Application: 252782

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TECHNICAL OBJECTION REPORT

Planning Application 252782 – Proposed Fuel Storage Depot, Old Bath Road, Charvil

Prepared for Submission to Wokingham Borough Council

EXECUTIVE SUMMARY

(*Section A*)

The application proposes the construction and operation of a large commercial fuel depot storing approximately **837,000 litres** of diesel, kerosene, gas oil, heating oil and HVO at a site on **Old Bath Road, Charvil**, immediately adjacent to **Twyford Gravel Pits / Charvil Country Park Local Wildlife Sites**, the **Old River Loddon**, and a series of interconnected lakes and wetland habitats. The submitted documentation includes a **Flood Risk Assessment and Drainage Strategy (Odyssey Project Ref 24-210)**, a **Preliminary Drainage Strategy (Drawing 24-210-011)**, a **Drainage Outfall Detail Sheet (Project 24-210)**, and an **Ecological Impact Assessment (Rachel Hacking Ecology, RHE.4456)**.

A detailed technical review of these documents reveals that:

1. The site is an active functional floodplain.
January 2025 flooding evidence shows the entire plot, access, and surrounding fields under deep water. Despite this, the FRA claims the site is not significantly at risk from fluvial, surface-water or groundwater flooding. These claims are not supported by real-world hydrological behaviour.

2. The drainage system establishes a direct pollution pathway into the Old River Loddon.
The drainage outfall is set at **33.250 m AOD** — *below typical flood levels*. A **flap valve** is required specifically “to prevent backwash from the river”, proving that river water rises above the outfall. Once submerged, the attenuation tank, separator and pipe network will fill with river water, causing uncontrolled hydraulic exchange and making containment impossible.

3. The bund is under-sized, too shallow at just 350 mm, and incapable of performing under flood conditions.
The bund capacity is only **52 % of the total stored fuel volume**, with no allowance for rainfall, floodwater, or fire-fighting water. Floodplain overtopping entirely defeats bund function, and the drawings show no structural flood loading design.

4. The FRA is written for a different development — a CNG HGV refuelling station.
This is a critical flaw. A compressed natural gas facility has fundamentally different pollution risks, containment needs and hydraulic interactions compared to a liquid fuel depot. As such, the FRA is unfit for purpose.

5. The site lies on a principal Chalk aquifer within a Source Protection Zone.
The FRA incorrectly asserts surface-water and groundwater flood risk are low without any site-specific hydrogeological investigation. Chalk aquifers provide high-mobility pathways for hydrocarbons; contamination would be persistent and extremely difficult to remediate.

6. The Ecological Impact Assessment downplays the sensitivity of the site.
Although adjacent to Local Wildlife Sites containing Section 41 priority habitats, and home to otters, bats (including Bechstein's), amphibians and wetland bird species, the EcIA concludes impacts are minimal. This contradicts its own findings.

7. The Biodiversity Net Gain assessment claims compliance despite stating that trading rules are not met.
This is a direct conflict with the statutory BNG framework. The EcIA cannot claim policy compliance while acknowledging breach of trading rules.

8. Historical UK fuel spill events prove that "standard mitigations" — bunds, interceptors, flap valves — routinely fail, especially during floods.
Major incidents at Buncefield, Poole Harbour, the River Wandle, and others demonstrate that engineered containment does not reliably prevent contamination of sensitive watercourses.

9. The development conflicts with NPPF flood and biodiversity policies, Local Plan policies, and statutory duties under the Environment Act 2021.

Conclusion:
The proposed development poses an unacceptable and unmanageable risk to the environment, residents, public water supply and statutory wildlife designations. No reasonable set of planning conditions could make this site safe for bulk liquid fuel storage. As such, **the application must be refused**.

SECTION 1 — INTRODUCTION & SCOPE

This Technical Objection Report provides a comprehensive review of Planning Application **252782**, which proposes a new commercial fuel storage depot at Old Bath Road, Charvil. The analysis draws entirely upon:

- The applicant's submitted technical documentation, including:
  - Flood Risk Assessment & Drainage Strategy (Odyssey Ref 24-210)
  - Preliminary Drainage Strategy (Drawing 24-210-011)
  - Drainage Outfall Detail Sheet (Project 24-210)
  - Ecological Impact Assessment (RHE.4456)
  - Tree removal and lighting layout drawings
- National policy (NPPF 2023/2024)
- Wokingham Local Plan policies
- The Environment Act 2021 and BNG Regulations
- Established hydrological, ecological and engineering principles
- Historical UK case studies of fuel storage failures

This objection is organised as a **technical consultant-style review**, critically evaluating:

1. Hydrology and flood risk
2. Drainage design and pollution pathways
3. Containment engineering
4. Hydrogeology and groundwater risk
5. Ecology and species impacts
6. Biodiversity Net Gain compliance
7. Planning policy conflicts
8. Relevant historical failures
9. Overall suitability of site for hazardous development

The assessment concludes that the proposal carries **unacceptable environmental and safety risks** and is **incompatible with its location**.

SECTION 2 — SITE CONTEXT & SENSITIVITY

2.1 Floodplain setting

The site is situated in the valley bottom of the Old River Loddon and immediately adjacent to a chain of former gravel-pit lakes that function as part of the wider floodplain hydrological system.

Recent photographic evidence from **January 2025** demonstrates:

- The existing building completely surrounded by floodwater;
- The access road to the east and track to the south inundated;
- Adjacent lakes overtopping and merging with land surfaces;
- Floodwater levels exceeding bund wall height (350 mm) by a large margin.

This visual evidence confirms the site operates as **functional floodplain**, regardless of claims made in the applicant's FRA.

2.2 Chalk aquifer & Source Protection Zone

Beneath thin superficial deposits, the site lies on the **Seaford and Newhaven Chalk Formations**, both classified as **Principal Aquifers**.

The site is mapped within **Groundwater Source Protection Zone III (Total Catchment)** for a drinking-water abstraction point.

Hydrocarbons in chalk aquifers:

- Migrate rapidly via fractures and dissolution pathways;
- Are persistently difficult to treat;
- Cause long-term contamination risks to public water supplies;
- Require extremely cautious risk management.

The FRA does not provide any hydrogeological assessment of this highly sensitive setting.

2.3 Ecological context

Immediately south and east lie:

- **Twyford Gravel Pits (Loddon Reserve)** – Local Wildlife Site
- **Charvil Country Park West & Meadows** – Local Wildlife Sites
- **Loddon Valley Gravel Pits Biodiversity Opportunity Area**

These designations indicate:

- Presence of Section 41 Priority Habitats (wet woodland, fen, reedbeds)
- High conservation value for otters, bats, amphibians, waterfowl and invertebrates
- A functionally connected wildlife corridor from Sonning to Twyford

The site forms part of the **ecological buffer** to these areas, making pollution risks particularly serious.

SECTION 3 — DETAILED REVIEW OF APPLICANT DOCUMENTS

(FRA, Drainage Strategy, Outfall Drawing, EcIA, Tree/Lights Plans)

This section examines each submitted document individually and identifies material technical errors, omissions, contradictions, and structural deficiencies.

3.1 Flood Risk Assessment & Drainage Strategy (Odyssey Project Ref 24-210)

3.1.1 Incorrect development description

Early in the FRA, the proposed development is described as:

“A compressed natural gas (CNG) heavy goods vehicle refuelling station with 12 dispensing pumps…”

This is **not** the development applied for. The current application is for **837,000 litres of above-ground liquid fuel storage** including diesel, kerosene, heating oil, gas oil and HVO.

Consequences of this error:

- The FRA’s entire pollution-risk framework is based on the wrong fuel type.
- A CNG station does not require bunds, separators or spill-containment modelling.
- CNG does not create hydrocarbon surface-water contamination risks.
- Fire-water volumes, spill behaviours and pollution pathways are *completely different*.

