



Making great sport happen

Manchester College – Wythenshawe Park Earthworks and drainage

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Introduction

Knight, Kavanagh, and Page (KKP) have commissioned STRI to assess a potential mitigation site at Wythenshawe Park on behalf of their client Miller Homes. The site currently is not used for sports but instead offers public access to green space and dog walking. It would appear that local residents utilise the site as a shortcut from the surrounding area to the nearby Metro station although no formal right of way is currently believed to be in place (This is shown by the red hatched line in Appendix 1).

STRI undertook a site assessment to determine the viability of the site for the proposed relocation of sports pitches from the nearby Manchester College site in Northenden which is currently earmarked for residential development.

Following the acceptance of the initial report outlining the findings of the site inspection, KKP have commissioned STRI to include an Earthworks and drainage section into the report aimed at identifying possibilities for the site and indicative associated costs.

Site assessment

The site itself has a very open aspect and is flanked on two sides by Baguley brook (North and West boundaries) with residential buildings along the Southern boundary. Playing pitches are located to the East of the site within the wider Wythenshawe Park area.

There is a visible continuous slope across the site predominantly from the South to North with minor surface undulations widespread over the area. STRI survey data taken during the site visit confirms this. The site was well grassed with ryegrass species (*Lolium* sp.) dominating. Broadleaf weed

populations were confined to the wetter areas where Creeping Buttercup (*Ranunculus repens*), mosses and Plantain (*Plantago* sp.) were widespread. There was little evidence of regular maintenance (mowing) which is understood to have been impacted further by the recent COVID pandemic restrictions.

There were no visible pitch markings on any areas of the site nor historic activity evidence. A thorough assessment of the ground conditions was undertaken with two trial pits dug – one in each of the Northern and Southern sectors, together with regular core inspections. Soil samples were harvested and sent away to STRI laboratories for analysis to determine the textural classification of the site soils.

There was no evidence of services or utilities traversing the site nor and indicator markers found around the boundary. A linear formation was noted in the Northwest corner (Figure 3) traversing in a North-easterly direction towards the brook, which upon further investigation could not be formally identified nor any purpose found.

Drainage

Currently there appears to be no formal drainage infrastructure in place. A thorough investigation of the site revealed no evidence of outlets or inspection chambers. The conclusion was drawn that the existing slope within the site sustains gravitational movement of water through the profile towards Baguley Brook (see Levels notes).

Inspection of the brook embankments showed seepage evidence, but not of sufficient discharge quantities to warrant further investigation. This was supported by the large area within the Northern sector that remained saturated with standing surface water present. Soil conditions and

structural integrity were compromised as illustrated by the grounds maintenance equipment causing significant and widespread damage to the site during mowing operations.

Soil investigations (see Soil and Agronomic notes) revealed inconsistent soil depths and structure across the site, however overall textural analysis results were uniform.

The primary limiting factor to effective drainage is the site topsoil, which laboratory analysis has confirmed is a Sandy Loam (Appendix...) with a high percentage of fine particles ('fines'). It can be anticipated that the site topsoil will have very poor drainage characteristics, which may be exacerbated by maintenance and play. To improve this further the site topsoil could be appropriately ameliorated with enough sand material to make it suitable for the pitch construction works if required.

Installing a primary pipe drainage network would allow for surface water to be removed from site effectively and is a proven method of improving playing surfaces. Subject to design requirements the site at Wythenshawe Park benefits from a natural slope across the site which should be utilised when considering investment into drainage. The most cost effective solution would be to drain the entire site in order to allow for uniformity and consistency of surfaces. Having outlets on the Western and Northern boundaries into the brook would help fulfil discharge requirements, as these are currently water courses with continuous flow. Additional works may be required on the Western brook to ensure vegetation and leaf debris do not inhibit future drainage.

The scope of works required, and associated costs would depend on the final number of pitches. A guideline cost framework suggests that a site of this size and considering the nature of the site soils that mobilisation of contractors and subject to design specifications, an estimated investment of approximately £90-150k would be required. This is based on previous

projects of a similar scale that STRI have been involved with. These figures all purely speculative at the moment and subject to further investigation and discussion, which STRI would be happy to assist with.

It is important to note that ongoing maintenance will be required going forward to retain the performance integrity of any new drainage installations. Regular aeration will be required as reduced inputs of cultural practices will accelerate a reduction in drainage performance.

Levels

The site benefits from continuous slopes across the whole site from South to North and East to West. Within these are localised areas of undulations of varying depths.

Topographical surveying was carried out over the whole site and supports the visual findings of the continuous slopes. Appendix... shows the contours of the site with an elevation change of 2 metres between the South-eastern corner (highest) and North-western corner (lowest).

The Northern sector is noticeably flatter terrain with wider contours. This may account for the water retention seen during the inspection within this area.

Additional Constraints

Within the boundaries of the site area there were no obvious constraints found that would impact on the proposal.

Soil and Agronomic Conditions

As part of the site assessment soil inspection pits were dug to determine the depth and nature of the topsoil as well as the dominant type of subsoil. Two pits were dug in the Northern and Southern sectors. The Northern pit showed higher moisture content, understandable as it is at the bottom of the site slope. The topsoil was uniform to a depth of 310mm and was of a heavy nature. Structurally it was tight in the upper 50-60mm below which it was more open structured but not crumbly. Throughout the topsoil layer there was evidence of stones and cobbles of unknown origin. Figure 1 shows the distinct layer between the topsoil and the heavier clay dominant subsoil.



