



Proposed Ice Skating Rink Impact Assessment & Mitigation Measures

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Introduction

PBA Consulting was instructed by the Natural History Museum Estates Department to assess the impact of the construction of a proposed Ice Skating Rink on the lawns and gardens at the Natural History Museum.

The brief

Carry out an impact assessment on the installation use and removal of a proposed ice skating rink, and associated facilities, within the East garden of the Natural History Museum.

As part of this assessment, it was also agreed to take into consideration the impact on the lawns of the London Fashion Week to be held during September 2005, as this event may affect the ability of the grass to withstand the stresses imposed by the proposed ice skating rink. Additionally, the need to protect the established trees and shrubs around the east and south boundaries will also be considered.

Site description

The east garden is bounded by the Watergate and the Palaeontology buildings to the North, Exhibition Road to the East with Cromwell Road to the South; the main entrance of the Museum forms the Western boundary.

The garden consists of formal central lawn areas surrounded by tarmac paths/drive. Along the east and northern boundaries and between the internal paths and railings to the public footpath and road there are raised shrub beds. Within these beds are eight excellent mature London Plane Trees, which, along with the trees in the West Garden, form an important prominent feature in West Kensington. The Natural History Museum is renowned for these trees. Railings and grass separate the internal paths from the Watergate building.

There are two lawn areas within the East garden, the main rectangular lawn in front of the Palaeontology building, this lawn is bounded by tarmac paths. It is on this lawn that the Ice rink is proposed.

To the west of the main lawn, there is a similar but smaller lawn area known as the “race track” lawn, again surrounded by tarmac paths. On this lawn it is proposed to install marquees that are associated with the ice skating rink functions.

These lawns were reinstated in 2004 following the refurbishments of the Palaeontology building and the Earth from the Air Exhibition. There is a small area on the south edge of the main lawn subjected to water-logging.

Description of proposed Rink, Tent and other features

Ice Skating Rink

The proposed rink will consist of GKN steel floor joists overlaid with 25mm plywood and insulation on which will be the coolant mat and 100mm of ice. The whole structure will be suspended on base jacks approx 500mm above ground level. Pads 300mm x 300mm are to be inserted beneath the jack feet to provide protection to the lawn surface. The whole construction will be surrounded and enclosed by a wooden fascia around the base. There is to be a steel barrier frame and wooden hand rail to the actual rink. A sectional drawing is given at Appendix A.

Trees

There is a proposal to install strings of "pea lights" in the Plane trees surrounding the rink.

Marquee

No information is available regarding the construction detail for the marquee; therefore, it is assumed that this will be of normal tent type construction, laid directly onto the turf.

London Fashion Week Marquee

It is anticipated that the Marquee for London Fashion Week will be as previously installed i.e. clad "scaffold" framework on the lawn with the whole structure suspended on short legs immediately above ground level with pads inserted beneath the "feet" to provide protection to the lawn surface.

Duration on site

It is understood that the rink will be constructed during the later part of November 2005 with full use between December 2005 and January 2006 with the removal thereafter. Therefore the grass will be covered for a minimum period of at 10 weeks and possibly longer.

London Fashion Week is to be held during September 2005.

Basic Requirements for Grass & Trees

In common with other green plants, grass leaves contain chlorophyll which in the presence of sunlight synthesises carbohydrates giving off oxygen to the atmosphere; in association nutrients and moisture assimilated from a well aerated root zone, carbohydrates are important for healthy grass growth.

During the period of November to January grass may go into semi-dormancy with reduced active growth particularly from the crown from where the new spring growth commences. Even though dormancy may intensify during cold periods, respiration, albeit at reduced rates will occur, for which a well aerated root zone is essential.

Trees and shrubs are also synthesisers but have woody stems/trunks supporting the crown/leaf structure above ground level, like grass they are also reliant on a aerated root zone, nutrients, air and moisture.

The Impact of the Ice Rink

The construction of the rink over the lawn area will exclude sunlight from the grass and will affect synthesis.

Being enclosed around the base, air circulation will be severely reduced and moisture from rain excluded; additionally, restriction in airflow will cause change to the air's carbon dioxide/oxygen ratio within and above the soil. A build up of moisture in the microclimate above the grass under the rink is also anticipated.

The construction of the rink will require the installation of a "scaffold" framework on the lawn and this will require the transportation of materials across the lawn. Plant and machinery will also be required on site, all of which could cause direct damage to grass, shrubs and trees; indirect damage by soil compaction may occur reducing sub-soil aeration and moisture movement, the effects of which would only be apparent in the long term.

Pads 300mm x 300mm are to be inserted beneath the jack feet to provide protection to the lawn surface, however, the weight of the proposed rink is not known to enable an assessment of these proposals to be made.