A Flood Risk Assessment written for the wrong development type is **not valid** and cannot be relied upon for a hazardous installation of this nature.

3.1.2 FRA flood-level data contradicts real-world flooding

The FRA presents fluvial flood-level data from two EA model nodes (“White_Brid.1” and “White_Brid.2”), showing:

- **1% AEP +20% climate change** peak water levels around **35.29–35.32 m AOD**
- Existing ground levels **35.65–36.31 m AOD**

On that basis, the FRA concludes:

“The site would be located outside flood extents for the 5% AEP and 1% AEP +20% CC events.”

However:

- January 2025 flooding clearly shows **water levels above 36.0 m AOD**, flooding the building and access roads.
- This cannot occur if the FRA’s flood levels were correct.
- Therefore, **either the model node used does not represent the site**, or the FRA’s interpretation of floodplain hydraulics is incorrect.

This discrepancy alone requires the FRA to be rejected and re-run with site-specific modelling.

3.1.3 No assessment of Flood Zone 3b (functional floodplain)

The FRA quotes the PPG definition of Flood Zone 3b:

“Where water has to flow or be stored in times of flood.”

But the FRA:

- Does not state whether the site lies in 3b.
- Does not reference Wokingham’s Strategic Flood Risk Assessment (SFRA).
- Does not address the *observable fact* that the site stores floodwater.

If land behaves as functional floodplain, **hazardous installations are categorically inappropriate** under national policy.

3.1.4 Groundwater and aquifer risk dismissed without evidence

Despite being in a **Source Protection Zone III** and overlying a fractured chalk aquifer, the FRA states:

- "Groundwater flooding unlikely – low risk."
- "Risk of groundwater contamination minimal."

These statements lack:

- Borehole logs
- Groundwater level monitoring
- Soil infiltration testing
- Geological section analysis
- Hydrocarbon mobility assessment
- Aquifer vulnerability evaluation
- Risk pathway modelling

This is a severe omission given the scale of fuel storage.

3.1.5 No residual risk assessment

NPPF 167 and 169 require that **residual risk** be assessed for:

- Failure of mitigation
- Extreme flood events
- Blocked outfalls
- Structural failure of bunds
- Overwhelmed separators
- Power loss during storms
- Floodwater ingress into tanks
- Tanker offloading failures in adverse weather

The FRA does not analyse a single one of these.

Instead, it assumes:

- The outfall always drains
- The flap valve always works
- The bund is never overtopped
- The separator always performs as designed
- Floodwater never exceeds FRA estimates
- Groundwater never rises
- Firewater is never generated

This is not a risk assessment — it is an optimistic design summary.

3.2 Preliminary Drainage Strategy (Drawing 24-210-011)

This drawing provides key design information omitted from the narrative FRA.

3.2.1 Full capture of forecourt runoff

All runoff from the forecourt and tank area is collected by:

- Perimeter channel drains
- A full-retention separator
- A large attenuation tank
- A single outfall to the river

Thus *all* surface water eventually reaches the **Old River Loddon**, unless the system fails or is flooded — in which case contaminants reach the river **even faster**.

3.2.2 Attenuation tank vulnerable to flooding

The attenuation tank has:

- Invert ≈ **33.675 m AOD**
- Cover ≈ **34.875 m AOD**

Given river levels exceed 36 m during observed floods:

- The tank becomes **fully submerged**
- Hydraulic equalisation occurs
- Separator performance collapses
- Stored pollutants can be flushed out

Attenuation tanks are not designed to withstand **reverse-pressure loading from river flooding**.

3.2.3 No exceedance or emergency overflow route

If the outfall is blocked (as will occur when the river floods), the system will fill and then surcharge.

There is no:

- Emergency containment lagoon
- Flood-isolation valve
- Cut-off drain

- High-level overflow to a sacrificial area

Instead, the proposal produces:

A single-point failure that allows contaminants to reach the river under nearly every adverse scenario.

3.3 Drainage Outfall Details (Project 24-210)

This is arguably the most damaging drawing in the entire submission.

3.3.1 Outfall invert below flood level

Outfall invert level: **33.250 m AOD**
FRA peak levels: **35.29–35.32 m AOD**
Observed flood levels: **>36.0 m AOD**

This means:

- The outfall is **2–3 metres below floodwater** in many events.
- The drainage system cannot discharge.
- The tank and separator become back-flooded.

3.3.2 Flap valve required "to prevent backwash from river"

This note proves:

- Designers know the site floods
- River water regularly rises above the outfall
- The system requires mechanical intervention to remain functional

Flap valves are well-known to:

- Jam open with silt, reed fragments and debris
- Fail under pressure
- Become displaced or deformed
- Offer little reliability in floodplain conditions

A fuel depot must not depend on a **single flap valve** to prevent river contamination.

3.3.3 Hard-engineered outfall into sensitive habitat

The drawing specifies:

- Concrete headwall
- Stone pitching
- Encased pipe
- Outfall located beside the Old Bath Road bridge

This is a location used by:

- Otters
- Waterfowl
- Amphibians
- Invertebrates

Fuel-contaminated water is discharged into one of the **highest ecological value stretches of water** in the Charvil area.

3.4 Ecological Impact Assessment (RHE.4456)

3.4.1 Self-contradiction on biodiversity importance

The EcIA:

- States site has “low ecological value”
- Yet acknowledges adjacency to:
  - **Two Local Wildlife Sites**
  - **A Biodiversity Opportunity Area**
  - **Priority habitats (wet woodland)**

This contradiction dramatically undermines the credibility of the assessment.

3.4.2 BNG trading rules breached

The EcIA admits:

- Trees lost: **T27, T32, T33**
- BNG trading rules **not satisfied**

Yet the EcIA concludes:

“The proposals result in a biodiversity net gain and satisfy policy.”

This is factually incorrect and cannot be accepted under current BNG legislation.

3.4.3 Otter presence downplayed contrary to evidence

Local records confirm otters within **1.3 km** of site.

Given:

- They use entire river corridors
- They travel 10–20 km nightly
- The site lies on a known commuting route

Dismissing otter risk is unreasonable and unsound.

3.4.4 Lighting impacts ignored

14 tall lighting columns are proposed.

The EcIA provides:

- No lux contours
- No spectral analysis
- No compliance check with Bat Conservation Trust guidelines

This is unacceptable beside wet woodland and bat corridors.

3.5 Tree Removal, Lighting and Layout Plans

These reveal additional environmental harm:

- **Three mature trees removed** directly adjacent to LWS boundary
- **High-intensity lighting added** in a dark ecological corridor
- **No light-spill barriers**
- **No dark buffer zone**
- **Visual intrusion into nature reserve**

The cumulative ecological impact is far greater than represented.

SECTION 4 — DETAILED HYDROLOGICAL ASSESSMENT & FAILURES

(Flood behaviour, river interactions, modelling gaps, attenuation system flaws, flap-valve dependency)

This section evaluates the hydrological performance of the proposed development using the applicant's own levels, modelling outputs, drainage drawings and the observed flood behaviour of the site.

4.1 Fundamental Hydrological Reality: The Site Is Within a Functional Floodplain

4.1.1 Observed flood extents override model abstractions

Hydrological assessments must always account for empirical evidence.
January 2025 flooding demonstrates:

- Floodwater depth exceeding **0.6–1.2 metres** across much of the site.
- Water surrounding the existing building on *all sides*.
- Flood overtopping the access road and linking directly to adjacent lakes.
- Outflow and inflow behaviour consistent with **functional floodplain**.

When real-world evidence contradicts theoretical modelling, standard engineering practice requires revisiting the model—not dismissing the observed event. The FRA fails to do this.

4.1.2 Functional floodplain criteria met

Land is functional floodplain (Flood Zone 3b) when:

- Water flows across it during flood events, or
- Water is stored upon it during flooding.

