped system is required the pumping station should have duty and standby pumps, adequate emergency storage and should be serviced on a regular basis (i.e. on an annual service contract).

It should be noted that an application to vary the existing Environment Permit in relation to the existing package treatment plant which serves the existing caravan park may need to be made to cater for the additional foul water loading from the proposed development.

**Surface Water**
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Geological maps would indicate that the use of shallow soakaways will not be feasible on the development as relatively impermeable clays are likely to be present on the site. It is therefore proposed to discharge surface water from the development, via the existing pipe under the A682, at greenfield runoff.

A greenfield runoff of 3.0 l/sec/ha is proposed for the site which equates to 2.8 x 3.0 = 8.4 l/sec but this discharge rate would need to be agreed with the local drainage authority.

Stormwater storage would be provided for storms up to 1:100 year return period plus an allowance for climate change.

The stormwater storage would be provided in the form of a dry detention basin and/or swales.

### 6.0 CAVEATS

6.01 The comments given in this report and recommendations made are based on the information that could be obtained from reasonably accessible sources. Detailed discussions have not yet been held with statutory bodies and the local authority.

6.02 This report has been prepared for the sole use of Park Resorts Ltd and their development funders, unless agreed otherwise in writing by CoDA Structures.

Signed: [Signature]
J Lawrence  B Eng  C Eng  M I Struct E

Client: PARK RESORTS LTD
Project No: 7486
Date: 08 June 2015
APPENDIX A

SITE LOCATION PLAN - FIG. 1
APPENDIX B

SITE TOPOGRAPHICAL SURVEY - FIG. 2
APPENDIX C

SITE AERIAL PHOTOGRAPH
APPENDIX D
ENVIRONMENT AGENCY RIVER NETWORK MAP
APPENDIX E

ENVIRONMENT AGENCY FLOOD MAP
APPENDIX F

ENVIRONMENT AGENCY WEBSITE RISK OF FLOODING FROM SURFACE WATER MAPS
Risk of Flooding from Surface Water

Surface water flooding happens when rainwater does not drain away through the normal drainage systems or soak into the ground, but lies on or flows over the ground instead.

The shading on the map shows the risk of flooding from surface water in this particular area.

Click on the map for a more detailed explanation.
Surface Water Depth - Low Chance of Occurring

Surface water flooding happens when rainwater does not drain away through the normal drainage systems or soak into the ground, but lies on or flows over the ground instead.

The shading on the map shows the estimated water depth when there is a low chance of flooding.

Click in the legend to see estimated water depths for high and medium chances of flooding, and for estimated velocity (speed and direction of the water).

Map of X: 383,126; Y: 446,814 at scale 1:10,000
Surface Water Depth - High Chance of Occurring

Surface water flooding happens when rainfall water does not drain away through the normal drainage systems or soak into the ground, but lies on or flows over the ground instead.

The shading on the map shows the estimated water depth when there is a high chance of flooding.

Click on the legends to see estimated water depths for medium and low chance of flooding, and for estimated velocity (speed and direction of the water).

Map of X: 383,125; Y: -446,814 at scale: 1:10,000