Transport and Environment Committee

10am, Tuesday, 18 March 2014

Park and Pitch Drainage Programme

Item number	7.13
Report number	
Wards	All

Links

Coalition pledges	P42, P43
Council outcomes	CO4, C010, C020
Single Outcome Agreement	S02

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Executive summary

Park and Pitch Drainage Programme

Summary

This report updates Committee on the progress made in delivering a programme to improve drainage in parks and recreational grounds that have suffered regular inundation in recent years.

It notes that of the 24 locations identified as requiring drainage improvements, the current programme should realise significant improvements to the seven most critical, the works for which have already been completed or are in the process of procurement.

Preliminary information is also provided regarding the possible options of establishing a more robust grassed space that can be used to accommodate large-scale events.

Recommendations

It is recommended that the Transport and Environment Committee:

1. Notes the progress in implementing the park and pitch drainage programme.
2. Notes that works on only seven of the 24 parks and recreational grounds identified as requiring drainage improvements can be resourced within the existing allocation.
3. To ask the Director of Services for Communities for a further report detailing the likely costs of extending the programme to parks and greenspaces still requiring drainage works.
4. Considers the options available should the Council wish to invest in reinforced surfacing or improved drainage/maintenance for locations likely to be regularly used for large-scale events, and notes that further information will be provided following completion of the Parks Events Manifesto consultation.
5. Refers this report to the Culture and Sport Committee for consideration.

Measures of success

Improved drainage of parks and pitches and greater resilience of grassland for large-scale events.

Financial impact

It is anticipated that the £500,000 budget allocation will allow improvement works to be carried out on the following park and pitch locations throughout the city: Inverleith Park (£82,400), Roseburn Park (£14,317), Seven Acre Park (£11,272), The Meadows (estimate £170k), Leith Links (estimate £101k), Seafield Recreation Ground (estimate £40k), and Silverknowes Playing Fields (estimate £71k).

Further funding will be required in the future, if the improvement programme is to be extended to other parks and pitches. However, actual costs can only be accurately determined once professional assessments have been undertaken.

Equalities impact

There is no relationship between the matters described in this report and the public sector general equality duty. There is no direct equalities impact arising from this report.

Sustainability impact

Investing in drainage will be an ongoing requirement if the Council's parks and pitches are to remain resilient to the anticipated impacts of climate change and levels of usage.

Consultation and engagement

Consultation was undertaken with Neighbourhood and Parks staff along with sports teams via the Pitches Group, which includes representatives for football, rugby, cricket, Edinburgh Leisure and Culture and Sport. Site specific consultation was also undertaken with direct users, including Roseburn Cricket Club, Leith Links Steering Group, Meadows and Bruntsfield Links Advisory Group, and Edinburgh Northern Rugby Club.

Background reading / external references

None

Report

Park and Pitch Drainage Programme

1. Background

1.1 Following extensive inundation to Council parks and sports pitches, £500,000 was allocated to Parks and Greenspace as part of the 2013/2014 capital budget for improved drainage.

1.2 A list of the worst affected locations was collated and a programme of works prioritised. This report informs the Committee of progress in delivering the programme.

2. Main report

2.1 Over the last few years there has been extensive flooding and persistent inundation of Council parks, gardens and playing fields. As a consequence, sports matches have been regularly postponed and parks events cancelled or located to better drained sites. Investigations suggested that a number of locations were unable to drain the water very effectively, and to enable them to do so would require significant investment in drainage improvements.

2.2 At its meeting of 7 February 2013, Council agreed to allocate £500,000 to a programme of drainage investigations and works.

2.3 Discussions with Parks, Neighbourhood and Edinburgh Leisure staff, as well as sports teams and park users, identified a list of 24 of the worst affected sites. These were then prioritised in terms of inundation severity, level of sporting use, park status/profile and neighbourhood impact.

2.4 Soil and drainage investigations were also procured from Scottish Agricultural College Consultancy Services on a phased basis and actual works procured on a project-by-project basis following consideration of assessment results and budget availability.

