ARCADIS Design & Consultancy for natural and built assets

NATIONAL INFRASTRUCTURE COMMISSION

Call for Evidence

London's Transport Infrastructure

JANUARY 2016

Incorporating

EC HARRIS BUILT ASSET CONSULTANCY

Hyder

CONTACTS

MATHEW RILEY
Strategy & Development Director

[Telephone numbers and email address redacted]

Arcadis.
Arcadis House
34 York Way
London
N1 9AB

CONTENTS

On the 13th November 2015, the National Infrastructure Commission published a Call for Evidence with respect to three core themes:

1. **Connecting Northern Cities**
2. **London's Transport Infrastructure**
3. **Electricity Interconnection and storage**

This paper comprises the response of Arcadis UK to the second of those themes, London's Transport Infrastructure.

Introduction

Whilst we absolutely understand the desire of the Commission to seek responses that are grounded in evidence and data, the overall vision and strategy for London is exciting and will undoubtedly lead to a step change in infrastructure and therefore economic outcomes, there is a concern that existing approaches to investment appraisal will lead to sub optimal outcomes.

Therefore, we have taken an approach that seeks to provide some guidance to overcome some of these challenges by referring to our experience in other countries, and looked at the strategic question of how to value the benefits of the various competing investment interventions and how to prioritise them in what will inevitably be a constrained funding environment.

We look forward to discussing this submission with the Commission in due course and expanding on both the themes and Case Studies contained within it, and to providing any additional information and analysis from the rich library of other case studies developed by Arcadis.

Question 1 – What are the major economic and social challenges facing London and its commuter hinterland over the next two to three decades?

London is home to 8.6 million people, is projected to grow to 10 million by 2030 and, assuming trend rates of economic growth continue, become a city of over 11 million by 2050. London competes on a global stage as one of the greatest cities on earth and if it (and the UK) is to continue to deliver, the benefits that flow from this status it needs to maintain its competitive advantage. Yet London is suffering from an acute shortage of affordable housing (200,000 additional units by 2030), education (600 new schools by 2050) and healthcare, and together with congestion and its aging infrastructure, means the city is becoming an increasingly less attractive place to live and work.

Attracting and retaining the talent required to maintain London's competitive advantage would depend on the ability to improve the quality of life for Londoners (and its hinterland). Managing the impact of climate change and changing the behaviours around public consumption of (what are now regarded as) basic human needs such as electricity, gas, water, and now data, are critical to the next generation and delivering a more sustainable environment.

This pace of change brings into question London's ability to fund this growth and ambition. Current funding models will not always be flexible enough to meet the demands of the city, and the ability for London and the surrounding hinterland to work together and be more flexible and agile; will be critical to its success. London's Infrastructure Plan alone calls for around £1.3trn of required investment through to 2050 to satisfy this demand.

London has extremes of wealth, with the very wealthy central London and the whole western corridor out to the Thames Valley self-evident. What is less obvious is that London also has some of the most deprived areas of poverty in the country. Rebalancing and redistributing some of London's wealth creation along its North/South axis and eastern corridor are real opportunities to address shortfalls in housing and employment to stimulate wider economic and social benefit.

Question 2 – What are the strategic options for future investment in large-scale transport infrastructure improvements in London – on road, rail and underground – including, but not limited to Crossrail 2

The strategic options should be driven by the need to both rebalance London's economy as well as address London's wider growth agenda. This growth agenda is likely to result in the need for extra capacity on key corridors to alleviate congestion as well as improve journey times for all modes.

These strategic options should also be assessed using an appraisal framework that takes full account of the additional agglomeration benefits that would be derived from creating a faster, more frequent and more integrated London regional transport network. Whilst individual projects such as Crossrail 2 will undoubtedly have a significant impact, the wider network effects ought to be greater than the sum of the parts.

For example, traditional project appraisal would tend to look at the business cases for projects such as Crossrail 2, Bakerloo Line Extension and the Overground to Barking in isolation. However, couple this with the potential investment by Network Rail to upgrade the West Anglian line into Liverpool Street to four tracks, and then both put into the wider regeneration context of accelerating growth to the opportunity areas of Upper Lea Valley and North Bexley. The result is the creation of vibrant and dynamic wider economic zones forming a Northern corridor from London to the knowledge economy powerhouse of Cambridge, including the international transport hub of Stansted Airport.

A similar approach could be used to connect he South Coast upgrade into Victoria Station via Croydon create another linear economic zone including another international transit hub at Gatwick Airport. Indeed, whilst Arcadis understands the NIC has not asked for responses on Aviation capacity, we do feel justified in pointing out these additional benefits bought by the wider connectivity along a North/South axis for London and the surrounding hinterland. Additional runways can be built at all of Gatwick, Stansted and Birmingham (leveraging HS2 links) airports for the same level of investment as required by a single third runway at Heathrow, and would deliver similar economic gains.

