

DESIGN RISK ANALYSIS

CONSTRUCTION, USE, FUTURE ALTERATION, DEMOLITION AND MAINTENANCE

This form is to be used by Waterman Group designers to enable them to record design decision that have been taken to eliminate, reduce or manage risks that are presented by their designs. There are certain design features that designers will routinely avoid or seek to include. These are listed on the attached 'Red, Amber and Green List'. Designers do not have to mention any of these standard features in their design risk analysis.

PROJECT:	MOD Graven Hill, Bicester – Phase 1 (LTA1a)	JOB No:	WIB13983-107
RISK ANALYSIS BY:	Tim Arkell	DATE:	11/03/16
		CHECKED BY:	Keith Rowe
		DATE:	11/03/16

Hazard Ref	Design Element	Phase when hazard is relevant (e.g. Construction, Use, Maintenance, Alteration, Demolition)	Description of hazard	Action taken to eliminate, reduce or manage risk
1	Water in Attenuation pond area	Use	Risk of children falling in.	Reduced Risk: Area containing water protected from access by young children by mesh fixed to fencing which cannot easily be climbed. Older children should be able to read/understand signage and potential safety risk if they climb the fence/access the areas.
2	Drainage Swales	Use	Risk of falling in	Reduced risk: Safe crossing points provided. Swale sides shallow enough to enable a person to climb out.
3	Underground services	Construction	Risk of affecting the services while constructing tree pits within the designated woodland and orchard area. (Red list: Lack of adequate pre-construction information)	Manage Risk: Two underground services currently run below the community orchard and new woodland areas. Pipe under proposed woodland area is a live water supply to be disconnected at a later date. Depth of pipe not confirmed. Unknown service appears to run below the community orchard. Unclear what this is/whether it's live and the depth of the same. Contractor shall locate by CAT Scan & hand dug pits to 1.2m begl and avoid with any excavations, earthworks, Works etc.

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4	Woodland LEAP	Use	Omission of 'standard' boundary fencing due to dispersed/naturalistic character of play equipment within woodland context.	Reduced risk: Play equipment to be set well back (minimum 20m) from adjacent highway carriageway. Use of brash windrows to slow pedestrian movement between play area and adjacent highway carriageway. Thinning out of approximately 50% of trees will improve visual permeability and natural surveillance.
5	Boardwalks	Use	Risk of falling in	Reduced risk: Reed planting along sections of the sides of the boardwalk to enforce the edge of water as suggested within 'Health and safety principles for SuDs: framework and checklists'. Stretches of boardwalk without planting and over open water has been provided with handrails to avoid falling in.
6	Viewing deck	Use	Risk of falling in	Reduced risk: Viewing deck provided with 1100mm high handrails to avoid falling in.
7	Attenuation Pond within Gateway Park	Use	Risk of falling in, Swimming	Reduced risk: Pond embankment has been graded at a gentle slope to enable a person to climb out. Warning signage installed regarding 'no swimming' in appropriate areas near the water.

Red, Amber and Green List

Red, amber and green lists are practical aides to designers on what to eliminate/avoid, and what to encourage. This list has been taken from the HSE website. If your design avoids red or amber items, or includes green items, you do not need to refer to them in your Risk Analysis: Your Risk Analysis should concentrate on what you are doing above and beyond these common design features.

Red Lists: Hazardous procedures, products and processes that should be eliminated from the project where possible. If your design is to include one of these features, seek advice from Waterman Group Construction Safety Advisors.

- Lack of adequate pre-construction information, eg asbestos surveys, geology, obstructions, services, ground contamination etc.
- Hand scabbling of concrete ('stop ends', etc);
- Demolition by hand-held breakers of the top sections of concrete piles (pile cropping techniques are available);
- The specification of fragile roof lights and roofing assemblies;
- Processes giving rise to large quantities of dust (dry cutting, blasting etc.);
- On-site spraying of harmful substances;
- The specification of structural steelwork which is not purposely designed to accommodate safety nets;
- Designing roof mounted services requiring access (for maintenance, etc), without provision for safe access (eg. barriers).
- Glazing that cannot be accessed Safely, All glazing should be anticipated as requiring cleaning and replacement, so a safe system of access is essential.
- Entrances, floors, ramps, stairs and escalators etc not specifically designed to avoid slips and trips during use and maintenance, including effect of rain water and spillages.
- Design of environments involving adverse lighting, noise, vibration, temperature, wetness, humidity and draughts or chemical and/or biological conditions during use and maintenance operations.
- Designs of structures that do not allow for fire containment during construction

Amber Lists: Products, processes and procedures to be eliminated or reduced as far as possible and only specified/allowed if unavoidable. Including amber items would always lead to the provision of information to the Principal Contractor. If you wish to include one of these features in your design you must justify it on your design risk analysis and seek approval or comments from a senior designer within Waterman Group.

- Internal manholes / inspection chambers in circulation areas;
- External manholes in heavy used vehicle access zones;
- The specification of "lip" details (i.e. trip hazards) at the tops of pre-cast concrete staircases;
- The specification of shallow steps (i.e. risers) in external paved areas;
- The specification of heavy building blocks i.e. those weighing > 20kgs;
- Large and heavy glass panels;
- The chasing out of concrete / brick / blockwork walls or floors for the installation of services;
- The specification of heavy lintels (the use of slim metal or hollow concrete lintels being alternatives);
- The specification of solvent-based paints and thinners, or isocyanates, particularly for use in confined areas;
- Specification of curtain wall or panel systems without provision for the tying (or raking) of scaffolds;
- Specification of blockwork walls >3.5 metres high using retarded mortar mixes.

Green Lists: Products, processes and procedures to be positively encouraged.

- Adequate access for construction vehicles to minimise reversing requirements (one-way systems and turning radii);
- Provision of adequate access and headroom for maintenance in plant rooms, and adequate provision for replacing heavy components;
- Thoughtful location of of mechanical / electrical equipment, light fittings, security devices etc. to facilitate access and away from crowded areas;
- The specification of concrete products with pre-cast fixings to avoid drilling;
- Specify half board sizes for plasterboard sheets to make handling easier;
- Early installation of permanent means of access, and prefabricated staircases with hand rails;
- The provision of edge protection at permanent works where there is a foreseeable risk of falls after handover;
- Practical and safe methods of window cleaning (eg. from the inside);
- Appointment of a Temporary Work Coordinator (BS 5975);
- Off-site timber treatment if PPA- and CCA-based preservatives are used (Boron or copper salts can be used for cut ends on site).
- Off site fabrication and prefabricated elements to minimize on site hazards.
- Encourage the use of engineering controls to minimize the use of Personal Protective Equipment