

Design Risk Assessment

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Contributing designers	Revision	Purpose of issue	Checked	Reviewed	Date
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Health and Safety Considerations

Stage 1 Identify				Stage 2 Eliminate / Reduce	Stage 3 Inform	Stage 4 Control		
Ref. no.	Project element, material or activity	Key health and safety <u>hazards</u> and their possible effects	<u>People/ environment</u> at risk from the hazard	<u>Design</u> measures taken to eliminate the hazard or reduce the risk	Significant <u>residual</u> hazards and risks	<u>Communication</u> method	Risk owner(s)	Proposed <u>control</u> measures
Guidance	Consider all aspects involved in each stage of interface with the site, environment and structure(s).	Record the key hazards and their potential consequences.	Identify the categories of people at risk.	Include obtaining adequate data for design certainty and any further studies carried out during the risk evaluation process. Proposed measures to be taken by constructors and operators are to be included in Stage 4.	Provide details of residual hazards and risks that will need to be communicated and managed.	Record how information is provided, whether on drawings, pre-construction information, buildability statement, specification, reports or H&S File	Record the name of designers, contractors, the client or other stakeholders who are to ensure the significant residual risk is minimised and controlled.	Recommend measures to be taken by the risk owner(s) to minimise and control the significant residual risk.
Design								
Des1	Design of drainage (All sites)	Risk of striking services. Potential for underground services crossing the site - gas, electricity, process drains and surface water drains.	Site personnel. Existing infrastructure	Hazard cannot be eliminated by design. Available information should be reviewed and mapped.	Potential unidentified services	DRA	Designer at detailed stage (identifying known risks) Contractor (construction of the scheme)	Detailed survey of services prior to construction. Liaison with utility providers. Risk assessments and method statements and adequate briefing of site personnel.
Des2	Design of drainage (All sites)	Ground and groundwater conditions: unknown at present however indicative information suggests that groundwater is unlikely to be a flood risk. Potential for: Contamination Instability Groundwater in excavations	Site personnel Site transformers and DNO substation compound	Hazard cannot be eliminated by design. Preliminary drainage design assumes largely shallow drainage / SuDS features.	Unknown ground conditions remain	DRA	Designer (identifying known risks) Contractor (construction of the scheme)	Follow recommendations arising from ground investigation report.
Des3	Design of drainage (All sites)	Unexploded ordnance	Site personnel Site transformers and DNO substation compound	An unexploded ordnance map has been consulted at zeticauxo.com This has highlighted that there is a low risk of finding UXO across the proposed development site.	Low risk from UXO	DRA	Designer (identifying known risks) Contractor (construction of the scheme)	Risk assessments and method statements and adequate briefing of site personnel.

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Des4	Design of above ground SUDS features	Risk of trips and falls, drowning	Site personnel	Preliminary design undertaken in accordance with CIRIA C753. SuDS proposed include a shallow swale feature with 1:3 side slopes to allow for safe access/egress.	Lack of knowledge about the SuDS features. Disrepair/lack of maintenance causing instability or obscured visibility	DRA	Owner/operator/ scheme designer	Detailed design should consider the location of swales near to vehicular access routes to reduce the risk of vehicles entering SuDS assets. Passive surveillance on all above ground SuDS features is good due to the presence of roads and well-used footpaths and good visibility. Side slopes on features are a maximum of 1:3. Maintenance schedule to be prepared.
Construction								
Con1	Excavations	Potential for instability of excavations Potential for striking of services	Site personnel Site transformers and DNO substation compound	Hazard cannot be eliminate. Limit depth of excavations where practicable. Ground investigations required.	Ground conditions and potential services.	DRA	Contractor	Early involvement of temporary works designer recommended Risk assessments and method statements and adequate briefing of site personnel. Follow recommendations arising from ground investigation report. Detailed survey of services prior to construction. Liaison with utility providers.

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Con2	Plant/ material deliveries	Access via A4109 and then the existing / proposed access track to the main site entrance. Unauthorised access by members of public.	Site personnel Public	Hazard cannot be eliminated by design.	Site access	DRA	Contractor	Traffic management plans, consultations with stakeholders, traffic management design and relevant NRSWA applications. Consider access to sites and expected levels of traffic, road widths, parking arrangements etc. Limit volumes of imported material or muck away where possible. Risk assessments and method statements and adequate briefing of site personnel.
Con 3	Connection of the drainage system to the surface water body	Striking of services Contamination Instable excavation	Site personnel	Hazard cannot be eliminated by design. Limit depth of excavation where possible.	Water	DRA	Contractor	Edge barriers/ safety harnesses to be used. The work to be undertaken during dry weather periods.
Operation & Maintenance								
O&M1	Drainage system in operation	Potential for failure of the drainage system and flooding of the site	Maintenance personnel	Design drainage to an appropriate design life and design storm event Consideration given appropriate arrangements for operation, maintenance and cleansing of features	Risk of flooding remains during exceedance events and if maintenance requirements are not followed.	Operation and maintenance manual (to be prepared)	Asset owner/operator	Regular maintenance in accordance with O&M manual, normal site safety controls, designated overland flow routes away from proposed DNO substation compound.
O&M2	Maintenance of drainage system	Water	Maintenance personnel	Above ground shallow SuDS features recommended where possible.	Water	Operation and maintenance manual (to be prepared)	Asset owner/operator	Vegetation in swales should be cut using a strimmer rather than a mover due to the slope. Regular maintenance in accordance with O&M manual, normal site safety controls.