Arcadis has used this approach to create models that maximise social and economic benefits for transportation links in other countries such as Asia and North America, and would be happy to share these with The Commission.

Of course, London and its hinterland is not a homogenous region. Whilst economic zones of considerable size could be created (such as The City, through the Lea Valley and then to Cambridge via Stansted), the needs of the citizens in this region will be very different to those in other parts of London and the South East. Given the fact that funding is always more constrained than would be ideal, choices have to be made and that means determining priorities. Sometimes those choices will have to be made taking account of qualitative as well as quantitative factors.

Arcadis has therefore developed a framework that enables policy makers to prioritise these strategic choices.

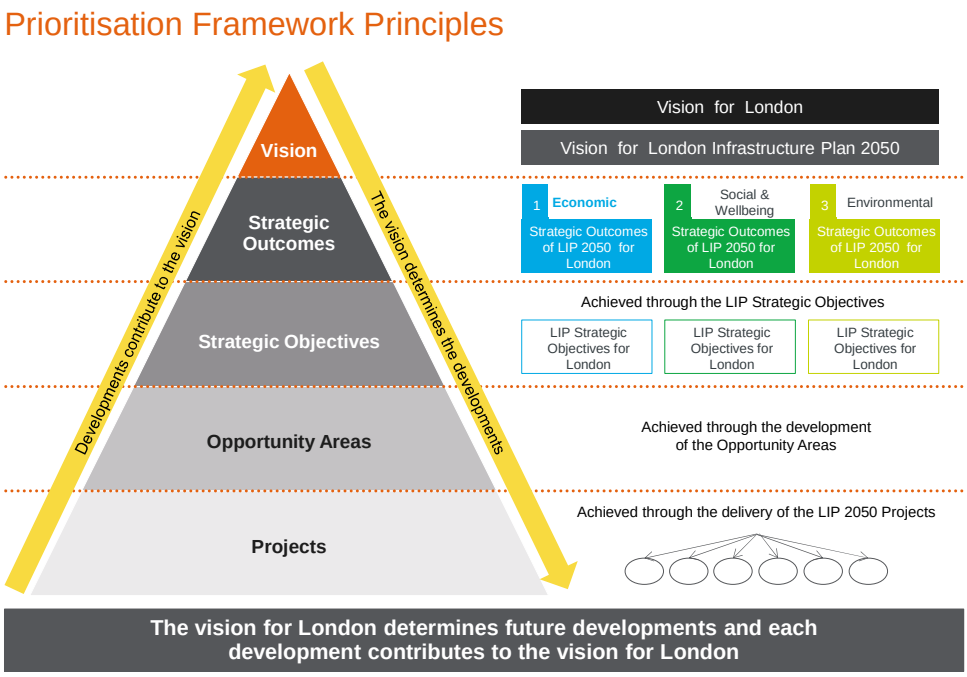
Prioritisation Framework

The establishment of a comprehensive appraisal framework that gives relevant weighting on a project-by-project basis and with appropriate local and regional context to:

- Direct User Benefits;
- Productivity Benefits;
- Investment and Employment Benefits;
- Changes in Land Use Planning.

will result in a more rounded approach to project appraisal.

A prioritisation framework is needed that takes account of factors that cannot always be easily quantified. Arcadis has experience of developing such a framework in London where the needs and agenda of the various Boroughs and Regions are often not aligned either economically or even politically, even though they all still see the benefit of functioning as a wider City Region. Below is an illustration of how the model works;



A series of KPI's are developed for each of the strategic objectives that flow through to the Opportunity Areas to ensure the benefits are delivered over lifetime of the investment plan. These include employment, productivity and housing supply.

Question 3 – What opportunities are there to increase the benefits and reduce the costs of the proposed Crossrail 2 scheme?

Having identified in Question 2 the benefits to be derived from a more integrated network that seeks to address both the needs to support the growth in London's wider economy as well as rebalance it, the question for Crossrail 2 is will the route currently being proposed support these objectives as much as it could do?

The criteria for assessing benefits needs to be broader than might traditionally have been the case. For example, is it correct that the benefit assessment for every station should be limited to a 1km radius from the station when the demographics for each are different? The private sector will always maximise their investment opportunity in a way the current appraisal model does not properly capture, particularly for densification and infill. Crossrail 2 will need to think and act more like a developer who runs rail networks, a good example of this approach being MTR in Hong Kong. London is a city with high land values with a growing population, and these land values could be sustained along the entire line of route with the right approach.