2.5 As of January 2014, assessments had been completed for Inverleith Park, Roseburn Park, Seven Acre Park, The Meadows, Bruntsfield Links, Leith Links, Seafield Recreation Ground and Silverknowes Playing Fields. To date, works have been completed at Inverleith Park, Roseburn Park, and Seven Acre Park. Procurement has been initiated for The Meadows, Leith Links, Seafield Recreation Ground, and Silverknowes Playing Fields. Drainage works were not

considered appropriate for Bruntsfield Links given its rocky nature and prevalent thin soils.

2.6 Assessments are currently being procured for Dundas Park (South Queensferry), Ravelston Park, Drumbrae Park, and Davidson's Mains Park.

2.7 Works are timetabled to avoid clashes with sports use. Works on football pitches is timed for summer and on cricket pitches for autumn/winter. There is also care to avoid impact on events occurring in parks.

2.8 Currently there is no further provision within the capital programme to carry out further assessments and works to the remaining list of affected parks and pitches.

2.9 Recognising the impact that large events can have on the ground conditions of a park, Parks and Greenspace officers have undertaken some preliminary research into the suitability and costs of establishing reinforced surfaces that can improve resilience to regular use whilst retaining their primary function for informal recreation. The potential to create such a feature in one or more of the Council's public parks is also being considered as part of the current Parks Events Manifesto consultation.

2.10 Three options seem suitable:

- reinforced fibre system
- reinforced net system; and
- improved drainage and maintenance regime

2.11 Design and specification details for each of these is summarised in Appendix 1. In short:

- a reinforced fibre system offers the most robust option, but is the most expensive to install and maintain;
- a reinforced net system is less expensive but limits the possible remedial/reinstatement works often required following use for events; and
- improved drainage and maintenance is the least expensive but requires continuous investment in regular sanding, spiking and other intensive maintenance typical of high quality sports pitches.

It should also be noted that reinstatement is far more difficult in reinforced systems should grass die from lengthy absence of light, air and water (which typically occurs when events exceed 14 days of operation).

3. Recommendations

3.1 It is recommended that the Transport and Environment Committee:

1. Notes the progress in implementing the park and pitch drainage programme.
2. Notes that works on only seven of the 24 parks and recreational grounds identified as requiring drainage improvements can be resourced within the existing allocation.
3. To ask the Director of Services for Communities for a further report detailing the likely costs of extending the programme to parks and greenspaces still requiring drainage works.
4. Considers the options available should the Council wish to invest in reinforced surfacing or improved drainage/maintenance for locations likely to be regularly used for large-scale events, and notes that further information will be provided following completion of the Parks Events Manifesto consultation.
5. Refers this report to the Culture and Sport Committee for consideration.

Mark Turley

Director of Services for Communities

Links

Coalition pledges	P42	Continue to support and invest in our sporting infrastructure.
	P43	Invest in healthy living and fitness advice for those most in need.
Council outcomes	CO4	Our children and young people are physically and emotionally healthy.
	C010	Improved health and reduced inequalities.
	C020	Culture, sport and major events – Edinburgh continues to be a leading cultural city where culture and sport play a central part in the lives and futures of citizens.
Single Outcome Agreement	S02	Edinburgh's citizens experience improved health and wellbeing, with reduced inequalities in health.
Appendices	Summary of Reinforced Surfacing Options	

Appendix 1 Reinforced Surfacing Options for Public Parks

Introduction

In dry weather conditions grass is a suitable surface for hosting events as it will allow marquees to be fixed down with spikes and a reasonable level of vehicular and pedestrian traffic. However, under wet conditions the structure of the soil quickly breaks down and turns to mud, causing long term damage which required expensive reinstatement works that can take many months for full recovery.

Compaction in soil is caused by pressure applied from above by vehicles or foot traffic. It starts with the removal of air from the spaces between the soil particles. This can stop biological activity. If this pressure is sustained, water is also displaced from between the soil particles; further pressure allows the soil particles to crush together allowing the structure of the soil to collapse and compact. Future rainfall will no longer be absorbed by this soil, causing poor drainage, flooding of the area and increased run off

Grass and soil will begin to “yellow” under tents and road tracking, but can recover normally if this for limited duration. Where an event is present for more than a couple of weeks the area of grass which has received no light for an extended period will require cultivation and seeding/new turf.

Recent advances in horticultural technology mean that grass surfaces can now be created that make grass and soils more resilient to these forms of damage, whilst allowing continued use for sport and outdoor recreation when not being used for large scale events. This preliminary report considers those most suitable for Edinburgh’s public parks.

