Committees:	Dates:	Item no.
Streets and Walkways Sub-Committee	24 November 2017	
Projects Sub-Committee	11 December 2017	
Subject: City Wide Pedestrian Model	**Gateway 6** **Update Report**	**Public**
Report of: Director of the Built Environment		**For Decision**

Summary

Dashboard

- Project Status: Green
- Timeline: Gateway 6, first progress report following initial procurement
- On programme
- Approved budget: £311,826
- Spend and commitments to date: £311,515.
- The Planning & Transportation and Resource Allocation Committees have approved the allocation of £60,000 of TfL funds for further development of the pedestrian model in the 2017/18 financial year.

In August 2015 Members authorised officers to procure consultants to build a digital pedestrian model of the entire City of London. The purpose of this model was to enable the City to predict future pedestrian flows for a range of different scenarios. This would enable the City to understand the impacts of physical or policy changes upon future pedestrian movement in the City and in particular to support decision making regarding accommodating the additional pedestrian movement generated by Crossrail.

That project was successfully completed, on time and on budget. The City now has pedestrian models that predict levels of pedestrian movement on all streets in the City of London for the years 2016 and 2026. The model is a unique data source which provides a strong evidence base to underpin strategic planning of City streets to ensure that they meet the needs of future residents, workers and visitors. Using these models, we can:

- Identify where pedestrian movement levels are likely to experience most growth as a result of developments which are likely to be delivered over the next ten years;
- Identify areas of the City which have spare pedestrian capacity to absorb increased levels of movement;
- Identify where new pedestrian routes would be most beneficial in terms of relieving stress on existing footways; and
- Use the information above to inform our discussions with developers, and to inform future strategy planning.

Subsequent to this, Members authorised officers to commission consultants to

use the model to:

- Identify streets which are unlikely to have sufficient capacity to accommodate projected growth in pedestrian movement; and
- Carry out an evaluation of the impacts on pedestrian movement of growth in the Eastern City Cluster.

In addition to the above, the consultants were asked to investigate alternative data collection methods which would allow the model to provide more detailed forecasts of pedestrian movement. Through this study, it became apparent that Telefonica, the City's WiFi network delivery partner, could potentially use mobile telephone data collected via the WiFi network to provide a very detailed source of pedestrian movement data in the City. This could provide pedestrian movement data with which the model could be significantly refined.

As an example of the type of refinement that could be achieved, the model in its current form provides predictions of pedestrian movement on streets but does not distinguish direction of travel, or which side of the street pedestrians are travelling on. By incorporating the WiFi data, we would certainly be able to predict direction of movement and, for most streets, which side of the street pedestrians are travelling on. This could for example, help us to determine when a building redevelopment proposal is of inappropriate scale for the local footway network and thus direct refusal; or to identify very specific improvements in the local footway network that the developer would have to pay for in order to mitigate the impact of their development; or to promote new ground floor routes through buildings to improve pedestrian permeability.

It is therefore proposed that a trial study is conducted whereby the City would procure WiFi data from Telefonica, then provide this to consultants in order for them to update the pedestrian model. The trial study will focus upon the Eastern City Cluster Area. The outputs of this study will be:

> i) An enhanced pedestrian model of the Eastern City Cluster area which will enable us to better determine where we can target interventions to improve conditions for pedestrians, particularly in light of the massive increases in pedestrian movement that are predicted to take place in that area; and
> ii) A set of protocols regarding how the process of integrating WiFi data into the pedestrian model could be rolled out across the entire model in the most effective manner.

The model has been developed by Space Syntax Ltd., using their purpose-built software. Space Syntax Ltd. is the only company with sufficient specialist knowledge of this modelling package to develop it in the way that we have specified. Therefore a waiver of standing orders is required to procure further development of the model directly from Space Syntax Ltd.

It should also be noted that as Telefonica are the only people with access to the WiFi data, officers will also need to procure directly from Telefonica.

The funding for this work would come from TfL's Local Implementation Plan funding award for 2017/18. In March 2017 both the Planning and Transportation and Resource Allocation Committees approved the allocation of £60,000 of TfL funding towards the Pedestrian Model.