Arcadis have developed a model that assesses the wider social and economic benefits beyond the conventional scheme appraisal and this is set out in the case study below.

CASE STUDY – INTERNATIONAL RAIL PROJECT

Arcadis was commissioned by the Government of a major and rapidly developing country to undertake a socio-economic impact assessment study for a transformational investment in high-speed rail infrastructure. Having studied available literature and ex-post assessments of the economic benefits of High Speed Rail (the number and quality of such studies being still limited), Arcadis developed a new methodology to the ex-ante assessment of the economic benefits of High Speed Rail – the Socio Economic Development Plan.

The methodology assumes that rather than simply build the infrastructure and assume the private sector will respond to the availability of infrastructure by investing (which to an extent they will), a more accelerated and optimised approach to stimulating economic growth would come from a structured and proactive approach on the part of Government, whether national, regional or local. By assessing local physical, social and economic opportunities and aligning them to the broader economic and industrial strategy of the Government, we were able to identify for each of the principal economic centres on the line route, the industry clusters most likely to benefit from the introduction of a High Speed Railway and contribute the most to Agglomeration effects.

The opportunities identified through this process included:

- Physical Development – Integrated and Planned Land Use.
- Socio- Economic Development – Regeneration of key centres as well as improved mobility / development of talent.
- Business Opportunities – dramatic acceleration of the growth of emerging industry clusters (many in advanced and emerging technologies) through links to new customers and markets.
- Monetisation Opportunities – Land value increases generally as well as specific development opportunities at transportation hubs.

Overall, we determined that this approach could support a doubling of GDP compared to the current forecast for the same corridor over the next half century. Whilst the project was undertaken in a country with different socio—economic characteristics than the Northern Powerhouse region as well as being in a very different phase of economic and industrial maturity, the approach adopted in terms of planned interventions to maximise the Agglomeration benefits from major transport infrastructure has many similarities worth evaluating.

The influence of Crossrail 2 on regional networks should not be discounted either as 6-8 train paths per hour will be freed up into Liverpool Street and Victoria stations. Along the New Southgate branch a connection to Network Rail at Seven Sisters should be made.

In terms of cost reduction opportunities, in assessing whether the current route is in fact the right one, Arcadis believe you could omit King Road station (£600m saving) and with the Piccadilly Line upgrades being undertaken this calls into question the rationale for the New Southgate branch.

Question 4 – What are the options for the funding, financing and delivery of large-scale transport infrastructure improvements in London, including Crossrail 2?

The London Finance Commission has outlined its approach for funding London's infrastructure, largely based on keeping a greater share of the tax receipts generated by the city. Whilst this is a model that should be considered, Arcadis believe approaches are valid and possibly, in a hybrid form i.e. parts of different models used in tandem.

One of the challenges is to use models that are understood by lenders and investors and the risk profile can be managed. Some options for further consideration should be;

- For large one-off projects, the funding model used for Thames Tideway Tunnel and creating a separate Regulated Asset Base (RAB) has its place.
- London should utilize its asset base to create a balance Sheet approach. This would allow access to borrowing that is currently not available and is how the private sector would operate.
- Creating 'London Bonds' that finance a portfolio of projects and/or areas of regeneration.
- PPP – a model that has a poor reputation in the UK but commonplace in Europe and the United States.
- Community Infrastructure Levies (CIL's).
- Tax Increment Finance (TIF).

What the above illustrates is there are already a number of tried and tested models that should not limit London's ability to invest in its infrastructure. The finance is available. What is required are the conditions to invest i.e. stable policies.

Question 5 – How have major metropolitan areas in other countries responded to similar challenges and priorities? Are there any lessons to be learned and applied to London?

Arcadis has considerable experience of responding to similar challenges in cities in other countries. We have set out below one such case study in New York City that could be applied to London.

New York City will use the Lower Manhattan Resiliency Project (aka The Big U) to strengthen social and economic resiliency in climate-vulnerable communities, and to enhance the City's coastal defences in response to the evolving risks associated with climate change and other 21st century threats.

Lower Manhattan and its residents remain vulnerable to the impacts of climate change and sea level rise. The City's project, "Protect and Connect," will integrate physical and social resiliency into the diverse communities of Lower Manhattan through the implementation of physical projects, programmes, and policies. This will provide integrated flood protection to maintain the social and economic viability of neighbourhoods, and invest in resilient affordable housing by adapting building systems and neighbourhood infrastructure to protect homes from climate stressors. (see link http://www.nycedc.com/sites/default/files/filemanager/Projects/Seaport_City/Southern_Manhattan_Coastal_Protection_Study_-_Evaluating_the_Feasibility_of_a_Multi-Purpose_Levee.pdf)

The funding vehicle was a Multi-Purpose Levee (MPL) which;

- Enhanced flood protection for Southern Manhattan.
- Resiliency programme funding source (i.e., the ability to self-finance and/or generate surplus revenue to fund other resiliency efforts); and
- Economic and community development (i.e., new economic activity, affordable housing, and open space; integration with Southern Manhattan's urban fabric and character).