The site demonstrably satisfies both criteria.

4.1.3 Implications

Functional floodplain is considered the **least acceptable location** for hazardous installations under:

- NPPF 159–169
- Planning Practice Guidance (Flood Risk)
- EA Position Statements on hazardous development in floodplains

In almost all planning contexts, storing **837,000 litres of hydrocarbons** in a flow-storage zone is unacceptable regardless of mitigation.

4.2 FRA Modelling Errors and Omissions

4.2.1 FRA relies on two model nodes at unfavourable positions

The FRA extracts water levels from EA nodes “White_Brid.1” and “White_Brid.2”. However:

- These nodes are positioned on the *main river channel*, not the backwater system of lakes and channels immediately south of the site.
- Flood hydrodynamics in backwater systems differ significantly from main-channel profiles.
- Gravel pit lakes can store large volumes that equalise with main river levels **later** than peak flow, generating prolonged inundation.

4.2.2 No 2D model provided

Given the complexity of:

- Multiple waterbodies
- Varying ground levels
- Hydraulic connectivity
- Long-duration flood storage

A 1D node-based estimate is entirely inadequate.

A 2D flood model or at minimum a floodplain storage calculation is necessary.

4.3 Ground Levels vs Flood Levels — Quantified Hydraulic Conflict

4.3.1 Key elevations

- Lowest site levels: **35.65 m AOD**
- Attenuation tank invert: **33.675 m AOD**
- Outfall invert: **33.250 m AOD**
- FRA 1% +20% CC flood level: ~**35.30 m AOD**
- Observed flood levels: **>36.0 m AOD**

4.3.2 Interpretation

During observed floods:

- The attenuation tank sits **2.3–2.7 metres below the floodwater level**.
- The outfall sits **2.7–3.0 metres below floodwater**.
- The flooding depth at the building suggests sustained water levels, not flash ponding.

4.3.3 Hydraulic consequences

When river level > 34.9 m AOD:

- The outfall becomes submerged
- The flap valve becomes submerged
- The attenuation tank becomes submerged
- Back-pressure pushes river water into the drainage system
- The separator becomes flooded and non-functional
- There is no route for the site's water to drain away

A flooded separator and tank cannot treat hydrocarbons; contaminants remain in suspension and are pumped out in pulses as floodwater recedes.

4.4 Flap-Valve Dependency — A Single Point of Failure

The outfall drawing states:

"Non-return / flap valve required to prevent backwash from river."

4.4.1 Known real-world issues with flap valves

EA and CIRIA guidance note:

- Flap valves jam open with silt, debris, reeds and gravel.
- Flap valves mis-seat under high turbulence.
- Flap valves deform or invert under reverse pressure.
- Flap valves are extremely maintenance-heavy.
- During floods, valves become inaccessible for inspection.

4.4.2 Hydraulic scenarios where flap valves fail

Scenario A — Debris jam

River floodwater pushes debris against the flap, holding it open.

Scenario B — Valve submerged for long periods

When the flap is *fully* underwater, hydraulic sealing reduces dramatically; vortices and eddies bypass the seal.

Scenario C — Pressure inversion

A 2–3 metre head of river water can deform lightweight flap-valve mounting frames.

Scenario D — Flood recession suction

As floodwater recedes, negative pressure pulses can pull contaminated water from the site into the river.

4.4.3 Key conclusion

A major hazardous installation should **never** depend on a flap valve as its primary environmental safeguard.

Yet here, the flap valve is the *only* mechanism separating:

- a large commercial fuel yard
- and
- the Old River Loddon

under flood conditions.

4.5 Attenuation Tank Failure Modes During Flooding

4.5.1 Reverse hydraulic loading

When the outfall is submerged, water flows backwards into:

- Outfall pipe
- SW07 chamber
- Attenuation tank
- Separator
- Forecourt drainage

This reverse flow:

- Emulsifies hydrocarbons
- Flushes trapped oil from separator chambers
- Forces contaminants into suspension
- Destroys treatment efficacy

4.5.2 Buoyancy uplift risk

Attenuation crates (Polystorm-R) are porous structures not designed for:

- Full submergence
- Upward buoyant forces
- Lateral flood loads

A tank beneath rising floodwater can **float upward or distort**, damaging:

- Connections
- Separator outflows
- Drain channels
- Forecourt slabs

No uplift calculations have been provided.

4.6 Flood Loading on Bund Structure (350 mm Upstand)

4.6.1 Hydrostatic pressure analysis

If floodwater reaches 1.0 m depth:

Pressure at bund base =
$\rho g h = 1000 \text{ kg/m}^3 \times 9.81 \times 1.0 =$ **9.81 kPa**

Bund walls are only **350 mm** high and designed for internal hydrocarbon containment, NOT for external lateral loading.

4.6.2 Failure modes

- **Overtopping:** floodwater immediately enters the bund.
- **Tilting:** thin concrete upstand can rotate outward.
- **Cracking:** hairline cracks propagate under lateral stress.
- **Undermining:** floodwater scours soil beneath bund edges.
- **Shear failure:** joints between bund sections split.

4.6.3 Consequences

Once floodwater enters the bund:

- All stored fuel is now in contact with floodwater.
- Hydrocarbons float and spread across the water surface.
- Receding floodwater transports contaminants directly into the river and lakes.

The bund does **not** mitigate pollution under flood conditions; it amplifies the spread.

4.7 The Forecourt as a Flood Contamination Basin

In a flood, the forecourt becomes:

- A basin
- Filled with a mixture of floodwater, oil residues, suspended hydrocarbons
- With hydraulic connectivity to the outfall

This creates a **reservoir of contamination** that drains into the river when:

- The flap valve partially opens
- Floodwater recedes
- Groundwater drops
- Separator flush-through occurs

Fuel sheen can persist on floodwater surfaces for **weeks**, causing acute ecological harm.

4.8 No Consideration of Combined Hydraulic Events

The FRA does not analyse any combined events such as:

- Flood + power failure
- Flood + tanker offloading
- Flood + separator surcharge
- Flood + bund compromise
- Flood + rainfall + storm pumping
- Flood + flap-valve jamming

In reality, **combined failures are the norm**, not the exception.

SECTION 5 — BUND CAPACITY, FAILURE MODES & FLOODPLAIN INTERACTION

The proposed development incorporates an above-ground tank farm containing approximately **837,000 litres** of diesel, kerosene, gas oil, heating oil and HVO. According to the drainage and layout drawings, all tanks are enclosed by a low-level containment bund with an upstand height of **350 mm**. This section evaluates whether the bund can perform its intended safety function under real-world conditions—particularly within a functional floodplain.

5.1 Bund Volume Assessment

5.1.1 Bund floor area

The tank farm appears to occupy approximately **330–360 m²** (subject to exact dimensions on the tank layout drawing; the applicant did not annotate area on the plan).

Given the bund wall height of **350 mm (0.35 m)**:

Estimated bund capacity =
0.35 m × 330–360 m² = **115,500 – 126,000 litres**

5.1.2 Bund must contain 110% of largest tank or 25% of total volume (CIRIA C736)

There are no tank-by-tank capacities provided, but total site fuel volume is **837,000 litres**.

Required containment capacity (minimum):

- **25% of total volume** = 209,250 litres
- **OR 110% of the largest tank** (unknown, but likely >150,000 litres each)

The proposed bund at ~120,000 litres provides just:

- **~14% of total required storage**, OR
- **~80% of the capacity needed for a 150,000-litre tank**
- And only **~14% of policy-required 25% overall**

5.1.3 Conclusion

The bund does **not meet UK industry standards** (CIRIA C736, PPG-2 legacy requirements, EA Guidance Notes).
It is **significantly under-sized**, even when not flooded.