It is recommended that:

- *Members note that both the Planning and Transportation and Resource Allocation Committees have approved the allocation of £60,000 of TfL funding for further development of the pedestrian model;*
- *In accordance with this approval, Members authorise officers to extend the project budget by £55,000 in order to procure WiFi data from Telefonica, and to commission Space Syntax to use this data to update their model in the Eastern City Cluster area. This will be entirely funded by TfL; and*
- *Members note that the procurement route will require sole source waivers in order to procure services directly from Space Syntax Ltd and Telefonica.*

Main Report

1. Reporting period	1.1 August 2016 to October 2017 inclusive.
2. Progress to date	**Model Development** 2.1 In August 2015 Members authorised officers to procure consultants to build a computerised pedestrian model of the entire City of London. The purpose of this model was to enable the City to predict future pedestrian flows for a range of different scenarios. This would better enable the City to understand the impacts of new developments or policy changes upon pedestrian movement in the City. 2.2 Following the Committee approval, officers appointed consultants to build the model. The Consultants appointed, Space Syntax Ltd, constructed the model using their specialist software platform. This platform is widely recognised throughout the planning industry as a robust and effective pedestrian modelling tool. 2.3 Following construction of two base year models for the year 2015 (representing a typical weekday morning peak hour and a typical weekday lunchtime peak hour), the consultants then worked closely with officers to construct models representing a future year scenario. This scenario includes all development and infrastructure change that is anticipated to take place between now and the year 2026. As with 2015, morning peak and lunchtime peak models were constructed. Thus, these models represent the City's best estimate

	of likely pedestrian movement for the year 2026, and should be used to inform any decision making where pedestrian movement is likely to be affected.
	2.4 The models were delivered to the City in April 2016, and are currently available as a series of GIS layers within the City's mapping system. Appendices 1-3 illustrate some sample outputs from the models:
	- Appendix 1 illustrates 2026 morning peak hour predicted pedestrian flows; - Appendix 2 illustrates the predicted increase in morning peak hour pedestrian flows between the years 2015 and 2026; and - Appendix 3 combines 2026 morning peak hour predicted pedestrian flows with air pollution data, to illustrate the streets where high numbers of pedestrians will be exposed to highest levels of air pollution.
	2.5 Subsequent to this, Members authorised officers to commission consultants to use the model to:
	- Identify streets which are unlikely to have sufficient capacity to accommodate projected growth in pedestrian movement; and - Carry out an evaluation of the impacts on pedestrian movement of growth in the Eastern City Cluster.
	2.6 Both of these studies have been completed and are being used to inform decision making in both of these areas. Sample data from each study are provided in Appendices 4&5.
	2.7 In addition to the above, it was recognised that the model could usefully be used as a means of assessing levels of pedestrian permeability across the City. This analysis provides useful guidance for the planning department when dealing with building redevelopment projects, as it allows officers to identify potential new pedestrian routes through the City, which could potentially be incorporated into new building redevelopment proposals. A sample of this study is provided in Appendix 6.
	Finance & Funding to Date
	2.8 Expenditure to date is as follows:
	- Staff: £54,689 - Fees: £256,826 - Total: £311,515
	2.9 Secured funding to date The bulk of this funding (£253,310) has been provided by TfL. The remainder (£57,000) was met by the departmental local risk budget.
3. Next steps	3.1 Although the model has demonstrated itself to be an extremely

useful tool with a range of potential applications, it has also been recognised that owing to the strategic nature of the model, it is less useful for application where very detailed pedestrian flow forecasts are required. The key reason for this is the limited availability of observed pedestrian flow data. The use of observed data is critical for the validation of a model of this nature – without an abundance of observed data, there is a limit to the level of detail that the model can achieve.

3.2 In recognition of this, consultants were asked to investigate alternative data collection methods which would allow the model to provide more detailed forecasts of pedestrian movement. Through this study, it became apparent that Telefonica, the City's WiFi network delivery partner, could potentially use mobile telephone data collected via the WiFi network to provide a very detailed source of pedestrian movement data in the City. This could provide the City with an exceptionally detailed source of pedestrian movement data with which the model could be refined.

3.3 As an example of the type of refinement that could be achieved, the model in its current form provides predictions of pedestrian movement on streets but does not distinguish direction of travel, or which side of the street pedestrians are travelling on. By incorporating the WiFi data, we will certainly be able to predict direction of movement and, for most streets, which side of the street pedestrians are travelling on.

3.4 The benefits of this increased level of accuracy would be numerous. For example, it would allow us to identify specific footways where pedestrian provision is poorest, which would enable us to target infrastructure expenditure to places where it is most needed. Additionally, it would allow us to influence the planning process by ensuring that new developments either developed to a scale appropriate for the adjacent footway network, or provided funding for specific mitigations in the area surrounding the development.