Events Space Requirements

Large-scale events seek park locations that are:

- Level
- Well drained

And which have:

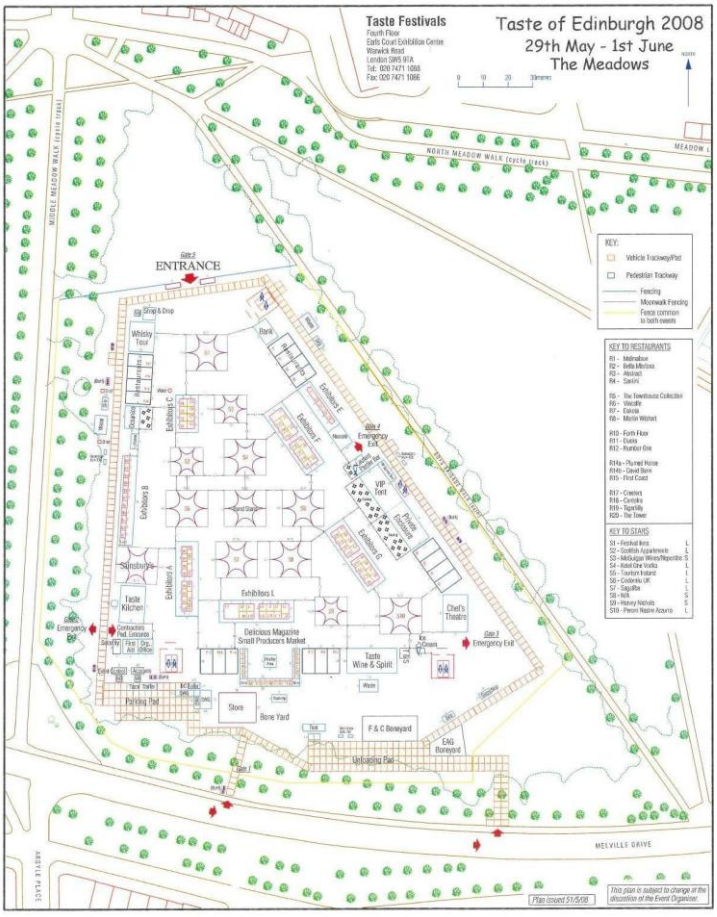
- Good vehicle access
- An area for heavy transport to load/off-load
- Large grass areas that are free from subterranean services so that Tents/Marquees can be fixed to ground with large spikes
- Access to power, water, and drainage.
- Good public access.

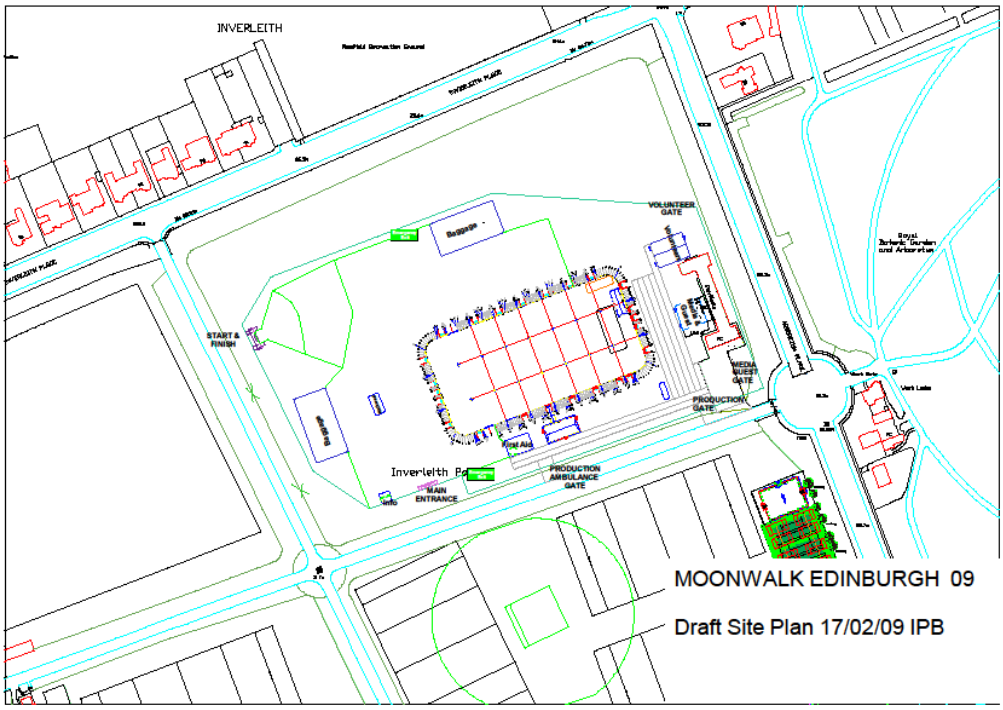
Events Space Sizes and Layouts:

Having considered the large events that typically occur in Edinburgh's parks, it is likely that the extent of ground required to be reinforced at each main park is as follows:

Park	m2	Acres	Ha
Calton Hill	1,091	0.27	0.10
West Princes Street Gardens	1,210	0.29	0.12
East Princes Street Gardens	7,805	1.93	0.78
Lauriston Castle	20,770	5.13	2.08
Leith Links	24,782	6.12	2.47
Inverleith Park Moon Walk	35,237	8.70	3.52
Inverleith Park Taste Event	32,324	7.98	3.32
Meadows	25,952	6.40	2.59

This suggests a reinforced events space of around 3ha should be able to accommodate the majority of events. However, as can be seen from the following example layouts, events would need to be arranged in a manner that maximised use of the space:





Surface Options

Three options have been identified as possible solutions to establishing an events space that can sustain regular events and associated traffic whilst retaining its main purpose as a recreational space usable for sports and other outdoor recreational activities.

1. Reinforced Fibre systems
2. Reinforced Net systems
3. Improved Drainage and Maintenance regime

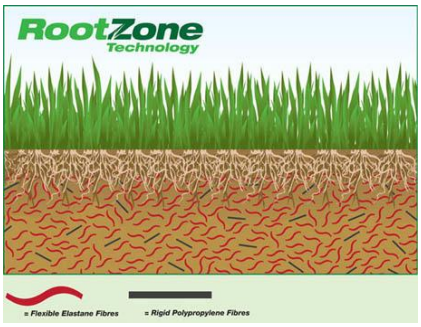
1. <u>Reinforced Fibre systems</u>

Examples of this type of system are found, in a variety of sizes and forms, at: Glasgow Green, Quartermile development, Gallery of Modern Art (Charles Jencks Landform sculpture), slope behind the National Gallery on The Mound, Murrayfield “back” pitches outside the main stadium.

Fibreturf/Fibresand is the name given to natural sports turf growing in a sand dominant rootzone that contains synthetic fibres. It has been developed in order to obtain greater use out of natural turf whilst maintaining a high quality sports surface. This is achieved by mixing silica sand and organic matter with polypropylene fibres to produce a ‘fibre reinforced’ upper rootzone. The natural turf finish is then produced by either seeding directly into the rootzone

or by laying Fibreturf which has been pre grown by specialist turf growers. This system is common on top grade sports pitches.

An advanced “Terram” version comprises a sandsoil rootzone into which thousands of small interlocking mesh elements have been pre-blended, and which when installed is supplied with a selected turf finish. As the grass roots develop, they penetrate through the mesh to form a deep-anchored root system and a very stable rootzone. This creates a free-draining natural grass surface with load-bearing capabilities, and has been employed on the Murryfield back pitches and Glasgow Green to accommodate events and car parking.



Fibrelastic is a similar alternative that aims to further improve the characteristics of typical fibre reinforced, sand-dominant rootzones by imparting a significant degree of resilience and energy absorption to the surface. This is achieved by mixing silica sand, organic matter, rigid polypropylene fibres and flexible elastane fibres to produce a completely homogeneous blend.

These reinforced systems cost around £50/m2 to install, a 3ha site costing up to £1.5m. In addition, additional drainage would be necessary, costing an estimated £170k for a 3ha site.

Due to the free draining properties of these systems it is likely that an irrigation system will also need to be installed, along with access to water and a power supply. Cost will be site dependent, and could involve construction of a water tank.

Regular application of fertilizer may also be necessary to replace leached soil nutrients.