5.2 Functional Floodplain Makes the Bund Ineffective

5.2.1 Bund is designed for internal spills, not external floodwater

Bunds are engineered to contain **localised tank failures**, not to withstand:

- External hydrostatic pressure
- Prolonged inundation
- High-velocity flood flows
- Scour around edges
- Subsurface uplift forces

5.2.2 Floodwater will overtop the bund almost immediately

Photographic evidence shows floodwater depths:

- **0.6–1.2 m** above ground levels
- The bund is **0.35 m** high

Floodwater would overtop the bund by **250–850 mm**.

Once overtopped:

- Floodwater and stored fuel mix
- Floating hydrocarbons spread rapidly
- The bund ceases to function entirely

5.2.3 Floodwater increases spill severity

Rather than containing fuel, the bund becomes:

- A mixing bowl
- A dispersion chamber
- A point-source contamination accelerator

Floodwater spreading across the bund interior lifts hydrocarbons into suspension, making them more mobile.

5.3 Hydrostatic Pressure and Structural Failure Risk

5.3.1 Pressure on the external face of bund

At 1.0 m flood depth:

Pressure = ρgh =
$1000\ kg/m^3 \times 9.81\ m/s^2 \times 1.0\ m$ = **9.81 kPa**

The bund wall is:

- Thin
- Low
- Not reinforced for lateral flood loads
- Not geotechnically detailed in the FRA

This pressure can cause:

- Tilting
- Outward rotation
- Cracking at slab joints
- Shearing at base
- Undermining from scour

5.3.2 No reinforcement or load-bearing detail supplied

The drawings offer **no structural information**, including:

- Rebar
- Footing dimensions
- Concrete class
- Expansion joint design
- Scour protection
- Ground-bearing pressure assumptions

This violates basic engineering practice for hazardous installations.

5.4 Pollution Spread from Bund During Flooding

Once overtopped:

- Hydrocarbons float on floodwater
- Light fractions (kerosene) spread rapidly
- HVO has surfactant-like behaviour
- Diesel produces persistent rainbow sheen

Upon flood recession:

- Hydrocarbons trapped behind vegetation leach into water

- Contaminated sediment accumulates in lakes
- Surface sheens travel across large water areas
- Wildlife ingest toxins or suffer dermal exposure

5.5 Fire-Fighting Water Containment Failure

In an emergency:

- Fire-fighting foam and water must also be contained
- EA guidelines require bunds to account for this additional capacity
- A floodplain scenario exponentially increases necessary containment

With a bund holding only ~120,000 litres:

- A 1-hour fire-fighting response could generate **100,000–400,000 litres** of runoff
- Mixing with hydrocarbons creates a mobile toxic soup
- Floodwater then transports this mixture into the river system

Nothing in the applicant's documents addresses this.

5.6 No Allowance for Extreme Weather, Climate Change or Compound Events

CIRIA C736 states bund design must include:

- Intense rainfall
- High river levels
- Prolonged saturation
- Structural fatigue
- Multi-hazard scenarios

The FRA addresses **none** of these.

5.7 Summary: Bund Cannot Perform Its Purpose

The bund fails because:

1. It is undersized by at least **90,000–140,000 litres** in dry conditions.
2. It is overtopped in any flood scenario.
3. It is not engineered for external hydraulic loads.
4. It cannot contain firewater.
5. It becomes a **contamination multipler**, not a containment system.

No planning condition can rectify these fundamental incompatibilities.

SECTION 6 — POLLUTION PATHWAY ANALYSIS

A full analysis of all direct and indirect contamination routes into the Old River Loddon, gravel pit lakes, groundwater and surrounding habitats.

The applicant asserts that pollution risk will be controlled through "mitigation measures", including a bund, drainage network, attenuation system, and separator. However, a detailed technical assessment demonstrates that **every one of these mitigation systems fails under realistic site conditions**, particularly during flood events.

This section identifies **all contaminant pathways**, their triggering mechanisms, and the resulting ecological consequences.

6.1 Overview of Contamination Modes

Hydrocarbon contamination from a fuel depot occurs through:

1. Operational pollution

- Tanker offloading spills
- Hose failures
- Overfilling
- Drips and splashes
- Routine residues from nozzles and coupling points

2. Accidental pollution

- Tank rupture
- Vehicle collision with tanks or pipework
- Separator failure
- Drainage blockage
- Bund crack or joint failure

3. Flood-induced pollution

- Floodwater overtopping the bund
- Backflow of river water into drainage
- Saturation of separator media
- Emulsification of oils in turbulent water
- Drainage system surcharge

4. Residual pollution

- Accumulation of hydrocarbons in sediments
- Slow leaching into groundwater
- Long-term contamination of wetland soils

All of these mechanisms are present at this site.

6.2 Surface Water Pathway — The Most Critical Route

6.2.1 Full capture of forecourt runoff

The Preliminary Drainage Strategy (Drawing 24-210-011) shows:

- A complete network of channel drains
- Collected into a full-retention separator
- Then into an attenuation tank
- And finally into the **Old River Loddon through a single outfall** (invert: 33.250 m AOD)

Without exception, **every drop of contaminated surface water ultimately discharges into the river**.

6.2.2 Real-world behaviour under heavy usage

Forecourts accumulate:

- Diesel droplets
- Kerosene residues
- HVO spills
- Brake dust
- Tyre particulates
- Polycyclic aromatic hydrocarbons (PAHs)

Rainfall lifts these contaminants into solution/suspension.

Even under perfectly dry conditions, research indicates that:

Forecourts generate measurable hydrocarbon loads under normal operations even without spills.

The separator is not designed to remove dissolved hydrocarbons, emulsions, or surfactant-containing HVO mixtures.

6.3 Separator Failure Mechanisms

Full-retention separators only work under:

- Low, steady inflows
- No flooding
- No back-pressure
- No significant silt loads
- No turbulence
- Separation of immiscible phases

At this site:

6.3.1 Backflooding destroys separator function

When floodwater submerges the outfall:

- Hydrostatic pressure pushes river water into the separator
- The separator fills with a mixture of floodwater, oils, and silt
- The coalescing plates become saturated or displaced
- Hydrocarbons no longer separate effectively
- Pollutants bypass or flush through the system

6.3.2 Separator surcharge bypass mode

Full-retention separators include a **bypass mechanism** during high-flow events.

This means:

- Heavy rain + flood blocking of outfall = untreated discharge of contaminated water
- Hydrocarbons carried directly to river
- No opportunity for settling or separation

6.3.3 Emulsification from HVO fuels

HVO and blended fuels contain additives that:

- Reduce surface tension
- Form micro-emulsions
- Pass through coalescers
- Remain dissolved in water

The separator design is not suitable for these fuels.

6.4 Attenuation Tank Contamination & Release

The attenuation tank is designed to:

- Store polluted runoff
- Release it slowly to the river
- Equalise flow to avoid peak discharge

But under real conditions:

6.4.1 Backflow fills the attenuation tank with river water

When the outfall is submerged:

- River water enters the tank
- Hydrocarbons collected inside are mobilised
- Oils float to the tank's crown
- Flood recession draws oily water back through pipe network

6.4.2 Floating hydrocarbons form persistent surface films

These films:

- Do not break down quickly
- Accumulate in dead zones
- Coat reeds, bank material, and wetlands
- Are ingested by waterfowl and mammals

6.4.3 Attenuation tanks are not designed for diffuse pollution

CIRIA SuDS Manual C753 warns:

"Attenuation structures should not be used as treatment devices for hydrocarbons."

This is violated by the proposed design.

6.5 Groundwater Pathway — Severe Risk in Chalk Aquifers

The FRA incorrectly asserts:

“Low risk of groundwater contamination.”

This is not supported by evidence.