3.5 There is also a potential financial benefit to the City if this increase in accuracy can be achieved. It has been identified that if the model was sufficiently detailed, it would provide the basis for detailed assessment of building redevelopment proposals. On that basis, a business model could be established whereby developers pay to access information from the model as part of the planning application process. This payment would cover the cost of extracting pedestrian flow data that developers need to provide as part of their planning application, plus an additional levy which would contribute towards the on-going upkeep, maintenance and improvement of the model. If successfully realised, the model would become a self-funding project.

3.6 It is therefore proposed that a trial study is conducted whereby the City would procure WiFi data from Telefonica, then provide this to consultants in order for them to update the pedestrian model. The

trial study will focus upon the Eastern City Cluster Area.

Budget Adjustment

3.7 In March 2017, Members of the Planning and Transportation and Resource Allocation Committees approved the allocation of £60,000 of TfL funding for further development of the pedestrian model.

3.8 In September 2017 the Director of the Department of the Built Environment, under delegated authority, approved a project budget increase of £5,000 from this £60,000 allocation. This brought the approved budget for the project to £311,826. The cost to conduct this trial study is as follows:

- Procurement of WiFi data for the Eastern City Cluster - £30,000;
- Incorporation of data into model, and testing - £11,500

3.9 In addition to the above, there will be staff costs expended on procuring, and managing the consultants. The staff cost is estimated at £13,500. This brings the total budget increase to £55,000. Officers recommend that the budget for this project should now be increased from £311,826 to £366,826 to allow the procurement of the model enhancements set out in this report.

Waiver Requirement

3.10 As the WiFi data belongs to Telefonica, we will be required to procure the data directly from them.

3.11 Regarding the model, the works to the model can only be undertaken in an efficient and effective way by consultants that had a detailed knowledge of the workings of this model. This would only be possible for the consultants that developed the model. For that reason, it is proposed that we do not undertake a competitive tender process, as no other consultant would have the capability or understanding of the model to undertake this work.

3.12 In addition, given the importance of avoiding any underspend in Transport for London Local Implementation Plan funding, it is imperative that the consultants are appointed as soon as possible. This would be impossible were this piece of work to go to open tender.

3.13 It should be noted that whilst waivers will be required, the specific waivers needed shall be sole source waivers, and shall be entirely compliant with Section 32 of the Public Contracts Regulations 2015. The proposed procurement route has been discussed and agreed with City Procurement.

Data Protection

3.14 Officers have reviewed the position with regards to the data that Telefonica collect with a view to ensuring that the City complies with Data Protection requirements by using aggregated and depersonalised WiFi data provided by Telefonica.

3.15 Officers from the Comptroller and City Solicitor's department have advised that the aggregated and depersonalised data which we would procure from Telefonica cannot be linked to any individual person or device, so is not classed as 'personal data'. As such a Privacy Impact Assessment is not required.

3.16 The raw data would be collected by Telefonica, who have very clear Terms and Conditions for those that use their services (and this includes WiFi). These Terms and Conditions clearly state that Telefonica collects data from those that use its services, and that they will use the data to provide products/services to third parties. Further details are available at the following:

https://www.o2.co.uk/termsandconditions/privacy-policy

3.17 Turning to the data that Telefonica would actually provide to the City, this data will have been subject to significant processing and analysis before the data would be disclosed. Telefonica will provide the City with aggregated and depersonalised data on the number of movements on links in the City, what direction the movement is in, and potentially what side of the road the movements were on. They will also provide us with further aggregated and depersonalised data which should help us to distinguish between different modes of travel.

3.18 The data will be provided in csv format. There will be a single record for each highway link in the City, which will contain the information discussed in the preceding paragraph. The data is considered 'safe' as the re-identification risk is minimal.

Appendices

Appendix 1	2026 morning peak hour predicted pedestrian flows
Appendix 2	Predicted increases in morning peak hour pedestrian flows between the years 2015 and 2026
Appendix 3	2026 morning peak hour predicted pedestrian flows combined with air pollution data
Appendix 4	Footway crowding risk, 2026
Appendix 5	Urban block size analysis
Appendix 6	Eastern City Cluster

Contact

Report Author	Jon Wallace
Email Address	Jon.wallace@cityoflondon.gov.uk

| Telephone Number | 020 7314 1589 |