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Demolition								
Dem1	Removal of drainage features requiring excavation	Hazards and risks: largely as per the construction stage, except that the removal of the drainage system will increase a risk of flooding to the site.	Site personnel End user	Reinstatement of site to greenfield conditions or replacement SuDS based drainage system.	Instability of excavations, disturbance of services Increase of flood risk	DRA	Demolition contractor	Full as-built records, specifications and maintenance procedures included in O&M manual to aid in planning of demolition

Environmental Considerations

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Ref. no.	Project element, material or activity	Key environmental <u>hazards</u> and their possible effects	<u>Who or what</u> is at risk from the hazard	<u>Design</u> measures taken to eliminate the hazard or reduce the risk	Significant <u>residual</u> hazards and risks	<u>Communication</u> method	Risk owner(s)	Proposed <u>control</u> measures
Guidance	Consider all aspects involved in each stage of interface with the site, environment and structure(s).	Record the key hazards and their potential consequences.	Identify the categories of people, animals or environments at risk.	Include obtaining adequate data for design certainty and any further studies carried out during the risk evaluation process. Proposed measures to be taken by constructors and operators are to be included in Stage 4.	Provide details of residual hazards and risks that will need to be communicated and managed.	Record how information is provided, whether on drawings, pre-construction information, buildability statement, specification, reports or H&S File	Record the name of designers, contractors, the client or other stakeholders who are to ensure the significant residual risk is minimised and controlled.	Recommend measures to be taken by the risk owner(s) to minimise and control the significant residual risk.
Design								
EDes1	Design of drainage system	Potential for ground contamination, Risk of pollution	Groundwater / surface water bodies	Ground investigations to be undertaken prior to work beginning to assess any contaminants at the site.	N/A	DRA	Contractor	Ground investigation to be undertaken to assess the risk of ground contamination, and any remediation measures needed in order to mitigate risk of mobilisation of contaminants.
EDes2	Design of drainage system	Oil spillage Pollution	Groundwater/ surface water bodies	SUDS have been used to treat flows. The Simple Index Approach has been utilised to demonstrate that the proposed SuDS features provide sufficient treatment to ensure there is no detrimental effect to water quality. Therefore, the SUDS measures are considered sufficient to control pollution within the development.	Lack of maintenance of SUDS features may mean pollution events bypass the SUDS features and pollute groundwater and/or the Ordinary Watercourses near to the site.	O&M manual	Asset owner/operator	Regular maintenance in accordance with O&M manual.

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Construction								
Con1	Construction of drainage system	Pollution of watercourses/drainage systems during construction, with sediments, oils and chemicals	Water bodies	Hazard cannot be eliminated by design.	Pollution	Construction Management Plan (to be prepared)	Contractor	Risk assessment and method statement undertaken to avoid pollution during the works. Water from excavations not to be connected to the drainage system. Use of silt curtains, bunded storage tanks, spill kits envisaged.
Operation & Maintenance								
O&M1	Inspection and clearance of manholes/ basins/ swales	Oil/fuel, sediment Pollution	Environment Maintenance personnel	Hazard cannot be eliminated by design.	Pollution	Operation and maintenance manual (to be prepared)	Asset owner/operator	Regular maintenance in accordance with O&M manual, normal site safety controls. Materials/sediments removed to be treated as contaminated and disposed of to a licenced waste management facility
Demolition								
Dem1	Removal of the drainage system/ general demolition activities	Hazards and risks: largely as per the construction stage.	Water bodies, groundwater	Site to be returned to greenfield land with the existing drainage scheme.	Pollution	Operation and Maintenance manual	Demolition contractor	Full as-built records, specifications and maintenance procedures included in O&M manual to aid in planning of demolition Risk assessment and method statement undertaken to avoid pollution during the works. Water from excavations not to be connected to the drainage system. Use of silt curtains, bunded storage tanks, spill kits envisaged.