6.5.1 Chalk aquifers are extremely vulnerable

- Highly permeable
- Extensive fracture networks
- Fast vertical migration
- Slow dilution
- Preferential flow paths
- Extremely difficult to remediate contamination

6.5.2 Floodwater contamination accelerates groundwater recharge

In a flood:

- Contaminated water sits over gravel deposits
- Hydrocarbons leach into shallow groundwater
- Rapid recharging transport pollutants toward drinking-water abstractions

No hydrogeological risk assessment has been performed.

6.5.3 Separator bypass and tank overflow exacerbate infiltration

Once contaminated water leaves engineered systems:

- It infiltrates directly into permeable substrates
- Biofilms and microbial attenuation cannot handle the load
- Dissolved-phase hydrocarbons persist for decades

6.6 Flood Recession — The “Hidden” Contamination Pulse

When the Old River Loddon floodwaters recede:

6.6.1 Contaminated floodwater drains off site

Hydrocarbons mobilised during inundation drain via:

- Channels
- Ditches
- Overland flow
- Recession gradients
- Internal drains (once flap valve opens)

This creates a **pulse** of pollution.

6.6.2 Oil sheens travel long distances

Sheens as thin as **0.0001 mm** create visible and ecologically damaging surface films over:

- Lakes
- Channels
- River edges
- Wetland pools

These eliminate oxygen exchange and kill aquatic life.

6.6.3 Sediment contamination persists for years

Hydrocarbon-contaminated sediments:

- Inhibit invertebrate populations
- Accumulate toxins in the food web
- Increase predation mortality in otters and waterfowl
- Create chronic ecological degradation

6.7 Ecological Consequences of Hydrocarbon Pollution

6.7.1 Otters

Otters are highly vulnerable because:

- They groom fur → ingest toxins
- They den in riverbanks → direct contamination
- Their prey (fish, amphibians) bioaccumulate hydrocarbons
- They use precisely the waterbodies surrounding the development

6.7.2 Birds

Hydrocarbons reduce feather insulation, leading to:

- Hypothermia
- Loss of flight
- Drowning
- Mortality of chicks through parental transfer

6.7.3 Amphibians

Amphibians have permeable skin; trace oils cause:

- Acute toxicity
- Reproductive failure
- Development defects
- Population collapse

6.7.4 Invertebrates

Benthos are the first casualties of hydrocarbon pollution and are essential for:

- Otters
- Bats
- Fish
- Birds

6.8 Summary of Pollution Pathways

Every possible failure mode results in hydrocarbons reaching:

- The Old River Loddon
- Gravel pit lakes
- Wet woodland
- Marsh habitats
- Groundwater / chalk aquifer
- Downstream nature reserves

Mitigation measures:

- Are under-designed
- Are structurally unsuited to the floodplain
- Fail when backflow occurs
- Are ineffective for modern fuel blends
- Collapse entirely during floods

No condition, monitoring plan or engineering revision can resolve these *systemic* vulnerabilities.

SECTION 7 — ECOLOGICAL IMPACT ASSESSMENT REVIEW

A systematic and critical evaluation of the applicant's Ecological Impact Assessment (EcIA: Rachel Hacking Ecology, RHE.4456) demonstrating significant omissions, contradictions, and failures to comply with ecological best practice and statutory requirements.

7.1 Overview of Major EcIA Failures

The EcIA is presented as evidence that the proposed development will not significantly impact local biodiversity. However, detailed review reveals five overarching issues:

1. **Misclassification of site importance despite proximity to nationally significant habitat networks.**
2. **Contradictions between desk-study results and impact conclusions.**
3. **Under-assessment of species known to occur locally (otters, bats, amphibians, reptiles).**
4. **Failure to assess lighting, hydrology, pollution, noise, and habitat fragmentation impacts.**
5. **Incorrect claims of Biodiversity Net Gain compliance despite breaching mandatory rules.**

These failures render the EcIA unsound, and insufficient to support the application.

7.2 Mischaracterisation of the Site's Ecological Value

7.2.1 EcIA asserts "low ecological value"

The EcIA repeatedly describes the site as:

"Degraded hardstanding with low ecological interest."

This conclusion is technically misleading because ecological value assessment **must consider adjacency effects**—not just the red-line boundary.

7.2.2 Contradicted by EcIA's own findings

The same EcIA states the site is immediately adjacent to:

- **Twyford Gravel Pits LWS** (a regionally important wetland complex)
- **Charvil Country Park West LWS**
- **Biodiversity Opportunity Area: Loddon Valley Gravel Pits**
- **Section 41 habitats** including wet woodland and lowland fen

This adjacency elevates the site's ecological sensitivity to at least **Local to District importance**.

7.2.3 Legal context ignored

Under NPPF 180 and 182:

"Significant harm to biodiversity must be avoided, mitigated, or compensated—in that order."

The EcIA dismisses adjacency to high-value habitat and fails to assess indirect impacts.

7.3 Species-Specific Assessment Failures

7.3.1 Otters — presence dismissed without justification

Known facts:

- Otters (Lutra lutra) confirmed along the Loddon and Charvil lakes.
- Records within **1.3 km** — well within normal otter territory ranges (10–20 km).
- Wetland edges on-site provide cover and movement routes.

EcIA claim:

"It is considered highly unlikely Otter will be present."

This directly contradicts:

- Local biodiversity records
- EA catchment data
- Otter conservation zone mapping
- Realistic home-range ecology

Otter foraging and passage routes pass *through* and *along* the proposed development boundary.

Impact not assessed:

- Toxicity from hydrocarbons
- Disruption of movement corridors
- Increased lighting on riparian areas
- Contamination of fish and amphibian prey base
- Habitat fragmentation

This alone invalidates the EcIA.

7.3.2 Bats — Severe Underassessment (Including Bechstein's)

Desk study results:

- **570 bat records** within search radius
- **11 species**, including the rare **Bechstein's bat (Myotis bechsteinii)**
- Woodland edge + watercourse identified as commuting/foraging corridors

EcIA impact conclusion:

"No significant indirect impacts anticipated."

Contradictions:

1. **Lighting assessment missing**
   The development proposes **14 high-output lighting columns**, but the EcIA has:
    - No lux contours
    - No scotopic/mesopic modelling
    - No spectral analysis
    - No bat-sensitive design recommendations

   This breaches Bat Conservation Trust guidelines, which require detailed modelling for any lighting within **50 m** of bat commuting routes.

2. **Tree removal breaks commuting lines**
   Removal of T27, T32 and T33 eliminates linear features used by bats for navigation.
3. **Noise and human activity not assessed**
   Fuel tankers (up to 59 HGV movements per weekday) will create movement, light sweep, and disturbance during dawn/dusk—critical bat windows.

Effect magnitude underestimated

Bat sensitivity in wetland-edge habitats is **high** due to:

- Rich invertebrate availability
- Navigation via riparian corridors
- Looped foraging around waterbodies

The EcIA does not consider any of this.

7.3.3 Amphibians (including Great Crested Newt)

Evidence:

- **15 GCN records** within desk-study radius
- Suitable terrestrial habitat immediately adjacent (woodland margins, tussocky grass, wetland soils)
- Multiple ponds and lakes within **250 m**

EcIA claims:

"Highly unlikely Great Crested Newt will be affected."

Omissions:

- No eDNA survey
- No habitat suitability index (HSI)
- No migration corridor assessment
- No flood dispersal modelling
- No lighting impact analysis on amphibian movement
- No assessment of flood-mediated pollution causing mass amphibian mortality

This severely downplays risk.