The private sector developer revenues were projected from two sources;

1. The phased disposition of the rights to create new residential (market rate and affordable), office, retail, and hotel development on the MPL, in accordance with certain space absorption estimates; and
2. Ongoing property tax or equivalent payments in lieu of taxes ("PILOT") from new buildings on the MPL.

Revenues from development rights were estimated by modelling hypothetical vertical development cash flows for each of the uses described above and solving for the amount private developers would be willing to pay per square foot for the right to build each product type. These "residual" values per square foot were multiplied by the projected development programme for each development parcel to determine the revenue generation potential of each parcel in each of the different flood protection options under review. Payments for development rights were assumed to consist of a ground lease, structured as either a lump sum payment or a stream of future cash flows (the latter were calibrated to equal a lump sum payment in net present value terms).

The ground lease was assumed to generate a modest reduction in the value of development rights compared to land sale, which is consistent with observed conditions at other local sites subject to a ground lease such as Battery Park City.

This Feasibility Study's financial analysis relies on a number of assumptions relating to rents, operating expenses, property taxes, tax incentives, tenant improvements and leasing commissions for commercial uses, exit sales for income-generating uses, as well as sale prices for condominiums. These assumptions are based on historic data for Southern Manhattan's neighbourhoods, as well as reasonable projections of future conditions. Residential development on the MPL was assumed to be 20% affordable housing and 80% market rate housing.

In addition to the revenues generated through development rights, this Feasibility Study examined the revenues from property taxes or PILOT. The NYC Department of Finance provides detailed estimates of property taxes per square foot, by use and neighbourhood, in its "FY 2014 Guidelines for Properties Valued Based on the Income Approach, Including Office Buildings, Retail, Garages, Hotels, and Residential Properties." The Financial Feasibility analysis projects annual property tax revenues for each new development parcel on the MPL based on these estimates, which are weighted to reflect the breakout of each use on each such parcel.

Project costs can be financed with a range of different options. Depending on the magnitude of those costs, the availability of funds, and the preferences of decision makers, project costs could be financed:

- Directly through City, state and/or federal government capital budgets (and those of their component entities).
- With revenue bonds tied to on-site development proceeds and PILOT, with or without a public sector guarantee.
- By a private master developer in exchange for the right to develop on newly created parcels; or
- By a hybrid of these options.

Given the magnitude of potential MPL project costs and the range of potential new development on the different MPL typologies, a private master developer is unlikely to independently finance all project costs, even in exchange for the right to all project revenues. At the same time, given the constrained budgets of the City, state and federal governments, public capital grants would likely not be available to cover more than a portion of project costs.

The Feasibility Study assumes that a future MPL project would largely be funded with a combination of General Obligation bonds and revenue bonds. The latter requires public credit enhancement and/or debt service support, at least in the earliest phases of the project (i.e., before a critical mass of revenue-generating uses is completed). Therefore, to compare future costs and revenues, the financial feasibility analysis applies a discount rate associated with publicly supported infrastructure projects.

Project Financing Structures

The magnitude of project costs, as well as the potentially long gap between the beginning of MPL construction and the first deliveries of revenue-generating uses, suggests that a future MPL project may require some upfront public support to cover infrastructure costs. Depending on the option selected and a range of future decisions by policy makers, this public support requirement may vary. For example, a project with a higher affordable housing requirement or lower density would generate lower

revenues and could require a greater financial role for the public sector. This public sector role could include:

- Credit enhancement for initial bond issues, likely a requirement given the perception of risk during the early years of a new project.
- Debt service support prior to the completion of revenue-generating uses in order to minimize capitalized interest costs; and
- Capital grants from federal, state or City agencies to cover certain upfront costs as available.
- Project revenues, consisting largely of land sale or ground-lease payments and PILOT or property tax payments, would become substantial as the project is built out. Over time, these revenues could cover all required interest payments and pay down outstanding principal on infrastructure bonds. The time required to retire infrastructure bonds would depend on the degree of upfront public capital support and the degree to which capitalised interest can be avoided prior to the completion of revenue-generating uses.

The lesson for London is simply that there are proven funding models for the public and private sectors to work together, all it takes is political will.

Arcadis LLP

Arcadis House
34 York Way
London, N1 9AB
United Kingdom

T: +44 (0)20 7812 2000

arcadis.com