2. Reinforced Net Systems

These typically involve use of a grass mesh and engineered turf, with plastic meshes installed directly onto existing grass surfaces, allowing the grass sward to grow through the mesh apertures. The grass roots intertwine with the plastic mesh creating a reinforced base for the roots, protection from wear, and ultimately a grassed surface that is capable of resisting a reasonable level of rutting and deformation.

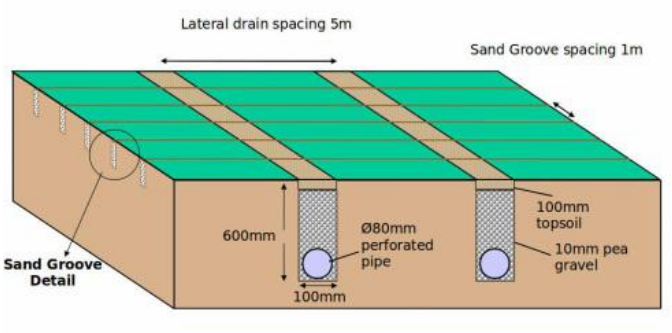
At an estimated £10/m2, a 3ha site would cost around £300k to install. In addition, as with fibre systems, Reinforced Net systems require site drainage installed prior to the net going down. This would be a further £170k.

There are more limitations with a net system. Remedial and post-event reinstatement works become more problematic, as any ground cultivation would damage the integrity of the net. Grass nets also have the potential to create trip points if exposed, as well as “catch” points to grass cutting machinery.

The performance of both reinforced fibre and net systems is greatly enhanced by the inclusion of a layer of clean open stone. The installation of this would require the stripping of the existing top soil and, in the case of fibre systems its removal from the site. Inclusion of a stone layer over 3ha would cost around £150k. Soil removal would cost around £200k, although some of this expense could be recouped by reuse elsewhere or sale. Good quality soil of this extent should generate around £100k.

3. Improved Drainage and Maintenance regime

Until the current drainage programme was initiated, there have been only cursory attempts to improve drainage in parks and sports pitches in recent years. The investments made should significantly improve the capability of sites to contend with event activities, but this can only be sustained over the longer term with a regular drainage maintenance regime that incorporates sanding, spiking, tining, grooving, verti-draining and other surface water management and soil aeration practices.



The costs of this maintenance regime will vary depending on levels of compaction, soil type and intensity of use, but would be around £30,000 per year for a 3ha site that already has a good quality drainage system installed, itself estimated to cost about £170k.

Light, Air and Water

Whichever option is chosen, the problems caused by length of time the event is in place remain. If light, air and water are removed from the growing grass for a sustained length of time then the grass will die and need to be replaced via seeding or returfing.

Tracking is extensively used to limit damage from vehicle and pedestrian movements, and it is important that this practice is demanded when deemed suitable.

In addition to this, event organisers using a location for a sustained period can be encouraged/instructed to ensure that their tents and marquees have panels in the roof structure that permit light penetration. Similarly, flooring can be made of clear plastic, and ideally incorporate gaps to permit light, air, and even regular watering.


Conclusions

The three systems examined all seek to protect the living green grass landscape. They all take a dual approach, improved drainage with a range of stabilisation treatments. From the high stability of the fibre systems which can sustain heavy traffic to the lighter sand ameliorated surfaces. This all helps the grass to survive concentrated foot and vehicular traffic without degrading, breaking down and turning to mud.

A reinforced fibre system will undoubtedly provide the most effective solution to establishing a surface that can adequately cope with regular events use whilst at the same time providing sporting and recreational use when not accommodating events. However, it is expensive at up to £2m for a fully costed installation across 3ha of grassland. It will also have ongoing maintenance costs to ensure good drainage, irrigation, and soil enrichment.

Reinforced net systems are far less expensive. However, there use presents potential public safety and operational management concerns, as well as limitations on site reinstatement works that may still be necessary.

Probably the most cost effective solution is therefore continued investment in the installation of drainage systems, and provision of an adequate revenue budget to allow for a high quality ongoing maintenance regime. Smaller zones of fibre or net reinforced turf could be installed at locations that are likely to suffer the greatest damage from events, typically vehicle entrance points and areas where heavy vehicles offload and collect their loads.