7.3.4 Reptiles

The site contains rubble piles, hard edges, and vegetated strips—ideal for:

- Grass snake
- Slow worm
- Common lizard

The EcIA dismisses reptile presence due to "limited habitat", ignoring:

- Adjacent wetland mosaic
- Refugia under debris
- Known grass snake presence around Charvil lakes

7.3.5 Birds (Wetland, Riparian & Ground Nesting)

LWS citations highlight:

- Reed warbler
- Cetti's warbler
- Kingfisher
- Snipe
- Wintering waterfowl
- Predatory species like heron and egret

Unassessed impacts include:

- Lighting disrupting nesting behaviour
- Noise disturbance from tankers
- Pollution causing reduced prey abundance
- Loss of edge vegetation
- Increased mortality through direct hydrocarbon exposure

7.4 Loss of Trees — Misstated & Underestimated Impact

Removal of three mature trees:

- Reduces canopy continuity
- Removes bat navigation structures
- Eliminates bird nesting microhabitat
- Removes shade from wetland edges
- Reduces verges essential for connectivity

The EcIA claims these trees are "unsuitable for retention" without arboricultural justification.

7.5 Lighting Impacts Grossly Underrepresented

Proposed lighting:

- 14 tall columns

- High-output lamps
- 5:00 AM activation
- Located directly beside nature reserve boundaries

EcIA omissions:

- No environmental lighting assessment
- No bat-sensitive measures
- No spill diagrams
- No compliance checks
- No cumulative lighting impact analysis

Lighting is one of the most damaging ecological stressors, especially in wetland systems.

7.6 Hydrological & Pollution Impacts Not Considered

EcIA makes **no reference** to:

- Separator bypass
- Flood-water contamination
- Outfall connectivity
- Attenuation tank pollution pulses
- River backflow
- Hydrocarbon toxicity
- Groundwater-infiltration impacts

This is extraordinary given the nature of the development.

7.7 Biodiversity Net Gain (BNG) Assessment — Incorrect & Misleading

EcIA acknowledges:

- BNG trading rules **are breached** (trees being replaced with low-distinctiveness habitat).

Yet claims:

“The scheme delivers net gain.”

This is **untrue** under statutory BNG regulations.

Under the Environment Act 2021:

- Trading rules must be met.
- High-distinctiveness features cannot be downgraded.
- Habitat units must be like-for-like or better.

The scheme fails on all three counts.

7.8 Summary of EcIA Failures

The EcIA:

- Misclassifies ecological value
- Contradicts its own data
- Underassesses key protected species
- Fails to address hydrological and pollution impacts
- Ignores lighting consequences
- Misrepresents BNG compliance
- Uses flawed logic to minimise harm
- Is technically insufficient for a high-risk site adjacent to LWS habitats

The EcIA must be rejected and redone.

SECTION 8 — HISTORICAL FAILURES OF FUEL STORAGE SITES

A curated set of the most impactful UK incidents demonstrating how fuel depots, separators, bunds, drainage systems and river outfalls routinely fail in real-world conditions, even when designed to current standards. These incidents are critical precedent demonstrating that "standard mitigation measures" are not reliable safety controls.

This evidence directly contradicts the applicant's position that bunds, separators and engineered drainage provide sufficient ecological protection.

8.1 Buncefield Oil Depot Explosion & Spill (Hertfordshire, 2005)

Facility Type:

One of the UK's largest fuel storage depots, with sophisticated bunding, alarms, and monitoring systems—far more advanced than the Charvil proposal.

What Happened:

- A tank overfilled due to **simultaneous failure of two independent safety systems**:
  - Automatic tank-gauging system
  - High-level shutoff alarm
- The tank overflowed for hours, producing a vapour cloud that detonated.
- Firefighting water mixed with fuel and inundated site drainage and bunding.

Where the Fail-Safes Failed:

- Bund walls **leaked**, allowing thousands of litres of contaminated firewater into the environment.
- Bund joints cracked under thermal and hydraulic stress.
- Contaminated water bypassed drainage controls.
- Ground beneath was heavily contaminated, requiring more than a decade of remediation.

Environmental Consequences:

- Hydrocarbons entered the **Chalk aquifer**, contaminating groundwater.
- Long-term extraction wells were shut down.
- The environmental damage persisted for years.

Relevance to Charvil:

- Demonstrates that **safety systems fail even in top-tier facilities**.
- Floodwater + hydrocarbons = catastrophic containment failure.
- Shows the extreme vulnerability of chalk aquifers to fuel contamination.
- Charvil's bunds, separators, and outfall are far less robust, and the site is in a functional floodplain.

8.2 River Wandle Diesel Spills (London, multiple events — including 2025)

Facility Type:

Bus depots, construction compounds, small fuel storage yards with bunds and oil separators—similar scale and design philosophy to the Charvil proposal.

What Happened:

- Repeated diesel discharges entered the River Wandle, often via surface-water drainage.
- Several incidents occurred after **heavy rain**, which overwhelmed interceptors.

Where the Fail-Safes Failed:

- Forecourt drainage carried diesel into public drains.
- Full-retention separators were **bypassed** during high flow.
- Flooding lifted contaminants from surfaces and washed them into rivers.
- Maintenance issues allowed hydrocarbons to accumulate.

Environmental Consequences:

- Up to **10 km of river** affected.
- Invertebrate death on a massive scale.
- Fish mortality and habitat damage.
- Long-term sediment contamination requiring ongoing monitoring.

Relevance to Charvil:

- Demonstrates that **surface-water drainage + hydrocarbons + rainfall = river contamination**.
- Full-retention separators are **not reliable** when hydraulics exceed idealised conditions.
- Charvil's attenuation/outfall system is guaranteed to surcharge during floods.

8.3 Poole Harbour Oil Pipeline Leak (Dorset, 2023)

Facility Type:

Pipeline carrying crude oil and diesel into a major port area; fitted with monitoring instrumentation.

What Happened:

- A leak released **200 barrels** of oil into Poole Harbour.
- The spill occurred despite remote monitoring systems.

Where the Fail-Safes Failed:

- Leak detection systems failed to identify the exact point.
- Containment boom deployment was delayed due to tidal conditions.
- Pollutants spread across shallow lagoons.

Environmental Consequences:

- Significant impacts on saltmarsh and mudflat habitats.
- Hydrocarbon residues persisted for months.
- Impacts on birds, shellfish and recreational waters.

Relevance to Charvil:

- Illustrates how quickly hydrocarbons spread across water surfaces.
- Shows that **even small leaks** cause extensive ecological damage.
- Charvil lakes are shallow and interconnected—ideal for rapid pollutant spread.

8.4 Elvington Beck Heating-Oil Contamination (York, 2018)

Facility Type:

Domestic or small commercial heating-oil storage.

What Happened:

- A leak released heating oil into a small watercourse.
- Pollution went undetected for days.

Where the Fail-Safes Failed:

- Storage tank bund insufficient.
- Oil migrated through **soil and drains**, bypassing containment.
- Cleanup was difficult due to narrow, reed-filled channel.

Environmental Consequences:

- Strong odour and sheen for months.
- Macroinvertebrate populations collapsed.
- Residents unable to use adjacent spaces.

Relevance to Charvil:

- Even **small volumes** of oil devastate aquatic ecosystems.
- Shows how hydrocarbons infiltrate soils and bypass containment via drains.
- Charvil is directly connected to reedbeds and a pond-lake system.

8.5 Red Diesel Spill into River & Lake System (East Sussex, 2017)

Facility Type:

Small diesel storage tank on rural estate.

What Happened:

- Theft/vandalism caused **1,500–2,000 litres** of diesel to escape.
- Flowed into a ditch, then a stream, then a private fishing lake.

Where the Fail-Safes Failed:

- Bunding insufficient.
- Drainage pathways were **not mapped** and inadvertently provided a fast route for contamination.

Environmental Consequences:

- Significant fish mortality.
- Long-term sediment contamination.
- Lake partially drained for remediation.

Relevance to Charvil:

- Just **2,000 litres** caused massive ecological damage.
- Charvil proposes **837,000 litres**, adjacent to a lake system.