Figure 1: Topsoil layer contained stones (arrows) above a heavier clay subsoil at 310mm depth.

The Southern pit showed a much deeper topsoil layer to 450mm over a sandier subsoil. Structurally the soil was more crumbly and held less moisture than the Northern soils, which being on the higher part of the site is understandable. Figure 2 shows the uniformity of the soil and the sandy nature of the subsoil. This sand layer was noted within the brook embankment but cannot be verified that it is a continuous seam.



Figure 2: Soil structure and texture is more consistent within the Southern sector to 450mm depth above a sandier subsoil (arrow).

Layout Discussion

Currently the site is not used as playing fields with no historic evidence of markings found. Under present conditions the site is unusable for pitches mainly due to the unsuitable ground conditions. These are directly related

to the poor drainage potential of the Northern sector of the site. Despite a recent period of dry weather, there were many areas that remained saturated with evidence of standing surface water. This would, under non-pandemic, likely render them unplayable for significant periods of the playing season.

The new site could potentially accommodate two full size football pitches and a smaller U12/13 pitch within the site footprint. Figure 3 shows the STRI proposed layout which also includes the potential for four Mini's (U8/9 age group) to be gained from within the two larger pitches. The proposed layout aims to maximise the available space whilst providing an increased amount of playing fields.



Figure 3: STRI proposed pitch layout within Wythenshawe Park.



Figure 4: STRI Earthworks calculations for the proposed pitch layout within Wythenshawe Park.

Earthworks and Drainage

STRI have undertaken a desktop analysis and calculation exercise to determine quantities and volumes of earthworks and drainage requirements for the proposed pitch layout as shown in Figure 4. These calculations consider the Sport England regulations for surface slopes and levels and have aimed to create uniform playing surfaces whilst minimising the earthworks requirements as best as possible. The existing site grade/levels do not allow for a uniform surface to be created, hence the requirement for the Earthwork calculations.

Below are indicative costings and have allowed for the regrading works on the three pitch areas shown on Figure 3 as well as drainage of the entire playing field area (i.e., both primary and secondary drainage) at 5 and 0.5 metre centres, respectively. The total figure is approximately £230K plus VAT, and allowing for a 10% contingency sum on top of this, would increase the total to £253K plus VAT. This offers a total drainage solution for the site and should further discussion be required about the details STRI would be happy to continue the discussion.

Within this the primary drainage would be estimated around £78K with the secondary drainage being around £53K. It is assumed that all drainage spoil would be tipped on site in the form of landscaped mounds to further reduce off site removal costs.

Other costs include site establishment (£10K), hire of Heras fencing to protect working areas (£10K), and the earthworks on the three pitches (including topsoil strip/grading/topsoil respread) which could be in the region of £22K, cultivations/sand amelioration/seeding of the same area (£40K), as well as initial maintenance of the seeded areas (£13K).

If the works were just restricted to the drainage only with no earthworks, then the total costs would be around £163K plus VAT (includes 10% contingency).

The above assumes that the drainage system can discharge into a locally available outfall (Baguley brook) and currently there is no allowance for any attenuation systems which could add a further £50K to the job, depending on what is required.

Mitigation

At present the proposed site at Wythenshawe Park is unusable as sports pitches due to the prolonged waterlogging in the Northern sector as explained earlier in the document.

The site area of c.2.5Ha provides sufficient area to bring unusable land back into play with enhanced benefits of drainage to restore playability and performance.

The sites natural slope and contours suggest that the drainage design and installation would be straightforward. No obvious impediments were noted during the inspection that would suggest any additional work would be required. Drainage discharge would be into Baguley Brook on both the Western and Northern boundaries. The precedent has been set for discharge by the presence of drainage pipes, ditches, and culverts from other areas of the site including the residential area to the North of the site. Figure 5 shows an active example of discharge from both a drainage ditch and culvert originating from the playing fields to the Northeast of the proposed site.



Figure 5: Active drainage discharge into Baguley Brook from other playing pitches via culverts and open ditches (arrowed).

With the commencement of any earthworks to establish levels, drainage potential of the soil will be changed, often detrimentally. Therefore, the recommendation is to install a primary drainage system at 5 metre centres across the entire area and support this further with a secondary drainage system (sand-banding). Increasing the interception capability of any drainage system will raise the playability and access to the pitches long term.

Future site maintenance requirements will need adjusting to retain expected standards. Included in this should be deep aeration via Verti-draining (3x year), annual sand dressings (80-100 tons/Ha) and appropriate fertiliser applications should be accommodated for the next 5 years.

Summary and Discussion

A summary of the findings of the site investigation suggest that Wythenshawe park would be suitable for the relocation of playing pitches. Currently unusable land for sport this site appears to show all the characteristics required to allow for the provision of facilities with enhanced performance characteristics namely via the installation of drainage into the site.

The proposed site could potentially offer multiple pitch layouts however Figure 3 illustrates what is believed to be the best solution and provision. With the installation of pipe drainage, the potential for sports pitch development is great added to which Baguley Brook offers a positive drainage discharge mechanism, the precedent for which has already been set by surrounding sports pitches already draining into it.

The area of the proposed site shows an increased offering from where the pitches are to be relocated from thereby indicating a net gain for sports. Subject to approval, the drainage design and specification that would be required prior to any commencement of earthworks on the site STRI would be able to assist if required.

By draining the entire site, the possibilities to utilise all available space in the future exists. Limiting drainage to the playing pitches only severely restricts the options.

Appendix 1 – STRI proposed pitch layout at Wythenshawe Park.