The construction of the Marquee directly on the lawn will exclude sunlight from the grass and will affect synthesis. Air circulation will be severely reduced and moisture from rain excluded; additionally, a build up of moisture in the microclimate between the grass and the floor of the marquee will occur. The above factors will directly impact on the turf causing disease and dieback of the turf. Weather conditions prior to and during the event would impact on the severity of the damage.

Access to the trees will be required to install the lights, this also could cause further damage to the trunk and branches within the tree, additionally the plant and machinery required on site may also cause damage. Any such damage could cause ingress of disease and decay.

The shrubs within East garden could be damaged by machinery and equipment when setting up the rink.

The Impact of London Fashion Week

The construction work required for London Fashion Week includes the installation of a scaffold framework Marquees on the lawns. This will also require the transportation of materials across the lawn areas; plant and machinery will also be required on site, all of which could cause direct damage to grass, shrubs and trees; and, indirect soil damage by soil compaction which would reduce sub-soil aeration and moisture. The effects may be increased due the grass being in active growth during this period and the risk of increased damage may be compounded by adverse weather and or high temperature should there be an “Indian summer” at the time of the event.

London Fashion Week may have an adverse effect upon the potential for the lawn to survive the effects of the ice rink, particularly as this event is held during the autumn when grass is in active growth, this coupled with the construction of the base of the London Fashion Week marquee being set close to the grass, a humid micro climate will be created encouraging rapid lush growth susceptible to disease.

With all the setup activities, the small water-logged area on the south edge of the main lawn may develop into mud.

Mitigation

With regards to the ice rink and applying practical experiences to the situation, rolls of turf do not normally store more than 3 weeks in a stack, often less. This is probably due to total exclusion of light, air and a reduced root zone. In severe cold weather, however, stacks of turf have been known to hold for over two months (a deep freeze effect). A combination of weather and soil conditions could result in the turf being able to survive the ice rink construction use and dismantling period; this would be difficult to predict but pre-construction preparations should enhance survival potential.

The following measures can be applied to both London Fashion Week and the proposed Ice Rink, prior to and between the event to mitigate any potential damage to the grass, trees and shrubs: -

- a) Investigate and cure the small wet area on the south edge of the main lawn.
- b) The encouragement and the development of a hard resilient turf resistant to wear, pest and diseases during the preceding period leading up to London Fashion Week.
- c) Further treatments to retain the resilient turf during the six week period between and leading up to the Ice Rink setup period.
- d) The development of a hard resilient turf can be achieved by:-
 - I. Eight weeks before London Fashion Week lightly scarify the turf and remove arisings. A second scarification may be required immediately after the event.
 - II. The applications of plant nutrients to produce hardened grass growth and encourage a denser grass crown; suitable plants nutrients would be organic fertilisers with potash and iron i.e. Mascot Microfine OC1. Two dressings at half rate should be applied, first dressing six weeks before London Fashion Week and the second five to six weeks before ice rink construction.
 - III. Carrying out regular mowing every 7-10 days prior to and between events with the mowers set between 50 to 60 mm high, removing arisings. The regular topping of the grass will encourage a dense turf /crown to form giving some resistance to the period of light exclusion etc. and provide a “foundation” for grass recovery.

- e) Should severe damage occur as a result of London Fashion Week, pre ice rink construction mitigation measures may not be viable. Further advice should be taken after the conclusion of the event.
- f) Review the adequacy of the 300mm x 300mm pads to be inserted beneath the jack feet to provide protection to the lawn surface. These may sink into the soil surface particularly if there is adverse weather prior to the event.
- g) During the build up of both events protection of the grass should be carried out with duck-boards or similar whenever any type of plant or equipment is to be taken onto the grass areas.
- h) Adequate temporary barriers as detailed in BS 5837 should be installed around the periphery of the site to prevent accidental damage to the retaining wall, shrubs and base of the trees. This could be removed once the event is opened to the public and replaced during “breakdown”.
- i) The installation of “Pea Lights” within the trees should be carried out with care. It is understood this will be carried out with the use of a “cherry picker” and care should be exercised during these operations. Sharp edges to the hoist “bucket” should be protected to prevent chaffing of the trees.

Warning

As these trees are in a Conservation Area, any proposed pruning of the trees will require six weeks prior consent from the Local Planning Authority; also, any damage caused to the trees may result in legal action being by the Local Planning Authority on the persons who caused the damage.

- j) Due to the importance of the landscape and the trees in the environment of West Kensington, it is essential that the installation of the Rink, Marquees and lights should be overseen by a qualified landscape manager/arborist to minimise the risk of any damage and to give advice on additional mitigation measures should inclement weather occur before, during and after the event.

In conclusion, as weather prior to and after the events is not predictable, contingency plans should be made to provide funds and resources to re-instate the lawns.

Appendix A

Sectional Drawing of Proposed Ice Rink.