8.6 Pattern of Failures During Flood Conditions (Nationwide Evidence)

Across the UK, floods routinely lead to:

1. **Bund overtopping**
2. **Separator bypass**
3. **Valve failure**
4. **Drainage system reversal**
5. **Tank movement or floatation**
6. **Surface-water pollution pulses during recession**

Notable examples include:

- Tyseley diesel spill (Birmingham)
- Manchester Ashton Canal biodiesel incident
- River Sowe contamination (Coventry)
- River Lagan diesel spill (Belfast)

Why They Matter:

All failures occurred under:

- Rainfall
- High river levels
- Flood recession

These conditions are **guaranteed** at Charvil.

8.7 Summary of Historical Evidence

Historical data shows:

- **Mitigation systems fail routinely** in UK fuel storage.
- **Floodwater massively increases contamination risk**.
- **Small spills cause enormous ecological damage**, even without floods.
- **Chalk aquifers are extremely vulnerable**.
- **Surface-water outfalls are the main failure point**.
- **Separators do not prevent hydrocarbon discharge during surcharged conditions**.

All these characteristics apply directly to the Charvil site.

The proposed development **cannot meet safe operational conditions** in this setting.

SECTION 9 — PLANNING POLICY COMPLIANCE REVIEW

A formal analysis of how the proposed development conflicts with the National Planning Policy Framework (NPPF), Wokingham Local Plan policies, the Environment Act 2021, and statutory biodiversity protections.

This section establishes that, even if technical mitigation were possible (it is not), **the development is explicitly prohibited by planning policy** due to its location, environmental risk, and harm to designated biodiversity assets.

9.1 National Planning Policy Framework (NPPF) — Flood Risk (Sections 159–169)

9.1.1 NPPF 159 — Sequential Test

NPPF requires that development:

“Steers new development to areas with the lowest risk of flooding.”

The proposed fuel depot:

- Is within an active functional floodplain (Flood Zone 3b).
- Has photographic evidence of deep flooding.
- Has an outfall invert *below* flood level.
- Depends on a flap valve to prevent river backwash.

A hazardous installation storing **837,000 litres of hydrocarbons** is the most inappropriate form of development for a floodplain location.

Sequential Test fails immediately.

9.1.2 NPPF 161 — Exception Test Not Possible

The Exception Test can only be applied if:

- The development provides wider sustainability benefits, **and**
- It can be demonstrated that the development will be safe for its lifetime without increasing flood risk elsewhere.

This proposal:

- Provides no sustainability benefits.
- Increases ecological risk substantially.
- Cannot be made safe under any engineering scenario.
- Uses outdated FRA modelling.
- Has drainage directly into a sensitive river.

The Exception Test cannot be passed.

9.1.3 NPPF 167 — Development must be safe for its lifetime

This section states:

"It must be demonstrated that the development will be safe for its lifetime, taking account of the vulnerability of its users, without increasing flood risk elsewhere."

This proposal breaches NPPF 167 because:

- Flood risk renders the bund ineffective.
- Separator fails when flooded.
- Attenuation tank backfloods.
- Drainage system reverses.
- Bund overtops.
- Fuel is mobilised into the river.
- Tanker offloading during wet conditions introduces additional risk.

There is no way to make the development "safe" on a functional floodplain.

Policy 167 is breached.

9.1.4 NPPF 169 — Flood Risk Assessments must be fit for purpose

A FRA must be:

- Based on the correct development type
- Evidence-led
- Modelled using appropriate techniques
- Include residual risk analysis
- Assess flood storage displacement
- Assess flood-routing impacts
- Consider climate change allowances

The FRA for this development:

- Was written for a **CNG refuelling station**, not a fuel depot.
- Contains no residual risk assessment.
- Misinterprets EA flood model outputs.
- Ignores observed flood behaviour.
- Contains no 2D flood modelling.
- Ignores bund displacement volume.
- Does not assess pollution pathways.

FRA does not meet NPPF 169 requirements.

9.2 NPPF — Biodiversity & Environmental Protection (180–182)

9.2.1 NPPF 180 — Avoid significant harm

Development must:

“Avoid significant harm to biodiversity… If significant harm cannot be avoided, adequately mitigated, or compensated, then planning permission should be refused.”

Significant harm **cannot be avoided** because:

- Tank farm is beside a LWS.
- River outfall discharges into sensitive habitat.
- Floodwater overtops containment.
- Lighting damages bat and bird ecology.
- Amphibian migration routes disrupted.
- Pollution risk unavoidable and unmitigable.

Mitigation and compensation are **not possible** due to the location.

NPPF 180 mandates refusal.

9.2.2 NPPF 182 — Protection of irreplaceable habitats

Wet woodland and priority habitats are irreplaceable.
The site is adjacent to:

- Wet woodland
- Fen habitat
- Shallow lakes
- Gravel-pit wetland mosaic

Fuel contamination, lighting, and hydrological disruption endanger these habitats.

NPPF 182 prohibits harmful development.

9.3 Wokingham Local Plan Policies

CP1 — Sustainable Development

Fails because the development:

- Harms biodiversity
- Increases pollution risk
- Is incompatible with floodplain function

CP3 — General Principles for Development

Breached because:

- Development causes unacceptable environmental harm
- Impacts cannot be mitigated
- Scale and nature inappropriate for location

CP7 — Biodiversity

Fails because:

- Adjacent LWS harmed
- Priority habitats threatened
- Species of principal importance impacted
- BNG trading rules breached

CP8 — Pollution and Contamination

Policy requires preventing contamination of soils and water.

Fuel depots on floodplains cannot meet this requirement.

CP1O — Infrastructure

Fails because:

- Flood infrastructure and drainage are insufficient
- Pollution containment cannot be guaranteed
- Hazardous materials threaten natural assets

9.4 Environment Act 2021 — Biodiversity Net Gain (BNG) Regulations

Mandatory from February 2024:

- BNG must be **at least 10%**
- Trading rules must be respected
- Habitats of high distinctiveness must not be downgraded
- Replacement planting must be like-for-like or higher value

Application breaches the law:

- Removal of mature trees not replaced like-for-like
- Replacement with shrubs violates trading rules
- Net gain claim is mathematically unsound
- Off-site compensation not proposed
- Adjacent priority habitat at risk (cannot be compensated)

BNG legislation requires refusal if trading rules are breached.

9.5 Statutory Duties for Local Wildlife Sites

Local authorities have a statutory duty under the NERC Act (Section 40) to:

“Have regard… to the purpose of conserving biodiversity.”

Fuel depots in flood-adjacent LWS buffer zones are fundamentally incompatible with this statutory duty.

9.6 Summary of Policy Failures

The development:

- Fails NPPF Sequential Test
- Fails NPPF Exception Test
- Fails to provide a valid FRA
- Causes unavoidable significant harm to biodiversity
- Breaches Wokingham Local Plan policies CP1, CP3, CP7, CP8
- Breaches the Environment Act 2021
- Undermines the statutory protection of LWS and priority habitats

These are **absolute policy conflicts**, not matters of planning judgement.

Planning permission **must be refused**.

SECTION 10 — CONCLUSION & RECOMMENDATIONS

This Technical Objection Report has undertaken a comprehensive, evidence-based review of the proposed bulk fuel depot at Old Bath Road, Charvil (Planning Application 252782). Using the applicant's own documents, hydrological and ecological principles, national policy, local planning requirements, and historical UK case studies, the following conclusions are unavoidable:

10.1 The site is fundamentally unsuitable for hazardous fuel storage

The site lies:

- Within a **functional floodplain**, as demonstrated by January 2025 photographic evidence
- Adjacent to multiple **Local Wildlife Sites**
- Connected hydrologically to the **Old River Loddon** and a chain of shallow gravel pit lakes
- Above a **Principal Chalk Aquifer** in a Source Protection Zone
- Within a **Biodiversity Opportunity Area** (Loddon Valley Gravel Pits)

A site with **all five** high-sensitivity characteristics is categorically inappropriate for storing **837,000 litres** of hydrocarbons.

10.2 The Flood Risk Assessment is invalid

The FRA (Odyssey Ref 24-210):

- Was written for a **different development type** (CNG station)
- Uses flood model nodes that do not represent site conditions
- Contradicts observed flood levels
- Contains no residual risk analysis
- Ignores bund displacement
- Ignores backflow conditions
- Fails to address groundwater vulnerability
- Omits surface-water flood routing and exceedance analysis

Under NPPF 169, the FRA is **not fit for planning purposes**.

10.3 Drainage design creates a guaranteed pollution pathway

The Preliminary Drainage Strategy (24-210-011) and Outfall Detail (24-210) show:

- A **single engineered outfall directly into the River Loddon**
- An outfall invert **~3 m below flood levels**
- Dependence on a **flap valve** as the only barrier to pollution
- An attenuation tank that becomes **fully submerged**
- A separator that **surcharges and bypasses during flood events**

These systems **reliably fail** under flood conditions.

Pollution during floods is not a theoretical risk — it is a guaranteed outcome.

10.4 Bunded containment fails both in design and in practice

The bund:

- Has capacity for just **14%** of required 25% containment volume
- Is only **350 mm** high
- Is overtopped by every medium-to-large flood
- Is not reinforced for external hydraulic loading
- Would structurally fail under lateral pressure
- Becomes a reservoir of contaminated floodwater

Even under ideal dry conditions, the bund is **non-compliant** with industry guidance (CIRIA C736).

Under flood conditions, it becomes **dangerously ineffective**.

10.5 The Ecological Impact Assessment is unsound

The EcIA (RHE.4456):

- Misclassifies the site's ecological importance

- Ignores adjacency impacts to LWS sites
- Contradicts its own desk-study findings
- Under-assesses otters, bats, amphibians and reptiles
- Fails to analyse lighting impacts
- Ignores hydrological contamination
- Incorrectly claims Biodiversity Net Gain compliance while breaching trading rules

The EcIA does not meet the requirements of BS42020 or NPPF 180–182.

10.6 Historical UK evidence shows these systems fail routinely

Across the UK:

- Buncefield
- Poole Harbour
- River Wandle
- Elvington Beck
- East Sussex diesel spill
- Manchester, Tyseley, Coventry and Belfast incidents

These demonstrate:

- Bunds leak, crack, and are overtopped
- Separators fail under flood loading
- Valves jam and reversal occurs
- Small spills cause disproportionate ecological harm
- Floods significantly amplify contamination spread

The applicant's mitigation claims are inconsistent with real-world performance.

10.7 The development fails national and local planning policy

Breaches include:

NPPF 159–169 (Flood Risk)

Sequential Test and Exception Test both fail.

NPPF 180–182 (Biodiversity)

Significant harm cannot be avoided or mitigated.

Wokingham Local Plan (CP1, CP3, CP7, CP8, CP10)

Fails sustainability, general principles, biodiversity protection, contamination prevention and infrastructure requirements.

Environment Act 2021 – BNG Regulations

Fails trading rules; net gain cannot be claimed.

The application **cannot** be made policy-compliant.

10.8 No conditions could make this development acceptable

Hazardous installations in floodplains adjacent to sensitive habitat networks cannot be "engineered safe."
Mitigation systems proposed by the applicant:

- Cannot withstand flood conditions
- Cannot contain hydrocarbon mixtures
- Cannot prevent backflow
- Cannot protect groundwater
- Cannot maintain ecological integrity

There is **no planning condition** that could remove the inherent environmental risks of this location.

10.9 Recommendation

Based on overwhelming hydrological, ecological, engineering, and policy evidence:

THE APPLICATION MUST BE REFUSED.

It is the clear conclusion of this technical review that the proposed fuel depot represents a significant and unmitigable risk to:

- The Old River Loddon
- Local Wildlife Sites
- Priority habitats
- Chalk aquifer and groundwater protection
- Flood safety

- The surrounding community
- The wider ecological network of Charvil and Twyford

Approval would contravene national planning policy, local planning requirements, and statutory environmental duties.

SECTION 11 — APPENDIX A: Applicant Document Reference List

A complete list of applicant documents referenced in this objection:

1. **Flood Risk Assessment & Drainage Strategy**
   Odyssey Infrastructure Solutions, Project Ref 24-210
2. **Preliminary Drainage Strategy**
   Drawing No. 24-210-011, Odyssey Infrastructure Solutions
3. **Drainage Outfall Detail Sheet**
   Project Ref 24-210
4. **Ecological Impact Assessment**
   Rachel Hacking Ecology, Ref RHE.4456
5. **Tree Removal and Site Layout Plans**
   As submitted with application
6. **Lighting Plans and Column Layouts**
   As submitted

SECTION 12 — APPENDIX B: Contradictions & Internal Inconsistencies

This appendix lists key contradictions inside the applicant's documents.

12.1 FRA Contradictions

Applicant Claim	Evidence Showing Contradiction
Site is "outside flood extent for 1% AEP +20% CC"	January 2025 photos show deep flooding above 36 m AOD
Development is a CNG station	Actual application: 837,000 litres of liquid fuels
Outfall drains freely	Outfall invert is 33.250 m AOD, 3 m below floodwater

Applicant Claim	Evidence Showing Contradiction
Separators function normally	Flooding causes surcharge and bypass
Groundwater risk is low	Chalk aquifer + SPZ III contradicts this
Residual risk assessed	No residual risk section exists

12.2 EcIA Contradictions

EcIA Claim	Actual Finding
Site has "low ecological value"	Adjacent to *two* Local Wildlife Sites and BOA
"Unlikely presence" of otters	Otter records within 1.3 km + known corridor
Lighting insignificant	14 columns proposed beside woodland
BNG compliant	BNG trading rules breached
Negligible impact on amphibians	15 GCN records; ideal habitat adjacency
Hydrology/ecotoxicology irrelevant	Entire drainage system connects to river

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12.3 Drainage Strategy Contradictions

Claim	Contradiction
Drainage prevents pollution	Drainage directs all pollutants into river
Outfall protected by flap valve	Flap valve is unreliable under flood conditions
Bund provides containment	Bund overtops instantly during floods
Attenuation improves water quality	Attenuation tanks not designed for hydrocarbons

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SECTION 13 — APPENDIX C: Hydrological Calculations (Summary)

33.250 m AOD — Outfall invert

35.30 m AOD — FRA predicted 1% AEP +20% CC

>36.0 m AOD — Observed flood level

Therefore:

- Outfall is **2.75 m below floodwater**
- Attenuation tank invert is **2.3 m below floodwater**
- Bund wall (0.35 m) submerged by **0.65–0.85 m**

This guarantees:

- Backflow
- Separator failure
- Bund overtopping
- Contaminated flood mixing
- Pollution pulse during recession

SECTION 14 — APPENDIX D: Species Sensitivity Notes

Otter (Lutra lutra)

- Highly vulnerable to hydrocarbons
- Grooming leads to ingestion
- Relies on fish/amphibians prone to bioaccumulation
- Corridor passes site boundary

Bats (incl. Bechstein’s)

- Lighting disrupts navigation
- Wetland edges are prime foraging habitat
- High lux columns violate Bat Conservation Trust guidelines

GCN & Amphibians

- Flood dispersal increases exposure
- Skin permeability means acute toxicity at low concentrations

Birdlife

- Hydrocarbons disrupt preen oil
- Even thin sheens kill aquatic birds through exposure and ingestion

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FINAL STATEMENT

Every layer of evidence—hydrological, engineering, ecological, statutory, historical—converges on one conclusion:

This site cannot safely or sustainably host a fuel storage depot.
Planning permission must be refused.